

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



## Improving the Health of Canadians: An Introduction to Health in Urban Places



C a n a d i a n   P o p u l a t i o n   H e a l t h   I n i t i a t i v e



Canadian Institute  
for Health Information

Institut canadien  
d'information sur la santé

The contents of this publication may be reproduced in whole or in part provided the intended use is for non-commercial purposes and full acknowledgement is given to the Canadian Institute for Health Information.

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

Phone: 613-241-7860  
Fax: 613-241-8120  
[www.cihi.ca](http://www.cihi.ca)

ISBN 13: 978-1-55392-926-0 (PDF)  
ISBN 10: 1-55392-926-8 (PDF)

© 2006 Canadian Institute for Health Information

How to cite this document:  
Canadian Institute for Health Information, *Improving the Health of Canadians: An Introduction to Health in Urban Places* (Ottawa: CIHI, 2006).

Cette publication est aussi disponible en français sous le titre :  
*Améliorer la santé des Canadiens : Une introduction à la santé en milieu urbain*  
ISBN 13 : 978-1-55392-929-1 (PDF)  
ISBN 10 : 1-55392-929-2 (PDF)

# Table of Contents

About the Canadian Population Health Initiative .....	v
About the Canadian Institute for Health Information .....	v
CPHI Council (as of August 2006) .....	vii
Acknowledgements .....	ix
<b>Introduction .....</b>	<b>3</b>
Organization of the Report .....	6
Objectives and Target Audiences of the Report .....	7
<b>Chapter 1. Health Status in Different Urban Areas .....</b>	<b>11</b>
Patterns of Health Across Canada .....	11
Patterns of Health Between Canada's Cities .....	13
<b>Chapter 2. Urban Living: Neighbourhoods and Health .....</b>	<b>21</b>
Neighbourhood Social Characteristics .....	22
Social Support Networks and Resources in the Neighbourhood .....	22
Cultural Diversity .....	23
Neighbourhood Socio-Economic Influences .....	24
CPHI Analyses: Health Outcomes and Behaviours in Different Neighbourhoods	
in Five Canadian Cities .....	26
Vancouver .....	28
Calgary .....	32
Toronto .....	36
Montréal .....	40
Halifax .....	44
Patterns of Health Between Cities and Neighbourhoods: What Do We Know? .....	48
Patterns of Health Between Cities and Neighbourhoods: What Do We Not Know? .....	48
Neighbourhood Physical Characteristics .....	49
Neighbourhood Conditions and Perceived Safety .....	49
Traffic-Related Health Outcomes in Neighbourhoods .....	50
Access to Services .....	53
Access to Health Services in Urban Areas .....	53
Access to Available and Affordable Food Services .....	55
Moving Between and Within Neighbourhoods .....	55
Location of Employment and Personal Vehicle Use .....	55
Modes of Transportation .....	56
Traffic-Related Pollution and Health Outcomes .....	57
<b>Chapter 3. Urban Living: Housing and Health .....</b>	<b>63</b>
Home as Place and House as Space .....	65
Housing Adequacy .....	66
Lead Exposure .....	68
Dust Mites and Dampness/Mould .....	68
Exposure to Environmental Tobacco Smoke (ETS) .....	68
Smoke and Fire .....	68
Home Safety/Stairs .....	68
Housing Suitability .....	70
Housing Affordability .....	72

<b>Chapter 4. Urban Living: Putting Policies and Programs in Place</b>	<b>79</b>
Building Blocks: Policies and Interventions for Neighbourhoods and	
Urban Development	80
Neighbourhood Safety and Injury Prevention	80
Urban Design and Health Behaviours	81
The Urban Environment	81
Laying the Foundation: Policies and Interventions for Housing	82
Housing Adequacy and Suitability	82
Housing Affordability	83
Putting Policies and Programs in Place: What Do We Know	
and What Do We Not Know?	84
Policies and Interventions for Neighbourhoods and Urban Development	84
Housing Adequacy and Suitability	84
Housing Affordability	85
<b>Conclusions</b>	<b>89</b>
Placing It All Together: Neighbourhoods and Health	90
Placing It All Together: Housing and Health	91
Placing It All Together: Urban Living and Health	92
<b>Key Messages and Information Gaps</b>	<b>93</b>
<b>For More Information</b>	<b>95</b>
<b>There's More on the Web</b>	<b>97</b>
<b>Appendices</b>	
Appendix A. Methodology	99
Appendix B. Patterns of Health Behaviours by Census Metropolitan Area (CMA)	105
Appendix C. Comparisons of Health Outcomes and Behaviours Between	
Different Types of Neighbourhoods in Five Census Metropolitan Areas	107
<b>For Additional Information</b>	<b>113</b>
<b>It's Your Turn</b>	<b>129</b>
<b>Figures</b>	
Figure 1. Canada's Population Density, 2001	8
Figure 2. Life Expectancy Across Canada, 2003	12
Figure 3. Percentage of Population Reporting Excellent or Very Good	
Health Across Canada, Population 12 Years and Over, 2003	12
Figure 4. Percentage of Population Reporting Excellent or Very Good	
Health by CMA, Population 12 Years and Over, 2003	14
Figure 5. Percentage of Population Who Report Adopting a Combination of	
Healthy Behaviours by CMA, Population 12 Years and Over, 2003	15
Figure 6. Percentage of Population Reporting Their Life as Extremely or	
Quite a Bit Stressful, Population 18 Years and Over, 2003	17
Figure 7. Canada's Aboriginal Peoples: Population Density, 2001	25
Figure 8. Neighbourhood Types in Vancouver CMA, B.C.	29
Figure 8.1 % Reporting Excellent or Very Good Health	31
Figure 8.2 % Reporting an Injury in the Last Year	31

Figure 8.3 % Who are Physically Active (Active and Moderately Active)	31
Figure 8.4 % Who are Overweight or Obese (BMI $\geq$ 25)	31
Figure 8.5 % Smokers	31
Figure 9. Neighbourhood Types in Calgary CMA, Alta.	33
Figure 9.1 % Reporting Excellent or Very Good Health	35
Figure 9.2 % Reporting an Injury in the Last Year	35
Figure 9.3 % Who Are Physically Active (Active and Moderately Active)	35
Figure 9.4 % Who Are Overweight or Obese (BMI $\geq$ 25)	35
Figure 9.5 % Smokers	35
Figure 10. Neighbourhood Types in Toronto CMA, Ont.	37
Figure 10.1 % Reporting Excellent or Very Good Health	39
Figure 10.2 % Reporting an Injury in the Last Year	39
Figure 10.3 % Who Are Physically Active (Active and Moderately Active)	39
Figure 10.4 % Who Are Overweight or Obese (BMI $\geq$ 25)	39
Figure 10.5 % Smokers	39
Figure 11. Neighbourhood Types in Montréal CMA, Que.	41
Figure 11.1 % Reporting Excellent or Very Good Health	43
Figure 11.2 % Reporting an Injury in the Last Year	43
Figure 11.3 % Who Are Physically Active (Active and Moderately Active)	43
Figure 11.4 % Who Are Overweight or Obese (BMI $\geq$ 25)	43
Figure 11.5 % Smokers	43
Figure 12. Neighbourhood Types in Halifax CMA, N.S.	45
Figure 12.1 % Reporting Excellent or Very Good Health	47
Figure 12.2 % Reporting an Injury in the Last Year	47
Figure 12.3 % Who Are Physically Active (Active and Moderately Active)	47
Figure 12.4 % Who Are Overweight or Obese (BMI $\geq$ 25)	47
Figure 12.5 % Smokers	47
Figure 13. Age-Standardized Rates of Injury Requiring Hospitalization by Cause in Urban Settings, Canada, 2003–2004	51
Figure 14. Self-Reported Prevalence of BMI $<$ 25 by Neighbourhood-Level Car and Public Transit Use Among Adults 18 Years and Over, 2003	58
Figure 15. Location of Injuries Occurring in Urban Areas, 2003–2004	69

## Tables

Table 1. Number of Fatal and Personal Injuries in Motor Vehicle Collisions in Urban and Rural Areas in Canada, 2003	52
Table 2. Self-Perceived Unmet Health Care Needs, 2003, and Number of Active Physicians and Nurses per 100,000 Population, 2004, by CMA	54
Table 3. Strength of Evidence for Biological/Chemical Exposures and Physical/Socio-Economic Characteristics as Risk Factors for Adverse Health Outcomes	67
Table 4. Ownership Rates in Selected CMAs, 2001	73
Table 5. Gaps in Average Market Rent and Affordable Housing in Five Canadian Cities, 2005	75
Table B.1 Adoption of Individual Healthy Behaviours by CMA, Population 12 Years and Over, 2003	105



# 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 August 2006)

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 la santé et des 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;
- **Judy Guernsey**, Associate Professor, Department of Community Health and Epidemiology, Faculty of Medicine, Dalhousie University, Nova Scotia;
- **Lynn McIntyre**, Department of Community Health Sciences, University of Calgary, Alberta;
- **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, Ontario;
- **Gerry Predy**, Medical Officer of Health, Capital Health, Alberta;
- **Deborah Schwartz**, Executive Director, Aboriginal Health Branch, British Columbia Ministry of Health, British Columbia;
- **Elinor Wilson**, Chief Executive Officer, Canadian Public Health Association, Ontario;
- **Michael Wolfson (ex officio)**, Assistant Chief Statistician of Analysis and Development, Statistics Canada, Ontario; and
- **Gregory Taylor (ex officio)**, Director General, Centre for Chronic Disease Prevention and Control, Public Health Agency of Canada, Ontario.



# 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 *Improving the Health of Canadians: An Introduction to Health in Urban Places*. We would like to express our appreciation to the members of the Expert Advisory Group, who provided invaluable advice throughout the development of the report. Members of the Expert Advisory Group were:

- **Cordell Neudorf (Chair)**, Chief Medical Health Officer and Vice-President, Research, Saskatoon Health Region;
- **Marie DesMeules**, Acting Director, Evidence and Risk Assessment Division, Centre for Chronic Disease Prevention and Control, Public Health Agency of Canada;
- **Karen Duffton**, Director, Communications—Cities and Communities, Infrastructure Canada;
- **James Dunn**, Scientist, Centre for Research on Inner City Health, St. Michael's Hospital; and Associate Professor, University of Toronto;
- **Trevor Hancock**, Medical Consultant, British Columbia Ministry of Health Services;
- **Michael Hayes**, Associate Dean, Faculty of Health Sciences, Simon Fraser University;
- **Russell Mawby**, Director, Housing, City of Ottawa, Community and Protective Services Department; and
- **Michael Wolfson**, Assistant Chief Statistician of Analysis and Development, 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:

- **Les Foster**, Adjunct Professor, Faculty of Human and Social Development and Department of Geography, University of Victoria;
- **Jason Gilmore**, Analyst/Project Leader, Health Statistics Division, Canadian Community Health Survey, Statistics Canada; and
- **Nancy Ross**, Assistant Professor, Department of Geography, McGill University.

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**, Writer
- **Anne-Marie Robert**, Data Consultant
- **Marie-Claude Martin**, Data Consultant
- **Uma Palaniappan**, Data Consultant
- **Nadine Valk**, Policy Consultant
- **Mélanie Josée Davidson**, Senior Data Analyst
- **Melanie Yugo**, Data Analyst and Quality Assurance
- **Candis Sabeau**, Data Analyst and Quality Assurance
- **Stephanie Paolin**, Data Analyst and Quality Assurance
- **Wendy Phillips**, Senior Policy Analyst
- **Elizabeth Gyorfi-Dyke**, Editor
- **Jennifer Zelmer**, Editor

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 website at [www.statcan.ca](http://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.





# Introduction

## Canada is known for many things. It is known for its cultural diversity, changing weather conditions and winter sports.

It is known for its differing geographical locations, from the West Coast of British Columbia, to the East Coast of Newfoundland and Labrador, to the territories in the North. It is also known for its vast land space, in which some areas are becoming increasingly more urbanized. More Canadians than ever before live in cities. In fact, the proportion of Canadians living in an urban area has increased from 76% (about 19 million) in 1986 to 80% (about 24 million) in 2001.<sup>1</sup>

Research shows that urban areas can influence numerous aspects of health and well-being, including what people eat, their employment status and working environment, their housing, the quality of the air they breathe and water they drink, their access to health services, the risks to which they are exposed in their neighbourhoods and various social support and economic resources.<sup>2</sup> Given this, urban areas represent an important area for health, as well as related research and policy development.

“ Vital cities have marvelous innate abilities for understanding, communicating, contriving and inventing what is required to combat their difficulties. Perhaps the most striking example of this ability is the effect that big cities have had on disease. Cities were once the most helpless and devastated victims of disease, but they became great disease conquerors.<sup>3</sup> (p. 447)  
—Jane Jacobs

How healthy people are depends on a range of individual characteristics (for example, age, gender, health-related behaviours, socio-economic status). However, cities are more than just urban areas with large numbers of individuals. Individuals live in different types of housing structures that are nested within different neighbourhoods that are themselves nested within different cities and regions across Canada. Factors at each of these levels may influence Canadians' health and well-being.

This report looks at some of those factors to explore why, collectively, people who live in some urban areas are healthier than others. Urban areas are built by people for people. They grow and change, just as the people who live in them grow and change. Further, the meanings that people give to cities also develop and change over time. *Improving the Health of Canadians: An Introduction to Health in Urban Places* explores how the spaces and places in urban areas—specifically neighbourhood and housing characteristics—may influence the lives and health of Canadians who live in them.



What do we mean by spaces and places? The term “space” refers to the physical or geographical characteristics of a location—where it is (for example, a three-bedroom house).<sup>4</sup> In contrast, the term “place,” which can refer to the social aspects of a location, can be described as what a space represents or what meaning it has for people (for example, a home).<sup>4</sup> Both aspects of urban areas can shape people’s daily lives and health.<sup>5</sup>

## Defining Canada’s Urban Areas<sup>6</sup>

<b>Census metropolitan areas (CMA)</b>	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. Canada currently has 27 CMAs.
<b>Census agglomerations (CA)</b>	An area composed of one or more neighbouring municipalities located around a major urban core. To be considered a CA, the urban core must have a population of at least 10,000.
<b>Urban core</b>	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.
<b>Urban fringe</b>	Small urban areas in a CMA or CA that have populations of less than 10,000 and which do not neighbour the urban core of a CMA or CA.
<b>Secondary urban core</b>	The urban core of a CA that has been combined with a neighbouring CMA or larger CA.

## Organization of the Report

This report is organized into four chapters.

### **Chapter 1. Health Status in Different Urban Areas**

Comparisons of health indicators provide information on health patterns and trends across the country. This chapter presents a brief overview of health status and health-related behaviours in Canada's urban areas.

### **Chapter 2. Urban Living: Neighbourhoods and Health**

Chapter 2 looks at differences in health outcomes between places in urban areas at a more local level—neighbourhoods. It includes a summary of research on links between health and various neighbourhood factors such as social characteristics, socio-economic influences, physical characteristics, the proximity and availability of services, and issues related to peoples' movement between and within neighbourhoods.

Chapter 2 also presents new analyses that explore whether patterns of health differ depending on the type of neighbourhood in which people live. To identify any existing differences in health outcomes and behaviours between neighbourhoods, cities with sufficiently large populations were needed for the analyses. The cities chosen were Canada's three most populated cities (Vancouver, Toronto and Montréal), as well as the next most populated cities in the Prairies (Calgary) and Eastern Canada (Halifax). Outcomes selected for inclusion in these analyses were based on relevant literature and include self-rated health, overweight and obesity, smoking, physical activity and injuries.

### **Chapter 3. Urban Living: Housing and Health**

Urban neighbourhoods are comprised of different individuals who live in different types of households and housing structures. Chapter 3 looks at the link between health and various social meanings attached to one's home. It also looks at links between health and such physical aspects as housing adequacy, overcrowding and affordability.

### **Chapter 4. Urban Living: Putting Policies and Programs in Place**

Chapter 4 discusses what we do and do not know about links between health and policies or interventions related to neighbourhoods and housing.

## Objectives and Target Audiences of the Report

Patterns of health are largely a consequence of how we live, learn, work and play. This report is part of CPHI's ongoing work to understand the patterns of health across Canada. It reflects the extent to which Canadians' health is socially determined, interconnected, complex and changing. This report is a starting point for some general discussion about the health of Canadians in urban places. It is intended to introduce the concept of place and health at a population level and set the foundation for future CPHI work in this area. It is also intended to look at existing policies and interventions specific to neighbourhoods and housing.

We expect that this report will be of particular interest to federal, provincial, territorial and regional health authorities, as well as municipalities, decision-makers, practitioners and officers responsible for population health. We also hope that it will be of interest to policy-makers and urban planners in related non-health sectors, such as economic and social development planners in urban centres and others with a general interest in the subject matter.

### **CPHI's Work on Health in Rural Areas**

In addition to its work on health in urban areas, CPHI is also looking at health among Canadians in rural areas. *Canada's Rural Communities: Understanding Rural Health and Its Determinants* is a research program funded by CPHI, the Public Health Agency of Canada and the Centre

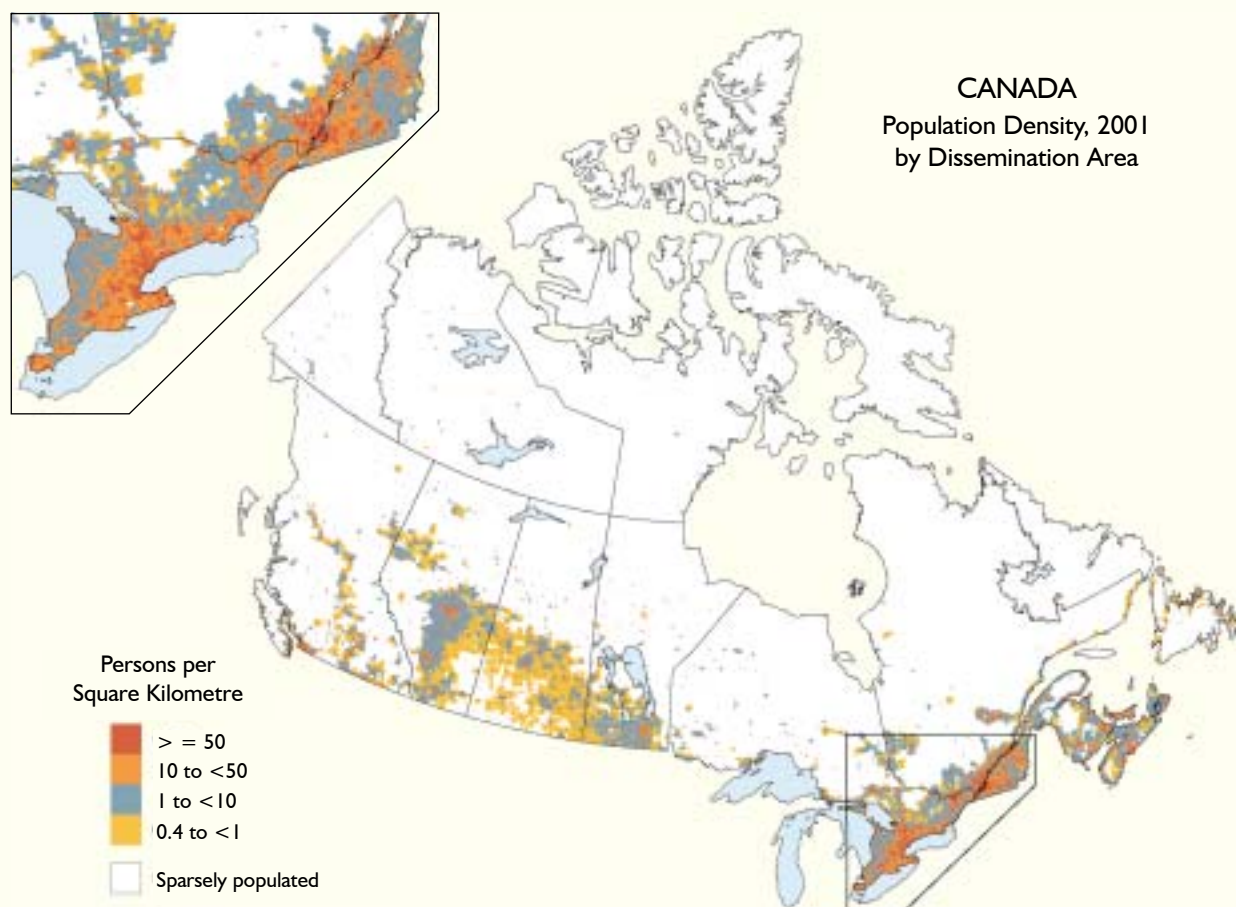
for Rural and Northern Health Research at Laurentian University. Watch for results of the program's work in the report *How Healthy Are Rural Canadians? An Assessment of Their Health Status and Health Determinants* and another report on patterns of health services use.

## Placing the Data

<b>Question</b>	How is Canada's population distributed?
<b>Answer</b>	<p>As shown in Figure 1, Canada's urban population is primarily concentrated in four regions:</p> <ul style="list-style-type: none"> <li>• The lower mainland of B.C. and southern Vancouver Island;</li> <li>• The Calgary-Edmonton corridor;</li> <li>• Southern Ontario's Golden Horseshoe; and</li> <li>• Montréal and its surrounding region.</li> </ul> <p>A growing proportion of the population lives in these regions. From 1996 to 2001, these regions combined showed a growth in population of almost 8%, while other parts of Canada grew by less than 1%. As a result, by 2001, approximately half (51%) of Canada's population lived in these four urban areas.<sup>7</sup></p>

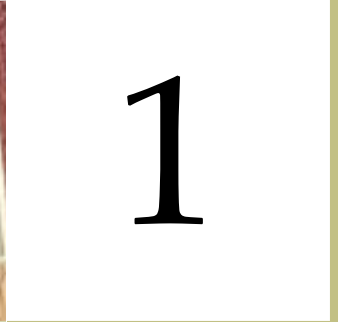
Figure 1

### Canada's Population Density, 2001



Source: 2001 Census of Canada. Produced by the Geography Division, Statistics Canada, 2002.

Note: This figure reprinted with permission.



# Health Status in Different Urban Areas





**Health indicators such as infant mortality, tobacco use and body mass index can be used to make comparisons between health patterns and trends across the country.**

Life expectancy and self-rated health are other indicators that show clear differences both between Canada and other countries, as well as within Canada. This chapter presents a brief overview of health status and health-related behaviours in Canada's urban areas.

## **Patterns of Health Across Canada**

The latest data (2002 and 2003) from the Organisation for Economic Co-operation and Development (OECD) show a 13-year range in life expectancy among 30 member countries. Japan ranked the highest, at 81.8 years, and Turkey the lowest, at 68.7 years. Canada ranked eighth out of the 30 countries, at 79.7 years, behind Japan, Iceland, Spain, Switzerland, Australia, Sweden and Italy. At 79.7 years, Canada's life expectancy is approximately two years less than Japan's.<sup>8</sup>

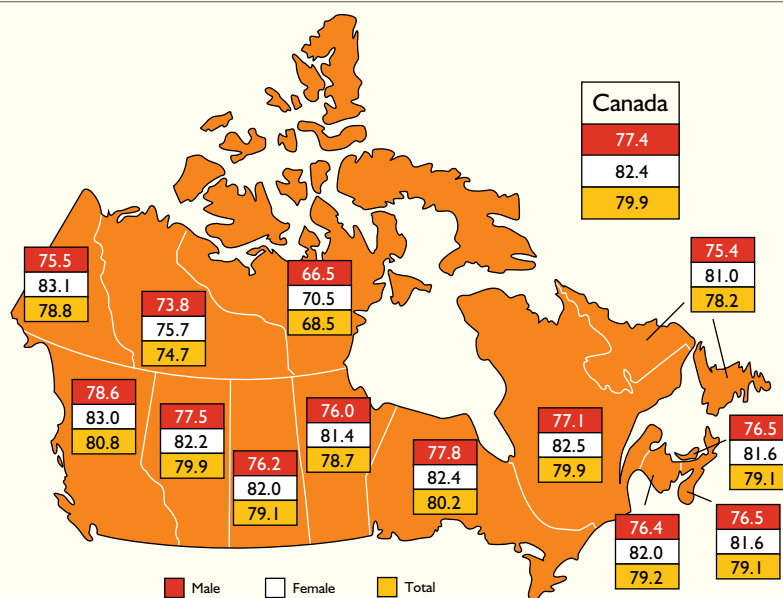
While telling, overall values such as this can mask wide variations within a country. In 2003, there was a 12-year difference in life expectancy between the provinces and territories. B.C. ranked the highest, at 80.8 years, and Nunavut the lowest, at 68.5 years (see Figure 2). In each province and territory, life expectancy was higher among women than men.

Differences in health between provinces and territories can also be found using another common indicator: self-rated health. As with life expectancy, there is a large gap in the percentage of people reporting excellent or very good health between the provinces and territories. In 2003, Newfoundland and Labrador ranked the highest, at 68%, and Nunavut the lowest, at 51% (see Figure 3). Life expectancy was higher among females than males across all the provinces and territories; in contrast, self-rated health was higher among females in only four provinces (Newfoundland and Labrador, Nova Scotia, New Brunswick and Saskatchewan). In all other provinces and territories, a greater percentage of males than females reported excellent or very good health.

Of note is the difference between life expectancy and self-rated health at the pan-Canadian and provincial/territorial level. As noted previously, Canada ranked eighth out of 30 OECD countries in overall life expectancy, at 79.7 years in 2003; however, only 60% of Canadian adults rated their health as excellent or very good.

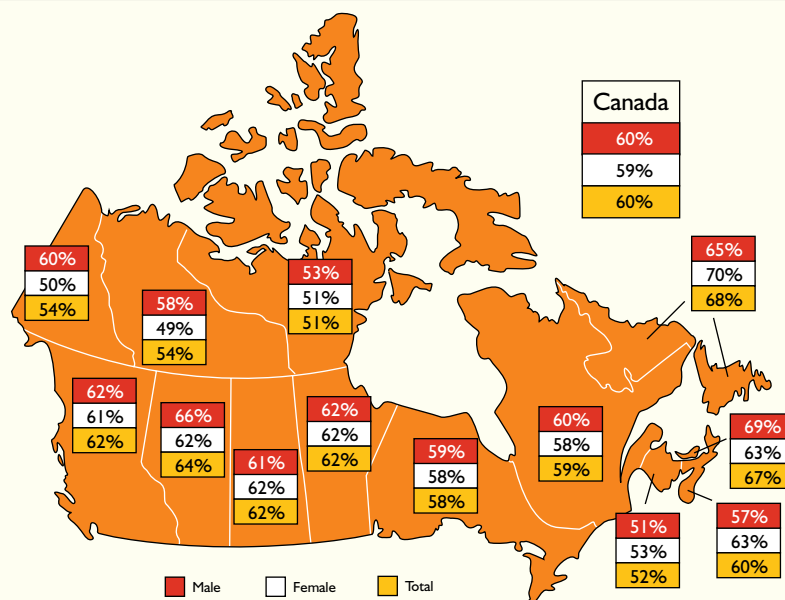
## Placing the Data

Figure 2  
Life Expectancy  
Across Canada,  
2003



Source: Statistics Canada, CANSIM Table 102-0511.<sup>9</sup>  
Note: All estimates have been age-standardized.

Figure 3  
Percentage of  
Population  
Reporting  
Excellent or  
Very Good  
Health Across  
Canada,  
Population  
12 Years and  
Over, 2003



Source: Statistics Canada, catalogue no. 82-401.<sup>10</sup>  
Note: All estimates have been age-standardized.



Newfoundland and Labrador had the highest proportion of adults rating their health as excellent or very good, yet its overall life expectancy was almost two years less than the Canadian average.

## Patterns of Health Between Canada's Cities

In recent decades, Canadian cities have experienced changes in population densities in their urban areas—in general, while most CMAs are growing, some have experienced population declines in their cores and inner-city areas.<sup>11</sup> Between 1971 and 1996, with some exceptions, Canadian CMAs lost, on average, about 7% of their core area populations and 19% of the population from their inner-city areas.<sup>11</sup> While there have been declines in those areas, there has been increased growth in decentralized suburban populations.<sup>11</sup>

While most research to date has focused on differences in health status across Canada or between provinces and territories, this report looks at differences in health outcomes and behaviours between places at a more local level. Using data from the 2003 Canadian Community Health Survey (CCHS), it explores differences in health outcomes and behaviours between Canadian cities (CMAs).\*

Recent reports by Statistics Canada that looked at trends and differences in health status, risk factors and health care use in Canada's 27 CMAs found that while Canadians are generally

healthy, residents of different cities are not equally healthy.<sup>12</sup> For example, among the CMAs in 2000, life expectancy at birth was highest in Vancouver, at 81.1 years, and lowest in Greater Sudbury, at 76.7 years.<sup>12</sup> This section highlights new CPHI analyses that show significant variation between CMAs for a number of self-reported health outcomes and behaviours: excellent or very good health, adoption of healthy behaviours,<sup>†</sup> perception of life stress and smoking.

Figure 4 illustrates that compared to the CMA average (59%), in 2003, individuals living in five Ontario CMAs, as well as the Quebec CMA of Saguenay, were less likely to report excellent or very good health. Individuals living in Alberta CMAs (Calgary and Edmonton), as well as those living in Winnipeg and St. John's, were more likely than Canadians living in other metropolitan areas to report excellent or very good health.

Figure 5 shows that compared to the CMA average (27%), in 2003, those living in urban areas along Canada's West Coast (Victoria, Vancouver and Abbotsford) were the most likely to report adopting a combination of healthy behaviours, with rates ranging from 32% to 35% in these cities. However, those living in Atlantic Canada (Saint John, Halifax and St. John's), as well as those residing in various Quebec CMAs (Montréal, Québec and Saguenay) were the least likely to report adopting a combination of healthy behaviours, with rates ranging from 20% to 23%.

\* Please refer to Appendix A for an outline of the methodology and statistical analyses used in this report.

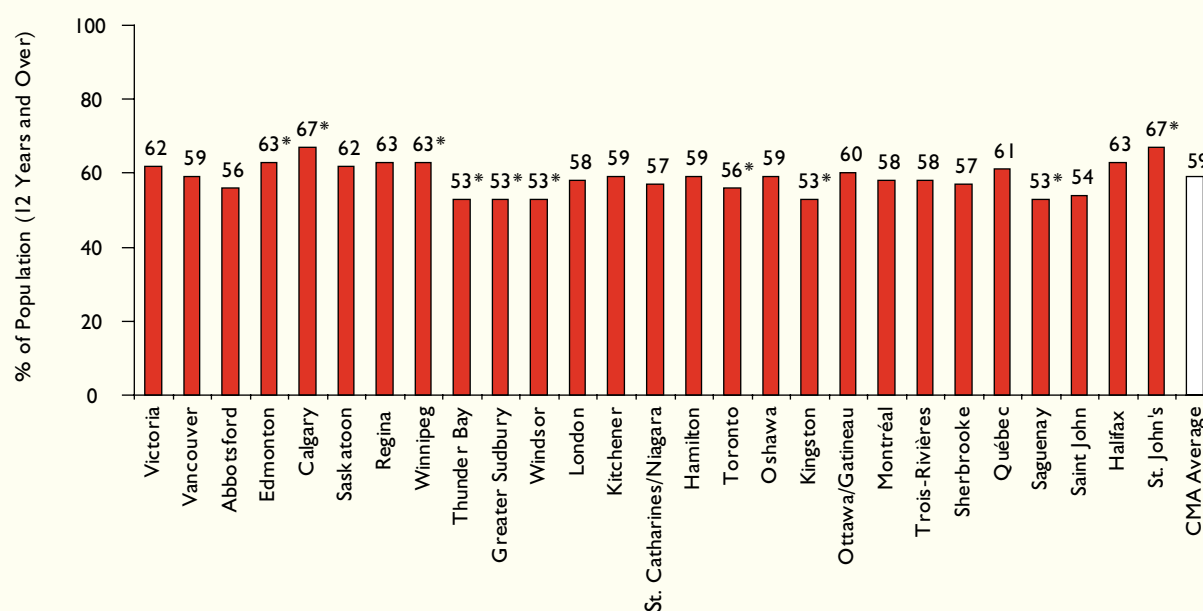
† For the purposes of these analyses, individuals who were active or moderately active and who did not smoke or drink five or more drinks in one sitting were identified as "adopting healthy behaviours." Please refer to Appendix B for detailed results by CMA.

## Placing the Data

<b>Question</b>	Are there differences in the proportion of Canadians who rate their health as excellent or very good between CMAs?
<b>Answer</b>	Compared to the CMA average (59%), in 2003, individuals living in Calgary and Edmonton, as well as those living in Winnipeg and St. John's, were more likely than Canadians living in other CMAs to report excellent or very good health. Individuals living in five Ontario CMAs (Thunder Bay, Greater Sudbury, Windsor, Toronto and Kingston), as well as the Quebec CMA of Saguenay were less likely to report excellent or very good health.

Figure 4

### Percentage of Population Reporting Excellent or Very Good Health by CMA, Population 12 Years and Over, 2003



Source: CPHI analysis of CCHS 2.1 (2003), Statistics Canada.

Note: All estimates have been age-standardized.

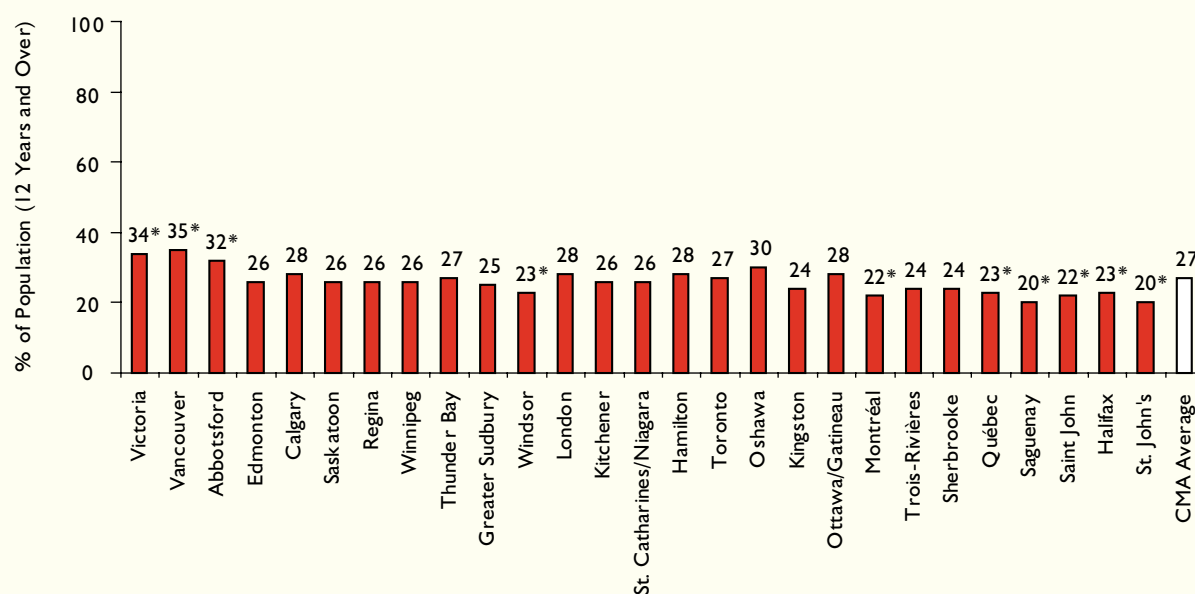
\* Significantly different from CMA average,  $p < .05$ .

