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Obesity and Physical Inactivity in Colorado: Demographic Characteristics and Regional Distribution

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Introduction

Obesity continues to be a major concern for the health of Americans. While Colorado ranks as the leanest state in the United States, the percentage of obese adults has more than doubled in the last 16 years (10.3% in 1996 to 20.7% in 2011).[1] As of 2011, more than 1 million Coloradans were considered obese. Obesity can be caused by several factors including genetics, metabolism, personal behaviors, culture, and socioeconomic status. Recent studies have shown that obesity rates in rural areas are often higher than urban areas in the U.S.[2-4] In Colorado, over 700,000 people live in rural areas of the state, which encompass over 75 percent of the total area of Colorado.[5] Rural areas in Colorado have been associated with a number of disparities in health and access to health services, including higher rates of motor vehicle deaths, tobacco use, suicide rates, and higher rates of uninsured populations.[5] This differentiation between urban and rural status is important for public health and health interventions due to the differential access to amenities between the two regions that may influence health. Addressing what has become a national epidemic starts with a closer look at the communities that are most acutely affected. This report will address obesity prevalence as well as physical inactivity by various health indicators and regions in Colorado.

Methods

Data source

The Colorado Behavioral Risk Factor Surveillance System (BRFSS) is a telephone survey of adults ages 18 and older developed by the Centers for Disease Control and Prevention (CDC), and conducted by individual states and U.S. territories on a yearly basis. In 2011, 13,612 respondents representing all 64 counties in Colorado were interviewed. Data were collected using random-digit dialing among households with a telephone or a cellular phone. Findings have been weighted using a raking method (first introduced in 2011) to reflect the characteristics of the general population.

Regions

Obesity and physical inactivity prevalence were analyzed by state, county and Health Statistics Region (HSR). The 64 counties were grouped as either rural or urban counties (as defined by the Colorado Rural Health Center, see Table 1).[5] Health Statistics Regions were

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Table 1. Definitions

Term	Definition	Source
Urban	A county with ≥ 50,000 people	Colorado Rural Health Center
Rural	A county with < 50,000 people	Colorado Rural Health Center
Health Statistics Region	The boundary for a region for public health planning purposes determined by the size of the population in each county and key demographic factors for each county.	Colorado Department of Public Health and Environment, Health Statistics Section
Body Mass Index (BMI)	weight (kg) / [height (m)]2	CDC
Obesity	Body Mass Index (BMI) of 30 or higher	CDC

Source: Colorado Rural Health Center; Health Statistics Section, Colorado Department of Public Health and Environment; CDC

constructed by the Health Statistics Section at the Colorado Department of Public Health and Environment to be used for regional analysis, particularly when county-level data do not have sufficient sample size for reliable interpretation (fewer than 50 respondents to a question).

Statistical analyses

Descriptive statistics were calculated to determine the mean prevalence and confidence intervals for each variable of interest. Multiple logistic regression was used to calculate the odds ratios for obesity between regions, adjusting for race and ethnicity, age, income, and education. Obesity prevalence estimates presented for the United States were retrieved from the CDC BRFSS. Body mass index (BMI) (kg/m^2), is a widely used tool among medical professionals and major health organizations as an approximate measurement of body fat.[6] Body mass index was categorized into four levels: *underweight, normal, overweight,* and *obese*. Individuals with a BMI measurement of 30.0 or higher were categorized as obese. Respondents were categorized as *physically inactive* if they reported not having exercised at all in the past month outside of their job. Race and ethnicity were categorized as *non-Hispanic White, White Hispanic, Black,* and *non-Hispanic Other Race*. Results are presented with 95 percent confidence intervals or p-value. Differences are considered significant if their confidence intervals do not overlap, or the p-value of the comparison test is less than 0.05. Data were analyzed using SAS 9.3 (SAS Institute Inc., Cary, North Carolina).

