

SUPPLEMENTAL INFORMATION

Comparisons of self-reported and measured height and weight, BMI and obesity prevalence from national surveys: 1999-2016

Katherine M. Flegal
Cynthia L. Ogden
Cheryl Fryar
Joseph Afful
Richard Klein
David T. Huang

Table S1: Sample sizes by survey year, adults, 20 years and older, 1999-2016

Table S2: Questions used to ascertain self-reported weight and height in the National Health Interview Survey, the Behavioral Risk Factor Surveillance System and the National Health and Nutrition Examination Survey

Table S3: Mean differences (cm) between self-reported and measured heights by survey year and age group for men and women: National Health and Nutrition Examination Survey, 1999-2016

Table S4: Mean differences (kg) between self-reported and measured weights by survey year, age group and BMI category for men and women: National Health and Nutrition Examination Survey, 1999-2016

Table S5: Mean differences between self-reported and measured body mass index by survey year, age group and BMI category for men and women: National Health and Nutrition Examination Survey, 1999-2016

Table S6: Mean differences in prevalence (%) of obesity (BMI ≥ 30) calculated from self-reported minus measured data by survey year for men and women: National Health and Nutrition Examination Survey, 1999-2016

Table S7: Beta coefficients from linear regression models of differences (self-reported minus measured data)

Table S8: Examples from the NHANES data of effects on BMI of weight and height misreporting

Table S1: Sample sizes by survey year, adults, 20 years and older, 1999-2016

Survey year	NHANES			NHIS	BRFSS
	Self-reported	Measured	Both		
1999-2000	4,399	4,117	3,958	58,446	317,930
2001-2002	4,940	4,413	4,300	59,062	422,753
2003-2004	4,674	4,431	4,313	57,164	524,931
2005-2006	4,458	4,356	4,193	51,188	659,950
2007-2008	5,652	5,550	5,345	41,494	788,141
2009-2010	5,924	5,926	5,713	51,100	824,951
2011-2012	5,340	5,181	5,039	63,103	911,368
2013-2014	5,565	5,455	5,325	66,653	899,022
2015-2016	5,428	5,337	5,134	62,410	851,745
Total	46,380	44,766	43,320	510,620	6,200,791

NHANES: National Health and Nutrition Examination Survey

NHIS: National Health Interview Survey

BRFSS: Behavioral Risk Factor Surveillance System, land-line and cell-phone data for 2011-2016; Age 18+ for 2013-2016.

Table S2: Questions used to ascertain self-reported weight and height in the National Health Interview Survey (NHIS), the Behavioral Risk Factor Surveillance System (BRFSS) and the National Health and Nutrition Examination Survey (NHANES)

Survey	Self-reported weight	Self-reported height
NHIS	How much do you weigh without shoes?	How tall are you without shoes?
BRFSS	About how much do you weigh without shoes?	About how tall are you without shoes?
NHANES	How much do you weigh without clothes or shoes?	How tall are you without shoes?

Table S3: Mean differences (cm) between self-reported and measured heights by survey year and age group for men and women: National Health and Nutrition Examination Survey, 1999-2016

Survey year	All ages	Male		All ages	Female	
		<60 years	≥60 years		<60 years	≥60 years
1999-2000	1.07	0.77	2.25	0.63	0.22	1.92
2001-2002	1.06	0.82	2.19	0.59	0.26	1.81
2003-2004	1.28	1.01	2.34	0.75	0.41	1.74
2005-2006	1.35	1.00	2.67	0.76	0.48	1.58
2007-2008	1.41	1.10	2.57	0.85	0.52	1.81
2009-2010	1.34	1.02	2.40	1.00	0.61	2.09
2011-2012	1.31	1.01	2.27	0.99	0.68	1.83
2013-2014	1.47	1.13	2.46	0.97	0.57	1.96
2015-2016	1.81	1.45	2.82	1.20	0.77	2.21
All years	1.36	1.04	2.46	0.87	0.51	1.90

NOTE: Difference calculated as self-report minus measured value

Table S4: Mean differences (kg) between self-reported and measured weights by survey year, age group and BMI category for men and women: National Health and Nutrition Examination Survey, 1999-2016

