DNP Project Final Report:

Assessment of Barriers and Facilitators to Buprenorphine Prescribing Among Nurse Practitioners in Rural Oregon

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Abstract

Rural communities are disproportionately impacted by the nation's current opioid epidemic. While access to buprenorphine, the gold standard of pharmaceutical treatment for opioid use disorder (OUD), has increased in rural areas, these communities continue to experience a shortage of providers who are authorized to prescribe this medication (Andrilla & Patterson, 2021; Mattick et al., 2014; Thomas et al., 2014). This study sought to understand the experiences of APRNs treating patients with OUD in rural Oregon, the real and perceived barriers to buprenorphine prescribing, and the facilitation strategies that could motivate providers to add or maintain this service. To achieve these aims, researchers and clinicians from the Oregon Health and Science University (OHSU) Family Medicine Department's MAT Evaluation team helped to develop a survey. An anonymous survey was emailed to 750 advanced practice nurse practitioners (APRN) who were identified as residing in rural Oregon, based on data provided by the Oregon State Board of Nursing (OSBN). The survey yielded a response rate of 19.5%. Descriptive statistics were displayed using a data table, and a Mann-Whitney U was run to determine if there were differences in responses between participants with and without an X-waiver to prescribe buprenorphine.

This project identified several overarching themes. First, it is evident that just over half of participants with an X-waiver are actively seeing patients, though those that are do so well under their waiver capacity. Additionally, most respondents did not feel they received adequate education on the treatment of OUD during their graduate nursing education. Overall, barriers to prescribing reported in this study were related to practice infrastructure and resource availability. The most frequently reported barrier to buprenorphine prescribing was access to behavioral health and psychosocial support. Similarly, most participants reported that greater access to

behavioral health and other psychosocial support services would make it easier to integrate buprenorphine into practice. Limitations of this study were discussed, as well as implications for practice and recommendations for future studies.

Introduction

Problem Description

OUD is an urgent public health problem and was declared a national emergency in 2017 (U.S. Department of Health and Human Services [HHS], 2017). Over the last two decades, the United States has seen a sixfold rise in deaths attributed to opioids, including prescription drugs and illicit opioids (Centers for Disease Control and Prevention, 2020). Rural communities are disproportionately impacted by OUD, experiencing higher rates of overdose deaths and infectious disease outbreaks (Mack et al., 2017; Van Handel et al., 2016). From 1999 to 2015, rural areas experienced a 325 percent increase in drug overdoses, compared to a 198 percent increase in urban areas (Mack et al., 2017). A rise in OUD in rural Oregon is partly explained by poor healthcare access, high rates of unemployment, inadequate social services, and an aging population (Oregon Substance Use Disorder Research Committee, 2017). Despite these threats, rural areas continue to have less access to outpatient treatment for OUD (Cummings et al., 2014). This data indicates an urgent need for the scaling up of rural health delivery as it relates to substance use treatment and harm reduction resources (Mack et al., 2017).

The public health implications of the opioid crisis are vast and complex. While the overprescribing of opioids has significantly contributed to the problem, opioid use is closely tied to mental health, trauma, and social determinants of health (Reinhart et al., 2018). Illicit opioid use is associated with increased mortality, medical complications, and higher rates of comorbidities, including substance use disorders and psychiatric disorders (Connock et al., 2007;

Leslie et al., 2019). Additionally, OUD is associated with drug-related injury, infection with blood-borne viruses, poor birth outcomes, criminal activity, and social problems related to impairments in parenting and employment (Connock et al., 2007). Indirect costs of OUD include those associated with lost productivity and absenteeism. It has also led to substantial increases in healthcare utilization, longer hospital stays, more frequent inpatient and outpatient visits, and a threefold rise in national Medicaid costs since 1999 (Leslie et al., 2019; Reinhart et al., 2018). In Oregon, the rate of hospitalizations related to opioid overdoses has been increasing since 2000, with median hospital stays costing over $13,000 (Oregon Health Authority [OHA], 2018). Oregon has also seen a rise in HIV and hepatitis C infections related to unsafe injection practices (National Institute on Drug Abuse, 2020). Thus, nonmedical opioid use in Oregon presents a significant economic and societal burden. Public health experts advise that efforts be strengthened to mitigate the impact of OUD (Wilson et al., 2020). In response to national trends, HHS (2015) has prioritized the expansion of medication-assisted treatment (MAT) as a means to reduce the prevalence of OUD, opioid overdoses, and deaths.

In more recent years, the scientific community has come to better understand the biological mechanisms behind dependence and the neurologic changes that occur. Thus, OUD is now considered a chronic, treatable medical condition (World Health Organization [WHO], 2009). Currently, there are three pharmacologic maintenance treatment options approved by the U.S. Food and Drug Administration (FDA) to treat OUD: buprenorphine, methadone, and naltrexone (FDA, 2019). These medications are commonly referred to as MAT. Methadone and buprenorphine provide a stable level of opioid effect, thus helping eliminate withdrawal and craving. Unlike methadone, buprenorphine exhibits a ceiling effect which lowers abuse and overdose potential. When combined with naloxone, it discourages abuse because injecting or

snorting the drug precipitates withdrawal (Nosyk et al., 2013). Access to MAT is considered crucial for reducing morbidity, mortality, and harms related to opioid use and improving the quality of life of those living with OUD (WHO, 2009).

The Drug Addiction Treatment Act of 2000 (DATA 2000) allowed physicians to prescribe buprenorphine after applying for a waiver, making it the first OUD treatment available in primary care offices. Qualifying practitioners must also meet certain requirements related to training, counseling, and other ancillary services. The Comprehensive Addiction Recovery Act (CARA) of 2016 expanded prescription authority to nurse practitioners (NP) and physician's assistants (PA), though they require more training hours than their physician colleagues (Substance Abuse and Mental Health Services Administration [SAMHSA], 2020). Then, on April 28, 2021, new HHS guidelines exempted eligible practitioners who possess a DEA waiver (which include physicians, NPs, and PAs) from the training-related requirements, in addition to requirements related to their capacity to provide counseling and ancillary services, allowing these practitioners to treat up to 30 patients at any one time after applying to do so (HHS, 2021).

Since the passage of CARA 2016, NPs have contributed to significant increases in buprenorphine prescribing in Oregon. In 2018, nearly one in five DEA-waivered providers in rural Oregon were NPs. Further, NPs accounted for over a third of buprenorphine prescriptions in frontier counties (Klein et al., 2021). Still, HHS has identified the Pacific Northwest as a high-need area, as defined by having high prevalence of drug overdose mortality, nonmedical use of opioid pain relievers, and opioid prescribing. Of the 23 Oregon counties with high need, 20 are rural. Further, seven of these rural counties have low-to-no treatment capacity. Meanwhile, 13 of Oregon's rural counties have average-to-high treatment capacity; however, this does not reflect true access, as several of these counties encompass large physical areas (HHS, 2020). In

response to the opioid crisis in Oregon, OHA created the Oregon Opioid Initiative in 2015, which established a goal of making MAT more accessible across the state. Additionally, Oregon receives funding through the SAMHSA State Targeted Response to the Opioid Crisis grant to support this goal and expand buprenorphine training, particularly in rural communities (Hedberg et al., 2019). For privacy purposes, the Oregon Office of Rural Health's workforce tracking system does not identify individual practitioners; as such they are not able to identify individual DEA license numbers and quantify the number of registered waivers (E. Ong, personal communication, October 19, 2020). Currently, there are approximately 841 waivered providers in Oregon. Of these, only 20 percent (173) practice in rural counties (HHS, 2018). This demonstrates that, despite significant need, Oregon's rural communities have considerably less access to buprenorphine.

Literature Review

A literature search on OUD, buprenorphine, and barriers and facilitators to its use in rural practice was conducted in April 2020 using three electronic databases: PubMed, Cumulative Index of Nursing and Allied Health Literature (CINAHL), and Cochrane Database of Systematic Reviews. Search terms included: *opioid related disorders, opiate substitution treatment, buprenorphine, Naloxone drug combination, Suboxone, buprenorphine, rural, and medically underserved*. Search results were limited to articles published in English language from January 1, 2010 to April 15, 2020. Additionally, a manual review of bibliographies was conducted to identify relevant primary articles.

A second literature search was conducted in April 2021 using two electronic databases: PubMed and CINAHL. Search terms included: *opioid use disorder, buprenorphine, opiate substitution treatment, rural, and medically underserved*. Search results were limited to articles

published in English language from January 1, 2010 to April 20, 2021. A manual review of bibliographies was conducted to identify relevant primary articles.

Buprenorphine Efficacy

Three systematic reviews demonstrate the effectiveness of buprenorphine over placebo. In 31 trials, buprenorphine was shown to improve treatment retention at any dose above 2 mg and reduce illicit opioid use at any dose above 16 mg (Mattick et al., 2014). In a review of 16 trials, higher dose ranges (16-32 mg) demonstrated the best treatment retention rates (Thomas et al., 2014). Compared to methadone, numerous randomized controlled trials (RCTs) have demonstrated that buprenorphine is associated with less risk of adverse events (Connock et al., 2007; Thomas et al., 2014). Additionally, buprenorphine offers the added benefit of more flexible dosing (Mattick et al., 2014; Thomas et al., 2014). Unlike methadone, which is more strictly regulated and offered only at federally sanctioned drug treatment centers, buprenorphine is more widely available in primary care settings (Nosyk et al., 2013). Further, buprenorphine treatment is associated with fewer overdose and relapse-related events compared to non-pharmacologic treatment, such as hospitalizations and emergency department visits (Clark et al., 2011; Lo-Ciganic et al., 2016; Wakeman et al., 2020). Buprenorphine maintenance therapy has also been shown to reduce mortality rates (Clark et al., 2011; Sordo et al., 2017). Importantly, it also reduces illegal opioid purchasing and needle use, resulting in decreased HIV and hepatitis C infections (Krebs et al., 2017; Mattick et al., 2014).

Availability of Buprenorphine in Rural Communities

While access to MAT has improved among rural areas, these communities continue to experience a shortage of waivered providers (Andrilla & Patterson, 2021; Rosenblatt et al., 2015). In July 2020, 63.1% of all rural counties in the U.S. had at least one provider with a DEA

waiver, versus 84.7% of urban counties. However, only 49% of small and remote rural counties had at least one provider with a waiver (Andrilla & Patterson, 2021). Still, this is a significant improvement since 2016, when only 39.9% of all rural counties and only 23.8% of small and remote rural counties had a provider with a DEA waiver (Andrilla et al., 2019). Among rural providers who are waivered, many do not treat to the extent of their waiver capacity (Andrilla et al., 2018; Huhn & Dunn, 2017).

