

FINAL REPORT

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Adult Obesity in Rural America: An examination of the relationships between obesity prevalence, sociodemographic factors, access to care, and differences between rural and urban counties

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Table of Contents

Introduction	1
Obesity Prevalence in Rural Areas	1
Methodology.....	2
Limitations	3
Key Findings	3
State Case Studies: Arkansas & Texas	17
Discussion.....	21
Summary of Analysis & Case Study Findings	21
Areas of Future Research & Policy Implications	22
Conclusion	23

Introduction

Obesity is a complex and chronic disease that is a growing public health problem in the United States, where there are an estimated 100 million adults living with obesity.¹ A large body of evidence confirms that obesity is more prevalent in rural than urban areas. This is driven in part by socioeconomic factors such as income and food security, which tend to be lower in rural America. While individual- and community-level drivers of obesity in rural areas are well-documented in existing literature, there is less research on how health system factors relate to a higher obesity burden or may contribute to challenges in accessing obesity-related treatment in rural areas.

This analysis builds on existing research by investigating the relationships between the prevalence of obesity, diverse socioeconomic factors, and various health access measures in rural areas compared to non-rural ones. We also include two case studies of Arkansas and Texas, in order to take a closer look at these measures and add nuance and detail to our findings, especially related to obesity-treatment access. We sought to detect if there are differences in how socioeconomic and health access measures interact with obesity prevalence in rural versus non-rural areas. We also strove to identify gaps in existing research and areas for future research.

Obesity Prevalence in Rural Areas

Obesity is substantially more prevalent among adult rural populations than urban ones. A prior analysis by NORC in 2022 led to the creation of an Obesity & Comorbidity Prevalence Map which shows that, nationally, 48 percent of adults in non-metro areas are living with obesity, compared to 41 percent in metro areas.² Many other studies have confirmed this finding. Rural and urban areas can be distinguished at the county level as metropolitan (metro) and nonmetropolitan (nonmetro). Our analysis uses a classification scheme (discussed in greater detail below) to categorize counties into three types, based on population and proximity to larger population areas.

Research also shows that obesity prevalence varies by sex, age, race, ethnicity, and education.³ Sociodemographic factors may also interact with urbanicity, such as increased racial disparities in obesity prevalence in rural vs. urban areas.⁴

Obesity is related to multiple other health issues, many of which can be life-threatening as well as require extensive treatment. For example, the NORC Obesity & Comorbidity Prevalence Map

¹ <https://obesitymap.norc.org/>

² https://obesitymap.norc.org/w_aa5c5d12/resources/Obesity%20in%20the%20United%20States_FactSheet.pdf

³ [Differences in Obesity Prevalence by Demographic Characteristics and Urbanization Level Among Adults in the United States, 2013-2016 | Obesity | JAMA | JAMA Network](#)

⁴ [Black/White Disparities in Obesity Widen with Increasing Rurality: Evidence from a National Survey | Health Equity \(liebertpub.com\)](#)

found an association between obesity and nine leading causes of preventable premature death, including high cholesterol, hypertension, diabetes, and cardiovascular disease. Rural residents are more likely to die from multiple chronic diseases—such as diabetes, heart disease, and cancer—linked to obesity.⁵

Methodology

The data for this analysis come from various sources, the majority of which are publicly available. All of the data have been aggregated at the county or county-equivalent level. The resulting dataset can then be used to examine correlations between adult obesity rates for counties based on their socioeconomic characteristics (i.e., poverty rates) and measures of health access (i.e., availability of certain medical specialties). The adult obesity rates for counties come from the 2022 County Health Rankings & Roadmaps (CHR&R) database, which is derived from the Centers for Disease Control and Prevention's Behavioral Risk Factor Surveillance System, using a multilevel model. Socioeconomic and health access measures were identified based on a literature review and availability of data. The majority of the data was pulled from the Agency for Healthcare Research and Quality (AHRQ) Social Determinants of Health database.

Other sources include the U.S. Census Bureau's American Community Survey (five-year estimates), Medicare Geographic Variation Public Use File, and the National Plan and Provider Enumeration System. We also included a dataset from GoodRx, a U.S. company with a mission to build better ways for people to find the right care at the best price, which analyzed health care deserts in 2021.⁶ The data includes distances to health care facilities, including hospitals and pharmacies, and county-level estimates of adults living in health care deserts. (*A full list of measures and data sources can be found in Appendix A.*)

We compiled data for 3,142 counties and county-equivalents using these data sources. This represents 99.9 percent of all 50 states and Washington D.C. Counties were categorized as metropolitan, micropolitan, or noncore using the 2013 U.S. Department of Agriculture's urban influence codes that define urban and rural areas.⁷ This scheme defines metropolitan counties by the population size of their metro area, and micropolitan and noncore counties by the size of their largest city, or town, and proximity to metro and micropolitan areas. Our definition of rural areas included both micropolitan and noncore counties. For example, in Texas—which is featured later as a short case study—El Paso County has 860,000 residents, making it a metropolitan county. Cooke County, TX, on the northern outskirts of Dallas, is a micropolitan

⁵ [Rural Americans at higher risk of death from five leading causes | CDC Online Newsroom | CDC](#)

⁶ [Mapping Healthcare Deserts: 80% of the Country Lacks Adequate Access to Healthcare - GoodRx](#)

⁷ [USDA ERS - Urban Influence Codes](#)

county with a population of 41,000. Duval County, TX, close to the border with Mexico, is a noncore county with just 10,000 residents.

This study provides descriptive statistics demonstrating the differences among metropolitan, micropolitan, and noncore counties for a range of measures. We used the population-weighted average of the estimates to provide national, U.S. census region, and select state-level estimates. We employed an area-level model to understand the association between the county characteristic (socioeconomic and health access measure) and obesity rate separately for metro, micro, and noncore counties. We used aggregate county-level data to identify the relationship between associated measures and obesity prevalence, scaling it to allow for comparison across measures that have different units. Scaling helps us understand which measures are most associated with an increase or decrease in obesity prevalence within and across county types. *(More details about our methodology can be found in Appendix B.)*

Limitations

This analysis has three primary limitations. First, our obesity prevalence estimates are lower than estimates that may be used in other research. The obesity prevalence estimates for this analysis are based on self-reported survey data. Other analyses, including the NORC Obesity & Comorbidity Map, adjust for self-reported data bias using verified physical examination data, such as the National Health and Nutrition Examination Survey (NHANES). In addition, CHR&R uses a multilevel model to produce estimates for all counties, even small counties with low representation in survey. Both factors contribute to a lower-than-expected obesity prevalence estimate compared to other research. Second, our area-level approach used aggregate, county-level data. This type of approach does not allow for individual-level analysis; therefore, our research cannot identify causal relationships and is limited to associations. This type of model is only able to analyze one variable at a time, so it does not consider the interaction and impact of multiple variables on obesity prevalence. Finally, this analysis is limited to the adult population.

