health watch

COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT

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Adult Obesity in Colorado: Results from the Behavioral Risk Factor Surveillance System

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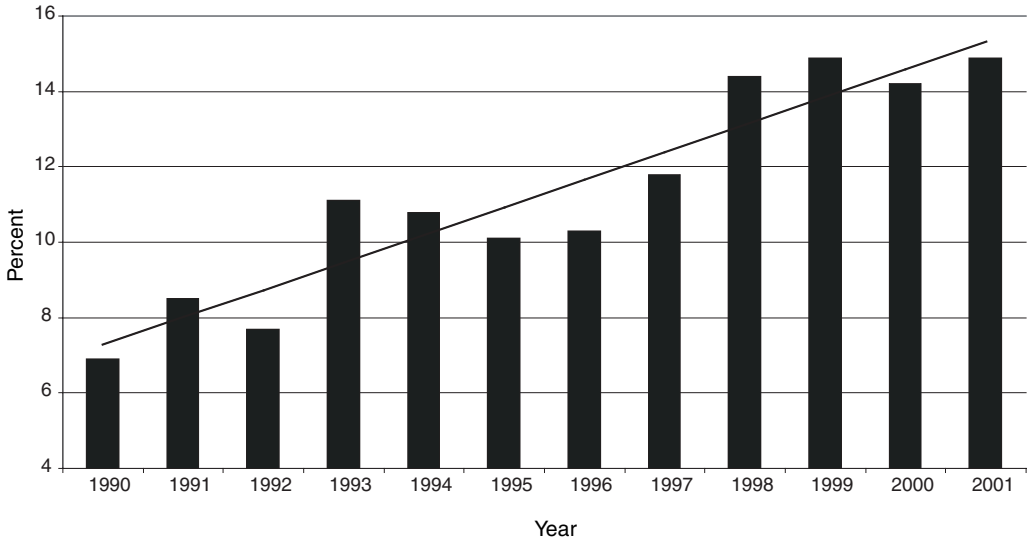
Introduction

"Overweight and obesity may soon cause as much preventable disease and death as cigarette smoking."[1] Alarming increases in overweight and obesity in the United States prompted former Surgeon General David Satcher to make this statement and issue a report entitled *The Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity*. Although Colorado has the lowest estimated prevalence of adult obesity (defined as a body mass index (BMI) of 30.0 or higher) in the nation, at 14.9 percent, the increase over the past decade is striking (see Figure 1). Between 1990 and 2001, obesity among Colorado adults more than doubled. Currently, over 450,000 Colorado adults are obese. Some of the consequences associated with obesity are increased risk of high blood pressure, high cholesterol, diabetes, arthritis, and even asthma. Obese adults have a *50 to 100 percent increased risk of premature death* compared to adults of healthy weight.[1] The economic costs of obesity are also staggering. The health costs associated with obesity exceed those associated with tobacco use[2]. This report examines the prevalence of and various health indicators associated with adult obesity in Colorado.

Figure 1. Obesity prevalence among adults 18 and older, Colorado BRFSS 1990-2001



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Methodology

The Colorado Behavioral Risk Factor Surveillance System (BRFSS) is an ongoing statewide telephone survey of non-institutionalized Coloradans ages 18 and older regarding their health behaviors and preventive health practices. The Survey Research Unit at the Colorado Department of Public Health and Environment conducts the survey and selects respondents using a random digit dialing sampling technique. Interviews were completed for 2,032 respondents in 2001. The data were combined and weighted to develop statewide estimates of various health behaviors. BMI is calculated from respondents' self-reported height and weight, by dividing weight in kilograms by height in meters squared. BMI has a greater correlation with body fat than any other indicator of height and weight.[3] Because BRFSS measures are self-reported by respondents, and people tend to underreport their weight, the BRFSS underestimates the prevalence of obesity. Nationwide obesity estimates based on measured data are substantially higher than BRFSS estimates.[4] Therefore, the actual prevalence of adult obesity in Colorado is likely higher than is estimated by the BRFSS.

