

Impacts of Bicycle Infrastructure in Mid-sized Canadian Cities



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SIMON FRASER UNIVERSITY
ENGAGING THE WORLD



Impacts of Bicycle Infrastructure in Mid-sized Canadian Cities (IBIMS)

designed in partnership with local government and public health

How does investment in a bicycling network impact:

1. people of “all ages and abilities” riding a bike?
2. different populations groups and neighbourhoods?
3. safety & injury rates?
4. health-related economic benefits of cycling?



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3 Mid-sized Canadian Cities

Study City	Population	Bicycling Mode Share	Bicycling infrastructure **
Victoria (including Esquimalt, Oak Bay, Saanich)	140,000	11.5%	~ 190 km
Kelowna	197,600	3.5%	~ 240 km
Halifax (including the Peninsula, Mainland, Dartmouth)	198,000	3.9%	~ 80 km



Notes:

*Population centre according to Stats Can: <http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/qeo049a-eng.cfm>

**We defined km of infrastructure based on previous work. We included 4 categories: painted lanes (excluding shoulders with no markings for cyclists); residential bikeways; off-street multi-use or bike only paths; cycle tracks. Based in 2016

Objectives & Methods

1. to estimate the impact of the intervention on changes in the use of active travel, perceived safety, and cycling incidents

Population Survey



2. to analyze the impact on spatial inequities of access to cycling infrastructure and safety incidents

Spatial & Mapping



3. to assess the health-related economic benefits, and the cost-benefit ratio for the intervention

Economic Assessment



WHO
"HEAT"

Health Economic
Assessment Tool

Population Survey

- Survey 1 (Baseline) October 19-31, 2016
- Recruited 3000 residents (1000 from each study city)
- Conducted by Leger, age and sex quotas
- Analyzed responses for those who live or work in study boundaries (n=2433 total)



Topics

- Travel behavior
- Physical activity
- Cycling patterns
- Cycling safety and incidents
- Knowledge, attitudes and use of cycling infrastructure
- Demographics

Survey 1
Baseline
2016

Survey 2
Short term
2018

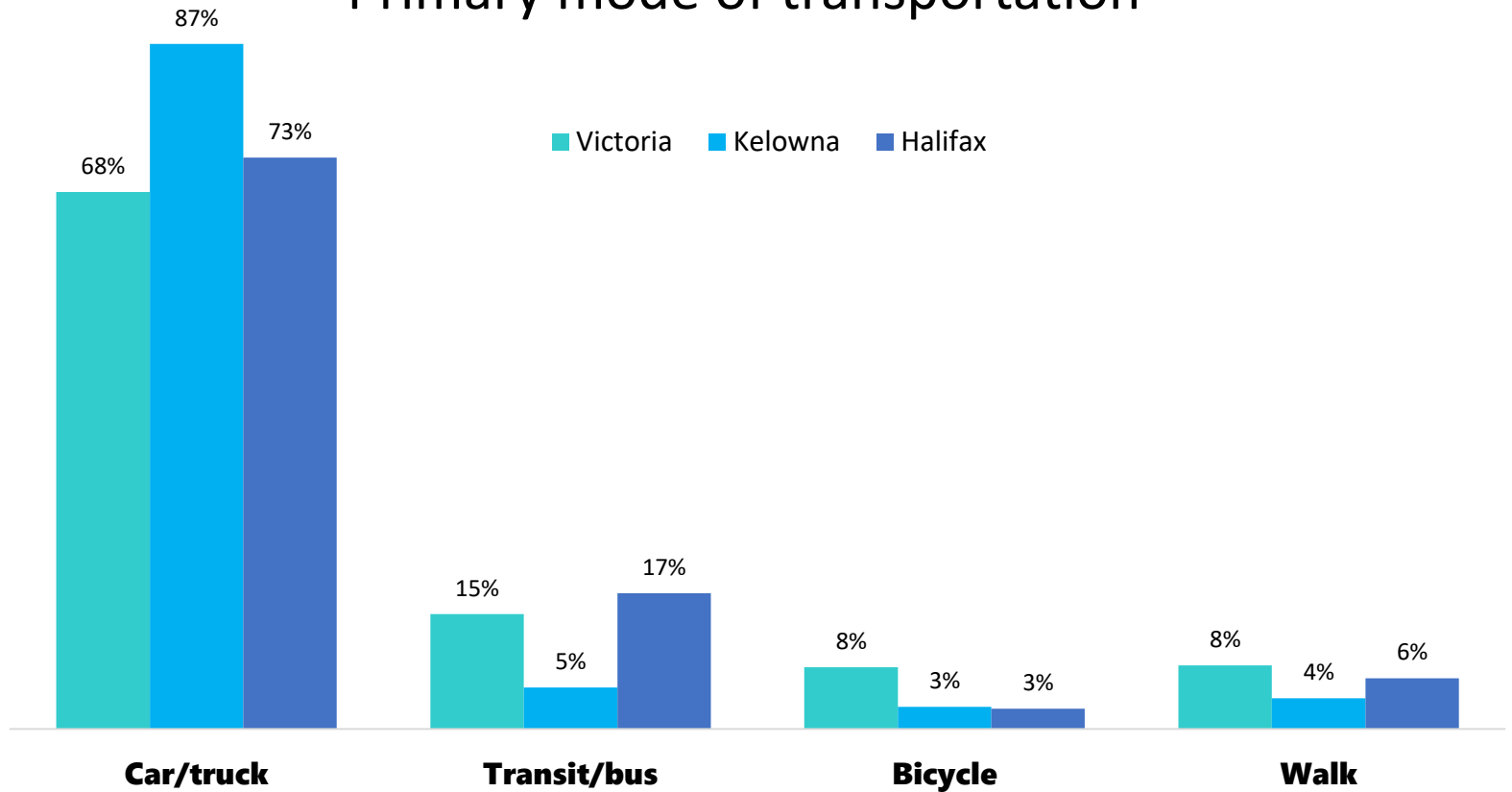
Survey 3
Long term
2021

2016 Baseline Population Survey Results



We drive a lot in Canada ... but active modes of transportation are gaining popularity