Key Findings

The following sections discuss five key findings from our analysis:

► Obesity is more prevalent in rural counties.

Using county obesity prevalence estimates drawn from the CHR&R database, we found that rural counties (both micropolitan and noncore) have a greater percentage of adults living with obesity than metro counties. The prevalence is highest in noncore counties, which are the most rural.

Figure 1. Adult obesity prevalence by county type, 2022

	Non-Rural	Rural	
	Metropolitan	Micropolitan	Noncore
Adult Obesity Prevalence	29.0%	34.1%	34.7%

Source: County Health Rankings & Roadmaps

As a reminder, the obesity prevalence estimates are lower-than-expected compared to other research based on the reasons discussed above.

The following sections discuss diverse socioeconomic and demographic measures, and various health access measures. Both descriptive statistics, as population-weighted averages, and associations with adult obesity prevalence are discussed throughout the findings. *(Full descriptive statistics and area-level model results are available in the Appendix.)*

► **Social and economic factors contribute to the higher burden of obesity in rural areas.**

There has been significant research to identify the various factors that contribute to obesity, including socioeconomic status, access to food, and physical activity levels. Several social and economic factors contribute to the higher burden of obesity in rural areas, including lower incomes and education levels, lower rates of food security, and limited options for physical activity compared to urban areas.^{8,9} To better understand the differences between rural and non-rural counties—as well as the association between obesity prevalence and the preidentified measures, such as access to food and physical activity levels—we investigated the following:

- **Income.** The average economic status of adults is lower in micropolitan and noncore counties than in metropolitan ones. We measured economic status by looking at poverty status, number of households per county receiving Supplemental Nutritional Assistance Program benefits (SNAP), and median household income. All of the economic status measures included in this analysis indicate that people in rural areas are poorer and had smaller incomes than their urban counterparts.

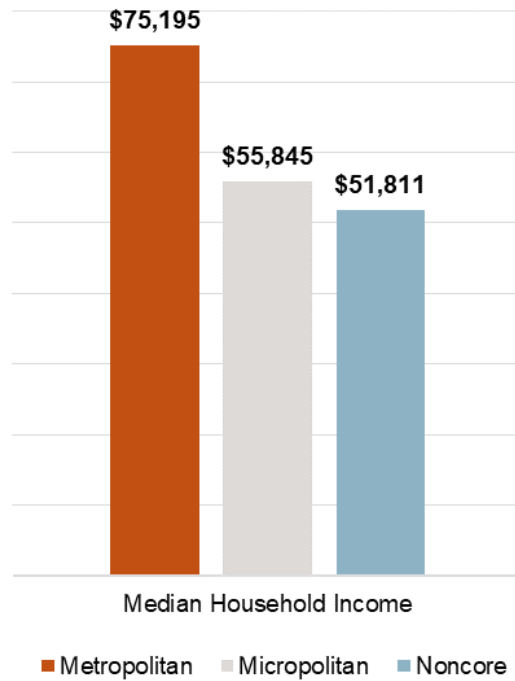
Previous research identified income as one of the primary factors contributing to an increased risk of obesity, as individuals of lower economic standing may not be able to afford the same care or healthy food as those with higher incomes.¹⁰ Figure 2 reveals that median household income is nearly \$25,000 greater in metropolitan than in noncore counties.

⁸ [The Burden of Obesity in the Rural Adult Population of America – PMC \(nih.gov\)](#)

⁹ [NRHA-Policy-Paper-final-Obesity-prevention-and-treatment-in-rural-America.pdf \(ruralhealth.us\)](#)

¹⁰ [The Burden of Obesity in the Rural Adult Population of America – PMC \(nih.gov\)](#)

Figure 2. Median household income, by county type, 2021



Source: American Community Survey, U.S. Census Bureau accessed from Census API

Our area-level model also found that poverty levels and median household income are associated with changes in obesity across the three county types. The model shows that an increase in income is associated with a decrease in obesity prevalence. We found that in noncore counties, every \$1,000 increase in household median income is associated with a 0.1 percentage point (pp) decrease in county level obesity prevalence (Figure 3). This effect is directionally the same but stronger in metropolitan counties, where every \$1,000 increase in income is associated with a 0.2 pp decrease in county-level obesity.

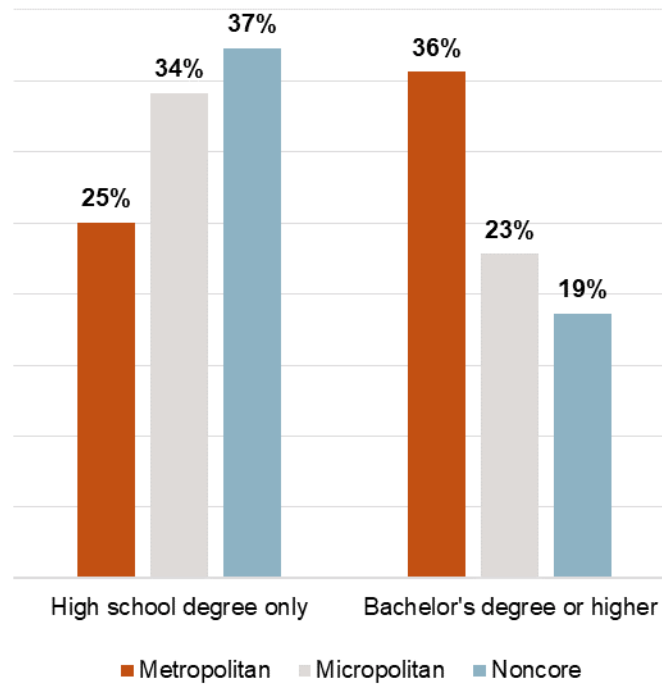
Figure 3. Association between median household income and adult obesity prevalence

County-Level Measure: Household Income	Non-Rural	Rural	
	Metropolitan	Micropolitan	Noncore
Median Household Income	↓ -0.2 pp	↓ -0.2 pp	↓ -0.1 pp

In noncore counties, a \$1,000 increase in the county median household income is associated with a 0.1 percentage point decrease in the county adult obesity prevalence.

- Education.** A person’s level of education has been identified as “the most stable variable over time” that is associated with obesity,¹¹ meaning that (over time) education is most consistently associated with obesity compared to other variables. Our analysis was limited to associations between obesity prevalence and a single variable—educational attainment—while previous research examined the significant relationships between the level of education and other socioeconomic variables such as income and occupation.¹² We found that micropolitan and noncore counties have lower educational levels than metropolitan counties, and that level of educational attainment is associated with obesity prevalence in all types of counties. For example, Figure 4 shows that noncore counties have the highest percentage of population with only a high school degree and the lowest percentage of population with a bachelor’s degree or higher.

