

Criteria for definition of overweight in transition: background and recommendations for the United States^{1,2}

Robert J Kuczmarski and Katherine M Flegal

ABSTRACT Overweight and obesity are leading nutrition-related disorders of clinical and public health concern. Assessment and classification of these conditions are dependent on specific body mass index (BMI; in kg/m²) cutoff points. US government agencies are making the transition to a revised BMI definition of overweight from that previously recommended for general use. The purpose of this article is to inform the broader medical and scientific communities of the transition that is underway in the United States to identify and classify overweight among adults by using BMI. Historical background on the use of BMI in a variety of applications, as reported in US federal government agency documents, provides an understanding of previous and current weight-for-height guidelines and the basis for arriving at them. On the basis of the current *Dietary Guidelines for Americans*, US government agencies are moving toward the use of criteria for overweight and obesity that are consistent with current international standards. Clinicians, researchers, and journal editors should be aware of the transition toward a common definition of healthy weight, overweight, and obesity. To facilitate comparisons and reporting of data, others are encouraged to consider making this transition as well. *Am J Clin Nutr* 2000;72:1074–81.

KEY WORDS Body mass index, overweight, obesity, healthy weight, practice guidelines, dietary guidelines

INTRODUCTION

Body weight and height are used in combination as simple and reliable measurements for evaluating nutritional and overall health status and screening for overweight. To identify individuals in clinical settings who are overweight, to document their baseline weights, and to evaluate the progress of weight-control interventions for these individuals, it is necessary to have objective screening and evaluation criteria.

Overweight is generally defined as weight that exceeds the threshold of a criterion standard or reference value. Reference values are generally based on observed population distributions of measured weight, whereas criterion standards are based on the relation of weight to morbidity or mortality outcomes. The distinction between references and standards is important because it indicates whether the source of the weight criteria is based on descriptive statistical distributions or on health outcomes. References, such as those based on the National Health and Nutrition

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Examination Survey (NHANES), and standards, such as the Metropolitan Life Insurance Company (MLIC) tables, have had widespread use in the United States.

Definitions of overweight have varied widely and there has not been a simple uniform definition. Numerous publications based on the recommendations of expert committees have struggled with developing working definitions of weight status. These recommendations have evolved from weight-for-height standards to sex-specific population-dependent references. The most recent transition is a movement toward a single body mass index (BMI; in kg/m²) standard that is applicable to all adults. Because it is independent of age and reference population, BMI can be used for comparisons across studies both in the United States and internationally.

The purposes of this article are 1) to inform the broader medical and scientific communities of a transition in the United States to using definitions for the identification, classification, and reporting of healthy weight, overweight, and obesity that are consistent with international standards; 2) to recommend uniform use of the latest criteria by clinicians, academic researchers, journal editors, and policymakers; and 3) to document the recent history of changing criteria for overweight, based on the recommendations of independent advisory committees and expert panels to federal agencies.

Historical background

Overweight is generally measured by using 1 of 2 approaches. The first approach is to use weight standards that vary by height. For example, the tables of weight-for-height provided by the MLIC give sex-specific weight ranges for each inch of height (1, 2). The second approach is to construct a weight-for-height index that is a function of weight and height, essentially equivalent to finding a value of weight adjusted for height. The derivation, comparison, and limitations of various weight-for-height indexes have been described in the scientific literature (3–8). The most widely used weight-for-height index is the BMI, also sometimes

¹From the Division of Health Examination Statistics, National Center for Health Statistics, Centers for Disease Control and Prevention, Hyattsville, MD.

²Reprints not available. Address correspondence to RJ Kuczmarski, National Center for Health Statistics, 6525 Belcrest Road, Room 900, Hyattsville, MD 20782. E-mail: rjk7@cdc.gov.

