



## Nutrition: Findings from the Canadian Community Health Survey

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### Measured Obesity Overweight Canadian children and adolescents

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## **Overweight Canadian children and adolescents**

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- In 2004, 26% of Canadian children and adolescents aged 2 to 17 were overweight or obese; 8% were obese.
- For adolescents aged 12 to 17, increases in overweight and obesity rates over the past 25 years have been notable; the overweight/obesity rate of this age group more than doubled, and the obesity rate tripled.
- Children and adolescents who eat fruit and vegetables 5 or more times a day are substantially less likely to be overweight or obese than are those whose fruit and vegetable consumption is less frequent.
- For children aged 6 to 11 and adolescents aged 12 to 17, the likelihood of being overweight or obese tends to rise as time spent watching TV, playing video games or using the computer increases.
- Canadian adolescent girls are significantly less likely than American adolescent girls to be overweight/obese.

Over the past 25 years, the prevalence of overweight and obesity in children and adolescents has risen, with the most substantial increases observed in economically developed countries.<sup>1</sup> According to the results of the 2004 Canadian Community Health Survey: Nutrition (CCHS), a substantial share of Canadian youth are part of this trend.

The 2004 CCHS was the first time in many years that interviewers directly measured the height and weight of a nationally representative sample of Canadians (see *Appendix A: Data sources and analytical techniques*). In the past, most health surveys relied on respondents to report their height and weight, a practice that tended to underestimate the prevalence of overweight and obesity among adolescents and adults<sup>2-5</sup> (see *Appendix B: Methodology makes a difference*).

The last time that the height and weight of a nationally representative sample of Canadian children and adolescents (aged 2 to 17) were directly measured was in 1978/79 as part of the Canada Health Survey. Results from that survey and the 2004 CCHS can be compared to get a better picture of the increase of overweight and obesity among young Canadians during the past quarter century.

In 1978/79, 12% of 2- to 17-year-olds were overweight, and 3% were obese—a combined overweight/obesity rate of 15%. By 2004, the overweight rate for this age group was 18% (an estimated 1.1 million), and 8% were obese (about half a million)—a combined rate of 26%.

### **Notable rise among adolescents**

Increases in overweight and obesity were similar among boys and girls (Chart 1). In 2004, the combined overweight/obesity rate for each sex was about 70% higher than it had been in 1978/79, and the obesity rate was 2.5 times higher. However, trends differed for various age groups.

For example, the percentage of children aged 2 to 5 who were overweight/obese remained virtually unchanged. By contrast, the overweight/obesity rate of adolescents aged 12 to 17 more than doubled from 14% to 29%, and their obesity rate tripled from 3% to 9% (Chart 2).

### **Higher body mass index**

Overweight and obesity are based on body mass index (BMI), a measure that takes weight and height into account (BMI = weight in kilograms divided by height in metres squared). For adults aged 18 or older, BMI cut-offs of 25 and 30 are used to classify individuals as overweight and obese, respectively, based on health risks associated with being in these weight classes.<sup>6</sup> For children and adolescents, the cut-offs are lower, and they also account for age (see *Appendix C: Calculating overweight and obesity in children and adolescents*).

The average BMI of adolescents aged 12 to 17 rose from 20.8 in 1978/79 to 22.1 in 2004. This produced a shift in the BMI distribution of the age group toward the heavy end of the continuum. The most pronounced increases were in the percentages of adolescents whose BMI exceeded 25 or 30, the overweight and obese thresholds for adults (Chart 3). This is of particular importance, given that adolescence is a critical period for the development of adult obesity.<sup>1,7-10</sup>

### **Provincial differences**

Youth overweight and obesity rates varied across the country, with the highest rates tending to be in the Atlantic provinces. In 2004, the combined overweight/obesity rate of 2- to 17-year-olds was significantly above the national level (26%) in Newfoundland and Labrador (36%), New Brunswick (34%), Nova Scotia (32%), and also, Manitoba (31%) (Chart 4). The prevalence of obesity was significantly higher than the national figure (8%) in Newfoundland and Labrador (17%) and New Brunswick (13%).

The combined overweight/obesity rate was significantly below the national level in Québec (23%) and Alberta (22%), but the obesity rate in these provinces was similar to the national rate.

### **Canada-US comparisons**

Since the early 1960s, the height and weight of a nationally representative sample of Americans have been directly measured as part of the National Health and Nutrition Examination Survey (NHANES). Based on the most recent NHANES data (1999-2002), the combined overweight/obesity rate of 2- to 17-year-olds was similar in the United States and Canada (Chart 5), but the American obesity rate was slightly higher (10% versus 8%).

Overweight/obesity and obesity rates for boys in the two countries were similar (Chart 6). However, for girls, the overweight/obesity rate in Canada was higher at ages 2 to 5, but lower at ages 12 to 17. At ages 12 to 17, American girls were almost twice as likely as Canadian girls to be obese: 13% versus 7%.

For young people of both sexes in the United States, the prevalence of overweight and obesity increased with age. The overweight/obesity rate of American boys rose from 14% at ages 2 to 5 to 33% at ages 12 to 17; for American girls, the increase was from 17% to 31%. In Canada, too, boys' overweight/obesity rate rose from 19% at ages 2 to 5 to 32% at ages 12 to 17. By contrast, Canadian girls' rate was relatively stable at around 25% regardless of age.

If the prevalence of overweight and obesity among youth is still increasing, differences between Canada and United States may be greater, because the American rates are based on earlier data (collected from 1999 to 2002).

Another factor in comparisons between the two countries is the ethnic composition of the population. In the United States, Black, Hispanic and Mexican-American children and adolescents had relatively high overweight/obesity rates (more than 30%) (Chart 7). These groups represent about one-third of American youth, but constitute a very small share of the population in Canada. When comparisons were made between white Canadian and American youth, the overweight/obesity and obesity rates did not differ significantly.

In Canada, young people of Aboriginal origin (off-reserve) had a significantly high combined overweight/obesity rate (41%). Their obesity rate was 20%, two and a half times the national average. By contrast, youth of Southeast Asian or East Asian origin had a low overweight/obesity rate (18%) (Chart 8). These differences between ethnic groups persisted when age and socio-economic factors were taken into account. However, because of the relatively small numbers in these ethnic groups, the national overweight/obesity and obesity rates were not strongly influenced by these differences.

### **A fattening environment?**

American data show that children's consumption of fast food has increased dramatically over the past two decades, and that a large majority of children and adolescents do not have an adequate number of daily servings of fruit and vegetables.<sup>1,10</sup> Based on data from the 2004 CCHS, 59% of Canadian children and adolescents were reported to consume fruit and vegetables less than five times a day (see *Appendix D: Definitions*). These young people were significantly more likely to be overweight/obese or obese than were those who ate fruit and vegetables more frequently (Chart 9).

Some studies have found that physical activity is protective against childhood obesity,<sup>11</sup> while others have not found such a relationship<sup>1</sup> (see *Appendix E: Limitations*). Analysis of CCHS data shows that physical activity levels were not associated with overweight and obesity at ages 6 to 11 (Chart 10), but by ages 12 to 17, associations were significant, though only for boys (Chart 11). Sedentary boys were more likely than active boys to be obese (16% versus 9%). Unexpectedly, a higher proportion of active and moderately active boys were overweight (but not obese), compared with boys who were sedentary.

Watching television, playing video games and using the computer are common pastimes for many Canadian children. Time spent on these activities is referred to as “screen time.” In 2004, over a third (36%) of children aged 6 to 11 logged more than 2 hours of screen time each day (Chart 12). These children were twice as likely to be overweight/obese as were those whose daily viewing totalled an hour or less (35% versus 18%), and about twice as likely to be obese (11% versus 5%).

For adolescents aged 12 to 17, screen time was measured on a weekly basis. Their overweight/obesity rates ranged from 23% of those whose viewing amounted to fewer than 10 hours a week to 35% of those who spent more 30 or more hours a week in front of a screen (Chart 13).

The relatively recent introduction and rapid proliferation of video games and home computers make it difficult to track trends in screen time. In 1988, the Campbell’s Survey on Health and Well-being asked 12- to 17-year-olds how many hours they watched television—the weekly average was 9. In 2004, average weekly television hours were almost the same, at 10. However, when time spent on the computer and playing video games is included, adolescents’ total average screen time doubles to 20 hours a week.

All associations between these lifestyle factors (fruit and vegetable consumption, physical activity and screen time) persisted when the effects of age and socio-economic status were controlled.

### **Socio-economic status**

For adults, lower socio-economic status tends to be associated with obesity. While the same relationship has been observed for children, the association is usually not as strong, and results have been inconsistent.<sup>12-14</sup>

According to the 2004 CCHS, children and adolescents in middle-income households were more likely to be overweight/obese or obese than were those in high-income households (Chart 14). Overweight/obesity rates and obesity rates for youth in low-income and high-income households were similar.

The pattern was clearer for education. Young people in households where no members had more than a high school diploma were more likely to be overweight/obese than were those in households where the highest level of education was postsecondary graduation (Chart 15).

### **Diminished perceptions of health**

In 2004, 18% of adolescents aged 12 to 17 reported that they had at least one diagnosed chronic condition. This rate did not vary significantly whether adolescents were in the normal weight range, overweight (not obese) or obese. Nevertheless, young people's perceptions of their health did differ, depending on their weight (Chart 16). Boys who were obese were much less likely than those whose weight was in the normal range to report their health as excellent or very good. For girls, diminished health perceptions were evident not only among those who were obese, but also among those who were overweight. These associations between weight and health perceptions persisted for both sexes when socio-economic status and the presence of a chronic condition were taken into account.

### **Conclusion**

The past 25 years have seen a considerable increase in the percentage of Canadian children and adolescents who are overweight or obese. The increase was particularly notable among 12- to 17-year-olds, whose overweight/obesity rate more than doubled, and whose obesity rate tripled.

The burden to the health care system of childhood obesity is difficult to quantify because the related physical health problems are usually not evident until later in life. Nonetheless, the upturn in the prevalence of overweight/obesity among young people is important because overweight/obesity in adolescence often persists into adulthood.<sup>1,7-10</sup> A recent Canadian study based on longitudinal data found that once an adult is overweight, further weight gain is likely; very few return to the normal weight range.<sup>15</sup>

However, some of the factors associated with overweight and obesity among young people are modifiable. Increased consumption of fruit and vegetables, more physical activity and less time devoted to sedentary activities such as watching television and playing video games may help reverse the upward trend.

### **Acknowledgements**

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## **Appendix A**

### **Data sources and analytical techniques**

Data from the 2004 Canadian Community Health Survey (CCHS): Nutrition were used to produce overweight and obesity rates for 2- to 17-year-olds. The 2004 CCHS was designed to gather information at the provincial level about the nutritional status of the Canadian population (see <http://www.statcan.ca/english/concepts/hs/index.htm#content>). The survey does not include residents of the three Territories, Indian reserves and some remote areas, and regular members of the Canadian Armed Forces. The response rate was 76.5%. Measured height and weight were obtained for 66% of the 2- to 17-year-olds who responded to the 2004 CCHS, a total of 8,661 individuals (see *Appendix E: Limitations*).

Overweight and obesity rates of American children and adolescents were estimated from the 1999-2002 National Health and Nutrition Examination Survey (NHANES). The NHANES obtained measured height and weight data for 7,297 children and adolescents.

