

RESEARCH REPORT

Obesity across America

Geographic Variation in Disease Prevalence and Treatment Options

Timothy A. Waidmann
URBAN INSTITUTE

Elaine Waxman
URBAN INSTITUTE

Vincent Pancini
URBAN INSTITUTE

Poonam Gupta
URBAN INSTITUTE

Loni Philip Tabb
DREXEL UNIVERSITY

February 2022



ABOUT THE URBAN INSTITUTE

The nonprofit Urban Institute is a leading research organization dedicated to developing evidence-based insights that improve people's lives and strengthen communities. For 50 years, Urban has been the trusted source for rigorous analysis of complex social and economic issues; strategic advice to policymakers, philanthropists, and practitioners; and new, promising ideas that expand opportunities for all. Our work inspires effective decisions that advance fairness and enhance the well-being of people and places.

Contents

Acknowledgments	iv
Obesity across America	1
Key Points	1
Background	1
Obesity Prevalence	3
Trends over Time	4
State- and County-Level Data Maps of Obesity	5
Racial and Ethnic Disparities in Obesity Prevalence	5
The Intersection of Obesity and Related Chronic Diseases	12
Prevention and Management of Obesity	18
Prevention Approaches	19
Treatment Approaches	19
Comprehensive Standards of Care	20
Variation in State Coverage Policies	21
Summary	32
About the Data	33
Notes	35
References	37
About the Authors	41
Statement of Independence	43

Acknowledgments

This report was funded by Novo Nordisk. We are grateful to them and to all our funders, who make it possible for Urban to advance its mission.

The views expressed are those of the authors and should not be attributed to the Urban Institute, its trustees, or its funders. Funders do not determine research findings or the insights and recommendations of Urban experts. Further information on the Urban Institute's funding principles is available at urban.org/fundingprinciples.

Obesity across America

Key Points

- Obesity is a serious chronic disease that affects more than 4 in 10 adults in the US, but the health burden is not equally distributed across the country.
- Obesity is more common in the Southeast and Midwest and less common in some areas in the Pacific Northwest and the western US. However, examining state- and county-level data shows obesity can vary significantly within states and regions, and pockets of high obesity prevalence exist across the US.
- Black, Hispanic/Latinx, Native American and Alaska Native, and Pacific Islander communities experience higher rates of obesity than white and Asian adults. Awareness of these disparities and their root causes provides important context for assessing place-based differences and for understanding how averages can also mask important differences within communities.
- Under the Affordable Care Act, all types of insurance nationwide provide preventive screening and counseling services, but coverage for other obesity treatment options varies substantially across the country. Consequently, coverage of the full range of recommended treatments is rare.
- In general, the comprehensiveness of insurance coverage in a state is not highly correlated with the magnitude of the obesity epidemic in that state.

Background

Obesity, defined by the World Health Organization as “abnormal or excessive fat accumulation that presents a risk to health,”¹¹¹ is a serious chronic disease that has emerged as a major public health challenge in the last few decades. The American Medical Association recognized obesity as a disease in 2013 (Kyle, Dhurandhar, and Allison 2016). More than 4 in 10 adults in the US are affected by obesity.²²² The most common measure of adult obesity is having a body mass index (BMI) of 30 or higher, and a BMI of 40 or greater is characterized as severe obesity.³³³ Obesity is associated with increased risks for mortality and serious health conditions, including

- hypertension;
- dyslipidemia (imbalance of lipids, such as cholesterol);

- type 2 diabetes;
- coronary heart disease;
- stroke;
- gallbladder disease;
- osteoarthritis;
- sleep apnea and breathing problems; and
- clinical depression, anxiety, and other mental illnesses.⁴⁴⁴

Obesity also increases the risks of 13 types of cancers, including cancers of the digestive, urinary, endocrine, and female reproductive systems. These cancers represent up to 40 percent of cancers diagnosed annually in the US.⁵

Because obesity is associated with so many complex health conditions, it is also costly in both human and economic terms. At the individual level, obesity can impair daily function (Cheng et al. 2017), negatively affect labor market outcomes (Renna and Thakur 2010), and reduce quality of life (Puhl and Heuer 2010). Obesity is also associated with higher mortality rates (Flegal et al. 2018). Early insights from the COVID-19 pandemic suggest people with obesity may experience more severe disease and higher rates of mortality (Kompaniyets 2021; Yu et al. 2021).

Though approaches to estimating the economic impacts of obesity vary, the literature documents significant economic burdens associated with obesity at both the individual and societal levels (Tremmel et al. 2017). One recent study examining data from the Medical Expenditure Panel Survey estimated that annual individual health care expenditures increase by approximately \$3,500 for people living with obesity (Biener, Cawley, and Meyerhoefer 2017). Another recent analysis put the economic costs of obesity for the US at nearly \$1.4 trillion in 2018, equal to 6.76 percent of the gross domestic product (Lopez, Bendix, and Sagynbekov 2020).

Obesity in the US is a widespread chronic health condition, but marked disparities in the prevalence of obesity exist across racial and ethnic groups. This is an important consideration for understanding place-based differences and developing prevention and treatment strategies that can reach communities at highest risk. Long-standing and persistent structural racism in the US has resulted in residential segregation, lower income and assets, fewer health-promoting opportunities, and lower rates of health insurance for many communities of color, and many of these factors have been tied to obesity (Auchincloss et al. 2013; Keisler-Starkey and Bunch 2021; Kershaw and Pender 2016; Kim and von dem Knesebeck 2018; Maharana and Nsoesie 2018; Ogden et al. 2017; Rajbhandari-Thapa et al.

2020). Segregation has also increased exposure to environments considered “obesogenic,” meaning they promote and reinforce unhealthy factors that may increase the likelihood of obesity. Some research suggests the US obesity epidemic would be more severe if not for the lower rates of the condition among many immigrants (Hao and Kim 2009). However, immigrants’ comparative advantage appears to erode the longer they stay in the US.

This report presents recent data on the geographic patterns of obesity and related diseases in the US and compares these trends with the availability of national and state-level health insurance, which affects access to obesity treatments. Examining the intersection of the burden of disease with the likelihood of insurance coverage is one step in assessing where policy changes at the state or national level may have the greatest impacts. Our future work will examine geographic variation in policies that affect diet and physical activity and variation in the availability and accessibility of health care services, even when they are covered.

Obesity Prevalence

Obesity is a widespread disease, affecting many people throughout their lives. People of all genders, of all races and ethnicities, and in all geographic areas experience obesity. Using data from the National Health and Nutrition Examination Survey, the Centers for Disease Control and Prevention reported that the age-adjusted rate of obesity among adults ages 20 and older in the US was 42.4 percent in 2017–18. When combined with the proportion of adults who were overweight (with a BMI between 25 and 30), the prevalence of adults affected rises to 73.6 percent. Obesity rates are not statistically significantly different between men and women or among different adult age groups.⁶ Some notable differences can help us understand who is most affected by obesity:

- Approximately 9 percent of all adults experience severe obesity (BMI at or above 40), but women are more likely than men to experience it (11.5 versus 6.9 percent).
- Black adults are more likely to live with obesity than adults of other racial and ethnic groups, and Black women experience the highest rate (56.9 percent; table 1). Asian adults are significantly less likely to have obesity than Black, Hispanic/Latinx, or white adults (17.4 percent versus 49.6 percent, 44.8 percent, and 42.2 percent).
- In the 2018 National Health Interview Survey, almost half (49.2 percent) of American Indian and Alaska Native adults reported having been told by a clinician that they have obesity.⁷ Compared with other surveys, the National Health Interview Survey provides a greater ability to assess the prevalence of obesity in some Native populations (see the About the Data section

for more information on differences between data sources). Native Hawaiians and Pacific Islanders also have high rates of obesity, although surveys can seldom disaggregate data for this group because of smaller sample sizes (Hawley and McGarvey 2015). In 2014, the National Center for Health Statistics conducted a special focused study of health conditions among Native Hawaiians and Pacific Islanders and found that 42.6 percent of such adults experienced obesity, and prevalence was highest for Pacific Islanders (48.0 percent).

Awareness of differences in obesity among racial and ethnic groups is important for several reasons, including recognition that strategies to address geographic disparities must address the structural disadvantages and segregation that influence geographic outcomes. Attention to differences in prevalence across groups is important because place-based averages may mask disparities among residents in a given community.

TABLE 1
Age-Adjusted Prevalence of Obesity among Adults Ages 20 and Older,
by Sex, Race, and Hispanic/Latinx Origin, 2017–18
Percent

	Black	Hispanic/ Latinx	White	Asian
All adults	49.6	44.8	42.2	17.4
Male	41.1	45.7	44.7	17.5
Female	56.9	43.7	39.8	17.2

Source: National Health and Nutrition Examination Survey.
 Note: Black, white, and Asian adults are non-Hispanic/Latinx.

Trends over Time

Obesity has increased significantly in the US in the last few decades. In 1999–2000, the age-adjusted prevalence of obesity was 30.5 percent; by 2017–18, the rate had grown to 42.4 percent, a 39 percent increase. The share of US adults experiencing severe obesity nearly doubled during the same period, from 4.7 to 9.2 percent, a 95.7 percent increase (Hales et al. 2020).

It is important to note that the shifting trends in obesity are not limited to adults. Childhood obesity has also been on the rise, and it carries short-term individual consequences for health and is a concerning precursor to adulthood experiences. In 2017–18, nearly one in five (19.3 percent) children and adolescents experienced obesity.⁸ Though this report focuses on adults, the public health obesity epidemic has roots earlier in life.

Obesity is a complex disease with multiple contributing factors, including metabolic, genetic, epigenetic, developmental, behavioral, and environmental mechanisms that promote fat accumulation and weight gain (Schwartz et al. 2017). Researchers continue to explore a wide range of pathways that may influence disease prevalence and outcomes across all adults. The abundance of evidence that documents the racial and ethnic disparities and inequities related to obesity (Hales et al. 2020), including the ways that structural racism may exacerbate risk among people of color (Mackey et al. 2021), underscore the importance of the multilevel factors needed to address this public health challenge. Though obesity can be treated at the individual level, the larger public health challenge of reducing obesity must address the full range of factors driving the prevalence of this serious medical condition.

State- and County-Level Data Maps of Obesity

Place is an important consideration in developing and scaling obesity interventions. Though obesity is a widespread phenomenon in the US, obesity rates and associated comorbidities differ across states. As discussed later in this report, these variations occur in the context of geographic differences in health care coverage for obesity screening and treatment.

Figures 1 and 2 present age-adjusted obesity estimates at the state and county levels. These maps help us understand some features of obesity at the population level. First, the state-level map in figure 1 confirms that though obesity is prevalent across the US, its prevalence is higher in certain regions, such as the Southeast and Midwest, and is lower in other areas, such as western states and the Pacific Northwest. Examining county-level prevalence (figure 2), however, also shows important variations within states that are obscured by focusing only on state-level data. For example, approximately one-third of South Dakota's adult population has obesity, but in some counties, the rate exceeds 50 percent.

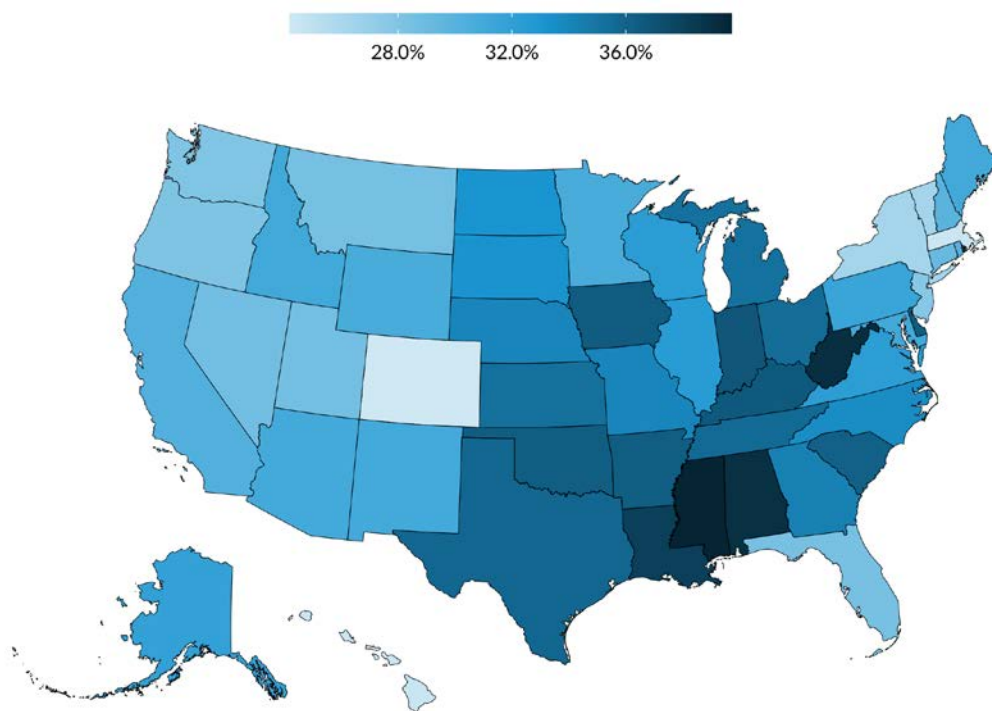
To provide additional context, figure 3 shows state-level percentage-point increases in obesity between 2011 and 2020. Though obesity has increased significantly in many states, those with the highest percentage-point increases in the last decade include California, Delaware, Georgia, and Iowa, which are in different parts of the US.

Racial and Ethnic Disparities in Obesity Prevalence

Policies and place-based strategies should also be informed by how prevalence varies across racial and ethnic groups within states, as shown in table 2. As noted above, Black and Hispanic/Latinx adults

typically experience higher rates of obesity than white and Asian adults. Native American and Alaska Native and Pacific Islander communities also experience higher prevalence rates, although small sample sizes in many datasets prohibit the examination of these trends at smaller geographic levels.