## Placing the Data

<b>Question</b>	Does the proportion of Canadians who adopt a combination of healthy behaviours (defined as active or moderate physical activity, choosing not to smoke and not drinking five or more drinks in one sitting) differ across the country?
<b>Answer</b>	Figure 5 shows that compared to the CMA average (27%), those living in urban areas along Canada's West Coast (Victoria, Vancouver and Abbotsford) were the most likely to report adopting all three healthy behaviours, with rates ranging from 32% to 35% in these communities. However, those living in Atlantic Canada (Saint John, Halifax and St. John's), as well as those residing in various Quebec CMAs (Montréal, Québec and Saguenay) were significantly less likely to engage in the combination of healthy behaviours, with rates ranging from 20% to 23%. (Please refer to Appendix B for a presentation of the individual behaviours).

Figure 5

### Percentage of Population Who Report Adopting a Combination of Healthy Behaviours by CMA, Population 12 Years and Over, 2003



Source: CPHI analysis of CCHS 2.1 (2003), Statistics Canada.

Note: All estimates have been age-standardized.

\* Significantly different from CMA average,  $p < .05$ .

Also of interest are differences between CMAs in regards to perceived life stress and smoking behaviours. Figure 6 shows that compared to the CMA average of 25%, in 2003, residents of Montréal (30%), Sherbrooke (30%) and Québec (29%) were the most likely to say that they perceived life to be extremely or quite a bit stressful. Perception of life stress as being extremely or quite a bit stressful fell below the CMA average in some CMAs in Eastern Canada (Halifax and St. John's), the Prairies (Saskatoon and Winnipeg) and Western Canada (Victoria and Vancouver).

Residents living in Montréal (26%), Québec (24%), Thunder Bay (27%), Greater Sudbury (27%) and Oshawa (27%) were more likely to report being smokers, when compared to the average for all Canadian CMAs (22%), while those living in Vancouver (16%), Abbotsford (17%) and Halifax (18%) were less likely to do so.

Why do these differences between cities exist?

The exact reasons are unclear. Recent correlation analyses conducted by Statistics Canada of life expectancy at the CMA level reported that life expectancy was shorter in CMAs with high rates of smoking, heavy drinking, obesity and high blood pressure; life expectancy was longer in CMAs with a higher percentage of postsecondary graduates and recent immigrants, as well as in CMAs where the average household income was higher.<sup>12</sup> The differences in CPHI's analyses reported in this section may therefore reflect differences in the social, physical and economic environments of each CMA. They may also mirror various provincial and municipal policies that may influence the health behaviours of residents in these CMAs.

#### Methodological Notes

Based on Canadian census definitions, the territories and P.E.I. do not have identified CMAs. Therefore, information specific to place and health among Canadians in the territories or P.E.I. is not presented in this report.

Statistics Canada's Canadian Community Health Survey (CCHS) is conducted every two years. The analyses presented in this report are based

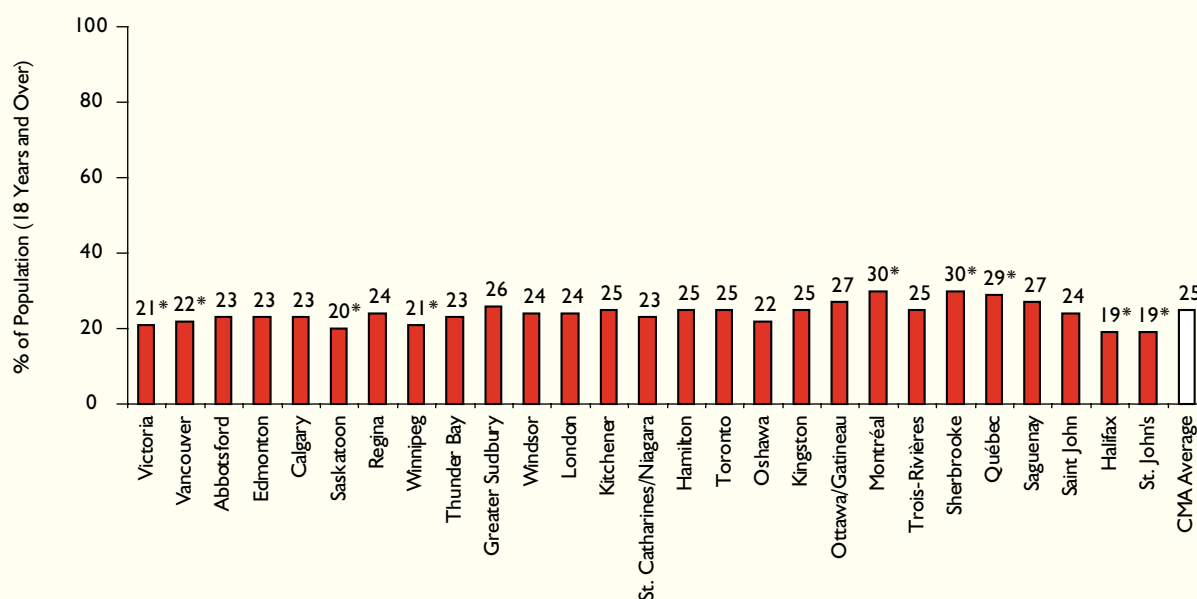
on data for the 2003 collection year. Although another cycle of the survey was conducted in 2005, during the time in which the analyses were being conducted for this report, the data files for 2005 were unavailable to researchers using remote data access, including CPHI.

## Placing the Data

<b>Question</b>	Are there differences in the proportion of Canadians who rate their life as extremely or quite a bit stressful between CMAs?
<b>Answer</b>	Figure 6 shows that compared to the CMA average of 25%, residents of Montréal (30%), Sherbrooke (30%) and Québec (29%) were the most likely to say that they perceive their life to be extremely or quite a bit stressful. Perception of life stress as being extremely or quite a bit stressful fell below the CMA average in some metropolitan centres on the East and West Coasts (Halifax, St. John's, Victoria and Vancouver), as well as in the Prairies (Saskatoon and Winnipeg).

Figure 6

Percentage of Population Reporting Their Life as Extremely or Quite a Bit Stressful, Population 18 Years and Over, 2003



Source: CPHI analysis of CCHS 2.1 (2003), Statistics Canada.

Note: All estimates have been age-standardized.

\* Significantly different from CMA average,  $p < .05$ .





2

# Urban Living: Neighbourhoods and Health





## The previous chapter highlighted that there are differences between Canada's various CMAs.

An increasing body of literature suggests that looking at data only at the CMA level may mask various inequalities found between the neighbourhoods within each CMA. While individual-level factors, such as education, income and health-related behaviours, tend to be strongly associated with differences in health,<sup>13</sup> some research suggests there is an additional, potentially important, association between some aspects of health and characteristics of the neighbourhoods in which people live,<sup>5, 13</sup> including various social, economic, cultural and environmental factors.

This section looks at some of those neighbourhood-level factors. While it is beyond the scope of this report to discuss all issues related to health, neighbourhoods and urban development, this section presents an overview of research specific to health and various neighbourhood aspects, including:

- Social characteristics (for example, social cohesion, social capital, collective efficacy, cultural diversity);
- Socio-economic influences (such as neighbourhood income level);
- Physical environment characteristics (such as neighbourhood conditions, perceived safety, traffic-related risks);
- Access to services (such as food outlets, health services); and
- Transportation-specific issues related to movement between and within neighbourhoods.

“ Always design a thing by considering it in its next larger context—a chair in a room, a room in a house, a house in an environment, an environment in a city plan. ”

—Eliel Saarinen

## Neighbourhood Social Characteristics

When asked to describe one's neighbourhood, some people may describe it by various social characteristics such as the friendliness or support of their neighbours or their neighbourhood's cultural diversity. Some may even point to their opportunities for involvement in various community or arts organizations. Although systematic research regarding people's involvement in the arts, particularly in urban areas, is limited, preliminary research has found that involvement in arts and culture may play a role in helping promote feelings of good health.<sup>16</sup> This section highlights examples of some recent research specific to select social characteristics that may play a role in the health of people living in urban areas.

### Social Support Networks and Resources in the Neighbourhood

Various terms and concepts have been developed to explore the social support networks and resources that make up the social environment of a neighbourhood. Social cohesion, social capital and collective efficacy are among these concepts.

Social cohesion is defined as "... the extent of connectedness and solidarity among groups in society."<sup>17</sup> (p. 175)

Social capital refers to "... the resources available to individuals and to society through social relationships."<sup>18</sup> (p. 650)

Collective efficacy is a measure of mutual trust and willingness to help out for the common good.<sup>19</sup>

Each concept has been looked at in terms of its link to health.<sup>20, 21</sup> For example, a study in Hamilton, Ontario, explored the link between various health outcomes and social capital in neighbourhoods. It looked at health outcomes at both the individual and neighbourhood level. At the neighbourhood level, good health (measured by body mass index, emotional distress and self-rated health) and high involvement in voluntary associations were highest in the study's two "advantaged" neighbourhoods. At the individual level, after controlling for age, gender and neighbourhood of residence, results indicated that involvement in voluntary associations were associated with lower emotional distress and lower overweight status.<sup>22</sup> Internationally, a study of socially contrasting neighbourhoods in Glasgow, Scotland, found that a lack of neighbourhood cohesion and perceived local problems were associated with self-reported physical and mental health problems.<sup>23</sup>

Collective efficacy was examined in a Chicago study that looked at the role of the social and physical environment on all-cause premature mortality and mortality due to cardiovascular disease and homicide in 343 neighbourhood clusters. Collective efficacy was measured by questions regarding neighbours' likelihood to intervene in the event of a problem and questions about neighbours' relationships with each other. In neighbourhoods with low levels of disadvantage, collective efficacy appeared to be protective for all-cause premature mortality and premature mortality due to cardiovascular disease and homicide.<sup>21</sup> In a Los Angeles study of 65 neighbourhoods, collective efficacy was linked to lower body mass indices. The study found that youth living in neighbourhoods with high levels of collective efficacy had lower body mass indices than youth living in neighbourhoods with average levels of collective efficacy.<sup>24</sup>

#### Neighbourhood Watch: Montréal, Quebec

Neighbourhood variations in health can be found for life expectancy in Montréal. Between 1997 and 1999, life expectancy in Montréal was 78.5 years.<sup>14</sup> However, the variation in life

expectancy between neighbourhoods ranged from a low of 71.6 years to a high of 82.3 years.<sup>15</sup>

## Cultural Diversity

Another means by which people may describe their neighbourhood is by its cultural diversity. Urban areas attract large numbers of both migrants from within Canada and immigrants from other parts of the world.<sup>25</sup> For example, between 1996 and 2001, nearly 712,400 Canadians moved from a non-metropolitan area to one of Canada's 27 CMAs. Those moving to the CMAs tended to prefer smaller-sized (under 500,000 residents) and medium-sized (500,000 to 1,000,000 residents) centres. A further 672,600 Canadians, 62,000 of whom had originally resided in Montréal, Toronto or Vancouver, moved from larger cities to non-metropolitan areas between 1996 and 2001.<sup>26</sup>

The losses observed in these three CMAs were offset by gains resulting from immigration. In 2001, 94% of immigrants who arrived in Canada in the previous 10 years settled in one of Canada's 27 CMAs, an increase from 84% in 1981. Toronto, Montréal and Vancouver were the top destinations, drawing 73% of recent immigrants.<sup>25</sup> Why the attraction? Research suggests that some may be attracted to places where they are more likely to find larger numbers of people of the same ethnicity; others may simply be drawn to cities by possible economic opportunities.<sup>27</sup>

Canadian researchers have emphasized the positive role of ethnic concentration in enhancing the integration of immigrant communities.<sup>28</sup> However, some researchers, particularly in Europe and the United States, maintain that these areas reinforce the persistence of social inequalities, in terms of labour market integration, poor language acquisition and educational achievement.<sup>28</sup> In Canada, data from the 1996 Census showed that visible minority neighbourhoods in Toronto, Montréal and Vancouver were more likely to experience higher unemployment and low-income rates than other neighbourhoods.<sup>29</sup> To date, there have been few studies that have looked at neighbourhood-level health characteristics in neighbourhoods with high levels of immigrants.<sup>30</sup> One study of neighbourhoods in Toronto showed that hospital use was significantly greater in areas with high rates of recent immigration, as well as in areas with low income (uncomplicated births were excluded); however, since recent immigrants tend to settle in low-income areas, it is difficult to disentangle the effects of recent immigration from those of income on hospitalization.<sup>30</sup>

### Neighbourhood Watch: Saskatoon, Saskatchewan

Using a cross-sectional study design, investigators examined the association between neighbourhood income status, health care use and health outcomes in Saskatoon. Unlike other neighbourhood-level research that uses national census data and census tract boundaries, this research looked at existing homogeneous neighbourhoods for which data on health care use was available. Six adjacent residential neighbourhoods in Saskatoon, identified as "low income cut-off neighbourhoods," were labelled as the "core neighbourhood." Two comparison groups were established: 1) residents from the five most affluent neighbourhoods in Saskatoon and 2) all other Saskatoon residents.<sup>31</sup>

Data for 2001 were collected on a number of health measures: eight most common diseases and disorders in Saskatoon; medication

information; public health information on the most common infectious diseases; and vital statistics information on teen births, low birth weights, all-cause mortality and infant mortality. Findings included:

- Significantly higher incidence of low income, lower education levels and higher proportions of unemployment in the core neighbourhood compared with the other groups; and
- Compared with the rest of Saskatoon, significantly higher rates for suicide attempts, mental health disorders, injuries and poisonings, diabetes, chronic obstructive pulmonary disease and coronary heart disease were found in the core neighbourhood. Differences for stroke or cancer were not significant.<sup>31</sup>

## Neighbourhood Socio-Economic Influences

Understanding the relationship between health and various socio-economic influences at the neighbourhood level is complicated by the numerous interactions of individual and environmental factors. Nonetheless, research looking at the link between health outcomes at the neighbourhood level continues to emerge. For example, international research looking at neighbourhood income and health status has found an association between living in a low-income neighbourhood and mortality, regardless of a person's personal circumstances.<sup>32</sup> Conversely, other research has found an association between neighbourhood affluence and positive health effects over and above individual income, demographic and health-related background factors.<sup>33</sup> This section highlights research specific to health and various socio-economic aspects of a neighbourhood (for example, neighbourhood variations in income level and household education level).

In Canada and elsewhere, socio-economic influences on neighbourhood variations in health have been observed for a number of health outcomes. Among these outcomes are poor mental health,<sup>34–36</sup> behavioural problems in children,<sup>37</sup> heart attacks,<sup>38</sup> levels of health care access and use,<sup>39</sup> height and weight in children<sup>40, 41</sup> and individual engagement in health-related behaviours such as smoking.<sup>42</sup>

Among Canadian CMAs, Statistics Canada classified about 6% of neighbourhoods as low-income in 2000; neighbourhoods are classified as low-income when more than 40% of their residents have a family income below a predetermined threshold.<sup>43</sup> In Canada, despite an increase in life expectancy between 1971 to 1996, life expectancy remained lowest among those living in the lowest-income neighbourhoods.<sup>44</sup> This may reflect differences in a number of factors, one of which is education level. In 2001, compared to 25% of adults in other neighbourhoods, 37% of adults living in low-income neighbourhoods did not

have a high school education; further, young people aged 15 to 24 in low-income neighbourhoods were less likely to be enrolled in school than those in other neighbourhoods (58% versus 65%).<sup>43</sup>

Although research shows a more even distribution of incomes within urban areas in Canada than in the U.S.,<sup>45</sup> evidence points to some residential segregation by income in Canada's cities (for example, Toronto).<sup>46–48</sup> There was little change in the number of low-income neighbourhoods in Canadian CMAs between 1980 (6%) and 2000 (6%); however, the concentration of people with low incomes living in low-income neighbourhoods increased during this period.<sup>43</sup>

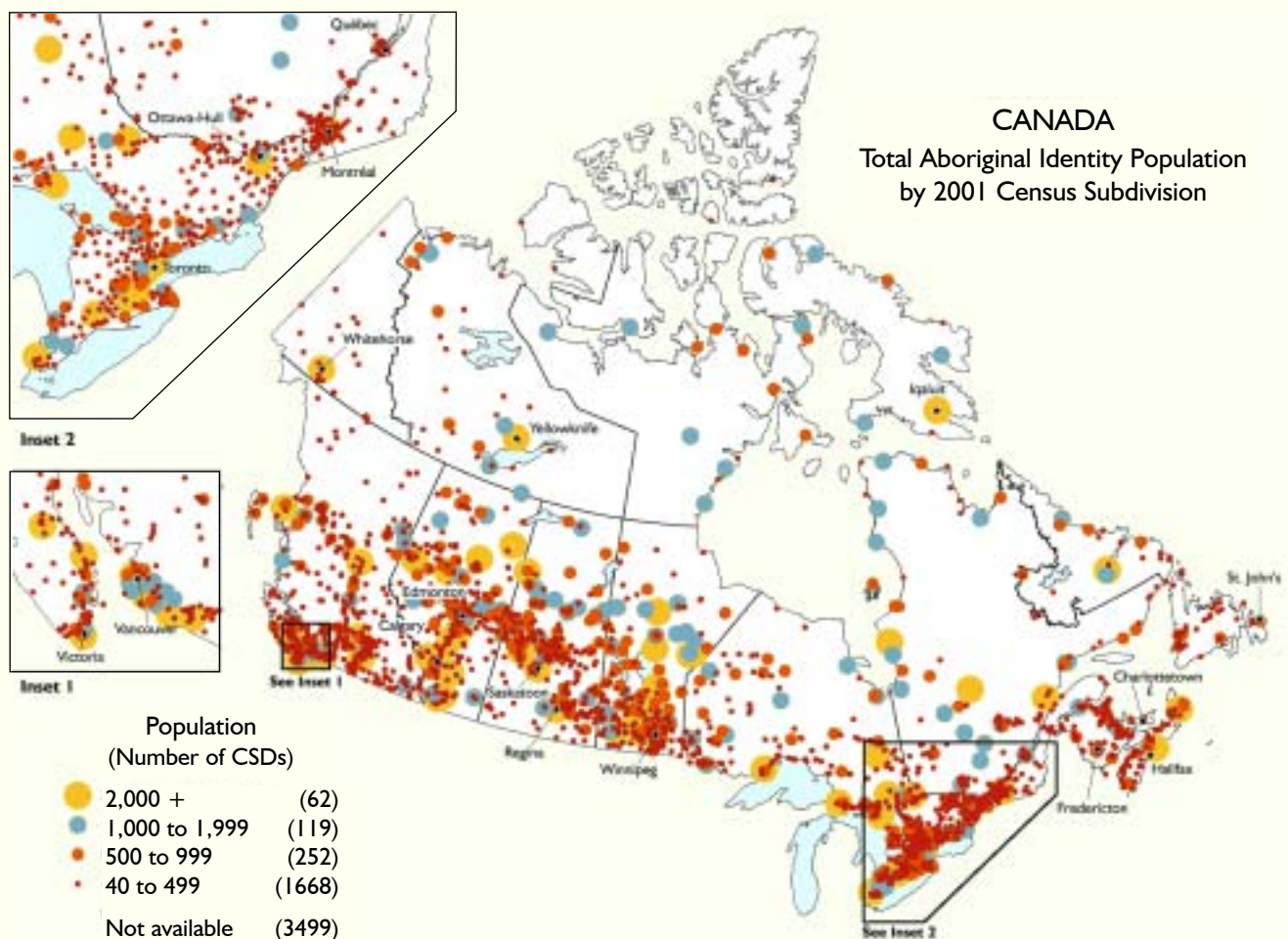
Evidence also points to some residential segregation by ethnicity in Canada's cities.<sup>47, 49</sup> In 2000, in cities with large Aboriginal populations, such as Winnipeg and Regina, there were high concentrations of Aboriginal People living in low-income neighbourhoods compared to the CMA population.<sup>43</sup> Similarly, in some cities with large populations of new immigrants, such as Toronto and Montréal, there were high concentrations of new immigrants living in low-income neighbourhoods.<sup>43</sup>

## Placing the Data

<b>Question</b>	How are Canada's Aboriginal Peoples distributed?
<b>Answer</b>	<p>In 2001, people identifying themselves as Aboriginal accounted for just over 3% of Canada's total population.<sup>50</sup> Ontario had the highest number of people with Aboriginal identity (188,315 or almost 2% of its population), followed by B.C. (170,025 or just over 4% of its population).<sup>50</sup> CMAs with an Aboriginal population of at least 5% of the total CMA population included Montréal, Ottawa/Gatineau (formerly Ottawa-Hull), Toronto, Greater Sudbury (formerly Sudbury), Thunder Bay, Winnipeg, Regina, Saskatoon, Calgary, Edmonton and Vancouver.<sup>51</sup> This represents 80% of the total Aboriginal population living in all CMAs.<sup>51</sup></p>

Figure 7

### Canada's Aboriginal Peoples: Population Density, 2001



Source: 2001 Census of Canada. Produced by the Geography Division, Statistics Canada, 2002.

Note: This figure reprinted with permission.



## CPHI Analyses: Health Outcomes and Behaviours in Different Neighbourhoods in Five Canadian Cities

Despite an increased interest in the link between health outcomes and neighbourhood characteristics, in Canada, as in other countries, data at the neighbourhood level are not always readily available. This can make comparisons between the health status of neighbourhoods difficult. One means of overcoming this is by using socio-economic profiles of neighbourhoods available from the census<sup>‡</sup> to group neighbourhoods together with similar profiles.<sup>52, 53</sup> Canadian research has found that census tracts are good proxies of naturally defined neighbourhoods when exploring neighbourhood effects.<sup>54</sup> The resulting groups of neighbourhoods are then large enough to allow for the exploration of differences in health outcomes and behaviours between these groups of neighbourhoods.

New CPHI analyses used this method to explore differences in health outcomes and behaviours between neighbourhoods in five Canadian cities. Health outcomes and behaviours of interest included self-rated health, reported injuries in the previous 12 months, self-reported overweight and obesity, physical activity and smoking. To identify any existing differences in health outcomes and behaviours between neighbourhoods, cities with sufficiently large populations were needed for the analyses. As such, analyses were conducted for Canada's three most populated cities (Vancouver, Toronto and Montréal), as well as the next most populated cities in the Prairies (Calgary) and Eastern Canada (Halifax).

Steps involved in conducting these analyses were as follows:

- The first step in CPHI's analyses involved using profiles of census tracts, taken from the 2001 Census of Canada, to create a list of variables of potential neighbourhood socio-economic influences.<sup>§</sup>
- The second step involved using a statistical technique to identify which variables seemed most important (that is, explained the majority of variation) and to reduce the list of variables that measured different aspects of neighbourhood socio-economics. This step identified the following variables: median income, percentage of postsecondary graduates, percentage of recent immigrants, percentage of persons living alone and percentage of lone-parent families.
- The identified variables were then used to group neighbourhoods with similar profiles into distinct neighbourhood types. The number of types for each city was separately determined using statistical tests and graphical representation. As a result, the cities analyzed had between three and five types that are unique to each city.
- For each city, the health outcomes and behaviours of the residents of the different types of neighbourhoods created were analyzed using the Canadian Community Health Survey (CCHS) 2003.\*\*

‡ In the following analyses, neighbourhoods were defined using 2001 census tract boundaries.

§ Please refer to Appendix A for more details on the socio-economic variables and statistical analyses used to profile the neighbourhood types.

\*\* Health outcomes and behaviours were reported for residents 12 years and over, except for body mass index, which is calculated only for residents 18 years and over (excluding pregnant women).

The following section presents an overview of the different types of neighbourhoods found in each of the five cities and their associated health patterns. For each city, a table outlining the socio-economic characteristics for each of the different types of neighbourhood is presented, as is a map of the geographic distribution of these neighbourhoods. Differences in the health outcomes and behaviours are presented in a series of five graphs for each respective city. For purposes of clarity in the graphs, not all significant pair-wise comparisons between the neighbourhood types are identified.<sup>††</sup>

While this section looks at neighbourhood-level factors in relation to key population health measures, the analyses do not attempt to attribute any observed patterns at the neighbourhood level to the income or other characteristics of the individuals who live in the various neighbourhoods.

Overall, the results show that place matters to health in these five select urban areas—patterns of health outcomes and behaviours can vary depending on the neighbourhood in which people live.

- In general, residents of neighbourhoods with a higher-than-average percentage of postsecondary graduates and a higher-than-average median income are more likely to report excellent or very good health status and to be physically active, and less likely to report being smokers.
- Rates of overweight and obesity seem to be lower in neighbourhoods mostly situated closest to the downtown areas. This is in line with results from CPHI's report, *Improving the Health of Canadians: Promoting Healthy Weights*, which showed that adults living in the urban core were more likely to self-report a body mass index (BMI) under 25.<sup>55</sup>

#### **What Is a Census Tract?**

Statistics Canada defines census tracts as “small, relatively stable geographic areas that usually have a population of 2,500 to 8,000 . . . [They] should be as homogeneous as possible in terms

of socio-economic characteristics, such as similar economic status and social living conditions at the time of . . . creation.”<sup>6</sup> (p. 246)

<sup>††</sup> Tables outlining all pair-wise comparisons of health outcomes and behaviours between the different types of neighbourhood are presented in Appendix C.

## Vancouver

Vancouver neighbourhoods can be grouped into five different types based on the socio-economic dimensions described previously. These types, for which descriptions follow, will be referred to as Vancouver neighbourhoods V1 to V5. Please refer to Figure 8 for a map showing their geographic distribution as well as a summary of the socio-economic characteristics of each type of neighbourhood.

**V1:** As depicted in the map of Vancouver, V1 areas (dark green) are mainly concentrated in the north and west parts of the city. With the highest median income, the largest proportion of postsecondary graduates and the fewest number of lone-parent families, these represent Vancouver's most affluent areas.

**V2:** Even though these neighbourhoods (light green) are dispersed throughout the city, they tend to be largely concentrated in Vancouver's southern suburbs. The median income in V2 areas is significantly higher than the Vancouver average, and these areas have a lower-than-average percentage of lone-parent families and persons living alone. However, these neighbourhoods also have a lower-than-average percentage of postsecondary graduates.

**V3:** The V3 neighbourhoods (yellow) are scattered throughout central Vancouver, Burnaby and Richmond. This type of neighbourhood has the highest proportion of the population that is made up of recent immigrants, as well as a lower-than-average median income.

**V4:** V4 neighbourhoods (orange) are mainly situated in east Vancouver, Richmond and north Surrey. With a lower-than-average median income and percentage of postsecondary graduates, and a higher-than-average proportion of lone-parent families, these represent some of Vancouver's more socio-economically disadvantaged areas.

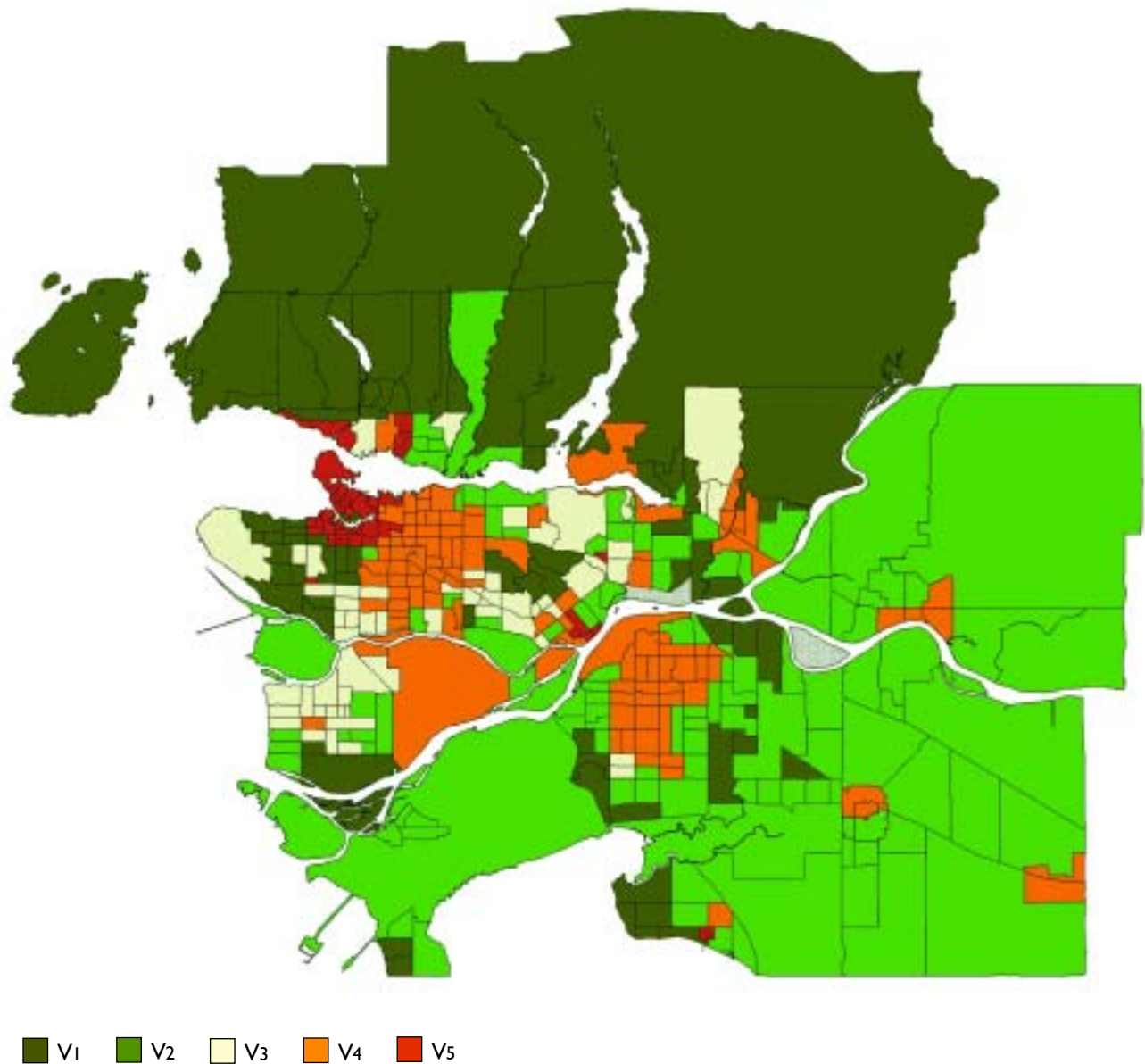
**V5:** Vancouver's V5 neighbourhoods (red) are mainly situated in the city's downtown area. Individuals living in these areas have the lowest median income, but the neighbourhoods have a higher-than-average proportion of postsecondary graduates. The proportion of persons living alone is more than three times Vancouver's average.

Summary Characteristics by Neighbourhood Type, Vancouver, B.C.						
	V1	V2	V3	V4	V5	Vancouver Average
% of Postsecondary Graduates	High (65%)	Low (50%)	Average (54%)	Low (43%)	High (63%)	53%
% of Persons Living Alone	Low (6%)	Low (6%)	Average (10%)	Average (10%)	High (37%)	11%
% of Recent Immigrants	Low (6%)	Low (4%)	High (18%)	Average (9%)	Average (8%)	8%
Median Income	High (\$77,268)	High (\$60,297)	Low (\$45,848)	Low (\$43,732)	Low (\$38,238)	\$54,584
% of Lone-Parent Families	Low (11%)	Low (13%)	Average (15%)	High (21%)	Average (14%)	15%
Average Age	37 years	36 years	37 years	36 years	42 years	37 years



Figure 8

Neighbourhood Types in Vancouver CMA, B.C.



Source: CPHI analysis of 2001 Census, Statistics Canada.

Note: "High" indicates a percentage statistically significantly higher than the Vancouver city average.

"Low" indicates a percentage statistically significantly lower than the Vancouver city average.

"Average" indicates a percentage that was not statistically different from the city average ( $p < .05$ ).

## Summary of Health Outcomes and Behaviours, by Neighbourhood Type, in Vancouver CMA, B.C.

Contrasting the different types of neighbourhood found in Vancouver reveals differences in both health status and participation in health behaviours.

- When looking at self-rated health and physical activity, V1, V2 and V5 neighbourhoods have a higher percentage of people reporting excellent or very good health and physical activity than V3 and V4 neighbourhoods (see Figures 8.1 and 8.3).
- The proportion of residents reporting an injury in the last year, on the other hand, is lower in V3 neighbourhoods, which have a high percentage of immigrants, and V4 neighbourhoods, which have a high percentage of lone-parent families, than in V2 neighbourhoods, with higher-than-average median income (see Figure 8.2).
- Rates of overweight and obesity are higher in Vancouver's V2 neighbourhoods compared to V3 neighbourhoods, which have a high percentage of recent immigrants, and compared to V5 neighbourhoods, which have a high percentage of persons living alone (see Figure 8.4).
- People living in Vancouver's most affluent neighbourhoods (V1) are less likely to report being smokers than residents of other neighbourhood types (see Figure 8.5).

- Residents of Vancouver neighbourhood types with a higher-than-average median income or a higher-than-average percentage of postsecondary graduates are more likely to report excellent or very good health and participation in physical activity than residents of other neighbourhood types.

- People living in Vancouver's most affluent neighbourhoods are less likely to report being smokers than other residents of Vancouver.

**Patterns of Health in Vancouver Neighbourhoods: Main Findings**

Figure 8.1

% Reporting Excellent or Very Good Health

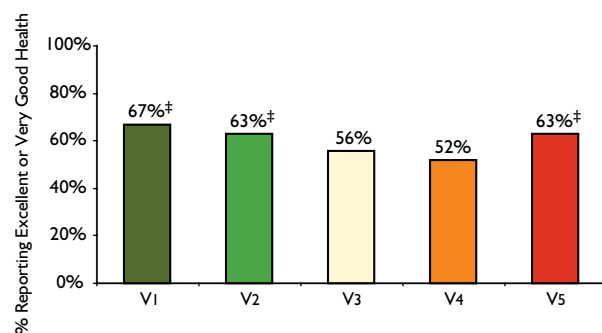


Figure 8.2

% Reporting an Injury in the Last Year

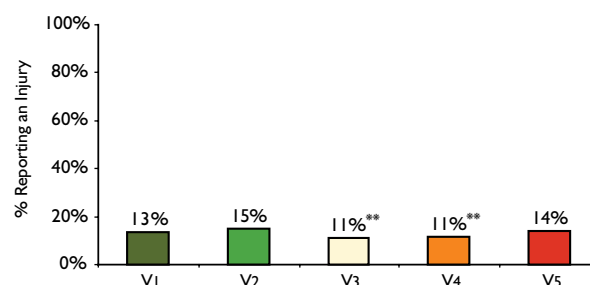


Figure 8.3

% Who Are Physically Active (Active and Moderately Active)

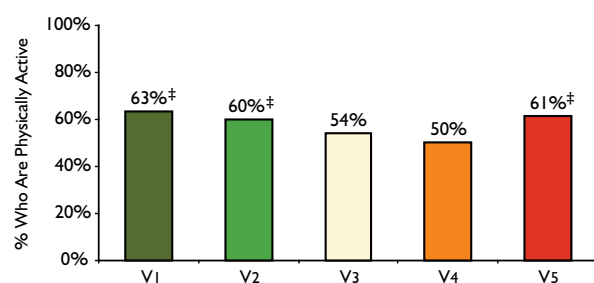


Figure 8.4

% Who Are Overweight or Obese (BMI ≥ 25)

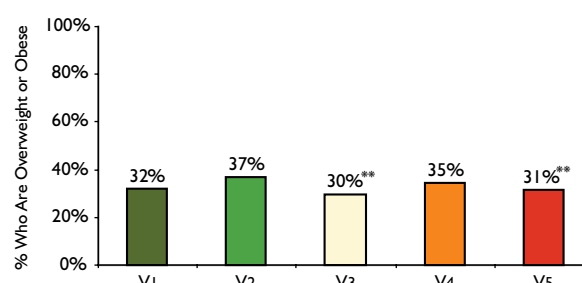
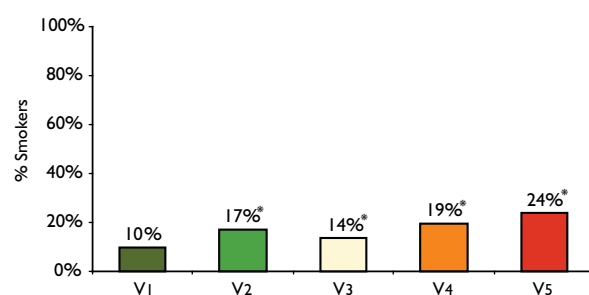


Figure 8.5

% Smokers



Source: CPHI analysis of 2001 Census and CCHS 2.1 (2003), Statistics Canada.

