

# FINAL REPORT

SEPTEMBER 2023

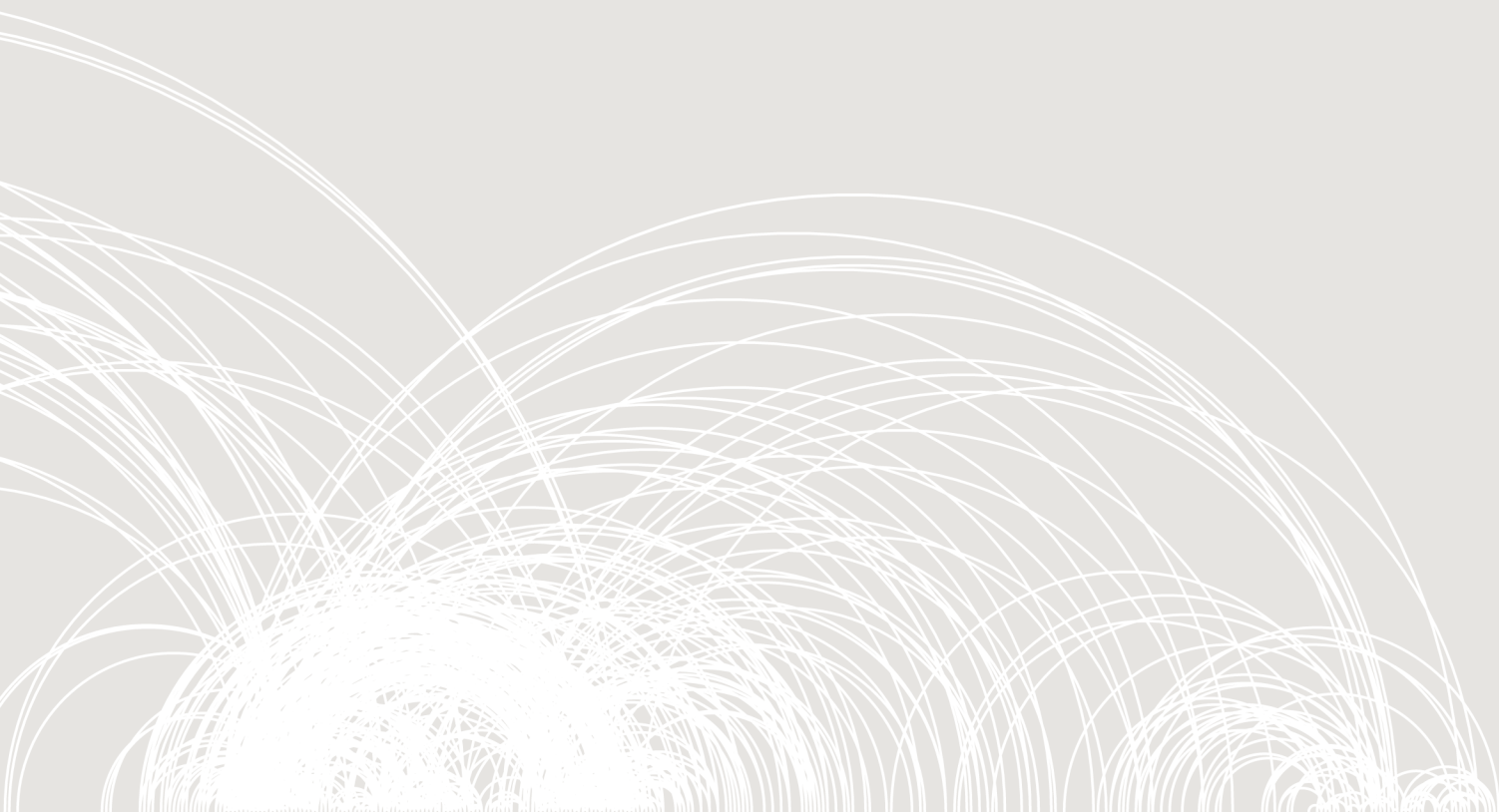
## Adult Obesity in Rural America: Appendix

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# Appendix A. Measures Included in the Analysis

Measure	Definition	Variable Name	Source 1	Source 2	Year
Adult obesity rate	Percentage of the adult population (age 18 and older) that reports a body mass index (BMI) greater than or equal to 30 kg/m2 (age-adjusted).	adult.obesity	<a href="#">County Health Rankings</a>	BRFSS / CDC PLACES	2020
Food Environment Index	Index of factors that contribute to a healthy food environment, from 0 (worst) to 10 (best). This measure includes access to healthy foods by considering the distance an individual lives from a grocery store, or supermarket, locations for healthy food purchases in most communities, and the inability to access healthy food because of cost barriers.	food.index		USDA Food Environment Atlas	2020
Limited access to healthy foods	Percentage of population that is low-income and does not live close to a grocery store.	healthy.foods		USDA Food Environment Atlas	2019
Access to exercise opportunities	Percentage of population with adequate access to locations for physical activity.	access.exercise		ArcGIS Business Analyst	2022
Physical inactivity	Percentage of adults age 18 and over reporting no leisure-time physical activity (age-adjusted).	phys.inactivity		BRFSS / CDC PLACES	2020
Percent under 18 years old	Percentage of population between 0 and 17.	ACS_PCT_AGE_0_17	<a href="#">AHRQ SDOH Database</a>	ACS	2019
Percent between 18 and 29 years old	Percentage of population between 18 and 29.	ACS_PCT_AGE_18_29			
Percent between 30 and 44 years old	Percentage of population between 30 and 44.	ACS_PCT_AGE_30_44			
Percent between 45 and 64 years old	Percentage of population between 45 and 64.	ACS_PCT_AGE_45_64			
Percent 65 years old or older	Percentage of population 65 and older.	ACS_PCT_AGE_ABOVE65			
Percent 80 years old or older	Percentage of population 80 and older.	ACS_PCT_AGE_ABOVE80			
Percent white only	Percentage of population reporting race as white only.	ACS_PCT_WHITE			
Percent Black only	Percentage of population reporting race as Black or African American only.	ACS_PCT_BLACK			
Percent Hispanic or Latino	Percentage of population reporting ethnicity as Hispanic.	ACS_PCT_HISPANIC			
Percent Asian only	Percentage of population reporting race as Asian only.	ACS_PCT_ASIAN			
Percent American Indian / Alaskan Native only	Percentage of population reporting race as American Indian and Alaska Native only.	ACS_PCT_AIAN			
Percent Native Hawaiian / Pacific Islander only	Percentage of population reporting race as Native Hawaiian and Pacific Islander only.	ACS_PCT_NATIVE HAWAIIAN / PACIFIC ISLANDER			
Percent multiple races	Percentage of population reporting as multiracial.	ACS_PCT_MULT_RACE			

Measure	Definition	Variable Name	Source 1	Source 2	Year
Percent U.S. Military Veterans	Percentage of the civilian population consisting of veterans (ages 18 and over).	ACS_PCT_VET			
Percent active-duty U.S. Armed Forces	Percentage of the 16+ population who report employment as active-duty armed forces.	ACS_PCT_AF			
Percent with less than a high school degree	Percentage of population with less than a high school education (ages 25 and over).	ACS_PCT_LT_HS			
Percent with a high school degree	Percentage of population with only high school diploma (ages 25 and over)	ACS_PCT_HS_GRADUATE			
Percent with an associate's degree or some college	Percentage of population with some college or an associate's degree (ages 25 and over).	ACS_PCT_COLLEGE_ASSOCIATE_DGR			
Percent with a bachelor's degree	Percentage of population with a bachelor's degree (ages 25 and over).	ACS_PCT_BACHELOR_DGR			
Percent with a master's degree or higher education	Percentage of population with a master's or professional school degree, or doctorate (ages 25 and over).	ACS_PCT_GRADUATE_DGR			
Percent without any health insurance	Percentage of population with no health insurance coverage.	ACS_PCT_UNINSURED			
Percent with private health insurance	Percentage of the civilian noninstitutionalized population covered by employer-provided, direct purchase, or TRICARE health insurance.	ACS_PCT_PRIVCOV	<a href="#">Census API</a>	ACS	2021
Percent with employer-sponsored health insurance (group)	Percentage of the civilian noninstitutionalized population covered by employer-sponsored (group) health insurance	ACS_PCT_ESI			
Percent with direct-purchase health insurance (non-group)	Percentage of the civilian noninstitutionalized population covered by direct purchase (nongroup) health insurance	ACS_PCT_DIRECT			
Percent with public health coverage	Percentage of the civilian noninstitutionalized population covered by Medicare, Medicaid/CHIP, or VA Health care.	ACS_PCT_PUBCOV			
Percent with Medicare	Percentage of the civilian noninstitutionalized population covered by Medicare.	ACS_PCT_MCARE			
Percent with Medicaid/CHIP	Percentage of the civilian noninstitutionalized population covered by Medicaid or some other state government operated, means-tested health coverage.	ACS_PCT_MCAID			
Percent of people in poverty	Percentage of population below poverty level.	ACS_PCT_POV			
Percent of households receiving Supplemental Nutrition Assistance Program (SNAP) benefits	Percentage of households who report receiving SNAP benefits (food stamps).	ACS_PCT_SNAP			

