



Health
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Canada

A Review of Weight Guidelines

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Canada

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Health Canada

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1. Weight Guidelines

The purpose of this document is to provide background information in preparation for a review and update of the Canadian Guidelines for Healthy Weights (Health and Welfare Canada, 1988).¹ This document provides a snapshot of guidelines currently in use at the national, provincial/territorial, and international levels.

Information for this document was largely provided by Health Canada personnel. This information was gathered through literature reviews and internet searches. The document focuses on body fat measurements associated with health risks and includes some information regarding the application of these measurements. Although the term guidelines is used throughout this document to be consistent with previous work of Health Canada, other terms in the literature are used such as standards or weight classification system.

1.a Measurement of Body Fat

Excessively high levels of body fat are a risk to health. Moreover, the distribution of body fat may be as important as total fat, with excess abdominal fat associated with the greatest health risk. Excessively low levels of body fat are also a risk to health and may be indicative of health problems. It is important to have consistent guidelines that can be used to estimate healthy levels of body fat as well as levels that pose risk of health problems.

Direct measures of body fat are expensive and to date, impractical for widespread use. Body *weight*, therefore, is most often used to estimate body *fat* levels. To date, the best (although imperfect) estimate of body fat is provided by the Body Mass Index (BMI) i.e. weight in kilograms divided by the square of height in metres (kg/m^2). BMI, however, does not provide an estimate of fat distribution. To estimate distribution, particularly to estimate abdominal fat, circumference measures are most often used e.g. waist circumference or the ratio between waist to hip circumferences. These are simple and practical for widespread use. There are limitations, however, to the ability of weight and circumference measurements to estimate body fat. Additional measures of body composition (i.e. dual X-ray absorptiometry and bioelectrical impedance analysis) are being used on an experimental basis in the current round of the *National Health and Nutrition Examination Survey* in the USA (Flegal et al, 2001a).

¹ This information builds on but does not duplicate the work of McCargar (*Should the 1988 Guidelines for Healthy Weight be Updated?*) which was commissioned by Health Canada in 2000 (McCargar, 2000).

2. Canada's Healthy Weights Guidelines

The document *Canadian Guidelines for Healthy Weights* was released in 1988 and was the culmination of a process to establish weight levels that are associated with health risk (Health and Welfare Canada, 1988). At that time four zones of the Body Mass Index were identified and described in terms of health risks. These are shown in Table 1.

Table 1

Canadian Guidelines for Healthy Weights (for adults 20 to 65 years of age)			
Zone A BMI Less than 20	Zone B BMI Between 20 and 25	Zone C BMI Between 25 and 27	Zone D BMI More than 27
May be associated with health problems for some people	Good weight for most people	May lead to health problems in some people	Increasing risk of developing health problems
	Generally acceptable range		

Source: Health and Welfare Canada. *Canadian Guidelines for Healthy Weights*. Report of an Expert Group Convened by Health Promotion Directorate, Health Services and Promotion Branch. Health And Welfare Canada, 1988, page 27

The Waist-Hip Ratio (WHR) was recommended as an additional measure to be used by health professionals to estimate body fat distribution. It was stated, however, that more research was needed before a precise recommendation on the use of WHR could be made. Recommended cut-off points at that point in time were: 1.0 for men; 0.8 for women.

It is of interest to note that the *1988 Canadian Guidelines* were unique in that they labelled cut-off points for BMI and the resulting zones according to health risks rather than the more common labels of 'underweight', 'overweight' or 'obesity'. The use of the term healthy weight may also have been a unique contribution of the *Canadian Guidelines*.

Since 1988 there has been considerable research on the prevalence, risks and measurement of body fat. In 1998, the World Health Organization (WHO) released the report *Obesity: Preventing and Managing the Global Epidemic: Report of a WHO Consultation* which provides a public health approach to the prevention and management of excess body fat (WHO, 1998). As a component of this approach, the *WHO Report* provides a system to classify underweight, normal range and overweight with four subclassifications of obesity. This weight classification system was previously released by the WHO in the report *Physical Status: The Use and Interpretation of Anthropometry: Report of a WHO Expert Committee (WHO, 1995)*. The 1998 report recommends that this system be adopted internationally.

3. WHO Weight Classification System

The *1998 WHO Report* focuses on overweight and obesity (WHO, 1998). Obesity is defined as, “a condition of abnormal or excessive fat accumulation in adipose tissue, to the extent that health may be impaired.” Obesity is described as a disease in its own right but also a key risk factor for other non communicable diseases such as non insulin dependent diabetes mellitus (NIDDM) and coronary heart disease (CHD). The *WHO Report* concludes that, “BMI provides the most useful albeit crude, population-level measure of obesity.” Table 2 shows the graded classifications provided in the *WHO Report*.