FIGURE 1
State-Level Obesity Prevalence, 2020

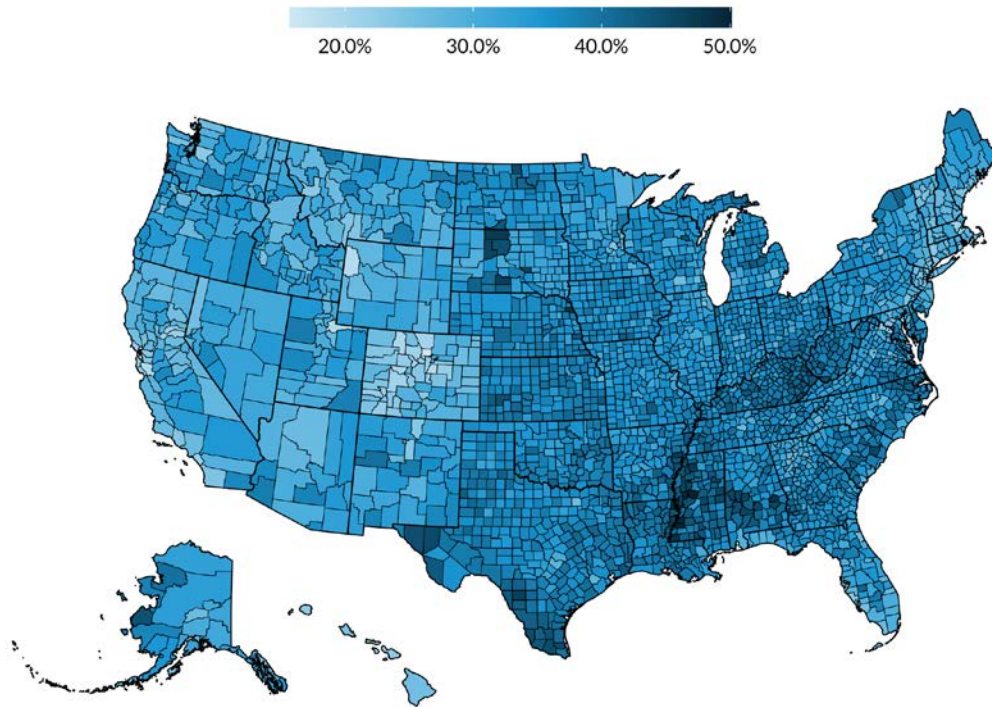


URBAN INSTITUTE

Source: Behavioral Risk Factor Surveillance System, 2020.

Notes: Obesity is defined as having a body mass index (BMI) of 30 kg/m² or higher. Height and weight data used in BMI calculations were self-reported. Records with the following were excluded: height < 3 feet or ≥ 8 feet; weight < 50 pounds or ≥ 650 pounds; BMI: < 12 kg/m² or ≥ 100 kg/m²; and pregnant women.

FIGURE 2
County-Level Obesity Prevalence, 2018

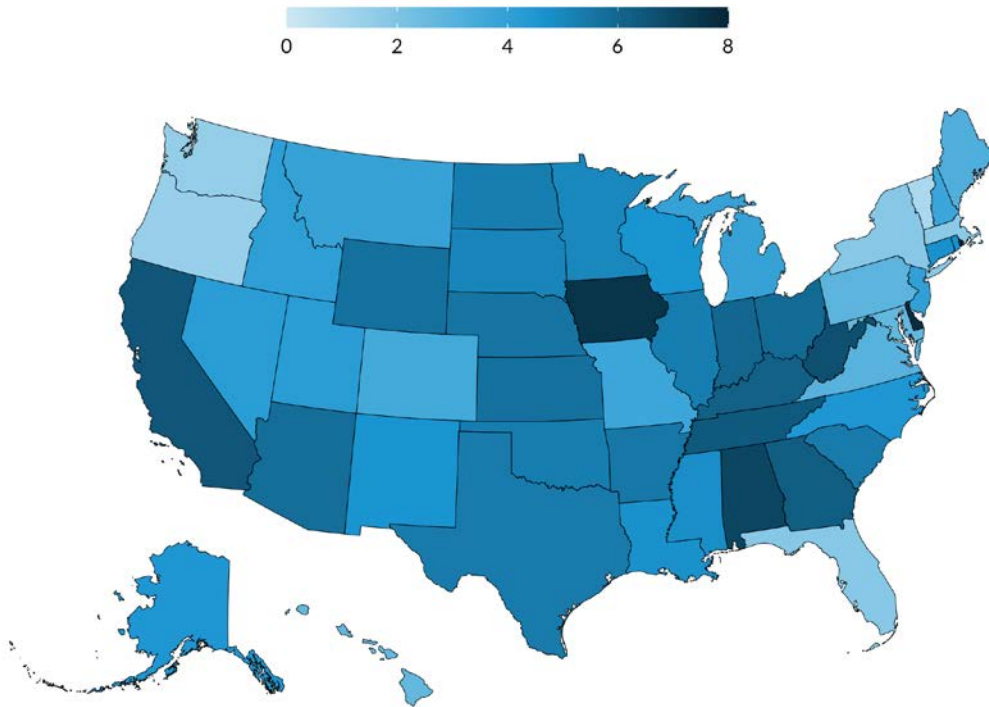


URBAN INSTITUTE

Sources: Estimates provided by the Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division of Population Health. The data sources used to generate these model-based estimates include Behavioral Risk Factor Surveillance System 2018 data, Census Bureau 2010 population estimates, and American Community Survey 2013–17 or 2014–18 estimates. For more information, see “Measure Definitions,” Centers for Disease Control and Prevention, PLACES: Local Data for Better Health, accessed December 22, 2021, <https://www.cdc.gov/places/measure-definitions/index.html>.

Note: Presented data are model-based estimates for the age-adjusted prevalence of obesity among adults ages 18 and older in 2018.

FIGURE 3
Percentage-Point Change in State-Level Prevalence of Obesity, 2011–20



URBAN INSTITUTE

Source: Behavioral Risk Factor Surveillance System, 2011–20.

Notes: Obesity is defined as having a body mass index (BMI) of 30 kg/m² or higher. Height and weight data used in BMI calculations were self-reported. Changes were statistically significant in all states except Florida, Massachusetts, Oregon, Vermont, and Washington. Records with the following were excluded: height < 3 feet or ≥ 8 feet; weight < 50 pounds or ≥ 650 pounds; BMI: < 12 kg/m² or ≥ 100 kg/m²; and pregnant women.

TABLE 2

State-Level Prevalence of Obesity, by Race and Ethnicity, 2018–20

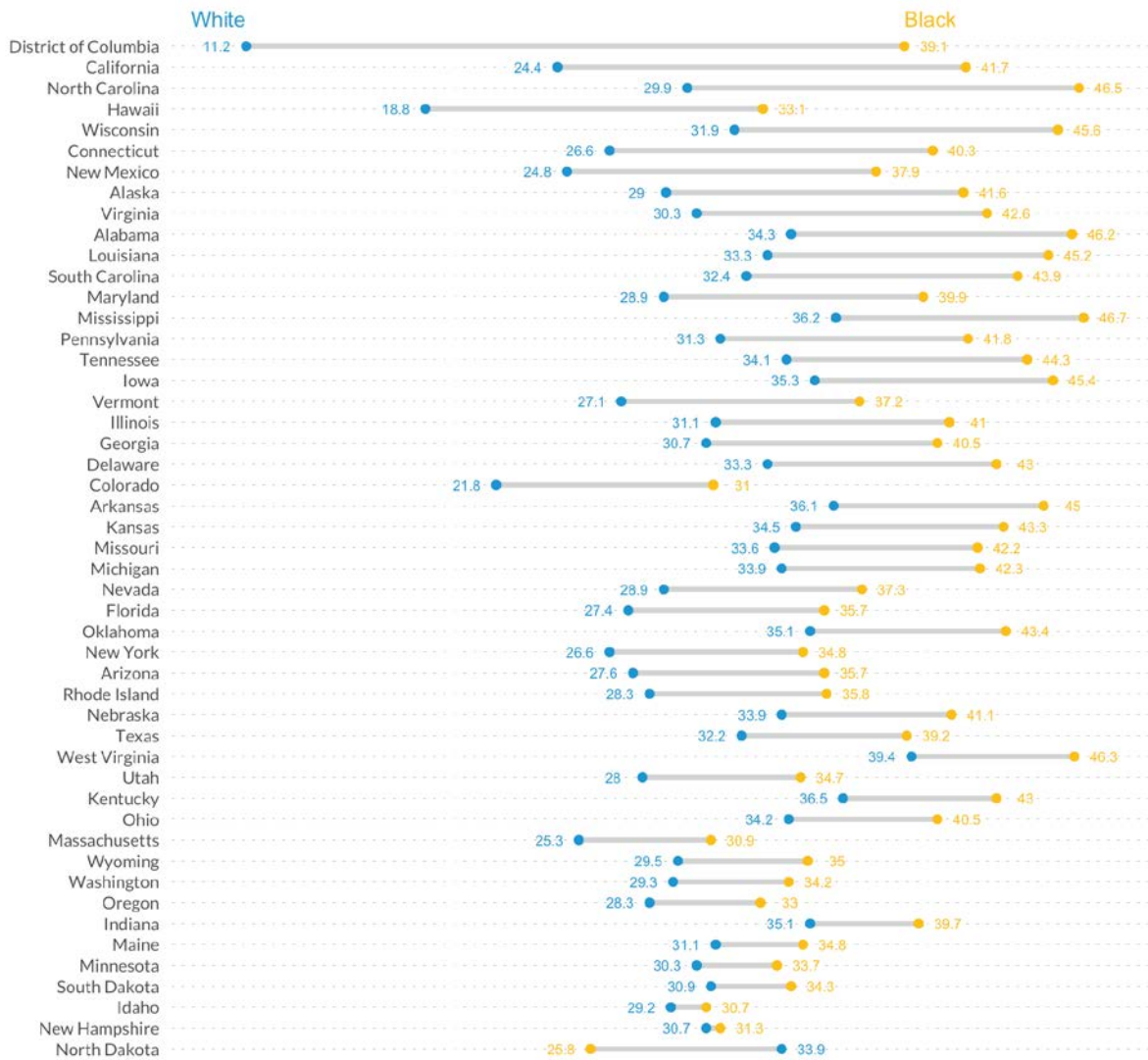
	Overall (%)	Rank	White (%)	Hispanic/ Latinx (%)	Asian (%)	Black (%)
Alabama	39.0	3	34.3	35.3	15.6	46.2
Alaska	31.9	27	29.0	34.0	25.5	41.6
Arizona	30.9	33	27.6	35.9	12.3	35.7
Arkansas	36.4	9	36.1	34.0		45.0
California	30.3	37	24.4	36.2	10.5	41.7
<i>Colorado</i>	24.2	53	21.8	30.9	6.3	31.0
Connecticut	29.2	40	26.6	34.5	11.6	40.3
Delaware	36.5	7	33.3	34.5	13.4	43.0
<i>District of Columbia</i>	24.3	52	11.2	25.2	7.3	39.1
<i>Florida</i>	28.4	44	27.4	29.7	14.9	35.7
Georgia	34.3	18	30.7	35.7	11.6	40.5
<i>Hawaii</i>	24.5	50	18.8	33.0	16.6	33.1
Idaho	31.1	30	29.2	33.1	19.0	30.7
Illinois	32.4	24	31.1	35.4	12.1	41.0
Indiana	36.8	5	35.1	40.0		39.7
Iowa	36.5	8	35.3	36.4	13.4	45.4
Kansas	35.3	15	34.5	38.0	11.9	43.3
Kentucky	36.6	6	36.5	33.2		43.0
Louisiana	38.1	4	33.3	32.2	16.9	45.2
Maine	31.0	31	31.1	28.2		34.8
Maryland	31.0	32	28.9	31.3	11.8	39.9
<i>Massachusetts</i>	24.4	51	25.3	30.4	9.6	30.9
Michigan	35.2	16	33.9	43.1	8.8	42.3
Minnesota	30.7	35	30.3	33.9	18.8	33.7
Mississippi	39.7	1	36.2	33.0		46.7
Missouri	34.0	19	33.6	39.5		42.2
Montana	28.5	43	26.9	29.7		
Nebraska	34.0	20	33.9	35.8	9.3	41.1
Nevada	28.7	41	28.9	33.1	13.4	37.3
New Hampshire	29.9	39	30.7	25.8	13.7	31.3
<i>New Jersey</i>	27.7	47				
New Mexico	30.9	34	24.8	35.7		37.9
<i>New York</i>	26.3	48	26.6	30.4	11.4	34.8
North Carolina	33.6	21	29.9	31.3	16.9	46.5
North Dakota	33.1	23	33.9	37.9	16.7	25.8
Ohio	35.5	14	34.2	39.7	10.5	40.5
Oklahoma	36.4	10	35.1	36.2	12.2	43.4
<i>Oregon</i>	28.1	45	28.3	35.4	16.7	33.0
Pennsylvania	31.5	28	31.3	32.9	7.2	41.8
Rhode Island	30.1	38	28.3	35.2		35.8
South Carolina	36.2	11	32.4	30.9	23.7	43.9
South Dakota	33.2	22	30.9	37.8		34.3
Tennessee	35.6	13	34.1	35.0		44.3
Texas	35.8	12	32.2	39.7	12.5	39.2
Utah	28.6	42	28.0	32.3	11.6	34.7
<i>Vermont</i>	26.3	49	27.1	21.7		37.2
Virginia	32.2	26	30.3	31.3	11.8	42.6
<i>Washington</i>	28.0	46	29.3	34.8	9.9	34.2
West Virginia	39.1	2	39.4	39.3		46.3
Wisconsin	32.3	25	31.9	39.0	18.1	45.6
Wyoming	30.7	36	29.5	32.3		35.0

Source: Behavioral Risk Factor Surveillance System, 2018–20.

Notes: Bolded states are the 10 states with the highest obesity prevalence. Italicized states are the 10 states with the lowest obesity prevalence. Blank cells indicate insufficient data, where the sample size is smaller than 50 people, the relative standard error (dividing the standard error by the prevalence) is 30 percent or more, or no data were available in a specific year. Black, white, and Asian adults are non-Hispanic/Latinx. State-level data on Native American obesity rates are not available.

Figures 4 and 5 show another way of examining the advantage of white adults relative to other racial and ethnic groups, specifically Black and Hispanic/Latinx adults. These charts rank the size of the white-Black and white-Hispanic/Latinx disparities in obesity rates by state.⁹ The top five states with the largest differences in obesity prevalence between white and Black adults are the District of Columbia, California, North Carolina, Hawaii, and Wisconsin. The top five states with the largest differences in obesity prevalence between white and Hispanic/Latinx adults are Hawaii, the District of Columbia, California, New Mexico, and Michigan.