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TABLE 1

Selected characteristics and limitations of the Metropolitan Life Insurance Company (MLIC) height-weight tables¹

Characteristic	Limitation
Age	Tables applicable only to persons aged 25–59 y
Height and weight	Height and weight measured while subjects wear street shoes and indoor clothing of varying amounts Measured with nonstandardized protocols and equipment Self reported ($\approx 20\%$ in 1959 and $\approx 10\%$ in 1983) and thus may be associated with bias: women and heavy men tend to underestimate and light men tend to overestimate weight; men tend to overestimate and women underestimate height; weight in pounds is frequently rounded to digits ending in 0 or 5; home bathroom scales are known to be inaccurate
Time frame	Recorded or reported only at time of application for life insurance policy Data for 1959 tables recorded in the years 1935–1954; data for 1983 tables recorded in years 1954–1972
Chronic diseases	Persons with chronic diseases (eg, heart disease, cancer, diabetes) excluded
Type of life insurance policy	Includes only persons who purchased individual life insurance policies from selected life insurance companies in the United States and Canada; group policyholders not represented; persons with multiple policies included in database multiple times
Smoking status	Both smokers and nonsmokers included
Frame size	Frame size not measured on subjects in MLIC tables; for the 1959 tables, weight distribution was divided into thirds and frame size was accordingly classified as small, medium, or large; for the 1983 tables, frame size was developed from NHANES I statistical distributions of elbow breadth (50% of the population was assigned a medium frame and 25% each were assigned small or large frames)

¹From references 14–22. NHANES, National Health and Nutrition Examination Survey.

called the Quetelet index (6). BMI has been recommended for use among all age groups from childhood through adulthood (9).

Relative weight and weight-for-height indexes each have the same limitations, because both are based on measurements of body weight rather than body composition. Body weight does not give information about the specific components of body composition. For example, very athletic persons may be heavy because of excess muscle or lean body mass rather than because of excess body fat (10). Relative weight and BMI are moderately correlated with body fatness (11) but do not quantify total body adiposity. However, for the general population, it is usually assumed that people above certain weights-for-height are overfat as well as overweight.

The weight standards most commonly used before 1980 were sex-specific weight-for-height tables based on actuarial data, presented as ranges of body weights for each inch (2.54 cm) of adult height. The 1959 MLIC weight-for-height tables presented “desirable” body weights (1). The weights were derived from distributions of weight-for-height associated with minimal mortality among a large group of persons in the United States and Canada at the time they purchased life insurance policies from 26 life insurance companies from 1935 to 1954. These were specified to be the weights-for-heights associated with the lowest death rates but not necessarily with the lowest morbidity. This was a change from the earlier version of the MLIC table, which presented “ideal” weight-for-height values (12, 13). The limitations of using the MLIC weight-for-height tables have been well documented (Table 1) (14–22).

Given below is a chronologic account of the multiple criteria and definitions used in reports from federal agencies that led to our current BMI-based classifications of healthy weight, overweight, and obesity. This information has been summarized in the text and in Table 2 to document the evolution of weight criteria and definitions in various authoritative guidelines published in the United States.

Since 1980, all editions of the *Dietary Guidelines for Americans* were issued jointly by the US Department of Agriculture and the US Department of Health and Human Services. The first edition included a table of sex-specific weights for given heights (23). When translated to BMI-equivalent units, weights above ideal

weight, ie, overweight, corresponded to BMI values beginning at ≈ 25 –26 for men and ≈ 24 –25 for women. These weights-for-heights were based on ranges of “recommended” weights for men and women published in the proceedings of a 1973 National Institutes of Health (NIH) conference on obesity (40). The values for these weight ranges represent a modified version of the 1959 MLIC desirable weights for men and women, using the sex- and height-specific minimum weight for persons with a small frame as the lower boundary of the range, and the maximum weight for persons with a large frame as the upper boundary of the range. No definition of frame size accompanied the 1959 MLIC tables. Heights in the MLIC tables for men and women included shoes with 1- and 2-inch (2.54- and 5.08-cm) heels, respectively. In the 1980 and all subsequent *Dietary Guidelines for Americans* (23, 27, 31, 33, 39), the data were adjusted to present heights without shoes and weights without clothes. In effect the ranges of acceptable weights in the 1980 *Dietary Guidelines for Americans* were slightly different but approximated the range of sex- and height-specific MLIC desirable weights.