Measure	Definition	Variable Name	Source 1	Source 2	Year
Median household income (in \$1,000s)	Median household income – includes wage and salary, self-employed earnings, interest, retirement, and other income sources.	ACS_MEDIAN_HINC2			
Percent with a disability (18 to 64 years old)	Percentage of the civilian noninstitutionalized population ages 18 to 64 who report difficulty with one or more functional limitations.	ACS_PCT_DISABLE_18_64	<a href="#">Census API</a>	ACS	2021
Percent of households without a vehicle	Percentage of housing units with no vehicle available.	ACS_PCT_HU_NO_VEH			
Percent of households without internet access	Percentage of households with no internet access.	ACS_PCT_HH_NO_INTERNET			
Number of hospital beds (per 1,000)	Total number of hospital beds per 1,000 population.	AHRF_HOSP_BED_RATE	<a href="#">AHRQ SDOH Database</a>	AHA Survey	2018
Number of hospitals (per 1,000)	Total number of hospitals per 1,000 population.	AHRF_HOSPS_RATE			
Number of Rural Health Clinics (RHC) (per 1,000)	Total number of RHCs per 1,000 population.	POS_RHC_RATE		CMS Provider of Services	2019
Mean distance to nearest health clinic (Federally Qualified Health Center, RHC)	Mean distance in miles to the nearest health clinic (FQHC, RHC), calculated using population weighted tract centroids in the county.	POS_MEAN_DIST_CLINIC			
County designation as a Medically Underserved Area (MUA)	MUAs are geographic areas with a lack of access to primary care services.	HRSA_MUA_COUNTY		HRSA Data Warehouse	2019
County designation as a Health Professional Shortage Area (HPSA)	HPSA is a code that identifies a shortage of primary care physicians	AHRF_HPSA_PRIM			
Number of primary care physicians (per 100k)	Total number of non-federal primary care physicians per 1,000 residents.	AHRF_PHYS_PRIMARY_RATE	AMA Physician Master file	2019	
Number of medical specialists (per 100k)	Total number of medical specialists per 1,000 residents.	AHRF_MED_SPEC_RATE			
Number of cardiovascular specialists (per 100k)	Total number of cardiovascular disease specialists per 1,000 residents.	AHRF_CARDIOVAS_SPEC_RATE			
Number of gastroenterologists (per 100k)	Providers per 100,000 residents, identified using the following codes from the Centers for Medicare & Medicaid Services National Plan & Provider Enumeration System (NPPES) Registry and geocoded at county level: 207RG0100X (Gastroenterology Physician).	Gastro_Phys	<a href="#">NPPES Registry</a>		2023
Number of endocrinologists (per 100k)	Providers per 100,000 residents, identified using the following codes from the NPPES Registry and geocoded at county level: 207RE0101X (Endocrinology, Diabetes & Metabolism Physician)	Endocrinology_Phys			

Measure	Definition	Variable Name	Source 1	Source 2	Year
Number of obesity medicine physicians (per 100k)	Providers per 100,000 residents, identified using the following codes from the NPPES Registry and geocoded at county level: 207RB0002X (Obesity Medicine – Internal Medicine Physician); 2083B0002X (Obesity Medicine – Preventive Medicine Physician); 2084B0002X (Obesity Medicine – Psychiatry & Neurology Physician); 207QB0002X (Obesity Medicine – Family Medicine Physician)	Obesity_Med	<a href="#">NPPES Registry</a>		2023
Number of nutritionists (per 100k)	Providers per 100,000 residents, identified using the following codes from the NPPES Registry and geocoded at county level: 133N00000X (Nutritionist)	Nutritionists			
Number of registered dietitians (per 100k)	Providers per 100,000 residents, identified using the following codes from the NPPES Registry and geocoded at county level: 133V00000X (Registered Dietitian)	Reg_Dietitian			
Percent of population living in a pharmacy desert	Percentage of county population living over 15 minutes from the nearest three pharmacies.	pharmacy_desert_pop_pct	<a href="#">GoodRx</a>		2021
Percent of population living in a hospital desert	Percentage of county population living over 30 minutes from the nearest hospital.	hospital_desert_pop_pct			
Number of community health workers (per 100k) – TX only	Number of community health workers per county, supplied by licensure data from licensing boards.	TX_COMM_HLTH_WRKRS_RATE	<a href="#">Texas DSHS</a>		2021

## Appendix B. Detailed Methodology

An area-level model was used with the aggregate county-level data to understand the relationship between socioeconomic and health access measures and adult obesity prevalence. To assess the differential associations of characteristics with adult obesity in urban and rural areas, we used the following model:

$$\hat{Y}_c = Y_c + v_c, \quad v_c \sim N(0, \psi_c)$$

$$Y_{g,c} = \alpha_g + \beta_g(X_{g,c} - \bar{X}) + \epsilon_c, \quad \epsilon_c \sim N(0, \sigma^2)$$

Where equation 1 represents the sampling model for the adult obesity estimates in the County Health Rankings,  $Y_c$  is the “true” obesity rate for county  $c$ , whereas  $\hat{Y}_c$  is the estimate, measured with error  $v_c$  which is normally distributed with known variance  $\psi_c$ . Equation 2 is the area-level model, where the true obesity rate for county  $c$  in urban/rural group  $g$  is a linear function of characteristic  $X_{g,c}$ , which is shifted by its mean  $\bar{X}$ . For each characteristic, this model estimates an intercept and slope for the relationship between the county characteristic and obesity rate separately for metro, micro, and noncore counties.

By subtracting the mean of the characteristic, the intercepts can be interpreted as the average obesity rates at the mean value of characteristic. To allow for comparisons of slopes across characteristics of differing scales,  $X_{g,c}$  is normalized by its mean and standard deviation so that the interpretation of slope coefficients across characteristics can all be interpreted as the association of a one-unit change in the standard deviation of  $X$  on county obesity rates.

This analysis examines only the unadjusted bivariate relationship between a selected county characteristic and the adult obesity rate, and should not be interpreted as causal. Because this model utilizes area-level aggregations of characteristics, it is unknown to what degree individual obesity is associated with the individual characteristics. For example, it is possible that areas with higher levels of poverty also experience higher levels of obesity. However, we cannot say that people who are living in poverty are just as likely to be living with obesity. Making this assumption is known as the ecological fallacy. In fact, Simpson’s paradox demonstrates how it is possible for individual and group-level associations to be in different directions.