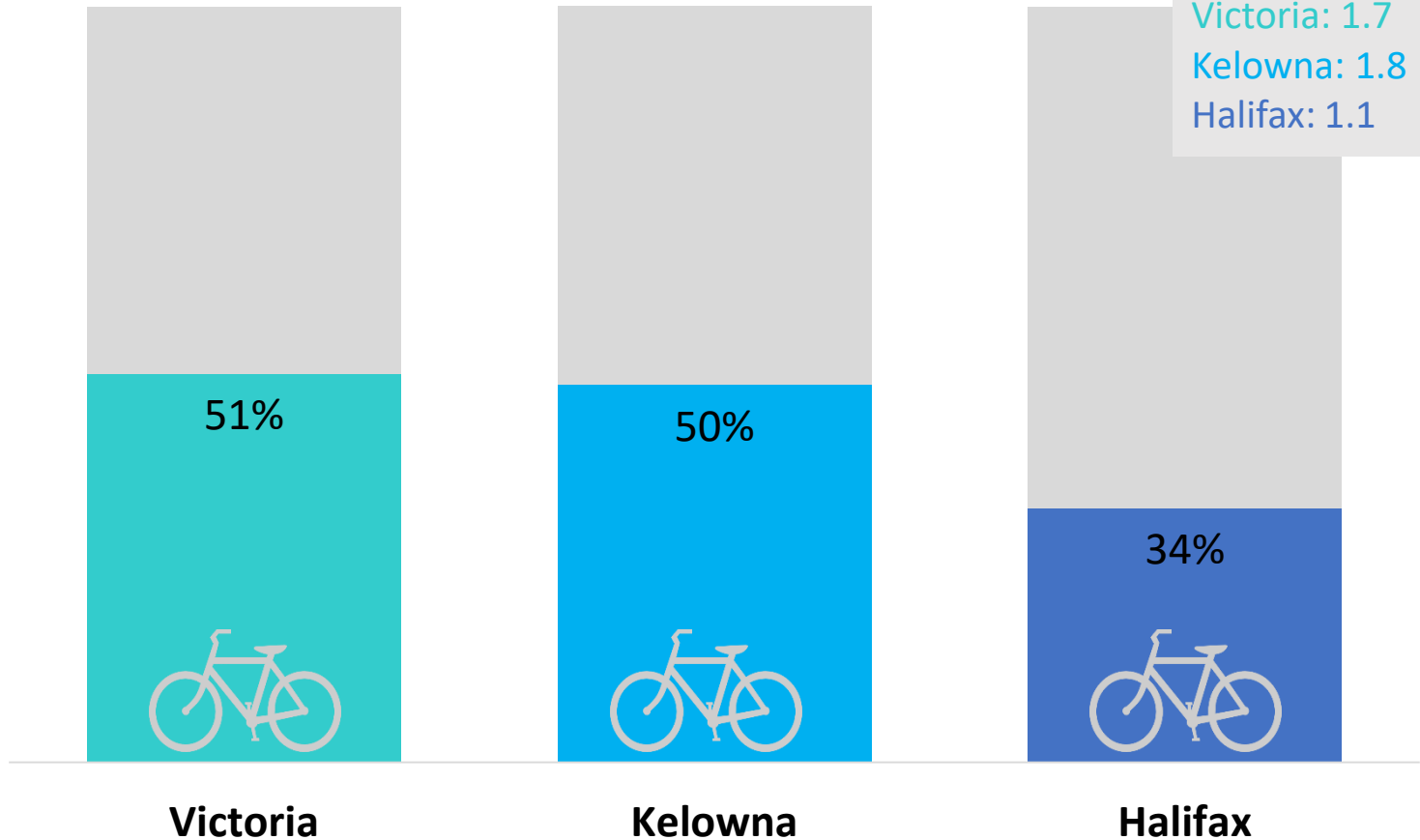
Primary mode of transportation



Phone Survey October 2016, N=2433 total respondents: n=843, Victoria; n=824, Kelowna; n=766, Halifax, Results weighted by age and sex for region Q1. Overall, which mode of transportation do you use most often to get around?

Cycling Rates in 3 Mid-sized Cities

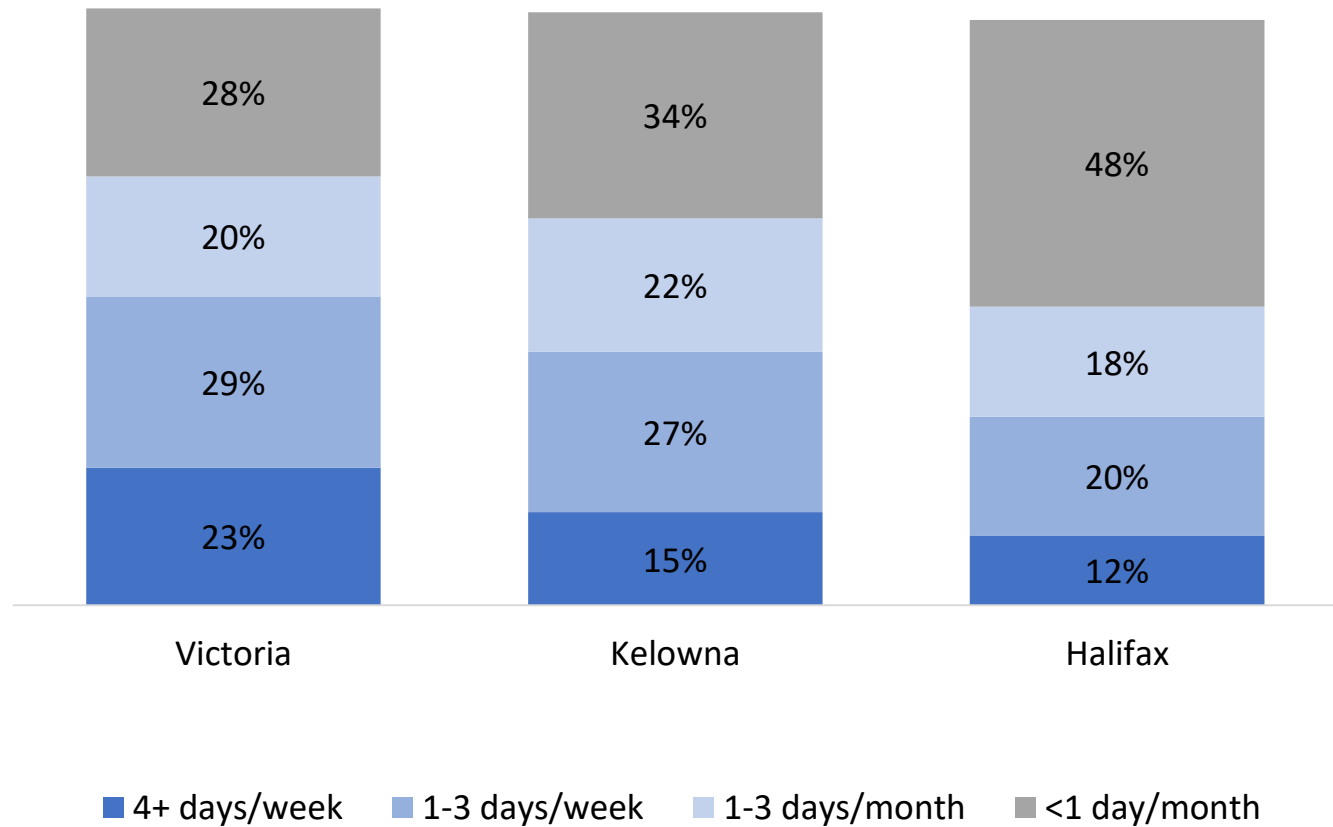
In the previous 12 months, have you used a bicycle?



Phone Survey October 2016, N=2433 total respondents: n=843, Victoria; n=824, Kelowna; n=766, Halifax, Results weighted by age and sex for region
Q12a. In the previous 12 months, have you used a bicycle?

Amongst cyclists, frequency of cycling varies city to city

How often do you typically travel by bicycle?



Phone Survey October 2016, Question only asked of those N=1104 respondents who had bicycled in past year including n=434, Victoria; n=412, Kelowna; n=258, Halifax, Results weighted by age and sex for region

Q7b. How often do you typically travel by bicycle?

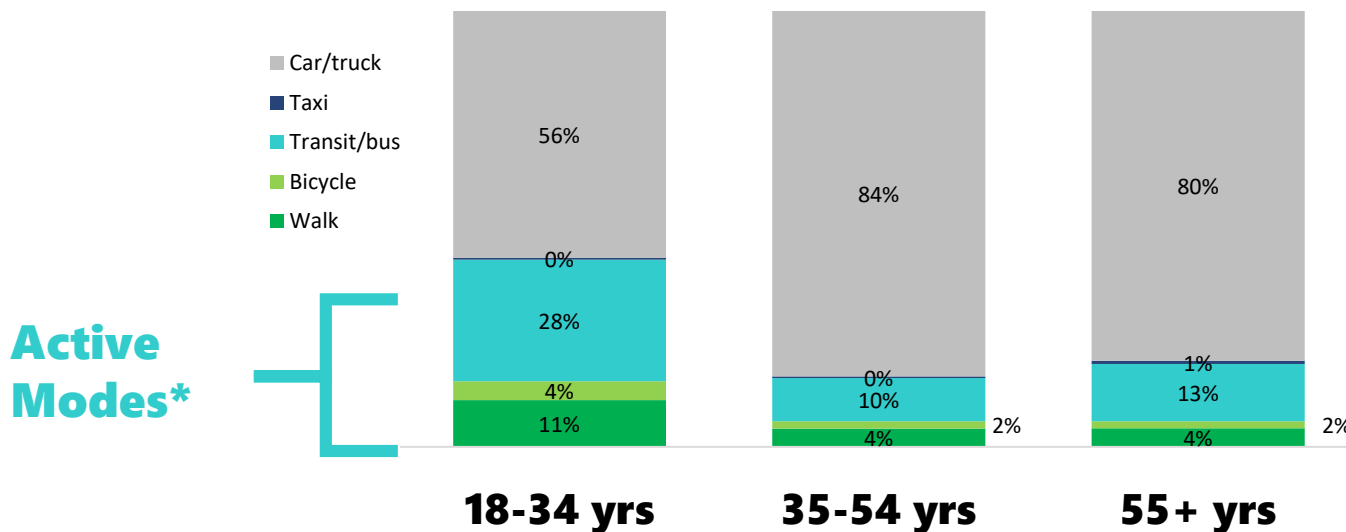
Who cycles? – age and gender



Gender: In Halifax, 40% of men cycled in the past year, but only 28% of women.