Health United States is the official annual report of the Secretary of the Department of Health and Human Services to the President and Congress of the United States on the health status of the nation. Statistics for this report are assembled at the National Center for Health Statistics/Centers for Disease Control and Prevention (NCHS/CDC). The first time that national overweight prevalence estimates were reported in *Health United States* was in 1984, when the national prevalence estimates for overweight among adults ages 25–74 y were based on a BMI ≥ 28.0 for men (24). However, instead of BMI, a different weight-for-height index, weight/height^{1.5}, was used for women, with overweight defined as ≥ 35.0 kg/m^{1.5}. These cutoffs were chosen because they represented the sex-specific 85th percentiles rounded to the nearest integer for persons aged 20–29 y in the second National Health and Nutrition Examination Survey (NHANES II, 1976–80). The power of 1.5 was used for women because, for an earlier NCHS report (41), this was calculated as the power to be used for height in the index for women, using an approach described by Benn (42). Benn described a method for calculating the exponent p in an index of the form weight/height ^{p} that would

TABLE 2
Various weight classifications used between 1942 and 2000

Date	Source	Sex	Criteria used	Label applied	Reference
1942	Metropolitan Life	M, F	Weight-for-height tables	Ideal weight	12, 13
1959	Metropolitan Life	M, F	Weight-for-height tables	Desirable weight	1
1980	Dietary Guidelines ^{2,3} (1st ed)		Weight-for-height tables	Ideal, normal, suggested, acceptable weight	23
		M	(<25–26 kg/m ²) ¹		
		F	(<24–25 kg/m ²) ¹		
1983	Metropolitan Life	M, F	Weight-for-height tables	Height and weight tables	2
1984	Health United States ⁴	M	≥28.0 kg/m ²	Overweight	24
		F	≥35.0 kg/m ^{1.5}		
1985	NIH Consensus Development Panel ⁵	M	≥27.8 kg/m ²	Overweight, obesity	25, 26
		F	≥27.3 kg/m ²		
1985	Dietary Guidelines ^{2,3} (2nd ed)		Weight-for-height tables	Desirable weight	27
		M, F	(<25.0 kg/m ²) ¹		
1985	Health United States ⁴	M	≥27.8 kg/m ²	Overweight	28
		F	≥27.3 kg/m ²		
1987	Najjar et al ⁴	M	≥27.8 kg/m ²	Overweight	29
		F	≥27.3 kg/m ²		
		M	≥31.1 kg/m ²	Severe overweight	
		F	≥32.3 kg/m ²		
1989	Committee on Diet and Health	M, F 19–24 y	19–24 kg/m ²	Desirable BMI	30
		M, F 25–34 y	20–25 kg/m ²		
		M, F 35–44 y	21–26 kg/m ²		
		M, F 45–54 y	22–27 kg/m ²		
		M, F 55–65 y	23–28 kg/m ²		
		M, F >65 y	24–29 kg/m ²		
1990	Dietary Guidelines ^{2,3} (3rd ed)		Weight-for-height tables	Unhealthy weight	30, 31
		M, F (19–34 y)	(≥25.0 kg/m ²) ¹		
		M, F (≥35 y)	(≥27.0 kg/m ²) ¹		
1990	Healthy People 2000 ²	M	≥27.8 kg/m ²	Overweight	32
		F	≥27.3 kg/m ²		
1995	Dietary Guidelines ^{2,3} (4th ed)	M, F	Weight-for-height chart		33
			(<25.0 kg/m ²) ¹	Healthy weight	
			(25.0–28.9 kg/m ²) ¹	Moderate overweight	
			(≥29.0 kg/m ²) ¹	Severe overweight	
1997	World Health Organization Consultation on Obesity	M, F	<18.5 kg/m ²	Underweight	34, 35
			18.5–24.9 kg/m ²	Normal weight	
			≥25.0 kg/m ²	Overweight	
			25.0–29.9 kg/m ²	Preobese	
			30.0–34.9 kg/m ²	Class 1 obese	
			35.0–39.9 kg/m ²	Class 2 obese	
			≥40.0 kg/m ²	Class 3 obese	
1998	NHLBI Expert Panel ⁷	M, F	<18.5 kg/m ²	Underweight	36
			18.5–24.9 kg/m ²	Normal weight	
			25.0–29.9 kg/m ²	Overweight	
			30.0–34.9 kg/m ²	Obesity 1	
			35.0–39.9 kg/m ²	Obesity 2	
			≥40 kg/m ²	Extreme obesity	
1999	Health United States ⁶	M, F	19.0–24.9 kg/m ²	Healthy weight	37
			≥25.0 kg/m ²	Overweight	
			≥30.0 kg/m ²	Obese	
2000	Healthy People 2010 ²	M, F	18.5–24.9 kg/m ²	Healthy weight	38
			≥30.0 kg/m ²	Obese	
2000	Dietary Guidelines ^{2,3} (5th ed)	M, F	18.5–25.0 kg/m ²	Healthy weight	39
			25.0–29.9 kg/m ²	Overweight	
			≥30.0 kg/m ²	Obese	

