

Comparing the Care and Distance Traveled by Rural and Urban Medicaid Beneficiaries With Opioid Use Disorder

KEY FINDINGS

- Rural Medicaid beneficiaries with opioid use disorder (OUD) had fewer average healthcare visits (64.6) than their urban counterparts (92.3).
- Medicaid beneficiaries with OUD who lived in small and remote rural counties not adjacent to a metro county had the lowest average number of annual visits among rural Medicaid beneficiaries (59.3).
- Rural beneficiaries with OUD overall traveled an average of 70.4 miles to access care.
- Rural Medicaid beneficiaries living in counties not adjacent to a metro county traveled more than twice as far (more than 80 miles on average) for care compared to urban beneficiaries who traveled an average of 32.7 miles.
- Rural Medicaid beneficiaries living in counties adjacent to a metro county traveled an average of 63.5 miles for care.
- The average travel time to care for rural Medicaid beneficiaries was about twice as long as for urban beneficiaries (80 minutes vs. 40 minutes, respectively).

BACKGROUND

The opioid epidemic continues to burden rural and urban communities, individuals and families in the United States (U.S.). In 2023, there were 81,083 overdose deaths attributable to opioids, the first decrease in annual overdose deaths since 2013.^{1,2} Despite this promising change, approximately 5.7 million Americans had opioid use disorder (OUD) in 2023, and only 55.2% of people who needed treatment for OUD received treatment (ie, counseling or medication treatment in an inpatient, outpatient, telehealth, or justice system setting).^{3,4} Effective medications for opioid use disorder (MOUD) include buprenorphine, methadone, and naltrexone, yet only one-quarter (25.1%) of Americans needing treatment for OUD received any type of MOUD as part of their treatment.⁴ Buprenorphine is relatively more accessible than methadone because it can be prescribed in an office-based, primary care setting from a variety of eligible clinicians.⁵ Methadone must be prescribed in a federally certified opioid treatment program, which are relatively less accessible, particularly in rural communities.⁶

In 2017, Medicaid covered about 40 percent of adults less than 65 years of age with OUD, making it the largest payor of substance use disorder treatment in the U.S.⁷ Medicaid is also a key insurer in rural communities, covering about one in four (24%) nonelderly rural adults.⁸ The Patient Protection and Affordable Care Act of 2014 (ACA) expanded Medicaid to cover individuals with incomes less than 138% of the federal poverty level. Since 2014, 40 states and the District of Columbia have opted to expand Medicaid.⁹ After the ACA, the uninsured rate in rural communities dropped from 24% in 2010 to 16% in 2019, providing a key gap in insurance coverage in rural communities, particularly in states that have expanded Medicaid.^{8,10}

Despite overall growth in the workforce eligible to prescribe MOUD, rural counties still have fewer clinicians who can prescribe buprenorphine per capita than urban counties, and a greater proportion of rural counties lack a buprenorphine prescribing clinician compared to urban counties.^{8,9} Even for rural patients with a prescribing clinician in their county, they are not guaranteed access to buprenorphine treatment. Prior to the elimination of the DEA waiver requirement to prescribe buprenorphine in January 2023, not all clinicians who obtained a waiver reported ever prescribing buprenorphine to treat OUD, and only 56.2% of rural physicians and 71.1% of rural nurse practitioners and physician assistants who had waivers reported being open to accepting new patients for treatment.^{10,11}

Not all clinicians will accept patients with Medicaid for buprenorphine treatment. Two studies of Medicaid participation of waived clinicians in single states (VA and NC) with claims data found that about half (42.8-51.6%) of eligible clinicians provided buprenorphine treatment for Medicaid beneficiaries.^{12,13} Clinicians report barriers of financial viability with limited reimbursement and the administrative burdens of prior authorization requirements limits their ability to accept new patients for MOUD treatment with Medicaid insurance.^{11,14} In order to reduce these burdens, most states Medicaid policies have eliminated prior authorization requirements for buprenorphine as of 2024.¹⁵ Rural buprenorphine prescribing clinicians are more likely to accept patients with Medicaid compared to urban clinicians.^{11,12,16} Yet the differences in utilization of buprenorphine treatment for rural versus urban patients with Medicaid are less well understood. This study seeks to describe the treatment for rural versus urban Medicaid beneficiaries with OUD.

