In denial: Misperceptions of weight change among adults in the United States ☆

Catherine M. Wetmore, Ali H. Mokdad *

Institute for Health Metrics and Evaluation, University of Washington, Seattle, WA, USA

ARTICLE INFO

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 ≥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 tim'e 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.

© 2012 Elsevier Inc. All rights reserved.

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.

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]^2), and to classify participants as obese (BMI ≥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,

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
	2008	2008 (reported in 2009)[a]	2009	Calculated[b]	Reported	($\Delta_{calculated} - \Delta_{reported}$)
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[c]						
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[d]						
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 ≥ 14 days per month that mental health is "not good"[e]	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 ≥ 14 days per month with insufficient rest or sleep[f]	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[g]	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)

Table 1 (*continued*)

Characteristics	Obesity prevalence estimated from self-reported body weight, % (95% CI)			Percentage point change in prevalence		Percentage point discrepancy
	2008	2008 (reported in 2009)[a]	2009	Calculated[b]	Reported	($\Delta_{calculated} - \Delta_{reported}$)
State						
Montana	23.5 (22.0, 25.1)	24.9 (23.4, 26.4)	22.9 (21.5, 24.4)	−0.6 (−2.7, 1.5)	−2.0 (−4.0, 0.1)	1.4 (−0.7, 3.5)
Nebraska	26.6 (25.2, 28.0)	28.4 (26.9, 29.9)	27.3 (25.8, 28.7)	0.7 (−1.4, 2.7)	−1.2 (−3.3, 0.9)	1.8 (−0.2, 3.9)
Nevada	24.8 (22.8, 26.9)	26.1 (23.6, 28.6)	25.3 (22.7, 27.9)	0.4 (−2.9, 3.7)	−0.8 (−4.5, 2.8)	1.3 (−2.0, 4.5)
New Hampshire	24.3 (22.9, 25.7)	27.0 (25.3, 28.8)	25.4 (23.7, 27.2)	1.1 (−1.1, 3.4)	−1.6 (−4.1, 0.9)	2.7 (0.5, 5.0)
New Jersey	22.9 (21.7, 24.1)	24.5 (23.3, 25.7)	23.0 (21.8, 24.1)	0.1 (−1.5, 1.8)	−1.5 (−3.2, 0.1)	1.7 (0.0, 3.4)
New Mexico	25.0 (23.4, 26.7)	26.3 (24.9, 27.8)	24.8 (23.3, 26.2)	−0.3 (−2.4, 1.9)	−1.6 (−3.6, 0.5)	1.3 (−0.9, 3.5)
New York	24.2 (22.9, 25.6)	24.7 (23.2, 26.1)	24.1 (22.7, 25.6)	−0.1 (−2.1, 1.9)	−0.5 (−2.6, 1.6)	0.4 (−1.6, 2.4)
North Carolina	28.9 (27.7, 30.0)	30.2 (28.8, 31.7)	29.1 (27.6, 30.6)	0.3 (−1.6, 2.1)	−1.1 (−3.2, 1.0)	1.4 (−0.5, 3.3)
North Dakota	27.0 (25.3, 28.6)	28.8 (27.1, 30.6)	27.3 (25.5, 29.0)	0.3 (−2.1, 2.7)	−1.6 (−4.0, 0.9)	1.9 (−0.6, 4.3)
Ohio	28.7 (27.5, 29.9)	30.3 (28.9, 31.7)	28.6 (27.2, 30.0)	−0.1 (−1.9, 1.8)	−1.7 (−3.6, 0.3)	1.6 (−0.3, 3.4)
Oklahoma	30.5 (29.1, 31.9)	32.5 (31.0, 33.9)	31.4 (29.9, 32.8)	0.8 (−1.2, 2.8)	−1.1 (−3.2, 1.0)	2.0 (−0.1, 4.0)
Oregon	24.6 (22.9, 26.2)	25.9 (24.0, 27.8)	23.0 (21.2, 24.8)	−1.6 (−4.0, 0.9)	−2.9 (−5.5, −0.3)	1.3 (−1.2, 3.8)
Pennsylvania	27.7 (26.3, 29.0)	29.0 (27.6, 30.4)	27.0 (25.7, 28.4)	−0.6 (−2.6, 1.3)	−2.0 (−3.9, 0.0)	1.3 (−0.6, 3.3)
Rhode Island	21.3 (19.7, 22.9)	26.3 (24.6, 28.0)	24.7 (23.0, 26.3)	3.4 (1.1, 5.7)	−1.6 (−4.0, 0.7)	5.0 (2.7, 7.3)
South Carolina	30.2 (28.5, 31.8)	30.0 (28.4, 31.7)	29.3 (27.6, 30.9)	−0.9 (−3.2, 1.4)	−0.8 (−3.1, 1.6)	−0.1 (−2.4, 2.2)
South Dakota	27.5 (26.7, 28.3)	30.5 (28.7, 32.3)	29.3 (27.5, 31.1)	1.8 (−0.6, 4.2)	−1.2 (−3.8, 1.3)	3.1 (0.7, 5.4)
Tennessee	30.7 (28.4, 32.9)	33.0 (30.9, 35.0)	31.8 (29.8, 33.8)	1.1 (−1.9, 4.2)	−1.2 (−4.1, 1.7)	2.3 (−0.7, 5.4)
Texas	28.4 (26.9, 29.9)	29.1 (27.6, 30.7)	28.4 (26.9, 30.0)	0.0 (−2.2, 2.2)	−0.7 (−2.9, 1.5)	0.7 (−1.4, 2.9)
Utah	22.5 (21.0, 24.0)	24.8 (23.6, 26.0)	23.4 (22.2, 24.6)	0.9 (−1.1, 2.8)	−1.4 (−3.1, 0.3)	2.3 (0.4, 4.3)
Vermont	22.5 (21.3, 23.8)	24.0 (22.6, 25.4)	22.3 (20.9, 23.6)	−0.3 (−2.1, 1.6)	−1.8 (−3.7, 0.2)	1.5 (−0.4, 3.4)
Virginia	24.9 (22.8, 27.1)	26.3 (24.3, 28.4)	24.0 (22.0, 25.9)	−1.0 (−3.8, 1.9)	−2.4 (−5.2, 0.5)	1.4 (−1.6, 4.4)
Washington	25.3 (24.5, 26.1)	27.8 (26.9, 28.7)	26.3 (25.4, 27.2)	1.0 (−0.3, 2.2)	−1.5 (−2.8, −0.2)	2.5 (1.2, 3.7)
West Virginia	31.1 (29.3, 32.8)	32.9 (31.2, 34.6)	30.9 (29.2, 32.5)	−0.2 (−2.6, 2.2)	−2.0 (−4.4, 0.3)	1.8 (−0.6, 4.3)
Wisconsin	25.4 (23.7, 27.0)	30.1 (27.9, 32.2)	28.6 (26.5, 30.8)	3.3 (0.6, 6.0)	−1.4 (−4.5, 1.6)	4.7 (1.9, 7.5)
Wyoming	24.5 (23.2, 25.7)	26.0 (24.4, 27.7)	24.4 (22.8, 26.1)	0.0 (−2.1, 2.0)	−1.6 (−4.0, 0.7)	1.6 (−0.5, 3.6)