Historical estimates of Canadian overweight and obesity rates, based on directly measured height and weight, are from on the 1978/79 Canada Health Survey, and for 12- to 17-year-olds, from the 1981 Canada Fitness Survey and the 1988 Campbell's Survey on Health and Well Being. For 12- to 17-year-olds, rates based on self-reported data are from the 2000/01 and 2003 CCHS and the 1994/95, 1996/97 and 1998/99 National Population Health Survey (NPHS). For 2- to 11-years olds, rates based on data reported by parents are from the 1994/95, 1996/97, 1998/99, 2000/01 and 2002/03 National Longitudinal Survey of Children and Youth (NLSCY). In 2002/03, NLSCY estimates could be made only for children aged 2 to 5, since the cross-sectional file does not include records for children aged 6 or older.

Descriptive statistics from the 2004 CCHS were used to estimate the proportion of 2- to 17-year-olds who were overweight and obese in relation to selected characteristics. All estimates were based on the 8,661 children and adolescents for whom measured data on height and weight were obtained. Since they accounted for only 66% of children and adolescents who responded to the 2004 CCHS, an adjustment was made to minimize non-response bias. A special sampling weight was created by redistributing the sampling weights of the non-respondents to the respondents, using response propensity classes. Variables such as province, age, sex, household income, race, education, physical activity, fruit and vegetable consumption and chronic conditions were used to create the classes. The classes were created with the CHAID (Chi-Square Automatic Interaction Detector) algorithm available in Knowledge Seeker<sup>16</sup> to identify the characteristics that best split the sample into groups that were dissimilar with respect to response/non-response. This adjusted sampling weight was used to produce all estimates in

this analysis. Standard errors and coefficients of variation were estimated using the bootstrap technique, which accounts for the survey design effects.<sup>17-19</sup>

The American and Canadian historical estimates are based on weighted data. The criteria specified by the International Obesity TaskForce (IOTF) were used to define overweight and obesity among youth (see *Appendix C: Calculating overweight and obesity in children and adolescents*).

Standard errors and coefficients of variation for estimates from the 1978/79 Canada Health Survey and the National Health and Nutrition Examination Survey (NHANES), 1999-2002 were estimated with SUDAAN, which uses a Taylor series linearization method to account for the complex survey sample design.

The body mass index (BMI) distribution (Chart 3) was smoothed by calculating three-point averages. For example, the percentage of the population with a BMI of 23 was calculated by summing the percentage with a BMI of 22, the percentage with a BMI of 23 and the percentage with a BMI of 24, and then dividing the result by 3.



## **Appendix B**

### **Methodology makes a difference**

In the United States, data from the National Health and Nutritional Examination Survey (NHANES) show sharp rises in overweight/obesity rates among children and adolescents between 1976-1980 and 1988-1994, and again, between 1988-1994 and 1999-2002.<sup>20</sup>

In Canada, because of variations in the methods used to collect information on height and weight, it is difficult to pinpoint when overweight and obesity rates increased. Rates for 12- to 17-year-olds, based on directly measured height and weight, can be calculated for four reference years: 1978/79, 1981, 1988, and 2004 (Chart 17) (see *Appendix A: Data sources and analytical techniques*). These data reveal a small decrease in adolescents' overweight/obesity and obesity rates between 1978/79 and 1981,<sup>21</sup> and then, substantial increases between 1981 and 1988, and again, between 1988 and 2004. Calculations based on self-reported data show a stabilization of rates from 1994/95 to 2003. But between 2003 and 2004, when the collection method changed from self-reported to measured data, overweight/obesity and obesity rates rose sharply. This is not surprising, as self-reports tend to yield lower rates of overweight and obesity.<sup>2-5</sup>

Comparisons of the average height and weight of adolescents (ages 12 to 17) in 2003 (self-reported) and 2004 (measured) illustrate these tendencies. In 2004, the average directly measured height of boys and girls was a third of an inch less than the 2003 averages based on self-reports. The directly measured average weight of boys in 2004 was 3 pounds more than in 2003, and for girls, 6 pounds more. As a result, one-year increases in the prevalence of overweight and obesity among adolescents were substantial.

	<b>2003 (self-report)</b>	<b>2004 (directly measured)</b>	<b>Difference</b>
<b>Boys aged 12 to 17</b>			
Average height	66.6 inches 169.2 cm	66.3 inches 168.4 cm	-0.3 inches -0.8 cm
Average weight	137.1 lb 62.2 kg	140.4 lb 63.7 kg	3.3 lb 1.5 kg
Average BMI	21.4	22.3	0.9
% overweight/obese	24.0%	32.3%	8.3
% obese	5.7%	11.1%	5.4
<b>Girls aged 12 to 17</b>			
Average height	63.6 inches 161.5 cm	63.3 inches 160.8	-0.3 inches -0.7 cm
Average weight	120.3 lb 54.6 kg	126.0 lb 57.2 kg	5.7 lb 2.6 kg
Average BMI	20.7	22.0	1.3
% overweight/obese	14.2%	25.8%	11.6
% obese	3.3%	7.4%	4.1

Another problem with overweight and obesity rates based on self-reports is variation in the mode of collection. Self-reported data from face-to-face interviews result in higher obesity rates than do data collected from telephone interviews.<sup>22</sup> In 1994/95, almost all interviews were conducted in person; in 1996/97 and 1998/99, most were by telephone; in 2000/01, it was approximately half and half; and in 2003, about one-quarter were in person.

For children aged 2 to 11, reported and measured data reveal a different bias. The data for 1994/95 to 2002/03 come from the National Longitudinal Survey of Children and Youth (NLSCY), in which parents reported the child's height and weight (Charts 18 and 19). A comparison with the directly measured 2004 CCHS data suggests that when parents report on behalf of their children, overweight and obesity rates are higher, largely because parents tend to underestimate their children's height. It is possible that they report the height when the child was last measured, which could be inaccurate given how quickly children of these ages grow. If height is routinely underestimated, the result would be substantial overestimates of overweight and obesity.

	<b>2002/03</b> <b>(reported by</b> <b>parent)</b>	<b>2004</b> <b>(directly</b> <b>measured)</b>	<b>Difference</b>
<b>Ages 2 to 5</b>			
Average height	39.7 inches 100.8 cm	40.5 inches 102.9 cm	0.8 inch 2.1 cm
Average weight	38.2 lb 17.4 kg	38.5 lb 17.5 kg	0.3 lb 0.1 kg
Average BMI	17.2	16.4	-0.8
% overweight/obese	36.1%	21.5%	-14.6
% obese	20.1%	6.3%	-13.8

	<b>2000/01</b> <b>(reported by</b> <b>parent)</b>	<b>2004</b> <b>(directly</b> <b>measured)</b>	<b>Difference</b>
<b>Ages 6 to 11</b>			
Average height	52.0 inches 132.1 cm	53.0 inches 134.6 cm	1.0 inch 2.5 cm
Average weight	70.0 lb 31.8 kg	73.7 lb 33.4 kg	3.7 lb 1.6 kg
Average BMI	18.2	18.1	-0.1
% overweight/obese	32.1%	25.8%	-6.3
% obese	11.7%	8.0%	-3.7

## **Appendix C**

### **Calculating overweight and obesity in children and adolescents**

For the 2004 Canadian Community Health Survey, Body Mass Index (BMI) was derived from the child's or adolescent's weight and height as measured by the interviewer, using the formula  $BMI = (\text{weight in kg})/(\text{height in m})^2$ .

BMI cut-offs of 25 and 30 are used to classify adults as overweight and obese, based on health risks associated with being in these BMI categories.<sup>6,23</sup> Recently, the International Obesity TaskForce (IOTF) agreed on a new approach to measure overweight and obesity among children and adolescents.<sup>24</sup> Because it is not clear which BMI levels are associated with health risks at younger ages, the group recommended extrapolating the adult cut-offs of 25 and 30 to create sex- and age-specific values. Based on data from the United States, Great Britain, the Netherlands, Brazil, Hong Kong and Singapore, BMI centile curves that passed through the points of 25 and 30 at age 18 were derived. These centile curves were based on data collected between 1963 and 1993.

The overweight and obesity rates presented in this analysis are based on the IOTF criteria. Because sexual maturation influences body fat, the IOTF cut-offs are sensitive to the timing of puberty.<sup>9</sup>

Age (years)	Overweight cut-off BMI greater than or equal to:		Obese cut-off BMI greater than or equal to:	
	Boys	Girls	Boys	Girls
2	18.41	18.02	20.09	19.81
2.5	18.13	17.76	19.80	19.55
3	17.89	17.56	19.57	19.36
3.5	17.69	17.40	19.39	19.23
4	17.55	17.28	19.29	19.15
4.5	17.47	17.19	19.26	19.12
5	17.42	17.15	19.30	19.17
5.5	17.45	17.20	19.47	19.34
6	17.55	17.34	19.78	19.65
6.5	17.71	17.53	20.23	20.08
7	17.92	17.75	20.63	20.51
7.5	18.16	18.03	21.09	21.01
8	18.44	18.35	21.60	21.57
8.5	18.76	18.69	22.17	22.18
9	19.10	19.07	22.77	22.81
9.5	19.46	19.45	23.39	23.46
10	19.84	19.86	24.00	24.11
10.5	20.20	20.29	24.57	24.77
11	20.55	20.74	25.10	25.42
11.5	20.89	21.20	25.58	26.05
12	21.22	21.68	26.02	26.67
12.5	21.56	22.14	26.43	27.24
13	21.91	22.58	26.84	27.76
13.5	22.27	22.98	27.25	28.20
14	22.62	23.34	27.63	28.57
14.5	22.96	23.66	27.98	28.87
15	23.29	23.94	28.30	29.11
15.5	23.60	24.17	28.60	29.29
16	23.90	24.37	28.88	29.43
16.5	24.19	24.54	29.14	29.56
17	24.46	24.70	29.41	29.69
17.5	24.73	24.85	29.70	29.84
18+	25.00	25.00	30.00	30.00

**Source:** Reference 24

For example, a 7-year-old boy who is 3 feet 11 inches (119 cm) tall would have to weigh at least 56.9 pounds (25.8 kg) (BMI = 17.9) to be considered overweight, and a 13-year-old girl who is 5 feet, 3 inches (160 cm) tall would be considered obese if she weighed 161 pounds (73 kg) (BMI = 28.5).

Many previous studies have used US growth curves and classified BMIs falling over the 85<sup>th</sup> and 95<sup>th</sup> centiles for age- and sex-specific categories as overweight or obese. While the two methods generally yield similar results, the IOTF reference values tend to give lower estimates for young children and higher estimates for older children.<sup>1,25</sup>

## Appendix D

### Definitions

The *frequency of fruit and vegetable consumption* was assessed with questions from the Behavioural Risk Factor Surveillance System in the United States.<sup>26</sup> Respondents were asked:

- 1) “How often do you usually drink fruit juices such as orange, grapefruit or tomato?” (for example, once a day, three times a week, twice a month)
- 2) “Not counting juice, how often do you usually eat fruit?”
- 3) “How often do you (usually) eat green salad?”
- 4) “How often do you usually eat potatoes, not including French fries, fried potatoes, or potato chips?”
- 5) “How often do you (usually) eat carrots?”
- 6) “Not counting carrots, potatoes or salad, how many servings of other vegetables do you usually eat?”

For 6- to 11-year-olds, *physical activity level* was measured by asking, “About how many hours a week do you usually take part in physical activity (that makes you out of breath or warmer than usual):

- 1) in your free time at school (for example, lunch)?”
- 2) in your class time at school?”
- 3) outside of school while participating in lessons or league or team sports?”
- 4) outside of school while participating in unorganized activities, either on your own or with friends?”

For each item, the response categories were “never,” “less than 1 hour per week,” “2 to 3 hours per week,” “4 to 6 hours a week” or “7 or more hours per week.” Total physical activity was derived by taking the mid-point of the response category (0, 0.5, 2.5, 5 or 7) for each of the four items and summing the resulting values.