\* Significantly different from V1 neighbourhoods,  $p < .05$ .

\*\* Significantly different from V2 neighbourhoods,  $p < .05$ .

† Significantly different from V3 and V4 neighbourhoods,  $p < .05$ .

## Calgary

Using the statistical techniques previously described, Calgary neighbourhoods were grouped into three different types based on the five socio-economic dimensions (see Figure 9). These types will be referred to as Calgary neighbourhoods C1 to C3 for the following analyses (see below for a description of each type of neighbourhood).

**C1:** As illustrated in Figure 9, with few exceptions, Calgary's C1 neighbourhoods (dark green) largely form the city's outermost suburban areas. These neighbourhoods have the highest median income and the largest proportion of the population made up of postsecondary graduates. This type of neighbourhood also has a lower-than-average percentage of lone-parent families, recent immigrants and persons living alone. Calgary's C1 neighbourhoods form some of the city's most affluent areas.

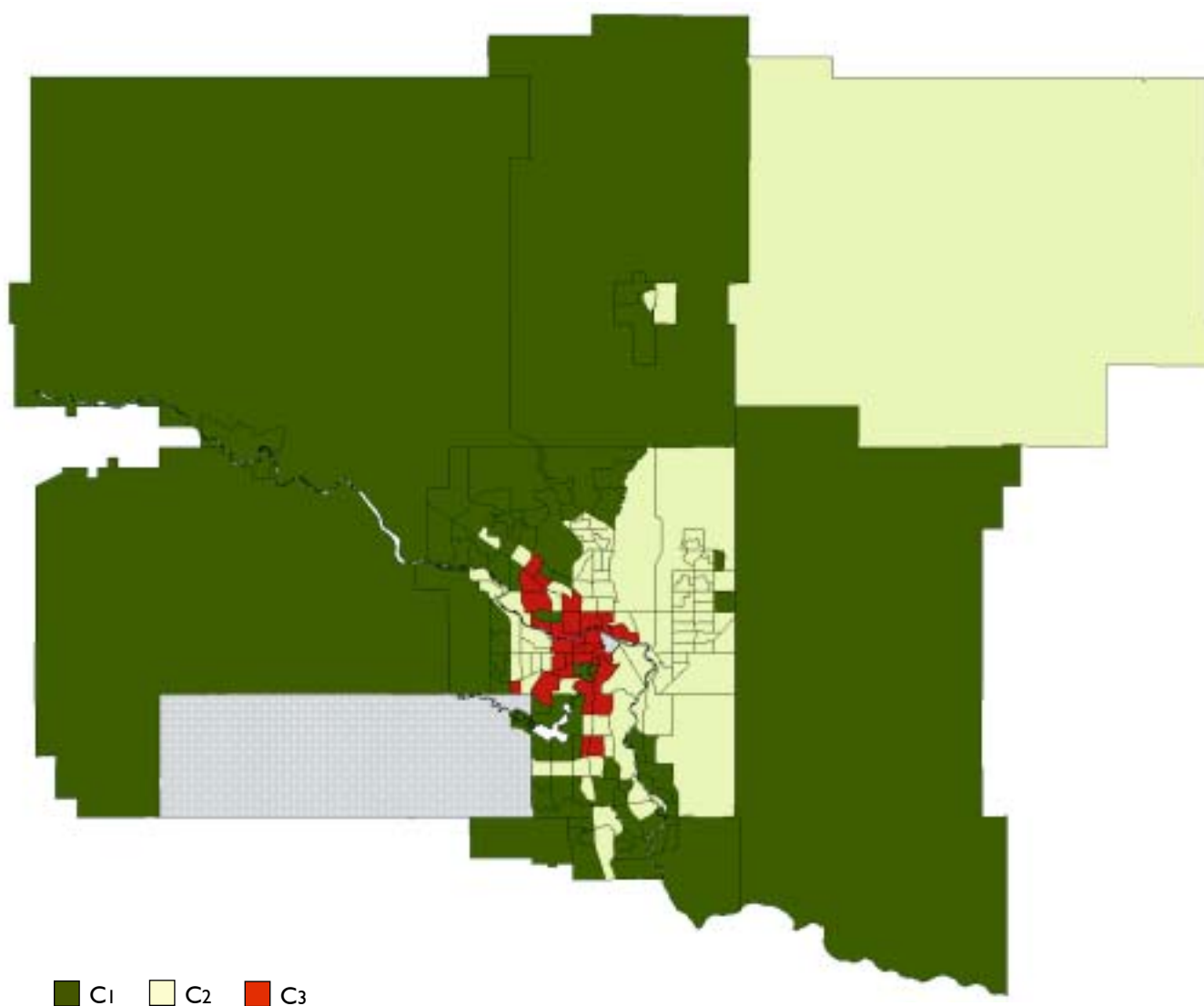
**C2:** With few exceptions, these neighbourhoods (yellow) tend to form Calgary's innermost suburbs and are situated around the city's downtown area. Both median income and the percentage of postsecondary graduates are lower than the city average in these areas. The proportion of lone-parent families in the C2 neighbourhoods is also higher than average.

**C3:** Figure 9 shows that C3 neighbourhoods (red) largely form the city's downtown area. Although these neighbourhoods have the lowest median income, they have a higher-than-average proportion of postsecondary graduates. Compared to the Calgary average, the proportion of persons living alone is almost three times higher in these neighbourhoods.

Summary Characteristics by Neighbourhood Type, Calgary, Alta.				
	C1	C2	C3	Calgary Average
% of Postsecondary Graduates	High (63%)	Low (47%)	High (62%)	56%
% of Persons Living Alone	Low (4%)	Average (8%)	High (24%)	9%
% of Recent Immigrants	Low (3%)	Average (4%)	High (6%)	4%
Median Income	High (\$82,620)	Low (\$52,191)	Low (\$42,959)	\$63,153
% of Lone-Parent Families	Low (9%)	High (20%)	Average (15%)	15%
Average Age	34 years	35 years	37 years	35 years

Figure 9

Neighbourhood Types in Calgary CMA, Alta.



Source: CPHI analysis of 2001 Census, Statistics Canada.

Note: "High" indicates a percentage statistically significantly higher than the Calgary city average.

"Low" indicates a percentage statistically significantly lower than the Calgary city average.

"Average" indicates a percentage that was not statistically different from the city average ( $p < .05$ ).

## Summary of Health Outcomes and Behaviours, by Neighbourhood Type, in Calgary CMA, Alta.

There are differences in health outcomes and behaviours between Calgary's three types of neighbourhood.

- Individuals living in C1 neighbourhoods are more likely to report excellent or very good health and are less likely to report being smokers than residents of other neighbourhoods (see Figures 9.1 and 9.5).
- The percentage of residents reporting injuries in the last year does not vary significantly from one neighbourhood type to another (see Figure 9.2).

- The residents of C1 neighbourhoods are more likely to report being physically active than people from C2 neighbourhoods (see Figure 9.3).
- The neighbourhoods forming the downtown area (C3) have a lower proportion of their population who report being overweight or obese, compared to neighbourhoods forming the inner suburb (C2) (see Figure 9.4).

- Residents of Calgary's most affluent areas are generally more likely to engage in physical activity and less likely to report being smokers than other residents.
- In Calgary's areas with higher-than-average median income and percentage of postsecondary graduates, residents are more likely to report better health.

- The proportion of residents reporting injuries does not vary significantly between Calgary's neighbourhood types.

### **Patterns of Health in Calgary Neighbourhoods: Main Findings**

Figure 9.1

% Reporting Excellent or Very Good Health

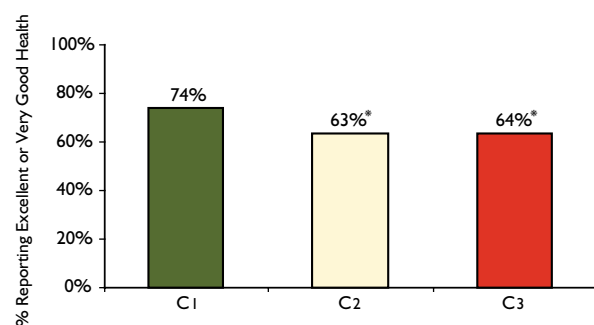


Figure 9.2

% Reporting an Injury in the Last Year

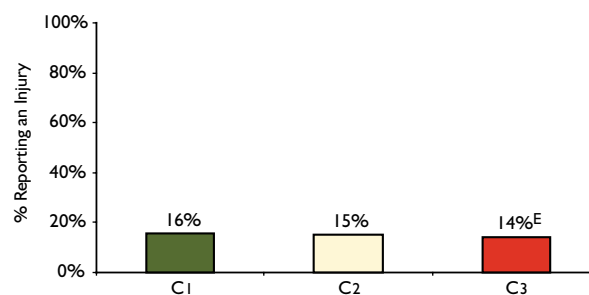


Figure 9.3

% Who Are Physically Active (Active and Moderately Active)

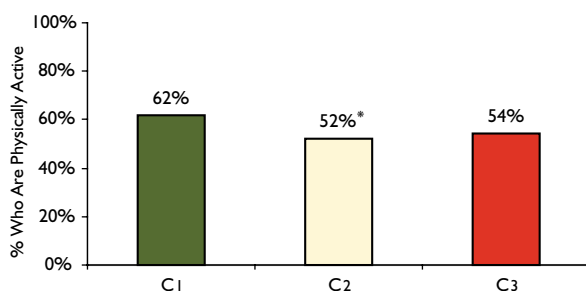


Figure 9.4

% Who Are Overweight or Obese (BMI ≥ 25)

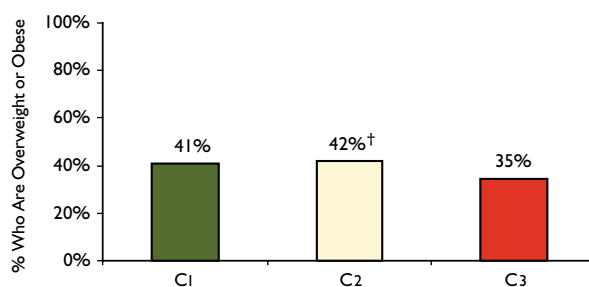
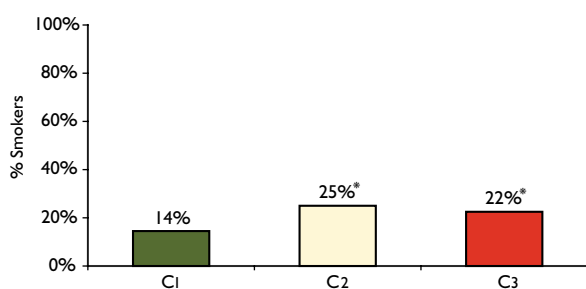


Figure 9.5

% Smokers



Source: CPHI analysis of 2001 Census and CCHS 2.1 (2003), Statistics Canada.

\* Significantly different from C1 neighbourhoods,  $p < .05$ .

† Significantly different from C3 neighbourhoods,  $p < .05$ .

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

## Toronto

Following the same methodology used for Vancouver and Calgary, neighbourhoods in Toronto were categorized into four neighbourhood types (see Figure 10). These types will be referred to as Toronto neighbourhoods T1 to T4 for the following analyses (see below for a brief description of each).

**T1:** These neighbourhoods (dark green) are scattered throughout the city, but appear to be most dominant in Toronto's suburban regions (Halton Hills, Caledon, Uxbridge, etc.) as well as immediately north of the downtown area. T1 areas have the highest median income, the lowest percentage of lone-parent families and the lowest percentage of persons living alone. In comparison to the city average, these neighbourhoods also have a higher-than-average percentage of postsecondary graduates. As was the case for the cities discussed previously, the dark green regions on the Toronto map represent some of the city's most affluent areas.

**T2:** Toronto's T2 neighbourhoods (light green) are also scattered throughout the city, with representation in both the inner and outer suburbs. These neighbourhoods have a lower-than-average median income, percentage of postsecondary graduates, percentage of persons living alone and percentage of recent immigrants.

**T3:** These neighbourhoods (orange) are almost exclusively situated in Toronto's downtown area. The percentage of postsecondary graduates is higher than average in these areas; however, median income falls below the city average. The percentage of persons living alone in T3 neighbourhoods is more than double that of the city as a whole.

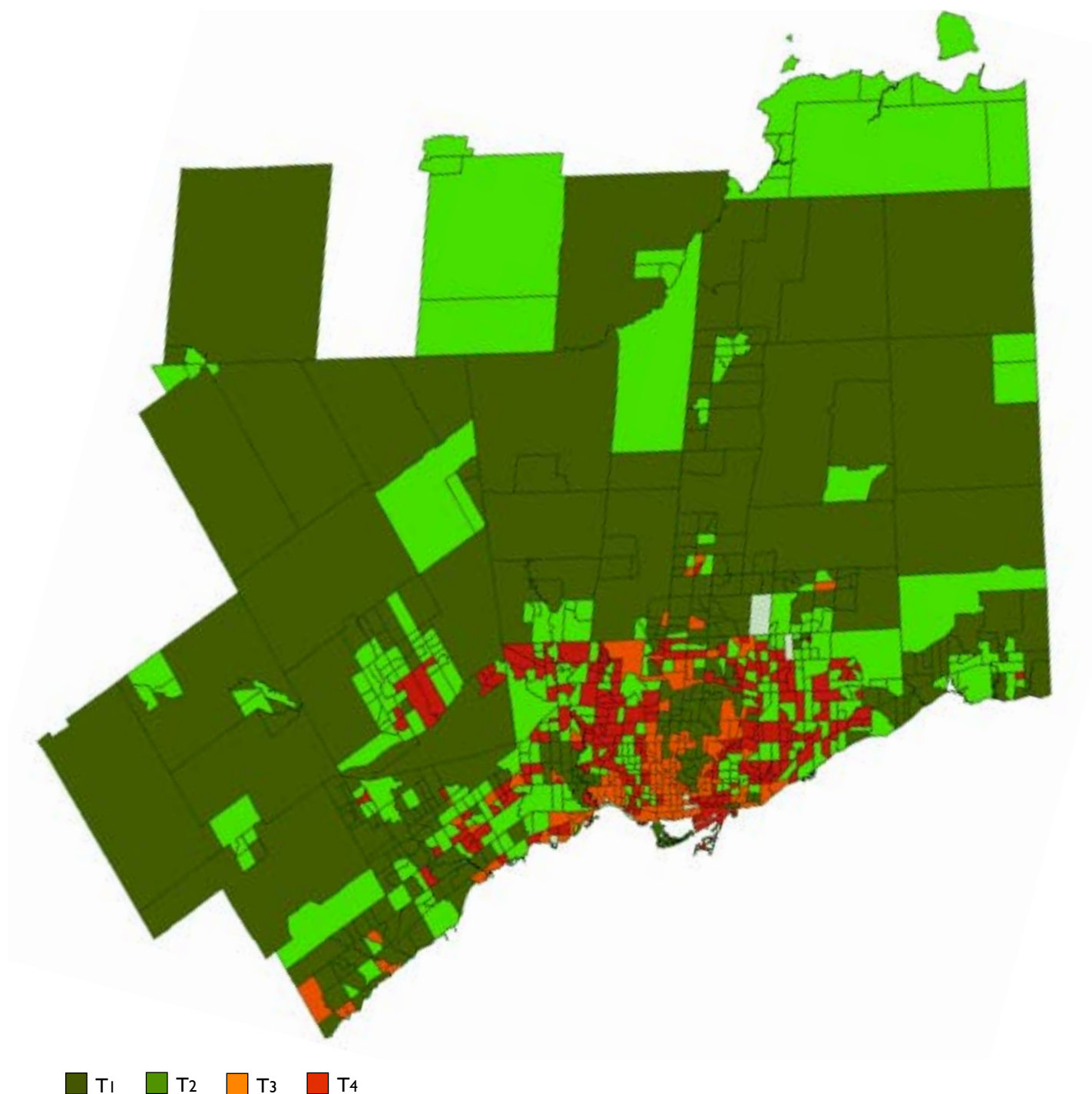
**T4:** Toronto's T4 neighbourhoods (red) are largely scattered in and around the downtown area, with representation in areas of Scarborough, North York and Etobicoke-York. These neighbourhoods represent some of the city's more socio-economically disadvantaged neighbourhoods, with a lower-than-average percentage of postsecondary graduates and median income. These T4 neighbourhoods also have a relatively high proportion of lone-parent families and recent immigrants.

Summary Characteristics by Neighbourhood Type, Toronto, Ont.					
	T1	T2	T3	T4	Toronto Average
% of Postsecondary Graduates	High (61%)	Low (45%)	High (64%)	Low (43%)	52%
% of Persons Living Alone	Low (4%)	Low (6%)	High (21%)	Average (9%)	8%
% of Recent Immigrants	Low (4%)	Low (6%)	Average (9%)	High (16%)	8%
Median Income	High (\$89,686)	Low (\$61,565)	Low (\$52,769)	Low (\$41,993)	\$65,532
% of Lone-Parent Families	Low (10%)	Average (16%)	Average (16%)	High (24%)	17%
Average Age	35 years	37 years	40 years	35 years	36 years



Figure 10

Neighbourhood Types in Toronto CMA, Ont.



Source: CPHI analysis of 2001 Census, Statistics Canada.

Note: "High" indicates a percentage statistically significantly higher than the Toronto city average.

"Low" indicates a percentage statistically significantly lower than the Toronto city average.

"Average" indicates a percentage that was not statistically different from the city average ( $p < .05$ ).

### Summary of Health Outcomes and Behaviours, by Neighbourhood Type, in Toronto CMA, Ont.

An examination of the four types of neighbourhood found in Toronto reveals differences in both health status and health behaviours.

- Individuals living in T1 neighbourhoods are more likely to report being in excellent or very good health than residents of T2 and T4 neighbourhoods (see Figure 10.1).
- Residents of T4 neighbourhoods, which are the least affluent areas of Toronto and which have twice the percentage of recent immigrants compared to Toronto on average, are less likely to report being physically active or to report injuries than those living in other neighbourhoods (see Figure 10.2 and 10.3).
- Rates of self-reported overweight and obesity are lower in T1 and T3 neighbourhoods, which are located primarily in the inner city or the outer suburbs, compared to T2 neighbourhoods, which are suburban areas lying on the east and west sides of the downtown area (see Figure 10.4).
- The percentage of the population that reports being smokers varies from 19% to 22%, but is not significantly different from one type of neighbourhood to another (see Figure 10.5).

- Residents of Toronto neighbourhoods with a higher-than-average median income and percentage of postsecondary graduates are more likely to report better health than residents of neighbourhoods with a lower-than-average median income and percentage of postsecondary graduates.

- In Toronto's neighbourhoods that are the least affluent areas, residents are less likely to report being physically active and less likely to report injuries than those living in other neighbourhoods.
- The percentage of smokers among Toronto residents does not vary significantly from one type of neighbourhood to another.

#### **Patterns of Health in Toronto Neighbourhoods: Main Findings**

Figure 10.1

% Reporting Excellent or Very Good Health

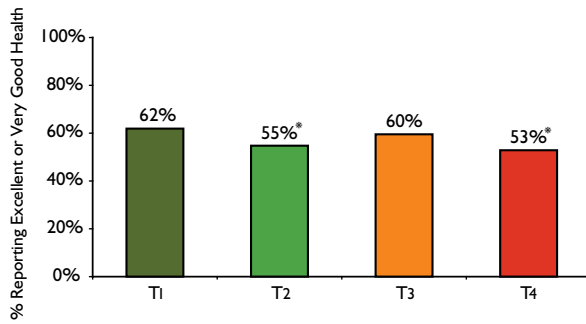


Figure 10.2

% Reporting an Injury in the Last Year

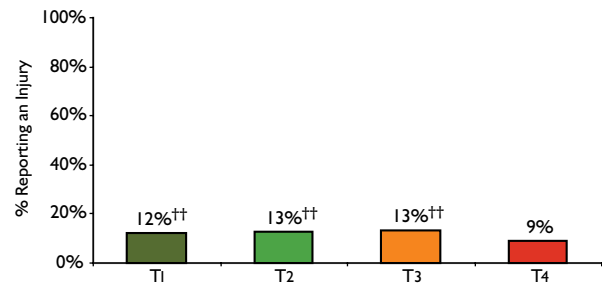


Figure 10.3

% Who Are Physically Active (Active and Moderately Active)

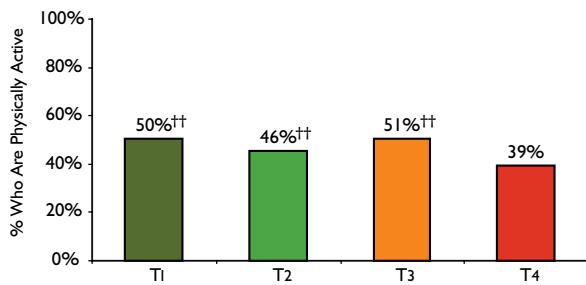


Figure 10.4

% Who Are Overweight or Obese (BMI ≥ 25)

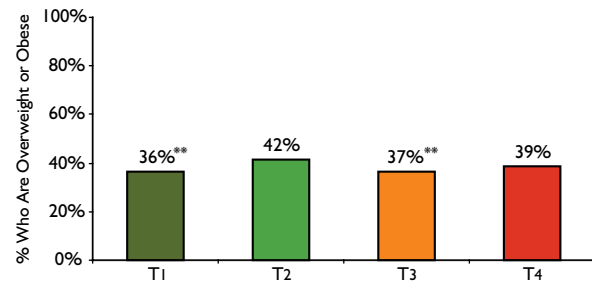
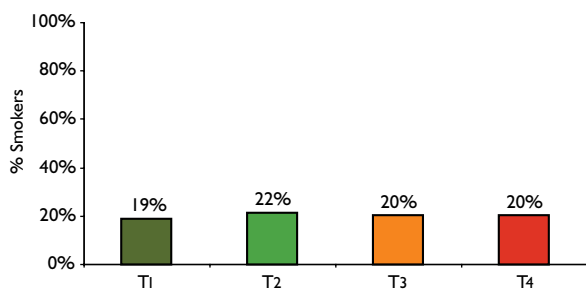


Figure 10.5

% Smokers



Source: CPHI analysis of 2001 Census and CCHS 2.1 (2003), Statistics Canada.

\* Significantly different from T1 neighbourhoods,  $p < .05$ .

\*\* Significantly different from T2 neighbourhoods,  $p < .05$ .

†† Significantly different from T4 neighbourhoods,  $p < .05$ .

## Montréal

Based on the criteria discussed earlier in this chapter, Montréal neighbourhoods were grouped into five distinct types (see Figure 11) and will be referred to as Montréal neighbourhoods M1 to M5.

**M1:** As illustrated in Figure 11, these neighbourhoods (dark green) are dispersed throughout the city, but tend to be grouped in and around the west part of the Island of Montréal and on the south shore, adjacent to the eastern part of the island. With the highest median income and proportion of postsecondary graduates, these neighbourhoods form the city's more affluent areas. In addition, they have a lower-than-average percentage of lone-parent families, persons living alone and recent immigrants.

**M2:** Although these neighbourhoods (light green) are also dispersed throughout the city, they are mainly situated in outer suburban areas. Montréal's M2 neighbourhoods have a similar profile to M1 neighbourhoods, with the exception of a lower-than-average percentage of postsecondary graduates.

**M3:** These neighbourhoods (yellow) are largely situated on the Island of Montréal, just east of the city's downtown area. The proportion of postsecondary graduates is higher than the city average, but the median

income falls below the city average.

Montréal's M3 neighbourhoods have a high percentage of persons living alone—almost twice as high as the Montréal average.

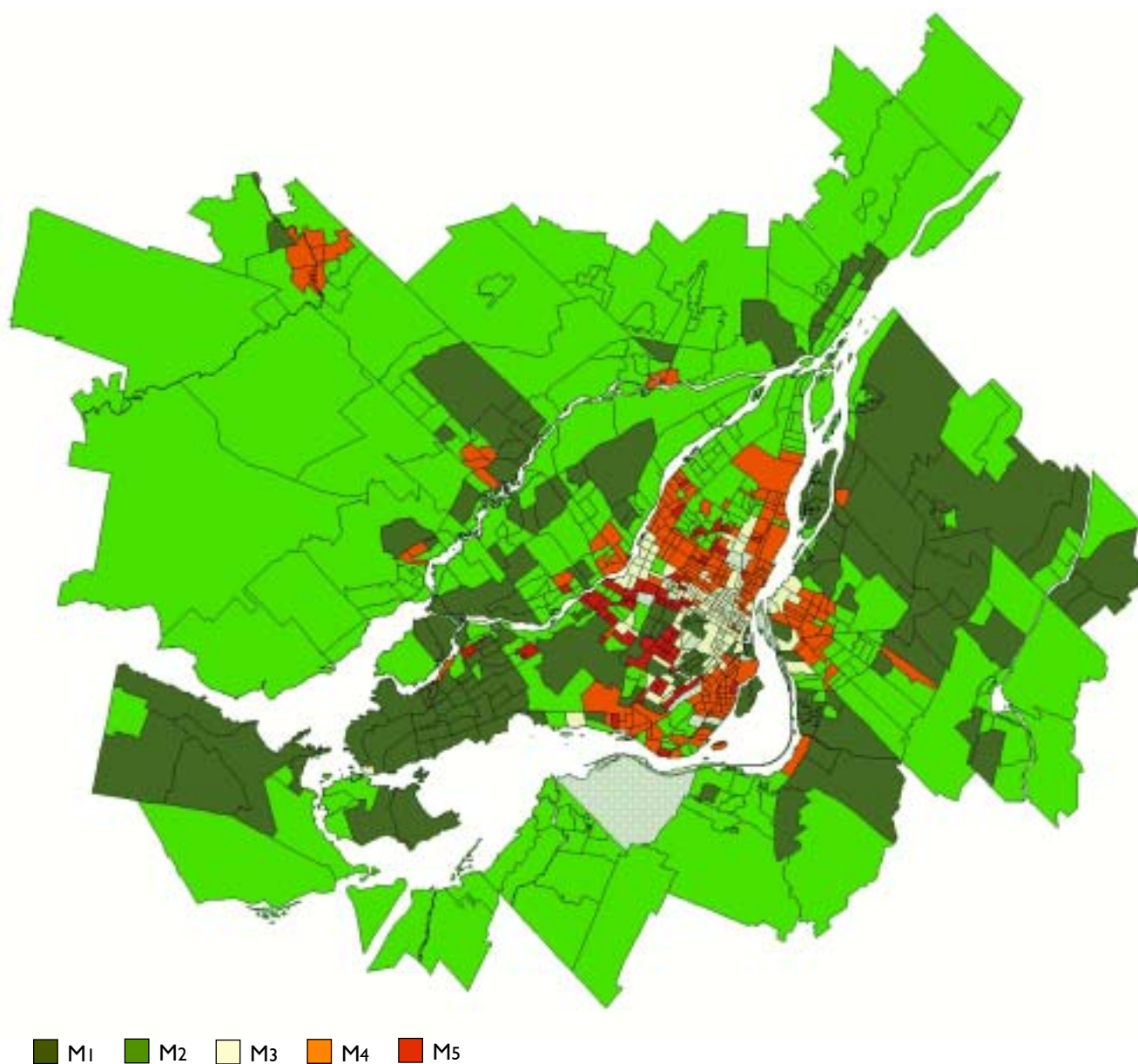
**M4:** The majority of these neighbourhoods (orange) can be found in the east and south of the Island of Montréal. M4 neighbourhoods have the lowest percentage of postsecondary graduates and a median income lower than the city average. They also have the highest percentage of lone-parent families. As such, they represent some of Montréal's more socio-economically disadvantaged neighbourhoods.

**M5:** With one exception, M5 neighbourhoods (red) are located exclusively on the Island of Montréal. These neighbourhoods have the lowest median income, and a lower-than-average percentage of postsecondary graduates. Like Montréal's M4 neighbourhoods, these too represent some of the city's less affluent areas. These neighbourhoods also have the highest proportion of recent immigrants—over four times the city average.

Summary Characteristics by Neighbourhood Type, Montréal, Que.						
	M1	M2	M3	M4	M5	Montréal Average
% of Postsecondary Graduates	High (65%)	Low (44%)	High (63%)	Low (37%)	Low (45%)	50%
% of Persons Living Alone	Low (6%)	Low (9%)	High (27%)	High (19%)	Average (16%)	15%
% of Recent Immigrants	Low (2%)	Low (1%)	High (6%)	Average (9%)	High (14%)	3%
Median Income	High (\$75,423)	High (\$49,040)	Low (\$35,472)	Low (\$29,738)	Low (\$29,011)	\$45,333
% of Lone-Parent Families	Low (11%)	Low (16%)	Average (20%)	High (28%)	High (23%)	19%
Average Age	36 years	37 years	39 years	38 years	37 years	37 years

Figure 11

Neighbourhood Types in Montréal CMA, Que.



Source: CPHI analysis of 2001 Census, Statistics Canada.

Note: "High" indicates a percentage statistically significantly higher than the Montréal city average.

"Low" indicates a percentage significantly statistically lower than the Montréal city average.

"Average" indicates a percentage that was not statistically different from the city average ( $p < .05$ ).

## Summary of Health Outcomes and Behaviours, by Neighbourhood Type, in Montréal CMA, Que.

Contrasting the different types of neighbourhood found in Montréal reveals differences in both health status and health behaviours.

- People living in M1 neighbourhoods are more likely than those living in M2, M4 and M5 neighbourhoods to report excellent or very good health (see Figure 11.1).
- In Montréal, the proportion of residents who reported injuries in the last year does not vary significantly from one type of neighbourhood to another (see Figure 11.2).
- Residents of M1 neighbourhoods are more likely to report being physically active and less likely to report being smokers than residents of other neighbourhoods (see Figures 11.3 and 11.5).
- Compared to the other types of neighbourhood, residents of M3 neighbourhoods are the least likely to report being overweight or obese. This type of neighbourhood is largely situated on the Island of Montréal, just east of the downtown core (see Figure 11.4).

- Residents of Montréal's areas with the highest median income and percentage of postsecondary graduates report better health, are more likely to be physically active and less likely to report being smokers than residents of Montréal's less affluent areas.

- The percentage of residents reporting injuries in Montréal does not vary significantly between neighbourhood types.

### **Patterns of Health in Montréal Neighbourhoods: Main Findings**

Figure 11.1

% Reporting Excellent or Very Good Health

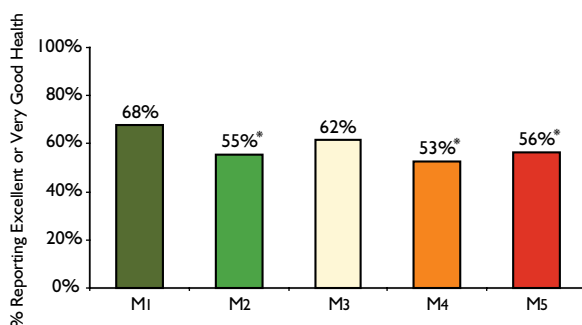


Figure 11.2

% Reporting an Injury in the Last Year

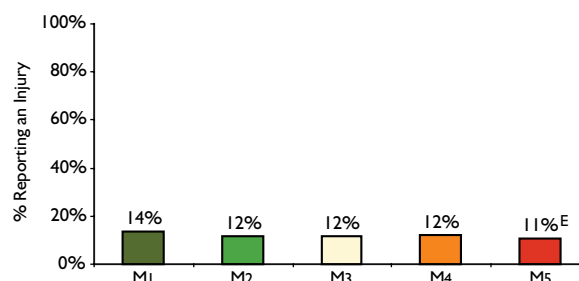


Figure 11.3

% Who Are Physically Active (Active and Moderately Active)

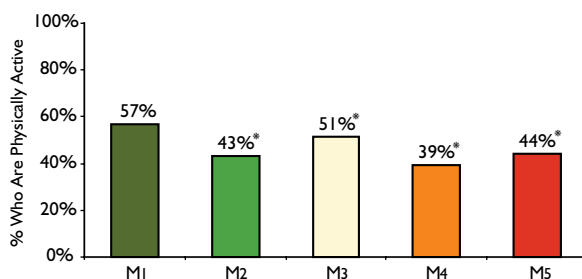


Figure 11.4

% Who Are Overweight or Obese (BMI ≥ 25)

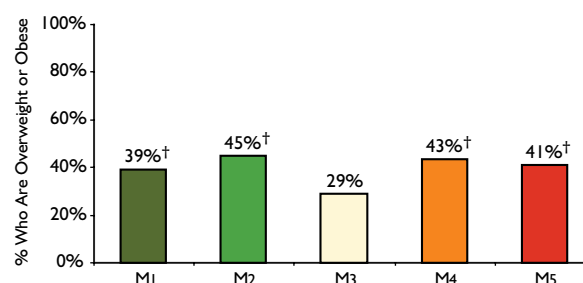
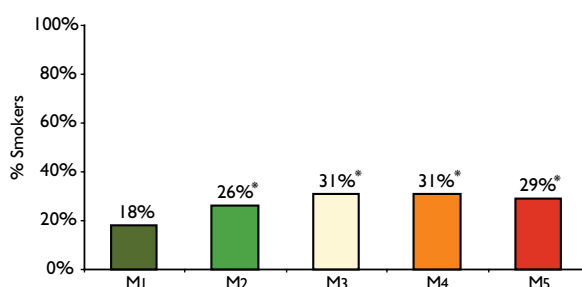


Figure 11.5

% Smokers



Source: CPHI analysis of 2001 Census and CCHS 2.1 (2003), Statistics Canada.

\* Significantly different from M1 neighbourhoods,  $p < .05$ .

† Significantly different from M3 neighbourhoods,  $p < .05$ .

<sup>E</sup> Coefficient of variation between 16.6% and 33.3% (interpret with caution).



## Halifax

When classified using the five socio-economic variables previously described (median income, percentage of postsecondary graduates, percentage of recent immigrants, percentage of persons living alone and percentage of lone-parent families), neighbourhoods in Halifax were grouped into one of three neighbourhood types (see Figure 12).<sup>2</sup> These types will be referred to as Halifax neighbourhoods H1 to H3 for the following analyses.

**H1:** As depicted in Figure 12, these neighbourhoods (dark green) are located almost exclusively around the downtown area. Halifax's H1 neighbourhoods have the highest median income and have a lower-than-average percentage of lone-parent families and persons living alone.