[a] Prior weight in 2008 was captured on the 2009 BRFSS survey, in response to the question "How much did you weigh a year ago? [If you were pregnant a year ago, how much did you weigh before your pregnancy?]". Prior obesity status in 2008 was defined using the responses to the prior weight and current height questions.

[b] Calculated change in obesity prevalence is defined as the difference between the estimated obesity prevalence in 2009 for each category and the estimated obesity prevalence in 2008 for each category, expressed in terms of percentage points.

[c] Respondents were considered to be current smokers if they reported smoking at least 100 cigarettes in their lifetime and currently smoked "every day" or "some days".

[d] The assessment of several chronic disease conditions was based on reported diagnoses made by "a doctor, nurse, or other health professional". Women diagnosed with diabetes only during pregnancy were considered not to have had this condition.

[e] Respondents classified into two groups based on their response to the question "Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?": infrequent poor mental health (0–13 days), and frequent poor mental health (≥14 days). This dichotomy has been used in previous research, with the term "frequent" representing the respondent's status for a substantial portion of the month (Strine et al., 2005).

[f] Respondents were classified into two groups based on their response to the question "During the past 30 days, for about how many days have you felt you did not get enough rest or sleep?": infrequent sleep insufficiency (0–13 days), and frequent sleep insufficiency (≥14 days).

[g] Health care coverage was assessed by asking "Do you have any kind of health care coverage, including health insurance, prepaid plans such as HMOs, or government plans such as Medicare?".

health care coverage, including "health insurance, prepaid plans such as HMOs, or government plans such as Medicare" was assessed.

In 2008, 414,509 participants completed the BRFSS interview from all states, the District of Columbia, Guam, Puerto Rico, and the Virgin Islands. In 2009, there were a total of 432,607 participants. We excluded respondents from Guam (n = 2062), Puerto Rico (n = 8715), and the Virgin Islands (n = 4998), pregnant women (n = 5365), and women with unknown pregnancy status (n = 807). We also excluded respondents reporting heights less than 3 ft (n = 26) or greater than 7 ft (n = 27), and those reporting current or prior weight greater than 500 lb (n = 177). Those with a calculated current or prior BMI of less than 12.5 or greater than 84.9, the lowest and highest measured values from the 2007-2008 and 2009-2010 waves of the National Health and Nutrition Examination Survey (NHANES) (US Centers for Disease Control and Prevention (CDC), 2008a, 2010b), were also excluded (n = 238). Finally, we excluded participants lacking data necessary to calculate BMI or changes in weight (n = 44,585). Our results are based on a final sample size of 385,416 for 2008 and 394,700 for 2009. The cooperation rate for BRFSS in 2008 and 2009, defined as the percentage of eligible respondents who completed the survey, was 75.0% (US Centers for Disease Control and Prevention (CDC), 2008b, 2009).

Statistical analyses

In this exploratory analysis, we used current and prior body weight data collected from repeated cross-sections of the US adult population to examine calculated and reported changes in body weight and obesity prevalence between 2008 and 2009. To do so, we first estimated "current" average body weight in kilograms in 2008 and 2009 (using data from the 2008 BRFSS and the 2009 BRFSS), and "prior" average body weight in 2008 (using data from the 2009 BRFSS), using geometric means to account for non-normally distributed data. We then calculated the average change in body weight between 2008 and 2009, expressed as the difference between the geometric mean "current" body weight reported in 2009 and the geometric mean "current" body weight reported in 2008. To estimate the reported average change in body weight between 2008 and 2009, we relied only on data collected in 2009, expressed as the difference between the geometric mean "current" body weight and the geometric mean "prior" body weight. When using reported change data collected from the 2009 BRFSS participants, we focused on the differences of aggregate measures of geometric mean body weight (rather than the individual-level differences) in order to exactly replicate the design of the analysis used for comparing the aggregate measures of weight reported by the 2008 BRFSS participants to those reported by the 2009 BRFSS participants. An identical process was used to evaluate the calculated and reported changes in obesity prevalence between 2008 and 2009. We then estimated the discrepancy between the calculated and reported changes in weight and obesity prevalence, expressed as the difference between the calculated change and the reported change. Finally, we computed conservative 95% confidence intervals for the calculated change, reported change, and discrepancy estimates by simply adding the variances of each pair of estimates that was used to construct each of the change and discrepancy variables.