Table 2

Classification of Adults According to BMI*		
Classification	BMI	Risk of comorbidities
Underweight	<18.50	Low (but risk of other clinical problems increased)
Normal range	18.50-24.99	Average
Overweight	≥25.00	
Preobese	25.00-29.99	Increased
Obese class I	30.00-34.99	Moderate
Obese class II	35.00-39.99	Severe
Obese class III	≥40.00	Very severe

* These BMI values are age-independent and the same for both sexes. However, BMI may not correspond to the same degree of fatness in different populations due, in part, to differences in body proportions (see section 2.3.2). The table shows a simplistic relationship between BMI and the risk of comorbidity, which can be affected by a range of factors, including the nature of the diet, ethnic group and activity level. The risks associated with increasing BMI are continuous and graded and begin at a BMI below 25. The interpretation of BMI gradings in relation to risk may differ for different populations. Both BMI and a measure of fat distribution (waist circumference or waist:hip ratio (WHR)) are important in calculating the risk of obesity comorbidities.

Source: World Health Organization. *Obesity: Preventing and Managing the Global Epidemic: Report of a WHO Consultation on Obesity*. Geneva: WHO, 1998, page 9

According to the *WHO Report*, a major advantage of the use of consistent BMI cut-off points world wide is to provide meaningful comparisons within and between populations. It further states that consistent BMI cut-off points also make it possible to identify at-risk groups and individuals, enable intervention priorities to be set and establish a basis for evaluation.

The *WHO Report* emphasizes that BMI does not distinguish between weight from fat and weight from fat free mass. Thus the relationship between BMI and body fat varies according to body proportions and body build. It may also vary according to age as body fat may increase with age and muscle mass may decrease. The health risks of obesity may also be influenced by ethnicity. BMI therefore may not correspond to the same level of health risk in different individuals and populations.

Since BMI does not provide an estimate of body fat distribution the *WHO Report* recommends that waist circumference should be used as an additional measure to identify those at increased risk of obesity-associated illness due to excess abdominal fat. Although the *WHO Report* provides examples of waist circumference cut-off points for men and women that indicate health risks, these were established among a Caucasian population and are not recommended as part of a grading system that can be used globally. Ethnic populations have been shown to differ in the level of risk associated with a particular waist circumference. Table 3 shows the waist circumference information included in the *WHO Report*.

Table 3

Sex-Specific Waist Circumference and Risk of Metabolic Complications Associated with Obesity in Caucasians*		
Risk of Metabolic Complications	Waist Circumference (cm)	
	Men	Women
Increased	≥94	≥80
Substantially increased	≥102	≥88

* This table is an example only. The identification of risk using waist circumference is population-specific and will depend on levels of obesity and other risk factors for CVD and NIDDM. This issue is currently under investigation.

Source: World Health Organization. *Obesity: Preventing and Managing the Global Epidemic: Report of a WHO Consultation on Obesity*, Geneva: WHO, 1998, page 11

The *WHO Report* highlights several limitations in assessing the health consequences of obesity. This document also states, however that while ethnic and other differences may have a bearing on the absolute prevalence of specific obesity-related health problems, the relative risk of any particular disease is fairly similar world-wide.

The *WHO Report* recommends the use of BMI and WC concurrently but specifies that the use of WC should be population specific.

4. Current Guidelines Used by Canadian Organizations

4.a Canadian Medical Association

Assessment guidelines are provided in the Canadian Medical Association, *Periodic Health Examination, 1999 Update* (Douketis et al, 1999). The *1988 Canadian Guidelines* form the basis for the BMI cut-off points in this *Update*. This *Update* defines obesity for adults between 18 to 65 years of age by a Body Mass Index of more than 27 and morbid obesity by a BMI of more than 35. The *Update* states that the use of body circumference measures will likely be used in the future but at present, “the use of these indices is limited by a lack of established normal reference ranges for adult men and women.”

It is of interest to note that with regard to assessment and treatment the following recommendations are made based on an extensive literature review:

- “For obese adults *without* obesity-related diseases, there is insufficient evidence to recommend in favour of or against weight-reduction therapy because of a lack of evidence supporting the long-term effectiveness of weight-reduction methods ...;
- For obese adults *with* obesity-related diseases (e.g. diabetes mellitus, hypertension), weight reduction is recommended because it can alleviate symptoms and reduce drug therapy requirements, at least in the short term.....
- For people *without* obesity-related diseases, there is insufficient evidence to recommend the inclusion or exclusion of BMI measurement as part of a periodic health examination, and therefore BMI measurement is left to the discretion of individual health care providers.....;
- For people *with* obesity-related diseases, BMI measurement is recommended because weight reduction should be considered with a BMI of more than 27...”

4.b Dietitians of Canada

The *Manual of Clinical Dietetics – Sixth Edition* was a joint effort between the Dietitians of Canada and the American Dietetic Association and was released in 2000 (Chicago Dietetic Association et al, 2000). Chapter 23, entitled *Obesity*, includes information on the effective management of obesity. Regarding BMI measurement, guidelines that are consistent with those of WHO are used with minor variations in terminology. Regarding WC, the upper level cut-offs are used from the WHO example. The classifications used in this Manual are identical to those published by the National Institutes of Health (to be discussed later).