**H2:** Halifax's H2 neighbourhoods (yellow) can be found in two well-defined pockets in the city's downtown area. Even though these are neighbourhoods where the percentage of postsecondary graduates is higher than the city average, their median income falls below the average for Halifax. The proportion of persons living alone in these neighbourhoods is also two times higher than it is on average in the city.

**H3:** These neighbourhoods (red) are primarily situated in the downtown area. In addition to having a lower than average median income, the percentage of postsecondary graduates is lower than average in these areas. The proportion of lone-parent families and persons living alone is also above the city average in these neighbourhoods.

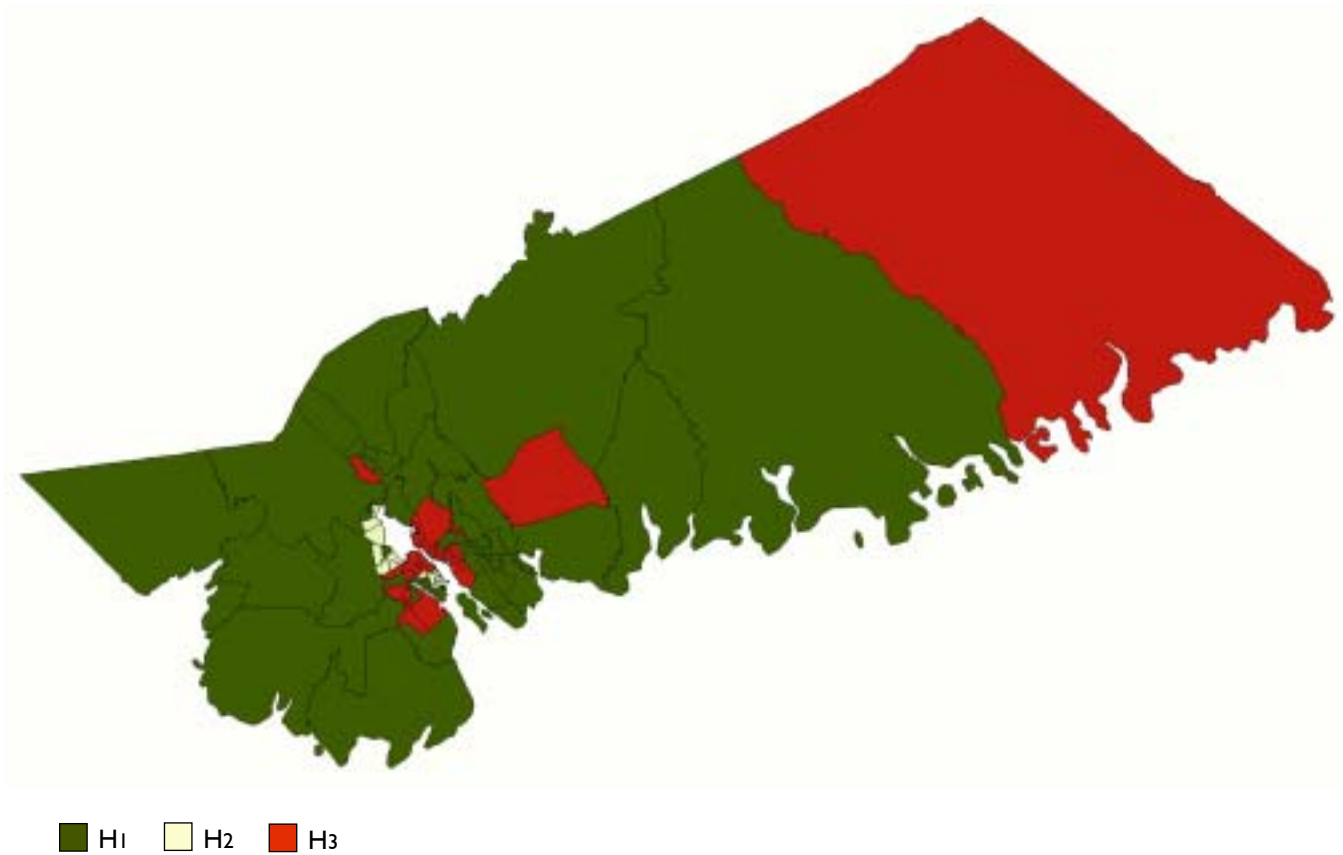
Summary Characteristics by Neighbourhood Type, Halifax, N.S.				
	H1	H2	H3	Halifax Average
% of Postsecondary Graduates	Average (60%)	High (67%)	Low (49%)	57%
% of Persons Living Alone	Low (7%)	High (24%)	High (16%)	12%
% of Recent Immigrants	Low (<1%)	High (4%)	Average (1%)	1%
Median Income	High (\$59,083)	Low (\$39,684)	Low (\$36,058)	\$49,301
% of Lone-Parent Families	Low (12%)	Low (13%)	High (27%)	17%
Average Age	36 years	38 years	37 years	37 years

<sup>22</sup> Compared to the larger cities of Vancouver, Calgary, Toronto and Montréal, the creation of neighbourhood types for Halifax was based on a smaller number of census tracts (N<30 for some types). Given this, the qualifiers "higher than average" and "lower than average" for Halifax should be interpreted with caution.



Figure 12

Neighbourhood Types in Halifax CMA, N.S.



Source: CPHI analysis of 2001 Census, Statistics Canada.

Note: "High" indicates a percentage statistically significantly higher than the Halifax city average.

"Low" indicates a percentage statistically significantly lower than the Halifax city average.

"Average" indicates a percentage that was not statistically different from the city average ( $p < .05$ ).

## Summary of Health Outcomes and Behaviours, by Neighbourhood Type, in Halifax CMA, N.S.

The different types of neighbourhood found in Halifax show differences in health outcomes and behaviours.

- Residents of H2 neighbourhoods, which have a lower-than-average income but a higher-than-average percentage of postsecondary graduates, are more likely than those living in H1 or H3 neighbourhoods to rate their health as excellent or very good (see Figure 12.1).
- There are no significant differences between the neighbourhood types with regards to the percentage of the population who report being physically active, who report being overweight or obese or who report an injury in the last year (see Figures 12.2 to 12.4).

- Residents of H3 neighbourhoods living in Halifax's least affluent areas with the lowest percentage of postsecondary graduates and median income, and the highest percentage of lone-parent families, are more likely to report being smokers than those living in either of the other types of neighbourhood (see Figure 12.5).

- The proportion of residents in Halifax who rate their health as excellent or very good is highest in neighbourhoods where there is a higher-than-average percentage of postsecondary graduates and lower-than-average median income.

- Residents of Halifax's least affluent areas are more likely to report being smokers.
- Rates of overweight and obesity do not significantly vary from one Halifax neighbourhood type to another. Injuries and physical activity also do not vary significantly across neighbourhood types.

### Patterns of Health in Halifax Neighbourhoods: Main Findings

Figure 12.1

% Reporting Excellent or Very Good Health

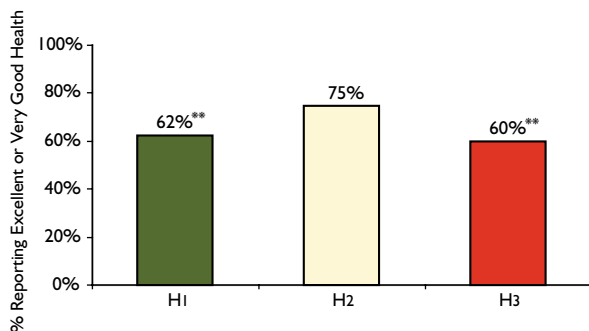


Figure 12.2

% Reporting an Injury in the Last Year

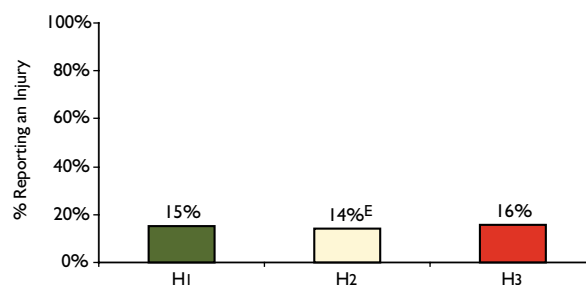


Figure 12.3

% Who Are Physically Active (Active and Moderately Active)

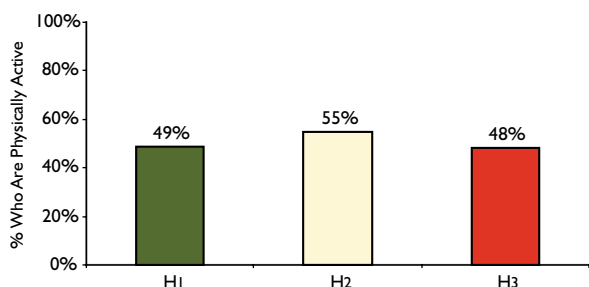


Figure 12.4

% Who Are Overweight or Obese (BMI ≥ 25)

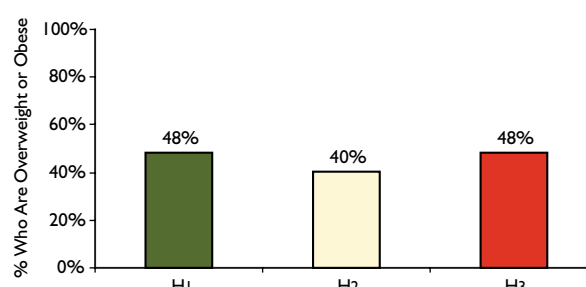
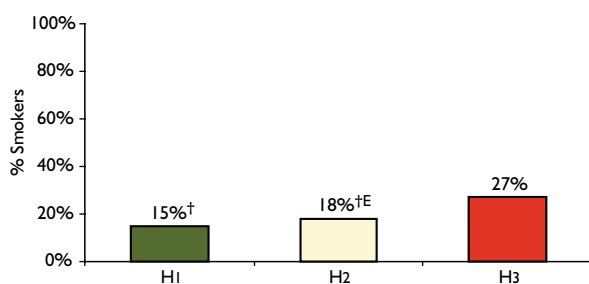


Figure 12.5

% Smokers



Source: CPHI analysis of 2001 Census and CCHS 2.1 (2003), Statistics Canada.

\*\* Significantly different from H2 neighbourhoods,  $p < .05$ .

† Significantly different from H3 neighbourhoods,  $p < .05$ .

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

## Patterns of Health Between Cities and Neighbourhoods: What Do We Know?

CPHI's new CMA-level and neighbourhood-level analyses show that patterns of health-related behaviours and outcomes can vary between CMAs and between neighbourhoods in the five studied cities.

- Residents of the 27 CMAs, including the neighbourhoods of the five studied cities, are not equally healthy. They also differ in their adoption of health-promoting and health-compromising behaviours.
- Within Canada's larger cities, neighbourhoods differ with regards to various socio-economic influences such as education, income and family structure.
- Given that various socio-economic characteristics differ from one neighbourhood to another, differences in health outcomes and behaviours can be observed between neighbourhood types within the same city.
- The presence of neighbourhoods with different socio-economic profiles and patterns of health indicate that there are many implications for health authorities, decision-makers, officers responsible for population health, as well as policy-makers and urban planners in related non-health sectors, such as economic and social development planners in urban centres.

## Patterns of Health Between Cities and Neighbourhoods: What Do We Not Know?

CPHI's neighbourhood-level analyses did not take into account the potential influence on health-related outcomes and behaviours of various features of urban living conditions

specific to the social and physical environment (for example, access to labour markets and services, presence of recreation centres, existence of sidewalks and movie theatres).

- The causal mechanisms through which a neighbourhood's socio-economic characteristics may be related to the health of its residents are unclear.
- CPHI analyses did not look at whether or not neighbourhood socio-economic characteristics may have had different influences on residents based on their gender.
- Neighbourhood socio-economic characteristics may be linked to the health of some residents and not others. We also do not know if links develop after a certain amount of time spent living in a given neighbourhood.
- The neighbourhood characteristics chosen for these analyses provide a snapshot of a local situation, but they do not explain it. For example, the percentage of persons living alone may be higher in neighbourhoods where there are a lot of students or where seniors are predominant, or where there is a mix of both. Caution should therefore be used when trying to portray the neighbourhood types.
- CPHI analyses did not measure what, if any, contribution to health the neighbourhood may have had over and above an individual's characteristics.

Not all health outcomes examined in CPHI's analyses (for example, injuries) differed significantly between neighbourhood types in each city. While the lack of significance between neighbourhood types may indicate that the outcomes were not linked to the socio-economic variables selected to profile the neighbourhoods, it may also indicate that other socio-economic variables or individual-level characteristics not included in the analyses may have been linked to health. The lack of significance may also indicate that other characteristics of the neighbourhood had a mediating or protective effect.

## Neighbourhood Physical Characteristics

When thinking of ways to describe the physical characteristics of a neighbourhood, one may think of a neighbourhood's size, geographical location, proximity to various services (for example, health clinics, shopping malls, grocery stores) or features of the built environment (for example, sidewalks). This section highlights findings from a number of studies that looked at various neighbourhood physical conditions (such as neighbourhood appearance, perceived safety, built environment and neighbourhood deprivation) and health-related outcomes (such as overweight or obesity, physical activity, sexual health outcomes, premature mortality, chronic health conditions and risk of injuries).

## Neighbourhood Conditions and Perceived Safety

Canadian research has looked at the location and quality of playgrounds in neighbourhoods. In Edmonton, a study showed that, with some exceptions, although the distribution of children's playgrounds appeared to be equal throughout the city, many of the playgrounds in neighbourhoods defined as having "high social needs" did not meet the city's safety standards.<sup>56</sup> Neighbourhoods in high social need were determined on the basis of four variables: percentage of low-income households, percentage with no vehicle access, percentage of attached houses and percentage of residents who had lived in their home for less than five years.<sup>56</sup>

Neighbourhood safety was also discussed in CPHI's report, *Improving the Health of Canadians: Promoting Healthy Weights*. Findings from this report showed that various features of our social and physical environments can affect the choices we make about what to eat and how physically active we are, both of which can affect our body weight.<sup>55</sup> Findings from a number of studies were highlighted in the report, including the following:

- A study of eight European cities found that people who lived in residential areas that had high levels of graffiti and litter had higher odds of being overweight/obese and lower odds of being physically active than people who lived in areas that had low levels of graffiti and litter. In addition, people living in areas with high levels of greenery had lower odds of being overweight/obese and higher odds of being physically active than people living in areas with low levels of greenery.<sup>57</sup>
- Neighbourhoods identified as "walkable" tend to have higher population densities, a greater mix of land use and easier movement between trip origin and destination.<sup>58</sup> Residents in high-walkability neighbourhoods are more likely to engage in at least 30 minutes of moderate-intense physical activity on a given day.<sup>58</sup>
- A literature review of 27 international studies found a link between a number of factors and decreased physical activity among seniors, including a neighbourhood's lack of attractiveness and perceptions of low neighbourhood safety due to unattended dogs and poor lighting.<sup>59</sup>

Analyses of data from the 2000–2001 National Longitudinal Survey of Children and Youth found that the percentage of parents and caregivers in low-socio-economic status neighbourhoods who disagreed with the statement that they had access in their neighbourhood to safe play spaces was three times higher than that of parents and caregivers in high-socio-economic status neighbourhoods.<sup>41</sup> The study also found a social gradient with overweight (obesity) increasing from 24% (7%) in high-socio-economic status neighbourhoods to 35% (16%) in low-socio-economic status neighbourhoods; participation in organized sports followed a similar pattern.<sup>41</sup>

Another Canadian study conducted in Hamilton reported a link between a neighbourhood's physical conditions and self-rated health. This study found that, compared

to residents who liked nothing about their neighbourhood's physical characteristics, those who liked their neighbourhood's physical characteristics were less likely to rate their health as fair or poor. In contrast, those who reported being dissatisfied with the physical environment of their neighbourhood had increased odds of reporting one or more chronic conditions.<sup>60</sup>

Research has also looked at the link between neighbourhood conditions and sexual health behaviours. Theories such as the “broken windows” theory suggest that “the appearance of the physical environment provides direct messages that regulate individual behaviour”<sup>61</sup> (p. 230)—if one window is left broken, other windows will soon be broken. Using this theory, researchers in the U.S. developed a “broken windows” index to reflect neighbourhood deterioration, collectively considering housing quality, number of abandoned cars, graffiti, trash and physical problems with public high schools.<sup>61</sup> Findings showed that poor neighbourhood physical conditions were a predictor of gonorrhoea rates in New Orleans.<sup>61</sup> The “broken windows” index explained more of the variance in gonorrhea

rates than did a poverty index, which measured low income, unemployment and low education.<sup>61</sup> In a subsequent study of 107 American cities, the number of “boarded up” housing units was used as a proxy for deteriorating neighbourhood conditions. It was a predictor of a number of health outcomes, including gonorrhoea, as well as premature mortality attributable to malignant neoplasms, diabetes, homicide and suicide.<sup>62</sup>

## Traffic-Related Health Outcomes in Neighbourhoods

Traffic-related injuries are another measure of health linked to the physical environment of neighbourhoods in urban areas. Despite a general decrease in the number of fatalities and injuries among pedestrians in most jurisdictions from 1992 to 2001,<sup>66</sup> data from CIHI's National Trauma Registry indicate that, in 2003, motor vehicle collisions were the second leading cause of injuries serious enough to require hospitalization among Canadians in urban areas. These were second only to unintentional falls as a cause of injury hospitalization (see Figure 13).<sup>†</sup>

Since 2000, the Early Child Development (ECD) Mapping Project in B.C. has assessed child populations to help communities examine how well they are doing in supporting children and their families.<sup>63</sup> It uses the Early Development Instrument (EDI) to examine children's readiness to participate and benefit from school activities and to show differences in child development across neighbourhoods.<sup>63–65</sup> The EDI is a questionnaire that collects data on five areas of child development:

- Physical health and well-being;
- Social competence;
- Emotional maturity;
- Language and cognitive development; and
- Communication skills and general knowledge.<sup>63–65</sup>

Collected data are mapped by neighbourhood and disseminated to school districts and community members through public fora.<sup>65</sup> Analyses show that neighbourhoods in

Vancouver with high average EDI scores had low proportions of vulnerable children, whereas neighbourhoods with low EDI scores had high proportions of vulnerable children.<sup>63</sup>

EDI maps and data have helped various B.C. communities to:

- “Allocate programs or services to areas where children have been shown to be vulnerable in more than one development area;
- Protect hearing and vision screening programs;
- Identify where programs are successful and areas where programs might be beneficial;
- Reveal differences between schools to better understand the spectrum of factors affecting school readiness outcomes;
- Break stereotypes within communities;<sup>64</sup> (p. 2) and
- Initiate community-driven early childhood and family projects that build social capital and family capacity.<sup>65</sup>

**Neighbourhood Watch:**  
**Early Child Development Mapping Project B.C.**

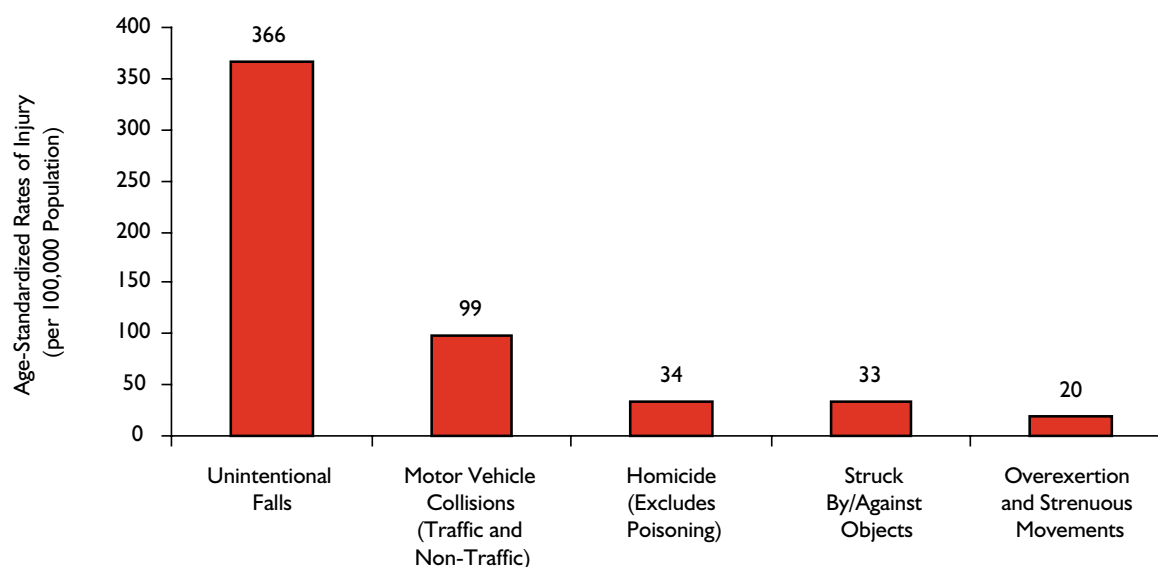
†† Housing-related risk factors for falls are discussed in Chapter 3, Urban Living: Housing and Health.

## Placing the Data

<b>Question</b>	What are the leading causes of injury among Canadians in urban settings?
<b>Answer</b>	Analyses of data from CIHI's National Trauma Registry indicate that, in 2003, most injuries serious enough to require hospitalization among Canadians in urban settings resulted from unintentional falls, followed by motor vehicle collisions. Even when the place of injury is an urban street, falls are nearly three times more common than injuries involving a motor vehicle or other road vehicle. In 2003, 61% of injuries on urban streets were caused by unintentional falls while 22% could be attributed to motor vehicles (traffic and non-traffic related) and other road vehicles.

Figure 13

### Age-Standardized Rates of Injury Requiring Hospitalization by Cause in Urban Settings, Canada, 2003–2004



Source: CIHI's National Trauma Registry's Minimum Data Set, 2003–2004 fiscal year.

Note: "Injuries," as per CIHI's National Trauma Registry definition, excludes poisoning. Traffic motor vehicle collisions (MVCs) occur on public highways while non-traffic MVCs occur in any place other than a public highway.

Transport Canada collision statistics for 2003 indicate that the number of personal injuries is high in Canada’s urban areas.<sup>67</sup> Table 1 illustrates that the number of personal injuries was higher in urban areas where the speed limit at the collision site was 60 kilometres per hour or less compared to rural areas where it exceed 60 kilometres per hour.<sup>68</sup> Table 1 also

shows that while the number of personal injuries was higher in urban areas, the number of fatalities was higher in rural areas, thereby suggesting that vehicle speed may be related to the outcome of an injury resulting from a motor vehicle collision.

## Placing the Data

Table 1 Number of Fatal and Personal Injuries in Motor Vehicle Collisions in Urban and Rural Areas in Canada, 2003	Location	Fatal	Personal Injury
	Urban	936	110,511
	Rural	1,539	41,639
	Not Stated	21	2,075
	Total	2,496	154,225
Source: Transport Canada, 2003. <sup>68</sup>			

In addition to vehicle speed at the time of collision, research has also looked at the influence of other neighbourhood factors on traffic-related health outcomes, including level of neighbourhood deprivation, urban sprawl and density, and mode of transportation. Studies conducted in the United Kingdom have found that the likelihood of pedestrians being injured by motor vehicles is higher in neighbourhoods that are most deprived.<sup>69, 70</sup> While it is not clear why deprivation is linked to injuries, according to researchers, potential influences have been suggested, including a greater exposure to traffic-related risk in lower-income areas,<sup>71</sup> less-safe traffic characteristics<sup>69</sup> or a combination of individual behaviours and environmental characteristics (for example, collision location).<sup>72</sup>

Pedestrian casualties can also be influenced by local characteristics related to urban sprawl, including urban scale, density and land use.<sup>73</sup> 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.<sup>74, 75</sup> Research in the UK found that despite an initial increase in pedestrian casualties with urban development, the incidence decreased as urban wards became more developed.<sup>73</sup> In addition, there were fewer pedestrian casualties in neighbourhoods that were closer to large employment centres.<sup>73</sup> The authors suggested that these results may have been linked to congestion and, in the case of city centres, possibly to traffic management and pedestrian safety initiatives.<sup>73</sup>

Consistent with these findings, a U.S. study found that counties with lower traffic fatality rates were those that were more densely populated and that had the most street-accessible destinations—these counties were typically found in the central districts of the oldest and biggest metropolitan areas.<sup>76</sup>



The researchers found a decrease of about 1.5% in the rate of traffic fatalities for every 1% increase in the compactness of a county.<sup>76</sup>

Research looking at the link between traffic and health outcomes has not been limited solely to injuries. Research has also explored the link between traffic-related stress and various mental health outcomes. For example, a study in Los Angeles found that stressors such as the amount of traffic, collisions and the need for vehicle maintenance were linked to poorer self-rated health and increased likelihood of depressive symptoms.<sup>77</sup> The effects of traffic stress on these health outcomes were higher in neighbourhoods that had more vehicle use compared to neighbourhoods with less vehicle use.<sup>77</sup> Research in Toronto found that driving on congested roads was associated with elevated stress levels, particularly among individuals with a high predisposition to stress.<sup>78</sup> Driving on busy roads has also been associated with an increased likelihood of experiencing road rage,<sup>79</sup> as well as engaging in deliberate risky driving.<sup>80</sup>

## Access to Services

Whether due to migration from within a country or immigration from another country, a growing population can have beneficial effects on local economies; however, it can also put a strain on infrastructure, programs and services.<sup>27</sup> Findings specific to such services as recreation areas and the presence of safe playgrounds in urban neighbourhoods were presented earlier in this chapter. Other services that can be found within a neighbourhood include grocery stores, medical services, shopping malls, restaurants, movie theatres and transit stops. This section provides a brief overview of findings specific to health services and food services in urban areas. The findings presented below indicate that proximity or lack of proximity to services, as well as issues related to accessibility and affordability, may be linked to various health outcomes.

## Access to Health Services in Urban Areas

Having a higher number of health care providers in an area is generally thought to provide residents of the area with increased access to services. In 2000–2001, a higher number of active physicians within a CMA was linked to a higher proportion of residents reporting good or better-than-good health status, but not to longer life expectancy.<sup>12</sup> Building on this, new CPHI analyses looked at self-reported unmet health care needs between CMAs. Data from the 2003 CCHS, as presented in Table 2, indicate that there are differences in self-reported unmet health care needs between CMAs and in some cases, differences between CMAs in the same province. Table 2 also shows the distribution of physicians and nurses in Canada, which CIHI data indicate is not equally distributed between Canadian cities. As noted by a recent Statistics Canada report, the distribution of health care providers, such as the number of general and family practitioners, as well as medical specialists, in an area may be influenced by the presence of a medical school.<sup>12</sup>

Table 2  
Self-Perceived Unmet Health Care Needs, 2003, and Number of Active Physicians and Nurses per 100,000 Population, 2004, by CMA

Has Medical School	% Reporting Unmet Health Care Needs	Active Physicians (per 100,000 Population)		Active Nurses (per 100,000 Population)			
		Family Physicians	Specialists	Registered Nurses	Licensed Practical Nurses	Registered Psychiatric Nurses	
Western Canada/Prairies							
Victoria		13%	151	128	1,024	142	39
Vancouver	✓	11%	104	113	690	82	63
Abbotsford		8%*	81	43	481	87	60
Edmonton	✓	10%	110	124	913	183	40
Calgary	✓	11%	107	117	819	92	19
Saskatoon	✓	8%*	121	152	1,188	155	44
Regina		10%	122	84	1,054	256	140
Winnipeg	✓	12%	93	130	1,048	146	47
Ontario							
Thunder Bay		14%	94	83	1,225	496	–
Greater Sudbury	✓	12%	89	97	1,049	293	–
Windsor		15%*	67	68	682	211	–
London	✓	9%	95	167	1,209	333	–
Kitchener		11%	78	58	584	187	–
St. Catharines/Niagara		11%	66	58	592	251	–
Hamilton	✓	11%	82	129	911	221	–
Toronto	✓	9%*	89	106	605	108	–
Oshawa		11%	60	57	594	225	–
Kingston	✓	12%	147	229	1,403	408	–
Ottawa/Gatineau	✓	13%*	112	138	821	179	–
Quebec							
Montréal	✓	14%*	106	131	692	152	–
Trois-Rivières		10%	98	110	965	312	–
Sherbrooke	✓	11%	156	205	1,316	235	–
Québec	✓	8%*	145	177	1,261	262	–
Saguenay		13%	108	91	977	335	–
Atlantic Canada							
Saint John		15%*	114	116	1,238	367	–
Halifax	✓	8%*	137	173	1,146	307	–
St. John's	✓	11%	128	165	1,507	586	–

Source: CPHI analysis of CCHS 2.1 (2003), Statistics Canada; Scott's Medical Database (2004), CIHI; Nursing Databases (2004), CIHI. Refer to Appendix A for methodological details.

\* Significantly different from CMA average (11%),  $p < .05$ .

Note: All estimates for unmet health care needs have been age-standardized.

"Family physicians" includes certificants of the College of Family Physicians of Canada or the Collège des médecins du Québec (family medicine), general practitioners and physicians who are licensed as specialists but who are not certified by the Royal College of Physicians and Surgeons of Canada or the Collège des médecins du Québec. "Specialists" includes certificants of the Royal College of Physicians and Surgeons of Canada or the Collège des médecins du Québec. B.C. data do not reflect the annual update from the College of Physicians and Surgeons of British Columbia; physician counts are underestimated.

– Not applicable; registered psychiatric nurses are educated and regulated as a separate nursing profession in the provinces of Manitoba, Saskatchewan, Alberta and B.C.

## Access to Available and Affordable Food Services

CPHI's report, *Improving the Health of Canadians: Promoting Healthy Weights*,<sup>55</sup> highlighted that various features specific to the nutrition environment may be linked to healthy eating. Some of these features are worthy of mention in this report on health in urban places, as they speak to people's access to food in urban areas. Some Canadian and U.S. research shows that many low-income individuals live in areas where local shopping facilities are limited and where the cost of food tends to be higher. For example:

- In a study of food pricing in a Nova Scotia neighbourhood, the cost of food was as much as 11% higher in some inner-city grocery stores than in suburban grocery stores.<sup>81</sup>
- In the U.S., research showed that wealthy neighbourhoods in four states had over three times more supermarkets, as well as fewer small grocery stores and convenience stores without a gas station, compared to low-income neighbourhoods.<sup>82</sup>

Research has also looked at the link between proximity of fast-food services and health outcomes. Although looking at differences between regions and not specifically between urban areas, an Ontario study found that the greater the number of fast-food outlets per region, after adjusting for risk, the higher the rates of death and hospitalization due to acute coronary syndromes.<sup>83</sup> Studies in the UK and the U.S. have found that the number of fast-food outlets is generally higher in lower-income neighbourhoods than higher-income neighbourhoods.<sup>82, 84</sup>

## Moving Between and Within Neighbourhoods

Before mass ownership of private automobiles and the development of public transit around the world, people who lived and worked in cities were dependent on walking, as well as on train and tram systems; this was linked to the

nature and size of urban development and where people could live in relation to places of work, recreation and services.<sup>85</sup> The emerging presence of the private automobile in the second half of the 20th century changed the nature of urban mobility, which in turn was linked to changes in urban planning and land use.<sup>85</sup> As will be illustrated in this section, many of these changes in urban development can also be seen in changes to employment location, patterns of personal vehicle and transit use; and traffic-related pollution in urban areas.

## Location of Employment and Personal Vehicle Use

Metropolitan areas are economic engines within the context of the Canadian economy.<sup>86</sup> For example, in 2003, Canada's 27 CMAs generated almost two-thirds of Canada's gross domestic product and provided about the same proportion of jobs.<sup>86</sup> The location of these jobs, however, has changed with urban development. Although CMAs continue to have concentrations of employment in the downtown core, the number of Canadians working in suburban areas has grown.<sup>87</sup> A number of studies have looked at the potential impacts of this movement on people's ability to find and maintain employment. Experts suggest that with the new patterns some workers may experience difficulties accessing employment if they are dependent on public transit.<sup>88, 89</sup> Preliminary research in the U.S. has found a positive association between having access to a car and an unemployed person both getting a job and staying off social assistance.<sup>90</sup> However, conclusive findings regarding the link between employment and vehicle access is lacking.

The expansion of work into the suburbs has also been associated with an increased likelihood of commuting by car, as jobs in the suburbs are often less accessible by transit.<sup>87</sup> Overall, 2001 Census data show that of commuters in Canada's 27 CMAs, 71% drove a car to work; almost 6% of commuters walked to work and just over 1% commuted by bicycle.<sup>91</sup>

In 2001, three of Canada's largest CMAs (Montréal, Ottawa/Gatineau and Toronto) had the lowest proportions of drivers to work; however, this represented nearly two-thirds of commuters in these cities.<sup>87</sup> Potential explanations for this may be drawn from research findings that car users tend to feel their cars afford them more autonomy, protection and prestige compared to those with no car access.<sup>92</sup> Car drivers are also more likely to view their mode of transport as providing more flexibility and convenience than users of other modes of transport.<sup>93</sup>

## Modes of Transportation

As noted, research shows that 71% of commuters in Canada's 27 CMAs drove to work in 2001.<sup>91</sup> Data also show that although the likelihood of driving to work increases with the distance of the commute, of those whose commuting distance was less than five kilometres, 57% drove to work.<sup>87</sup> What, if anything, might influence those drivers to choose another mode of transport? Evidence indicates the choice is typically influenced by both the distance and ease of movement between one's trip origin and destination.<sup>94</sup> For example, living close to many destinations, such as stores in more densely populated neighbourhoods, has been associated with an increased likelihood of travel on foot or by bicycle rather than by car.<sup>95</sup>

Consistent with this, CPHI's report, *Improving the Health of Canadians: Promoting Healthy Weights*, presented new analyses that showed a link between where Canadians live and how they travel to work with self-reported overweight and obesity. Adults living in

urban cores were more likely to report a BMI less than 25 compared to those living in other urban areas (urban fringes, urban areas outside of CMAs/CAs and secondary urban cores) or in rural areas.<sup>55</sup> This may be due in part to an increased likelihood of walking or taking public transit by residents of urban cores. In 2001, Canadians who lived in urban areas were almost three times more likely to use public transit than their counterparts in the U.S.<sup>96</sup>

CPHI's report also showed that Canadians living in areas where a number of residents relied on biking or taking public transit to work were more likely to report a BMI less than 25 than those living in neighbourhoods where fewer people did so (see Figure 14).<sup>55</sup> This finding is likely due in part to the physical activity gained from moving to and from pick-up points. A recent study in the U.S. found that by walking to and from pick-up points, 29% of bus-riders achieved at least 30 minutes of daily physical activity.<sup>97</sup>

This section has highlighted research showing that people's choices to commute may be influenced by the perceived benefits they feel their cars afford them, the distance of their commute and the ease of movement during their commute. These may not be the only factors affecting people's mode of transportation. Data from the 2001 Census show differences in mode of transport by income, gender, age and length of time since immigration:

- Commuters with family incomes of \$25,000 or less were more than twice as likely to walk to work (13%) than commuters with a family income of \$50,000 or more.<sup>87</sup>

“ This is the contradictory desire in our utopia. We want to live in a small community with which we can identify and yet we want all the facilities of the city of millions of people. We want to have very intense urban experiences and yet we want the open space right next to us. ”

—Moshe Safdie

- Commuters in Canada's 27 CMAs with family incomes of \$25,000 or less were more than twice as likely to use public transit (28%) than were commuters with family incomes of \$50,000 or more.<sup>87</sup>
- Almost one-quarter (24%) of commuters aged 20 to 24 used public transit.<sup>87</sup>
- More than 19% of women commuters used transit, compared with 13% of men.<sup>87</sup>
- New immigrants to Canada (0 to 10 years) were also more likely to use public transit (32%) to get to work than Canadian-born commuters (14%);<sup>87</sup> however those who immigrated 20+ years before became more like those of Canadian-born commuters.<sup>87</sup>

## Traffic-Related Pollution and Health Outcomes

Earlier in this chapter, research was presented on the link between traffic-related injuries in urban areas and various neighbourhood physical characteristics. Another factor linked to health and traffic in urban areas is pollution and the effects it may have on the quality of the air we breathe, the quality of the water we drink and the noise levels to which we are exposed.

