Health status and behaviours of Canada's youth: A rural-urban comparison

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Highlights

♦ Girls and boys in Canada's northern regions report lower self-rated health and lower functional health.

♦ Youth in northern regions are generally more likely to smoke. Within each type of region, girls are more likely to be smokers than boys.

♦ Boys in small town regions have the highest prevalence of being overweight or obese.

♦ One in four boys report heavy drinking practices in small metro regions, small cities, small towns, and northern regions. In contrast, boys in the major metropolitan regions have the lowest prevalence of heavy drinking.

♦ Physical inactivity is generally the same among youth across metro and non-metro regions – a different result than the findings of an earlier study that found that physical inactivity for the population as a whole is more likely in rural areas.

Introduction

The health and well-being of Canada's rural population has gained increased attention in recent years. Studies have indicated that the health status of Canadians living in the most rural and remote parts of Canada is lagging behind that of urban residents (Pitblado *et al.*, 1999; Shields and Tremblay, 2002; Mitura and Bollman, 2003).

This has led to the need to analyse health indicators across the urban-to-rural gradient. The health and well-being of youth are also gaining increased attention as the benefits of promoting preventative measures, rather than only focusing resources on treating "the sick", become apparent.

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The population health approach taken by Health Canada includes a combination of personal health behaviours (e.g., smoking, eating and drinking habits, physical exercise), the characteristics of the health care system (e.g., distance to the nearest hospital, availability of medical services) and the socio-economic factors influencing health status (e.g., income, education, cultural traditions). Over the past few years, many initiatives have been undertaken in Canada to promote the health and well-being of young people (e.g., anti-smoking and active lifestyle campaigns, healthy eating programs). Are these messages making a difference?

The objective of this study is to examine the health status of Canadian youth (ages 12 to 17) across a geographic gradient of youth living in the largest metropolitan centres to those living in the northern regions of the country. To begin to focus health care on preventative measures, we need to understand the health of our youth to address where intervention measures may make a difference. In addition, information on whether health risk behaviours of urban youth are different from those of rural youth can assist families, policy-makers and local communities to target

policies, programs and services at an appropriate geographic level. This analysis can also help to support claims made about youth behaviours or alternatively to dispel myths.

This analysis is based on data from Statistics Canada's 2000/01 Canadian Community Health Survey (CCHS). When the sub-sample of youth ages 12 to 17 was selected from the total sample, 13,174 observations (6,655 boys and 6,513 girls) were used in the analysis. This represented approximately 2.4 million youth.

The CCHS does not cover the population of Aboriginals (or non-Aboriginals) living on reserves, but off-reserve Aboriginals are included in the CCHS. In this bulletin, no distinction is made between off-reserve Aboriginals and the non-Aboriginal population. The 2002 Statistics Canada study by Michael Tjepkema (2002) provides a comparison of the off-reserve Aboriginal population with the rest of the Canadian population. Health information from the Aboriginal Peoples Survey is expected to be published in 2004.

Definitions

Youth is defined as respondents ages 12 to 17. Girls who were pregnant are not included in this analysis because pregnancy, in itself, would influence the level of the indicators of health status. We did not investigate whether there were differences in youth pregnancy rates across the rural-to-urban spectrum.

We selected eight indicators to profile the health status of Canadian youth:

Self-rated health describes the respondent's health status based on his or her own judgment. The data are generated from a question on the survey that simply asked, "In general, would you say your health is excellent, very good, good, fair, or poor?"

Functional health is a health utility index (Statistics Canada, 2003) that provides a description of an individual's overall functional health status based on eight attributes: vision, hearing, speech, mobility (ability to get around), dexterity (use of hands and fingers), cognition (memory and thinking), emotion (feelings), pain and discomfort. An index of 0.8 or higher is defined in this study as excellent or very good functional health.

Body Mass Index (BMI) is a method to determine health risk as it relates to body weight and height. BMI is calculated as a person's weight in kilograms divided by height in metres squared. In the CCHS, respondents were asked "how much do you weigh?" and "how tall are you without shoes on?" The responses to weight and height were used to calculate the BMI for each respondent and this index was categorized as overweight or as obese according to international cut-off points for youth BMI as published by Cole *et al.* (2000) and as shown in the following table:

	Overweight[1]		Obese[2]	
	Males	**Females**	**Males**	**Females**
Age (years)	**BMI at each year of age to meet the standard[3] for "overweight" and "obese" at 18 years of age**			
12	21.22	21.68	26.02	26.67
13	21.91	22.58	26.84	27.76
14	22.62	23.34	27.63	28.57
15	23.29	23.94	28.30	29.11
16	23.90	24.37	28.88	29.43
17	24.46	24.70	29.41	29.69

International cut-off points for body mass index (BMI) for being overweight and for being obese, by sex and by single year of age

Data source: Estimates of cut-off points for body mass index for youth are derived from a paper published by Tim J. Cole *et al.* (2000) entitled "Establishing a standard definition for child overweight and obesity worldwide: International survey".

1. Standard for "overweight" for individuals 18 years of age and over is a body mass index of 25 kg/m² or more.

2. Standard for "obese" for individuals 18 years of age and over is a body mass index of 30 kg/m² or more.

3. The international cut-off points for body mass index for overweight and obesity by sex between the ages of 12 and 18 years, defined to pass through body mass index of 25 and 30 kg/m² at age 18, were obtained from averaging data from Brazil, Great Britain, Hong Kong, Netherlands, Singapore and United States.

In Appendix B, a comparison is made between the calculated BMI for each sex and the perception of the respondents as to their own weight given the response to the question "Do you consider yourself overweight, underweight, or just about right?"

Smoking is defined as those who responded that they smoke daily or occasionally when asked the question "At the present time, do you smoke cigarettes daily, occasionally or not at all?"

Depression is based on a predicted probability of a person experiencing a major depressive episode. Respondents were asked a series of questions relating to feelings of sadness, depression, losing interest in most things, feeling tired/low energy, trouble concentrating and trouble falling asleep over the previous 12 months. A predicted probability score of 0.9 or greater is defined in this study as indicating symptoms of depression.

Heavy drinking is defined as drinking 5 or more drinks, on one occasion, once a month, or more than once per month. The specific question was, "How often in the past 12 months have you had 5 or more drinks on one occasion? Never, less than once a month, once a month, 2 to 3 times a month, once a week, more than once a week."

Physical inactivity is derived from a physical activity index which measures the energy expenditure of respondents in their leisure activities. Energy expenditure for each leisure activity in kcal/kg/day is calculated based on the number of times a respondent engaged in an activity over a 12-month period. The average duration in hours of the activity and the energy cost of the activity (kilocalories expended per kilogram of body weight per hour of activity divided by 365) are used to calculate energy expenditure. Respondents were classified as physically inactive if their energy expenditure in leisure activities was less than 1.5 kcal/kg/day.

Sense of belonging to the local community is considered in this study as an indicator of emotional well-being. The question posed to respondents was "How would you describe your sense of belonging to your local community? Would you say it is very strong, somewhat strong, somewhat weak, or very weak?" In this study, youth were considered to have a positive sense of belonging to their community if they described their sense of belonging to the community as very or somewhat strong.