Prevalence of Obesity

While the overall prevalence of obesity among Colorado adults is estimated at 14.9 percent, there is significant variation by demographic characteristics. Obesity prevalence is lowest among 18 to 24-year-olds, increases substantially through the 45 to 54-year old age group, and moderately declines thereafter (see Figure 2). Obesity prevalence varies widely by race/ethnicity[a]; it is lowest among non-Hispanic whites (13.4 percent) and highest among non-Hispanic blacks (29.2 percent) (see Figure 3). For all races and ethnicities combined, obesity prevalence varies only slightly by sex. However, variations in both the direction and magnitude of differences exist within races by sex. While the prevalence of obesity is similar in non-Hispanic white men and women, for all other race/ethnicity categories presented, obesity prevalence is higher for women than for men. Within-race differences by sex are largest for non-Hispanic blacks and Hispanics. For non-Hispanic blacks, the prevalence of obesity is almost 23 percent higher for women compared to men (32.1 percent compared to 26.2 percent); for the 'non-Hispanic other' race/ethnicity category, obesity prevalence is 58 percent higher for women compared to men (18.2 percent compared to 11.5 percent).

Figure 2. Obesity prevalence by age group, Colorado BRFSS 2001

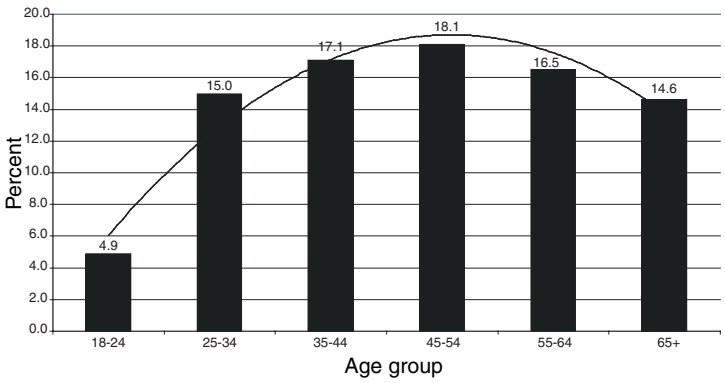
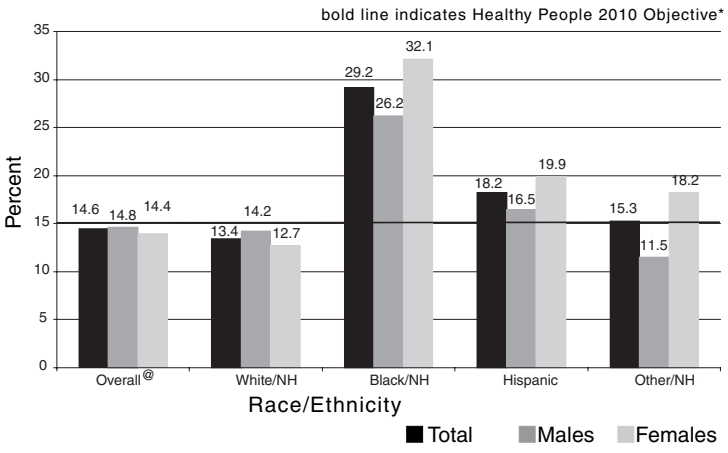


Figure 3. Obesity prevalence by race/ethnicity and sex, Colorado BRFSS 1999-2001



* The 467 Healthy People 2010 Objectives are 10-year nationwide targets for increasing quality and years of healthy life and eliminating health disparities.

@ Please note that the 3 estimates in the hard copy version of this report for overall obesity prevalence in Figure 3 are incorrect.

Since obesity prevalence varies significantly by both age group and race/ethnicity, subsequent comparisons of prevalence estimates by obesity status will include both unadjusted estimates and estimates adjusted by age and race/ethnicity. Because non-Hispanic whites account for 80 percent of the adult Colorado population, for whom there is not a statistically significant difference in obesity prevalence by sex, an adjustment is not made based on sex. All data noted in the text will cite age- and race/ethnicity-adjusted estimates. Adjusted prevalence estimates show that as annual household

a 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.[5]

