



Colorado Department
of Public Health
and Environment

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4300 Cherry Creek Drive South
Denver, Colorado 80246-1530
(303)692-2160
(800)886-7689

health.statistics@state.co.us
www.cdph.state.co.us/hs/

Food-Insecurity Contributes to Obesity Among Colorado Children and Pregnant Women

Rickey Tolliver, MPH, Alyson Shupe, PhD, Center for Environmental Information and Statistics, Health Statistics Section; Shana Patterson, RD, Prevention Services Division, Healthy Living Section

Introduction

The United States Department of Agriculture's (USDA) measure of hunger is "food-insecurity" which is defined as lack of access to enough food to fully meet basic needs due to lack of financial resources. Studies have shown that food-insecure children are at higher risk of stunted early development, physical health problems, and behavioral challenges.⁽¹⁾ Research also demonstrates that food-insecurity can lead to weight gain, as the least expensive food options are typically high in calories and low in nutrients.^(2,3) Additionally, households with limited resources tend to spend less on healthy foods such as fruits and vegetables.⁽⁴⁾ Food-insecurity can also lead to greater weight gain and complications for women during pregnancy. These complications include developing physical health problems such as gestational diabetes, and mental health complications such as anxiety and depression.⁽⁵⁾

The purpose of this report is to estimate the prevalence of food-insecurity among Colorado's children and pregnant women and to explore its implications. Additionally, the relationship between food-insecurity and obesity will be explored.

Methods

Data from the 2008-2010 Colorado Child Health Survey (CHS) and Pregnancy Risk Assessment Monitoring System (PRAMS) were utilized for this report. The CHS is a "call back survey" from The Behavioral Risk Factor Surveillance System Survey (BRFSS) which monitors self-reported health status, prevalence of chronic diseases, and risk behaviors of Colorado adults through a random-digit-dial telephone survey. Through a screening process, BRFSS-participating households with children ages 1-14 are identified and called a few days later to complete the CHS. For this report, responses from 4,277 surveys were weighted to reflect behaviors and experiences for all Colorado children between the ages of 1 and 14 years.

PRAMS is a population-based risk factor surveillance system designed to identify and monitor behaviors of women before, during and after pregnancy. A stratified random sample of Colorado women is selected from birth certificates to participate in the survey. The PRAMS survey

combines two methods of data collection: a survey conducted by a mailed questionnaire with multiple follow-up attempts, and a survey by telephone. Results from 5,973 PRAMS surveys were weighted to reflect the experiences of all Colorado women giving birth.

Questions focusing on food-insecurity were included in both the CHS and PRAMS:

CHS

- “You relied on only a few kinds of low-cost foods to feed (child’s name) because you were running out of money to buy food. Was that often, sometimes, or never true in the last 12 months?”

PRAMS

- “During the 12 months before your new baby was born, did you ever eat less than you felt you should because there wasn’t enough money to buy food?”

Using the responses to these questions, weighted prevalence estimates of food-insecurity among children and pregnant women were computed. We also compared the odds of being obese for pregnant women and children who were food-insecure to those who were not food-secure. All statistical analyses, including prevalence, odds ratios (OR), and 95 percent confidence intervals (CI) were completed using SAS version 9.3. Significant differences were determined by examining overlapping CIs between prevalence estimates and by logistic regression modeling to calculate ORs. All reported ORs are statistically significant at the $\alpha=0.05$ level.