¹ Approximate BMI equivalents that correspond to weight-for-height table or chart data.

^{2–7} Federal agency using the criteria: ² US Department of Agriculture, ³ Department of Health and Human Services, ⁴ National Center for Health Statistics, ⁵ National Institutes of Health (NIH), ⁶ National Center for Health Statistics/Centers for Disease Control and Prevention, ⁷ National Heart, Lung, and Blood Institute (NHLBI)/NIH.

maximize the correlation with adiposity given the assumption that adiposity is independent of height (42). However, this assumption specified by Benn may not be met in the NHANES data; in fact, BMI appears to have a higher correlation with adi-

posity for both men and women than does weight/height^{1.5} (8). The use of the exponent 1.5 is not currently recommended.

At the 1985 NIH Consensus Development Conference on the Health Implications of Obesity, the Consensus Development

Panel worked to develop a new definition of overweight. The Panel defined obesity as a BMI ≥ 27.8 for men and a BMI ≥ 27.3 for women in the United States (25). These BMI cutoffs represented the sex-specific 85th percentile of the BMI distribution for persons aged 20–29 y in NHANES II (43). The rationale for selecting this age group as the reference population was that young adults are relatively lean and the increase in body weight that usually occurs with age is due almost entirely to fat accumulation (25). In their summary consensus statement, members of the Consensus Development Panel concluded: “At this level of obesity (ie, BMI ≥ 27.8 for men and BMI ≥ 27.3 for women), which is very close to a weight increase of 20% above desirable, treatment is strongly advised” (26). The weight increase of 20% above desirable was a reference to calculated BMIs corresponding to a weight 20% above the midpoint of the sex-specific median weight range across all heights for a medium frame in the 1983 MLIC weight-for-height tables (2). The resulting BMI equivalents for a weight increase of 20% above these weight-for-height values are 27.2 for men and 26.9 for women. This endorsement by the Consensus Panel was based on the observation of a coincidental agreement between the values from a reference distribution and an established criterion standard based on minimal mortality outcomes. In addition, the subsequent adoption of these values by federal agencies led to widespread use of these definitions by others. Interestingly, if these same criteria were used, a BMI of 25.0 would be equivalent to weights that are only 10% and 12% above the 1983 MLIC weight-for-height tables for men and women, respectively.