Table 4

Classification of Overweight and Obesity by Body Mass Index (BMI), Waist Circumference (WC), and Associated Disease Risks				
Classification	BMI	Obesity Class	Disease Risk By Waist Circumference*	
			Males ≤102 cm Females ≤88cm	Males >102 cm Females >88 cm
Underweight	<18.5			
Normal**	18.5 – 24.9			
Overweight	25.0 – 29.9		Increased	High
Obesity	30.0 – 34.9	I	High	Very High
	35.0 – 39.9	II	Very High	Very High
Extreme obesity	≥40	III	Extremely High	Extremely High

* Disease risk for type 2 diabetes, hypertension, and cardiovascular disease
 **Increased waist circumference can also be a marker for increased risk even in persons of normal weight
 Source: Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults. Washington, DC: National Institutes of Health, Obesity Education Initiative Task Force; 1998.

Source: Chicago Dietetic Association, South Shore Suburban Dietetic Association, Dietitians of Canada. *Manual of Clinical Dietetics - Sixth Edition*. Produced by the American Dietetic Association, Chicago, Illinois, 2000. Chapter 23 (Obesity), page 367

The obesity chapter also addresses the need for an individualized approach to management with options that range from weight loss to size acceptance.

4.c Statistics Canada

A recent report from Statistics Canada, *The Health Divide: How the Sexes Differ*, released on April 26, 2001, provides information primarily from the last round of the National Population Health Survey and includes many measures that describe the health of Canadians (Statistics Canada, 2001b). With regard to weight, BMI was calculated on all those surveyed age 15 or older (excluding pregnant women), although *The Health Divide* does caution that for teenagers and seniors the BMI may be less valid. The following BMI cut-offs were used to establish prevalences, i.e. BMI 18.5 or less – underweight, 18.6 to 24.9 acceptable weight, 25.0 to 29.9 – overweight, and 30 or more – obese. These follow the WHO classification and cut-offs with one very subtle exception. Whereas Statistics Canada classifies underweight as a BMI of 18.5 or less, WHO classifies underweight as less than 18.5.

Another project by Statistics Canada and the Canadian Institute for Health Information identified and reported on key Canadian health indicators. As part of this project BMI's drawn from the last three rounds of the National Population Health Survey were reported. In this case both the 'Canadian Standard' (based on the 1988 *Canadian Guidelines for Healthy Weights*) and the 'International Standard' (based on the *WHO Report*) were used to report the data. With regard to the International Standard, less than 18.5 was classified as underweight which is in line with the *WHO Report* (Statistics Canada, 2001a). Reporting, however, was restricted to adults age 20 to 64 (excluding pregnant women).

4.d Provinces

From an informal survey conducted with the Federal/ Provincial/ Territorial Group on Nutrition and from a review of provincial Ministry of Health web sites, it was apparent that most provinces use the 1988 *Canadian Guidelines* (Survey of Provincial/ Territorial Nutritionists, 2001).

4.e Voluntary/ Non Governmental Organizations

A cursory review of a selected number of voluntary/non governmental agencies revealed that, although healthy weight was mentioned with regard to the work of the agencies, only one had specified guidelines to define weight categories. Organizations reviewed included the Heart and Stroke Foundation of Canada, Canadian Cardiovascular Society, Canadian Diabetes Association, and the Canadian Cancer Society. This review showed that the Heart and Stroke Foundation of Canada has a position statement on obesity which includes the *1988 Canadian Guidelines for Healthy Weights*. However, a meeting was held in April 2001 by the Foundation along with a number of other organizations to discuss the development of a joint obesity policy statement. Follow-up will be needed to determine whether a joint policy statement resulted and, if so, whether the *1988 Guidelines* will be used in the policy.

5. Other Countries and Regions

Since the publication of the WHO classification system some countries and organizations within countries have adopted and/or adapted the classification system for their own use. A group of researchers from ten countries met in May of 1999 to investigate whether current WHO guidelines could be used consistently and adopted widely by both health promoters and primary care workers and also whether proposed cut-off points for BMI and WC would predict adverse health outcomes in diverse populations (Seidall et al, 2001). Countries represented included Australia, Canada, England, Finland, Netherlands, New Zealand, Scotland, Sweden, Taiwan, and the US. Examples of guidelines are included below that are either proposed or implemented in some of these countries, or in regional areas, or in organizations within a country.

5.a United States

More than one organization in the US has adopted the WHO system of classification with minor deviations. The following summarizes three of these and briefly addresses similarities and differences between them and the *WHO Report*.

National Institutes of Health

The National Institutes of Health (NIH) report *Clinical Guidelines on the Identification, Evaluation and Treatment of Overweight and Obesity in Adults: the Evidence Report* was released in June 1998 and has been endorsed by several other organizations (North American Association for the Study of Obesity, National Task Force on the Prevention and Treatment of Obesity, and the coordinating committees of both the National Cholesterol Education Program and the National High Blood Pressure Education Program) (NHLBI, 1998). A second report, *The Practical Guide to the Identification, Evaluation and Treatment of Overweight and Obesity* is largely based on the *Evidence Report* (NHLBI, 2000). It was developed for primary care physicians, nurses, registered dietitians, nutritionists and other interested health care practitioners and provides information and tools needed to assess and manage overweight and obesity.

