Patterns of health and disease are largely
a consequence of how we learn, live and work

Improving the Health of Canadians: Promoting Healthy Weights

Canadian Population Health Initiative

Canadian Institute
for Health Information

Institut canadien
d'information sur la santé

Canadian Institute for Health Information
495 Richmond Road
Suite 600
Ottawa, Ontario, Canada
K2A 4H6

Telephone: (613) 241-7860
Fax: (613) 241-8120
www.cihi.ca

ISBN 1-55392-773-7 (PDF)

Cette publication est aussi disponible en français sous le titre :
Améliorer la santé des Canadiens : Promouvoir le poids santé, 2006 ISBN 1-55392-772-9 (PDF)

Table of Contents

About the Canadian Population Health Initiative v
About the Canadian Institute for Health Information v
CPHI Council (as of November 2005) vii
Acknowledgements ix

Population Health Approach to Healthy Weights—Environmental and Social Factors 3
Exploring the Issues: What We Do and Do Not Know 5
Population Health Approach to Healthy Weights: What the Research Says 6

Community and Physical Environment 23
Urban Sprawl and Active Transportation 23
Urban Sprawl, Active Transportation and Physical Activity 26
Urban Sprawl, Active Transportation and Healthy Weights 27
Perceptions of Safety 29
Access to Recreational Areas and Facilities 30

Workplace 35
Healthy Eating, Physical Activity and Beyond 35
Workplace Policies to Promote Healthy Weights 36

School 43
Healthy Eating in the School Environment 44
Physical Activity in Schools 45
Beyond Healthy Eating and Physical Activity: Coordinated School Health Programs 47
Challenges Associated With Coordinated School Health Programs: The Best Laid School Health Plan? 50

Home and Family Environment 55
Parents' Eating Habits and Physical Activity Behaviours 55
Parental Control of Children's Eating 56
Home-Packed Versus Purchased Lunches 56
Screen Time and Advertising: Are They Linked to Healthy or Unhealthy Weights? 57

Nutrition Environment 63
Food Insecurity 63
Cost of and Access to Food 64
Food Expenditures 64
Energy-Dense Foods 64
Fast Food Restaurants 64
Portion Size 65

Personal Health Services 69
Experiences With and Use of Health Services 69
Clinical Interventions 69
Mental Health and Unhealthy Weights 70
Commercial Weight-Loss Programs 70

The Simple Solution? Canadians' Views on Options to Promote Healthy Weights 75

Policies and Programs to Promote Healthy Weights: What Do We know? What Do We Not know? 79
Community and Physical Environment 80
Workplace 81
School 82
Home and Family Environment 83
Nutrition Environment 84
Personal Health Services 85

Conclusions 89

For More Information 93

There's More on the Web 95

Appendices
Appendix A—Measuring Overweight and Obesity 97
Appendix B—Methodology 99

References 105

It's Your Turn 117

Figures
Figure 1. Measured Obesity Rates (BMI ≥30) Among Adults 18 Years and Over, Canada, Excluding the Territories (2004) 18
Figure 2. Measured Overweight/Obesity Rates Among Children and Youth 2 to 17 Years, Canada, Excluding the Territories (2004) 19
Figure 3. Self-Reported Prevalence of BMI <25 by Geographic Location Among Adults 18 Years and Over (2003) 25
Figure 4. Self-Reported Prevalence of BMI <25 by Geographic Location and Gender Among Adults 18 Years and Over (2003) 25
Figure 5. Self-Reported Prevalence of BMI <25 by Neighbourhood-Level Car and Public Transit Use Among Adults 18 Years and Over (2003) 28
Figure 6. Self-Reported Prevalence of BMI <25 by Neighbourhood-Level Walking and Biking Among Adults 18 Years and Over (2003) 28
Figure 7. Proportion of Canadian Workplaces With 20 or More Employees With Strategies to Increase Employees' Physical Activity (2003) 37
Figure 8. Trends in Self-Reported and Measured Obesity Rates (BMI ≥30) Among Adults 18 Years and Over (1978 to 2004) 40
Figure 9. Measured Overweight and Obesity Rates Among Children and Youth 2 to 17 Years (2004) 51
Figure 10. Trends in Self-Reported and Measured Obesity Rates (BMI ≥30) Among Adult Males and Females 18 Years and Over (1978 to 2004) 59
Figure 11. Importance of Reducing Obesity to Overall Health: What the Canadian Public Thinks (2004) 76

Tables

Table 1. Examples of Evaluated Workplace Obesity-Related Health Initiatives 39
Table 2. Examples of Evaluated School-Based Obesity-Related Health Initiatives 48

About the Canadian Population Health Initiative

The Canadian Population Health Initiative (CPHI), a part of the Canadian Institute for Health Information (CIHI), was created in 1999. CPHI's mission is twofold:

- To foster a better understanding of factors that affect the health of individuals and communities; and
- To contribute to the development of policies that reduce inequities and improve the health and well-being of Canadians.

As a key actor in population health, CPHI:

- Provides analysis of Canadian and international population health evidence to inform policies that improve the health of Canadians;
- Commissions research and builds research partnerships to enhance understanding of research findings and to promote analysis of strategies that improve population health;
- Synthesizes evidence about policy experiences, analyzes evidence on the effectiveness of policy initiatives and develops policy options;
- Works to improve public knowledge and understanding of the determinants that affect individual and community health and well-being; and
- Works within CIHI to contribute to improvements in Canada's health system and the health of Canadians.

About the Canadian Institute for Health Information

CIHI collects and analyzes information on health and health care in Canada and makes it publicly available. Canada's federal, provincial and territorial governments created CIHI as a not-for-profit, independent organization dedicated to forging a common approach to Canadian health information. CIHI's goal: to provide timely, accurate and comparable information. CIHI's data and reports inform health policies, support the effective delivery of health services and raise awareness among Canadians of the factors that contribute to good health.

CPHI Council (as of November 2005)

A council of respected researchers and decision-makers from across Canada guides CPHI in its work.

- **Richard Lessard** (Chair), Director, Prevention and Public Health, Agence de développement de réseaux locaux de service de santé et de services sociaux de Montréal, Quebec
- **Monique Bégin**, Professor Emeritus, Faculty of Health Sciences and Visiting Professor, Health Administration, University of Ottawa, Ontario
- **André Corriveau**, Chief Medical Officer of Health and Director, Population Health, Health and Social Services, Government of Northwest Territories, Northwest Territories
- **Lynn McIntyre**, Professor, Faculty of Health Professions, Dalhousie University, Nova Scotia
- **John Millar**, Executive Director, Population Health Surveillance and Disease Control Planning, Provincial Health Services Authority, British Columbia
- **Cordell Neudorf**, Chief Medical Health Officer and Vice-President, Research, Saskatoon Health Region, Saskatchewan
- **Ian Potter**, Assistant Deputy Minister, First Nations and Inuit Health Branch, Health Canada
- **Gerry Predy**, Medical Officer of Health, Capital Health, Alberta
- **Elinor Wilson**, Chief Executive Officer, Canadian Public Health Association
- **Michael Wolfson** (ex officio), Assistant Chief Statistician of Analysis and Development, Statistics Canada
- **Gregory Taylor** (ex officio), Director General, Centre for Chronic Disease Prevention and Control, Public Health Agency of Canada

Acknowledgements

The Canadian Population Health Initiative (CPHI), a part of the Canadian Institute for Health Information (CIHI), acknowledges with appreciation the contributions of many individuals and organizations to the development of *Promoting Healthy Weights*. We would like to express our appreciation to the members of the Expert Advisory Group, who provided invaluable advice throughout the development of *Promoting Healthy Weights*. Members of the Expert Advisory Group were:

- **John Millar** (Chair), Executive Director, Population Health Surveillance and Disease Control Planning, Provincial Health Services Authority, British Columbia
- **Theresa Glanville**, Professor, Applied Human Nutrition, Mount Saint Vincent University, Nova Scotia
- **Jean Harvey**, Interim Executive Director, Chronic Disease Prevention Alliance of Canada
- **Hasan Hutchinson**, Assistant Director, Institute of Nutrition, Metabolism and Diabetes, Canadian Institutes of Health Research, British Columbia
- **Neil MacDonald**, Executive Director, Population Health Strategies, Alberta Health and Wellness, Alberta
- **Sylvie Stachenko**, Deputy Chief Public Health Officer, Public Health Agency of Canada
- **Mark Tremblay**, Senior Scientific Advisor on Health Measurement, Statistics Canada

We would also like to express our appreciation to the following individuals who peer reviewed the report and provided feedback invaluable to its development:

- **Mary Bush**, Director General, Office of Nutrition Policy and Promotion, Health Canada
- **Peter Katzmarzyk**, Associate Professor, School of Physical and Health Education, Queen's University
- **Stephen B. Grundy**, Chief Operations Officer, Coalition for Active Living; Vertigo Project Management

Please note that the analyses and conclusions in this report do not necessarily reflect those of the individual members of the Expert Advisory Group or peer reviewers, or their affiliated organizations.

CPHI would like to express its appreciation to the CIHI Board and CPHI Council for their support and guidance in the strategic direction of this report.

CPHI staff members who comprised the project team for this report included:

- **Elizabeth Votta**, Project Manager and Writer
- **Keith Denny**, Researcher and Writer
- **Uma Palaniappan**, Data Coordinator
- **Andrea Norquay**, Policy Coordinator
- **Nadine Valk**, Policy Consultant and Writer
- **Melanie Yugo**, Data Analyst
- **Stephanie Paolin**, Data Analyst and Quality Assurance
- **Anne Markhauser**, Data Analyst
- **John Beauchamp**, Quality Assurance
- **Marissa McGuire**, Writer and Quality Assurance
- **Judy Threinen**, Quality Assurance
- **Mélanie Josée Davidson**, Quality Assurance
- **Mellissa Blaauwbroek**, Administrative Support
- **Susan Charron**, Administrative Support
- **Les Foster**, Consultant
- **Carol Brulé**, Editor
- **Elizabeth Gyorfi-Dyke**, Editor
- **Jennifer Zelmer**, Editor

Production of a report such as this involves many people and many aspects of the CIHI organization. We want to thank all CIHI staff for their contribution to this report, including individuals from the Canadian Population Health Initiative, Publications, Translation, Information Technology and Infostructure Standards, Web Content, Communications and Distribution Services.

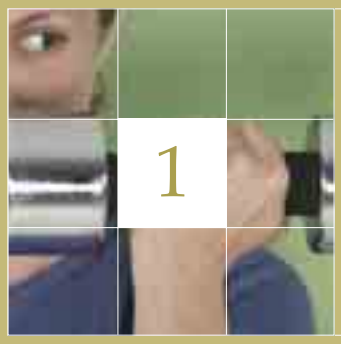
CPHI wishes to thank Doug Willms (Faculty of Education and Canada Research Chair [Tier 1] in Human Development, University of New Brunswick) for his contribution to some of the analyses for this report.

We would like to gratefully acknowledge the staff at Statistics Canada. Statistics Canada is recognized as an invaluable source of rigorous and available data and information, which make reports like this possible. Statistics Canada information is used with the permission of Statistics Canada. Users are forbidden to copy the data and re-disseminate them, in an original or modified form, for commercial purposes, without the expressed permission of Statistics Canada. Information on the wide range of data available from Statistics Canada can be obtained from Statistics Canada's regional offices, its Web site, at www.statcan.ca, and its toll-free phone number 1 (800) 263-1136.

We appreciate the ongoing efforts of researchers working in the field of population health to further our knowledge and understanding of the important issues surrounding health determinants and related health improvements.

1

Population Health Approach to Healthy Weights



Environmental and Social Factors

Whether in a headline in the newspaper or a report on the radio or television, obesity is in the news.

- *There has been a significant increase in the combined overweight/obesity rate among youth aged 12 to 17 in the last 25 years.*[1]
- *Obesity among adults 18 years and over has increased from 14% in 1978–1979 to 23% in 2004.*[2]
- *Most people who are obese are at increased risk for a range of preventable chronic diseases*[3, 4] *including, but not limited to, cardiovascular disease,*[4–6] *hypertension,*[4] *type 2 diabetes,*[4, 7] *arthritis*[8] *and some types of cancer.*[9]
- *The total number of deaths related to overweight and obesity from 1985 to 2000 was more than 57,000, according to research estimates.*[10]
- *Researchers estimate that the total direct cost of weight-related major chronic diseases to Canada's health system was nearly $1.6 billion in 2001; coupled with indirect costs, this total was $4.3 billion.*[11]

Obesity is a health issue affecting the Canadian population. Promoting healthy weights and treating obesity is a complicated issue that involves both our genetic make-up[12–14] and the choices that we make as individuals about what to eat and how physically active we are.[4] It also involves our social, cultural, physical and economic environments. Various features in these environments can influence the choices we make, and these choices, in turn, can affect our body weight. This report looks at the features of the environments where we live, learn, work and play that make it easier—or harder—for us as Canadians to make choices that promote healthy weights.

The report reviews the latest research, presents new analyses of data* from the Canadian Community Health Survey (CCHS) and the National Longitudinal Survey of Children and Youth (NLSCY) and explores relevant policies and programs in six environments and settings:

- Chapter 2: Community and Physical Environment;
- Chapter 3: Workplace;
- Chapter 4: School;
- Chapter 5: Home and Family Environment;
- Chapter 6: Nutrition Environment; and
- Chapter 7: Personal Health Services.

The report concludes by summarizing what we know and do not know across these settings about the influence of population-level factors on healthy weights, highlighting opportunities for policy and intervention research to address current knowledge gaps.

* An overview of issues regarding the measurement of overweight and obesity is presented in Appendix A. Please refer to Appendix B for an outline of the methodology (data sources, variables, statistical analyses) used in this report.

Exploring the Issues: What We Do and Do Not Know

There is much that we do and do not know about promoting healthy weights. In an effort to better understand the role various environments can play on people's decisions and weight, this report will look at the following features:

Community and Physical Environment • Urban sprawl • Active transportation • Perceptions of safety • Access to recreational areas and facilities	**Workplace** • Healthy eating • Physical activity • Workplace policies	**School** • Healthy eating • Physical activity • Coordinated school-health programs
Home and Family Environment • Parents' eating habits and physical activity behaviours • Parental control of children's eating • Home-packed versus purchased lunches • Screen time and advertising	**Nutrition Environment** • Food insecurity • Cost of and access to food • Food expenditures • Energy-dense foods • Fast food restaurants • Portion size	
		Personal Health Services • Experiences with and use of health services • Clinical interventions • Mental health and unhealthy weights • Commercial weight-loss programs

Population Health Approach to Healthy Weights

A number of factors affect the health and well-being of Canadians, including social, economic, cultural and physical environments; interactions between individual biology and behaviours; and health services.

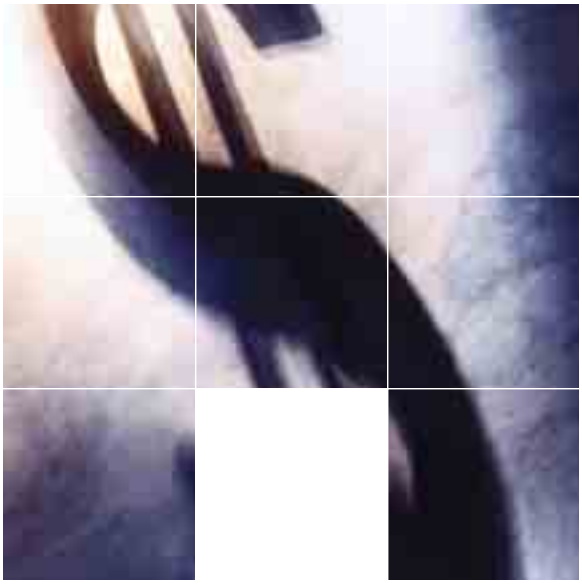
A population health approach addresses a range of individual and collective factors known as determinants of health. It focuses on how these determinants are interrelated and associated with long-term health, explores health disparities and applies the resulting knowledge to developing and implementing policies and actions to improve the health and well-being of populations.[15–18] Examples of how these factors are linked to healthy weights are reviewed in the following pages.

What the Research Says . . .

Education

- Statistics Canada data on measured height and weight show a link between education level and obesity among men and women.
  - In 2004, women aged 25 to 64 with less than secondary education were more likely to be obese than women with postsecondary education.[2]
  - In 2004, men aged 25 to 64 with no more than secondary education had higher rates of obesity compared to men of the same age who had completed postsecondary education.[2]

- Adults with postsecondary education tend to report eating fruit and vegetables more frequently than those with less than high school graduation.[22]



Socioeconomic Status

- The links between socioeconomic status and obesity rates are complex.
  - Past research found that prevalence rates of self-reported overweight and obesity were higher among women of low socioeconomic status than among women of higher socioeconomic status.[19, 20]
  - Recent data on measured height and weight indicate that, in 2004, obesity rates were higher among Canadian women in middle and upper-middle income households compared to women in the highest income households; in contrast, compared to men in the highest income households, men in lower-middle income households were less likely to be obese.[2]

- Research indicates that income level can affect family living conditions, including access to sufficient healthy food.[21]

Social Support Networks and Social Environment

- Research shows a link between "social quantity" and "social frequency" and physical activity. That is to say:
  - Physical activity levels are higher among Canadians who report having more friends and family members.[23]
  - Physical activity levels are higher among Canadians who are in more frequent contact with their friends and family.[23]

- Research in the United States shows that people are more likely to be physically active if their friends compliment them on their skill at a given physical activity.[24]

- People who say that their neighbours are active also tend to walk more, according to studies conducted in the U.S.[25]

Employment and Working Conditions

- International research shows a link between working conditions and overweight and obesity.
  - A study in the U.S. found that people who work in jobs that involve high levels of physical activity (for example, waitressing, construction) have a lower likelihood of being obese.[26]
  - A study in Italy of chemical industry workers reported that obesity was higher among shift workers than those who worked day shifts only.[27]
  - A longitudinal study in Finland that followed a group of men and women from age 14 to 31 reported that women who had been unemployed for longer than a year were at greater risk for obesity at age 31.[28]
  - A study in Switzerland reported that women in low-status employment positions (defined as manual or lower occupation) were at greater risk for being overweight.[29]

Early Child Development

- The World Health Organization recommends that infants be fed only breast milk for the first six months of life.[30] Systematic reviews indicate that breastfeeding can be a protective factor against later childhood obesity.[4, 7, 31]

- A systematic review shows that infants identified as obese, or who grew rapidly in infancy, were more likely than other infants to be obese as children, adolescents and young adults.[32]

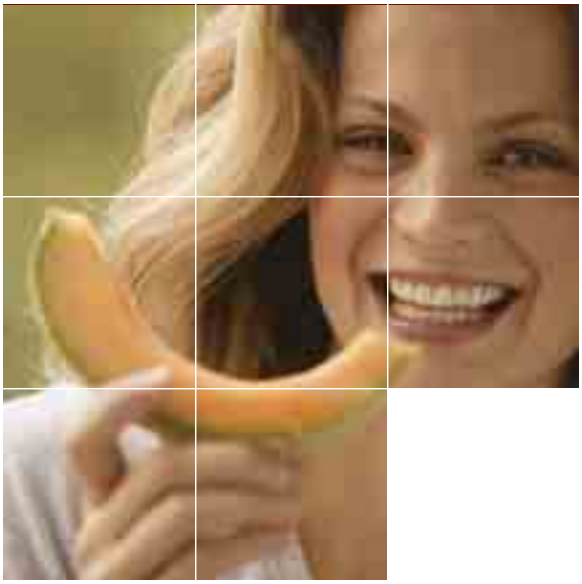
- Eighteen percent (18%) of Canadian children and youth (2 to 17 years old; excluding the territories) were overweight in 2004; 8% were obese.[1]

Physical Environment

- Researchers have found that some neighbourhood characteristics, such as better street lighting and availability of sidewalks, are associated with increased physical activity and walking, respectively.[25]

- Availability of recreational facilities, parks, sports fields and playgrounds is related to increased physical activity.[25]

- People who live in residential areas in Europe that have more greenery and less graffiti and litter are more likely to be physically active and less likely to be overweight and obese than people who live in areas with less greenery and more graffiti and litter. These results held even after people's age, sex, socioeconomic status and city of residence were taken into account.[33]



Personal Health Practices and Coping Skills

- Regular physical activity is a protective factor against unhealthy weight gain; in contrast, factors such as sedentary occupations and inactive recreation may contribute to unhealthy weight gain.[4]

- High intake of energy-dense foods is a risk factor for obesity.[4]

- The link between body mass index (BMI) and fruit and vegetable consumption differs among the sexes.
  - Compared to men who are obese, men of normal weight eat fruit and vegetables more frequently.[22]
  - Compared to women who are obese, women who are underweight, normal weight or overweight consume fruit and vegetables more frequently.[22]

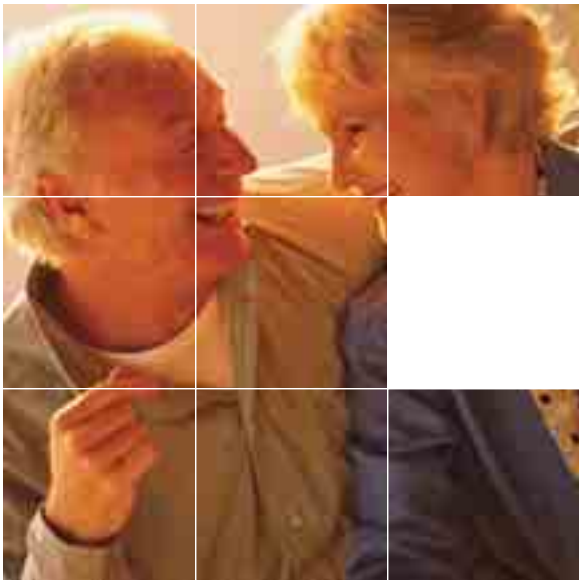
- Weight criticism during physical activity (WCA) is defined as "verbal comments directed toward a child, in sports or physical activity settings, that condescend or ridicule the child's weight."[34] (p. 1)
  - A U.S. study found that girls are more likely than boys to receive WCA.
  - While WCA is related to higher BMI, reduced sports enjoyment and reduced physical activity of a mild leisure nature, these associations are not as pronounced among children who cope with the criticism through direct action, problem-solving or seeking support (problem-focused strategies).[34]

Biological and Genetic Factors

- Researchers suggest that obesity involves interactions between environmental and genetic factors,[12, 14] but the specific role played by genetics remains unclear.[13, 14]
- Genes may play different roles in common forms of obesity by affecting food intake and metabolism.[12]
- Abdominal obesity is one of six components of the "metabolic syndrome"—a cluster of risk factors that increase an individual's risk of developing heart disease, diabetes and a number of other conditions.[35]

Health Services

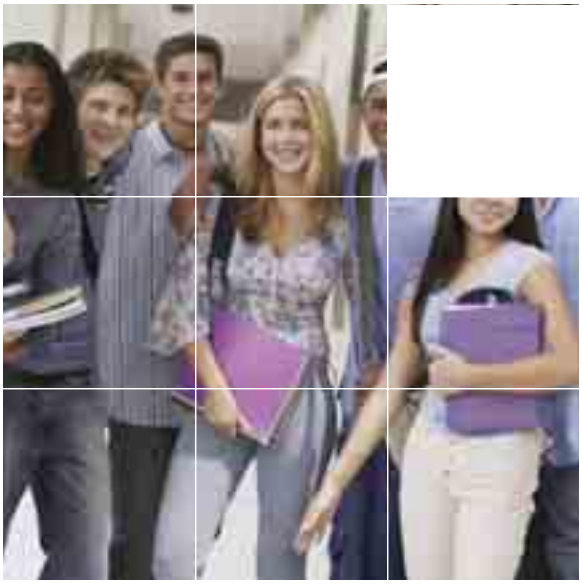
- People who are obese tend to visit health professionals more often than those who are not obese.[36]
- Research in the U.S. shows that negative attitudes among health care personnel toward overweight and obese patients are not uncommon,[37, 38] even among professionals who treat and study obesity specifically.[39]
- With the exception of mammograms, obese and severely obese women are more likely to choose to delay obtaining preventive health services than are women of average relative body weight, according to research conducted in the U.S.[40]



Gender

- Canadian men (23%) and women (23%) were equally likely to be obese in 2004; however, of the three classifications of obesity, a higher percentage of women than men were in Class III (BMI $\geq$40).[2]

- For Canadian women, having children under the age of 18 lowered the odds that they would engage in leisure-time physical activities; having children was not related to men's activity levels.[43]



Culture

- **Aboriginal Peoples**
  - In 2004, off-reserve Aboriginal adults had an obesity rate 1.6 times higher (38%) than the Canadian average (23%).[2]
  - Preliminary findings of the First Nations Regional Longitudinal Health Survey show differences in self-reported body weight between different age groups of children living in First Nations communities. In 2002–2003, compared to 3- to 5-year-olds, children aged 9 to 11 were twice as likely to be overweight (29% versus 13%). However, 3- to 5-year-olds were more likely to be obese than 9- to 11-year-olds (49% versus 26%).[44]