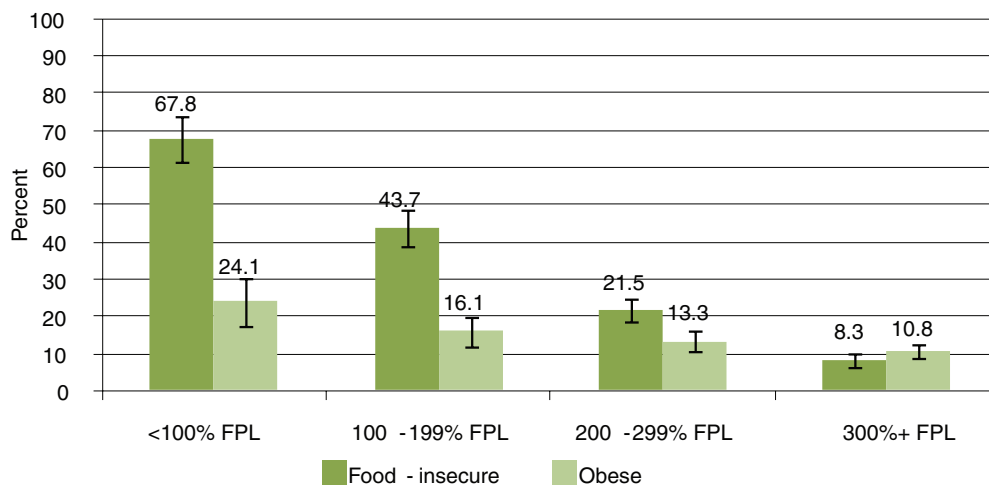
Results

Children

Overall, 26.9 percent of Colorado children lived in food-insecure households. The prevalence of food insecurity increased steadily with poverty. Children living in households in the lowest income categories were more likely to be food-insecure than children living in the highest income categories. More than two-thirds of children (67.8%) living in households with incomes less than 100 percent of the federal poverty level (FPL) were food-insecure. Children living in households with incomes above 300 percent FPL were the least likely to experience food-insecurity (Figure 1).

Obesity prevalence rates mirrored those for food-insecurity: rates were significantly higher among children living in households below 100 percent FPL compared to children living in households above 300 percent FPL. Close to one-quarter (24.1%) of children living in households below 100 percent FPL were obese, while only 10.8 percent of children in households above 300 percent FPL were obese (Figure 1).

Figure 1. Prevalence of food-insecurity and obesity^b by poverty, children ages 1-14 years, Colorado Child Health Survey, 2008-2010.

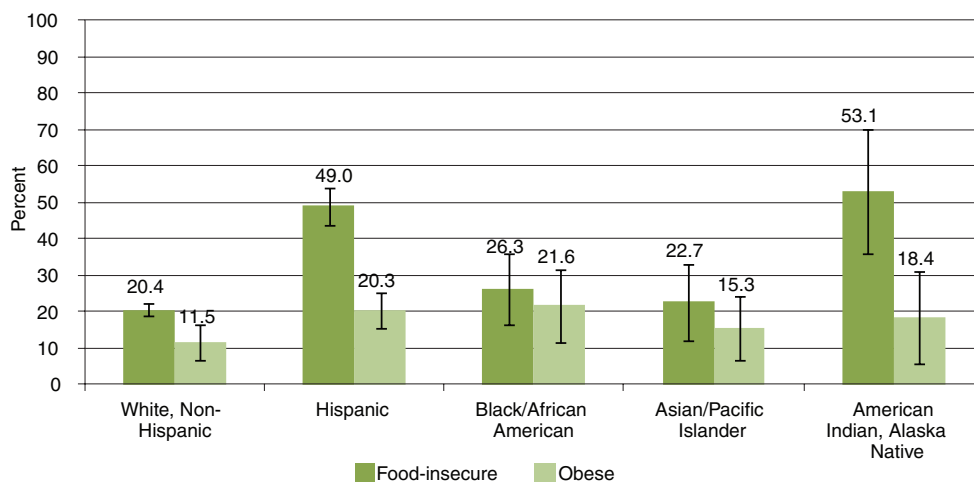


Error bars represent the 95% confidence interval.
 Source: Health Statistics Section, Colorado Department of Public Health and Environment.
^b Body Mass Index calculated for children ages 2-14 years.

The prevalence of food-insecurity was lowest among White Non-Hispanic children (20.4%). American Indian (53.1%) and Hispanic (49.0%) children were the most food-insecure.*

The prevalence of obesity was also higher among Non-White children. Hispanic children (20.3%) had a higher prevalence of obesity than White, Non-Hispanic children (11.5%) (Figure 2).

Figure 2. Prevalence of food-insecurity and obesity^b by race and ethnicity, children ages 1-14 years, Colorado Child Health Survey, 2008-2010.



Error bars represent the 95% confidence interval.
 Source: Health Statistics Section, Colorado Department of Public Health and Environment.
^b Body Mass Index calculated for children ages 2-14 years.

*The Health Statistics Section joins the Centers for Disease Control and Prevention in recognizing that race and ethnicity do not represent valid biological or genetic categories but are social constructs with cultural and historical meaning.

We also examined the association between obesity and food-insecurity while controlling for race/ethnicity and poverty. Food-insecure children were 1.4 times (OR=1.4) more likely to be obese than children who were not food-insecure.