Figure 4. Educational attainment, by county type, 2021



Source: American Community Survey, U.S. Census Bureau accessed from Census API

The area-level model also shows an association between lower educational attainment and increased obesity prevalence across *all* counties, rural and urban. The greatest increase to obesity prevalence is in metropolitan counties, where a 1pp increase in the rate of population that only has a high school degree is associated with a 0.7pp increase in obesity prevalence. In other words, when the number of people who only finish high school rises so does the obesity rate, and this increase is greatest in urban areas. As one might anticipate, as educational

¹¹ [Socioeconomics of Obesity - PMC \(nih.gov\)](https://pubmed.ncbi.nlm.nih.gov/26111111/)

¹² [Socioeconomics of Obesity - PMC \(nih.gov\)](https://pubmed.ncbi.nlm.nih.gov/26111111/)

attainment increases, obesity prevalence declines. The magnitude of the impact of a bachelor’s degree or higher is fairly similar across county types.

Figure 5. Association between educational attainment and adult obesity prevalence

County-Level Measure: Education Level	Non-Rural	Rural	
	Metropolitan	Micropolitan	Noncore
Percent with high school degree only	↑ +0.7 pp	↑ +0.4 pp	↑ +0.3 pp
Percent with bachelor’s degree or higher	↓ -0.3 pp	↓ -0.4 pp	↓ -0.3 pp

In noncore counties, a 1 percentage point increase in the county rate of the population with a bachelor’s degree or higher is associated with a 0.3 percentage point decrease in the county adult obesity prevalence.



- **Access to Healthy Foods.** Prior studies have shown that food insecurity and lack of access to healthy foods are both associated with an increased risk of chronic disease, including obesity.¹³ A National Institutes of Health study found that higher-income individuals make more trips to grocery stores with a wider variety of food options.¹⁴ Meanwhile, rural communities often lack the same options, resulting in food deserts or areas with limited-to-no access to fresh, affordable food.¹⁵ Other barriers, such as lower incomes and less access to transportation, may compound the problem.

We evaluated access to healthy food using the Food Environment Index (FEI), a CHR&R diet and exercise metric that measures access to food by the population’s proximity to healthy foods and average income of the area.¹⁶ The index ranges from 0 to 10, with 0 being the worst access and 10 the best. Our analysis found that noncore and micropolitan counties nationwide score lower on the FEI, indicating limited access to healthy foods compared to their metropolitan peers. The area-level model revealed that the higher the FEI score the lower the prevalence of obesity, no matter whether a county was urban or rural. However, metropolitan counties with the best access also showed a smaller proportion of adults living with obesity.

In addition, our research showed that 10.4 percent of the population of noncore counties is low income and does not live near a grocery store, compared to 8.6 percent in micropolitan areas, and 6.7 percent in metro ones. The difference in access to healthy foods between rural and non-rural counties is particularly large in the West, with almost three of every 20

¹³ [Food Accessibility, Insecurity and Health Outcomes \(nih.gov\)](#)

¹⁴ [The Burden of Obesity in the Rural Adult Population of America - PMC \(nih.gov\)](#)

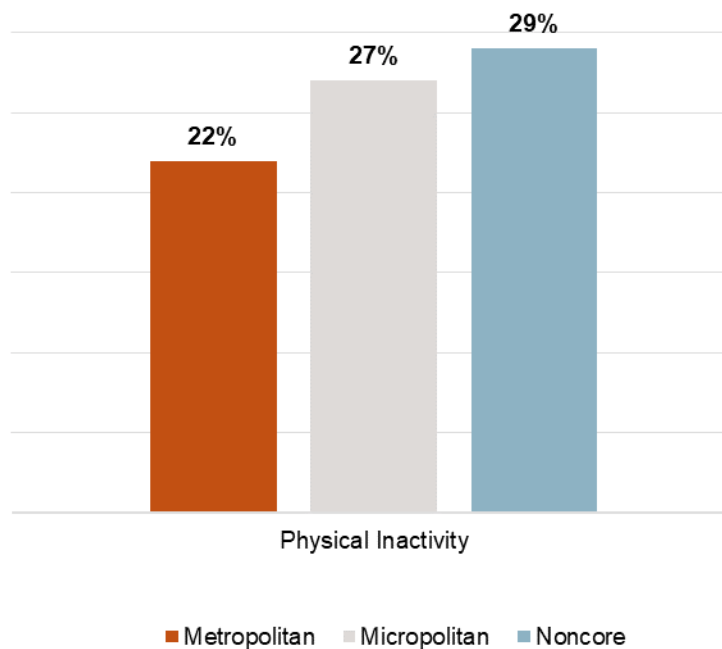
¹⁵ [Rural Hunger and Access to Healthy Food Overview - Rural Health Information Hub](#)

¹⁶ [Food Environment Index | County Health Rankings & Roadmaps](#)

people (15.7 percent) in noncore counties having limited access to healthy foods whereas only about seven out of 100 (7.2 percent) face that challenge in metro areas.

- **Access to Exercise Opportunities.** Exercise is commonly cited as one of the most important ways to maintain a healthy weight and lose excess weight. However, not everyone has access to safe places to exercise which leads to higher rates of physical inactivity. This increases the risk of obesity. Existing evidence has shown that rural Americans do not have the same access to exercise facilities as those in metropolitan areas, further compounding the disparities between rural and non-rural residents.¹⁷ Not only do individuals living in metropolitan counties have the benefit of greater access, they also are more likely to have free time to be physically active. Figure 6 shows that noncore counties have the highest physical inactivity rate.

Figure 6. Physical Inactivity rate, by county type, 2020



Source: AHRQ Social Determinants of Health Database

Our area-level model found that physical inactivity is associated with an increase in obesity prevalence across all three county types (Figure 7). For example, in noncore counties, when physical inactivity increases by 1pp there is an associated 0.5pp increase in obesity prevalence. As before, the effect of physical inactivity on obesity prevalence is directionally the same across the three county types but has the largest impact on metropolitan counties.

¹⁷ [The Burden of Obesity in the Rural Adult Population of America - PMC \(nih.gov\)](#)

Figure 7. Association between physical inactivity and adult obesity prevalence

County-Level Measure: Physical Inactivity	Non-Rural	Rural	
	Metropolitan	Micropolitan	Noncore
Percent with no leisure-time activity	↑ +0.7 pp	↑ +0.6 pp	↑ +0.5 pp

In noncore counties, a 1 percentage point increase in the county rate of physical inactivity is associated with a 0.5 percentage point increase in the county adult obesity prevalence.



Summary: Social and economic factors contribute to higher obesity rates in rural areas.

