

How Cities Can Increase Cycling Among Women

An Evaluation of:
Portland, OR, Washington D.C., and Vancouver B.C.



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Executive Summary

Bicycling, as a form of transportation, has been on the rise in the past few decades in North America as cities begin to realize the multiple benefits to the environment and physical health. Though there has been an increase in public interest, the percentage of people commuting by bike in the United States and Canada is only 0.6% and 1.3% respectively, according to the 2014 American Community Survey and 2011 Canadian Statistics. Even lower cycling rates are seen among women, who cycle at half the rate of men. Numerous studies have found common barriers for women cycling such as concerns about safety or traveling with children. Women have been called the “indicator species” to tell if a city is bike friendly so if cities want to increase people cycling in general, they should appeal to what women want.

This study researched the characteristics and programs of Portland, OR, Washington D.C., and Vancouver B.C., to evaluate how they have been successful at achieving high percentages of women cycling. The cities were evaluated based on case studies of their environmental conditions and programs as well as 12 interviews with government agencies, advocacy groups, and bike experts. From the case studies and interviews, there were common elements that these three cities shared that contributed to high percentages of women cycling:

- **Transportation plans with ambitious bicycle mode share goals.**
- **Safe infrastructure** (neighborhood greenways, cycle tracks, protected lanes, or off-street paths) as the first priority.
- **Influential advocacy groups** providing education and a social network.
- **Normalizing cycling** through public bikeshare and marketing materials.
- **Convenient facilities** including indoor or outdoor bike parking, bicycle transit integration, and showers in office buildings.
- **Safe Routes to School programs** providing education and encouragement to kids and mothers as well as improving infrastructure around schools.

An overall theme that resulted was that there are two components to increasing women biking: a physical and a psychological component. The physical component can be provided by government agencies in the form of the built environment and the psychological component can be provided by advocacy and grassroots organizations in the form of education, encouragement, and a social network. It is a combination of these agencies that help to provide the environment for women to bike as a means of transportation.

The goal from this study is to provide examples of successful programs from the three model cities of Portland, OR, Washington D.C., and Vancouver B.C. and to understand what more is needed to make cycling a feasible mode of transportation for women.

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Chapter 1: Introduction

For several decades, North America has been behind in using cycling as a major mode of transportation compared to European countries such as Denmark, the Netherlands, and Germany. The 2014 American Community Survey found the percentage of people commuting by bike in the United States to be 0.6% or 832,000 and in Canada, the 2011 National Household Survey found the percentage to be 1.3% or 201,000. Even more behind is the presence of women cycling, with women in the United States accounting for 24% of all bike trips in 2014 and 29% in Canada (U.S. Census Bureau, 2014) (Pucher & Buehler, 2012). In comparison, in the Netherlands and Germany the percentage of women cycling are 56% and 49% (Pucher & Buehler, 2012).

For too long, cities have not considered women's needs in encouraging bicycling as a means of transportation. Women account for 51% of the population (U.S. Census Bureau, 2014) (Statistics Canada, 2011) and should be considered when creating transportation plans and thinking about a sustainable future. Not only is it important to help increase women's cycling for the consideration of the environment, but it is also important for gender equity and creating the opportunity for women to feel encouraged to participate. "If bicycling is created to be efficient, practical and safe for women, more men and children will bike as well. The more women that are riding bikes, the more normalized bike riding becomes" (Jones, 2015, p. 5). Biking gives women empowerment and encourages civic engagement in the community where they live.

There are many individual interventions that cities can apply to try to increase bicycle mode share and women cycling but it is a comprehensive application of policies and programs that has proven to be the most successful. The cities of Portland, Washington D.C, and Vancouver all have exhibited comprehensive approaches in achieving increased cycling that include improvements to infrastructure as well as targeted approaches. There has been research on women's bicycling preferences and policies that have been successful in increasing overall bicycle ridership but there has not been a clear evaluation of the success of city policies in increasing women cycling and whether those policies or other factors have led to increasing female participation.