These clinical guidelines use BMI cut-offs and WC for the initial assessment of body weight. WC is described as an independent risk factor. Waist circumference measurement is described as particularly useful for assessing patients who are categorized as normal or overweight. It is recommended that assessment also include information on the presence or absence of other risk factors. Three or more of a list of seven risk factors is said to confer high absolute risk. These risk factors are cigarette smoking, hypertension, high low-density lipoprotein cholesterol, low high-density lipoprotein cholesterol, impaired fasting glucose, family history of premature coronary heart disease, and age (male over 45 and female over 55 or postmenopausal). Table 5 shows the summary of the assessment recommendations.

Table 5

Classification of Overweight and Obesity by BMI, Waist Circumference, and Associated Disease Risk*				
	BMI (kg/m²)	Obesity Class	Disease Risk* (Relative to Normal Weight And Waist Circumference)**	
			Men ≤40in (≤102 cm) Women ≤35in (≤88cm)	>40in (>102 cm) >35in (>88 cm)
Underweight	<18.5			
Normal	18.5 – 24.9			
Overweight	25.0 – 29.9		Increased	High
Obesity	30.0 – 34.9	I	High	Very High
	35.0 – 39.9	II	Very High	Very High
Extreme obesity	≥40	III	Extremely High	Extremely High
* Disease risk for type 2 diabetes, hypertension, and CVD				
**Increased waist circumference can also be a marker for increased risk even in persons of normal weight				
Adapted from “Preventing and Managing the Global Epidemic of Obesity. Report of the World Health Organization Consultation of Obesity”. WHO Geneva, June 1997				

Source: National Institutes of Health, National Heart, Lung, and Blood Institute. *Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults. The Evidence Report.* NIH Publication No. 98-4083. September 1998, page 62

Minor changes can be noted between this and the table included under WHO. For example, the term overweight is used rather than the WHO classification, preobese. Furthermore, the upper level cut-offs for WC provided in the WHO example are used with minor variations — NIH uses >102 cm instead of ≥102 cm as the waist circumference cut-off for men and >88 cm instead of ≥88 cm for women. In addition, the combination of BMI and WC in a single table with relative risk of disease included at various combined cut-off points was not included in the *WHO Report*.

Dietary Guidelines for Americans, 2000

The Year 2000 *Dietary Guidelines for Americans* provides advice on ten dietary guidelines, which are grouped into three categories (Nutrition and Your Health, 2000). The first category “*Aim for Fitness*” contains two guidelines: *Aim for a healthy weight*, and *Be physically active each day*. The *Dietary Guidelines* are intended for lay readers and the information below was taken from the web site.

Under the healthy weight guideline, there are three recommendations regarding assessment. First of all, readers are asked to identify their BMI through the use of a nomogram. The healthy weight range (rather than the WHO and NIH ‘normal’ range) includes BMI’s from 18.5 up to 25. The term underweight is not used to describe those under 18.5 because of the lack of information as to risk (whether healthy or unhealthy) of those in the lower weight range (Willet et al, 1999). Overweight (rather than the WHO term pre-obese) is defined as BMI of 25 up to 30 and obesity a BMI of 30 or over (with the explanation that obese people are also overweight). Secondly, readers are advised to measure their waist circumference. A waist circumference over 35 inches

for women and over 40 inches for men is described as indicative of increased health risks which are consistent with the NIH cut-off points. Finally, readers are asked to assess other risk factors from a list of seven (i.e. personal or family history of heart disease, male older than 45 years or a postmenopausal female, smoke cigarettes, sedentary lifestyle, high blood pressure, abnormal blood lipids, diabetes – the last three as assessed by a doctor). These risk factors differ somewhat from those identified by the National Institutes of Health in their *Evidence Report*. The higher the BMI and waist measurement, and the more risk factors the more likely an individual is to benefit from weight loss.

The text of the *Aim for a healthy weight* guideline offers some qualifications regarding the ability of the cut-off points to correctly identify a healthy weight for each individual. Although the term underweight is not used it is noted that BMI's slightly below the healthy range may not be a risk unless resulting from illness but also noted that a BMI below the healthy range may lead to increased health risk such as infertility and osteoporosis.

The inclusion of issues such as fat distribution and weight-related health conditions has been criticized as inappropriate advice for the lay reader in that it goes beyond the intentions of *Dietary Guidelines* (Flegal et al, 2001a). The fact that the *Aim for a healthy weight* guideline has become more medically oriented over time has been noted as has the strong recommendations regarding weight loss in the Year 2000 *Dietary Guidelines* as compared with earlier editions of the *Dietary Guidelines* (Flegal et al, 2001a).

