



# HEALTHY KIDS COLORADO SURVEY

## Brief Report: Adolescent Weight and Physical Activity, 2013

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### Introduction

Overweight and obesity continues to be a major public health concern. Obese youth have increased short-term risks of health conditions such as high blood pressure, high cholesterol, and abnormal glucose tolerance or diabetes.<sup>1</sup> Excess weight in childhood and adolescence also substantially increases risks of being overweight or obese in adulthood,<sup>1,2</sup> which in turn increase risks for chronic diseases such as Type II diabetes, hypertension, dyslipidemia, coronary heart disease, heart failure, obstructive sleep apnea, gastroesophageal reflux, and osteoarthritis.<sup>3</sup>

The current report describes the prevalence of overweight and obesity among Colorado adolescents and examines protective and detrimental factors associated with excess weight. The report also describes physical activity and inactivity, an important factor influencing weight, and examines factors associated with levels of physical activity. Results in this report can be used to inform prevention programming that addresses overweight and obesity among adolescents.

### Background

Data for this report came from the Healthy Kids Colorado Survey (HKCS). The HKCS is a voluntary survey that collects self-reported health information from Colorado middle and high school students, grades 6-12. A unified version of the survey was launched in 2013 that addressed multiple needs for youth health data and provided both state- and region-level results. The unified HKCS was administered in fall 2013 and will be repeated in odd-numbered years, with the next administration in fall 2015.

The HKCS was supported by the Colorado Department of Public Health and Environment (CDPHE), Colorado Department of Education (CDE), and Colorado Department of Human Services (CDHS). The University of Colorado Anschutz Medical Campus implemented the HKCS. The survey included the Centers for Disease Control and Prevention's Youth Risk Behavior Surveillance System (YRBSS) and collected anonymous student information on multiple health topics, as well as student attitudes and perceptions that addressed prevention and risk behaviors. Topics included weight, nutrition, physical activity, suicide, bullying, mental health, tobacco, alcohol, marijuana, drugs, sexual health (high school only), other health topics and youth engagement in school and their community. The HKCS results represented Colorado's middle and high school populations both statewide and for 21 health statistics regions.

Schools, public health and other agencies, community partners, researchers, foundations and students use HKCS results to identify youth health priorities and improve school- and community-based strategies to improve and maintain the health of youth across Colorado.

## Methods and Measures

Surveys were completed by students from a random sample of selected schools and randomly selected classrooms with those schools. A total of 224 randomly selected schools and over 40,000 randomly students participated in the 2013 HKCS. Results are weighted to represent the whole population as well categories of sex, grade, and health statistics region.

The current report focuses on overweight, obesity, physical activity and inactivity. Body mass index (BMI) was calculated for each gender and age using the 2000 Centers for Disease Control Growth Charts for the United States ([http://www.cdc.gov/nchs/data/series/sr\\_11/sr11\\_246.pdf](http://www.cdc.gov/nchs/data/series/sr_11/sr11_246.pdf)). Obesity was defined as BMI above the 95<sup>th</sup> percentile, and overweight was defined as those BMI above the 85<sup>th</sup> percentile and below the 95<sup>th</sup> percentile. These measures were calculated only for high school students, because height and weight were not collected from middle school students.

Physical activity was defined as 60 minutes or more of physical activity on 5 or more days in the past week; inactivity was defined as not participating in any physical activity over the past week. Data on physical activity and inactivity were collected from both middle school and high school students.

Prevalence of overweight, obesity, physical activity and inactivity is presented by demographic characteristics using weighted data to estimate population rates and 95% confidence intervals (95% CIs) for Colorado adolescents. Significant differences within the Colorado data (e.g., between males and females or between racial/ethnic groups) was tested using a Rao-Scott chi-square and p value of less than .05. Logistic regression was used to evaluate factors associated with overweight or obesity as well as physical activity. Results are presented as odds ratios (OR) and 95% CIs, adjusted for age, race/ethnicity, and sex.