Age: Younger people are more likely to rely on active modes, including cycling

Primary mode by age category



Phone Survey October 2016, Halifax respondents only (n=766), Results weighted by age and sex for region

Survey Questions: **Q7a. In the previous 12 months, have you used a bicycle?** and **Q1. Overall, which mode of transportation do you use most often to get around?**

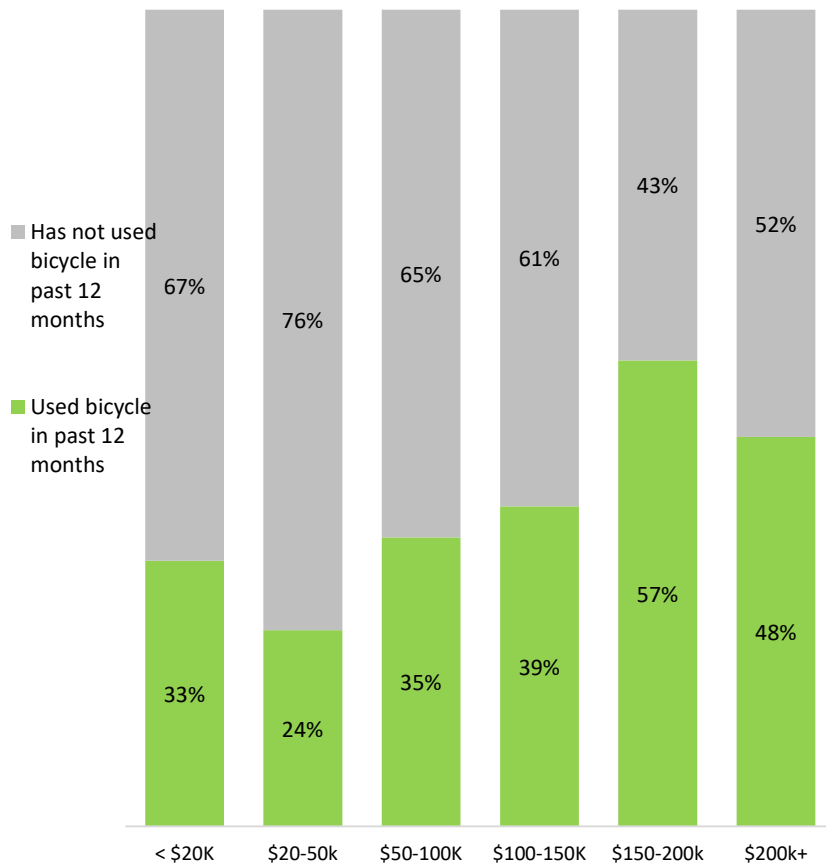
*We include transit in “active modes” as this mode nearly always requires some walking to and from stations.

Who cycles? Income considerations...

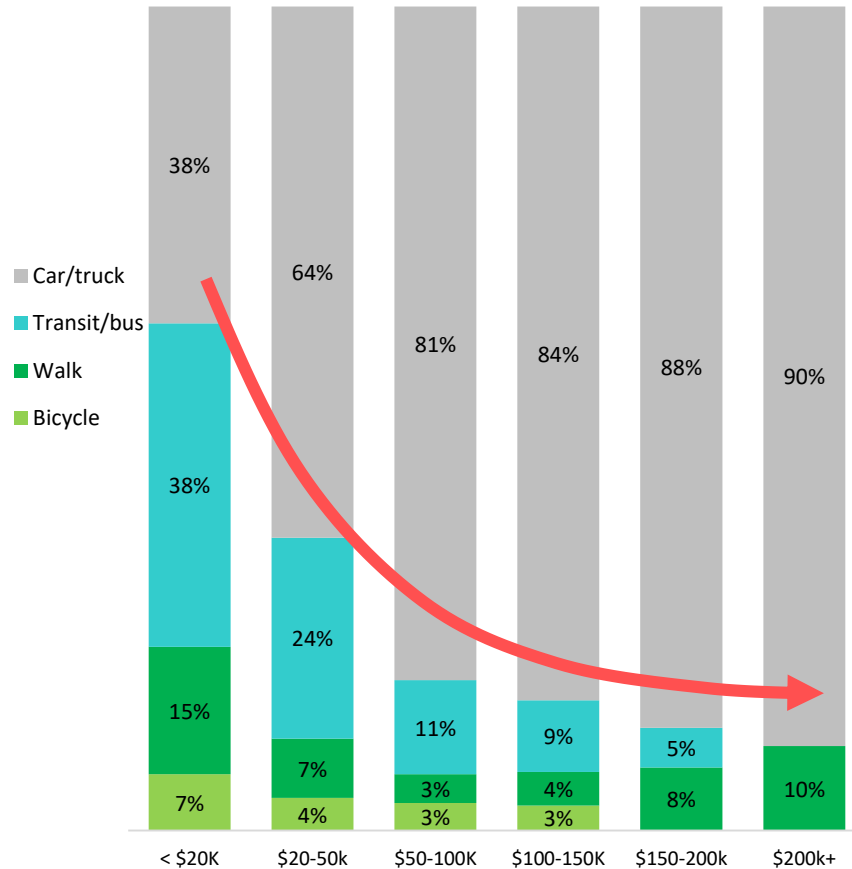


Although those with higher income have picked up a bicycle at least once in the past year, reliance on active modes (including bicycling) decline with higher income