Healthy People 2010

Healthy People 2010 is a set of health objectives for the USA to achieve between 2000 and 2010 (US Department Health and Human Services, no date). "Overweight and obesity" is the second of ten leading health indicators described in *Healthy People 2010*. In describing prevalence of overweight and obesity, overweight is described as a BMI of 25 or more and obesity a BMI of 30 or more — which is in line with the NIH Report.

Advice provided on the *Healthy People* web site recommends a healthy diet and regular physical activity to maintain a healthy weight and that over time small decreases in caloric intake and small increases in physical activity can prevent weight gain or facilitate weight loss. For individuals attempting to lose substantial amounts of weight, it is recommended they seek help from a health care provider.

In summary, current guidelines in the USA are very similar to those proposed by WHO. Minor deviations have been noted. All caution the lack of precision for identification of health risk levels for individuals.

5.b Australia

Australia has developed a national plan to counteract the increasing incidence of overweight and obesity in that country (Acting on Australia's Weight, 1997). The plan includes the WHO weight classification with some deviations in wording and BMI cut-off points i.e. underweight <20, acceptable weight 20 to ≤25, overweight 25 to ≤30, and obese >30. Waist circumference

measurement is recommended as an indication of degree of abdominal obesity.

5.c New Zealand

A 1997 publication on *Healthy Weight* distributed by the Ministry of Health for New Zealand defined a healthy weight range as being between BMI's of 20 to 25 (Ministry of Health, New Zealand, 1997). The lower level of 20 is above the current WHO recommendation. Other cut-off levels were not given in this publication. The healthy weight range was described as not suitable for those under 18 or over 69 years of age, for heavily muscled athletes, or for people from ethnic groups who naturally have a different body build. The booklet also stated that for Maori and Pacific people a slightly higher weight may be appropriate. It would be useful to know if changes have been made to the New Zealand definition of the healthy weight range in light of recent work. The booklet provided general information on physical activity, healthy eating with ideas for lowering dietary fat, and healthy lifestyles. Gradual changes to lifestyle were recommended if needed and readers were cautioned against quick weight loss and that 'dieting' doesn't work.

5.d Scotland

The information for Scotland was obtained from the Scottish Intercollegiate Guidelines Network (SIGN, 1996). The objective of SIGN is to improve the quality of health care for patients in Scotland by reducing variation in practice through the development and dissemination of evidence-based national clinical guidelines. Membership of SIGN includes medical, nursing, pharmacy, dentistry, professions allied to medicine, patients, health service managers, social services and researchers.

In 1996 *Obesity in Scotland: Integrating Prevention with Weight Management* was released. In this guideline, intended for those involved in primary care/ community/ commercial management of overweight and obesity a summary of recommendations includes: routine assessment based on BMI and waist measurement; additional risk factor assessment, risk factor management; and, preventive measures.

Weight gain greater than 5 kg during adulthood is an indication for weight management procedures in order to reduce the health effects of weight gain. In addition, the benefits of modest weight loss are described. This information is intended for a broad range of those involved in the prevention and management of weight problems, including primary care workers as well as workers within the community and business sectors. BMI cut-off points follow the WHO range and are shown in Table 6.

Table 6

The Internationally Accepted Ranges of BMIs Are as Follows	
Underweight	<18.5
Normal	18.5-24.9
Overweight	25-29.9
Obesity	30.0-39.9
Extreme obesity	≥40

Source: Scottish Intercollegiate Guidelines Network. *Obesity in Scotland: Integrating Prevention with Weight Management. A National Clinical Guideline Recommended for Use in Scotland.* Pilot Edition, November 1996. Section 3 (Definitions), page 3

It is noted in the text that these values are age-independent and the same for both sexes and that the normal range is wide and there is evidence to suggest that there are benefits in having a BMI in the lower part of the normal range.

The measurement of waist circumference is also recommended and the following table shows the sex-specific levels that denote enhanced relative risk. Cut-off points are the same as those given in the example in the *WHO Report*.

Table 7

The Following Sex-Specific Levels Denote Enhanced Relative Risk		
	Increased Risk	Substantial Risk
Men	≥94 cm (approximately 37 inches)	≥102 cm (approximately 40 inches)
Women	≥80 cm (approximately 32 inches)	≥88 cm (about 35 inches)

Source: Scottish Intercollegiate Guidelines Network. *Obesity in Scotland: Integrating Prevention with Weight Management. A National Clinical Guideline Recommended for Use in Scotland.* Pilot Edition, November 1996. Section 3 (Definitions), page 4

It is also noted that adults from the Indian Subcontinent are particularly prone to abdominal fat deposition on weight gain, are very susceptible to glucose intolerance and diabetes, and are more prone to coronary heart disease than Caucasians.

5.e England

The report *Tackling Obesity in England* presents an in-depth study of the prevalence, cost, management and prevention of obesity in England (National Audit Office, 2001). With regard to the definition of obesity, *Tackling Obesity* draws on the classifications and cut-offs used by the Department of Health in England and also on WHO data. Table 8 below shows the BMI cut-offs and relative health risks.