Overweight criteria, based on the BMI cutoffs of 27.8 for men and ≥ 27.3 for women, were used subsequently to report the prevalence of overweight among US adults in every annual edition of *Health United States* beginning in 1985 (28) and continuing through 1998. This definition of overweight has been cited by numerous other researchers reporting overweight prevalence estimates from research studies. A higher degree of overweight termed “severe overweight” was based on the 95th percentile BMIs from NHANES II for men and women aged 20–29 y (29). The term severe overweight has received limited use in the scientific and medical literature. *Healthy People 2000, Health Promotion and Disease Prevention Objectives for the Nation*, established a national goal for reduction in overweight based on the prevailing BMI cutoff criteria of 27.8 and ≥ 27.3 for men and women, respectively (32).

The second edition of the *Dietary Guidelines for Americans* provided a table of “desirable” weights for each inch of height with the highest weight-for-height ranges equivalent to a BMI of ≈ 25 for both men and women (27). Other than a statement that these values were adapted from the 1959 MLIC table of desirable weights, there was no further elaboration regarding what these weights were intended to signify. This edition of the guidelines actually matches the MLIC table.

In 1990, the Nutrition Monitoring Legislation—Public Law 101-445, Title III, Section 301, provided for the “Establishment of Dietary Guidelines,” stating that “Dietary Guidelines for Americans . . . shall contain nutritional and dietary information for the general public, and shall be promoted by each Federal agency. . . . The information shall be based on the preponderance of the scientific and medical knowledge which is current at the time the report is prepared” (44). This law implies indirectly that the definition of healthy weight or overweight, stated or implied, in the most recently published edi-

tion of the *Dietary Guidelines for Americans*, should be used by the constituent Federal agencies, although this is not stated directly. In the *Dietary Guidelines for Americans*, healthy weight and overweight categories are established with the use of BMI cutoffs, then translated to and published as a weight-for-height graphic figure to be used by the lay public.

The third edition of *Dietary Guidelines for Americans* discussed “healthy” weights, and a table of “suggested” weights was presented for 2 age groups (31). In contrast with preceding editions, this was a single table for men and women combined. This represented a move toward using the same overweight criteria for both sexes. However, values above the weight-for-height ranges presented were referred to as “unhealthy weights” and translated to BMI cutoffs ≥ 25.0 for adults aged 19–34 y and ≥ 27.0 for adults aged ≥ 35 y. These were the same values recommended to define overweight in the 1989 report from the National Academy of Sciences, *Diet and Health: Implications for Reducing Chronic Disease Risk* (30). As confirmed by the author of the report himself (45), the recommendations in this report were developed by Bray (46), who was influenced by the earlier work of Andres et al (47), which reported that the lowest mortality occurs at progressively increasing body weight as age increases.

The 1990 *Dietary Guidelines for Americans* used criterion standards that allowed higher BMIs at older adult ages. During the time that these guidelines were in effect, other publications used reference-based criteria to provide overweight prevalence estimates. For example, data from phase 1 (1988–91) of NHANES III were used to update national overweight prevalence estimates for the United States (48) using the NHANES II BMI cutoffs to be consistent with assessing progress toward the *Healthy People 2000* overweight objectives (49). With 33.4% of US adults aged ≥ 20 y estimated to be overweight, this report received widespread attention, further encouraging others to continue using the NHANES II BMI cutoffs to define overweight.

The fourth edition of *Dietary Guidelines for Americans* used the BMI range of 19–25 as the basis for defining healthy weights at all adult ages (33). Thus, overweight would be defined at a BMI > 25.0 . In a supporting document, the Dietary Guidelines Advisory Committee justified their selection of this cutoff, stating that current evidence showed increased morbidity and mortality occur at BMIs > 25.0 (50). This cutoff was moving in the direction of a criterion standard. However, the Advisory Committee concluded that there was lack of a clear cutoff or consensus to distinguish categories of weight associated with risk for morbidity or mortality. Therefore, a shaded figure was recommended to reflect the uncertainty of the cutoffs for increasing levels of overweight above a BMI of 25.0, based on health risk.

