
Self-Perception of Weight Appropriateness in the United States

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Background: The self-perception of weight appropriateness is an important component of eating and weight-loss behaviors. Self-perceived weight status, however, is not fully explained by objective weight status.

Objective: To examine the influence of sociodemographic factors on Americans' perceptions of their weight appropriateness, controlling for objective weight status.

Design: In the Third National Health and Nutrition Examination Survey, respondents were asked, "Do you consider yourself now to be overweight, underweight, or about the right weight?" Responses to this question were compared with how respondents ($n=15,593$) would be classified by medical standards given their body mass index (BMI). A proportional odds logistic regression model was used to assess the predictive effects of various sociodemographic factors on weight self-perception.

Results: Overall, 27.5% of women and 29.8% of men misclassified their own weight status by medical standards. Of particular note, 38.3% of *normal weight women* thought they were "overweight," while 32.8% of *overweight men* thought they were "about the right weight" or "underweight." Multivariate regression analysis revealed that, controlling for BMI, numerous factors—including gender, age, marital status, race, income, and education—were independently associated with the self-evaluation of weight status.

Conclusions: The self-perceived appropriateness of weight status varies in highly predictable ways among population-level subgroups, likely reflecting differences in the normative evaluation of bodily weight standards. Such evaluations may assist in the explanation of discrepancies between clinical recommendations based on weight status and actual weight control behaviors, discrepancies that are socially patterned along some of the same subgroupings. (Am J Prev Med 2003;24(4):332–339) © 2003 American Journal of Preventive Medicine

Introduction

Obesity is now described as epidemic and considered to be a major public health concern in the United States. Recent studies show that the prevalence of obesity has increased from 12.0% to 19.8% over the last decade,^{1,2} and that over half the adult population is now overweight or obese.³ These changes have occurred despite national public health directives to reduce the prevalence of overweight persons,⁴ as well as dominant cultural ideals favoring

increasingly slim and fit physiques. This disjuncture between population-level weight gains and medical and cultural injunctions to lose weight reflects the difficulties of successful weight loss or weight maintenance, but it may also reflect a variation in body standards. For some, it may simply be the case that self-perception of weight appropriateness differs from both public health and normative cultural standards. Previous studies note that self-perceived weight status is inadequately explained by actual body size.^{5–9}

Moreover, previous work indicates that there is a strong association between self-perceived weight status and weight control behavior, often independently of objective weight status.^{8–12} Lastly, studies on weight control practices in the United States have shown that a sizable fraction of clinically normal-weight persons are attempting or desire weight loss, while an equally notable fraction of overweight persons are not.^{6,7,9,11–16} Self-perceived weight appropriateness may therefore be an important point of focus for the design and implementation of clinical and public health initiatives. Self-evaluation of weight status, however, is not simply

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an autonomous, individual response; it is likely subject to social patterning. Attitudes toward body size and preferences for particular levels of fatness are mediated by local social and cultural factors, and perceptions may vary in predictable ways among population subgroups.

In this study, a nationally representative sample was used to investigate the influence of various sociodemographic characteristics on the self-perception of weight appropriateness in the United States. Data from the Third National Health and Nutrition Examination Survey (NHANES III), conducted in 1988–1994, were used. Work in this area has typically been limited by (1) a focus restricted predominately to the effects of race/ethnicity and gender; (2) failure to control for objective weight status; and/or (3) a sample restricted to particular regions or groups (typically women, students, or dieters) that are not representative of the general population.^{5,7,9–11,17–26} This work improves on previous studies by overcoming each of these limitations. Here, a broad range of sociodemographic factors was evaluated with adjustments for body mass index (BMI), and a large national sample spanning the adult age and weight spectrum was used. In previous work, we studied the gap between self-evaluations of weight status and classification by medical standards.²⁷ In this study, the focus was specifically on the perception of weight appropriateness itself. Additionally, previous work was improved by using *measured* rather than self-reported height and weight, eliminating any potential bias due to under- or over-reporting at BMI extremes.^{28,29}

Methods

Study Population

NHANES III was conducted by the National Center of Health Statistics from 1988 to 1994 and designed to obtain nationally representative data on the health and nutritional status of the U.S. population through in-person home interviews and direct physical examinations.³⁰ African Americans, Mexican Americans, and the elderly were oversampled. Measured height and weight, used to calculate body mass index (BMI; defined as weight [kg] divided by square of height [m]), were included among the exam components collected through the use of a mobile examination center (MEC). A home examination was an option for elderly persons who could not visit the MEC. The survey also collected data on respondents' self-perceived weight status and standard demographic information.