Survey year	All ages			<60 years		≥ 60 years	
	All	BMI <30	BMI ≥ 30	BMI <30	BMI ≥ 30	BMI <30	BMI ≥ 30
Male							
1999-2000	0.15	0.74	-1.44	0.76	-1.61	0.68	-0.92
2001-2002	0.20	0.74	-1.20	0.72	-1.32	0.86	-0.68
2003-2004	0.18	0.83	-1.25	0.79	-1.33	0.99	-0.94
2005-2006	-0.04	0.86	-1.82	0.93	-2.05	0.61	-0.91
2007-2008	0.01	0.74	-1.51	0.71	-1.61	0.85	-1.20
2009-2010	-0.25	0.46	-1.52	0.42	-1.64	0.59	-1.13
2011-2012	-0.02	0.55	-1.15	0.43	-1.33	0.91	-0.53
2013-2014	-0.30	0.62	-2.00	0.60	-2.23	0.69	-1.38
2015-2016	-0.52	0.28	-1.83	0.12	-2.07	0.73	-1.18
All years	-0.08	0.65	-1.55	0.61	-1.71	0.76	-1.03
Female							
1999-2000	-1.55	-0.80	-3.07	-0.99	-3.20	-0.18	-2.69
2001-2002	-1.47	-0.67	-3.11	-0.77	-3.31	-0.28	-2.43
2003-2004	-1.17	-0.39	-2.75	-0.46	-3.00	-0.20	-1.95
2005-2006	-1.33	-0.59	-2.67	-0.67	-3.05	-0.38	-1.51
2007-2008	-1.37	-0.58	-2.84	-0.67	-3.14	-0.35	-1.90
2009-2010	-1.27	-0.52	-2.62	-0.62	-2.82	-0.19	-2.19
2011-2012	-1.35	-0.72	-2.47	-0.87	-2.69	-0.31	-1.93
2013-2014	-1.38	-0.68	-2.44	-0.76	-2.68	-0.48	-1.84
2015-2016	-1.46	-0.60	-2.68	-0.72	-3.01	-0.33	-1.94
All years	-1.37	-0.62	-2.72	-0.72	-2.97	-0.31	-2.01

NOTE: Difference calculated as self-report minus measured value

Table S5: Mean differences between self-reported and measured body mass index by survey year, age group and BMI category for men and women: National Health and Nutrition Examination Survey, 1999-2016

Survey year	All ages			<60 years		≥ 60 years	
	All	BMI <30	BMI ≥ 30	BMI <30	BMI ≥ 30	BMI <30	BMI ≥ 30
Male							
1999-2000	-0.22	0.06	-0.97	0.17	-0.92	-0.40	-1.13
2001-2002	-0.24	-0.01	-0.85	0.06	-0.82	-0.36	-1.00
2003-2004	-0.34	-0.05	-0.99	0.02	-0.92	-0.31	-1.28
2005-2006	-0.43	-0.10	-1.09	0.03	-1.04	-0.56	-1.31
2007-2008	-0.43	-0.11	-1.11	-0.02	-1.03	-0.45	-1.36
2009-2010	-0.50	-0.15	-1.13	-0.07	-1.04	-0.43	-1.39
2011-2012	-0.42	-0.12	-1.00	-0.07	-0.94	-0.30	-1.17
2013-2014	-0.56	-0.15	-1.31	-0.06	-1.26	-0.41	-1.48
2015-2016	-0.74	-0.36	-1.35	-0.30	-1.31	-0.54	-1.46
All years	-0.44	-0.11	-1.11	-0.02	-1.05	-0.42	-1.32
Female							
1999-2000	-0.74	-0.34	-1.56	-0.27	-1.45	-0.58	-1.89
2001-2002	-0.75	-0.37	-1.51	-0.30	-1.47	-0.64	-1.65
2003-2004	-0.68	-0.35	-1.37	-0.25	-1.38	-0.63	-1.35
2005-2006	-0.76	-0.38	-1.45	-0.31	-1.48	-0.55	-1.38
2007-2008	-0.79	-0.42	-1.50	-0.35	-1.45	-0.60	-1.63
2009-2010	-0.83	-0.42	-1.57	-0.34	-1.46	-0.66	-1.81
2011-2012	-0.84	-0.48	-1.48	-0.43	-1.44	-0.62	-1.58
2013-2014	-0.88	-0.47	-1.49	-0.36	-1.45	-0.74	-1.61
2015-2016	-0.97	-0.55	-1.58	-0.45	-1.52	-0.78	-1.70
All years	-0.81	-0.42	-1.50	-0.34	-1.46	-0.65	-1.63