# Appendix C. Population-Weighted Statistics, National

In this appendix and all the following appendices, the measures are presented as percentages unless otherwise noted. For Appendices C-G, the following key applies:

Measures where lower numbers are associated with better health outcomes ●

Measures where higher numbers are associated with better health outcomes ◆

Measure <i>(percentages unless otherwise noted)</i>	Overall	SD	Metro Counties	Micro Counties	Noncore Counties	Metro – Micro (%diff)	Metro – Noncore (%diff)
Number of counties	3142	0	1166	641	1335		
Percent of adult obesity ●	29.7	5.7	29.0	34.1	34.7	18%	20%
<b>Race / Ethnicity</b>							
White	72.5	16.6	70.6	84.2	84.6	19%	20%
Black	12.7	12.7	13.4	7.8	8.6	-42%	-36%
Hispanic	18.0	17.0	19.5	9.8	6.7	-50%	-65%
Asian	5.5	6.5	6.3	1.3	0.6	-80%	-91%
American Indian / Alaskan Native	0.8	3.2	0.6	1.8	2.6	196%	315%
Native Hawaiian / Pacific Islander	0.2	0.7	0.2	0.2	0.1	4%	-69%
Multiracial	3.3	2.0	3.5	2.7	2.1	-22%	-39%
<b>Age</b>							
Ages 0-17	22.6	2.9	22.7	22.2	21.8	-2%	-4%
Ages 18-29	16.5	3.4	16.8	16.1	13.6	-4%	-19%
Ages 30-44	19.4	2.4	19.8	17.4	16.7	-12%	-15%
Ages 45-64	25.8	2.4	25.7	26.3	27.5	2%	7%
Ages 65+	15.6	4.0	15.1	18.0	20.4	19%	35%
Ages 80+	3.8	1.2	3.7	4.3	4.9	17%	33%
<b>U.S. Military / Veterans</b>							
Veterans	6.9	2.9	6.7	8.2	8.3	23%	25%
Active-duty military	0.5	1.4	0.5	0.4	0.1	-14%	-81%
<b>Education</b>							
Less than a high school degree ●	11.2	5.0	11.0	12.0	13.6	9%	24%
High school degree only ●	26.4	7.3	25.0	34.1	37.3	36%	49%
Some college/associate's degree	28.8	4.9	28.4	31.2	30.5	10%	7%
Bachelor's degree or higher ◆	33.6	11.5	35.6	22.8	18.6	-36%	-48%
Master's or graduate-level degree ◆	13.0	5.8	13.9	8.3	6.5	-40%	-54%
<b>Disability</b>							
Ages 18-64 with a disability ●	10.4	3.5	9.8	13.8	15.6	42%	60%
<b>Misc.</b>							
Households without access to a vehicle ●	8.2	9.0	8.5	6.2	6.4	-27%	-25%



Measure <i>(percentages unless otherwise noted)</i>	Overall	SD	Metro Counties	Micro Counties	Noncore Counties	Metro – Micro (%diff)	Metro – Noncore (%diff)
<b>Telehealth Access</b>							
No internet access ●	13.8	5.9	12.6	19.4	24.1	54%	92%
<b>Health Insurance Coverage</b>							
Uninsured ●	8.8	4.5	8.6	9.4	10.4	9%	21%
Private health insurance	67.8	9.0	68.6	64.2	60.9	-6%	-11%
Employer-provided health insurance	55.4	9.0	56.5	50.6	46.4	-10%	-18%
Direct-purchase health insurance	13.5	2.9	13.2	14.6	15.7	10%	19%
Public health insurance	35.5	8.0	34.4	40.8	44.3	19%	29%
Medicare	17.6	4.6	16.8	21.1	24.0	25%	43%
Medicaid	20.3	7.3	19.8	22.6	24.0	14%	21%
<b>Income</b>							
In poverty (under 100 percent federal poverty level) ●	12.6	4.5	12.3	16.1	18.6	32%	51%
Households receiving SNAP ●	11.4	5.2	11.0	13.3	13.9	20%	26%
Median Household Income ◆	\$72,267	\$19,754	\$75,195	\$55,845	\$51,811	-26%	-31%
<b>Access to Food</b>							
Food Environment Index (0=worst, 10=Best) ◆	8.0	0.8	8.1	7.4	7.3	-8%	-9%
Limited access to healthy foods (percent that are low-income & not near a grocery store) ●	5.9	4.2	5.6	7.8	7.3	40%	29%
<b>Physical Activity</b>							
Physical inactivity (percent of adults with no leisure-time activity) ●	22.7	5.4	22.0	26.8	28.5	22%	30%
Access to exercise opportunities (percent of population with adequate access) ◆	84.5	16.2	88.0	68.0	56.0	-23%	-36%
<b>Hospitals / Clinics / Pharmacies</b>							
Hospital beds (per 1,000) ◆	2.8	2.0	2.8	2.6	2.6	-7%	-10%
Counties with >0 hospital beds ◆	1.0	0.2	1.0	1.0	0.8	-2%	-18%
Hospitals (per 1,000) ◆	0.019	0.023	0.015	0.031	0.061	109%	313%
Counties with >0 hospitals ◆	0.9	0.2	0.9	1.0	0.8		
Rural Health Clinics (per 1,000) ◆	0.032	0.102	0.011	0.097	0.266	818%	2433%
Mean distance to nearest health clinic (in miles) ●	3.7	3.7	3.4	5.6	6.0	64%	75%
County population living in a pharmacy desert ●	12.6	20.1	7.6	34.0	57.5	351%	660%
County population living in a hospital desert ●	8.9	15.6	6.8	17.3	28.4	154%	318%
<b>Providers</b>							
Primary Care Physicians (per 100k) ◆	76.6	31.7	80.6	56.9	45.1	-29%	-44%
Cardiovascular Specialists (per 100k) ◆	6.95	6.11	7.72	3.15	0.76	-59%	-90%
Medical Specialists (per 100k) ◆	104.0	81.3	115.9	40.9	15.9	-65%	-86%
Obesity Medicine Physicians (per 100k) ◆	0.344	0.477	0.377	0.172	0.102	-54%	-73%

Measure <i>(percentages unless otherwise noted)</i>	Overall	SD	Metro Counties	Micro Counties	Noncore Counties	Metro – Micro (%diff)	Metro – Noncore (%diff)
Endocrinology Physicians (per 100k) ♦	4.03	3.69	4.43	1.49	0.51	-66%	-88%
Registered Dietitians (per 100k) ♦	18.4	10.9	18.9	15.1	13.6	-20%	-28%
Obesity Medicine Registered Dietitians (per 100k) ♦	0.176	0.288	0.192	0.054	0.068	-72%	-65%
Nutritionists (per 100k) ♦	1.580	1.613	1.692	0.765	0.800	-55%	-53%
Gastroenterologists (per 100k) ♦	0.347	0.638	0.264	1.041	0.755	295%	186%
Counties deemed MUAs ●	0.163	0.369	0.111	0.391	0.621	254%	461%
Counties with no areas with primary- care shortages ♦	0.073	0.261	0.071	0.100	0.067	41%	-6%
Counties entirely made up of areas with primary-care shortages ●	0.047	0.213	0.022	0.120	0.332	449%	1421%

# Appendix D. Population-Weighted Statistics, U.S. Census Bureau Midwest Region

Measure <i>(percentages unless otherwise noted)</i>	Midwest				
	Metro Counties	Micro Counties	Noncore Counties	Metro – Micro (% diff)	Metro – Noncore (% diff)
Number of counties	302	232	521	-23%	73%
Percent of adult obesity ●	31.3	34.9	34.4	11%	10%
<b>Race / Ethnicity</b>					
White	77.2	92.1	93.3	19%	21%
Black	12.8	2.5	1.4	-80%	-89%
Hispanic	8.7	5.7	3.7	-35%	-57%
Asian	3.9	1.0	0.5	-74%	-87%
American Indian / Alaskan Native	0.4	0.8	2.2	99%	426%
Native Hawaiian / Pacific Islander	0.1	0.1	0.0	15%	-19%
Multiracial	2.9	2.2	1.8	-24%	-39%
<b>Age</b>					
Ages 0-17	22.9	22.3	22.3	-3%	-3%
Ages 18-29	16.7	16.0	12.9	-4%	-23%
Ages 30-44	19.2	17.2	16.2	-10%	-16%
Ages 45-64	26.0	26.5	27.7	2%	7%
Ages 65+	15.1	17.9	20.9	18%	38%
Ages 80+	3.8	4.6	5.5	22%	47%
<b>U.S. Military / Veteran</b>					
Veterans	6.4	8.1	8.6	26%	34%
Active-duty military	0.2	0.4	0.1	133%	-51%
<b>Education</b>					
Less than a high school degree ●	8.3	9.5	10.5	15%	26%
High school degree only ●	26.6	36.1	37.6	36%	41%
Some college/associate's degree	29.8	32.2	32.8	8%	10%
Bachelor's degree or higher ◆	35.3	22.2	19.2	-37%	-46%
Master's or graduate-level degree ◆	13.4	7.6	6.1	-43%	-55%
<b>Disability</b>					
Ages 18-64 with a disability ●	10.2	12.6	13.7	24%	35%
<b>Misc.</b>					
Households without access to a vehicle ●	7.7	6.0	5.8	-21%	-24%
<b>Telehealth Access</b>					
No internet access ●	13.1	17.3	21.2	32%	62%
<b>Health Insurance Coverage</b>					
Uninsured ●	6.4	7.3	8.5	15%	34%
Private health insurance	72.4	70.1	67.1	-3%	-7%