METHODS

This study used Medicaid T-MSIS analytic files (TAF) for calendar year 2019 to examine the number of visits received by rural and urban Medicaid beneficiaries aged 18 years and older who resided in the U.S. Our data included claims from the TAF Other Services (OT) file for beneficiaries who had a claim with an ICD-10 diagnosis code of opioid use disorder (F11) or opioid overdose (T40). The TAF OT file contains records for physician services, outpatient hospital utilization, lab/X-ray, clinical services, home health, and hospice.

Beneficiary information (age, sex, and ZIP Code for home or mailing address) came from the TAF Demographic and Eligibility file and visit information (place of service, provider type, servicing provider National Provider Identifier (NPI), and servicing provider specialty) came from the TAF OT base claim and line files. A single visit was defined by rows of data with the same beneficiary ID, visit date, and servicing provider NPI number.

Given that the TAF OT files did not have a ZIP Code for the place of service, we used the servicing provider's practice location ZIP Code (obtained from the July 2019 full replacement monthly NPI file) as a proxy for where a visit took place (provider location). We used the 2013 Urban Influence Codes (UIC) to classify each provider and beneficiary county location as metropolitan (UIC 1-2), adjacent to metro (UIC 3-7), micropolitan nonadjacent to metro (UIC 8), and small and remote nonadjacent to a metro county (UIC 9-12).¹⁷

We used general estimating equations to test geographic differences in the mean distance (in miles) and time (in minutes) traveled for each visit by geographic county category using the beneficiary and servicing provider practice ZIP Code and Google Maps. We also calculated the beneficiary median distance and time traveled for each visit. Full details about data set construction and analyses, and distance/travel time calculations are in the Technical Appendix. We used Version 9.4 of the SAS System for Windows software to perform statistical testing to compare rural and urban beneficiary characteristics and care. The University of Washington’s Human Subjects Division approved this research.

FINDINGS

Table 1 shows the characteristics of adult Medicaid beneficiaries who had a diagnosis of OUD or opioid overdose in 2019. Over 80% of beneficiaries (82.5%) lived in an urban location while 17.5% of beneficiaries lived in a rural location. The majority of rural beneficiaries lived in counties adjacent to metro counties (11.2%). Among the remaining rural beneficiaries, almost an equal split lived in a micropolitan county that was nonadjacent to a metro county (3.2%) or a small and remote county nonadjacent to a metro county (3.2%). Rural beneficiaries were slightly younger (39.8-40.8 years) than urban beneficiaries (42.0 years). A greater percentage of rural Medicaid beneficiaries with a diagnosis of OUD or opioid overdose were female (54.7%) compared to urban beneficiaries (48.2%). The highest percentage of rural beneficiaries overall came from the Middle Atlantic (20.6%) and East North Central (18.5%) Census Divisions, while the fewest came from the West North Central (3.2%) and West South Central (3.7%) Census Divisions. A greater share of rural beneficiaries resided in a county without a DEA waived provider (8.8%) compared to urban beneficiaries (0.8%).

Table 1. Characteristics of Adult Medicaid Beneficiaries Who Had a Diagnosis of Opioid Use Disorder or Opioid Overdose by Urban-Rural Status^a of Beneficiary Residence, 2019