income increases, obesity decreases (Figure 4). Obesity prevalence is almost twice as high among adults from households with annual incomes of less than $25,000 compared to those from households with annual incomes of $50,000 and above. Obesity prevalence is slightly higher in urban Colorado compared to rural Colorado (15.4 percent compared to 12.8 percent, respectively) (see Figure 5). However, special surveys that have focused on specific rural areas of Colorado show that obesity prevalence varies by rural area. Special BRFSS-like surveys were conducted in the San Luis Valley (comprised of Alamosa, Conejos, Costilla, Mineral, Rio Grande, and Saguache counties) and the Rural Resort ski counties (Eagle, Garfield, Lake, Pitkin, and Summit) in 1997 and 1998, respectively; the Eastern Plains counties[b] were oversampled in the 1995 BRFSS. Results from these surveys show age- and race/ethnicity-adjusted obesity prevalence at 15.6 percent for the San Luis Valley (excludes ages 65 and older), 7.5 percent for the Rural Resort area, and 17.9 percent for the Eastern Plains (unadjusted estimates are 16.9, 7.0, and 18.7, respectively).

Figure 4. Obesity prevalence by annual household income, Colorado BRFSS 2001

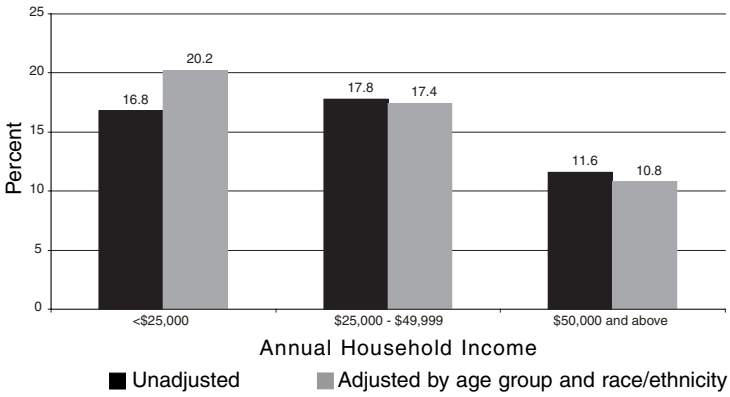
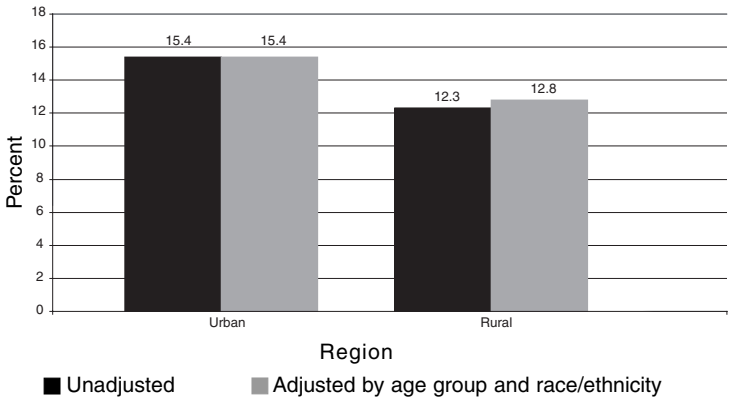


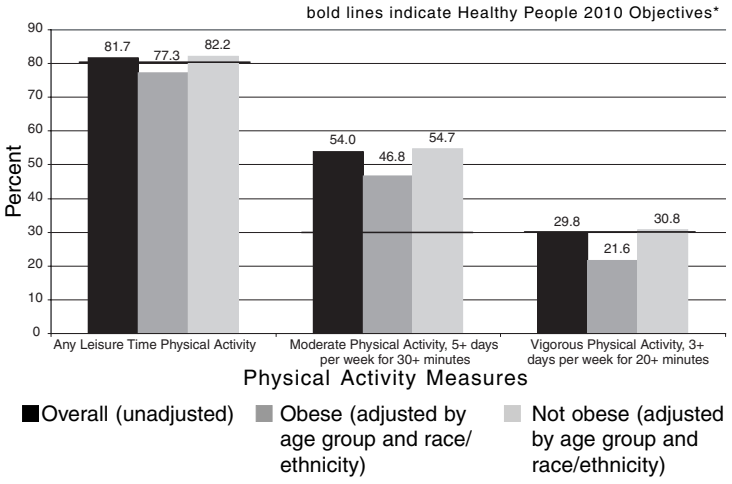
Figure 5. Obesity prevalence by region, Colorado BRFSS 2001



