

Underweight Canadians

by Janet Che

As a society, we are obsessed with the “perfect” body. While for men this implies mostly strength and muscle, for women, the often-perceived “ideal” calls for,

among other things, an impossibly lean physique. Although most people recognize that skinny does not necessarily equal healthy, the urge to conform to society’s ideals tends to be

strong. And we live in a culture that prizes thinness — for women at least.

Culture, however, is only one factor that influences body weight. Others include genetic, socioeconomic, and

CST What you should know about this study

Data in this article come from the National Population Health Survey (NPHS), which collects information about the health of Canadians every two years. It covers residents in all provinces and territories, except persons living on Indian reserves, on Canadian Forces bases, and in some remote areas.

Underweight: Refers to the segment of the population with a body mass index (BMI) of less than 20.

Household income: Household income groups were based on household size and total household income from all sources in the 12 months before the interview.

Distress: The distress index was based on six questions. Respondents were asked: “During the past month, how often did you feel: so sad that nothing could cheer you up? nervous? restless or fidgety? hopeless? worthless? that everything was an effort?” The response options — all of the time, most of the time, some of the time, a little of the time, and none of the time — were given weights of 4, 3, 2, 1 and 0, respectively. The score could range from 0 to 24. Respondents scoring 7 or more were classified as feeling distressed; about 15% of underweight

respondents and 12% of those with acceptable weight fell into this category.

Smoking status: Individuals were asked if they smoked cigarettes daily, occasionally, or not at all. This article used two categories: current smoker (daily or occasional) and non-smoker (former smokers or those who never smoked).

Leisure-time physical activity

Active: Those who averaged 3.0 or more kcal/kg/day of energy expenditure. This is approximately the amount of exercise that is required for cardiovascular health benefit (for example, jogging for an hour three times a week).

Moderately active: Those who averaged between 1.5 and 2.9 kcal/kg/day. They might experience some health benefits but little cardiovascular benefit (for example, walking for an hour four times a week).

Inactive: Those whose daily energy expenditures were below 1.5 kcal/kg (for example, gardening for an hour twice a week).

behavioral reasons as well as health status and the presence of chronic disease. Whatever the factors, though, warnings about and awareness of the health consequences of excess weight abound,¹ while much less attention seems to be paid to the implications of being underweight. In part, this may be because it is not as prevalent as being overweight. But also, because thinness is so commonly regarded as an ultimate goal, it is hard to think of it as a health concern.

Research on the health and well-being of underweight Canadians is limited, and experts' opinions on the topic vary. Some researchers state that the health risks of being moderately underweight are comparable to that of being quite overweight.² Others claim that being very thin could be associated with chronic conditions and shortened life span.³ On the other hand, some maintain that low

1. Heart disease, high blood pressure, type II diabetes, gall bladder disease, and some types of cancer are often associated with excess weight. Pi-Sunyer, F.X. 1993. "Medical hazards of obesity." *Annals of Internal Medicine* 119, 7: 655-660; Berg, F.M. July/August 1995. "Obesity costs reach \$45.8 billion." *Healthy Weight Journal* 6; Rabkin, S.W., Y. Chen, L. Leiter, L. Liu and B.A. Reeder. Canadian Heart Health Surveys Research Group. 1997. "Risk factor correlates of body mass index." *Canadian Medical Association Journal* 157 (1 suppl.): S26-S31; Must, A., J. Spadano, E.H. Coakley, A.E. Field, G. Colditz and W.H. Dietz. 1999. "The disease burden associated with overweight and obesity." *The Journal of the American Medical Association* 282, 16: 1523-1529.
2. Troiano, R.P., E.A. Frongillo Jr., J. Sobal and D.A. Levitsky. 1996. "The relationship between body weight and mortality: A quantitative analysis of combined information from existing studies." *International Journal of Obesity* 20: 63-75.
3. American Dietetic Association. *Healthy Weight, Healthy You*. www.eatright.org/nfs/nfs12.html (accessed November 21, 2001).

CST Body mass index

Body mass index (BMI) is calculated as weight in kilograms divided by the square of height in meters. To convert pounds to kilograms, divide by 2.2, and to arrive at height in meters, divide inches by 39.4.