Geographic categories

Respondents were grouped into seven geographic categories based on the settlement pattern of the census division in which the respondents resided. *Metropolitan regions* are defined as those census divisions (CDs) that have 50,000 or more people living in urban settlements (of 2,500 or more) while *non-metropolitan regions* have a population under 50,000 living in urban settlements. The metropolitan and non-metropolitan regions are divided into seven geographic sub-categories to portray an urban-to-rural gradient, as follows:

Geographic category	Population of census division living in "urban" settlements of 2,500 or more:	CCHS population ages 12 to 17	
		Percent	**Weighted Total**
Metropolitan regions			
• Major metro	one million or more	36.2	880,107
• Mid-sized metro	250,000 to 999,999	20.9	509,777
• Smaller metro	50,000 to 249,000	15.7	381,698
Non-metropolitan regions			
• Small city	20,000 to 49,999	11.9	289,068
• Small town	2,500 to 19,999	12.0	292,940
• Rural	no population living in urban settlements of 2,500 or more	1.2	28,970
• Northern	People residing in CDs that are entirely or mostly north of the following parallels by region; Newfoundland, 50th; Québec and Ontario, 49th; Manitoba, 53rd; Saskatchewan, Alberta and British Columbia, 54th; and all of the Yukon, Northwest Territories and Nunavut.	2.1	51,612
Total		100.0	2,434,172

Methods

Data Source

This analysis is based on data from Statistics Canada's 2000/01 Canadian Community Health Survey (CCHS) (Cycle 1.1). The CCHS was undertaken over a 14-month period beginning in September 2000. The survey covered the household population aged 12 or older in all provinces and territories (except persons living on Indian reserves, full time members of the Canadian Armed Forces and some remote areas). The resulting sample size of the CCHS was 131,535 with 83 percent of the surveys obtained by face-to-face interviews and 17 percent by telephone interview. The Statistics Canada paper by Y. Beland (2002) entitled "Canadian Community Health Survey – Methodological Overview" provides additional information on the survey design and methodology.

From the total CCHS sample, a sub-sample was selected of boys and girls ages 12 to 17. Girls who reported being pregnant were removed from the sample. The resulting number of observations used for this analysis was 13,174 (6,655 boys and 6,513 girls).

Analytical technique

All estimates produced with data from the CCHS have been weighted to represent the appropriate target populations at the regional level. To account for the variation in income distribution among regions (as identified in the box entitled "Geographic categories"), all estimates were standardized for income[1]. Given the complex sampling design of the CCHS, confidence intervals and levels of significance for the estimates were calculated using a bootstrapping method of re-sampling.[2]

Limitations

To study and compare health indicators over an urban-to-rural gradient, data had to be aggregated according to a specific geographical definition (as outlined in the box entitled "Geographic categories"). Comparisons of health indicators in this analysis may mask important fluctuations that arise due to socio-demographic factors such as education, cultural differences and province of residence. The small sample size of the CCHS in regions with a small population results in a comparatively large confidence interval — in these cases, the results should be used with caution.

How to read the figures

Figures 1 through 8 provide a graphical analysis of the differences between the youth living in metropolitan and non-metropolitan regions of Canada. For each type of region, the mean is represented in the chart by a square for boys and triangle for girls. The 95% confidence interval is denoted by the length of the vertical line (i.e., there is a 95% probability the mean will fall within this range). The star over the line shows that the indicator for the region is statistically significantly different than the national average for the respective gender, at the 95% level of confidence. Differences between genders may be considered significantly different if their confidence intervals do not overlap.

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[1] Health outcomes are often influenced by the level of family income. Rural residents, on average, report lower incomes (Rupnik *et al,* 2001; Singh, 2002), although the disparities within rural tend to be less than the income disparities within the urban population (Rupnik *et al.,* 2001). To remove the rural-urban differences in health variables due to income level and income distribution, the health variables reported in this bulletin have been calculated within each income group and then "standardized" (or, adjusted, or reweighted) to the Canada-level distribution of individuals by size of family income. Thus, the reported results should be interpreted as the observed results "if" the distribution of individuals across family income classes was the same as the Canada-level distribution.

[2] Given the complex survey design of the CCHS and the need to estimate differences between prevalences at different geographical levels, the BOOTMAC8.SAS computer program was used to perform the data analysis. Replicate weights obtained by re-sampling provides for a more stable variance estimate.

Girls in rural and northern regions have a lower self-rated health

Recent research on the health status of Canadians has generally concluded that people living in rural and northern regions of Canada have a lower self-rated health than those living in metro centres (Mitura and Bollman, 2003). Does this result hold true for youth as well?

This analysis indicates that a significantly lower proportion of girls in rural and northern regions of Canada rate their health as "excellent." While 33 percent of girls in major metro regions rated their health as excellent, only 17 percent of girls in rural regions and 15 percent of girls in northern regions rated their health at this level (Figure 1).

Similarly, a lower proportion of boys in northern regions rated their health as excellent (23 percent) compared to boys in major metro regions (36 percent).

The question this raises is why do a lower proportion of girls and boys living in northern Canada, and girls living in rural Canada, rate their overall health as "excellent"? Can their health behaviours point to a reason for this disparity or do other factors play a role in their response? A recent study by Statistics Canada found that adolescents who considered their own health to be poor, fair or good were more likely to smoke, drink or be obese. They were also less likely to live in a relatively high-income household (Tremblay *et al.*, 2003).

Figure 1
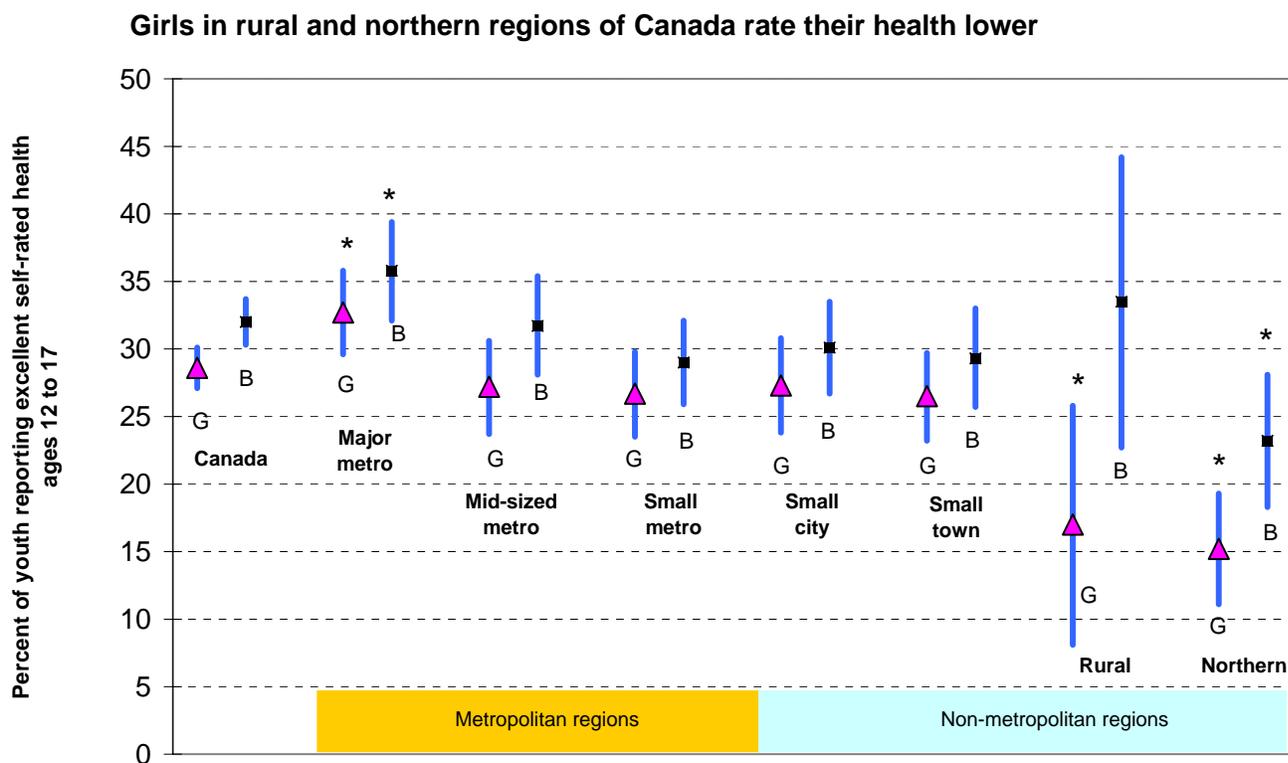
Girls in rural and northern regions of Canada rate their health lower