In 1997, the World Health Organization (WHO) provided further authoritative refinements to the overweight terminology and BMI cutoffs (34). The WHO not only suggested BMIs to classify normal weight and overweight but also added criteria for underweight, preobese, and class 1, 2, and 3 obese categories that are age-independent and the same for both sexes. The WHO classification is useful to screen for health risk because the risk of comorbidities, such as hyperinsulinemia, hyperlipidemia, and hypertension tends to increase with increasing BMI (34). Garrow (51) earlier proposed the framework for the BMI classification scheme that was endorsed by the WHO. His classification scheme, in fact, has its roots in the 1959 MLIC weight-for-height tables. The WHO document was influential in that it represented a broader international perspective on weight classifications.



Subsequent reports on the prevalence and emerging trends in overweight used a variety of BMI cutoffs (52, 53). To approximate the overweight criteria of the 1995 *Dietary Guidelines for Americans*, to match the overweight and obesity BMI criteria recommended by the WHO (34), and to facilitate international comparisons, data were published on the prevalence and trends in overweight (BMI ≥ 25.0), preobesity (BMI of 25.0–29.9), and class 1, 2, and 3 obesity (BMI of 30–34.9, 35.0–39.9, and ≥ 40.0 , respectively) in the United States from 1960 to 1994 (35). This publication was important in that it was the first to apply the WHO criteria to the US data.

In 1998, the National Heart, Lung, and Blood Institute (NHLBI) published *Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults* (36). The BMI criteria published in this report are similar to those recommended by the WHO for international applications and comparisons. As stated by the NHLBI expert panel, the basis for this BMI classification scheme stems from observational and epidemiologic studies that relate BMI to risk of morbidity and mortality (36). Use of a BMI ≥ 30.0 is consistent with the internationally accepted BMI criterion for obesity (34).

The NCHS/CDC published overweight and obesity prevalence and trend statistics in *Health United States 1999* (37) using the BMI cutoffs that were recommended previously (50) to define healthy weight (19.0–24.9), “overweight” (≥ 25.0), and “obesity” (≥ 30.0). Therefore, in *Health United States 1999*, prevalence estimates for obesity (BMI ≥ 30.0) are presented separately in the “obesity” category and are also included in the “overweight” category (BMI ≥ 25.0).

In *Healthy People 2010, Health Promotion and Disease Prevention Objectives for the Nation*, the proposed objectives were to increase the prevalence of healthy weight and to decrease the prevalence of adults categorized as overweight and obese (BMI ≥ 30.0) (38). No objective was proposed for persons with BMIs ≥ 25.0 and < 30.0 who are overweight but not obese.

For the fifth edition of *Dietary Guidelines for Americans* (39), the Dietary Guidelines Advisory Committee recommended that healthy weight, overweight, and obesity criteria standards be used (39). These recommendations were made to coincide with the criteria recommended by NHLBI (36) and to approximate those recommended by the WHO (34). Recalling Public Law 101-445 stated above, because these BMI cutoffs are used in the most recently published edition of the *Dietary Guidelines for Americans*, they should now be interpreted and accepted as the current definitions of overweight to be used by each federal agency, at least until the next edition of the *Dietary Guidelines for Americans* is issued.

DISCUSSION

Over time, a variety of criteria have been used in the United States to define various levels of weight status (Table 2). Although weight category labels have varied, generally the *Dietary Guidelines for Americans* have used a BMI of ≈ 25 to define overweight. The 1990 Dietary Guidelines had a notable exception with a tolerance that increased for older ages.