Pregnant Women

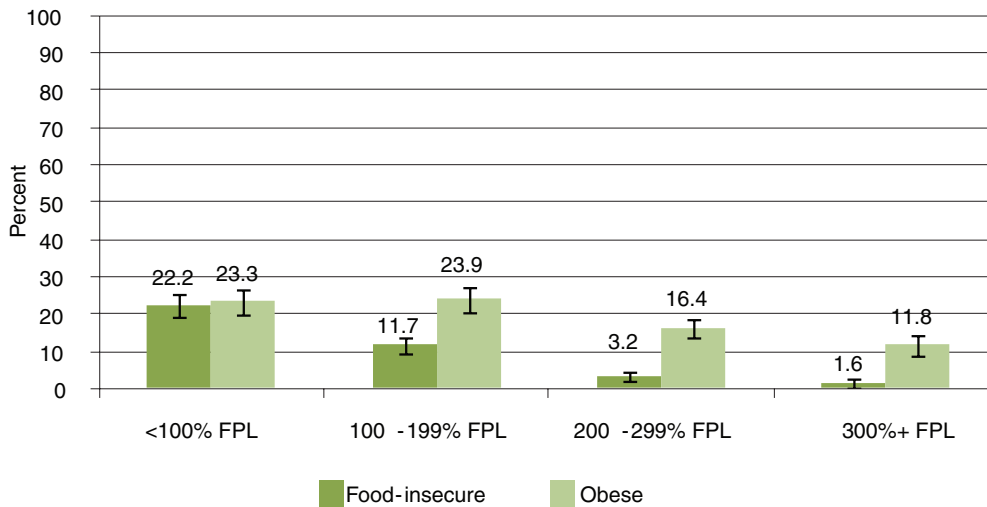
Overall, 10 percent of pregnant women were food-insecure. The prevalence of food-insecurity increased with increasing levels of poverty, a similar pattern as seen in children. Among pregnant women whose household incomes were less than 100 percent

FPL, the prevalence of food-insecurity was 22.2 percent. Conversely, only 1.6 percent of pregnant women living above 300 percent FPL were food-insecure (Figure 3).

Food-insecure children were 1.4 times more likely to be obese than children who were not food-insecure.

Significantly higher prevalence of obesity existed among pregnant women living in households with less than 100 percent FPL (22.2%) and 100-199 percent FPL (23.9%) (Figure 3). The prevalence of obesity was lowest among pregnant women living in households with 300 percent FPL (11.8%) and 200-299 percent FPL (16.4%) (Figure 3).

Figure 3. Prevalence of food-insecurity and obesity by poverty, pregnant women, Colorado PRAMS, 2008-2010.



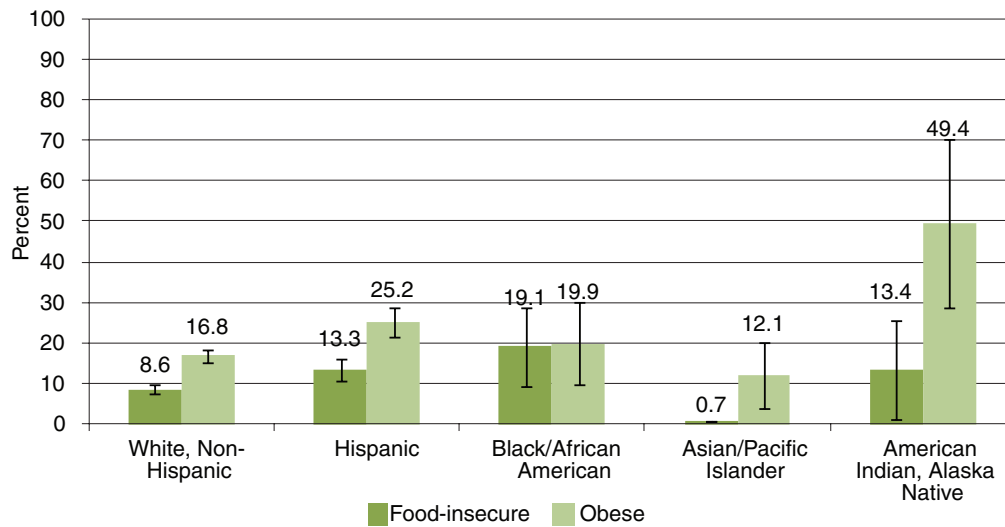
Error bars represent the 95% confidence interval. Source: Health Statistics Section, Colorado Department of Public Health and Environment.