Source: Statistics Canada, Canadian Community Health Survey, 2000/01
Note: * Significantly different from the Canada estimate.
G=girl, B=boy.

Girls and boys in northern regions have lower functional health

Functional health status is an index based on eight attributes: vision, hearing, speech, mobility (ability to get around), dexterity (use of hands and fingers), cognition (memory and thinking), emotion (feelings), pain and discomfort.

In Canada, it is estimated that 85 percent of girls and boys have excellent or very good functional health. In northern regions, girls and boys are found to have significantly lower functional health compared to the national average. Only 77 percent of girls and 80 percent of boys have excellent or very good functional health in the northern regions (Figure 2). In contrast, girls in the rural regions are the most likely to have good or excellent functional health (91 percent).

Figure 2
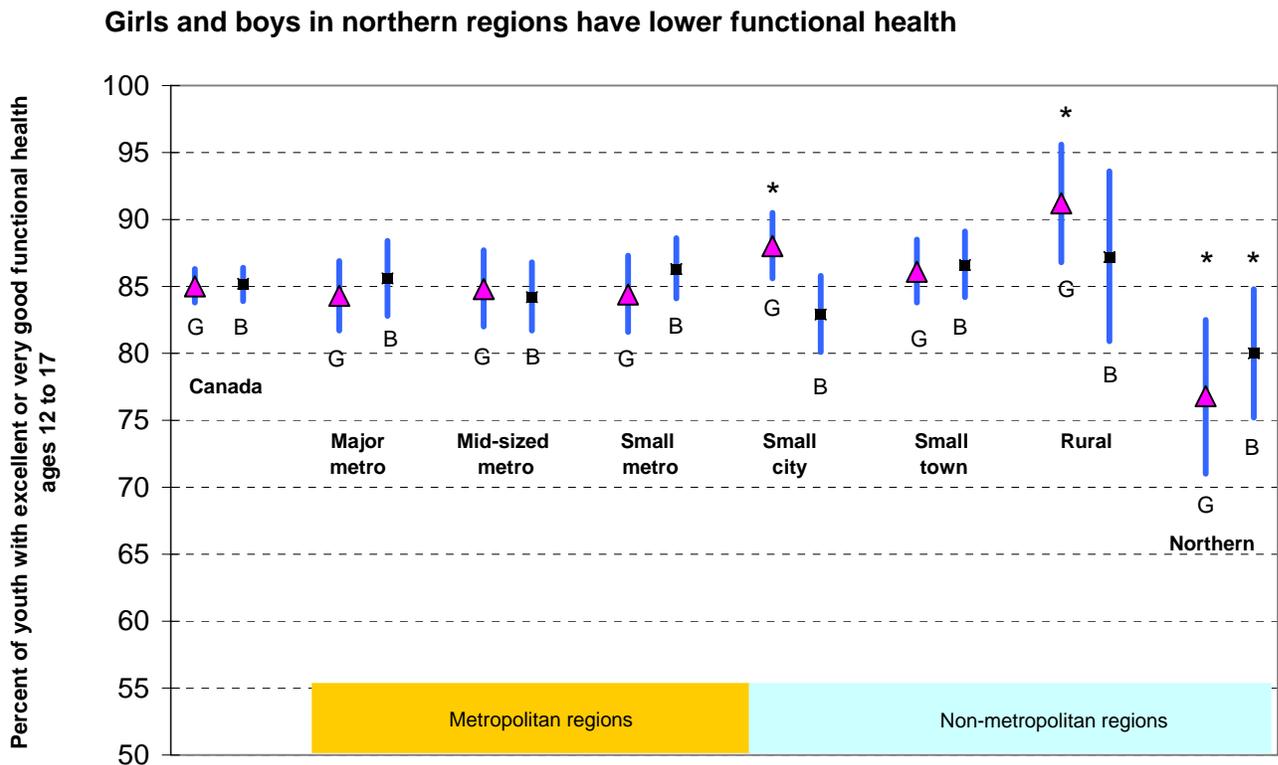
Girls and boys in northern regions have lower functional health

Source: Statistics Canada, Canadian Community Health Survey, 2000/01
Note: *Significantly different from the Canada estimate.
G=girl, B=boy.

Boys in small town regions have the highest prevalence of being overweight or obese

According to the World Health Organization (2002), obesity is one of today's most blatantly visible – yet most neglected – public health problems. Obesity is a complex condition, one with serious social and psychological dimensions that affects virtually all age and social economic groups.

Based on body mass index international cut-off points for youth (see "Definitions" box for details), the CCHS indicates that 16 percent of girls and 25 percent of boys in Canada are overweight (Figure 3). In addition, 3 percent of girls and 6 percent of boys are obese (Appendix Table A).

Boys located in small town regions had the highest prevalence of being overweight (30 percent) (Figure 3) and obese (9 percent) (Appendix Table A). While boys were twice as likely as girls to be obese in Canada, the prevalence of obesity in northern regions (6 percent) was similar between the genders (Appendix Table A).