Emerging data demonstrates that NPs and PAs are increasing access to buprenorphine since the passage of the CARA legislation in 2016. For instance, compared to physicians, a higher proportion of waivered NPs and PAs actively treat patients, in addition to treating more patients on average. Rural NPs and PAs also accept new patients at rates significantly higher than rural physicians (Andrilla et al., 2020). Further, from December 2017 to July 2020, the number of DEA-waivered NPs and PAs increased by 354% and 363%, respectively. On the other hand, the number of DEA-waivered physicians grew by 247% (Andrilla & Patterson, 2021). Additionally, between 2016 and 2019, NPs and PAs represented the largest majority of newly waivered providers in rural communities across the country. Since 2017, the number of rural counties where NPs and PAs are the only provider offering buprenorphine treatment increased from 43 to 121; 42.1% of these are small and remote rural counties (Andrilla et la., 2019). Counties in states with full NP scope of practice have seen faster growth in NP-delivered buprenorphine maintenance therapy (Barnett et al., 2019). States with more restrictive practice regulations are associated with far less NPs who are waivered, thus limiting the healthcare system's capacity to meet the needs of patients with OUD (Spetz et al., 2019). In Oregon, as of 2018, NPs accounted for one in five buprenorphine prescriptions dispensed in rural counties and over a third of prescriptions dispensed in frontier counties (Klein et al., 2020).

Barriers to Buprenorphine Prescribing

Numerous barriers to prescribing buprenorphine have been reported among rural providers. At a federal level, cumbersome regulatory requirements appear to be a barrier to prescribing, including concerns about intrusions by the Drug Enforcement Administration (DEA) (Andrilla et al., 2020; DeFlavio et al., 2015). Interestingly, concerns for DEA intrusions are more commonly reported by providers who have never prescribed buprenorphine (Andrilla et al., 2020). Rural clinics also report reimbursement concerns and insurance issues, such as prior authorization requirements and limits on prescription duration (Andrilla et al., 2020; Huhn & Dunn, 2017; Netherland et al., 2009). Limited availability of mental health and specialty services for more complex patients is also more commonly reported among rural providers (Andrilla et al., 2020). Specifically, rural providers have identified the need for easier access to psychiatric care, pain management, and addiction specialists (DeFlavio et al., 2015). Additionally, some states' Medicaid policies require that patients be enrolled in counseling for reimbursement, which is problematic in healthcare shortage areas (Hutchinson et al., 2014). Negative views towards buprenorphine efficacy are also reported (DeFlavio et al., 2015).

According to a large 2018 survey, a higher percentage of rural providers than urban providers report lack of confidence as a barrier to prescribing buprenorphine (Andrilla et al., 2020). Rural providers have expressed feeling unprepared to meet the unique needs of patients experiencing addiction, meanwhile feeling that their staff had insufficient knowledge of OUD (DeFlavio et al., 2015). Patients with OUD are considered a challenging population to treat; this is further complicated by the fact that patients with OUD have a higher prevalence of comorbid substance use disorders, depression, and suicidal ideation (DeFlavio et al., 2015; Han et al., 2017). Additionally, providers have reported mistrust of patients experiencing addiction

(DeFlavio et al., 2015). In a 2016 survey, rural providers expressed concern that offering buprenorphine would attract new patients with OUD to their practice (Andrilla et al., 2017). However, in a follow-up survey, a large majority of respondents reported that offering MAT did not attract new patients to their practice, but rather helped identify already established patients with OUD who needed treatment (Andrilla et al., 2019).

Lack of institutional support is another commonly reported barrier (Hutchinson et al., 2014). Rural providers are impeded by clinic policies, resistance from clinic leadership, insufficient staffing, and long scheduling wait lists (Andrilla et al., 2017; Andrilla et al., 2020; DeFlavio et al., 2015; Hutchinson et al., 2014). Compared to urban providers, rural providers are also more likely to report resistance from practice partners or lack of physician support, which is especially challenging for NPs seeking to prescribe in states without full practice authority. Resistance is partially borne out of concerns about diversion and medication misuse, which is the one of the most commonly reported barriers (Andrilla et al., 2020; Huhn & Dunn, 2017). Weighing these concerns is particularly challenging in rural settings, where there is significant need but limited services. Rural providers must balance the need for decreased treatment oversight to maximize access and alleviate burden on patients and providers alike, while also providing enough supervision to reduce the risk of medication nonadherence, diversion, and misuse (Sigmon, 2014).

Facilitators and Strategies to Expand Buprenorphine Prescribing

The literature alludes to several strategies to help reduce barriers to buprenorphine prescribing, although there is limited data that specifically addresses the needs of rural practitioners. Similarly, there are limited studies that evaluate the effectiveness of any one intervention to improve the integration of buprenorphine into practice. For rural providers who

are newly waivered and wishing to integrate buprenorphine therapy into their practice, the availability of mentorship has been identified as an important resource (Andrilla et al., 2019; Huhn & Dunn, 2017). Establishing 'champion' staff members has been shown to evolve organizational culture and facilitate acceptance, while organizational investment in professional development opportunities has been associated with increased willingness to adopt and prescribe buprenorphine (Gordon et al., 2011; Thomas et al., 2008). Having the presence of behavioral health support on-site has also shown to increase prescribing rates (Peterson et al., 2020a). In their research, Cole et al. (2021) emphasize the importance of a team-based approach to MAT, and assert that all clinic staff be educated about OUD and buprenorphine therapy. Other potential strategies include adoption of a hub and spoke model of care, financial incentives and loan forgiveness programs, alternative outcomes-based reimbursement, and the elimination of federal waiver requirements (Andrilla et al., 2019; Haffajee et al., 2018). Emergency department-initiated buprenorphine, along with close community follow up, also can help increase access. One randomized controlled study demonstrated that, compared with brief intervention and referral, ED-initiated buprenorphine led to greater treatment engagement, less illicit opioid use, and decreased use of inpatient services (D'Onofrio et al., 2015).

Additionally, prescribing buprenorphine via telemedicine has emerged as a promising alternative to face-to-face visits (Brunet et al., 2020; Eibl et al., 2017; Weintraub et al., 2021). Because of the COVID-19 pandemic, prescribers can for the first time deliver buprenorphine maintenance treatment virtually (U.S. DEA, 2020). This is a temporary exception to the 2008 Ryan Haight Act, which requires an in-person evaluation to prescribe controlled substances (Wang et al., 2021). Though there have been limited controlled comparison studies, non-randomized studies suggest that telemedicine is as effective as in-person delivered MAT in

retaining patients, in addition to improving access in rural and remote areas (Eibl et al., 2017; Weintraub et al., 2021). Patient satisfaction surveys also demonstrate that it is largely accepted by patients (Cole et al., 2021b). While historically the use of telemedicine-based MAT has been limited due to federal and state regulations, as well as patient challenges such as less access to broadband and technology, its rapid expansion during the COVID-19 pandemic has demonstrated that it is a viable, low-barrier care delivery option (Wang et al., 2021). To support rural clinics seeking to offer telehealth services, it has been suggested that they collaborate with an established telemedicine provider that already has the infrastructure to deliver telemedicine-based MAT (Hser et al., 2021). For instance, the VA has utilized a hub and spoke model to tele-prescribe buprenorphine to its rural sites. In this model of care, mental health providers operate out of hub sites that typically had greater resources than their rural spoke counterpoints. Hub prescribers were responsible for evaluating patients and prescribing buprenorphine, while staff at the spoke sites were responsible for scheduling, toxicology testing, measuring vital signs, and so forth (Brunet et al., 2020). Similarly, Weintraub et al. (2021) describe a successful collaboration between an urban medical center and a rural drug treatment center, wherein prescribers provided buprenorphine treatment to rurally located patients via videoconferencing. In this study, end outcomes such as retention rates and toxicology results were comparable to in-person treatment.

Buprenorphine prescribers have reported the need for follow-up education after additional DEA waiver training, ongoing technical assistance, and site visits (Hutchinson et al., 2014). Cole et al. (2021a) found that offering ongoing support allowed providers to practice skills and discuss common prescribing challenges. Haffajee et al. (2018) propose that training should be incorporated into general medical education to increase student practitioners' knowledge of and confidence providing MAT. There is promising evidence that addiction

medicine training is becoming more commonplace in medical education, as the literature demonstrates that early-career providers are more likely obtain an X-waiver and prescribe buprenorphine than mid-to-late career providers (Peterson et al., 2020b). It's also been suggested that MAT training be incorporated into continuing medical education requirements (Haffajee et al., 2018).

Additional training could also help to increase peer-to-peer support and reduce some of the stigma surrounding buprenorphine prescribing. For instance, Project ECHO, a multidisciplinary teleconference learning platform conducted entirely online, has led to dramatic increases in the number of waivered providers and availability of buprenorphine in New Mexico, indicating this is a promising resource for other rural states (Karomy et al., 2016). ECHO curricula, which includes didactic content on prescribing and clinic functioning, has been shown to be an acceptable and feasible approach to expanding buprenorphine treatment (Salvador et al., 2020). One study out of the University of North Carolina utilized Project ECHO-based teleconferencing sessions to provide education and support to rural providers delivering MAT. Participants reported that the ECHO sessions helped to increase their knowledge and confidence prescribing buprenorphine and found value in the collegial support and coaching services the program provided. However, the ECHO sessions did not address some common barriers to buprenorphine delivery, such as the limited availability of psychosocial services, insurance reimbursement, and stigma surrounding MAT (Shea et al., 2021). Similarly, PCSS-B provides online, telephone, and in-person ongoing education and mentorship to currently waivered providers. Given a lack of control data, it cannot be concluded that this program has expanded buprenorphine treatment or improved care quality; however, there is evidence that PCSS-B has increased initial and ongoing professional support for rural practitioners (Egan et al., 2010).

DNP Project

Rationale

There is abundant evidence that demonstrates the effectiveness of buprenorphine for the treatment of OUD (Mattick et al., 2014; Thomas et al., 2014). However, rural communities, including those across Oregon, continue to experience a shortage of waivered providers (Andrilla et al., 2019; HHS, 2020; Rosenblatt et al., 2015). Numerous barriers to prescribing buprenorphine have been reported among rural providers. These barriers prevent those without waivers from seeking them, meanwhile preventing waivered providers from prescribing to the full extent of their waiver capacity.