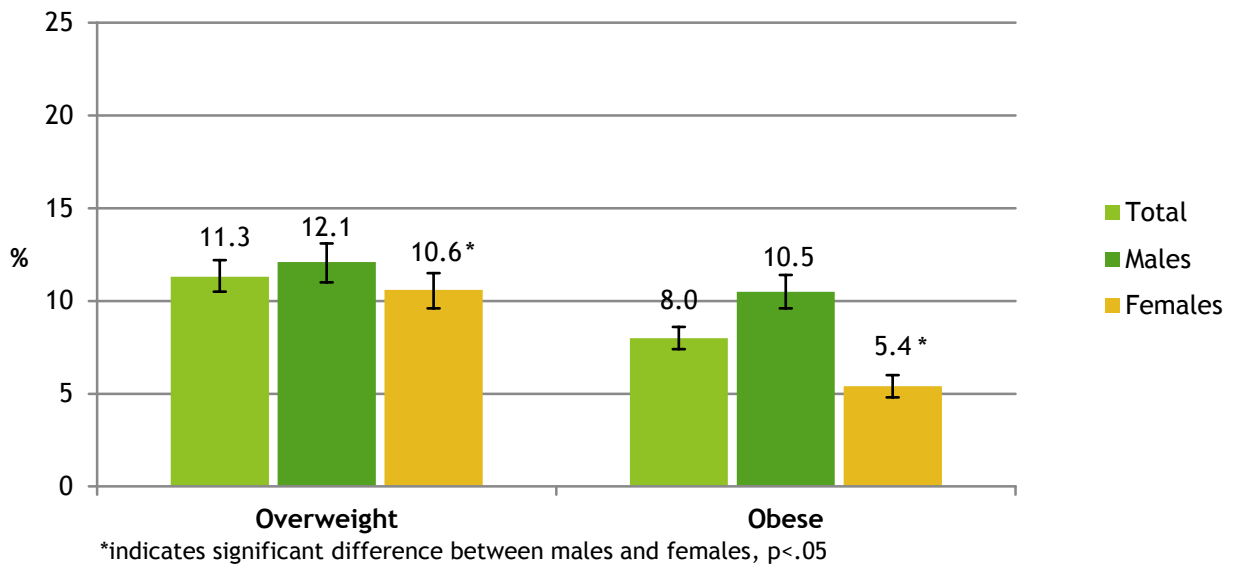
## Findings

### ***Overweight and Obesity among High School Students***

In 2013, nearly one in five Colorado high school students was overweight (8.0%) or obese (11.3%). The rates of being overweight or obese in Colorado are significantly higher for males than females (Figure 1). Males were nearly twice as likely as females to be obese (10.5% vs. 5.4%; Figure 1).

Colorado racial and ethnic minority populations had higher rates of overweight and obesity than White high school students (Table 1). Being overweight was significantly more common among Black/African American, Hispanic and those in the multiracial race ("other") category compared to White high school students. Obesity was significantly more common among Black/African American, Hispanic, American Indian/Alaskan Native and those in "other" category compared to White high school students.