For 12- to 17-year-olds, *physical activity level* was based on total energy expenditure (EE) during leisure time. EE was calculated from the reported frequency and duration of all of a respondent’s leisure-time physical activities in the three months before his or her 2004 CCHS interview and the metabolic energy demand (MET value) of each activity, which was independently established.<sup>27</sup>

$EE = \Sigma (N_i * D_i * MET_i / 365 \text{ days})$ , where

$N_i$  = number of occasions of activity  $i$  in a year,

$D_i$  = average duration in hours of activity  $i$ , and

$MET_i$  = a constant value for metabolic energy cost of activity  $i$ .

An EE of 3 or more kilocalories per day (KKD) was defined as *active*; 1.5 to 2.9 KKD, *moderately active*; and less than 1.5 KKD, *inactive*.

*Screen time* is the amount of time spent watching television or videos, playing video games, or using a computer. Children aged 6 to 11 were asked:

- “On average, about how many hours a day do you watch TV or videos or play video games?”
- “On average, about how many hours a day do you spend on a computer, playing games, e-mailing, chatting, surfing the Internet, etc.?”

The response categories were: “I don’t watch TV or videos or play video games/I don’t use a computer,” “less than 1 hour a day,” “1 to 2 hours a day,” “3 to 4 hours a day,” “5 to 6 hours a day,” and “7 to more hours a day.” Total daily screen time was calculated by combining the time reported in the two questions, using the mid-point of the category (0, 0.5, 1.5, 3.5, 5.5 or 7).

For 12- to 17-year-olds the following questions were asked: “In a typical week in the past three months, how much time did you usually spend:

- on a computer, including playing computer games and using the Internet or the World Wide Web?”
- playing video games, such as SEGA, Nintendo and Playstation?”
- watching television or videos?”

The response categories were: “none,” “less than an hour,” “1 to 2 hours,” “3 to 5 hours,” “6 to 10 hours,” “11 to 14 hours,” “15 to 20 hours,” and “more than 20 hours.” Total weekly viewing time was derived by taking the mid-point of each response category (0, 0.5, 1.5, 4, 8, 12.5, 17.5, or 20) and summing the resulting values across the three questions.

*Household income* was based on the number of people in the household and total household income from all sources in the 12 months before the interview.

<b>Household income group</b>	<b>People in household</b>	<b>Total household Income</b>
Lowest	1 to 4	Less than \$10,000
	5 or more	Less than \$15,000
Lower-middle	1 or 2	\$10,000 to \$14,999
	3 or 4	\$10,000 to \$19,999
	5 or more	\$15,000 to \$29,999
Middle	1 or 2	\$15,000 to \$29,999
	3 or 4	\$20,000 to \$39,999
	5 or more	\$30,000 to \$59,999
Upper-middle	1 or 2	\$30,000 to \$59,999
	3 or 4	\$40,000 to \$79,999
	5 or more	\$60,000 to \$79,999
Highest	1 or 2	\$60,000 or more
	3 or more	\$80,000 or more



Respondents were grouped into three *education* categories based on the highest level of attainment in the household: secondary graduation or less, some postsecondary, and postsecondary graduation.

*Self-perceived health* was assessed with the question, “In general would you say that your health is excellent, very good, good, fair or poor?” For this analysis, children were divided into two groups: those who reported very good and excellent health, and those who did not.

*Ethnicity* was based on the question: “People living in Canada come from many different cultural and racial backgrounds. Are you:

1. White?”
2. Chinese?”
3. South Asian (e.g., East Indian, Pakistani, Sri Lankan, etc.)?”
4. Black?”
5. Filipino?”
6. Latin American?”
7. Southeast Asian (e.g., Cambodian, Indonesian, Laotian, Vietnamese, etc.)?”
8. Arab?”
9. West Asian (e.g., Afghan, Iranian, etc.)?”
10. Japanese?”
11. Korean?”
12. Aboriginal Peoples of North America (North American Indian, Métis, Inuit/Eskimo)?”
13. Other – specify.

In this analysis, category 1 was used for the comparison with the White population in the United States. To compare ethnic groups within Canada, the following categories were used: White (1); Black (4); Southeast/East Asian (2, 5, 7, 10, 11); off-reserve Aboriginal (12); and Other (3, 6, 8, 9, 13). Multiple responses across the categories defined here were coded to “Other.”

## Appendix E

### Limitations

The response rate to the 2004 Canadian Community Health Survey (CCHS) was 76.5%. For various reasons (availability of the child; parents refusing to have their child measured; adolescents refusing to be measured; and operational problems), directly measured height and weight were obtained for only 65.5% of 2- to 17-year-olds.

#### Percentage distribution of respondents aged 2 to 17, by response and reasons for non-response to measured height and weight

	Total %	Age group	
		2-11 %	12-17 %
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Measured</b>	65.5	61.9	70.8
<b>Not measured - total</b>	34.5	38.1	29.2
<b>Reason</b>			
Child not available	14.6	24.5	---
Refusal	4.4	1.7	8.3
Measuring equipment	7.2	6.2	8.7
Too tall for interviewer to measure	2.3	---	4.2
Telephone interview	1.5	---	3.4
Interview setting	0.9	---	2.0
Other	3.6	5.7	2.8

--- Rate too low to report

**Data source:** 2004 Canadian Community Health Survey: Nutrition

Response rates to directly measured height and weight differed significantly by sex, age group and province. Measured data were slightly more likely to have been obtained for boys than for girls. The response rate was lowest for 2- to 5-year-olds (55%), and highest for adolescents (71%). At 56%, Ontario's response rate was particularly low.

<b>Response rates to directly measured height and weight</b>				
	%			%
<b>Overall</b>	66		<b>Province</b>	
<b>Sex</b>			Newfoundland	74 ↑
			Prince Edward Island	72
Boys	64 ↓		Nova Scotia	77 ↑
Girls	67 ↑		New Brunswick	71
<b>Age group</b>			Quebec	73 ↑
2-5	55 ↓		Ontario	56 ↓
6-11	66		Manitoba	76 ↑
12-17	71 ↑		Saskatchewan	71 ↑
			Alberta	69
			British Columbia	71 ↑

↑ Significantly higher than overall rate

↓ Significantly lower than overall rate

**Data source:** 2004 Canadian Community Health Survey: Nutrition

The response rate was not associated with fruit and vegetable consumption, leisure-time physical activity, screen time, household income, highest level of education in the household, the presence of a chronic condition, or self-perceived health.

Because it is difficult to measure physical activity, evidence of a relationship between energy expenditure and overweight and obesity among children and adolescents is lacking in many studies.<sup>28</sup> In the 2004 CCHS, parents of children aged 6 to 11 were asked about activities that increased the child's heart rate and made him/her feel out of breath some of the time (see *Appendix D: Definitions*). The child was encouraged to participate in answering these questions. The degree to which parents and/or children can accurately recall and report such information is unknown and may affect associations with overweight and obesity. Adolescents were asked about their leisure-time physical activities over the past three months. Again, there may have been recall problems, and leisure-time may not reflect overall physical activity because school and work were excluded.

The questions about fruit and vegetable consumption asked the *number of times* fruit and vegetables were consumed per day, but not the *amounts* consumed. Because the questions did not specify portion size, compliance with daily intake recommendations, such as the Canada Food Guide, cannot be assessed.

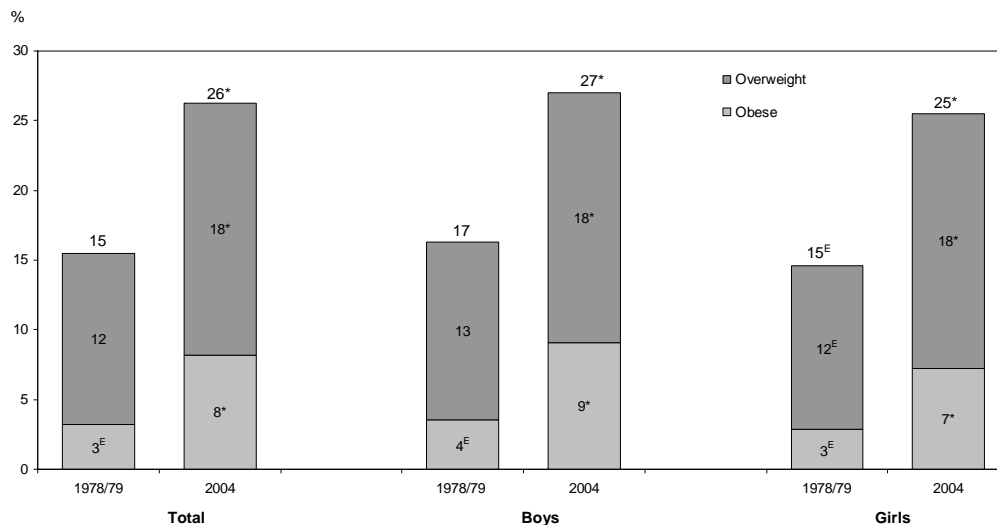
## References

- 1 Lobstein T, Baur L, Uauy R. Obesity in children and young people: A crisis in public health. *Obesity Reviews* 2004; 5(Suppl. 1): 4-85.
- 2 Booth ML, Hunter C, Gore CJ, et al. The relationship between body mass index and waist circumference: implications for estimates of the population prevalence of overweight. *International Journal of Obesity and Related Metabolic Disorders* 2000; 24(8): 1058-61.
- 3 Roberts RJ. Can self-reported data accurately describe the prevalence of overweight? *Public Health* 1995; 109(4): 275-84.
- 4 Rowland ML. Reporting bias in height and weight data. *Statistical Bulletin of the Metropolitan Insurance Company* 1989; 70(2): 2-11.
- 5 Strauss RS. Comparison of measured and self-reported weight and height in a cross-sectional sample of young adolescents. *International Journal of Obesity and Related Metabolic Disorders* 1999; 23(8): 904-8.
- 6 World Health Organization. *Physical Status: The Use and Interpretation of Anthropometry, Report of the WHO Expert Committee* (WHO Technical Report Series, No. 854). Geneva: World Health Organization, 1995.
- 7 Guo SS, Wu W, Chumlea WC, et al. Predicting overweight and obesity in adulthood from body mass index values in childhood and adolescence. *American Journal of Clinical Nutrition* 2002; 76(3): 653-8.
- 8 Whitaker RC, Wright JA, Pepe MS, et al. Predicting obesity in young adulthood from childhood and parental obesity. *New England Journal of Medicine* 1997; 337(13): 869-73.
- 9 Cole TJ, Rolland-Cachera MF. Measurement and Definition. In: Burniat W, Cole T, Lissau I, et al, eds. *Childhood and Adolescent Obesity: Causes and Consequences, Prevention and Management*. Cambridge: Cambridge University Press, 2002: 3-27.
- 10 Koplan JP, Liverman CT, Kraak VI. *Preventing Childhood Obesity: Health in the Balance*. Washington, D.C.: The National Academies Press, 2005.