FIGURE 4
White-Black Disparity in Obesity Rates, by State, 2018–20
Percent



URBAN INSTITUTE

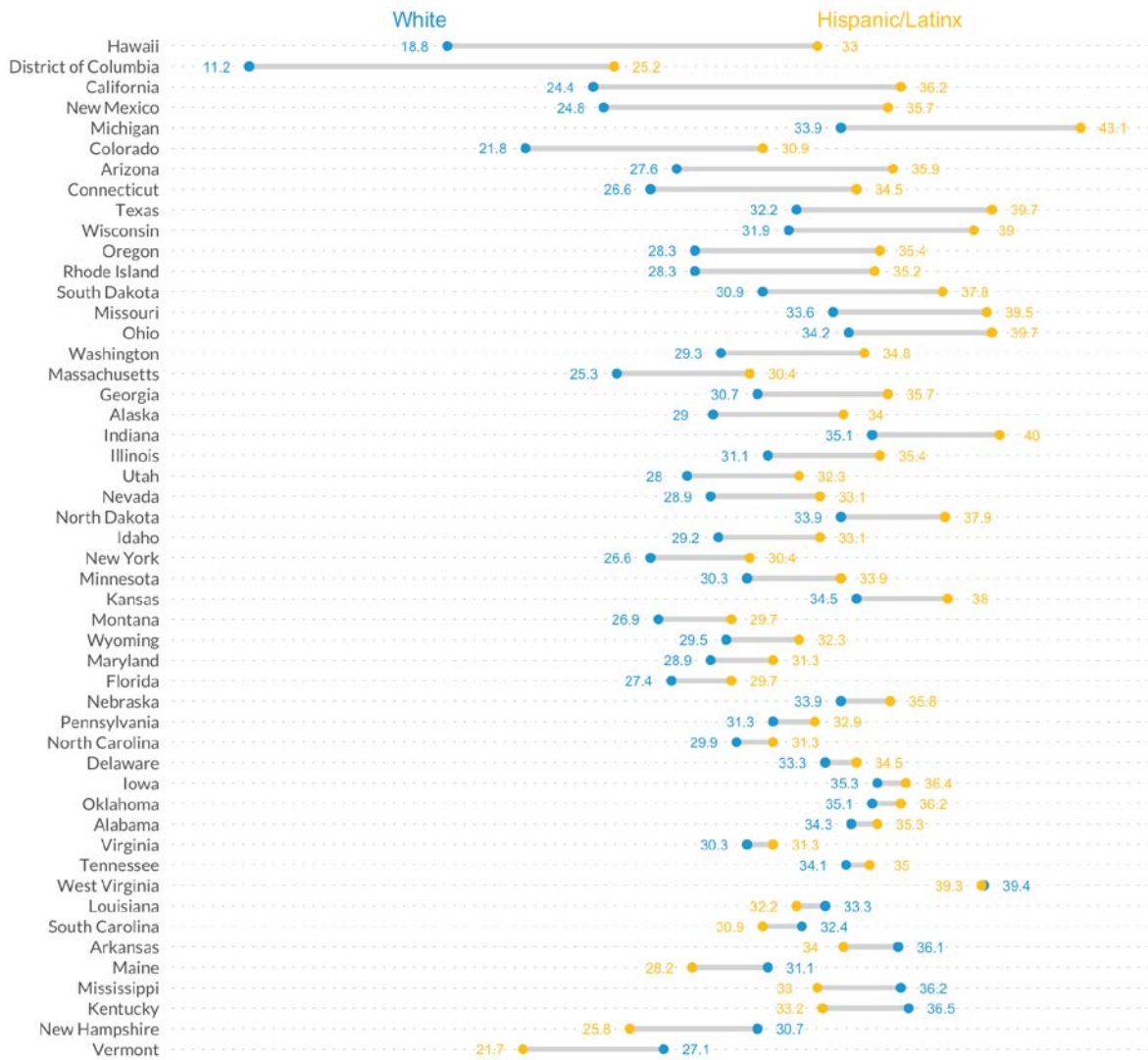
Source: Behavioral Risk Factor Surveillance System, 2018–20.

Notes: Montana is excluded because of insufficient data on Black adults (fewer than 50 people or relative standard error 30 percent or more). New Jersey is excluded because no data were available in 2019. Black and white adults are non-Hispanic/Latinx. For simplicity, the District of Columbia is considered a state.

FIGURE 5

White-Hispanic/Latinx Disparity in Obesity Rates, by State, 2018–20

Percent



URBAN INSTITUTE

Source: Behavioral Risk Factor Surveillance System, 2018–20.

Notes: New Jersey is excluded because no data were available in 2019. White adults are non-Hispanic/Latinx. For simplicity, the District of Columbia is considered a state.

The Intersection of Obesity and Related Chronic Diseases

Examining obesity prevalence alongside other associated health conditions provides additional insight into place-based challenges related to obesity. Figures 6 through 10 present county-level obesity rates mapped in combination with rates of diabetes, high blood pressure or hypertension, cardiovascular

disease, stroke, and arthritis. The maps reveal counties in the top two or bottom two quintiles of the prevalence of obesity in combination with each major health condition. The maps also show similar patterns of concentrated health disadvantage across these conditions in many parts of the US, including the arc through the South sometimes called the “diabetes belt” and the “stroke belt” (Barker et al. 2011; Howard and Howard 2020).

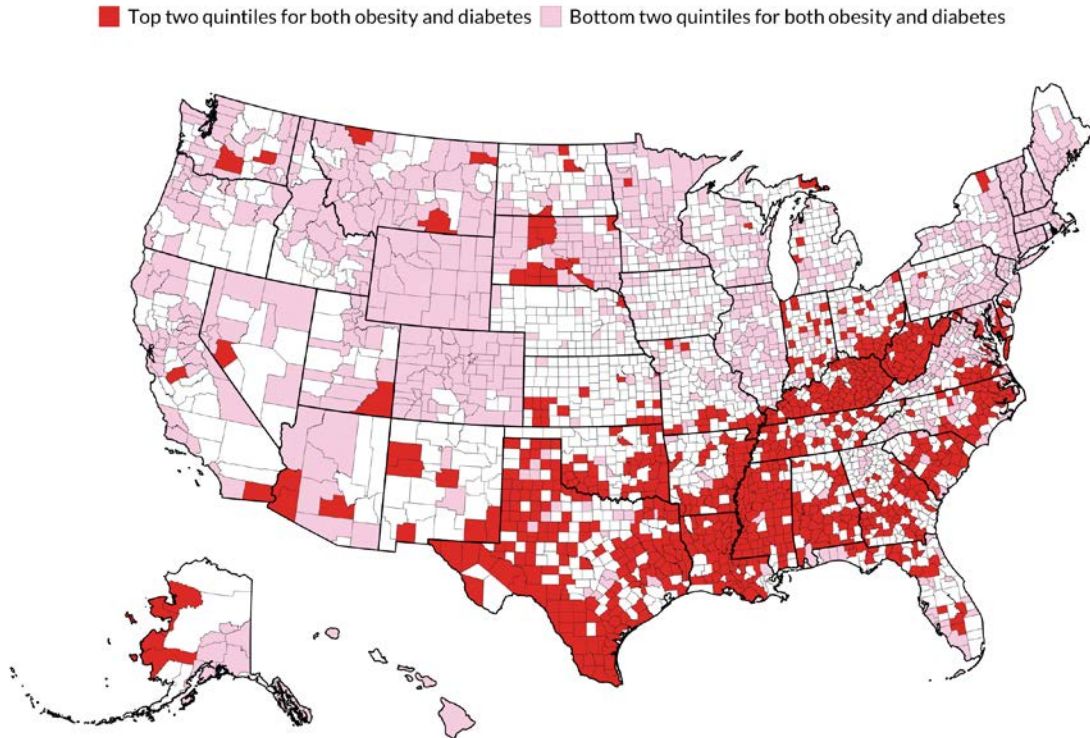
Mapping epidemiological data helps us conceptualize both the widespread nature of the obesity epidemic and the areas of highest concern with respect to comorbidities. In a later section, we provide maps of access to health care coverage to better understand how disease prevalence aligns with obesity screening and treatment interventions.

State obesity rates range from 24.2 percent in Colorado to 39.7 percent in Mississippi. Obesity rates increased in all states from 2011 to 2020. However, the rate of increase is not perfectly correlated with current prevalence rates. Since 2011, obesity has increased the most in Delaware (7.7 percentage points) and has increased the least in Vermont (0.9 percentage points). Obesity is more prevalent in the Southeast and Midwest regions of the United States, but the increase in obesity is more widespread and not concentrated within any specific region.

County obesity rates range from 15.7 percent in Boulder County, Colorado, to 50.1 percent in Holmes County, Mississippi. However, rates are as high as 33.3 percent in Colorado (Pueblo County) and as low as 33.2 percent in Mississippi (Madison County). County-level variation in obesity rates suggests state-level policies alone cannot address the obesity epidemic. Still, many counties in the top 40 percent of obesity and related comorbidity rates are concentrated within states such as Alabama, Kentucky, Louisiana, Texas, and West Virginia. Similarly, counties in the bottom 40 percent of obesity and related comorbidity rates are concentrated within western states such as California, Colorado, and Wyoming and in northeastern states such as Massachusetts, New Hampshire, Rhode Island, and Vermont. State-level policies, such as expanding access to obesity treatments through Medicaid, are therefore important tools for treating and preventing obesity.

FIGURE 6

Top and Bottom Two Quintiles of Obesity and Diabetes Prevalence, by County, 2018



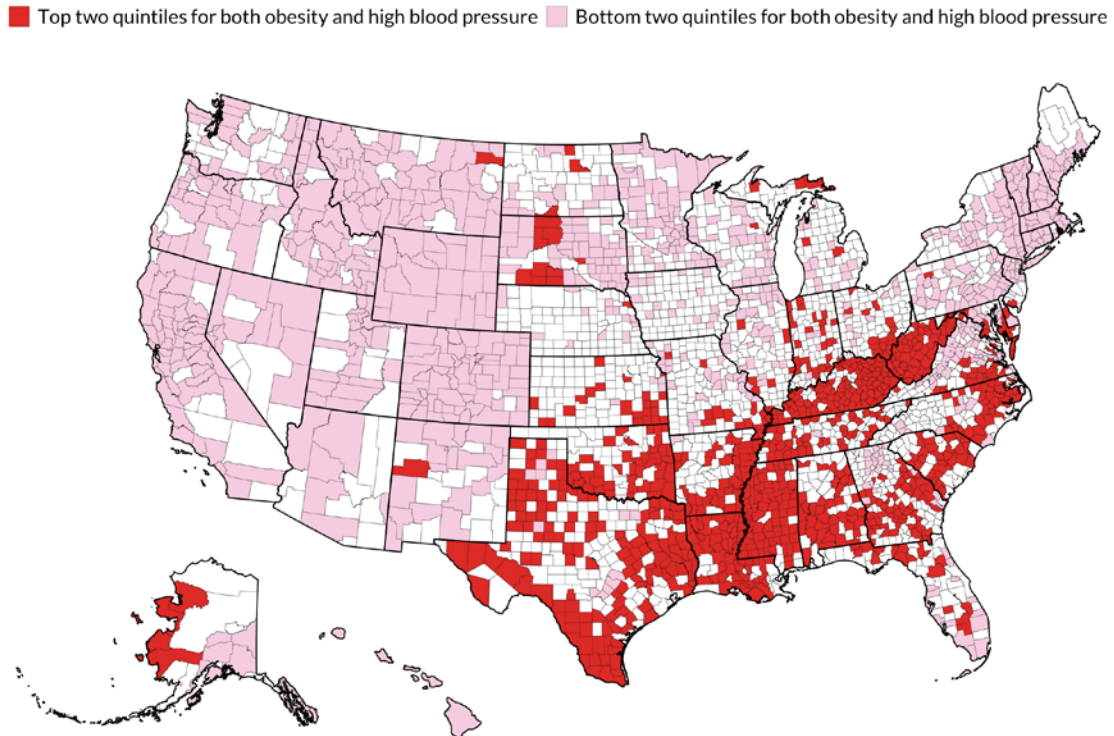
URBAN INSTITUTE

Sources: Estimates provided by the Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division of Population Health. Data sources used to generate these model-based estimates include Behavioral Risk Factor Surveillance System 2018 data, Census Bureau 2010 population estimates, and American Community Survey 2013–17 or 2014–18 estimates. For more information, see “Measure Definitions,” Centers for Disease Control and Prevention, PLACES: Local Data for Better Health, accessed December 22, 2021, <https://www.cdc.gov/places/measure-definitions/index.html>.

Note: Presented data are model-based estimates for the age-adjusted prevalence of diagnosed diabetes and obesity among adults ages 18 and older in 2018.

FIGURE 7

Top and Bottom Two Quintiles of Obesity and High Blood Pressure Prevalence, by County, 2017–18



URBAN INSTITUTE

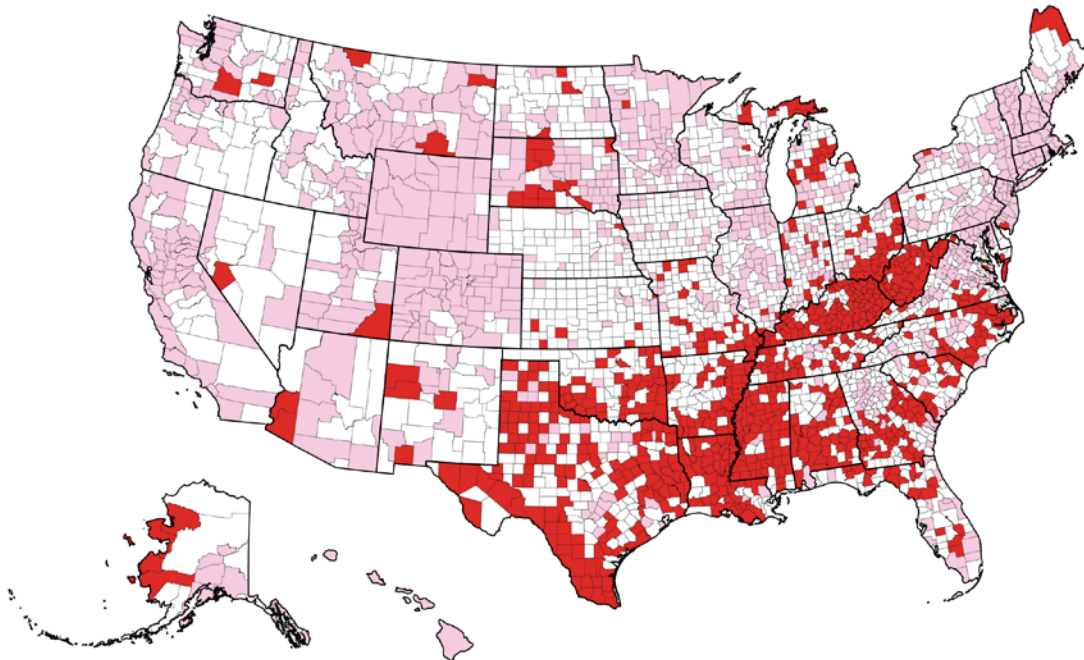
Sources: Estimates provided by Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division of Population Health. Data sources used to generate these model-based estimates include Behavioral Risk Factor Surveillance System 2018 data, Census Bureau 2010 population estimates, and American Community Survey 2013–17 or 2014–18 estimates. For more information, see “Measure Definitions,” Centers for Disease Control and Prevention, PLACES: Local Data for Better Health, accessed December 22, 2021, <https://www.cdc.gov/places/measure-definitions/index.html>.