**Figure 1. Prevalence of overweight & obesity among high school students by sex, Colorado, 2013**



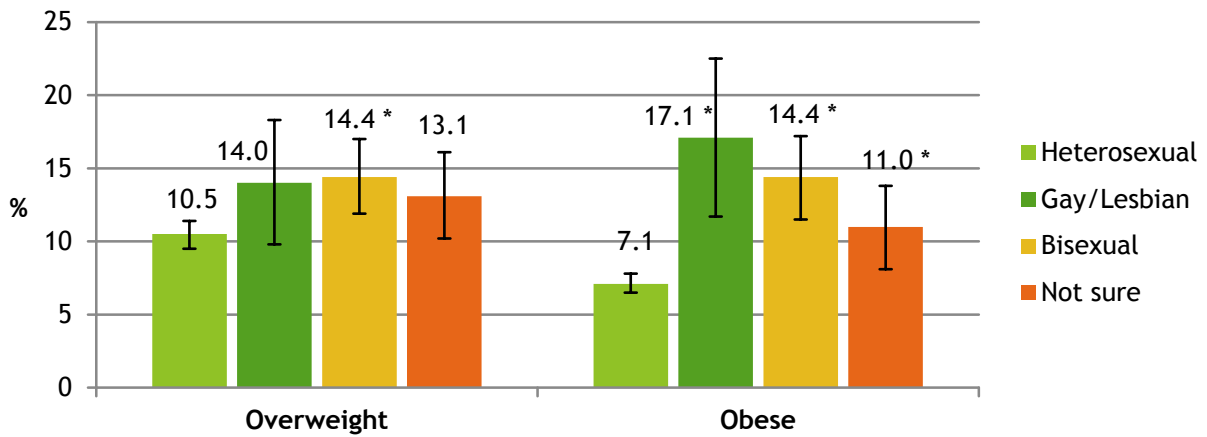
**Table 1. Prevalence of overweight & obese among high school students by race/ethnicity, Colorado, 2013**

Race/ethnicity	Overweight	Obese
	% (95%CI) Colorado	% (95%CI) Colorado
White	9.1 (8.5-9.8)	5.9 (5.3-6.4)
Black/African American	14.5 (12.0-17.1)*	12.2 (10.4-14.1)*
Hispanic	15.2 (13.9-16.5)*	11.8 (10.8-12.8)*
Asian	9.1 (6.7-11.5)	5.2 (3.7-6.8)
American Indian/Alaska Native	12.1 (7.0-17.2)	12.6 (6.8-18.4)*
Native Hawaiian/Pacific Islander	10.9 (5.4-16.4)	9.7 (4.9-14.5)
other	14.3 (12.7-15.8)*	9.6 (8.2-11.1)*

\*statistically significant difference when compared to White students, p<0.05

Among self-identified gay/lesbian high school students, 31% were overweight or obese, and 29% of bisexual high school students were overweight or obese, compared with 18% heterosexual high school students (data not shown). Prevalence of overweight was significantly different for bisexual student compared to heterosexual (Figure 2). There were greater differences by sexual orientation for obesity. Gay/lesbian (17.1%) and bisexual students (14.4 %) were at least twice as likely to be obese as compared to heterosexual high school students (7.1%). Those who responded “not sure” were also significantly more likely to be obese compared to heterosexual high school students (11.0% versus 7.1%; Figure 2).

**Figure 2. Prevalence of high school students who were overweight & obese by sexual orientation, Colorado, 2013**



\*statistically significantly different from heterosexual,  $p < 0.05$

### ***Overweight and Obesity Risk and Protective Factors***

Several protective factors were associated with a lower likelihood of being overweight or obese among high school students (Table 2). High school students who ate breakfast daily or lunch daily were significantly less likely to be overweight/obese compared to those who did not eat breakfast or lunch daily. High school students who were physically active for 60 minutes on five of the last seven days were 31% less likely to be overweight or obese than those who were active for fewer than five days per week. Similarly, youth who participated in one or more sports teams were 37% less likely than those who did not participate on a sports team to be overweight or obese. Factors that were not significantly associated with being overweight or obese among high school students included physical activity in school through physical education (PE), obtaining at least 8 hours of sleep per night, and drinking water.

**Table 2. Protective factors associated with overweight/obesity among high school students, Colorado, 2013**

Protective Factors	Overweight/Obesity Adjusted Odds Ratio <sup>a</sup> (95% CI)
Breakfast consumption, past 7 days (all 7 vs. <7 days)	0.71 (0.66 - 0.77)*
Lunch consumption, past 7 days (all 7 vs. < 7 days)	0.82 (0.74 - 0.91)*
Physical activity for 60 min, past 7 days (5+ vs. < 5 days)	0.69 (0.64 - 0.75)*
Number of sports teams, past 12 months (1 + vs. 0)	0.63 (0.60 - 0.67)*
Number of days of PE in school ( $\geq 1$ vs. 0 days/week)	1.09 (0.96 - 1.23)
Daily water consumption ( $\geq 1$ vs. 0 time/day)	0.96 (0.86 - 1.08)
Average sleep per night ( $\geq 8$ vs. <8 hours)	0.98 (0.85 - 1.12)