Like prior studies, ours found that lower socioeconomic status, reduced access to food, and fewer options for exercise contribute to higher obesity prevalence especially in rural areas. While our analysis did not find any directional differences in the association between socioeconomic measures and obesity prevalence between rural and non-rural areas, we found that the magnitude of the association varied somewhat. Taken together, these findings suggest that addressing and preventing obesity in rural areas will involve tackling the same difficult socioeconomic challenges as in non-rural areas.

► **Race and ethnicity play a role in obesity prevalence.**

We also examined how demographic factors are associated with obesity prevalence, using aggregate county-level data:

- **Race/Ethnicity.** Previous research, including our own Obesity & Comorbidity Prevalence Map, has shown that obesity prevalence rates are higher for non-Hispanic Blacks, Hispanics/Latinos, and other minorities—including American Indian, Alaskan Native, Native Hawaiian, Pacific Islander, and those who are multiracial—than non-Hispanic whites and Asians.¹⁸ Other research suggests that this gap is wider in rural than urban America.¹⁹ While data demonstrate that these disparities exist, there is limited research as to why they may be greater in rural communities.

Many minority populations are associated with an increase in obesity prevalence in noncore counties (Figure 8). Interestingly, we found a negative association between the percentage of Hispanic residents and county obesity prevalence (i.e., there were fewer people with obesity in areas with more Hispanic people).

¹⁸ https://obesitymap.norc.org/_w_311446cc/resources/Obesity%20in%20the%20United%20States_FactSheet.pdf

¹⁹ <https://www.liebertpub.com/doi/10.1089/heq.2021.0149>

Figure 8. Association between race/ethnicity and adult obesity prevalence

County-Level Measure: Race / Ethnicity	Non-Rural	Rural	
	Metropolitan	Micropolitan	Noncore
White	↓ -0.0 pp	↓ -0.1 pp	↓ -0.1 pp
Black	↑ +0.1 pp	↑ +0.1 pp	↑ +0.2 pp
Hispanic	↓ -0.1 pp	↓ -0.1 pp	↓ -0.1 pp
Asian	↓ -0.7 pp	↓ -0.5 pp	↑ +0.1 pp
American Indian / Alaskan Native	↑ +0.0 pp	↑ +0.1 pp	↑ +0.1 pp
Native Hawaiian and Pacific Islander	↓ -0.9 pp	↓ -0.9 pp	↓ -0.1 pp
Multiracial	↓ -0.7 pp	↓ -0.2 pp	↑ +0.0 pp

In noncore counties, a 1 percentage point increase in the county rate of Black population is associated with a 0.2 percentage point increase in the county adult obesity prevalence.

Source: Race / ethnicity data from AHRQ Social Determinants of Health Database

Summary: Demographics interact with and influence obesity prevalence.

While this study only analyzed the association between race/ethnicity and obesity prevalence, other studies have examined multiple demographics and established that they play a role in obesity prevalence. We discovered some differences in direction, and small differences in the magnitude of the relationship, across county types. While it is beyond the scope of this study to explore other factors that might account for the relationship between membership in a racial group and obesity, it is noteworthy that many of the factors that have been well-documented as results of systematic racism and discrimination (e.g., income, educational opportunities, access to healthy foods) are associated with increases in obesity. A direction for future research might be to explore those other factors to better understand the potential causal relationship between systematic racism, discrimination, and obesity among Black, Hispanic, American Indian/Alaskan Native, and multiracial individuals. Additional research at the individual level would be useful to understand these patterns. (See the future research section for more.)

- ▶ Limited health care access in rural areas makes it more challenging to treat obesity.

Health insurance and access to quality health care are essential to preventing and treating obesity.²⁰ However, in rural areas, a variety of challenges limit access to both. Following is a closer look at several barriers.

²⁰ [2022ObesityReport_FINAL3923.pdf \(tfah.org\)](#)

- **Providers and Specialists.** Effective obesity treatment requires care coordination by a multidisciplinary team. Workforce shortages and limited access to specialized services hamper this approach in rural areas. Additionally, primary care providers (PCPs) often fail to provide an obesity diagnosis and quality weight-loss counseling.²¹ Even when obesity is identified, rural patients face a lack of specialty providers and services. For instance, health facilities in rural areas are less likely to have nutritionists, dietitians, or weight management providers.²² There are also fewer nutrition education and obesity prevention programs in rural than urban areas.²³

Consistent with existing literature, our analysis finds that 62 percent of noncore counties are medically underserved (areas with a shortage of primary care services),²⁴ By contrast, only 11 percent of metropolitan counties are considered such. The gap between urban and rural areas is even greater in the U.S. Census Bureau's South Region, with 85 percent of noncore counties deemed medically underserved compared to only 22 percent of metro counties.

It may come as no surprise that metropolitan counties have a greater number of PCPs, cardiovascular and other specialists—including endocrinologists and registered dietitians—than their more rural counterparts. Figures 9 and 10 show the average number of PCPs and select obesity-related specialists per 100,000, by county type, respectively. Notably, metro counties have nearly twice as many PCPs as noncore counties. In addition, we found that while the number of physicians that specialize in obesity is low across the board, there is a greater shortage in rural counties. Metropolitan counties have an average of 0.38 obesity medicine physicians per 100,000, compared to 0.17 per 100,000 in micropolitan, and 0.10 per 100,000 in noncore counties.

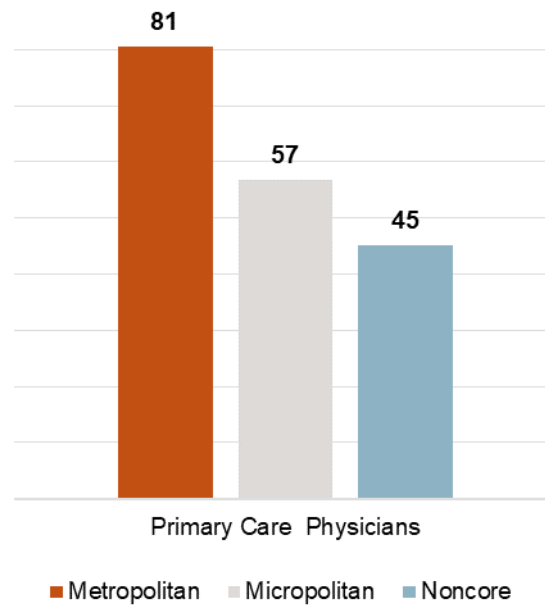
²¹ [Befort OB-1402-09413 Report \(pcori.org\)](#)

²² [NRHA-Policy-Paper-final-Obesity-prevention-and-treatment-in-rural-America.pdf \(ruralhealth.us\)](#)

²³ [NRHA-Policy-Paper-final-Obesity-prevention-and-treatment-in-rural-America.pdf \(ruralhealth.us\)](#)

