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Body mass index

Excess weight has been linked to three major risk factors for cardiovascular disease, namely hypertension, diabetes, and adverse changes in blood lipids. It is also associated with the development of endometrial cancer and breast cancer among postmenopausal women, gallbladder disease, and complications during pregnancy. Osteoarthritis may also be made worse by obesity.[1]

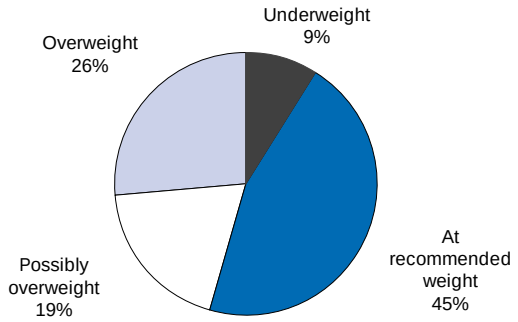
Being underweight has its dangers as well, not the least of which are health problems associated with disturbed eating behaviours. Nutrient deficiencies, chronic fatigue, hypertension, heart irregularities, depression, psychological distress, anemia, and diarrhea sometimes accompany eating disorders leading to underweight.[1]

Body mass index (BMI), calculated as weight in kilograms divided by height in metres squared, is considered a valid and reliable measure of weight status for adults. It has a high correlation with body fat, especially when age is taken into account.

The overall results from the 1995 Physical Activity Monitor, presented in Figure 1, show that 26% of Canadian adults aged 18 and older are at increased risk of developing health problems because of excess body weight (BMI > 27). An additional 19% are considered moderately overweight and at possible risk of health problems (BMI 25–27), while 45% are at what is considered to be a good, healthy weight for most people (BMI 20–25). Nine percent are classified as underweight (BMI < 20).

Figure 1

BODY MASS INDEX OF CANADIANS AGED 18+



1995 Physical Activity Monitor, CFLRI

The proportion of overweight Canadians increases with age group, with 37% of Canadians aged between 45 and 64 now being considered overweight.

Trends

Trends over time can be obtained by comparing the data from the 1995 Physical Activity Monitor with the data from the 1985[2] and the 1991[3] General Social Survey, both of which also used self-reported height and weight to estimate BMI.

As shown in Table 1, there has been a substantial increase over the past decade in the overall percentage of Canadians aged between 20 and 64 who are overweight.

While the increase in the number of overweight Canadians has occurred among both men and women, it has been greatest among

Table 1

TRENDS IN BODY MASS INDEX FOR CANADIANS AGED 20 TO 64

	< 20[1]	20–25[2]	25–27[3]	> 27[4]
Women				
GSS 1985	20%	56%	10%	14%
GSS 1991	16	52	13	19
PAM 1995	13	52	14	21
Men				
GSS 1985	5	52	21	22
GSS 1991	3	45	24	28
PAM 1995	5	38	25	31

[1]underweight, [2]recommended weight, [3]possible overweight, [4]overweight

1995 Physical Activity Monitor, CFLRI

men. Not only are there more overweight men than women (31% compared with 21%), but the percentage of men who have a healthy weight is also decreasing at a faster rate than it is among women. The proportion of men with a healthy weight has decreased steadily, from 52% in 1985 to 38% in 1995. At the same time, the proportion of men who are overweight has increased by almost 10 percentage points over the past 10 years. In comparison, the proportion of overweight women has risen by about 7 percentage points during the same period.

Half of women are now estimated to be at the recommended weight. The percentage of women who are considered at possible risk of health problems as a result of being moderately overweight has increased very slightly, whereas the number who are underweight has dropped from 20% in 1985 to 13% in 1995.

Socioeconomic differences

Canadians with lower education levels are more likely to be overweight than Canadians with higher levels of education.

No consistent pattern was found between level of household income and incidence of being overweight. However, the percentage ofoverweight individuals is significantly higher among those with a household income between $80,000 and $99,999. Well over one-third of this group are overweight, compared with approximately one-quarter of people in other income brackets. The reasons for this difference are not immediately apparent.

Among occupational groups, the proportion of overweight Canadians is highest among retirees (34%), homemakers (32%), and unemployed individuals (30%); it is lowest among part-time and full-time workers (20% and 26% respectively).

Smaller communities tend to have greater proportions of overweight individuals than do larger communities. The reasons for this difference are not clear but may be related in part to the finding that smaller communities tend to be characterized by older populations, which are more likely to be overweight.