This report will analyze bicycle programs and policies in Portland, OR, Washington D.C., and Vancouver, B.C., as they are some of the top cities that have higher women ridership, (35%, 38%, and 37%) respectively, than the U.S. and Canadian national average (U.S. Census Bureau, 2014) (Statistics Canada, 2011). This research will include an applied question that will evaluate how city policies and programs to increase bicycling have addressed the needs of women in their efforts to increase ridership. This research will also evaluate how the work of advocacy groups and other organizations have made an impact on increasing cycling among women. Together, the results will provide knowledge to other North American cities what elements can be implemented to increase the percentage of women transporting by bike.

Research Questions

To understand how cities can increase cycling among women, I will examine the three model cities based on the following research questions:

1. Why do these cities exhibit a higher percentage of women bicyclists than their national average?
2. What combination of government intervention, influence from advocacy groups, or other factors has contributed to women's cycling?
3. What strategies from these cities could be applied in other cities across the nation to achieve higher female cycling ridership?
4. Could governments, advocacy groups, or other groups do more to encourage women's cycling?

These research questions will help to understand what factors have led to high percentages of women cycling whether from government intervention, advocacy work, environmental conditions, or other factors. I hypothesize that each of these cities may have implemented similar policy strategies; however, there may be additional factors, possibly from advocacy or grassroots organizations, demographics, or environmental conditions that have also been contributing factors in the increase in female ridership.

Methodology

The methodology for this research builds upon the 2011 study by John Pucher, Ralph Buehler, and Mark Seinen titled, *Bicycling Renaissance in North America? An update and re-appraisal of cycling trends and policies*, which is based upon nine North American cities. This study looked at national trends in cycling levels, safety, and funding as well as conducted case studies of the nine cities looking specifically at programs and policies that have increased cycling levels overall. This study was informative in regards to overall cycling levels but does not provide analysis regarding specific factors that helped increase women cycling.

To expand upon Pucher's study, this research will follow the same case study approach on three model cities: Portland, OR, Washington D.C, and Vancouver B.C, as well as include 12 interviews with government agencies, advocacy groups, and bicycle experts. The interviews will help provide expert knowledge in the field of women and cycling since there is no concrete data to analyze the causes for increasing women cycling.

The case studies examine data from the U.S. National Household Travel Surveys (NHTS), U.S. Census, Canadian Census, U.S. Department of Transportation, long-range city transportation plans, and city transportation websites. I examine the overall characteristics of the cities

regarding climate, topography, density, and population size to compare the environmental characteristics that could be a factor in female bicycle ridership. Next, I review city policies and programs, growth trends of female bicycle mode share, and other outside programs or factors unique to each city's success in female ridership.

The interviews were conducted by using a structured interview guide that was either conducted by email or phone. The interview guide was sent to government agencies, advocacy groups, and bicycle experts in the three model cities. Requests for interviews were sent to the transportation departments of each city, active advocacy groups in the region related to women bicycling, and bicycle experts upon recommendations. The interviewees were chosen based on willingness to participate. These interviews helped provide insight regarding any connection between the overall increase in bicycle ridership and female ridership. The interview guide was the same for all participants responding and organized in a skip logic manner. The questions began with a series of general questions and then progressed to narrowly tailored questions specifically for planners, advocacy groups, or bicycle experts. To keep the conversation flowing naturally for phone interviews, some follow up questions were asked in the process. The interview questions were reviewed and approved by the Public Health Institutional Review Board to ensure the rights and well being of the subjects are protected. I compiled the responses from the interviews and analyzed their anecdotal responses in relationship to the case studies for each city.

In sum, the case study analysis and interviews are helpful in answering my research questions in terms of why these cities are exhibiting higher rates of women cycling, whether the strategies from the city, advocacy groups, or other factors have been successful in increasing women cycling, what lessons learned from these cities can be applied elsewhere, and if there could be more done to encourage women cycling. The results from this research will be a useful step in closing the gender gap in bicycle transportation in North America for the purposes of social equity and environmental preservation.

Chapter 2: Background

Getting more people out of cars and onto bikes has been a problem that has perplexed North American planners for years. A growing body of research suggests that a strategy to increase more people cycling would be to ask the question: “What do women want?” Women have been dubbed the “indicator species” for evaluating if a city is bike-friendly (Pucher & Buehler, 2012). “If you want to know if an urban environment supports cycling, you can forget about all the detailed ‘bikeability indexes’—just measure the proportion of cyclists who are female,” says Jan Garrard, a senior lecturer at Deakin University in Melbourne, Australia, and author of several studies on biking and gender differences. This section will provide a background on the history of cycling in North America and the issues related to women cycling.