To further explore the characteristics associated with reported changes in body weight, we calculated the prevalence of reported intentional weight loss and unintentional weight gain among subgroups of the US adult population. Multivariable logistic regression models were then used to identify factors independently associated with these reported outcomes. Because the

majority of respondents reported body weight data in pounds, rather than kilograms, and due to heaping of weight change data on multiples of 5 lb (Figure A.1), reported weight loss or gain of ≥10 lb was used as an indicator of weight change in these models.

Survey weights were used to generate population-level estimates accounting for the complex survey design and year-to-year variations in the age, sex, and racial distribution of survey respondents. Because even small differences can be statistically significant given the large sample size available, statistical testing was not emphasized. All analyses were stratified by sex, and were performed using Stata Version 11.2 (StataCorp, College Station, Texas).

Results

Calculated and reported changes in obesity prevalence and body weight

The prevalence of obesity among adults in the US increased slightly from 26.0% to 26.5% during this one-year period (Table 1). State-level obesity prevalences ranged widely, and differed by sex (Table A.1). Although obesity prevalence and average weight increased from 2008 to 2009, Americans tended to report weight losses during the same time

Table 2
Discrepancies between calculated and reported changes in body weight between 2008 and 2009 among repeated cross-sections of US adults participating in the Behavioral Risk Factor Surveillance System (BRFSS).

| Characteristics | Weight, kg Mean (95% CI)[a] | | | Change in weight, kg | | Discrepancy, kg |
	2008	2008 (reported in 2009)[b]	2009	Calculated[c]	Reported	($\Delta_{calculated} - \Delta_{reported}$)
Total	77.7 (77.6, 77.8)	78.3 (78.2, 78.5)	78.1 (77.9, 78.2)	0.4 (−0.3, 1.1)	−0.3 (−1.0, 0.5)	0.6 (−0.1, 1.3)
Sex						
Male	86.2 (86.0, 86.4)	86.9 (86.7, 87.1)	86.6 (86.4, 86.8)	0.4 (−0.5, 1.2)	−0.3 (−1.2, 0.6)	0.7 (−0.2, 1.6)
Female	69.9 (69.8, 70.1)	70.4 (70.3, 70.6)	70.2 (70.1, 70.4)	0.3 (−0.4, 1.0)	−0.2 (−0.9, 0.5)	0.5 (−0.2, 1.2)
Age						
18–29 years old	74.3 (73.9, 74.7)	73.6 (73.2, 74.0)	74.5 (74.1, 74.9)	0.3 (−1.0, 1.5)	0.9 (−0.4, 2.2)	−0.7 (−1.9, 0.6)
30–39 years old	79.0 (78.7, 79.3)	79.4 (79.0, 79.7)	79.3 (79.0, 79.7)	0.3 (−0.8, 1.4)	0.0 (−1.2, 1.1)	0.4 (−0.8, 1.5)
40–49 years old	80.0 (79.7, 80.2)	80.5 (80.3, 80.8)	80.2 (79.9, 80.4)	0.2 (−0.8, 1.2)	−0.3 (−1.4, 0.7)	0.6 (−0.4, 1.6)
50–59 years old	80.4 (80.2, 80.6)	81.4 (81.2, 81.6)	80.7 (80.5, 80.9)	0.3 (−0.6, 1.2)	−0.7 (−1.6, 0.3)	1.0 (0.0, 1.9)
60–69 years old	79.7 (79.5, 80.0)	80.7 (80.5, 81.0)	79.8 (79.6, 80.1)	0.1 (−0.9, 1.0)	−0.9 (−1.9, 0.0)	1.0 (0.0, 2.0)
70+ years old	72.5 (72.3, 72.7)	74.2 (74.0, 74.4)	73.1 (73.0, 73.3)	0.6 (−0.2, 1.5)	−1.1 (−1.9, −0.2)	1.7 (0.8, 2.6)
Race/ethnicity						
White, non-Hispanic	78.0 (77.9, 78.1)	78.8 (78.7, 78.9)	78.3 (78.2, 78.5)	0.4 (−0.4, 1.1)	−0.5 (−1.2, 0.3)	0.8 (0.1, 1.5)