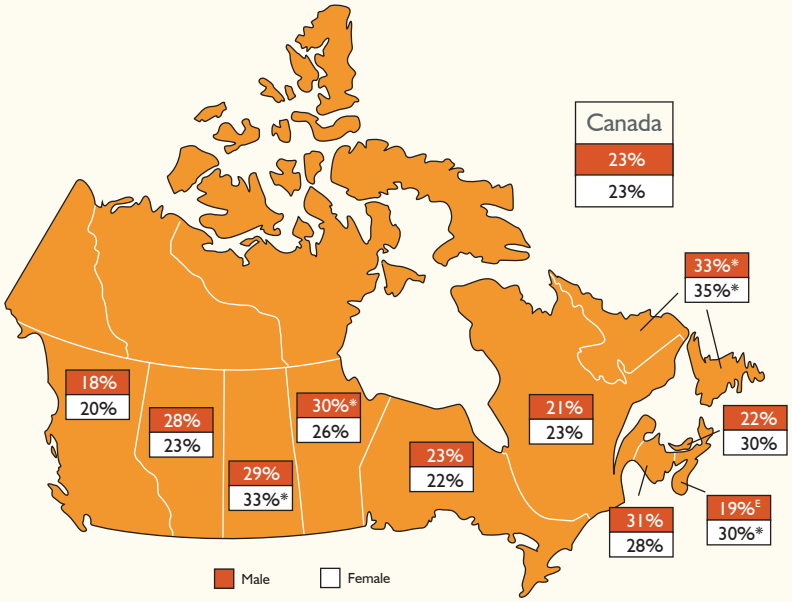
- **Immigrants**
  - Immigrants who came to Canada more than 11 years ago have a higher prevalence of self-reported overweight or obesity compared to more recent immigrants (10 years or less).[45]
  - Canadian data show that regardless of the time since immigration, the odds of being overweight were lower among East/Southeast Asian immigrant adults than among White immigrants.[45] Relative to immigrant White women, the odds of being overweight were higher among long-term immigrant Black and Latin American women.[45]
  - Compared to those born in Canada, the probability of being overweight or (for women) obese is lower among immigrants on arrival, but increases to levels similar to or higher than those of native-born Canadians for those who have been in the country 20 to 30 years.[46]

Tipping the Scales

Question	Are there province-wide differences in measured obesity among adults?
Answer	Yes, relative to the Canadian average, more adult men in Newfoundland and Labrador and Manitoba were obese in 2004. Among women, obesity rates were higher in Newfoundland and Labrador, Nova Scotia and Saskatchewan.[2]

Figure 1

Measured Obesity Rates (BMI ≥30) Among Adults 18 Years and Over, Canada, Excluding the Territories (2004)



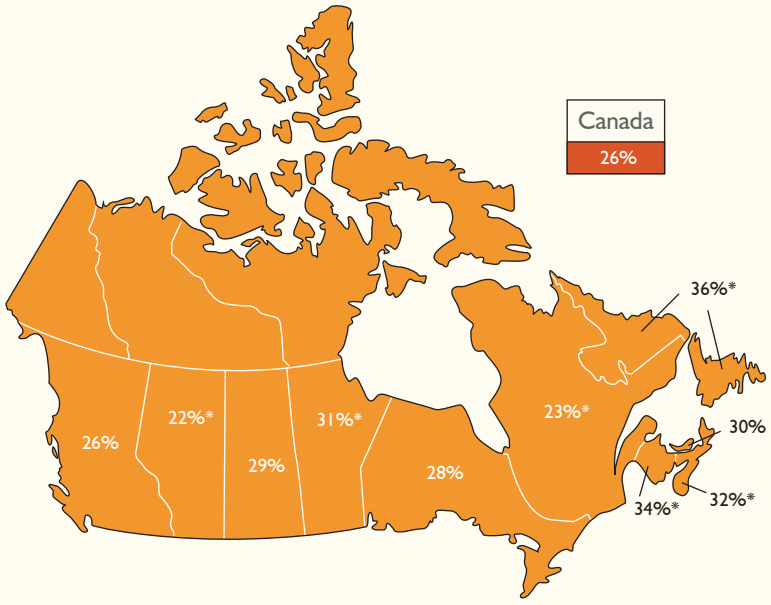
Source: CCHS 2.2 (2004), Statistics Canada.[2]
* Significantly different from the Canadian average, $p < .05$.
[E] Coefficient of variation between 16.6% and 33.3% (interpret with caution).

Tipping the Scales

Question	Are there province-wide differences in rates of overweight/obesity among children and youth?
Answer	Yes, in 2004, the overweight/obesity rate of 2- to 17-year-olds was significantly higher than the Canadian average (26%) in Newfoundland and Labrador (36%), New Brunswick (34%), Nova Scotia (32%) and Manitoba (31%) and significantly lower than the Canadian average in Quebec (23%) and Alberta (22%).[1]

Figure 2

Measured Overweight/ Obesity Rates Among Children and Youth 2 to 17 Years, Canada, Excluding the Territories (2004)



Source: CCHS 2.2 (2004), Statistics Canada.[1]
* Significantly different from the Canadian average, $p < .05$.
Note: Analyses were based on the International Obesity Task Force (IOTF) criteria for BMI cut-offs for 2- to 18-year-olds.[205]

2

2 Community and Physical Environment

Is there a link between where people live, how people get to work or school and healthy weights?

Our communities and the physical environments in which we live, learn, work and play look very different than they did at the turn of the last century. This section addresses the following issues: sprawl, active transportation, perceptions of safety in one's community and access to community recreation facilities.

Urban Sprawl and Active Transportation

The growth of urban sprawl has been linked to increases in automobile use for personal travel over the last 85 years.[47] Sprawl is defined as the outcome of four factors:

- Residential density;
- Neighbourhood mix of land use for homes, jobs and services;
- Strength of activity centres and downtown areas; and
- Accessibility of the street network.[48, 49]

Features often linked to sprawl include:

- Communities that are relatively isolated or not densely populated;
- Development at the edges or outside of the city;
- A lack of well-defined centres of activity;
- Developments in which residents are dependent on their vehicles to travel between homes, shops, services and workplaces;
- Increased commuting times;
- Streets that may pose a safety risk to pedestrians and cyclists; and
- Incomplete sidewalk networks.[47–50]

As there tends to be very little within easy walking distance of anything else in sprawling communities,[49, 51] discussions of sprawl often go hand-in-hand with discussions of active transportation and how to encourage people to travel by means other than their vehicles.[52] Active transportation refers to the mode by which individuals choose to move between destinations for a specific purpose,[53] such as going to school or work, visiting friends or shopping.

What is active transportation?

According to the 2003 Roundtable on Active Transportation, "active transportation involves choosing modes of transportation that require human power, such as walking, cycling, wheel chairing, in-line skating, skateboarding or skiing, for a cleaner environment and improved personal health."[54] (p. 7)

What is the Body Mass Index (BMI)?

Classification	BMI Category (kg/m²)
Underweight	<18.5
Normal weight	18.5–24.9
Overweight	25.0–29.9
Obese	
• Class I	30.0–34.9
• Class II	35.0–39.9
• Class III	≥40.0

BMI is used to identify weight-related health risks among individuals 18 years of age and older. Health Canada suggests that for those 65 years and older "the normal range may begin slightly above BMI 18.5 and extend into the overweight range."[56] (p. 10)

Research suggests that various factors influence active transportation choices:

- Proximity or the distance between trip origin (for example, home) and destination (for example, work);[55]
- Connectivity or the ease (or directness) of moving from trip origin to destination;[55]
- Health benefits (for example, increased positive health outcomes through physical activity);[54]
- Environmental benefits (for example, reduced air pollution);[54]
- Quality of life benefits (for example, reduced traffic noise and congestion);[54] and
- Cost (for example, parking prices).[54]

Where a person lives can be a factor that promotes or impedes active lifestyle choices. To assess potential links between self-reported BMI and the geographical area in which people live, CPHI examined relevant data from the 2003 CCHS and the 2001 Census (see sidebar for Census definitions).‡ According to these analyses, 70% of Canadians live in urban core areas. Those living in urban cores are more likely to report a BMI <25 (see above) than those living in other urban areas (urban fringes, urban areas outside of CMAs/CAs and secondary urban cores) or in rural areas (rural fringes and rural areas outside of CMAs/CAs) (see Figure 3).§

Women living in the urban core are more likely to report a BMI <25 compared to women living outside the urban and rural CMA/CA boundaries. Similarly, men living in the urban core are more likely to report a BMI <25 compared to men living in rural areas, men living in the urban fringe or men living in urban and rural areas outside the CMA/CA (see Figure 4).

How urban is urban and how rural is rural?[57]

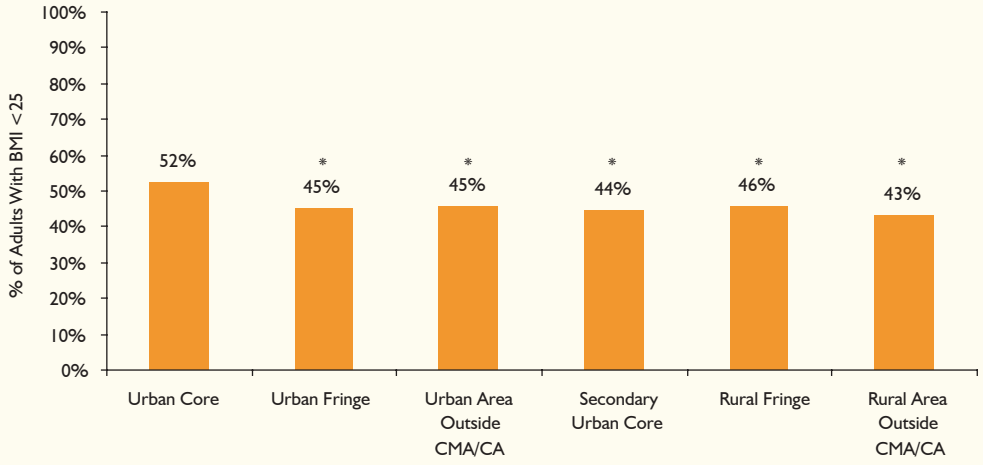
Census metropolitan areas (CMA) or census agglomerations (CA)	An area composed of one or more neighbouring municipalities located around a major urban core. To be considered a CMA, the urban core must have a population of at least 100,000 persons. To be considered a CA, the urban core must have a population of at least 10,000 persons.
Urban core	A large urban area by which a CMA or a CA is defined. Urban cores in CMAs have populations of at least 100,000 persons. Urban cores in CAs have populations of at least 10,000 to 99,999 persons.
Urban fringe	Small urban areas in a CMA or CA that have populations of less than 10,000 persons, and which do not neighbour the urban core of a CMA or CA.
Secondary urban core	The urban core of a CA that has been combined with a neighbouring CMA or larger CA.
Rural fringe	All areas in a CMA or CA not defined as urban core or as urban fringe.

‡ Data of measured height and weight were not available at the time that these analyses were conducted, as the CCHS 2.2 (2004) had not yet been released.

§ BMI values in Figures 3 and 4 are unadjusted for age and sex. For the purpose of these analyses, BMI <25 refers to those in the underweight and normal weight categories as defined by Health Canada's Guidelines for Weight Classification in Adults. Of the 49% of Canadians in this BMI category, 4% were underweight (BMI <18.5) and the remainder had a BMI in the normal range (18.5 to 24.9).

Figure 3

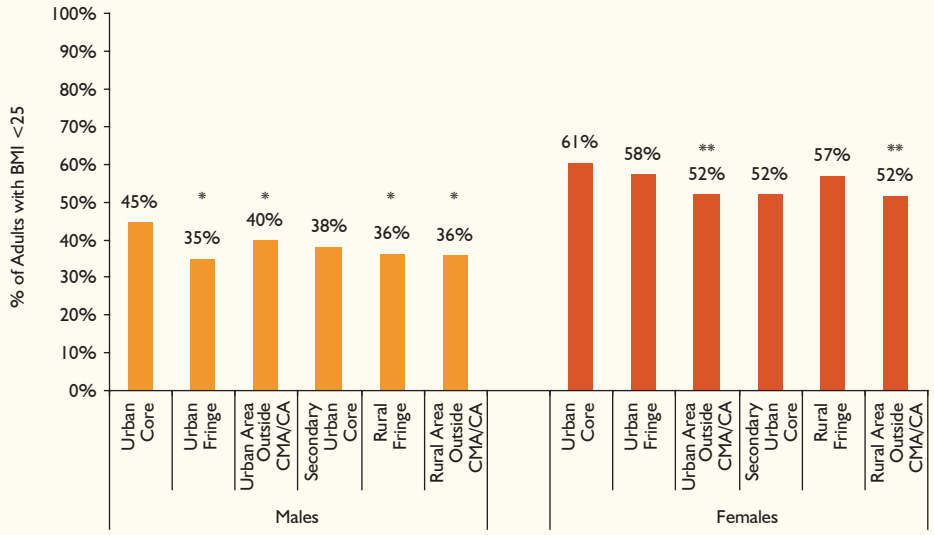
Self-Reported Prevalence of BMI <25 by Geographic Location Among Adults 18 Years and Over (2003)



Sources: CCHS 2.1 (2003) and Census 2001, Statistics Canada (custom tabulation).
* Significantly different from urban core, p <.05.

Figure 4

Self-Reported Prevalence of BMI <25 by Geographic Location and Gender Among Adults 18 Years and Over (2003)



Sources: CCHS 2.1 (2003) and Census 2001, Statistics Canada (custom tabulation).
* Significantly different from men living in the urban core, p <.05.
** Significantly different from women living in the urban core, p <.05.

Urban Sprawl, Active Transportation and Physical Activity

Many researchers have begun to look at the relationship between sprawl and physical activity.[58] In Canada, about 12% of urban trips are made on foot or by bicycle. This is slightly higher than the rate of 7% in the U.S., but much lower than rates reported in the Netherlands (46%) and Denmark (41%).[59] With respect to physical activity itself, new CPHI analyses of physical activity data from the 2004 CCHS indicate that 18% of Canadian adults 18 years and over are active, 58% are inactive and the remainder are moderately active (25%).+

Unlike sprawling communities, "walkable" neighbourhoods tend to have higher population densities, a greater mix of land use and easier movement between trip origin and destination.[60] Compared to residents in low-walkability neighbourhoods, residents in high-walkability neighbourhoods report making more trips on foot or by bicycle[53] and are more likely to engage in 30 minutes or more of moderate-intense physical activity on a given day.[60]

Research comparing older and newly developed communities reports similar findings. Older communities were built on the assumption that few people would own and use personal vehicles—grocery stores, for example, were typically located within relatively easy walking distances from people's homes.[61] Communities developed before 1946 tend to have more interconnected streets and sidewalks and a greater mix of housing, shops and services.[49, 62] Compared to residents living in urban and suburban homes built after 1973, those living in such areas built before 1946 and up to 1973 are more likely to walk one mile or more (1.6 kilometres or more) 20 times or more per month.[63]

As part of its *2005 Report Card on Canadians' Health*, the Heart and Stroke Foundation of Canada examined data from the 2000 Survey of Canadian Municipalities. The Report Card indicated that larger urban communities tend to encourage walking or biking by having bike lanes on the road, safe routes for pedestrian and bicycle travel and off-road trails and paths on which motorized vehicles are not permitted to travel.[64] The Report Card further noted that residents of major urban centres reported higher rates of walking or biking to do daily chores (77%), compared with the rest of Canada (60%).[64] Residents of major urban centres also reported higher rates of walking, biking or taking public transit to get to work (34% of residents in major urban centres versus 18% in the rest of Canada).[64]

Residents in "high-walkability" neighbourhoods report making more trips on foot or by bicycle.

+ Due to rounding, numbers do not add up to 100%.

Urban Sprawl, Active Transportation and Healthy Weights

Although Calgary (fifth), Vancouver (sixth) and Toronto (ninth) have been ranked in the top 10 most sprawling metropolitan areas outside the U.S.,[65] there is little published research on the relationship between sprawl, active transportation and obesity in Canada.[66]

Current research in the U.S. indicates that for each extra daily hour spent driving a car, the likelihood of being obese increases by 6%.[67] The Heart and Stroke Foundation reported a similar finding in its *2005 Report Card on Canadians' Health*, showing that Canadians who are car-dependent get less physical activity and are at increased risk of being overweight or obese.[64] The Report Card further showed a 5% reduction in the likelihood of being obese for every additional kilometre walked per day.[64]

The influence of neighbourhood and metropolitan characteristics (for example, neighbourhood education level, density of dwellings and urban sprawl) on BMI in urban Canada has recently been examined.[212] After individual socio-demographics and behaviours were controlled for, it was found that people living in neighbourhoods with a high proportion of less educated individuals tended to have higher BMI levels than those living in neighbourhoods comprised of more highly educated individuals. For men only, lower BMIs were associated with living in a neighbourhood with a high proportion of recent immigrants, while higher BMI levels were associated with metropolitan sprawl.[212]

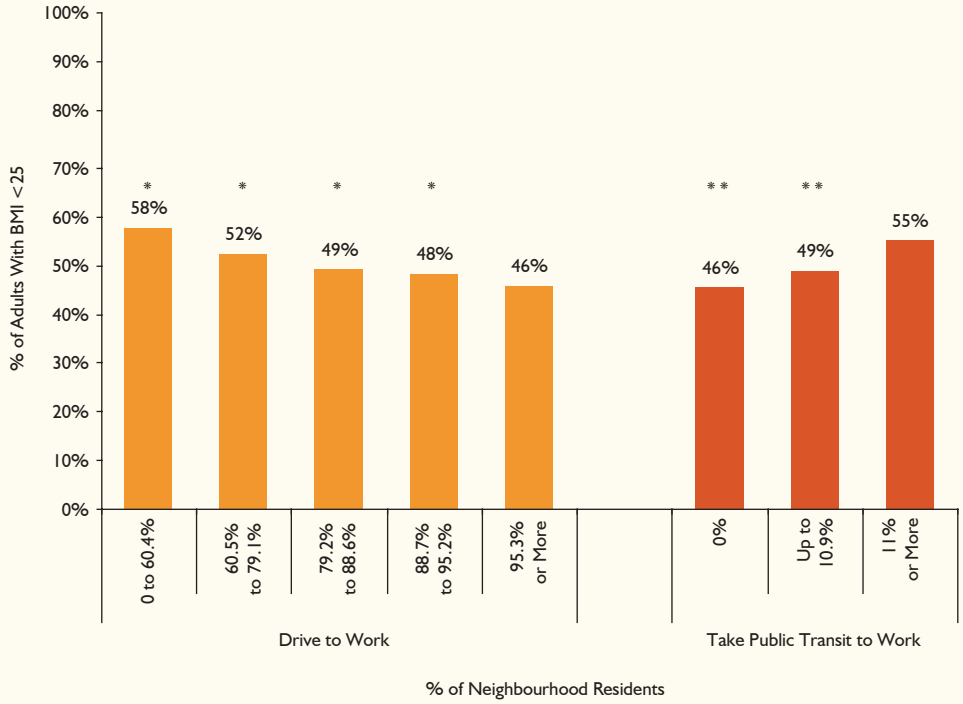
Building on research outlining the positive health outcomes associated with active living choices, CPHI conducted new analyses to examine the link between various modes of transportation (active and inactive) and self-reported BMI, according to the neighbourhoods in which people live. These analyses indicate that Canadians living in neighbourhoods where the majority of residents drive to work are less likely to report a BMI <25 than those living in areas where fewer people drive to work (see Figure 5).**

New CPHI analyses also show that Canadians living in areas where some residents rely on biking or taking public transit to work are more likely to report a BMI <25 than those living in neighbourhoods where fewer people do so. As noted earlier, biking to and from work is a form of active transportation. Some also consider taking public transit to be a form of active transportation, given that it replaces a number of individual vehicles on the road (thereby reducing air pollution and road congestion)[68] and involves the physical activity associated with walking to and from the transit stop. CPHI analyses show that the prevalence of reporting a BMI <25 is similar among Canadians who live in neighbourhoods where residents never walk to work, walk to work up to 6% of the time and walk to work 6% or more of the time (see Figure 6).

** BMI values in Figures 5 and 6 are unadjusted for age and sex. For the purpose of these analyses, BMI <25 refers to those in the underweight and normal weight categories as defined by health Canada's Guidelines for Weight Classification in Adults. Of the 49% of Canadians in this BMI category, 4% were underweight (BMI <18.5) and the remainder had a BMI in the normal range (18.5 to 24.9).

Figure 5

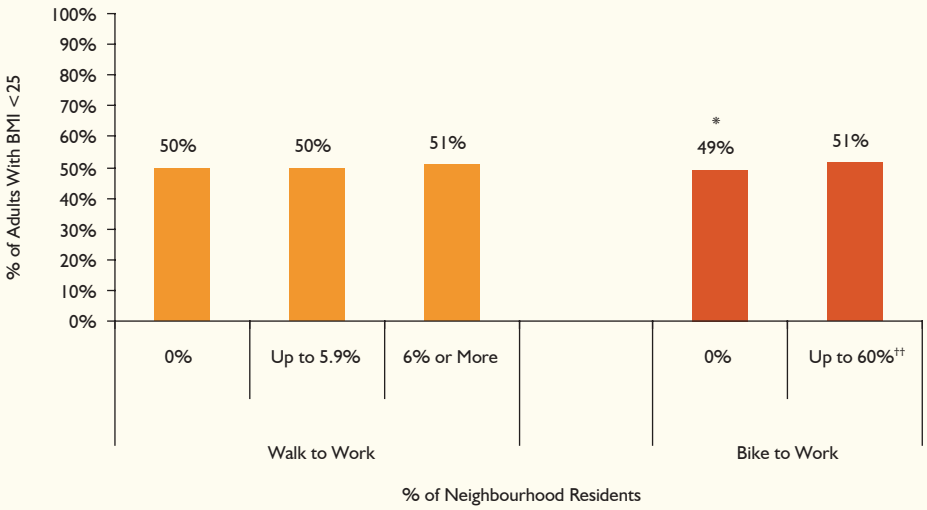
Self-Reported Prevalence of BMI <25 by Neighbourhood-Level Car and Public Transit Use Among Adults 18 Years and Over (2003)



Sources: CCHS 2.1 (2003) and Census 2001, Statistics Canada (custom tabulation).
* Significantly different from *95.3% or more drive to work*, p <.05.
** Significantly different from *11% or more take public transit to work*, p <.05.

Figure 6

Self-Reported Prevalence of BMI <25 by Neighbourhood-Level Walking and Biking Among Adults 18 Years and Over (2003)



Sources: CCHS 2.1 (2003) and Census 2001, Statistics Canada (custom tabulation).
* Significantly different from *up to 60% bike to work*, p <.05.
†† No neighbourhoods exist in which over 60% of residents report biking to work.

What is the link between features of the community and healthy weights?

Perceptions of Safety

Research shows that feeling safe in one's neighbourhood is linked to active transportation among seniors[69] and children,[70] as well as physical activity among adults[71] and youth.[72]

Seniors

- A literature review of 27 studies reported that a neighbourhood's lack of attractiveness and appeal, as well as perceptions of low safety due to unattended dogs and inadequate lighting, are related to decreased physical activity among seniors.[69]

Adults

- In 1999, 23% of Canadian adults reported that concerns about safety prevented them from walking or biking. Specific concerns were related to too much traffic, street crime, poor lighting on streets and sidewalks and poorly maintained sidewalks and bike lanes.[71]

- In 2002, 65% of Canadian adults aged 15 and older believed there were many safe places to walk in their local communities, including sidewalks, paths and trails. Thirty-seven percent (37%) said there were many safe places to bike in their communities, such as bike paths and lanes.[73]

Youth

- In a U.S. study of youth aged 11 to 16, improved neighbourhood social conditions (such as relationships with neighbours and perceived safety) contributed to increased levels of physical activity in different neighbourhoods.[72]

- In another U.S. study, perception of adults at local facilities (such as gyms, parks and community centres) as trustworthy was related to more frequent physical activity among youth.[74]

Children

- Parents report that barriers to their children walking to school include long distances to school (53%) and weather (11%). Reported barriers to children cycling to school include distance to school (30%), concerns about traffic (26%) and weather (12%).[70]

- Thirty-seven percent (37%) of Canadian children aged 5 to 13 and 33% of youth aged 14 to 18 walk to school at least half the time.[70] Although 9 out of 10 children own a bike, only 5% cycle to school most of the time. This number increases slightly to 9% for children living within one to three kilometres of their school.[70]

It's too cold to exercise—or is it?

Although limited, research is beginning to emerge on the association between physical activity and climate, particularly cold weather.