The Theory of Planned Behavior suggests that individuals engage in particular behaviors based on attitudes towards the behavior, subjective norms, and perceived behavioral control (Ajzen, 1991). This theory has been used to explain factors which impact the intent to use clinical guidelines in decision-making on patient care (Kortteisto et al., 2010). Using the Theory of Planned Behavior as a framework, one could hypothesize that positively influencing attitudes about buprenorphine's efficacy and feasibility in rural settings would contribute to increased interest in obtaining a waiver and promote the widespread incorporation of buprenorphine into practice. Additionally, identifying common barriers and strategies employed by others who have successfully integrated buprenorphine into their practice could enhance provider self-efficacy and confidence in delivering MAT.

Specific Aims

The overarching purpose of this project was to gather data that could be used to increase access to buprenorphine for the treatment of OUD in rural Oregon. In order to develop informed, relevant future interventions aimed at increasing access, it is necessary to understand the current

challenges experienced by rural APRNs, as well as areas of opportunity. As such, three aims were identified. The first aim was to explore attitudes towards buprenorphine and OUD. The second aim was to assess the common barriers to MAT, both real and perceived, that either prevent APRNs from pursuing their X-waiver or from actively using it. The third aim was to identify potential strategies that could be employed by rural APRNs in order to overcome commonly cited barriers.

Methods

Setting

This project was not site-specific. Rather, it targeted all APRNs practicing in rural Oregon. Both APRNs with a DEA waiver and APRNs without a waiver were invited to participate. Practice location was determined by data provided from OSBN. Rurality, as defined by the Oregon Office of Rural Health, was determined by home address zip code. This included both rural and frontier counties (Oregon Office of Rural Health, 2019).

Intervention

After gaining consent from OSBN, an anonymous cross-sectional survey was emailed via Qualtrics to all APRNs identified as living in a rural county. Prior to being sent out, this survey was reviewed by the OHSU Family Medicine Department's MAT Evaluation Team to ensure clarity and content validity. Members of this team, which include research faculty and clinicians, have done extensive research on buprenorphine for the treatment of OUD. The first part of the survey collected demographic and practice data, as well as DEA waiver status. If participants did not have a waiver, they were asked about their interest in obtaining one. If participants did have a waiver, they were asked about their prescribing practices (waiver limits and number of patients currently in treatment) and interest in becoming a mentor for new prescribers. Additionally, all

participants were asked to indicate whether they agreed or disagreed with several statements about OUD and buprenorphine. The second part of the survey asked participants questions related to confidence in treating OUD, attitudes towards buprenorphine, barriers to prescribing, and additional resources and supports that respondents would feel would be helpful and/or motivate them to become waivered.

Measures

The survey collected information about respondent demographics and practice characteristics. Additionally, the survey asked providers about their waiver status, interest in completing waiver training if applicable, and current prescribing practices if waivered. Lastly, respondents were asked to rate a list of barriers and facilitators using a Likert scale. Questions pertaining to barriers addressed those identified in the literature, including concerns about medication diversion, practice and/or peer support, the availability of specialty or mental health support, confidence, knowledge, and time/staffing issues. The survey was anonymous in nature to mitigate response bias.

Analysis

Descriptive analysis was used to describe demographic and practice data, as well as waiver rates among respondents. For questions pertaining to attitudes towards OUD and buprenorphine, and confidence treating OUD, a Mann-Whitney U test was run to determine if there were differences in responses between non-waivered providers and waivered providers. Similarly, for questions pertaining to barriers and facilitators to buprenorphine prescribing, a Mann-Whitney U test was run to determine if there were differences in responses. These responses were ranked based on overall frequency to determine the top barriers and facilitators.

Ethical Considerations

This project was waived by the Institutional Review Board. The most important ethical considerations were the provision of informed consent and respondent confidentiality. Informed consent was obtained and documented prior to the administration of surveys and interviews. Survey responses were anonymous. Additionally, zip codes were not identified in order to ensure the identities of the respondents were not revealed. OSBN data was stored on OHSU's secure cloud storage system, Box.

Results

After submitting a mailing list request form to OSBN, email addresses of all licensed APRNs in Oregon (as of August 2020) were obtained from the OSBN mailing list. APRNs were categorized as rural using the corresponding zip codes provided by OSBN. A survey invitation email was sent to 750 individuals who were classified as APRNs in rural Oregon. Of these, 14 emails were no longer active. After two weeks had elapsed, a second reminder email was sent out to the remaining emails. The survey was left open for another three weeks without additional reminders. There was a response rate of 19.2% (n = 142). Of these, 22 participants were excluded because they did not practice in a rural location. Data from the remaining 120 respondents are included in the analysis. Only 115 participants completed all of the questions.

Demographics and Practice Setting

Table 1 represents the demographic and practice characteristics of the participants. Most participants (67%) practice in family medicine. Additionally, participants most frequently reported (28.8%) working in private practice, followed by hospital or hospital-owned (26.3%) and Rural Health Clinic designated clinics (23.7%). Most participants (72.9%) work in clinics with 2 to 10 providers. Participants were also asked if behavioral health was integrated at their practice site (Table 1). Participants were advised that this could include social workers, licensed

professional counselors, psychiatrists, psychologists, and psychiatric mental health nurse practitioners. Just over half (55.6%) of participants work in clinics with some type of behavioral health provider on site.

Table 1. Characteristics of respondents.

	No. (% of total N)
Practicing in rural Oregon	N = 142
Yes	120 (84.5)
No	22 (15.5)
Years into practice	N = 117
<1 year	11 (9.4)
1 to 5 years	41 (35.0)
6 to 10 years	21 (18.0)
> 10 years	44 (37.6)
Practice specialty	N = 118
Family medicine	79 (67.0)
Internal medicine	6 (4.3)
Addiction medicine	5 (5.1)
Psychiatry/mental health	12 (10.2)
Women's health	12 (10.2)
Pediatrics	3 (2.5)
Acute care/emergency	9 (7.6)
Specialty	5 (5.1)
Geriatrics	2 (1.7)
Palliative care/hospice	4 (3.4)
Corrections	1 (0.8)
Other	3 (2.5)
Practice site	N = 118
Private practice	34 (28.8)
Federally Qualified Health Center	21 (17.8)
Community Health Clinic	4 (3.4)
Rural Health Clinic	28 (23.7)
Indian Health Services	3 (2.5)
Academic	0 (0.0)
Hospital or hospital-owned	31 (26.3)
Veteran's Affairs	5 (4.2)
Corrections	5 (4.2)
Other	5 (4.2)

Practice size	N = 118
1 (solo) provider	16 (13.6)
2 to 10 providers	86 (72.9)
11 to 20 providers	11 (9.3)
>20 providers	5 (4.2)
Behavioral health in clinic	N = 118
Yes	65 (55.6)
No	53 (44.9)
X-waivered	N = 119
Yes	35 (29.4)
No	84 (70.6)

Note: Percentages within categories may not total 100 because of rounding.

[a]Questions regarding practice specialty and practice site are select all that apply; therefore, percentages are out of N and do not total 100.

DEA Waiver Status

Regarding DEA X-waiver status, 70.6% of participants did not have a DEA X-waiver to prescribe buprenorphine (Table 1). Among those who did have an X-waiver, 55.9% have were eligible to treat 30 patients at any one time and 38.2% were eligible to treat 100 patients at any one time (Table 2). 57.6% of participants with an X-waiver were actively treating patients with buprenorphine, yet 69.7% were accepting new patients with OUD for treatment of buprenorphine. Participants with a 30-patient waiver treated an average of 6 patients, while 47.4% of them were not treating any patients. Participants with a 100-patient waiver treated an average of 46 patients at any one time, while only one person indicated they were not treating any patients. Regarding mentorship, 33.3% were interested in mentoring others who are new to prescribing buprenorphine, 33.3% were not interested in mentoring others, were 33.3% are unsure.

Among those without an X-waiver, 51.8% indicated they did not intend on getting an X-waiver (Table 3). On the other hand, 24.1% indicated they were interested in obtaining an X-

waiver and 2.4% indicated they were in the process of obtaining an X-waiver. 21.7% of non-waivered individuals had not thought about getting an X-waiver.

Table 2. Respondents with X waiver.

	No. (% out of N)
Waiver capacity	N = 34
30 patients	19 (55.9)
100 patients	13 (38.2)
275 patients	0 (0.0)
Unknown	2 (5.9)
Patients in treatment	N = 33
Yes	19 (57.6)
No	14 (42.4)
Accepting new patients	N = 33
Yes	23 (69.7)
No	10 (30.3)
Interest in mentoring	N = 33
Yes	11 (33.3)
No	11 (33.3)
Maybe	11 (33.3)

Note: Percentages within categories may not total 100 because of rounding.

Table 3. If unwaivered, interest in getting an X-waiver.

	No. (%)
Interest in getting an X-Waiver	N = 84
Interested in getting one	20 (24.1)
Do not intend to get one	43 (51.8)
Have not thought about getting one	18 (21.7)
In the process of getting one	2 (2.4)

Note: Percentages within categories may not total 100 because of rounding.

Attitudes Towards and Experience Treating OUD

Participants were asked several questions about their attitudes towards patients with OUD and buprenorphine, as well as their experience with treating OUD. The results are presented in Table 4. Overall, 63.1% of participants without an X-waiver and 91.2% of participants with an X-waiver have patients with OUD on their panel. A mixed number of respondents reported that

they had a colleague who treated patients with OUD, either with or without buprenorphine. Among participants without an X-waiver, 45.1% have colleagues that prescribe buprenorphine, and 14.6% have colleagues that treat OUD with some other non-buprenorphine intervention. Among participants with an X-waiver, 78.8% have colleagues that prescribe buprenorphine, while 18.2% have colleagues that treat OUD with some other non-buprenorphine intervention. Those with an X-waiver were more likely to have a colleague that also treated patients with an X-waiver ($p = .012$).

Most respondents, regardless of waiver status, felt that patients with OUD are challenging to treat, as co-occurring substance use disorders and/or psychiatric disorders may be present. Statistically, however, non-waivered participants were more likely to feel that patients with OUD are a challenging population to treat compared to waivered participants ($p = .045$). Attitudes towards graduate education were mixed. Among non-waivered providers, only 16.8% felt that they received adequate training on the treatment of OUD during their graduate nursing education. Among waivered providers, only 18.2% felt that they had received adequate training in graduate school.