The relative percentage of overweight individuals varies only slightly with marital status and family composition, with the exception of those who have never been married (typically young adults), who tend to have a lower BMI. Again, age is very likely a factor in these results.

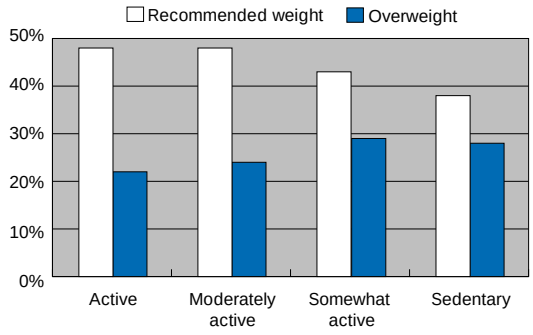
Activity level

The most active Canadians, who have an average daily energy expenditure of at least 3 KKD, are the least likely to be overweight (Figure 2). In contrast, Canadians who are sedentary or active at only a low level are the most likely to be overweight. About half of active Canadians are at the recommended weight, compared with just 38% of sedentary Canadians.

For both the active and the sedentary, 21% are classified as being at possible risk of health problems because of overweight (BMI 25–27). With very active individuals, however, being slightly over average weight may be

Figure 2

% AT RECOMMENDED WEIGHT AND OVERWEIGHT
by energy expenditure



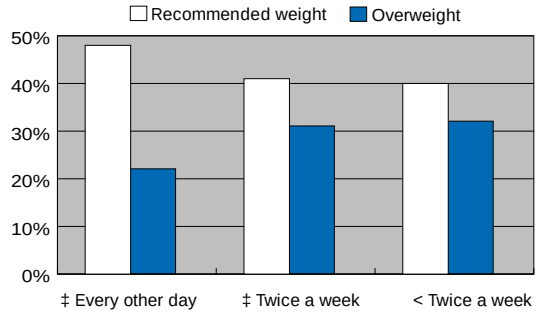
1995 Physical Activity Monitor, CFLRI

more reflective of a higher-than-average muscle density, rather than an indication of excess body fat. One of the limitations of using BMI to assess body fat is that muscle tissue weighs more than fat, and heavily muscled individuals may be inadvertently misclassified as overweight as a result of a higher muscle density.

It seems that *frequency* of physical activity is helpful in maintaining a good weight as well, even when intensity and duration of activity are not taken into account (Figure 3). Respondents who are active at least every other day, regardless of intensity or duration of activity, are less likely to be overweight and more likely to be in the healthy-weight range than those who are less frequently active.

Figure 3

% AT RECOMMENDED WEIGHT AND OVERWEIGHT
by frequency of activity



1995 Physical Activity Monitor, CFLRI

These findings are encouraging for both those who are currently active and those who are less frequently active but are contemplating increasing their participation. Just getting out and doing something at least every other day is associated with a lower incidence of being overweight.

Average height and weight

The same raw data used to calculate BMI can be used to calculate the average height and weight of Canadians. As can be seen from Table 2, the average height of Canadian women aged 18 and older is 163 centimetres (about 5 feet, 4 inches), while the average height for men is 177 centimetres (about 5 feet, 10 inches). The average weight of Canadian women is 65 kilograms (about 143 pounds), while the average weight for men is 81 kilograms (about 180 pounds).

Table 2

MEAN HEIGHT AND WEIGHT FOR MEN AND WOMEN
by age

	Height (cm)		Weight (kg)	
	Women	Men	Women	Men
Total, 18 +	163	177	65	81
18–24	165	180	61	79
25–44	164	178	63	80
45–64	162	176	68	82
65 +	162	176	68	80

1995 Physical Activity Monitor, CFLRI

Younger adults tend to be slightly taller than adults in older age groups. Men's height ranges from 180 centimetres among 18–24 year-olds to 176 centimetres among their elders aged 45 and older. A similar decrease with age is observed for women's height.

There are also age differences with respect to weight, with men aged between 45 and 64 being about two kilograms heavier on average than men aged 25–44 or men aged 65 and older. Men aged 18–24 are the lightest, weighing in at 79 kilograms. Among women, weight increases with age, from 61 kilograms among the 18–24 year-olds to 68 kilograms among women aged 45 and older.