There has been an inconsistent use of BMI cutoffs based on references and standards that yield contrasting results. For example, when applying the BMI cutoffs of ≥ 27.8 for men and ≥ 27.3 for women to the NHANES III data, the prevalence of overweight among adults aged ≥ 20 y is 33.3% for men and 36.4% for women.

In contrast, at a BMI ≥ 25.0 , the prevalence is 59.4% among men and 50.7% among women. By simply changing the overweight cutoffs, the estimated number of overweight adults increases from 61.7 million (BMI ≥ 27.8 and 27.3) to 97.1 million (BMI ≥ 25.0), representing a difference of 35.4 million overweight adults. This example calls to attention the actual effect that a shift in BMI criteria can have on determining the population at risk.

Recommendations for adults

As *Healthy People 2000* is replaced by *Healthy People 2010*, the BMI criteria of the 2000 *Dietary Guidelines for Americans* for healthy weight will be applied in setting future healthy weight objectives for the nation. Federal agencies have made the transition to abandon the overweight criteria of 27.8 and 27.3, and, instead, to define overweight in future agency publications as a BMI consistent with recommendations in the current edition of *Dietary Guidelines for Americans*. Consistent with internationally recommended BMI cutoffs, a BMI ≥ 30.0 is used to define obesity (54).

This does not imply that BMI cutoffs in the range of 27–29 are not useful. Some of the applications have been reviewed (53) and there are additional applications. In the past, BMIs near the threshold of 27–28 have been used in making clinical decisions about the use of pharmacotherapy when other conditions, such as hypertension, dyslipidemia, coronary heart disease, type 2 diabetes, or sleep apnea, are present (55). A BMI in the range of 27–30 may continue to be useful for selected applications (36, 37, 55). The 1995 Dietary Guidelines Advisory Committee acknowledged this in their report as well (50).

To clarify the nomenclature currently in use (39), all BMIs ≥ 25.0 are considered to indicate excess body weight, ie, overweight. BMIs in the range of 25.0–29.9 indicate only overweight, but not obesity (ie, preobesity). Applying BMIs ≥ 30.0 assumes that persons categorized at this level are obese, ie, overweight because of excess adiposity. Such terminology is useful because it uses a common reference yet remains imperfect because it is based only on correlations of fatness with increasing weight, rather than serving as a measure of body fatness. Among individuals, it is possible to have a BMI < 30.0 with excess body fat, just as it is possible to have a BMI ≥ 30.0 without excess adiposity. Nevertheless, when descriptive terms are applied to general populations and accompanied by their associated BMI cutoffs, they have a utility in describing those populations. To eliminate any potential for confusion, when the term overweight is used it should be accompanied by the BMI range to indicate either all-inclusive overweight (BMI ≥ 25.0) or overweight but not obese (BMI 25.0–29.9), as distinguished from overweight and obese (BMI ≥ 30.0).

There is some inherent risk to using BMI cutoffs as a sole clinical diagnostic criterion. For example, it is conceivable that there is a potential for misclassification, especially for overweight near a BMI of 25, and especially among males who may appear to be overweight in this zone because of an accumulation of additional lean muscle mass. A study from Australia, where, as in the United States, more than half of all men are overweight (BMI ≥ 25.0), showed that a significant proportion of men did not consider themselves to be overweight, when in fact they had BMIs ≥ 25.0 . At all adult ages, the men in this study identified overweight as beginning at BMI values closer to ≈ 26 –27 (56). Future body-composition studies should examine to what extent men in the BMI range of ≈ 25 –27 are classified as overweight because they have excess lean body mass.



TABLE 3

Age-adjusted percentage of US adults aged 20–74 y with BMI \geq 25.0, United States, 1960–1994¹

Survey and years	Men	Women	Total
		%	
NHES I (1960–1962)	48.2	38.7	43.3
NHANES I (1971–1974)	52.9	39.7	46.1
NHANES II (1976–1980)	51.4	40.8	46.0
NHANES III (1988–1994)	59.3	49.6	54.4

¹NHES, National Health Examination Survey; NHANES, National Health and Nutrition Examination Survey.