Table 8

This Table Shows the Way Different BMI's are Classified and the Relationship Between BMI and Risk of Associated Diseases		
Body Mass Index (kg/m²)	Classification	Risk of disease associated with excess weight
Less than 20	Underweight	Low (but increased risk of other clinical problems)
Over 20 to 25	Desirable or healthy range	Average
Over 25 to 30	Overweight	Increased
Over 30 to 35	Obese (Class I)	Moderate
Over 35 to 40	Obese (Class II)	Severe
Over 40	Morbidly or severely obese (Class III)	Very severe

Source: BMI classifications from Health Survey for England with additional data on associated risk from the World Health Organization

Source: National Audit Office. *Tackling Obesity in England. Report by the Comptroller and Auditor General*, HC 220 Session 2000-2001, February 15, 2001. Part 2, page 11

The terminology used to classify overweight and various levels of obesity generally conforms with the WHO classifications although, as with other countries, the use of the term overweight is preferred to the WHO 'preobese.' The cut-offs used for BMI ranges does however differ from the WHO somewhat with the most notable difference being the classification of underweight as a BMI of less than 20 rather than less than 18.5 as given in the *WHO Report*.

Tackling Obesity also uses the WHO cut-offs given in their example for waist circumference i.e. increased risk of obesity-related diseases for men at 94 cm (37 inches) and for women at 80 cm (32 inches) and substantially increased risk for men at 102 cm (40 inches) and for women at 88 cm (35 inches).

5.f Asian Pacific Perspective

A recent WHO report, *The Asia-Pacific Perspective: Redefining Obesity and its Treatment*, describes the rising levels of obesity in this region and the subsequent increase in the prevalence of chronic diseases (WHO, 2000). It also addresses the issue of ethnicity and measurement of body fat.

As the Asian Pacific population is ethnically mixed, *The Asia-Pacific Perspective* presents evidence to support the use of BMI and WC cut-off points for particular ethnic groups that differs from the 1998 WHO recommendations. For some Asian populations such as Chinese and Japanese the health risks of obesity occur at lower body fat levels and smaller waist

circumferences than for the racial group termed Europids (which includes Americans and Europeans). According to *The Asia-Pacific Perspective*, Asians tend to accumulate intra-abdominal fat without developing generalized obesity. South Asians (Indians) have a more centralised distribution of body fat and higher mean waist to hip ratios for a given BMI compared to Europids. *The Asia-Pacific Perspective* suggests they may have high levels of abdominal obesity but may not be considered obese by conventional BMI standards. According to this document, Polynesians tend to be muscular and to have higher BMI's than Europids, but lower body fat levels for the same BMI. This group however, is prone to diabetes. *The Asia-Pacific Perspective* also describes research that indicates that those born at low birth weight who are obese as adults are particularly susceptible to what is termed the Metabolic Syndrome which includes central obesity, glucose intolerance, insulin resistance, dyslipidaemia, and hypertension. *The Asia-Pacific Perspective* does not elaborate on the possible reasons for these ethnic differences in body fat distribution or increased susceptibility to metabolic problems. A recent paper, however, addresses the possible influences of genetics, small size at birth coupled with later obesity, and other environmental factors on the development of insulin resistance specifically among South Asian populations (Chittaranjan et al, 2001).

The Asia-Pacific Perspective proposes the use of the WHO classification system but recommends different cut-off points for Asian populations. It does not specify which populations would be included in this. This report also specifies that ethnic differences are shown in immigrant populations in industrialized countries. *The Asia-Pacific Perspective* does caution that research is limited regarding ethnic differences and that the values provided in the table below would require revision as new data became available.

Table 9

Comorbidities Risk Associated with Different Levels of BMI and Suggest Waist Circumference in Adult Asians			
	BMI (kg/m ²)	Risk of co-morbidities	
		<90 cm (men) <80cm (women)	≥ 90 cm (men) ≥ 80 cm (women)
Underweight	<18.5	Low (but increased risk of other clinical problems)	Average
Normal	18.5 – 22.9	Average	Increased
Overweight	≥23		
At risk	23-24.9	Increased	Moderate
Obese I	25-29.9	Moderate	Severe
Obese II	≥30	Severe	Very severe

Source: World Health Organization. *The Asian Pacific Perspective: Redefining Obesity and its Treatment*. Health Communications Australia Pty Ltd. February 2000, Section 2, page 20

BMI cut-off points for overweight and obesity are lower than those given in the 1998 WHO Report and other guidelines reviewed herein. WC cut-offs are lower than those used in other guidelines but are provisional until new data become available

6. Weight Standards for Children and Adolescents

The information included under assessment guidelines has thus far concentrated on assessment of adults. Childhood obesity, however, is a growing global problem. The International Obesity Task Force (IOTF) has been working on a method of assessment for obesity among children and adolescents. Reports in the literature have documented progress with this project.