Household income category by bicycle use



Income category by primary mode

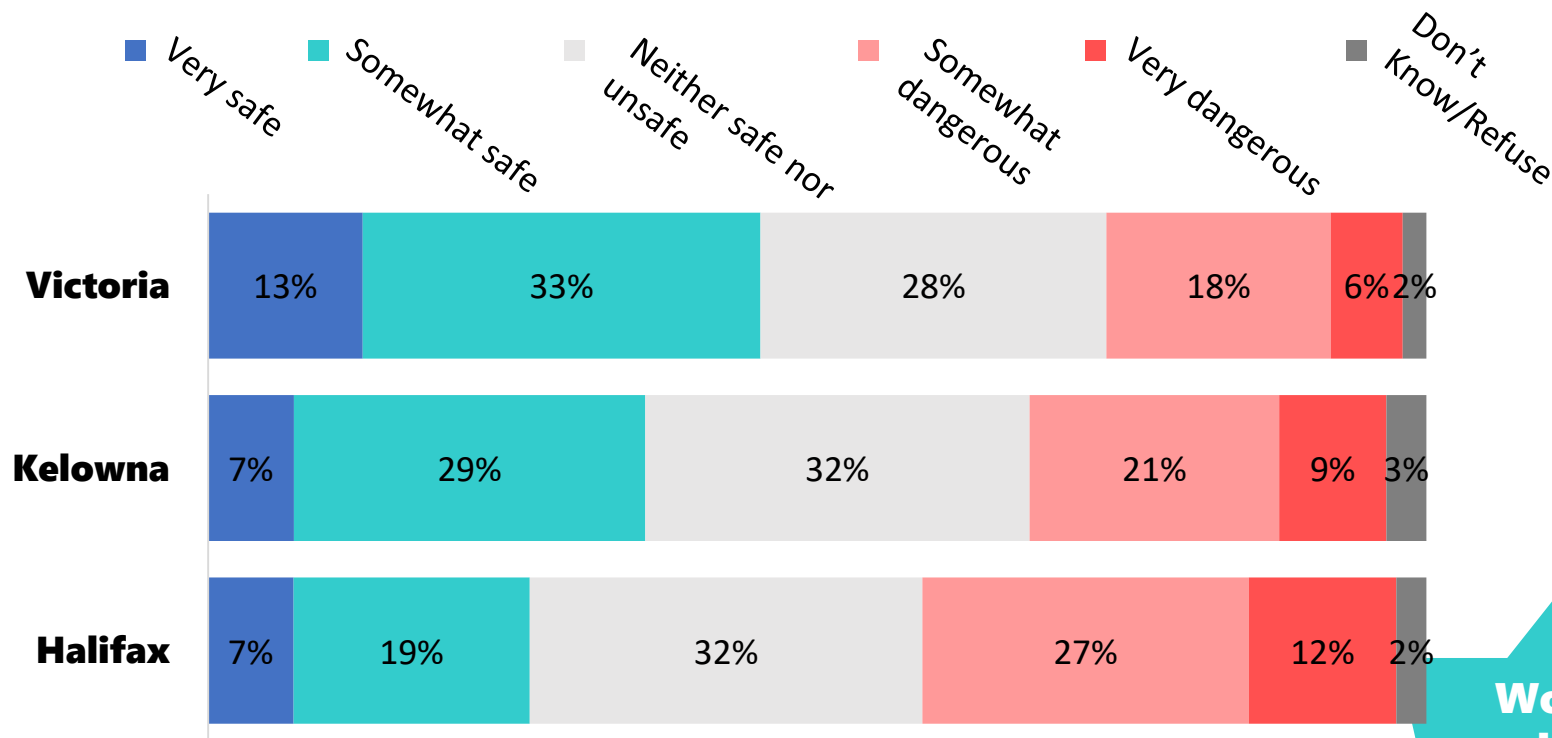


Phone Survey October 2016; n=766, Halifax, Results weighted by age and sex for region

Based on question Q1. Overall, which mode of transportation do you use most often to get around?, Q7a. In the previous 12 months, have you used a bicycle? and Q26. "Which of the following best describes your total annual household income before taxes?"

Residents in Halifax felt their city was less safe for cycling, relative to those from other cities

How safe do you think cycling is in your city?

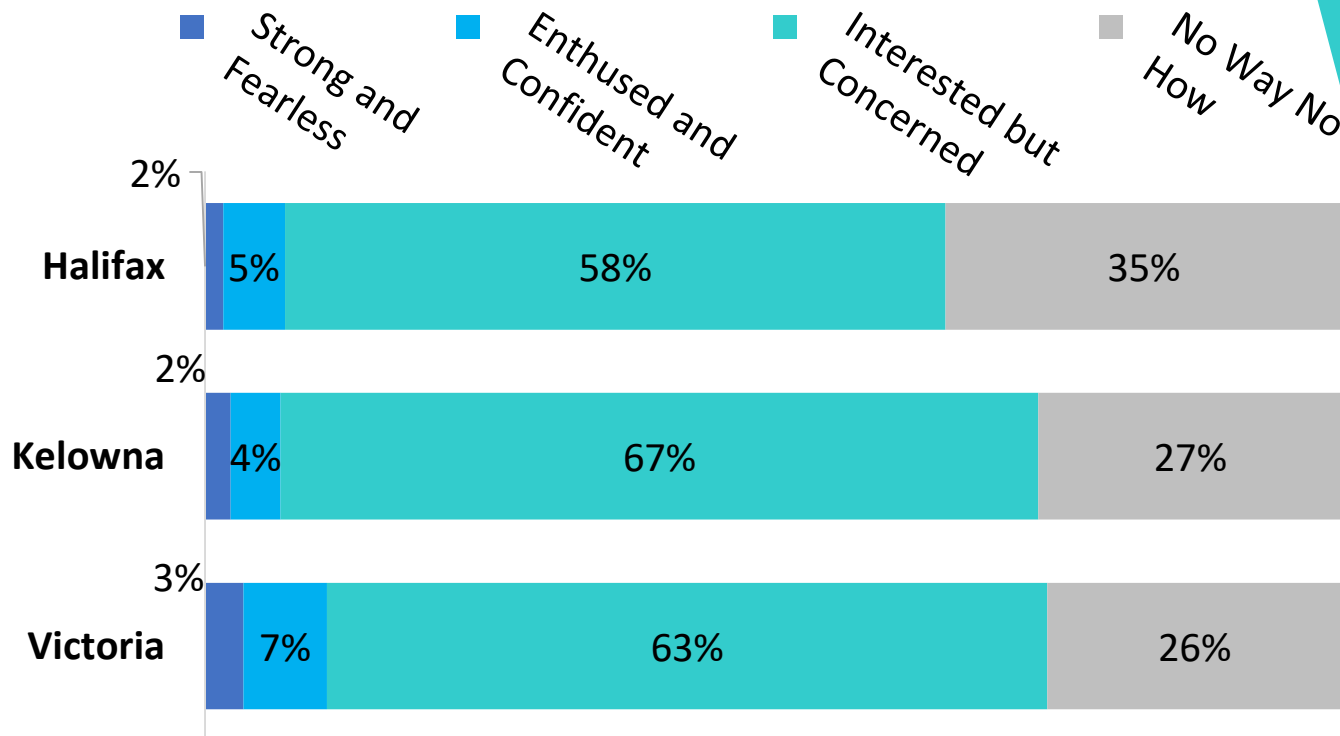


Women had greater concerns than men

Phone Survey October 2016, N=2433 total respondents: n=843, Victoria; n=824, Kelowna; n=766, Halifax, Results weighted by age and sex for region
Q6. Overall, how safe do you think cycling is in your city?

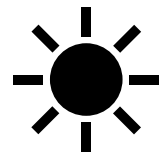
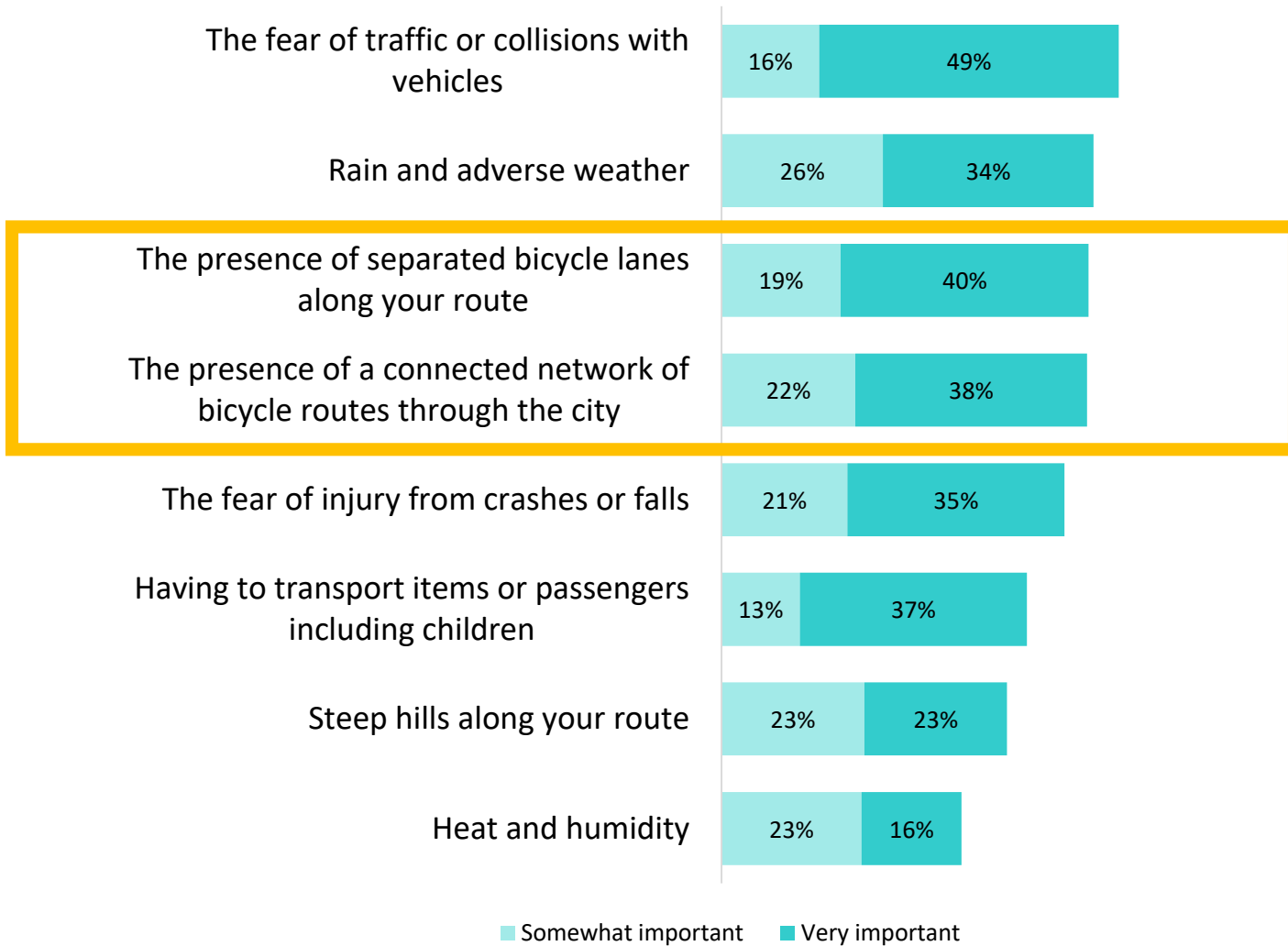
Planning for all ages and abilities? Cyclist typologies