A study of weather classifications in 355 U.S. counties found that the percentage of adults meeting recommendations for physical activity was highest in summer and lowest in winter.[75] Another U.S. study reported that combined moderate-intensity household and leisure-time activity was more than two times higher in the summer than in the winter.[76] Another U.S. study, which looked only at leisure-time physical activity, reported drops in energy expenditure of 21% in the winter and 16% in the fall among adults, compared to the spring and summer seasons.[77] Looking at BMI and waist circumference, a four-year Dutch study of adults aged 20 to 59 found that both measures were lower in each summer season than in the previous winter season.[78]

Given the extreme cold weather conditions experienced in parts of Canada, some researchers suggest that health promotion campaigns may benefit from attempting to identify ways to promote year-long participation and overcome barriers to physical activity.[76] This can be done by providing information about the health benefits of physical activity, as well as information on options that are "tailored by season and climate conditions and address concerns related to convenience, accessibility, safety and aesthetics."[75] (p. 379)

Access to Recreational Areas and Facilities

Studies show that access to recreational facilities, including bike paths, open public spaces, trails and programs, neighbourhood appearance and support from friends, family or facility staff, is related to increases in levels of recreational physical activity.[79–82] Also linked to increased physical activity levels among adults in urban areas are the number of destinations within walking distance (for example, grocery stores, restaurants, schools), the availability of public transit and the number of active people in the neighbourhood.[80]

In addition to the availability of programs, another component of access to recreational facilities is cost. The *2005 Report Card on Physical Activity for Children and Youth* reported that while 97% of Canadian municipalities reported offering community-based programs for children and youth, fewer (54%) reported providing subsidies for low-income families.[83] Examining data from the 2000 Survey of Canadian Municipalities, the Report Card also stated that there was insufficient data to assess the "walkability" or "playability" of Canadian communities or to evaluate the quality of sports and recreation programs across the country.[83]

Saskatoon *in motion*[84]

Saskatoon *in motion* is an example of a community-wide physical activity promotion program that, through partnerships with community actors, community awareness, targeted community strategies and ongoing evaluation, worked to have all Saskatoon residents integrate regular physical activity into their daily lives. Saskatoon and area residents were surveyed in spring 2000 before the program's launch and then again in 2001, 2002 and 2004. Among the 1,627 residents surveyed in 2004, 50% were active enough to receive health benefits. This was up from 2000 (36%) but about the same as in 2002 (49%). Saskatoon *in motion* has since been expanded province-wide to Saskatchewan *in motion*.[85]

According to the Canadian Task Force on Preventive Health, evidence on the long-term effectiveness of community-based obesity interventions to prevent and treat obesity in adults is inconclusive. In 1999, the Task Force concluded that community-based obesity prevention programs that made use of seminars, educational packages and social marketing had not been proven effective in achieving weight reduction among adults.[86] However, the Task Force pointed out that methodological problems with the evaluations of the programs prevented any definitive conclusions about their effectiveness.[86]

More recently, in 2002, the U.S. Task Force on Community Preventive Services reported strong evidence for a number of community-based strategies to increase physical activity, including the following:

- Large-scale community-wide campaigns;
- Interventions that build and maintain social networks (such as buddy systems) to support behaviour change; and
- Creating or improving access to places for physical activity (for example, building trails, reducing facility fees).[117]

Of note, however, is that the Task Force looked only at the effectiveness of these interventions to increase physical activity, not to prevent or treat obesity.

ParticipACTION

ParticipACTION is an example of a national-level initiative that targeted Canadians in all communities in response to concerns about the health and fitness of Canadians and rapidly rising health costs.[87] Its task was to increase public awareness of the benefits of what is now called active living, to influence key decision-makers to develop environments that encouraged active living[88] and to motivate all Canadians to be more active.[87] Evaluating ParticipACTION's success is difficult. For example, the population was not subdivided into intervention and control groups who received and did not receive ParticipACTION's message. Further, although evidence indicates that mass social marketing campaigns can improve physical activity-related message recall in the short-term,[89] no known research speaks to ParticipACTION's impact on long-term behaviour change. Surveys assessing community awareness about ParticipACTION indicate that between 1971 and 2002, Canadian adults recognized the branding and reported being more active since the ParticipACTION campaign, which was discontinued in 2001.[88]





3

3

Workplace

There appears to be a link between physical activity in the workplace and obesity. However, is it the job itself, the health promotion strategies within the workplace or something else?

Just as the school can be an environment in which to promote healthy weights among children and youth, so can the workplace for adults.[90–93] Due to the concentration of people, existing communication channels and the time adults spend at work, workplaces can be a convenient location through which to reach large numbers of adults to promote healthy weights.[90, 92]

Physical activity among adults: does income matter?

New CPHI analyses show that adults (18 years and over) in the highest household income quintile are less likely to be inactive (50%) than those in the lowest (66%), lower-middle (67%), middle (64%) and upper-middle (58%) household income quintile groups. This trend held for both men and women.

Source: CCHS 2.2 (2004), Statistics Canada (custom tabulation).

Healthy Eating, Physical Activity and Beyond

Occupations vary greatly in their level of physical activity. Some jobs, such as those of bank tellers and cashiers, require employees to stand most of the day. Construction may involve high levels of physical labour. Other jobs involve much sitting at a computer. With technological advances, many work environments that once had high levels of physical activity have since become more sedentary.[94] Research indicates that high levels of on-the-job physical activity, such as manual labour, are associated with a lower likelihood of obesity among employees.[19, 26]

In addition to looking at the link between physical activity and job-design features, physical activity and healthy eating can also be elements of workplace health promotion strategies. Conclusions from systematic reviews regarding the effectiveness of worksite physical activity programs designed to improve employee health are mixed.[92, 95, 96]

- Some reviews note a lack of studies with methodological soundness.[92]
- Other reviews report associations between workplace physical activity programs (such as aerobic exercise and strength training) and increased physical activity.[95]

- A randomized control trial reported that personal face-to-face counselling at the worksite was associated with increased energy expenditure, reduced body fat and blood cholesterol and improved cardiorespiratory fitness.[97]

- Others have not found evidence of a significant positive relationship between workplace physical activity programs and overall health, physical fitness or weight.[92, 95]

- Others, such as a review conducted by the U.S. Task Force on Community Preventive Services, concluded that interventions in the worksite that combine diet and physical activity initiatives are effective in helping employees control overweight and obesity.[96]

These differences in conclusions suggest that a better understanding of the contribution of workplace health promotion strategies to promote healthy weights is needed.

Workplace Policies to Promote Healthy Weights

From a policy perspective, relatively few companies in Canada have formal policies encouraging physical activity and healthy eating.[98] There is therefore limited information available on evaluated workplace programs that promote healthy weights among Canadians. However, there is information on factors that prevent workplaces from initiating or expanding physical activity programs at worksites. These factors include:

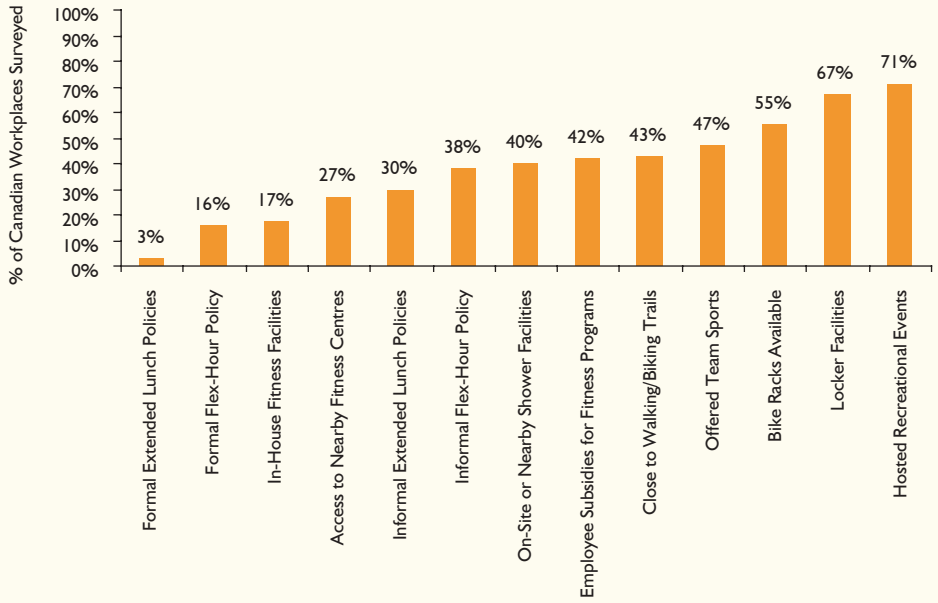
- Lack of space;
- Lack of on-site facilities;
- Insufficient company funds; and
- Lack of time due to short lunch breaks.[98]

Although not examined in relation to overweight and obesity among employees, there is also information on the number of Canadian workplaces in 2003 that had various strategies to increase physical activity. Surveys were mailed to small, medium and large workplaces representing companies with 20 or more employees and organizations in the non-government sector (n = 1,782). Workplace strategies explored ranged from having on-site fitness facilities to offering employee subsidies or discounts for fitness centres and hosting recreational activities (see Figure 7).[98]

Relatively few companies in Canada have formal policies encouraging physical activity and healthy eating.

Figure 7

Proportion of Canadian Workplaces With 20 or More Employees With Strategies to Increase Employees' Physical Activity (2003)



Source: Canadian Fitness and Lifestyle Research Institute, Opportunities for Physical Activity at Work Survey (2003).[98]

Some workplaces, such as the Canadian-based Husky Injection Molding Systems,[99, 100] also provide healthy cafeteria food, incentives for staff that meet fitness level criteria and reward employees who walk, bike, car pool or use public transit to get to work. Although not formally evaluated for its impact on health status and physical activity, Husky estimates a savings of $8 million dollars in reduced absenteeism (2.25 days per employee in 1999 compared to the Canadian average of 5.7 days), low injury rates (0.77 injuries per 200,000 hours worked in 1998), reductions in employee drug costs ($153 per employee annually in 1997 compared to the $495 sectoral average), higher productivity and better use of resources.[99] Findings such as these speak to the need for evaluation of health impacts arising from workplaces that offer health promotion programs.

The effectiveness of worksite programs to improve health can be difficult to evaluate because of differences in study design, measurement and sampling (for example, self-selection of participants, short duration of evaluation).[102] Table 1 outlines three evaluated programs that, while different in method and scope, promote healthy eating and active living in the work environment. Further, primary limitations of many program evaluations are the challenges of self-report or recall bias that is typical of survey-based research, as well as the lack of sound methodological designs (for example, pre- and post-intervention measures).

Walk In to Work Out Program[101]

"Walk In to Work Out" in Scotland was a self-help intervention in which participants received information on transit routes, personal safety, maps, location of showers and safe cycle storage information, as well as an activity diary, safety accessories and the contact information for relevant organizations and shops. Intervention materials were sent to 295 employees, who had been identified as thinking about or doing some walking or cycling to work, from three medium to large Glasgow workplaces. The majority of employees were women of higher income households. At six months, participants who had received the program materials were almost two times more likely to walk to work than participants in the control group. Increases in cycling to work were not observed. Of those who received the intervention at baseline, 25% continued to engage in regular active commuting to work 12 months later. The study did not measure weight change.

Table 1

Examples of Evaluated Workplace Obesity-Related Health Initiatives

Program Goals and Approach	Health and Health-Related Benefits
Heartbeat Award[93] (Leicester, United Kingdom) The Heartbeat Award (HBA) is a national nutrition labelling initiative that encourages caterers to reduce total fat, sugar and salt and increase the availability of fibre-rich foods they provide to worksites. **Method:** Four worksites received the intervention (n = 453) and two were controls (n = 124). Pre-post intervention survey.	• Relative to control sites, there were increases in consumption of fruit, decreases in consumption of fried foods and sweet puddings and a change to lower-fat milk among intervention sites.
Treatwell 5-a-Day[91] (Massachusetts, U.S.) Treatwell 5-a-day program is a cancer-prevention initiative that aimed to increase consumption of fruit and vegetables. **Method:** Twenty-two worksites were randomly assigned to one of three groups: worksite intervention group (n = 7); worksite plus family intervention group (n = 7); or control group (n = 8) (September 1994 to April 1996).	• Increases in fruit and vegetable consumption among the worksite plus family intervention group (19%). • Differences in fruit and vegetable consumption between the worksite intervention group and control group were not significant.
The Working Healthy Project[103] (Rhode Island and Massachusetts, U.S.) The Working Healthy Project (WHP) is an intervention aimed at multiple risk factors that targets physical activity, nutrition and smoking. WHP was part of the Working Well Trial, a multi-centre, randomized, national worksite intervention trial involving 114 worksites. Interventions included individually focused activities as well as strategies targeted at the social norms and health-related policies at the workplace. **Method:** Study was implemented in 26 worksites using a randomized matched pair design over a period of 2.5 years.	**Physical activity outcomes** • 30% increase in self-reported physical activity in the intervention group compared to a 4.3% increase among the control group. **Nutrition outcomes** • Marginally significant increases in fruit, vegetable and fibre consumption among intervention sites.

Tipping the Scales

Question

Compared to previous years, have rates of obesity increased among Canadian adults 18 years and over?

Answer

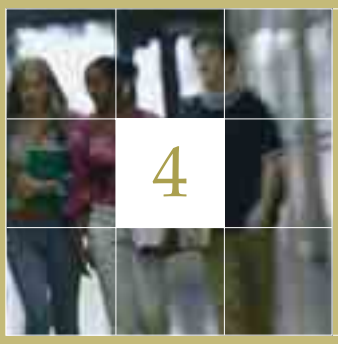
Yes, both self-reported and measured rates of overweight and obesity have increased in Canada and around the world.[4] Statistics Canada reports an increase of just over nine percentage points in the rate of measured obesity among adults aged 18 years from 1978 to 2004.[2]

Figure 8

Trends in Self-Reported and Measured Obesity Rates (BMI ≥30) Among Adults 18 Years and Over (1978 to 2004)[2]

Sources: Reproduced with permission of Statistics Canada.
Measured: 1978–1979 Canada Health Survey; 1986 to 1992 Canadian Heart Health Surveys (ages 18 to 74); 2004 CCHS: Nutrition.
Self-reported: 1985 and 1990 Health Promotion Survey; 1994–1995, 1996–1997 and 1998–1999 National Population Health Survey; 2000–2001 and 2003 CCHS.
Figure adapted from: "Trends in Obesity Rates, Household Population Aged 18 or Older, Canada Excluding Territories, Selected Years, 1978–79," from the Statistics Canada publication, *Measured obesity—adult obesity in Canada: measured height and weight*, catalogue 82–620, July 6, 2005, available at: www.statcan.ca/english/research/82-620-MIE/2005001/pdf/aobesity.pdf, Chart 16, page 26.
Note: Measured height and weight data for Canada were not obtained from 1979 to 1986 and from 1992 to 2004.

4



4 School

Are there interventions that are effective at promoting healthy eating and physical activity in the school setting?

Children and youth spend a great deal of their time at school. Schools play a role in children's academic and social development. They also play a role in children's physical development by providing them with physical and health education classes,[104] food choices and services,[104, 105] and access to resources such as gyms, sports equipment and outdoor playing fields.[105]

Given these factors, the school setting is an environment in which there can be many opportunities to promote healthy weights.[106, 107] School-based initiatives may focus on one aspect of healthy weights promotion such as healthy eating or physical activity or they may focus on specific targeted behaviours such as reducing screen time (for example, television watching and computer use) among children (see discussion in Chapter 5: Home and Family Environment). Others focus on both healthy eating and physical activity within the context of a coordinated approach that includes various strategies targeting healthy eating, physical activity, education and the community.

What is the link between obesity and the amount of fruit and vegetables children consume?

Data indicate that in 2004 almost 60% of Canadian children and youth aged 2 to 17 consumed fruit and vegetables less than five times per day. Children and youth who ate fruit and vegetables less than three times per day or between three to less than five times per day were significantly more likely to be obese (10% and 9%, respectively) compared to children and youth who ate fruit and vegetables five or more times per day (6%).

Source: CCHS 2.2 (2004), Statistics Canada.[1]

Healthy Eating in the School Environment

Decisions, decisions. A hamburger with salad or fries? A muffin or yoghurt? Fries with or without gravy? Chocolate bar or an apple? Pizza or a sandwich? Buy your lunch or bring your lunch?

The school environment can present students with many, sometimes conflicting, messages about food choices[105] and eating patterns.[108] To date, there is little direct evidence regarding the impact of the school food environment on body weight in Canada. Current U.S. research indicates that school foods tend to be non-nutritive and energy-dense foods that are sold in vending machines, cafeterias, school stores, snack bars and at fundraising events.[105] Complicating the matter is the fact that many schools rely on revenue garnered through the sale of these products to support sport and extracurricular activities.[109]

Although not all school-based programs are successful at promoting healthy weights, a recent synthesis of the literature concluded that school environments that provide healthy food options and limit the availability of non-nutritious foods may promote healthy weights.[106] Below are examples of programs that introduced healthy food options and obtained positive results.

- One U.S. study looked at the link between students' dietary practices and the availability of vending machines, à la carte programs and fried potatoes being served at school lunches.[110] The study looked at Grade 7 students (n = 598) at 16 schools in the St. Paul–Minneapolis metropolitan area. Results showed that à la carte availability was negatively related to fruit and vegetable consumption and positively related to fat intake. The availability of vending machines on-site was also inversely associated with fruit consumption. The study found a positive relationship between fruit and vegetable consumption and fried potatoes being served to students during school lunches.[110]

- Another U.S. study looked at longitudinal changes in fruit, vegetable, milk and sweetened beverage intake in two cohorts of students (n = 594) during the 1998–1999 and 1999–2000 academic years.[111] The first cohort was in Grade 4 in 1998–1999 and ate only National School Lunch Program (NSLP) meals that provided two servings of fruit and vegetables and eight ounces of milk daily. In 1999–2000 these same students, now attending a fifth and sixth grade middle school, had access to both NSLP meals and a snack bar. The second cohort of students remained in the middle school environment over the two-year period, thereby acting as a control. Students in the first cohort, who had access to snack bars in year two, had a significant decrease in fruit, non-fried vegetable and milk consumption, as well as an increase in high-fat vegetable and sweetened beverage consumption as they transitioned from Grade 4 to 5. There was also a significant decrease in the consumption of NSLP meals among these students in the second year of the study.[111]

Fuel to Xcell

Fuel to Xcell is a pilot project in Ottawa, Ontario, that stocked vending machines with a range of healthier and less healthy snacks and beverages. Its aim was to use the vending machines as an "avenue for reinforcing positive messages about nutrition and healthy eating."[109] (p.3) After a four-month period, sales data indicated that the quantity of healthier snacks and beverages purchased doubled following the pilot. Overall sales of food and beverage items remained the same. To date, an evaluation of the long-term health outcomes has not been conducted.

- In another study, also carried out in the St. Paul–Minneapolis metropolitan area, lower-fat à la carte food options were made available to secondary school students.[112] Twenty secondary schools were randomly assigned to either an intervention or a control group for a period of two school years. Students in the intervention group had increased access to lower-fat foods in their school cafeterias and were also exposed to peer-developed advertisements promoting healthier food options. The intervention was assessed by both sales figures (% of healthier food items sold) and students' self-reported food choices. The percentage of sales of lower-fat foods was significantly higher in the intervention schools over the two-year period.[112]

- A randomized control study in Britain used an educational program to discourage carbonated drink consumption among children aged 7 to 11.[113] Although carbonated drink consumption did not change among children in the control group, it decreased among children who received the intervention.[113] Further, at 12-months follow-up, the average percentage of overweight and obese children decreased in the intervention group by 0.2% compared to an increase among children in the control group of 7.5%.[113] As with many intervention studies, including the others presented in this section, this study did not analyze the direct relationship between soft drink consumption and changes in obesity prevalence.[114] Nonetheless, it indicates that reducing carbonated drink consumption may be linked to reductions in overweight and obesity among children.

In response to concerns over a perceived unhealthy school environment, some jurisdictions are choosing to modify the content of, or removing, vending machines from schools. Other jurisdictions are taking more drastic measures: for example, in September 2005, the UK announced a ban on junk food high in fat, salt or sugar in all schools across England within a year.[115] In Canada, a number of provinces have introduced nutrition legislation. For example, New Brunswick has adopted a comprehensive policy on food and nutrition to provide students in public schools with healthy food and beverage choices.[214] British Columbia has also introduced guidelines for food and beverages to eliminate junk food in schools.[215] Although many jurisdictions are monitoring the impact of such legislation on eating choices and sales data,[109] the impact of these actions on obesity among children and youth is unclear.

Physical Activity in Schools

The *2005 Canadian Report Card on Physical Activity for Children and Youth* reports that less than half of Canadian children and youth are active enough on a daily basis to meet Health Canada guidelines for healthy growth and development as measured by the CCHS.[83] Most Canadian children are neither moderately (for example, walking)

How many youth are physically active?

In 2003, 76% of boys and 71% of girls aged 12 to 14 were moderately active or active in leisure-time physical activity; among youth aged 15 to 19 years, rates decreased slightly for boys to 74% and decreased significantly for girls to 61%.

Source: CCHS 2.1 (2003) [CANSIM Table 105-0233].[119]

or vigorously (for example, running) active for 30 to 60 minutes per day.[83] Canada's *Physical Activity Guide for Youth* recommends that, over a five-month period, youth strive toward increasing the time currently spent each day on physical activity (in increments of at least 5 to 10 minutes) to achieve a total daily increase in physical activity of 90 minutes (60 minutes of moderate activity and 30 of vigorous activity) by the end of month five.[118]

In many Canadian schools, physical education has been an optional part of the school curricula.[120] For example, in 2001, 54% of Canadian schools had policies in place to provide students with daily physical education classes; however, only 16% were actually doing so.[121] At the time of this report's publication, updates to these numbers were not available. However, in response to concern about the prevalence of childhood obesity, some provinces have implemented policies to ensure students receive a minimum level of physical activity. For example, in 2005, the Ontario government announced a policy requiring schools to provide a minimum of 20 minutes of daily physical activity in Grades 1 to 8.[122] Although evaluations of the impact of these policies on children's obesity rates have not yet been conducted, there have been reports that some jurisdictions (for example, Alberta) are noting challenges finding the time and resources to implement the required changes, especially in the junior high setting.[123]

Recent systematic reviews and evaluations of individual programs indicate that increasing the amount of time that students spend being physically active in physical education classes, providing training and motivation to physical education teachers and increasing the number of physical activity classes may support increased activity levels.[116, 117] For various reasons, interventions do not always obtain their desired results. What follow are examples of three school-based physical activity programs that obtained improved weight-related outcomes.

At the pre-school level: Hip-Hop to Health Jr.[124] is a 14-week school-based physical activity program in Chicago, Illinois, that aims to reduce increases in weight among pre-school children in the Head Start Program. It includes 20 minutes of teaching about healthy eating and active living and 20 minutes of physical activity. Results show significantly smaller increases in BMI at one- and two-year follow-up among children in the program relative to those who did not take part in the program.[124]

At the Kindergarten level: The U.S. Department of Education Early Childhood Longitudinal Study–Kindergarten Class (ECLS-K) reported that a one-hour increase in physical education instruction per week was related to a decrease in BMI among overweight and at-risk-for-overweight girls in Grade 1.[125, 126] No significant effect was found among boys. Based on these data, U.S. researchers estimate that the prevalence of overweight among girls could be decreased by 43% by increasing physical education instruction to five hours per week.[125]

At the elementary school level: A randomized controlled study in the U.S. reported positive effects for specialized school physical education curricula on health outcomes among children (11 to 13 years of age) with BMIs over the 95th percentile.[104] Results showed significant improvements in the cardiovascular fitness levels of children in the lifestyle-focused, fitness-oriented gym classes over the course of one school year.[104] Children in the intervention also showed greater losses of body fat and significant improvements in fasting insulin levels compared to children who participated in standard gym classes only.[104]

What is the association between overweight/obesity and physical activity among youth?

In 2004, boys aged 12 to 17 years who were sedentary were more likely to be obese compared to boys who were active or moderately active (16%[E] versus 9%). Boys aged 12 to 17 years who were active or moderately active were more likely to be overweight compared to boys who were sedentary (24% vs. 13%). There were no significant differences found for girls.

Source: CCHS 2.2 (2004), Statistics Canada.[1]

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

Beyond Healthy Eating and Physical Activity: Coordinated School Health Programs

Coordinated school health programs, as recommended by the U.S. Centers for Disease Control and Prevention (CDC) are comprised of eight interactive components: health education, physical education, health services, nutrition services, counselling and psychological services, healthy school environment, health promotion for staff and family/community involvement.[127, 128] Programs of this nature are designed to engage communities, families, schools and other stakeholders such as health workers, the media, young people, religious organizations and community organizations in supporting healthy eating and physical activity among children and youth.[128]

With respect to overweight and obesity, coordinated school health programs are based on the idea that both the school environment and the curriculum play roles in influencing students' eating and activity behaviours.[108] Although long-term outcome results are not yet available, the Annapolis Valley Health Promoting School Project (AVHPSP)[129‡‡] is an example of a coordinated school health program that, consistent with the CDC's recommendations, used many strategies to try to make it easier for students to make healthy choices about food and physical activity (see sidebar for further information), including:[129, 130]

- Soliciting input from schools to guide the project's direction;
- Building on the successes of health-promoting activities that were already in schools;
- Introducing new student-developed games at lunch hour and recess;
- Opening school gyms after school for students;
- Developing strategies to sustain low-cost and nutritious recess/lunch programs;
- Providing healthy food options in school lunch and recess programs; and
- Using multiple strategies such as education, awareness, leadership development and multi-sectoral partnerships to sustain the program.[129]

Effectiveness of School Programs in Preventing Childhood Obesity: A Multilevel Comparison[130]

Goals and approach: Participants were children who had taken part in the 2003 Children's Lifestyle and School performance Study (CLASS)—a large study of fifth-grade students from 282 public schools in Nova Scotia, their parents and school principals. Students attended schools that (a) did not have a nutrition program; (b) had nutrition policies and practices in place; or (c) were participating in the Annapolis Valley School Promoting Health Program (AVHPSP). Each child's height and weight was measured and dietary intake assessed using a version of Harvard's Youth Adolescent Food Frequency Questionnaire (YAQ). Children completed an additional survey designed to measure physical and sedentary activities.