History of Cycling in North America

The United States has in the postwar era, built cities with the priority for cars. This has greatly contributed to poor air quality, unhealthy lifestyles, congestion, and economic struggles. Bicycling, as a means of transportation, has been made a priority in European countries in the past few decades and has therefore witnessed improved conditions to the environment, health, and a sustainable future.

Bicycling, as a means of transportation in North America, became popular in the 1890’s, and was accommodated by paved roads. In the present era, it is not poor pavement but separation from heavy motor traffic that restricts cyclists’ ability to get places safely. In many European countries such as Denmark, the Netherlands, and Germany, cyclists’ need for separation from fast, heavy traffic is considered a fundamental principle of road safety. This has led policy to include traffic calming on local streets and among busier streets, to create a network of cycle tracks, physically separated from motor traffic. In contrast, the U.S has mainly pursued a policy of integrating bikes with traffic, which limits a large percentage of the population who are unwilling to assume that risk (Pucher & Buehler, 2012).

In 1990, the Federal Highway Administrator described bicycling and walking as “the forgotten modes” of transportation (U.S. Department of Transportation, 2004). In the same year, the U.S. Department of Transportation adopted a new national transportation policy that sought to “increase the use of bicycling and encourage planners and engineers to accommodate bicycle and pedestrian needs in designing transportation facilities for urban and suburban areas.” In 1994, the *National Bicycling and Walking Study* was completed which provided information from 24 case studies from around the world, outlined a Federal Action Plan, and set two overall goals to double the percentage of total trips made from bicycling and walking from 7.9% to 15.8% and reduce by 10% the number of bicyclists and pedestrians killed or injured in traffic crashes. Soon after the study, Congress passed several acts such as the Intermodal Surface Transportation Efficiency Act (ISTEA), the Transportation Equity Act for the 21st Century (TEA21), and the Safe, Accountable, Flexible, Efficient, Transportation Equity Act (SAFETEA-LU), which provided billions of dollars of transportation funds for bicycling and walking

improvements (U.S. Department of Transportation, 2004). Spending of federal transportation funds on bicycling and walking improvements rose from \$5 million in 1990 to almost a billion in 2009. In contrast, there is no federal funding for cycling facilities in Canada so funding depends entirely on local funds (Pucher, Buehler, & Seinen, 2011).

Cycling has been growing very rapidly in the last few decades in North America. The Nationwide Personal Transportation Surveys of 1977-1995 and the National Household Travel Surveys of 2001 and 2009 indicate the total number of bike trips have tripled in the U.S. between 1977-2009. Cycling has increased in Canada as well by 42% between 1996-2006 and from 1.1%-1.3% of bike commuters (Statistics Canada, 2006). Figure 1 illustrates the percentage of bicycle mode share in each state in North America where you also see a spatial variation in cycling levels within each country (Pucher, Buehler, & Seinen, 2011).

Until recently, bicycle infrastructure consisted mainly of on-street paths with only painted line barriers from high-speed traffic. Efforts have now begun in some cities to include safer infrastructure such as neighborhood bikeways and separated paths, which has led to increased people cycling including women. Studies have shown that certain infrastructure improvements such as separate bike paths (Garrard, Rose, & Kai Lo, 2008) and bike boulevards (Dill, Gliebe, & Oregon Transportation Research Education Consortium, 2008) are preferred facilities that women will travel out of their way to use. Additional facility improvements have helped to increase cyclists including: bike parking, close accessibility to bike paths, traffic calming, and intersection improvements (Pucher, Buehler, & Seinen, 2011) as well as programs such as: bike education, promotion and events, and bikeshare. The presence of bike culture, bike clubs, and advocacy groups has also shown to increase bicycle ridership.