<sup>a</sup> Odds ratios are adjusted for age, sex, and race/ethnicity and calculated for overweight/obese vs. underweight/normal weight

\*Statistically significant,  $p < 0.05$

Several factors were associated with a higher likelihood of being overweight or obese (Table 3). High school students who consumed at least one soda per day were 13% more likely to be overweight or obese than those who consumed less than one soda per day. Those that did not eat any fruits within the last week were 15% more likely to be overweight or obese compared to students who ate some fruit. Similarly, high school students that did not eat any vegetables within the last week were 12% more likely to be overweight or obese than those who ate at least some vegetables. High school students who were not physically active within the past 7 days were more likely to be overweight or obese compared to those who had at least some physical activity.

**Table 3. Factors associated with increased overweight/obesity among Colorado high school students**

<b>Risk Factors</b>	<b>Overweight/Obesity Adjusted Odds Ratio<sup>a</sup> (95%CI)</b>
Soda beverage consumption, past 7 days ( $\geq 1$ vs. $< 1$ times/day)	1.13 (1.02 - 1.25)*
Fruit consumption, past 7 days (0 vs. $\geq 1$ times/day)	1.15 (1.06 - 1.25)*
Vegetable consumption, past 7 days (0 vs. $\geq 1$ times/day)	1.12 (1.04 - 1.22)*
Physically active for 60 min, past 7 days (0 vs. any)	1.30 (1.15 - 1.47)*

<sup>a</sup> Odds ratios are adjusted for age, sex, and race/ethnicity and calculated for overweight/obesity combined vs. underweight/normal weight combined.

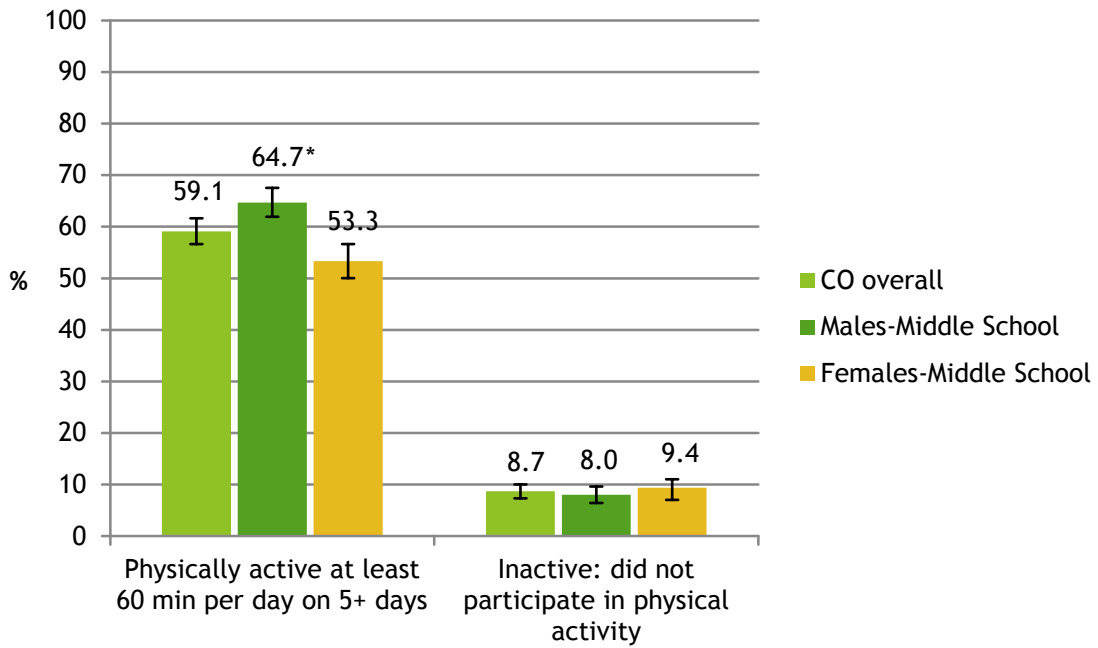
\*Statistically significant,  $p < 0.05$

