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Assessing Differences in the Availability of Opioid Addiction Therapy Options: Rural Versus Urban and American Indian Reservation Versus Non-Reservation

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Abstract

Background—Opioid misuse is a large public health problem in the United States. Residents of rural areas and American Indian (AI) reservation/trust lands represent traditionally underserved populations with regard to substance-use-disorder therapy.

Purpose—Assess differences in the number of opioid agonist therapy (OAT) facilities and physicians with Drug Addiction Treatment Act (DATA) waivers for rural versus urban, and AI reservation/trust land versus non-AI reservation/trust land areas in Washington State.

Methods—The unit of analysis was the zip code. The dependent variables were the number of OAT facilities and DATA-waivered physicians in a region per 10,000 residents aged 18–64 in a zip code. A region was defined as a zip code and its contiguous zip codes. The independent variables were binary measures of whether a zip code was classified as rural versus urban, or AI reservation/trust land versus non-AI reservation/trust land. Zero-inflated negative binomial regressions with robust standard errors were estimated.

Results—The number of OAT clinics in a region per 10,000 zip-code residents was significantly lower in rural versus urban areas ($P = .002$). This did not differ significantly between AI reservation/trust land and non-AI reservation/trust land areas ($P = .79$). DATA-waivered physicians in a region per 10,000 zip-code residents was not significantly different between rural and urban ($P = .08$), or AI reservation/trust land versus non-AI reservation/trust land areas ($P = .21$).

Conclusions—It appears that the potential for Washington State residents of rural and AI reservation areas to receive OAT is similar to that of residents outside of those areas; however, difficulties in accessing therapy may remain, highlighting the importance of expanding health care insurance and providing support for DATA-waivered physicians.

Keywords

American Indians; opioid agonist therapy; rural treatment; treatment access

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In the late 1990s prescription pain medication was deregulated and standards imposed by medical boards and the Joint Commission on Accreditation of Healthcare Organizations were relaxed, contributing to a 402% increase in opioid sales during this period.¹ Since then, non-medical prescription pain medication use has grown and has become the leading cause of deaths due to injury in the United States.² Further, the annual economic costs associated with illicit and prescription pain medication abuse are estimated to be roughly \$62 billion [2015 USD].^{3, 4}

There are important discrepancies between rural and urban opioid misusers in that rural users appear to die at twice the rate of urban users,⁵ and treatment for substance use disorders is accessed by urban residents at about twice the rate of their rural counterparts.^{6, 7} Opioid agonist therapy (OAT) has been shown to be both an effective and cost-effective therapy for opioid use disorders.^{8–13} Even so, information on the relative availability of OAT is limited.

Another population that suffers disproportionately from nonmedical prescription drug use is American Indians, 40% of whom reside in rural areas.¹⁴ The rate of nonmedical prescription drug use among American Indians is 6.2% versus 5.6% among Caucasians.³ Moreover, American Indians have a higher rate of accidental drug overdose (14.7% for Caucasians versus 15.7% for American Indians/Alaska Natives).^{2, 15, 16}

Further complicating matters, American Indians' access to health care services has always been complex.¹⁴ Treaties established that health care be provided to American Indians by the federal government through the Indian Health Service (IHS) as part of the trust responsibility to tribes.¹⁴ Currently, there are 259 substance use disorder treatment facilities tailored to American Indians in the United States. Of these facilities, 189 are tribally run, while only 41 are operated by IHS.¹⁵ Compounding barriers to engagement of OAT is the fact that less than 4% of the facilities offer an opiate substitution program, regardless of whether the facility is located in an urban or rural region.¹⁵ These services can be accessed with no out-of-pocket expense to the individual meeting the IHS eligibility criteria, but barriers remain for those not residing near an IHS facility or if IHS cannot cover the cost of treatment due to administrative factors.¹⁴