Black, non-Hispanic	82.5 (82.1, 83.0)	81.8 (81.3, 82.3)	82.1 (81.6, 82.5)	−0.5 (−1.8, 0.8)	0.2 (−1.2, 1.6)	−0.7 (−2.1, 0.7)
Asian, non-Hispanic	66.0 (65.3, 66.7)	67.0 (66.2, 67.7)	67.1 (66.4, 67.8)	1.1 (−0.5, 2.7)	0.2 (−1.5, 1.8)	0.9 (−0.7, 2.6)
Native American, non-Hispanic	81.4 (80.3, 82.6)	82.0 (80.8, 83.3)	81.6 (80.5, 82.7)	0.2 (−2.0, 2.3)	−0.5 (−2.6, 1.7)	0.6 (−1.6, 2.8)
Hispanic	75.3 (74.9, 75.8)	76.0 (75.5, 76.5)	76.3 (75.8, 76.8)	1.0 (−0.3, 2.3)	0.3 (−1.1, 1.7)	0.7 (−0.7, 2.1)
Other, non-Hispanic	78.4 (77.6, 79.2)	78.9 (78.0, 79.9)	78.8 (77.9, 79.8)	0.5 (−1.4, 2.3)	−0.1 (−2.0, 1.9)	0.6 (−1.3, 2.4)
Education						
Less than high school	75.9 (75.5, 76.4)	76.8 (76.4, 77.3)	77.2 (76.7, 77.6)	1.2 (−0.1, 2.5)	0.3 (−1.0, 1.6)	0.9 (−0.4, 2.2)
High school graduate	78.2 (78.0, 78.5)	78.7 (78.4, 78.9)	78.6 (78.4, 78.9)	0.4 (−0.6, 1.4)	−0.1 (−1.1, 0.9)	0.5 (−0.5, 1.5)
Some college	78.5 (78.3, 78.8)	79.3 (79.0, 79.6)	78.9 (78.6, 79.2)	0.4 (−0.6, 1.4)	−0.4 (−1.4, 0.6)	0.8 (−0.2, 1.8)
College graduate	77.3 (77.1, 77.4)	77.8 (77.6, 78.0)	77.3 (77.1, 77.5)	0.0 (−0.8, 0.9)	−0.5 (−1.3, 0.4)	0.5 (−0.4, 1.4)
Marital status						
Married/unmarried couple	78.7 (78.5, 78.8)	79.5 (79.4, 79.7)	79.2 (79.0, 79.3)	0.5 (−0.3, 1.2)	−0.3 (−1.1, 0.4)	0.8 (0.1, 1.6)
Divorced or separated	78.0 (77.7, 78.3)	79.1 (78.8, 79.5)	78.5 (78.2, 78.9)	0.5 (−0.6, 1.6)	−0.6 (−1.7, 0.6)	1.1 (0.0, 2.2)
Widowed	71.2 (70.9, 71.4)	72.4 (72.1, 72.6)	71.3 (71.0, 71.5)	0.1 (−0.9, 1.1)	−1.1 (−2.1, −0.1)	1.2 (0.2, 2.2)
Never married	76.6 (76.2, 77.0)	76.0 (75.6, 76.5)	76.5 (76.1, 76.9)	0.0 (−1.3, 1.2)	0.5 (−0.8, 1.8)	−0.5 (−1.8, 0.7)
Smoking status[d]						
Never smoked	76.5 (76.4, 76.7)	76.9 (76.7, 77.1)	76.8 (76.6, 77.0)	0.2 (−0.6, 1.1)	−0.1 (−1.0, 0.7)	0.4 (−0.4, 1.2)
Former smoker	80.8 (80.6, 81.0)	81.8 (81.6, 82.0)	81.2 (81.0, 81.4)	0.5 (−0.5, 1.4)	−0.6 (−1.5, 0.4)	1.0 (0.1, 1.9)
Current smoker	77.3 (77.1, 77.6)	78.2 (77.8, 78.5)	77.9 (77.6, 78.2)	0.6 (−0.5, 1.7)	−0.2 (−1.4, 0.9)	0.8 (−0.3, 1.9)
Previous diagnoses[e]						
Diabetes (excludes borderline cases)	88.2 (87.8, 88.6)	90.2 (89.7, 90.7)	88.0 (87.6, 88.4)	−0.2 (−1.5, 1.0)	−2.2 (−3.5, −0.9)	2.0 (0.7, 3.3)
Myocardial infarction	81.6 (81.1, 82.1)	83.4 (82.9, 84.0)	82.1 (81.6, 82.5)	0.4 (−0.9, 1.8)	−1.4 (−2.8, 0.0)	1.8 (0.4, 3.2)
Coronary heart disease or angina	82.0 (81.6, 82.5)	83.5 (83.0, 84.0)	82.3 (81.8, 82.7)	0.2 (−1.1, 1.6)	−1.2 (−2.6, 0.2)	1.5 (0.1, 2.8)
Stroke	77.8 (77.3, 78.4)	79.6 (79.0, 80.3)	78.2 (77.6, 78.8)	0.4 (−1.1, 1.9)	−1.4 (−3.0, 0.1)	1.8 (0.3, 3.3)
Asthma (excludes resolved cases)	79.8 (79.3, 80.3)	80.1 (79.5, 80.6)	79.8 (79.4, 80.3)	0.1 (−1.3, 1.4)	−0.2 (−1.6, 1.2)	0.3 (−1.1, 1.7)
Other health-related characteristics						
Reports ≥14 days per month that mental health is "not good"[f]	79.0 (78.6, 79.4)	80.1 (79.7, 80.6)	80.0 (79.5, 80.4)	1.0 (−0.3, 2.3)	−0.2 (−1.5, 1.2)	1.1 (−0.2, 2.5)
Reports ≥14 days per month with insufficient rest or sleep[g]	79.2 (79.0, 79.5)	79.5 (79.2, 79.7)	79.4 (79.1, 79.7)	0.2 (−0.8, 1.2)	−0.1 (−1.1, 1.0)	0.2 (−0.8, 1.2)
Lacks health care coverage[h]	77.4 (77.0, 77.8)	78.4 (77.9, 78.8)	78.5 (78.1, 79.0)	1.1 (−0.1, 2.4)	0.2 (−1.1, 1.5)	1.0 (−0.3, 2.2)