Note: Presented data are model-based estimates for the age-adjusted prevalence of high blood pressure among adults ages 18 and older in 2017 and the age-adjusted prevalence of obesity among adults ages 18 and older in 2018.

FIGURE 8

Top and Bottom Two Quintiles of Obesity and Coronary Heart Disease Prevalence, by County, 2018

■ Top two quintiles for both obesity and coronary heart disease ■ Bottom two quintiles for both obesity and coronary heart disease



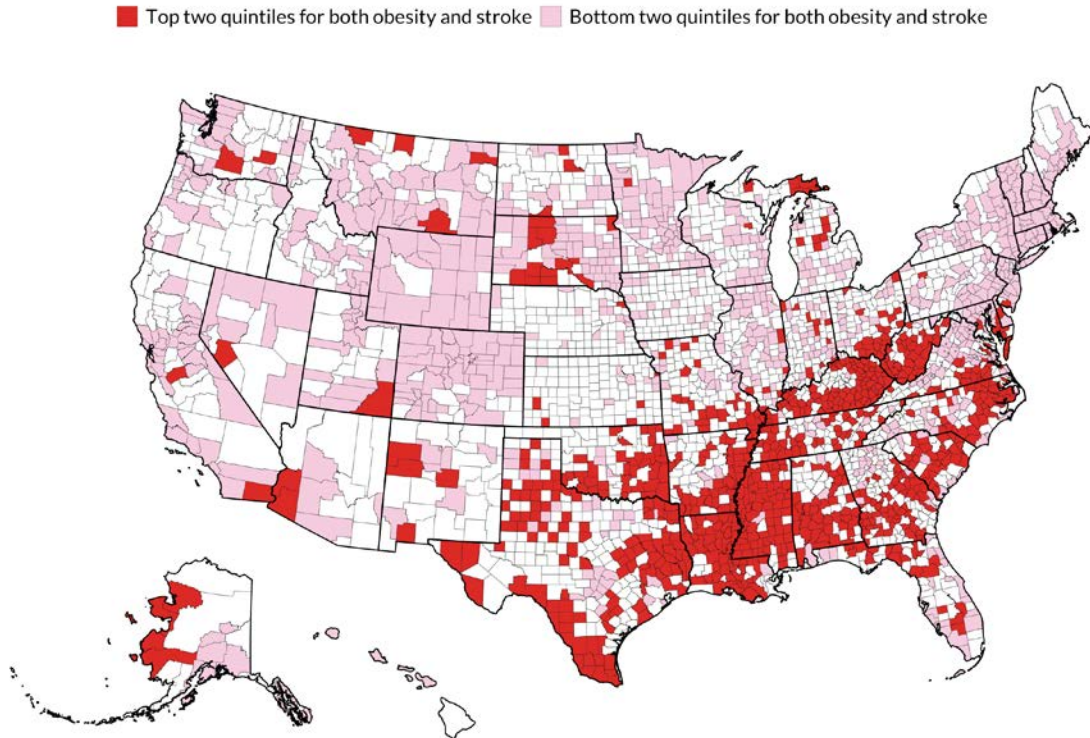
URBAN INSTITUTE

Sources: Estimates provided by the Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division of Population Health. Data sources used to generate these model-based estimates include Behavioral Risk Factor Surveillance System 2018 data, Census Bureau 2010 population estimates, and American Community Survey 2013–17 or 2014–18 estimates. For more information, see “Measure Definitions,” Centers for Disease Control and Prevention, PLACES: Local Data for Better Health, accessed December 22, 2021, <https://www.cdc.gov/places/measure-definitions/index.html>.

Note: Presented data are model-based estimates for the age-adjusted prevalence of coronary heart disease and obesity among adults ages 18 and older in 2018.

FIGURE 9

Top and Bottom Two Quintiles of Obesity and Stroke Prevalence, by County, 2017–18



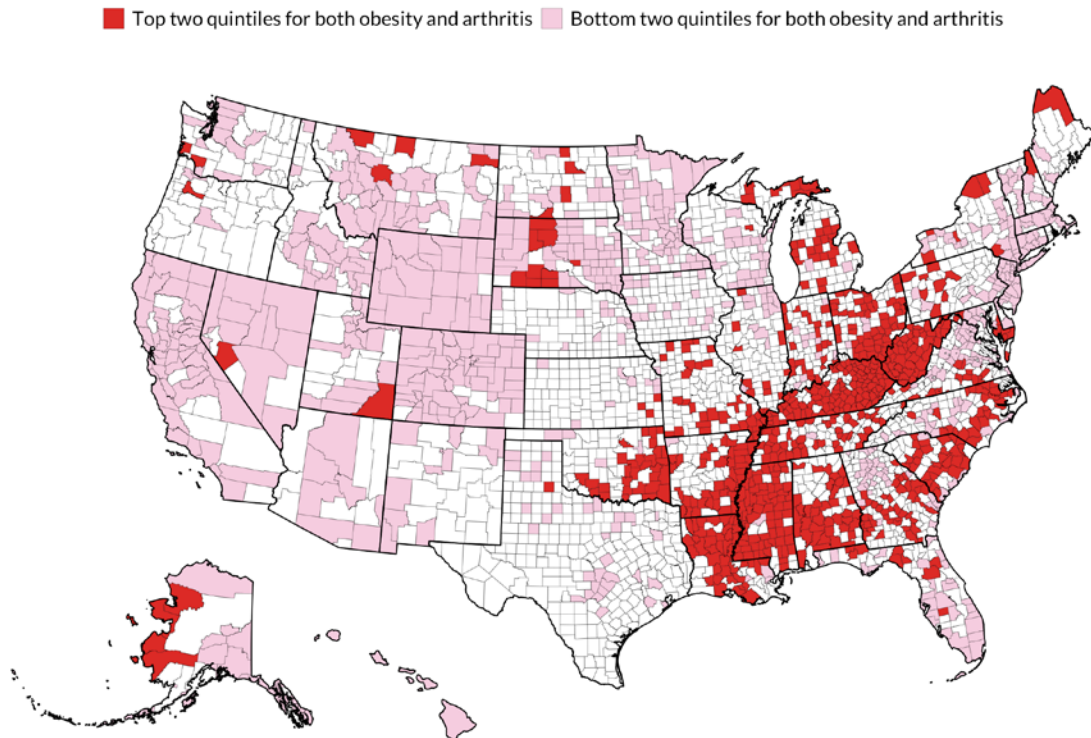
URBAN INSTITUTE

Sources: Estimates provided by the Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division of Population Health. Data sources used to generate these model-based estimates include Behavioral Risk Factor Surveillance System 2018 data, Census Bureau 2010 population estimates, and American Community Survey 2013–17 or 2014–18 estimates. For more information, see “Measure Definitions,” Centers for Disease Control and Prevention, PLACES: Local Data for Better Health, accessed December 22, 2021, <https://www.cdc.gov/places/measure-definitions/index.html>.

Note: Presented data are model-based estimates for the age-adjusted prevalence of stroke among adults ages 18 and older in 2017 and the age-adjusted prevalence of obesity among adults ages 18 and older in 2018.

FIGURE 10

Top and Bottom Two Quintiles of Obesity and Arthritis Prevalence, by County, 2018



URBAN INSTITUTE

Sources: Estimates provided by the Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division of Population Health. Data sources used to generate these model-based estimates include Behavioral Risk Factor Surveillance System 2018 data, Census Bureau 2010 population estimates, and American Community Survey 2013–17 or 2014–18 estimates. For more information, see “Measure Definitions,” Centers for Disease Control and Prevention, PLACES: Local Data for Better Health, accessed December 22, 2021, <https://www.cdc.gov/places/measure-definitions/index.html>.

Note: Presented data are model-based estimates for the age-adjusted prevalence of arthritis and obesity among adults ages 18 and older in 2018.

Prevention and Management of Obesity

Our review of obesity prevalence across the US documents that it is widespread but not evenly distributed across geographies and groups. In this section, we briefly review effective clinical and nonclinical approaches for preventing and treating obesity and experts’ recommendations about

standards of care. We then turn to a discussion of the availability of health insurance coverage that can facilitate treatment for obesity.

Prevention Approaches

Obesity can occur for many reasons, including unhealthy diet, sedentary lifestyle, genetic predisposition, and even as a side effect of medical treatment, but the common strategies to prevent obesity focus largely on healthy eating and physical activity. Studies of dietary and exercise interventions show they can be effective in preventing excess weight gain at key points in the life course (Bray et al. 2018). Both dietary modification and exercise programs during pregnancy have been shown to reduce excess gestational weight gain (Muktabhant et al. 2015). Because excessive weight gain in childhood and adolescence is often a precursor of adult obesity, educational settings are a logical place to conduct prevention interventions in groups. A recent systematic review found that programs that combine diet and exercise are effective for children under age 5, but programs that focus on exercise alone are not effective. In contrast, among children and adolescents ages 6 to 18, physical activity interventions are more effective (Brown et al. 2019). Among adults, worksites are a common location for obesity prevention programs, and one systematic review found that nutrition and physical activity programs in these settings had a modest effect on BMI (Anderson et al. 2009). Broader population-based approaches to modify diets and physical activity are more difficult to implement and evaluate, so evidence on these approaches is limited. Still, suggested policy approaches include excise taxation of sugary beverages (Colchero et al. 2017) and changes to the built environment to promote physical activity.¹⁰

Treatment Approaches

Though population-based strategies are typically necessary for preventing obesity, treatment of those who have obesity is more often delivered to individuals. The National Institute of Diabetes and Digestive and Kidney Diseases summarizes common approaches to treating overweight and obesity.¹¹ Healthy eating and regular physical activity are typically considered the first steps in treatment, but self-management alone is often insufficient, and coaching has been shown to increase weight loss (Wadden et al. 2011). Based on studies of multicomponent behavioral interventions' effectiveness, the US Preventive Services Task Force recommends such interventions to help patients achieve clinically important weight loss through dietary changes and physical activity (US Preventive Services Task Force 2018).

Pharmaceutical treatments can also be effective in achieving weight loss and are a recommended component in most clinical guidelines. A recent review of randomized clinical trials of five antiobesity medications (AOM) approved by the US Food and Drug Administration as of 2016 found AOM to be effective (Khera et al. 2016). A recent analysis also found that the fiscal impact of 100 percent uptake of AOMs would reduce Medicare and Medicaid spending and increase tax revenue over 75 years (Kabiri et al. 2021). However, concerns about the side effects and the safety of early drugs have led to hesitancy among clinicians (Connolly et al. 1997), insurers, and patients in prescribing, paying for, and using these pharmacotherapies. Newer medications including semaglutide, recently approved for obesity treatment, and tirzepatide, still in phase 3 clinical trials, have shown promising increases in efficacy, improved safety, and reduced side effects that may decrease patient discontinuation (Yanovski and Yanovski 2014, 2021).

People with severe obesity who have been unable to lose weight through other means are sometimes referred to surgical treatments. These treatments work by variously reducing the amount of food consumed or reducing the absorption of nutrients through the small intestine.¹² The literature on these procedures finds them effective, but their safety and effectiveness vary by type of surgery (Chang et al. 2014). Clinical guidelines call for nutritional and behavioral support for patients undergoing surgery (Mechanick et al. 2020).

Comprehensive Standards of Care

Various organizations have studied the evidence on the effectiveness of standards of care and have developed recommended standards. More than 20 years ago, the National Institutes of Health convened an expert panel to review the available evidence and produce recommendations for the full spectrum of treatments discussed above (NHLBI Obesity Education Initiative Expert Panel 1998). More recently, the Departments of Veterans Affairs and Defense reviewed the current evidence and came to a similar conclusion (VA and DoD 2020); their strongest recommendation was for comprehensive lifestyle interventions that include behavioral, dietary, and physical activity components. However, their review also supported long-term pharmacotherapy and bariatric surgery for people with higher BMIs. In addition, the American Association of Clinical Endocrinology and the American College of Endocrinology have made similar recommendations (Garvey et al. 2016), and a recent Canadian review also supported these approaches to varying degrees (Wharton et al. 2020).

Variation in State Coverage Policies

Though these reviews of clinical evidence support the use of comprehensive lifestyle interventions, pharmacotherapy, and surgery, patients' access to the full spectrum of these services is limited by a lack of insurance coverage. As the largest national insurance plan, traditional Medicare generally covers only screening and counseling performed by a primary care provider and surgery.¹³ It covers weight loss programs only if they are part of a treatment plan to manage an associated condition like diabetes or hypertension.¹⁴ TRICARE (military health insurance) covers surgery and pharmaceuticals but not nutritional counseling. The Affordable Care Act requires that all private insurers cover screening and counseling as preventive care services. Private individual and group plans are not required to cover other treatments, though they may offer such coverage.

At the state level, the coverage provided by state governments to their employees and to Medicaid beneficiaries or mandated for Affordable Care Act Marketplace plans varies considerably. The maps below describe the coverage landscape for four types of insurance coverage governed by state policies (box 1): Medicaid fee for service (figure 11), Medicaid managed care (figure 12), state employee insurance (figure 13), and the state benchmark plan governing Marketplace plan coverage requirements (figure 14).

The common finding across all types of insurance coverage is that pharmacotherapy is the least-covered treatment option. Only 15 Medicaid programs cover AOM in fee-for-service Medicaid, and only 4 additional programs cover AOM under at least one Medicaid managed-care plan. In only two states does the benchmark Marketplace plan cover AOM. Finally, 16 state employee plans offer such coverage. In contrast, all but two states cover some form of bariatric surgery under Medicaid, as do 23 state benchmark plans and 42 state employee plans. Though preventive screening and counseling are covered by all types of insurance nationwide under the Affordable Care Act, only 26 fee-for-service Medicaid programs and 28 managed-care Medicaid programs cover specific nutritional counseling to support modified diets. In addition, such counseling is covered in 37 state benchmark plans and in 13 state employee health plans.

The correlations between the treatments covered and the obesity rates in each state are not obvious. For example, among the 10 states with the highest obesity prevalence (MS, WV, AL, LA, IN, KY, DE, IA, AR, and OK), 3 cover AOM in their Medicaid programs. On the other hand, 3 of the 10 states with the lowest obesity prevalence (CO, MA, HI, VT, NY, NJ, WA, OR, FL, MT) do so as well. In state employee plans, only one high-prevalence state covers AOM, whereas three low-prevalence states do so. Differences are more apparent in the coverage of nutritional counseling: three high-prevalence

states cover this service in Medicaid, whereas six low-prevalence states do so. Eight of the 10 low-prevalence states cover nutritional counseling in state benchmark plans, whereas only 5 of the 10 high-prevalence states do so. Nine of the 10 high-prevalence states cover this benefit in state employee plans, and 8 of the 10 low-prevalence states do so.