Results: Rates of overweight and obesity among students from schools participating in the AVHPSP coordinated program were significantly lower than rates in students attending schools that had nutrition policies only and schools that had no programs at all (*, $p < .05$).

Funding for this research provided by CPHI.

	NO PROGRAM	NUTRITION PROGRAM Policies or practices in place to provide healthy menu alternatives	AVHPSP PROGRAM Coordinated program based on CDC recommendations for school-based programs
Students Who Completed the YAQ	70% (3,656 students)	26% (1,350 students)	3% (133 students)
% Overweight/Obese	33	34	18*
% Obese Only	10	10	4*

Note: This survey-based research lacked pre- and post-intervention observations, thereby limiting the conclusions that can be drawn.

‡‡ Funded by Health Canada's Canadian Diabetes Strategy (January 2002 to March 2004). Participants were students in eight elementary and middle schools in the Annapolis Valley Regional School Board (Nova Scotia).

Table 2 presents examples of five evaluated programs that, while not necessarily identified as coordinated school health programs according to the CDC model, do incorporate many of the components specified by the CDC to promote healthy weights among children and youth. Primary limitations of many of the program evaluations are the challenge of self-report or recall bias that is typical of most survey-based research.

Table 2

Examples of Evaluated School-Based Obesity-Related Health Initiatives

Program Goals and Approach	Health and Health-Related Benefits
Action Schools! BC[131] (British Columbia, Canada) Action Schools! BC is a project designed to assist elementary schools in creating action plans to integrate healthy eating and a minimum of 150 minutes of weekly physical activity among students in Grades 4 to 7 (n = 515). Based on information from its project report, Action Schools! BC has been evaluated for health-related outcomes. **Method:** Stratification and random assignment of 10 schools (three control and seven intervention schools [four liaison and three champion schools]) from February 2003 to June 2004.	• Girls in the liaison schools reported a 32% increase in moderate to vigorous physical activity compared to an increase of 18% among girls in the control schools. Results were not significant for boys. • While girls in the control schools decreased their number of pedometer-measured steps per day by 8%, girls in the liaison schools increased their steps by 25%. Results were not significant for boys. • Changes in BMI among students in the intervention schools were not significant.
Planet Health[132] (Massachusetts, U.S.) Planet Health integrated interventions into the major subject areas and physical education classes of Grade 6 to 8 students (n = 1,295). It focused on four behavioural changes: • Reducing television viewing; • Increasing moderate to vigorous physical activity; • Decreasing consumption of high-fat foods; and • Increasing consumption of fruit and vegetables to five a day or more. **Method:** Five intervention and five control schools (fall 1995 to spring 1997).	• No difference in prevalence of obesity among boys. • Obesity prevalence decreased among girls in the intervention schools (24% to 20%) and increased among girls in the control schools (22% to 24%). • Relative to control schools, children in the intervention schools watched less television per day (-0.40 hours for boys and -0.58 hours for girls).
Eat Well and Keep Moving[133] (Baltimore, U.S.) This program integrated materials and messages into the classes of Grade 4 and 5 students (n = 336). It focused on decreased consumption of high-fat foods, increased intake of fruit and vegetables, reduced television viewing and increased physical activity. **Method:** Six intervention and eight control schools (fall 1995 to spring 1997).	• Relative to control schools, there were statistically significant reductions in percentage of total fat intake (-1.4%) and increases in fruit and vegetable intake (0.36 servings/4,184kJ) among students in intervention schools. • There was some reduction in television viewing (-0.55 hours/day) among intervention students relative to control schools. • BMI change was not measured.

Table 2 (cont'd)

Program Goals and Approach	Health and Health-Related Benefits
Active Programme Promoting Lifestyle Education in School (APPLES)[134] (Leeds, UK) APPLES aimed to reduce risk factors for obesity among 7- to 11-year-olds (n = 634) through teacher training, modification of school meals and action plans that targeted the curriculum, physical education and playground activities. **Method:** Five intervention and five control schools (September 1996 to July 1997).	Some outcomes were as expected. • A modest, but significant increase in vegetable consumption among students in the intervention schools (50% of baseline intake). • Obese children in the intervention schools reported higher "global self-worth" than those in the control schools. Some outcomes were not as expected. • Fruit consumption among obese children in the intervention schools fell to lower than those in the control schools. • There was a significant increase in consumption of high-sugar foods and drinks among overweight children in the intervention schools compared to control schools. • Changes in growth, BMI or physical activity were not significant.
Child and Adolescent Trial for Cardiovascular Health (CATCH) [135] (California, Louisiana and Minnesota, U.S.) CATCH was a cardiovascular disease prevention program aimed at the Grade 3 curriculum (n = 5,106) and both the school and family environments. Interventions included: modification of menus, food service personnel training, physical education interventions and teacher training. **Method:** Randomized control trial (28 schools received school intervention only, 28 schools received school and family interventions; 40 were control schools) (fall 1991 to spring 1994).	• There was a significant decrease in total fat in cafeteria-prepared lunches in intervention schools (39% to 32%) compared to control schools (39% to 36%). • There was a significant decrease in total fat intake (33% to 30% of energy consumed) among students in the intervention schools compared to students in the control schools (33% to 32%). • No significant differences between intervention and control schools in students' blood pressure, body size or cholesterol. • Relative to the control schools, there was a significant increase in the intensity of activity among students in intervention schools.

Challenges Associated With Coordinated Health Programs: The Best Laid School Health Plan?

Despite sometimes being well funded and well designed, not all intervention research obtains its expected results. Consistent with the challenges associated with worksite programs[102] or interventions that target multiple audiences using multiple strategies (known as multiple interventions),[136] the challenges associated with evaluating coordinated school health programs include issues related to measurement, design and sampling (for example, self-selection of participants, short duration of evaluation). In addition, program success may be affected by other factors, such as:

- Societal trends and cultural, political and economic factors;[137]
- Insufficient dose (for example, intensity of the intervention);[138, 139]
- Short timelines;[136]
- Interactions between different strategies;[136]
- Reliance on self-report data;[139]
- Variable level of exposure and compliance to the intervention;[137–139] and
- Lack of funding to ensure sustainability and evaluate long-term outcomes.[136]

The Active Programme Promoting Lifestyle Education in School (APPLES),[134] described in Table 2, is an example of a well-designed study that obtained mixed results. The Kahnawake School Diabetes Prevention Project (KSDPP)[137] for Aboriginal elementary-school children is an example of another project that did not obtain all of its desired results (see sidebar). According to the study's investigators, many of the following external factors may have been contributing factors:

- The introduction of satellite television in the community between study phases;
- Increased overall community wealth over the decade in combination with an increase in fast-food restaurants in the area;
- Increase in the number of families with both parents entering the workforce, leaving less time for meal supervision and leisure activities; and
- Increased perception of the importance of computer literacy among youth.[137]

Kahnawake School Diabetes Prevention Project (KSDPP)[137]

Goals and approach: A primary type 2 diabetes prevention program for Aboriginal elementary-school children. KSDPP included a health curriculum and various community and culturally appropriate health lifestyle interventions.

Phase One	Phase Two
Method: A comparison of the Kahnawke community (intervention) to a control community over a two-year period (1994–1996).	**Method:** Repeated cross-sectional surveys for children in the intervention community only in 1994, 1995, 1996, 1998, 1999 and 2002.
Outcomes • Students in the intervention school had significantly lower increases in skinfold thickness compared to students in the control school. • Unexpectedly, children in the intervention demonstrated a decrease in fitness level, while students in the control schools demonstrated an increase. • Dietary and BMI measures did not reveal any changes over time.	**Outcomes** By 2002, many of the positive outcomes achieved in the intervention community had not been sustained. • Children in the intervention school were at a significantly higher risk of having an increase in BMI and skinfold thickness. • Earlier improvements in physical activity among students in the control schools had not been sustained. • Fruit and vegetable consumption decreased in the intervention community.

Tipping the Scales

Question

Compared to previous years, have rates of self-reported and measured overweight and obesity increased among children and youth?

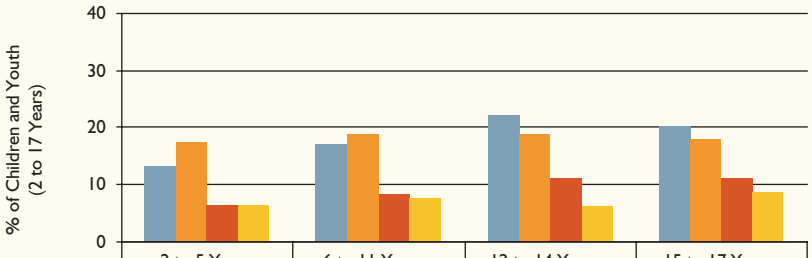
Answer

Self-reported data from the National Longitudinal Survey of Children and Youth (NLSCY) (Cycle 5) demonstrate an overall increase in rates of overweight/obesity among children and youth aged 8 to 11 between 1986 and 2002. Rates for males increased from 13% to 34% and from 14% to 31% for females.§§

Measured data from the 2004 CCHS show that rates of overweight and obesity among children and youth aged 2 to 17 have risen by about 70% compared to 25 years ago. However, rates differ among boys and girls of different ages (see Figure 9 for 2004 rates).***[1]

Figure 9

Measured Overweight and Obesity Rates Among Children and Youth 2 to 17 Years (2004)



	2 to 5 Years	6 to 11 Years	12 to 14 Years	15 to 17 Years
Overweight Males	13.1	17.0	22.1	20.0
Overweight Females	17.3	18.8	18.6	18.0
Obese Males	6.3[E]	8.5	11.1	11.2[E]
Obese Females	6.4[E]	7.5	6.1[E]	8.7

Source: CCHS 2.2 (2004) [CANSIM Table 105-2002].[1, 140]
[E] Coefficient of variation between 16.6% and 33.3% (interpret with caution).

§§ Custom analyses of NLSCY data (Cycle 5, 2002–2003).
*** Analyses were based on the International Obesity Task Force (IOTF) criteria for BMI cut-offs for 2- to 18-year-olds.








5

5

Home and Family Environment

What aspects of the home and family environment are related to healthy weights?

A number of aspects related to healthy eating and physical acitivity can be discussed within the context of the home and family environment. This section addresses issues particularly related to children and youth in this context. Among these issues are the eating behaviours and physical activity patterns that parents help establish in their children, oftentimes through their own modelling of these behaviours. Other issues specific to the family environment include children's exposure to screen time (for example, television viewing and computer use) and television advertising.

Parents' Eating Habits and Physical Activity Behaviours

Research suggests that parents can play key roles in children's eating behaviours and physical activity patterns, which can develop into behaviours that promote good health or contribute to poor health.[141] Analyses of 2001 CCHS data indicate that parental obesity was strongly associated with youth obesity.[141] Adolescents with a parent who was inactive in his or her leisure time were also themselves more likely to be inactive.[141] Consistent with this, Canada's 2005 *Report Card on Physical Activity for Children and Youth,* stated that only 43% of parents were regularly active with their children in 2000.[83]

What is the proportion of adults (18 years and over) who consume fruit and vegetables five or more times per day?

New CPHI analyses show that women (36%) are more likely than men (26%) to report consuming fruit and vegetables five or more times per day.

Relative to the Canadian average (31%), adults in Quebec (38%) are more likely to report consuming fruit and vegetables at least five or more times per day. In contrast, adults in Atlantic Canada (Newfoundland and Labrador, 20%; Prince Edward Island, 20%; Nova Scotia, 25%; and New Brunswick, 23%) and the Prairies (Manitoba, 24%; Saskatchewan, 26%; and Alberta, 25%) are less likely to report consuming fruit and vegetables five or more times per day. Ontario (32%) and British Columbia (31%) were not significantly different from the Canadian average.

Source: CCHS 2.2 (2004), Statistics Canada (custom tabulation).

Parental Control of Children's Eating

Control over children's food intake can come in many forms, one of which is exclusive breastfeeding versus mixed breastfeeding (breastfeeding plus other liquids or solid foods). The World Health Organization (WHO) recommends breastfeeding for a period of at least six months exclusively.[30] A number of systematic reviews indicate that breastfeeding can be a protective factor against later childhood obesity.[4, 7, 31] In 2003, 85% of Canadian women aged 15 to 55 reported initiating breastfeeding; 19% did so for at least six months exclusively.[213] In terms of supporting breastfeeding, the Canadian Task Force on Preventive Health Care indicates that structured breastfeeding education in the first two months postpartum, as well as telephone or in-person postpartum support, are effective at improving both initiation and continuation of breastfeeding.[142] The Task Force found no evidence supporting the effectiveness of written materials alone or commercial discharge packages.[142]

As children get older, the link between children's BMI and parental control over children's eating habits is less clear. Some research suggests there is a higher likelihood of weight problems among children whose eating is highly controlled by parents.[143–145] In these cases, researchers believe that too much parental control may interfere with children's ability to self-regulate their energy intake. In contrast, a study of Grade 3 children with diverse ethnic and socioeconomic backgrounds reported different findings for girls than boys. Parents who reported greater control over their children's food intake had daughters who were less likely to be overweight; results were not significant for boys.[146]

Home-Packed Versus Purchased Lunches

A recent study funded by CPHI reported that children in Nova Scotia who purchased lunch at school were 39% more likely to be overweight than children who brought their lunch from home.[148] In addition, children who ate supper at home with their families at least three or more times per week were less likely to be overweight.[148] Although this research adjusted for such risk factors as dietary habits, activities, socio-demographic factors and school-based factors, it was not able to examine the types and quality of food in purchased or packed lunches.[148] Nonetheless, it speaks to a potentially interesting aspect related to the home and family environment in promoting healthy weights.

Children who purchased their lunch at school were more likely to be overweight than children who brought their lunch from home.

Screen Time and Advertising: Are They Linked to Healthy or Unhealthy Weights?

"Screen time" refers to time spent watching television, playing video games and using the computer.[1] Researchers suggest that increased screen time can have an impact on weight by:

- Displacing physical activity; or
- Promoting an increased intake of calories as a result of food advertising or eating while watching television.[149]

A number of past studies have examined the relationship between screen time and body weight among children and adolescents. The evidence has been mixed.[151]

- Some researchers report no link between television use and weight status[149] or a very weak link;[152, 153]
- Some report strong links between weight status and both television viewing and video game use;[154] and
- Others report strong links between weight status and television viewing only.[155, 156]

While there are many explanations for these differing conclusions, most tend to focus on limitations in the studies' methods.[151]

What is the proportion of youth (12 to 19 years) who consume fruit and vegetables five or more times per day?

In 2003, 41% of boys and 46% of girls aged 12 to 14 consumed fruit and vegetables five or more times per day; among 15- to 19-year-olds, 38% of boys and 45% of girls consumed fruit and vegetables five or more times per day.

Source: CCHS 2.1 (2003) [CANSIM Table 105-0249].[147]

Based on data analyses from the NLSCY, CCHS and the Health Behaviour in School-Aged Children Survey (HBSC), Canada's 2005 *Report Card on Physical Activity for Children and Youth* stated the following:

- Half of Canada's children and youth watch up to two to four hours of television each day;[83]
- The time spent using computers by Canadian children and youth is among the highest in the world;[83]
- Although girls report less daily activity than boys, they also report less television and computer use than boys;[83, 150]
- Higher television time was noted among children of lower income families;[83] and
- In international comparisons, Canadian girls and boys aged 11 to 15 rank in the top quartile for weekend computer use.[83, 150]

Recent studies using both self-reported and measured Canadian data show a link between screen time and overweight and obesity. Analyses of self-reported data from the NLSCY showed that video game use and television watching were risk factors for overweight and obesity, while physical activity was protective.[157] Measured data of height and weight for Canadian children and youth indicate that in 2004, children aged 6 to 11 who engaged in more than two hours of screen time per day were twice as likely to be overweight or obese compared to those who logged one hour or less per day (35% versus 18%).[1]

A randomized control study conducted in 1996–1997 showed significant decreases in BMI, tricep skinfold thickness, waist circumference and waist-to-hip ratio among Grade 3 and 4 children who had received a school-based curriculum to decrease television, videotape and videogame use at home.[154] This same research reported significant decreases in television viewing and the frequency of eating meals in front of the television among children who participated in the curriculum.[154] This research points to the school and home as potentially interrelated environments in effectively targeting one factor that may affect healthy weights among children.

Researchers have also looked at the content of television viewing, specifically food advertisements. In Australia, food advertisements account for approximately one-third of all advertisements broadcast during children's television viewing hours.[159] Many advertisements are for high-fat or high-sugar products, with fruit and vegetables being the least-advertised food product.[159] Studies of children's choices conducted in the UK indicate that obese and overweight children tend to recognize more food advertisements than do non-obese and non-overweight children.[160] Children exposed to advertising also tend to choose advertised food products at higher rates than do those who are not exposed.[161]

Nevertheless, the direct effects of advertising on children's food choices are difficult to untangle from the many other influences to which children are exposed,[160] such as their peers.[162]

A number of governments have imposed restrictions on television advertising to children, several of which target food advertising.[163] Bans on advertising to children are in place in Quebec, Norway and Sweden;[163] however evaluations of the impact of legislation to restrict food advertising on children's eating habits and weight are limited.[163]

The above research speaks to the possible influences of advertising on body weight. Related to this is the possible negative influence of advertising on body image. A meta-analysis of 25 studies conducted in the U.S. examined the effects of the "thin beauty ideal" on females' body image.[164] After viewing "thin media images," females' body image was significantly more negative than after viewing images of average-sized models, plus-sized models, cars or houses.[164]

How many Canadian households have computers and televisions?

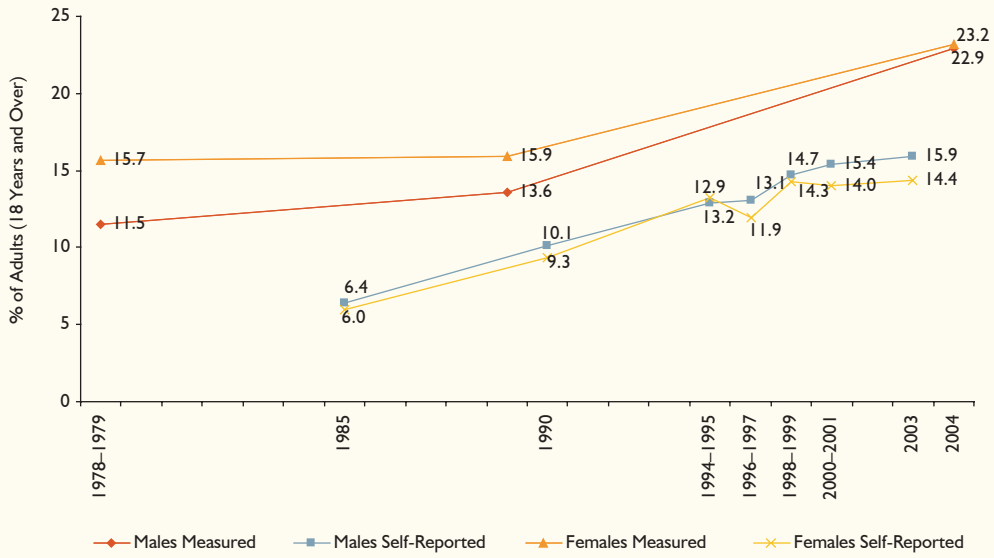
- The percentage of Canadian households with computers rose from 55% in 2000 to 69% in 2004.[158]
- The percentage of households with Internet use from home rose from 42% in 2000 to 60% in 2004.[158]
- In 2004, 99% of Canadian households owned a colour television. Of these households, 36% had one television, 36% had two televisions and 28% had three or more.[158]

Tipping the Scales

Question	Are men and women equally likely to under-report their weight when surveyed?
Answer	There are large discrepancies among both men and women in their self-reported versus measured rates of obesity.[181]

Figure 10

Trends in Self-Reported and Measured Obesity Rates (BMI ≥30) Among Adult Males and Females 18 Years and Over (1978 to 2004)[181]



Sources: *Measured:* 1978–1979 Canada Health Survey; 1986 to 1992 Canadian Heart Health Surveys (ages 18 to 74); 2004 Canadian Community Health Survey: Nutrition.
Self-reported: 1985 and 1990 Health Promotion Survey; 1994–1995, 1996–1997 and 1998–1999 National Population Health Survey; 2000–2001 and 2003 Canadian Community Health Survey.
Note: Measured height and weight data for Canada were not obtained from 1979 to 1986 and from 1992 to 2004.

6

6

Nutrition Environment

What aspects of the nutrition environment are related to healthy weights?

Healthy eating is a broad concept within the larger nutrition environment. The nutrition environment can refer to a number of aspects, including food accessibility, affordability and quality. This section looks at the following issues: food insecurity, cost of and access to food, food expenditures, energy-dense foods, proximity of fast food restaurants and portion size.

Food Insecurity

There are three dimensions underlying food insecurity:

1) not eating the desired quality or variety of foods (compromised quality);
2) being concerned about not having enough to eat; and
3) not having enough to eat.[165]

In 2001, approximately 15% of the Canadian population aged 12 and older (or 3.7 million Canadians) experienced food insecurity.[165] There is a higher prevalence of food insecurity among residents of lower income households and those who rely on social assistance.[165, 166] Compared to the Canadian average (15%), individuals living in the territories were at highest risk for food insecurity (Yukon, 21%; Northwest Territories, 28%; Nunavut, 56%).[165] According to National Population Health Survey (NPHS) data from 1998–1999, single-mother households had higher odds of experiencing food insecurity (compared to other household types), as did Aboriginal Peoples (compared to non-Aboriginal Peoples).[166] Research shows that mothers in food-insecure households are likely to compromise their own diet to ensure their children have sufficient food.[167]

Some research suggests there is an association between food insecurity and overweight[168] and obesity, particularly among women.[169] Research indicates that compared to residents in food-secure households, a higher percentage of residents in food-insecure households are obese, regardless of age, sex and income level.[166] This relationship, however, is not restricted solely to people who are overweight and obese. A Finnish study shows that compared to those with a BMI of 20 or more, individuals with a BMI less than 20 were the most likely to report hunger and food insecurity.[170]

Cost of and Access to Food

Findings from Canada's Family Food Expenditure Survey, as well as studies conducted in the U.S., indicate that many low-income individuals live in areas where local shopping facilities and transport networks are limited and where the average cost of food is higher.[172–174] In some Canadian neighbourhoods, the cost of food is as much as 11% higher in inner-city grocery stores compared to suburban grocery stores.[172]

The Northern Food Prices Project explored why and how foods were priced the way they were in northern Manitoba.[175] It found that freight costs for air delivery to remote communities were 13% higher than freight costs to southern retailers. This was found to contribute to higher food costs in these areas. In communities with all-weather road access, freight costs were lower, at 3%, and therefore food prices were competitive with southern food retailers. In addition, nutritious perishable foods that were of poor quality and high price tended to discourage northern residents from purchasing and consuming these foods.[175]

Food Expenditures

Recent analyses of data from the 1996 Family Food Expenditure Survey reported that Canadian households with lower incomes spent less money on food at both restaurants and stores than households with higher incomes.[176] Compared to higher income households, lower-income households also purchased fewer servings of both fruit and vegetables and milk products.[176]

Energy-Dense Foods

U.S. data indicate that potato chips, chocolate and locally bottled soft drinks provide dietary energy at a lower cost than healthier foods such as lean meat, fish and fresh vegetables and fruit.[177]

Fast Food Restaurants

A cross-sectional study in the U.S. reported a correlation between the number of residents per fast food restaurant and state-level obesity prevalence, which ranged from 17% to 28%.[178] States that ranked low in obesity tended to have more residents per fast food restaurant. Given its cross-sectional and correlational nature, conclusions about causality cannot be made.

To date, Canadian research shows increased mortality rates and admissions for acute coronary syndromes in Ontario regions with greater numbers of fast-food restaurants.[179] Research looking at the link between the number of fast food restaurants in Canadian cities and obesity is lacking.