The majority of the population is interested - but concerned...



Phone Survey October 2016, N=2433 total respondents: n=843, Victoria; n=824, Kelowna; n=766, Halifax, Results weighted by age and sex for region
Cyclist type generated based on Jennifer Dills cyclist typologies using Q7c (Comfort on different types of road and pathway infrastructure) and Q9 (desire to cycle more)

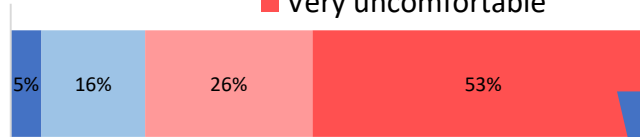
Top factors in deciding to bicycle (or not)



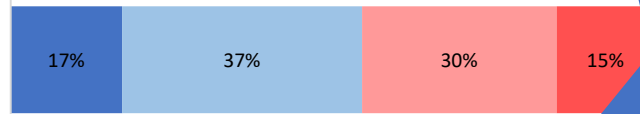
Comfort riding on various road types

- Very Comfortable
- Somewhat Comfortable
- Somewhat uncomfortable
- Very uncomfortable

A major urban or suburban street* with no bike lane?



A major urban or suburban street*, with a striped bike lane added?



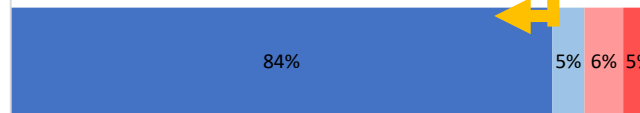
A major urban or suburban street*, with a wide bike lane physically separated from traffic by a raised curb, planters, or parked cars?



A quiet, residential street with traffic speeds of 30-40 km per hour?



A path or trail separate from the street.



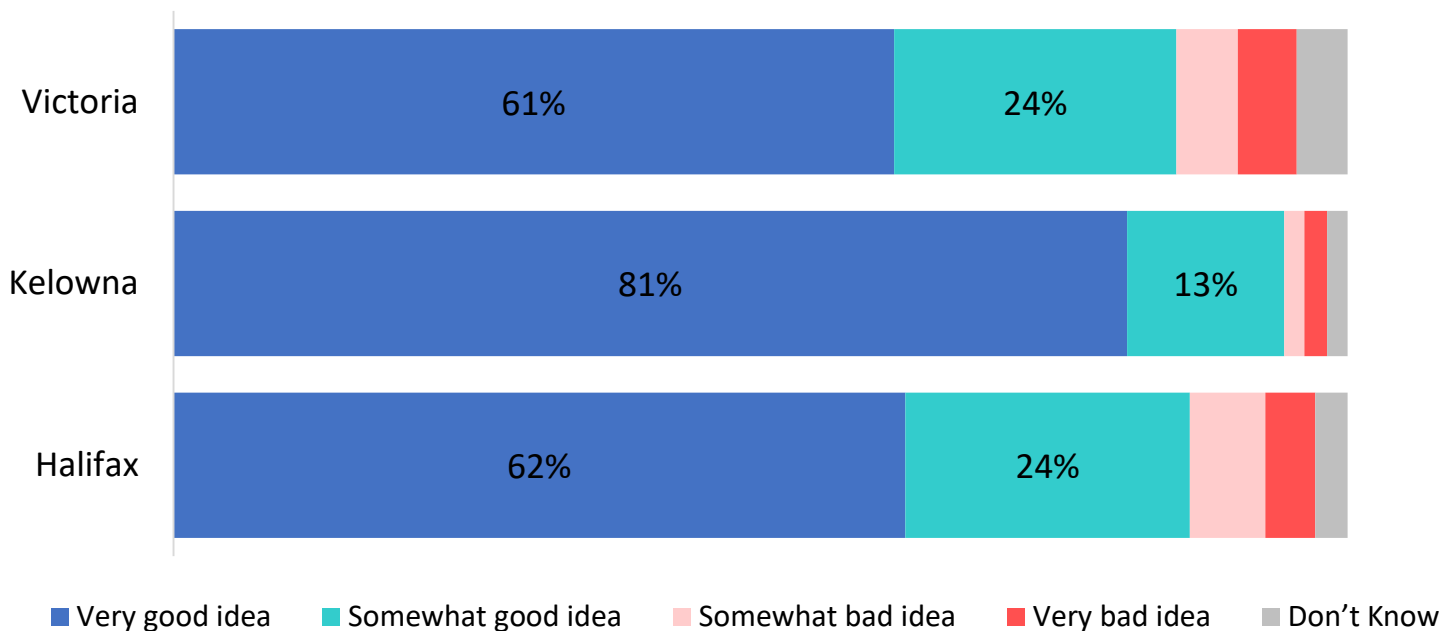
A quiet residential street, with a 30 km per hour speed limit, bicycle route markings, wide speed bumps, and other things that slow down and discourage car traffic?



With the right infrastructure, folks can be nearly as comfortable riding on a major busy road as on a quiet path!

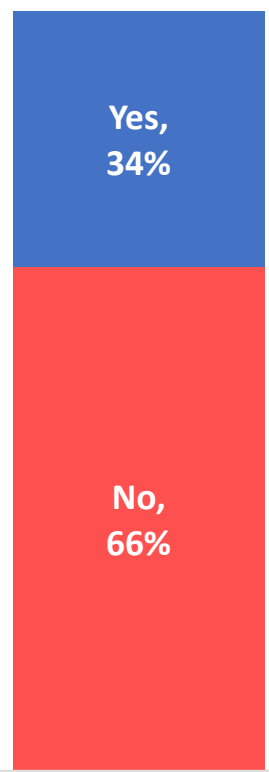
Widespread support for cycling infrastructure amongst both cyclists and non-cyclists

Do you think that building more cycling infrastructure is a good or bad idea for your area?

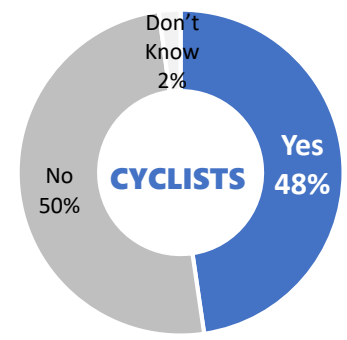


Cycling infrastructure makes a difference for folks who cycle...and those who don't... yet.

