



# In denial: Misperceptions of weight change among adults in the United States<sup>☆</sup>

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## ABSTRACT

**Objective.** Obesity is associated with several chronic conditions, increased medical costs, and premature death. Proper assessment of changes in body weight is crucial to control the spread of obesity. We used data from the Behavioral Risk Factor Surveillance System to explore how adults in the United States recall their weight change and to identify characteristics associated with weight changes.

**Methods.** Data from two cross-sections of adults aged  $\geq 18$  years from the 2008 ( $n = 385,416$ ) and 2009 ( $n = 394,700$ ) Behavioral Risk Factor Surveillance System were analyzed. Body mass index was calculated from self-reported height and weight. Self-reported estimates of weight 1 year prior to the interview were used to calculate changes in weight and obesity status between 2008 and 2009.

**Results.** If self-reported changes in weight between 2008 and 2009 are to be believed, the obesity prevalence among men and women in the United States would have declined by 2.0% and 0.9% respectively. Yet, obesity prevalence increased 0.4%, overall, during this time period. In general, American adults overestimated their previous weight and reported weight losses even though they had gained weight.

**Conclusion.** Public health and medical professionals should interpret self-reported weight changes with caution when developing, implementing, and evaluating programs to control and prevent weight gain.

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## Introduction

The prevalence of obesity among adults is increasing in nearly all countries worldwide, with approximately 2 billion adults being classified as overweight or obese as of 2008 (Swinburn et al., 2011). In 2009–2010, more than one-third of adults in the United States (US) were obese (Ogden et al., 2012). Obesity is associated with a wide array of deleterious health effects, including chronic conditions such as heart disease and diabetes, increased health care costs, and premature death (Finkelstein et al., 2008; US Department of Health and Human Services, 2001). Americans are increasingly encouraged to lose weight (or engage in behaviors leading to weight loss such as dietary modification and increased physical activity) as a means of reducing their risk of chronic disease and premature death. Despite the high prevalence of attempted and reported weight loss among adults in the US (Bish et al., 2005; Serdula et al., 1999), obesity remains a major health problem, and data suggest prevalence of obesity continues to rise at an alarming rate (US Centers for Disease Control and Prevention (CDC), 2010a). We sought to investigate this apparent contradiction using nationally-representative data to estimate changes in body weight and obesity prevalence among adults in the US, and to compare these findings to self-reported changes.

## Methods

### Data collection

We used data from the 2008 and 2009 Behavioral Risk Factor Surveillance System (BRFSS). Operated by state health departments with assistance from the Centers for Disease Control and Prevention (CDC), BRFSS is designed to monitor the leading risk factors for morbidity and mortality in the United States at the local, state, and national levels (Mokdad, 2009). Each year, an independent cross-section of adults is surveyed. A detailed description of the survey methods is available elsewhere (Mokdad et al., 2003); all BRFSS questionnaires and data are available at [www.cdc.gov/brfss](http://www.cdc.gov/brfss).

Self-reported height and weight were assessed by asking respondents “About how tall are you without shoes?” and “About how much do you weigh without shoes?”. In addition, respondents were asked “How much did you weigh a year ago? [If you were pregnant a year ago, how much did you weigh before your pregnancy?]”. Respondents who reported a difference in body weight were then asked “Was the change between your current weight and your weight a year ago intentional?”. The self-reported height and body weight data were used to calculate current and prior body mass index (BMI; weight [kg]/height [m]<sup>2</sup>), and to classify participants as obese (BMI  $\geq 30.0$ ) or not obese (BMI  $< 30.0$ ) at the time of the interview and 1 year prior to the interview.

In addition to data on height and weight, a range of sociodemographic indicators were also extracted from the survey responses, including age, race/ethnicity, highest level of education, marital status, and state of residence. Self-reported health behaviors including lifetime smoking status, daily fruit and vegetable consumption, and weekly physical activity were also collected. Previous diagnoses made by “a doctor, nurse, or other health professional” of specific chronic conditions were noted. To assess other health-related aspects of quality of life, we also looked at mental health and sleep quality. Finally,

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**Table 1**  
Discrepancies between calculated and reported changes in obesity prevalence between 2008 and 2009 among repeated cross-sections of US adults participating in the Behavioral Risk Factor Surveillance System (BRFSS).