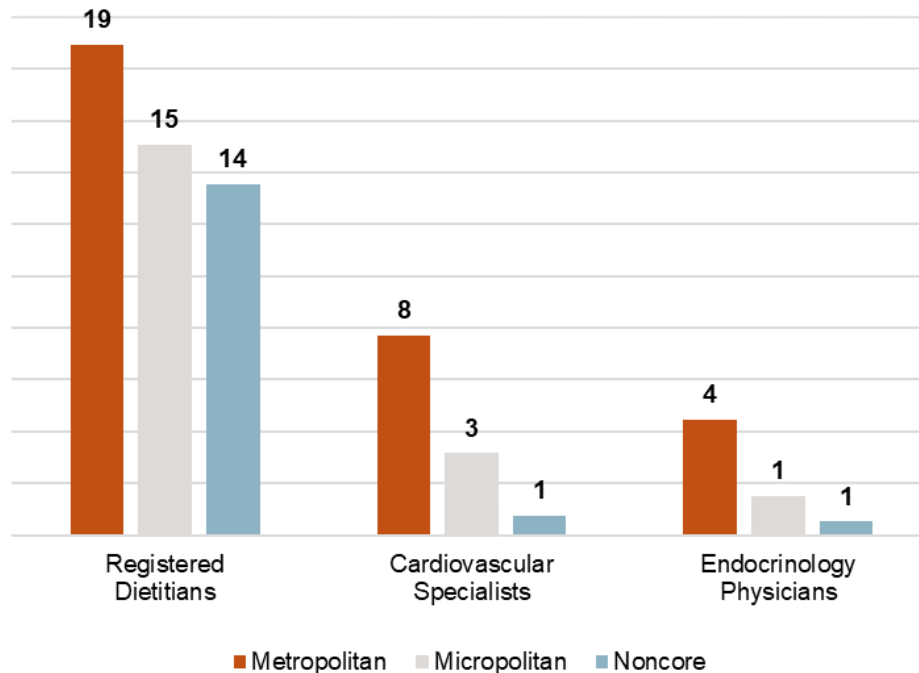
²⁴ [AHRQ Social Determinants of Health Database Data Source Documentation](#)

Figure 9. Primary Care Physicians per 100,000, by county type, 2019



Source: AHRQ Social Determinants of Health Database

Figure 10. Obesity-Related Specialists per 100,000, by county type, 2019-2023



Sources: Cardiovascular specialists from AHRQ Social Determinants of Health Database, 2019 data. Registered dietitians and endocrinology physicians from NPPES Registry, 2023 data

This analysis confirms the relatively limited number of physicians and specialists in rural areas, especially those who focus on obesity. Given the established importance of coordination across multiple providers for obesity prevention and treatment, this is an important gap for policymakers to consider as they seek ways to improve the health, and potentially the productivity, of rural residents.

- Insurance Coverage.** In addition to provider shortages, access to obesity treatment in rural America is restricted by other factors such as insurance coverage. Compared to urban adults, rural ones are more likely to be uninsured or rely on Medicare or Medicaid.²⁵ Nearly a quarter of all residents in noncore counties are on Medicare or Medicaid as compared to 17 percent on Medicare and 20 percent on Medicaid in metropolitan counties (Figure 11).

Figure 11. Insurance coverage, by county type, 2021

	Non-Rural	Rural	
	Metropolitan	Micropolitan	Noncore
Uninsured	9%	9%	10%
Employer-Provided	57%	51%	46%
Medicare	17%	21%	24%
Medicaid	20%	23%	24%

Source: American Community Survey, U.S. Census Bureau accessed from Census API. Note: Totals will not equal 100 percent across insurance types as some individuals may be enrolled in multiple plans.

Treatment coverage may be limited even for those who are insured. For example, Medicare prohibits coverage of pharmacological obesity treatments and requires the administration of intensive behavioral therapy for obesity (IBTO) in a primary care setting.^{26,27} As mentioned earlier, the lack of PCPs in rural areas presents a challenge for Medicare recipients who need IBTO. This barrier is notable as obesity is growing faster among older U.S. adults (ages 65+) than any other age group.²⁸

Type of health insurance can be another hurdle. Private health insurers are required to cover obesity screening and counseling, as preventive care, but there is no similar requirement for other treatments.²⁹ An Urban Institute analysis using 2016-2017 data found that pharmacological obesity treatment was the least-covered treatment for obesity (across Medicaid programs, state employee health insurance, and the state benchmark plans that guide other plan requirements) in stark contrast to higher coverage rates for the more invasive option of

²⁵ [NRHA-Policy-Paper-final-Obesity-prevention-and-treatment-in-rural-America.pdf \(ruralhealth.us\)](#)

²⁶ [NRHA-Policy-Paper-final-Obesity-prevention-and-treatment-in-rural-America.pdf \(ruralhealth.us\)](#)

²⁷ [Intensive Behavioral Therapy for Obesity \(cms.gov\)](#)

²⁸ [The Burden of Obesity in the Rural Adult Population of America – PMC \(nih.gov\)](#)

²⁹ [Obesity across America: Geographic Variation in Disease Prevalence and Treatment Options \(urban.org\)](#)

bariatric surgery.³⁰ Medicaid coverage for obesity treatment options also varies widely across states, with many Medicaid programs failing to provide coverage for nutritional counseling focused on dietary changes.³¹ Higher rates of uninsurance and heavier reliance on Medicare and Medicaid make it challenging for people in rural areas to access the full spectrum of obesity treatment options.

- **Distance to Care.** Long travel times and limited transportation options also serve as barriers to care in rural areas.³² Urban dwellers have multiple advantages over rural residents when it comes to ease of access, including shorter travel times to the nearest health clinic. The closest clinic for a metro resident is an average of 3.4 miles away, compared to 5.6 miles in micropolitan counties, and 6.0 miles in noncore ones. In the U.S. Census Bureau's West Region, the distances that people in noncore counties have to travel are even greater. The closest clinic for noncore residents is an average of 12.8 miles away, nearly six times the distance (2.6 miles) of regional metro residents. Similarly, a much larger share of residents in noncore counties live in a hospital desert. Based on the GoodRx analysis, people who live in an area where it takes more than 30 minutes to drive to the nearest hospital are considered to live in a hospital desert. Leveraging these data, we found that—on average—more than one in four (28 percent) noncore county residents lives more than a 30-minute drive from a hospital. By contrast, only 17 percent of micropolitan residents and seven percent of metropolitan county residents live in a hospital desert.

Pharmacists can also play a role in preventing and managing obesity.³³ People living in rural areas are more likely to have less access to pharmacies than urban dwellers. Using the GoodRx analysis, people who live in an area in which residents have to drive more than 15 minutes to the nearest three pharmacies are considered to live in a pharmacy desert. Using the data from the analysis, we found that—on average—well over half the population (58 percent) of noncore counties live in a pharmacy desert, compared to slightly more than a third (34 percent) in micropolitan counties, and just two out of 25 (eight percent) in metropolitan areas.

