Using GIS to characterize urban form and bikeability
in Metro Vancouver, Canada

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Background

The built environment – the urban form in which we live, work, and commute – has been found to correlate with travel behavior and physical activity. To date, research has focused on walking or general physical activity. However cycling is a transport mode that allows for faster travel and longer trips distances than walking, one that may be a more desirable mode substitute for car trips.

A recent **opinion** survey conducted as part of the "Cycling in Cities" project in Metro Vancouver confirmed that route characteristics were strong motivators and deterrents of cycling. Here, we will use geographical data to explore how **objective** measures of the urban environment correlate with cycling.

Spatial Data Sources

Spatial datasets for key variables relevant to cycling were obtained from government agencies, through academic data sharing agreements, and also developed in-house.All maps were generated in Geographic Information Systems (GIS). We will use 2 levels of outcome variables: mode choice for individual trips from the Cycling in Cities survey; and area-level data from the 2006 Census for journey-to-work mode.

What is "bikeability"?

Walkability and sprawl indices have been useful in predicting physical inactivity, obesity, air pollution, and chronic diseases. One example is the walkability index by Frank et al. (2006, JAPA). It includes 4 measures: residential density, intersection density, land use mix, and a measure of retail design. However, there are likely to be important differences between "walkability" and "bikeability". For example, whereas sidewalks may be important to walking, bicycle facilities and flat terrain might be key factors for cyclists. To define our bikeability index, we will draw on data from the opinion survey, focus groups, and objective data such as connectivity.

Focus Groups

In August 2008 we conducted focus groups with different types of cyclists (potential, occasional, and regular) and with members of a local cycling advocacy group to get a sense of what "bikeability" means to a broad range of individuals. This consultation process will inform our development of the "bikeability index". Analysis of the focus group themes is presently underway.

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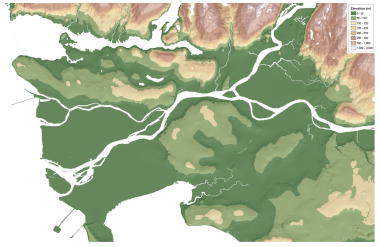
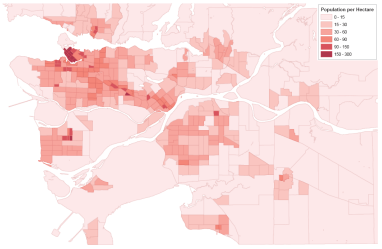
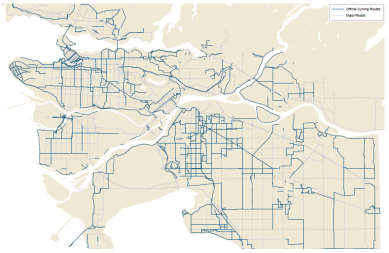
How does urban form ..... influence cycling?



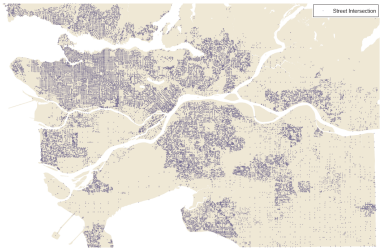
Elevation



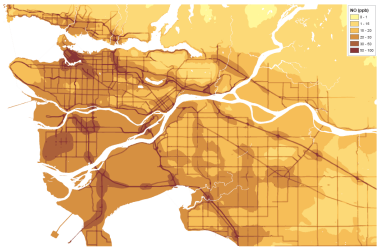
Population density



Bicycle facilities

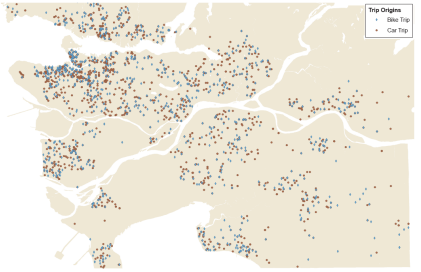


Connectivity

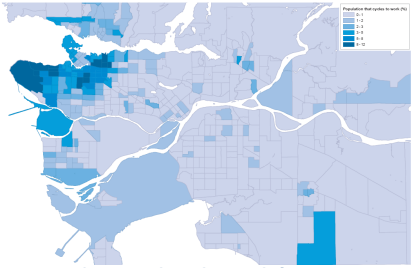


Air pollution

"Greenness"



Individual cycling & car trips, from Cycling in Cities Survey



Area data on % who cycle to work, from 2006 Census

Policy Implications

An important outcome of this research will be the development of a "bikeability " map for the region, which can be used to evaluate the capacity of neighbourhoods to achieve increased cycling rates, to highlight areas where enhanced infrastructure could access a latent demand for cycling, and thus allow for the funding of cycling improvements to be allocated across the region in a more strategic manner.

As many of the types of geographical data shown here are commonly available, analogous measures of urban form can be can be mapped in other regions to identify areas that are more or less conducive for biking, and provide tools for planners on how to design cities for cycling.

www.cher.ubc.ca/cyclingincities