Characteristics	Obesity prevalence estimated from self-reported body weight, % (95% CI)			Percentage point change in prevalence		Percentage point discrepancy ( $\Delta_{\text{calculated}} - \Delta_{\text{reported}}$ )
	2008	2008 (reported in 2009) <sup>a</sup>	2009	Calculated <sup>b</sup>	Reported	
Total	26.0 (25.7, 26.3)	27.9 (27.6, 28.2)	26.5 (26.2, 26.8)	0.4 (0.0, 0.8)	-1.4 (-1.9, -1.0)	1.9 (1.5, 2.3)
Sex						
Male	27.2 (26.7, 27.6)	29.5 (29.0, 29.9)	27.5 (27.0, 28.0)	0.3 (-0.3, 1.0)	-2.0 (-2.6, -1.3)	2.3 (1.7, 3.0)
Female	24.9 (24.6, 25.3)	26.3 (26.0, 26.7)	25.4 (25.1, 25.8)	0.5 (0.0, 1.0)	-0.9 (-1.4, -0.4)	1.4 (0.9, 1.9)
Age						
18–29 years old	19.8 (18.9, 20.6)	19.8 (19.0, 20.7)	19.6 (18.8, 20.5)	-0.1 (-1.4, 1.1)	-0.2 (-1.4, 1.1)	0.1 (-1.2, 1.3)
30–39 years old	26.6 (25.9, 27.4)	28.3 (27.5, 29.1)	27.6 (26.8, 28.4)	1.0 (-0.1, 2.0)	-0.7 (-1.8, 0.4)	1.7 (0.6, 2.7)
40–49 years old	29.3 (28.7, 30.0)	30.6 (30.0, 31.3)	29.3 (28.6, 29.9)	0.0 (-0.9, 0.9)	-1.4 (-2.3, -0.5)	1.3 (0.4, 2.2)
50–59 years old	31.0 (30.4, 31.6)	33.0 (32.4, 33.6)	31.0 (30.4, 31.6)	0.0 (-0.8, 0.8)	-2.0 (-2.8, -1.2)	2.0 (1.1, 2.8)
60–69 years old	30.2 (29.6, 30.8)	33.1 (32.5, 33.7)	30.7 (30.1, 31.2)	0.5 (-0.3, 1.3)	-2.4 (-3.2, -1.6)	2.9 (2.1, 3.7)
70+ years old	19.3 (18.8, 19.7)	23.1 (22.6, 23.6)	20.3 (19.8, 20.7)	1.0 (0.4, 1.7)	-2.8 (-3.5, -2.2)	3.9 (3.2, 4.5)
Race/ethnicity						
White, non-Hispanic	24.8 (24.5, 25.1)	26.9 (26.6, 27.2)	25.1 (24.8, 25.4)	0.3 (-0.1, 0.7)	-1.9 (-2.3, -1.5)	2.2 (1.8, 2.6)
Black, non-Hispanic	36.1 (34.9, 37.2)	36.5 (35.4, 37.7)	36.3 (35.1, 37.4)	0.2 (-1.4, 1.8)	-0.3 (-1.9, 1.4)	0.5 (-1.1, 2.1)
Asian, non-Hispanic	8.4 (7.1, 9.7)	9.9 (8.4, 11.3)	9.4 (8.0, 10.8)	1.0 (-0.9, 2.9)	-0.5 (-2.5, 1.6)	1.5 (-0.5, 3.4)
Native American, non-Hispanic	33.0 (30.3, 35.8)	35.0 (32.3, 37.7)	33.6 (31.0, 36.2)	0.6 (-3.2, 4.4)	-1.4 (-5.2, 2.4)	2.0 (-1.9, 5.8)