Transportation is a major producer of air pollution in Canada.<sup>100, 101</sup> In 1999, cars and light trucks made up almost 50% of transportation's total greenhouse gas emissions.<sup>100</sup> Internal combustion engines that power vehicles and equipment contribute to the formation of smog, which can have adverse effects on both the environment and people's health.<sup>101, 102</sup> Public transit, on the other hand, produces fewer greenhouse gas emissions. Canadian data from 1990 to 2003 show that school buses, urban transit and inter-city buses consistently produced fewer greenhouse gas emissions than did cars and trucks of all sizes.<sup>103</sup>

Health outcomes linked to air pollution include, but are not limited to, low-birth weight, physical inactivity and respiratory problems. For example, a recent review of air

pollution and pregnancy outcomes concluded that, while there was insufficient evidence regarding the association between air pollution and birth defects, evidence showed an association between increased levels of particulate matter air pollution and post-neonatal respiratory deaths and suggested an association with low birth weight.<sup>104</sup>

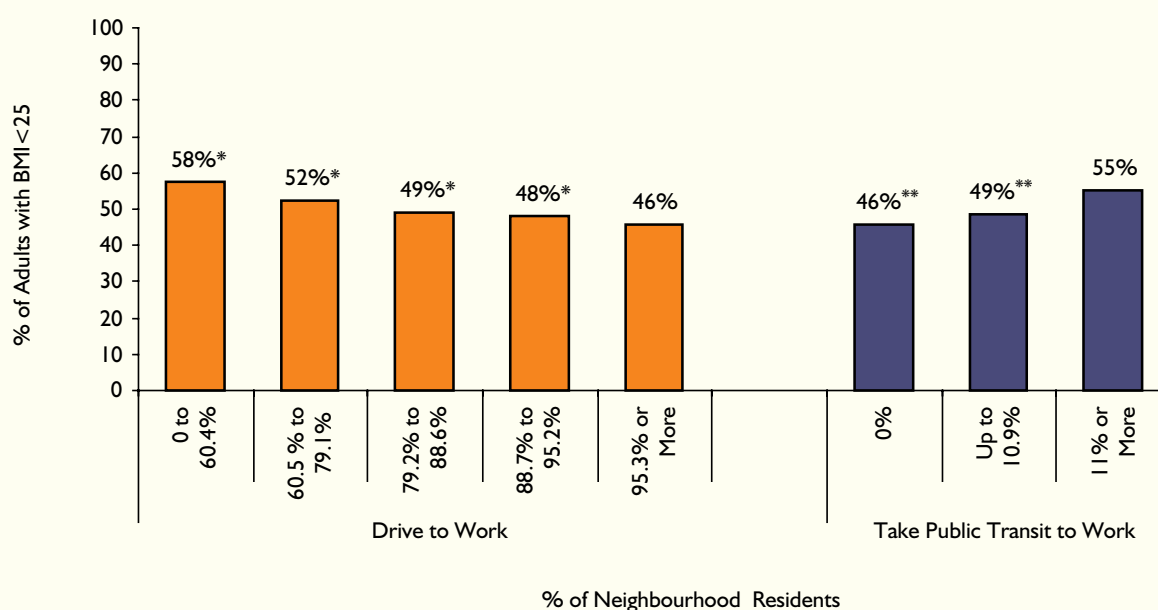
A recent review of exposure to urban traffic-related pollution during exercise explored the mechanisms underlying increases in cardiovascular morbidity and mortality for people exercising in environments with high levels of air pollution. While the authors suggested that the risks associated with air pollution itself were intensified by the more rapid and deep breathing of people during exercise,<sup>105</sup> they also suggested that these findings did not outweigh the benefits of physical activity. Instead, the authors urged health professionals to educate people about the potential hazards and alternatives to exercising near busy roads or industrial sites.<sup>105</sup>

Findings regarding the link between air pollution and respiratory illnesses are inconsistent. For example, a Vancouver study of 6- to 12-year-olds from 1987 to 1998 showed significant and positive associations between nitrogen dioxide (for boys) and sulphur dioxide (for girls) with asthma hospitalization among those in the low socio-economic group, but not in the high socio-economic group.<sup>106</sup> Research conducted in France, Austria and Switzerland estimated that traffic-related air pollution in these countries was estimated to be associated with 25,400 cases of chronic bronchitis in adults, 295,000 episodes of bronchitis in children and 16.5 million person days of restricted activities in adults.<sup>107</sup> In contrast, a study of children living in London, England, found no association between exposure to traffic-related pollution at the place of residence and hospital admissions for asthma and respiratory illness among children aged 5 to 14.<sup>108</sup>

## Placing the Data

Figure 14

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).<sup>55</sup>

\* Significantly different from 95.3% or more drive to work,  $p < .05$ .

\*\* Significantly different from 11% or more take public transit to work,  $p < .05$ .

Note: 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% in the BMI category, 4% were underweight (BMI <18.5) and the remainder had a BMI in the normal range (18.5 to 24.9). Please see Appendix A for additional details on the BMI.

Studies conducted in the Hamilton, Ontario area have explored the possibility that observed socio-economic inequalities in health status may be associated with exposure to traffic and air pollution.<sup>98, 99</sup> Using a geographic information system (GIS) to map both household income and residential exposure to major sources of air and traffic pollution, this cross-sectional research found the following:

- In general, residents in lower-income neighbourhoods tended to live closer to traffic and were exposed to higher average levels of air pollution.<sup>98, 99</sup>
- Exposure to traffic pollution was associated with higher mortality rates (smoking history was not recorded).<sup>98</sup>
- Mortality rates from cardiovascular disease were related to measures of neighbourhood deprivation, pollution and traffic exposure.<sup>99</sup>

**Neighbourhood Watch:**  
**Hamilton, Ontario**



Research seems to indicate that not all people in urban areas are equally exposed to air pollution. Recent studies in the UK have suggested that urban neighbourhoods characterized by lower social class, visible minority groups and other indicators of deprivation are more likely to be exposed to poorer outdoor air quality.<sup>109-111</sup> While income was recognized as a factor in the findings, some researchers suggested that differences in exposure to traffic-related air pollution may also have been influenced by different rates of car ownership,<sup>111</sup> the number of vehicles per household,<sup>111</sup> the extent to which a neighbourhood is used as a pass-through to other areas<sup>111</sup> and limitations associated with creating study-specific air quality indices.<sup>109</sup>

In addition to air pollution, our drinking water can be affected by a number of sources in the urban environment. Whether from surface water (for example, lakes, rivers) or ground water (for example, wells), water treatment facilities use various means to ensure that our drinking water is filtered, disinfected and thereby safe to drink. Some of the sources that can affect water quality are traffic-related and others are due to individual behaviours:

- Oil and other petroleum products from oil leaks; auto emissions from driveways, roads and parking lots; and improper disposal of waste oil;<sup>112</sup>
- Water pollutants in urban areas such as chemicals (de-icing and anti-skid agents),<sup>113</sup> pathogens (E coli and other bacteria),<sup>114</sup> nutrients (fertilizer),<sup>115</sup>
- Sewage treatment discharge, storm-water runoff and runoff from agricultural areas;<sup>112, 116</sup>
- Urban runoff, from rainfall and snowmelt, which is transported through sewers and other drainage channels and discharged into receiving waters along with pollutants it picks up;<sup>112, 113</sup> and
- The improper disposal of medications through the water system (for example, flushing them down the toilet or pouring them down the sink).<sup>117</sup>

Noise can refer to the sound of children/youth socializing, music volume or sounds heard in multiple dwelling structures (for example, apartments). In urban areas in particular, most noise stems from automobile traffic.<sup>118</sup> Although over 55% of Canadian adults surveyed in a nation-wide telephone survey report not being bothered, disturbed or annoyed by traffic noise,<sup>119, 120</sup> noise exposure is a risk factor for various health outcomes. Hearing loss is one health outcome that has

been linked to repeated noise exposure over 90 decibels (for example, a jet taking off, a live rock concert).<sup>118, 121</sup> Research also shows that long-term exposure to noise can lead to stress-related outcomes ranging from annoyance to hypertension and ischemic heart disease.<sup>122</sup> As is the case with many other health outcomes, some populations may be more vulnerable to the adverse health effects of noise than others due to such factors as varying levels of exposure.<sup>122</sup>

### Noise and Health in Urban Areas







3

# Urban Living: Housing and Health



**Earlier in this report, it was said that urban areas are built by people for people. This can refer to infrastructure and transportation development. It can also refer to the building of different types of housing structures.**

Housing is a feature of urban development, and neighbourhoods specifically, that was not discussed in the previous chapter.

The previous chapter looked at the social or place-based aspects of urban neighbourhoods together with the physical or space-based aspects. The same can be done with housing in urban areas.

This chapter looks at the link between health and the physical, or space aspects, of housing—such as housing adequacy, suitability and affordability. Although the research is limited, this chapter also presents information on the social, or place aspects, of home and those links to well-being. It also presents information on housing-related issues for two vulnerable groups: Canada's homeless population and Canada's Aboriginal Peoples.

Researchers have suggested that the relationship between housing tenure and health reflects an underlying relationship between income, tenure and health.<sup>123</sup> Stated differently, a household's

socio-economic status may be one of the ways in which income and wealth are reflected.<sup>124</sup> For example, how much of one's income is spent on shelter can be a reflection of the cost of the mortgage or rent, household income or a combination of the two. Given this, while this chapter presents research on the links between health and various housing dimensions, research is not always conclusive. Therefore, while there are often correlations, no conclusions regarding causality can be made at this time.

## Home as Place and House as Space

Housing is a key component of neighbourhoods. In distinguishing between space and place, some have said the difference is similar to the distinction between house and home.<sup>4</sup> One's house is the physical structure of the building. In its most basic form, housing is a physical space that provides shelter from the elements; however, it can also be a physical space that contributes to poor health outcomes such as respiratory problems. One's home, on the other hand, encompasses the social meaning that is attached to one's house.

A Canadian study of two neighbourhoods in Vancouver looked at the link between physical and mental health and the meanings people attach to their homes. This study controlled for a number of factors, including age, gender, income, education, employment status, housing tenure, cooperative dwelling, housing type and crowding. Findings showed linkages between self-rated health and mental health with the meaning people attributed to their homes, the level of satisfaction they felt with their homes and the control they felt they had over their home lives. Other links to health status included income, education, social support, coping mechanisms and self-reported stress levels.<sup>125</sup>

Although not linked to housing in urban areas specifically, a qualitative study conducted in New Zealand found that people associated their homes with the rituals and celebrations of family life and felt that their homes gave them a sense of control, privacy, refuge and familiarity.<sup>126</sup> Feelings of privacy, refuge and control were also noted by homeowners and renters in a study conducted in West Central Scotland. This study also reported that people felt their home provided them with a sense of safety and freedom and, for some residents, a sense of routine.<sup>127</sup>

Consistent with this, a study conducted in Australia found that levels of security, sense of belonging and satisfaction with domestic role were characteristics that defined a "home" for some women.<sup>128</sup> Other aspects identified included:

- Appropriate physical environment;
- Good social relations, especially with other residents;
- An environment that feels warm, caring and cozy;
- Privacy and freedom;
- Space for self-expression and development; and
- Ownership.<sup>128</sup>

While research is increasingly beginning to look at the social meaning people attach to their home, research linking this with physical health is limited.

“ A house is home when it shelters the body and comforts the soul. ”

—Phillip Moffit

## Housing Adequacy

Research has looked at the timing, location and activity patterns of over 2,000 households in cities and surrounding suburbs across Canada. This research, which interviewed one member per household, found that adults spent most of their time indoors (about 88%), with lesser amounts of time spent outdoors (6%) or in vehicles (6%).<sup>129</sup> Percentage of time spent indoors at home ranged from 64% for adults, 68% for youth and 72% for children.<sup>129</sup>

Given this, while the indoor environment can be seen as having a protective effect against outdoor hazards, it can itself pose a risk to health if the physical condition of a dwelling or if its' basic facilities do not provide a safe and healthy environment—in the case of housing, this is typically referred to as the level of housing adequacy. The Canada Mortgage and Housing Corporation (CMHC) defines *adequate housing* as dwellings that occupants report do not require major repairs.<sup>130</sup> Housing adequacy issues can affect Canadians living in both urban and rural environments. As the vast majority of Canadians live in urban areas, this issue is of particular relevance to health in urban places.

Responses from the 2001 Census indicate that about 70% of Canadians live in *acceptable housing*, defined by the CMHC as housing that is affordable, suitable in size and adequate in terms of its condition.<sup>131</sup> Current research shows that housing that is in need of major repair tends to house low-income households<sup>132</sup> or to be found in highest-need neighbourhoods.<sup>133</sup> A review of the literature on housing and population health examined the strength of evidence for various biological, chemical and physical housing exposures as risk factors for adverse outcomes (see Table 3).<sup>134</sup> While it is beyond the scope of this report to discuss all issues related to health and housing adequacy, this section presents a brief overview of research specific to the following housing-related risk factors:

- Lead;
- Environmental tobacco smoke;
- Dust mites and dampness/mould;
- Smoke and fire; and
- Home safety/stairs.<sup>134</sup>



Table 3

**Strength of Evidence for Biological/Chemical Exposures and Physical/Socio-Economic Characteristics as Risk Factors for Adverse Health Outcomes**

Exposure or Characteristic	Health Effect(s)	Strength of Evidence <sup>§§</sup>
<b>Physical or Chemical Exposures</b>		
Lead	Neurological and intellectual deficits, anemia	Definitive
Asbestos	Lung cancer, gastrointestinal cancers	Definitive
Radon	Lung cancer	Strong/definitive
<b>Specific Biological Exposures</b>		
Dampness/mould	Asthma, respiratory symptoms, respiratory tract infections, psychological distress, rheumatic fever	Possible
House dust mites	Asthma	Strong/definitive
Cockroaches	Asthma	Strong/definitive
Various characteristics (for example, presence or absence of stairs), home safety	Falls	Definitive
Heating system	Burns, smoke inhalation, carbon monoxide poisoning	Definitive
Smoke detectors	Burns, smoke inhalation	Definitive
Carbon monoxide detectors	Carbon monoxide poisoning	Possible
Building type	Psychological distress	Possible
Floor level	Psychological distress	Possible
High-rise structure	Psychological distress, general physical health	Possible
Overcrowding and density	Psychological distress, general physical health, mortality, hepatitis B infection, Type I diabetes mellitus	Possible
Environmental tobacco smoke (ETS)	Asthma, bronchitis, pneumonia, and ear infections in children, low birth weight, lung cancer	Strong
Volatile organic compounds	Respiratory symptoms	Possible/strong
Nitrogen dioxide (gas stoves)	Respiratory symptoms	Possible
Sulfur dioxide	Respiratory symptoms	Possible
Ventilation	Respiratory symptoms, various infectious agents	Possible
Cold and heat	Heat stroke, mortality, respiratory tract infections, cardiac events	Strong/definitive
<b>Socio-Economic Characteristics</b>		
Housing tenure	Cancer incidence, cancer survival, general physical health, mortality	Possible
Housing satisfaction	Psychological distress	Possible

Source: Adapted with permission from S. Hwang et al, *Housing and Population Health: A Review of the Literature* (Ottawa: Canada Mortgage and Housing Corporation, 1999).<sup>134</sup>

§§ "This is a qualitative rating of the strength of the evidence supporting a causal relationship between the housing exposure or characteristic and the health effect. The rating scale is based on the following guidelines:

Definitive: Numerous well-designed studies showing the effect, most or all causal criteria met, essentially complete agreement among experts that a health effect exists.

Strong: Some well-designed studies showing the effect, most causal criteria met, preponderance among experts that a health effect exists.

Possible: Small number of studies showing the effect, most causal criteria met, no consensus among health experts that a health effect exists."<sup>134</sup> (p. 89)

## Lead Exposure

Research shows that exposure to lead from various sources (for example, lead paint chips and dust, older toys, drinking water, contaminated soil and leaded gasoline) can result in damage to the nervous system, damage to intellectual growth and anemia.<sup>134</sup> Those at high risk for lead exposure include young children, pregnant women and the developing fetus.<sup>134</sup> Studies conducted in New York found that elevated blood lead levels in children increased as poverty increased.<sup>135</sup> Elevated blood lead levels also increased among children living in older housing, overcrowded housing<sup>135</sup> and in homes where renovation and remodelling activities disturbed lead-based paint (for example, scraping, sanding and chemical stripping).<sup>136</sup>

## Dust Mites and Dampness/Mould

Published reviews indicate that houses with high levels of indoor humidity are at increased risk for house dust mites and mould growth. Evidence shows a strong association between dampness/mould and respiratory problems such as asthma.<sup>134</sup> Research also shows a strong link between house dust mites and such respiratory problems as asthma.<sup>134, 137</sup> One review notes that while the extent of ventilation in a home can influence the levels of pollutants and allergens, the impact on health outcomes of improved home ventilation has not been well examined.<sup>137</sup>

## Exposure to Environmental Tobacco Smoke (ETS)

There is strong evidence showing that adults exposed to second-hand smoke (ETS) are at risk for respiratory problems and other conditions, such as lung cancer and heart disease.<sup>134, 138</sup> Children who are exposed to ETS experience increased severity of asthmatic symptoms, additional asthmatic episodes, increased risk of lower respiratory tract infections and increased prevalence of middle ear problems.<sup>134, 139</sup>

## Smoke and Fire

Canadian data indicate that annually 70% to 80% of fire deaths and 60% to 70% of fire injuries occur in residential units.<sup>140</sup> Age of resident, type of housing and overcrowding increase the risks of fire-related deaths:

- Data from Ontario, Quebec and Alberta indicate that people 65 years and older are approximately two times more likely to die in fires than those under 65 years.<sup>140</sup>
- Pan-Canadian data from the most recent five years indicate that injury and death rates due to fire are approximately 11 and 12 times greater in rooming and lodging houses, respectively, compared to rates in one- and two-family dwellings.<sup>\*\*\* 140</sup>
- People living in mobile homes are almost six times as likely to die in a fire and over twice as likely to be injured in a fire than people in one- and two-family dwellings.<sup>140</sup>
- Injury rates in apartments are only slightly higher than in one- and two-family dwellings, while death rates are lower.<sup>140</sup>
- As dwellings become more crowded, fire death rates increase significantly.<sup>140</sup>

Research indicates that based on the commonly used population benchmark, which looks at fire losses across a population, over the past 20 years, the incidence of fire, death and injury has fallen significantly in Canada.<sup>140</sup> Researchers stress, however, that there are several ways of measuring fire incidence, as well as death and injury due to fire—depending on the information needed, different measures may be used.<sup>140</sup>

## Home Safety/Stairs

Earlier in this report, data from CIHI's National Trauma Registry showed that unintentional falls were the leading cause of injuries requiring hospitalization among Canadian adults in urban areas in 2003–2004. Although the cause of many falls is unspecified, falls resulting from slipping, tripping and stumbling accounted for 30% of unintentional falls in urban areas. Other causes of falls included falling from one level to another (13%), falls on

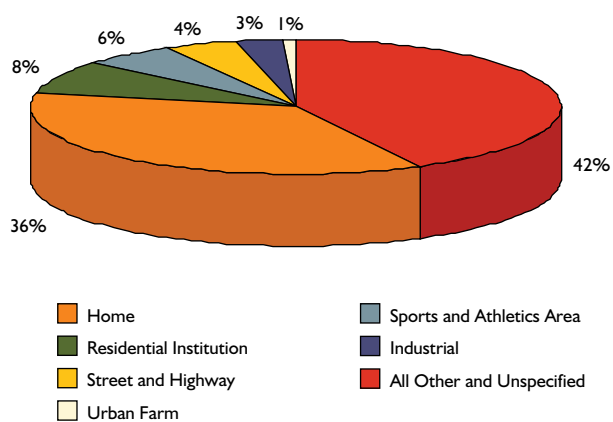
\*\*\* A one-family dwelling is a stand-alone single house. A one-family dwelling becomes a lodging or boarding house when it contains separate rental units. A two-family dwelling is a duplex or semi-detached house.

or from stairs and steps (10%) and falls on or from ladders and scaffolding (3%). CIHI National Trauma Registry data further show that in 2003–2004, 36% of injuries in urban areas occurred in and around the home compared to 6% in sports or athletics areas and 4% on a street or highway (see Figure 15). Of injuries occurring in the urban home, 81% resulted from unintentional falls.

A recent report on falls among seniors in Canada by the Public Health Agency of Canada noted that many housing-specific factors may increase the risk for falls among seniors, including hazards related to stairs, such as uneven or excessively high or narrow steps; slippery surfaces; unmarked edges; lack of or discontinuous, poorly fitted handrails; and inadequate or excessive lighting. Other housing-related risk factors include the lack of grab bars or handrails and hazardous shower stalls or baths.<sup>141</sup>

## Placing the Data

Figure 15  
Location of  
Injuries  
Occurring in  
Urban Areas,  
2003–2004



Source: CIHI's National Trauma Registry's Minimum Data Set, 2003–2004 fiscal year.

## Housing Suitability

The CMHC defines *suitable housing* as dwelling units that “have enough bedrooms for the size and make-up of resident households according to National Occupancy Standard requirements.”<sup>130</sup> (p. 27) The National Occupancy Standard further indicates the number of people that can occupy one bedroom, as well as the number and sex of children occupying the same room.<sup>130</sup>

Various factors may influence whether people live in overcrowded housing. In some cases, the unexpected arrival of a family member may not provide families sufficient time to adjust to new additions to a household.<sup>142</sup> In other cases, such as the case of immigrants to a new city or country, family and friends may share their housing during the initial phase of immigration.<sup>142</sup> During the course of this adjustment, some immigrants may reduce their overcrowding.<sup>142</sup> Others, particularly those from cultures preferring or more tolerant of close social interactions, may maintain a higher density level in the home.<sup>143</sup> Other people may be constrained by socio-economic factors, such as low income, necessitating their living in overcrowded housing—these factors will be discussed in the next section on housing affordability.

Research shows a link between overcrowded or unsuitable housing and poor physical and mental health outcomes. For example, in a report of First Nations communities in Canada, tuberculosis notification rates were higher in communities with higher levels of crowding.<sup>144</sup> With respect to mental health outcomes, a review of the evidence looking at housing and mental health found a number of linkages between mental health outcomes and various housing characteristics, despite various methodological limitations associated with housing-specific research (for example, income as a confounding variable).<sup>145</sup> Main findings from this review indicate that in general, people living in multi-dwelling units, particularly high-rises, have more mental health problems compared to people living in houses or low-rises. People living on higher-floor levels also tend to have poorer mental health than people on lower-floor levels. The review also found higher levels of behaviour problems and restricted play opportunities among young children in high-rise dwellings and a positive association between overall housing quality and psychological well-being.<sup>145</sup>

A report on health in urban places in Canada cannot overlook the proportion of Canada's population who are at risk of homelessness or are homeless. Although shelters across Canada document the number of people using their services on a nightly basis, exact statistics on Canada's homeless population are generally not known.<sup>146, 147</sup> Current estimates suggest that the number of homeless people in Canada is in the tens of thousands.<sup>148</sup>

Lack of affordable housing is “. . . recognised as an increasingly important factor in the production of homelessness, a phenomenon on the rise in urban areas.”<sup>149</sup> (p. 362) Although there is a lack of consensus over its definition, most definitions of homelessness encompass those who live in emergency shelters or on the street.<sup>147, 148</sup> Broader or more inclusive definitions also include those who are at risk of homelessness because their accommodations are unsafe, insecure or not affordable.<sup>147, 148</sup>

Canada's homeless population, which includes children, youth, adults and seniors, is at risk for a range of health problems associated with being homeless.<sup>148</sup>

Current literature indicates that homeless people are at increased risk for a number of health problems, including, but not limited to:

- Psychological distress;<sup>150, 151</sup>
- Mental health problems<sup>151</sup> (or worsening of existing mental health problems);<sup>152</sup>
- Intentional injuries (for example, suicidal behaviours);<sup>152</sup>
- Chronic obstructive pulmonary disease and respiratory tract infections; musculoskeletal conditions (for example, arthritis); infectious diseases (for example, tuberculosis, HIV); poor oral and dental health; poor management of chronic conditions such as diabetes and high blood pressure; skin and foot problems;<sup>148</sup> and
- Premature death.<sup>153-155</sup>

Research shows that securing physical housing resources can be associated with reduced psychological distress among the homeless.<sup>150</sup> A New York City study that followed up with a group of homeless families after five years found that being in receipt of subsidized housing was the best predictor of achieving housing stability.<sup>156</sup> Families in subsidized housing had higher odds of being in a stable housing situation than families who were not subsidized, after other characteristics of the families were taken into account.<sup>156</sup>

### **No Place to Call Home or Space to Call House: Canada's Homeless Population**

**What Is Housing Tenure?**

The term *housing tenure* refers to whether a “home is owner occupied, rented from the public sector or rented from the private sector.”<sup>169</sup> (p. 141)

## Housing Affordability

Housing affordability is determined by financial resources and the costs of housing,<sup>149</sup> both of which are among the many factors that can play a role in the type of housing people are able to own or rent. The CMHC indicates that *affordable housing* is that which costs less than 30% of one’s household income before taxes.<sup>130</sup>

Research shows that people who own their home generally report being healthier than those who rent.<sup>157</sup> According to research, potential factors identified as contributing to the differences in health between homeowners and renters include individual-level differences,<sup>157</sup> physical aspects of the housing itself<sup>157, 158</sup> and quality of the surrounding neighbourhood.<sup>158</sup> Health issues that have been linked to owning and renting in urban areas include depression, stress, psychological distress and inadequate nutrition.

A study of adolescents in different regions of Canada found that levels of psychological distress were higher among 12- to 14-year-olds who were living in rental households; in addition, these children were three times more likely to have experienced major depression compared to those living in homes owned by their caregivers.<sup>159</sup> Different results were obtained for 15- to 19-year-olds. Among this age group, there was no association between housing tenure and distress; levels of depression were higher among those living in owned homes than rented homes. Analyses controlled for various factors including gender, overcrowding in the home, household income, region of the country and family structure. The study’s authors suggested that while younger children may be more vulnerable to aspects of housing tenure because they spend more time in the home, differences among older youth may be linked to maturational changes.<sup>159</sup>

While there are advantages available to homeowners that are not available to renters (for example, non-taxable imputed rents, tax deductions and subsidies for home ownership),<sup>124</sup> not all homeowners share equally in the benefits of ownership.<sup>160</sup> Some owners are unable to afford needed repairs, while others may live in overcrowded housing.<sup>161</sup> For some homeowners, mortgage debt is a source of distress. A recent Canadian study looked at psychological distress among three groups: homeowners with mortgages, renters and homeowners without mortgages. Psychological distress was defined as including depression, feelings of isolation and restlessness. After taking into account factors such as income, age, education, gender and marital status, results showed a gradient in levels of distress: homeowners without a mortgage experienced less psychological distress than homeowners with a mortgage, while those with a mortgage experienced less distress than rental households.<sup>162</sup>

Paying a higher proportion of income for shelter often means having less money to spend on food.<sup>163, 164</sup> Food insecurity, which has been associated with inadequate nutrition<sup>165</sup> and physical and mental health problems,<sup>165, 166</sup> is typically defined as not eating the desired quality or variety of foods; being concerned about not having enough to eat; and not having enough to eat—the latter being considered the most serious threat to health.<sup>167</sup> In Canada, data from 1998–1999 showed that almost 35% of people in low-income households had experienced food insecurity in the previous year.<sup>165</sup> Twenty-two percent (22%) of people living in rented households had experienced food insecurity compared to 6% of homeowners.<sup>165</sup> A recent study found that among food-insecure households receiving a housing subsidy, children had a greater mean weight for their age than children from food-insecure families that did not receive such subsidies.<sup>168</sup>

From the information presented in this section, we know that people who own their home generally report being healthier than those who rent.<sup>157</sup> We also know that housing affordability is determined by financial resources and the costs of housing.<sup>149</sup> However, although a conclusion regarding housing, health and income may appear simple, it is in fact, complex. The remaining portion of this chapter explores differences in housing tenure across Canada.

Data from the 2001 Census indicate that of Canadian households, almost two-thirds own their own homes and about one-third are renters.<sup>131</sup> Recent Canadian data indicate that first-time home buyers were about twice as likely to buy in a Canadian city of more than a million people than in a rural area.<sup>170</sup> The proportion of home-owning Canadians is greater in small or rural areas (over 75%) than in all metropolitan areas (just over 60%).<sup>131</sup>

In 2002, more home buyers were single, separated or divorced (typically these smaller households had smaller incomes); more buyers were also buying homes in need of repair.<sup>170</sup> Research shows that rates of ownership are not even across Canada. For example, increases in ownership rates from 1996 to 2001 were higher than average in most Ontario CMAs and below average in 2001 in Quebec CMAs.<sup>133</sup> Table 4, which presents information on ownership rates in the five CMAs used in CPHI's analyses, further illustrates this.

## Placing the Data

Table 4

**Ownership Rates in Selected CMAs, 2001**

	Percentage of Homeowners
<b>Canada</b>	<b>66%</b>
Vancouver	61%
Calgary	71%
Toronto	63%
Montréal	50%
Halifax	62%

Source: CMHC, 2005.<sup>131</sup>



Since the early 1990s, urban housing markets have been affected by many factors said to contribute to increased homeownership rates (for example, low interest rates, employment growth, lowered mortgage insurance premiums, low mortgage rates and small down payments).<sup>133, 170–172</sup> Despite these market changes, not all Canadians can afford to buy a house, or in some cases, rent.

In 2001, 9 out of 10 Canadian households with the highest incomes owned their homes and spent about 10% of their income on housing.<sup>131</sup> In contrast, among households with lower incomes (that is under \$20,000), almost two-thirds rented, many of whom had incomes at the level that they were considered to be in core housing need.<sup>131</sup> The CMHC defines *core housing need* using the following three criteria:

- Affordability: paying 30% or more of gross income for shelter;
- Suitability: the number of bedrooms is insufficient for household size and composition; and
- Adequacy: the dwelling is in need of major repair.<sup>130</sup>

Based on 1982 to 1999 Canadian data, renters represented the highest proportion of households paying more than 30% and 50% of household income on housing costs compared to homeowners.<sup>171</sup> In 2001, about 30% of renter households in major Canadian cities were considered to be in core housing need, compared with less than 10% of owners.<sup>133</sup> Further, in 2001, core housing need levels were high among single-parent families, seniors living alone, recent immigrants to Canada and Canada's urban Aboriginal population.<sup>133</sup>

Information gathered by CPHI specific to housing affordability details the gaps that exist between the average market rent and the rent affordable to households in the cities of Vancouver, Calgary, Toronto, Montréal and Halifax (see Table 5). The “✓” symbol indicates what type of housing is affordable, while the “x” symbol indicates what is not affordable in each of the five cities. Using CMHC's 30% of annual earnings as the cut-off for affordability, analyses indicate that an average one-bedroom apartment in 2005 would cost over 30% of total income for any household earning less than \$20,000 in each of the five cities. Table 5 further shows that in Vancouver and Toronto, households with an income of up to \$39,999 per year were unable to afford more than a one-bedroom apartment.

Table 5  
Gaps in  
Average  
Market  
Rent and  
Affordable  
Housing  
in Five  
Canadian  
Cities,  
2005

Income Bracket	Number of Households (% of Households in City)	Affordable Monthly Rent (30% of annual income)	Average Apartment Rent (2005)				Average Row (Townhouse) Rent (2005)	
			Bachelor	1 Bedroom	2 Bedrooms	3+ Bedrooms	2 Bedrooms	3+ Bedrooms
Vancouver			\$678	\$788	\$1,004	\$1,184	\$1,051	\$1,208
Less than \$10,000	54,530 (7%)	\$0–\$250	X	X	X	X	X	X
\$10,000–\$19,999	86,180 (11%)	\$250–\$500	X	X	X	X	X	X
\$20,000–\$29,999	77,345 (10%)	\$500–\$750	✓	X	X	X	X	X
\$30,000–\$39,999	83,845 (11%)	\$750–\$1,000	✓	✓	X	X	X	X
Total households earning up to \$39,999: 301,900 (40%)								
Calgary			\$524	\$666	\$808	\$775	\$789	\$841
Less than \$10,000	14,170 (4%)	\$0–\$250	X	X	X	X	X	X
\$10,000–\$19,999	27,600 (8%)	\$250–\$500	X	X	X	X	X	X
\$20,000–\$29,999	32,100 (9%)	\$500–\$750	✓	✓	X	X	X	X
\$30,000–\$39,999	35,945 (10%)	\$750–\$1,000	✓	✓	✓	✓	✓	✓
Total households earning up to \$39,999: 109,815 (31%)								
Toronto			\$724	\$888	\$1,052	\$1,243	\$1,058	\$1,272
Less than \$10,000	86,265 (5%)	\$0–\$250	X	X	X	X	X	X
\$10,000–\$19,999	144,730 (9%)	\$250–\$500	X	X	X	X	X	X
\$20,000–\$29,999	145,980 (9%)	\$500–\$750	✓	X	X	X	X	X
\$30,000–\$39,999	155,065 (10%)	\$750–\$1,000	✓	✓	X	X	X	X
Total households earning up to \$39,999: 532,040 (33%)								
Montréal			\$466	\$562	\$616	\$742	–	–
Less than \$10,000	117,015 (8%)	\$0–\$250	X	X	X	X	–	–
\$10,000–\$19,999	199,805 (14%)	\$250–\$500	✓	X	X	X	–	–
\$20,000–\$29,999	179,780 (13%)	\$500–\$750	✓	✓	✓	✓	–	–
\$30,000–\$39,999	171,950 (12%)	\$750–\$1,000	✓	✓	✓	✓	–	–
Total households earning up to \$39,999: 668,550 (47%)								
Halifax			\$552	\$626	\$762	\$946	–	–
Less than \$10,000	10,080 (7%)	\$0–\$250	X	X	X	X	–	–
\$10,000–\$19,999	17,065 (12%)	\$250–\$500	X	X	X	X	–	–
\$20,000–\$29,999	17,025 (12%)	\$500–\$750	✓	✓	X	X	–	–
\$30,000–\$39,999	16,645 (12%)	\$750–\$1,000	✓	✓	✓	✓	–	–
Total households earning up to \$39,999: 60,815 (42%)								

Source: CPHI analysis of Census (2001) and CMHC (2005) data.

Note: Montréal and Halifax Rental Market Reports do not include average rent data for row (townhouse).<sup>173–177</sup> Model adapted from the City of Calgary with permission.<sup>178</sup> Due to rounding, the percentage of total households may not equal the sum of the individual income brackets.