NOTE: Difference calculated as self-report minus measured value

Table S6: Mean differences in prevalence (%) of obesity (BMI ≥ 30) calculated from self-reported minus measured data by survey year and age group for men and women: National Health and Nutrition Examination Survey, 1999-2016

Survey Year	Male			Female		
	All ages	<60 years	60+ years	All ages	<60 years	60+ years
1999-2000	-1.65	-0.72	-5.35	-4.00	-2.51	-8.80
2001-2002	-2.00	-1.46	-4.59	-4.37	-3.65	-6.98
2003-2004	-1.99	-2.05	-1.76	-3.00	-2.56	-4.32
2005-2006	-2.59	-2.31	-3.61	-4.52	-4.19	-5.48
2007-2008	-2.88	-2.17	-5.51	-4.30	-3.55	-6.49
2009-2010	-4.27	-3.77	-5.95	-3.54	-2.30	-6.91
2011-2012	-3.89	-3.09	-6.41	-4.01	-3.51	-5.33
2013-2014	-3.62	-3.04	-5.37	-4.77	-3.73	-7.37
2015-2016	-4.49	-4.12	-5.44	-5.20	-4.53	-6.78
All years	-3.11	-2.56	-5.01	-4.21	-3.34	-6.47

NOTE: Difference calculated as self-report minus measured value

Table S7: Beta coefficients for linear regression models of differences (self-reported minus measured data)

	Weight		Height		BMI		Obesity	
	Men	Women	Men	Women	Men	Women	Men	Women
Intercept	-1.6111	-2.272	4.4295	5.8641	-1.5953	-1.7819	-2.4801	-2.3054
Survey cycle								
1999-2000	0.4552	-0.2278	-0.6588	-0.4861	0.3944	0.1253	-0.1701	-0.1130
2001-2002	0.5350	-0.1338	-0.6191	-0.4881	0.3636	0.1122	-0.0917	0.0429
2003-2004	0.5719	0.1452	-0.4433	-0.3758	0.3071	0.1848	-0.0380	-0.1966
2005-2006	0.4055	0.0362	-0.3807	-0.3703	0.2455	0.1387	-0.1087	-0.1345
2007-2008	0.4261	-0.0180	-0.3250	-0.2790	0.2315	0.0990	-0.0122	-0.1300
2009-2010	0.2331	0.0951	-0.4222	-0.1491	0.2024	0.0748	0.0923	-0.2744
2011-2012	0.4116	0.0118	-0.4676	-0.1675	0.2691	0.0683	0.0172	-0.1554
2013-2014	0.1632	0.0583	-0.3257	-0.2161	0.1471	0.0748	-0.0965	-0.0619
2015-2016	0	0	0	0	0	0	0	0
Age category								
<60 yrs	-0.3565	-0.6114	-1.3778	-1.2930	0.3405	0.2563	-0.0295	-0.3769
60+ yrs	0	0	0	0	0	0	0	0
Obesity status								
BMI<30	2.1818	2.1100	NA*	NA	0.9795	1.0752	NA	NA
BMI>=30	0	0	NA	NA	0	0	NA	NA
Standing Height (cm)	NA	NA	-0.0091	-0.0232	NA	NA	NA	NA

* NA = Not applicable

Table S8: Examples from the NHANES data of effects on BMI of weight and height misreporting

Examples					
Reporting of weight and height relative to measured values	Effect on BMI relative to measured values	Weight difference (kg)	Height difference (cm)	BMI calculated from measured values	BMI calculated from self-reported values
Weight and height both over-reported	Underestimated	0.2	2.4	25	24.4
Weight and height both over-reported	Overestimated	3.3	1.1	25	25.8
Weight over-reported, height under-reported	Overestimated	3.3	-1.0	25	26.5
Weight under-reported, height over-reported	Underestimated	-3.3	1.1	25	23.6
Weight and height both under-reported	Overestimated	-0.5	-3.7	25	25.9
Weight and height both under-reported	Underestimated	-3.8	-1.4	25	23.9