- 11 Tremblay MS, Willms JD. Is the Canadian childhood obesity epidemic related to physical inactivity? *International Journal of Obesity and Related Metabolic Disorders* 2003; 27(9): 1100-5.
- 12 Guillaume M, Lissau I. Epidemiology. In: Burniat W, Cole T, Lissau I, et al, eds. *Childhood and Adolescent Obesity: Causes and Consequences, Prevention and Management*. Cambridge: Cambridge University Press, 2002: 28-49.
- 13 Hill AJ, Lissau I. Psychosocial factors. In: Burniat W, Cole T, Lissau I, et al, eds. *Childhood and Adolescent Obesity: Causes and Consequences, Prevention and Management*. Cambridge: Cambridge University Press, 2002: 109-27.
- 14 Willms JD, Tremblay MS, Katzmarzyk PT. Geographic and demographic variation in the prevalence of overweight Canadian children. *Obesity Research* 2003; 11(5): 668-73.
- 15 Le Petit C, Berthelot J-M. Obesity: A Growing Issue. Available at: <http://www.statcan.ca/english/research/82-618-MIE/82-618-MIE2005003.htm>.
- 16 ANGOSS Software. *Knowledge Seeker IV for Windows - User's Guide*. ANGOSS Software International Limited, 1995.
- 17 Rao JNK, Wu CFJ, Yue K. Some recent work on resampling methods for complex surveys. *Survey Methodology* (Statistics Canada, Catalogue 12-001) 1992; 18(2): 209-17.
- 18 Rust KF, Rao JNK. Variance estimation for complex surveys using replication techniques. *Statistical Methods in Medical Research* 1996; 5: 281-310.
- 19 Yeo D, Mantel H, Liu TP. Bootstrap variance estimation for the National Population Health Survey. *Proceedings of the Annual Meeting of the American Statistical Association, Survey Research Methods Section, August 1999*. Baltimore: American Statistical Association, 1999.
- 20 National Center for Health Statistics. *Health, United States, 2004: With Chartbook on the Trends of the Health of Americans*. Hyattsville, Maryland: 2004.
- 21 Torrance GM, Hooper MD, Reeder BA. Trends in overweight and obesity among adults in Canada (1970-1992): evidence from national surveys using measured height and weight. *International Journal of Obesity* 2002; 26: 797-804.

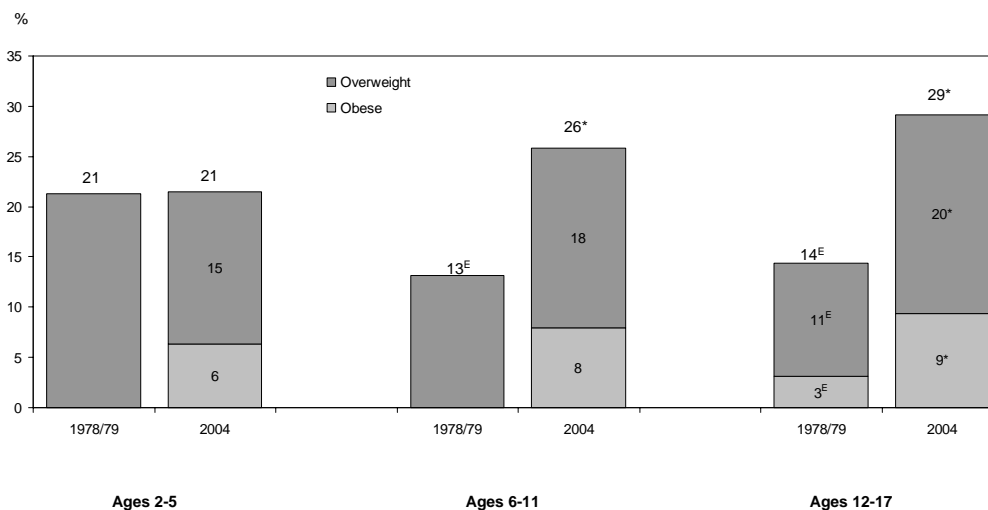
- 22 St-Pierre M, Béland Y. Mode effects in the Canadian Community Health Survey: A comparison of CAPI and CATI. *Proceedings of the Annual Meeting of the American Statistical Association, Survey Research Methods Section, August 2004*. Toronto: American Statistical Association, 2004.
- 23 Health Canada. *Canadian Guidelines for Body Weight Classification in Adults* (Catalogue H49-179) Ottawa: Health Canada, 2003.
- 24 Cole TJ, Bellizzi MC, Flegal KM, et al. Establishing a standard definition for child overweight and obesity worldwide: international survey. *British Medical Journal* 2000; 320(7244): 1240-3.
- 25 Flegal KM, Ogden CL, Wei R, et al. Prevalence of overweight in US children: a comparison of US growth charts from the Centers for Disease Control and Prevention with other reference values for body mass index. *American Journal of Clinical Nutrition* 2001; 73(6): 1086-93.
- 26 Serdula M, Coates R, Byers T, et al. Evaluation of a brief telephone questionnaire to estimate fruit and vegetable consumption in diverse study populations. *Epidemiology* 1993; 4(5): 455-63.
- 27 Stephens T, Craig CL, Ferris BF. Adult physical activity in Canada: findings from the Canada Fitness Survey. *Canadian Journal of Public Health* 1986; 77(4): 285-90.
- 28 Schutz Y, Maffeis C. Physical activity. In: Burniat W, Cole T, Lissau I, et al, eds. *Childhood and Adolescent Obesity: Causes and Consequences, Prevention and Management*. Cambridge: Cambridge University Press, 2002: 93-108.

**Chart 1**  
**Overweight and obesity rates, by sex, household population aged 2 to 17, Canada excluding territories, 1978/79 and 2004**



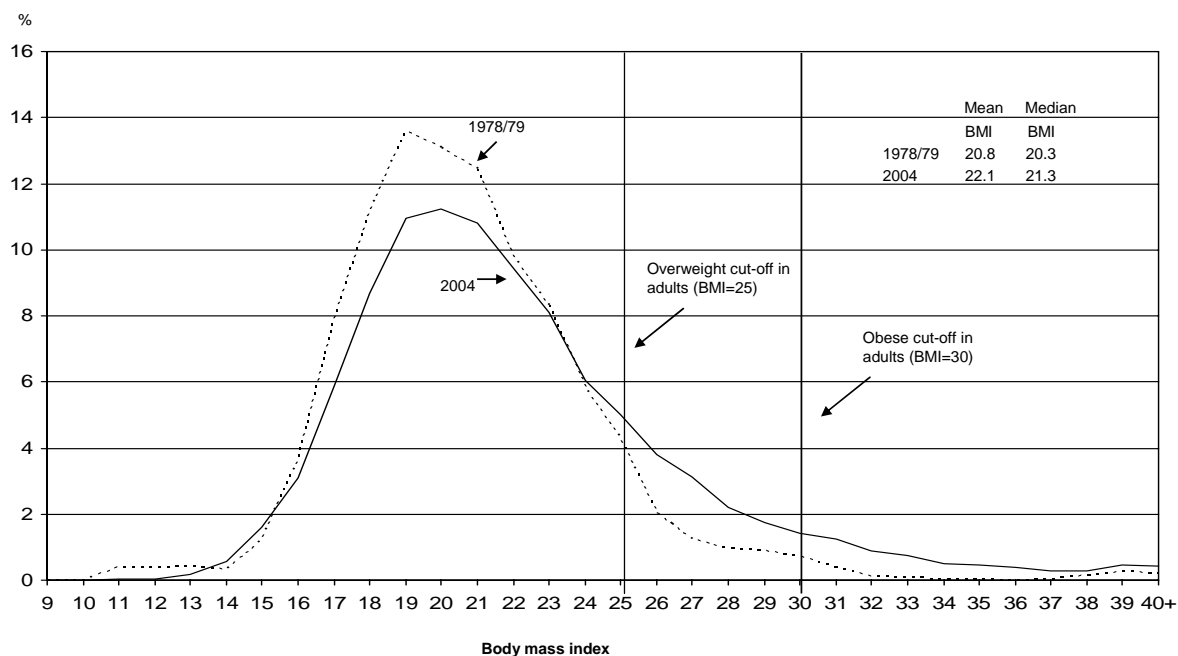
Data sources: 2004 Canadian Community Health Survey: Nutrition; Canada Health Survey 1978/79  
 \* Significantly different from estimate for 1978/79 (p < 0.05)  
 E Coefficient of variation between 16.6% and 33.3% (interpret with caution)

**Chart 2**  
**Overweight and obesity rates, by age group, household population aged 2 to 17, Canada excluding territories, 1978/79 and 2004**



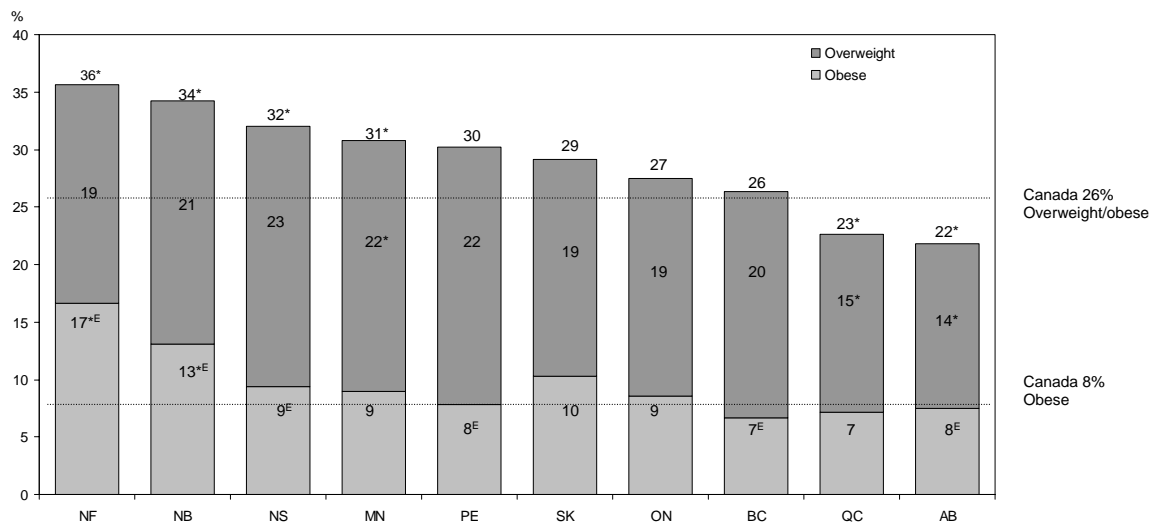
Data sources: 2004 Canadian Community Health Survey: Nutrition; Canada Health Survey 1978/79  
 Note: The obesity rates for the 2-5 and 6-11 age groups from the 1978/79 Canada Health Survey have coefficients of variation greater than 33.3%; therefore, the estimates are not releasable.  
 E Coefficient of variation between 16.6% and 33.3% (interpret with caution)  
 \* Significantly different from estimate for 1978/79 (p < 0.05)

**Chart 3**  
**Percentage distribution of body mass index (BMI), household population aged 12 to 17, Canada excluding territories, 1978/79 and 2004**



Data sources: 2004 Canadian Community Health Survey: Nutrition; Canada Health Survey 1978/79

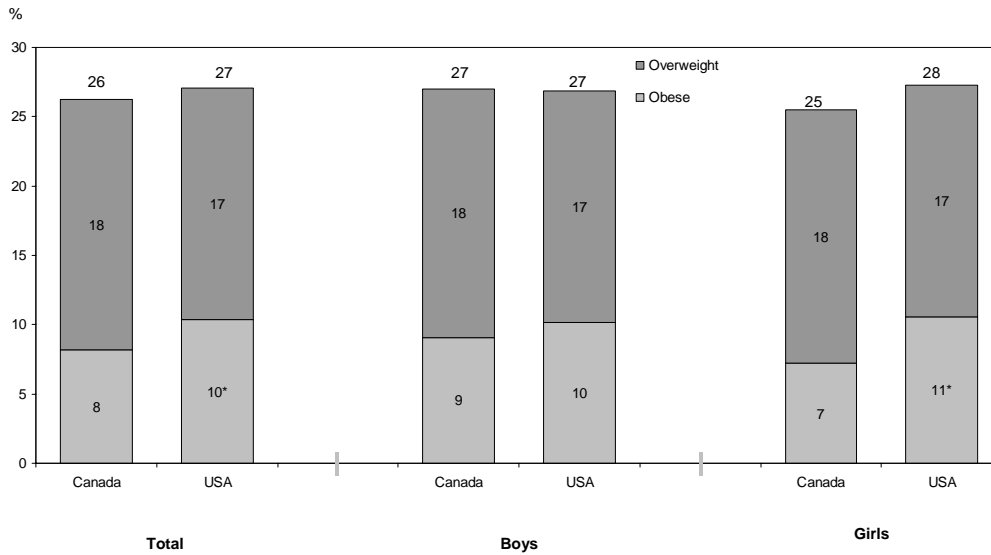
**Chart 4**  
**Overweight and obesity rates, by province, household population aged 2 to 17, Canada excluding territories, 2004**