Health Behaviors

A healthy diet and regular exercise are key to preventing and reducing obesity. The BRFSS includes measures of physical activity and fruit and vegetable consumption. Figure 6 shows comparisons by obesity status for 3 measures of physical activity. Overall, nearly 82 percent of Colorado adults engage in some form of leisure time physical activity, while less than one-third participate in vigorous physical activity 3 or more days per week for 20 or more minutes per session. Adults who are not obese are more likely to engage in all three measures of physical activity presented compared to those categorized as obese. The adjusted percentage differences are 5 percent, 8 percent, and 9 percent, respectively. For comparison, although obese and overweight adults in Colorado are equally likely to engage in leisure time physical activity, those who are overweight are more likely to engage in both moderate and vigorous physical activity, than those who are obese (54.1 percent compared to 46.8 percent, and 29.7 percent compared to 21.6 percent, respectively).

Figure 6. Physical activity measures by obesity status, Colorado BRFSS 2001

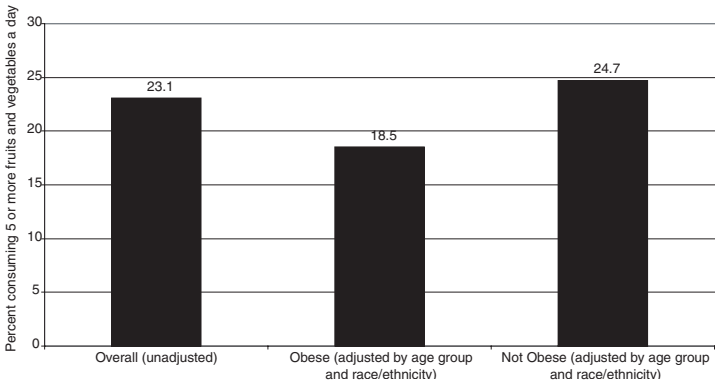


* The 467 Healthy People 2010 Objectives are 10-year nationwide targets for increasing quality and years of healthy life and eliminating health disparities.

b Baca, Bent, Cheyenne, Crowley, Elbert, Huerfano, Kiowa, Kit Carson, Las Animas, Lincoln, Logan, Morgan, Otero, Phillips, Prowers, Sedgwick, Washington, and Yuma counties

Overall, approximately 23 percent of Colorado adults consume 5 or more fruits and vegetables a day (see Figure 7).

Figure 7. Fruit and vegetable consumption by obesity status, Colorado BRFSS 2000

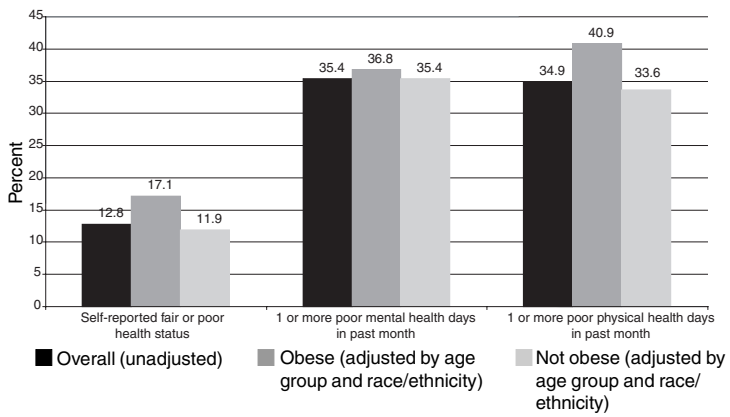


Adjusting by age group and race/ethnicity, those who are not obese are almost 34 percent more likely to have at least 5 servings of fruits and vegetables each day than those who are obese. As with moderate and vigorous physical activity, overweight Coloradans have a higher prevalence of fruit and vegetable consumption (21.0 percent) compared to those who are obese.

General Health Status

BRFSS respondents are asked to categorize their general health as excellent, very good, good, fair, or poor. Research shows self-reported health status is consistently associated with health care utilization.[6] Adjusted for age group and race-ethnicity, those categorized as obese are almost 44 percent more likely to say they have fair or poor health status than those who are not obese (17.1 percent compared to 11.9 percent) (see Figure 8). Based on adjusted estimates, obese adults are only slightly more likely than those who are not obese to report having 1 or more poor mental health days in the past month. However, they are 21.7 percent more likely to report having 1 or more poor physical health days in the past month (40.9 percent compared to 33.6 percent).