	Urban	Rural	Rural		
	Metro (N=1,227,710)	Nonmetro (N=260,763)	Adjacent to metro (N=166,370)	Micropolitan nonadjacent to metro (N=47,390)	Small and remote nonadjacent to metro (N=47,003)
Overall %^b	82.5%	17.5%	11.2%	3.2%	3.2%
Age, mean (SD)^{***}	42.0 (12.9)	40.1 (12.4)	39.8 (12.3)	40.5 (12.7)	40.8 (12.1)
Age group					
18-24	4.7%	5.5%	5.7%	5.6%	4.9%
25-44	56.9%	63.3%	64.1%	61.8%	62.2%
45-64	33.8%	27.3%	26.6%	28.3%	29.2%
65 and older	4.7%	3.8%	3.6%	4.3%	3.7%
Sex^{c***}					
Male	51.8%	45.3%	45.0%	45.3%	46.5%
Female	48.2%	54.7%	55.0%	54.7%	53.5%
Total Medicaid enrollment days in 2019, mean (SD)	331.3 (74.1)	334.6 (70.7)	331.3 (73.9)	336.5 (68.7)	344.6 (59.3)
Census Division^{d***}					
New England	10.6%	7.3%	8.3%	5.1%	6.0%
Middle Atlantic	22.8%	10.4%	14.0%	5.7%	2.8%
East North Central	17.8%	22.2%	27.6%	13.6%	11.6%
West North Central	2.8%	5.1%	4.4%	7.8%	5.1%
South Atlantic	14.2%	14.6%	17.1%	9.4%	11.0%
East South Central	4.1%	21.2%	11.7%	28.3%	47.8%
West South Central	3.5%	4.2%	4.8%	3.5%	2.9%
Mountain	8.7%	6.9%	5.2%	11.7%	8.0%
Pacific	15.4%	8.1%	7.0%	15.0%	4.9%
County of residence has a DEA-waivered provider^{e***}					
Yes	99.2%	91.2%	91.1%	96.2%	86.2%
No	0.8%	8.8%	8.9%	3.8%	13.8%

Abbreviations: SD - Standard deviation; DEA - Drug Enforcement Administration.

Overall four-category chi-squared or t-test: ***p<.0001.

^aBeneficiary urban rural locations were classified with Urban Influence Codes (UIC) as: urban/metro (UIC 1-2) and rural/adjacent to metro (UIC 3-7), rural/micropolitan nonadjacent to metro (UIC 8), and rural/small and remote nonadjacent to metro (UIC 9-12).

^bPercentages in this row sum to 100%, other percentages sum by column to 100%.

^cThere were 32 beneficiaries (0.002% overall) with missing sex data.

^dCensus Divisions: New England—CT, ME, MA, NH, RI, VT; South Atlantic—DE, DC, FL, GA, MD, NC, SC, VA, WV; West North Central—IA, KS, MN, MO, NE, ND, SD; West South Central—AR, LA, OK, TX. East North Central—IL, IN, MI, OH, WI; East South Central—AL, KY, MS, TN; Middle Atlantic—NJ, NY, PA; Mountain—AZ, CO, ID, MT, NV, NM, UT, WY; Pacific—AK, CA, HI, OR, WA.

^eProviders include physicians, nurse practitioners, and physician assistants.

The mean and median number of visits for urban and rural beneficiaries with OUD are shown in Table 2. Urban beneficiaries had an average of 92.3 visits in 2019, while rural beneficiaries overall had fewer (64.6). Among rural beneficiaries, those living in counties that were adjacent to a metro county had more annual visits (67.6) compared to beneficiaries from micropolitan counties not adjacent to a metro county (59.3) and beneficiaries from small and remote counties not adjacent to a metro county (59.6). The median number of visits for urban and rural beneficiaries followed similar patterns as shown in Table 2. The median number of visits by urban beneficiaries was 25% higher than the median number of visits by beneficiaries from all types of rural counties.

Table 2. Mean and Median Number of Visits by Medicaid Beneficiary Residence Location,^a 2019

	Urban	Rural	Rural		
	Metro	Nonmetro	Adjacent to metro	Micropolitan nonadjacent to metro	Small and remote nonadjacent to metro
Visits, n	105,078,583	15,173,330	10,236,954	2,472,385	2,463,991
Mean (SD)***	92.3 (119.2)	64.6 (86.4)	67.6 (91.1)	59.3 (81.3)	59.6 (72.3)
Median***	45	36	36	34	39

Abbreviations: SD - standard deviation.

^aBeneficiary urban-rural locations were classified with Urban Influence Codes (UIC) as: urban/metro (UIC 1-2) and rural/adjacent to metro (UIC 3-7), rural/micropolitan nonadjacent to metro (UIC 8), and rural/small and nonadjacent to metro (UIC 9-12).