One potential substitute to traditional specialty clinics offering OAT is buprenorphine prescribed by a physician with a Drug Addiction Treatment Act (DATA) waiver. DATA waivers allow physicians to prescribe buprenorphine in a variety of office-based medical settings beyond the typical opioid treatment environment, including primary care or through a psychiatrist.¹⁷ Research on geographical access disparities to OAT is limited. Instead, access to OAT has primarily focused on patient- and provider-level factors associated with the likelihood of adoption.^{17–22} To the best of our knowledge, no study has examined the relative availability of OAT options for persons in rural and American Indian-affiliated areas. We test whether there are significant differences in the number of Substance Abuse and Mental Health Services Administration (SAMHSA) listed facilities offering OAT or the number of physicians with DATA waivers in a region per 10,000 adults 18–64 years old in rural versus urban and tribal versus non-tribal zip codes. A region was defined as the zip

code of interest plus all contiguous zip codes. This provides important information from a policy perspective as it highlights the potential to reduce OAT disparities among these traditionally underserved populations via the increased health insurance options under the Patient Protection and Affordable Care Act (ACA) of 2010, the increased access to behavioral health care services resulting from the Mental Health Parity and Addiction Equity Act of 2008 and the ACA, and the ability of DATA-waivered physicians in office-based settings to prescribe buprenorphine.

Methods

Sample

Physicians with DATA waivers and clinics providing opiate agonist therapy (OAT) were identified through the SAMHSA US Department of Health and Human Services website.²³ As of November 1, 2014, in Washington State there were 307 physicians and 38 facilities offering OAT. To identify the location of the OAT programs, zip code data were collected from the US Census Bureau.²⁴ In addition, the Washington State Department of Social and Health Services' (DSHS) Chemical Dependency Handbook was examined to verify location of services.²⁵

The directory obtained from DSHS included the name and location of all certified facilities. The directory also listed whether the facility's treatment focus was American Indian and whether the facility was tribally run. American Indian was defined as a federally recognized tribal Nation; currently, there are 29 tribes located in Washington State. To determine whether the zip code of interest was associated with reservation or tribal lands, the Washington Governor's Office of Indian Affairs and the Bureau of Indian Affairs Northwest region were contacted.^{26–28} American Indian tribal offices were then called to verify that the zip code was associated with a reservation or trust land (Figure 1, used with permission by the Northwest Portland Area Indian Health Board).²⁸

Measures

Rural and urban counties were defined by the Washington State Office of Financial Management.²⁹ Rural counties were defined as having a population density of less than 100 people in a given square mile. Rural and urban counties along with the location of clinics and physicians, as previously mentioned, were then matched to zip codes.^{24–28}

Our unit of analysis was the zip code. The dependent variables were discrete count variables of the number of OAT facilities or DATA-waivered physicians in a region. A region was defined as the zip code of interest plus all contiguous zip codes. The independent variables were binary measures of: a) whether the zip code was classified as rural or urban, and b) whether the zip code was affiliated with an American Indian reservation or trust land, or not. Urban was the reference category as was non-tribal zip codes. We also controlled for the number of persons aged 18–64 in the zip code of interest. The age range of 18–64 was selected for several reasons. First, this age range matches the general Medicaid eligibility criteria, as well as the majority of the population who would be shopping for insurance on the health-insurance exchange. The Medicaid population is of interest because they have

been shown to have higher rates of opioid dependence.³⁰ Second, the rate of illicit drug use among adults aged 18–34 has been shown to be higher than for those aged 17 or younger, and the rate is considerably lower for those 65 years and older.^{31–34} Finally, in Washington State, OAT services are not typically offered to those younger than 18 years of age or older than 64.²⁵