Figure 3

A significantly higher proportion of boys in small town regions of Canada are overweight

Source: Statistics Canada, Canadian Community Health Survey, 2000/01
Note: *Significantly different from the Canada estimate.
G=girl, B=boy.
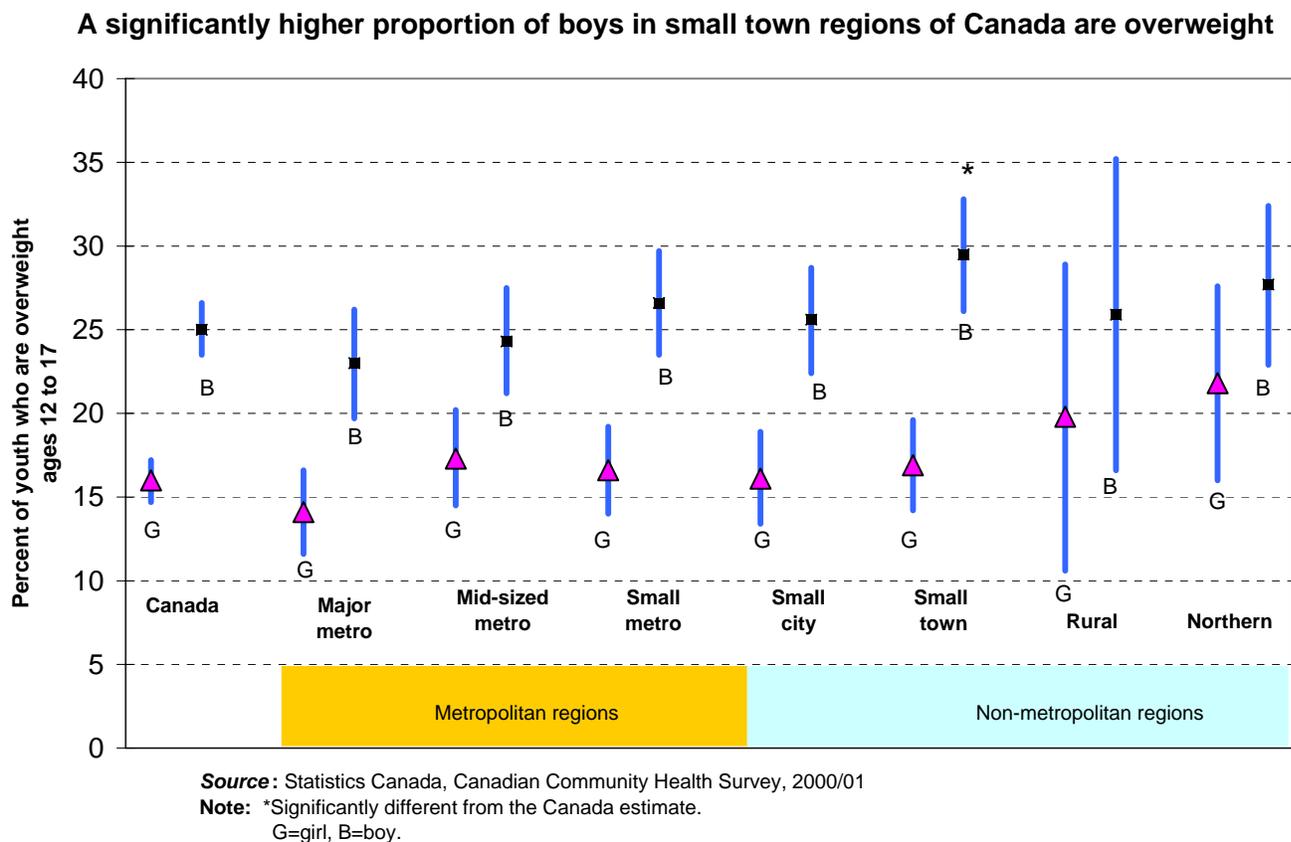
A comparison was made between the calculated body mass index (BMI) for girls and boys and their own perception of being overweight. The results indicate a similar pattern for girls between the BMI calculation and how the girls perceived themselves in terms of being overweight. However, when a similar comparison is made for boys, the results are markedly different. While the BMI calculation indicates that 25 percent of Canadian boys are overweight (much higher than girls), only 13 percent of boys (much lower than girls) perceived themselves to be overweight (Appendix B).

A second question that researchers have begun to study more closely is whether being overweight in childhood increases the chances of being overweight as an adult and the resulting risk of disease. According to some researchers, the results have been mixed. It is not clear whether the increased risk of adult disease is from the higher rates of adult obesity or whether childhood obesity itself confers additional risk (Power *et al.,* 1997). A recent study by Wright *et al*. (2001) in the United Kingdom tracked over 400 individuals from childhood to age 50. The UK study found that children who were obese at age 13 showed an increased risk of obesity as adults and no excess adult health risk from childhood or teenage overweight was found. This study also found that being thin in childhood offered no protection from being overweight as an adult.

Carrière (2003) found that for both girls and boys, having an obese parent greatly increased the odds for youth obesity. In addition, among girls, former smokers had higher odds for obesity while for boys being physically inactive increased the odds of obesity.

Girls in northern regions have the highest prevalence of smoking

According to the CCHS, an estimated 26 percent of Canadians aged 12 and over smoke daily or occasionally and the prevalence of smoking was higher in more rural regions (Mitura and Bollman, 2003). Given that smoking habits in developed nations often occur before the age of 18, preventing smoking at a young age is key to reducing the overall prevalence of smoking in Canada.

Among youth ages 12 to 17, 15 percent of girls and 12 percent of boys in Canada smoke daily or occasionally (Figure 4). Girls in the northern regions were found to have the highest prevalence of smoking at 21 percent. Interestingly, there were no significant differences found in the prevalence of smoking among boys by type of region.

Figure 4
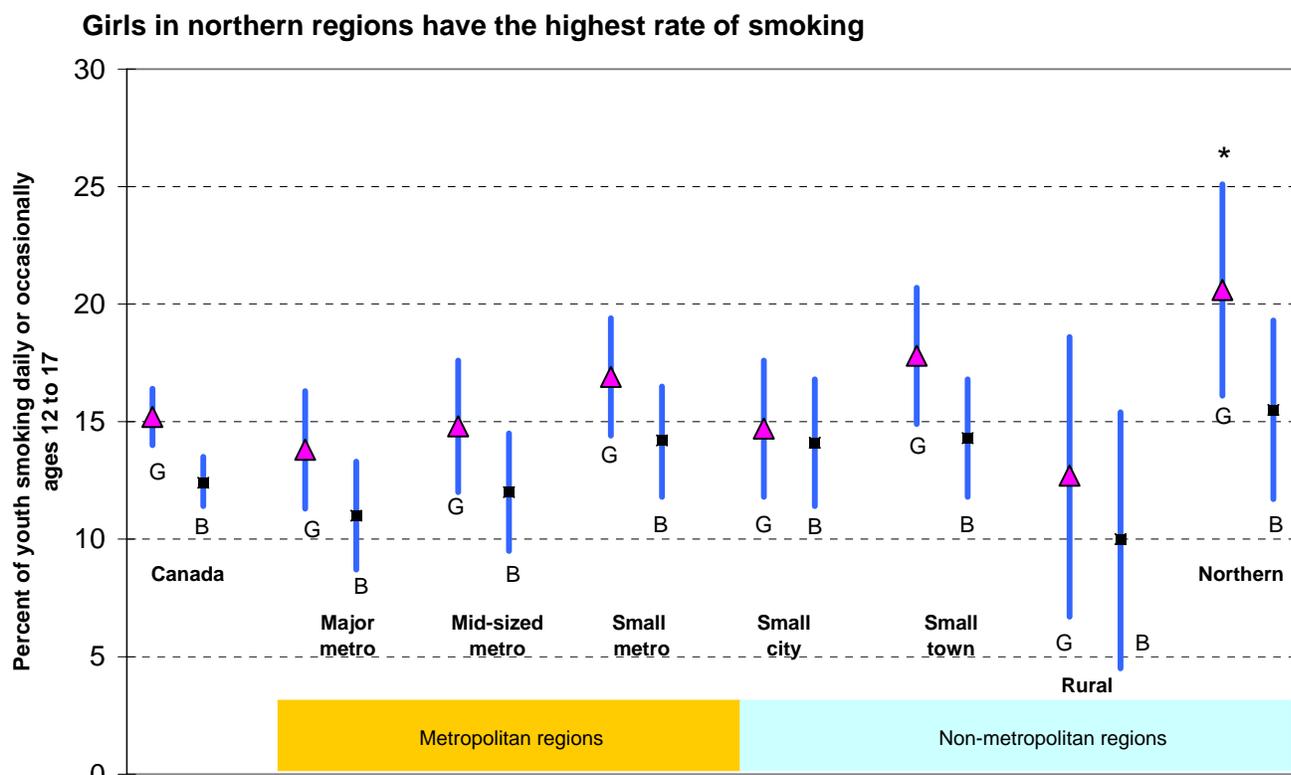
Girls in northern regions have the highest rate of smoking

Source: Statistics Canada, Canadian Community Health Survey, 2000/01
Note: *Significantly different from the Canada estimate.
G=girl, B=boy.