For example, to calculate the BMI of someone who weighs 130 pounds and is 65 inches (5'5") tall, you have to do the following:

1. 130 pounds/2.2 = 59 kilograms
2. 65 inches/39.4 = 1.65 meters
3. 1.65 x 1.65 = 2.72
4. 59 kilograms/2.72 = 21.7 BMI

Therefore, a person with these measurements has a body mass index of 22, which is in the acceptable range.

Canadian Guidelines for Healthy Weights uses BMI as a measuring unit of weight for adult Canadians. The World Health Organization (WHO) and the National Institute of Health (NIH) in the United States also use BMI in their weight guidelines, although the cutoffs are different than those used in Canada.

BMI guidelines

Canadian	International (WHO and NIH)
Underweight: under 20	Underweight: 18.5 or under
Acceptable weight: 20 to under 25	Acceptable weight: 18.5 to under 25
Some excess weight: 25 to 27	Overweight: 25 to under 30
Overweight: over 27	Obese: 30 or over

In general, BMI is not calculated for pregnant women. While some reports have restricted the calculation of BMI to people aged 20 to 64, this article, like some others, includes individuals aged 15 and over.¹

Limitations of BMI: BMI has been widely used to study the relationship between weight and health. Overall, it works well as a simple surrogate measure of body fat in most middle-aged adults. However, it is not perfect. As BMI does not discriminate between muscle and fat, some people with a high BMI may be very muscular with little body fat. Others, whose BMI is in the acceptable range, may have little muscle mass and too much body fat. BMI is probably a less valid measure for body-builders, athletes, adolescents who are still growing, and older adults.

1. McElhone, S., J.M. Kearney, G. Chetti et al. Winter 1999. "Body image perception in relation to recent weight changes and strategies for weight loss in a nationally representative sample in the European Union." *Public Health Nutrition* 2 (1a): 143-151; Statistics Canada. Winter 1999. "Personal health practices: Smoking, drinking, physical activity and weight." *Health Reports: How Healthy Are Canadians?* 11, 3 (Statistics Canada Catalogue no. 82-003): 83-90; Statistics Canada. Winter 2000. "Taking risks/taking care." *Health Reports: How Healthy Are Canadians?* 12, 3 (Statistics Canada Catalogue no. 82-003): 11-20.

body weight is linked with low mortality rates and there is little evidence of harm in being very thin.⁴

Using data from the 1998–99 National Population Health Survey (NPHS), this article explores the demographic, social and economic characteristics of the underweight population. It also compares selected health characteristics of underweight Canadians with those of individuals whose weight is considered acceptable.

Nearly one in 10 Canadians report being underweight

According to the 1998–99 NPHS, almost one in 10 (9%) Canadians aged 15 and over, 2.2 million people, were underweight (i.e. they have a body mass index, or BMI, of less than 20). While the proportion of overweight individuals has increased steadily over time (from 17% in 1985 to 30% in 1998–99)⁵, that of underweight Canadians has dropped from 13% to 9% during these years.

Because there is a natural tendency to gain weight with age, young people are the most likely group to be underweight. Indeed, in 1998–99, about 28% of 15- to 19-year-olds⁶ and 14% of 20- to 24-year-olds were underweight, compared with 8% of those aged 65 and over. The likelihood of being underweight is lowest, at about 5%, between the ages of 45 and 64.

4. Manson, J.E., W.C. Willett, M.J. Stampfer, G.A. Colditz, D.J. Hunter, S.E. Hankinson, C.H. Hennekens and F.E. Speizer. 1995. "Body weight and mortality among women." *The New England Journal of Medicine* 333, 11: 677-685; Byers, T. 1995. "Body weight and mortality." *The New England Journal of Medicine* 333, 11: 723-724.
5. The data from 1985 are from the General Social Survey, while data from 1998–99 are from the National Population Health Survey.
6. As teenagers' bodies have not yet finished growing, BMI measures for them should be interpreted with caution.