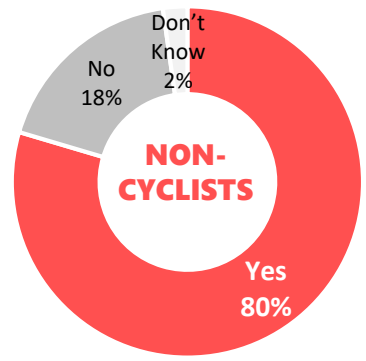
Used a bicycle in the previous year



Halifax



Will you be **likely to cycle more** in the future if more cycling infrastructure (e.g. separated bike lanes) is built in Halifax? **



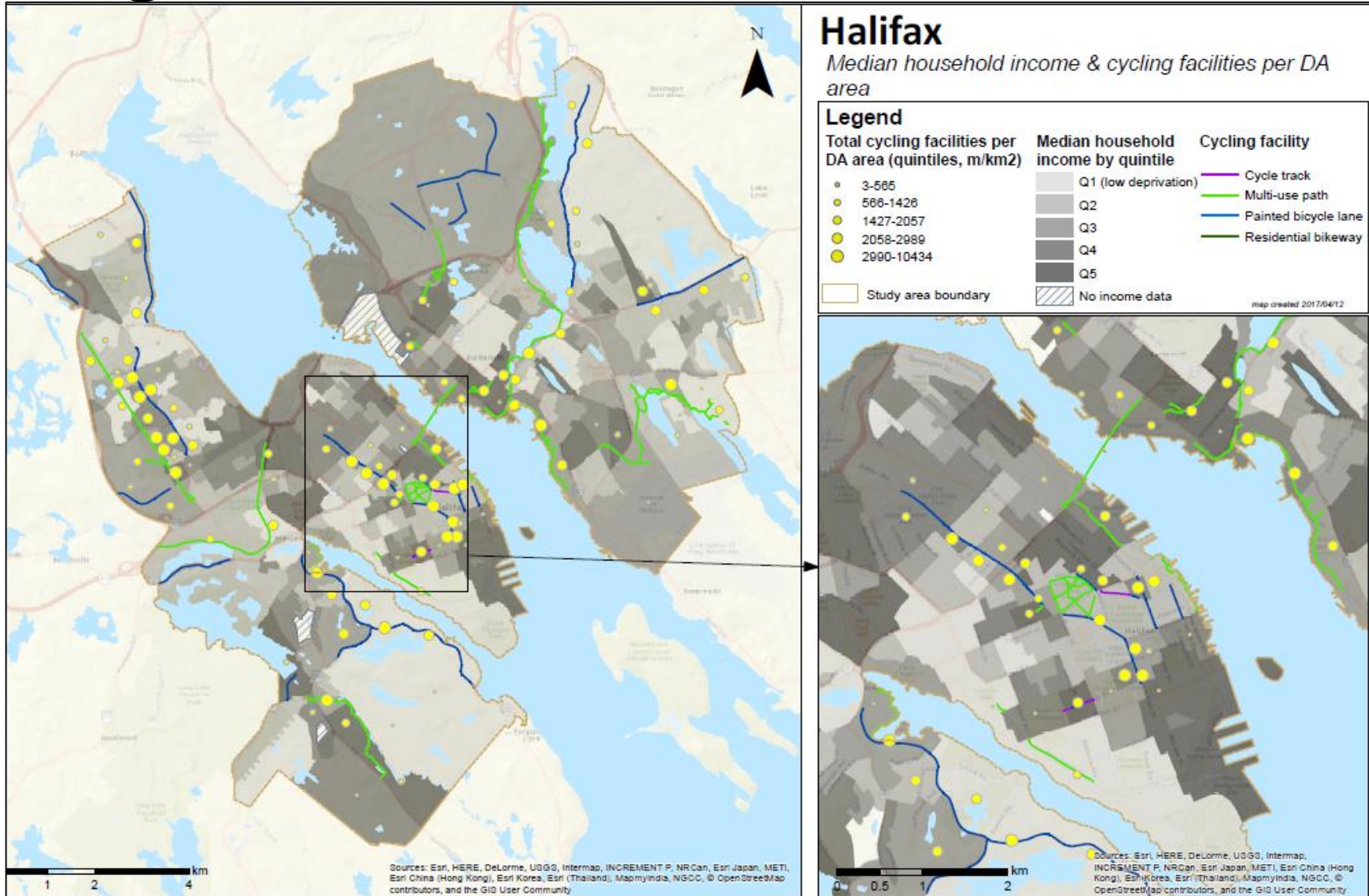
Will you be **more likely to cycle** in the future if more cycling infrastructure (e.g. separated bike lanes) is built in Halifax? **

Phone Survey October 2016, N=766 Halifax respondents, Cyclists, n=258, Non-cyclists, n=508 Results weighted by age and sex for region Q7a. Have you used a bicycle in the past



Equity in Spatial Access to Infrastructure - 2016

Does investment happen in both high and low income communities?



Bicycling Facilities- Infrastructure included



Cycle Track: a paved path next to a city street, separated by a curb or barrier



On -Street Painted Bike Lanes: a marked bike lane on the street, with or without parked cars