## Risk of depression higher in girls than in boys in each type of region

In this study, depression is based on a predicted probability (90 percent or higher) of the youth experiencing a major depressive episode. In Canada, a significantly higher percent of girls (9 percent) than boys (3 percent) was estimated to be in this high probability range of experiencing a major depressive episode (Figure 5). Within each type of region, girls were more likely than boys to experience a major depressive episode – the highest rate was for girls in the northern region with a risk of depression at 13 percent.

The risk of depression for boys in the major metro region was significantly below the national average at 2 percent, while boys in small metro regions and northern regions had a significantly higher prevalence at 6 percent and 8 percent, respectively.

Youth depression has been shown to be an important precursor to depression and other health problems in adulthood. Park (2003) found that self-concept (self-esteem and the extent one feels in control of important aspects of one's life) tends to be lower among girls than boys. A weak self-concept in adolescence tended to put girls at risk of depression, poor self-perceived health and obesity in young adulthood.

Figure 5

Girls are more likely than boys to suffer a major depressive episode in each type of region

Source: Statistics Canada, Canadian Community Health Survey, 2000/01
Note: *Significantly different from the Canada estimate. G=girl, B=boy.
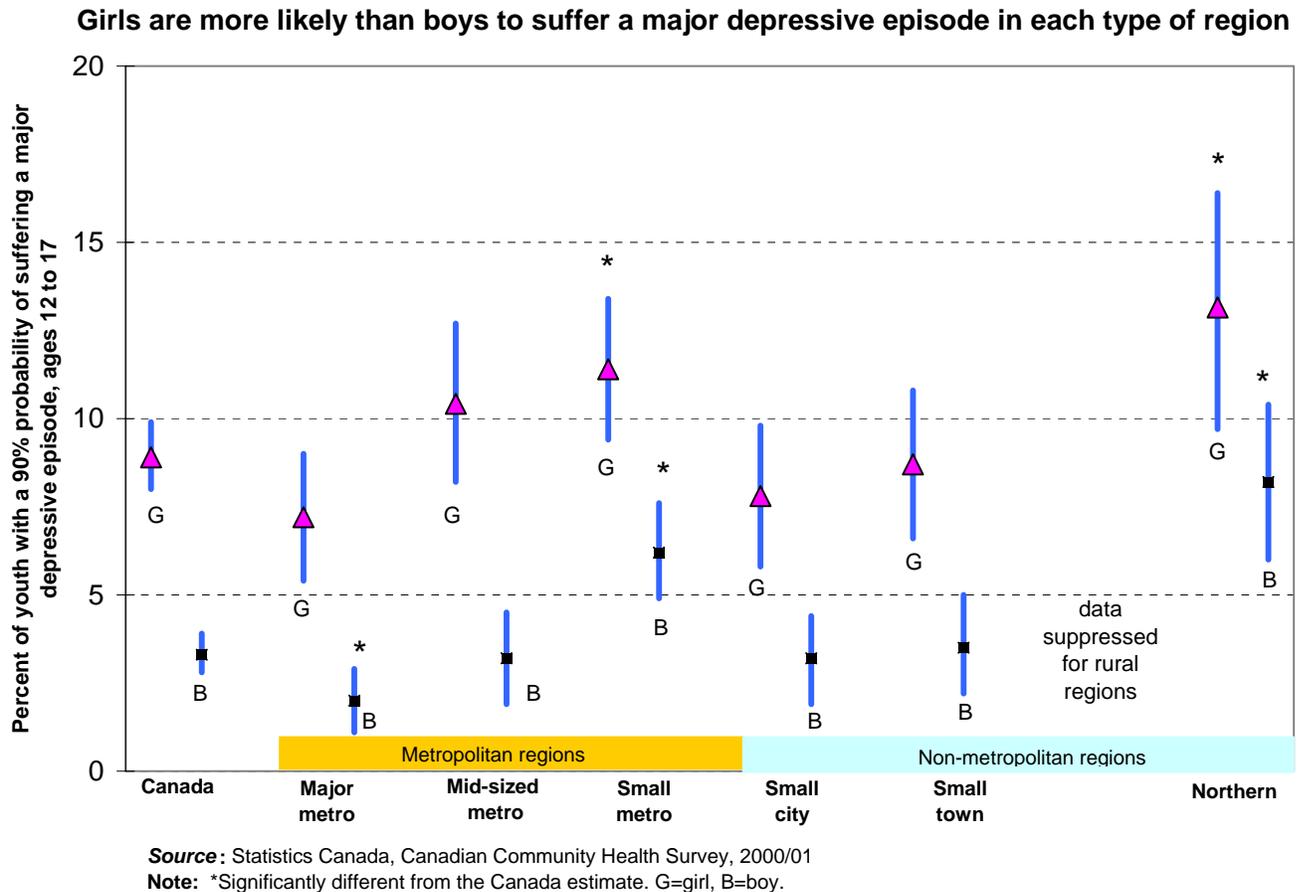
Boys in small metro regions have the highest prevalence of heavy drinking

Heavy drinking is defined as those youth who drink five or more drinks of alcohol on one occasion, once or more per month. At the national level, it is estimated that 20 percent of boys and 15 percent of girls participate in heavy drinking at least once per month (Figure 6). The significant difference in heavy drinking between girls and boys was found in small metro, small city and small town regions. Heavy drinking by boys in major metro regions was significantly below (13 percent) the national average, while that for boys in small metro regions was significantly above (30 percent).