Canada's Food Mail Program

Canada's Food Mail Program is a subsidy for the transportation of nutritious foods. Isolated communities (those that do not have year-round road or rail access) are eligible for the program, which is a partnership between Canada Post, Indian and Northern Affairs Canada and Health Canada. While the long-term effectiveness of this program on body weights is presently unknown, as of 2003, the Northern Food Prices Project reported the following:[175]

- There were 140 communities (total population 90,000) in six provinces and three territories eligible for the Food Mail Program;
- Of these, 60 communities (total population 46,000) in four provinces and three territories were using the Food Mail Program; and
- None of the 19 eligible communities (total population, 17,000) in Manitoba were using the program.[175]

Portion Size

Analyses of three nationally representative U.S. studies reported that between 1977 and 1996, portion sizes (with the exception of pizza) had increased both inside and outside the home. From 1977 to 1996, there was an increase in energy intake and portion size in hamburgers by 97 kcal, fries by 68 kcal and soft drinks by 49 kcal. From 1994 to 1998, the largest portion sizes for salty snacks, soft drinks, fruit drinks and fries were found at fast food restaurants.[180]

Obesity rates among men and women: does income matter?

CPHI's *Improving the Health of Canadians 2004* showed that rates of self-reported overweight and obesity among men increased with increasing household income level in 2000–2001.[41] In contrast, women in the highest income households were less likely to be overweight and obese.

Newer results—based on measured height and weight—suggest different conclusions. The 2004 CCHS reports the following:

- Canadian men in lower-middle income households were less likely to be obese than men in the highest income households; and
- Compared to women in highest income households, women in middle and upper-middle income households had higher obesity rates.[2]

There are a number of underlying factors that may play a role in these results:

Employment

- Research has shown that men in less-skilled occupations appear to be more physically active at work and home than professional or skilled workers.[171]

Personal Health Practices

- The health risks associated with both smoking[216] and obesity[3, 4] are well known. As a result, the relationship between the two is often examined.
- While some research shows that smokers have lower BMIs than non-smokers, the same research also shows that "the risk of coronary heart disease death among smokers is not reduced sufficiently by the lower BMIs to justify the habit."[216] (p. 838)

Food Insecurity

- There is a higher prevalence of reported food insecurity among residents of lower income households and those who rely on social assistance.[165, 166]
- Single mother households and Aboriginal Peoples had higher odds of experiencing food insecurity than other household types and non–Aboriginal Peoples.[166] Further, mothers in food-insecure households are likely to compromise their own diet to ensure their children have sufficient food.[167]

Measurement Issues

- It is not uncommon for people to refuse to answer survey questions specific to income, which limits the conclusions that can be drawn about differences between income levels. For example, the 2004 CCHS 2.2 reported differences in response rate by household income among both men and women.[2]

The findings outlined in this section indicate that there are a number of factors specific to the nutrition environment that may play a role in healthy weights. As the research in this chapter indicates, certain groups of individuals or individuals living in certain areas tend to be at higher risk for obesity due to their inability to access or buy sufficient healthy food.[165, 166]

Do adults in different income households differ in their consumption of fruit and vegetables?

New CPHI analyses indicate that Canadian adults (18 years and over) in the highest-income households are significantly more likely to report consuming fruit and vegetables five or more times per day (36%), compared to those in the lowest (24%[E]), lower-middle (22%), middle (28%) and upper-middle (31%) household income quintiles.

Source: CCHS 2.2 (2004), Statistics Canada (custom tabulation).
[E] Coefficient of variation between 16.6% and 33.3% (interpret with caution).





7

7

Personal Health Services

What is the link between personal health services and healthy weights?

"Health services" can mean many things to many people.

At a population level, it can mean health promotion and prevention of illness, injury and death. At an individual level, it can mean wait times, availability of health providers and use of different types of health care. In this section, obese persons' experiences with and use of personal health services, clinical interventions, mental health outcomes and commercial weight-loss programs will be discussed.

Experiences With and Use of Health Services

Analyses of 1994 data from Canada's National Population Health Survey indicate that, compared to non-obese persons, obese persons had lower rates of hospital admissions; were more likely to visit general physicians, mental health professionals and specialists more often; and were more likely to be on more medications (such as heart and blood pressure medication).[36]

Recent research suggests that some health professionals may subscribe to stereotypes of obese people as "lazy" and "worthless" and in turn demonstrate implicit and explicit negative attitudes toward obese people.[39] A number of studies have documented these negative attitudes,[37, 38] even among those health professionals who specialize in the treatment and study of obesity.[39]

Research conducted in the U.S. shows that obese persons, particularly women, also tend to choose to delay seeking certain preventive health services.[40] With the exception of mammograms, obese and severely obese women are more likely to delay, by up to three years, going for clinical breast examinations, gynecologic examinations and pap smear testing than are women with an average BMI of 25. These results held even when age, race, income, education, smoking and health insurance status were taken into account.[40]

Clinical Interventions

In addition to preventive health services, there are a number of medical and surgical options available for the treatment of obesity. Various randomized trials and meta-analyses indicate that weight loss drugs (for example, Orlistat and Sibutramine) can be used

together with diet and exercise[185] to help achieve modest weight loss and maintain a reduced weight among those with a BMI in the overweight or obese ranges.[182–184] Long-term health outcomes are generally not known.[184, 185]

For some individuals, dieting, exercising or drug therapy is not successful. For example, among adults with a BMI of 40 or more, or those who are obese with weight-related health problems, more invasive treatments, such as gastric bypass and stomach stapling, are sometimes tried.[186, 187] In recent years, the annual number of bariatric surgeries in Canada has been relatively stable, with the exception of 2002–2003, during which an increase was noted.[188, 218] Procedures such as these are costly and have a relatively high risk of surgery-related complications (up to 20% in some studies), post-operative digestive problems and in some cases, death.[187, 189, 190] Among those for whom surgery was successful, systematic reviews and meta-analyses have shown maintained weight reductions of 20 to 30 kilograms a decade after surgery, as well as improvements in such health conditions as blood pressure and diabetes.[186, 190] While effective in some cases, these interventions are relevant for only a few individuals and do not have a significant overall effect on promoting healthy weights at the population level.

Mental Health and Unhealthy Weights

A number of studies have shown that obesity (BMI ≥30) and severe obesity (BMI ≥40) are associated with depressive symptoms and major depressive disorders. A Canadian study reported a greater risk of depression among obese adults than non-obese adults.[191] Two U.S. studies noted this association particularly among women. In one study, obese women had a 37% higher probability of being diagnosed as depressed, while obese men had a 37% lower probability of being diagnosed as depressed; interestingly, men who were underweight were at increased risk for being diagnosed as depressed.[192] Another study reported an association between obesity with "past-month depression" in women; the association was also significant among men who were severely obese.[193] The direction of the relationship between obesity and depression is unclear. Are obese individuals more likely to be depressed or are those who are depressed more likely to be obese?

The connection between mental health and unhealthy weights is not restricted solely to obesity. As noted above, it can also be an issue for those who are underweight. In their *Report on Mental Illness in Canada*,[194] the Public Health Agency of Canada addresses this subject by looking at a number of issues surrounding eating disorders (anorexia, bulimia and binge eating disorders). Highlights from this report show that:

- Throughout the course of their lives, roughly 3% of women will be affected by an eating disorder;
- These disorders have an effect on "girls and women more than boys and men";[194] (p. 1)
- Society's endorsement of thin body images, as well as both biological and individual factors, can be risk factors for the onset of eating disorders; and
- Hospitalizations for eating disorders in general hospitals rose by 34% among girls under 15 from 1987 to 1999; these rates also increased by 29% among 15- to 24-year-olds over the same period.[194]

Commercial Weight-Loss Programs

Systematic reviews conducted in the U.S.[196] and the UK,[197] as well as randomized control studies,[198] provide some support for the long-term effectiveness of selected weight-reducing diets among adults.

A systematic review conducted in the U.S. examined three non-medical commercial weight-loss programs (Weight Watchers, Jenny Craig and LA Weight Loss), two very-low-calorie medically based diets (Health Management Resources and OPTIFAST), one Internet-based program (eDiets.com) and two non-profit self-help programs (Overeaters Anonymous and Take Off Pounds Sensibly).[196] Weight Watchers was the only program for which a randomized control trial indicated it was effective for weight reduction. No published high-quality studies of Jenny Craig or LA Weight Loss were found. Studies of the very-low-calorie medically based programs, Internet-based or self-help programs were of limited quality.[196] Patients of very-low-calorie diets who stayed on their program lost 15% to 25% of their body weight in three to six months; however, many dropped out of the programs. Those who completed their program maintained a weight loss of 8% to 9% one year later.[196]

Most recently, another U.S. randomized trial looked at the effectiveness of four popular diets (Atkins, Zone, Weight Watchers and Ornish) for weight loss and decreases in cardiac risk factors.[198] At 12 months, all diets resulted in significant weight loss, as well as significant improvements in various cardiac risk factors—for example, low-density lipoprotein/high-density lipoprotein (LDL/HDL) cholesterol ratio. In each of the four diets examined, weight loss was significantly associated with changes in total/HDL cholesterol ratio, C-reactive protein and insulin levels.

A systematic review conducted in the UK found little evidence for the effectiveness of low-calorie (LCDs), and very-low-calorie diets (VLCDs) and protein-sparing modified fasts (PSMFs) for weight reduction.[197] When compared with control treatments, only one of the LCDs and one of the VLCDs reported a change in weight among participants.[197] However, of the diets, various low-fat diets (LFDs) were associated with significant weight loss in participants, sometimes up to 36 months later. As a result, the authors suggest that LFDs appeared to be the most consistently effective for weight reduction.[197]

In 2001, what proportion of youth reported trying to do something about their weight?

In 2001, among youth who were of normal weight, 25% reported trying to lose weight (37% of girls and 10% of boys). Among youth who were overweight, 44% reported trying to lose weight (64% of girls and 32% of boys). Of the 56% of obese youth who reported trying to lose weight, 74% were girls and 45% were boys.

Source: NLSCY (Cycle 4, 2000–2001), Statistics Canada (custom tabulation).

In 2001, what proportion of adults reported trying to do something about their weight?

In 2000–2001, 70% of Canadian adults said they intended to make a change to improve their health. Of those, 62% intended to become more active, 17% intended to lose weight and 17% intended to improve their diet.[195]

Tipping the Scales

Weight-Related Factors Among Adolescents in Relation to Social Assets

In its report, *Improving the Health of Young Canadians*,[42] CPHI explored how social ties with family (parental nurturance and monitoring), friends (connectedness to peers), school (engagement at school) and the community (volunteerism) were related to youths' (aged 12 to 17) self-rated health, self-worth and use of tobacco, alcohol and marijuana. For this report, CPHI looked at how these ties were linked to physical activity and positive physical image.

- Youth reporting high levels of peer connectedness also tended to report higher levels of participation in unorganized sports (at least four times per week).
- Youth who reported higher levels of parental nurturance and monitoring, school engagement and peer connectedness were more likely to report a positive physical image (liking the way they look) than youth reporting medium-low levels.
- Among females, 48% of normal weight, 37% of overweight females and 38% of obese females reported a positive physical image.
- Males of normal weight (66%) were more likely to report a positive physical image compared to overweight (54%) and obese males (49%) (comparisons between males and females or between BMI levels were not conducted).





8

8

The Simple Solution?

Canadians' Views on Options to Promote Healthy Weights

The solution to promoting healthy weights is often presented as an easy one—eat right and exercise.

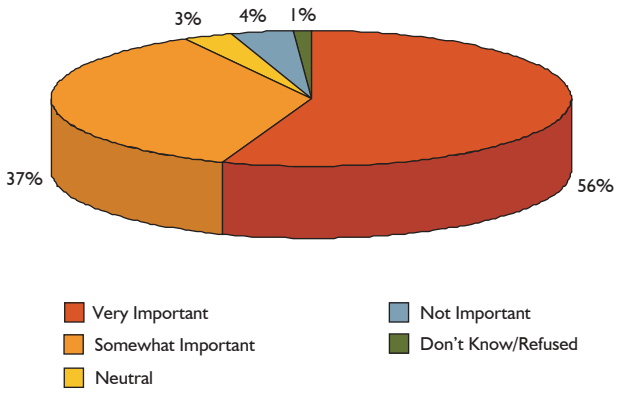
This "simple solution" appears to resonate strongly with the Canadian public, as indicated by a recent CPHI-funded public opinion telephone survey. Policy-making can be influenced by a number of factors, including evidence-based research, political will and the availability resources.[217] It can also be influenced by public opinion. To understand the public's attitudes and perceptions of healthy weights, 1,816 Canadians aged 18 and over were asked questions about factors that affect a person's weight; potential options to promote healthy weights; and whose responsibility it was to deal with the issue of healthy weights.[†††]

What does the Canadian public think about options to promote healthy weights? According to CPHI's public opinion survey . . .	
12% of Canadian adults feel obesity is a significant health issue—fourth behind heart disease, cancer and chronic disease (29%); lack of availability of doctors and nurses (19%); health care (19%); and hospital and emergency room waiting times (19%).	Although there is evidence indicating that social and environmental factors can play a role in obesity, 58% of Canadian adults believe obesity is caused by personal choices and 73% think individuals have the most responsibility for reducing obesity in Canada.
Canadian adults identified individual factors such as the amount of exercise people get (59%) and a person's eating habits (65%) as very important in preventing obesity.	56% of Canadian adults think reducing obesity is very important to the overall health of Canadians (see Figure 11).

††† See Appendix B—Methodology for further information about the target population and issues highlighted in the public opinion survey.

Figure 11

Importance of Reducing Obesity to Overall Health: What the Canadian Public Thinks (2004)



However, as outlined in this report, at a population level, addressing this complex health issue is anything but simple, and can involve individual behaviours as well as environmental and social factors. While eating and physical activity have a direct impact on body weight, both can be influenced by the settings in which we live, learn, work and play, including:

- Community and physical environment;
- Workplace;
- School;
- Home and family environment;
- Nutrition environment; and
- Personal health services.

Characteristics of these settings can encourage excessive food intake and physical inactivity or promote healthy eating and physical activity. In keeping with the goals of this report, the next chapter will summarize what we know and do not know, based on the evidence, and highlight opportunities for research, policy and action to make healthier choices the easier choices for Canadians. Additional information on Canadians' views about options to promote healthy weights is also provided.








9

Policies and Programs to Promote Healthy Weights

9

What Do We Know? What Do We Not Know?

As seen throughout this report, a great deal of research is being conducted and many initiatives are being implemented to promote healthy weights. In early 2005, CPHI funded the Atlantic Health Promotion Research Centre (AHPRC) to update and enhance an inventory of Canadian policies and initiatives that promote healthy eating and active living (HEAL).[¥] Of the 413 programs found nationwide, only 10% (or 42) had an evaluation component; of those, few had long-term outcome evaluations. This result, and reviews of the literature,[106] illustrate that while there are a number of initiatives taking place to promote healthy weights, there is a shortage of published evaluations of programs targeting healthy behaviour change and healthy weights.

The present report highlights examples of programs within Canada and around the world for which evaluation results were available. Focusing on each of the settings and environments discussed in the report, this section summarizes what we know based on the evidence, identifies gaps in our knowledge and highlights opportunities for research and policy.

¥ See www.ahprc.dal.ca/heal/index.cfm for the complete inventory.

Community and Physical Environment

What Do We Know?

- Degree of urban sprawl,[67] perceived safety,[71, 73] "walkability,"[53] neighbourhood appeal and access to recreational facilities[79–82] appear to play a role in the decisions of children, youth, adults and seniors to engage in physical activity or active transportation.

- Adults who engage in active transportation (for example, walking or biking to work) are less likely to be overweight or obese.[64]

- Efforts to create or enhance access to physical activity facilities by changing the local environment can be effective at promoting physical activity among adults. Community recreation facilities and walking trails may play a role in promoting physical activity.[117, 199]

- Social support in the community is associated with activity levels. Building, strengthening and maintaining social networks that support behaviour change may help increase physical activity.[117, 199]

- Community-wide campaigns may promote an increase in physical activity levels.[199] Community-wide campaigns such as Saskatoon *in motion*[84] typically include many sectors in ". . . highly visible, broad-based, multiple intervention approaches" (p. 77) to bring about behaviour change such as increasing physical activity.[199] These initiatives often target a large audience and provide health-promoting messages through various media, such as direct mail, television, radio and newspapers.[199]

What Do We Not Know?

- While there is a link between community-based interventions and activity levels, we do not know whether there is a link between community-based interventions and obesity—or how strong it is. This may be due in part to the difficulties of evaluating and linking such interventions to health outcomes in community-based interventions.[86]

- Although there is a relationship between sprawl and obesity, we do not completely understand the cause–effect nature of the relationship.

- We do not know the extent to which seasonal variation, particularly during cold weather months, influences Canadians' physical activity levels and BMI.

What does the Canadian public think about options to promote healthy weights?

According to CPHI's public opinion survey . . .

39% of adults think living in communities with recreational spaces and 46% of adults think living in communities that are safe for walking and playing is very important in preventing obesity.	Societal factors, such as living in communities that are safe for walking and playing and where there are recreational spaces, are more likely to be rated as being very important in preventing obesity by Canadian adults with lower education and income levels.
39% of adults believe encouraging the development of communities where cars are not always needed to get around is very important to the health of the people in their communities.	41% of adults believe having access to public transportation and 52% of adults believe providing adequate sidewalks and bicycle paths that reduce car travel is very important to the health of people in their community.

Workplace

What Do We Know?

- In 2004, 23% of Canadians (or 5.5 million) aged 18 and over were obese.[2] Workplaces are one potential setting to promote healthy weights, given the amount of time most people spend at work.

- Nature of employment and workplace environment can influence people's activity levels and risk for unhealthy weights.[26–29]

- A recent systematic review conducted by the U.S. Task Force on Community Preventive Services concluded that interventions in the worksite that combine diet and physical activity initiatives can be effective in helping employees control overweight and obesity.[96]

What Do We Not Know?

- We do not know the costs and benefits associated with programs to promote healthy eating and physical activity in Canadian workplaces.

- We do not know the types of workplaces where programs may be most effective at promoting healthy weights.

- Although one known review found an association between workplace physical activity programs and increased physical activity,[95] evidence on workplace strategies that improve health, increase physical activity, increase healthy eating and reduce overweight and obesity is scarce.[92, 95, 200]

What does the Canadian public think about options to promote healthy weights?

According to CPHI's public opinion survey . . .

57% of Canadian adults strongly support offering incentives to employers who provide fitness facilities or programs to their workers.

School

What Do We Know?

- Schools are one logical setting to address the issue of healthy weights, given the amount of time children and youth spend there and the connection between health and learning potential.[104–107]
- Modifications to school-based physical education classes (such as lengthening existing classes or increasing activity) have been found to be effective at increasing physical activity levels among students in both the U.S. and Canada.[116, 199]
- Although 54% of Canadian schools had physical education policies in 2001, only 16% reported providing daily physical education classes.[121]
- Coordinated programs that actively engage the school, community and families can be effective at promoting healthy behaviour changes, such as healthier eating and being more active.[127, 139]
- Limited research suggests that school-based programs to discourage carbonated drink consumption among children appear to be linked to decreases in the average percentage of overweight and obesity among children.[113] However, the exact role that carbonated drink consumption plays in contributing to obesity among children and adults remains unclear.

What Do We Not Know?

- We do not know the "portability" of coordinated school health programs. Will interventions that vary from school to school depending on community needs, demographics and culture be equally effective at promoting healthy weights?
- We do not know the intensity and frequency of the intervention (also known as "dose") required for a school health program to be effective. How much is enough and what is the necessary balance of knowledge, nutrition and physical activity needed to produce a change in overweight and obesity within the school environment?
- We do not know the impact on child and youth obesity rates of recent provincial policies to legislate the minimum amount of physical activity in school.
- We do not know the long-term effectiveness of removing vending machines or changing their content on children's obesity.

What does the Canadian public think about options to promote healthy weights?

According to CPHI's public opinion survey . . .

72% of adults strongly support encouraging more non-competitive and recreational programs in schools.

85% strongly support encouraging more school-based nutrition and physical education programs.

Home and Family Environment

What Do We Know?

- In 2004, 21% of children aged 2 to 5, 26% of children aged 6 to 11 and 29% of youth aged 12 to 17 were overweight or obese.[1]
- Education levels, socioeconomic status and culture are associated with obesity rates.[2]
- Obesity rates are also related to personal health practices[22] and genetic factors.[12, 14]
- Systematic reviews assessing the effects of breastfeeding on later childhood obesity indicate that breastfeeding can be a protective factor against later childhood obesity.[4, 7, 31]
- Research indicates that children who purchase lunch at school are 39% more likely to be overweight than children who bring their lunch from home.[148] In addition, children who eat supper at home with their families at least three times per week are less likely to be overweight or obese.[148]
- Parental obesity is associated with youth obesity, and youth with a parent who is inactive during leisure time are also themselves more likely to be inactive.[141]
- Past research has been mixed regarding the strength of the relationship between "screen time" and obesity among children and youth. However, recent data of measured height and weight indicate there is a higher risk of overweight and obesity among Canadian children who engage in more than two hours of screen time per day relative to those who engage in one hour or less.[1]
- Home and school appear to be two interrelated settings in which healthy weight promotion strategies can be targeted. As an example of this, evidence from a randomized control trial indicates that a school-based curriculum to reduce screen time at home was associated with decreases in BMI, tricep skinfold thickness, waist circumference and waist-to-hip ratio among children in Grades 3 and 4.[154] More research in this area appears warranted.

What Do We Not Know?

- We do not know the impact on weight status of regulations that ban advertising to children.
- Traditional definitions and composition of the family are changing. We do not know how (or whether) different family structures are linked to the home environment and obesity.
- We do not know the association between the number of televisions and computers per household and overweight/obesity among children, youth and adults.

What does the Canadian public think about options to promote healthy weights?

According to CPHI's public opinion survey . . .

47% of Canadian adults think obesity is a greater problem among children; 28% think it is a greater problem among adults and 22% think it is a problem among both children and adults.

54% of adults think the availability of nutritious foods is a very important factor in preventing obesity.

Nutrition Environment

What Do We Know?

- Compared to the Canadian average (15%), individuals living in the territories are at the highest risk for food insecurity.[165] Single-mother households and Aboriginal Peoples have higher odds of experiencing food insecurity (compared to other household types and non-Aboriginal Peoples).[166]

- Canadians in lower income households spend less money on food and purchase fewer servings of fruit, vegetables and milk products than Canadians in higher income households.[176]

- U.S. studies report a positive relationship between state-level obesity rates and the number of residents per fast food restaurant.[178]

- In 2004, Canadian men in lower-middle income households were less likely to be obese than men in highest income households.[2] In contrast, compared to women in highest income households, women in middle and upper-middle income households had significantly elevated obesity rates.[2]

What Do We Not Know?

- Updated population-level data for the proportion of Canadians who are obese and experiencing food insecurity are not presently available. We thus do not know the current extent and impact of food insecurity on unhealthy weights (both under and overweight) among Canadians.

- We are lacking population-level information on the cost of energy-dense and healthier foods in Canada and their relationship to overweight and obesity.

- We cannot make conclusions about the relationship between fast food restaurants and obesity among Canadians.

What does the Canadian public think about options to promote healthy weights?

According to CPHI's public opinion survey . . .

78% of adults strongly support future initiatives that would ensure people have access to reasonably priced healthy foods.

68% of Canadian adults strongly support requiring fast food companies to provide nutritional information about each product they sell.

24% of Canadian adults strongly support charging more tax for less healthy food choices.

Personal Health Services

What Do We Know?

- Individual-level clinical interventions such as gastrointestinal surgery have been relatively stable in Canada within the last decade.[188, 218] Clinical interventions such as these are not accessible to or approriate for the population as a whole.

- Research suggests that some health professionals may subscribe to stereotypes of overweight and obese people as "lazy" and "worthless," and in turn demonstrate negative attitudes toward overweight and obese people.[39]

- Hospitalizations for eating disorders increased by 29% among 15- to 24-year-olds from 1987 to 1999.[194] Society's endorsement of "thin body images," as well as both biological and individual factors, can be risk factors for the onset of various eating disorders.[194]

What Do We Not Know?

- Current research demonstrates a link between obesity and depression.[191] However, it is not clear whether this is because people who are obese are more likely to be depressed, or because people who are depressed are more likely to be obese.

- Various systematic reviews and randomized trials indicate there is some support for the effectiveness of commercial weight-loss programs.[196–198] For those for whom the programs are not effective, what are the long-term effects of unsuccessful weight reduction on people's mental health status?

What does the Canadian public think about options to promote healthy weights?

According to CPHI's public opinion survey . . .

Canadian adults think exercise, healthy eating and dieting are the three most important factors that contribute to good health. Canadian adults think eating junk food, smoking and not exercising enough are the three most important factors that contribute to poor health.

16% of Canadian adults think a person's genetic make-up is a very important factor in preventing obesity.