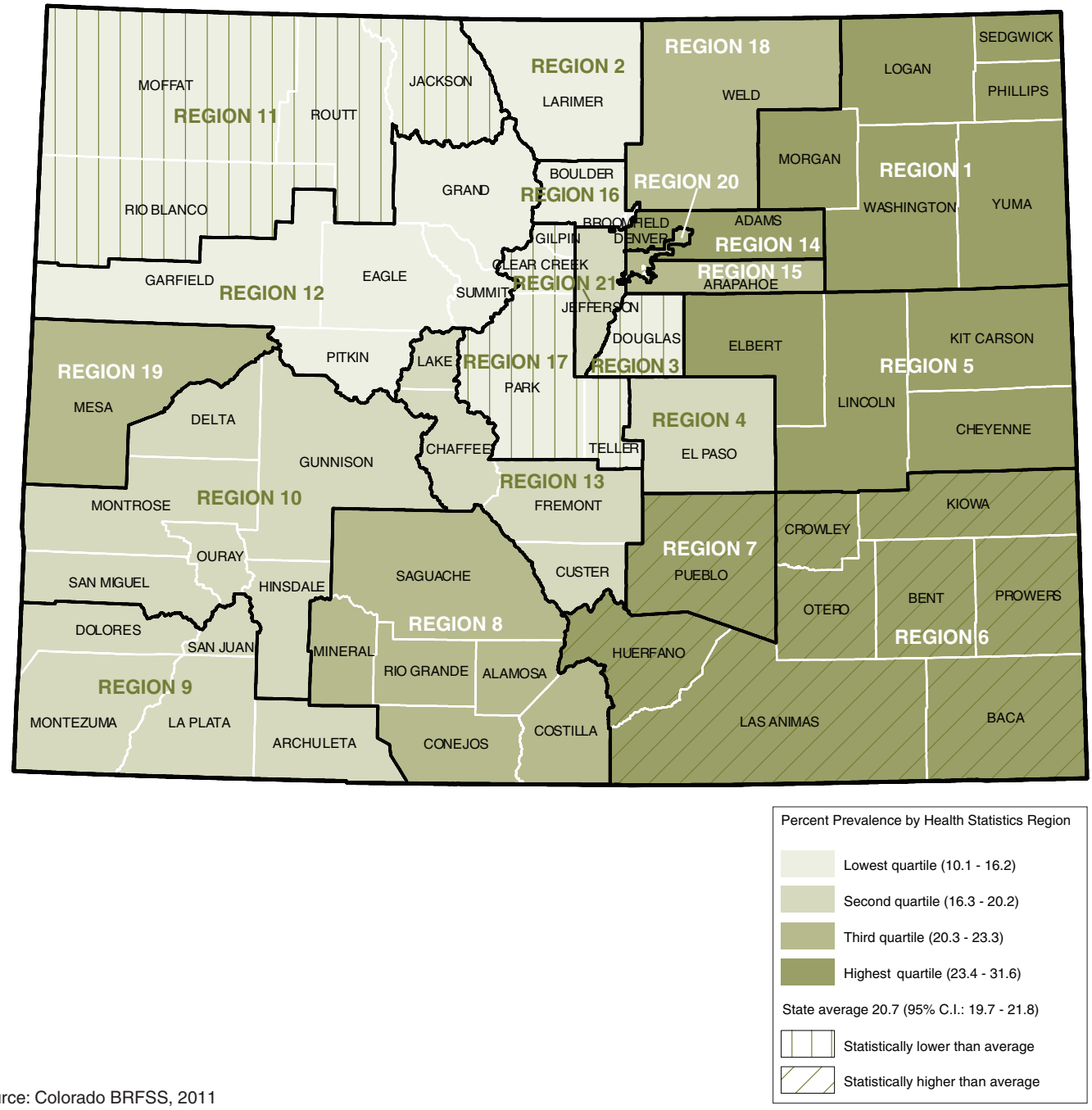
Results

Obesity and physical inactivity by region

In 2011, the statewide obesity rate was 20.7 percent (95% CI: 19.7-21.8%) and the prevalence of physical inactivity was 16.5 percent (95% CI: 15.5-17.4%). Interestingly, there was not a significant difference in obesity rates between rural and urban areas of Colorado (19.0% versus 20.7% respectively, p=0.18). However, the rate of physical inactivity was significantly higher in rural areas than in urban areas (18.7% versus 15.9% respectively, p=0.02).