Measure <i>(percentages unless otherwise noted)</i>	Midwest				
	Metro Counties	Micro Counties	Noncore Counties	Metro – Micro (% diff)	Metro – Noncore (% diff)
Employer-provided health insurance	61.4	56.2	50.9	-8%	-17%
Direct-purchase health insurance	12.9	15.3	17.9	19%	38%
Public health insurance	33.3	37.5	41.0	13%	23%
Medicare	17.0	20.3	23.4	19%	38%
Medicaid	18.1	19.4	20.4	7%	12%
<b>Income</b>					
In poverty (under 100 percent federal poverty level) ●	12.1	13.7	16.4	13%	36%
Households receiving SNAP ●	10.6	10.9	10.8	2%	1%
Median Household Income ◆	\$70,438	\$58,384	\$56,447	-17%	-20%
<b>Access to Food</b>					
Food Environment Index (0=worst, 10=Best) ◆	8.1	7.9	7.9	-3%	-3%
Limited access to healthy foods (percent that are low-income & not near a grocery store) ●	5.8	6.6	7.0	13%	20%
<b>Physical Activity</b>					
Physical inactivity (percent of adults with no leisure-time activity) ●	22.4	26.4	26.9	18%	20%
Access to exercise opportunities (percent of population with adequate access) ◆	88.9	72.1	60.3	-19%	-32%
<b>Hospitals / Clinics / Pharmacies</b>					
Hospital beds (per 1,000) ◆	3.2	2.7	2.8	-16%	-11%
Counties with >0 hospital beds ◆	1.0	1.0	0.8	-1%	-16%
Hospitals (per 1,000) ◆	0.0	0.0	0.1	98%	350%
Rural Health Clinics (per 1,000) ◆	0.0	0.1	0.3	587%	2063%
Mean distance to nearest health clinic (in miles) ●	4.0	6.8	5.9	69%	48%
County population living in a pharmacy desert ●	10.0	35.6	63.9	254%	537%
County population living in a hospital desert ●	7.5	15.7	28.1	110%	276%
<b>Providers</b>					
Primary Care Physicians (per 100k) ◆	85.4	56.4	47.6	-34%	-44%
Cardiovascular Specialists (per 100k) ◆	8.0	2.4	0.4	-70%	-96%
Medical Specialists (per 100k) ◆	117.9	33.3	11.3	-72%	-90%
Obesity Medicine Physicians (per 100k) ◆	0.281	0.147	0.081	-48%	-71%
Endocrinology Physicians (per 100k) ◆	4.30	1.33	0.48	-69%	-89%
Registered Dietitians (per 100k) ◆	21.1	16.1	15.5	-24%	-27%
Obesity Medicine Registered Dietitians (per 100k) ◆	0.151	0.046	0.000	-69%	-100%
Nutritionists (per 100k) ◆	0.953	0.370	0.546	-61%	-43%
Gastroenterologists (per 100k) ◆	0.317	0.926	0.567	193%	79%
Counties deemed MUAs ●	0.0	0.2	0.4	475%	1000%
Counties with no areas with primary-care shortage ◆	0.1	0.2	0.1	45%	8%
Counties entirely made up of areas with primary-care shortages ●	0.0	0.1	0.2	227%	1301%

# Appendix E. Population-Weighted Statistics, U.S. Census Bureau Northeast Region

Measure <i>(percentages unless otherwise noted)</i>	Northeast				
	Metro Counties	Micro Counties	Noncore Counties	Metro – Micro (% diff)	Metro – Noncore (% diff)
Number of counties	130	46	41	-65%	-68%
Percent of adult obesity ●	27.0	33.1	32.0	23%	18%
<b>Race / Ethnicity</b>					
White	70.8	93.6	94.4	32%	33%
Black	12.9	2.2	1.9	-83%	-85%
Hispanic	15.5	3.0	2.8	-80%	-82%
Asian	7.0	1.0	0.7	-85%	-90%
American Indian / Alaskan Native	0.3	0.4	0.5	58%	65%
Native Hawaiian / Pacific Islander	0.0	0.0	0.0	-14%	-33%
Multiracial	3.0	1.8	1.8	-38%	-39%
<b>Age</b>					
Ages 0-17	21.0	19.3	18.8	-8%	-10%
Ages 18-29	16.5	15.2	13.6	-8%	-17%
Ages 30-44	19.1	16.7	16.2	-12%	-15%
Ages 45-64	27.1	29.0	29.8	7%	10%
Ages 65+	16.3	19.7	21.6	21%	32%
Ages 80+	4.3	4.9	5.1	14%	18%
<b>U.S. Military / Veteran</b>					
Veterans	5.0	8.3	8.7	66%	75%
Active-duty military	0.1	0.1	0.1	-58%	-59%
<b>Education</b>					
Less than a high school degree ●	10.2	9.0	9.0	-12%	-12%
High school degree only ●	26.6	37.1	38.4	40%	44%
Some college/associate's degree	23.8	27.3	27.2	15%	14%
Bachelor's degree or higher ◆	39.4	26.6	25.4	-32%	-35%
Master's or graduate-level degree ◆	16.7	11.0	9.9	-34%	-41%
<b>Disability</b>					
Ages 18-64 with a disability ●	9.2	13.3	14.2	44%	54%
<b>Misc.</b>					
Households without access to a vehicle ●	17.4	7.9	6.8	-54%	-61%
<b>Telehealth Access</b>					
No internet access ●	12.8	17.2	17.7	35%	39%
<b>Health Insurance Coverage</b>					
Uninsured ●	5.4	5.7	6.7	4%	24%
Private health insurance	70.8	69.1	66.0	-2%	-7%

Measure <i>(percentages unless otherwise noted)</i>	Northeast				
	Metro Counties	Micro Counties	Noncore Counties	Metro – Micro (% diff)	Metro – Noncore (% diff)
Employer-provided health insurance	59.6	56.0	50.7	-6%	-15%
Direct-purchase health insurance	13.5	15.1	16.7	12%	24%
Public health insurance	36.5	41.9	45.3	15%	24%
Medicare	17.8	23.0	25.3	29%	42%
Medicaid	22.0	22.3	24.2	1%	10%
<b>Income</b>					
In poverty (under 100 percent federal poverty limit) ●	11.6	12.3	13.9	7%	20%
Households receiving SNAP ●	12.3	12.8	13.1	4%	6%
Median Household Income ◆	\$82,099	\$61,683	\$57,968	-25%	-29%
<b>Access to Food</b>					
Food Environment Index (0=worst, 10=Best) ◆	8.5	8.2	8.1	-4%	-5%
Limited access to healthy foods (percent that are low-income & not near a grocery store) ●	3.4	4.8	3.4	40%	0%
<b>Physical Activity</b>					
Physical inactivity (percent of adults with no leisure-time activity) ●	22.7	24.1	24.5	6%	8%
Access to exercise opportunities (percent of population with adequate access) ◆	92.8	74.8	62.0	-19%	-33%
<b>Hospitals / Clinics / Pharmacies</b>					
Hospital beds (per 1,000) ◆	3.0	2.9	2.1	-4%	-31%
Counties with >0 hospital beds ◆	1.0	0.9	0.9	-5%	-6%
Hospitals (per 1,000) ◆	0.0	0.0	0.0	94%	194%
Rural Health Clinics (per 1,000) ◆	0.0	0.0	0.1	1674%	6291%
Mean distance to nearest health clinic (in miles) ●	3.3	7.2	6.9	121%	112%
County population living in a pharmacy desert ●	4.4	33.3	52.4	662%	1099%
County population living in a hospital desert ●	4.8	18.9	29.1	289%	501%
<b>Providers</b>					
Primary Care Physicians (per 100k) ◆	89.8	68.1	60.7	-24%	-32%
Cardiovascular Specialists (per 100k) ◆	11.7	5.6	1.5	-52%	-87%
Medical Specialists (per 100k) ◆	158.4	69.2	32.6	-56%	-79%
Obesity Medicine Physicians (per 100k) ◆	0.453	0.415	0.069	-8%	-85%
Endocrinology Physicians (per 100k) ◆	6.13	2.78	1.05	-55%	-83%
Registered Dietitians (per 100k) ◆	23.4	18.9	13.3	-19%	-43%
Obesity Medicine Registered Dietitians (per 100k) ◆	0.275	0.000	0.140	-100%	-49%
Nutritionists (per 100k) ◆	2.709	1.568	1.193	-42%	-56%
Gastroenterologists (per 100k) ◆	0.218	1.216	1.334	458%	512%
Counties deemed MUAs ●	0.0	0.1	0.1	59%	212%
Counties with no areas with primary-care shortages ◆	0.1	0.1	0.0	-17%	-68%
Counties entirely made up of areas with primary-care shortages ●	0.0	0.0	0.0	211%	158%