Statistically, waivered providers were significantly more likely to feel a responsibility to treat OUD compared to non-waivered providers ($p = <.001$). Respondents were also asked if they felt OUD is treatable. Waivered providers were significantly more likely to believe that OUD is treatable compared to non-waivered providers ($p = <.001$). Further, waivered providers were significantly more likely to believe buprenorphine was an effective treatment for OUD compared to non-waivered providers ($p = <.001$).

Waivered providers were also more likely to report feeling confident treating OUD compared to non-waivered providers ($p = <.001$). The same method was used to compare

differences in confidence treating OUD between respondents who have behavioral health integrated at their practice site versus those without (Table 5). Statistically, confidence levels for participants with on-site behavioral health support and participants without on-site behavioral health support were not significantly different (p = .147).

Table 4. Experience with treating OUD and attitudes towards OUD.

	Total sample	Non-waivered	Waivered	*P* value
	No. (% of N)	No. (% of N)	No. (% of N)	
Have patients with OUD on their panel	N = 118	N = 84	N = 34	.745
Yes	84 (71.2)	53 (63.1)	31 (91.2)	
No	23 (19.5)	20 (23.8)	3 (8.8)	
Unknown	11 (9.3)	11 (13.1)	0 (0.0)	
Have patients that may have OUD without official diagnosis	N = 118	N = 84	N = 34	.698
Yes	86 (72.9)	59 (70.2)	27 (79.4)	
No	16 (13.6)	12 (14.3)	4 (11.8)	
Unknown	16 (13.6)	13 (15.5)	3 (8.8)	
Colleagues treat patients with OUD with an X-waiver	N = 115	N = 82	N = 33	.012*
Yes	63 (54.8)	37 (45.1)	26 (78.8)	
No	43 (37.4)	38 (46.3)	5 (15.2)	
Unknown	9 (7.8)	7 (8.6)	2 (6.1)	
Colleagues treat patients with OUD without an X-waiver	N = 115	N = 82	N = 33	.119
Yes	18 (15.7)	12 (14.6)	6 (18.2)	
No	66 (57.4)	44 (53.7)	22 (66.7)	
Unknown	31 (27.0)	26 (31.7)	5 (15.2)	
Believe patients with OUD are challenging to treat	N = 117	N = 83	N = 34	.045*
Strongly agree	81 (69.2)	62 (74.7)	19 (55.9)	
Agree	25 (21.4)	15 (18.1)	10 (29.4)	
Somewhat agree	8 (6.8)	4 (4.8)	4 (11.8)	
Neither agree nor disagree	1 (0.9)	1 (1.2)	0 (0.0)	
Somewhat disagree	0 (0.0)	0 (0.0)	0 (0.0)	
Disagree	2 (1.7)	1 (1.2)	1 (2.9)	
Strongly disagree	0 (0.0)	0 (0.0)	0 (0.0)	
Had adequate training on OUD treatment in school	N = 117	N = 83	N = 34	.471
Strongly agree	3 (2.6)	1 (1.2)	2 (5.9)	
Agree	9 (7.7)	8 (9.6)	1 (2.9)	
Somewhat agree	9 (7.7)	5 (6.0)	4 (11.8)	

Neither agree nor disagree	18 (15.4)	13 (15.7)	5 (14.7)	
Somewhat disagree	25 (21.4)	17 (20.5)	8 (23.5)	
Disagree	33 (28.2)	23 (27.8)	10 (29.4)	
Strongly disagree	20 (17.1)	16 (19.3)	4 (11.8)	
Feel responsibility to treat patients with OUD	N = 117	N = 83	N = 34	<.001*
Strongly agree	51 (43.6)	27 (32.5)	24 (70.6)	
Agree	41 (35.0)	31 (37.3)	10 (29.4)	
Somewhat agree	10 (8.6)	10 (12.0)	0 (0.0)	
Neither agree nor disagree	9 (7.7)	9 (10.8)	0 (0.0)	
Somewhat disagree	2 (1.7)	2 (2.4)	0 (0.0)	
Disagree	4 (3.4)	4 (5.0)	0 (0.0)	
Strongly disagree	0 (0.0)	0 (0.0)	0 (0.0)	
Believe OUD is treatable	N = 117	N = 83	N = 34	<.001*
Strongly agree	59 (50.4)	33 (39.8)	26 (76.5)	
Agree	50 (42.7)	42 (50.6)	8 (23.5)	
Somewhat agree	7 (6.0)	7 (8.4)	0 (0.0)	
Neither agree nor disagree	1 (0.9)	1 (1.2)	0 (0.0)	
Somewhat disagree	0 (0.0)	0 (0.0)	0 (0.0)	
Disagree	0 (0.0)	0 (0.0)	0 (0.0)	
Strongly disagree	0 (0.0)	0 (0.0)	0 (0.0)	
Believe buprenorphine is an effective treatment	N = 115	N = 82	N = 33	<.001*
Strongly agree	37 (32.2)	16 (19.5)	21 (63.6)	
Agree	35 (30.4)	28 (34.2)	7 (21.2)	
Somewhat agree	22 (19.1)	17 (20.7)	5 (15.2)	
Neither agree nor disagree	16 (13.9)	16 (19.5)	0 (0.0)	
Somewhat disagree	5 (4.4)	5 (6.1)	0 (0.0)	
Disagree	0 (0.0)	0 (0.0)	0 (0.0)	
Strongly disagree	0 (0.0)	0 (0.0)	0 (0.0)	
Feel confident treating OUD	N = 117	N = 83	N = 34	<.001*
Strongly agree	13 (11.1)	3 (3.6)	10 (29.4)	
Agree	24 (20.5)	11 (13.3)	13 (38.2)	
Somewhat agree	39 (33.3)	31 (37.3)	8 (23.5)	
Neither agree nor disagree	13 (11.1)	13 (15.7)	0 (0.0)	
Somewhat disagree	18 (15.4)	15 (18.1)	3 (8.9)	
Disagree	7 (6.0)	7 (8.4)	0 (0.0)	
Strongly disagree	3 (2.6)	3 (3.6)	0 (0.0)	

Note: Percentages within categories may not total 100 because of rounding.

Table 6. Behavioral health in clinic and confidence level

	BH on site, No. (%)	BH not on site, No. (%)	*P*-value

Feel confident treating OUD	N = 65	N = 52	.147
Strongly agree	9 (13.8)	4 (7.7)	
Agree	16 (24.6)	8 (15.4)	
Somewhat agree	18 (27.7)	21 (40.4)	
Neither agree nor disagree	8 (12.3)	5 (9.6)	
Somewhat disagree	11 (16.9)	7 (13.5)	
Disagree	3 (4.7)	4 (7.7)	
Strongly disagree	0 (0.0)	3 (5.7)	

Note: Percentages within categories may not total 100 because of rounding.

*$p < .05$

[a]BH: Behavioral health.

Barriers to Buprenorphine Prescribing

Participants were asked about barriers to buprenorphine prescribing. The results are represented in Table 6. It was clarified that respondents may have either experienced these barriers (for those with an X-waiver) or anticipate experiencing these barriers (for those without an X-waiver). The top barriers identified, in order of most frequently reported, were: limited access to community behavioral health and/or other psychosocial support services (69.0%); lack of staff training around addiction, addiction treatment, and buprenorphine (56.0%); logistical issues (i.e., time, space, staffing, schedule capacity) (50.8%); limited access to specialty consultation (45.7%); lack of confidence and/or training around buprenorphine treatment (44.8%); and limited availability of mentors (40.5%). Participants without an X-waiver were more likely to report lack of mentorship ($p = .025$) and lack of confidence ($p = .010$) as barriers to the adoption of buprenorphine into their practice.

Table 6. Perceived and/or experienced barriers to buprenorphine adoption and prescribing.

	Barriers	Total sample (N=116)	Non-waivered (N=85)	Waivered (N=31)	*P*-value
		No. (%)	No. (% out of 85)	No. (% out of 31)	
Clinic characteristics	Logistical issues	59 (50.8)	40 (47.1)	19 (61.3)	0.261
	Need for staff training	65 (56.0)	46 (54.1)	19 (61.3)	0.667

	Resistance from colleagues	23 (19.8)	16 (18.8)	7 (22.6)	0.741
Community resources	BH availability	80 (69.0)	58 (68.2)	22 (71.0)	0.947
	Specialty availability	53 (45.7)	41 (48.2)	12 (38.7)	0.215
	Mentor availability	47 (40.5)	39 (45.9)	8 (25.8)	0.025*
	Long waitlists	33 (28.5)	23 (27.1)	10 (32.3)	0.690
Regulatory/financial	Waiver requirements	21 (18.1)	18 (21.2)	3 (9.8)	0.102
	Insurance concerns	28 (24.1)	21 (24.7)	7 (22.6)	0.816
	Funding	14 (12.1)	12 (14.1)	2 (6.5)	0.294
Provider characteristics	Lack of confidence	52 (44.8)	44 (51.8)	8 (25.8)	0.010*
	Personal beliefs	8 (6.9)	7 (8.2)	1 (3.2)	0.322
Patient characteristics	Medication diversion	46 (39.7)	34 (40.0)	12 (38.7)	0.667
	Patient concerns	30 (25.9)	25 (29.4)	5 (16.1)	0.146
Other	Other	14 (12.1)	9 (10.6)	5 (16.1)	0.474

Note: Percentages within categories may not total 100 because of rounding.

*$p < .05$

[a]Logistical issues: Logistical issues (i.e., time, space, staffing, schedule capacity); Need for staff training: More staff training around addiction, addiction treatment, or buprenorphine; Resistance from colleagues: Resistance from your colleagues and/or clinic leadership; BH availability: Limited access to mental health and/or other psychosocial support services in your community; Specialty availability: Limited access to specialty consultation to support clinical decision making; Mentor availability: Limited availability of mentors to answer your questions and provide support; Long waitlists: Long waitlists for referring patients to higher levels of care; Waiver requirements: X-waiver training requirements are too time consuming; Insurance concerns: Insurance concerns (i.e., reimbursement rates, prior authorizations, etc.); Funding: Lack of funding to complete the training for an X-waiver; Lack of confidence: Lack of confidence and/or training around buprenorphine treatment; Personal beliefs: Your personal beliefs about buprenorphine; Medication diversion: Concerns for medication diversion or misuse; Patient concerns: Concerns that offering treatment would attract patients with OUD to your practice.