Figure 8. General health status measures by obesity status, Colorado BRFSS 2001



Statistics Primer

What are the odds?

The BRFSS is a cross-sectional study – health risk behaviors and health conditions are measured at the same time. Therefore, the *causes* of health outcomes cannot be examined. However, it is possible to look at *correlations* between variables. One measure of association is the odds ratio, which provides the estimated odds of having a health condition if a health risk behavior is present. For instance, the odds ratio presented in this report for the variables high blood pressure and obesity indicates that the probability of having hypertension is 2.3 times higher for obese individuals compared to those who are not obese. It is not possible to determine whether obesity precedes hypertension, or vice versa, or even if high blood pressure is the result of another factor. Still, odds ratios can be very suggestive of relationships between variables.

Health Conditions

Persons who are obese have an increased risk of at least 20 health conditions, including high blood pressure, high blood cholesterol, diabetes, stroke, and coronary heart disease.[7] The increased risk of many of these conditions translates into higher death rates for obese individuals. Because the BRFSS is a cross-sectional study, cause and effect cannot be demonstrated. However, associations can be shown between BRFSS variables (see *Statistics Primer* box). Heart disease and stroke, the first and fourth leading causes of death in Colorado, are the major components of cardiovascular disease. Risk factors

for cardiovascular disease include hypertension, high blood cholesterol, and diabetes. Obese individuals are over 2 times more likely to have high blood pressure compared to those who are not obese, and the odds ratio is statistically significant (see Table 1). Compared to individuals not classified as obese, individuals who are classified as obese have a higher prevalence of both high blood cholesterol (25.3 percent compared to 34.5 percent) and diabetes (4.0 percent compared to 8.2 percent), but these differences are not statistically significant.

Having a chronic condition such as arthritis, asthma, or a disability can diminish one's quality of life. These conditions can also pose barriers to participation in physical activity, which impacts obesity prevention and control. Compared to 40.0 percent of obese individuals, 28.5 percent of those who are not obese have chronic joint symptoms (defined as having symptoms on most days for at least one month during the last year) and/or diagnosed arthritis; this difference is not statistically significant. The prevalence of asthma and disability (defined as being limited in any way in any activities because of physical, mental, or emotional problems) are also higher for obese individuals compared to those who are not obese (16.0 percent compared to 11.3 percent, and 24.7 percent compared to 14.2 percent, respectively), but the differences are not statistically significant.

Mortality

Obesity deaths are defined here as codes '278.0' and 'E66' in the International Classification of Diseases (ICD), versions 9 and 10, respectively. ICD-9 codes were used from 1980 through 1998; ICD-10 codes have been in effect since 1999. Since the two versions may not be directly comparable only ICD-9 data are presented. Obesity is not frequently reported on Colorado death certificates. However, as the prevalence of obesity in Colorado has increased, so have deaths associated with obesity. In 1990, obesity was mentioned on Colorado death certificates in 141 cases. By 1998, that number had increased to 268, a 90 percent increase (comparatively, overall deaths increased 26 percent between 1990 and 1998 in Colorado). The number of deaths with obesity listed as the underlying cause also increased. While there were only 5 such deaths reported in 1990, 22 obesity deaths were reported in 1998, an increase of over 300 percent.

Table 1. Prevalence of Selected Health Conditions Among Adults by Obesity Status, Colorado BRFSS 2001