[a] Geometric mean.

[b] Prior weight in 2008 was captured on the 2009 BRFSS survey, in response to the question "How much did you weigh a year ago? [If you were pregnant a year ago, how much did you weigh before your pregnancy?]".

[c] Calculated weight change is defined as the difference between the geometric mean weight in 2009 for each category and the geometric mean weight in 2008 for each category, expressed in kilograms.

[d] Respondents were considered to be current smokers if they reported smoking at least 100 cigarettes in their lifetime and currently smoked "every day" or "some days".

[e] The assessment of several chronic disease conditions was based on reported diagnoses made by "a doctor, nurse, or other health professional". Women diagnosed with diabetes only during pregnancy were considered not to have had this condition.

[f] Respondents classified into two groups based on their response to the question "Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?": infrequent poor mental health (0–13 days), and frequent poor mental health (≥14 days). This dichotomy has been used in previous research, with the term "frequent" representing the respondent's status for a substantial portion of the month (Strine et al., 2005).

[g] Respondents were classified into two groups based on their response to the question "During the past 30 days, for about how many days have you felt you did not get enough rest or sleep?": infrequent sleep insufficiency (0–13 days), and frequent sleep insufficiency (≥14 days).

[h] Health care coverage was assessed by asking "Do you have any kind of health care coverage, including health insurance, prepaid plans such as HMOs, or government plans such as Medicare?".

period (Table 2 and Table A.2). The discrepancies between the calculated and reported changes in body weight and obesity status were somewhat larger for men than women. The obesity prevalence among men crept up 0.3% between 2008 and 2009, despite reports of weight loss that, if realized, would have resulted in a decline in prevalence of 2.0%. Among women, obesity prevalence increased 0.5% between 2008 and 2009, despite reported weight losses that would have translated to a decline of 0.9%. Thus, self-reported changes in body weight corresponded to a 2.3 percentage point underestimation of the observed increase in obesity prevalence among men, and a 1.4 percentage point underestimation of the observed increase in obesity prevalence among women. The extent to which survey respondents overestimated their weight losses, and underestimated their weight gains also differed by state (Fig. 1), with few regional patterns detected (Fig. 2). With few exceptions, US adults provided higher estimates of their 2008 body weight when asked to recall it (Figure A.2). Current body weight was not related to the extent of the discrepancies between observed and reported changes in body weight (Fig. 3).

Intentional and unintentional changes in body weight

While a substantial fraction of the population reported losing weight between 2008 and 2009 (25.8%), an equally large proportion acknowledged gaining weight (26.8%). Among those who acknowledged gaining weight between 2008 and 2009, the majority (83.6%) reported that their weight gain was unintentional, and nearly half (47.5%) indicated that they had gained at least 10 lb. In comparison, among those who reported losing weight, a lower proportion (65.5%) reported that the loss was intentional, and 60.6% said they had lost at least 10 lb. The prevalence of intentional weight loss and unintentional weight gain varied by state (Figure A.3). Georgia had the highest percentage of male respondents with a self-reported intentional weight loss of 10 lb or more in the previous year (15.4%) compared to a low 8.0% in Tennessee (Table A.3). Alaska had the highest percentage of female respondents with a self-reported intentional weight loss of 10 lb or more in the previous year (13.9%) compared to a low 8.7% in Hawaii. On the other hand, Mississippi had the highest percentage of male respondents acknowledging an unintentional weight gain of 10 lb or more during the prior year (12.0%) compared to a low 6.9% in Vermont. Finally, Mississippi had the highest percentage, by a large margin, of female respondents acknowledging an unintentional weight gain of 10 lb or more (18.4%) compared to a low 7.5% in Connecticut.

### Characteristics associated with reported changes in body weight

The odds of weight gain were substantially higher for men and women under the age of 40, those identifying as black, Native American, or Hispanic, current and former smokers, those consuming less than five servings of fruits and vegetables per day, those reporting no physical activity, those with diagnosed chronic diseases, frequent poor mental health, and insufficient sleep, and those lacking health care coverage (Table A.4). The odds of reporting an intentional weight loss of at least 10 lb between 2008 and 2009 increased dramatically for those with higher BMI in 2008, at the beginning of the interval. For example, compared to normal weight individuals (BMI 18.5 to <25.0), the adjusted odds ratio for reporting an intentional weight loss for overweight adults (BMI 25.0 to <30.0) was 7.5 (95% confidence interval [CI]: 6.7, 8.4), compared to 47.5 (95% CI: 41.8, 54.0) for those considered class 3 obese (BMI ≥40.0). Prior BMI was less strongly associated with unintentional weight gains, compared to intentional weight losses. Compared to those who reported normal weight, those who were underweight (BMI <18.5) at the start of the interval were most likely to report unintentionally gaining at least 10 lb (aOR 1.3; 95% CI: 1.1, 1.6) and those who were considered class 3 obese (BMI ≥40.0) were the least likely to report unintentionally gaining 10 lb (aOR 0.7; 95% CI: 0.6, 0.8). However, the magnitudes of these associations were modest relative to the associations between prior BMI and unintentional weight gain, summarized above. In fact, among men, the odds of weight gain among those who were overweight or obese were largely similar to those who were normal weight.

Discussion

To our knowledge, this is the first study to comprehensively compare calculated and reported changes in body weight and their determinants in a large state-based surveillance system. The calculated findings are in stark contrast to reported changes, and indicate that public health and medical professionals should interpret self-reported weight changes with caution. Moreover, our results are a reminder that Americans have not come to accept the reality of their
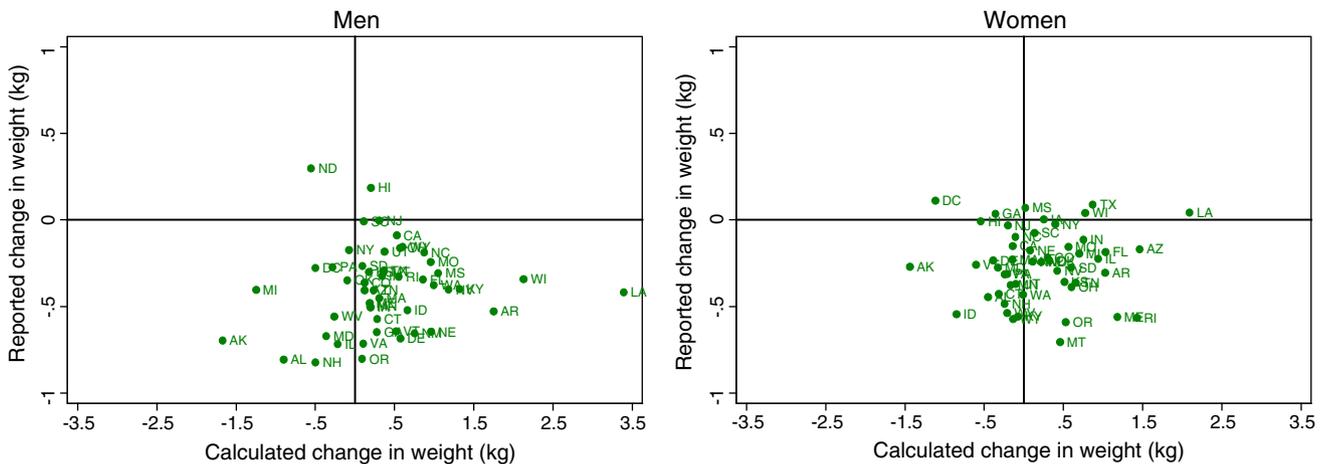
Fig. 1. Relationship between calculated and reported annual change in weight among repeated cross-sections of US adults participating in the 2008 and 2009 Behavioral Risk Factor Surveillance System (BRFSS), stratified by sex and state. Calculated change in state-level geometric mean weight between 2008 and 2009 was estimated using data from adjacent years of the BRFSS survey (e.g., for each combination of state and sex, the difference between geometric mean weight captured on the 2008 survey and geometric mean weight captured on the 2009 survey was calculated). Reported change in state-level geometric mean weight was estimated using the geometric mean values for current weight and prior weight that were captured on the 2009 BRFSS survey (e.g., for each combination of state and sex, the difference between the geometric mean prior [2008] weight and the geometric mean current [2009] weight was calculated).