# Appendix F. Population-Weighted Statistics, U.S. Census Bureau South Region

Measure <i>(percentages unless otherwise noted)</i>	South				
	Metro Counties	Micro Counties	Noncore Counties	Metro – Micro (% diff)	Metro – Noncore (% diff)
Number of counties	592	261	569	-56%	-4%
Percent of adult obesity ●	31.1	36.0	36.4	16%	17%
<b>Race / Ethnicity</b>					
White	69.4	76.1	77.6	10%	12%
Black	19.7	16.8	16.4	-14%	-17%
Hispanic	19.3	11.1	7.9	-43%	-59%
Asian	3.9	0.8	0.5	-79%	-88%
American Indian / Alaskan Native	0.5	1.7	1.4	238%	178%
Native Hawaiian / Pacific Islander	0.1	0.1	0.1	21%	-30%
Multiracial	2.9	2.4	2.2	-17%	-25%
<b>Age</b>					
Ages 0-17	23.2	22.8	21.8	-2%	-6%
Ages 18-29	16.6	16.4	14.2	-1%	-14%
Ages 30-44	19.8	17.6	17.2	-11%	-13%
Ages 45-64	25.4	25.7	27.1	1%	7%
Ages 65+	15.0	17.5	19.7	17%	32%
Ages 80+	3.5	4.1	4.5	17%	30%
<b>U.S. Military / Veteran</b>					
Veterans	7.8	7.8	7.7	0%	-1%
Active-duty military	0.7	0.5	0.1	-36%	-89%
<b>Education</b>					
Less than a high school degree ●	11.4	15.4	17.3	35%	52%
High school degree only ●	25.8	34.4	38.4	33%	49%
Some college/associate's degree	28.7	29.9	28.3	4%	-2%
Bachelor's degree or higher ◆	34.1	20.3	16.0	-40%	-53%
Master's or graduate-level degree ◆	13.2	7.5	5.8	-43%	-56%
<b>Disability</b>					
Ages 18-64 with a disability ●	10.4	15.4	17.6	48%	69%
<b>Misc.</b>					
Households without access to a vehicle ●	6.0	6.4	6.7	7%	10%
<b>Telehealth Access</b>					
No internet access ●	13.7	23.4	28.0	71%	105%
<b>Health Insurance Coverage</b>					
Uninsured ●	12.0	12.4	12.1	4%	1%
Private health insurance	66.7	58.9	56.3	-12%	-16%

Measure <i>(percentages unless otherwise noted)</i>	South				
	Metro Counties	Micro Counties	Noncore Counties	Metro – Micro (% diff)	Metro – Noncore (% diff)
Employer-provided health insurance	53.5	45.9	43.4	-14%	-19%
Direct-purchase health insurance	13.5	13.6	13.8	0%	2%
Public health insurance	32.7	42.0	46.1	28%	41%
Medicare	17.0	21.2	24.2	25%	43%
Medicaid	17.6	24.2	26.2	38%	49%
<b>Income</b>					
In poverty (under 100 percent federal poverty limit) ●	13.1	19.0	20.6	45%	57%
Households receiving SNAP ●	11.4	15.5	16.5	36%	45%
Median Household Income ◆	\$69,257	\$49,092	\$46,573	-29%	-33%
<b>Access to Food</b>					
Food Environment Index (0=worst, 10=Best) ◆	7.7	6.9	6.9	-10%	-9%
Limited access to healthy foods (percent that are low-income & not near a grocery store) ●	7.5	8.7	6.9	17%	-7%
<b>Physical Activity</b>					
Physical inactivity (percent of adults with no leisure-time activity) ●	24.2	30.5	31.5	26%	30%
Access to exercise opportunities (percent of population with adequate access) ◆	82.7	59.2	49.1	-28%	-41%
<b>Hospitals / Clinics</b>					
Hospital beds (per 1,000) ◆	3.0	3.0	2.3	0%	-23%
Counties with >0 hospital beds ◆	1.0	0.9	0.8	-2%	-22%
Hospitals (per 1,000) ◆	0.0	0.0	0.0	79%	187%
Rural Health Clinics (per 1,000) ◆	0.0	0.1	0.3	722%	1775%
Mean distance to nearest health clinic (in miles) ●	3.7	4.1	4.3	10%	14%
County population living in a pharmacy desert ●	9.3	32.8	49.9	252%	436%
County population living in a hospital desert ●	8.6	16.6	27.7	93%	222%
<b>Providers</b>					
Primary Care Physicians (per 100k) ◆	73.8	51.0	36.6	-31%	-50%
Cardiovascular Specialists (per 100k) ◆	7.0	3.5	0.9	-50%	-88%
Medical Specialists (per 100k) ◆	104.5	39.8	15.8	-62%	-85%
Obesity Medicine Physicians (per 100k) ◆	0.426	0.142	0.134	-67%	-68%
Endocrinology Physicians (per 100k) ◆	4.20	1.39	0.53	-67%	-87%
Registered Dietitians (per 100k) ◆	16.3	12.1	9.5	-26%	-42%
Obesity Medicine Registered Dietitians (per 100k) ◆	0.201	0.063	0.092	-69%	-54%
Nutritionists (per 100k) ◆	1.412	0.648	0.697	-54%	-51%
Gastroenterologists (per 100k) ◆	0.332	1.265	0.825	281%	148%
Counties deemed MUAs ●	0.22	0.61	0.85	175%	284%
Counties with no areas with primary-care shortages ◆	0.1	0.1	0.0	4%	-44%
Counties entirely made up of areas with primary-care shortages ●	0.0	0.2	0.5	328%	984%