Women, teens, and unmarried people are more likely to be underweight

	Population aged 15 and over ¹	Underweight population
	'000	%
Total	23,600	9
Sex		
Males	11,700	5
Females	11,900	13
Age		
15–19	2,100	28
20–24	1,900	14
25–44	9,400	8
45–64	6,700	5
65 and over	3,500	8
Marital status		
Single, never-married	6,300	17
Married, common-law	14,000	6
Widowed	1,400	9
Separated/divorced	1,900	7
Living arrangements		
Living alone	3,500	8
Living with immediate family	17,400	9
Living with others	2,700	12
Household income		
Low	3,000	12
Middle	5,800	9
High	13,100	8
Missing	1,800	14

1. Excludes pregnant women.
Source: Statistics Canada, National Population Health Survey, 1998–99.

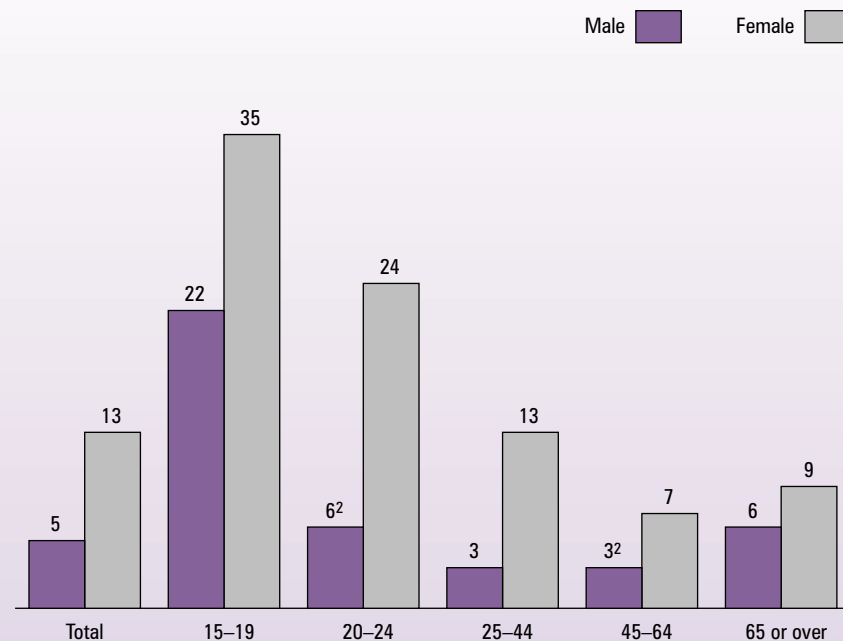
Besides age, other factors may also be associated with being underweight, such as sex, marital status, living arrangements and household income. But when these factors were held constant, the odds of being underweight still remained higher for the 15- to 19-year-old and the 20- to 24-year-old groups than for those aged 65 and over.

Low body weight at younger ages could be the result of numerous factors, including a more active lifestyle, a higher metabolic rate, or weight

concerns during adolescence. In the pursuit of thinness, young people are more likely to engage in weight control measures such as dieting, smoking or excessive exercising.

Women substantially more likely to be underweight

According to the 1998–99 NPHS, women were far more likely than men to be underweight (13% versus 5%, respectively). While men's larger muscle and bone mass may account for some of the disparity, women are also

% of Canadians aged 15 and over who are underweight¹

1. Population excludes pregnant women.

2. Subject to high sampling variability.

Source: Statistics Canada, National Population Health Survey, 1998-99.

generally more likely to try to lose weight.⁷ These gender differences persisted even after the effects of the other socio-demographic factors were taken into consideration: the odds of women being underweight were nearly three times that of men.

The difference in the proportion of underweight men and women occur in all age groups, although to different degrees. At 18 percentage points, the gap peaks among 20- to 24-year-olds (24% of females versus 6% of males are underweight in this age group) then starts declining. By the time individuals are 45 or over, the difference in the percentage of underweight men and women diminishes greatly.

The fact that young women are considerably more likely to be underweight than young men is not surprising. It is a well-documented fact that teenage boys and girls have

different ideals regarding body shape and weight. For example, a study of college students showed that, while the majority wished to change their weights, males wanted to gain but females wanted to lose weight.⁸ Some researchers maintain that the gender difference in body shape and weight aspiration may start as early as age nine.⁹

Underweight people more likely to be found among singles

Both being single and living with people other than immediate family are associated with being underweight.¹⁰ Singles were more than twice as likely to be underweight as their married or common-law counterparts: 17% versus 6%, respectively. Similarly, individuals who lived with immediate family were less likely to be underweight (9%) than those who lived

with others (12%). People who do not have the support of family members and who probably eat alone more, may simply not bother to spend time cooking nutritious meals for themselves. After holding all other factors constant, singles still had a significantly higher likelihood of being underweight than married people, but the effect of living arrangements was no longer significant.