Bellizzi and Dietz (1999) reported on the results of a workshop convened by IOTF to determine methods for assessment of obesity worldwide among children and adolescents. A previous consensus conference had proposed as an index of adiposity in adolescents the use of a BMI above the 85th percentile as a screening index for overweight and a BMI above the 95th percentile for obesity. Despite limitations in the research (e.g. among different ethnic populations, influence of prior undernutrition, sensitivity and specificity of the cut-off points) the current workshop concluded that the BMI provides a reasonable measure of body fatness in both children and adolescents. A scheme for the development of cut-off points was suggested. A reference population would be used to identify the percentile values for a 20 year old that correspond to BMIs of 25 and 30. These percentiles would be extrapolated to identify overweight and obesity at all ages of children and adolescents. At this workshop neither skin fold thickness nor circumference measurements were deemed appropriate for use at this point in time.

A later paper reported on the application of the scheme described above on a representative population (Cole et al, 2000). Six large nationally representative cross sectional growth surveys (Brazil, Great Britain, Hong Kong, the Netherlands, Singapore, and U.S.) were used to develop an internationally acceptable definition of child overweight and obesity. For each survey group centile curves were drawn that at age 18 passed through the BMI cutoff points of 25 and 30 used to identify adult overweight and obesity. The resulting curves were averaged and age and sex specific cut-off points were derived for children from age 2 to 18. Limitations to the method include the fact that it is statistically derived, that it corresponds to adult cut-off points whereas the health consequences for children above these cut-offs may differ from those for adults, the extent to which the centile curves for the data sets are of the same shape, and the fact that it is limited to the six data sets used. Cut-off points for underweight could not be developed at that point in time.

A final report of the work of the IOTF to establish assessment measures and cut-off points for children and adolescents is due this year. However, a recent paper reported on a comparison between three different sets of reference BMI values for children including the one proposed by Cole et al and concluded that, “these methods should be used cautiously, with awareness of the possible limitations” (Flegal et al, 2001b).

7. Considerations for the Review of the 1988 Canadian Guidelines

The current *Canadian Guidelines* differ from those proposed by WHO for international use and from those adopted by several other countries. In addition, they differ from those currently in use by some institutions within Canada.

For the guidelines that were reviewed for this document, there is a general acceptance of the WHO classification system and for the most part, acceptance of the BMI cut-off points for overweight and obesity. The WHO Asian Pacific Region report proposes the most significant differences. According to Willett et al (1999), the cut-off point of 25 for overweight is well established but under 18.5 as a measure of underweight has less evidence to support it. In the *Dietary Guidelines for Americans*, 2000, the word underweight was not used to describe those under 18.5 and it was noted that BMI's under the healthy weight range may not be a risk. On the other hand, England, New Zealand and Australia have retained the BMI cut-off of 20 to define underweight.

Several countries are proposing the WC cut-offs given in the WHO example and others have adopted aspects of these cut-offs. Again the cut-offs proposed for the Asian Pacific Region are lower than those in use in other countries. McCargar (2000) describes work in Canada to establish WC cut-offs based on Canadian data.

Table 10 summarizes some of the guidelines described in this document in order to illustrate similarities and differences in cut-off points and wording. Despite the growing agreement about the WHO classification and cut-off points, the documents reviewed also discussed the limitations of the proposed measures. For example, there is a continuous relationship between gradations of excess weight and morbidity which makes the selection of cut-off points problematic. In addition, individuals who have gained weight or increased waist circumference but still lie within the normal limits may be at increased risk. Differences in body build and body proportions are also influential as are changes in body composition that may accompany aging. Finally, the influence of ethnicity was raised by most countries and organizations reviewed. These and other limitations of newer guidelines will need to be considered in a review of the *1988 Canadian Guidelines*.

As noted in the guidelines reviewed, the terms used for weight ranges may also differ. For example, although the *WHO Report* uses the term overweight to describe all BMI's of 25 and over and the term preobese to describe the 25 to 29.9 range, most other jurisdictions use the term overweight to designate the 25 to 29.9 range only. The term used by WHO for the 'normal' range (18.5 – 24.9) also has not been universally accepted. Some jurisdictions *have* adopted the term 'normal' (e.g. National Institutes of Health, Scotland, Asian Pacific Region). Others use 'acceptable weight' (Australia), or 'desirable or healthy range' (England). Some jurisdictions have used 'healthy weights' (e.g. *Dietary Guidelines for Americans*, New Zealand). In the Canadian Guidelines 'good weight for most people' was used for BMI 20 to 25 and 'generally acceptable range' for BMI 20 to 27 with the caution that BMI 25 to 27 'may lead to health problems in some people'. In Canada the generally acceptable range is frequently referred to as a healthy weight range.

As far as the term healthy weight is concerned, there is considerable information in the literature that attempts to define this term. The limitations of the relationship between BMI categories and health have been raised. For example, body fat distribution also influences health. In addition, metabolic abnormalities associated with obesity may be present even though an individual's BMI may lie with the 'healthy range.' Conversely, individuals may be metabolically healthy yet have BMI's above the healthy range. Finally, individuals may use unhealthy means (e.g. disordered eating, purging, smoking, compulsive exercise) to achieve a weight that lies within the healthy range yet such practises cannot be equated with health (Ikeda, undated). Nomenclature will have to be a consideration in a review of the *Canadian Guidelines*.