A total of 16,742 adults aged ≥ 20 years were physically examined in NHANES III, excluding women who were pregnant at the time of the survey. Exclusions included 12 ($<0.1\%$) persons who were missing data on the self-perceived weight status question and 454 (2.7%) persons who were missing data on one or more of the independent variables of interest. An additional 683 (4.2%) persons were then excluded because their recorded BMI was based on a substituted (nonmeasured) value for height or weight (such as the self-reported value). Therefore, the working sample size was 15,593, which included 8165 women and 7428 men.

Table 1. Sample characteristics^a

Variable/categories	Women (n=8165)	Men (n=7428)
Body mass index (mean)	26.4	26.6
Age (years)		
20–34	31.8%	36.5%
35–54	37.5	37.4
≥ 55	30.7	26.1
Marital status		
Formerly married	25.2%	10.5%
Never married	13.9	18.7
Married	60.9	70.8
Race/ethnicity		
Non-Hispanic black	11.4%	9.9%
Mexican American	4.5	5.5
Non-Hispanic white	76.5	77.0
Other	7.7	7.7
Income		
$\geq \$20,000$	63.6%	69.9%
$< \$20,000$	36.4	30.1
Education (years)		
≥ 13 (college or more)	39.2%	43.5%
12 (high school graduate)	36.5	31.0
1–11 (high school or less)	24.3	25.5
Region of residence		
Northeast	20.9%	20.8%
Midwest	23.6	24.3
South	34.2	34.3
West	21.2	20.7
Urbanization		
Urban	47.6%	49.1%
Rural	52.4	50.9

^aWeighted using survey sample weights.

Measures

For a measure of self-perceived weight status that we used, respondent answers were used to the following survey question: “Do you consider yourself now to be overweight, underweight, or about the right weight?” Objective weight status was based on respondent's BMI and the following cut-points for weight classification: overweight (or obese) (BMI ≥ 25); normal (BMI 18.5–24.9); and underweight (BMI < 18.5). These cut-points were selected to reflect prevailing national and international public health directives, such as those from the National Heart, Lung and Blood Institute (NHLBI), the 2000 Dietary Guidelines for Americans, and the World Health Organization (WHO).^{31–33}

With respect to self-perceived weight status (overweight, about right, underweight), our predictor variables of interest were age, marital status, race/ethnicity, income, education, region of residence, and urbanization in area of residence. All were modeled as unordered indicators to maximize model flexibility and facilitate interpretation. The categories for each of these variables are listed in Table 1. With respect to marital status, the formerly married category includes those who are widowed, divorced, or separated. With respect to urbanization, urban refers to residence in a central or fringe county of a metropolitan area with ≥ 1 million persons. The choice of covariates was guided by prior work in this area and by the fact that many of these factors are well documented to be associated with objective weight status (BMI).^{34–38} The race/ethnic variable was based on self-report during the

Table 2. Comparison of objective weight status with self-perceived weight status^{ab}

Objective status	Self-perceived status			
	Overweight % (SE)	About right % (SE)	Underweight % (SE)	Total % (SE)
Women (n=8165)				
Overweight	44.8 (1.10)	5.7 (0.28)	0.2 (0.04)	50.6 (1.11)
Normal	17.5 (0.76)	26.2 (0.85)	2.1 (0.13)	45.7 (1.06)
Underweight	<0.1 (0.01)	2.1 (0.28)	1.6 (0.22)	3.7 (0.33)
Total	62.3 (0.97)	33.9 (0.90)	3.8 (0.26)	
Men (n=7428)				
Overweight	40.1 (0.92)	19.1 (0.78)	0.5 (0.14)	59.6 (1.10)
Normal	4.1 (0.40)	29.4 (0.73)	5.7 (0.52)	39.2 (1.02)
Underweight	<0.1 (<0.01)	0.4 (0.09)	0.8 (0.15)	1.1 (0.18)
Total	44.2 (0.88)	48.9 (0.79)	6.9 (0.52)	

^aCell percentages (%) are weighted using survey sample weights, and standard errors are shown in parentheses next to each percentage estimate.