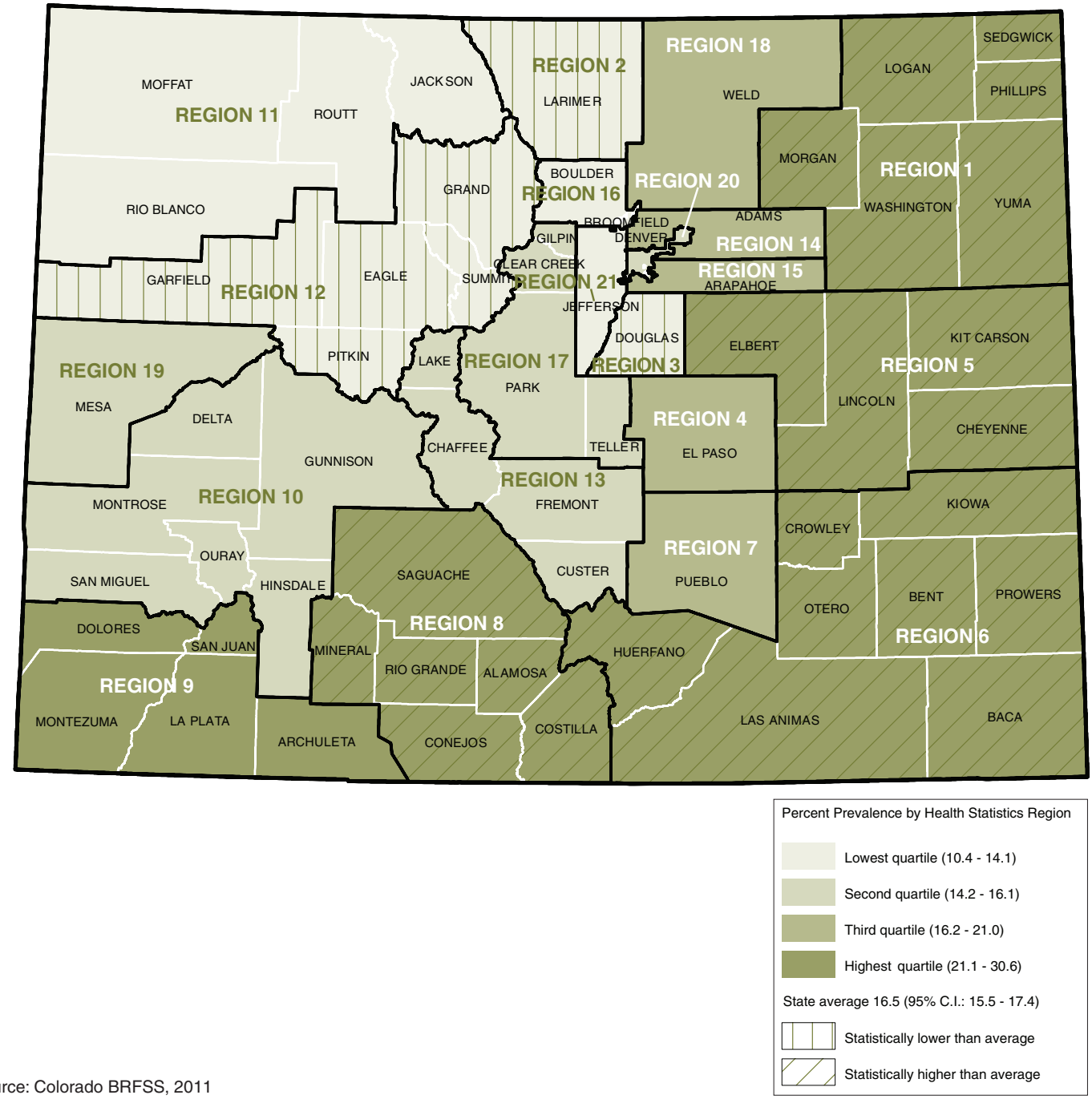
Health Statistics Regions with higher obesity rates also had higher rates of physical inactivity. For example, HSRs on the eastern plains such as HSR 1, 5, 6 and 7 had some of the highest obesity rates and rates of physical inactivity in Colorado. In contrast, HSRs in northwestern Colorado had some of the lowest obesity rates and rates of physical inactivity (Figures 1 and 2). With the exception of Mesa County (with an obesity rate of 23.3%), regions in southwestern Colorado had slightly lower obesity rates than the state average.