**Neighbourhood  
Watch:  
Housing Among  
Canada's  
Aboriginal  
Peoples**

According to the 2001 Census, just over half of the 976,000 Aboriginal People in Canada lived on Indian reserves and other rural non-reserve areas (including the Far North), while the other half lived in urban areas.<sup>51</sup> A CMHC report on Canadian housing indicates that both on-reserve and off-reserve Aboriginal households face many challenges in accessing adequate housing, such as low income, unemployment, poor education, legal barriers to home ownership and regional characteristics (for example, remoteness).<sup>131</sup> A limited supply of affordable housing has contributed to overcrowded and unhealthy living conditions that "...do not compare to those of the Canadian population in general."<sup>131</sup> (p. 37)

In 2001, almost 24% of off-reserve Aboriginal households were in core housing need, compared with 13% of non-Aboriginal households.<sup>131</sup> This ranged from 27% among First Nations, 19% among Métis and 32% among Inuit.<sup>131</sup> Census information shows that 18% of Aboriginal People living off-reserve lived in homes requiring major repairs (for example, defective plumbing or electrical wiring or structural repairs to walls, floors or ceilings), compared to 8% of the total Canadian non-reserve population.<sup>179</sup> CMAs with high rates of Aboriginal crowding include

Winnipeg, Regina, Saskatoon and Edmonton. For example, 18% of Aboriginal People in Saskatoon lived in crowded households, compared to 5% of the total population. However, there has been a decrease in some cities: 17% of Aboriginal People in Winnipeg lived in crowded conditions in 2001, down from 20% in 1996.<sup>179</sup>

CMAs with the highest proportion of Aboriginal People's homes requiring major repairs included Regina, Vancouver and Winnipeg.<sup>179</sup> In both Regina and Vancouver, 17% of Aboriginal People lived in homes of this type, compared to 8% of the total population in either city. In Winnipeg, 16% of Aboriginal People lived in homes requiring major repairs, compared to 10% of the city's total population.<sup>179</sup>

On-reserve Aboriginal People face similar challenges. In the 2001 Census, 22% of Aboriginal households lived in inadequate housing and were unable to afford adequate housing—this number is over 11 times higher than for non-Aboriginal households.<sup>131</sup> Recent Canadian data show that 10% of on-reserve Aboriginal households lived in crowded quarters and were unable to afford suitably sized housing, compared to 2% of non-Aboriginal households.<sup>131</sup>



4

# Urban Living: Putting Policies and Programs in Place



**This report has shown that patterns of health can vary between cities and between neighbourhoods in urban areas.**

Both the social and physical aspects of a neighbourhood and the housing within it can shape these differences, as well as the daily lives and health of people living in urban areas.<sup>5</sup> It is therefore difficult to evaluate broad urban development policies and interventions for their direct influence on health outcomes. This is particularly true when health outcomes were not an explicit goal of the intervention.

Nevertheless, there are a number of programs and policies related to place-specific aspects of neighbourhood characteristics, infrastructure development, housing and the environment that have been implemented across Canada and around the world. Some have been evaluated, but many have not. Those that have been evaluated can inform evidence-based decisions that affect health. However, the lack of evaluation indicates that there remain many research questions and evaluation opportunities to help us better understand what we do and do not know about the link between health and urban places. This chapter highlights examples of policy-relevant research, programs and initiatives that are linked to health in urban areas. It aims to build on some aspects of place and health raised earlier in this report and to inform the relationship between research and policy.

## Building Blocks: Policies and Interventions for Neighbourhoods and Urban Development

Chapter 2 highlighted a number of aspects related to the social and physical environments of neighbourhoods, the availability and accessibility of services in neighbourhoods and different transportation-specific aspects related to moving between and within neighbourhoods. It presented evidence that linked factors such as the quality of social relationships to a number of health outcomes and behaviours. With respect to the physical environment, it highlighted health outcomes and behaviours related to neighbourhood physical conditions and traffic.

There is little in the way of evaluated policies or initiatives that address neighbourhood social characteristics or the availability and accessibility of services and their links to health outcomes. There are, however, a number of evaluated policies, guidelines and regulations affecting neighbourhood design and urban planning that have demonstrated effectiveness in improving health-related outcomes.

### Neighbourhood Safety and Injury Prevention

Content presented earlier in the report provided data on the number of traffic-related fatalities and collisions and briefly reviewed some of the risk factors (for example, vehicle speed, neighbourhood deprivation and sprawl). Within the context of neighbourhood conditions, a risk factor mentioned in the context of perceived safety was inadequate lighting and its link to physical inactivity. In addition, research in the U.S. has linked inadequate lighting to traffic-related injuries. A review found that two pre-post studies reported significant decreases (57% and 59%) in the number of night-time pedestrian-vehicle crashes following increased intensity of roadway lighting.<sup>180</sup>

An aspect of neighbourhood safety and injury prevention are traffic engineering countermeasures. These countermeasures describe modifications to the built environment intended to slow down vehicles (for example, speed humps), separate pedestrians and vehicles by time (for example, timing of traffic signals) and increase visibility of pedestrians (for example, increased intensity of roadway lighting).<sup>180</sup> Evaluations of various traffic-related countermeasures in urban neighbourhoods have shown evidence of effectiveness in reducing injuries and crash rates.

- A meta-analysis of 33 different studies reported that area-wide urban traffic-calming schemes had a mean effect of reducing collisions by 15%.<sup>181</sup>
- Denmark and the Netherlands implemented legislation to reduce traffic speeds to 30 kilometres per hour in urban neighbourhoods in the 1970s and 1980s. Evaluation of these initiatives showed reductions in the number of collisions and casualties in areas with speed limits, compared to others where limits were not imposed.<sup>182, 183</sup>
- Other research shows that separating pedestrians and vehicles through such strategies as sidewalks, refuge islands, raised areas in the middle of the street, pedestrian barriers and fences that channel people to safer crossing areas are linked to reduced injuries (that is, lower pedestrian-vehicle crash rates).<sup>180</sup>

Some of these techniques, under certain circumstances, may hamper emergency vehicle response time.<sup>184</sup> However, experts suggest that the impact on vehicle response issues can be addressed if factored into plans to reduce vehicle speed.<sup>184</sup>



## Urban Design and Health Behaviours

Policies and programs around urban design may affect access to service, as well as individual choices that may have an influence, either positively or negatively, on health behaviours. For example, research conducted in the U.S. reports an association between increased physical activity and the availability of recreational facilities, parks, sports fields and playgrounds;<sup>185</sup> having housing close to stores<sup>95</sup> and direct pathways between homes and destinations.<sup>58</sup> In addition:

- A review of research on land use and active transport—in which walkability is measured in terms of population density, mix of land use and easier movement between trip origin and destination—found that people living in high-walkability neighbourhoods are more likely to engage in at least 30 minutes of moderate-intense physical activity on a given day.<sup>58</sup>
- Links have been shown between physical activity and neighbourhood characteristics such as “walkability,”<sup>58</sup> safety,<sup>186</sup> visual appeal,<sup>57</sup> accessibility to bike paths and trails and number of active neighbours.<sup>187</sup>
- Public transit users can achieve at least 30 minutes of daily physical activity by walking to and from pick-up points.<sup>97</sup>

## The Urban Environment

Neighbourhood characteristics, particularly those related to transport and air quality, can be influenced by policies and interventions that can be either municipally, provincially or nationally driven. Policies ranging from emission standards to the availability of public transportation to urban design legislation may affect the quality of the air we breathe.

- The *Canadian Environmental Assessment Act* is a planning tool intended to assess the potential environmental impacts of projects and activities. Areas for environmental assessment can include effects on air and water quality.<sup>188</sup>
- Legislation can also target individual behaviour as a means of improving air quality and overall population health. For example, many provinces have province-wide initiatives aimed at reducing the use of nicotine and protecting all residents from the risks associated with exposure to cigarette smoke.<sup>189</sup>
- At the municipal level, bylaws around such things as noise pollution and garbage collection are in place to protect the health, safety, peace and quiet of neighbourhood residents.<sup>190</sup>
- Canadian data from 1990 to 2003 show that public transit (for example, school buses, urban transit, inter-city buses) consistently produced fewer greenhouse gas emissions than did cars and trucks of all sizes.<sup>103</sup>

Consistent with the literature on urban design presented in this report, Smart Growth is an approach to community development that aims to benefit the economy, the environment and the community. Smart Growth communities are “those that are compact with a mix of land uses, well-connected street and sidewalk networks and a supportive pedestrian environment.”<sup>191</sup> (p. 1) They can promote health by affecting the ways people choose to get around. Through such strategies as reducing automobile emissions and preserving open spaces, Smart Growth aims to promote improved air and water quality, as well as preserve farmland.<sup>192</sup>

A recently published report on the incorporation of Smart Growth practices in six Canadian urban areas (Halifax, Montréal, Toronto, Saskatoon, Calgary and Vancouver) examined the extent to which indicators of Smart Growth were found in urban development plans and practice. The report examined the presence of 10 Smart Growth indicators in each of the urban areas.<sup>193</sup> While critiques of Smart Growth exist, the report found that policies are in place to pursue management of urban growth; progress in implementation is varied.<sup>193</sup>

### Smart Growth

## Laying the Foundation: Policies and Interventions for Housing

A key component of the urban environment and the neighbourhoods within them is the housing that shelters the people who live in those neighbourhoods. Research presented in Chapter 3 shows that specific housing issues such as housing quality (known as “housing adequacy”), how crowded it is (known as “housing suitability”) and how much it costs (known as “housing affordability”) can each have varying influences on health. Federal, provincial, territorial and local housing policies and programs exist that may have an effect on health.

### Housing Adequacy and Suitability

At the federal level, one means by which attempts have been made to improve housing suitability is through legislation regarding crowding standards. As noted earlier in this report, the National Occupancy Standard specifies that “. . . suitable dwellings have enough bedrooms for the size and make-up of resident households.”<sup>130</sup> (p. 27) It further defines the standard for the number of people that can occupy one bedroom, as well as the number and sex of children occupying the same room.<sup>130</sup>

The Canadian Commission on Building and Fire Codes, which prepares national building, fire and plumbing codes, is another example of federal legislation related to housing adequacy.<sup>194</sup> The *National Building Code* is used by the construction industry to ensure that buildings are “structurally sound, safe from fire, free of health hazards and accessible.”<sup>195</sup> (p. 1) Although the *National Building Code* is used as a model for most regulations regarding construction and renovations in Canada, under Canada’s constitution, it is the responsibility of the provinces and territories (and the municipalities if so delegated) to adopt, enforce and potentially alter the regulations.<sup>194</sup>

In addition to national guidelines, codes and standards, a number of evaluated initiatives and interventions exist that provide evidence on ways in which housing can be made safer and healthier.

- Lead is a hazardous material that can be found in housing, particularly older housing, housing that is overcrowded<sup>135</sup> and housing where renovation activities may have disturbed lead-based paint.<sup>136</sup> There are a number of prevention programs in place to reduce blood lead concentrations and thereby reduce the health risks associated with lead exposure.<sup>196</sup>
- The World Health Organization reports small improvements in general health and respiratory health among asthmatic children in response to energy efficiency measures to reduce dampness.<sup>196</sup>
- A review of the evidence on protection from second-hand smoke in Ontario by the Ontario Tobacco Research Unit concludes that the removal of second-hand smoke from the home is the only solution to reducing exposure, as ventilation systems capable of removing tobacco smoke from the air do not exist and are unlikely to exist in the future.<sup>138</sup> Campaigns and resources to encourage smoke-free homes are underway across the country, along with several evaluations of effective campaign strategies.<sup>197–199</sup>
- Research indicates that since the introduction of safety requirements for the installation of smoke alarms in new buildings in approximately 1980, and in all buildings in about 1985, the rate of death due to fire per 100,000 residential units dropped by 75% by 1999. Fire-related injury rates also declined by about one-third from 1980 to 1999.<sup>140</sup>
- Home modifications that include installing grab bars and handrails, better lighting and improved shower/tub safety may be effective in reducing the risk of falls among the elderly.<sup>141</sup>

A New York City study looked at a number of outcomes, including the achievement of stable housing among mentally ill chronically homeless individuals who participated in a program based on a “Housing First” approach. The Housing First approach gives priority to ensuring adequate housing for homeless individuals rather than working to help them by addressing other issues—such as mental illness or substance use—first (the “Continuum of Care” model).<sup>200</sup> Although flexible, program

requirements include participating in a money management plan and meeting with a staff member at least twice per month.<sup>201</sup> Participants in the Housing First group spent significantly more time in stable housing over a two-year period than did participants in the Continuum of Care group. The housing retention rate among the Housing First group was about 80%. There were no significant differences between the groups in alcohol and drug use or in psychiatric symptoms.<sup>200</sup>

### **Housing First**

## **Housing Affordability**

This report has outlined that for both renters and owners, the cost of housing is one of many factors that may be related to health outcomes. In 2001, core housing need levels were high among single-parent families, seniors living alone, recent immigrants to Canada and Canada’s urban Aboriginal population.<sup>133</sup>

The National Homelessness Initiative (NHI) is an example of an initiative launched by the federal government in 1999 that, among other goals, aimed to “foster effective partnerships and investment that contribute to addressing the immediate and multifaceted needs of the homeless and reducing homelessness in Canada.”<sup>202</sup> (p. 7) To date, only a formative evaluation on specific components of the NHI is available.<sup>202</sup>

The provision of affordable housing is something for which there is much activity at all levels of government. Initiatives can range from the provision of emergency shelter by municipalities to municipal, provincial and federal social housing programs. Initiatives have also included the creation of affordable housing through the form of newly constructed houses, renovation of existing houses, rent supplements and the promotion of homeownership.<sup>203, 204</sup> While many of these initiatives are reviewed from a process perspective, evaluations specific to long-term health outcomes are limited or unavailable.

## Putting Policies and Programs in Place: What Do We Know and What Do We Not Know?

At various levels of government there are examples of programs, initiatives and regulations that reflect some of the policy-relevant research presented in this report. Some examples include subsidies, incentives and education campaigns to encourage public transit use, increase physical activity, improve the energy efficiency of homes and reduce air pollution. While these programs and initiatives may have implications for improving health, there are no known evaluations of their long-term health outcomes and therefore no conclusions can be made as to their effectiveness. So what do we know and what do we not know about putting policies and programs in place to improve health in urban settings?

### Policies and Interventions for Neighbourhoods and Urban Development

- We know a great deal about the effectiveness of strategies to address specific neighbourhood physical environment attributes related to traffic and safety issues. This may be due to the availability of pre–post studies and surveillance activities (for example, crash rates, observation) that provide empirical evidence.<sup>180</sup>
- There is evidence regarding the links between various neighbourhood characteristics (such as appearance) and both psychosocial outcomes (such as feelings of safety) and health-related behaviours (such as physical activity).<sup>59</sup> However, we know less about how neighbourhood-level strategies specific to health behaviours translate into health outcomes (such as overall health).

- We do not know a great deal about the effectiveness of interventions and strategies to modify social characteristics such as social cohesion. Interventions intended to improve the quality of social relationships in neighbourhoods are not easily designed nor easily evaluated for their effectiveness in improving health outcomes (due to methodological limitations in controlling for individual- or environmental-level factors).
- We know that urban planning approaches such as Smart Growth appear to have an effect on urban development. Within the Canadian context, we do not know the impact of full implementation of this approach and the resulting impacts, if any, on the health of communities.

### Housing Adequacy and Suitability

- While we know that research suggests that factors such as feelings of privacy, freedom, good social relations and self-expression are important characteristics in defining “home,”<sup>128</sup> we do not know the extent to which the psychosocial aspects of home are linked to health.
- With respect to housing suitability, we know that policies such as the National Occupancy Standard act as benchmarks to define crowding. We also know that, as presented in Chapter 3, living in overcrowded housing can be a risk factor for poor health outcomes such as the spread of infection<sup>144</sup> and poor mental health outcomes.<sup>145</sup> There is limited research on the existence of evaluated research or policy initiatives designed to address overcrowding and associated health consequences.
- There is variation in building code standards across Canada’s provinces and territories due to variability in the adoption and enforcement of the regulations.<sup>194</sup> We do not know the relationship between these variations in provincial building codes and health outcomes across the provinces and territories.

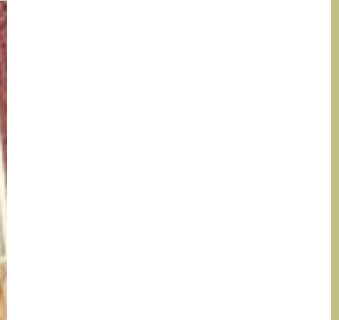
- Although we know that safety requirements for the installation of fire alarms in new and old homes exist and have been associated with a decline in fire-related death and injury since the 1980s, we do not know the number of homes with and without smoke alarms.<sup>205</sup>

## Housing Affordability

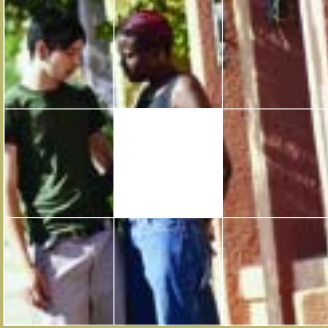
- We know that being homeless is associated with increased risk of a number of health problems<sup>148</sup> and that research has indicated that certain populations are more vulnerable to affordability problems and homelessness. Further, the best predictor of achieving housing stability among the homeless is receiving subsidized housing.<sup>156</sup> To date, however, there has been no systematic research into outcomes associated with more targeted, compared to less targeted, models of program delivery.
- We know that the concentration of people living in low-income neighbourhoods increased from 1980 to 2000.<sup>43</sup> There is much that remains unknown about the possible interactions between individual and neighbourhood-level factors.
- We know that among food-insecure households receiving a housing subsidy, children had a greater mean weight for their age than children from food-insecure families that did not receive such subsidies.<sup>168</sup>
- Research suggests that finding acceptable housing is linked in part to the amount of income available compared to the rent charged. The Federation of Canadian Municipalities (FCM) suggested that, particularly in higher cost areas, there is a considerable gap between the Average Market Rent and the amount of rent affordable to households earning only minimum wage.<sup>206</sup> To date, there have not been any known pan-Canadian systematic analyses of the actual rents for newly constructed or subsidized units and their level of affordability.











# Conclusions

*Improving the Health of Canadians: An Introduction to Health in Urban Places* is the third and final report in CPHI's *2005–2006 Improving the Health of Canadians Report Series*.

The purpose of the present report was to explore how various social or place-based aspects together with physical or space-based aspects of urban areas—specifically, neighbourhoods and housing characteristics—may influence the lives and health of Canadians who live in them.

Just as the people who live in urban areas grow and change, so do neighbourhoods and cities. Further, the cultural meanings that people give to their homes, neighbourhoods and cities can also develop and evolve over time. This may be in part due to the fact that people do not necessarily live their whole lives in the same place or next to the same people. They may live and work in different parts of cities. They may move to different neighbourhoods. They may move from one city to another. Information presented throughout this report indicates that patterns of health can vary depending on the characteristics of the neighbourhoods, houses and urban areas in which people live, work and play.

“ A healthy city is ‘one that is continually creating and improving those physical and social environments and expanding those community resources which enable people to mutually support each other in performing all the functions of life and in developing to their maximum potential.’<sup>207</sup>

—International Healthy Cities Movement

To date, most research has focused on differences in health status across Canada or between provinces and territories. However, as previously noted, examining data at these levels of geography can mask wide variations within a country, within a province or territory and even within a CMA. This report looked at differences in health outcomes and behaviours between places at a more local level—CMAs and neighbourhoods.

Consistent with recent reports released by Statistics Canada, analyses in this report showed that residents of Canada’s 27 CMAs are not equally healthy and differ in their adoption of health-promoting and health-compromising behaviours. New CPHI analyses also showed that to varying degrees, health differs between neighbourhoods within a city. CPHI’s new analyses showed that patterns of some health-related behaviours and outcomes vary between different types of neighbourhoods within the cities of Vancouver, Calgary, Toronto, Montréal and Halifax. CPHI’s analyses focused on five socio-economic influences at the neighbourhood level. However, much remains to be learned about the interactions of individual and contextual neighbourhood factors and their association with health. Researchers studying neighbourhood health have shown that other differences between neighbourhoods may be due to an interaction between aspects of the individuals living in neighbourhoods (such as education and income) and contextual aspects of the neighbourhoods themselves (such as neighbourhood conditions, housing adequacy). Some of these contextual aspects were addressed in this report.

## Placing It All Together: Neighbourhoods and Health

The size and shape of Canadian cities has changed substantially in recent decades. In general, there has been a relocation of populations from downtown and urban cores to new suburban developments.<sup>11</sup>

Chapter 2 provided an overview of various aspects related to neighbourhoods and health. With respect to the social environment of a neighbourhood, research shows that the social resources available to people (social capital) and the extent to which neighbours are willing to help each other (collective efficacy) are respectively linked to lower overweight status<sup>22</sup> and lower levels of premature mortality.<sup>21</sup>

With respect to socio-economic influences, research shows an association between neighbourhood affluence and positive health effects over and above individual income, demographic and health-related background factors.<sup>33</sup> In Canada and elsewhere, links between socio-economic characteristics and neighbourhood variations in health have been observed for a number of health outcomes, such as behavioural problems in children,<sup>37</sup> levels of health care access and use<sup>39</sup> and height and weight in children.<sup>40, 41</sup>

Chapter 2 also highlighted a number of findings specific to health and various neighbourhood physical characteristics. For example, research shows a link between neighbourhood appearance with physical

activity and less likelihood of overweight and obesity;<sup>57</sup> neighbourhood deprivation with high rates of sexual health problems<sup>61</sup> and premature mortality;<sup>62</sup> and population density with increased likelihood of physical activity<sup>58</sup> and lowered risk of traffic-related fatalities.<sup>76</sup>

Chapter 2 also looked at the availability and accessibility of various health and food services in urban areas, as well as transportation-specific aspects related to movement between and within neighbourhoods. Research shows that 71% of commuters in Canada's 27 CMAs drive to work.<sup>87</sup> Adults living in areas where a number of residents bike or take public transit to work are more likely to report a BMI less than 25.<sup>55</sup> Factors affecting people's mode of transport include ease and distance of movement between trip origin and destination,<sup>94</sup> income, gender, age and length of time since immigration.<sup>87</sup> Transport is linked not only to overweight and physical inactivity. In the form of motor vehicle collisions, transport is linked to injuries, particularly in urban areas where speed limits are 60 kilometres per hour or less.<sup>67</sup> In the form of air pollution, transport is linked to post-neonatal respiratory deaths<sup>104</sup> and, in some cases, respiratory problems.<sup>106</sup>

## Placing It All Together: Housing and Health

Housing is a key component of neighbourhoods and urban development; the home is a key social environment. Canadian research has reported linkages between self-rated health and mental health with the meaning people attributed to their homes, the level of satisfaction they felt with their homes and the control they felt they had over their home lives.<sup>125</sup> Research such as this, which focuses on the link between health and the place-based aspects of home, is limited.

Research presented in this report shows an association between health and various issues related to the physical or space-based aspects of housing. Research shows that, both individually and collectively, issues related to

crowding or suitability, adequacy and affordability have been linked to various adverse effects on health.

Living in overcrowded housing can be a risk factor for poor health outcomes such as the spread of infection<sup>144</sup> and poor mental health outcomes.<sup>145</sup> However, despite policies such as the National Occupancy Standard that act as benchmarks to define crowding, this is a component of housing for which research is limited.

The adequacy or physical quality of housing and its link to health has been extensively researched. The 2001 Census indicates that about 70% of Canadians live in acceptable housing, defined by the CMHC as housing that is affordable, suitable in size and adequate in terms of its condition.<sup>131</sup> Current research shows that housing that is in need of major repair tends to be found in highest-need neighbourhoods.<sup>132</sup> This report highlights the adverse health outcomes (for example, respiratory problems, falls, lung cancer, injuries and death) associated with various biological, chemical and physical housing exposures, including lead, environmental tobacco smoke, house dust mites, dampness/mould, home safety/stairs and smoke/fire.<sup>134, 138, 140, 141</sup>

Systematic and comprehensive expert reviews of the research suggest that there are a number of effective strategies for reducing physical hazards in the home.<sup>141</sup>

In the urban setting, housing affordability is a key issue linked to the ability to obtain and maintain appropriate and healthy housing. Affordability is an issue that affects all individuals, particularly low-income renters and first-time homebuyers. Housing affordability can influence health by affecting the amount of income available for spending on other items such as food, as well as affecting the neighbourhood in which people can afford to live. Researchers have suggested that the relationship between housing tenure and health reflects an underlying relationship between income, tenure and health.<sup>123</sup> For example, how much of one's income is spent on shelter can be a reflection

of the cost of the mortgage or rent, household income or a combination of the two. Given this, while this report highlights research on the links between health and various housing dimensions, research is not always conclusive. Therefore, while there are often correlations, no conclusions regarding causality can be made at this time.

## Placing It All Together: Urban Living and Health

One goal of this report was to initiate some general discussion about the meaning of place in urban areas and its link to Canadians' health. Evidence presented in this report indicates there is much to consider in unravelling this link. This report focused on two key aspects of urban areas—neighbourhoods and housing—and specific factors associated with those settings (such as social, physical and socio-economic neighbourhood characteristics, access to services, transport, housing adequacy, housing suitability and housing affordability). Much of this research has looked at the physical aspects of these settings. To a lesser extent, research has also looked at the link between health and the social aspects of these settings; however, much of the focus has been on health behaviours as opposed to health outcomes. This report delved further to explore the links between health outcomes and the interaction of social and physical aspects of neighbourhoods and housing in urban areas. It highlights that “place and health” is an emerging area of study. Although research shows that both place and space can, individually, influence health, further evidence is required to determine their collective influence.

Another goal of this report was to highlight examples of evaluated policies and interventions to improve health among Canadians in urban areas. There are a number of programs and policies specific to neighbourhoods and housing. However, as seems to be the case with much research, both specific and non-specific to health, documented

evaluations of any health outcomes are limited. As a result, the extent to which evidence-based decisions can be made is also limited.

So what can we conclude about place and health? This report has shown that various factors specific to the social and physical environments of urban areas—particularly neighbourhoods and housing—are linked to health outcomes. The research evidence, analyses and policy information presented in this report indicate that when talking about Canadians' health, place matters. There is a role for everyone to play, both in the health and non-health sectors, in creating places and spaces throughout Canada's urban areas that are healthy and that enable Canadians to support each other where they live, learn, work and play.

## Key Messages and Information Gaps

<p>What do we know?</p>	<p>To better understand the role of place in peoples' health, various research and program initiatives are taking place across Canada and in various locations around the world.</p> <ul style="list-style-type: none"> <li>• Patterns of health outcomes and behaviours can vary depending on the characteristics of the neighbourhood in which people live.</li> <li>• Various aspects of the physical and social environments of neighbourhoods and housing can influence health in urban places.</li> <li>• Neighbourhood characteristics such as population density, appearance, perceived safety, access to services and transportation can play a role in people's health-related behaviours (such as physical activity) and/or health outcomes (such as injuries).</li> <li>• Housing that is overcrowded, inadequate and unaffordable is linked to poor health outcomes.</li> <li>• Air, water and noise pollution can all have adverse effects on health.</li> </ul>
<p>What do we still need to know?</p>	<ul style="list-style-type: none"> <li>• How important are neighbourhood and housing influences on health relative to other determinants of health?</li> <li>• Given the lack of evaluation, to what extent do housing and neighbourhood policies and programs promote or impede health?</li> <li>• There is much that remains unknown about the possible interactions between individual (for example, gender, income) and neighbourhood effects.</li> <li>• What aspects specific to place in the home and neighbourhood contribute to better physical and mental health outcomes?</li> <li>• What are the causal mechanisms underlying the links between income, housing and health?</li> <li>• Are there similarities and differences in exposure to air pollution, noise pollution and contaminated water in Canada's urban areas?</li> <li>• Socio-economic profiles of the different neighbourhood types were based on five variables: median income, percentage of residents with postsecondary education, percentage of recent immigrants, percentage of persons living alone and percentage of lone-parent families. Other variables not examined may be linked to different patterns of health outcomes.</li> </ul>

## Key Messages and Information Gaps *continued*

### What CPHI research is happening in the area?

CPHI has funded and commissioned a number of research projects exploring the link between place and health, including those listed below.

#### CPHI Published Reports

- *How Healthy Are Rural Canadians? An Assessment of Their Health Status and Health Determinants*
- *Kachimaa Mawiin—Maybe for Sure: Finding a Place for Place in Health Research and Policy* (proceedings of a place and health research to policy workshop)
- *Developing a Healthy Community Index: A Collection of Papers*
- *Housing and Population Health* (prepared by Brent Moloughney)
- *Prairie Regional Workshop on the Determinants of Healthy Communities* (various authors)
- *CPHI Workshop on Place and Health Synthesis Report*

#### Ongoing CPHI-Funded Research Projects and Review Papers

- 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)

#### CPHI-Funded Research Programs

- Baseline indicators of mortality for monitoring health disparities (Russell Wilkins)
- Development and Application of Community Population Health Indicators (Ron Colman)
- Inequalities in Health and Living Circumstances: Social Determinants and How They Interact (Maria DeKoninck)
- Metropolitan Socio-Economic Inequality and Population Health (Jim Dunn and Nancy Ross)
- Assessing the Health of Canada's Communities: Development of a Measurement Tool and Conceptual Model (James Frankish)
- Inventory and Linkage of Databases for Studying the Relationships Between Place and Health in Urban Settings (Louise Potvin and Penny Hawe)
- Populations and Communities: Understanding the Determinants of Health (Leslie Roos)
- Material and Social Inequalities in the Montréal Metropolitan Area: Association With Physical and Mental Health Outcomes (Maria-Victoria Zunzunegui and Lise Gauvin)

#### Other

- CPHI is currently coordinating the inclusion of a supplement in an upcoming issue of the *Canadian Journal of Public Health* (early 2007) on *Place and Health* (working title).



## For More Information

*Improving the Health of Canadians 2004* (IHC 2004)<sup>208</sup> 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* (released in February 2006) and *place and health*. 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 first report in the series, *Improving the Health of Young Canadians*, explored the association between positive ties with families, schools, peers and communities and the health behaviours and outcomes of Canadian youth aged 12 to 19 years old.<sup>209</sup>

The second report in the series, *Improving the Health of Canadians: Promoting Healthy Weights*, looked at how features in the environments in which we live, learn, work and play make it easier—or harder—for us as Canadians to make healthier choices about what we eat and how physically active we are.<sup>55</sup>

The unique contribution of this third and final report in the series is its focus on the link between the health of Canadians in urban settings and how various social and physical aspects of urban places influence the daily lives and health of people who live in them.

*Improving the Health of Canadians: An Introduction to Health in Urban Places* is available in both official languages on the CIHI website, at [www.cihi.ca/cphi](http://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

Phone: 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](mailto: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 website. Please stop by [www.cihi.ca/cphi](http://www.cihi.ca/cphi) for additional information and a full list of available CPHI reports, newsletters and other products.

- Download a presentation of the highlights of *Improving the Health of Canadians: An Introduction to Health in Urban Places*.
- Sign up to receive updates and information through CPHI's e-newsletter, *Health of the Nation*.
- Learn about previous reports in the *Improving the Health of Canadians 2005–2006 Report Series*.
- Learn about upcoming CPHI events.
- Download copies of other reports published by CPHI.

### Reports Previously Published by CPHI

Name of Report	Author and Publication Date
<b>Healthy Transitions to Adulthood</b>	
• <i>From Patches to a Quilt: Piecing Together a Place for Youth</i>	CPHI (September 2006)
• <i>Improving the Health of Young Canadians</i>	CPHI (October 2005)
• "You say 'to-may-to(e)' and I say 'to-mah-to(e)'": <i>Bridging the Communication Gap Between Researchers and Policy-Makers</i>	CPHI (September 2004)
• <i>CPHI Regional Workshop—Atlantic Proceedings (Fredericton)</i>	CPHI (July 2003)
<b>Place and Health</b>	
• <i>How Healthy Are Rural Canadians? An Assessment of Their Health Status and Health Determinants</i>	CPHI, Public Health Agency of Canada and Laurentian University (September 2006)
• <i>Kachimaa Mawiin—Maybe for Sure: Finding a Place for Place in Health Research and Policy</i>	CPHI (October 2005)
• <i>Developing a Healthy Community Index: A Collection of Papers</i>	CPHI (February 2005)
• <i>Housing and Population Health</i>	Brent Moloughney (June 2004)
• <i>Prairie Regional Workshop on the Determinants of Healthy Communities</i>	CPHI (August 2003)
• <i>CPHI Workshop on Place and Health Synthesis Report (Banff)</i>	CPHI (June 2003)
<b>Healthy Weights</b>	
• <i>Improving the Health of Canadians: Promoting Healthy Weights</i>	CPHI (February 2006)
• <i>Socio-Demographic and Lifestyle Correlates of Obesity— Technical Report on the Secondary Analyses Using the 2000–2001 Canadian Community Health Survey</i>	Cora L. Craig, Christine Cameron and Adrian Bauman (August 2005)
• <i>Overweight and Obesity in Canada: A Population Health Perspective</i>	Kim D. Raine (August 2004)
• <i>Improving the Health of Canadians—Obesity Chapter</i>	CPHI (February 2004)
• <i>Obesity in Canada—Identifying Policy Priorities</i>	CPHI and the Canadian Institutes of Health Research (CIHR) (June 2003)

continued

Reports  
Previously  
Published  
by CPHI

Name of Report	Author and Publication Date
<b>Early Childhood Development</b>	
<ul style="list-style-type: none"> <li>• <i>Early Development in Vancouver: Report of the Community Asset Mapping Project (CAMP)</i></li> </ul>	Clyde Hertzman et al. (March 2004)
<ul style="list-style-type: none"> <li>• <i>Improving the Health of Canadians—Early Childhood Development Chapter</i></li> </ul>	CPHI (February 2004)
<b>Income</b>	
<ul style="list-style-type: none"> <li>• <i>What Have We Learned Studying Income Inequality and Population Health?</i></li> </ul>	Nancy Ross (December 2004)
<ul style="list-style-type: none"> <li>• <i>Improving the Health of Canadians—Income Chapter</i></li> </ul>	CPHI (February 2004)
<ul style="list-style-type: none"> <li>• <i>Poverty and Health CPHI Collected Papers</i></li> </ul>	CPHI, Shelley Phipps and David R. Ross (September 2003)
<b>Aboriginal Peoples' Health</b>	
<ul style="list-style-type: none"> <li>• <i>Improving the Health of Canadians—Aboriginal Peoples' Health Chapter</i></li> </ul>	CPHI (February 2004)
<ul style="list-style-type: none"> <li>• <i>Measuring Social Capital: A Guide for First Nations Communities</i></li> </ul>	Javier Mignone (December 2003)
<ul style="list-style-type: none"> <li>• <i>Initial Directions: Proceedings of a Meeting on Aboriginal Peoples' Health</i></li> </ul>	CPHI (June 2003)
<ul style="list-style-type: none"> <li>• <i>Urban Aboriginal Communities: Proceedings of a Roundtable Meeting on the Health of Urban Aboriginal People</i></li> </ul>	CPHI (March 2003)
<ul style="list-style-type: none"> <li>• <i>Broadening the Lens: Proceedings of a Roundtable on Aboriginal People's Health</i></li> </ul>	CPHI (January 2003)
<b>Cross-Cutting Issues and Tools</b>	
<ul style="list-style-type: none"> <li>• <i>Moving Population and Public Health Knowledge Into Action</i></li> </ul>	CPHI and CIHR (February 2006)
<ul style="list-style-type: none"> <li>• <i>Select Highlights on the Public Views of the Determinants of Health</i></li> </ul>	CPHI (February 2005)
<ul style="list-style-type: none"> <li>• <i>Women's Health Surveillance Report: Supplementary Chapters</i></li> </ul>	CPHI and Health Canada (October 2004)
<ul style="list-style-type: none"> <li>• <i>Charting the Course, Progress Report: Two Years Later: How Are We Doing?</i></li> </ul>	CPHI and CIHR (February 2004)
<ul style="list-style-type: none"> <li>• <i>Women's Health Surveillance Report: A Multidimensional Look at the Health of Canadian Women</i></li> </ul>	CPHI and Health Canada (October 2003)
<ul style="list-style-type: none"> <li>• <i>Barriers to Accessing and Analyzing Health Information in Canada</i></li> </ul>	George Kephart (November 2002)
<ul style="list-style-type: none"> <li>• <i>Tools for Knowledge Exchange: Best Practices for Policy Research</i></li> </ul>	CPHI (October 2002)
<ul style="list-style-type: none"> <li>• <i>Charting the Course: A Pan-Canadian Consultation on Population and Public Health Priorities</i></li> </ul>	CPHI and CIHR (May 2002)
<ul style="list-style-type: none"> <li>• <i>Health of the Nation—e-Newsletter</i></li> </ul>	CPHI (Quarterly)
<ul style="list-style-type: none"> <li>• <i>Partnership Meeting Report</i></li> </ul>	CPHI (March 2002)
<ul style="list-style-type: none"> <li>• <i>An Environmental Scan of Research Transfer Strategies</i></li> </ul>	CPHI (February 2001)

# Appendix A—Methodology

## Data Sources

This report focuses on place and health across all age groups. Information was obtained from various sources, including:

- Canadian Community Health Survey (CCHS—Cycle 2.1, 2003), Statistics Canada;
- Census of Canada (2001), Statistics Canada;
- National Trauma Registry (2003–2004), Canadian Institute for Health Information;
- Nursing Databases (2004), Canadian Institute for Health Information; and
- Scott's Medical Database (formerly Southam Medical Database) (2004), Canadian Institute for Health Information.