^bObjective status: overweight (body mass index [BMI]≥25.0); normal (BMI=18.5–24.9); underweight (BMI<18.5).

SE, standard error.

survey. Although race/ethnicity undoubtedly functions as a proxy for sociocultural factors here, this variable was retained and modeled to allow comparability with previous studies in the United States. Confounding of race by socioeconomic status was minimized by adjustment for income and education. Annual family income was modeled as a dichotomous variable, with a \$20,000 cut-point in order to minimize the loss of data since finer gradations (available in a different variable for income) contained missing data for over 10% of the sample. BMI was modeled as a continuous variable. BMI was also evaluated for possible nonlinear relationships with the dependent variable, but such elaboration did not meaningfully modify results; only the most parsimonious model is presented here.

Statistical Analysis

Self-perceived weight status was compared with how an individual would be classified by medical and public health standards (objective weight status based on BMI) by cross-tabulation and kappa statistics of agreement. A proportional odds ordered logistic regression model was then used to assess the predictive effects of sociodemographic variables on self-perceived weight status as an ordered, three-category response variable (underweight, about right, overweight). The data were also examined with a multinomial logistic regression model, an alternative but more complex model that allows for separate, two-category comparisons within the three self-perception categories. The additional information provided by this model did not bear any meaningful consequence with respect to the results, so the ordered model, which is more parsimonious, is presented. Lastly, the regression was stratified by gender to allow the processes by which the independent variables affect weight self-perception to vary between men and women. A nonstratified version of the model was also performed to assess the main effect of gender.

All comments on odds refer to the odds of being in a higher (heavier), rather than lower, weight self-perception category, with “overweight” as the highest (heaviest) category; estimates throughout are followed by 95% confidence intervals. Statistical analysis was performed with STATA 7.0 software (Stata Corp., College Station TX). The NHANES uses a complex, stratified, multistage, probability design; thus, sur-

vey design information was incorporated into the analyses to generate appropriate population estimates and standard errors.

Results

Objective and Subjective Body Size Assessments

Table 2 displays a cross-tabulation of objective weight status (classified according to BMI), with self-perceived weight status for each gender. With respect to self-perceived weight status, most women were in the “overweight” category (62.3%, confidence interval [CI]=60.3–64.2), while most men were in the “about the right weight” category (48.9%, CI=47.3–50.5). With respect to weight status by NHLBI/WHO guidelines, however, the majority of both women (50.6%, CI=48.4–52.9) and men (59.6%, CI=57.6–61.6) were overweight. A substantial percentage of women and men *misclassified* their own weight status relative to these medical standards: 27.5% of women (CI=25.9–29.2) and 29.8% of men (CI=28.2–31.4) (off-diagonal cells). Based on survey-weighted cell percentages, the kappa statistic (κ) was 0.48 for women and 0.45 for men, indicating, at best, moderate agreement between objective and subjective statuses.

Discrepancies of particular note include the fact that 38.3% (CI=35.6–41.0) of *normal* weight women considered themselves “overweight,” while 32.8% (CI=30.5–35.2) of *overweight* men considered themselves “about the right weight” or “underweight.” Moreover, many of those who misclassified had a BMI that deviated substantially from the NHLBI/WHO cut-points. For example, 47.6% (CI=42.9–52.4) of women who misclassified themselves as “overweight” were two or more BMI units *below* the cut-point of 25, and 44.7% (CI=40.8–48.8) of overweight men who misclassified themselves as “about the right weight” or “underweight” were two or more BMI units *above* the cut-point of 25. Lastly, the obese (BMI≥30) generally do not misclassify. A total of 95.1% of obese women (CI=94.2–