Figure 1. Prevalence (%) of obesity by Health Statistics Region, Colorado BRFSS, 2011.



Source: Colorado BRFSS, 2011

Figure 2. Prevalence (%) of physical inactivity by Health Statistics Region, Colorado BRFSS, 2011.

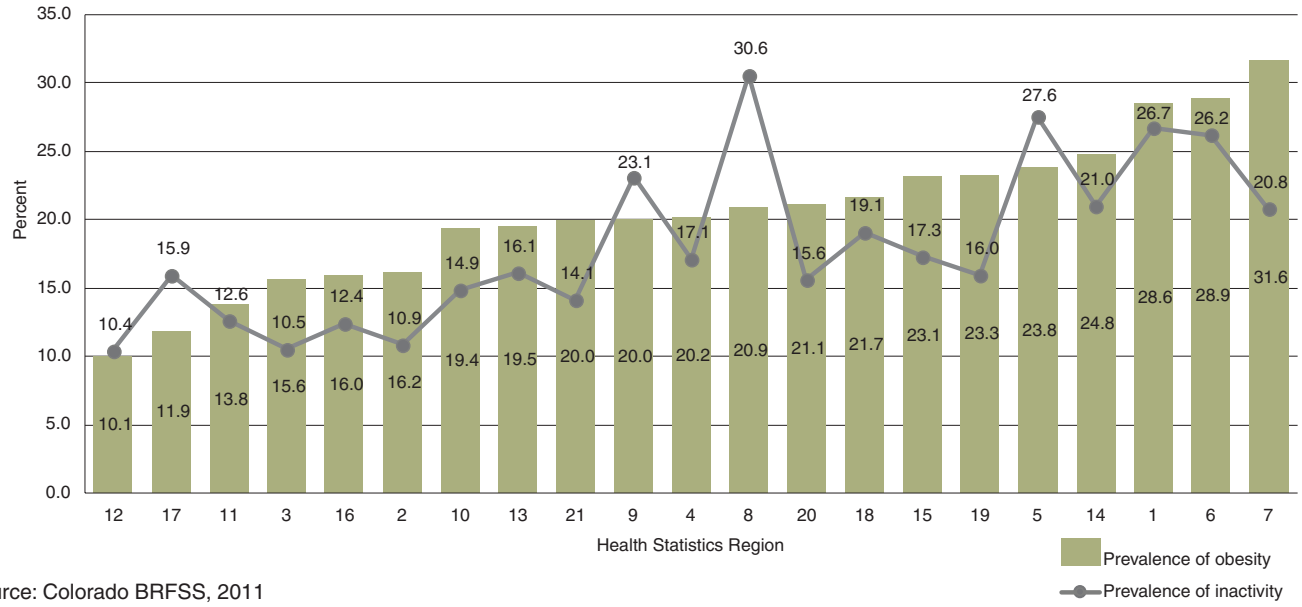


Source: Colorado BRFSS, 2011

Among all 21 Health Statistics Regions, HSR 7 (Pueblo County) had the highest obesity rate at 31.6 percent (95% CI: 24.9-38.3%) and HSR 12 (Eagle, Garfield, Grand, Summit and Pitkin Counties) had the lowest obesity rate at 10.1 percent (95% CI: 5.7-14.5%). In comparison, the estimated median rate of obesity for the U.S. in 2011 was 27.8 percent. The odds ratio for obesity in HSR 7 compared to HSR 12 was 3.2, after adjusting for race and ethnicity, age, income, and education.