Even though guidelines based on BMI are available to describe overweight, for the medical management and treatment of overweight and obesity, BMI alone should not be considered diagnostic. Additional risk factors should be assessed, including the presence of abdominal obesity based on a measure of waist circumference and the presence of concomitant risk factors or comorbidities, such as hypercholesterolemia or diabetes. The use of skinfold-thickness measurements, bioelectrical impedance analysis, or more sophisticated procedures such as dual-energy X-ray absorptiometry may be useful in confirming the initial BMI screening classification. Despite a potentially low sensitivity of BMI and fatness at low to moderate BMIs (57), BMI has high specificity in screening for high percentage fat values. The utility of BMI as a criterion standard is that it tends to be predictive of common health risks, such as hypertension, dyslipidemias, and diabetes (58).

Recommendations for children

Diagnostic and treatment guidelines that consider factors in addition to BMI as screening tools were recently published for children, adolescents, and adults (36, 59, 60). The overweight criteria discussed above apply only to men and women. For children and adolescents aged <20 y, BMI-for-age percentile distributions were recommended. Two useful terms were suggested. At a BMI-for-age that falls in the range from the 85th to the 95th percentile, youths may be classified as “at risk of overweight”; at BMIs \geq 95th percentile, they may be classified as “overweight” (59, 60). The pediatric growth charts were revised and include new sex-specific BMI-for-age percentile charts for ages 2–20 y (61, 62). The criteria for defining overweight among youths using the 95th percentile of the new BMI-for-age CDC growth charts has also been endorsed in the Healthy People 2010 objectives (38). Overweight prevalence estimates for youths can vary with the selection of the reference population, the BMI cutoff criteria, and age or maturational status of the subjects (63). Primary care providers can screen for overweight in children and adolescents by using the new BMI-for-age growth references.

Conclusions


During the past 3 or 4 decades in the United States, we have come almost full circle in the arena of weight criteria and definitions. Classifications began with the 1959 MLIC weight-for-height criterion standards (1), shifted to the NHANES II BMI reference values (29), and ended with the current recommendations in the 2000 *Dietary Guidelines for Americans* (39). These recommendations, strongly supported by the NIH Clinical Guidelines (36), are also consistent with the WHO criteria (34).

These recommendations also happen to very nearly approximate the equivalent maximum BMI for a “large frame” for women (24.6) and men (24.9) in the 1959 MLIC tables (51).

Because BMI is a variable with a continuous distribution, it is necessary to specify BMI cutoffs or ranges of BMIs at which overweight and obesity may be categorized. Research has continued in this area as more epidemiologic studies have explored the relations between BMI and the subsequent development of overweight and obesity, or related morbidity and mortality (58).

The current guidelines for defining overweight and obesity are based on measured heights and weights. Applying these BMI cutoffs to self-reported values of height and weight could lead to misclassification errors. Studies have shown that both men and women misreport height and weight (64, 65). This can result in the miscalculation of BMIs and the inaccurate classification of overweight.

Since 1980, Federal agency reports have used a variety of cutoffs and terms to describe reference weights and overweight (66, 67). If standardized BMI cutoffs are applied consistently, comparing prevalence estimates, setting objectives, and monitoring progress toward goals will also become standardized. This is important because, with >59% of men and 50% of women currently overweight (BMI \geq 25.0), representing >97 million US adults, overweight is at extremely high levels in this country (53). In fact, trend analyses indicate that high levels of overweight (BMI \geq 25.0) have existed in the United States since 1960 (Table 3).

This high prevalence of overweight represents a serious public health concern as a recognized risk factor for other chronic conditions and diseases. With the transition toward common definitions of healthy weight and overweight, federal agencies are taking a major step forward to recognize, identify, and set guidelines for the management of a problem of major public health and economic importance (68, 69). 

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