### ***Physical Activity among High School and Middle School Students***

Both middle school and high school students were asked about physical activity. Among Colorado middle school students, 59.1% were physically active and 8.7% were inactive in the past week (Figure 3). Middle school males (64.7%) were significantly more likely to be physically active for 60 minutes per day on at least 5 days per week compared to females (53.3%). Fewer than 1 in 10 middle school students was physically inactive (males: 8.0%, females: 9.4%).

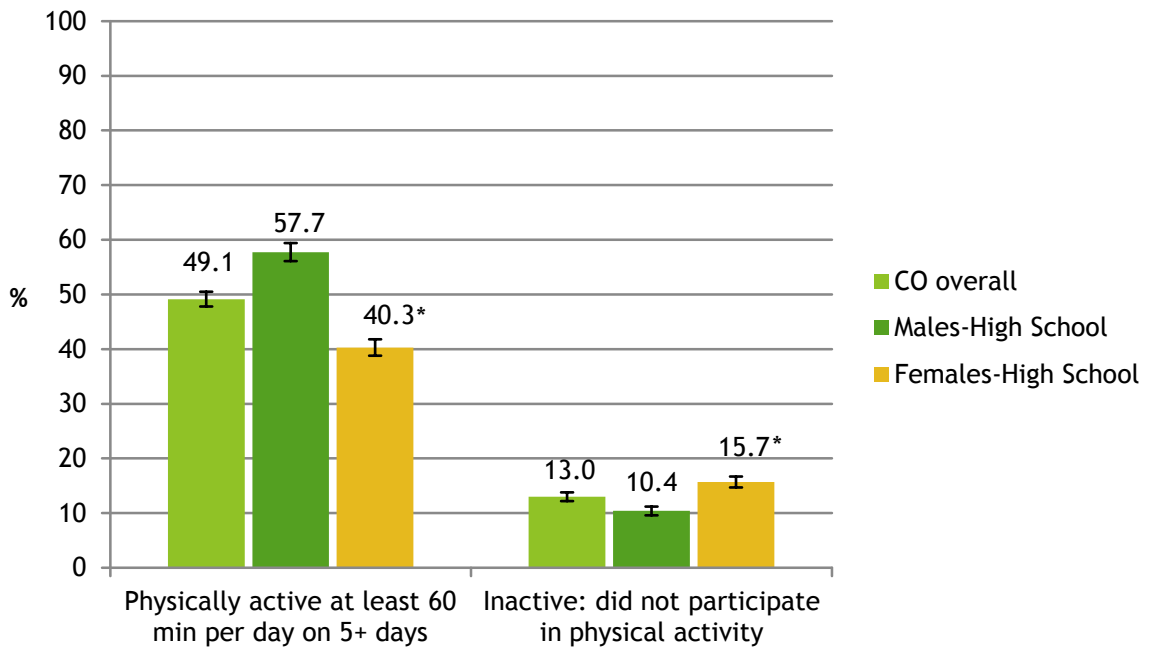
By high school, physical activity declined and inactivity increased. About half (49.1%) of Colorado high school students were physically active for 60 minutes on five or more days in the last week, while 13.0% were not physically active in the past week (Figure 4). Significantly more high school males (57.7%) than females (40.3%) were physically active for at least 60 minutes per day on at least 5 days within the last week.