HSR 8 (Alamosa, Costilla, Conejos, Mineral, Rio Grande and Saguache counties) had the highest rate of physical inactivity at 30.6 percent (95% CI: 20.5, 40.6%) and HSR 12 had the lowest rate of physical inactivity at 10.4 percent (95% CI: 5.9-14.9%). Nationally, the estimated median rate of physical inactivity was 26.2 percent. The adjusted odds ratio for reported physical inactivity in HSR 8 compared to HSR 12 was 2.1.

Figure 3. Prevalence (%) of obesity and physical inactivity by Health Statistics Region, Colorado BRFSS, 2011.



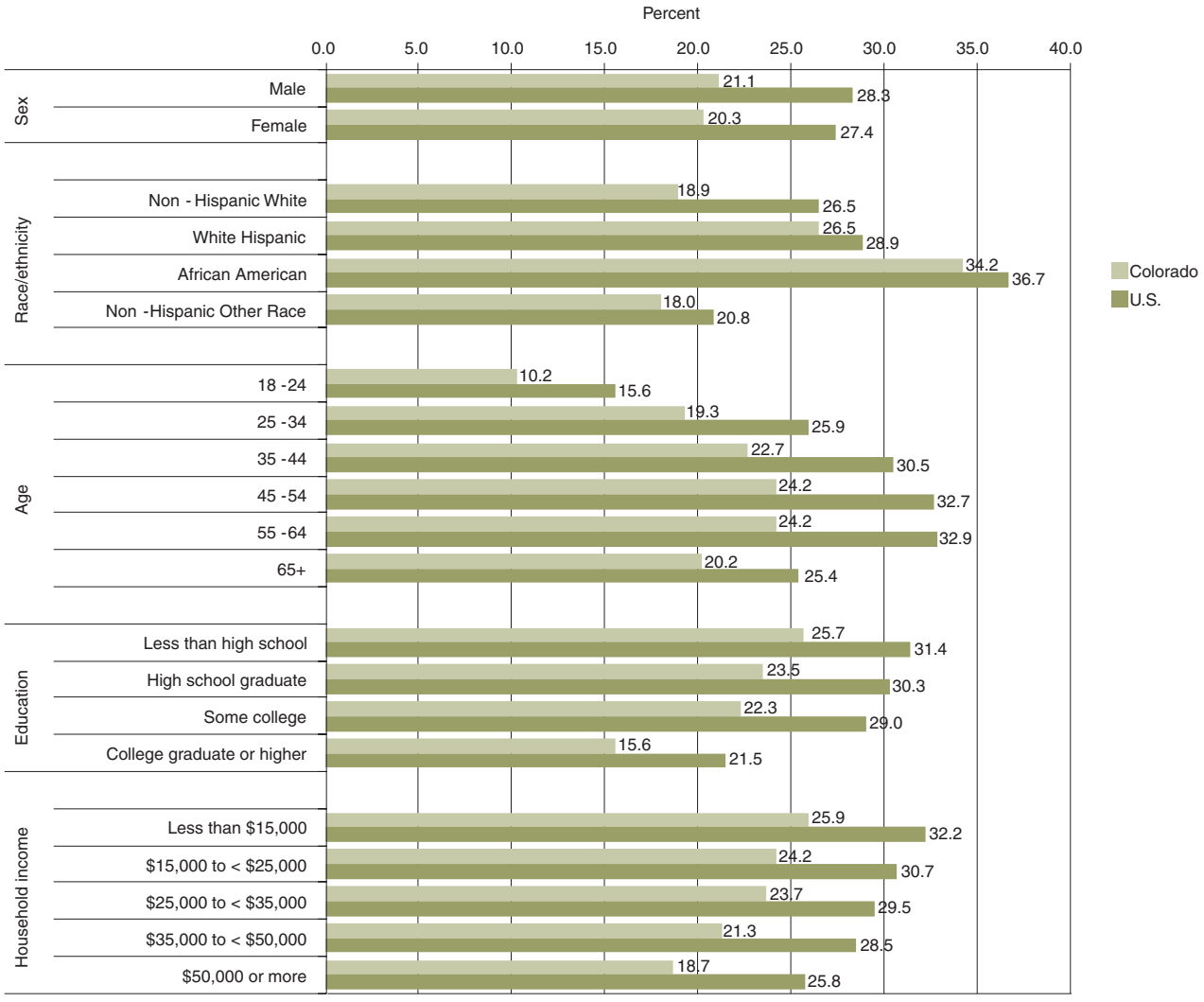
Source: Colorado BRFSS, 2011

Obesity and physical inactivity by demographic characteristics

Obesity rates and rates of physical inactivity in Colorado differed by demographic characteristics, which reflected similar trends to the U.S. For example, White Hispanic and Black populations had higher rates of obesity than non-Hispanic White or Other non-Hispanic Race populations both in Colorado and the U.S. (Figure 4). Stratified by education, adults in Colorado with less than a high school education had the highest obesity rates among all education groups (25.7%), while obesity prevalence declined