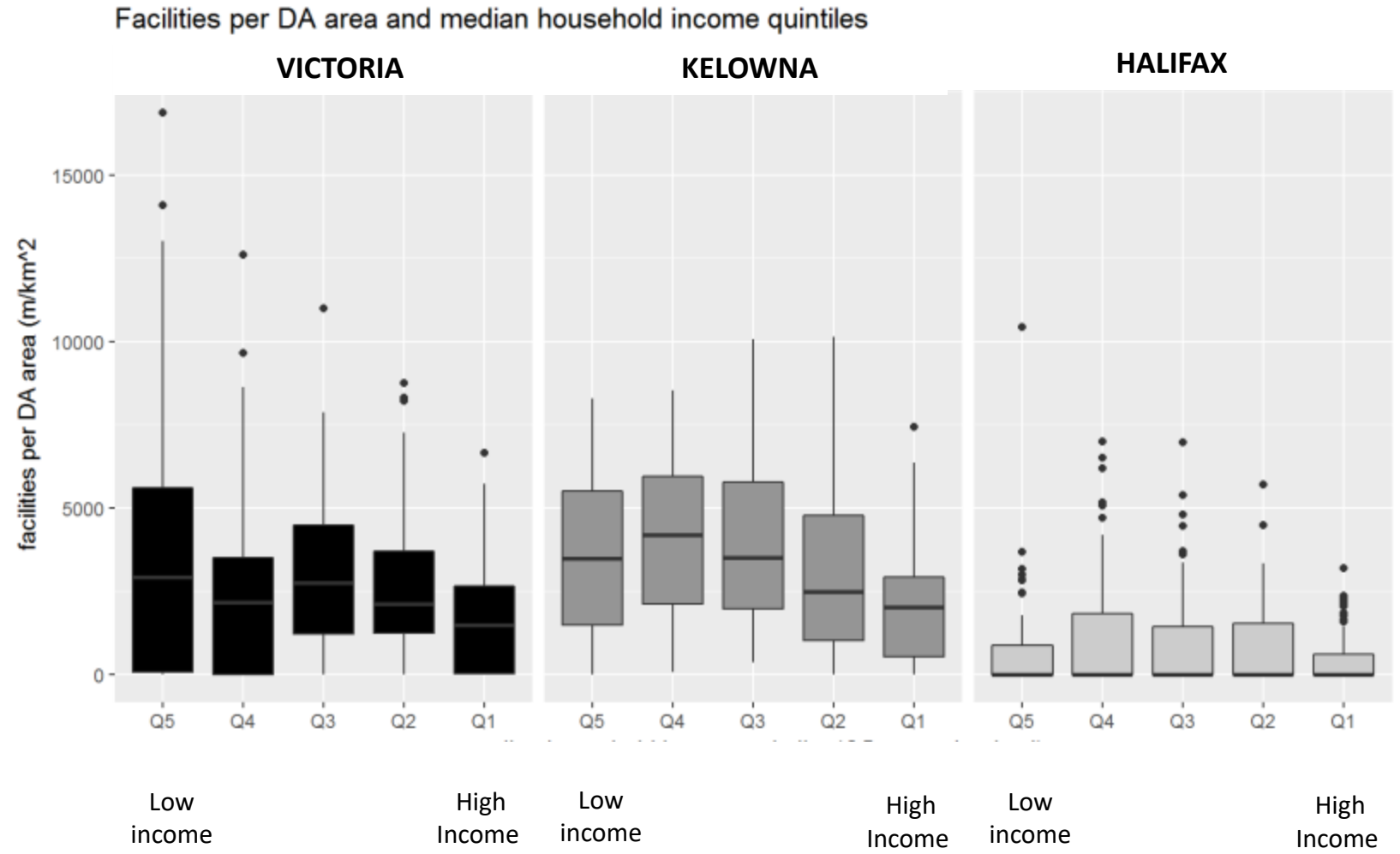


Off-Street Paths: an off-street paved path, either bike only or shared with pedestrians



Residential Bikeway: designated bicycle route with signs, cyclist activated traffic signals/traffic calming

Access to Bicycling Infrastructure, by Income

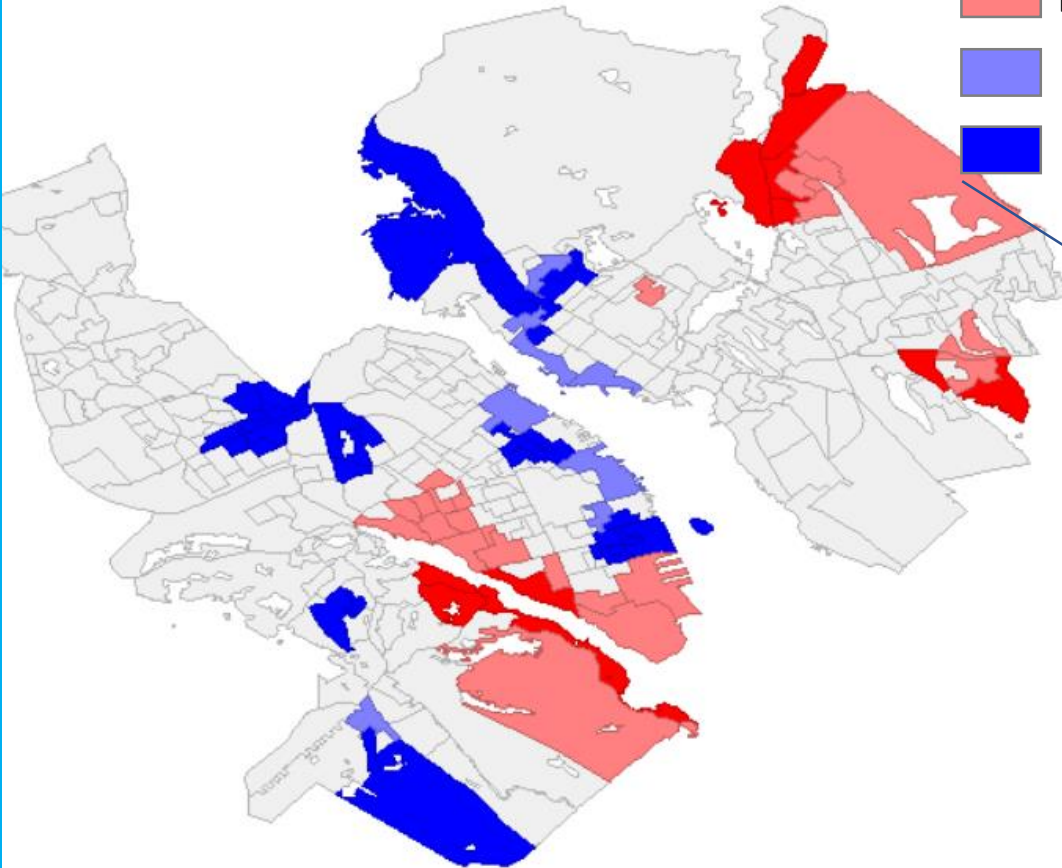


Spatial Analysis

Halifax: Infrastructure vs. Income

High income areas with poor investment:
quiet streets that may not need infrastructure?

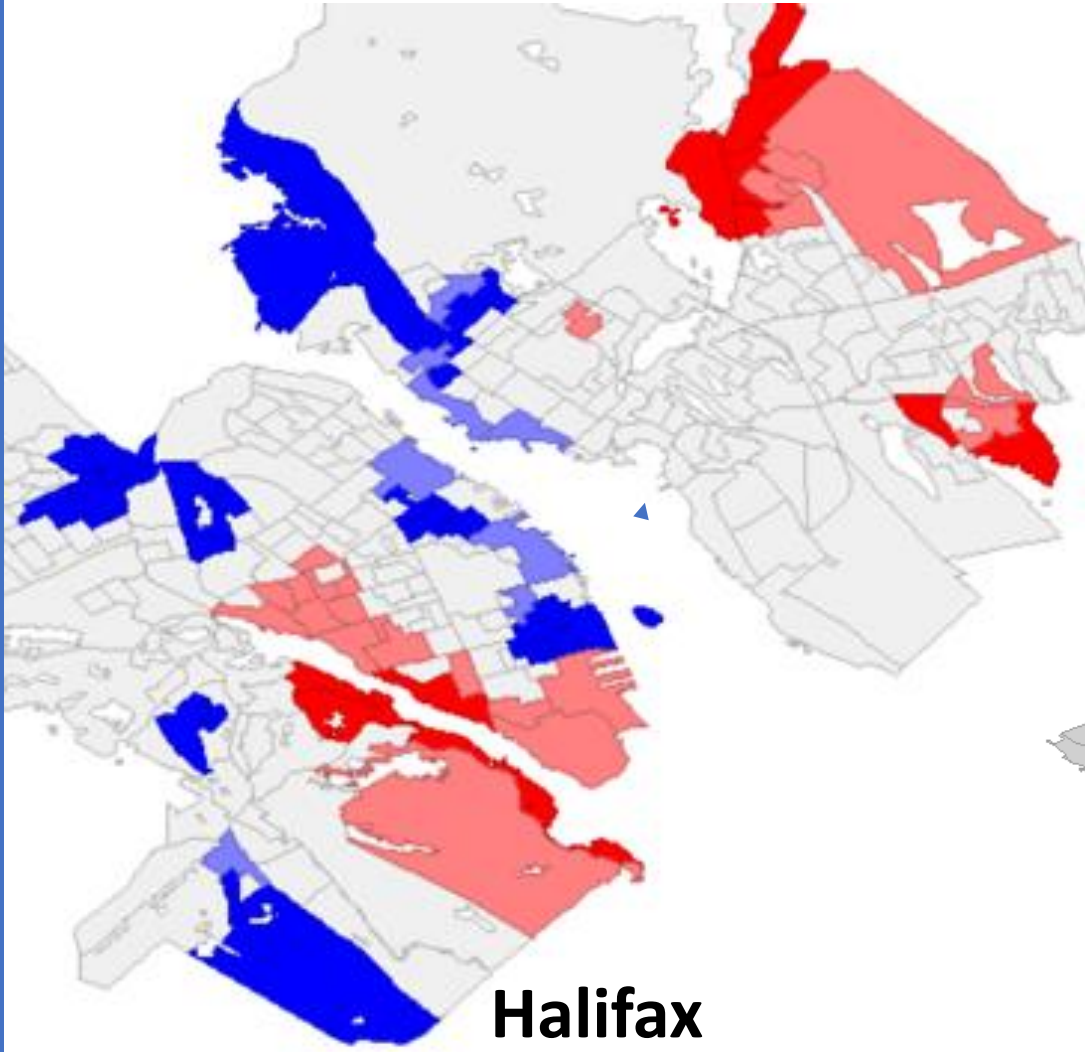
- Not significant
- High infrastructure-high income
- Low infrastructure-high income
- High infrastructure-low income
- Low infrastructure-low income