Health behavior	Sample size[1]	Crude prevalence				Age- and race/ethnicity-adjusted prevalence				Age- and race/ethnicity-adjusted odds ratios	
		Obese		Not Obese		Obese		Not Obese			
		%	95% C.I.[2]	%	95% C.I.	%	95% C.I.	%	95% C.I.	Odds Ratio	95% C.I.
Cardiovascular Disease Risk Factors											
Ever told blood pressure high	1,939	36.7	30.6 - 42.8	19.0	16.8 - 21.2	34.7	29.6 - 39.8	18.7	16.8 - 20.6	2.3	1.2 - 4.4
Ever told blood cholesterol high	1,488	39.3	32.5 - 46.1	27.8	25.0 - 30.6	34.5	28.9 - 40.1	25.3	22.8 - 27.8	1.6	0.9 - 2.9
Ever told have diabetes	1,939	8.7	5.3 - 12.1	3.8	2.7 - 4.9	8.2	5.0 - 11.4	4.0	2.9 - 5.1	2.1	0.6 - 7.2
Chronic Conditions											
Chronic joint symptoms[3]/ diagnosed arthritis	1,934	42.9	36.7 - 49.1	28.7	26.3 - 31.1	40.0	34.3 - 45.7	28.5	26.2 - 30.8	1.7	0.9 - 3.1
Ever told have asthma	1,938	15.1	10.7 - 19.5	11.2	9.5 - 12.9	16.0	10.8 - 21.2	11.3	9.7 - 12.9	1.5	0.7 - 3.4
Disability[4]	1,931	24.9	19.5 - 30.3	14.0	12.2 - 15.8	24.7	19.0 - 30.4	14.2	12.4 - 16.0	2.0	1.0 - 4.1

Shading indicates statistically significant differences by obesity status
[1]Changes in sample size reflect non-response for some variables
[2]Confidence interval
[3]Chronic joint symptoms are defined as symptoms occurring on most days for at least one month during the last year
[4]Disability is defined as being limited in any way in any activities because of physical, mental, or emotional problems

Summary

As in the rest of the nation, adult obesity in Colorado has increased markedly over the last several years. Obesity-related deaths in Colorado have also increased. Adult Coloradans most at risk for obesity include 35 to 64-year-olds, non-Hispanic blacks, and those residing in households with annual incomes less than $25,000. Obese Coloradans are less likely to be physically active, they consume fewer fruits and vegetables, and they are more likely to report a fair or poor health status and poor physical health in particular. Compared to those who are not obese, obese individuals have a higher prevalence of several health conditions, including hypertension, high blood cholesterol, arthritis, and disability. Further research on this issue in Colorado should examine obesity-related health behaviors and conditions by age and race-ethnicity; overweight among adults (defined as a BMI of 25.0 to 29.9), which increased from 29.8 percent in 1990 to 36.7 percent in 2001; and the prevalence of overweight among children, which has also increased.[8]

References

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Additional Information

For more information about the Behavioral Risk Factor Surveillance System (BRFSS), visit the Colorado BRFSS Web site at www.cdphe.state.co.us/hs/cobrfss.asp, and the national BRFSS Web site at www.cdc.gov/brfss/, or contact the Health Statistics Section at the Colorado Department of Public Health and Environment, 303-692-2160.

Data from the Colorado Behavioral Risk Factor Surveillance System can also be queried using the Colorado Health Information Dataset (CoHID) at www.cdphe.state.co.us/cohid/

This Brief is available on our Web site at www.cdphe.state.co.us/hs/pubs.html

Colorado is one of twelve states to receive funding from the Centers for Disease Control and Prevention (CDC) to have an obesity program. The Colorado Physical Activity and Nutrition (CO-PAN) Program develops and implements activities that promote healthy eating and active living in schools, work sites and communities to minimize the development of obesity that leads to diabetes, heart disease, cancer, and other lifestyle related disease. For more information please contact Rachel Oys at 303.692.2606 or rachel.oys@state.co.us.

Colorado also receives funding from the CDC for community-based prevention research through the Rocky Mountain Prevention Research Center (RMPRC), established in 1998 and housed at the University of Colorado Health Sciences Center. The RMPRC is one of 28 prevention research centers funded nationwide and one of several focused on prevention of obesity and type 2 diabetes. The mission of the RMPRC is to advance healthy lifestyles and prevent chronic disease among residents and communities in the Rocky Mountain Region by conducting, disseminating, and serving as a resource for community-based prevention research and policy. The RMPRC is partnering with schools, families and communities in the San Luis Valley of southern Colorado to increase physical activity and fruit and vegetable consumption and to better understand how effective nutrition and physical activity interventions work in communities. Faculty and staff provide training and consultation in the areas of intervention development, program evaluation, and disease surveillance. For more information, contact 303.315.0934 or rmprc@uchsc.edu.