# Appendix G. Population-Weighted Statistics, U.S. Census Bureau West Region

Measure <i>(percentages unless otherwise noted)</i>	West				
	Metro Counties	Micro Counties	Noncore Counties	Metro – Micro (% diff)	Metro – Noncore (% diff)
Number of counties	142	102	204	-28%	44%
Percent of adult obesity ●	25.5	29.2	30.2	14%	18%
<b>Race / Ethnicity</b>					
White	67.2	81.4	82.1	21%	22%
Black	5.0	1.1	0.7	-78%	-85%
Hispanic	30.9	19.3	13.4	-38%	-57%
Asian	10.9	2.8	1.2	-75%	-89%
American Indian / Alaskan Native	1.2	5.0	10.4	310%	762%
Native Hawaiian / Pacific Islander	0.6	0.8	0.2	38%	-71%
Multiracial	5.0	4.8	3.2	-5%	-37%
<b>Age</b>					
Ages 0-17	23.2	22.6	22.0	-2%	-5%
Ages 18-29	17.3	15.9	13.1	-8%	-24%
Ages 30-44	20.6	18.0	16.8	-13%	-18%
Ages 45-64	24.7	25.4	27.0	3%	9%
Ages 65+	14.3	18.0	21.1	27%	48%
Ages 80+	3.4	3.8	4.5	13%	33%
<b>U.S. Military / Veteran</b>					
Veterans	6.3	9.1	9.7	44%	53%
Active-duty military	0.6	0.6	0.2	1%	-72%
<b>Education</b>					
Less than a high school degree ●	12.9	10.8	10.0	-16%	-22%
High school degree only ●	21.4	27.7	31.4	29%	47%
Some college/associate's degree	30.3	34.8	35.2	15%	16%
Bachelor's degree or higher ◆	35.4	26.7	23.4	-25%	-34%
Master's or graduate-level degree ◆	13.4	9.7	8.0	-28%	-40%
<b>Disability</b>					
Ages 18-64 with a disability ●	9.0	13.2	13.6	47%	52%
<b>Misc.</b>					
Households without access to a vehicle ●	6.4	4.9	6.7	-23%	5%
<b>Telehealth Access</b>					
No internet access ●	10.4	16.2	20.5	55%	97%
<b>Health Insurance Coverage</b>					
Uninsured ●	7.7	9.1	11.3	18%	47%
Private health insurance	66.9	62.0	58.6	-7%	-12%

Measure <i>(percentages unless otherwise noted)</i>	West				
	Metro Counties	Micro Counties	Noncore Counties	Metro – Micro (% diff)	Metro – Noncore (% diff)
Employer-provided health insurance	54.9	47.3	43.0	-14%	-22%
Direct-purchase health insurance	12.8	14.9	16.3	17%	28%
Public health insurance	36.0	43.5	45.7	21%	27%
Medicare	15.7	20.9	23.9	33%	52%
Medicaid	22.7	25.2	24.8	11%	9%
<b>Income</b>					
In poverty (under 100 percent federal poverty limit) ●	11.7	15.6	20.0	34%	72%
Households receiving SNAP ●	9.9	13.0	12.3	32%	25%
Median Household Income ◆	\$82,494	\$62,213	\$56,306	-25%	-32%
<b>Access to Food</b>					
Food Environment Index (0=worst, 10=Best) ◆	8.3	7.4	7.0	-11%	-15%
Limited access to healthy foods (percent that are low-income & not near a grocery store) ●	4.4	10.2	12.1	133%	178%
<b>Physical Activity</b>					
Physical inactivity (percent of adults with no leisure-time activity) ●	17.8	21.2	23.4	19%	32%
Access to exercise opportunities (percent of population with adequate access) ◆	91.5	75.0	69.1	-18%	-24%
<b>Hospitals / Clinics / Pharmacies</b>					
Hospital beds (per 1,000) ◆	2.2	1.7	3.2	-22%	43%
Counties with >0 hospital beds ◆	1.0	1.0	0.9	-1%	-9%
Hospitals (per 1,000) ◆	0.0	0.0	0.1	176%	653%
Rural Health Clinics (per 1,000) ◆	0.0	0.1	0.3	934%	2718%
Mean distance to nearest health clinic (in miles) ●	2.6	5.6	12.8	117%	399%
County population living in a pharmacy desert ●	5.4	34.5	74.5	535%	1270%
County population living in a hospital desert ●	5.0	20.5	31.7	305%	528%
<b>Providers</b>					
Primary Care Physicians (per 100k) ◆	80.2	63.3	63.5	-21%	-21%
Cardiovascular Specialists (per 100k) ◆	5.6	2.2	1.0	-60%	-82%
Medical Specialists (per 100k) ◆	99.9	39.2	18.4	-61%	-82%
Obesity Medicine Physicians (per 100k) ◆	0.320	0.125	0.048	-61%	-85%
Endocrinology Physicians (per 100k) ◆	3.60	1.13	0.06	-69%	-98%
Registered Dietitians (per 100k) ◆	17.9	16.7	21.8	-7%	22%
Obesity Medicine Registered Dietitians (per 100k) ◆	0.150	0.085	0.124	-43%	-17%
Nutritionists (per 100k) ◆	1.899	1.191	1.555	-37%	-18%
Gastroenterologists (per 100k) ◆	0.157	0.681	0.560	332%	255%
Counties deemed MUAs ●	0.1	0.4	0.5	648%	814%
Counties with no areas with primary-care shortages ◆	0.0	0.0	0.0	112%	-72%
Counties entirely made up of areas with primary-care shortages ●	0.0	0.2	0.2	1394%	2254%

# Appendix H. Area-Level Model Results

**How to read these results:** The intercepts can be interpreted as the average obesity rates at the mean value of characteristic. The slope can be interpreted as how the county obesity prevalence changes with a one-unit change in the measure. (Note: measures have different scales, so use caution when comparing slopes against one another.)

Measure (percentages unless otherwise noted)	Intercept (at means)						Slope					
	Metro		Micro		Noncore		Metro		Micro		Noncore	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
<b>Race / Ethnicity</b>												
White	32.9	0.2	35.4	0.3	35.2	0.2	0.0	0.0	-0.1	0.0	-0.1	0.0
Black	32.9	0.2	34.8	0.2	34.5	0.2	0.1	0.0	0.1	0.0	0.1	0.0
Hispanic	32.1	0.2	33.6	0.3	32.6	0.2	-0.1	0.0	-0.1	0.0	-0.1	0.0
Asian	30.7	0.2	32.1	0.6	34.2	0.5	-0.7	0.0	-0.5	0.1	0.1	0.1
American Indian / Alaskan Native	32.7	0.2	34.1	0.2	33.6	0.2	0.0	0.1	0.1	0.0	0.1	0.0
Native Hawaiian / Pacific Islander	32.7	0.2	34.1	0.2	33.7	0.2	-0.9	0.2	-0.9	0.4	-0.1	0.9
Multiracial	32.4	0.2	34.0	0.3	33.8	0.2	-0.7	0.1	-0.2	0.1	0.0	0.1
<b>Age</b>												
Ages 0-17	32.8	0.2	34.2	0.2	33.9	0.2	0.4	0.1	0.3	0.1	0.3	0.0
Ages 18-29	32.6	0.2	34.1	0.2	35.0	0.2	-0.1	0.0	0.0	0.0	0.4	0.1
Ages 30-44	32.4	0.2	34.0	0.3	34.5	0.3	-0.3	0.1	-0.1	0.1	0.3	0.1
Ages 45-64	32.7	0.2	34.2	0.2	34.0	0.2	0.0	0.1	-0.1	0.1	-0.2	0.1
Ages 65+	32.7	0.2	34.4	0.3	35.7	0.2	0.0	0.0	-0.1	0.1	-0.4	0.0
Ages 80+	32.8	0.2	34.2	0.3	34.6	0.2	-0.3	0.1	-0.2	0.2	-0.6	0.1
<b>U.S. Military / Veterans</b>												
Veterans	32.2	0.2	34.1	0.3	34.4	0.2	0.4	0.1	0.0	0.1	-0.5	0.1
Active-duty military	32.7	0.2	34.1	0.2	33.7	0.2	0.1	0.1	0.0	0.1	-0.2	0.5
<b>Education</b>												
Less than a high school degree	33.0	0.2	33.9	0.2	33.4	0.2	0.4	0.0	0.2	0.0	0.2	0.0
High school degree only	30.9	0.2	30.9	0.3	31.0	0.3	0.4	0.0	0.4	0.0	0.3	0.0
Some college/associate's degree	32.3	0.2	34.2	0.3	34.1	0.2	0.3	0.0	0.0	0.0	-0.1	0.0
Bachelor's degree or higher	31.0	0.2	29.9	0.3	28.7	0.3	-0.3	0.0	-0.4	0.0	-0.3	0.0
Master's or graduate-level degree	31.3	0.2	31.0	0.4	29.6	0.4	-0.6	0.0	-0.6	0.1	-0.6	0.1
<b>Disability</b>												
Ages 18-64 with a disability	31.7	0.2	32.2	0.3	32.8	0.2	0.7	0.0	0.6	0.1	0.2	0.0

