

# Walk it off: Living in Walkable Metro Vancouver, Canada Neighbourhoods Associated with Lower Body Mass Index (BMI)



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## Introduction

Obesity is a major modifiable risk factor for type 2 diabetes. In Canada, adult obesity, childhood obesity and diabetes have increased in the past two decades.<sup>1</sup> In 2014, around half of adult Canadians and British Columbians were overweight or obese.<sup>2</sup>

In addition to diet and physical activity, obesity is influenced by complex interrelated factors including built environment. Low neighbourhood walkability has been shown to be associated with an increase in obesity and diabetes, and people living in walkable neighbourhoods walk more and have lower BMI.<sup>3,4</sup>

Walk Score®, primarily developed for real estate use, offers one way to measure walkability and is increasingly being used by public health researchers as an index of walkability.

## Objective

To assess the association between neighbourhood walkability and BMI, as a pathway to onset of type 2 diabetes among adults in Metro Vancouver, Canada.

## Methods

### My Health My Community Survey (MHMC)

MHMC surveyed residents of Vancouver Coastal and Fraser Health regions of British Columbia, Canada aged 18 years or older from June 2013-July 2014. The predominantly web-based survey was available in English, Chinese and Punjabi and covered questions on socio-demographics, health status and behaviours, access to care, and built environment.

- The final MHMC sample was weighted using 2011 National Household Survey.
- Body Mass Index (BMI) was calculated using self-reported height and weight, and adjusted for reporting bias using Statistic Canada methodology.<sup>5</sup>

More detailed information on the survey tool, recruitment of participants and limitations can be found in the MHMC Technical Report at [www.myhealthmycommunity.org](http://www.myhealthmycommunity.org).

### Walk Score®

Walk Score® is a proprietary measure of walkability.<sup>6</sup> We obtained the data for all MHMC participant postal codes from Redfin Real Estate ([redfin.com](http://redfin.com)).

- The score was developed by analyzing the distance (“as the crow flies”) from a point to nearby amenities (e.g. grocery stores, schools, parks, restaurants and retail). Scores range from 0-100.
- Amenities within 400m of a location are given full points and a decay function applied with increasing distance; zero points are given for distances over 2400m. Areas with fewer road intersections and larger average block lengths receive a penalty.
- Categories used for this analysis were “walker’s paradise” (90-100), very walkable (70-89), somewhat walkable (50-69), and car dependent (0-49).

### Modelling Methods

We modelled the associations between BMI (Overweight/Obese vs. Normal/Underweight) and Walk Score® (4 categories) among Metro Vancouver respondents using multivariate logistic regression. We adjusted the model for:

- **Socio-demographics:** Age, gender, ethnicity, immigration, education and household income.
- **Health behaviours:** Sleep time, screen time, moderate or vigorous physical activity time, smoking, walking time, and servings of fruit and vegetables/day.
- **Health Status:** Diagnosis of mood or anxiety disorder and self-reported physical health.
- **Others:** Commute mode to work or school and time living in the current neighbourhood.