Not owning or having access to a vehicle at home can also be a barrier to care in rural counties where public transportation is limited. The area-level model found that this particular barrier is associated with an increase in obesity prevalence in both micropolitan and noncore counties. Interestingly, the opposite holds true in metropolitan counties, potentially reflecting the interaction of other variables, such as better access to public transportation in a denser urban setting.

- **Internet Access.** Lack of internet is yet another hurdle to care in rural areas, particularly when it comes to telehealth. On average, nearly a quarter of noncore residents have no internet access, whereas only 16 percent of metro residents can't get online (Figure 12).

³⁰ [Obesity across America: Geographic Variation in Disease Prevalence and Treatment Options \(urban.org\)](#)

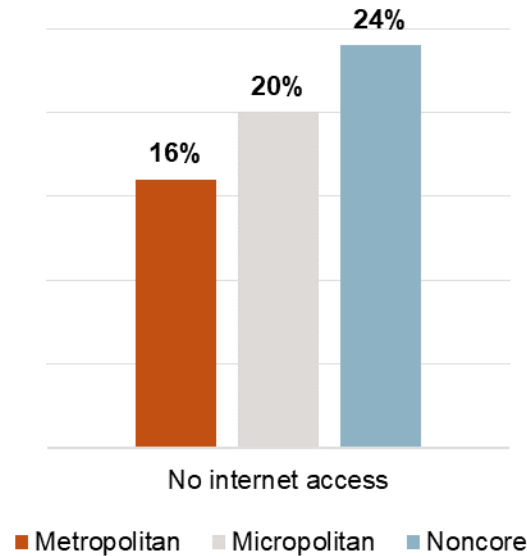
³¹ [Obesity across America: Geographic Variation in Disease Prevalence and Treatment Options \(urban.org\)](#)

³² [Telemedicine and primary care obesity management in rural areas – innovative approach for older adults? - PMC \(nih.gov\)](#)

³³ [Exploring the Role of Community Pharmacists in Obesity and Weight Management in Qatar: A Mixed-Methods Study \(nih.gov\)](#)

This lack of connectivity is particularly problematic when it comes to telehealth, which has effectively expanded access to treatment in rural areas, including for diabetes and other specialized care.^{34,35} That said, there is limited research on the efficacy of telehealth at treating people for obesity.

Figure 12. Share of the population with no internet access, by county type, 2019



Source: AHRQ Social Determinants of Health Database

Our area-level model found that lack of internet access is associated with higher obesity prevalence across all three county types (Figure 13). For example, in micropolitan counties, a 1 pp increase in the number of people with no internet access is associated with a 0.3 pp increase in that county’s obesity prevalence rate.

Figure 13. Association between internet access and adult obesity prevalence

County-Level Measure: No internet access	Rural		
	Non-Rural Metropolitan	Micropolitan	Noncore
Percent with no internet access	↑ +0.4 pp	↑ +0.3 pp	↑ +0.2 pp

In micropolitan counties, a 1 percentage point increase in the county rate of the population with no internet access is associated with 0.3 percentage point increase in the county adult obesity prevalence.

Summary: Limited health care access in rural areas makes it more challenging to treat obesity.

³⁴ [Telemedicine and primary care obesity management in rural areas – innovative approach for older adults? - PMC \(nih.gov\)](#)

³⁵ [Telemedicine intervention effects on waist circumference and body mass index in the IDEATel project](#)

We found less access to the PCPs and specialists needed for effective obesity prevention and treatment in rural counties. Additional rural barriers include more uninsured residents, longer distances to clinics, and less internet access. We also identified some small directional differences in the association between health access measures and obesity prevalence between rural and non-rural areas, such as access to a vehicle and insurance-coverage type, suggesting that there may be other variables at play. The magnitude of the association varied somewhat across county types, suggesting that both non-rural and rural areas will need to continue focusing on access to care.

► **Certain measures are most associated with changes in obesity prevalence.**

Scaling the area-level model allowed us to compare across measures with different units, in order to identify measures that have the largest magnitude of association with obesity prevalence. Figures 14 and 15, below, show the measures that are most associated with an increase or decrease in obesity prevalence in each county type. Characteristics that are strongly associated with an *increase* in obesity prevalence—including less physical activity, higher poverty levels, and lower educational attainment—are shared across county type (Figure 14). All three types also share characteristics that are strongly associated with a *decrease* in obesity prevalence (Figure 15), such as higher household income and levels of education, as well as some access to specialists.

Figure 14. Top five measures most associated with an *increase* in obesity prevalence, from greatest association to fifth greatest association

Non-Rural	Rural	
Metropolitan	Micropolitan	Noncore
Physical inactivity rate	Population without access to a vehicle	Physical inactivity rate
Percent of population with a high school degree only	Physical inactivity rate	Population without access to a vehicle
Percent of population with no internet access	Percent of population with a high school degree only	Percent of population with a high school degree only
Percent of population with a disability	Percent of population receiving SNAP	Percent of population that is Black
Percent of population receiving SNAP	Percent of population with a disability	Percent of population receiving Medicaid

Figure 15. Top five measures most associated with a *decrease* in obesity prevalence from greatest association to fifth greatest association

Non-Rural	Rural	
Metropolitan	Micropolitan	Noncore
Percent of population that is Asian	Median household income	Percent of population with a bachelor’s degree or higher
Percent of population with a bachelor’s degree or higher	Percent of population with a bachelor’s degree or higher	Percent of population with a master’s or graduate level degree
Percent of population with a master’s or graduate level degree	Percent of population with a master’s or graduate level degree	Median household income
Median household income	Percent of population that is Asian	Percent of population that is white
Percent of population with private health insurance	Number of medical specialists per 1,000 population	Percent of population that is Hispanic

For full list of measures and the results from the area-level model (unscaled and scaled), see Appendix H.

Summary: Many common measures are associated with an increase or decrease in obesity prevalence across county types.

The area-level model suggests that many of the factors associated with an increase or decrease in obesity prevalence are the same across geographies with physical inactivity, education level, and income level showing up across each county type.

State Case Studies: Arkansas & Texas

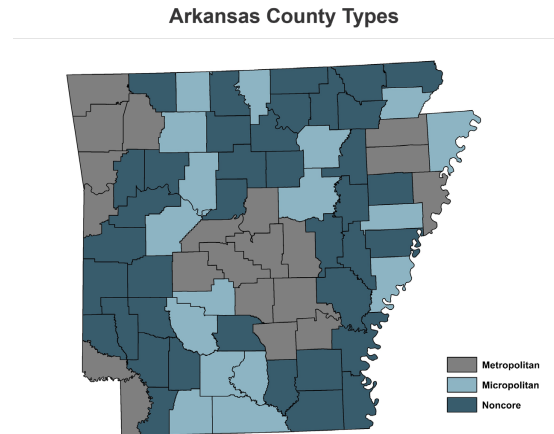
To provide additional state-level data and identify unique trends, we decided to take a closer look at two states—Arkansas and Texas—that have a large number of rural counties. Arkansas and Texas were selected in conjunction with Novo Nordisk based on the number of rural counties and the higher prevalence of obesity in both states. According to our classification of micropolitan and noncore counties as rural areas, 73 percent of Arkansas’ counties are rural while slightly fewer Texas counties (67 percent) are such. In these two states, the adult obesity rates across all county types are also higher than national averages.