Measure (percentages unless otherwise noted)	Intercept (at means)						Slope					
	Metro		Micro		Noncore		Metro		Micro		Noncore	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
<b>Misc.</b>												
Households without access to a vehicle	32.5	0.2	35.9	0.3	34.2	0.2	-0.1	0.0	0.8	0.1	0.2	0.0
<b>Telehealth</b>												
No internet access	31.7	0.2	32.2	0.3	31.4	0.3	0.4	0.0	0.3	0.0	0.2	0.0
<b>Health Insurance Coverage</b>												
Uninsured	32.8	0.2	34.1	0.2	33.8	0.2	0.3	0.0	0.0	0.0	0.0	0.0
Private health insurance	32.9	0.2	33.6	0.2	33.1	0.2	-0.2	0.0	-0.1	0.0	-0.1	0.0
Employer-provided health insurance	32.8	0.2	33.7	0.3	33.2	0.2	-0.2	0.0	-0.1	0.0	-0.1	0.0
Direct-purchase health insurance	32.9	0.2	34.7	0.2	34.5	0.2	-0.4	0.1	-0.5	0.1	-0.2	0.0
Public health insurance	32.5	0.2	33.3	0.3	33.0	0.2	0.2	0.0	0.2	0.0	0.1	0.0
Medicare	32.4	0.2	33.9	0.3	35.0	0.3	0.2	0.0	0.1	0.1	-0.2	0.0
Medicaid	33.0	0.2	33.6	0.2	33.2	0.2	0.3	0.0	0.2	0.0	0.2	0.0
<b>Income</b>												
In poverty (under 100 percent federal poverty level)	32.8	0.2	33.2	0.2	32.9	0.2	0.4	0.0	0.4	0.0	0.3	0.0
Households receiving SNAP	32.9	0.2	33.5	0.2	33.4	0.2	0.4	0.0	0.4	0.0	0.3	0.0
Median Household Income	31.9	0.2	30.1	0.4	30.9	0.3	-0.2	0.0	-0.2	0.0	-0.1	0.0
<b>Access to Food</b>												
Food Environment Index (0=worst, 10=Best)	32.5	0.2	33.3	0.3	33.4	0.2	-2.4	0.2	-1.4	0.2	-0.5	0.1
Limited access to healthy foods (percent that are low-income & not near a grocery store)	32.6	0.2	34.2	0.3	34.0	0.2	0.1	0.0	0.0	0.0	-0.1	0.0
<b>Physical Activity</b>												
Physical inactivity (percent of adults with no leisure-time activity)	31.2	0.2	31.6	0.2	31.0	0.2	0.7	0.0	0.6	0.0	0.5	0.0
Access to exercise opportunities (percent of population with adequate access)	31.2	0.2	32.8	0.3	32.5	0.3	-0.1	0.0	-0.1	0.0	0.0	0.0
<b>Hospitals / Clinics / Pharmacies</b>												
Hospital beds (per 1,000)	32.7	0.2	34.2	0.2	33.8	0.2	0.0	0.1	0.2	0.1	0.0	0.0
Hospitals (per 1,000)	32.7	0.2	34.1	0.3	34.1	0.2	20.0	6.4	3.4	6.7	-4.5	1.3

Measure <i>(percentages unless otherwise noted)</i>	Intercept (at means)						Slope					
	Metro		Micro		Noncore		Metro		Micro		Noncore	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Rural Health Clinics (per 1,000)	32.5	0.2	33.8	0.3	34.2	0.2	7.3	1.3	3.1	1.5	-1.2	0.4
Mean distance to nearest health clinic (in miles)	32.7	0.2	34.5	0.2	33.8	0.2	0.0	0.0	-0.2	0.0	0.0	0.0
Counties deemed MUAs	32.3	0.2	33.7	0.3	33.0	0.2	2.9	0.4	1.7	0.5	1.4	0.3
Counties with >0 hospital beds	32.5	0.2	34.2	0.2	34.1	0.2	-1.8	0.5	1.0	0.7	1.5	0.4
Counties with >0 hospitals	32.5	0.2	34.2	0.2	34.1	0.2	-1.5	0.4	1.0	0.7	1.5	0.4
County population living in a pharmacy desert	31.9	0.2	34.3	0.3	35.6	0.3	0.0	0.0	-0.0	0.0	-0.0	0.0
County population living in a hospital desert	32.4	0.2	34.4	0.3	34.3	0.2	0.0	0.0	-0.0	0.0	-0.0	0.0
<b>Providers</b>												
Primary Care Physicians (per 1,000)	31.9	0.2	33.1	0.3	33.2	0.2	-0.1	0.0	0.0	0.0	0.0	0.0
Cardiovascular Specialists (per 1,000)	32.2	0.2	33.5	0.3	33.1	0.5	-0.2	0.0	-0.1	0.1	-0.1	0.1
Medical Specialists (per 1,000)	32.0	0.2	31.9	0.5	34.3	0.9	0.0	0.0	0.0	0.0	0.0	0.0
Obesity Medicine Physicians (per 100k)	32.6	0.2	34.1	0.3	33.9	0.2	-1.6	0.3	0.0	0.4	0.3	0.2
Endocrinology Physicians (per 100k)	32.2	0.2	33.3	0.3	34.6	0.4	-0.3	0.0	-0.3	0.1	0.1	0.1
Registered Dietitians (per 100k)	32.2	0.2	33.7	0.2	34.4	0.2	-0.1	0.0	-0.1	0.0	0.0	0.0
Obesity Medicine Registered Dietitians (per 100k)	32.3	0.2	34.0	0.2	34.3	0.2	-3.3	0.5	-1.1	0.6	-0.6	0.3
Nutritionists (per 100k)	31.9	0.2	33.6	0.3	34.4	0.2	-1.1	0.1	-0.5	0.1	0.0	0.1
Gastroenterologists (per 100k)	32.2	0.2	34.2	0.3	34.4	0.2	0.8	0.2	-0.1	0.1	0.0	0.1
Counties with no areas with primary-care shortages	32.8	0.2	34.2	0.2	33.8	0.2	-1.3	0.5	-1.7	0.7	0.2	0.6
Counties entirely made up of areas with primary-care shortages	32.4	0.2	34.1	0.2	33.6	0.2	2.9	0.5	0.5	0.6	0.5	0.3

# Appendix I. Area-Level Model Results – Scaled

**How to read these results:** The intercepts can be interpreted as the average obesity rates at the mean value of characteristic. To allow for comparisons of slopes across characteristics of differing scales, the measure is normalized by its mean and standard deviation so that the interpretation of slope coefficients across characteristics can all be interpreted as the association of a one-standard deviation change in the measure of county obesity rates.