10

10 Conclusions

As discussed throughout this report, preventing and treating obesity is a complicated issue for which many factors in many settings can play a role. Further, these factors are interrelated and are part of the broader determinants of health. Promoting healthy weights is an issue receiving much attention, as evidenced by its inclusion in the Integrated Pan-Canadian Healthy Living Strategy—an initiative with the long-term goal of improving the health outcomes of Canadians and reducing health disparities nationwide.[201, 202] Formed in 2002, the strategy will target increasing the proportion of Canadians who eat healthy foods, who participate in regular physical activity and who are at a healthy body weight.[219] The strategy is population-based and intended to target all Canadians, with a special emphasis on children and youth, Aboriginal Peoples and other vulnerable groups.

In addition to the strategy described above, a number of programs and policies have aimed to promote healthy eating and active living in Canada. Many single-targeted interventions appear to be effective at increasing healthy eating and physical activity and, in some cases, reducing overweight and obesity. Other interventions that use multiple strategies or have multiple target audiences, such as coordinated school health programs, also appear to be effective in many cases.

Not all interventions, however, are always effective. Some interventions obtain no significant results—and at times, negative results. This may be for various reasons, such as poor methodology (for example, sampling bias or design limitations) or contextual factors (for example, political climate or media messages).

This highlights that the importance of evaluation cannot be understated. Evaluation is important to understand what interventions are effective for different target groups in different settings or contexts.

At present, there is a shortage of published evaluations of programs targeting healthy behaviour change and healthy weights. So, while there are numerous initiatives aimed at promoting healthy weights, there remain many research and evaluation opportunities to help us better understand what we do not know about promoting healthy weights.

What we do know from the evidence presented in this report is that there are many opportunities at the population level—in the settings where we live, learn, work and play—to promote healthy weights and support Canadians in the process of achieving and maintaining a healthy weight.

Food for Thought

What's Happening to Promote Healthy Weights?

In an effort to promote healthy weights, a number of initiatives are taking place across Canada and in various locations around the world. For example, CPHI has funded and commissioned a number of research projects examining healthy weights.

- Vulnerable Youth: A Study of Obesity, Poor Mental Health, and Risky Behaviours Among Adolescents in Canada (principal investigator: Doug Willms)
- Moving Ahead by Looking Back: A Novel Approach for Establishing Physical Activity Guidelines for Children (principal investigator: Mark Tremblay)
- International Comparisons of Child Health (principal investigator: Shelley Phipps)
- A Province-Wide Life-Course Database on Child Development and Health (principal investigator: Paul Veugelers)
- State of the Evidence Review on Urban Health—Healthy Weights (investigators: Kim Raine, John Spence, John Church, Normand Boulé, Linda Slater, Karyn Gibbons and Josh Marko)
- *Overweight and Obesity in Canada—A Population Health Perspective* (prepared by Kim Raine)
- *Socio-Demographic and Lifestyle Correlates of Obesity Technical Report* (prepared by Cora Lynn Craig, Christine Cameron and Adrian Bauman)
- *Programs and Policies Related to Achieving Healthy Weights in Canada: An Inventory* (prepared by Atlantic Health Promotion Research Centre)
- *Improving the Health of Canadians 2004—Obesity Chapter* (prepared by CPHI)

For More Information

Improving the Health of Canadians 2004 (IHC 2004)[41] was the Canadian Population Health Initiative's first flagship report. The report was organized into four key chapters: Income, Early Childhood Development, Aboriginal Peoples' Health and Obesity. It synthesized and presented evidence about the factors that affect the health of Canadians, ways to improve health and the implications of policy and program options. It also noted key information gaps and recent initiatives.

After the release of IHC 2004, a decision was made to produce and disseminate the second report, *Improving the Health of Canadians 2005–2006*, as a report series reflecting CPHI's current three strategic themes: *healthy transitions to adulthood* (released in October 2005), *healthy weights* and *place and health* (scheduled for release in fall 2006). Building on earlier reports, the series examines what we know about factors that affect the health of Canadians, ways to improve our health and relevant options for evidence-based policy choices. The unique contribution of this second report in the series is its focus, within a population health framework, on the role of a number of settings and environments (community and physical environment, workplace, school, home and family environment, nutrition environment and personal health services) in promoting or inhibiting healthy weights among Canadians.

Improving the Health of Canadians: Promoting Healthy Weights is available in both official languages on the CIHI Web site, at www.cihi.ca/cphi. To order additional copies of the report, please contact:

Canadian Institute for Health Information
Order Desk
495 Richmond Road, Suite 600
Ottawa, ON K2A 4H6
Tel.: (613) 241-7860
Fax: (613) 241-8120

We welcome comments and suggestions about this report and about how to make future reports more useful and informative. For your convenience, a feedback sheet ("It's Your Turn") is provided at the end of the report. You can also email your comments to cphi@cihi.ca.

There's More on the Web!

What you see in the print version of this report is only part of what you can find on our Web site (www.cihi.ca/cphi). For additional information and a full list of available CPHI reports, newsletters and other products, please visit our Web site to:

- Download a presentation of the highlights of *Improving the Health of Canadians: Promoting Healthy Weights*;
- Sign up to receive updates and information through CPHI's e-newsletter, *Health of the Nation*;
- Learn about upcoming reports, including the one on *place and health*, from the *Improving the Health of Canadians 2005–2006 Report Series*;
- Learn about upcoming CPHI events; and
- Download copies of other reports previously published by CPHI

Reports Previously Published by CPHI

Name of Report	Author and Publication Date
Healthy Transitions to Adulthood	
• *Improving the Health of Young Canadians*	CPHI (October 2005)
• *"You say 'to-may-to(e)' and I say 'to-mah-to(e)'": Bridging the Communication Gap Between Researchers and Policy-Makers*	CPHI (September 2004)
• *CPHI Regional Workshop—Atlantic Proceedings (Fredericton)*	CPHI (July 2003)
Place and Health	
• *Kachimaa Mawiin—Maybe for Sure: Finding a Place for Place in Health Research and Policy*	CPHI (October 2005)
• *Developing a Healthy Community Index*	Collected Papers (February 2005)
• *Housing and Population Health*	Brent Moloughney (June 2004)
• *Prairie Regional Workshop on the Determinants of Healthy Communities*	CPHI (August 2003)
• *CPHI Workshop on Place and Health Synthesis Report (Banff)*	CPHI (June 2003)
Healthy Weights	
• *Socio-Demographic and Lifestyle Correlates of Obesity—Technical Report on the Secondary Analyses Using the 2000–2001 Canadian Community Health Survey*	Cora L. Craig, Christine Cameron and Adrian Bauman (August 2005)
• *Overweight and Obesity in Canada: A Population Health Perspective*	Kim D. Raine (August 2004)
• *Improving the Health of Canadians—Obesity Chapter*	CPHI (February 2004)
• *Obesity in Canada—Identifying Policy Priorities*	CPHI and CIHR (June 2003)
Early Childhood Development	
• *Early Development in Vancouver: Report of the Community Asset Mapping Project (CAMP)*	Clyde Hertzman et al. (March 2004)
• *Improving the Health of Canadians—Early Childhood Development Chapter*	CPHI (February 2004)

continued

Reports Previously Published by CPHI

Name of Report	Author and Publication Date
Income	
• *What Have We Learned Studying Income Inequality and Population Health?*	Nancy Ross (December 2004)
• *Improving the Health of Canadians—Income Chapter*	CPHI (February 2004)
• *Poverty and Health CPHI Collected Papers*	CPHI, Shelley Phipps and David R. Ross (September 2003)
Aboriginal Peoples' Health	
• *Improving the Health of Canadians—Aboriginal Peoples' Health Chapter*	CPHI (February 2004)
• *Measuring Social Capital: A Guide for First Nations Communities*	Javier Mignone (December 2003)
• *Initial Directions: Proceedings of a Meeting on Aboriginal Peoples' Health*	CPHI (June 2003)
• *Urban Aboriginal Communities: Proceedings of a Roundtable Meeting on the Health of Urban Aboriginal People*	CPHI (March 2003)
• *Broadening the Lens: Proceedings of a Roundtable on Aboriginal People's Health*	CPHI (January 2003)
Cross-Cutting Issues and Tools	
• *Select Highlights on the Public Views of the Determinants of Health*	CPHI (February 2005)
• *Women's Health Surveillance Report: Supplementary Chapters*	CPHI and Health Canada (October 2004)
• *Charting the Course, Progress Report: Two Years Later: How Are We Doing?*	CPHI and CIHR (February 2004)
• *Women's Health Surveillance Report: A Multidimensional Look at the Health of Canadian Women*	CPHI and Health Canada (October 2003)
• *Barriers to Accessing and Analyzing Health Information in Canada*	George Kephart (November 2002)
• *Tools for Knowledge Exchange: Best Practices for Policy Research*	CPHI (October 2002)
• *Charting the Course: A Pan-Canadian Consultation on Population and Public Health Priorities*	CPHI and CIHR (May 2002)
• *Health of the Nation—e-Newsletter*	CPHI (Quarterly)
• *Partnership Meeting Report*	CPHI (March 2002)
• *An Environmental Scan of Research Transfer Strategies*	CPHI (February 2001)

Appendix A—Measuring Overweight and Obesity

Adults

Current Canadian guidelines for body weight classification in adults[56] are noted in the table below:

Classification	BMI Category (kg/m²)
Underweight	<18.5
Normal Weight	18.5–24.9
Overweight	25.0–29.9
Obese	
Class I	30.0–34.9
Class II	35.0–39.9
Class III	≥40.0

The term "overweight" refers to anyone with a body mass index (BMI) of 25.0 to 29.9. The term "obese" refers to someone with a BMI of 30 and over.[56] BMI is used to identify weight-related health risks among individuals 18 years of age and older. Health Canada suggests that for those 65 years and older "the normal range may begin slightly above BMI 18.5 and extend into the overweight range."[56] (p. 10) BMI is calculated by dividing a person's body weight in kilograms by the square of their height in metres.[56]

Children and Youth

There are a number of different perspectives regarding the use of BMI to measure overweight and obesity among children and youth. In 2000, the U.S. Centers for Disease Control and Prevention (CDC) devised a set of BMI-for-age charts that could be used to monitor BMI levels for those age 2 and older.[203] The following centiles have been recommended by the CDC as cut-off points to categorize abnormal body weights in children and youth:[203]

Classification	BMI Category/Centile
Overweight	BMI-for-age ≥95th centile
Risk of Overweight	85th centile ≤ BMI-for-age <95th centile
Underweight	BMI-for-age <5th centile

The CDC has used the term "overweight" instead of "obesity" in its definition to avoid the possible negative connotations associated with the use of the latter.[204] Although often used in analyses for children and youth, this definition has yet to be officially accepted internationally.[204, 205]

Two studies have noted limitations with the use of the CDC's growth charts in defining pediatric overweight and obesity. Work carried out with nationally representative data from 1981, 1988 and 1996 shows a progressive increase in the BMI of Canadian children over time.[206] As a result of this documented increase, the use of the 85th and 95th centiles would not adequately capture the prevalence of overweight and obesity among children and youth nationwide, thereby making it difficult to assess secular changes in the population.[206, 207]

Cole et al.[205] also note limitations with the use of the CDC's growth charts, particularly for use in international comparisons. By using dataset-specific centiles linked to adult cut-off points, Cole et al.[205] established age- and sex-specific cut-off points for overweight and obese children aged 2 to 18, based on BMI data from six large nationally representative cross-sectional growth studies. In doing this, the authors devised a less arbitrary measure of child overweight and obesity, which they recommend be used in international comparisons among children.[205]

The most recent Statistics Canada analyses of overweight and obesity in children and youth, which report measured height and weight data (results of which have been presented throughout this report), use the international criteria developed by Cole et al.[1, 205] The Dietitians of Canada, the Canadian Paediatric Society, the College of Family Physicians of Canada and the Community Health Nurses Association of Canada also recommend using these cut-off points when comparing Canadian prevalence data on children's BMIs against those of other countries.[204]

On an individual level, BMI has limitations, as it does not take into consideration lean muscle mass compared to one's body fat or fat distribution in the body, which can vary by age, sex and ethnicity.[208, 209] It may thus not be an accurate measure among very muscular individuals, youth who have not stopped growing and the elderly.[106] However, on a population level, it is a good indicator of body fat[3] and a standard that allows for comparisons between and within jurisdictions, as well as over time.

Waist Circumference and Waist-to-Hip Ratio

The BMI is not the only measure of overweight and obesity. Another measure is waist circumference, which unlike BMI, is used as a measure of fat in the abdominal area and as an indicator of health risks associated with abdominal obesity.[210] Men and women with waist measurements of more than 102 centimetres (40 inches) and 88 centimetres (35 inches), respectively, are at increased risk of developing such health problems as type 2 diabetes, coronary heart disease and hypertension.[56] Recently, new Canadian research involving 27,000 people from 52 countries has emerged speaking to the value of waist-to-hip ratio as a measure of obesity. According to this study, the proportion of people at risk of heart attack would be increased from 8% to 24% using waist-to-hip ratios to assess risk compared to current BMI cut-offs.[211]

Appendix B—Methodology

Data Sources

This report focused on healthy weights across a wide age span. Information was obtained from various Statistics Canada surveys, including the following:

- Canadian Community Health Survey (CCHS Cycle 2.2, 2004), Nutrition;
- Canadian Community Health Survey (CCHS Cycle 2.1, 2003);
- 2001 Census;
- National Longitudinal Survey of Children and Youth (NLSCY Cycle 4, 2000–2001); and
- National Longitudinal Survey of Children and Youth (NLSCY Cycle 5, 2002–2003).

This report features new analyses that merged self-reported BMI from the CCHS (Cycle 2.1, 2003) with data from the 2001 Canadian Census. It also features new analyses from Cycle 4 (2000–2001) and Cycle 5 (2002–2003) of the NLSCY. In addition, this report presents findings from CPHI's Public Opinion Survey on Healthy Body Weights. Programs and policies included in the report were identified from a detailed search of relevant peer-reviewed journals and online databases, as well as government and non-government Web sites to identify key documents in the grey literature (that is, publications issued by government, academia, business and industry, in print and electronic format, such as newsletters, reports and conference proceedings).

Canadian Community Health Survey (CCHS)

The CCHS provides data on Canadians' health status, health determinants and health care use. It is a bi-annual Canada-wide population survey that was first administered in 2000–2001. The CCHS collects responses from persons aged 12 or older living in private occupied dwellings, excluding persons living on Indian Reserves or Crown Lands, residents of institutions, full-time members of the Canadian Armed Forces and residents of certain remote regions, and thus covers approximately 98% of the Canadian population aged 12 and over. Further details on the CCHS can be found at the following Web site: www.statcan.ca/english/concepts/health/cchsinfo.htm. Data involving the CCHS were obtained from the Canadian Socio-economic Information Management System (CANSIM) and through custom cross-tabulations.

Body Mass Index (BMI). The CCHS (Cycle 1.1, 2000–2001 and Cycle 2.1, 2003) collected self-reported height and weight data for those aged 12 and over. The CCHS (Cycle 2.2, 2004) obtained measured height and weight data from those 2 years of age and over. BMI is calculated by dividing the respondent's body weight (in kilograms) by height (in metres) squared. Overweight and obese categories for children and youth were developed based on the International Obesity Task Force criteria, while those for adults were based on the current Canadian Guidelines (see Appendix A).

Response Categories:

- underweight
- normal weight
- overweight
- obese

Age Groups Examined:

- 2- to 17-year-olds (children and youth)
- 18 years and over (adults)

Fruit and Vegetable Consumption. Derived variable (CCHS, Cycle 2.2, 2004) based on responses to a number of questions on the frequency (number of times per day) of consumption of various types of fruit, juice and vegetables including: "How often do you usually drink fruit juices such as orange, grapefruit or tomato?," "Not counting juice, how often do you usually eat fruit?," "How often do you (usually) eat green salad?," "How often do you usually eat potatoes, not including French Fries, fried potatoes, or potato chips?," "How often do you (usually) eat carrots?" and "Not counting carrots, potatoes or salad, how many servings of other vegetables do you usually eat?"

Response Categories:
- less than five times per day
- five or more times per day
- not stated

Age Groups Examined:
- 2- to 17-year-olds (children and youth)
- 18 years and over (adults)

Physical Activity Index. Derived variable (CCHS, Cycle 2.2, 2004) using adult categories that groups participants based on average daily energy expenditure values (kcal/kg/day) during leisure time. Physical activity levels are calculated from responses to the reported frequency and duration of the respondents' leisure time physical activities in the three months prior to the survey and the metabolic energy demand of each activity.

Response Categories:
- active
- moderately active
- inactive
- not stated

Age Groups Examined:
- 2- to 17-year-olds (children and youth)
- 18 years and over (adults)

Household Income. Derived variable (CCHS, Cycle 2.1, 2003, and Cycle 2.2, 2004) based on the total household income and the number of people living in the household.

Response Categories:
- lowest income quintile
- lower-middle income quintile
- middle income quintile
- upper-middle income quintile
- highest income quintile
- not applicable
- don't know
- not stated

Age Group Examined: 18 years and over (adults)

National Longitudinal Survey of Children and Youth (NLSCY)

The National Longitudinal Survey of Children and Youth (NLSCY) is a long-term study following Canadian children from birth to early adulthood. The first cycle was completed in the fall of 1994 with a cohort from a targeted population of 25,000 Canadian children aged 0 to 11 years who have since been surveyed every two years. The information is provided by parents, children themselves (for children above 10 or 11 years of age), teachers and principals. The sample excludes children and youth living on Indian Reserves or Crown Lands, in institutions as well as in the territories. More information on the NLSCY can be found at the following Web site: www.statcan.ca/english/sdds/4450.htm.

Data for youth aged 12 to 17 in Cycle 4, 2000–2001 (N = 5,580 and representing 2,451,613 youth of the same age in Canada) were examined through Remote Data Access. Data for youth aged 8 to 17 (Cycle 5, 2002–2003) were examined through custom tabulation.

Parental Nurturance. Derived score based on the following items: My parents . . . smile at me, praise me, make me feel appreciated; speak of the good things I do; seem proud of the things I do; listen to my ideas and opinions; solve a problem together with me whenever we disagree about something.

Response Categories:
- never
- rarely
- sometimes
- often
- always
- refusal/not stated

Age Group Examined: 12- to 15-year-olds

Continuous Score Range (0 to 28):
- medium-low (0 to 20)
- high (21 to 28)

High score indicates a high level of parental nurturance.

Parental Monitoring. Derived score based on the following items: My parents . . . want to know exactly where I am and what I am doing; tell me what time to be home when I go out; let me go out any evening I want; take an interest in where I am going and who I am with; and find out about my misbehaviour.

Response Categories:

- never
- rarely
- sometimes
- often
- always
- refusal/not stated

Age Group Examined: 12- to 15-year-olds

Continuous Score Range (0 to 20):

- medium-low (0 to 14)
- high (15 to 20)

High score indicates a high level of parental monitoring.

School Engagement. A compound variable derived by CPHI based on the degree of importance a youth places on the following items: getting good grades; making friends; participating in extra-curricular activities; getting to class on time; learning new things; expressing one's opinion in class; and getting involved in the student council or other similar groups.

Response Categories:

- very important
- somewhat important
- not very important
- not important at all
- refusal/not stated

Age Group Examined: 12- to 15-year-olds

Continuous Score Range (0 to 21):

- medium-low (0 to 13)
- high (14 to 21)

High score indicates a high level of school engagement.

Community Engagement (Volunteerism). A compound variable derived by CPHI based on the youth who indicated that in the past 12 months they engaged in one or more of the following activities without pay: supporting a cause (food bank, environmental group); fund-raising (charity, school trips); helping in one's community (hospital volunteering, work in a community organization); helping neighbours or relatives (cutting grass, babysitting, shovelling snow for a neighbour); and doing another organized volunteer activity.

Response Categories:

- yes
- no
- refusal/not stated

Age Group Examined: 12- to 17-year-olds

Categorical Score:

- volunteer
- non-volunteer

Peer Connectedness. Derived score based on the following items ("Friends" score): I have many friends; I get along easily with others my age; others my age want me to be their friend; and most others my age like me.

Response Categories:

- false
- mostly false
- sometimes true/sometimes false
- mostly true
- true
- refusal/not stated

Age Group Examined: 12- to 17-year-olds

Continuous Score Range (0 to 16):

- medium-low (0 to 11)
- high (12 to 16)

High score indicates a high level of peer connectedness.

Positive Physical Image. Variable based on participants' response to the question "I like the way I look."

Response Categories:
- false
- mostly false
- sometimes false/sometimes true
- mostly true
- true
- refusal/not stated

Age Group Examined: 12- to 17-year-olds

Categorical Score:
- mostly true or true
- mostly false, false or sometimes false/true

Weight Maintenance. Variable based on participants' response to the question "Which of the following are you trying to do?"

Response Categories:
- trying to lose weight
- trying to gain weight
- trying to stay the same weight
- not trying to do anything about their weight
- refusal/not stated

Age Group Examined: 12- to 17-year-olds

Categorical Score:
- trying to lose weight
- trying to gain weight or stay the same weight
- not trying to do anything about their weight

Participation in Unorganized Sports. Variable based on participants' response to the question of how often during the past 12 months they played sports or did physical activities without a coach or instructor (biking, skateboarding, etc.)

Response Categories:
- never
- less than once a week
- one to three times a week
- four or more times a week
- refusal/not stated

Age Group Examined: 12- to 15-year-olds

Categorical Score:
- four or more times a week
- less than four times a week

Body Mass Index (BMI). For children (2 to 11 years), derived variable based on parents' report of their child's height (in metres and centimetres, without shoes) and weight (in kilograms and grams). For youth (12 to 17 years), derived variable based on self-reported height and weight.

Response Categories:
- height
- weight
- not applicable
- don't know
- refusal
- not stated

Age Group Examined: 8- to 17-year-olds

Analyses using self-reported BMI data from both Cycles 4 and 5 of the NLSCY were conducted. Cycle 4 BMI data were used for the purposes of cross-tabulations with parental nurturance, parental monitoring, school engagement, community engagement and peer connectedness. Cycle 4 BMI data were also used for cross-tabulations with youths' responses to the questions on weight maintenance and physical appearance. In addition, external analyses of Cycle 5 self-reported overweight are included in the report.

2001 Census

Self-reported BMI (CCHS Cycle 2.1, 2003) was merged with the following three dimensions from the 2001 Census (population 18 to 64 years, excluding institutional residents, who worked some time since January 1, 2000, at a usual workplace address):

Dimension 1: Dissemination Area
Refers to a small area comprising one or more adjacent blocks with a population of 400 to 700 people.

Dimension 2: Mode of Transportation
Refers to the principal means of transport used to travel between a person's place of residence and workplace. These modes of transportation include:

- Passenger or driver of motor vehicle (car, truck, van, motorcycle, taxi);
- Public transit;
- Active commuter roll-up (walk to work and bicycle);
- Walk to work; and
- Bicycle.

Dimension 3: Urban/Rural Status by Census Metropolitan Area (CMA) and Census Agglomeration (CA)

- **Urban Core.** "A large urban area around which a CMA or a CA is delineated. The urban core must have a population (based on the previous census) of at least 100,000 persons in the case of a CMA, or between 10,000 and 99,999 persons in the case of a CA."[57] (p. 264)
- **Urban Fringe.** "All small urban areas (with less than 10,000 population) within a CMA or CA, which are not contiguous with the **urban core** of the CMA or CA."[57] (p. 264)
- **Secondary Urban Core.** "The urban core of a CA that has been merged with an adjacent CMA or larger CA."[57] (p. 264)
- **Rural Fringe.** "All territory within a CMA or CA not classified as an urban core or an urban fringe."[57] (p. 264)
- **CMA/CA.** "Formed by one or more adjacent municipalities centered on a large urban area (known as the urban core). The census population count of the urban core is at least 10,000 to form a CA and at least 100,000 to form a CMA. To be included in the CMA or CA, other adjacent municipalities must have a high degree of integration with the central urban area, as measured by commuting flows derived from census place of work data."[57] (p. 229)

Statistical Analyses

Descriptive analyses were used to estimate the prevalence of various health indicators in the CCHS. Bootstrapping techniques were used by Statistics Canada in its analysis of the variables presented in custom tabulations.

Descriptive analyses were used with the NLSCY to estimate the proportion of youth who responded to the questions on positive physical image, weight maintenance and participation in unorganized sports among youth aged 12 to 17 years, in addition to cross-tabulations with the BMI and five positive assets (parental nurturance, parental monitoring, peer connectedness, school engagement and community engagement). For the purposes of this report, due to small sample size for the low category (and hence high variability), the medium and low categories for the NLSCY-specific variables have been combined. The bootstrap weights method for variance estimation was used to account for the complexity of the NLSCY (that is, complex sample design, non-response adjustment and post-stratification). NLSCY Cycle 4 cross-sectional weights were used. Only those who responded to the relevant questions were included in the analyses. For those analyses using NLSCY Cycle 5, cross-sectional design weights for 2002 were not available; these estimates used cross-sectional weights for 2000 linked at the individual level. Adjustments were then made for bias due to attrition from 2000 to 2002.