Data source: 2004 Canadian Community Health Survey: Nutrition  
 E Coefficient of variation between 16.6% and 33.3% (interpret with caution)  
 \* Significantly different from estimate for Canada (p < 0.05)

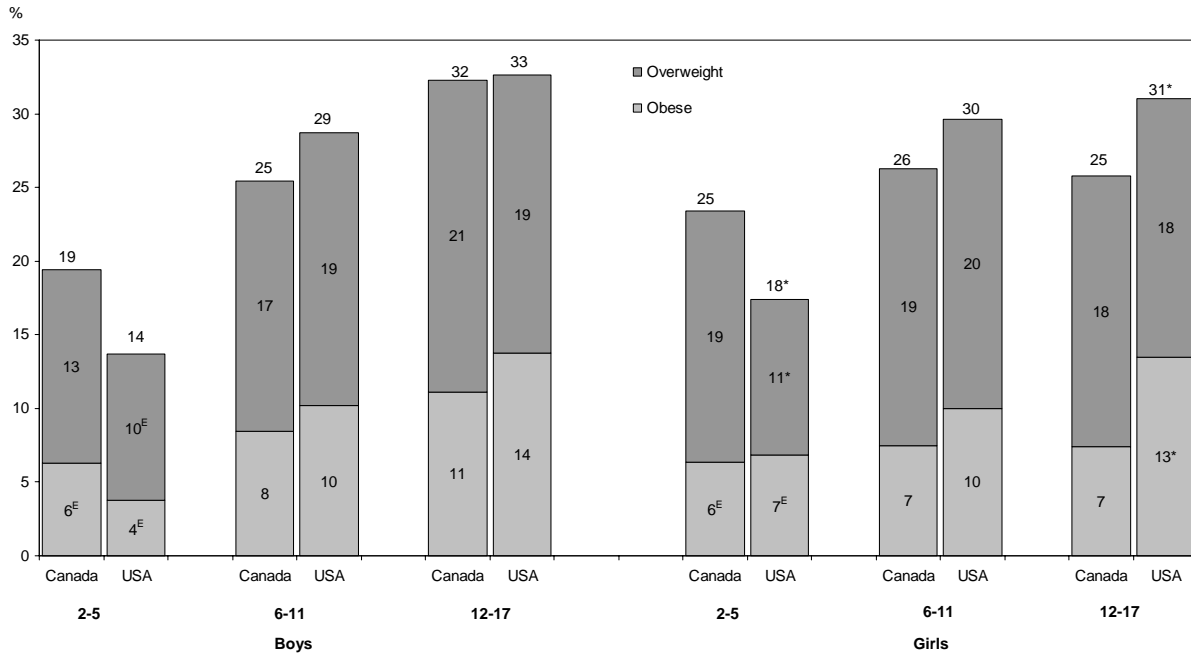


**Chart 5**  
**Overweight and obesity rates, by sex, household population aged 2 to 17, Canada (2004) and United States (1999-2002)**



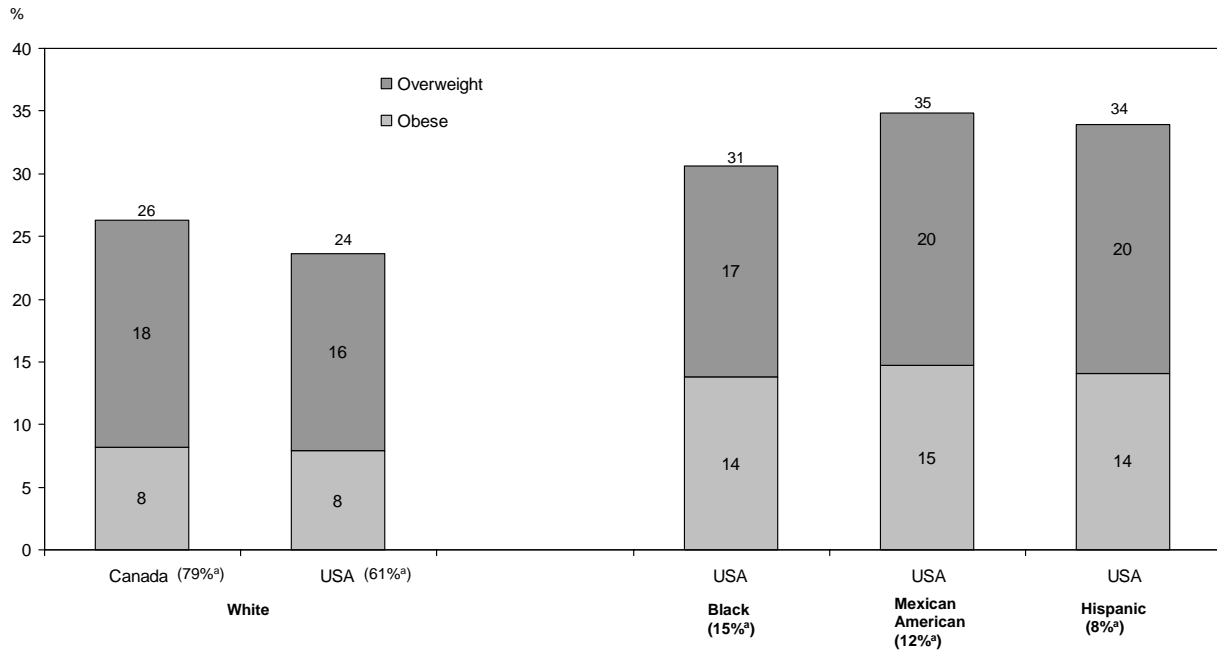
Data sources: 2004 Canadian Community Health Survey: Nutrition; 1999-2002 National Health and Nutrition Examination Survey  
 \* Significantly different from estimate for Canada (p < 0.05)

**Chart 6**  
**Overweight and obesity rates, by sex and age group, household population aged 2 to 17, Canada (2004) and United States (1999-2002)**



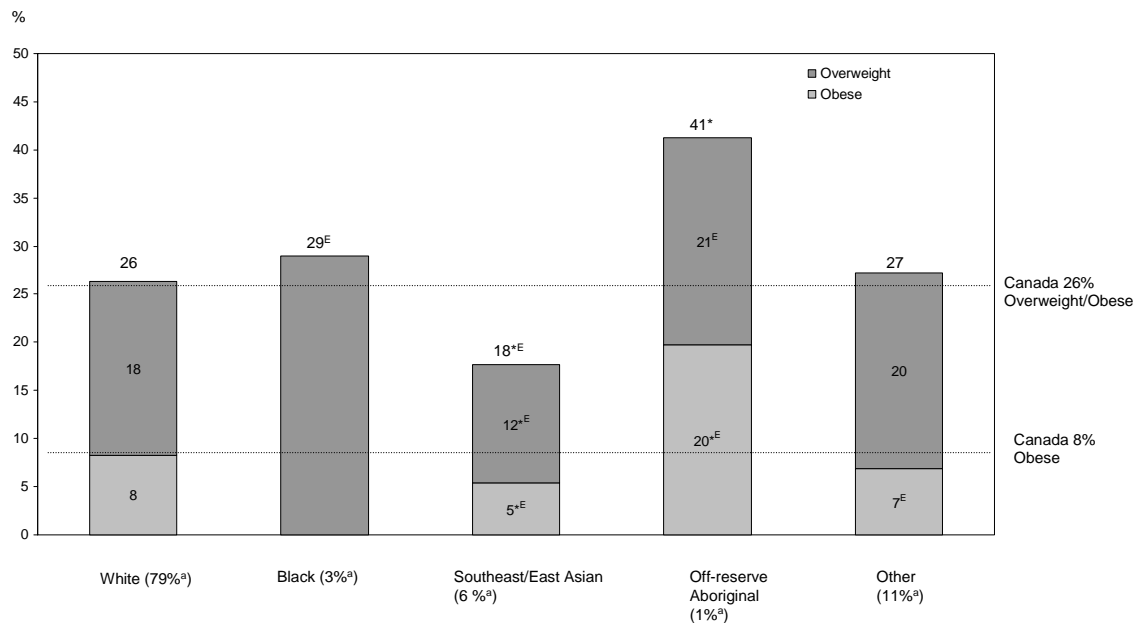
Data sources: 2004 Canadian Community Health Survey: Nutrition; 1999-2002 National Health and Nutrition Examination Survey  
<sup>E</sup> Coefficient of variation between 16.6% and 33.3% (interpret with caution)  
 \* Significantly different from estimate for Canada (p < 0.05)

**Chart 7**  
**Overweight and obesity rates, by ethnic origin, household population aged 2 to 17, Canada (2004) and United States (1999-2002)**



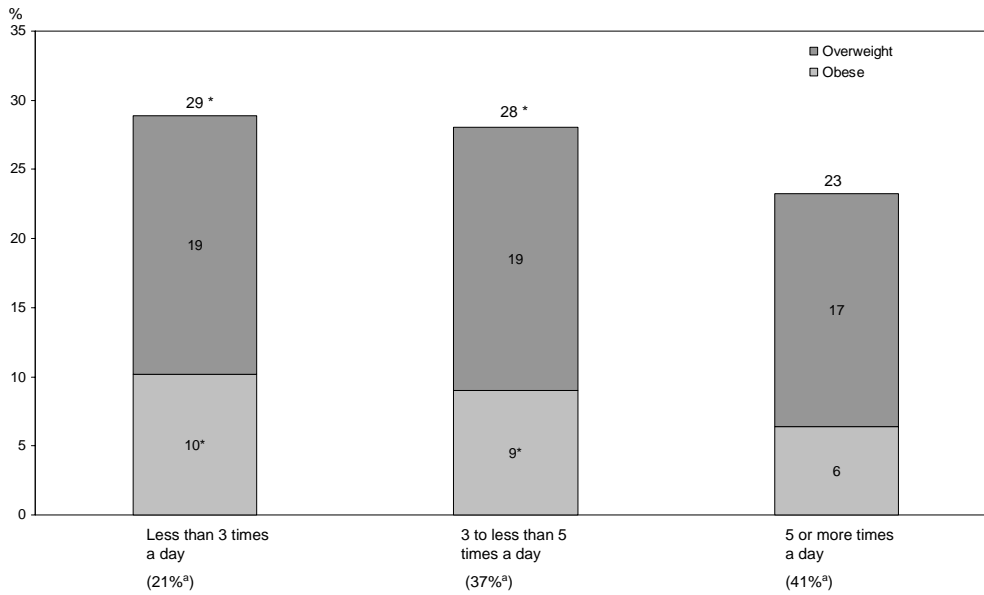
**Data sources:** 2004 Canadian Community Health Survey: Nutrition; 1999-2002 National Health and Nutrition Examination Survey  
<sup>a</sup> Percent of youth population in this ethnic group  
<sup>\*</sup> Significantly different from estimate for Canada (p < 0.05)

**Chart 8**  
**Overweight and obesity rates, by ethnic origin, household population aged 2 to 17, Canada excluding territories, 2004**