Though we can say nothing about the causal relationships between comprehensive coverage and obesity prevalence, these differences suggest states with the largest obesity burdens may not be deploying the full range of available treatment options to help reduce that burden.

BOX 1

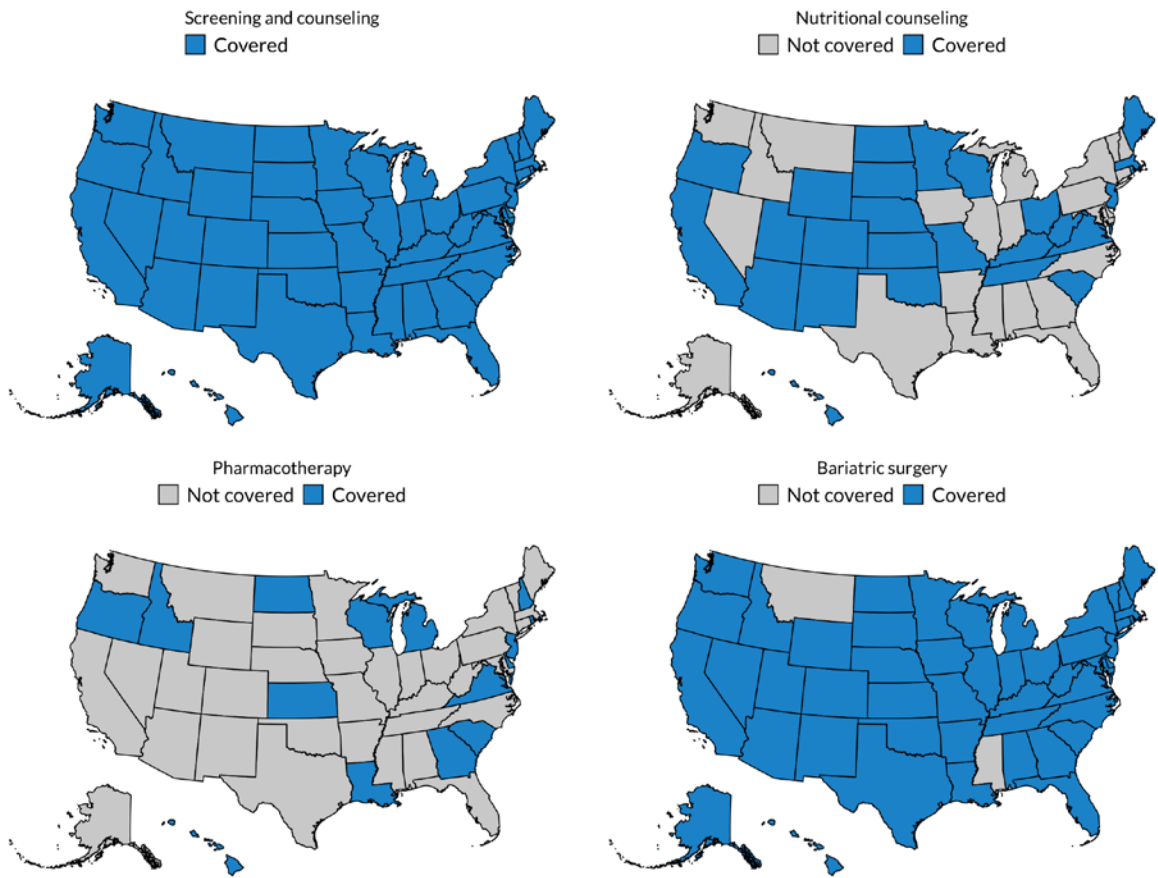
Notes on Coverage Definitions

We consider a treatment to be covered if we observed a strong indication of coverage for all nonpregnant adults ages 21 and older. We did not consider a treatment covered if it only applied to children (ages 21 and under), pregnant women, patients with diabetes but not obesity, or other subpopulations of adults. Screening and counseling were considered covered if a plan offered any preventive measures to assess and treat obesity, including annual physical and routine wellness exams. Nutritional counseling was considered covered if dietary instruction or other nutrition services were available beyond routine visits. Pharmacotherapy was considered covered if the plan indicated coverage for any medication used to treat obesity, including phentermine, diethylpropion, orlistat, liraglutide, and semaglutide. Pharmacotherapy was not considered covered if a medication that could be used to treat obesity was only covered to treat conditions other than obesity. For example, if a plan only covered orlistat for the treatment of hyperlipidemia, that pharmacotherapy was considered to be not covered. Bariatric surgery was considered covered if a plan covered any type of bariatric surgery, including gastric bypass, gastric band, and sleeve gastrectomy.

If coverage for an obesity treatment was unclear or unavailable, we did not consider the treatment to be covered. For all treatment options, we did not consider restrictions such as prior authorization requirements, BMI requirements, documentation of supervised exercise or diet regimens, documented weight loss, comorbidities, additional medical criteria, limited duration of benefits, copayments, and other criteria that might affect benefit coverage. Therefore, our determination of coverage for each treatment option may differ from actual coverage.

FIGURE 11

State-Level Medicaid Fee-for-Service Coverage of Obesity Treatments, 2016–17

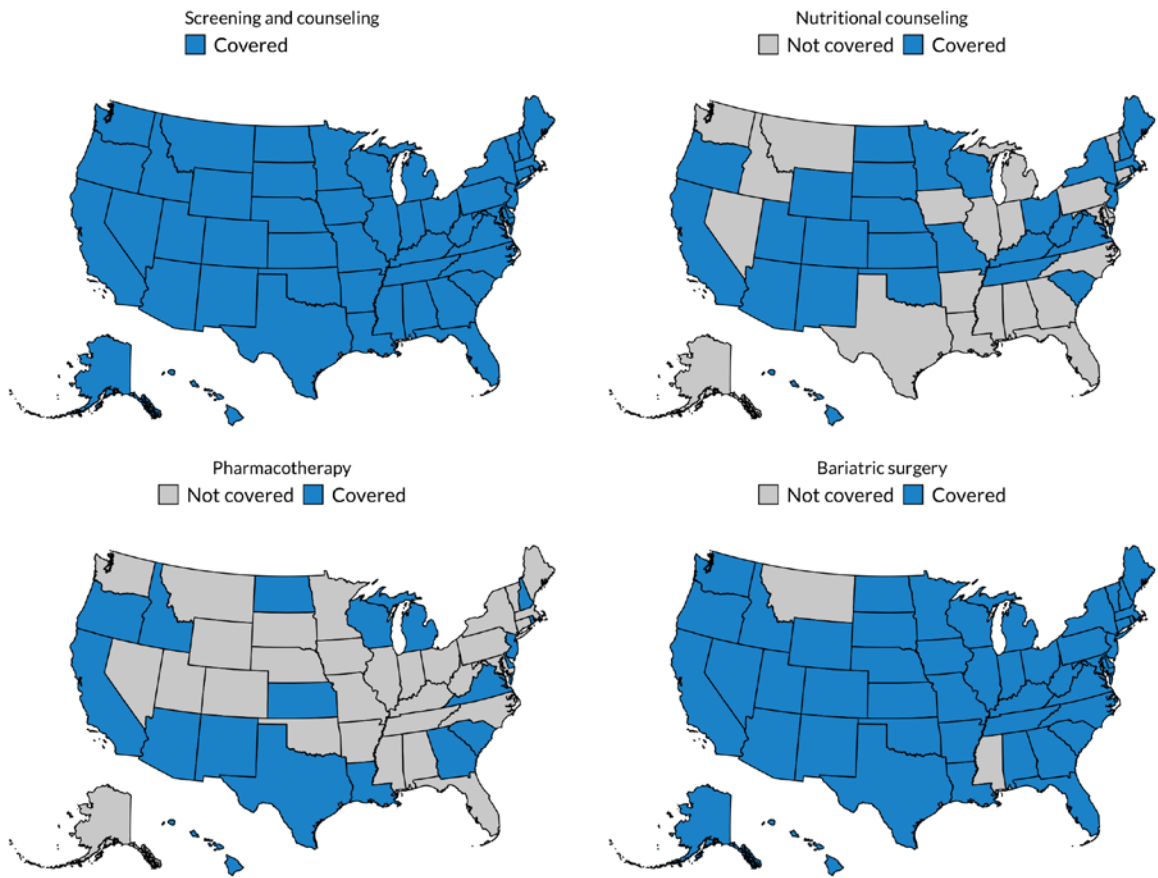


URBAN INSTITUTE

Source: Data for the 2016–17 plan year were accessed from “Coverage for Obesity Treatment Services – State Medicaid Programs,” the George Washington University, STOP Obesity Alliance, accessed December 22, 2021, <https://stop.publichealth.gwu.edu/coverage/medicaid>.

FIGURE 12

State-Level Medicaid Managed-Care Coverage of Obesity Treatments, 2016-17

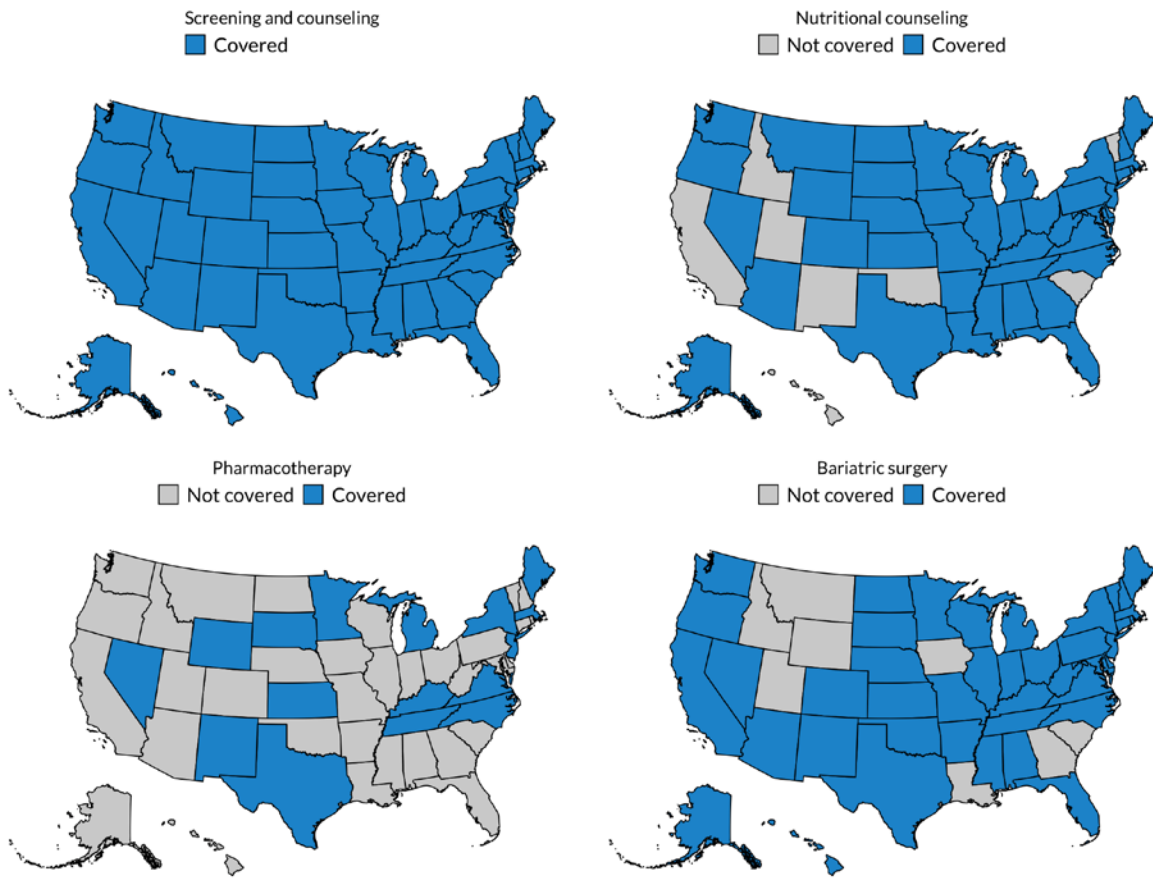


URBAN INSTITUTE

Source: Data for the 2016-17 plan year were accessed from "Coverage for Obesity Treatment Services - State Medicaid Programs," the George Washington University, STOP Obesity Alliance, accessed December 22, 2021, <https://stop.publichealth.gwu.edu/coverage/medicaid>.

FIGURE 13

State-Level Employee Health Plan Coverage of Obesity Treatments, 2020–21



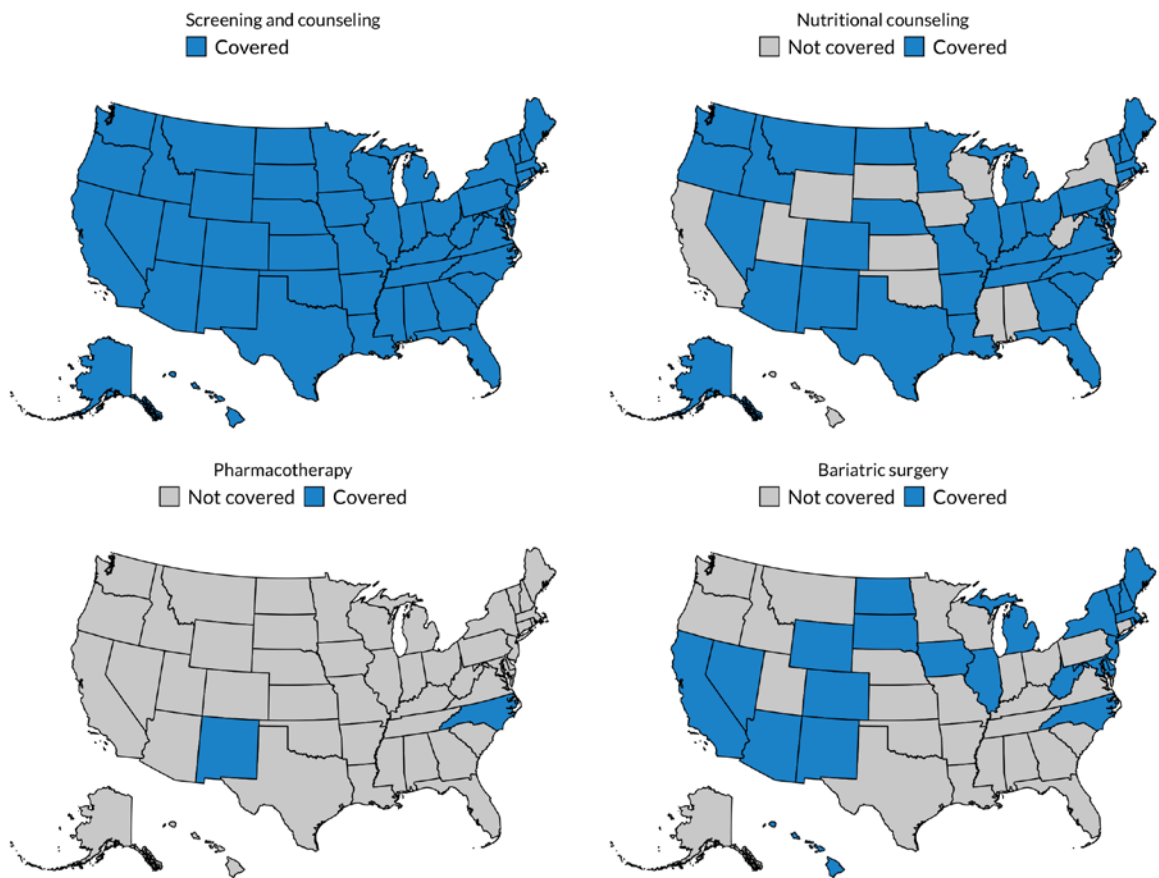
URBAN INSTITUTE

Source: Data for the 2020–21 plan year were accessed from “Obesity Treatment Coverage,” the George Washington University, STOP Obesity Alliance, accessed December 22, 2021, <https://stop.publichealth.gwu.edu/coverage>.