## Canadian Community Health Survey (CCHS—Cycle 2.1, 2003)

The CCHS provides data on Canadians' health status, health determinants and health care use. It is a biennial 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 website: [www.statcan.ca/english/concepts/health/cchsinfo.htm](http://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 the remote data access (RDA) program.

The analyses presented in this report use data from the 2003 collection year. The survey was conducted again in 2005; however, at the time of analysis, the data files for 2005 were not available to researchers using remote data access, including CPHI.

## 2001 Census of Canada

The census of population is a reliable source for estimates of the population and dwelling counts of the provinces, territories and local municipal areas.

The census also provides information about the demographic, social and economic characteristics of the population and its housing within small geographic areas and for small population groups to support planning, administration, policy development and evaluation activities of governments at all levels, as well as activities of data users in the private sector.

The census takes place every five years. It provides a historical perspective on how communities change and how the country evolves over time.

## National Trauma Registry (NTR)

The NTR provides national statistics on injuries in Canada. Data come from the Hospital Morbidity Database, as well as from provincial trauma registries or trauma centres in Canada. The NTR has three data sets:

1. The Minimum Data Set (MDS) includes demographic, diagnostic and procedural information on all admissions to acute care hospitals in Canada due to injury.
2. The Comprehensive Data Set (CDS) contains data on patients hospitalized with major trauma.
3. The Death Data Set (DDS), which is currently under development, will contain data on all deaths in Canada due to injury.

Rates presented in the report have been directly standardized using Canada 1991 as the standard population. Hospitalization counts were obtained from the NTR MDS, 2003–2004 fiscal year; 2001 population counts were obtained from Statistics Canada's 2001 Census.

## Nursing Databases

CIHI collects information on Canada's nurses through three databases:

1. Registered Nurses Database (RNDB)—Contains supply and distribution information for the registered nursing workforce in Canada from 1980 to the present and is managed by CIHI.
2. Licensed Practical Nurses Database (LPNDB)—Contains supply and distribution information for licensed practical nurses in Canada since 2002 and is managed by CIHI.
3. Registered Psychiatric Nurses Database (RPNDB)—Contains supply and distribution information for registered psychiatric nurses in Canada since 2002 and is maintained by CIHI. Registered psychiatric nurses are educated and regulated as a separate nursing profession in the provinces of Manitoba, Saskatchewan, Alberta and B.C.

All three types of nurses—registered nurses (RNs), licensed practical nurses (LPNs) and registered psychiatric nurses (RPNs)—who worked in Canada in 2004 were included in the analysis. Postal codes of worksite and residence were linked to the 2004 Postal Code Conversion File (PCCF) to determine where nurses worked at the census metropolitan area (CMA) level. The analysis included nurses who worked in the 27 CMAs only. Because response rates for postal code of primary worksite were low for RNs (70%) and RPNs (75%), and 95% of postal codes of residence and worksite were matched at CMA level, we used a residential postal code if a worksite postal code was missing or invalid for the analysis of all three types of nurses. Frequency counts of RNs in the Quebec CMAs were received directly from the Ordre des infirmières et infirmiers du Québec (OIIQ).

## Scott's Medical Database (SMDB) (Formerly Southam Medical Database)

The SMDB provides information on the supply, distribution and migration patterns of Canadian physicians. The database includes information on the physician's name, sex, year of birth, province or territory, postal code, activity status, place and year of graduation from medical school, specialty, primary interest, medical appointment, hospital affiliation/hospital appointment and prescribing information.

Physician counts include all active family physicians and specialist physicians as of December 31, 2004. Physicians are defined as active if they have a medical doctorate degree and a valid address. Active physicians include those in clinical and non-clinical practice (such as research, teaching or administration). Excluded are residents and unlicensed physicians who have requested that their information not be published. Specialists include certificants of the Royal College of Physicians and Surgeons of Canada (RCPSC) or the Collège des médecins du Québec (CMQ). Family physicians include certificants of the College of Family Physicians of Canada or CMQ (Family Medicine), general practitioners and physicians who are licensed as specialists but who are not certified by the RCPSC or the CMQ (that is, non-certified specialists). Please note that B.C. data in 2004 do not reflect the annual update from the College of Physicians and Surgeons of B.C.; therefore, physician counts are underestimated.

Following the same method as that used for nurses, postal codes of physicians' preferred mailing address were linked to the 2004 Postal Code Conversion File (PCCF) to determine where physicians were located at the CMA level. The analysis included physicians who were situated in the 27 CMAs only. Please note that even though the postal code is based on the preferred address, the majority of physicians choose to receive their mail where they work.

## Variables Examined in This Report

The following variables were included in the analyses based on a review of the literature, their relevance to the report's objectives, availability in the CCHS and census and their respective psychometric properties.

### Canadian Community Health Survey (CCHS—Cycle 2.1, 2003)

**Self-Rated Health.** Asks participants to indicate their health status in general.

#### Response Categories:

- excellent
- very good
- good
- fair
- poor
- don't know/refusal/not stated

#### Age Group Examined:

- 12 years and over

#### Categorical Score:

- excellent or very good
- good, fair or poor

**Physical Activity Index.** Derived variable using categories that groups participants based on the total daily energy expenditure values (kcal/kg/day).

#### Response Categories:

- active
- moderate
- inactive
- don't know/refusal/not stated

#### Age Group Examined:

- 12 years and over

#### Categorical Score:

- active or moderately active
- inactive

**Type of Smoker.** Asks participants how often they smoke cigarettes.

#### Response Categories:

- daily
- occasionally
- not at all
- don't know/refusal/not stated

#### Age Group Examined:

- 12 years and over

#### Categorical Score:

- daily or occasional smoker
- non-smoker

**Injuries.** Indicates if the participants injured themselves in the past 12 months.

#### Response Categories:

- yes
- no
- don't know/refusal

#### Age Group Examined:

- 12 years and over

#### Categorical Score:

- reported an injury in the last year
- reported not having an injury in the last year

**Body Mass Index (BMI).** The CCHS cycle 2.1 collected self-reported height and weight. BMI is calculated for participants aged 18 years old and over by dividing the participant's body weight (in kilograms) by height (in metres) squared. Overweight and obese categories were based on the current Canadian Guidelines for Body Weight Classification in Adults. The CCHS 2.2, which collects measured height and weight, was designed to provide provincial-level estimates and was not available by remote data access at the time the analyses were conducted.

#### Response Categories:

- underweight (BMI: <18.5)
- normal weight (BMI: 18.5 to 24.9)
- overweight (BMI: 25.0 to 29.9)
- obese (BMI: ≥ 30.0, includes class I, II and III)
- don't know/refusal/not stated

#### Age Group Examined:

- 18 years and over, excluding pregnant women

#### Categorical Score:

- overweight or obese
- underweight or normal weight

**Self-Perceived Life Stress.** Asks participants to indicate how stressful most of their days are.

#### Response Categories:

- not at all stressful
- not very stressful
- a bit stressful



- quite a bit stressful
- extremely stressful
- don't know/refusal/not stated

**Age Group Examined:**

- 18 years and over

**Categorical Score:**

- extremely or quite a bit stressful
- not at all, not very or a bit stressful

**Self-Perceived Unmet Health Care Needs.**

Asks participants if there ever was a time during the previous 12 months when they felt that health care was needed but they did not receive it.

**Response Categories:**

- yes
- no
- don't know/refusal/not stated

**Age Group Examined:**

- 12 years and over

**Categorical Score:**

- reported unmet health care needs in the last year
- reported not having unmet health care needs in the last year

**Alcohol.** Participants who answered “yes” to the question, “During the past 12 months, have you had a drink of beer, wine, liquor or any other alcoholic beverage?” were further asked to describe their frequency of consumption of five or more drinks on one occasion during the past 12 months.

**Response Categories:**

- never
- less than once a month
- once a month
- two to three times a month
- once a week
- more than once a week
- don't know/refusal/not stated

**Age Group Examined:**

- 12 years and over

**Categorical Score:**

- did not consume five or more alcoholic beverages on one occasion in the last year
- consumed five or more alcoholic beverages on at least one occasion in the last year

## Statistical Analyses

### CMA-level Analyses

Cross-tabulations of CCHS variables were used to estimate the age-standardized prevalence of health outcomes and behaviours in each of the 27 CMAs. Bootstrap weights developed by Statistics Canada were used in the analysis of the variables shown in the report.

The overall CMA prevalence was calculated and each CMA prevalence was compared to this overall prevalence using significance tests (t-test,  $p < .05$ ). The CMAs with a significantly different prevalence than the overall CMA prevalence were identified in the tables and graphs.

### Within CMA-Level Analyses

#### Data Used to Define the Neighbourhoods

To study the potential relationships between neighbourhoods and health within CMAs, socio-economic and demographic data from the 2001 Census were used at the level of census tract (CT) for five census metropolitan areas (CMAs). Canada's three most populated cities (Vancouver, Toronto and Montréal), as well as the next most populated cities in the Prairies (Calgary) and Eastern Canada (Halifax) were chosen to ensure a large enough sample.

According to Statistics Canada, “census tracts (CTs) are small, relatively stable geographic areas that usually have a population of 2,500 to 8,000. They are located in census metropolitan areas and in census agglomerations with an urban core population of 50,000 or more in the previous census . . . . Census tract (CT) boundaries must follow permanent and easily recognizable physical features . . . .

The CT should be as homogeneous as possible in terms of socio-economic characteristics, such as similar economic status and social living conditions at the time of its creation.”<sup>6</sup> (p. 246)

### Creation of the Neighbourhood Types

Neighbourhood types were defined by grouping CTs that have similar socio-economic and demographic characteristics together. First, potential candidates of socio-economic and demographic variables were identified to be included in the grouping process. All census variables available at the CT level were examined and a review of relevant literature was done to identify the most common variables used in this type of exercise. Variables retained at this stage included:

- Total population (%)
  - Aboriginal
  - Visible minority
  - 0 to 19 years old
  - 65 years old and older
  - No knowledge of English or French
  - Immigrants
  - Recent immigrants (five years prior to the 2001 Census) (Note: Immigrants and recent immigrants were kept as two distinct categories as their health profiles differ. Recent immigrants generally report being healthier than Canadian-born residents, but as time passes their health tends to resemble that of other Canadians.)<sup>210</sup>
- Total number of census families in private households (%)
  - Couple families
  - Lone-parent families
- Total economic families (%) (that is, two or more persons living in the same dwelling and related by blood, marriage, common-law or adoption)
  - Low-income families (families with incomes below the Statistics Canada low-income cut-off)
- Total population 20 years and over (%)
  - Without high school graduation
  - With postsecondary graduation
  - With university degree
- Total population 15 years and over (%)
  - Unemployment rate
- Total population 65 years and over (%)
  - Living alone
- Total number of occupied private dwellings (%)
  - Major repairs needed

- Total number of persons in private households (%)
  - Living alone
- Household
  - Tenant and owner households spending 30% or more of household income on gross rent/owner's major payments (%)
  - Average value of dwelling (in dollars)
  - Median household income (in dollars)

Formal definitions can be obtained from the Census of Canada 2001 Dictionary.<sup>6</sup>

Variables were standardized to a mean of 0 and variance of 1 to accommodate for different variances and different scales of measurements. Correlation matrices were built to explore relationships between the 20 variables selected (these are available for download from CPHI's website). Since many variables were correlated, principal component analysis (PCA) was used for each CMA to reduce the number of variables to be included in the grouping process. Principal component analysis is a technique used to reduce a series of variables to a smaller set.<sup>211</sup> The Kaiser criterion was used to derive the number of principal components to retain (that is, only components with eigenvalues greater than 1 were retained).<sup>212</sup> A varimax rotation was used to maximize the variance of the variables and to improve the interpretability of the results.<sup>213</sup>

Five variables were retained to perform cluster analysis. This technique has been used in similar studies to group small geographical units based on similarities of a number of their characteristics.<sup>52, 53</sup> In this study, the variables were median income, percentage of postsecondary graduates, percentage of lone-parent families, percentage of persons living alone and percentage of recent immigrants. Cluster analysis was done on the basis of Euclidean distances: observations that were very close to each other were assigned to the same cluster, while observations that were far apart were in different clusters. A non-hierarchical clustering method, the K-means method, was used.<sup>214</sup> Observations with

missing values for one of the five retained variables were excluded from the cluster analysis and extreme values were set to -3 or 3 (standardized data) to avoid the creation of clusters with a single observation. The number of clusters to use was determined based on the Calinski-Harabasz pseudo-F test,<sup>215</sup> the cubic clustering criterion<sup>216</sup> and graphical representation of the clusters for each of the CMA individually. In this study, clusters of CTs are referred to as neighbourhood types.

Characteristics of each neighbourhood type were compared with the overall average characteristics of the city using significance tests (t-test,  $p < .05$ ). Each of the characteristics was described as low or high if it was significantly different than the overall average. Otherwise, it was described as average. As the results for Halifax were based on a small number of CTs ( $N < 30$  for certain neighbourhood types), one should exercise caution when interpreting the analysis.

Although the neighbourhood characteristics were not age-standardized, average age was added for each of the neighbourhood types as a reference point. Age was not used in the cluster analysis. Median age was not available at the CT level.

Once the number of clusters to use was determined and each CT was assigned to a cluster, a link was made with the CCHS 2.1 (2003), whereby each observation in the CCHS was assigned to its corresponding neighbourhood type based on the CT where the respondent resided. Analysis of the CCHS was then done through remote data access, using Statistics Canada's Bootvar program for variance estimation using the bootstrap method. CCHS weighted population counts for each neighbourhood type were compared with Census 2001 population counts for these same neighbourhood types to ensure representativeness of the sampling.

For purposes of clarity in the graphs, not all significant differences between the neighbourhood types are presented. Tables outlining all pair-wise comparisons of health outcomes and behaviours between the different types of neighbourhoods are presented in Appendix C.

## Appendix B—Patterns of Health Behaviours by Census Metropolitan Area (CMA)

Table B.1  
Adoption of  
Individual  
Healthy  
Behaviours  
by CMA,  
Population  
12 Years and  
Over, 2003

	% Who Do Not Drink Five or More Drinks in One Sitting	% Non-Smokers	% Who Are Physically Active	
			Active	Moderately Active
<b>CMA Average</b>	<b>65%</b>	<b>78%</b>	<b>26%</b>	<b>24%</b>
<b>Western Canada/Prairies</b>				
Victoria	67%	81%	35%*	25%
Vancouver	71%*	84%*	31%*	26%
Abbotsford	73%*	83%*	28%	25%
Edmonton	64%	77%	28%	23%
Calgary	61%*	81%	30%*	26%
Saskatoon	58%*	76%	29%	23%
Regina	61%	76%	27%	26%
Winnipeg	60%*	77%	29%*	23%
<b>Ontario</b>				
Thunder Bay	55%*	73%*	34%*	26%
Greater Sudbury	58%*	73%*	28%	25%
Windsor	62%	79%	25%	24%
London	63%	80%	27%	27%
Kitchener	61%	76%	25%	26%
St. Catharines/Niagara	59%*	75%	30%*	24%
Hamilton	61%*	77%	30%*	25%
Toronto	70%*	80%	23%*	23%*
Oshawa	64%	73%*	31%*	25%
Kingston	61%	74%	27%	26%
Ottawa/Gatineau	63%	79%	28%	26%
<b>Quebec</b>				
Montréal	62%*	74%*	22%*	24%
Trois-Rivières	61%	73%	28%	21%
Sherbrooke	58%*	77%	22%	29%
Québec	55%*	76%*	23%*	28%*
Saguenay	54%*	73%	23%	23%
<b>Atlantic Canada</b>				
Saint John	64%	79%	23%	21%
Halifax	58%*	82%*	24%	24%
St. John's	52%*	79%	23%*	26%

Source: CPHI analysis of CCHS 2.1 (2003), Statistics Canada.

\* Significantly different from CMA average,  $p < .05$ .

Note: All estimates have been age-standardized.



# Appendix C—Comparisons of Health Outcomes and Behaviours Between Different Types of Neighbourhoods in Five Census Metropolitan Areas

The following matrices indicate all significant relationships noted among the previously defined neighbourhood types in Vancouver, Calgary, Toronto, Montréal and Halifax. Significant relationships ( $p < .05$ ) are noted with a check mark (✓). For example, the first column and the first row of the self-rated health matrix

indicate significant differences between Vancouver's Type V1 neighbourhoods and Type V3 and V4 neighbourhoods (individuals living in Type V1 neighbourhoods are more likely than those living in Type V3 or V4 neighbourhoods to report excellent or very good health status).

## Statistically Significant Relationships Among Neighbourhood Types in Vancouver CMA, B.C.

% Reporting Excellent or Very Good Health

	V1 (67%)	V2 (63%)	V3 (56%)	V4 (52%)	V5 (63%)
V1 (67%)			✓	✓	
V2 (63%)			✓	✓	
V3 (56%)	✓	✓			✓
V4 (52%)	✓	✓			✓
V5 (63%)			✓	✓	

% Reporting an Injury in the Last Year

	V1 (13%)	V2 (15%)	V3 (11%)	V4 (11%)	V5 (14%)
V1 (13%)					
V2 (15%)			✓	✓	
V3 (11%)		✓			
V4 (11%)		✓			
V5 (14%)					

% Who Are Physically Active (Active and Moderately Active)

	V1 (63%)	V2 (60%)	V3 (54%)	V4 (50%)	V5 (61%)
V1 (63%)			✓	✓	
V2 (60%)			✓	✓	
V3 (54%)	✓	✓			✓
V4 (50%)	✓	✓			✓
V5 (61%)			✓	✓	

% Who Are Overweight or Obese (BMI ≥ 25)

	V1 (32%)	V2 (37%)	V3 (30%)	V4 (35%)	V5 (31%)
V1 (32%)					
V2 (37%)			✓		✓
V3 (30%)		✓			
V4 (35%)					
V5 (31%)		✓			

% Smokers

	V1 (10%)	V2 (17%)	V3 (14%)	V4 (19%)	V5 (24%)
V1 (10%)		✓	✓	✓	✓
V2 (17%)	✓				✓
V3 (14%)	✓			✓	✓
V4 (19%)	✓		✓		
V5 (24%)	✓	✓	✓		

## Statistically Significant Relationships Among Neighbourhood Types in Calgary CMA, Alta.

% Reporting Excellent or Very Good Health

	C1 (74%)	C2 (63%)	C3 (64%)
C1 (74%)		✓	✓
C2 (63%)	✓		
C3 (64%)	✓		

% Reporting an Injury in the Last Year

	C1 (16%)	C2 (15%)	C3 (14% <sup>5</sup> )
C1 (16%)			
C2 (15%)			
C3 (14% <sup>5</sup> )			

% Who Are Physically Active  
(Active and Moderately Active)

	C1 (62%)	C2 (52%)	C3 (54%)
C1 (62%)		✓	
C2 (52%)	✓		
C3 (54%)			

% Who Are Overweight or Obese (BMI ≥ 25)

	C1 (41%)	C2 (42%)	C3 (35%)
C1 (41%)			
C2 (42%)			✓
C3 (35%)		✓	

% Smokers

	C1 (14%)	C2 (25%)	C3 (22%)
C1 (14%)		✓	✓
C2 (25%)	✓		
C3 (22%)	✓		

Note: <sup>5</sup> Coefficient of variation between 16.6% and 33.3% (interpret with caution).



## Statistically Significant Relationships Among Neighbourhood Types in Toronto CMA, Ont.

% Reporting Excellent or Very Good Health

	T1 (62%)	T2 (55%)	T3 (60%)	T4 (53%)
T1 (62%)		✓		✓
T2 (55%)	✓			
T3 (60%)				✓
T4 (53%)	✓		✓	

% Reporting an Injury in the Last Year

	T1 (12%)	T2 (13%)	T3 (13%)	T4 (9%)
T1 (12%)				✓
T2 (13%)				✓
T3 (13%)				✓
T4 (9%)	✓	✓	✓	

% Who Are Physically Active  
(Active and Moderately Active)

	T1 (50%)	T2 (46%)	T3 (51%)	T4 (39%)
T1 (50%)		✓		✓
T2 (46%)	✓		✓	✓
T3 (51%)		✓		✓
T4 (39%)	✓	✓	✓	

% Who Are Overweight or Obese (BMI≥25)

	T1 (36%)	T2 (42%)	T3 (37%)	T4 (39%)
T1 (36%)		✓		
T2 (42%)	✓		✓	
T3 (37%)		✓		
T4 (39%)				

% Smokers

	T1 (19%)	T2 (22%)	T3 (20%)	T4 (20%)
T1 (19%)				
T2 (22%)				
T3 (20%)				
T4 (20%)				

## Statistically Significant Relationships Among Neighbourhood Types in Montréal CMA, Que.

% Reporting Excellent or Very Good Health

	M1 (68%)	M2 (55%)	M3 (62%)	M4 (53%)	M5 (56%)
M1 (68%)		✓		✓	✓
M2 (55%)	✓		✓		
M3 (62%)		✓		✓	
M4 (53%)	✓		✓		
M5 (56%)	✓				

% Reporting an Injury in the Last Year

	M1 (14%)	M2 (12%)	M3 (12%)	M4 (12%)	M5 (11% <sup>ε</sup> )
M1 (14%)					
M2 (12%)					
M3 (12%)					
M4 (12%)					
M5 (11% <sup>ε</sup> )					

% Who Are Physically Active (Active and Moderately Active)

	M1 (57%)	M2 (43%)	M3 (51%)	M4 (39%)	M5 (44%)
M1 (57%)		✓	✓	✓	✓
M2 (43%)	✓		✓		
M3 (51%)	✓	✓		✓	
M4 (39%)	✓		✓		
M5 (44%)	✓				

% Who Are Overweight or Obese (BMI ≥ 25)

	M1 (39%)	M2 (45%)	M3 (29%)	M4 (43%)	M5 (41%)
M1 (39%)		✓	✓		
M2 (45%)	✓		✓		
M3 (29%)	✓	✓		✓	✓
M4 (43%)			✓		
M5 (41%)			✓		

% Smokers

	M1 (18%)	M2 (26%)	M3 (31%)	M4 (31%)	M5 (29%)
M1 (18%)		✓	✓	✓	✓
M2 (26%)	✓			✓	
M3 (31%)	✓				
M4 (31%)	✓	✓			
M5 (29%)	✓				

Note: <sup>ε</sup> Coefficient of variation between 16.6% and 33.3% (interpret with caution).

## Statistically Significant Relationships Among Neighbourhood Types in Halifax CMA, N.S.

% Reporting Excellent or  
Very Good Health

	H1 (62%)	H2 (75%)	H3 (60%)
H1 (62%)		✓	
H2 (75%)	✓		✓
H3 (60%)		✓	

% Reporting an Injury in the Last Year

	H1 (15%)	H2 (14% <sup>E</sup> )	H3 (16%)
H1 (15%)			
H2 (14% <sup>E</sup> )			
H3 (16%)			

% Who Are Physically Active  
(Active and Moderately Active)

	H1 (49%)	H2 (55%)	H3 (48%)
H1 (49%)			
H2 (55%)			
H3 (48%)			

% Who Are Overweight or Obese (BMI ≥ 25)

	H1 (48%)	H2 (40%)	H3 (48%)
H1 (48%)			
H2 (40%)			
H3 (48%)			

% Smokers

	H1 (15%)	H2 (18% <sup>E</sup> )	H3 (27%)
H1 (15%)			✓
H2 (18% <sup>E</sup> )			✓
H3 (27%)	✓	✓	

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



## For Additional Information

- 1 Statistics Canada, *Population Urban and Rural, by Province and Territory* (source: Censuses of Population, 1851-2001), [online], last modified September 1, 2005, cited June 8, 2006, from <<http://www40.statcan.ca/l01/cst01/demo62a.htm>>.
- 2 S. Galea, N. Freudenberg and D. Vlahov, "Cities and Population Health," *Social Science & Medicine* 60, 5 (2005): pp. 1017–1033.
- 3 J. Jacobs, *The Death and Life of Great American Cities* (London, England: Jonathan Cape, 1962).
- 4 H. V. Tunstall, M. Shaw and D. Dorling, "Places and Health," *Journal of Epidemiology and Community Health* 58, 1 (2004): pp. 6–10.
- 5 D. Vlahov et al., "Cities and Health: History, Approaches, and Key Questions," *Academic Medicine* 79, 12 (2004): pp. 1133–1138.
- 6 Statistics Canada, *2001 Census Dictionary* (Ottawa, Ont.: Statistics Canada, 2002), Statistics Canada catalogue no. 92-378-XIE.
- 7 Statistics Canada, *A Profile of the Canadian Population: Where We Live* (Analysis Series, 2001 Census) (Ottawa, Ont.: Statistics Canada, 2002), Statistics Canada catalogue no. 96F0030XIE2001001.
- 8 Organisation for Economic Co-operation and Development, *OECD in Figures—Statistics on the Member Countries 2005 Supplement 1*, eds. R. Clark and E. Capponi (Paris, France: OECD Publishing, 2005).
- 9 Statistics Canada, *Life Expectancy, Abridged Life Table, at Birth and at Age 65, by Sex, Canada, Provinces and Territories, Annual (Years)* (source: Statistics Canada), (CANSIM table 102-0511), [online], cited July 4, 2006, from <<http://www.statcan.ca/english/freepub/82-221-XIE/2006001/tables/1hlthsta/deaths2.htm>>, Statistics Canada catalogue no. 82-221-XIE.
- 10 Statistics Canada, (65-HLT) *Self-Rated Health by Sex, Household Population Aged 12 and over, Canada, Provinces and Territories, 2003* (source: Canadian Community Health Survey, Cycle 3.1), (CANSIM table 105-4022), Statistics Canada catalogue no. 82-401.
- 11 T. Bunting, "Decentralization or Recentralization? A Question of Household Versus Population Enumeration, Canadian Metropolitan Areas 1971-1996," *Environment and Planning A* 36 (2004): pp. 127–147.
- 12 J. Gilmore, *Health of Canadians Living in Census Metropolitan Areas* (Trends and Conditions in Census Metropolitan Areas Series, no. 2) (Ottawa, Ont.: Statistics Canada, 2004), Statistics Canada catalogue no. 89-613-MIE.
- 13 S. Macintyre, A. Ellaway and S. Cummins, "Place Effects on Health: How Can We Conceptualise, Operationalise and Measure Them?," *Social Science & Medicine* 55, 1 (2002): pp. 125–139.

- 14 Direction de la santé publique: Régie régionale de la santé et des services sociaux de Montréal-Centre, "Region de Montréal — Santé de la population," [online], cited January 12, 2006, from <<http://www.santepub-mtl.qc.ca/portrait/montreal/deces.html#tab5>>.
- 15 Direction de la santé publique: Régie régionale de la santé et des services sociaux de Montréal-Centre, *Les 29 CLSC d'un coup d'oeil — santé de la population* (Montréal, Que.: Régie régionale de la santé et des services sociaux de Montréal-Centre, 2003).
- 16 F. Matarasso, *Use or Ornament? The Social Impact of Participation in the Arts* (Gloucestershire, UK: Comedia, 1997).
- 17 I. Kawachi and L. F. Berkman, "Social Cohesion, Social Capital and Health," in *Social Epidemiology*, eds. L. F. Berkman and I. Kawachi (New York, NY: Oxford University Press, 2000), pp. 174–190.
- 18 I. Kawachi, S. V. Subramanian and N. Almeida-Filho, "A Glossary for Health Inequalities," *Journal of Epidemiology and Community Health* 56, 9 (2002): pp. 647–652.
- 19 R. J. Sampson, S. W. Raudenbush and F. Earls, "Neighborhoods and Violent Crime: A Multilevel Study of Collective Efficacy," *Science* 277, 5328 (1997): pp. 918–924.
- 20 J. M. Patterson et al., "Associations of Smoking Prevalence With Individual and Area Level Social Cohesion," *Journal of Epidemiology and Community Health* 58, 8 (2004): pp. 692–697.
- 21 D. A. Cohen, T. A. Farley and K. Mason, "Why Is Poverty Unhealthy? Social and Physical Mediators," *Social Science & Medicine* 57, 9 (2003): pp. 1631–1641.
- 22 G. Veenstra et al., "Who You Know, Where You Live: Social Capital, Neighbourhood and Health," *Social Science & Medicine* 60, 12 (2005): pp. 2799–2818.
- 23 A. Ellaway, S. Macintyre and A. Kearns, "Perceptions of Place and Health in Socially Contrasting Neighbourhoods," *Urban Studies* 38, 12 (2001): pp. 2299–2316.
- 24 D. A. Cohen et al., "Collective Efficacy and Obesity: The Potential Influence of Social Factors on Health," *Social Science & Medicine* 62, 3 (2006): pp. 769–778.
- 25 G. Schellenberg, *Immigrants in Canada's Census Metropolitan Areas* (Ottawa, Ont.: Statistics Canada, 2004), Statistics Canada catalogue no. 89-613-MWE.
- 26 Statistics Canada, *Profile of the Canadian Population by Mobility Status: Canada, a Nation on the Move* (Trends and Conditions in Census Metropolitan Areas Series, no. 3) (Analysis Series, 2001 Census) (Ottawa, Ont.: Statistics Canada, 2001), [online], cited June 13, 2006, from <<http://www12.statcan.ca/english/census01/Products/Analytic/companion/mob/provs.cfm>>.
- 27 J. T. McDonald, "Toronto and Vancouver Bound: The Location Choice of New Canadian Immigrants," *Canadian Journal of Urban Research* 13, 1 (2004): pp. 85–101.
- 28 R. A. Murdie and C. Teixeira, "Towards a Comfortable Neighbourhood and Appropriate Housing: Immigrant Experiences in Toronto," in *The World in a City*, eds. P. Anisef and M. Lanphier (Toronto, Ont.: University of Toronto Press, 2003), pp. 132–191.

- 29 F. Hou and G. Picot, *Visible Minority Neighbourhood Enclaves and Labour Market Outcomes of Immigrants* (Analytical Studies Branch research paper series) (Ottawa, Ont.: Statistics Canada, 2003), Statistics Canada catalogue no. 11F0019MIE2003204.
- 30 R. H. Glazier et al., "Neighbourhood Recent Immigration and Hospitalization in Toronto, Canada," *Canadian Journal of Public Health* 95, 3 (2004): pp. 130-134.
- 31 M. Lemstra and C. Neudorf, "Health Disparity by Neighbourhood Income Status: A Novel Approach," *Canadian Journal of Public Health* (in press).
- 32 M. A. Winkleby and C. Cubbin, "Influence of Individual and Neighbourhood Socioeconomic Status on Mortality among Black, Mexican-American, and White Women and Men in the United States," *Journal of Epidemiology and Community Health* 57, 6 (2003): pp. 444-452.
- 33 M. Wen, C. R. Browning and K. A. Cagney, "Poverty, Affluence, and Income Inequality: Neighborhood Economic Structure and Its Implications for Health," *Social Science & Medicine* 57, 5 (2003): pp. 843-860.
- 34 L. D. Kubzansky et al., "Neighborhood Contextual Influences on Depressive Symptoms in the Elderly," *American Journal of Epidemiology* 162, 3 (2005): pp. 253-260.
- 35 E. Silver, E. P. Mulvey and J. W. Swanson, "Neighborhood Structural Characteristics and Mental Disorder: Faris and Dunham Revisited," *Social Science & Medicine* 55, 8 (2002): pp. 1457-1470.
- 36 B. Chaix et al., "Comparison of a Spatial Perspective With the Multilevel Analytical Approach in Neighborhood Studies: The Case of Mental and Behavioral Disorders Due to Psychoactive Substance Use in Malmö, Sweden, 2001," *American Journal of Epidemiology* 162, 2 (2005): pp. 171-182.
- 37 M. H. Boyle and E. L. Lipman, "Do Places Matter? Socioeconomic Disadvantage and Behavioral Problems of Children in Canada," *Journal of Consulting and Clinical Psychology* 70, 2 (2002): pp. 378-389.
- 38 M. K. Stjärne et al., "Socioeconomic Context in Area of Living and Risk of Myocardial Infarction: Results From Stockholm Heart Epidemiology Program (SHEEP)," *Journal of Epidemiology and Community Health* 56 (2002): pp. 29-35.
- 39 M. Law et al., "Meeting Health Need, Accessing Health Care: The Role of Neighbourhood," *Health & Place* 11, 4 (2005): pp. 367-377.
- 40 T. Moffat, T. Galloway and J. Latham, "Stature and Adiposity Among Children in Contrasting Neighborhoods in the City of Hamilton, Ontario, Canada," *American Journal of Human Biology* 17, 3 (2005): pp. 355-367.
- 41 L. N. Oliver and M. V. Hayes, "Neighbourhood Socioeconomic Status and the Prevalence of Overweight Canadian Children and Youth," *Canadian Journal of Public Health* 96, 6 (2005): pp. 415-420.
- 42 J. Sundquist, M. Malmström and S. E. Johansson, "Cardiovascular Risk Factors and the Neighbourhood Environment: A Multilevel Analysis," *International Journal of Epidemiology* 28, 5 (1999): pp. 841-845.