Facilitators to Buprenorphine Prescribing

Participants were also asked about what would make it easier to prescribe buprenorphine, both hypothetical (for those without an X-waiver) and experienced (for those with an X-waiver). The results are represented in Table 7. The top facilitators to incorporating buprenorphine into practice, in order of most frequently reported, were: greater access to community behavioral

health services and/or other psychosocial support services (67.9%); more staff training around addiction, addiction treatment, and buprenorphine (43.8%); more staffing at their clinic site (i.e., case managers, referral coordinators, social workers, etc.) (42.9%); greater access to specialty consultation (40.2%); and greater availability of mentorship (33.9%). Participants without an X-waiver were more likely to report the need for more buprenorphine training and on-going technical support (p = .003) and a reduction in the number of training hours required to obtain an X-waiver (p = .038). Additionally, participants without an X-waiver were more likely to report that it would be easier to incorporate buprenorphine into one's practice if prescribing it was less complicated (p = .004).

Table 7. Perceived and/or experienced facilitators to buprenorphine adoption and prescribing.

	Barriers	Total sample (N=112)	Non-waivered (N=82)	Waivered (N=30)	*P-value*
		No. (%)	No. (% out of 82)	No. (% out of 30)	
Clinic characteristics	Longer appointments	28 (25.0)	20 (24.4)	8 (26.7)	0.788
	Telemedicine capacity	10 (8.9)	7 (8.5)	3 (10.0)	0.920
	More staffing	48 (42.9)	36 (43.9)	12 (40.0)	0.471
	Staff training	49 (43.8)	35 (42.7)	14 (46.7)	0.811
	Office space	19 (17.0)	11 (13.4)	8 (26.7)	0.214
Professional support	BH availability	76 (67.9)	54 (65.9)	22 (73.3)	0.899
	Specialty availability	45 (40.2)	35 (42.7)	10 (33.3)	0.148
	Mentorship	38 (33.9)	28 (34.1)	10 (33.3)	0.535
	Colleague support	17 (15.2)	13 (15.9)	4 (13.3)	0.428
	Training and assistance	46 (41.1)	39 (47.6)	7 (23.3)	0.003*
Regulatory	Training hours reduced	23 (20.5)	20 (24.4)	3 (10.0)	0.038*
	Training hours eliminated	8 (7.1)	7 (8.5)	1 (3.3)	0.299
	Less insurance issues	28 (25.0)	18 (22.0)	10 (33.3)	0.415
	Easier prescribing	27 (24.1)	25 (30.5)	2 (6.7)	0.004*
Other	Other	13 (11.6)	12 (14.6)	1 (3.3)	0.059*

Note: Percentages within categories may not total 100 because of rounding.

*p < .05

[a]Longer appointments: If longer appointments could be offered to your patients; Telemedicine capacity: If your clinic setting had greater telemedicine capacity; More staffing: If your clinic setting had more staffing (including case managers, referral coordinators, social workers, and after-hours coverage); Staff training: More staff training around addiction, addiction treatment, and buprenorphine; Office space: If there was more available office space for in-office inductions; BH availability: Greater availability of behavioral health services and/or other psychosocial support services in your community; Specialty availability: Greater access to specialty consultation; Mentorship: Greater availability of mentors to answer questions and provide support; Colleague support: If your colleagues and/or clinic leadership were more supportive; Training and assistance: If more training and on-going technical support were available; Training hours reduced: If X-waiver training hour requirements were reduced (i.e., from 24 hours to 8 hours); Training hours eliminated: If X-waiver training hour requirements were eliminated altogether. Less insurance issues: If insurance issues were not a concern (i.e., reimbursement rates, prior authorization requirements, etc.); Easier prescribing: If prescribing buprenorphine was less complicated.

Qualitative Responses

For questions pertaining to barriers and facilitators to buprenorphine prescribing, participants were welcome to share additional comments. Additionally, at the end of the survey participants were invited to share any additional comments. Many participants, such as those working in urgent care, noted that it would not be appropriate to prescribe buprenorphine in their practice setting. Participants also cited additional barriers such as high appointment no-show rates, lack of clinic policies, and uninsured patients. Additionally, participants cited the need for training that is more applicable and specific to their practice specialty. One participant noted that the training was too confusing: ‘The training I received was too convoluted and confusing…it made my head spin…’ Another noted, ‘The training was complicated. And the process to obtain a waiver after completing the training was as painful as the training. I gave up and skipped the certificate altogether.’

Multiple participants alluded to competing health priorities: 'Rural healthcare is extremely stretched by complex medical issues…Adding one more stress to the pile means less of something else. It's impossible to be current on all needs.' Regarding resistance from clinic leadership, one participant noted, '…I don't even know if it would be allowed…We were encouraged to wean everyone off opioids period.' Lastly, two participants reiterated the need for more robust staffing: '…having a good, organized team of [behavioral healthcare providers] and [registered nurses] has been essential.'

Discussion

Summary

Ultimately, this project's purpose was to gather data that could be used to increase access to buprenorphine for the treatment of OUD in rural Oregon. In order to meet this end goal, this project attempted to understand how APRNs practicing in these settings view OUD and buprenorphine. Furthermore, to increase the number of waivered APRNs in rural Oregon, this project explored the barriers that might prevent them from pursuing an X-waiver, in addition to the facilitators that could encourage them to do obtain an X-waiver. Among those with an X-waiver, this project attempted to understand the barriers that prevent them from meeting their waiver capacity, in addition to the factors that would better support them in doing so.

This project identified several overarching themes. First, while they may not be providing MAT, most APRNs (71.2%) in this study indicated they see patients with OUD. Only 29.4% of respondents had an X-waiver to prescribe buprenorphine; among them, just over half are actively treating patients. Those who are treating patients appear to be treating under their waiver capacity. Additionally, most respondents (78.4%) believed that OUD is challenging to treat and most (66.7%) did not feel they received adequate education on the treatment of OUD during their

graduate nursing education. Those with an X-waiver were more likely to have a colleague that also treats patients with buprenorphine. Further, they were more likely to report feeling a responsibility to treat patients with OUD, believing OUD is treatable, believing buprenorphine is an effective treatment for OUD, and feeling confident treating OUD. Interestingly, the presence of behavioral health support on-site did not appear to impact confidence levels.

Overall, barriers to prescribing reported in this study were related to practice infrastructure and resource availability. Limited access to behavioral health services was the most frequently reported barrier, followed by lack off staff training, logistical issues, lack of confidence, and limited availability of mentorship. Participants without an X-waiver were more likely to report lack of mentorship and lack of confidence as barriers to adopting buprenorphine into their practice. The overall top facilitators identified were also related to practice infrastructure and the availability of resources; the most commonly cited facilitator was better access to behavioral health support, followed by more staff training, more staffing, greater access to specialty support, and greater availability of mentorship. APRNs without an X-waiver were more likely to indicate they would be more likely to utilize buprenorphine if prescribing it was less complicated, while citing the need for additional training and ongoing support and a reduction in the number of training hours required to obtain an X-waiver. It is important to note that, at the time this survey was conducted, HHS guidelines had not yet exempted certain practitioners from completing the training requirements required to obtain an X-waiver to treat up to 30 patients.

Outcomes in Relation to the Literature

The results of this study in many ways parallel the findings of the literature. While certainly not indicative of the true number of waivered providers in rural Oregon, the ratio of

waivered to non-waivered providers reflects national shortages of waivered providers in rural counties (Andrilla et al., 2021; Rosenblatt et al, 2015). Additionally, among participants with an X-waiver, just over half are actively treating patients. Those who are treating patients are treating well under their waiver capacity. This is consistent with previous reports (Andrilla et al, 2018; Huhn & Dunn, 2017). Participants with an X-waiver were also significantly more likely to have a colleague that also prescribes buprenorphine, which has been found in previous reports (Hutchinson et al., 2014).

Similar to the findings of DeFlavio et al (2015) and Gordon et al. (2011), most participants indicated that patients with OUD are challenging to treat. However, while previous studies suggest that perceived efficacy of buprenorphine has remained a significant barrier to expanding access to this treatment, participants in this study demonstrated an overall favorable attitude towards buprenorphine (DeFlavio et al., 2015; Huhn & Dunn, 2017). However, waivered participants were more likely to believe buprenorphine is an effective treatment. This is inconsistent with the findings of Hutchinson et al. (2014), who found no differences between prescribers and non-prescribers.

The limited availability of behavioral healthcare is a significant theme in the literature (Andrilla et al., 2020; Hutchinson et al., 2014; Netherland et al., 2009; Quest et al., 2012). While Netherland et al. (2009) found that more experience prescribing buprenorphine eases a number of concerns about barriers, including specialty access, logistical issues, and staff training, access to behavioral health was a persistent concern despite experience or waiver status. Additionally, the need for more staff training, limited mentorship availability, logistical concerns, and concerns for medication diversion were frequently reported, similar to the findings of many

previous studies (Andrilla et al., 2017; Andrilla et al., 2020; DeFlavio et al., 2015; Huhn & Dunn, 2017; Netherland et al., 2009).

Non-waivered providers were more likely to report lack of confidence as a barrier, as was suggested by Andrilla et al. (2017). Interestingly, in this study the presence of on-site behavioral health support did not impact confidence. However, it remains unknown if the presence of behavioral health affected prescribing behaviors, as has been shown in other studies (Peterson et al., 2020a). Other barriers reported in the literature were less commonly reported in this study, such as reimbursement concerns, resistance from practice partners, concerns about attracting patients with OUD, and personal beliefs about buprenorphine (Andrilla et al., 2017; DeFlavio et al., 2015; Huhn & Dunn, 2017; Netherland et al., 2009; Quest et al., 2012).

Implications for Practice

Given the prevalence of OUD in Oregon, it is unsurprising that nearly two-thirds of study participants indicated they have patients with OUD on their panel (HHS, 2020). This indicates that at some point in their career, APRNs will encounter a patient with this diagnosis. As such, prior to entering the workforce, APRNs must receive adequate education and training on how to manage this population safely and effectively (Smothers et al., 2018). However, most participants in this study indicated that they did not feel that their graduate nursing education adequately prepared them to treat OUD. This reflects the overall lack of education regarding the management of substance use disorders and pain medicine in U.S. medical and nursing schools (Rasyidi et al., 2012; Smothers et al., 2018). It is vital that graduate nursing programs better prepare their students to manage OUD, though more research is needed to determine the most effective curriculum to do so (Smothers et al., 2018). Additionally, given that lack of confidence and insufficient training continue to be reported barriers to buprenorphine prescribing, there is a

need to not only better prepare APRNs early on to treat OUD, but to continue to reinforce this training throughout one's practice. This could be in the form of continuing education, programs like PCSS-B, or other novel approaches.