Income also appears to have a bearing on being underweight. Nearly 12% of Canadians who lived in low-income households were underweight compared with 8% of their high-income counterparts.¹¹ Lower levels of income can lead to poor nutrition if there is insufficient money to buy the right quantity and quality of food. And poor nutrition is a known cause of being underweight. However, when the effects of sex, age, marital status and living arrangements were taken into account, the association between income and being underweight was no longer statistically significant. In other words, different levels of income did not influence the odds of being underweight.

7. Green, K.L., R. Cameron, J. Polivy, K. Cooper, L. Liu, L. Leiter and T. Heatherton. Canadian Heart Health Surveys Research Group. 1997. "Weight dissatisfaction and weight loss attempts among Canadian adults." *Canadian Medical Association Journal* 157 (1 suppl.): S17-S25.

8. Conner-Greene, P.A. 1988. "Gender differences in body weight perception and weight-loss strategies of college students." *Women and Health* 14, 2: 27-42.

9. Hill, A.J., E. Draper and J. Stack. 1994. "A weight on children's minds: Body shape dissatisfactions at nine years old." *International Journal of Obesity* 18: 383-389.

10. Immediate family refers to a spouse/partner, a parent or a child.

11. For a household of three or four people, total household income is defined as low if it is \$19,999 or under, middle income \$20,000 to \$39,999 and high income \$40,000 or over.

	<u>Odds ratio¹</u>
Sex	
<i>Males</i>	1.00
Females	3.04*
Age	
15–19	3.78*
20–24	1.63*
25–44	1.03
45–64	0.66*
<i>65 and over</i>	1.00
Marital status	
Single, never-married	1.44*
<i>Married, common-law</i>	1.00
Widowed	0.96
Separated/divorced	1.06
Living arrangements	
Living alone	0.95
<i>Living with immediate family</i>	1.00
Living with others	1.19
Household income	
Low	1.18
Middle	1.05
<i>High</i>	1.00

* Significantly different from reference category at the 95% confidence level.

1. Presents the odds of individuals with particular characteristics being underweight relative to the odds of a benchmark group, when all other variables in the model are held constant.

Note: Italics represent reference category, for which odds ratio is always 1.00. Analysis is based on population 15 and over, excluding pregnant women.

Source: Statistics Canada, National Population Health Survey, 1998–99.

Higher proportion of current smokers among underweight Canadians

Lifestyle choices and behaviour have a powerful influence on both weight and health. Physical activity, for example, contributes to overall well-being, while smoking adversely affects health and is a strong risk factor for several diseases and mortality.

According to the 1998–99 NPHS, about 23% of both underweight Canadians and those with acceptable

weight were physically active during their leisure time. The two groups also had similar proportions of moderately active and inactive members, implying that physical activity is not more likely to be associated with being underweight than with having acceptable weight.

The proportion of current smokers, however, was higher among underweight Canadians (33%) than among individuals with acceptable weight (29%). Perhaps underweight people

are more likely than others to smoke because they use smoking as a method to control and lose weight.¹² In a culture that favors thinness, the temptation to use smoking to curb appetite and hence weight gain may be high for some. This is particularly so for young females, who were found to have taken up smoking for the sake of losing weight and staying slim.¹³ Indeed even when other factors were held constant, the odds of an underweight individual smoking were 1.3 times the odds of a person with acceptable weight.