Men

Women

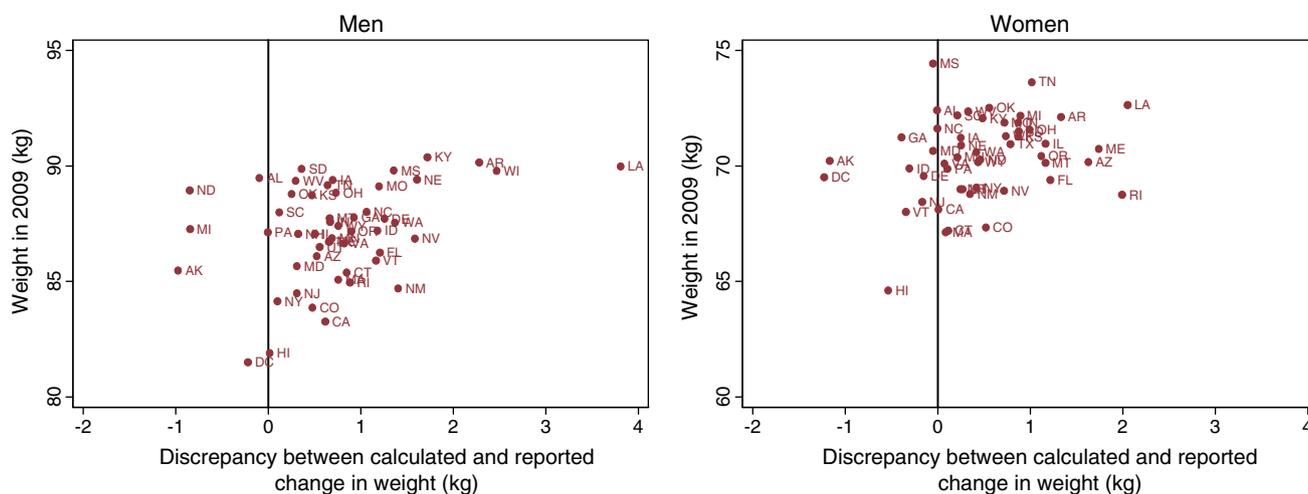☐ Not Significant
☐ 2.0 to <4.0
■ 4.0+
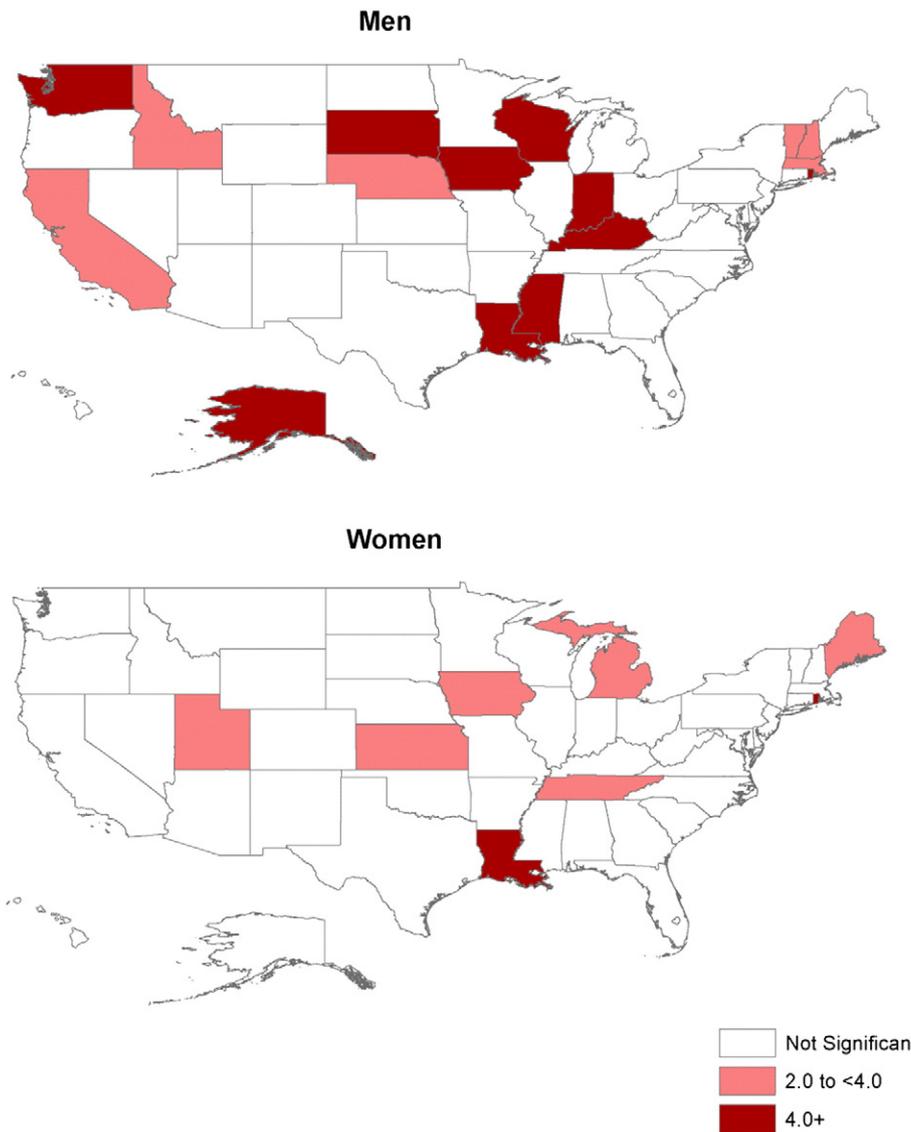
Fig. 2. Percentage point discrepancy between calculated and reported changes in obesity prevalence between 2008 and 2009 among repeated cross-sections of US adults partici-pating in the 2008 and 2009 Behavioral Risk Factor Surveillance System (BRFSS), stratified by sex and state. The discrepancy between calculated and reported change in obesity prevalence is expressed as follows: $[\Delta_{calculated} - \Delta_{reported}]$, and can be interpreted as the extent to which the calculated increase in obesity prevalence is greater (or less) than the reported change in obesity prevalence, in terms of percentage points. The calculated annual change in state-level obesity prevalence between 2008 and 2009 was estimated from adjacent years of the BRFSS survey (e.g., for each combination of state and sex, the difference between the estimated obesity prevalence calculated from height and weight data captured on the 2008 survey and the estimated obesity prevalence calculated from height and weight data captured on the 2009 survey was calculated). The reported annual change in state-level obesity prevalence was computed using the estimated obesity prevalences calculated using the current weight and prior weight data that were captured on the 2009 BRFSS survey (e.g., for each combination of state and sex, the difference between the obesity prevalence based on prior [2008] weight and the obesity prevalence based on current [2009] weight was calculated.