Analysis

Based on the fit of the data,^{35, 36} a generalized linear model with a Poisson family was initially chosen to estimate the model. However, due to the apparent overdispersion of the dependent variables resulting from the large number of zip codes with zero facilities offering OAT or physicians with DATA waivers,³⁷ the *countfit* program in STATA (STATA Corp LLP, College Station, Texas) was subsequently used to determine the appropriate empirical model. The *countfit* program compares the fit of the Poisson, zero-inflated Poisson, negative binomial, and zero-inflated negative binomial models using various tests and measures. The zero-inflated negative binomial (ZINB) model was chosen as the most appropriate. The ZINB model adjusts for the overdispersion of the dependent variable by modeling the excess zeros independently through the logit model, while the second stage is the standard negative binomial regression. That is, the data are assumed to be a combination of 2 different distributions, where some observations will always produce a zero count and others have the potential to generate both zero and non-zero counts. Therefore, the first stage of the model estimates the likelihood that an observation is a certain (or excess) zero. Incidence Rate Ratios (IRR) were calculated, and the models were estimated with robust standard errors to account for the heterogeneity in cell size between urban and rural, and American Indian reservation/trust land versus non-American Indian reservation/trust land zip codes. Additionally, the *collin* STATA program was used to ensure that multicollinearity was not a concern. STATA version 13.1 was used for all analyses.

Results

There are 809 zip codes in Washington State. Zip Code Tabulation Areas were created for the 2010 Census utilizing residential and commercial addresses. Six zip codes were dropped due to missing population data. The missing zip codes were in urban, non-tribal zip codes. Therefore, our final sample consisted of 803 zip codes. Zip codes that were businesses only may not have been tabulated³⁸ and could account for the missing values. Of the 803 zip codes included in the study, 309 were defined as rural (494 as urban) and 24 were affiliated with an American Indian reservation or trust land (779 were not affiliated with an American Indian reservation or trust land). The average number of adults aged 18–64 was 11,709 in urban zip codes versus 3,399 in rural zip codes. For American Indian reservation/trust land zip codes versus non-American Indian reservation/trust land zip codes, the respective population figures were 8,255 and 7,363.

Table 1 contains the results from the Zero-inflated negative binomial regressions. American Indian reservation/trust land zip codes were significantly less likely to be “excess zeros” with regard to counts of clinics offering OAT and physicians with DATA waivers. This was also true of rural zip codes with regard to OAT clinics. Rural areas had significantly fewer

OAT clinics than urban areas per 10,000 residents in a given zip code (IRR=0.03; $P = .002$). After controlling for rurality, this figure did not differ significantly between American Indian reservation/trust land and non-American Indian reservation/trust land affiliated zip codes (IRR=0.66; $P = .79$). The number of DATA-waivered physicians in a region per 10,000 residents in a given zip code did not differ significantly between rural and urban areas (IRR=0.40; $P = .08$), or between zip codes associated with an American Indian reservation/trust land and those that were not (IRR=1.99; $P = .21$).

Discussion

American Indian reservation/trust land zip codes were significantly less likely to be “excess zeros” and therefore more likely to be capable of producing a non-zero count with respect to clinics offering opioid agonist therapy (OAT) and DATA-waivered physicians; this was also true of rural areas with regard to OAT clinics. Even after controlling for population differences, the number of clinics offering OAT in rural versus urban regions was significantly lower, indicating that difficulties may remain for rural residents in terms of accessing most OAT services offered in these facilities. However, after controlling for rurality, in addition to population differences, the number of OAT facilities did not differ significantly between non-American Indian and American Indian reservation regions. The number of DATA-waivered physicians was not significantly different in rural versus urban or in American Indian compared to non-American Indian regions. This finding is promising in that it signifies the potential to address the barriers to OAT that these populations have historically faced.

Despite the similarity in relative OAT availability, obstacles persist in relation to individuals with opioid-use disorders gaining access to waived providers. American Indians and rural residents have historically had lower insurance rates than non-American Indians and urban dwellers. American Indians are insured at a rate that is one-half that of non-American Indians (15.1% versus 29.20%) and are therefore more likely to forgo treatment when they are unable to access an IHS facility.³⁹ Similarly, smaller rural areas suffer the largest insurances gap at 27.5%, as compared to 12.7% of those living in urban centers.⁴⁰

As previously mentioned, the ACA could increase access to buprenorphine treatment as more American Indian and rural residents enroll in health insurance coverage through the state and federally operated insurance exchanges.^{39, 41} The Mental Health Parity and Addiction Equity Act of 2008 requires that mental health and substance use disorder benefits are the same as medical and surgical benefits for plans that offer them.⁴² The ACA further expanded access to mental health and substance use disorder benefits for insured populations by including them in the *essential health benefits*.