Hispanic	28.8 (27.6, 30.0)	30.6 (29.4, 31.8)	30.3 (29.1, 31.5)	1.6 (-0.2, 3.3)	-0.2 (-1.9, 1.5)	1.8 (0.1, 3.5)
Other, non-Hispanic	26.3 (24.3, 28.2)	29.2 (27.2, 31.3)	27.6 (25.6, 29.6)	1.3 (-1.5, 4.1)	-1.6 (-4.5, 1.3)	3.0 (0.1, 5.8)
Education						
Less than high school	30.3 (29.3, 31.4)	33.0 (31.9, 34.1)	32.5 (31.4, 33.6)	2.1 (0.6, 3.7)	-0.5 (-2.1, 1.1)	2.7 (1.1, 4.2)
High school graduate	28.8 (28.2, 29.3)	30.3 (29.7, 30.9)	29.3 (28.8, 29.9)	0.6 (-0.2, 1.4)	-1.0 (-1.8, -0.2)	1.6 (0.7, 2.4)
Some college	28.2 (27.6, 28.8)	30.4 (29.8, 31.0)	28.8 (28.2, 29.4)	0.6 (-0.2, 1.4)	-1.6 (-2.4, -0.8)	2.2 (1.4, 3.0)
College graduate	20.7 (20.2, 21.1)	22.7 (22.2, 23.1)	20.7 (20.3, 21.1)	0.1 (-0.5, 0.7)	-2.0 (-2.6, -1.3)	2.0 (1.4, 2.6)
Marital status						
Married/unmarried couple	26.4 (26.0, 26.7)	28.2 (27.9, 28.6)	26.9 (26.5, 27.2)	0.5 (0.0, 1.0)	-1.4 (-1.8, -0.9)	1.9 (1.4, 2.4)
Divorced or separated	29.8 (29.1, 30.6)	33.2 (32.4, 34.0)	31.3 (30.6, 32.1)	1.5 (0.4, 2.6)	-1.9 (-3.0, -0.7)	3.4 (2.3, 4.5)
Widowed	23.7 (23.0, 24.3)	27.0 (26.3, 27.7)	24.4 (23.7, 25.1)	0.7 (-0.2, 1.7)	-2.6 (-3.5, -1.6)	3.3 (2.3, 4.3)
Never married	23.6 (22.8, 24.5)	24.3 (23.5, 25.2)	23.2 (22.4, 24.0)	-0.4 (-1.6, 0.8)	-1.1 (-2.3, 0.1)	0.7 (-0.5, 1.9)
Smoking status <sup>c</sup>						
Never smoked	25.2 (24.8, 25.6)	26.7 (26.3, 27.1)	25.5 (25.1, 25.8)	0.2 (-0.3, 0.8)	-1.2 (-1.8, -0.7)	1.5 (0.9, 2.0)
Former smoker	29.2 (28.7, 29.8)	31.7 (31.2, 32.2)	29.8 (29.3, 30.4)	0.6 (-0.2, 1.3)	-1.9 (-2.6, -1.1)	2.4 (1.7, 3.2)
Current smoker	24.3 (23.6, 25.0)	26.7 (26.0, 27.4)	25.1 (24.4, 25.8)	0.8 (-0.2, 1.8)	-1.6 (-2.6, -0.6)	2.4 (1.4, 3.4)
Previous diagnoses <sup>d</sup>						
Diabetes (excludes borderline cases)	51.2 (50.2, 52.1)	55.9 (54.9, 56.8)	51.1 (50.1, 52.0)	-0.1 (-1.4, 1.2)	-4.8 (-6.1, -3.5)	4.7 (3.4, 6.0)
Myocardial infarction	34.5 (33.3, 35.7)	38.5 (37.3, 39.7)	34.6 (33.5, 35.8)	0.1 (-1.6, 1.8)	-3.8 (-5.5, -2.1)	3.9 (2.2, 5.6)