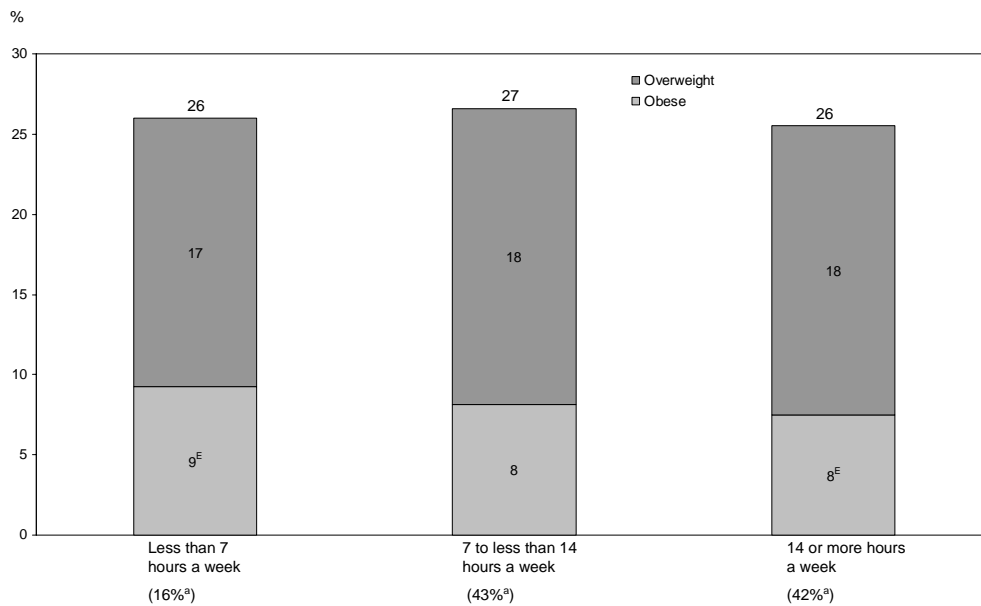
**Data source:** 2004 Canadian Community Health Survey: Nutrition  
**Note:** The obesity rate for Black has a coefficient of variation greater than 33.3%, therefore, the estimate is not releasable.  
<sup>a</sup> Percent of youth population in this ethnic group  
<sup>E</sup> Coefficient of variation between 16.6% and 33.3% (interpret with caution)  
<sup>\*</sup> Significantly different from estimate for Canada (p < 0.05)

**Chart 9**  
**Overweight and obesity rates, by fruit and vegetable consumption, household population aged 2 to 17, Canada excluding territories, 2004**



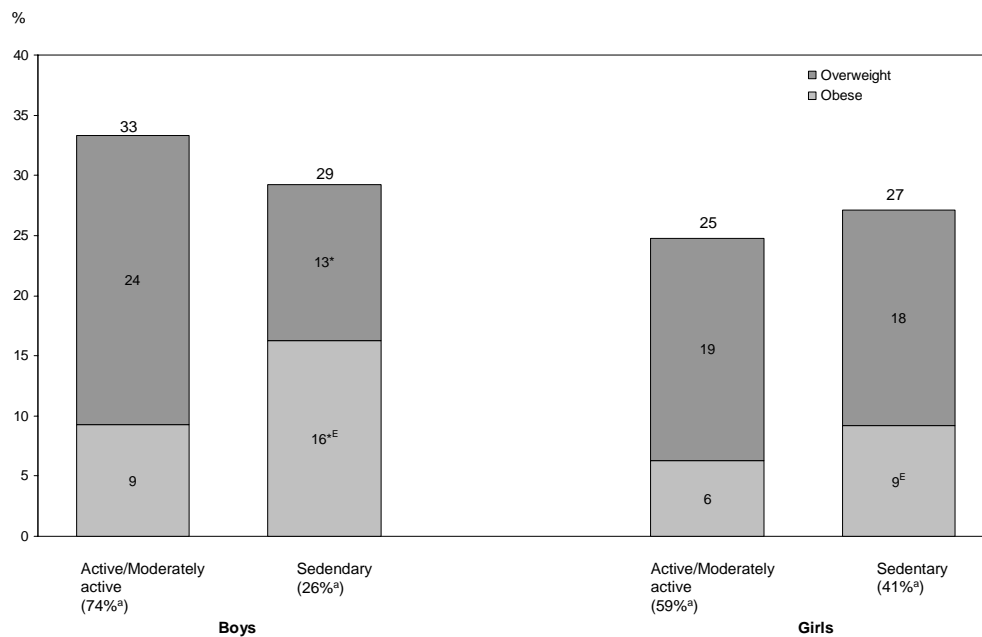
**Data source:** 2004 Canadian Community Health Survey: Nutrition  
<sup>a</sup> Percent of youth population in this consumption group  
 \* Significantly different from estimate for 5 or more (p < 0.05)

**Chart 10**  
**Overweight and obesity rates, by weekly hours of physical activity, household population aged 6 to 11, Canada excluding territories, 2004**



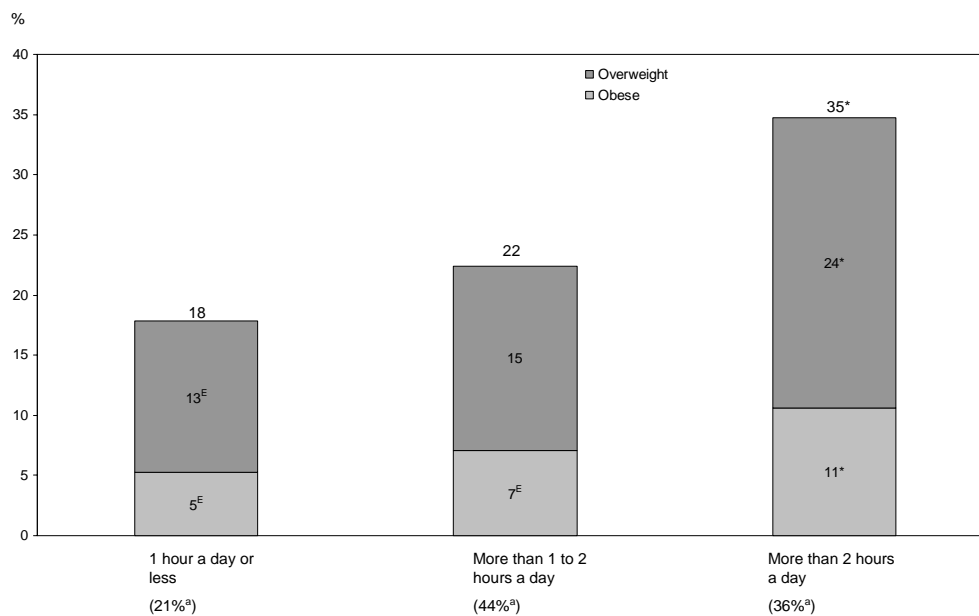
**Data source:** 2004 Canadian Community Health Survey: Nutrition  
<sup>a</sup> Percent of children aged 6 to 11 in this physical activity group  
<sup>E</sup> Coefficient of variation between 16.6% and 33.3% (interpret with caution)

**Chart 11**  
**Overweight and obesity rates, by sex and leisure-time physical activity level, household population aged 12 to 17, Canada excluding territories, 2004**



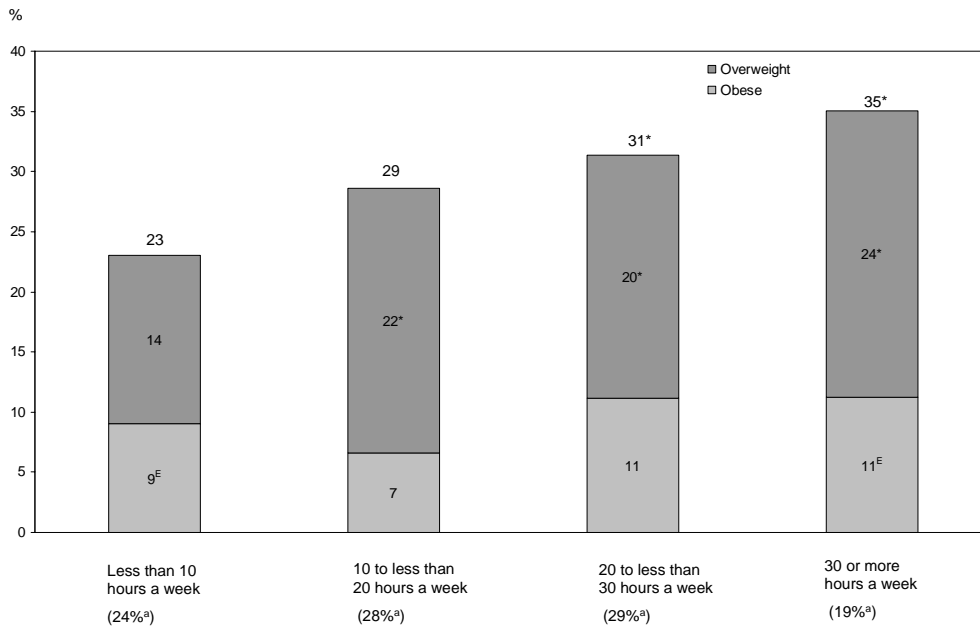
**Data source:** 2004 Canadian Community Health Survey: Nutrition  
 a Percent of boys/girls aged 12 to 17 in this physical activity group  
 E Coefficient of variation between 16.6% and 33.3% (interpret with caution)  
 \* Significantly different from estimate for active/moderately active (p < 0.05)

**Chart 12**  
**Overweight and obesity rates, by daily hours of screen time, household population aged 6 to 11, Canada excluding territories, 2004**



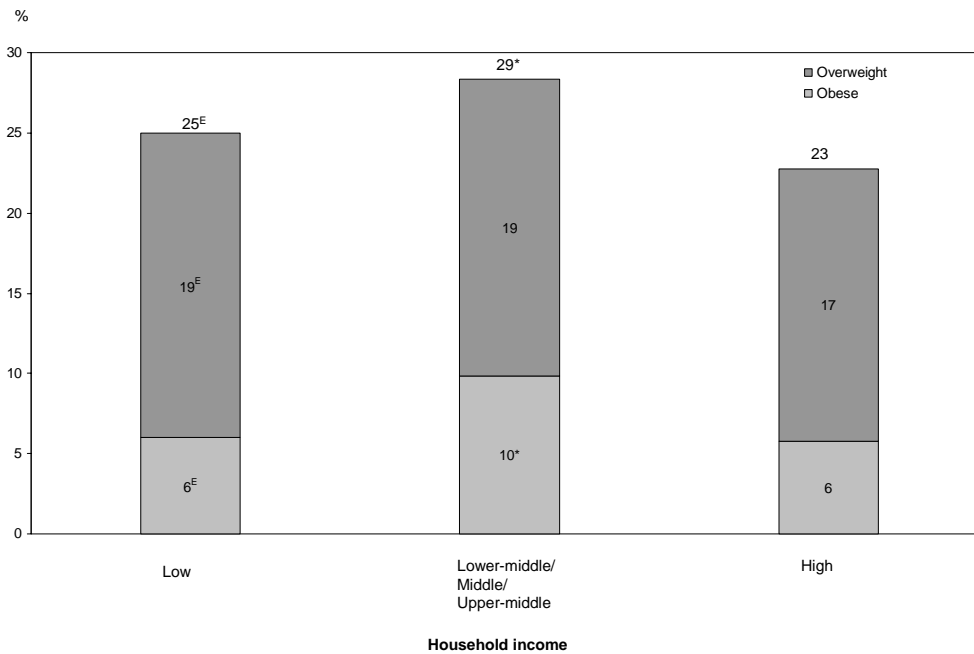
**Data source:** 2004 Canadian Community Health Survey: Nutrition  
 a Percent of children aged 6 to 11 in this screen time group  
 E Coefficient of variation between 16.6% and 33.3% (interpret with caution)  
 \* Significantly different from estimate for 1 hour or less (p < 0.05)