Figure 6
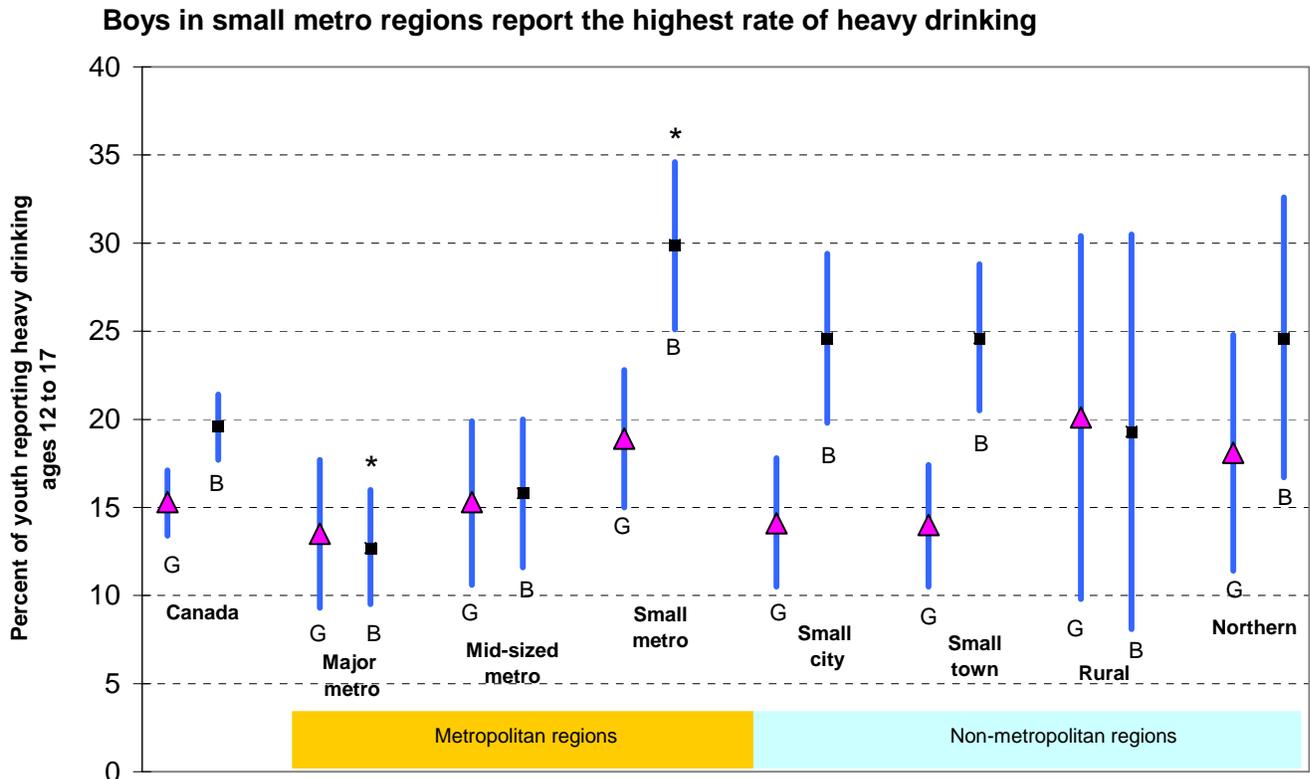
Boys in small metro regions report the highest rate of heavy drinking

Source: Statistics Canada, Canadian Community Health Survey, 2000/01
Note: *Significantly different from the Canada estimate.
  G=girl, B=boy.

Girls in major metro regions have the highest prevalence of physical inactivity

Physical inactivity is derived from a physical activity index which measures the energy expenditure of respondents in their leisure activities. This analysis indicates that girls in Canada are significantly more inactive (35 percent) in their leisure activities than boys (23 percent). Girls' physical inactivity is significantly higher than boys in major metro, mid-sized metro, small city and small town regions. The highest prevalence of inactivity was for girls in major metro regions (40 percent), which was significantly above the national average.

Figure 7
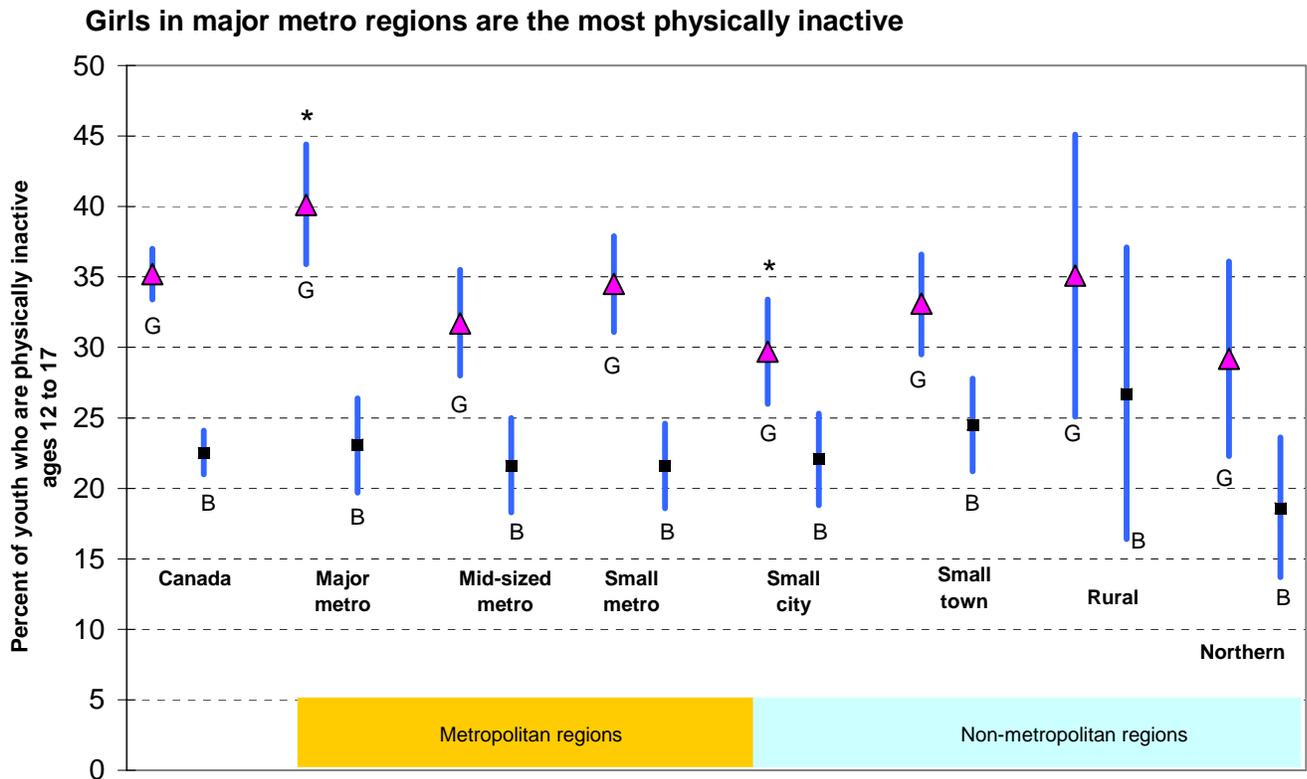
Girls in major metro regions are the most physically inactive

Source: Statistics Canada, Canadian Community Health Survey, 2000/01
**Note:** *Significantly different from the Canada estimate.
G=girl, B=boy.

Boys in northern regions have a strong sense of belonging to their local communities

The feeling by youth of belonging to their community has been included as "youth behaviour" in this analysis based on the argument that youth between the ages of 12 to 17 can choose to be active within their community and if they feel a sense of belonging to their communities, this may add to their personal well-being.

There is a general perception in Canada that "rural" children have a special relationship to their communities — knowing their neighbours and an opportunity to grow up in a rural setting. Our results are (to a degree) consistent with this perception. In Canada, 7 in 10 youth have a very strong or somewhat strong sense of belonging to their local communities (Figure 8). The highest prevalence of strong or somewhat strong sense of belonging to the community was found for girls in small town regions (78 percent) and boys in northern regions (83 percent).