Coronary heart disease or angina	35.4 (34.3, 36.6)	38.6 (37.4, 39.8)	35.5 (34.3, 36.7)	0.1 (-1.6, 1.7)	-3.1 (-4.8, -1.4)	3.2 (1.5, 4.8)
Stroke	31.8 (30.3, 33.2)	35.3 (33.8, 36.8)	31.4 (30.0, 32.8)	-0.4 (-2.4, 1.7)	-3.9 (-5.9, -1.8)	3.5 (1.5, 5.6)
Asthma (excludes resolved cases)	36.1 (35.0, 37.1)	36.8 (35.7, 37.9)	35.5 (34.4, 36.5)	-0.6 (-2.1, 0.9)	-1.3 (-2.8, 0.2)	0.7 (-0.8, 2.2)
Other health-related characteristics						
Reports $\geq 14$ days per month that mental health is "not good" <sup>e</sup>	34.0 (33.0, 35.0)	36.6 (35.6, 37.6)	35.5 (34.6, 36.5)	1.5 (0.2, 2.9)	-1.0 (-2.4, 0.4)	2.6 (1.2, 4.0)
Reports $\geq 14$ days per month with insufficient rest or sleep <sup>f</sup>	30.8 (30.2, 31.4)	32.2 (31.6, 32.8)	31.2 (30.6, 31.8)	0.4 (-0.5, 1.2)	-1.0 (-1.9, -0.1)	1.3 (0.5, 2.2)
Lacks health care coverage <sup>g</sup>	27.9 (26.9, 28.9)	29.4 (28.5, 30.4)	28.9 (27.9, 29.9)	1.0 (-0.4, 2.4)	-0.5 (-1.9, 0.9)	1.5 (0.2, 2.9)
State						
Alabama	31.5 (29.6, 33.3)	32.7 (30.9, 34.5)	30.9 (29.1, 32.6)	-0.6 (-3.1, 2.0)	-1.8 (-4.3, 0.7)	1.2 (-1.3, 3.8)
Alaska	26.4 (23.8, 28.9)	27.0 (24.2, 29.7)	24.3 (21.8, 26.8)	-2.0 (-5.7, 1.6)	-2.7 (-6.4, 1.0)	0.6 (-3.1, 4.4)
Arizona	24.5 (22.0, 26.9)	27.2 (24.7, 29.7)	25.1 (22.6, 27.6)	0.6 (-2.9, 4.1)	-2.1 (-5.6, 1.4)	2.7 (-0.8, 6.2)
Arkansas	28.8 (27.1, 30.6)	31.9 (29.7, 34.2)	30.1 (27.9, 32.3)	1.2 (-1.6, 4.1)	-1.9 (-5.0, 1.3)	3.1 (0.3, 6.0)
California	23.7 (22.6, 24.8)	25.6 (24.7, 26.6)	24.5 (23.5, 25.4)	0.8 (-0.6, 2.3)	-1.1 (-2.5, 0.2)	2.0 (0.5, 3.4)
Colorado	18.4 (17.4, 19.3)	20.0 (18.9, 21.1)	18.4 (17.4, 19.4)	0.0 (-1.4, 1.4)	-1.6 (-3.1, -0.1)	1.6 (0.2, 3.0)
Connecticut	21.0 (19.5, 22.5)	22.0 (20.5, 23.4)	20.4 (18.9, 21.8)	-0.6 (-2.7, 1.4)	-1.6 (-3.7, 0.4)	1.0 (-1.1, 3.1)
Delaware	27.3 (25.2, 29.3)	28.8 (26.8, 30.9)	26.7 (24.7, 28.8)	-0.5 (-3.4, 2.4)	-2.1 (-5.0, 0.8)	1.6 (-1.3, 4.5)
District of Columbia	21.8 (20.1, 23.5)	20.0 (18.3, 21.8)	19.3 (17.5, 21.1)	-2.5 (-4.9, 0.0)	-0.7 (-3.2, 1.8)	-1.7 (-4.2, 0.7)