The passage of CARA 2016 expanded buprenorphine prescriptive authority to a large untapped sector of the healthcare workforce, resulting in significant improvements in access to MAT nationally and in Oregon (Andrilla et al., 2021; Klein et al., 2021). Additionally, the new federal policy that waives training requirements for eligible practitioners, allowing them to obtain an X-waiver to treat up to 30 patients, will hopefully continue to expand access to buprenorphine, while also further mainstreaming and reducing stigma around this treatment. As more providers become waivered and the use of buprenorphine more widespread, this treatment might eventually be viewed similarly to any other medication that treats a chronic condition. In future years, federal policies regarding buprenorphine licensing and prescribing should continue to be relaxed, or even eliminated, as has been done successfully in other countries (Fiscella et al., 2018). Meanwhile, this study reinforces the need to not only increase the number of NPs seeking a waiver, but also to increase the number of NPs actively using their waiver.

This study illustrates several of the common workforce barriers that either deter individual practitioners from becoming waivered or prevent them from prescribing to the full extent of their waiver capacity. Overall, barriers to prescribing reported in this study were related to practice infrastructure and resource availability rather than regulatory procedures, reimbursement, or stigma. First, lack of access to behavioral health support was the most commonly cited barrier. Similarly, most participants reported that greater access to behavioral health and other psychosocial support services would make it easier to integrate buprenorphine into practice. This is unsurprising, given an overall lack of behavioral health providers in rural

Oregon (Oregon Office of Rural Health, 2020). Reducing disparities in behavioral healthcare requires effort across multiple sectors and might include the promotion of hub and spoke models, incentive programs that draw behavioral health providers to rural areas, investments in telehealth infrastructure, and the expansion of acceptable behavioral health provider types through the promotion of traditional health workers and unlicensed qualified mental health professionals (Brunet et al., 2020; Scheyer et al., 2019). At the national and state level, policy makers should embrace regulatory changes and payment policies that expand coverage for behavioral health and incentivize the integration of behavioral health into primary care (Gale et al., 2019; Haffajee et al., 2018).

Other potential strategies to increase the adoption of buprenorphine in rural settings include financial incentives, such as loan forgiveness programs. Additionally, reimbursement models that reward outcomes could foster organizational buy-in, such as those adopted by accountable care organizations under the Affordable Care Act. Such models also incentivize improved care coordination across disciplines, including behavioral health and primary care (Haffajee et al., 2018).

Logistical issues were also a common reported barrier, including time, space, and staffing. Because resources and capabilities vary considerably from practice to practice, it is challenging to identify any single strategy to overcome these challenges. Constraints such as time and staffing may be mitigated by transitioning to a collaborative care model, in which other staff (nurses, program coordinators, etc.) help to coordinate care and reduce the workload of prescribing providers. For instance, nurses have successfully shown to supervise buprenorphine induction and maintenance phases, thereby increasing access and improving patient outcomes (Alford et al., 2011). Unobserved inductions, which are common practice, also help to mitigate

logistical issues such as time and office space (Kermack et al., 2017). Lastly, as mentioned, incorporating a hub and spoke model would allow smaller clinics to benefit from the resources of larger, better-funded organizations, while also allowing prescribers to refer to higher levels of care as needed (Andrilla et al., 2019). Telemedicine may also help to connect isolated prescribers to more experienced clinicians, as well as specialty consultation.

Dissemination

The findings of this study were presented to OHSU's MAT evaluation team at their monthly meeting. Additionally, with the help of this team, the results will be formulated into a report for submission to the *Journal of Rural Health*. Finally, the findings will be formally presented to faculty and peers at the OHSU School of Nursing.

Limitations

This study had several limitations. Overall, this study had a small sample size and a limited response rate of 19.2%. Therefore, the results may not be generalized to the entire state. This study also likely excluded many rural providers who live in urban areas but work in rural settings, or those whose current address has not been reported to the OSBN. Additionally, this study did not exclude providers who work in certain settings, such as emergency departments, acute care clinics, or correctional facilities. Provider experiences in these settings likely do not reflect the experiences of those working in primary care, addiction medicine, etc. Future studies might look at providers working only in primary care settings, where the majority of patients with OUD are receiving buprenorphine treatment (Nosyk et al., 2013).

Further, this study is limited by underrepresentation of waivered APRNs. This may be in part due to the limited population of waivered APRNs in rural Oregon from which to draw from. Regardless, future studies might attempt to further investigate this population. Specifically,

future studies should explore the reasons why waivered providers do not treat to the extent of their X-waiver capacity. To meet these ends, a qualitative format could provide more in-depth insight into the experiences of those who prescribe, or have prescribed, buprenorphine.

Lastly, many participants skipped multiple survey questions, leading to missing data. Because of the small sample size, this author chose not to exclude data from participants with missing values. To ensure accuracy of the results, this could have been addressed using multiple-regression analysis to estimate the missing data.

Conclusions

Over the past two decades, the nation has experienced staggering increases in the number of opioid-related deaths, particularly in rural communities (Mack et al., 2017). Additionally, the opioid crisis has led to a rise in infectious disease outbreaks, drug-related injuries, healthcare expenditures, and negative collateral effects on communities and families (Connock et al., 2007; Leslie et al., 2019; Reinhart et al., 2018). As such, it is imperative that the healthcare workforce respond to this crisis with viable, evidence-based solutions, such as the provision of buprenorphine maintenance treatment (Mattick et al., 2014; Thomas et al., 2014). Since the passage of CARA 2016, NPs have been leading the increase in buprenorphine access (Barnett et al., 2019). Yet still, rurality overwhelmingly determines access to OUD treatment and rural areas continue to experience poor access to waivered providers (Andrilla et al., 2019). Among providers who are qualified to prescribe buprenorphine, many are either not treating patients or are treating far fewer patients than their prescribing privileges allow (Andrilla et al, 2018; Huhn & Dunn, 2017).

This project surveyed APRNs in rural Oregon to assess this population's attitudes towards OUD and buprenorphine. Further, this project explored the barriers that prevent APRNs

from either pursuing a waiver to prescribe buprenorphine or prescribing to their waiver capacity. Additionally, this project sought to identify possible facilitators that could encourage APRNs to integrate this life-saving treatment into their practice. Understanding the factors that prevent APRNs from offering this treatment, as well as identifying strategies and resources that could better support rural providers, is an important step in expanding rural access to buprenorphine. Results of this survey can be used to informed future interventions aimed at expanding buprenorphine access in Oregon's rural communities.

This project suggests that most APRNs in rural Oregon do see patients with OUD. Additionally, it suggests that there is a shortage in the number of APRNs utilizing buprenorphine for the treatment of OUD. Among those that do possess an X-waiver, many either are not seeing patients or are prescribing under their waiver capacity. Data from this survey also suggest that graduate nursing programs need to better prepare their students to evaluate and manage patients with OUD, given how prevalent this diagnosis is. To increase the number of providers who apply for an actively use their X-waiver, and ultimately to mainstream this treatment, it is important that resources be mobilized that address infrastructure and logistical issues at the practice-level. This includes identifying strategies that address issues such as inadequately trained staff, insufficient staffing, and limited time. Further, nurse leaders should embrace a culture of mentorship and consider initiatives, either formal or informal, that promote peer-to-peer collaboration and support. Lastly, the results of this study strongly suggest that lack of behavioral health in rural Oregon is the greatest impediment to the widespread adoption of buprenorphine. Current and future stakeholders must seek solutions that address the behavioral workforce shortage in rural Oregon.

References

Ajzen, I. (1991, December). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179-211.

Alford, D. P., LaBelle, C. T., Kretsch, N., Bergeron, A., Winter, M., Botticelli, M., & Samet, J. H. (2011). Collaborative care of opioid-addicted patients in primary care using buprenorphine: five-year experience. *Archives of Internal Medicine, 171*(5), 425–431. https://doi-org.liboff.ohsu.edu/10.1001/archinternmed.2010.541

Andrilla, C. H. A., Coulthard, C., & Larson, E. H. (2017). Barriers rural physicians face prescribing buprenorphine for opioid use disorder. *Annals of Family Medicine, 15*(4), 359-362. https://doi-org.liboff.ohsu.edu/10.1370/afm.2099

Andrilla, C. H. A., Coulthard, C., & Patterson, D. G. (2018). Prescribing practices of rural physicians waivered to prescribe buprenorphine. *American Journal of Preventative Medicine, 54*(6 Suppl 3), S208-s214. https://doi-org.liboff.ohsu.edu/10.1016/j.amepre.2018.02.006

Andrilla, C. H. A., Jones, K. C., & Patterson, D. G. (2020). Prescribing practices of nurse practitioners and physician assistants waivered to prescribe buprenorphine and the barriers they experience prescribing buprenorphine. *Journal of Rural Health, 36*(2), 187-195. https://doi-org.liboff.ohsu.edu/10.1111/jrh.12404

Andrilla, C. H. A., Moore, T. E., Patterson, D. G., & Larson, E. H. (2019). Geographic distribution of providers with a DEA waiver to prescribe buprenorphine for the treatment of opioid use disorder: A 5-Year Update. *Journal of Rural Health, 35*(1), 108-112. https://doi-org.liboff.ohsu.edu/10.1111/jrh.12307

Andrilla, C., & Patterson, D. G. (2021). Tracking the geographic distribution and growth of

clinicians with a DEA waiver to prescribe buprenorphine to treat opioid use disorder. *The Journal of Rural Health: Official Journal of the American Rural Health Association and the National Rural Health Care Association*, 10.1111/jrh.12569. Advance online publication. https://doi-org.liboff.ohsu.edu/10.1111/jrh.12569

Barnett, M. L., Lee, D., & Frank, R. G. (2019). In rural areas, buprenorphine waiver adoption since 2017 driven by nurse practitioners and physician assistants. *Health Affairs, 38*(12), 2048-2056. https://doi-org.liboff.ohsu.edu/10.1377/hlthaff.2019.00859

Brunet, N., Moore, D. T., Lendvai Wischik, D., Mattocks, K. M., & Rosen, M. I. (2020). Increasing buprenorphine access for veterans with opioid use disorder in rural clinics using telemedicine. *Substance Abuse*. Advance online publication. https://doi-org.liboff.ohsu.edu/10.1080/08897077.2020.1728466