Table 3. Factors associated with self-perceived weight appropriateness^a

Variable	Women OR	95% CI	Men OR	95% CI
Body mass index	1.69**	.63–1.76	1.68**	1.59–1.77
Age (years)				
20–34	3.42**	2.73–4.27	1.41**	1.17–1.70
35–54	2.59**	2.17–3.10	1.52**	1.25–1.84
≥55	1.00	—	1.00	—
Marital status				
Formerly married	0.86	0.67–1.12	0.95	0.69–1.31
Never married	0.91	0.67–1.24	0.68**	0.54–0.86
Married	1.00	—	1.00	—
Race				
Non-Hispanic black	0.32**	0.26–0.38	0.51**	0.42–0.61
Mexican American	0.43**	0.33–0.55	0.68**	0.55–0.83
Non-Hispanic white	1.00	—	1.00	—
Other	0.65*	0.46–0.94	0.62*	0.46–0.86
Income ≥\$20,000	1.55**	1.26–1.89	1.19	0.97–1.47
Education (years)				
≥13 (college or more)	2.16**	1.65–2.81	1.70**	1.30–2.23
12 (high school graduate)	2.11**	1.74–2.55	1.21	0.97–1.51
1–11 (high school or less)	1.00	—	1.00	—
Region of residence				
Northeast	0.80	0.58–1.09	0.80	0.60–1.05
Midwest	1.14	0.85–1.51	0.93	0.72–1.20
South	1.30*	1.01–1.66	0.91	0.72–1.14
West	1.00	—	1.00	—
Urban residence	0.96	0.81–1.15	1.15	0.97–1.35

* $p < 0.05$; ** $p < 0.001$.

^aThe table shows an ordered logistic regression model of response to the question on self-perceived weight. Odds ratios refer to the odds of being in a higher (heavier) rather than lower weight-perception category, with “overweight” as the highest category. CI, confidence interval; OR, odds ratio.

95.9) and 88.1% of obese men (CI=84.2–91.1) saw themselves as “overweight.” However, since the survey question for subjective appraisal does not distinguish between overweight and obese, it is not known what portion of these persons would furthermore consider themselves “obese.”

Multivariate Regression Analysis

Table 3 displays the results of ordered logistic regression with self-perceived weight appropriateness as an ordered, three-category response variable. We emphasize that the results described below refer to effects *after controlling for BMI*, as well as for all other covariates in the model. First, and as expected, BMI itself had a large effect on weight self-perception. A one-unit increase in BMI (corresponding to an increase in weight of 3.06 kg for a person at 1.75 meters in height) was estimated to increase the odds of being in a higher (heavier) weight-perception category by more than 60% for both genders. A two-unit increase in BMI nearly tripled these odds. Aside from BMI, it was also found that older age, never being married, nonwhite race/ethnicity, higher income or education, and female gender increased the odds of being in a higher (heavier) weight-perception category. Selected odds ratios are highlighted below.

In both women and men, the young (20 to 34 years) and middle (35 to 54 years) age groups had greater

odds of placing themselves in a higher weight-perception category compared to the old (≥55 years) age group, but the magnitude of the estimate was much greater in women. For example, the young group had 3.42 times greater odds in women (CI=2.73–4.27) and 1.41 times greater odds in men (CI=1.17–1.70). Marital status had no significant effects on weight self-perception for women. For men, however, those who have never been married were 0.68 times less likely (CI=0.54–0.86) to be in a higher weight-perception category compared to the married, despite adjustment for BMI. Race/ethnicity had significant effects in both genders, with non-Hispanic blacks and Mexican Americans estimated to have substantially lower odds of being in a higher weight self-perception category relative to non-Hispanic whites. In black women, for example, these odds were 0.32 times lower (CI=0.26–0.38); and for Mexican-American women, they were 0.43 times lower (CI=0.33–0.55). Pair-wise comparisons between blacks and Mexican Americans showed that blacks had lower odds of being in a higher weight-perception category than Mexican Americans, with an estimated odds ratio of 0.73 for women (CI=0.56–0.97) and 0.75 for men (CI=0.59–0.94).

Higher income and higher education each significantly and independently increased the odds of placing oneself in a higher weight-perception category in

women. For example, having a yearly family income of \geq \$20,000 increased these odds by 55% (CI=26%–89%), while graduating from high school (HS) increased them by a factor of 2.11 (CI=1.74–2.55), compared to those who have not graduated. Trends in the same direction were noted for men, but the effect of income was only significant at the 10% level, and the difference between HS graduates and nongraduates was not significant. Men who had gone to college, however, had 1.70 times greater odds of being in a higher weight-perception category (CI=1.30–2.23) compared to those not graduating from HS, and 1.40 times greater odds compared to HS graduates (CI=1.07–1.84).