Reducing obesity

Obesity is on the rise and is an important trend to reverse if we are to reduce the risk of diseases associated with being overweight. The results of the 1995 Physical Activity Monitor, along with those of previous research, point to regular physical activity as a worthwhile strategy in managing weight. Regularly active people have a better chance of being at the recommended weight for their height.

In adopting regular activity, it is important to

- expect and aim for long-term improvements in body composition rather than a "quick fix." This approach will pay lifelong dividends;
- remember that regular activity sometimes improves body composition without showing any effect on body weight, because it increases muscle mass, which weighs more than fat mass;[4]
- realize that becoming older does not equate with becoming less active or overweight. Activity preferences might change with age, but there is nothing to prevent a person from living actively, and consequently maintaining a healthy weight, throughout the golden years;
- shift emphasis from weight to other goals, such as enjoyable physical activity and a positive body image.

Focusing instead on an enjoyable, active lifestyle will ensure that weight-reduction strategies "improve well-being rather than exacerbate the prevailing prejudice against fatness and increase dangerous preoccupations with weight."[1]

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Body mass index[1]

1995 Physical Activity Monitor

	<20[2]	20–25	25–27	>27
TOTAL, ADULTS (18+)	9%	45%	19%	26%
women	13	52	13	22
men	6	39	25	30
18–24	18	53	17	12
women	26	55	–	–
men	–	51	20	–
25–44	10	49	18	23
women	14	56	13	17
men	–	42	23	30
45–64	6	35	22	37
women	–	44	14	35
men	–	27	30	38
65+	–	42	21	30
women	–	47	–	32
men	–	37	32	28
EDUCATION LEVEL				
Less than secondary	8	39	19	35
Secondary	8	48	18	26
College	10	48	20	22
University	11	46	20	23
HOUSEHOLD INCOME				
< $20,000	10	48	17	25
$20,000–29,999	–	49	17	24
$30,000–39,999	9	42	20	29
$40,000–59,999	10	45	20	25
$60,000–79,999	–	49	18	24
$80,000–99,999	–	38	21	37
≥ $100,000	–	48	–	26
EMPLOYMENT STATUS				
Full-time worker	8	46	20	26
Part-time worker	9	52	19	20
Unemployed	–	40	–	30
Homemaker	–	47	–	32
Student	29	47	–	–
Retired	–	39	20	34

1 BMI = kg/m².

2 Exact categories are as follows: ≤19.99 (underweight), 20.00 to 24.99 (recommended weight), 25.00 to 27.00 (possible overweight), >27.00 (overweight).

– Data unavailable because of insufficient sample size.

(cont'd)

	<20[2]	20–25	25–27	>27
COMMUNITY SIZE				
< 1,000	–	*42%*	*17%*	*34%*
1,000–9,999	*9*	*41*	*23*	*27*
10,000–74,999	*7*	*46*	*20*	*26*
75,000–299,999	*10*	*49*	*17*	*24*
≥ 300,000	*11*	*48*	*19*	*22*
FAMILY COMPOSITION				
Living with a partner	*7*	*43*	*21*	*29*
with children at home	*7*	*45*	*20*	*28*
without children at home	*7*	*42*	*22*	*29*
Widowed, divorced, separated	*9*	*44*	*17*	*30*
with children at home	–	*49*	–	–
without children at home	–	*43*	*16*	*32*
Never married	*16*	*52*	*15*	*17*
with children at home	–	*56*	–	–
without children at home	*15*	*52*	*15*	*18*
ENERGY EXPENDITURE				
Active (≥3 KKD[1])	*8*	*48*	*21*	*22*
Moderately active (1.5–2.9 KKD)	*9*	*48*	*19*	*24*
Somewhat active (0.5–1.4 KKD)	*10*	*43*	*18*	*29*
Sedentary (<0.5 KKD)	–	*38*	*21*	*28*
ACTIVITY PATTERN				
≥ Every other day	*10*	*48*	*20*	*22*
≥ Twice a week	–	*41*	*21*	*31*
< Twice a week	*10*	*40*	*18*	*32*

1 Kilocalories/kilogram of body weight/day; an energy expenditure of 3 KKD is equivalent to walking one hour every day.

2 Exact categories are as follows: ≤19.99 (underweight), 20.00 to 24.99 (recommended weight), 25.00 to 27.00 (possible overweight), >27.00 (overweight).

– Data unavailable because of insufficient sample size.