Low income areas with poor investment:
intervention opportunities

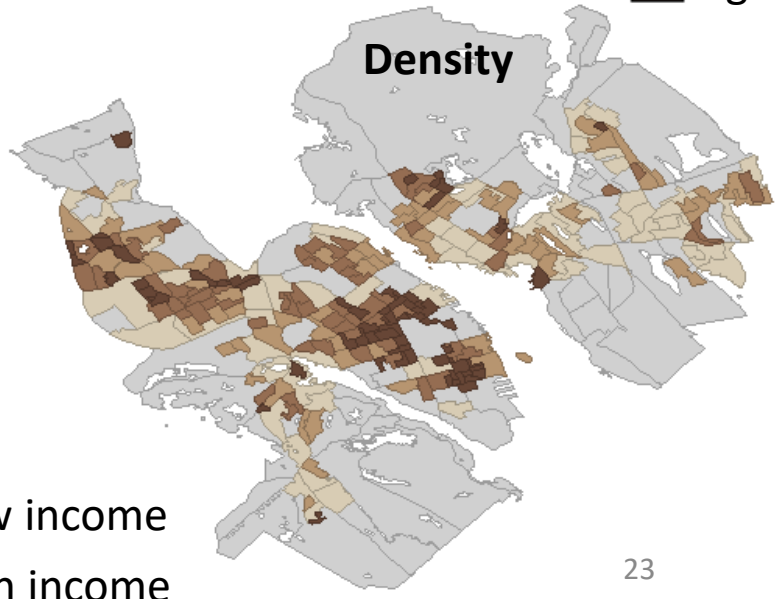
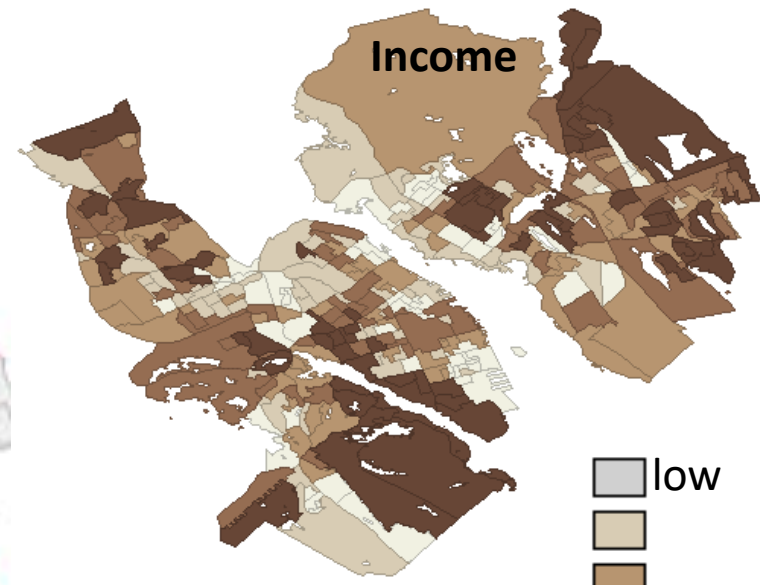
Population Density

A driver for mid-sized cities



Halifax

-  High infrastructure-low income
-  Low infrastructure-high income



-  low
- 
- 
-  high



What's next?

Impacts of Cycling Infrastructure in Mid-sized Canadian Cities

Collaborative project aiming to fill an evidence gap for mid-sized cities

Activities over the next 5 years:

- Additional population surveys (2018, 2021)
- GIS mapping of changes in infrastructure **and safety incidents**
- **Economic analysis**
- Sharing evidence with study cities, and larger group of stakeholders

Many opportunities to partner



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Funding & Partners



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THE CITY OF
VICTORIA



island health

HALIFAX

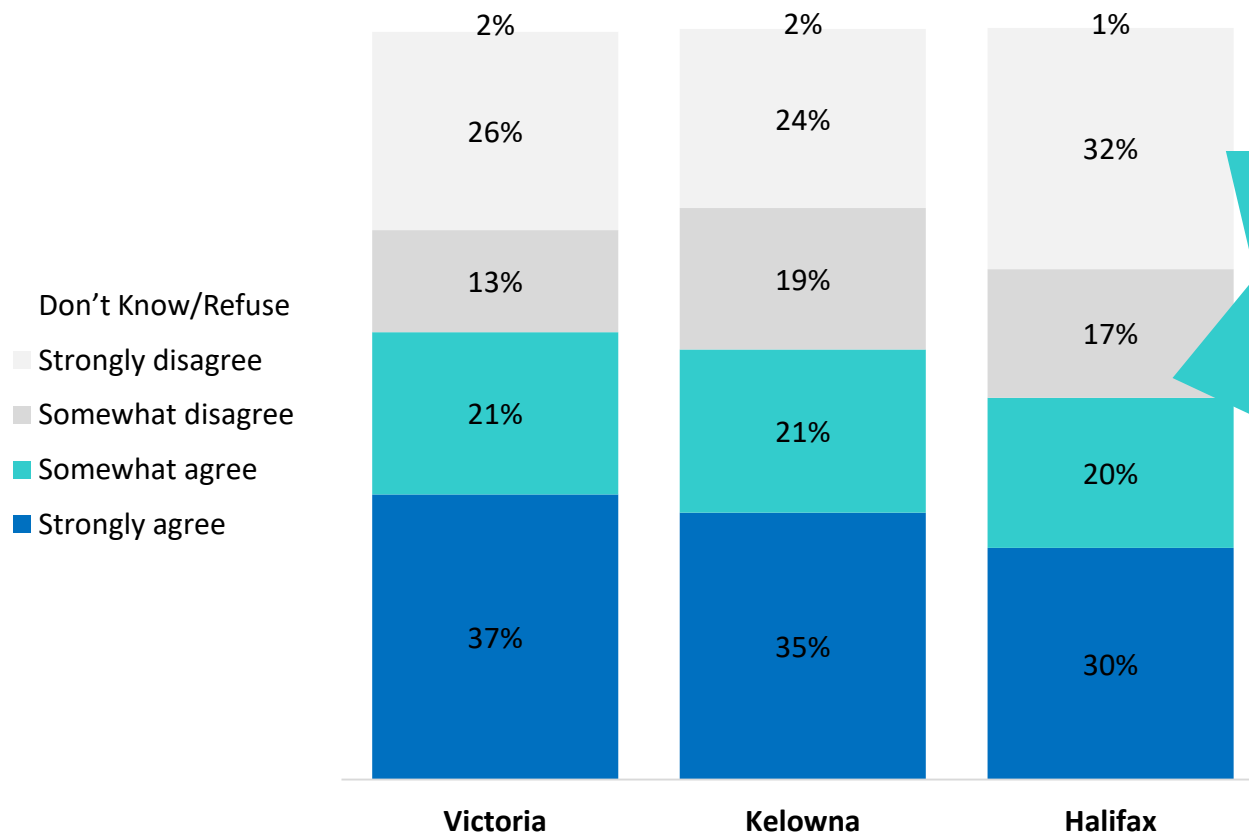


City of
Kelowna



To close, a point you can all take home with you – huge latent demand!

“I would like to travel by bicycle more than I do now.”



**In Halifax,
50%
said they would
like to travel by
bicycle more
than they do
now**

Phone Survey October 2016, N=843: City of Victoria, n=294; Saanich, n=357; Esquimalt, n=79; Oak Bay, n=58; Lives outside these municipalities but works inside one, n=55

Results weighted by age and sex for region

Based on Q9. On a 4 point scale, with 1 being strongly disagree and 4 being strongly agree, how much would you agree with the following statement: "I would like to travel by bicycle more than I do now."