to 15.6 percent in the highest education group (college graduates or higher). Similarly, the lowest income group had the highest obesity rates among all income groups (25.9%), and this rate declined to 18.7 percent for the highest income group (household income of $50,000 or more a year). Nationally, obesity rates followed similar patterns by education and income group.

By age group, obesity prevalence was the lowest among 18 to 24 year-olds (10.2%), and then increased to 24.2 percent for 45 to 64 year-olds before declining moderately. While there was only a slight difference in obesity rates between males and females (21.1% versus 20.3% respectively), there was a difference in obesity prevalence between sexes within the Black population (27.4% for males versus 41.5% for females). There was no demonstrable difference in obesity or physical inactivity by sex for other race and ethnic groups. For a comparison between Colorado and the U.S. by these demographic characteristics, see Figure 4.

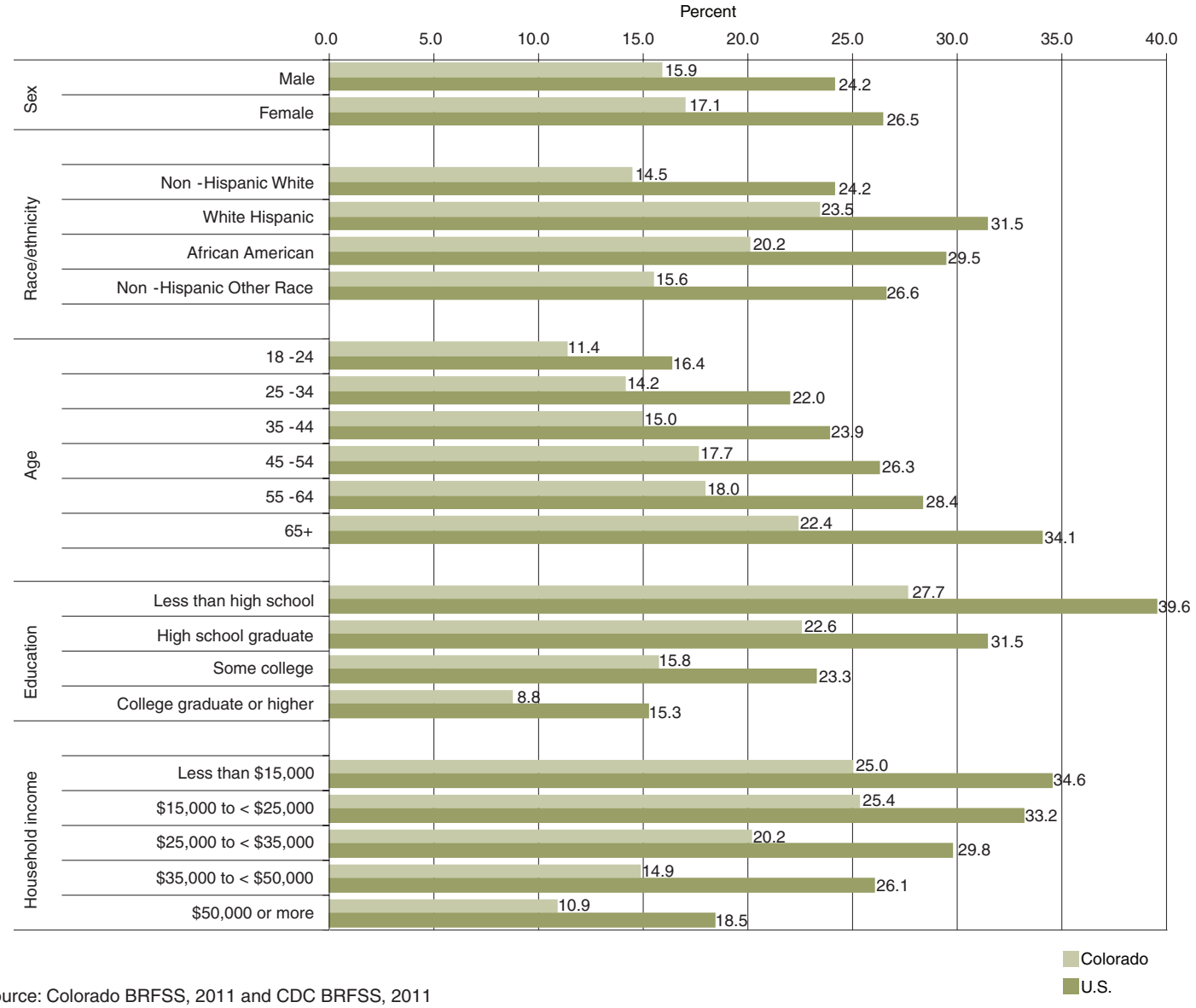
Figure 4. Prevalence (%) of obesity by demographic characteristic for Colorado and the U.S., Colorado and National BRFSS, 2011.