Analyses in this report were considered in comparison to Statistics Canada's quality level guidelines:

Quality Level	Requirements
Acceptable	n is equal to or greater than 30, and coefficient of variation is between 0 and 16.5%.
Marginal	n is equal to or greater than 30, and coefficient of variation is between 16.6% and 33.3%. **Warning: High level of error associated with the estimate.**
Unacceptable	n is less than 30, or coefficient of variation is greater than 33.3%. **The estimate should not be released.**

CPHI Public Opinion Survey on Healthy Body Weights

In March 2005, CPHI funded a public opinion survey to look at the public's attitudes and perceptions of health and healthy weights in Canada. The public opinion and marketing research firm POLLARA surveyed a nationally representative sample of 1,515 adult Canadians 18 years of age and older. All data were weighted to correct proportions using Statistics Canada targets for age, gender and population distribution. In addition, an oversample of 301 interviews was conducted in the territories. The unweighted interview sample from the territories was analyzed separately to identify any differences between respondents in this region and the rest of the country. A total overall sample of 1,816 ensured accuracy to within ± 2.3%, 19 times out of 20.

The weighted population distribution surveyed across Canada was as follows: 13% in British Columbia and the territories; 10% in Alberta; 7% in Saskatchewan and Manitoba; 38% in Ontario; 24% in Quebec; and 8% in the Atlantic provinces.

Using questions with open-ended or categorical responses or scales (1 to 7, where 1 is not at all important and 7 is very important), respondents were asked their opinion on the following issues:

- significant health issues in Canada;
- social and personal factors causing obesity;
- social and personal factors preventing obesity;
- importance of reducing obesity;
- factors important to the health of their community;
- support for initiatives dealing with the issue of obesity;
- perception of obesity as a problem among children and adults;
- factors contributing to good health; and
- factors contributing to poor health.

References

1 M. Shields, *Nutrition: Findings From the Canadian Community Health Survey. Issue No. 1. Measured Obesity: Overweight Canadian Children and Adolescents* (Ottawa, Ont.: Statistics Canada, 2005), catalogue no. 82-620-MWE2005001.

2 M. Tjepkema, *Nutrition: Findings From the Canadian Community Health Survey. Issue No. 1 Measured Obesity: Adult Obesity in Canada* (Ottawa, Ont.: Statistics Canada, 2005), catalogue no. 82-620-MWE2005001.

3 National Institutes of Health, *Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults* (Bethesda, MD: NIH, 1998).

4 World Health Organization, *Diet, Nutrition and the Prevention of Chronic Diseases* (Geneva, Switzerland: WHO, 2003).

5 J. Gilmore, "Body Mass Index and Health," *Health Reports* 11, 1 (1999): pp. 31–46, catalogue no. 82-003.

6 S. Wannamethee, "Overweight and Obesity and Weight Change in Middle Aged Men: Impact on Cardiovascular Disease and Diabetes," *Journal of Epidemiology and Community Health* 59 (2005): pp. 134–139.

7 B. A. Swinburn et al., "Diet, Nutrition and the Prevention of Excess Weight Gain and Obesity," *Public Health Nutrition* 7, 1A (2004): pp. 123–146.

8 K. Wilkins, "Incident Arthritis in Relation to Excess Weight," *Health Reports* 15, 1 (2004): pp. 39–49, catalogue no. 82-003.

9 Y. Mao et al., "Physical Inactivity, Energy Intake, Obesity and the Risk of Rectal Cancer in Canada," *International Journal of Cancer* 105, 6 (2003): pp. 831–837.

10 P. T. Katzmarzyk and C. I. Ardern, "Overweight and Obesity Mortality Trends in Canada, 1985–2000," *Canadian Journal of Public Health* 95, 1 (2004): pp. 16–20.

11 P. T. Katzmarzyk and I. Janssen, "The Economic Costs Associated With Physical Inactivity and Obesity in Canada: An Update," *Canadian Journal of Applied Physiology* 29, 1 (2004): pp. 90–115.

12 K. Clement and P. Ferre, "Genetics and the Pathophysiology of Obesity," *Pediatric Research* 53, 5 (2003): pp. 721–725.

13 L. Perusse and C. Bouchard, "Gene-Diet Interactions in Obesity," *American Journal of Clinical Nutrition* 72, 5 Supplement (2000): pp. 1285S–1290S.

14 P. Froguel and P. Boutin, "Genetics of Pathways Regulating Body Weight in the Development of Obesity in Humans," *Experimental Biology and Medicine* 226, 11 (2001): pp. 991–996.

15 Federal/Provincial/Territorial Advisory Committee on Population Health, *Toward a Healthy Future—Second Report on the Health of Canadians* (Ottawa, Ont.: Health Canada, 1999), [online], cited February 7, 2004, from <www.phac-aspc.gc.ca/ph-sp/phdd/report/toward/report.html>.

16 Health Canada, *Healthy Development of Children and Youth: The Role of the Determinants of Health* (Ottawa, Ont.: Health Canada, 1999), [online], cited December 7, 2004, from <www.phac-aspc.gc.ca/dca-dea/pdfa-zenglish.html#H>, catalogue no. H39-501/1999E.

17 Public Health Agency of Canada, "What Determines Health?," [online], cited February 21, 2005, from <www.phac-aspc.gc.ca/ph-sp/phdd/determinants/determinants.html#unhealthy>.

18 R. Labonte, *How Our Programs Affect Population Health Determinants: A Workbook for Better Planning and Accountability* (Regina, Sask.: Health Canada and Saskatchewan Population Health and Evaluation Research Unit, 2003).

19 J. Wardle and J. Griffith, "Socioeconomic Status and Weight Control Practices in British Adults," *Journal of Epidemiology and Community Health* 55, 3 (2001): pp. 185–190.

20 S. Bryan and P. Walsh, "Physical Activity and Obesity in Canadian Women," *BioMed Central* (2004): pp. 1–10.

21 Dietitians of Canada, *The Cost of Eating in BC: The Challenge of Feeding a Family on a Low Income* (Vancouver, B.C.: Dietitians of Canada, BC Region, 2002).

22 C. E. Pérez, "Fruit and Vegetable Consumption," *Health Reports* 13, 3 (2003): pp. 23–31, catalogue no. 82-003.

23 P. A. Spanier and K. R. Allison, "General Social Support and Physical Activity: An Analysis of the Ontario Health Survey," *Canadian Journal of Public Health* 92, 3 (2001): pp. 210–213.

24 M. A. Okun et al., "Social Support and Social Norms: Do Both Contribute to Predicting Leisure-Time Exercise?," *American Journal of Health Behavior* 27, 5 (2003): pp. 493–507.

25 C. L. Addy et al., "Associations of Perceived Social and Physical Environmental Supports With Physical Activity and Walking Behavior," *American Journal of Public Health* 94, 3 (2004): pp. 440–443.

26 G. A. King et al., "Relationship of Leisure-Time Physical Activity and Occupational Activity to the Prevalence of Obesity," *International Journal of Obesity and Related Metabolic Disorders* 25, 5 (2001): pp. 606–612.

27 L. Di Lorenzo et al., "Effect of Shift Work on Body Mass Index: Results of a Study Performed in 319 Glucose-Tolerant Men Working in a Southern Italian Industry," *International Journal of Obesity and Related Metabolic Disorders* 27, 11 (2003): pp. 1353–1358.

28 J. Laitinen et al., "Unemployment and Obesity Among Young Adults in a Northern Finland 1966 Birth Cohort," *International Journal of Obesity and Related Metabolic Disorders* 26, 110 (2002): pp. 1329–1338.

29 B. Galobardes, A. Morabia and M. S. Bernstein, "The Differential Effect of Education and Occupation on Body Mass and Overweight in a Sample of Working People of the General Population," *Annals of Epidemiology* 10, 8 (2000): pp. 532–537.

30 M. S. Kramer and R. Kakuma, "Optimal Duration of Exclusive Breastfeeding," *Cochrane Database of Systematic Reviews*, 1 (2002): p. CD003517.

31 S. Arenz et al., "Breast-Feeding and Childhood Obesity—A Systematic Review," *International Journal of Obesity and Related Metabolic Disorders* 28, 10 (2004): pp. 1247–1256.

32 J. Baird et al., "Being Big or Growing Fast: Systematic Review of Size and Growth in Infancy and Later Obesity," *British Medical Journal* 331, 7522 (2005): pp. 1–6.

33 A. Ellaway, S. Macintyre and X. Bonnefoy, "Graffiti, Greenery, and Obesity in Adults: Secondary Analysis of European Cross Sectional Survey," *British Medical Journal* 331, 7517 (2005): pp. 611–612.

34 M. S. Faith et al., "Weight Criticism During Physical Activity, Coping Skills, and Reported Physical Activity in Children," *Pediatrics* 110, 2 Part 1 (2002): p. e23.

35 S. M. Grundy et al., "Definition of Metabolic Syndrome: Report of the National Heart, Lung, and Blood Institute/American Heart Association Conference on Scientific Issues Related to Definition," *Circulation* 109, 3 (2004): pp. 433–438.

36 K. Trakas, K. Lawrence and N. H. Shear, "Utilization of Health Care Resources by Obese Canadians," *Canadian Medical Association Journal* 160, 10 (1999): pp. 1457–1462.

37 R. Puhl and K. D. Brownell, "Bias, Discrimination, and Obesity," *Obesity Research* 9, 12 (2001): pp. 788–805.

38 G. D. Foster et al., "Primary Care Physicians' Attitudes About Obesity and Its Treatment," *Obesity Research* 11, 10 (2003): pp. 1168–1177.

39 M. B. Schwartz et al., "Weight Bias Among Health Professionals Specializing in Obesity," *Obesity Research* 11, 9 (2003): pp. 1033–1039.

40 K. R. Fontaine et al., "Body Weight and Health Care Among Women in the General Population," *Archives of Family Medicine* 7, 4 (1998): pp. 381–384.

41 Canadian Institute for Health Information, *Improving the Health of Canadians* (Ottawa, Ont.: CIHI, 2004).

42 Canadian Institute for Health Information, *Improving the Health of Young Canadians* (Ottawa, Ont.: CIHI, 2005).

43 J. Chen and W. J. Millar, "Starting and Sustaining Physical Activity," *Health Reports* 12, 4 (2001): pp. 33–43, catalogue no. 82-003.

44 First Nations Centre—National Aboriginal Health Organization, *Preliminary Findings of the First Nations Regional Longitudinal Health Survey (RHS) 2002–03* (Ottawa, Ont.: NAHO, 2005).

45 M. S. Tremblay et al., "Obesity, Overweight and Ethnicity," *Health Reports* 16, 4 (2005): pp. 23–34, catalogue no. 82-003.

46 J. T. McDonald and S. Kennedy, "Is Migration to Canada Associated With Unhealthy Weight Gain? Overweight and Obesity Among Canada's Immigrants," *Social Science & Medicine* 61 (2005): pp. 2469–2481.

47 H. Frumkin, "Urban Sprawl and Public Health," *Public Health Reports* 117, 3 (2002): pp. 201–217, catalogue no. 82-003.

48 R. Ewing, R. Pendall and D. Chen, *Measuring Sprawl and Its Impact* (Washington, D.C.: Smart Growth America,, 2002), cited October 22, 2005, from <www.smartgrowthamerica.org/sprawlindex/sprawlreport.html>.

49 R. Ewing et al., "Relationship Between Urban Sprawl and Physical Activity, Obesity, and Morbidity," *American Journal of Health Promotion* 18, 1 (2003): pp. 47–57.

50 R. Cervero and M. Duncan, "Walking, Bicycling, and Urban Landscapes: Evidence From the San Francisco Bay Area," *American Journal of Public Health* 93, 9 (2003): pp. 1478–1483.

51 R. Ewing, "Is Los Angeles-Style Sprawl Desirable?," *Journal of the American Planning Association* 63, 1 (1997): pp. 107–137.

52 S. L. Handy et al., "How the Built Environment Affects Physical Activity: Views From Urban Planning," *American Journal of Preventive Medicine* 23, 2 Supplement (2002): pp. 64–73.

53 J. F. Sallis et al., "Active Transportation and Physical Activity: Opportunities for Collaboration on Transportation and Public Health Research," *Transportation Research* 38 (2004): pp. 249–268.

54 Go for Green, "Active Transportation Roundtable," presented at the Active Transportation Roundtable, Wakefield, Que., on April 9 and 10, 2003.

55 L. D. Frank, "Land Use and Transportation Interaction: Implications on the Public Health and Quality of Life," *Journal of Planning Education and Research* 20 (2000): pp. 6–22.

56 Health Canada, *Canadian Guidelines for Weight Classification in Adults* (Ottawa, Ont.: Health Canada, 2000), adapted from World Health Organization, *Obesity: Preventing and Managing the Global Epidemic: Report of a WHO Consultation on Obesity* (Geneva, Switzerland: WHO, 2000).

57 Statistics Canada, *2001 Census Dictionary* (Ottawa, Ont.: Statistics Canada, 2002), catalogue no. 92-378-XIE.

58 J. Schilling and L. S. Linton, "The Public Health Roots of Zoning in Search of Active Living's Legal Genealogy," *American Journal of Preventive Medicine* 28, 2 Supplement 2 (2005): pp. 96–104.

59 J. Pucher and L. Dijkstra, "Promoting Safe Walking and Cycling to Improve Public Health: Lessons From the Netherlands and Germany," *American Journal of Public Health* 93, 9 (2003): pp. 1509–1516.

60 L. D. Frank et al., "Linking Objectively Measured Physical Activity With Objectively Measured Urban Form Findings From SMARTRAQ," *American Journal of Preventive Medicine* 28, 2 Supplement 2 (2005): pp. 117–125.

61 H. Badland and G. Schofield, "Transport, Urban Design, and Physical Activity: An Evidence-Based Update," *Transportation Research Part D* 10 (2005): pp. 177–196.

62 S. Handy, "Understanding the Link Between Urban Form and Non-Work Travel Behavior," *Journal of Planning and Education Research* 15 (1996): pp. 183–198.

63 D. Berrigan and R. P. Troiano, "The Association Between Urban Form and Physical Activity in U.S. Adults," *American Journal of Preventive Medicine* 23, 2 Supplement (2002): pp. 74–79.

64 Heart and Stroke Foundation, "Has the Suburban Dream Gone Sour?," [online], cited May 30, 2005, from <ww2.heartandstroke.ca/Page.asp?PageID=1251&RecordID=3916&CategoryID=21&Src=pei&from=search>.

65 J. Kenworthy and F. Laube, The Millennium Cities Database for Sustainable Transport [CD-ROM database] (Brussels, Belgium: International Union of Public Transport; Perth Australia: Institute for Sustainability and Technology Policy, Murdoch University) as cited in C. W. Schmidt, "Sprawl: The New Manifest Destiny?," *Environmental Health Perspectives* 112, 11 (2004): pp. A620–627.

66 R. Bray, C. Vakil and D. Elliott, *Report on Public Health and Urban Sprawl in Ontario* (Toronto, Ont.: Environmental Health Committee, Ontario College of Family Physicians, 2005).

67 L. D. Frank, M. A. Andresen and T. L. Schmid, "Obesity Relationships With Community Design, Physical Activity, and Time Spent in Cars," *American Journal of Preventive Medicine* 27, 2 (2004): pp. 87–96.

68 Go For Green, "Commuter Challenge 2005—Active and Sustainable Modes of Transportation," [online], cited November 3, 2005, from <www.commuterchallenge.ca/english/modes.aro>.

69 G. O. Cunningham and Y. L. Michael, "Concepts Guiding the Study of the Impact of the Built Environment on Physical Activity for Older Adults: A Review of the Literature," *American Journal of Health Promotion* 18, 6 (2004): pp. 435–443.

70 Go For Green, *1998 National Survey on Active Transportation—Summary Report* (Ottawa, Ont.: Health Canada, 1998).

71 C. L. Craig et al., *Increasing Physical Activity: Building a Supportive Recreation and Sport System* (Ottawa, Ont.: Canadian Fitness and Lifestyle Research Institute, 2001).

72 B. E. Molnar et al., "Unsafe to Play? Neighborhood Disorder and Lack of Safety Predict Reduced Physical Activity Among Urban Children and Adolescents," *American Journal of Health Promotion* 18, 5 (2004): pp. 378–386.

73 C. L. Craig and C. Cameron, *Increasing Physical Activity: Assessing Trends From 1998–2003* (Ottawa, Ont.: Canadian Fitness and Lifestyle Research Institute, 2004).

74 A. Romero, "Low-Income Neighborhood Barriers and Resources for Adolescents Physical Activity," *The Journal of Adolescent Health* 36 (2005): pp. 253–259.

75 R. M. Merrill et al., "Climate Conditions and Physical Activity in the United States," *American Journal of Health Behavior* 29, 4 (2005): pp. 371–381.

76 C. E. Matthews et al., "Seasonal Variation in Household, Occupational, and Leisure Time Physical Activity: Longitudinal Analyses From the Seasonal Variation of Blood Cholesterol Study," *American Journal of Epidemiology* 153, 2 (2001): pp. 172–183.

77 J. M. Pivarnik, M. J. Reeves and A. P. Rafferty, "Seasonal Variation in Adult Leisure-Time Physical Activity," *Medicine & Science in Sports & Exercise* 35, 6 (2003): pp. 1004–1008.

78 T. L. Visscher and J. C. Seidell, "Time Trends (1993–1997) and Seasonal Variation in Body Mass Index and Waist Circumference in the Netherlands," *International Journal of Obesity* 28, 10 (2004): pp. 1309–1316.

79 N. Humpel et al., "Associations of Location and Perceived Environmental Attributes With Walking in Neighborhoods," *American Journal of Health Promotion* 18, 3 (2004): pp. 239–242.

80 C. M. Hoehner et al., "Perceived and Objective Environmental Measures and Physical Activity Among Urban Adults," *American Journal of Preventive Medicine* 28, 2 Supplement 2 (2005): pp. 105–116.

81 B. Giles-Corti et al., "Increasing Walking: How Important Is Distance to, Attractiveness, and Size of Public Open Space?," *American Journal of Preventive Medicine* 28, 2 Supplement 2 (2005): pp. 169–176.

82 R. C. Brownson et al., "Environmental and Policy Determinants of Physical Activity in the United States," *American Journal of Public Health* 91, 12 (2001): pp. 1995–2003.

83 Active Healthy Kids Canada, *Dropping the Ball: Canada's Report Card on Physical Activity for Children and Youth* (Toronto, Ont.: Active Healthy Kids Canada, 2005).

84 Saskatoon in motion, *Saskatoon in motion—Five Years in the Making, 2000–2005* (Saskatoon, Sask.: Saskatoon Regional Health Authority, 2005).

85 Saskatchewan in motion, "Join the Movement," [online], cited November 3, 2005, from <www.saskatchewaninmotion.ca>.

86 J. D. Douketis et al., "Periodic Health Examination, 1999 Update: 1. Detection, Prevention and Treatment of Obesity. Canadian Task Force on Preventive Health Care," *Canadian Medical Association Journal* 160, 4 (1999): pp. 513–525.

87 P. Edwards, "No Country Mouse: Thirty Years of Effective Marketing and Health Communications," *Canadian Journal of Public Health* 95 Supplement 2 (2004): pp. S6–13.

88 A. Bauman et al., "ParticipACTION: This Mouse Roared, But Did It Get the Cheese?," *Canadian Journal of Public Health* 95 Supplement 2 (2004): pp. S14–19.

89 S. J. Finlay, "Physical Acitivity Promotion Through the Mass Media: Inception, Production, Transmission and Consumption," *Preventive Medicine* 40 (2005): pp. 121–130.

90 D. J. Hennrikus and R. W. Jeffery, "Worksite Intervention for Weight Control: A Review of the Literature," *American Journal of Health Promotion* 10, 6 (1996): pp. 471–498.

91 G. Sorensen et al., "Increasing Fruit and Vegetable Consumption Through Worksites and Families in the Treatwell 5-a-Day Study," *American Journal of Public Health* 89, 1 (1999): pp. 54–60.

92 R. K. Dishman et al., "Worksite Physical Activity Interventions," *American Journal of Preventive Medicine* 15, 4 (1998): pp. 344–361.

93 M. Holdsworth, N. T. Raymond and C. Haslam, "Does the Heartbeat Award Scheme in England Result in Change in Dietary Behaviour in the Workplace?," *Health Promotion International* 19, 2 (2004): pp. 197–204.

94 House of Commons Health Committee, *Obesity* (United Kingdom House of Commons, 2004), [online], cited October 28, 2005, from <www.parliament.uk/parliamentary_committees/health_committee.cfm>.

95 K. I. Proper et al., "The Effectiveness of Worksite Physical Activity Programs on Physical Activity, Physical Fitness, and Health," *Clinical Journal of Sport Medicine* 13, 2 (2003): pp. 106–117.

96 Guide to Community Preventive Services, "Worksite Programs Combining Nutrition and Physical Activity Are Recommended to Control Overweight or Obesity," [online], cited August 15, 2005, from <www.thecommunityguide.org/obese/obese-int-worksite.pdf>.

97 K. I. Proper et al., "Effect of Individual Counseling on Physical Activity Fitness and Health: A Randomized Controlled Trial in a Workplace Setting," *American Journal of Preventive Medicine* 24, 3 (2003): pp. 218–226.

98 C. Cameron and C. L. Craig, *Increasing Physical Activity: Building Active Workplaces* (Ottawa, Ont.: Canadian Fitness and Lifestyle Research Institute, 2004).

99 Social Development Canada, "Organizational Profiles: Husky Injection Molding Systems," [online], cited July 18, 2005, from <www.sdc.gc.ca/asp/gateway.asp?hr=/en/lp/spila/wlb/ell/08husky_injection_molding_systems.shtml&hs=wnc>.

100 C. Wanjek, *Food at Work: Workplace Solutions for Malnutrition, Obesity and Chronic Diseases* (Geneva, Switzerland: International Labour Office, 2005).

101 N. Mutrie et al., "'Walk in to Work Out': A Randomised Controlled Trial of a Self Help Intervention to Promote Active Commuting," *Journal of Epidemiology and Community Health* 56, 6 (2002): pp. 407–412.

102 K. Bachmann, *Health Promotion Programs at Work: A Frivolous Cost or a Sound Investment?* (The Conference Board of Canada, 2002), [online], cited November 2, 2004, from <www.conferenceboard.ca>.

103 K. M. Emmons et al., "The Working Healthy Project: A Worksite Health-Promotion Trial Targeting Physical Activity, Diet, and Smoking," *Journal of Occupational and Environmental Medicine* 41, 7 (1999): pp. 545–555.

104 A. L. Carrel et al., "Improvement of Fitness, Body Composition, and Insulin Sensitivity in Overweight Children in a School-Based Exercise Program: A Randomized, Controlled Study," *Archives of Pediatrics & Adolescent Medicine* 159, 10 (2005): pp. 963–968.

105 M. Story, "School-Based Approaches for Preventing and Treating Obesity," *International Journal of Obesity and Related Metabolic Disorders* 23 Supplement 2 (1999): pp. S43–51.

106 K. Raine, *Overweight and Obesity in Canada* (Ottawa, Ont.: Canadian Institute for Health Information, 2004).

107 Committee on the Prevention of Obesity in Children and Youth, *Preventing Childhood Obesity: Health in the Balance* (Washington, DC: The National Academies Press, 2005).

108 Centers for Disease Control and Prevention, "Guidelines for School Health Programs to Promote Lifelong Healthy Eating," *Morbidity and Mortality Weekly Report* 45, RR-9 (1996): pp. 1–33, [online], cited April 8, 2005, from <www.cdc.gov/mmwr/preview/mmwrhtml/00042446.htm>.

109 P. Messier, G. Cloutier and S. Rowe, *Fuel to Xcell: Healthy Vending Machine Program* (Ottawa, Ont.: Ottawa Public Health, 2004).

110 M. Kubik et al., "The Association of the School Food Environment With Dietary Behaviours of Young Adolescents," *American Journal of Public Health* 93, 7 (2003): pp. 1168–1173.

111 K. W. Cullen and I. Zakeri, "Fruits, Vegetables, Milk, and Sweetened Beverages Consumption and Access to à la Carte/Snack Bar Meals at School," *American Journal of Public Health* 94, 3 (2004): pp. 463–467.

112 S. A. French et al., "An Environmental Intervention to Promote Lower-Fat Food Choices in Secondary Schools: Outcomes of the TACOS Study," *American Journal of Public Health* 94, 9 (2004): pp. 1507–1512.

113 J. James et al., "Preventing Childhood Obesity by Reducing Consumption of Carbonated Drinks: Cluster Randomised Controlled Trial," *British Medical Journal* 328, 7450 (2004): p. 1237.

114 S. A. French, P. J. Hannan and M. Story, "School Soft Drink Intervention Study," *British Medical Journal* 329, 7462 (2004): pp. E315–316.

115 "Labour on the Side of Parents," (speech given by UK Labour Party Secretary of State Ruth Kelly) [online], cited September 29, 2005, from <www.labour.org/uk/index.php?id=news&ux_news_id=labouronthesideofparents>.

116 H. Thomas et al., *Effectiveness of Physical Activity Enhancement and Obesity Prevention Programs in Children and Youth* (Ottawa, Ont.: Health Canada, 2004).