weight changes and hence may not be motivated to engage in behav-iors leading to healthy weight goals. Indeed, if a majority of over-weight adults in the United States believe that they are losing weight, and convey their success stories to clinicians and public health authorities, the pressure on all of us to deal with the burden of obesity is reduced.

Our study has some limitations. BRFSS is based on self-reported data, and it is widely accepted that self-reported height and weight are subject to measurement error (Gorber et al., 2007), with individ-uals tending to underestimate their weight and overestimate their height. In fact, the NHANES data showed that obesity based on mea-sured weight and height was even higher in 2008 (32.8% among men and 35.5% among women) (Flegal et al., 2010). Variation in the extent of the discrepancies between self-reported and measured height or weight by age, race/ethnicity, and sex has been noted

(Gillum and Sempos, 2005; Johnson et al., 2009; Stommel and Schoenborn, 2009). Nonetheless, self-reported height and weight are commonly used for surveillance efforts, and even these imperfect measures are strongly associated with morbidity and mortality (Gorber et al., 2007). Moreover, the trends we describe when making comparisons across the independent samples of respondents in 2008 and 2009 are valid, given that BRFSS relies on the same methodology from year to year. Additionally, BRFSS is a telephone survey (including landline and cellular respondents) and may have excluded individuals without a telephone. However, when compared to other household surveys, BRFSS data are valid and reliable (Fahimi et al., 2008).

Our results call for increased efforts to address the barriers to weight loss which prevent individuals and communities from achiev-ing healthy weight goals. Clearly, the first barrier is self-imposed. If Americans do not accept that they are gaining weight, they will be

Fig. 3. Relationship between current body weight and the discrepancy between calculated and reported annual change in weight among repeated cross-sections of US adults participating in the 2008 and 2009 Behavioral Risk Factor Surveillance System (BRFSS), stratified by sex and state. The discrepancy between calculated and reported change in weight is expressed as follows: $[\Delta_{calculated} - \Delta_{reported}]$, and can be interpreted as the extent to which the calculated change in weight is greater (or less) than the reported change in weight, in kilograms. The calculated annual change in state-level geometric mean weight between 2008 and 2009 was estimated using data from adjacent years of the BRFSS survey (e.g., for each combination of state and sex, the difference between geometric mean weight captured on the 2008 survey and geometric mean weight captured on the 2009 survey was calculated). The reported annual change in state-level geometric mean weight was estimated using the geometric mean values for current weight and prior weight that were captured on the 2009 BRFSS survey (e.g., for each combination of state and sex, the difference between the geometric mean prior [2008] weight and the geometric mean current [2009] weight was calculated).

less likely to seek medical or public health advice about obesity prevention and control (Duncan et al., 2011). In the US, we have experience implementing successful interventions for public health threats such as alcoholism, tobacco use, and drug addiction. At the forefront of these strategies were efforts, implemented in both clinical settings and in our communities, to help individuals acknowledge that they have a problem. We have not invested in such a strategy for obesity prevention and control.

Our study should be viewed as a wake-up call for change in the way that we, medical and public health professionals, have dealt with the obesity epidemic. For the past 20 years, we have focused on disseminating information about what overweight and obese individuals should do to lose weight, and what those of a healthy weight should do to maintain their healthy weight status. These messages are instrumental and have been of great help to many in our communities. Unfortunately, a substantial proportion of the target audience has ignored these messages, believing them to be irrelevant, as so many Americans have not yet accepted the reality of their weight gain.