Notes: Coverage for nutritional counseling was undetermined for California, Hawaii, New Mexico, and Oklahoma. Coverage for pharmacotherapy was undetermined for Illinois, Missouri, Montana, North Dakota, Oklahoma, Oregon, and Vermont. Coverage for bariatric surgery was undetermined for Iowa, Montana, and Wyoming. Treatments for which coverage was undetermined were coded as “not covered.” Undetermined coverage means information was unavailable or conflicting information was found in separate documents.

FIGURE 14

State-Level Essential Health Benefits Benchmark Plans' Coverage of Obesity Treatments



URBAN INSTITUTE

Source: Data accessed from the Centers for Medicare & Medicaid Services.

Notes: Most data come from plan years 2017–23, except for data for Illinois (2020–23), Michigan (2022–23), New Mexico (2022–23), Oregon (2022–23), and South Dakota (2021–23). For more information, see “Essential Health Benefits Benchmark Plans,” Centers for Medicare & Medicaid Services, accessed December 22, 2021, <https://www.cms.gov/CCIIO/Resources/Data-Resources/ehb#ehb>.

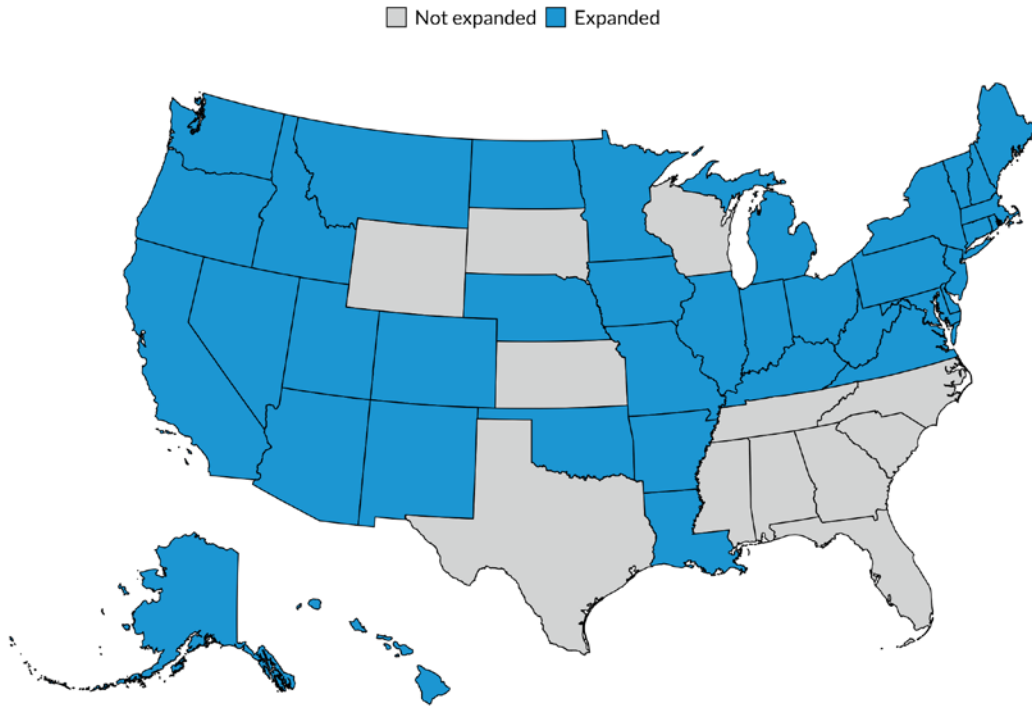
The composition of insurance coverage types in a state greatly influences the comprehensiveness of coverage experienced by the typical person in the state. In states where Medicaid covers a greater portion of the population, the Medicaid coverage policy has a greater impact on access to obesity care. Conversely, access to any of these services is more limited in states with higher proportions of residents who are uninsured. The next set of maps shows (1) differences in Medicaid coverage by states' Affordable Care Act Medicaid expansion statuses (figure 15) and (2) the shares of state populations who are covered by Medicaid (figure 16), employer-sponsored coverage (figure 17), and Medicare (figure 18) or are uninsured (figure 19).

Comparing the Medicaid expansion statuses of states with high versus low obesity prevalence, 2 of the 10 highest-prevalence states have not yet expanded Medicaid; among the 10 lowest-prevalence states, 1 has not expanded Medicaid. However, the two nonexpansion states in the high-prevalence group have the highest (Mississippi) and third-highest (Alabama) obesity rates in the country. The nonexpansion state in the low-prevalence group, Florida, has the ninth-lowest obesity prevalence of all states. As of 2020, the shares of state populations covered by Medicare are similar in the high- and low-prevalence states. The average share of the population with Medicaid coverage is slightly higher in high-prevalence states than in low-prevalence states (22.6 versus 20.2 percent), and the share covered by employer-based insurance is higher in low-prevalence states than in high-prevalence states (50.3 versus 46.7 percent). Finally, average uninsurance rates are 8.9 percent in the 10 highest-prevalence states and 6.8 percent in the 10 lowest-prevalence states.

Again, though we cannot make causal claims about the correlation between insurance coverage and obesity, the potential impact of increasing insurance coverage of obesity treatment is likely to be muted by the higher uninsurance rates in high-prevalence states. The somewhat larger share of the population of high-prevalence states covered by Medicaid suggests making changes to Medicaid programs may have a greater impact in those states. Conversely, changes to employer-based coverage policies may have a relatively greater effect in low-prevalence states.

FIGURE 15

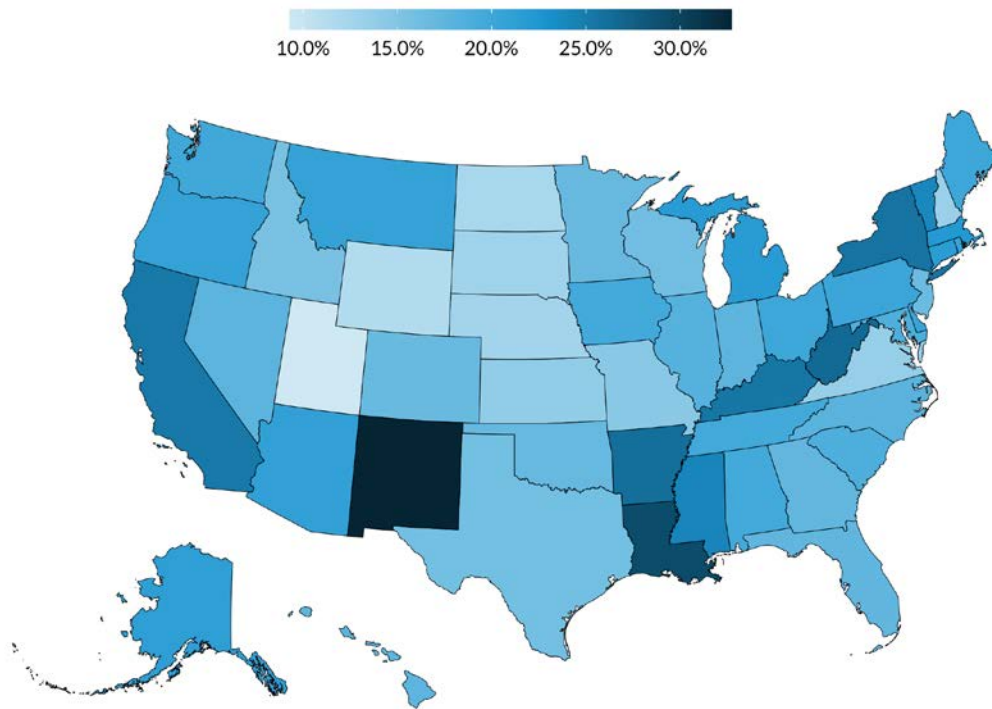
State Affordable Care Act Medicaid Expansion Status as of November 2021



URBAN INSTITUTE

Source: "Status of State Action on the Medicaid Expansion Decision: Timeframe November 19, 2021," Kaiser Family Foundation, accessed December 22, 2021, <https://www.kff.org/health-reform/state-indicator/state-activity-around-expanding-medicaid-under-the-affordable-care-act/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D>.

FIGURE 16
State-Level Medicaid Coverage, 2019

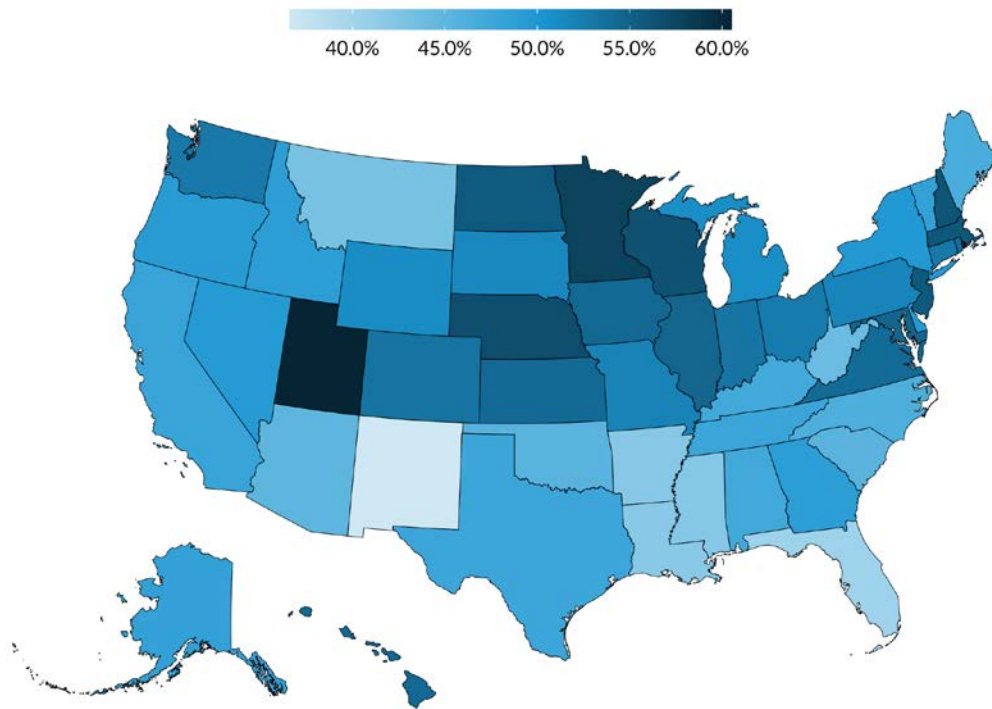


URBAN INSTITUTE

Source: "Health Insurance Coverage of the Total Population: Timeframe 2019," Kaiser Family Foundation, accessed December 22, 2021, <https://www.kff.org/health-reform/state-indicator/state-activity-around-expanding-medicaid-under-the-affordable-care-act/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D>.

FIGURE 17

State-Level Employer-Sponsored Insurance Coverage, 2019

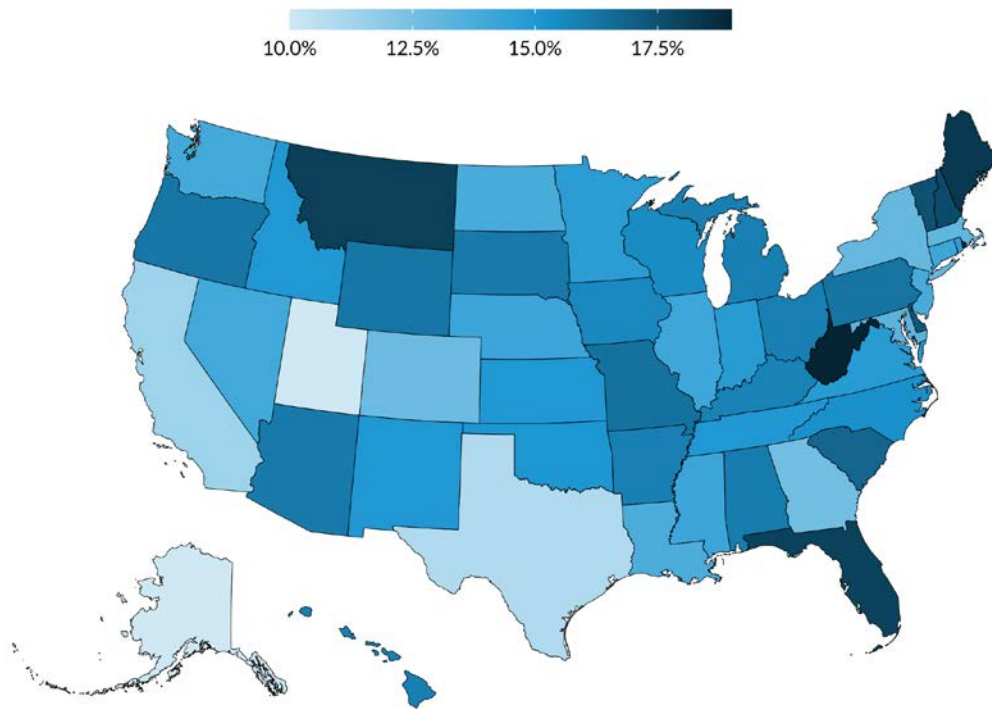


URBAN INSTITUTE

Source: "Health Insurance Coverage of the Total Population: Timeframe 2019," Kaiser Family Foundation, accessed December 22, 2021, <https://www.kff.org/health-reform/state-indicator/state-activity-around-expanding-medicaid-under-the-affordable-care-act/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D>.