Figure 8
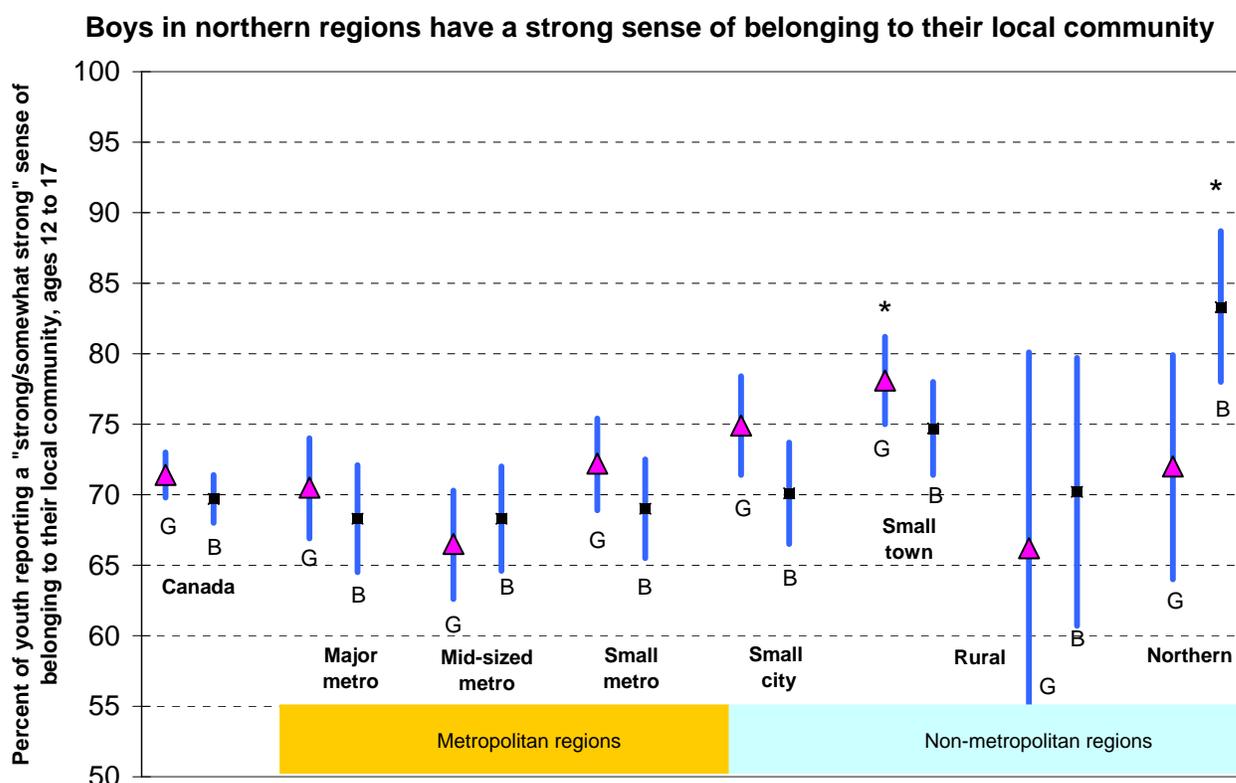
Boys in northern regions have a strong sense of belonging to their local community

Source: Statistics Canada, Canadian Community Health Survey, 2000/01
**Note:** *Significantly different from the Canada estimate.
G=girl, B=boy.

Concluding remarks

What is perhaps most surprising from this analysis on youth health behaviours is the low number of significant differences between youth living in the most urban regions of Canada compared to those living in small towns, rural and northern regions. The significant differences between youth tend to occur more often between the genders than across the regional types as defined in this paper.

This study points to boys in small metro and non-metro regions as having the highest prevalence of heavy drinking. Heavy drinking by youth is a serious issue, not only in terms of health but also

in relation to safety when drinking and driving is involved.

Given that smoking by adults is often linked to smoking habits prior to the age of 18, reducing youth smoking today should continue to be an important strategy for the future. The results of this study would suggest that programs need to address the higher rates of smoking by girls, and most notably girls in northern regions.

Research needs to continue in Canada on identifying youth eating habits and tracking the

issue of underweight and overweight/obesity in youth through to the adult years to begin to understand the implications of eating habits and body weight on health. It is important that messages about good nutrition are communicated in ways that will be understood by both boys and girls across all types of regions in Canada. Parents and teachers are obviously the "first line of defence" in encouraging and setting an example on best practices in nutrition. Governments can also play a larger role to support programs designed with youth nutrition as a priority.

Physical activity (especially among girls) needs to be stressed as an important component to daily living. Perhaps physical activity could play a role in reducing the prevalence of depression among girls. In addition, the onus is on everyone to ensure that youth feel a strong sense of belonging to their community. Given that 30 percent of our youth feel a somewhat weak or very weak sense of belonging, there is work to be done.

In summary, it is important to gain a better understanding of why gender differences exist in the health status and behaviours of Canadian youth. In the process, consideration should be given to different health-related issues between rural and urban girls and boys when developing strategies, policies and programs.

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Appendix A

Selected health indicators by type of region, youth ages 12 to 17, Canada, 2000/01