**Figure 3. Prevalence of physical activity and inactivity among middle school students, Colorado, 2013**



\*statistically significant difference between males and females,  $p < .05$

**Figure 4: Prevalence of physical activity and inactivity among high school students, Colorado, 2013**



\*statistically significant difference between males and females,  $p < .05$

Among Colorado middle school students, only Hispanics had statistically significantly lower rates of physical activity than Whites (Table 4). Among Colorado high school students, statistically significantly lower rates of physical activity were observed for Blacks/African Americans, Hispanics, Asians and multi-racial (“other”) race/ethnicity students as compared to Whites.

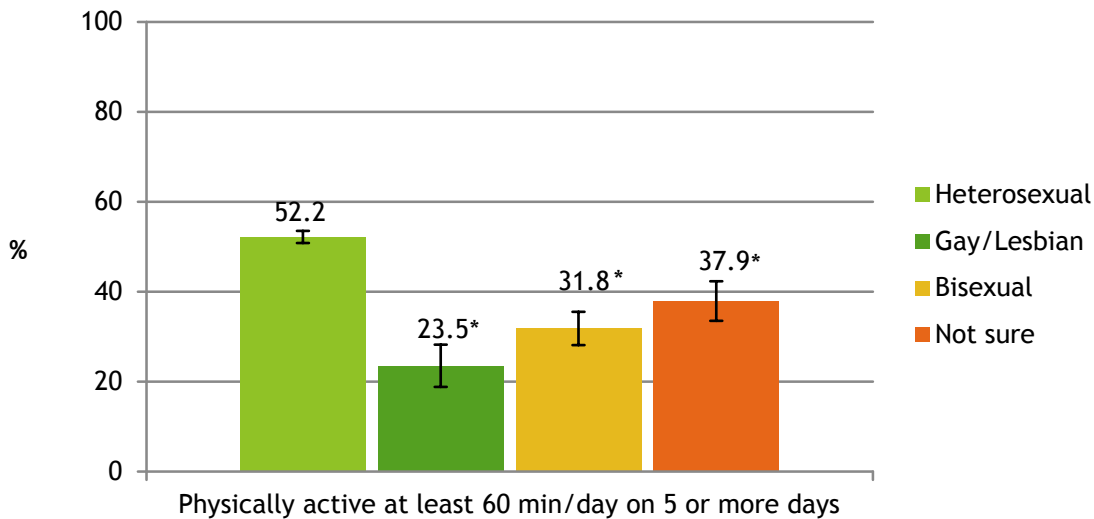
**Table 4. Prevalence of adolescent physical activity by race/ethnicity, Colorado, 2013**

Race/ethnicity	Physically active at least 60 min/day on 5 or more days % (95% CI)	
	Colorado	
	Middle School	High School
White	62.9 (59.8-66.0)	53.7 (52.5-54.9)
Black/African American	54.4 (47.7-61.0)	43.8 (39.0-48.5)*
Hispanic	53.2 (49.1-57.3)*	42.3 (40.0-44.6)*
Asian	58.9 (45.8-72.1)	34.4 (30.5-38.2)*
American Indian/Alaska Native	62.5 (54.8-70.3)	51.8 (45.1-58.5)
Native Hawaiian/Pacific Islanders	47.7 (28.2-67.3)	62.2 (49.5-75.0)
other	59.9 (55.7-64.1)	49.1 (46.4-51.7)*

\*statistically significant difference when compared to White students,  $p < .05$

Physical activity was less common among high school students who self-identified as gay/lesbian, bisexual, or unsure of their sexual orientation than among those who self-identified as heterosexual (Figure 5). The prevalence among gay/lesbian adolescents was less than half the rate among heterosexual adolescents (23.5% versus 52.2%).<sup>1</sup>

**Figure 5. Prevalence of physical activity for at least 60 minutes per day on 5 or more days by sexual orientation among high school students, Colorado, 2013**



\*significantly different than heterosexual,  $p < .05$

<sup>1</sup> Demographic information about sexual orientation is only collected from high school students.