FIGURE 18

State-Level Medicare Coverage, 2019

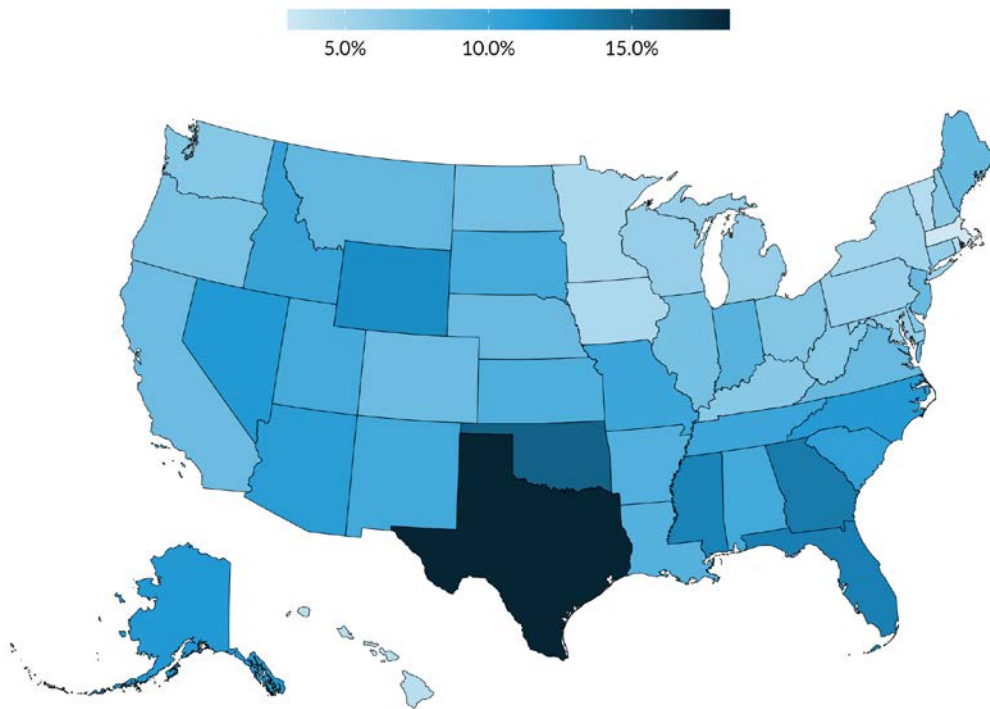


URBAN INSTITUTE

Source: "Health Insurance Coverage of the Total Population: Timeframe 2019," Kaiser Family Foundation, accessed December 22, 2021, <https://www.kff.org/health-reform/state-indicator/state-activity-around-expanding-medicaid-under-the-affordable-care-act/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D>.

FIGURE 19

State-Level Uninsurance Rates, 2019



URBAN INSTITUTE

Source: “Health Insurance Coverage of the Total Population: Timeframe 2019,” Kaiser Family Foundation, accessed December 22, 2021, <https://www.kff.org/health-reform/state-indicator/state-activity-around-expanding-medicaid-under-the-affordable-care-act/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D>.

Summary

Obesity is a complex condition with social, environmental, and individual causes. People of all genders, races, and ethnicities and across all geographies experience this condition. Obesity rates have continued to rise across the United States in the last decade, and prevalence is highest among women and Black, Hispanic/Latinx, Native American and Alaska Native, and Pacific Islander adults. People residing in the Southeast and Midwest tend to experience higher prevalence overall, but pockets of significantly elevated obesity exist throughout the country. Obesity is associated with other serious health conditions, higher rates of mortality, and high economic costs. Because social and environmental factors shape obesity prevalence, the treatment and prevention of obesity cannot solely address individual causes. Access to affordable health care that covers obesity treatment and prevention services, such as nutritional counseling, pharmacotherapy, and bariatric surgery, can mitigate the social and environmental causes of this public health emergency. However, states with the highest prevalence

of obesity are often not providing insurance coverage for all effective obesity treatments, nor is the Medicare program. Expanding health insurance access through Medicaid and covering obesity treatments through Medicaid and Medicare would help states combat obesity. This is especially true for high-prevalence states, where both uninsurance and Medicaid coverage rates are higher than such rates in low-prevalence states. What changes in insurance coverage policy might have the largest impact on obesity depends, in part, on where high-prevalence populations obtain their health insurance. Enhancing coverage through the Marketplaces and state employee plans would also help address this epidemic. Thus, further analysis is required. Finally, though many policies and the prevalence of obesity vary at the state level, county-level data reveal that the prevalence of obesity and related disease varies within states, suggesting state-level policies alone may not completely address the obesity epidemic. To the extent that access to high-quality, local providers of comprehensive services or some other factor drives those intrastate differences, locally targeted interventions may also be necessary.

About the Data

We derived national and state- and county-level data on obesity and related health conditions from multiple datasets, including the National Health and Nutrition Examination Survey, the National Health Interview Survey, and the Behavioral Risk Factor Surveillance System (BRFSS). The National Health and Nutrition Examination Survey is a nationally representative study of about 5,000 people that collects data every two years, both via interview and physical examination. The Centers for Disease Control and Prevention's National Center for Health Statistics uses these survey data to determine the prevalence of major diseases and risk factors for diseases. The National Health Interview Survey is a larger, cross-sectional household interview (35,000 to 40,000 households with about 75,000 to 100,000 people). It is conducted annually under the auspices of the Centers for Disease Control and Prevention's National Center for Health Statistics, and it collects information on diagnoses identified by a clinician. Because it is a large national survey, it can provide greater visibility into the demographic characteristics of people reporting various health conditions. The BRFSS is the primary method for collecting state- and community-level data. It is a large telephone survey conducted with more than 400,000 people each year. Most state health departments use the survey to identify the prevalence of chronic conditions in their populations. Although the survey was designed to collect data at the state and metropolitan statistical area levels, multiple years of BRFSS data are used to report information for smaller geographic areas like counties. To report county-level information, we used the Centers for Disease Control and Prevention's PLACES 2021 release, an effort to release information uniformly at a large scale for local areas. The data sources used to create these estimates include 2017 or 2018 BRFSS data,

Census Bureau 2010 population data, and American Community Survey 2013–17 or 2014–18 estimates. See the PLACES data portal for more information on the county-level data.¹⁵ For more information about the other public health datasets, see the National and Community Health Data Sets appendix in Institute of Medicine (2011).

Data on the insurance coverage of obesity treatment for state employees and Medicaid beneficiaries come from the STOP Obesity Alliance at the George Washington University. The alliance collected these data using administrative documents, health plan websites, provider manuals, subscriber handbooks, fee schedules, and drug formularies. Data on individual and small-group coverage of essential health benefits as mandated through state benchmark plans come from the Centers for Medicare & Medicaid Services.¹⁶ Data on state-level shares of insurance type come from the Kaiser Family Foundation’s analysis of the Census Bureau’s American Community Survey.

Notes

- ¹ “Obesity,” World Health Organization, accessed February 2, 2022, <https://www.who.int/westernpacific/health-topics/obesity>.
- ² Cheryl D. Fryar, Margaret D. Carroll, and Joseph Afful, “Prevalence of Overweight, Obesity, and Extreme Obesity among Adults Aged 20 and Over: United States, 1960–1962 through 2017–2018,” Centers for Disease Control and Prevention, NCHS Health E-Stats, December 2020, <https://www.cdc.gov/nchs/data/hestat/obesity-adult-17-18/obesity-adult.htm>.
- ³ BMI is calculated as a person’s weight in kilograms divided by the square of their height in meters.
- ⁴ “The Health Effects of Overweight and Obesity,” Centers for Disease Control and Prevention, accessed December 18, 2021, <https://www.cdc.gov/healthyweight/effects/index.html>.
- ⁵ “Obesity and Cancer,” Centers for Disease Control and Prevention, November 17, 2021, <https://www.cdc.gov/cancer/obesity/index.htm>.
- ⁶ Fryar, Carroll, and Afful, “Prevalence of Overweight, Obesity, and Severe Obesity among Adults.”
- ⁷ “National Health Interview Survey,” Centers for Disease Control and Prevention, National Center for Health Statistics, accessed December 16, 2021, <https://www.cdc.gov/nchs/nhis/index.htm>.

In this paper, we use the following racial and ethnic terms primarily based on such categories from the National Health and Nutrition Examination Survey: Asian, Black, Hispanic/Latinx, Native American and Alaska Native, and white. We use “Hispanic/Latinx” to reflect the different ways people self-identify. Asian, Black, Native American and Alaska Native, and white adults are not Hispanic/Latinx. We use data from the National Health Interview Survey to examine outcomes among Native Americans and Alaska Natives. However, these data have some limitations. Though the National Health Interview Survey separates Native Hawaiian and Pacific Islander people from Asian people, the numbers for this group do not reach the threshold for public reporting.
- ⁸ Cheryl D. Fryar, Margaret D. Carroll, and Joseph Afful, “Prevalence of Overweight, Obesity, and Severe Obesity among Children and Adolescents Aged 2–19 Years: United States, 1963–1965 through 2017–2018,” Centers for Disease Control and Prevention, NCHS Health E-Stats, December 2020, <https://www.cdc.gov/nchs/data/hestat/obesity-child-17-18/obesity-child.htm>.
- ⁹ For simplicity, we consider the District of Columbia a state for this analysis.
- ¹⁰ “Physical Activity: Creation of or Enhanced Access to Places for Physical Activity Combined with Informational Outreach Activities,” the Community Guide, November 2, 2021, <https://www.thecommunityguide.org/findings/physical-activity-creation-or-enhanced-access-places-physical-activity-combined>.
- ¹¹ “Treatment for Overweight and Obesity,” National Institute of Diabetes and Digestive and Kidney Diseases, accessed December 14, 2021, <https://www.niddk.nih.gov/health-information/weight-management/adult-overweight-obesity/treatment>.
- ¹² “Bariatric Surgery Procedures,” American Society for Metabolic and Bariatric Surgery, accessed December 14, 2021, <https://asmbs.org/patients/bariatric-surgery-procedures>.
- ¹³ “Obesity Screening Coverage,” Medicare.gov, accessed December 16, 2021, <https://www.medicare.gov/coverage/obesity-behavioral-therapy>; and “Bariatric Surgery Coverage,” Medicare.gov, accessed December 16, 2021, <https://www.medicare.gov/coverage/bariatric-surgery>.
- ¹⁴ “Medical Nutrition Therapy Insurance Coverage,” Medicare.gov, accessed December 16, 2021, <https://www.medicare.gov/coverage/nutrition-therapy-services>.

- ¹⁵ “PLACES: Local Data for Better Health, Census Tract Data 2021 Release,” Centers for Disease Control and Prevention, Chronic Disease and Health Promotion Data and Indicators, accessed December 20, 2021, <https://chronicdata.cdc.gov/500-Cities-Places/PLACES-Local-Data-for-Better-Health-Census-Tract-D/cwsq-ngmh>.
- ¹⁶ “Essential Health Benefits Benchmark Plans,” Centers for Medicare & Medicaid Services, accessed December 22, 2021, <https://www.cms.gov/CCIIO/Resources/Data-Resources/ehb#ehb>.

References

- Anderson, Laurie M., Toby A. Quinn, Karen Glanz, Gilbert Ramirez, Leila C. Kahwati, Donna B. Johnson, Leigh Ramsey Buchanan, et al. 2009. "The Effectiveness of Worksite Nutrition and Physical Activity Interventions for Controlling Employee Overweight and Obesity: A Systematic Review." *American Journal of Preventive Medicine* 37 (4): 340–57. <https://doi.org/10.1016/j.amepre.2009.07.003>.
- Auchincloss, Amy H., Mahasin S. Mujahid, Mingwu Shen, Erin D. Michos, Melicia C. Whitt-Glover, and Ana V. Diez Roux. 2013. "Neighborhood Health-Promoting Resources and Obesity Risk (the Multi-ethnic Study of Atherosclerosis)." *Obesity* 21 (3): 621–28. <https://doi.org/10.1002/oby.20255>.
- Barker, Lawrence E., Karen A. Kirtland, Edward W. Gregg, Linda S. Geiss, and Theodore J. Thompson. 2011. "Geographic Distribution of Diagnosed Diabetes in the U.S.: A Diabetes Belt." *American Journal of Preventive Medicine* 40 (4): 434–39. <https://doi.org/10.1016/j.amepre.2010.12.019>.
- Biener, Adam, John Cawley, and Chad Meyerhoefer. 2017. "The High and Rising Costs of Obesity to the US Health Care System." *Journal of General Internal Medicine* 32 (Suppl. 1): 6–8. <https://doi.org/10.1007/s11606-016-3968-8>.
- Bray, George A., William E. Heisel, Ashkan Afshin, Michael D. Jensen, William H. Dietz, Michael Long, Robert F. Kushner, et al. 2018. "The Science of Obesity Management: An Endocrine Society Scientific Statement." *Endocrine Reviews* 39 (2): 79–132. <https://doi.org/10.1210/er.2017-00253>.
- Brown, Tamara, Theresa H. M. Moore, Lee Hooper, Yang Gao, Amir Zayegh, Sharea Ijaz, Martha Elwenspoek, et al. 2019. "Interventions for Preventing Obesity in Children." *Cochrane Database of Systematic Reviews*, no. 7: CD001871. <https://doi.org/10.1002/14651858.CD001871.pub4>.
- Chang, Su-Hsin, Carolyn R. T. Stoll, Jihyun Song, J. Esteban Varela, Christopher J. Eagon, and Graham A. Colditz. 2014. "The Effectiveness and Risks of Bariatric Surgery: An Updated Systematic Review and Meta-analysis, 2003–2012." *JAMA Surgery* 149 (3): 275–87. <https://doi.org/10.1001/jamasurg.2013.3654>.
- Cheng, Feon W., Xiang Gao, Le Bao, Diane C. Mitchell, Craig Wood, Martin J. Sliwinski, Helen Smiciklas-Wright, et al. 2017. "Obesity as a Risk Factor for Developing Functional Limitation among Older Adults: A Conditional Inference Tree Analysis: Obesity and Functional Decline among Older Adults." *Obesity* 25 (7): 1263–69. <https://doi.org/10.1002/oby.21861>.
- Colchero, M. Arantxa, Juan Rivera-Dommarco, Barry M. Popkin, and Shu Wen Ng. 2017. "In Mexico, Evidence of Sustained Consumer Response Two Years after Implementing a Sugar-Sweetened Beverage Tax." *Health Affairs* 36 (3): 564–71. <https://doi.org/10.1377/hlthaff.2016.1231>.
- Connolly, Heidi M., Jack L. Crary, Michael D. McGoon, Donald D. Hensrud, Brooks S. Edwards, William D. Edwards, and Hartzell V. Schaff. 1997. "Valvular Heart Disease Associated with Fenfluramine-Phentermine." *New England Journal of Medicine* 337 (9): 581–88. <https://doi.org/10.1056/NEJM199708283370901>.
- Flegal, Katherine M., Barry I. Graubard, David F. Williamson, and Mitchell H. Gail. 2018. "Excess Deaths Associated with Underweight, Overweight, and Obesity: An Evaluation of Potential Bias." *Vital and Health Statistics, Series 3, Analytical and Epidemiological Studies*, no. 42: 1–21.
- Garvey, W. Timothy, Jeffrey I. Mechanick, Elise M. Brett, Alan J. Garber, Daniel L. Hurley, Ania M. Jastreboff, Karl Nadolsky, Rachel Pessah-Pollack, and Raymond Plodkowski. 2016. "American Association of Clinical Endocrinologists and American College of Endocrinology Comprehensive Clinical Practice Guidelines for Medical Care of Patients with Obesity." *Endocrine Practice* 22 (7): 842–84. <https://doi.org/10.4158/EP161356.ESGL>.
- Hales, Craig M., Margaret D. Carroll, Cheryl D. Fryar, and Cynthia L. Ogden. 2020. "Prevalence of Obesity and Severe Obesity among Adults: United States, 2017–2018." Atlanta: Centers for Disease Control and Prevention.