Centers for Disease Control and Prevention. (2020, March 19). *The Drug Overdose Epidemic: Behind the Numbers*. https://www.cdc.gov/drugoverdose/data/index.html

Clark, R. E., Samnaliev, M., Baxter, J. D., & Leung, G. Y. (2011). The evidence doesn't justify steps by state Medicaid programs to restrict opioid addiction treatment with buprenorphine. *Health Affairs, 30*(8), 1425-1433. https://doi-org.liboff.ohsu.edu/10.1377/hlthaff.2010.0532

Cole, E. S., DiDomenico, E., Green, S., Heil, S., Hilliard, T., Mossburg, S. E., Sussman, A. L., Warwick, J., Westfall, J. M., Zittleman, L., & Salvador, J. G. (2021a). The who, the what, and the how: A description of strategies and lessons learned to expand access to medications for opioid use disorder in rural America. *Substance Abuse*. Advance online publication. https://doi-org.liboff.ohsu.edu/10.1080/08897077.2021.1891492

Cole, T. O., Robinson, D., Kelley-Freeman, A., Gandhi, D., Greenblatt, A. D., Weintraub, E., &

Belcher, A. M. (2021b). Patient satisfaction with medications for opioid use disorder treatment via telemedicine: brief literature review and development of a new assessment. *Frontiers in Public Health, 8*, 557275. https://doi-org.liboff.ohsu.edu/10.3389/fpubh.2020.557275

Connock, M., Juarez-Garcia, A., Jowett, S., Frew, E., Liu, Z., Taylor, R. J., Fry-Smith, A., Day, E., Lintzeris, N., Roberts, T., Burls, A., & Taylor, R. S. (2007). Methadone and buprenorphine for the management of opioid dependence: a systematic review and economic evaluation. *Health Technology Assessment, 11*(9), 1–iv. https://doi-org.liboff.ohsu.edu/10.3310/hta11090

Cummings, J. R., Wen, H., Ko, M., & Druss, B. G. (2014). Race/ethnicity and geographic access to Medicaid Substance use disorder treatment facilities in the United States. *JAMA Psychiatry, 71*(2), 190-196. https://doi-org.liboff.ohsu.edu/10.1001/jamapsychiatry.2013

DeFlavio, J. R., Rolin, S. A., Nordstrom, B. R., & Kazal, L. A., Jr. (2015). Analysis of barriers to adoption of buprenorphine maintenance therapy by family physicians. *Rural Remote Health, 15*, 3019.

D'Onofrio, G., O'Connor, P. G., Pantalon, M. V., Chawarski, M. C., Busch, S. H., Owens, P. H., Bernstein, S. L., & Fiellin, D. A. (2015). Emergency department-initiated buprenorphine/naloxone treatment for opioid dependence: a randomized clinical trial. *Journal of the American Medical Association, 313*(16), 1636–1644. https://doi-org.liboff.ohsu.edu/10.1001/jama.2015.3474

Egan, J. E., Casadonte, P., Gartenmann, T., Martin, J., McCance-Katz, E. F., Netherland, J., Renner, J. A., Weiss, L., Saxon, A. J., & Fiellin, D. A. (2010). The Physician Clinical Support System-Buprenorphine (PCSS-B): a novel project to expand/improve

buprenorphine treatment. *Journal of General Internal Medicine, 25*(9), 936-941. https://doi-org.liboff.ohsu.edu/10.1007/s11606-010-1377-y

Fiscella, K., Wakeman, S. E., & Beletsky, L. (2019). Buprenorphine deregulation and mainstreaming treatment for opioid use disorder: X the X Waiver. *JAMA Psychiatry, 76*(3), 229–230. https://doi-org.liboff.ohsu.edu/10.1001/jamapsychiatry.2018.3685

Gale, J., Janis, J., Coburn, A., & Rochford, H. (2019, December). *Behavioral Health in Rural America: Challenges and Opportunities*. Rural Policy Research Institute. https://rupri.public-health.uiowa.edu/publications/policypapers/Behavioral%20Health%20in%20Rural%20America.pdf

Gordon, A. J., Kavanagh, G., Krumm, M., Ramgopal, R., Paidisetty, S., Aghevli, M., Goodman, F., Trafton, J., & Liberto, J. (2011). Facilitators and barriers in implementing buprenorphine in the Veterans Health Administration. *Psychology of Addictive Behaviors, 25*(2), 215-224. https://doi-org.liboff.ohsu.edu/10.1037/a0022776

Haffajee, R. L., Bohnert, A. S. B., & Lagisetty, P. A. (2018). Policy pathways to address provider workforce barriers to buprenorphine treatment. *American Journal of Preventive Medicine, 54*(6 Suppl 3), S230-s242. https://doi-org.liboff.ohsu.edu/10.1016/j.amepre.2017.12.022

Han, B., Compton, W. M., Blanco, C., Crane, E., Lee, J., & Jones, C. M. (2017). Prescription opioid use, misuse, and use disorders in U.S. adults: 2015 national survey on drug use and health. *Annals of Internal Medicine*, *167*(5), 293–301. https://doi-org.liboff.ohsu.edu/10.7326/M17-0865

Hedberg, K., Bui, L. T., Livingston, C., Shields, L. M., & Van Otterloo, J. (2019). Integrating

public health and health care strategies to address the opioid Epidemic: the Oregon Health Authority's Opioid Initiative. *Journal of Public Health Management and Practice, 25*(3), 214-220. https://doi-org.liboff.ohsu.edu/10.1097/PHH.0000000000000849

Hser, Y. I., & Mooney, L. J. (2021). Integrating telemedicine for medication treatment for opioid use disorder in rural primary care: beyond the COVID pandemic. *The Journal of Rural Health: Official Journal of the American Rural Health Association and the National Rural Health Care Association, 37*(1), 246–248. https://doi-org.liboff.ohsu.edu/10.1111/jrh.12489

Huhn, A. S., & Dunn, K. E. (2017). Why aren't physicians prescribing more buprenorphine?. *Journal of Substance Abuse Treatment*, *78*, 1–7. https://doi-org.liboff.ohsu.edu/10.1016/j.jsat.2017.04.005

Hutchinson, E., Catlin, M., Andrilla, C. H., Baldwin, L. M., & Rosenblatt, R. A. (2014). Barriers to primary care physicians prescribing buprenorphine. *Annals of Family Medicine, 12*(2), 128-133. https://doi-org.liboff.ohsu.edu/10.1370/afm.1595

Jones, E. B. (2018). Medication-assisted opioid treatment prescribers in federally qualified health centers: capacity lags in rural areas. *Journal of Rural Health, 34*(1), 14-22. https://doi-org.liboff.ohsu.edu/10.1111/jrh.12260

Kermack, A., Flannery, M., Tofighi, B., McNeely, J., & Lee, J. D. (2017). Buprenorphine prescribing practice trends and attitudes among New York providers. *Journal of Substance Abuse Treatment, 74*, 1–6. https://doi-org.liboff.ohsu.edu/10.1016/j.jsat.2016.10.005

Klein, T. A., Geddes, J., & Hartung, D. (2020). The geographic impact of buprenorphine

expansion to nurse practitioner prescribers in Oregon. *The Journal of Rural Health: Official Journal of the American Rural Health Association and the National Rural Health Care Association*, 10.1111/jrh.12538. Advance online publication. https://doi-org.liboff.ohsu.edu/10.1111/jrh.12538

Koonin, L. M., Hoots, B., Tsang, C. A., Leroy, Z., Farris, K., Jolly, B. T., Antall, P., McCabe, B., Zelis, C. B. R., Tong, I., & Harris, A. M. (2020). Trends in the use of telehealth during the emergence of the COVID-19 pandemic – United States, January-March 2020. *Morbidity and Mortality Weekly Report, 69*(43), 1595-1599.

Kortteisto, T., Kaila, M., Komulainen, J., Mantyranta, T., & Rissanen, P. (2010). Healthcare professionals' intentions to use clinical guidelines: a survey using the theory of planned behavior. *Implementation Science*, *5*(51). https://doi-org.liboff.ohsu.edu/10.1186/1748-5908-5-51

Krebs, E., Urada, D., Evans, E., Huang, D., Hser, Y. I., & Nosyk, B. (2017). The costs of crime during and after publicly funded treatment for opioid use disorders: a population-level study for the state of California. *Addiction*, *112*(5), 838–851. https://doi-org.liboff.ohsu.edu/10.1111/add.13729

Leslie, D. L., Ba, D. M., Agbese, E., Xing, X., & Liu, G. (2019). The economic burden of the opioid epidemic on states: the case of Medicaid. *American Journal of Managed Care, 25*(13 Suppl), S243-s249

Lo-Ciganic, W. H., Gellad, W. F., Gordon, A. J., Cochran, G., Zemaitis, M. A., Cathers, T., Kelley, D., & Donohue, J. M. (2016). Association between trajectories of buprenorphine treatment and emergency department and in-patient utilization. *Addiction, 111*(5), 892-902. https://doi-org.liboff.ohsu.edu/10.1111/add.13270

Mattick, R. P., Kimber, J., Breen, C., & Davoli, M. (2014). Buprenorphine maintenance versus placebo or methadone maintenance for opioid dependence. *Cochrane Database of Systematic Reviews* (3), Cd002207. https://doi-org.liboff.ohsu.edu/10.1002/14651858.CD002207.pub2

Mack, K. A., Jones, C. M., & Ballesteros, M. F. (2017). Illicit drug use, illicit drug use disorders, and drug overdose deaths in metropolitan and nonmetropolitan Areas – United States. *Morbidity and Mortality Weekly Report, 66*(19), 1-12. https://doi-org.liboff.ohsu.edu/10.1111/ajt.14555

National Institute on Drug Abuse. (2020, April). *Drug-Involved Overdose Deaths*. https://www.drugabuse.gov/opioid-summaries-by-state/Oregon-opioid-involved-deaths-related-harms

Netherland, J., Botsko, M., Egan, J. E., Saxon, A. J., Cunningham, C. O., Finkelstein, R., Gourevitch, M. N., Renner, J. A., Sohler, N., Sullivan, L. E., Weiss, L., & Fiellin, D. A. (2009). Factors affecting willingness to provide buprenorphine treatment. *Journal of Substance Abuse Treatment, 36*(3), 244-251.