Measure (percentages unless otherwise noted)	Intercept (at means)						Slope					
	Metro		Micro		Noncore		Metro		Micro		Noncore	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
<b>Race / Ethnicity</b>												
White	32.9	0.2	35.4	0.3	35.2	0.2	-0.5	0.2	-1.7	0.2	-2.0	0.1
Black	32.9	0.2	34.8	0.2	34.5	0.2	1.6	0.2	1.8	0.2	1.9	0.1
Hispanic	32.1	0.2	33.6	0.3	32.6	0.2	-1.4	0.2	-1.1	0.2	-2.1	0.2
Asian	30.7	0.2	32.1	0.6	34.2	0.5	-4.3	0.3	-3.0	0.8	0.6	0.7
American Indian / Alaskan Native	32.7	0.2	34.1	0.2	33.6	0.2	0.1	0.2	0.2	0.1	0.3	0.0
Native Hawaiian / Pacific Islander	32.7	0.2	34.1	0.2	33.7	0.2	-0.6	0.1	-0.7	0.3	-0.1	0.6
Multiracial	32.4	0.2	34.0	0.3	33.8	0.2	-1.4	0.2	-0.3	0.2	0.0	0.2
<b>Age</b>												
Ages 0-17	32.8	0.2	34.2	0.2	33.9	0.2	1.0	0.2	0.8	0.2	0.9	0.1
Ages 18-29	32.6	0.2	34.1	0.2	35.0	0.2	-0.5	0.1	-0.1	0.2	1.3	0.2
Ages 30-44	32.4	0.2	34.0	0.3	34.5	0.3	-0.7	0.2	-0.1	0.3	0.7	0.2
Ages 45-64	32.7	0.2	34.2	0.2	34.0	0.2	0.1	0.1	-0.2	0.2	-0.5	0.1
Ages 65+	32.7	0.2	34.4	0.3	35.7	0.2	0.1	0.2	-0.5	0.2	-1.5	0.1
Ages 80+	32.8	0.2	34.2	0.3	34.6	0.2	-0.4	0.2	-0.2	0.2	-0.7	0.1
<b>U.S. Military / Veterans</b>												
Veterans	32.2	0.2	34.1	0.3	34.4	0.2	1.1	0.2	0.1	0.3	-1.4	0.2
Active-duty military	32.7	0.2	34.1	0.2	33.7	0.2	0.1	0.1	0.0	0.2	-0.3	0.7
<b>Education</b>												
Less than a high school degree	33.0	0.2	33.9	0.2	33.4	0.2	2.0	0.2	1.0	0.2	1.0	0.1
High school degree only	30.9	0.2	30.9	0.3	31.0	0.3	3.1	0.1	2.9	0.2	2.0	0.2
Some college/associate's degree	32.3	0.2	34.2	0.3	34.1	0.2	1.3	0.2	-0.2	0.2	-0.6	0.1
Bachelor's degree or higher	31.0	0.2	29.9	0.3	28.7	0.3	-3.7	0.2	-4.2	0.3	-3.9	0.2
Master's or graduate-level degree	31.3	0.2	31.0	0.4	29.6	0.4	-3.5	0.2	-3.4	0.3	-3.5	0.3
<b>Disability</b>												

Measure (percentages unless otherwise noted)	Intercept (at means)						Slope					
	Metro		Micro		Noncore		Metro		Micro		Noncore	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Ages 18-64 with a disability	31.7	0.2	32.2	0.3	32.8	0.2	2.3	0.1	2.0	0.2	0.8	0.1
<b>Misc.</b>												
Households without access to a vehicle	32.5	0.2	35.9	0.3	34.2	0.2	-1.0	0.3	7.2	0.8	1.9	0.3
<b>Telehealth</b>												
No internet access	31.7	0.2	32.2	0.3	31.4	0.3	2.5	0.1	1.7	0.2	1.3	0.1
<b>Health Insurance Coverage</b>												
Uninsured	32.8	0.2	34.1	0.2	33.8	0.2	1.3	0.2	0.2	0.2	-0.1	0.1
Private health insurance	32.9	0.2	33.6	0.2	33.1	0.2	-2.0	0.2	-1.2	0.2	-1.0	0.1
Employer-provided health insurance	32.8	0.2	33.7	0.3	33.2	0.2	-1.8	0.2	-0.7	0.2	-0.5	0.2
Direct-purchase health insurance	32.9	0.2	34.7	0.2	34.5	0.2	-1.2	0.2	-1.3	0.2	-0.6	0.1
Public health insurance	32.5	0.2	33.3	0.3	33.0	0.2	1.9	0.2	1.3	0.2	0.8	0.1
Medicare	32.4	0.2	33.9	0.3	35.0	0.3	0.8	0.2	0.3	0.2	-0.9	0.1
Medicaid	33.0	0.2	33.6	0.2	33.2	0.2	1.9	0.2	1.7	0.2	1.5	0.1
<b>Income</b>												
In poverty (under 100 percent federal poverty level)	32.8	0.2	33.2	0.2	32.9	0.2	1.6	0.2	1.7	0.2	1.3	0.1
Households receiving SNAP	32.9	0.2	33.5	0.2	33.4	0.2	2.2	0.2	2.1	0.2	1.4	0.1
Median Household Income	31.9	0.2	30.1	0.4	30.9	0.3	-3.1	0.2	-4.6	0.4	-2.7	0.3
<b>Access to Food</b>												
Food Environment Index (0=worst, 10=Best)	32.5	0.2	33.3	0.3	33.4	0.2	-2.0	0.2	-1.2	0.2	-0.4	0.1
Limited access to healthy foods (percent that are low-income & not near a grocery store)	32.6	0.2	34.2	0.3	34.0	0.2	0.6	0.1	-0.1	0.1	-0.2	0.1
<b>Physical Activity</b>												
Physical inactivity (percent of adults with no leisure-time activity)	31.2	0.2	31.6	0.2	31.0	0.2	3.6	0.1	3.1	0.2	2.9	0.1
Access to exercise opportunities (percent of population with adequate access)	31.2	0.2	32.8	0.3	32.5	0.3	-1.9	0.1	-1.1	0.2	-0.7	0.1
<b>Hospitals / Clinics / Pharmacies</b>												
Hospital beds (per 1,000)	32.7	0.2	34.2	0.2	33.8	0.2	0.0	0.1	0.3	0.1	0.0	0.0

Measure (percentages unless otherwise noted)	Intercept (at means)						Slope					
	Metro		Micro		Noncore		Metro		Micro		Noncore	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Hospitals (per 1,000)	32.7	0.2	34.1	0.3	34.1	0.2	0.5	0.1	0.1	0.2	-0.1	0.0
Rural Health Clinics (per 1,000)	32.5	0.2	33.8	0.3	34.2	0.2	0.7	0.1	0.3	0.2	-0.1	0.0
Mean distance to nearest health clinic (in miles)	32.7	0.2	34.5	0.2	33.8	0.2	-0.1	0.2	-0.7	0.1	0.0	0.0
Counties deemed MUAs	32.3	0.2	33.7	0.3	33.0	0.2	1.1	0.1	0.6	0.2	0.5	0.1
Counties with >0 hospital beds	32.5	0.2	34.2	0.2	34.1	0.2	-0.3	0.1	0.2	0.1	0.3	0.1
Counties with >0 hospitals	32.5	0.2	34.2	0.2	34.1	0.2	-0.4	0.1	0.2	0.2	0.4	0.1
County population living in a pharmacy desert	31.9	0.2	34.3	0.3	35.6	0.3	0.9	0.1	-0.1	0.2	-0.6	0.1
County population living in a hospital desert	32.1	0.2	34.4	0.3	34.3	0.2	0.6	0.1	-0.3	0.1	-0.3	0.1
<b>Providers</b>												
Primary Care Physicians (per 1,000)	31.9	0.2	33.1	0.3	33.2	0.2	-1.7	0.1	-1.4	0.3	-0.5	0.1
Cardiovascular Specialists per 1,000	32.2	0.2	33.5	0.3	33.1	0.5	-1.4	0.2	-0.8	0.3	-0.6	0.4
Medical Specialists (per 1,000)	32.0	0.2	31.9	0.5	34.3	0.9	-1.6	0.2	-2.6	0.5	0.5	0.8
Obesity Medicine Physicians (per 100k)	32.6	0.2	34.1	0.3	33.9	0.2	-0.8	0.1	0.0	0.2	0.2	0.1
Endocrinology Physicians (per 100k)	32.2	0.2	33.3	0.3	34.6	0.4	-0.9	0.1	-1.1	0.3	0.2	0.3
Registered Dietitians (per 100k)	32.2	0.2	33.7	0.2	34.4	0.2	-1.0	0.1	-1.4	0.2	-0.4	0.1
Obesity Medicine Registered Dietitians (per 100k)	32.3	0.2	34.0	0.2	34.3	0.2	-1.0	0.2	-0.3	0.2	-0.2	0.1
Nutritionists (per 100k)	31.9	0.2	33.6	0.3	34.4	0.2	-1.8	0.2	-0.9	0.2	0.0	0.1
Gastroenterologists (per 100k)	32.2	0.2	34.2	0.3	34.4	0.2	0.5	0.1	-0.1	0.1	0.0	0.1
Counties with no areas with primary-care shortages	32.8	0.2	34.2	0.2	33.8	0.2	-0.3	0.1	-0.4	0.2	0.1	0.2
Counties entirely made up of areas with primary-care shortages	32.4	0.2	34.1	0.2	33.6	0.2	0.6	0.1	0.1	0.1	0.1	0.1