Limitations of guidelines are of greater or lesser concern depending on their application. Guidelines are used for several purposes: to estimate prevalence of weight (fat) problems; establish trends; make comparisons between and within populations; identify at-risk groups and individuals, and provide a basis for population, group and individual preventative and weight management programs. The limitations described above are of less concern when the guidelines are applied on a population basis i.e. to establish prevalence, track population trends, or compare populations. However, a slight shift in cut-off points can have considerable impact on prevalence levels. Also with regard to limitations, health promotion programs that are directed towards enabling increased physical activity and healthful food choices on a population basis need not rely on identifying individuals who are overweight or obese and the limitations of measurements are of less concern.

Limitations are of greater concern when identification, prevention or management is directed towards individuals. Most guidelines reviewed herein emphasize the difficulty of identifying a true healthy or normal weight range for individuals. A recent paper highlights the considerable limitations of BMI to predict body fatness among individuals (Kline, 2001). In the guidelines presented that included a component with recommendations for individuals (whether intended for clinicians or the lay public) assessment of clinical conditions such as metabolic irregularities and obesity-related diseases was also recommended. The influence of ethnicity also assumes greater importance when applied to individuals. A review of the current *Canadian Guidelines* will have to consider the implications of one set of guidelines for an ethnically mixed population such as Canada. First Nations people will require particular consideration as Inuit people, particularly, may be at different risk levels at given measurements than other populations (McCargar, 2000). However, the difficulties with using different guidelines for different ethnic groups would also pose problems. The issue of the application of guidelines to the assessment of individuals will be an important component of a review of the current *Canadian Guidelines*.

Regarding the application of the guidelines to weight management, some advice stresses the benefits of weight loss, other advice focusses more on the benefits of moderate weight loss, while other advice emphasizes healthy eating and physical activity rather than weight per se. The latter has been the Canadian approach in the Vitality Program. This program exemplifies a healthy lifestyle approach rather than a focus on weight.

It will also be noted that newer guidelines focus on the problem of overweight with little

attention paid to underweight. Whereas previous Canadian work included attention to the continuum of weight problems from eating disorders and underweight to overweight and obesity.

The possible negative impact of labeling people with regard to weight, the lack of effectiveness of weight loss programs, or the drawbacks to weight loss attempts were not addressed to a large extent in newer guidelines. In previous Canadian reports, the possible impact of programs to aggressively promote healthy weight on those susceptible to a negative body image and eating disorders was a major concern which influenced both prevention and treatment recommendations. However, the relationship between body weight and body image is complex (Strain, 1999) and this area requires added investigation and review.

There are varying approaches to weight (fat) management from both a prevention and treatment perspective which range from a focus on weight loss to an approach that recommends 'health at any size' which focuses on fat acceptance and healthy living (Neumark-Sztainer, 1999). This polarization of viewpoints will have to be addressed in any update of the *Canadian Guidelines*.

Table 10

	WHO	NIH	Scotland Body Mass Index (BMI)	England	Asian Pacific
Zone A: <20 May be associated with health problems for some people	Underweight <18.5	Underweight <18.5	Underweight <18.5	Underweight <20	Underweight <18.5
Zone B: 20 - 25 Good weight for most people	Normal range 18.50-24.99	Normal 18.5-24.9	Normal 18.5-24.9	Desirable or healthy Range. Over 20-25	Normal 18.5-22.9
Zone C: Between 25 and 27 May lead to health problems in some people	Preobese 25.00-29.99	Overweight 25.0-29.9	Overweight 25-29.9	Overweight Over 25 to 30	At risk 23-24.9
Zone D: >27 Increasing risk of developing health problems	Obese class I 30.00-34.99	Obesity class I 30.0-34.9	Obesity 30.0-39.9	Obese Class II Over 30 to 35	Obese I 25-29.9
	Obese class II 35.00-39.99	Obesity class II 35.0-39.9		Obese Class III Over 35 to 40	Obese II ≥30
	Obese class III ≥40	Extreme Obesity Class III ≥40	Extreme Obesity ≥40	Morbidly or severely obese Class III Over 40	
Waist Circumference (WC)					
WHR cut-offs					
	Increased risk (cm)	Disease risk	Increased risk	Increased risk	Risk (cm)
Male: 1.0 Female: 0.8	M: ≥ 94 F: ≥ 80 Substantially Incr. M: ≥ 102 F: ≥ 88 Example only	M: >40 in (>102 cm) F: >35 in (>88 cm)	M: ≥ 94cm (about 37 in) F: ≥ 80cm (about 32 in) Substantially Incr. M: ≥ 102cm (about 40 in) F: ≥ 88 (about 35in)	M: ≥ 94cm (37 in) F: ≥ 80cm (32 in) Substantially Incr. M: ≥ 102cm (40 in) F: ≥ 88 (35in)	M: ≥ 90 F: ≥ 80

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