Adjusting for objective weight status and the other demographic factors, urbanization did not have significant effects on weight self-perception for either women or men, and region of residence generally did not have significant effects for men. Women residing in the South did show significantly higher odds for being in a higher weight-perception category, compared to the West, albeit with a confidence interval quite close to 1.00 at the lower bound. Lastly, a nonstratified model including a main effect for gender revealed that women, compared to men, were estimated to have 5.58 times greater odds of being in a higher weight self-perception category (CI=4.94–6.30), controlling for BMI and all the other covariates.

Discussion

Although self-perception of weight status appeared highly sensitive to small changes in BMI, a large percentage of men (29.8%) and women (27.5%) placed themselves in a weight category that is incongruent with public health classifications. Several sociodemographic factors were found to influence the self-perception of weight appropriateness after adjustment for BMI. Many studies have reported that women (including adolescents) are much more likely than men to be dissatisfied with their body image and size,^{8,11,12,17–19} a finding consistent with the notion that modern Western cultural ideals and popular media place an undue amount of pressure on women to be thin. Indeed, in this study, the majority of women viewed themselves as “overweight,” while the majority of men viewed themselves as “about the right weight.” Moreover, a substantial fraction of these women were actually in the normal weight range, while a substantial fraction of these men were actually in the overweight range. Controlling for BMI, women had over five times greater odds for viewing themselves as overweight. Moreover, the magnitude of the estimates for many of the other covariates was larger for women, indicating a probable interaction effect of gender in addition to its main effect.

Although medical categorizations apply the same BMI cut-points to each gender, men and women of a

given BMI are likely to manifest different degrees of adiposity, because men tend to have a higher muscle-to-fat ratio. This difference in adiposity, which is not accounted for by BMI, may contribute to the gender differences found in weight self-perception and misclassification. Lastly, many studies tend to emphasize women who, by medical standards, inappropriately consider themselves overweight. Such perceptions are not benign, but, as this study shows, a vast majority of these women are in the normal weight range. In terms of people who might be advised to change their weight (because they are outside of this range) it is overweight men that are most notable. Sixty percent of men were overweight, but over 30% of them did not see themselves as such. Hence, it is this group that merits considerable attention with respect to public health initiatives aimed at obesity.

Age was also important in people’s self-perception, with younger men and women more likely to judge themselves to be in a higher weight category. Given the cross-sectional nature of this data, the age effects could be secondary to a cohort effect whereby people born in different eras have different ideas regarding weight status.³⁹ However, evidence in support of a life cycle rather than cohort effect is given by a 10-year longitudinal study of eating attitudes and behaviors by Heatherton et al.⁴⁰ In this study, women experienced substantial declines in disordered eating and increased body satisfaction in the years after college, suggesting that dominant standards for body size have their primary effect on women when they are younger. We found that even the middle age group had much greater odds for feeling overweight, indicating that societal pressures to be thin may extend well into middle age and affect men as well as women. Furthermore, these results are unlikely to be driven by changes in body composition with age. Since the ratio of fat to muscle (for a given BMI) tends to increase with age, and the adjustment in this study for BMI does not account for adiposity per se, these findings are, if anything, underestimated given such changes.

Never-married men were less likely to consider themselves of a higher weight category compared to married men. Although results in the literature are mixed, some previous work has suggested that marriage, or entry into marriage, is associated with fatness and weight gain.^{34,41,42} The findings of the current study, with respect to the self-perception of weight, are not attributable solely to married men being heavier, because we controlled for BMI. Furthermore, the fact that marital status did not have significant effects among women is surprising, given that appearance and attractiveness have been noted to serve as important factors for women in marital entry and marital mobility.⁴³ If appearance were to function as such for women, it would be expected that unmarried women are more concerned with being overweight. Further investiga-

tion is required to more thoroughly delineate these relationships.