***Comparisons across the four urban-rural categories with analysis of variance (ANOVA - means) and non-parametric tests (Kruskal-Wallis - medians) significant at $p < .0001$.

Rural beneficiaries overall traveled farther for care than their urban counterparts. Beneficiaries living in rural counties adjacent to a metro county traveled an average of 63.5 one-way miles for a visit compared to 32.7 miles for urban beneficiaries (Table 3). Rural residents living in non-adjacent micropolitan counties and small and remote counties not adjacent to a metro county traveled about two and a half times farther (89.0 and 82.3 miles, respectively) than urban beneficiaries. The median distance traveled by rural beneficiaries overall was almost three times farther than the median distance traveled by urban beneficiaries (36.1 vs. 13.3 miles, respectively).

Table 3. Mean and Beneficiary Median Distance and Time Traveled by Medicaid Beneficiary Residence Location,^a 2019

		Urban	Rural	Rural		
		Metro	Nonmetro	Adjacent to metro	Micropolitan nonadjacent to metro	Small and remote nonadjacent to metro
Mean distance in miles (SD)	No zeroes imputed***	32.7 (56.5)	70.4 (71.9)	63.5 (64.7)	89.0 (89.4)	82.3 (78.0)
	Zeroes imputed***	29.5 (54.5)	57.8 (70.5)	53.1 (63.6)	66.1 (86.3)	69.1 (77.6)
Beneficiary median distance in miles (IQR)	No zeroes imputed***	13.3 (6.6-26.7)	36.1 (18.9-64.0)	35.4 (19.3-58.1)	33.7 (14.0-77.4)	41.5 (22.9-78.6)
	Zeroes imputed***	12.9 (6.2-26.2)	34.1 (16.3-61.7)	34.1 (17.4-56.8)	29.2 (7.7-71.5)	38.8 (19.2-76.3)
Mean time in minutes (SD)	No zeroes imputed***	41.1 (52.4)	78.9 (69.8)	71.8 (61.3)	97.7 (90.3)	91.4 (76.9)
	Zeroes imputed***	36.9 (51.2)	64.8 (70.1)	60.0 (62.0)	72.6 (88.8)	76.8 (78.0)
Beneficiary median time in minutes (IQR)	No zeroes imputed***	23 (15-38)	47 (27-76)	45 (27-69)	44 (22-90)	54 (31-93)
	Zeroes imputed***	23 (14-37)	44 (24-74)	44 (25-68)	39 (11-85)	51 (28-91)

Abbreviations: SD - standard deviation; IQR – interquartile range.

^aBeneficiary urban-rural locations were classified with Urban Influence Codes (UIC) as: urban/metro (UIC 1-2) and rural/adjacent to metro (UIC 3-7), rural/micropolitan nonadjacent to metro (UIC 8), and rural/small and remote nonadjacent to metro (UIC 9-12).

***Comparisons across the four urban-rural categories with generalized estimating equations (means) and the Kruskal-Wallis test (medians) significant at $p < .0001$.

When we imputed zero miles for care received in the same ZIP Code as the beneficiary’s residence, the estimates of travel distances decreased in all geographic areas, but the relative patterns did not change. Urban beneficiaries traveled an average of 29.5 miles compared to rural beneficiaries where the average distance ranged from 53.1 miles to 69.1 miles depending on the type of rural county (Table 3).

When we compared the mean and median distances traveled by rural beneficiaries who lived in a county with and without a DEA clinician with an X-waiver, we found no differences.

The average travel time that rural beneficiaries from all types of rural counties spent traveling for care was higher than the time urban beneficiaries spent. The travel time for beneficiaries from rural counties adjacent to a metro county was 75% greater than the travel time for urban beneficiaries. Beneficiaries from micropolitan counties not adjacent to a metro county and small and remote rural counties (not adjacent to a metro county) spent more than twice as long as urban beneficiaries traveling to get care (98 and 91 minutes, respectively). When zeroes were imputed for the travel time for care received in the beneficiary’s residence ZIP Code, rural beneficiaries in all types of counties still traveled on average an hour or more for care compared to 37 minutes for urban beneficiaries.