**Chart 13**  
**Overweight and obesity rates, by weekly hours of screen time, household population aged 12 to 17, Canada excluding territories, 2004**



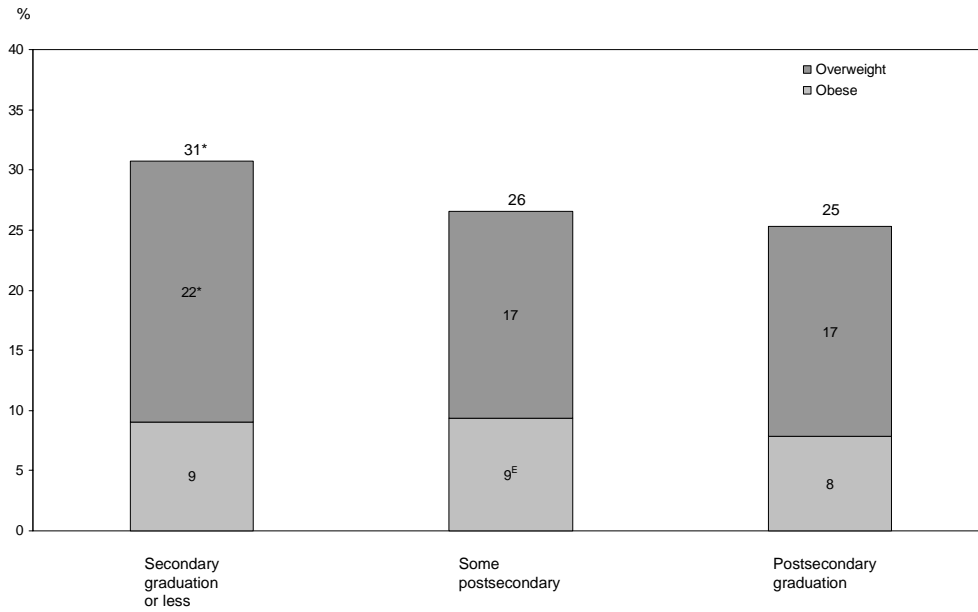
**Data source:** 2004 Canadian Community Health Survey: Nutrition  
a Percent of adolescents aged 12 to 17 in this screen time group  
E Coefficient of variation between 16.6% and 33.3% (interpret with caution)  
\* Significantly different from estimate for less than 10 hours a week (p < 0.05)

**Chart 14**  
**Overweight and obesity rates, by household income, household population aged 2 to 17, Canada excluding territories, 2004**



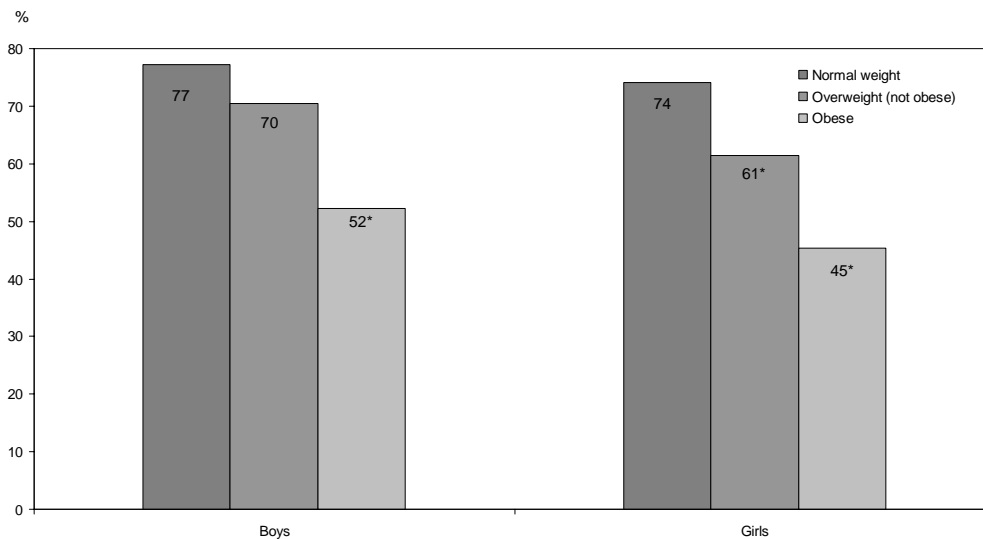
**Data source:** 2004 Canadian Community Health Survey: Nutrition  
E Coefficient of variation between 16.6% and 33.3% (interpret with caution)  
\* Significantly different from estimate for high household income (p < 0.05)

**Chart 15**  
**Overweight and obesity rates, by highest level of education in household, household population aged 2 to 17, Canada excluding territories, 2004**



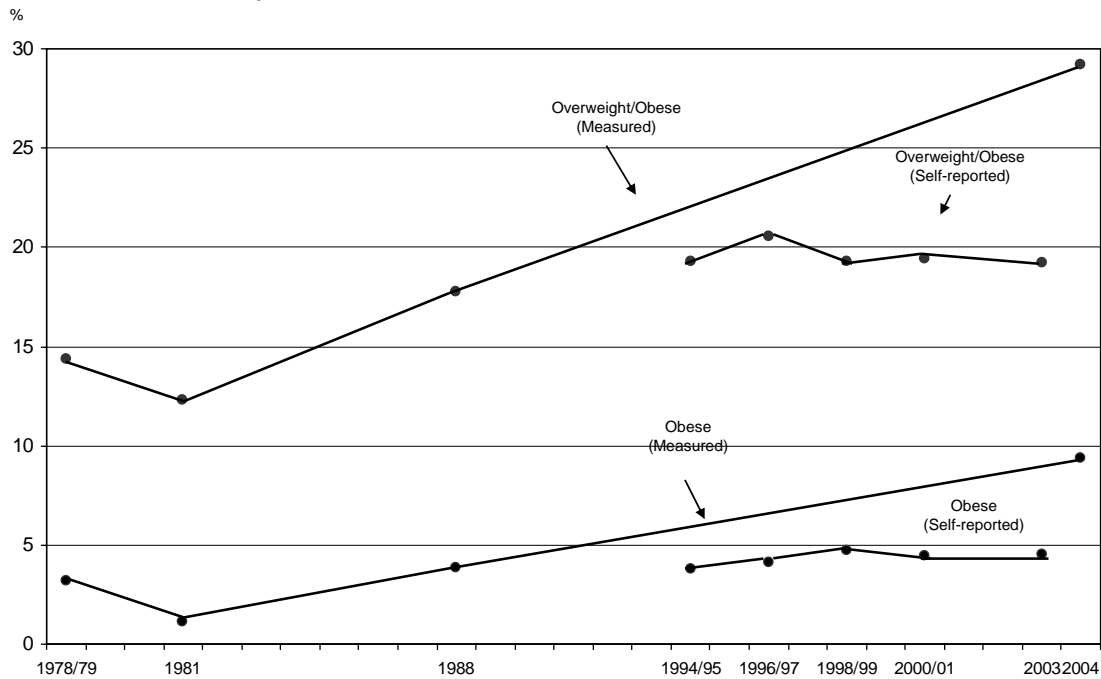
Data source: 2004 Canadian Community Health Survey: Nutrition  
 E Coefficient of variation between 16.6% and 33.3% (interpret with caution)  
 \* Significantly different from estimate for postsecondary graduation (p < 0.05)

**Chart 16**  
**Percentage of population aged 12 to 17 reporting excellent or very good health, by weight status and sex, household population, Canada excluding territories, 2004**



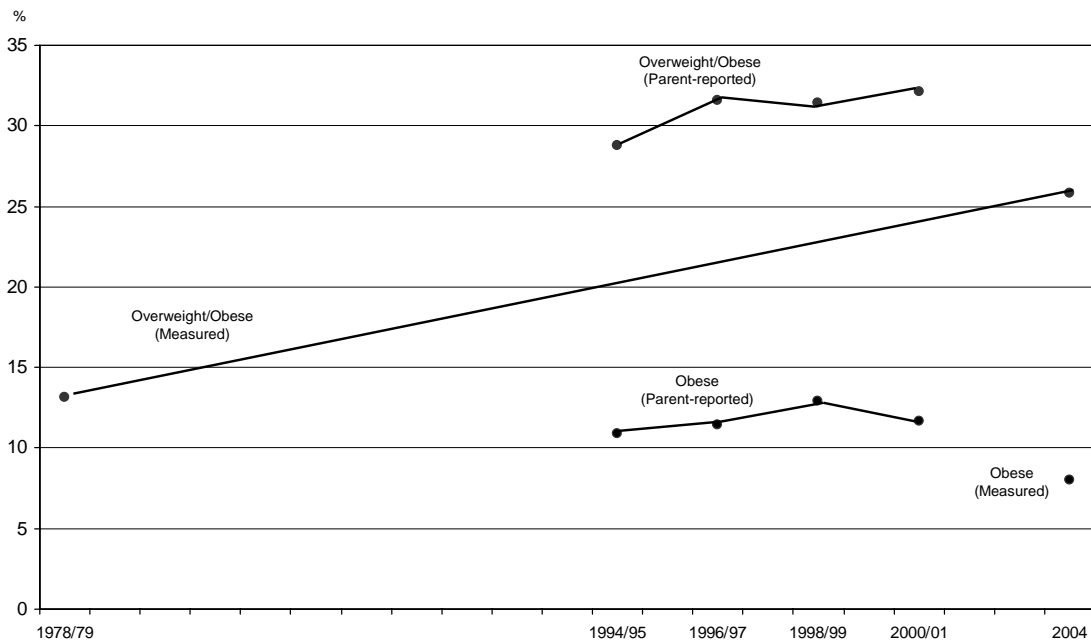
Data source: 2004 Canadian Community Health Survey: Nutrition  
 \* Significantly different from estimate for normal weight (p < 0.05)

**Chart 17**  
Trends in overweight/obese and obesity rates, household population aged 12 to 17, Canada excluding territories, selected years 1978/79 to 2004



**Data sources:** 2004 Canadian Community Health Survey: Nutrition; 2000/01 and 2003 Canadian Community Health Survey; 1994/95, 1996/97 and 1998/99 National Population Health Survey; 1988 Campbell's Survey on Health and Well-being; 1981 Canada Fitness Survey; 1978/79 Canada Health Survey