Arkansas

Arkansas has a total of 75 counties, 55 of which qualify as rural according to our classification. The obesity prevalence across all of the counties is relatively consistent; metropolitan counties have an obesity prevalence of 34 percent and both micropolitan and noncore counties are at 36 percent. These rural counties align with national and southern trends by exhibiting lower educational attainment, higher poverty and physical inactivity rates, and less access to food than the state’s metropolitan counties. Arkansas ranks particularly low on the FEI, with micropolitan and noncore counties scoring lower than counties in the same categories

nationwide, and across census regions. Lower access to healthy foods and less physical activity are both associated with higher obesity rates. Arkansas residents are also less physically active across all county types when compared to the rest of the nation and their neighboring southern states.

When looking at access to care, there is a stark contrast between the state’s rural and metropolitan counties when it comes to hospital beds. Its metro counties have more hospital beds per 1,000 people than similar counties nationwide and in the South, while noncore counties have substantially fewer. When it comes to distance to care, people in metropolitan Arkansas counties have greater access than their micropolitan and noncore county counterparts but are more likely to have to travel farther than people in metropolitan counties elsewhere in the South and nationwide. For example, 17 percent of metropolitan county residents in Arkansas live in a hospital desert compared to a seven percent nationwide average. On average, 28 percent of noncore residents and 20 percent of micropolitan residents in Arkansas live in hospital desert.



There is also an abundance of registered dietitians in metro areas—on par with or more than in other states—but a dearth in micropolitan and noncore counties. In terms of physicians who specialize in obesity, the state’s rural areas have none. While the number of these types of specialists is low nationwide, to not have a single obesity medicine specialist in micro and noncore Arkansas counties is notable.

In sum, when it comes to access to providers and care, Arkansas is a tale of two extremes. Metropolitan areas have comparable or even better access than neighboring southern and other states. However, rural areas have less access than their counterparts elsewhere, suggesting that managing obesity and related comorbidities could be particularly difficult for the state’s rural residents, a point that is noteworthy for policymakers and others addressing health disparities.

Figure 16, below, compares select Arkansas statistics to national data as well as those from the U.S. Census Bureau’s South Region.

Figure 16. Key Arkansas, U.S. Census Bureau South Region and National Statistics

Key Statistics Comparison of Arkansas, U.S. Census Bureau South Region, & national averages	Arkansas			South Census Region			National		
	Metro	Micro	Noncore	Metro	Micro	Noncore	Metro	Micro	Noncore
Number of Counties	20	17	38	592	261	569	1166	641	1335
Adult Obesity Prevalence ●	34%	36%	36%	31%	36%	36%	29%	34%	35%
Select Drivers of Obesity Measures									
Percent under 100% federal poverty limit ●	15%	18%	19%	13%	19%	21%	12%	16%	19%
Percent with a high school degree only ●	31%	38%	40%	26%	34%	38%	25%	34%	37%
Percent with a bachelor's degree or higher ◆	29%	18%	15%	34%	20%	16%	36%	23%	19%
Food Environment Index (0=worst, 10=Best) ◆	7.1	6.4	6.2	7.7	6.9	6.9	8.1	7.4	7.3
Physical Inactivity (Percent with no leisure-time activity) ●	28%	34%	34%	24%	31%	32%	22%	27%	29%
Select Access-to-Care Measures									
Hospital Beds (per 1,000) ◆	4.2	2.9	2.2	3.0	3.0	2.3	2.8	2.6	2.6
Primary Care Physicians (per 100,000) ◆	79.0	57.4	42.4	73.8	51.0	36.6	80.6	56.9	45.1
Obesity Medicine Physicians (per 100,000) ◆	0.3	0	0	0.4	0.2	0.1	0.4	0.1	0.1
Registered Dietitians (per 100,000) ◆	21.9	10.9	9.5	16.3	12.1	9.5	18.9	15.1	13.6
Percent of counties deemed medically underserved areas ●	20%	57%	94%	22%	61%	85%	11%	39%	62%
Percent of population in pharmacy deserts ●	18%	38%	48%	9%	33%	50%	8%	34%	58%
Percent of population in hospital deserts ●	17%	20%	28%	9%	17%	28%	7%	17%	28%
Percent with no internet access ●	18%	25%	29%	14%	23%	28%	13%	19%	24%

Measures where lower numbers are associated with better health outcomes ●

Measures where higher numbers are associated with better health outcomes ◆

Texas

In many ways, the Lone Star State’s micro and noncore counties mirror those of its southern neighbors— including Arkansas—and other heavily rural states; they exhibit lower socioeconomic standing, less access to healthy foods, lower rates of physical activity, and fewer PCPs and specialists than metropolitan counties. (See *Figure 17* for details on the number of select obesity-related providers by county type.)

Also, similar to national statistics, Texas residents living in metropolitan counties are less likely to live in a pharmacy desert than those in micro or noncore counties. On average, two of 25 (eight percent) metro residents live more than 15 minutes from the nearest three pharmacies. By contrast, 17 of 25 (68 percent) Texans living in noncore counties and slightly more than nine of 25 (37 percent) micropolitan residents live in pharmacy deserts.

Texas County Types

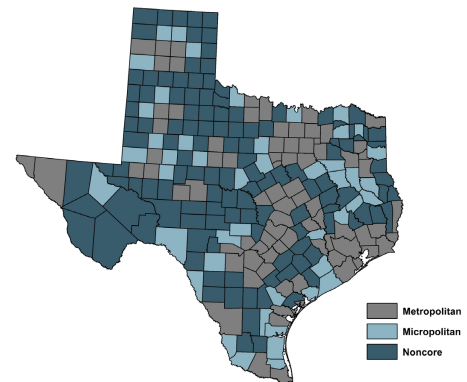


Figure 17. Obesity-related providers (per 100,000) across Texas

	Non-Rural	Rural	
	Metro	Micro	Noncore
Primary Care Physicians	64.2	41.3	33.1
Cardiovascular Specialists	5.5	2.3	0.4
Medical Specialists	88.2	28.9	8.6
Obesity Medicine Physicians	0.3	0.1	0.0
Endocrinology Physicians	3.6	1.0	0.2
Registered Dietitians	14.2	9.9	8.2
Gastroenterologists	0.2	1.1	0.8
Community Health Workers	16.6	7.5	9.7

Sources: AHRQ Social Determinants of Health Database, NPES Registry, and Texas Department of State Health Services

In other ways, Texas is unique. It’s one of the few states that provides public data on community health workers (CHWs). CHWs act as liaisons between community members and medical and social services, helping people find providers and access resources.³⁶ Given the complex nature of obesity, CHWs can play an important role in identifying the various specialists and resources to best manage it. Metropolitan counties in Texas have nearly twice as many CHWs

³⁶ <https://www.ncoa.org/article/the-role-of-community-health-workers-in-fighting-obesity-and-chronic-disease>

as rural areas; there are an average of 16.6 CHWs per 100,000 in metro counties, 7.5 per 100,000 in micro counties, and 9.7 per 100,000 in noncore counties.