117 Task Force on Community Preventative Services, "Recommendations to Increase Physical Activity in Communities," *American Journal of Preventive Medicine* 22, 4 Supplement (2002): pp. 67–72.

118 Health Canada, *Canada's Physical Activity Guide for Youth* (Ottawa, Ont.: Minister of Public Works and Government Services Canada, 2002), [online], cited December 21, 2005, from <www.phac-aspc.gc.ca/pau-uap/paguide/child_youth/pdf/guide_y_en.pdf>.

119 Statistics Canada, *Leisure-Time Physical Activity, by Age Group and Sex, Household Population Aged 12 and Over, Canada, 2003* (Statistics Canada) (Ottawa, Ont.) (CANSIM table number 1050233), 2003, cited October 7, 2005, from <www.statcan.ca/english/freepub/82-221-XIE/2005001/tables/pdf/2167_03.pdf>.

120 Canadian Association for Health, Physical Education, Recreation and Dance, "All You Need to Know About QDPE," [online], cited February 2005, from <www.cahperd.ca/eng/physicaleducation/about_qdpe.cfm>.

121 C. Cameron et al., *Increasing Physical Activity: Encouraging Physical Activity Through School* (Ottawa, Ont.: Canadian Fitness and Lifestyle Research Institute, 2003).

122 Ontario Ministry of Education, *Healthy Schools Condition Healthy Minds* (media release) (Toronto, Ont.: Government of Ontario, October 6, 2005).

123 D. Howell, "Some Schools Finding It Hard to Fit 30 Minutes of PA into Schedule," *The Edmonton Journal*, October 15, 2005.

124 M. L. Fitzgibbon et al., "Two-Year Follow-up Results for Hip-Hop to Health Jr.: A Randomized Controlled Trial for Overweight Prevention in Preschool Minority Children," *Journal of Pediatrics* 146, 5 (2005): pp. 618–625.

125 A. Datar and R. Sturm, "Physical Education in Elementary School and Body Mass Index: Evidence From the Early Childhood Longitudinal Study," *American Journal of Public Health* 94, 9 (2004): pp. 1501–1506.

126 National Institute for Health Care Management, *Obesity in Young Children: Impact and Intervention* (Washington, DC: National Institute for Health Care Management, 2004).

127 D. D. Allensworth and L. J. Kolbe, "The Comprehensive School Health Program: Exploring an Expanded Concept," *Journal of School Health* 57, 10 (1987): pp. 409–412.

128 Centers for Disease Control and Prevention, "Healthy Youth! Coordinated School Programs," [online], cited May 27, 2005, from <www.cdc.gov/HealthyYouth/CSHP/>.

129 Annapolis Valley Health Promoting Schools Project, *Making the Healthy Choice the Easy Choice* (Port Williams, N.S.: Port Williams Nutrition for Health Association, 2004).

130 P. J. Veugelers and A. L. Fitzgerald, "Effectiveness of School Programs in Preventing Childhood Obesity: A Multilevel Comparison," *American Journal of Public Health* 95, 3 (2005): pp. 432–435.

131 H. McKay, *Action Schools! BC—Phase I (Pilot) Evaluation Report and Recommendations* (Vancouver, B.C.: Action Schools BC, 2004), [online], cited April 6, 2005, from <www.actionschoolsbc.ca>.

132 S. L. Gortmaker et al., "Reducing Obesity via a School-Based Interdisciplinary Intervention Among Youth: Planet Health," *Archives of Pediatrics & Adolescent Medicine* 153, 4 (1999): pp. 409–418.

133 S. L. Gortmaker et al., "Impact of a School-Based Interdisciplinary Intervention on Diet and Physical Activity Among Urban Primary School Children: Eat Well and Keep Moving," *Archives of Pediatrics & Adolescent Medicine* 153, 9 (1999): pp. 975–983.

134 P. Sahota et al., "Randomised Controlled Trial of Primary School Based Intervention to Reduce Risk Factors for Obesity," *British Medical Journal* 323, 7320 (2001): pp. 1029–1032.

135 R. V. Luepker et al., "Outcomes of a Field Trial to Improve Children's Dietary Patterns and Physical Activity. The Child and Adolescent Trial for Cardiovascular Health. Catch Collaborative Group," *Journal of the American Medical Association* 275, 10 (1996): pp. 768–776.

136 N. Edwards, J. Mill and A. R. Kothari, "Multiple Intervention Research Programs in Community Health," *Canadian Journal of Nursing Research* 36, 1 (2004): pp. 40–54.

137 G. Paradis et al., "Impact of a Diabetes Prevention Program on Body Size, Physical Activity, and Diet Among Kanien'keha:Ka (Mohawk) Children 6 to 11 Years Old: 8-Year Results From the Kahnawake Schools Diabetes Prevention Project," *Pediatrics* 115, 2 (2005): pp. 333–339.

138 M. Dobbins et al., *The Effectiveness of School-Based Interventions in Promoting Physical Activity and Fitness Among Children and Youth: A Systematic Review* (Dundas, Ont.: Ministry of Health and Long Term Care, Ontario, 2001).

139 S. Micucci, H. Thomas and J. Vohra, *The Effectiveness of School-Based Strategies for the Primary Prevention of Obesity and for Promoting Physical Activity and/or Nutrition, the Major Modifiable Risk Factors for Type 2 Diabetes: A Review of Reviews* (Dundas, Ont.: Public Health Research, Education and Development Program, 2002).

140 Statistics Canada, *Measured Child Body Mass Index (BMI), by Age Group and Sex, Household Population Aged 2 to 17 Excluding Pregnant Females, Canada* (Statistics Canada) (Ottawa, Ont.) (CANSIM table 105–2002), 2004, cited November 1, 2005, from <www.statcan.ca/english/research/82-620-MIE/2005001/tables/t003_en.pdf>.

141 G. Carrière, "Parent and Child Factors Associated With Youth Obesity," *Health Reports* 14 Supplement (2003): pp. 29–39, catalogue no. 82-003.

142 V. A. Palda, J. M. Guise and C. N. Wathen, "Interventions to Promote Breast-Feeding: Applying the Evidence in Clinical Practice," *Canadian Medical Association Journal* 170, 6 (2004): pp. 976–978.

143 L. L. Birch and J. O. Fisher, "Mothers' Child-Feeding Practices Influence Daughters' Eating and Weight," *American Journal of Clinical Nutrition* 71, 5 (2000): pp. 1054–1061.

144 D. Spruijt-Metz et al., "Relation Between Mothers' Child-Feeding Practices and Children's Adiposity," *American Journal of Clinical Nutrition* 75, 3 (2002): pp. 581–586.

145 M. Y. Hood et al., "Parental Eating Attitudes and the Development of Obesity in Children. The Framingham Children's Study," *International Journal of Obesity* 24, 10 (2000): pp. 1319–1325.

146 T. N. Robinson et al., "Is Parental Control Over Children's Eating Associated With Childhood Obesity? Results From a Population-Based Sample of Third Graders," *Obesity Research* 9, 5 (2001): pp. 306–312.

147 Statistics Canada, *Dietary Practices, by Age Group and Sex, Household Population Aged 12 and Over, Canada, 2003* (Canadian Community Health Survey, Cycle 2.1) (Ottawa, Ont.) (CANSIM table 105-0249), 2003, cited October 6, 2005, from <www.statcan.ca/english/freepub/82-221-XIE/2005001/tables/pdf/2187_03.pdf>.

148 P. J. Veugelers and A. L. Fitzgerald, "Prevalence of and Risk Factors for Childhood Overweight and Obesity," *Canadian Medical Association Journal* 173, 6 (2005): pp. 607–613.

149 E. Vandewater, "Linking Obesity and Activity Level With Children's Television and Video Game Use," *Journal of Adolescence* 27 (2003): pp. 71–85.

150 World Health Organization, *Young People's Health in Context—Health Behaviour in School-Aged Children (HBSC) Study: International Report From the 2001/2002 Survey—Health Policy for Children and Adolescents*, eds. C. Currie et al. (Copenhagen, Denmark: WHO, 2004).

151 T. N. Robinson, "Television Viewing and Childhood Obesity," *Pediatric Clinics of North America* 48, 4 (2001): pp. 1017–1025.

152 R. G. McMurray et al., "The Influence of Physical Activity, Socioeconomic Status, and Ethnicity on the Weight Status of Adolescents," *Obesity Research* 8, 2 (2000): pp. 130–139.

153 S. J. Marshall et al., "Relationships Between Media Use, Body Fatness and Physical Activity in Children and Youth: A Meta-Analysis," *International Journal of Obesity and Related Metabolic Disorders* 28, 10 (2004): pp. 1238–1246.

154 T. N. Robinson, "Reducing Children's Television Viewing to Prevent Obesity: A Randomized Controlled Trial," *Journal of the American Medical Association* 282, 16 (1999): pp. 1561–1567.

155 S. L. Gortmaker et al., "Television Viewing as a Cause of Increasing Obesity Among Children in the United States, 1986–1990," *Archives of Pediatrics & Adolescent Medicine* 150, 4 (1996): pp. 356–362.

156 B. A. Dennison, T. A. Erb and P. L. Jenkins, "Television Viewing and Television in Bedroom Associated With Overweight Risk Among Low-Income Preschool Children," *Pediatrics* 109, 6 (2002): pp. 1028–1035.

157 M. S. Tremblay and J. D. Willms, "Is the Canadian Childhood Obesity Epidemic Related to Physical Inactivity?," *International Journal of Obesity and Related Metabolic Disorders* 27, 9 (2003): pp. 1100–1105.

158 Statistics Canada, "Selected Dwelling Characteristics and Household Equipment (Household Electronics and Vehicles)," [online], cited September 29, 2005, from <www40.statcan.ca/l01/cst01/famil09c.htm?sdi=video>, catalogue no. 62F0026MIE.

159 L. Neville, M. Thomas and A. Bauman, "Food Advertising on Australian Television: The Extent of Children's Exposure," *Health Promotion International* (2005): pp. 1–8.

160 J. C. Halford et al., "Effect of Television Advertisements for Foods on Food Consumption in Children," *Appetite* 42, 2 (2004): pp. 221–225.

161 D. L. Borzekowski and T. N. Robinson, "The 30-Second Effect: An Experiment Revealing the Impact of Television Commercials on Food Preferences of Preschoolers," *Journal of the American Dietetic Association* 101, 1 (2001): pp. 42–46.

162 Office of Communications, *Childhood Obesity—Food Advertising in Context* (London, UK: OFCOM, 2004).

163 C. Hawkes, *Marketing Food to Children: The Global Regulatory Environment* (Geneva, Switzerland: World Health Organization, 2004).

164 L. M. Groesz, M. P. Levine and S. K. Murnen, "The Effect of Experimental Presentation of Thin Media Images on Body Satisfaction: A Meta-Analytic Review," *International Journal of Eating Disorders* 31, 1 (2002): pp. 1–16.

165 I. Ledrou and J. Gervais, "Food Insecurity," *Health Reports* 16, 3 (2005): pp. 47–51, catalogue no. 82-003.

166 J. Che and J. Chen, "Food Insecurity in Canadian Households," *Health Reports* 12, 4 (2001): pp. 11–22, catalogue no. 82-003.

167 L. McIntyre et al., "Do Low-Income Lone Mothers Compromise Their Nutrition to Feed Their Children?," *Canadian Medical Association Journal* 168, 6 (2003): pp. 686–691.

168 M. S. Townsend et al., "Food Insecurity Is Positively Related to Overweight in Women," *The Journal of Nutrition* 131, 6 (2001): pp. 1738–1745.

169 E. J. Adams, L. Grummer-Strawn and G. Chavez, "Food Insecurity Is Associated With Increased Risk of Obesity in California Women," *The Journal of Nutrition* 133, 4 (2003): pp. 1070–1074.

170 S. Sarlio-Lahteenkorva and E. Lahelma, "Food Insecurity Is Associated With Past and Present Economic Disadvantage and Body Mass Index," *Journal of Nutrition* 131, 11 (2001): pp. 2880–2884.

171 J. Veitch et al., "Physical Inactivity and Other Health Risks Among Australian Males in Less-Skilled Occupations," *Journal of Occupational and Environmental Medicine* 41, 9 (1999): pp. 794–798.

172 K. D. Travers, "The Social Organization of Nutritional Inequities," *Social Science & Medicine* 43, 4 (1996): pp. 543–553.

173 K. Morland et al., "Neighborhood Characteristics Associated With the Location of Food Stores and Food Service Places," *American Journal of Preventive Medicine* 22, 1 (2002): pp. 23–29.

174 C. Chung and S. L. Myers Jr., "Do the Poor Pay More for Food? An Analysis of Grocery Store Availability and Food Price Disparities," *Journal of Consumer Affairs* 33, 2 (1999): p. 276.

175 Northern Food Prices Project Steering Committee, *Northern Food Prices Project Report 2003* (Winnipeg, Man.: Manitoba Aboriginal and Northern Affairs, 2003).

176 S. Kirkpatrick and V. Tarasuk, "The Relationship Between Low Income and Household Food Expenditure Patterns in Canada," *Public Health Nutrition* 6, 6 (2003): pp. 589–597.

177 A. Drewnowski and S. E. Specter, "Poverty and Obesity: The Role of Energy Density and Energy Costs," *American Journal of Clinical Nutrition* 79, 1 (2004): pp. 6–16.

178 J. Maddock, "The Relationship Between Obesity and the Prevalence of Fast Food Restaurants: State-Level Analysis," *American Journal of Health Promotion* 19, 2 (2004): pp. 137–143.

179 D. A. Alter and K. Eny, "The Relationship Between the Supply of Fast-Food Chains and Cardiovascular Outcomes," *Canadian Journal of Public Health* 96, 3 (2005): pp. 173–177.

180 S. J. Nielsen and B. M. Popkin, "Pattern and Trends in Food Portion Sizes, 1977–1998," *Journal of the American Medical Association* 289, 4 (2003): pp. 450–453.

181 Email correspondence with M. Tjepkema, Analytical Studies and Reports, Health Statistics Division, Statistics Canada, September 26, 2005.

182 J. Hauptman et al., "Orlistat in the Long-Term Treatment of Obesity in Primary Care Settings," *Archives of Family Medicine* 9, 2 (2000): pp. 160–167.

183 R. Padwal, S. K. Li and D. C. Lau, "Long-Term Pharmacotherapy for Overweight and Obesity: A Systematic Review and Meta-Analysis of Randomized Controlled Trials," *International Journal of Obesity and Related Metabolic Disorders* 27, 12 (2003): pp. 1437–1446.

184 C. K. Haddock et al., "Pharmacotherapy for Obesity: A Quantitative Analysis of Four Decades of Published Randomized Clinical Trials," *International Journal of Obesity and Related Metabolic Disorders* 26, 2 (2002): pp. 262–273.

185 Z. Li et al., "Meta-Analysis: Pharmacologic Treatment of Obesity," *Annals of Internal Medicine* 142, 7 (2005): pp. 532–546.

186 H. Buchwald et al., "Bariatric Surgery: A Systematic Review and Meta-Analysis," *Journal of the American Medical Association* 292, 14 (2004): pp. 1724–1737.

187 C. M. Hydock, "A Brief Overview of Bariatric Surgical Procedures Currently Being Used to Treat the Obese Patient," *Critical Care Nursing Quarterly* 28, 3 (2005): pp. 217–226.

188 R. S. Padwal and R. Z. Lewanczuk, "Trends in Bariatric Surgery in Canada, 1993–2003," *Canadian Medical Association Journal* 172, 6 (2005): p. 735.

189 W. E. Encinosa et al., "Use and Costs of Bariatric Surgery and Prescription Weight-Loss Medications," *Health Affairs (Millwood)* 24, 4 (2005): pp. 1039–1046.

190 M. A. Maggard et al., "Meta-Analysis: Surgical Treatment of Obesity," *Annals of Internal Medicine* 142, 7 (2005): pp. 547–559.

191 E. Johnston et al., "The Relation of Body Mass Index to Depressive Symptoms," *Canadian Journal of Public Health* 95, 3 (2004): pp. 179–183.

192 K. M. Carpenter et al., "Relationships Between Obesity and DSM-IV Major Depressive Disorder, Suicide Ideation, and Suicide Attempts: Results From a General Population Study," *American Journal of Public Health* 90, 2 (2000): pp. 251–257.

193 C. U. Onyike et al., "Is Obesity Associated With Major Depression? Results From the Third National Health and Nutrition Examination Survey," *American Journal of Epidemiolgy* 158, 12 (2003): pp. 1139–1147.

194 Public Health Agency of Canada, "A Report on Mental Illnesses in Canada," [online], cited April 5, 2005, from <www.phac-aspc.gc.ca/publicat/miic-mmac/pdf/men_ill_e.pdf>.

195 C. L. Craig, C. Cameron and A. Bauman, *Socio-Demographic and Lifestyle Correlates of Obesity—Technical Report on the Secondary Analyses Using the 2000–2001 Canadian Community Health Survey* (Ottawa, Ont.: Canadian Institute for Health Information, 2005).

196 A. G. Tsai and T. A. Wadden, "Systematic Review: An Evaluation of Major Commercial Weight Loss Programs in the United States," *Annals of Internal Medicine* 142, 1 (2005): pp. 56–66.

197 A. Avenell et al., "What Are the Long-Term Benefits of Weight Reducing Diets in Adults? A Systematic Review of Randomized Controlled Trials," *Journal of Human Nutrition and Dietetics* 17, 4 (2004): pp. 317–335.

198 M. L. Dansinger et al., "Comparison of the Atkins, Ornish, Weight Watchers, and Zone Diets for Weight Loss and Heart Disease Risk Reduction: A Randomized Trial," *Journal of the American Medical Association* 293, 1 (2005): pp. 43–53.

199 E. B. Kahn et al., "The Effectiveness of Interventions to Increase Physical Activity," *American Journal of Preventive Medicine* 22, 4S (2002): pp. 73–107.

200 R. J. Shephard, "Worksite Fitness and Exercise Programs: A Review of Methodology and Health Impact," *American Journal of Health Promotion* 10, 6 (1996): pp. 436–452.

201 Health Canada, *Taking Action on Healthy Living: Background Information on the Integrated Pan-Canadian Healthy Living Strategy* (Ottawa, Ont.: Health Canada, 2002).

202 Public Health Agency of Canada, "Healthy Living Strategy," [online], cited September 29, 2005, from <www.phac-aspc-gc.ca/hl-vs-strat/index.html>.

203 R. J. Kuczmarski et al., "CDC Growth Charts: United States," *Advance Data*, 314 (2000): pp. 1–27.

204 Dietitians of Canada et al., "The Use of Growth Charts for Assessing and Monitoring Growth in Canadian Infants and Children," *Canadian Journal of Dietetic Practice and Research* 65, 1 (2004): pp. 22–32.

205 T. J. Cole et al., "Establishing a Standard Definition for Child Overweight and Obesity Worldwide: International Survey," *British Medical Journal* 320, 7244 (2000): pp. 1240–1243.

206 M. S. Tremblay and J. D. Willms, "Secular Trends in the Body Mass Index of Canadian Children," *Canadian Medical Association Journal* 163, 11 (2000): pp. 1429–1433.

207 Email correspondence with J. D. Willms, Professor, Faculty of Education and Canada Research Chair (Tier I) in Human Development, University of New Brunswick, August 5, 2005.

208 P. Deurenberg, "Asians Are Different From Caucasians and From Each Other in Their Body Mass Index/Body Fat Per Cent Relationship," *Obesity Reviews* 3 (2002): pp. 141–146.

209 World Health Organization Expert Consultation, "Appropriate Body-Mass Index for Asian Populations and Its Implications for Policy and Intervention Strategies," *The Lancet* 363 (2004): pp. 157–163.

210 B. A. Reeder et al., "The Association of Cardiovascular Disease Risk Factors with Abdominal Obesity in Canada. Canadian Heart Health Surveys Research Group," *Canadian Medical Association Journal* 157, Supplement 1 (1997): pp. S39–45.

211 S. Yusuf et al., "Obesity and the Risk of Myocardial Infarction in 27 000 Participants from 52 Countries: A Case-Control Study," *The Lancet* 366, 9497 (2005): pp. 1640–1649.

212 N. Ross et al., "Body Mass Index in Urban Canada: Neighbourhood and Metropolitan Effects," *American Journal of Public Health* (in press). Reprinted with permission from the American Public Health Association.

213 Statistics Canada, *Breastfeeding Practices, Females Aged 15 to 55 Who Had a Baby in the Previous Five Years, Canada, Provinces, Territories and Peer Groups, 2003* (Canadian Community Health Survey, Cycle 2.1) (Ottawa, Ont.) (CANSIM table 105-0244), 2003, cited November 22, 2005, from <www.statcan.ca/english/freepub/82-221-XIE/2005001/tables/pdf/2178_03.pdf>.

214 Government of New Brunswick, *New Policy for Healthier Eating in Schools* (October 25, 2005), [online], cited November 23, 2005, from <www.gnb.ca/cnb/news/edu/2005e1431ed.htm>.

215 Government of British Columbia, *Food Guidelines to Help Schools Improve Student Health* (November 22, 2005), [online], cited November 23, 2005, from <www2.news.gov.bc.ca/news_releases_2005-2009/2005EDU0098-001064.htm>.

216 The Diverse Populations Collaboration, "Smoking, Body Weight and CHD Mortality in Diverse Populations," *Preventive Medicine*, 38 (2004): pp. 834–840.

217 D. Nutbeam, "Evidence-Based Public Policy for Health: Matching Research to Policy Need," *Promotion and Education* 2, Supplement (2001): pp. 15–27.

218 A. Jokovic, J. Frood and K. Leeb, "Bariatric Surgery in Canada," *Healthcare Policy* (submitted for publication).

219 The Secretariat for the Intersectoral Healthy Living Network, *The Integrated Pan-Canadian Healthy Living Strategy*, [online], cited December 7, 2005, from <www.phac-aspc.gc.ca/hl-vs-strat/pdf/hls_e.pdf>.

It's Your Turn

We welcome comments and suggestions on *Improving the Health of Canadians: Promoting Healthy Weights* and on how to make future reports more useful and informative. Please email ideas to cphi@cihi.ca or complete this questionnaire and return it to:

Improving the Health of Canadians 2005–2006 Report Series
***Promoting Healthy Weights* Feedback**
Canadian Population Health Initiative
Canadian Institute for Health Information
495 Richmond Road, Suite 600
Ottawa, ON K2A 4H6
Fax: (613) 241-8120

Instructions

For each question, please put an "X" beside the most appropriate response.
There are no right or wrong answers—we are simply interested in your opinions.
Our goal is to improve future reports. Individual responses will be kept confidential.

Overall Satisfaction With the Report

1. How did you obtain your copy of *Improving the Health of Canadians: Promoting Healthy Weights*?

❑ It was mailed to me ❑ From a colleague ❑ Through the Internet
❑ I ordered my own copy ❑ Other, please specify_____

2. To what extent have you read through the report?

❑ I have read through the entire report ❑ I have read certain sections and browsed through the entire report
❑ I have browsed through the entire report

3. How satisfied are you with the following aspects of the report?

Clarity	❑ Excellent	❑ Good	❑ Fair	❑ Poor
Organization/format	❑ Excellent	❑ Good	❑ Fair	❑ Poor
Use of figures	❑ Excellent	❑ Good	❑ Fair	❑ Poor
Quality of analysis	❑ Excellent	❑ Good	❑ Fair	❑ Poor
Level of detail presented	❑ Excellent	❑ Good	❑ Fair	❑ Poor
Length of the report	❑ Excellent	❑ Good	❑ Fair	❑ Poor

Usefulness of the Report

4. Please indicate how useful you found the report by putting an "X" in the most appropriate category:

❑ Very useful ❑ Somewhat useful ❑ Not useful

5. How do you plan on using the information presented in this report?

_____

_____

_____

_____

_____

6. What did you find most useful about this report?

_____

_____

_____

_____

7. How would you improve this report? Do you have any suggestions for future reports?

_____

_____

_____

_____

Reader Information

8. Where do you live?

- ❑ Newfoundland and Labrador
- ❑ Nova Scotia
- ❑ New Brunswick
- ❑ Prince Edward Island
- ❑ Quebec
- ❑ Ontario
- ❑ Manitoba
- ❑ Saskatchewan
- ❑ Alberta
- ❑ British Columbia
- ❑ Northwest Territories
- ❑ Yukon Territory
- ❑ Nunavut
- ❑ Outside Canada (please specify country)_____

9. What is your main position or role?

- ❑ Health manager or administrator
- ❑ Researcher
- ❑ Policy analyst
- ❑ Board member
- ❑ Elected official
- ❑ Health provider
- ❑ Student/youth
- ❑ Educator
- ❑ Other, please specify_____

Thank you for completing and returning this questionnaire.

This publication is part of CPHI's ongoing inquiry into the patterns of health across this country. Consistent with our broader findings, it reflects the extent to which the health of Canadians is socially determined, interconnected, complex and changing. CPHI is committed to deepening our understanding of these patterns.

www.cihi.ca *Taking health information further*
www.icis.ca *À l'avant-garde de l'information sur la santé*