The prevalence of food-insecurity was lowest among White, Non-Hispanic pregnant women (8.6%). Black (19.1%) and Hispanic (13.3%) pregnant women were the most food-insecure. The prevalence of obesity was higher among non-white pregnant women. Native Americans (49.4%) and Hispanics (25.2%) had a higher prevalence of obesity than White, Non-Hispanic pregnant women (11.5%) (Figure 4).

Food-insecure pregnant women were 1.9 times more likely to be obese than pregnant women who were not food-insecure.

We also examined the association between obesity and food-insecurity while controlling for race/ethnicity and poverty. Food-insecure pregnant women were 1.9 times (OR=1.9) more likely to be obese than pregnant women who were not food-insecure.

Figure 4. Prevalence of food-insecurity and obesity by race and ethnicity, pregnant women, Colorado PRAMS, 2008-2010.



Error bars represent the 95% confidence interval.

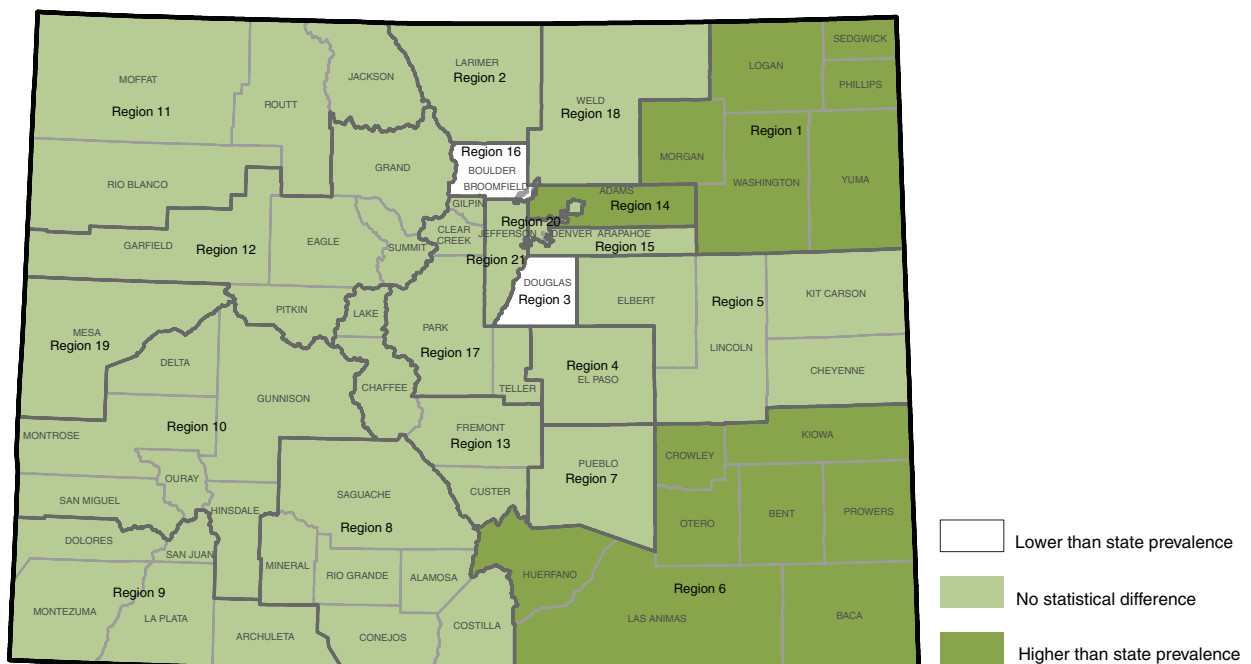
Source: Health Statistics Section, Colorado Department of Public Health and Environment.

Food-insecurity by Region

Examining the geographic variation of food-insecurity across Colorado can help us identify regions of the state where the problem seems to be more severe. The prevalence of food-insecurity in children varies significantly by region, and three of Colorado’s regions have statistically higher food-insecurity than