Florida	24.3 (22.7, 26.0)	26.0 (24.5, 27.6)	24.9 (23.4, 26.5)	0.6 (-1.7, 2.8)	-1.1 (-3.3, 1.0)	1.7 (-0.6, 3.9)
Georgia	27.1 (25.3, 28.8)	29.5 (27.5, 31.4)	26.8 (24.9, 28.6)	-0.3 (-2.9, 2.3)	-2.7 (-5.4, 0.0)	2.4 (-0.2, 5.0)
Hawaii	22.7 (21.2, 24.2)	22.5 (21.0, 24.0)	21.9 (20.4, 23.4)	-0.8 (-2.9, 1.4)	-0.6 (-2.8, 1.6)	-0.2 (-2.3, 2.0)
Idaho	24.5 (22.8, 26.1)	27.1 (25.4, 28.8)	24.5 (22.8, 26.2)	0.0 (-2.3, 2.4)	-2.6 (-5.0, -0.2)	2.6 (0.3, 5.0)
Illinois	26.2 (24.5, 27.9)	28.8 (27.2, 30.4)	26.6 (25.1, 28.1)	0.4 (-1.9, 2.7)	-2.2 (-4.4, 0.0)	2.6 (0.2, 4.9)
Indiana	26.4 (24.6, 28.1)	30.8 (29.4, 32.2)	29.2 (27.8, 30.6)	2.8 (0.5, 5.1)	-1.6 (-3.6, 0.4)	4.4 (2.2, 6.7)
Iowa	26.1 (24.6, 27.6)	29.8 (28.2, 31.4)	27.6 (26.0, 29.2)	1.4 (-0.7, 3.6)	-2.2 (-4.5, 0.0)	3.7 (1.5, 5.9)
Kansas	27.5 (26.2, 28.8)	29.7 (28.8, 30.6)	28.0 (27.1, 28.9)	0.5 (-1.0, 2.1)	-1.7 (-2.9, -0.4)	2.2 (0.6, 3.8)
Kentucky	29.6 (28.0, 31.2)	33.4 (31.6, 35.2)	31.6 (29.8, 33.4)	2.0 (-0.4, 4.4)	-1.8 (-4.3, 0.7)	3.8 (1.3, 6.2)
Louisiana	28.3 (26.7, 29.8)	33.8 (32.3, 35.3)	32.7 (31.2, 34.2)	4.4 (2.3, 6.5)	-1.1 (-3.2, 1.0)	5.5 (3.4, 7.7)
Maine	25.1 (23.8, 26.4)	26.9 (25.6, 28.2)	25.3 (24.1, 26.6)	0.2 (-1.6, 2.0)	-1.5 (-3.3, 0.3)	1.8 (-0.1, 3.6)
Maryland	26.0 (24.7, 27.3)	27.0 (25.6, 28.5)	25.6 (24.2, 27.0)	-0.4 (-2.3, 1.5)	-1.4 (-3.5, 0.6)	1.0 (-0.9, 3.0)
Massachusetts	21.0 (20.0, 21.9)	22.9 (21.8, 24.0)	21.4 (20.3, 22.5)	0.5 (-1.0, 1.9)	-1.5 (-3.0, 0.1)	1.9 (0.5, 3.4)
Michigan	29.0 (27.7, 30.3)	30.5 (29.2, 31.9)	29.3 (28.0, 30.6)	0.3 (-1.6, 2.1)	-1.2 (-3.1, 0.6)	1.5 (-0.3, 3.4)
Minnesota	24.5 (22.8, 26.1)	26.8 (25.1, 28.5)	24.4 (22.8, 26.0)	-0.1 (-2.4, 2.3)	-2.4 (-4.7, 0.0)	2.3 (0.0, 4.7)
Mississippi	32.7 (31.2, 34.3)	34.9 (33.5, 36.4)	33.9 (32.5, 35.3)	1.2 (-0.9, 3.2)	-1.0 (-3.0, 1.0)	2.2 (0.1, 4.3)
Missouri	28.4 (26.5, 30.3)	31.2 (29.1, 33.2)	30.1 (28.1, 32.1)	1.7 (-1.0, 4.5)	-1.0 (-3.9, 1.8)	2.8 (0.0, 5.5)

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