Indicator	Canada	Metropolitan regions			Non-metropolitan regions			
		Major metro	**Mid-sized metro**	**Small metro**	**Small city**	**Small town**	**Rural**	**Northern**
					(percent)			
Self-rated health (excellent)								
Girls	28.6	32.7*	27.2	26.7	27.3	26.5	17.0* E	15.2*
	(27.1-30.1)	(29.6-35.8)	(23.7-30.6)	(23.5-29.8)	(23.8-30.8)	(23.2-29.7)	(8.1-25.8)	(11.1-19.3)
Boys	32.0	35.8	31.7	29.0	30.1	29.3	33.5	23.2*
	(30.3-33.7)	(32.1-39.4)	(28.1-35.4)	(25.9-32.1)	(26.7-33.5)	(25.7-33.0)	(22.7-44.2)	(18.3-28.1)
Functional health (excellent/very good)								
Girls	85.0	84.3	84.8	84.4	88.0*	86.1	91.2*	76.8*
	(83.8-86.3)	(81.7-86.9)	(82.0-87.7)	(81.6-87.3)	(85.6-90.5)	(83.8-88.5)	(86.8-95.6)	(71.0-82.5)
Boys	85.2	85.6	84.2	86.3	82.9	86.6	87.2	80.0*
	(83.9-86.4)	(82.8-88.4)	(81.7-86.8)	(84.1-88.6)	(80.1-85.8)	(84.2-89.1)	(80.9-93.6)	(75.2-84.8)
Body Mass Index (obese)								
Girls	3.4	3.3 E	2.8 E	3.5 E	3.6 E	3.7 E	F	5.4 E
	(2.8-4.0)	(2.0-4.7)	(1.6-4.1)	(2.3-4.8)	(2.1-5.2)	(2.4-5.0)	F	(2.7-8.2)
Boys	6.0	4.7	5.5	7.4	6.1	9.4*	F	6.0 E
	(5.2-6.8)	(3.2-6.2)	(3.8-7.3)	(5.6-9.3)	(4.5-7.7)	(7.2-11.7)	F	(3.7-8.4)
Body Mass Index (overweight)								
Girls	16.0	14.1	17.3	16.6	16.1	16.9	19.8 E	21.8
	(14.7-17.2)	(11.6-16.6)	(14.5-20.2)	(14.0-19.2)	(13.4-18.9)	(14.2-19.6)	(10.6-28.9)	(16.0-27.6)
Boys	25.0	23.0	24.3	26.6	25.6	29.5*	25.9 E	27.7
	(23.5-26.6)	(19.7-26.2)	(21.2-27.5)	(23.5-29.7)	(22.4-28.7)	(26.1-32.8)	(16.6-35.2)	(22.9-32.4)
Perceived weight (overweight)								
Girls	19.0	18.7	19.4	19.3	18.8	20.0	21.3 E	21.2
	(17.6-20.5)	(15.8-21.5)	(16.2-22.6)	(16.5-22.1)	(15.9-21.6)	(17.3-22.8)	(11.8-30.8)	(15.1-27.3)
Boys	12.6	14.6	11.0	11.8	11.1	12.5	11.3 E	9.8
	(11.4-13.8)	(11.9-17.3)	(8.8-13.1)	(9.5-14.1)	(9.0-13.2)	(10.2-14.8)	(5.8-16.9)	(6.7-12.9)
Smoking (daily or occasionally)								
Girls	15.2	13.8	14.8	16.9	14.7	17.8	12.7 E	20.6*
	(14.0-16.4)	(11.3-16.3)	(12.0-17.6)	(14.4-19.4)	(11.8-17.6)	(14.9-20.7)	(6.7-18.6)	(16.1-25.1)
Boys	12.4	11.0	12.0	14.2	14.1	14.3	10.0 E	15.5
	(11.4-13.5)	(8.7-13.3)	(9.5-14.5)	(11.8-16.5)	(11.4-16.8)	(11.8-16.8)	(4.5-15.4)	(11.7-19.3)
Depression (90% probability)								
Girls	8.9	7.2	10.4	11.4*	7.8	8.7	F	13.1*
	(8.0-9.9)	(5.4-9.0)	(8.2-12.7)	(9.4-13.4)	(5.8-9.8)	(6.6-10.8)	F	(9.7-16.4)
Boys	3.3	2.0* E	3.2 E	6.2*	3.2 E	3.5 E	F	8.2*
	(2.8-3.9)	(1.1-2.9)	(1.9-4.5)	(4.9-7.6)	(1.9-4.4)	(2.2-5.0)	F	(6.0-10.4)
Heavy drinking (5+ alcoholic drinks)								
Girls	15.3	13.5	15.3	18.9	14.1	14.0	20.1 E	18.1 E
	(13.4-17.1)	(9.3-17.7)	(10.6-19.9)	(15.0-22.8)	(10.5-17.8)	(10.5-17.4)	(9.8-30.4)	(11.4-24.8)
Boys	19.6	12.7*	15.8	29.9*	24.6	24.6	19.3 E	24.6 E
	(17.7-21.4)	(9.5-16.0)	(11.6-20.0)	(25.1-34.6)	(19.8-29.4)	(20.5-28.8)	(8.1-30.5)	(16.7-32.6)
Physical activity index (inactive)								
Girls	35.2	40.1*	31.7	34.5	29.7*	33.1	35.1	29.2
	(33.4-37.0)	(35.9-44.4)	(28.0-35.5)	(31.1-37.9)	(26.0-33.4)	(29.5-36.6)	(25.1-45.1)	(22.3-36.1)
Boys	22.5	23.1	21.6	21.6	22.1	24.5	26.7 E	18.6
	(21.0-24.1)	(19.7-26.4)	(18.3-25.0)	(18.6-24.6)	(18.8-25.3)	(21.2-27.8)	(16.4-37.1)	(13.7-23.6)
Sense of belonging to community (strong/somewhat strong)								
Girls	71.4	70.3	66.4	72.8	75.6	78.1*	64.7	72.3
	(69.8-73.0)	(66.7-73.9)	(62.5-70.3)	(69.7-75.9)	(72.2-78.9)	(74.9-81.4)	(49.2-80.2)	(64.2-80.3)
Boys	69.7	68.3	68.3	69.0	70.0	74.7	70.2	83.3*
	(68.0-71.4)	(64.5-72.1)	(64.6-72.0)	(65.5-72.5)	(66.5-73.7)	(71.4-78.0)	(60.7--79.7)	(78.0-88.7)

Data source: Statistics Canada, Canadian Community Health Survey, Cycle 1.1, 2000/01.
Notes:
1. Beale codes are used to assign census divisions to the various geographic categories as described in the text box entitled "Geographic categories".
2. Bootstrapping techniques were used to produce the coefficients of variation (CV) and 95% confidence intervals (shown in brackets). Data with a CV from 16.6% to 33.3%
are identified by an E and should be interpreted with caution. Data with a CV greater than 33.3% are identified with an F and are suppressed due to extreme sampling variability.
3. * significantly different than the national average (95% confidence interval) by sex. Coefficients highlighted in blue are significantly "better" than the Canadian average
for the given gender while those highlighted in yellow are significantly "worse".
4. Estimates are standardized by income.

Appendix B

Comparing the prevalence of being "overweight" as shown from the calculated body mass index and the prevalence of reporting a perception of being "overweight"

According to the calculated body mass index (BMI) (the standard for assessing being "obese" or being "overweight") in the CCHS, boys have a much higher probability of being "overweight" compared to girls (Figure 3). However, boys are much less likely to perceive themselves as being overweight (Appendix Table B).

Appendix Table B. Difference between perception of being overweight and measured Body Mass Index, boys and girls, ages 12 to 17, Canada, 2000/01

		Girls	Boys	**Difference:** Percent of boys "obese" or "overweight" minus percent of girls "obese" or "overweight"
row		col. 1	col. 2	col .3 (= col. 2 minus col. 1)
(1)	Percent "obese" (BMI>30 kg/m^2)	3.4	6.0	2.6
(2)	Percent "overweight" (BMI>25 kg/m^2)	16.0	25.0	9.0
(3)	Percent who responded "overweight" to the question "Do you consider yourself overweight, underweight, or just about right?"	19.0	12.6	-6.4
(4) (= row(3) minus row(2))	**Difference:** Percent who perceive being "overweight" minus percent with calculated BMI>25 kg/m^2	3.0	-12.4	

Source: Statistics Canada, Canadian Community Health Survey, 2000/01.

Interestingly, when British and American researchers (Cole *et al.¸* 2000) worked to develop an internationally acceptable definition of child overweight and obesity using six countries as the basis for their analysis, they excluded the Canadian datasets because "Canada was a clear outlier during puberty".

The comparisons in Appendix Table B indicate:

1. that a much higher share of boys, compared to girls, are measured to be overweight but a much lower share of boys perceive they are overweight, compared to girls (see column 3); but
2. a slightly higher share of girls perceive themselves to be overweight, compared to the BMI calculation but a much lower share of boys perceive themselves to be overweight, compared to their BMI calculation (see row 4).

Since the perception of girls is similar to their BMI results and since a lower share of boys perceive themselves to be overweight (as we would have expected), we wonder if the BMI calculation for boys is resulting in too high a share of boys being "overweight".

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