## Factors Associated with Physical Activity

Several factors were associated with increased likelihood of being physically active (Table 5). High school students who could or do walk, ride a bike, or skateboard to school were between 11-31% more likely to participate in physical activity. Middle school and high school adolescents who participated in one or more days of physical education (PE) in school were more than twice as likely to be physically active as those who did not participate in PE. Participation in one or more sports teams was strongly associated with physical activity in middle school and high school compared to adolescents who were not part of a sports team. Middle and high school adolescents who watched fewer than three hours of television on school days were between 53-56% more likely to be physically active compared to those who watched three or more hours of television. Similarly, adolescents who spent fewer than three hours per day of screen time using electronic devices were 75-80% more likely to participate in physical activity.

**Table 5. Factors associated with physical activity for 60 minutes per day on 5 or more days among middle and high school students, Colorado, 2013**

	Physical Activity Middle School OR <sup>a</sup> (95%CI)	Physical Activity High School OR <sup>a</sup> (95%CI)
Could walk/ride bike/skateboard to school (Yes vs. No)	–	1.31 (1.21 - 1.43)*
Walk/ride bike/skateboard to school (≥1 vs. 0 day/week)	–	1.11 (0.98 - 1.26)*
Average days per week of PE in school (≥1 vs <1 day/week)	2.36 (1.93 - 2.89)*	2.26 (2.04 - 2.50)*
Number of sports teams (≥1 vs. 0)	2.49 (2.09 - 2.99)*	3.74 (3.46 - 4.05)*
Number of hours watching television on school day (<3 vs ≥3 hours)	1.56 (1.47 - 1.67)*	1.53 (1.43-1.64)*
Screen time using electronic devices (<3 vs ≥3 hours)	1.75 (1.62 - 1.88)*	1.80 (1.67 - 1.93)*

<sup>a</sup> Odds ratios were adjusted for age, sex, and race/ethnicity. Odds ratios were calculated with the outcome variable of overweight/obese versus underweight/normal weight.

\*Statistically significant,  $p < 0.05$

## Summary

One in five Colorado adolescents had higher than normal body weight. Obesity was more common among males than females and higher among Black/African Americans, Hispanics and American Indians/Alaskan Natives, than among non-Hispanic Whites. Obesity was twice as common among high school who self-identified as gay/lesbian, bisexual, or unsure of their sexual orientation as compared to heterosexuals. Adolescents who ate breakfast and lunch every day, were physically active for 60 minutes for 5 days within the last week, or who participated on a sports team were less likely to be overweight or obese. Adolescents who consumed at least one soda per day, did not eat any fruits or vegetables, and did not participate in any physical activity were more likely to be overweight or obese.

Physical activity is an important factor to prevent overweight and obesity. About half of high school students and three-fifths of middle school students were physically active for 60 minutes on 5 or more days in the last week. At the same time, one in 10 adolescents did not participate in any physical activity. Participation rates in physical activity was lower among females, racial/ethnic minorities, gay/lesbians, bisexuals, and those who were unsure of their sexual orientation. Physical activity participation was more likely among adolescents who could or did walk, ride a bike or skateboard to



school, participated in PE at school, were on one or more sports teams, watched less than 3 hours of television, or engaged in less than 3 hours of electronic screen time.

## Acknowledgment

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## References

1. Freedman DS, Mei Z, Srinivasan SR, Berenson GS, Dietz WH. Cardiovascular risk factors and excess adiposity among overweight children and adolescents: the Bogalusa Heart Study. *J Pediatr* 2007;150:12-17.
2. Singh AS, Mulder C, Twisk JWR, van Mechelen W, Chinapaw MJW. Tracking of childhood overweight into adulthood: a systematic review of the literature. *Obes Rev* 2008;9:474-88.
3. Malnick SD, Knobler H. The medical complications of obesity. *QJM* 2006;99:565-79.
4. Kann L, Kinchen S, Shanklin SL, Flint KF, Hawkins J, Harris WA, et al. Youth Risk Behavior Surveillance – United States, 2013. *MMWR* 2014;63(4): 1-47



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The University of Colorado Denver - Anschutz Medical Campus implemented the survey in 2013.