Source: Colorado BRFSS, 2011 and CDC BRFSS, 2011

Similar trends were found in the prevalence of physical inactivity by various demographic characteristics. By race and ethnicity, the White Hispanic population had the highest rate of physical inactivity at 23.5 percent, followed by the Black population at 20.2 percent. Respondents in the lowest education level and in the second lowest income group had the highest rates of physical inactivity among their respective groups (27.7% and 25.4%, respectively). See Figure 5 for more information on the prevalence physical inactivity by each characteristic for Colorado and the U.S.

Figure 5. Prevalence (%) of physical inactivity by demographic characteristic for Colorado and the U.S., Colorado and National BRFSS, 2011.



Source: Colorado BRFSS, 2011 and CDC BRFSS, 2011

Discussion

Findings from this study demonstrate variability in risk factors and regional differences in obesity for Coloradans. Similar to patterns experienced in the U.S. as a whole, respondents with lower income, lower education, and who were non-white or white Hispanic experienced higher obesity rates and higher rates of physical inactivity. In contrast, non-Hispanic white respondents, younger adults, college graduates, and respondents with higher incomes experienced lower obesity rates and lower rates of physical inactivity.

While there was not a significant difference in obesity in urban versus rural areas of the state, there were clusters of Health Statistics Regions that had demonstrably higher and lower rates in obesity and physical inactivity (southeast Colorado and northwest Colorado respectively). This may be due to differences in the demographic and geographic characteristics of counties that are considered rural in Colorado. For instance, rural counties in the mountains tend to have populations that engage in more physical activity (skiing, hiking, biking, etc.) compared to rural counties on the eastern plains that do not have high levels of recreational physical activity. In-depth interpretation of this information may provide insight into what factors may contribute to more or less physical activity outside of one's work and what other components of rural areas may be considered risk factors for obesity. While Colorado is known as an active and healthy state, these results demonstrate that obesity and sedentary lifestyles remain persistent even among ostensibly healthy populations.

Limitations

In this report, occupational physical activity was excluded from the analysis. Due to higher rates of manual labor in some rural areas versus urban areas, estimates of recreational activity in rural areas may underestimate the true amount of physical activity among these populations. In addition, the BRFSS relies on the judgment and honesty of the respondent. Social desirability bias may occur as a result (i.e., respondents answering questions about their weight or physical activity in a manner that is viewed as favorable or socially acceptable by others), which may cause the estimates in this project to be lower than the true value. This is a general limitation of survey data analysis, which must always be considered when interpreting findings.

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