DISCUSSION

Understanding the barriers to accessing care for rural Medicaid beneficiaries is important to improve access. The additional miles and time required to receive care almost certainly contributed to the lower average number of annual visits by rural beneficiaries compared to their urban counterparts. Programs like Medicaid's Non-Emergency Medical Transport (NEMT), which provide transportation for eligible beneficiaries to facilitate access to healthcare services, although required, may be implemented differently in rural and urban places. The additional travel time is also an additional burden on rural Medicaid beneficiaries, regardless of whether transportation is provided as a Medicaid benefit.¹⁸ Thus, ensuring a local health workforce able to provide care for OUD is vital. However, building and maintaining an adequate rural health workforce is a persistent challenge and rural-urban differences have persisted for years for many health care professions.¹⁹ Initiatives to train more health professionals in rural areas and for rural communities to 'grow their own' are underway and tracking their outcomes will be important.^{20,21} The federal Rural Communities Opioid Response Program (RCORP) has provided extensive resources to rural communities to expand the workforce that can provide care for rural patients with OUD. Evidence suggests that rural-urban differences in this workforce have decreased since its inception.⁹ More data is needed to investigate how the expanded workforce is delivering care for OUD and to identify barriers to providing that care. The RCORP initiative was in its first year at the time this data represents, so we would not expect to observe any impact of this program in this data. Looking at visit data in subsequent years may show a decrease in rural-urban differences. Additionally, stigma towards patients with OUD continues to be a challenge and many rural providers cite it as one of their top challenges.²² Addressing this will require a sustained effort.

LIMITATIONS

This study has a number of limitations that should be considered when interpreting the findings. Given that Medicaid is a joint federal and state program, eligibility and data reporting vary by state, which impacts data quality. The amount and type of missing data varies by state as well. For example, some states have claims with incomplete data (eg, data elements with missing values) in the TAF OT file, while other states have missing data (eg, missing or incorrect data elements) that results in claims being excluded from the TAF OT file. A more complete description of the issues impacting Medicaid data quality (overall and by state) can be found at <https://www.medicaid.gov/dq-atlas/welcome>. In addition, given that we did not have a ZIP Code for place of service, we used the provider practice ZIP Code as a proxy. This means that driving distance and time for some visits may not accurately estimate how far and/or how long a beneficiary had to travel to see a provider. Because we only had access to the beneficiary's ZIP Code, and the ZIP Code of the provider, when care was received in the same ZIP Code as the beneficiary's residence, we were not able to calculate the travel distance to care. We imputed zeros for these visits and Table 3 shows the summary statistics for travel time and distance with and without these zeros included. The true average travel distances and times fall between these estimates. However, the patterns and differences between the different levels of rurality were consistent regardless of which estimate was used. Finally, we used data from 2019 claims. Extensive changes to telehealth care were made in response to the COVID-19 pandemic and many have persisted. This undoubtedly has changed the way and place that at least some care is provided for Medicaid beneficiaries.

POLICY CONSIDERATIONS

Ensuring access to care for patients with OUD is critical to combat the opioid epidemic. Expanding the behavioral health workforce is an important component to improve care for rural patients. Improving Medicaid reimbursement rates might increase the number of providers willing to provide care and reduce the burden on patients to access care.