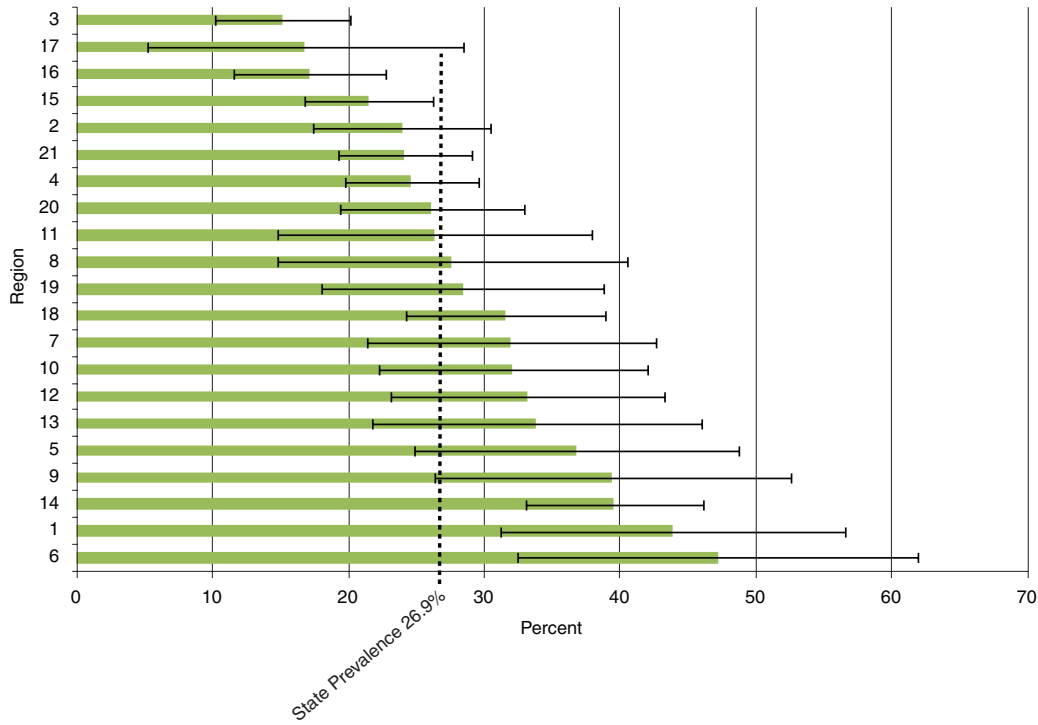
the overall state prevalence. Southeastern Colorado (Region 6) has the highest prevalence of food-insecure children, followed by Northeastern Colorado (Region 1) and Adams County (Region 14). Douglas County (Region 3) and Boulder and Broomfield Counties (Region 16) have the lowest prevalence of food-insecurity in the state.

Figure 5. Map of prevalence of food-insecurity in children by Health Statistics Region.



Source: Health Statistics Section, Colorado Department of Public Health and Environment.

Figure 6. Prevalence of food-insecurity by Health Statistics Region, children ages 1-14 years, Colorado Child Health Survey, 2008-2010.



Error bars represent the 95% confidence interval.

Source: Health Statistics Section, Colorado Department of Public Health and Environment.

Discussion

Food-insecurity is often used as a measure within the broader issue of poverty. However, sometimes households experiencing food-insecurity are well above the poverty line. This point is important because many factors that cause food-insecurity (unexpected life events, job loss, divorce, etc.) are not captured by annual income or poverty-level measures.⁽⁶⁾

Currently, there is little research that has found clear associations between diet quality, nutrient intake, and obesity. However, thousands of practitioners and dietitians have logged years of diet records of overweight and obese clients that provide an important piece of the food picture. The most common, shared elements were: consumption of cheap, highly processed, low-nutrient-dense foods,⁽⁷⁾ low consumption of fruits and vegetables, and low intake of fiber. Still, there are data that point to impacts of diet quality and nutrient density. Drewnowski and Specter showed that energy-dense foods are much less expensive than nutrient-dense

foods.⁽⁷⁾ We also know that the food-insecure tend to have lower average scores for healthful eating habits.⁽⁸⁾ While measures of total energy intake, e.g. calories, show no significant difference, food-insufficient families and older adults have lower intakes of micronutrients (i.e., calcium, B6, magnesium, iron and zinc).⁽⁹⁾ Additionally, we cannot ignore the implications that food-insecurity poses to diet-sensitive chronic diseases such as hypertension, hyperlipidemia, and diabetes.⁽¹⁰⁾

There is a link between being food-insecure and being obese, regardless of how contradictory these problems may seem. When hunger is eminent and money is scarce it is economical to purchase the foods that offer the greatest caloric content and not necessarily the greatest nutritional value. This report illustrates the importance of taking food-insecurity into account when trying to untangle the complex factors associated with obesity among Colorado children and pregnant women.

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