For low-income individuals and households, gaining insurance through Medicaid is now another option as eligibility criteria has been modified to increase enrollment.⁴¹ About 60% of states have adopted the Medicaid expansion through the provisions set forth under the ACA, including Washington State.⁴³ Nineteen states have opted out,⁴³ impacting the potential availability of medication-based buprenorphine treatment for low-income individuals residing in these states who do not currently qualify for Medicaid coverage.

However, as more American Indians and rural residents gain health insurance and are therefore able to receive treatment through primary care providers or outside of the IHS network, access to needed services could be greatly enhanced.³⁹

Patient characteristics may also influence whether physicians prescribe buprenorphine. According to Baxter and colleagues,³⁰ Medicaid beneficiaries who had certain forms of mental illness or a history of alcohol or substance abuse were less likely to receive OAT. On the other hand, patient knowledge of OAT and previous exposure to buprenorphine in particular have been shown to be highly correlated with patients receiving buprenorphine, emphasizing the importance of patient education and previous treatment experience in demand for services.⁴⁴ Additionally, Murphy and associates⁴⁵ found that individuals with less restrictive insurance plans were significantly more likely to receive buprenorphine relative to other forms of therapy for opioid use disorders.

There are supply-side issues that will need to be addressed as well. A recent national study found that 90% of waived physicians were in urban areas,⁴⁶ underscoring the need for continued efforts to increase the relative number of waived physicians in geographically isolated areas. Yet our findings suggest that this is not an issue in Washington State after accounting for population differences and providers in contiguous zip codes. However, with respect to specialty clinics, our study supports the findings of previous research indicating there was a disparity in potential access to OAT between rural and urban areas.^{17, 46} The lack of a significant difference in the number of DATA-waivered physicians across areas of Washington State could be due in part to various initiatives to address the high rates of opioid-related deaths in the state. One such collaboration is the Rural Opiate Addiction Management (ROAM) program, which is a physician-waiver training program that focuses on providing rural physicians with the training required to obtain a DATA waiver.^{21, 47} Additionally, in 2006 the IHS implemented a program to assist physicians in obtaining DATA waivers. This was a promising initiative that modestly increased the number of waived physicians able to prescribe buprenorphine through primary care services offered at the IHS.⁴⁸ However, the program ended in 2010.

Although there have been increased efforts in Washington to augment the number of physicians certified to prescribe buprenorphine medication, and state support is positively associated with an increased number of waived physicians in a region,⁴⁹ compared to many other states, Medicaid in Washington has more stringent guidelines for providers.⁵⁰ For example, the Washington State Medicaid program pays for buprenorphine only if the patient is enrolled in a certified addiction treatment program. Therefore, Medicaid patients cannot receive buprenorphine in an office-based setting without being associated with a specialty clinic. Furthermore, lifetime limits have been implemented for buprenorphine treatment.⁵⁰

Additionally, Kissin and associates⁵¹ surveyed a national sample of DATA-waivered physicians and found that about half were currently prescribing buprenorphine. Almost 25% of the waived physicians had since stopped prescribing altogether. Factors contributing to lack of prescribing included potential maintenance issues such as patient non-compliance, the limited availability of buprenorphine, and the 30-patient treatment limit imposed upon

providers. Hutchinson and colleagues²¹ point to additional obstacles that physicians may encounter which hinder their overall willingness to treat opioid addiction, including inadequate institutional support. Another is the concern that there may not be the appropriate community mental and behavioral health services needed once opioid therapy has been initiated. Other physicians have cited the low reimbursement rate of Medicaid as a potential barrier.²² Even with the hurdles faced by physicians treating opioid dependence with buprenorphine, many waived physicians who were prescribing believed it to be an effective treatment.^{18, 52} Additionally, Rieckmann and associates⁵² found that some of the previously mentioned physician-related issues in implementing buprenorphine treatment began to decrease as physician training increased.