REFERENCES

1. Ahmad F, Cisewski J, Rossen L, Sutton P. Provisional drug overdose death counts. Published online January 14, 2026. Accessed January 20, 2026. <https://www.cdc.gov/nchs/nvss/vsrr/drug-overdose-data.htm>
2. Garnett M, Miniño A. *Drug Overdose Deaths in the United States, 2003–2023*. National Center for Health Statistics; 2024. doi:10.15620/cdc/170565
3. Substance Abuse and Mental Health Services Administration. *Key Substance Use and Mental Health Indicators in the United States: Results from the 2023 National Survey on Drug Use and Health*. Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration; 2024. Accessed July 30, 2024. <https://www.samhsa.gov/data/report/2023-nsduh-annual-national-report>
4. Dowell D, Brown S, Gyawali S, et al. Treatment for opioid use disorder: population estimates — United States, 2022. *MMWR Morb Mortal Wkly Rep*. 2024;73:567-574. doi:10.15585/mmwr.mm7325a1
5. Wakeman SE, Larochelle MR, Ameli O, et al. Comparative effectiveness of different treatment pathways for opioid use disorder. *JAMA Netw Open*. 2020;3(2):e1920622. doi:10.1001/jamanetworkopen.2019.20622
6. Amiri S, Hirchak K, McDonell MG, Denney JT, Buchwald D, Amram O. Access to medication-assisted treatment in the United States: comparison of travel time to opioid treatment programs and office-based buprenorphine treatment. *Drug Alcohol Depend*. 2021;224:108727. doi:10.1016/j.drugalcdep.2021.108727
7. Tolbert J, Orgera K. *The Opioid Epidemic and Medicaid's Role in Facilitating Access to Treatment*. 2019. Accessed July 12, 2021. <https://www.kff.org/medicaid/issue-brief/the-opioid-epidemic-and-medicaids-role-in-facilitating-access-to-treatment/>
8. Andrilla CHA, Patterson DG. Tracking the geographic distribution and growth of clinicians with a DEA waiver to prescribe buprenorphine to treat opioid use disorder. *J Rural Health*. 2022;38(1):87-92. doi:10.1111/jrh.12569
9. Andrilla CHA, Woolcock SC, Meyers K, Patterson DG. Expanding the opioid use disorder medication treatment workforce in rural communities through the RCORP initiative. *J Rural Health*. 2025;41(1):e12867. doi:10.1111/jrh.12867
10. Andrilla CHA, Coulthard C, Patterson DG. Prescribing practices of rural physicians waived to prescribe buprenorphine. *Am J Prev Med*. 2018;54(6):S208-S214. doi:10.1016/j.amepre.2018.02.006
11. Andrilla CHA, Jones KC, Patterson DG. Prescribing practices of nurse practitioners and physician assistants waived to prescribe buprenorphine and the barriers they experience prescribing buprenorphine. *J Rural Health*. 2020;36(2):187-195. doi:10.1111/jrh.12404
12. Saunders H, Britton E, Cunningham P, et al. Medicaid participation among practitioners authorized to prescribe buprenorphine. *J Subst Abuse Treat*. 2022;133:108513. doi:10.1016/j.jsat.2021.108513
13. Grove LR, Rao N, Domino ME. Are North Carolina clinicians delivering opioid use disorder treatment to Medicaid beneficiaries? *Addiction*. 2022;117(11):2855-2863. doi:10.1111/add.15854
14. Andrilla CHA, Moore TE, Patterson DG. Overcoming barriers to prescribing buprenorphine for the treatment of opioid use disorder: recommendations from rural physicians. *J Rural Health*. 2019;35(1):113-121. doi:10.1111/jrh.12328
15. Saunders H, Gifford K. State approaches to addressing the opioid epidemic: findings from a survey of state Medicaid programs. Kaiser Family Foundation. February 6, 2024. Accessed July 8, 2024. <https://www.kff.org/medicaid/issue-brief/state-approaches-to-addressing-the-opioid-epidemic-findings-from-a-survey-of-state-medicaid-programs/>
16. Lin LA, Knudsen HK. Comparing buprenorphine-prescribing physicians across nonmetropolitan and metropolitan areas in the United States. *Ann Fam Med*. 2019;17(3):212-220. doi:10.1370/afm.2384
17. Economic Research Service, U.S. Dept of Agriculture. Urban Influence Codes. Published online 2013. Accessed July 8, 2024. https://ers.usda.gov/sites/default/files/_laserfiche/DataFiles/53797/UrbanInfluenceCodes2013.xls