- Hao, Lingxin, and Julie J. H. Kim. 2009. "Immigration and the American Obesity Epidemic." *International Migration Review* 43 (2): 237–62. <https://doi.org/10.1111/j.1747-7379.2009.00764.x>.
- Hawley, Nicola, and Stephen McGarvey. 2015. "Obesity and Diabetes in Pacific Islanders: The Current Burden and the Need for Urgent Action." *Current Diabetes Reports* 15 (May): 594. <https://doi.org/10.1007/s11892-015-0594-5>.
- Howard, George, and Virginia J. Howard. 2020. "Twenty Years of Progress toward Understanding the Stroke Belt." *Stroke* 51 (3): 742–50. <https://doi.org/10.1161/STROKEAHA.119.024155>.
- Institute of Medicine (Institute of Medicine, Committee on Public Health Strategies to Improve Health). 2011. *For the Public's Health: The Role of Measurement in Action and Accountability*. Washington, DC: National Academies Press.
- Kabiri, Mina, Alison Sexton Ward, Abhilasha Ramasamy, Rebecca Kee, Rahul Ganguly, Brian Gabriel Smolarz, Tracy Zvenyach, James R. Baumgardner, and Dana P. Goldman. 2021. "Simulating the Fiscal Impact of Anti-obesity Medications as an Obesity Reduction Strategy." *Inquiry: A Journal of Medical Care Organization, Provision and Financing* 58:0046958021990516. <https://doi.org/10.1177/0046958021990516>.
- Keisler-Starkey, Katherine, and Lisa N. Bunch. 2021. *Health Insurance Coverage in the United States: 2020*. Washington, DC: US Census Bureau.
- Kershaw, Kiarri N., and Ashley E. Pender. 2016. "Racial/Ethnic Residential Segregation, Obesity, and Diabetes Mellitus." *Current Diabetes Reports* 16 (11): 108. <https://doi.org/10.1007/s11892-016-0800-0>.
- Khera, Rohan, Mohammad Hassan Murad, Apoorva K. Chandar, Parambir S. Dulai, Zhen Wang, Larry J. Prokop, Rohit Loomba, Michael Camilleri, and Siddharth Singh. 2016. "Association of Pharmacological Treatments for Obesity with Weight Loss and Adverse Events: A Systematic Review and Meta-analysis." *JAMA* 315 (22): 2424. <https://doi.org/10.1001/jama.2016.7602>.
- Kim, Tae Jun, and Olaf von dem Knesebeck. 2018. "Income and Obesity: What Is the Direction of the Relationship? A Systematic Review and Meta-analysis." *BMJ Open* 8 (1): e019862. <https://doi.org/10.1136/bmjopen-2017-019862>.
- Kompaniyets, Lyudmyla. 2021. "Body Mass Index and Risk for COVID-19-Related Hospitalization, Intensive Care Unit Admission, Invasive Mechanical Ventilation, and Death — United States, March–December 2020." *Morbidity and Mortality Weekly Report* 70 (10): 355–61. <https://doi.org/10.15585/mmwr.mm7010e4>.
- Kyle, Theodore K., Emily J. Dhurandhar, and David B. Allison. 2016. "Regarding Obesity as a Disease: Evolving Policies and Their Implications." *Endocrinology and Metabolism Clinics of North America* 45 (3): 511–20. <https://doi.org/10.1016/j.ecl.2016.04.004>.
- Lopez, Claude, Joseph Bendix, and Ken Sagynbekov. 2020. "Weighing Down America: 2020 Update: A Community Approach against Obesity." Rochester, NY: Social Science Research Network. <https://doi.org/10.2139/ssrn.3743879>.
- Mackey, Eleanor R., E. Thomaseo Burton, Adelle Cadieux, Elizabeth Getzoff, Melissa Santos, Wendy Ward, and Amy R. Beck. 2021. "Addressing Structural Racism Is Critical for Ameliorating the Childhood Obesity Epidemic in Black Youth." *Childhood Obesity*. <https://doi.org/10.1089/chi.2021.0153>.
- Maharana, Adyasha, and Elaine Okanyene Nsoesie. 2018. "Use of Deep Learning to Examine the Association of the Built Environment with Prevalence of Neighborhood Adult Obesity." *JAMA Network Open* 1 (4): e181535. <https://doi.org/10.1001/jamanetworkopen.2018.1535>.
- Mechanick, Jeffrey I., Caroline Apovian, Stacy Brethauer, W. Timothy Garvey, Aaron M. Joffe, Julie Kim, Robert F. Kushner, et al. 2020. "Clinical Practice Guidelines for the Perioperative Nutrition, Metabolic, and Nonsurgical Support of Patients Undergoing Bariatric Procedures - 2019 Update: Cosponsored by American Association of Clinical Endocrinologists/American College of Endocrinology, the Obesity Society, American Society for

- Metabolic and Bariatric Surgery, Obesity Medicine Association, and American Society of Anesthesiologists." *Obesity* 28 (4): O1–O58. <https://doi.org/10.1002/oby.22719>.
- Muktabhant, Benja, Theresa A. Lawrie, Pisake Lumbiganon, and Malinee Laopaiboon. 2015. "Diet or Exercise, or Both, for Preventing Excessive Weight Gain in Pregnancy." *Cochrane Database of Systematic Reviews* (6): CD007145. <https://doi.org/10.1002/14651858.CD007145.pub3>.
- NHLBI Obesity Education Initiative Expert Panel (NHLBI Obesity Education Initiative Expert Panel on the Identification, Evaluation, and Treatment of Obesity in Adults). 1998. *Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults*. Bethesda, MD: National Heart, Lung, and Blood Institute.
- Ogden, Cynthia L., Tala H. Fakhouri, Margaret D. Carroll, Craig M. Hales, Cheryl D. Fryar, Xianfen Li, and David S. Freedman. 2017. "Prevalence of Obesity among Adults, by Household Income and Education - United States, 2011-2014." *Morbidity and Mortality Weekly Report* 66 (50): 1369–73. <https://doi.org/10.15585/mmwr.mm6650a1>.
- Puhl, Rebecca M., and Chelsea A. Heuer. 2010. "Obesity Stigma: Important Considerations for Public Health." *American Journal of Public Health* 100 (6): 1019–28. <https://doi.org/10.2105/AJPH.2009.159491>.
- Rajbhandari-Thapa, Janani, Donglan Zhang, Kara E. MacLeod, and Kiran Thapa. 2020. "Impact of Medicaid Expansion on Insurance Coverage Rates among Adult Populations with Low Income and by Obesity Status." *Obesity* 28 (7): 1219–23. <https://doi.org/10.1002/oby.22793>.
- Renna, Francesco, and Nidhi Thakur. 2010. "Direct and Indirect Effects of Obesity on US Labor Market Outcomes of Older Working Age Adults." *Social Science & Medicine* 71 (2): 405–13. <https://doi.org/10.1016/j.socscimed.2010.03.038>.
- Schwartz, Michael W., Randy J. Seeley, Lori M. Zeltser, Adam Drewnowski, Eric Ravussin, Leanne M. Redman, and Rudolph L. Leibel. 2017. "Obesity Pathogenesis: An Endocrine Society Scientific Statement." *Endocrine Reviews* 38 (4): 267–96. <https://doi.org/10.1210/er.2017-00111>.
- Tremmel, Maximilian, Ulf-G. Gerdtham, Peter M. Nilsson, and Sanjib Saha. 2017. "Economic Burden of Obesity: A Systematic Literature Review." *International Journal of Environmental Research and Public Health* 14 (4): 435. <https://doi.org/10.3390/ijerph14040435>.
- US Preventive Services Task Force. 2018. "Behavioral Weight Loss Interventions to Prevent Obesity-Related Morbidity and Mortality in Adults: US Preventive Services Task Force Recommendation Statement." *JAMA* 320 (11): 1163–71. <https://doi.org/10.1001/jama.2018.13022>.
- VA and DoD (Department of Veterans Affairs and Department of Defense). 2020. *VA/DoD Clinical Practice Guideline for the Management of Adult Overweight and Obesity*. Washington, DC: Department of Veterans Affairs and Department of Defense.
- Wadden, Thomas A., Sheri Volger, David B. Sarwer, Marion L. Vetter, Adam G. Tsai, Robert I. Berkowitz, Shiriki Kumanyika, et al. 2011. "A Two-Year Randomized Trial of Obesity Treatment in Primary Care Practice." *New England Journal of Medicine* 365 (21): 1969–79. <https://doi.org/10.1056/NEJMoa1109220>.
- Wharton, Sean, David C. W. Lau, Michael Vallis, Arya M. Sharma, Laurent Biertho, Denise Campbell-Scherer, Kristi Adamo, et al. 2020. "Obesity in Adults: A Clinical Practice Guideline." *CMAJ : Canadian Medical Association Journal* 192 (31): E875–91. <https://doi.org/10.1503/cmaj.191707>.
- Yanovski, Susan Z., and Jack A. Yanovski. 2014. "Long-Term Drug Treatment for Obesity: A Systematic and Clinical Review." *JAMA* 311 (1): 74–86. <https://doi.org/10.1001/jama.2013.281361>.
- . 2021. "Progress in Pharmacotherapy for Obesity." *JAMA* 326 (2): 129–30. <https://doi.org/10.1001/jama.2021.9486>.

Yu, Wanqi, Kristen E. Rohli, Shujuan Yang, and Peng Jia. 2021. "Impact of Obesity on COVID-19 Patients." *Journal of Diabetes and Its Complications* 35 (3): 107817. <https://doi.org/10.1016/j.jdiacomp.2020.107817>.

About the Authors

Timothy A. Waidmann is a senior fellow in the Health Policy Center at the Urban Institute. He has over 25 years of experience designing and conducting studies on varied health policy topics, including disability and health among the elderly; Medicare and Medicaid policy; disability and employment; public health and prevention; health status and access to health care in vulnerable populations; health care utilization among high-cost, high-risk populations; geographic variation in health care needs and utilization; and the relationships between health and a wide variety of economic and social factors. Waidmann's publications based on these studies have appeared in high-profile academic and policy journals including *New England Journal of Medicine*, *Quarterly Journal of Economics*, *American Journal of Public Health*, *Health Affairs*, *Journal of Human Resources*, *Milbank Quarterly*, *Social Science & Medicine*, *Gerontologist*, and *Demography*. He has also been involved in several large-scale federal evaluation studies of health system reforms, assuming a central role in the design and execution of the quantitative analyses for those evaluations. Before joining Urban in 1996, Waidmann was assistant professor in the School of Public Health and postdoctoral fellow in the Survey Research Center at the University of Michigan. He received his PhD in economics from the University of Michigan in 1991.

Elaine Waxman is a senior fellow in the Income and Benefits Policy Center at the Urban Institute. Her expertise includes food insecurity, nutrition and the food assistance safety net, the social determinants of health disparities, and other issues affecting low-income families and communities. Before joining Urban, Waxman was vice president of research and nutrition at Feeding America, where she oversaw research on food insecurity, the intersection of hunger and health, and the circumstances and experiences of individuals seeking charitable food assistance. Waxman has coauthored numerous research and policy reports and articles in scholarly journals, including *American Journal of Public Health*, *Applied Economics Perspectives and Policy*, *Health Affairs*, *Social Science Review*, *Journal of Hunger and Environmental Nutrition*, *Journal of Family and Economic Issues*, and *Journal of Food Law and Policy*. She is a member of the Feeding America Technical Advisory Group, an adviser to the national food and agricultural policy forum Agree, and a member of the Aspen Institute Dialogue on Food Insecurity and Health Care Expenditures. She holds an MPP and a PhD from the University of Chicago, where she is a lecturer.

Vincent Pancini is a research assistant with the Health Policy Center at the Urban Institute. He received his BS in economics and public policy from the Ohio State University, where he graduated with honors and research distinction. His senior thesis, which investigated the relationship between the Affordable Care Act's Medicaid expansion and time spent seeking health care, won the Gledhill Prize for best paper in applied economics.

Poonam Gupta is a research analyst in the Income and Benefits Policy Center at the Urban Institute, focusing on social safety net policy, specifically related to food insecurity. Gupta holds BAs in public health and Spanish from the Johns Hopkins University and an MSPH in international health from Johns Hopkins Bloomberg School of Public Health.

Loni Philip Tabb is an associate professor of biostatistics at Drexel University within the Department of Epidemiology and Biostatistics in the Dornsife School of Public Health. She received her MS (2005) and BS (2003) in mathematics from Drexel University and her PhD (2010) and AM (2007) in biostatistics from Harvard University. Since joining the faculty at Drexel, her research has focused primarily on spatial and spatiotemporal statistics and epidemiology with applications in health and social disparities. Much of Tabb's work involves using Bayesian statistical methods in the presence of complex data structures. Recently, her work has focused on the intersection of health and space and time, and she has published numerous related articles in journals like *Spatial and Spatio-temporal Epidemiology*, *Health and Place*, *Proceedings of the National Academy of Sciences*, and *JAMA*. She currently examines the geographically and temporally varying Black-White inequities in cardiovascular health, with a focus on providing the evidence needed for more informed, evidence-based policies and interventions targeted toward eliminating these disparities.

STATEMENT OF INDEPENDENCE

The Urban Institute strives to meet the highest standards of integrity and quality in its research and analyses and in the evidence-based policy recommendations offered by its researchers and experts. We believe that operating consistent with the values of independence, rigor, and transparency is essential to maintaining those standards. As an organization, the Urban Institute does not take positions on issues, but it does empower and support its experts in sharing their own evidence-based views and policy recommendations that have been shaped by scholarship. Funders do not determine our research findings or the insights and recommendations of our experts. Urban scholars and experts are expected to be objective and follow the evidence wherever it may lead.



500 L'Enfant Plaza SW
Washington, DC 20024

www.urban.org