Underweight people slightly more likely to rate their health as fair or poor

In 1998–99, the proportion of underweight Canadians who rated their health as fair or poor was somewhat higher than that of individuals with acceptable weight: 8% versus 7%. When other factors were controlled for, the odds that an underweight person would rate their health as fair or poor were 1.3 times higher than the odds of someone with acceptable weight.¹⁴

12. Varner, L.M. January/February 1996. "Smoking — yet another weight loss strategy?" *Healthy Weight Journal* 13-19.

13. Crisp, A.H., C. Halek, P. Sedgwick, C. Stavrakaki, E. Williams and I. Kiossis. 1998. "Smoking and pursuit of thinness in schoolgirls in London and Ottawa." *Postgraduate Medicine Journal* 74: 473-479; Crocker, P., N. Kowalski, K. Kowalski, K. Chad, L. Humbert and S. Forrester. 2001. "Smoking behaviour and dietary restraint in young adolescent women: The role of physical self-perceptions." *Canadian Journal of Public Health* 92, 6: 428-432; Boles S. and P. Johnson. 2001. "Gender, weight concerns and adolescent smoking." *Journal of Addictive Diseases* 20, 2: 5-14.

14. An individual's subjective assessment of well-being gives a good indication of one's general health. According to some researchers, self-rated health is considered a valid and reliable indicator of health.

	<u>Odds ratio¹</u>
Current smoker	
<i>Acceptable weight</i>	1.00
Underweight	1.32*
Active leisure-time activity	
<i>Acceptable weight</i>	1.00
Underweight	0.88
Poor/fair self-perceived health	
<i>Acceptable weight</i>	1.00
Underweight	1.33*
Distress	
<i>Acceptable weight</i>	1.00
Underweight	1.10

* Significantly different from reference category at the 95% confidence level.

1. Presents the odds of individuals with particular characteristics being underweight relative to a benchmark group when all other variables are held constant.

Note: Italics represent reference category, for which odds ratio is always 1.00. Analysis is based on population 15 and over, excluding pregnant women.

Source: Statistics Canada, National Population Health Survey, 1998–99.

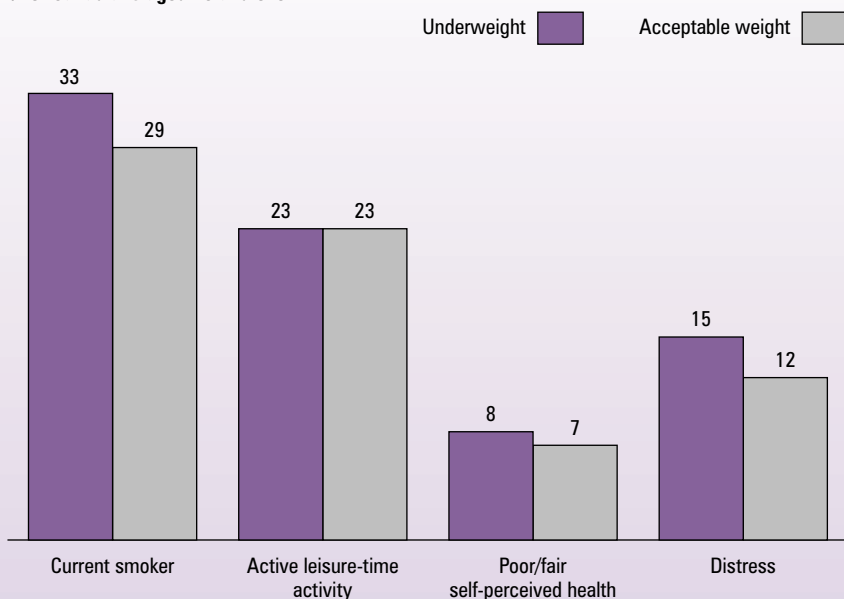
People who were underweight were also more likely than those with acceptable weight to report feelings of distress (15% versus 12%). However, after taking into account the other socio-demographic variables, this difference was no longer significant.

Summary

Close to one in 10 Canadians were underweight in 1998–99, a rate slightly lower than in 1985. Underweight people were most likely to be found among youth under 25 years of age, females, singles, people living with others who are not immediate family, and those in low-income households.

When other factors were held constant, sex, age, marital status, current smoking and self-perceived health were found to be associated with being underweight. For example, the odds of being a current smoker and of having poor or fair self-perceived health were higher among underweight Canadians than among those with acceptable weight. On the other hand, the odds of being physically active and having feelings of distress were not significantly different between the two groups.

% of Canadians aged 15 and over¹



1. Population excludes pregnant women.

Source: Statistics Canada, National Population Health Survey, 1998–99.



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