- 43 A. Heisz and L. McLeod, *Low-Income in Census Metropolitan Areas, 1980-2000* (Trends and Conditions in Census Metropolitan Areas Series, no. 1) (Ottawa, Ont.: Statistics Canada, 2004), Statistics Canada catalogue no. 89-613-MIE-No.001.
- 44 R. Wilkins, J. M. Berthelot and E. Ng, "Trends in Mortality by Neighbourhood Income in Urban Canada From 1971 to 1996," *Health Reports* 13 Supplement (2002): pp. 1-28, Statistics Canada catalogue no. 82-003.
- 45 N. Ross, K. Nobrega and J. Dunn, "Income Segregation, Income Inequality and Mortality in North American Metropolitan Areas," *GeoJournal* 53 (2001): pp. 117-124.
- 46 L. S. Bourne, "Close Together and Worlds Apart: An Analysis of Changes in the Ecology of Income in Canadian Cities," *Urban Studies* 30, 8 (1993): pp. 1293-1317.
- 47 E. Fong and K. Shibuya, "Economic Changes in Canadian Neighborhoods," *Population Research and Policy Review* 22 (2003): pp. 147-170.
- 48 N. Ross et al., "Dimensions and Dynamics of Residential Segregation by Income in Urban Canada, 1991-1996," *The Canadian Geographer* 48, 4 (2004): pp. 433-445.
- 49 E. Fong and K. Shibuya, "The Spatial Separation of the Poor in Canadian Cities," *Demography* 37, 4 (2000): pp. 449-459.
- 50 Statistics Canada, *Aboriginal Peoples of Canada: A Demographic Profile* (Analysis Series, 2001 Census) (Ottawa, Ont.: Statistics Canada, 2003), Statistics Canada catalogue no. 96F0030XIE2001007.
- 51 A. J. Siggner and R. Costa, *Aboriginal Conditions in Census Metropolitan Areas, 1981-2001* (Trends and Conditions in Census Metropolitan Areas Series, no. 8) (Ottawa, Ont.: Statistics Canada, 2005), Statistics Canada catalogue no. 89-613-MIE.
- 52 A. Odoi, et al, "Inequalities in Neighbourhood Socioeconomic Characteristics: Potential Evidence-Base for Neighbourhood Health Planning," *International Journal of Health Geographics* 4, 20 (2005): pp. 1-15, [online], cited April 19, 2006, from <http://www.ij-healthgeographics.com/content/pdf/1476-072X-4-20.pdf>.
- 53 *Vulnerable Children*, ed. J. D. Willms (Edmonton, Alta.: University of Alberta Press, 2002).
- 54 N. A. Ross, S. S. Tremblay and K. Graham, "Neighbourhood Influences on Health in Montreal, Canada," *Social Science & Medicine* 59, 7 (2004): pp. 1485-1494.
- 55 Canadian Institute for Health Information, *Improving the Health of Canadians: Promoting Healthy Weights* (Ottawa, Ont.: CIHI, 2006).
- 56 K. E. Smoyer-Tomic, J. N. Hewko and M. J. Hodgson, "Spatial Accessibility and Equity of Playgrounds in Edmonton, Canada," *The Canadian Geographer* 48, 3 (2004): pp. 287-302.
- 57 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.

- 58 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.
- 59 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.
- 60 K. Wilson et al., "Linking Perceptions of Neighbourhood to Health in Hamilton, Canada," *Journal of Epidemiology and Community Health* 58, 3 (2004): pp. 192–198.
- 61 D. Cohen et al., "'Broken Windows' and the Risk of Gonorrhea," *American Journal of Public Health* 90, 2 (2000): pp. 230–236.
- 62 D. A. Cohen et al., "Neighborhood Physical Conditions and Health," *American Journal of Public Health* 93, 3 (2003): pp. 467–471.
- 63 C. Hertzman et al., *Early Development in Vancouver: Report of the Community Asset Mapping Project (CAMP)* (Vancouver: Human Early Learning Partnership, 2002).
- 64 Human Early Learning Partnership, "EDI Frequently Asked Questions," [online], cited May 23, 2006, from <<http://www.earlylearning.ubc.ca/documents/HELP%20EDI%20FAQ%20Sept%202004.pdf>>.
- 65 Canadian Institutes for Health Research—Institute of Population and Public Health and Canadian Institute for Health Information, *Moving Population and Public Health Knowledge Into Action: A Casebook of Knowledge Translation Stories* (Ottawa, Ont.: CIHR, 2006).
- 66 Transport Canada, *Pedestrian Fatalities and Injuries, 1992-2001* (Ottawa, Ont.: Transport Canada, 2004).
- 67 Transport Canada, *Road Safety in Canada—2003* (Ottawa, Ont.: Transport Canada, 2006).
- 68 Transport Canada, "Canadian Motor Vehicle Traffic Collision Statistics: 2003," [online], cited June 29, 2006, from <<http://www.tc.gc.ca/roadsafety/tp/tp3322/2003/page8.htm>>.
- 69 R. B. Noland and M. A. Quddus, "A Spatially Disaggregate Analysis of Road Casualties in England," *Accident Analysis & Prevention* 36, 6 (2004): pp. 973–984.
- 70 D. Graham, S. Glaister and R. J. Anderson, "The Effects of Area Deprivation on the Incidence of Child and Adult Pedestrian Casualties in England," *Accident Analysis & Prevention* 37, 1 (2005): pp. 125–135.
- 71 I. M. Abdalla et al., "An Investigation into the Relationships Between Area Social Characteristics and Road Accident Casualties," *Accident Analysis & Prevention* 29, 5 (1997): pp. 583–593.
- 72 P. J. Hewson, "Epidemiology of Child Pedestrian Casualty Rates: Can We Assume Spatial Independence?," *Accident Analysis & Prevention* 37, 4 (2005): pp. 651–659.
- 73 D. J. Graham and S. Glaister, "Spatial Variation in Road Pedestrian Casualties: The Role of Urban Scale, Density and Land-Use Mix," *Urban Studies* 40, 8 (2003): pp. 1591–1607.

- 74 R. Ewing, R. Pendall and D. Chen, *Measuring Sprawl and Its Impact* (Washington, D.C.: Smart Growth America, 2002), [online], cited October 22, 2005, from <http://www.smartgrowthamerica.org/sprawlindex/sprawlreport.html>.
- 75 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.
- 76 R. Ewing, R. A. Schieber and C. V. Zegeer, "Urban Sprawl as a Risk Factor in Motor Vehicle Occupant and Pedestrian Fatalities," *American Journal of Public Health* 93, 9 (2003): pp. 1541–1545.
- 77 G. C. Gee and D. T. Takeuchi, "Traffic Stress, Vehicular Burden and Well-Being: A Multilevel Analysis," *Social Science & Medicine* 59, 2 (2004): pp. 405–414.
- 78 D. A. Hennessey and D. L. Wiesenhal, "The Relationship Between Traffic Congestion, Driver Stress and Direct Versus Indirect Coping Behaviours," *Ergonomics* 40, 3 (1997): pp. 348–361.
- 79 R. G. Smart et al., "Road Rage Experience and Behavior: Vehicle, Exposure, and Driver Factors," *Traffic Injury Prevention* 5 (2004): pp. 343–348.
- 80 T. Lajunen, D. Parker and H. Summala, "Does Traffic Congestion Increase Driver Aggression?," *Transportation Research Part F* 2 (1999): pp. 225–236.
- 81 K. D. Travers, "The Social Organization of Nutritional Inequities," *Social Science & Medicine* 43, 4 (1996): pp. 543–553.
- 82 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.
- 83 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.
- 84 S. C. Cummins, L. McKay and S. Macintyre, "McDonald's Restaurants and Neighborhood Deprivation in Scotland and England," *American Journal of Preventive Medicine* 29, 4 (2005): pp. 308–310.
- 85 P. W. G. Newman and J. R. Kenworthy, "The Land Use-Transport Connection: An Overview," *Land Use Policy* 13, 1 (1996): pp. 1–22.
- 86 Conference Board of Canada, "Canada's Cities: In Need of a New Fiscal Framework," in *Performance and Potential 2004-05: How Can Canada Prosper in Tomorrow's World?* (Ottawa, Ont.: Conference Board of Canada, 2004), pp.142–157.
- 87 A. Heisz and S. LaRochelle-Côté, *Work and Commuting in Census Metropolitan Areas, 1996-2001* (Trends and Conditions in Census Metropolitan Areas Series, no. 7) (Ottawa, Ont.: Statistics Canada, 2005), Statistics Canada catalogue no. 89-613-MIE.
- 88 T. W. Sanchez, "The Connection Between Public Transit and Employment: The Cases of Portland and Atlanta," *Journal of the American Planning Association* 65, 3 (1999): pp. 284–296.

- 89 D. B. Hess, "Access to Employment for Adults in Poverty in the Buffalo-Niagara Region," *Urban Studies* 42, 7 (2005): pp. 1177–1200.
- 90 R. Cervero, O. Sandoval and J. R. Landis, "Transportation as a Stimulus of Welfare-to-Work. Private Versus Public Mobility," *Journal of Planning and Education Research* 22 (2002): pp. 50–63.
- 91 Statistics Canada, *2001 Census: Analysis Series—Where Canadians Work and How They Get There* (Ottawa, Ont.: Statistics Canada, 2003), Statistics Canada catalogue no. 96F0030XIE2001010.
- 92 A. Ellaway et al., "In the Driving Seat: Psychosocial Benefits From Private Motor Vehicle Transport Compared to Public Transport," *Transportation Research Part F* 6 (2003): pp. 217–231.
- 93 J. Anable and B. Gatersleben, "All Work and No Play? The Role of Instrumental and Affective Factors in Work and Leisure Journeys by Different Travel Modes," *Transportation Research Part A* 39 (2005): pp. 163–181.
- 94 J. F. Sallis et al., "Active Transportation and Physical Activity: Opportunities for Collaboration on Transportation and Public Health Research," *Transportation Research Part A* 38 (2004): pp. 249–268.
- 95 R. Cervero, "Mixed Land-Uses and Commuting: Evidence From the American Housing Survey," *Transportation Research Part A* 30, 5 (1996): pp. 361–377.
- 96 R. M. Zavergiu, "The Comparative Advantages of Urban Canada," *Horizons* 6, 4 (2004): pp. 22–29.
- 97 L. M. Besser and A. L. Dannenberg, "Walking to Public Transit: Steps to Help Meet Physical Activity Recommendations," *American Journal of Preventive Medicine* 29, 4 (2005): pp. 273–280.
- 98 M. M. Finkelstein et al., "Relation Between Income, Air Pollution and Mortality: A Cohort Study," *Canadian Medical Association Journal* 169, 5 (2003): pp. 397–402.
- 99 M. M. Finkelstein, M. Jerrett and M. R. Sears, "Environmental Inequality and Circulatory Disease Mortality Gradients," *Journal of Epidemiology and Community Health* 59, 6 (2005): pp. 481–487.
- 100 Environment Canada, "Factsheet 3—Transportation: 1990-1999," [online], cited July 29, 2005, from <[http://www.ec.gc.ca/pdb/ghg/factsheet3\\_e.cfm](http://www.ec.gc.ca/pdb/ghg/factsheet3_e.cfm)>.
- 101 Environment Canada, *A Guide to Understanding the Canadian Environmental Protection Act, 1999* (Gatineau, Que.: Environment Canada, 2004).
- 102 Environment Canada, "Clear Air Online—6.1—Smog," [online], last modified May 2, 2006, cited July 5, 2006, from <[http://www.ec.gc.ca/cleanair-airpur/Smog-WS13D0EDAA-1\\_En.htm](http://www.ec.gc.ca/cleanair-airpur/Smog-WS13D0EDAA-1_En.htm)>.
- 103 Natural Resources Canada, "Transportation Sector—GHG Emissions," [online], cited July 7, 2006, from <[http://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/tablesanalysis2/aaa\\_00\\_5\\_e\\_1.cfm?attr=0](http://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/tablesanalysis2/aaa_00_5_e_1.cfm?attr=0)>.

- 104 R. J. Sràm et al., "Ambient Air Pollution and Pregnancy Outcomes: A Review of the Literature," *Environmental Health Perspectives* 113, 4 (2005): pp. 375–382.
- 105 J. E. Sharman, J. R. Cockcroft and J. S. Coombes, "Cardiovascular Implications of Exposure to Traffic Air Pollution During Exercise," *Quarterly Journal of Medicine* 97, 10 (2004): pp. 637–643.
- 106 M. Lin et al., "Gaseous Air Pollutants and Asthma Hospitalization of Children With Low Household Income in Vancouver, British Columbia, Canada," *American Journal of Epidemiology* 159, 3 (2004): pp. 294–303.
- 107 N. Künzli et al., "Public-Health Impact of Outdoor and Traffic-Related Air Pollution: A European Assessment," *Lancet* 356, 9232 (2000): pp. 795–801.
- 108 P. Wilkinson et al., "Case-Control Study of Hospital Admission With Asthma in Children Aged 5-14 Years: Relation With Road Traffic in North West London," *Thorax* 54, 12 (1999): pp. 1070–1074.
- 109 B. W. Wheeler and Y. Ben-Shlomo, "Environmental Equity, Air Quality, Socioeconomic Status, and Respiratory Health: A Linkage Analysis of Routine Data From the Health Survey for England," *Journal of Epidemiology and Community Health* 59, 11 (2005): pp. 948–954.
- 110 J. S. Brainard et al., "Modelling Environmental Equity: Access to Air Quality in Birmingham, England," *Environment and Planning A* 34 (2002): pp. 695–716.
- 111 G. Mitchell and D. Dorling, "An Environmental Justice Analysis of British Air Quality," *Environment and Planning A* 35 (2003): pp. 909–929.
- 112 J. Frankenberger, *Land Use and Water Quality* (West Lafayette, Ind.: Purdue University Cooperative Extension Service, 2000).
- 113 J. Marsalek et al., "Review of Operation of Urban Drainage Systems in Cold Weather: Water Quality Considerations," *Water Science & Technology* 48, 9 (2003): pp. 11–20.
- 114 H. Leclerc, L. Schwartzbrod and E. Dei-Cas, "Microbial Agents Associated With Waterborne Diseases," *Critical Reviews in Microbiology* 28, 4 (2002): pp. 371–409.
- 115 J. M. Davies and A. Mazumder, "Health and Environmental Policy Issues in Canada: The Role of Watershed Management in Sustaining Clean Drinking Water Quality at Surface Sources," *Journal of Environmental Management* 68, 3 (2003): pp. 273–286.
- 116 L. Sliva and D. D. Williams, "Buffer Zone Versus Whole Catchment Approaches to Studying Land Use Impact on River Water Quality," *Water Resources* 35, 14 (2001): pp. 3462–3472.
- 117 Health Canada, *It's Your Health: Proper Use and Disposal of Medication* (Ottawa, Ont.: Health Canada, 2004).
- 118 Toronto Community and Neighbourhood Services, *Health Effects of Noise* (Toronto, Ont.: City of Toronto, 2000).

- 119 D. S. Michaud, "Noise Annoyance in Canada," *Noise & Health* 7 (2005): pp. 39–47.
- 120 IBM Business Consulting Services, "Traffic Noise Outside the Home," *Health Insider* December 2002 (2002): pp. 1–5.
- 121 *Dangerous Decibels: Teacher Resource Guide*, ed. M. Johnson (Portland, OR: Oregon Museum of Science and Industry, 2005), [online], cited May 23, 2006, from [http://www.dangerousdecibels.org/teachers\\_guide.cfm](http://www.dangerousdecibels.org/teachers_guide.cfm).
- 122 Health Council of the Netherlands, *Committee on Noise and Health: Noise and Health* (publication no. 1994/15E) (The Hague, Netherlands: Health Council of the Netherlands, 1994).
- 123 S. Macintyre et al., "Do Housing Tenure and Car Access Predict Health Because They Are Simply Markers of Income or Self Esteem? A Scottish Study," *Journal of Epidemiology and Community Health* 52 (1998): pp. 657–664.
- 124 J. R. Dunn et al., "Housing as a Socio-Economic Determinant of Health: A Canadian Research Framework," in *Housing & Health: Research, Policy and Innovation*, eds. P. Howden-Chapman and P. Carroll (Wellington, New Zealand: Steele Roberts Ltd, 2004), pp. 12–39.
- 125 J. R. Dunn and M. V. Hayes, "Social Inequality, Population Health, and Housing: A Study of Two Vancouver Neighborhoods," *Social Science & Medicine* 51, 4 (2000): pp. 563–587.
- 126 A. Dupuis and D. C. Thorns, "Home, Home Ownership and the Search for Ontological Security," *The Sociological Review* 46, 1 (1998): pp. 24–47.
- 127 A. Kearns et al., "'Beyond Four Walls.' The Psycho-Social Benefits of Home: Evidence From West Central Scotland," *Housing Studies* 15, 3 (2000): pp. 387–410.
- 128 S. G. Smith, "The Essential Qualities of a Home," *Journal of Environmental Psychology* 14 (1994): pp. 31–46.
- 129 J. A. Leech et al., "The Canadian Human Activity Pattern Survey: Report of Methods and Population Surveyed," *Chronic Diseases in Canada* 17, 3 (1997), [online], cited May 17, 2006, from [http://www.phac-aspc.gc.ca/publicat/cdic-mcc/17-3/d\\_e.html](http://www.phac-aspc.gc.ca/publicat/cdic-mcc/17-3/d_e.html).
- 130 J. Engeland and R. Lewis, "Exclusion From Acceptable Housing: Canadians in Core Housing Need," *Horizons* 7, 2 (2004): pp. 27–33, [online], cited June 6, 2006, from [http://www.policyresearch.gc.ca/page.asp?pagenm=v7n2\\_art\\_05](http://www.policyresearch.gc.ca/page.asp?pagenm=v7n2_art_05).
- 131 Canada Mortgage and Housing Corporation, *Canadian Housing Observer 2005* (Ottawa, Ont.: CMHC, 2005).
- 132 S. Lefebvre, "Housing: An Income Issue," *Perspectives on Labour and Income* 3, 6 (2002): pp. 5–12, Statistics Canada catalogue no. 75-001-XIE.
- 133 J. Engeland et al., *Evolving Housing Conditions in Canada's Census Metropolitan Areas, 1991-2001* (Trends and Conditions in Census Metropolitan Areas Series, no. 5) (Ottawa, Ont.: Statistics Canada, 2005), Statistics Canada catalogue no. 89-613-MWE2004005.

- 134 S. Hwang et al., *Housing and Population Health: A Review of the Literature* (Ottawa, Ont.: Canada Mortgage and Housing Corporation, 1999).
- 135 B. P. Lanphear et al., "Community Characteristics Associated With Elevated Blood Lead Levels in Children," *Pediatrics* 101, 2 (1998): pp. 264–271.
- 136 Centre for Disease Control, "Children With Elevated Blood Lead Levels Attributed to Home Renovation and Remodeling Activities—New York, 1993-1994," *Morbidity and Mortality Weekly Report* 45, 51-52 (1997): pp. 1120–1123.
- 137 B. Moloughney, *Housing and Population Health: The State of Current Research Knowledge* (Ottawa, Ont.: Canadian Institute for Health Information, 2004).
- 138 Ontario Tobacco Research Unit, *Protection from Second-Hand Tobacco Smoke in Ontario: A Review of the Evidence Regarding Best Practices* (Toronto, Ont.: University of Toronto, 2001).
- 139 U.S. Environmental Protection Agency, *Respiratory Health Effects of Passive Smoking: Lung Cancer and Other Disorders* (Washington, D.C.: U.S. Environmental Protection Agency, 1992).
- 140 Canada Mortgage and Housing Corporation, "Canadian Housing Fire Statistics," *Research Highlights* 04-004 (2004): pp. 1–4.
- 141 Public Health Agency of Canada, *Report on Seniors' Falls in Canada* (Ottawa, Ont.: PHAC, 2005).
- 142 D. Myers and S. W. Lee, "Immigration Cohorts and Residential Overcrowding in Southern California," *Demography* 33, 1 (1996): pp. 51–65.
- 143 G. W. Evans, S. J. Lepore and K. M. Allen, "Cross-Cultural Differences in Tolerance for Crowding: Fact or Fiction?," *Journal of Personality and Social Psychology* 79, 2 (2000): pp. 204–210.
- 144 M. Clark and P. Riben, *Tuberculosis in First Nations Communities, 1999* (Ottawa, Ont.: Health Canada, 1999).
- 145 G. W. Evans, N. M. Wells and A. Moch, "Housing and Mental Health: A Review of the Evidence and a Methodological and Conceptual Critique," *Journal of Social Issues* 59, 3 (2003): pp. 475–500.
- 146 Federation of Canadian Municipalities, *Quality of Life in Canadian Communities* (Vancouver, B.C.: FCM, 2004).
- 147 P. Begin et al., *Homelessness* (Ottawa, Ont.: Parliamentary Research Branch, 1999), [online], cited June 26, 2006, from <<http://www.parl.gc.ca/information/library/PRBpubs/prb991-e.pdf>>.
- 148 S. W. Hwang, "Homelessness and Health," *Canadian Medical Association Journal* 164, 2 (2001): pp. 229–233.
- 149 T. Bunting, R. A. Walks and P. Filion, "The Uneven Geography of Housing Affordability Stress in Canadian Metropolitan Areas," *Housing Studies* 19, 3 (2004): pp. 361–393.



- 150 Y.-L. I. Wong and I. Piliavin, "Stressors, Resources, and Distress among Homeless Persons: A Longitudinal Analysis," *Social Science & Medicine* 52 (2001): pp. 1029–1042.
- 151 E. Votta and I. G. Manion, "Factors in the Psychological Adjustment of Homeless Adolescent Males: The Role of Coping Style," *Journal of the American Academy of Child and Adolescent Psychiatry* 42, 7 (2003): pp. 778–785.
- 152 E. Votta and I. Manion, "Suicide, High-Risk Behaviours, and Coping Style in Homeless Adolescent Males' Adjustment," *The Journal of Adolescent Health* 34, 3 (2004): pp. 237–243.
- 153 A. M. Cheung and S. W. Hwang, "Risk of Death Among Homeless Women: A Cohort Study and Review of the Literature," *Canadian Medical Association Journal* 170, 8 (2004): pp. 1243–1247.
- 154 S. W. Hwang, "Mortality Among Men Using Homeless Shelters in Toronto, Ontario," *Journal of the American Medical Association* 283, 16 (2000): pp. 2152–2157.
- 155 E. Roy et al., "Mortality in a Cohort of Street Youth in Montreal," *Journal of the American Medical Association* 292, 5 (2004): pp. 569–574.
- 156 M. Shinn et al., "Predictors of Homelessness Among Families in New York City: From Shelter Request to Housing Stability," *American Journal of Public Health* 88, 11 (1998): pp. 1651–1657.
- 157 R. Hiscock et al., "Residents and Residence: Factors Predicting the Health Disadvantage of Social Renters Compared to Owner-Occupiers," *Journal of Social Issues* 59, 3 (2003): pp. 527–546.
- 158 W. M. Rohe, S. Van Zandt and G. McCarthy, *The Social Benefits and Costs of Homeownership: A Critical Assessment of the Research* (Chapel Hill, N.C.: Harvard University, 2001).
- 159 J. Cairney, "Housing Tenure and Psychological Well-Being During Adolescence," *Environment and Behavior* 37, 4 (2005): pp. 552–564.
- 160 W. M. Rohe, S. Van Zandt and G. McCarthy, "Home Ownership and Access to Opportunity," *Housing Studies* 17, 1 (2002): pp. 51–61.
- 161 P. Somerville, "Explanations of Social Exclusion: Where Does Housing Fit In?," *Housing Studies* 13, 6 (1998): pp. 761–780.
- 162 J. Cairney and M. H. Boyle, "Home Ownership, Mortgages and Psychological Distress," *Housing Studies* 19, 2 (2004): pp. 161–174.
- 163 Dietitians of Canada, *The Cost of Eating in BC: Impact of a Low-Income Food Security and Health* (Vancouver, B.C.: Dietitians of Canada, BC Region, 2004).
- 164 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.
- 165 J. Che and J. Chen, "Food Insecurity in Canadian Households," *Health Reports* 12, 4 (2001): pp. 11–22, Statistics Canada catalogue no. 82-003.

- 166 N. T. Vozoris and V. S. Tarasuk, "Household Food Insufficiency Is Associated With Poorer Health," *The Journal of Nutrition* 133, 1 (2003): pp. 120–126.
- 167 I. Ledrou and J. Gervais, "Food Insecurity," *Health Reports* 16, 3 (2005): pp. 47–51, Statistics Canada catalogue no. 82-003.
- 168 A. Meyers et al., "Subsidized Housing and Children's Nutritional Status: Data From a Multisite Surveillance Study," *Archives of Pediatrics & Adolescent Medicine* 159, 6 (2005): pp. 551–556.
- 169 A. Ellaway and S. Macintyre, "Does Housing Tenure Predict Health in the UK Because It Exposes People to Different Levels of Housing Related Hazards in the Home or Its Surroundings?," *Health & Place* 4, 2 (1998): pp. 141–150.
- 170 D. Thomas, "Socio-Demographic Factors in the Current Housing Market," *Canadian Economic Observer* 18, 10 (2005): pp. 3.1–3.9.
- 171 E. Moore and A. Skaburskis, "Canada's Increasing Housing Affordability Burdens," *Housing Studies* 19, 3 (2004): pp. 395–413.
- 172 Canada Mortgage and Housing Corporation, "Housing the Boom, Bust and Echo Generations," *Research Highlights* 77 (March 2002): pp. 1–6.
- 173 Canada Mortgage and Housing Corporation, "Montréal CMA," *Rental Market Report*, October 2005: pp. 1–23.
- 174 Canada Mortgage and Housing Corporation, "Toronto CMA," *Rental Market Report*, October 2005: pp. 1–28.
- 175 Canada Mortgage and Housing Corporation, "Calgary CMA," *Rental Market Report*, October 2005: pp. 1–15.
- 176 Canada Mortgage and Housing Corporation, "Vancouver CMA," *Rental Market Report*, October 2005: pp. 1–28.
- 177 Canada Mortgage and Housing Corporation, "Halifax CMA," *Rental Market Report*, October 2005: pp. 1–17.
- 178 City of Calgary, *Affordability Challenges for Calgary Renter Households: Affordable Housing Calgary* (Calgary, Alta.: City of Calgary, 2006).
- 179 Statistics Canada, *Aboriginal People's Survey 2001—Initial Findings: Well-Being of the Non-Reserve Aboriginal Population* (Ottawa, Ont.: Statistics Canada, 2003), Statistics Canada catalogue no. 89-589-XIE.
- 180 R. A. Retting, S. A. Ferguson and A. T. McCartt, "A Review of Evidence-Based Traffic Engineering Measures Designed to Reduce Pedestrian-Motor Vehicle Crashes," *American Journal of Public Health* 93, 9 (2003): pp. 1456–1463.
- 181 R. Elvik, "Area-Wide Urban Traffic Calming Schemes: A Meta-Analysis of Safety Effects," *Accident Analysis & Prevention* 33, 3 (2001): pp. 327–336.

- 182 U. Engel and L. K. Thomsen, "Safety Effects of Speed Reducing Measures in Danish Residential Areas," *Accident Analysis & Prevention* 24, 1 (1992): pp. 17–28.
- 183 A. A. Vis, A. Dijkstra and M. Slop, "Safety Effects of 30 km/h Zones in the Netherlands," *Accident Analysis & Prevention* 24, 1 (1992): pp. 75–86.
- 184 C. Atkins and M. Coleman, "The Influence of Traffic Calming on Emergency Response Times," *Institute of Transportation Engineers* 67, 8 (1997): pp. 42–48.
- 185 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.
- 186 C. L. Craig et al., *Increasing Physical Activity: Building a Supportive Recreation and Sport System* (Ottawa, Ont.: Canadian Fitness and Lifestyle Research Institute, 2001).
- 187 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.
- 188 Western Economic Diversification Canada, "The Canadian Environmental Assessment Act," [online], cited June 19, 2006, from <[http://www.wd.gc.ca/mediacentre/facts/pan/pan6\\_e.asp](http://www.wd.gc.ca/mediacentre/facts/pan/pan6_e.asp)>.
- 189 Canadian Paediatric Society, *Are We Doing Enough? A Status Report on Canadian Public Policy and Child and Youth Health* (Ottawa, Ont.: CPS, 1995).
- 190 Action Sandy Hill, "Assist Tools on Local Problems," [online], last modified May 3, 2006, cited July 27, 2006, from <[www.ash-acs.ca/Tools/tools\\_supp\\_e.html](http://www.ash-acs.ca/Tools/tools_supp_e.html)>.
- 191 F. Lawrence, S. Kavage and T. Litman, *Promoting Public Health through Smart Growth* (Vancouver, B.C.: Smart Growth BC, 2006).
- 192 U.S. Environmental Protection Agency, "About Smart Growth," [online], cited April 28, 2006, from <<http://www.epa.gov/cgi-bin/epaprintonly.cgi>>.
- 193 Canada Mortgage and Housing Corporation, *Smart Growth in Canada: Implementation of a Planning Concept* (Ottawa, Ont.: Canada Mortgage and Housing Corporation, 2005).
- 194 National Research Council Canada, "Model Code Adoption Across Canada," [online], cited May 3, 2006, from <[http://www.nationalcodes.ca/ncd\\_model-code\\_e.shtml](http://www.nationalcodes.ca/ncd_model-code_e.shtml)>.
- 195 Federal Publications Inc., "National Building Code of Canada 2005" [online], cited March 5, 2006, from <<http://www.fedpubs.com/subject/housing/natbuilding.htm>>.
- 196 World Health Organization, *Is Housing Improvement a Potential Health Improvement Strategy?* (Geneva, Switzerland: WHO, 2005).
- 197 Health Canada, *Make Your Home and Car Smoke-Free: A Guide to Protecting Your Family From Second-Hand Smoke* (Ottawa, Ont.: Health Canada, 2005).
- 198 J. d'Avernas, *Environmental Tobacco Smoke in the Home* (Toronto, Ont.: Ontario Tobacco Strategy, 1997).

- 199 The NRC+PickerGroup Canada, *Smoke Free Homes Pre and Post Campaign Survey* (Ottawa, Ont.: Program Training and Consultation Centre, 2004).
- 200 S. Tsemberis, L. Gulcur and M. Nakae, "Housing First, Consumer Choice, and Harm Reduction for Homeless Individuals With a Dual Diagnosis," *American Journal of Public Health* 94, 4 (2004): pp. 651–656.
- 201 S. Tsemberis and R. F. Eisenberg, "Pathways to Housing: Supported Housing for Street-Dwelling Homeless Individuals With Psychiatric Disabilities," *Psychiatric Services* 51, 4 (2000): pp. 487–493.
- 202 Human Resources Development Canada, *Evaluation of the National Homelessness Initiative: Implementation and Early Outcomes of the HRDC-Based Components* (Ottawa, Ont.: HRDC, 2003).
- 203 Department of Finance Canada, *The Budget Speech 2001—Securing Progress in an Uncertain World* (Ottawa, Ont.: Government Services Canada, 2001), Statistics Canada catalogue no. F1-23/2001-1E.
- 204 Manitoba Family Services and Housing, "A Framework for Bilateral Agreements Aimed at Affordable Housing by the Federal, Provincial and Territorial (F/P/T) Ministers Responsible for Housing," [online], cited April 12, 2006, from [http://www.gov.mb.ca/fs/housing/ahi\\_framework.html](http://www.gov.mb.ca/fs/housing/ahi_framework.html).
- 205 Canada Mortgage and Housing Corporation, "Fire Experience, Smoke Alarms and Sprinklers in Canadian Houses: CMHC Research to 2005," *Research Highlight* 05-107 (2005): pp. 1–8.
- 206 Federation of Canadian Municipalities, *Moving Forward: Refining the FCM Recommendation for a National Affordable Housing Strategy* (FCM: Ottawa, Ont., 2004).
- 207 International Healthy Cities Foundation, "Launching a Healthy Communities Project," [online], cited October 19, 2005, from <http://www.healthycities.org/launching.html>.
- 208 Canadian Institute for Health Information, *Improving the Health of Canadians* (Ottawa, Ont.: CIHI, 2004).
- 209 Canadian Institute for Health Information, *Improving the Health of Young Canadians* (Ottawa, Ont.: CIHI, 2005).
- 210 C. E. Pérez, "Health Status and Health Behaviour Among Immigrants," *Health Reports* 13 Supplement (2002): pp. 1–13, Statistics Canada catalogue no. 82-003.
- 211 R. A. Johnson and D. W. Wichern, *Applied Multivariate Statistical Analysis* (Upper Saddle River, NJ: Prentice Hall, 2002).
- 212 H. F. Kaiser, "The Application of Electronic Computers to Factor Analysis," *Educational and Psychological Measurement* 20, 1 (1960): pp. 141–151.
- 213 H. F. Kaiser, "The Varimax Criterion for Analytic Rotation in Factor Analysis," *Psychometrika* 23, 3 (1958): pp. 187–200.

- 214** J. MacQueen, *Some Methods for Classification and Analysis of Multivariate Observations* (Proceedings of the 5th Berkeley Symposium on Mathematical Statistics and Probability) (Berkeley, CA: University of California Press, 1967).
- 215** T. Calinski and J. Harabasz, "A Dendrite Method for Cluster Analysis," *Communication in Statistics* 3, 1 (1974): pp. 1–27.
- 216** SAS Institute Inc., *SAS Technical Report A-108 Cubic Clustering Criterion* (Cary, NC: SAS Institute Inc., 1983).



# It's Your Turn

We welcome comments and suggestions on *Improving the Health of Canadians: An Introduction to Health in Urban Places* and on how to make future reports more useful and informative. Please email ideas to [cphi@cihi.ca](mailto:cphi@cihi.ca) or complete this questionnaire and return it to:

***Improving the Health of Canadians: An Introduction to Health in Urban Places* 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: An Introduction to Health in Urban Places*?

- ☐ 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                   | <input type="checkbox"/> Excellent | <input type="checkbox"/> Good | <input type="checkbox"/> Fair | <input type="checkbox"/> Poor |
| Organization/format       | <input type="checkbox"/> Excellent | <input type="checkbox"/> Good | <input type="checkbox"/> Fair | <input type="checkbox"/> Poor |
| Use of figures            | <input type="checkbox"/> Excellent | <input type="checkbox"/> Good | <input type="checkbox"/> Fair | <input type="checkbox"/> Poor |
| Quality of analysis       | <input type="checkbox"/> Excellent | <input type="checkbox"/> Good | <input type="checkbox"/> Fair | <input type="checkbox"/> Poor |
| Level of detail presented | <input type="checkbox"/> Excellent | <input type="checkbox"/> Good | <input type="checkbox"/> Fair | <input type="checkbox"/> Poor |
| Length of the report      | <input type="checkbox"/> Excellent | <input type="checkbox"/> Good | <input type="checkbox"/> Fair | <input type="checkbox"/> 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?


- |                                                    |                                                                        |
|----------------------------------------------------|------------------------------------------------------------------------|
| <input type="checkbox"/> Newfoundland and Labrador | <input type="checkbox"/> Saskatchewan                                  |
| <input type="checkbox"/> Nova Scotia               | <input type="checkbox"/> Alberta                                       |
| <input type="checkbox"/> New Brunswick             | <input type="checkbox"/> British Columbia                              |
| <input type="checkbox"/> Prince Edward Island      | <input type="checkbox"/> Northwest Territories                         |
| <input type="checkbox"/> Quebec                    | <input type="checkbox"/> Yukon Territory                               |
| <input type="checkbox"/> Ontario                   | <input type="checkbox"/> Nunavut                                       |
| <input type="checkbox"/> Manitoba                  | <input type="checkbox"/> 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
- ☐ Urban planner
- ☐ 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.