CHWs can also be particularly valuable in working with hard-to-reach populations. One study of CHWs who were helping to bridge health equity gaps by expanding access to preventive health services to El Paso's low-income Hispanics illustrates this point. The analysis found that participants who completed recommended activities such as meal planning and exercise—both critical to achieving and maintaining a healthy weight—had better health outcomes.³⁷ While this suggests that engaging CHWs could be valuable in addressing obesity and its related comorbidities, especially in harder-to-reach populations in rural areas, there is currently little current research on their role in doing so.

Discussion

Summary of Analysis & Case Study Findings

Our goal was to understand the differences between metropolitan, micropolitan, and noncore counties in terms of the social and economic drivers of obesity, and access to care for obesity and related comorbidities. We found that noncore and micropolitan counties largely have lower levels of income, educational attainment, and physical activity, as well as less access to safe options for exercise and healthy foods. All of these contribute to higher obesity prevalence and worse health outcomes. These factors were all associated with an increase in obesity across the three county types. Our findings are consistent with those of prior studies that have focused on factors that contribute to obesity.

In addition, we discovered that noncore and micropolitan counties largely have less access to providers and specialists, have higher rates of uninsured residents, lower rates of internet access, and are more likely to be classified as medically underserved than metropolitan areas. These measures demonstrate the difficulties that rural populations face in accessing treatment and care for obesity.

Our deeper examination of Arkansas and Texas, both of which are mostly rural, allowed for a closer look at state-level data across measures. It revealed similar trends in associations to national and southern census data and reinforced our overall findings. These studies also revealed state-level differences in socioeconomic and health access measures across rural and non-rural areas. These differences demonstrate the need to consider regional context as well as rurality when developing obesity prevention approaches.

Furthermore, in order to identify potential areas for policymakers to focus on when addressing obesity, we investigated whether the magnitude or direction of the association between obesity

³⁷ <https://pubmed.ncbi.nlm.nih.gov/34791885/>

and the socioeconomic and health access measures differed between rural and non-rural areas. Overall, there were no major differences between the factors that contribute to obesity—nor the relationship between access to care and obesity prevalence—across the three county types. These findings suggest that policymakers should continue addressing the socioeconomic factors that are known to contribute to obesity prevalence across both urban and rural areas, as well as increase their focus on overcoming barriers to access in rural communities where they are a major challenge.

Areas of Future Research & Policy Implications

This study lays a foundation for researchers to build upon in order to provide deeper insights into the effects of rural sociodemographic factors and access to care on obesity prevalence. Three areas of promising research have emerged from this work:

- **Individual-level analysis.** An individual-level analysis using claims data would be useful to further understanding disparities in access to care by urbanicity or demographic factors. It would enable researchers to better investigate how individuals living with obesity interact with health care systems, for better-targeted interventions. However, one challenge is that obesity may be substantially under-documented in claims data, even relative to self-reported surveys.³⁸
- **Intersection of race/ethnicity and obesity.** A more granular individual-level examination of obesity prevalence, socioeconomic factors, and health access measures of minority populations in rural areas would be useful to policymakers and others. There is limited research on obesity prevalence in rural residents who are minorities. Understanding why disparities may be greater in rural rather than urban areas would help identify potential solutions to such disparities.
- **Rural-specific programs focused on expanding access.** More research is needed on the effectiveness of telehealth in treating obesity among adults in rural settings, so as to support the expansion of effective programs into areas with limited access to health care facilities. Such research could also shed light for health insurers on the need to cover obesity treatments via telehealth. In addition, more research is needed on the role of community health workers (CHWs) in supporting obesity treatment. CHWs already serve hard-to-reach, or medically underserved populations, and further examination of their important contributions in expanding obesity care access and reducing disparities in rural areas could be helpful to decision-makers.

Our findings underscore the complexity of obesity, and the various resources required to address it, no matter where someone lives. However, there should be a special focus on expanding access to the full continuum of obesity care in rural areas given that they exhibit greatly reduced access to and coordination of care required to prevent and treat obesity, due to

³⁸ <https://www.novonordiskworks.com/content/dam/nnw/resource-library/pdf/milliman-white-paper.pdf>

fewer providers, less insurance coverage, further distances to facilities, and less internet access.

Conclusion

Our analysis found that socioeconomic factors associated with obesity are more prevalent in non-core and micropolitan counties. These factors—including household income, educational attainment, physical activity, access to healthy foods, and places that residents can be physically active—have an inverse relationship with obesity prevalence and related health outcomes. That is, higher levels of these measures (e.g., physical activity) are typically associated with lower prevalence of obesity. Noncore and micropolitan counties also have less access to providers and specialists, increased rates of residents who are uninsured, lower rates of internet access, and were more likely to be classified as medically underserved than metropolitan areas. This highlights the challenges in accessing treatment and care for obesity in rural areas.

Our state case studies confirmed our overall findings while shedding light on the role of CHWs in expanding access to care and the importance of considering the state/regional context when addressing the social drivers of obesity and barriers in rural areas. There were no major differences between the factors that contribute to obesity or the relationship between access to care and obesity prevalence across county types.

Our findings highlight the complexity of obesity and the various resources needed to address it across different county contexts. Unlike prior literature on rural obesity that mainly focused on social drivers, our analysis has opened up an important discussion of health system factors that impact rural residents, emphasizing the role of health care payers, providers, state health departments, and policymakers in expanding access to obesity care and reducing the obesity burden on people who live in rural areas. Expanding access to the full continuum of care for obesity in rural areas (e.g., access to primary care physicians and specialists) is an essential starting point to better health for communities as well as individuals.

Lastly, our research points to the limitations of examining the many factors that contribute to obesity at the county level. Additional research at the individual level that ultimately supports targeted interventions to prevent and address obesity in rural areas is needed to further understand disparities in access to care by urbanicity, race/ethnicity, and other demographic factors.

This project was funded by Novo Nordisk. Novo Nordisk is a leading global healthcare company that's been making innovative medicines to help people living with serious chronic diseases longer, healthier lives for more than 100 years.