Strengths and Limitations

This study adds to the scarce literature on the relative availability of OAT options for persons residing in rural and American Indian areas—regions that have historically been subject to additional barriers to access. Unlike previous studies that have examined the distribution of waived physicians in rural versus urban areas,^{17, 46} by controlling for population differences and defining a region as the zip code of interest plus all of its contiguous zip codes, we address a crucial aspect of availability and, in so doing, provide an estimate of the potential OAT opportunities available to those newly insured under the ACA.

Our study also has several important limitations. We did not have patient-level data that would allow us to determine whether individuals in these areas were accessing treatment at different rates. Additionally, the SAMHSA website provides information on waived physicians who have agreed to be listed. This could potentially yield a smaller number of waived providers in each region; however, we do not have any reason to believe that physicians in a given area would be more or less likely to volunteer their information. Consequently, we do not believe this limitation influenced the statistical significance of our results. Initially, physicians are waived to treat 30 clients. After the first year physicians can request that their patient limit be increased to 100, which could have implications for the relative availability of treatment for rural individuals; recent findings indicate that rural physicians with a DATA waiver for 100 patients were associated with a larger quantity increase in grams of buprenorphine dispensed than 100-patient-waived urban physicians.⁵³ Similarly, we were unable to determine whether physicians were accepting new clients, or even if they were treating any clients at all. Finally, the fact that our data were derived from a single state limits our ability to generalize our findings to other states. Future studies that are able to perform similar analyses on a multi-state sample, or assess changes in unmet need for substance use disorder therapy around health care reform legislation designed to improve access, would provide valuable new information to policy makers.

Conclusion

Prior studies examining deficiencies in potential access to opioid agonist therapy (OAT) among rural residents have largely focused on county-level data and failed to consider the availability of treatment options in neighboring areas. This study used the zip code as the unit of analysis, while also accounting for the number of relevant OAT options in contiguous

zip codes. Additionally, we examined potential differences in access to OAT among another traditionally underserved population, those who reside on American Indian reservation/trust lands. Our findings indicate that urban-rural differences remain with regard to potential access to OAT via specialty clinics, although this was not the case for American Indian versus non-American Indian affiliated areas. The number of providers with DATA waivers appears to be similar between urban and rural, and American Indian and non-American Indian affiliated areas, which supports recent evidence that the number of opioid treatment shortage areas has decreased since the FDA's approval of buprenorphine for OAT.⁵⁴ These findings signify the potential to increase access to an evidence-based, cost-effective form of opioid use disorder therapy in OAT, for populations who, in the past, have had fewer opportunities to obtain such treatment. This is particularly true in this era of health reform where opportunities to access health insurance and behavioral health care are increasing. Nevertheless, underlying patient and provider factors may be preventing utilization of buprenorphine, which highlights the importance of efforts intended to lessen these barriers, such as those designed to reduce uninsurance rates, and to educate and support providers willing to treat opioid use disorders.

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Figure 1.

Table 1

Zero-Inflated Negative Binomial Regressions

Variable	IRR	Robust Std. Error	Z-Statistic	Probability
<i>Data Waiver Regression Results</i>				
Excess Zero Equation (Logistic Link Function)				
Intercept	0.08	0.61	0.13	.89
Rural	0.25	0.40	0.61	.54
Reservation/Trust Land	-13.15	3.12	-4.21	< .001
Number of DATA waivers in a region, ^a per 10,000 zip code residents				
Intercept	3.69	1.29	3.74	< .001
Rural	0.40	0.21	-1.75	.08
Reservation/Trust Land	1.99	1.09	1.26	.21
<i>OAT Regression Results</i>				
Excess Zero Equation (Logistic Link Function)				
Intercept	0.29	0.99	0.29	.77
Rural	-14.41	2.48	-5.81	< .001
Reservation/Trust Land	-30.68	7.78	-3.95	< .001
Number of specialty clinics offering OAT in a region, ^a per 10,000 zip code residents				
Intercept	0.80	0.83	-0.21	.83
Rural	0.03	0.03	-3.08	.002
Reservation/Trust Land	0.66	1.05	-0.26	.79

^aRegion is defined by the zip code of interest, plus contiguous zips.