

2009 BC Sprawl Report

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Walkability and Health

Research Summary

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Research indicates that the risk of obesity can decline by as much as 10% by walking approximately 24 minutes per day. ^v

Why is this study relevant?

Chronic diseases have become Canada's greatest health threat. Heart disease, for example, is the number one killer in the country. It is also the most costly disease, putting the greatest burden on our national health care system.ⁱ Cancer is the leading cause of premature death in Canada: 1,026,700 potential years were lost in 2004 as a result of cancer. This represents 32% of the potential years of life lost resulting from all causes of death.ⁱⁱ

According to the Heart and Stroke Foundation of Canada, physical activity is a lifesaver.ⁱⁱⁱ Regular physical activity can dramatically lower one's risk of chronic disease and related factors such as high blood pressure, high cholesterol and obesity.

What's more, one does not need to engage in high-intensity aerobic exercise in order to get the health benefits of physical exercise. Studies have shown that significant health benefits can be gained by engaging in 30 minutes of moderate physical activity, such as walking or bicycling, five days each week.^{iv}

Yet, most North Americans do not meet these minimum levels of exercise. Scientists are studying if the *built environment*, our homes, shops, work places, parks, schools, roads, and other infrastructure that we encounter in our daily lives, might have something to do with this unexpected trend.

A growing body of research has consistently shown that there is a significant relationship between the built environment, physical activity, and public health. Most of this research, however, has been conducted in the United States, with few such studies in Canadian context. Focusing on walkability and health, the 2009 BC Sprawl Report is one of the first comprehensive Canadian studies on the relationship between physical activity and built environment characteristics

Neighbourhoods with good street lighting, availability of continuous sidewalks, a variety of shops, services, parks, schools and workplaces within walking distance of homes are often called “walkable” neighbourhoods.



What methodology was used?

- Researchers obtained physical activity and health data for 2,731 residents of 16 neighbourhoods throughout BC, ranging from very urban to rural. Each neighbourhood corresponded to a census Dissemination Area (DA), which is the smallest geographic unit used for census reporting.
- The physical activity and health data was originally collected in spring 2006 by the BC Provincial Health Services Authority’s *Health and Wellness Survey*. The survey asked respondents to:
 - Estimate the number of days they had walked for more than 10 minutes over the last seven days;
 - Provide their gender, age, income, weight & height (from which to calculate Body Mass Index); And
 - Indicate whether they had hypertension or diabetes.
- The survey also asked respondents to assess their neighbourhood on 10 counts, including: whether street traffic made it difficult or unpleasant to walk; whether most streets had sidewalks; if shops and markets were within walking distance; and whether they felt safe walking at night. This data enabled the researchers to calculate a **subjective** walkability index score for each neighbourhood.

- Using Geographic Information System (GIS) software, 2006 census data and aerial photos, the researchers calculated built environment factors that previous studies had been found to influence walking and physical activity levels. They combined these factors to calculate an **objective** walkability index score for each neighbourhood. The factors:

Variable	Definition
Net population density	Number of people living in the neighbourhood per sq km of residential land
Street connectivity	Percent of intersections that have three or more streets intersecting
Intersection density	Number of intersections per sq km
Land use mix index	An index that reflects diversity of land types, varies between 0 (homogenous) and 1 (balanced mix)
Access to parks and greenspace	Straight line distance to the closest major greenspace from the neighbourhood centroid, in metres
Housing mix index	An index that reflects diversity of housing types, varies between 0 (homogenous) and 1 (balanced mix)
Sidewalks	Percentage of streets with no sidewalks
Setbacks	Average distance from curb to front of house, in metres
Street widths	Average width of streets from curb to curb, in metres
Block lengths	Average block length, in metres



Photo: Sarah Becking

- Researchers then used statistical analysis to see if there were significant linkages between the subjective and objective walkability indices, and levels of physical activity, hypertension, diabetes, and Body Mass Index. In the processes, they controlled for socio-demographic factors such as age, gender, and annual household income.





What were the most meaningful findings?

The analysis revealed that:

- British Columbians living in more walkable neighbourhoods, regardless of age, income or gender, are more likely to walk for at least 10 minutes on a daily basis than those living in less walkable neighbourhoods. This finding is significant at the 99% confidence level for both the subjective and the objective walkability indices.
- Even when controlling for age, income, and gender, an increase in walkability is associated with a decline in the odds of being obese or overweight (significant at the 99% confidence level); and
- The odds of suffering from hypertension decline with an increase in the objective walkability index, all else being equal (still significant at the 99% confidence level).

What is the most significant policy implication?

Municipal and provincial governments should carefully consider the health implications of decisions affecting neighbourhood design and take the necessary steps to ensure that more compact, complete communities are promoted over sprawling, homogenous urban landscapes. The literature reviewed in Section 2 of this report suggests that land use mix, residential and employment density, the attractiveness of streetscapes, and street connectivity are among the most important features to be promoted in new developments and major redevelopments.

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- ⁱ Health Canada: <http://www.hc-sc.gc.ca/dc-ma/heart-coeur/index-eng.php>
- ⁱⁱ Canadian Cancer Society: http://www.cancer.ca/canada-wide/about%20cancer/cancer%20statistics/canadian%20cancer%20statistics/potential%20years%20of%20life%20lost%20due%20to%20cancer%20-%202008.aspx?sc_lang=en
- ⁱⁱⁱ Heart and Stroke Foundation of Canada: http://www.heartandstroke.com/site/c.ikiQLcMWJtE/b.3483953/k.7D68/Basic_principles_of_physical_activity.htm
- ^{iv} _____1996. Physical Activity and Health: A Report of the Surgeon General. Atlanta, GA: United States Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion
- ^v Adapted from the Heart and Stroke Foundation of Canada's website: http://www.heartandstroke.com/site/c.ikiQLcMWJtE/b.3820627/k.DB5D/The_built_environment_physical_activty_heart_disease_and_stroke.htm

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