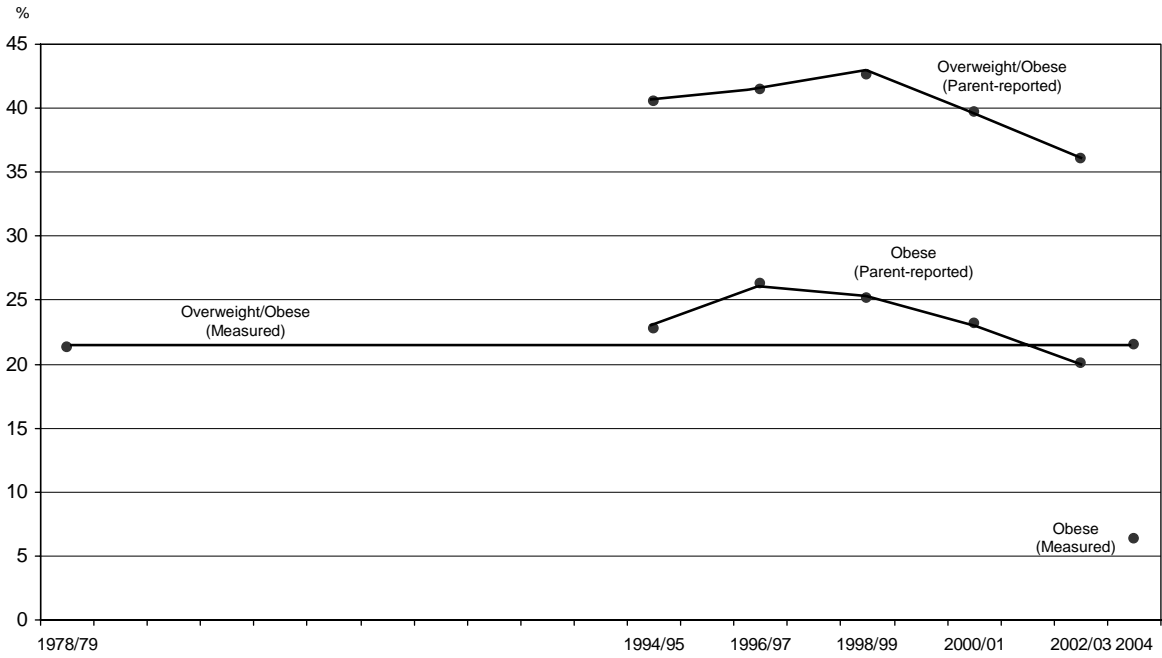
**Chart 18**  
Trends in overweight/obese and obesity rates, household population aged 6 to 11, Canada excluding territories, selected years 1978/79 to 2004



**Data sources:** 2004 Canadian Community Health Survey: Nutrition; 1994/95, 1996/97, 1998/99, 2000/01 National Longitudinal Survey of Children and Youth; 1978/79 Canada Health Survey

**Notes:** The obesity rate of the 6-11 age group from the 1978/79 Canada Health Survey has a coefficient of variation greater than 33.3%, and therefore, the estimate is not releasable. The 2002/03 NLSCY cross-sectional file has records only for children aged 0 to 5.

**Chart 19**  
**Trends in overweight/obese and obesity rates, household population aged 2 to 5, Canada excluding territories, selected years 1978/79 to 2004**



**Data sources:** 2004 Canadian Community Health Survey: Nutrition; 1994/95, 1996/97, 1998/99, 2000/01, 2002/03 National Longitudinal Survey of Children and Youth; 1978/79 Canada Health Survey  
**Notes:** The obesity rate of the 2-5 age group from the 1978/79 Canada Health Survey has a coefficient of variation greater than 33.3%, and therefore, the estimate is not releasable.



**Table 1**
**Overweight and obesity rates, by selected socio-demographic characteristics, household population aged 2 to 17, Canada excluding territories, 2004**

	Estimated population '000	Overweight		Obese		Overweight/Obese	
		%	95% confidence interval	%	95% confidence interval	%	95% confidence interval
<b>Total</b>	6,184	18.1	16.8, 19.3	8.2	7.3, 9.1	26.2	24.8, 27.7
<b>Sex</b>							
Boys <sup>a</sup>	3,178	17.9	16.0, 19.8	9.1	7.7, 10.5	27.0	24.6, 29.3
Girls	3,007	18.3	16.4, 20.1	7.2	6.1, 8.4	25.5	23.4, 27.6
<b>Age group</b>							
Total 2-5	1,348	15.2	12.3, 18.0	6.3	4.6, 8.0	21.5	18.3, 24.6
Boys <sup>a</sup>	684	13.1	9.4, 16.9	6.3 <sup>E</sup>	3.9, 8.6	19.4	15.0, 23.7
Girls	664	17.3	12.9, 21.6	6.4 <sup>E</sup>	4.0, 8.8	23.6	19.1, 28.2
Total 6-11	2,321	17.9	15.8, 19.9	8.0	6.4, 9.6	25.8*	23.4, 28.3
Boys <sup>a</sup>	1,173	17.0	13.9, 20.0	8.5	6.0, 11.0	25.4	21.6, 29.2
Girls	1,148	18.8	15.9, 21.6	7.5	5.2, 9.8	26.3	22.8, 29.8
Total 12-17	2,515	19.8	17.8, 21.8	9.4	7.9, 10.9	29.2	26.9, 31.5
Boys <sup>a</sup>	1,320	21.1	18.3, 24.0	11.1	8.8, 13.4	32.3	28.9, 35.6
Girls	1,195	18.3	15.6, 21.0	7.4*	5.6, 9.3	25.8*	22.6, 28.9
<b>Province</b>							
Newfoundland	93	19.0	14.2, 23.7	16.6 <sup>E</sup>	11.1, 22.2	35.6*	29.1, 42.1
Prince Edward Island	29	22.4	16.1, 28.8	7.8 <sup>E</sup>	4.7, 10.9	30.2	23.2, 37.3
Nova Scotia	172	22.6	17.6, 27.7	9.4 <sup>E</sup>	6.2, 12.5	32.0*	26.6, 37.4
New Brunswick	138	21.1	15.2, 27.1	13.1 <sup>E</sup>	8.4, 17.8	34.2*	27.9, 40.6
Québec	1,368	15.5*	12.6, 18.3	7.1	5.0, 9.3	22.6*	19.2, 26.0
Ontario	2,513	19.0	16.8, 21.1	8.5	6.9, 10.2	27.5	24.9, 30.1
Manitoba	234	21.9*	19.1, 24.6	9.0	6.9, 11.0	30.8*	27.4, 34.2
Saskatchewan	197	18.8	13.5, 24.1	10.3	7.3, 13.3	29.1	23.7, 34.5
Alberta	669	14.3*	11.3, 17.3	7.5 <sup>E</sup>	4.7, 10.3	21.8*	18.2, 25.5
British Columbia	772	19.7	15.9, 23.6	6.6 <sup>E</sup>	4.1, 9.2	26.4	21.9, 30.8
<b>Ethnic origin</b>							
White	4,907	18.1	16.7, 19.6	8.2	7.2, 9.3	26.3	24.7, 28.0
Black	186	17.6 <sup>E</sup>	8.6, 26.6	F	...	29.3 <sup>E</sup>	18.0, 46.0
Southeast/East Asian	343	12.2 <sup>E</sup>	7.5, 17.0	5.4 <sup>E</sup>	2.7, 8.2	17.7 <sup>E</sup>	12.3, 23.0
Aboriginal (off-reserve)	84	21.5 <sup>E</sup>	12.5, 30.5	19.8 <sup>E</sup>	10.8, 28.7	41.3*	30.4, 52.1
Other	665	20.4	15.8, 25.0	6.8 <sup>E</sup>	4.0, 9.6	27.2	22.1, 32.3
<b>Household income</b>							
Low	143	19.0 <sup>E</sup>	9.1, 28.8	6.0 <sup>E</sup>	2.8, 9.2	25.0 <sup>E</sup>	15.0, 34.9
Lower-middle/Middle/Upper-middle	3,574	18.5	16.8, 20.2	9.8*	8.5, 11.2	28.3*	26.4, 30.3
High <sup>a</sup>	1,856	17.0	14.6, 19.4	5.8	4.2, 7.3	22.8	20.0, 25.5
<b>Highest level of education in household</b>							
Secondary graduation or less	1,036	21.7*	18.5, 24.9	9.0	6.9, 11.1	30.7*	27.4, 34.1
Some postsecondary	477	17.2	12.0, 22.3	9.4 <sup>E</sup>	6.1, 12.7	26.5	20.5, 32.6
Postsecondary graduation <sup>a</sup>	4,570	17.4	15.9, 19.0	7.8	6.8, 8.9	25.3	23.5, 27.0

**Data source:** 2004 Canadian Community Health Survey: Nutrition

**Notes:** For age, the reference category is the previous age group; for province and ethnic origin, the overall Canadian rate. There was 1 respondent with a missing value for ethnic origin, 952 for household income, and 137 for household education.

<sup>a</sup> Reference group

\* Significantly different from estimate for reference group ( $p < 0.05$ )

E Coefficient of variation between 16.6% and 33.3% (interpret with caution)

F Coefficient of variation greater than 33.3% (suppressed because of extreme sampling variability)

... Not applicable

**Table 2**
**Overweight and obesity rates, by selected health behaviours, household population aged 2 to 17, Canada excluding territories, 2004**

	Estimated population '000	Overweight		Obese		Overweight/Obese	
		%	95% confidence interval	%	95% confidence interval	%	95% confidence interval
<b>Total</b>	6,184	18.1	16.8, 19.3	8.2	7.3, 9.1	26.2	24.8, 27.7
<b>Daily fruit and vegetable consumption</b>							
Less than 3 times	1,307	18.7	16.1, 21.3	10.2*	8.0, 12.3	28.9*	25.6, 32.1
3 to less than 5 times	2,310	19.0	16.7, 21.4	9.0*	7.4, 10.7	28.1*	25.5, 30.7
5 or more times <sup>a</sup>	2,552	16.8	14.7, 19.0	6.4	5.2, 7.7	23.3	21.0, 25.6
<b>Weekly hours of physical activity (ages 6 to 11)</b>							
Less than 7 <sup>a</sup>	359	16.7	12.1, 21.3	9.3 <sup>E</sup>	5.2, 13.4	26.0	20.2, 31.8
7 to less than 14	982	18.4	15.2, 21.7	8.2	5.7, 10.6	26.6	22.8, 30.4
14 or more	957	18.0	14.5, 21.5	7.5 <sup>E</sup>	4.9, 10.1	25.5	21.3, 29.7
<b>Leisure time physical activity (ages 12 to 17)</b>							
<b>Boys</b>							
Active/Moderately active <sup>a</sup>	974	24.0	20.5, 27.5	9.3	7.2, 11.4	33.3	29.7, 37.0
Sedentary	346	13.0*	9.3, 16.7	16.3 <sup>E</sup>	10.3, 22.2	29.3	22.4, 36.2
<b>Girls</b>							
Active/Moderately active <sup>a</sup>	709	18.5	15.3, 21.8	6.3	4.2, 8.3	24.8	21.1, 28.5
Sedentary	486	18.0	13.4, 22.6	9.2 <sup>E</sup>	5.8, 12.6	27.1	21.7, 32.6
<b>Daily hours of screen time (ages 6 to 11)</b>							
Less than or equal to 1 <sup>a</sup>	484	12.5 <sup>E</sup>	8.0, 17.1	5.3 <sup>E</sup>	2.2, 8.4	17.8	12.6, 23.0
More than 1 to 2	1,013	15.3	12.4, 18.2	7.1 <sup>E</sup>	4.7, 9.5	22.4	18.9, 25.9
More than 2	824	24.1*	19.6, 28.6	10.6*	7.7, 13.6	34.8*	29.9, 39.6
<b>Weekly hours of screen time (ages 12 to 17)</b>							
Less than 10 <sup>a</sup>	614	13.9	11.0, 16.8	9.1 <sup>E</sup>	5.6, 12.5	23.0	18.6, 27.4
10 to less than 20	699	21.9*	18.0, 25.9	6.6	4.7, 8.6	28.6	24.6, 32.6
20 to less than 30	728	20.2*	16.8, 23.6	11.2	8.3, 14.0	31.4*	27.2, 35.6
30 or more	466	23.8*	18.9, 28.8	11.2 <sup>E</sup>	7.5, 14.9	35.0*	29.4, 40.6

**Data source:** 2004 Canadian Community Health Survey: Nutrition

**Note:** There were 27 respondents with a missing value for fruit and vegetable consumption, 18 for physical activity for ages 6 to 11, 2 for screen time for ages 6 to 11, and 7 for screen time for ages 12 to 17.

<sup>a</sup> Reference group

\* Significantly different from estimate for reference group ( $p < 0.05$ )

E Coefficient of variation between 16.6% and 33.3% (interpret with caution)