The findings with respect to race/ethnicity and self-perception are consistent with a plethora of previous reports on racial differences showing that white women and girls are more likely than those of other groups to experience body dissatisfaction in terms of feeling overweight.^{5,11,18–25} However, this analysis extends the results of previous work by investigating these relationships in both genders and controlling for BMI as well as socioeconomic factors, all of which are likely to confound the relationship between race/ethnicity and weight self-perception. It was also found that blacks and Mexican Americans—both men and women—had much lower odds of placing themselves in a higher weight-perception category when compared to whites. Thus, in the adult population, these results indicate that such race/ethnic differences, which are well documented for women, also hold for men. In this study, as well as in the host of previous studies in the United States, race/ethnicity undoubtedly functions as a proxy for sociocultural factors wherein some groups are more accepting of larger body sizes. It has been suggested that among some groups, higher weights may be culturally valued as a positive sign of health, or that overeating is less disparaged in communities where there has been a history of scarcity.^{44,45} Or, these findings may reflect the fact that people evaluate their weight status, for the most part, with reference to the weight distribution of their peer groups.²⁴

Obesity and BMI are observed to show an inverse relationship with socioeconomic status (SES) in Western societies, especially for women.³⁷ The question arises as to whether or not attitudes toward one's body weight is associated with SES as well, since such a factor may mediate the relationship between SES and actual body size. Those at a higher SES may be thinner because they can afford a healthier lifestyle, but they may also have more narrowly defined standards for acceptable body size and adjust their behavior accordingly. In this study, the independent effects of both education and income on weight perception were examined, providing an indirect assessment of bodily standards. For each gender, it was found that an increase in either income or education increased the odds of being in a higher weight-perception category. These findings suggest that SES indeed bears a relationship to self-perceived weight status and that self-evaluation may have an intermediary role in the relationship of SES to true weight status.

Lastly, these findings seem to be consistent with several demographic patterns in weight control practices. Nonoverweight persons who report attempted weight loss are more often women (than men), and overweight persons who do not report attempted weight loss are more often men.^{6,9,12–15} It has also been shown that, adjusting for objective weight classification,

weight-loss behavior is more common among whites, younger people, and those with higher education and income.^{6,11,15,25}

This study has important limitations. First, the NHANES provides a somewhat limited assessment of self-perceived weight appropriateness. We did not have access to information regarding the reference point of each respondent's assessment and did not know whether a respondent was referring to internal or external standards of judgment. For example, one can recognize that one is considered overweight by overarching social standards, yet still personally consider one's weight to be just right. Therefore, future study should obtain a more extensive and nuanced accounting of self-evaluation.

Second, BMI is only a proxy for body-fat content. It does not discriminate between the ratio of muscle versus fat mass, which people are likely to take into consideration when evaluating the appropriateness of their own weight. Thus, future work on the self-perception of weight should address degree of adiposity as well as body shape.

Third, the reported findings were based on the most recent data available for a national sample (1988–1994). It is possible that the proportions of Americans in the various categories discussed may have changed since then, particularly with respect to recent weight increases, but the overarching patterns identified are likely still significant.

Finally, this study can be interpreted in the context of a broader sociologic framework, wherein body outcomes such as weight status are conceptualized in terms of the social determinants of health. While public health models often focus on pecuniary resources and access to medical care, these findings suggest that social differences in the normative evaluation of weight status may play an equally important role. Modern U.S. society is commonly thought to have an intense preoccupation with the body, imposing rigorous standards of beauty and fitness.⁴⁶ Here it is shown that these standards are not distributed or accepted homogeneously throughout the population and that persons of comparable body size can experience highly disparate conceptions of their own weight appropriateness. Furthermore, for a large percentage of the population, these evaluations are incongruous with medical classifications.

While public health campaigns tend to stress the provision of information on diet and health risks, it is unlikely that the social appraisal of weight status can be adequately explained by an individual's stock of health knowledge. In a more sociologic framework, bodily form is not merely an issue of health; it is also an issue of social status. For example, a person's body may be used explicitly as a form of display, or signal of status, along traditional axes of social stratification such as gender, age, race, and wealth. As social status is a

matter of relative distinctions, differences in average BMI along these axes may also play an important role in the determination of what is acceptable, or not acceptable, in terms of body size. Here, how weight evaluations vary along such dimensions has been considered as an initial empirical inquiry into but one aspect of undoubtedly complex and multifarious social processes.

Given that the self-appraisal of weight status is implicated in health statuses ranging from obesity and overweight to eating disorders and weight fluctuations, the influence of social determinants on weight perception is of important clinical and public health significance. Future work directed toward a grounded theoretical and empirical specification of the macro and micro social processes involved in this determination will be relevant to any clinical or public health initiative intending to thwart the "obesity epidemic."

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