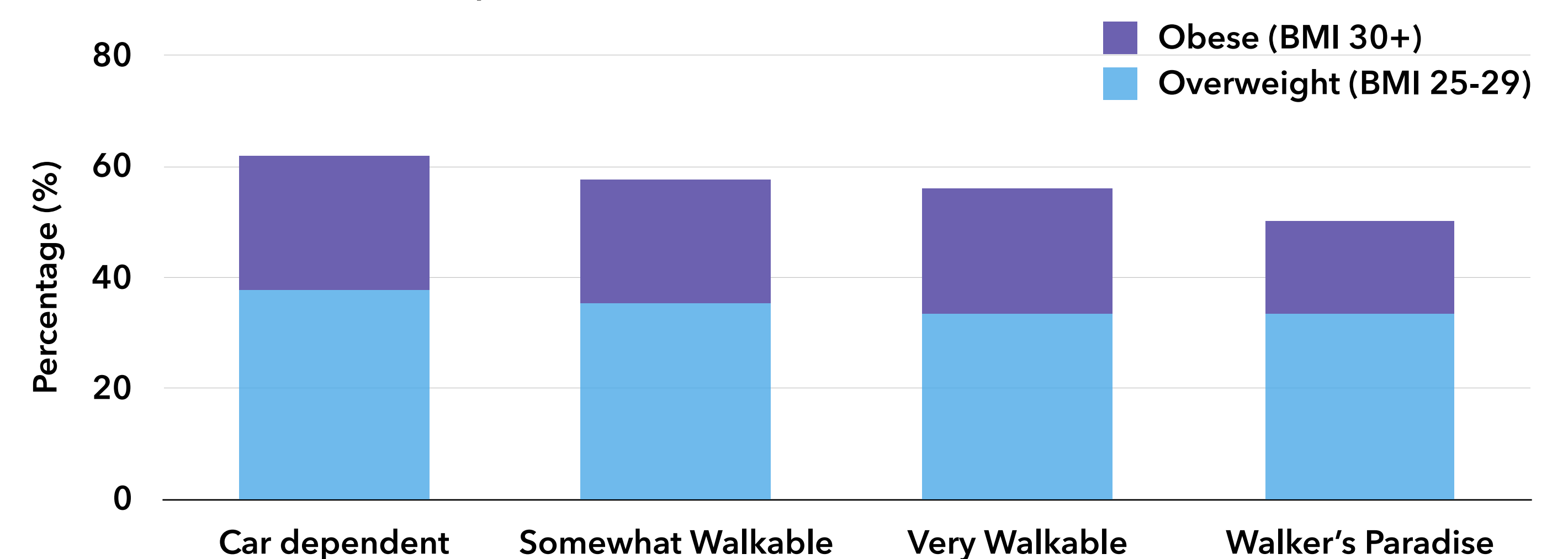
## Results

In Metro Vancouver, over 28,000 people took part in MHMC. Around 6.9% reported a past diabetes diagnosis (BMI < 25 = 3.8%; BMI 25-29 = 6.2%; BMI 30+ = 13.9%).

BMI and Walk Score® data were available for 79.2% (n=22,499) of respondents. In our sample, 22.2% were obese and 35.4% were overweight (Total BMI 25+ = 57.6%).

A higher proportion of respondents were overweight or obese (BMI ≥ 25) in car dependent neighbourhoods (Figure 1).

**Figure 1: Percentage overweight and obese by Walk Score® category, Metro Vancouver, Canada.**



The final adjusted model found (Table 1) that compared to car dependent areas, those living in “walker’s paradise” had 31% lower odds of being obese/overweight, and those living in very walkable areas had 11% lower odds of being obese/overweight. Association between obese/overweight and somewhat walkable areas was not significant.

**Table 1: Odds ratio of being obese/overweight by Walk Score® category, Metro Vancouver, Canada. (n= 22,499)**

Walk Score® Category (Score)	Odds ratio (95% Confidence interval)
Car dependent (0-49)	1.00
Somewhat Walkable (50-69)	0.93 (0.83, 1.04)
Very Walkable (70-89)	0.89 (0.80, 0.98)
Walker's Paradise (90-100)	0.69 (0.61, 0.78)

## Discussion

**We found that living in walkable areas, as measured by Walk Score®, was associated with significantly lower odds of being obese or overweight.**

Chiu et al. from Ontario, Canada also found lower obesity among those residing in more walkable areas and found more utilitarian walking among those in these areas.<sup>3</sup>

Limitations of this analysis include the self-reported cross-sectional nature of MHMC data. Walk Score® does not measure quality of the amenities or access, and neighbourhood features such as safety and community design. Future research on neighbourhood walkability and health should incorporate additional community features such as availability of fruits and vegetables, and quality of built environment features, such as sidewalk availability/quality, availability of green spaces and traffic volumes.

Walkable neighbourhoods may play an important role in prevention of obesity and type 2 diabetes by encouraging active lifestyles and increasing accessibility to services and amenities which promote healthy living. Municipal planners should view access to walkable neighbourhoods not only for community connectedness but as physical activity resources for the community. Making the active option the easier option can pay dividends in terms of lower obesity and diabetes.

## References

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