18. National Conference of State Legislatures. Nonemergency Medical Transportation (NEMT). February 13, 2023. Accessed May 29, 2025. <https://www.ncsl.org/health/nonemergency-medical-transportation-nemt>
19. Andrilla CHA, Woolcock SC, Garberson LA, Keppel GA, Graves JM, Patterson DG. *Trends in the Health Workforce Supply in the Rural U.S.* WWAMI Rural Health Research Center, University of Washington; October 2024. <https://familymedicine.uw.edu/rhrc/publications/trends-in-the-health-workforce-supply-in-the-rural-u-s/>
20. Rural Residency Planning and Development (RRPD) Program. Health Resources and Services Administration. August 2024. Accessed February 3, 2025. <https://www.hrsa.gov/rural-health/grants/rural-health-research-policy/rrpd>
21. Education and Training of the Rural Healthcare Workforce Overview. Rural Health Information Hub. January 7, 2025. Accessed February 3, 2025. <https://www.ruralhealthinfo.org/topics/workforce-education-and-training>
22. Burchim SE, Patterson DG, Andrilla CHA. *RCORP Grantees' Sustained Challenges, Technical Assistance Needs, and Technical Assistance Provided: A Review of the September 2022 Request for Information.* Evaluation Brief. WWAMI Rural Health Research Center, University of Washington; April 2023. https://familymedicine.uw.edu/rhrc/wp-content/uploads/sites/4/2024/02/RHRC_RCORP_EBAPR2023_Burchim.pdf

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TECHNICAL APPENDIX

This study used data from the 2019 Medicaid T-MSIS analytic files (TAF) for Medicaid beneficiaries who resided in the U.S. The data set included claims from the TAF Other Services (OT) file for beneficiaries who had a claim with an ICD-10 diagnosis code of opioid use disorder (F11) or opioid overdose (T40).

The TAF OT file contains records for physician services, outpatient hospital utilization, lab/X-ray, clinical services, home health, and hospice. Claims in the TAF OT file include fee-for-service, managed care encounters and supplemental payments for Medicaid, Medicaid-expansion Children's Health Insurance Program (CHIP), and separate CHIP. We used both the TAF OT base claims file and the TAF OT line file. Each row in the base claims file represented a claim. Each row in the line file represented an item or service for which a claim of payment was made to Medicaid. Beneficiary information (age, sex, and ZIP Code for home or mailing address) came from the TAF Demographic and Eligibility file and visit information (place of service, provider type, servicing provider National Provider Identifier (NPI), and servicing provider specialty) came from the TAF OT base claim and line files. Given that neither file had a ZIP Code for the place of service, we used the servicing provider's practice location ZIP Code (obtained from the July 2019 full replacement monthly NPI file) as a proxy for where a visit took place (provider location).

The final analytic data set (after the exclusions discussed below) included data on 120,251,913 visits and contained rows of data from the TAF OT line file. We considered each group of rows with the same beneficiary ID, visit date, and servicing provider NPI number to be a single beneficiary visit.

We used the July 2019 Drug Enforcement Administration (DEA) list of clinicians with a waiver to prescribe buprenorphine for Opioid Use Disorder (OUD) to identify counties with and without a waived provider.

A SAS macro that accessed Google Maps allowed us to calculate one-way driving distance and travel time between beneficiary location (origin) and provider location (destination). We modified the macro so that we could calculate the distance between ZIP Codes rather than addresses, as we did not have access to full addresses for beneficiaries. We calculated driving distance and travel time for the 1,841,322 unique ZIP Code pairs in the study. If a beneficiary and provider were located in different states with a driving distance of 1,000 miles or more, we excluded the visit (n=4,286,933 visits excluded).

We were not able to calculate driving distance and travel time for 5,583,304 visits. Google Maps could not calculate driving distance for some locations in and around mountains or bodies of water. In addition, we were not able to determine driving distance for beneficiaries who traveled to a provider located in the same ZIP Code in which the beneficiary lived. We excluded most visits for which we could not calculate driving distance from the analytic data set except for visits where the beneficiary and provider were located in the same ZIP Code. Since rural beneficiaries are more likely to have visits in their home ZIP Codes than their urban counterparts, we chose to impute a mileage of zero for those visits. This provided a more conservative approach to assessing rural-urban and intra-rural differences in distance traveled.