While the focus of this research has been, by design, the misperception of weight change by individuals and the potential contribution of this phenomenon to the spreading obesity epidemic, it is widely accepted that environmental determinants also play a major role in human health, especially with respect to obesity prevention and control (Swinburn et al., 2011). Indeed, a shift from primarily educational efforts directed at individuals to community-based efforts is already underway, with much work being done to combat this public health emergency through policy and systems change, including the Communities Putting Prevention to Work Initiative sponsored by the US Centers for Disease Control and Prevention (Bunnell et al., 2012), and numerous other state and local campaigns. It is clear that a multipronged approach that tackles both individual and environmental determinants of obesity is warranted. As part of this effort, we should re-visit our messaging about weight change and weight control. We need to help Americans accept the fact that they are gaining weight. To those who do, we have a lot to offer to help them achieve their goals. Unfortunately, with relatively few policies and regulations in place as-of-yet to address the underlying social, cultural, and environmental determinants of health and health disparities, little can be done to help those who are in denial about their weight gain.

References

Bish, C., Blanck, H., Serdula, M., Marcus, M., Kohl III, H., Khan, L., 2005. Diet and physical activity behaviors among Americans trying to lose weight: 2000 Behavioral Risk Factor Surveillance System. Obes. Res. 13, 596–607.

Bunnell, R., O'Neil, D., Soler, R., et al., 2012. Fifty communities putting prevention to work: accelerating chronic disease prevention through policy, systems and environmental change. J. Community Health, http://dx.doi.org/10.1007/s10900-012-9542-3 (Epub ahead of print).

Duncan, D., Wolin, K., Scharoun-Lee, M., Ding, E., Warner, E., Bennett, G., 2011. Does perception equal reality? Weight misperception in relation to weight-related attitudes and behaviors among overweight and obese US adults. Int. J. Behav. Nutr. Phys. Act. 8, 1–9.

Fahimi, M., Link, M., Schwartz, D., Levy, P., Mokdad, A., 2008. Tracking chronic disease and risk behavior prevalence as survey participation declines: statistics from the Behavioral Risk Factor Surveillance System and other national surveys. Prev. Chronic Dis. 5, A80.

Finkelstein, E., Trogdon, J., Brown, D., Allaire, B., Dellea, P., Kamal-Bahl, S., 2008. The lifetime medical cost burden of overweight and obesity: implications for obesity prevention. Obesity 16, 1843–1848.

Flegal, K., Carroll, M., Ogden, C., Curtin, L., 2010. Prevalence and trends in obesity among US adults, 1999–2008. J. Am. Med. Assoc. 303, 235–241.

Gillum, R., Sempos, C., 2005. Ethnic variation in validity of classification of overweight and obesity using self-reported weight and height in American women and men: the Third National Health and Nutrition Examination Survey. Nutr. J. 4, 27.

Gorber, S., Tremblay, M., Moher, D., Gorber, B., 2007. A comparison of direct vs. self-report measures for assessing height, weight and body mass index: a systematic review. Obes. Rev. 8, 307–326.

Johnson, W., Bouchard, C., Newton Jr., R., Ryan, D., Katzmarzyk, P., 2009. Ethnic differences in self-reported and measured obesity. Obesity (Silver Spring) 17, 571–577.

Mokdad, A., 2009. The Behavioral Risk Factor Surveillance System: past, present and future. Annu. Rev. Public Health 30, 43–54.

Mokdad, A., Stroup, D., Giles, W., 2003. Public health surveillance for behavioral risk factors in a changing environment: recommendations from the Behavioral Risk Factor Surveillance Team. MMWR Recomm. Rep. 52, 1–12.

Ogden, C., Carroll, M., Kit, B., Flegal, K., 2012. Prevalence of Obesity in the United States, 2009–2010 (NCHS Data Brief, No. 82). National Center for Health Statistics, Hyattsville, MD.

Serdula, M., Mokdad, A., Williamson, D., Galuska, D., Mendlein, J., Heath, G., 1999. Prevalence of attempting weight loss and strategies for controlling weight. J. Am. Med. Assoc. 282, 1353–1358.

Stommel, M., Schoenborn, C., 2009. Accuracy and usefulness of BMI measures based on self-reported weight and height: findings from the NHANES & NHIS 2001–2006. BMC Public Health 9, 421.

Strine, T., Okoro, C., Balluz, L., Mokdad, A., 2005. Health-related quality of life and health risk behaviors among smokers. Am. J. Prev. Med. 28, 182–187.

Swinburn, B., Sacks, G., Hall, K., et al., 2011. The global obesity pandemic: shaped by global drivers and local environments. Lancet 378, 804–814.

US Centers for Disease Control, Prevention (CDC), 2008a. National Health and Nutrition Examination Survey Questionnaires, Datasets, and Related Documentation: NHANES 2007–2008. Retrieved from http://www.cdc.gov/nchs/nhanes/nhanes2007-2008/nhanes07_08.htm.

US Centers for Disease Control, Prevention (CDC), 2008b. BRFSS 2008 Summary Data Quality Report. Retrieved from http://www.cdc.gov/brfss/technical_infodata/quality.htm.

US Centers for Disease Control, Prevention (CDC), 2009. BRFSS 2009 Summary Data Quality Report. Retrieved from http://www.cdc.gov/brfss/technical_infodata/quality.htm.

US Centers for Disease Control and Prevention (CDC), 2010. Vital signs: state-specific obesity prevalence among adults — United States, 2009. MMWR Morb. Mortal. Wkly Rep. 59, 951–955.

US Centers for Disease Control, Prevention (CDC), 2010. National Health and Nutrition Examination Survey Questionnaires, Datasets, and Related Documentation: NHANES 2009–2010. Retrieved from http://www.cdc.gov/nchs/nhanes/nhanes2009-2010/nhanes09_10.htm.

US Department of Health and Human Services, 2001. The Surgeon General's Call to Action to Prevent and Decrease Obesity. US Department of Health and Human Services, US Public Health Service, Office of the Surgeon General, Rockville, MD. Retrieved from http://www.surgeongeneral.gov/topics/obesity.