Nosyk, B., Anglin, M. D., Brissette, S., Kerr, T., Marsh, D. C., Schackman, B. R., Wood, E., & Montaner, J.S. (2013). A call for evidence-based medical treatment of opioid dependence in the United States and Canada. *Health Affairs, 32*(8), 1462-1469. https://doi-org.liboff.ohsu.edu/10.1

Oregon Health Authority. (2018). *Opioid Overdose in Oregon*. https://sharedsystems.dhsoha.state.or.us/DHSForms/Served/le2479.pdf

Oregon Office of Rural Health. (2019, September 3). *Oregon Office of Rural Health Geographic*

Definitions. https://www.ohsu.edu/44Oregon-office-of-rural-health/about-rural-and-frontier-data

Oregon Office of Rural Health. (2020, August). *Oregon Areas of Unmet Health Care Need Report*. https://www.ohsu.edu/sites/default/files/2020-08/2020%20Areas%20of%20Unmet%20Health%20Care%20Needs%20Report.pdf

Oregon Substance Use Disorder Research Committee. (2017, November). *Substance Use Disorders in Oregon – Prevention, Treatment, & Recovery*. https://stateofreform.com/wp-content/uploads/2017/11/SUDs-in-Oregon-Prevention-Treatment-and-Recovery3.pdf

Peterson, L. E., Morgan, Z. J., & Borders, T. F. (2020a). Practice predictors of buprenorphine prescribing by family physicians. *Journal of the American Board of Family Medicine, 33*(1), 118–123. https://doi-org.liboff.ohsu.edu/10.3122/jabfm.2020.01.190235

Peterson, L. E., Morgan, Z. J., & Eden, A. R. (2020b). Early-career and graduating physicians more likely to prescribe buprenorphine. *Journal of the American Board of Family Medicine*, *33*(1), 7–8. https://doi-org.liboff.ohsu.edu/10.3122/jabfm.2020.01.190230

Rasyidi, E., Wilkins, J. N., & Danovitch, I. (2012). Training the next generation of providers in addiction medicine. *The Psychiatric Clinics of North America, 35*(2), 461–480. https://doi-org.liboff.ohsu.edu/10.1016/j.psc.2012.04.001

Reinhart, M., Scarpati, L. M., Kirson, N. Y., Patton, C., Shak, N., & Erensen, J. G. (2018). The economic burden of abuse of prescription opioids: a systematic literature review from 2012 to 2017. *Applied Health Economics and Health Policy*, *16*(5), 609–632. https://doi-org.liboff.ohsu.edu/10.1007/s40258-018-0402-x

Rosenblatt, R. A., Andrilla, C. H., Catlin, M., & Larson, E. H. (2015). Geographic and specialty

distribution of US physicians trained to treat opioid use disorder. *Annals of Family Medicine, 13*(1), 23-26. https://doi-org.liboff.ohsu.edu/10.1370/afm.1735

Salvador, J. G., Bhatt, S. R., Jacobsohn, V. C., Maley, L. A., Alkhafaji, R. S., Rishel Brakey, H., Myers, O. B., & Sussman, A. L. (2020). Feasibility and acceptability of an online ECHO intervention to expand access to medications for treatment of opioid use disorder, psychosocial treatments and supports. *Substance Abuse,* 1–8. Advance online publication. https://doi-org.liboff.ohsu.edu/10.1080/08897077.2020.1806184

Scheyer, K., Gilchrist, E., Muther, J., Hemeida, S., Wong, S. L. (2019, April). *Recruitment and Retention Recommendations for Oregon's Behavioral Health Workforce*. Farley Health Policy Center. https://www.oregon.gov/oha/HPA/ANALYTICS/ HealthCareWorkforceReporting/2019-04-R ecruitment-Retention-Recs-Oregon-BH-Workforce.pdf

Shea, C. M., Gertner, A. K., & Green, S. L. (2021). Barriers and perceived usefulness of an ECHO intervention for office-based buprenorphine treatment for opioid use disorder in North Carolina: A qualitative study. *Substance Abuse*, *42*(1), 54–64. https://doi-org.liboff.ohsu.edu/10.1080/08897077.2019.1694617

Sigmon, S. C. (2014). Access to treatment for opioid dependence in rural America: challenges and future directions. *JAMA Psychiatry, 71*(4), 359-360. https://doi-org.liboff.ohsu.edu/10.1001/jamapsychiatry.2013.4450

Smothers, Z., Reynolds, V., McEachern, M., Derouin, A. L., Carter, B. M., & Muzyk, A. (2018). Substance use education in schools of nursing: a systematic review of the literature. *Nurse Educator, 43*(3), 136–139. https://doi-org.liboff.ohsu.edu/10.1097/ NNE.0000000000000449

Sordo, L., Barrio, G., Bravo, M. J., Indave, B. I., Degenhardt, L., Wiessing, L., Ferri, M., & Pastor-Barriuso, R. (2017). Mortality risk during and after opioid substitution treatment: systematic review and meta-analysis of cohort studies. *British Medical Journal, 357*, j1550. https://doi-org.liboff.ohsu.edu/

Spetz, J., Toretsky, C., Chapman, S., Phoenix, B., & Tierney, M. (2019). Nurse practitioner and physician assistant waivers to prescribe buprenorphine and state scope of practice restrictions. *Journal of the American Medical Association, 321*(14), 1407-1408. https://doi-org.liboff.ohsu.edu/10.1001/jama.2019.0834

Substance Abuse and Mental Health Services Administration. (2020, May 4). *Buprenorphine*. https://www.samhsa.gov/medication-assisted-treatment/treatment/buprenorphine

Thomas, C. P., Fullerton, C. A., Kim, M., Montejano, L., Lyman, D. R., Dougherty, R. H., Daniels, A. S., Ghose, S. S., & Delphin-Rittmon, M. E. (2014). Medication-assisted treatment with buprenorphine: assessing the evidence. *Psychiatric Services, 65*(2), 158-170. https://doi-org.liboff.ohsu.edu/10.1176/appi.ps.201300256

Thomas, C. P., Reif, S., Haq, S., Wallack, S. S., Hoyt, A., & Ritter, G. A. (2008). Use of buprenorphine for addiction treatment: perspectives of addiction specialists and general psychiatrists. *Psychiatric Services, 59*(8), 909-916. https://doi-org.liboff.ohsu.edu/10.1176/ps.2008.59.8.909

U.S. Department of Health and Human Services. (2015, March 26). *Opioid Abuse in the U.S. and HHS Actions to Address Opioid-Drug Related Overdoses and Deaths*. https://aspe.hhs.gov/system/files/pdf/107956/ib_OpioidInitiative.pdf

U.S. Department of Health & Human Services. (2017, October 27). *HHS Acting Secretary*

Declares Public Health Emergency to Address National Opioid Crisis. https://www.hhs.gov/about/news/2017/10/26/hhs-acting-secretary-declares-public-health-emergency-address-national-opioid-crisis.html

U.S. Department of Health & Human Services. (2018). *Buprenorphine-Waivered Providers – County Data* [Infographic]. https://oig.hhs.gov/oei/maps/waivered-providers/index.html?utm_source=web&utm_medium=web&utm_campaign=bup-interactive-map

U.S. Department of Health & Human Services. (2020, January). *Geographic Disparities Affect Access to Buprenorphine Services for Opioid Use Disorder*. https://oig.hhs.gov/oei/ reports/ oei-12-17-00240.pdf?utm_source=newsletter&utm_medium=email&utm _campaign= newsletter_axiosvitals&stream=top

U.S. Department of Health and Human Services. (2021, April 28). *Practice Guidelines for the Administration of Buprenorphine for Treating Opioid Use Disorder*. https://www.govinfo.gov/content/pkg/FR-2021-04-28/pdf/2021-08961.pdf

U.S. Drug Enforcement Agency (2020, March 31). *How to Prescribe Controlled Substances During the COVID-19 Public Health Emergency*. https://www.deadiversion.usdoj.gov/ GDP/(DEA-DC-022)(DEA068)%20DEA %20SAMHSA%20buprenorphine% 20telemedicine%20%20(Final)%20+Esign.pdf

U.S. Food and Drug Administration (2019, February 14). *Information about Medication-Assisted Treatment (MAT)*. https://www.fda.gov/drugs/information-drug-class/information-about-medication-assisted-treatment-mat

Van Handel, M. M., Rose, C. E., Hallisey, E. J., Kolling, J. L., Zibbell, J. E., Lewis, B., Bohm,

M. K., Jones, C. M., Flanagan, B. E., Siddiqi, A. E., Iqbal, K., Dent, A. L., Mermin, J. H., McCray, E., Ward, J.W., & Brooks, J. T. (2016). County-level vulnerability assessment for rapid dissemination of HIV or HCV Infections among persons who inject drugs, United States. *Journal of Acquired Immune Deficiency Syndromes, 73*(3), 323-331. https://doi-org.liboff.ohsu.edu/10.1097/QAI.0000000000001098

Wakeman, S. E., Larochelle, M. R., Ameli, O., Chaisson, C. E., McPheeters, J. T., Crown, W. H., Azocar, F., & Sanghavi, D. M. (2020). Comparative effectiveness of different treatment pathways for opioid use disorder. *JAMA Network Open, 3*(2), e1920622. https://doi-org.liboff.ohsu.edu/10.1001/jamanetworkopen.2019.20622

Wang, L., Weiss, J., Ryan, E. B., Waldman, J., Rubin, S., & Griffin, J. L. (2021). Telemedicine increases access to buprenorphine initiation during the COVID-19 pandemic. *Journal of Substance Abuse Treatment, 124*, 108272. https://doi-org.liboff.ohsu.edu/10.1016/j.jsat.2020.108272

Weintraub, E., Greenblatt, A. D., Chang, J., Welsh, C. J., Berthiaume, A. P., Goodwin, S. R., Arnold, R., Himelhoch, S. S., Bennett, M. E., & Belcher, A. M. (2021). Outcomes for patients receiving telemedicine-delivered medication-based treatment for opioid use disorder: A retrospective chart review. *Heroin Addiction and Related Clinical Problems, 23*(2), 5–12.

Wilson, N. W., Karisa, M., Seth, P., Smith, H., Davis, N. L. (2020). Drug and opioid-involved overdose deaths – United States, 2017-2018. *Morbidity and Mortality Weekly Report,* 69, 290-297. doi: http://dx.doi.org/10.15585/mmwr.mm6911a4

World Health Organization. (2009). *Guidelines for the Psychosocially Assisted Pharmacological*

Treatment of Opioid Dependence. https://www.who.int/substance_abuse/publications/Opioid_dependence_guidelines.pdf