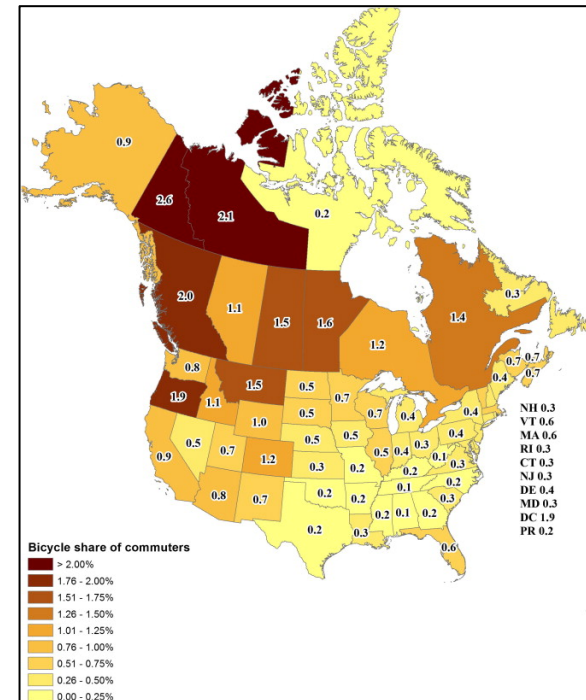


Figure 1. Variation among states and provinces in the bicycle share of work commuters in the USA (2005-2009, averaged) and Canada (2006). Note: GIS Map created by Mark Seinen. Sources: ACS 2009 2006 Canadian Census

Women and Cycling

The average person cycling in North America is white and male (U.S. Department of Transportation, 2010). In the U.S., men's cycling trips surpass women's with a modal split of 0.8% and 0.3% (U.S. Census Bureau, 2014), respectively. This evidence does not mean that women dislike cycling because in countries such as Denmark and the Netherlands (Figure 2) where there is a high bicycle mode share of 18% and 26%, respectively, women make 55% and 56% of all trips (Pucher & Buehler, 2012). Countries like Canada and the United States, where cycling is less popular as a whole, result in fewer women biking. Cities that have made improvements to their bicycling infrastructure to make them safe and pleasant have seen an increase in women cycling. This would suggest that one aspect leading to fewer women cycling is the safety of the infrastructure and willingness to assume a low level of risk. Gil Penalosa, who runs Toronto-based consultancy 8-80 Cities states, "if there aren't at least as many women as men, then usually it's because cycling is not safe enough. It's an indicator that you do not have good enough cycling infrastructure" (Slavin, 2015).



Figure 2. Cycling in Copenhagen. Photo Credit: Brian Yuanyue Bi/Alarny

Literature has found that issues related to women cycling less than men include: being more "risk averse", problems associated with fashion, comfort, convenience, and additional child bearing duties (Garrard, Rose, & Kai Lo, 2008). Numerous studies indicate that in low-cycling countries, concerns about cycling safety are a major constraint on cycling and a greater concern for women than men (Pucher & Buehler, 2012, p. 222). Safety concerns, particularly concerns from vehicle traffic, appear to affect women's route choices and preferences. Jennifer Dill, transportation and planning researcher at Portland State University, did a study in 2008 that examined the effect of different types of bike facilities on cycling. She found that women are less likely than men to try on-street bike lanes and more likely to go out of their way to use "bike boulevards," quiet residential streets with special traffic-calming features for bicycles (Dill, 2009).

Besides concern for safety, another commonly cited barrier for women is due to household roles and transporting children. "Despite our hope that gender roles don't exist, they still do," says Jennifer Dill. Women also do most of the childcare and household shopping, which means these bike routes need to be organized around practical urban destinations to make a difference (Baker, 2009).

In the Spring 2010, the Association of Pedestrian and Bicycling Professionals launched the Women Cycling Project where they asked women through an online survey "What would cause you to start or increase your cycling?" (Garland, 2011). 13,000 responses were received from all around the world. Twenty-two percent responded that their level of cycling has to do with **convenience** and said they would cycle more if they had better weather, more time in the day, or shorter distances to their destinations. Fourteen percent said they

would ride more often if there were **better bicycling infrastructure** including better engineering and planning, maintenance of the paths and bike lanes, exclusive bikeways, cycle tracks, and trails as well as the desire for secured bike parking near work places and popular destinations. Eight percent would like **more bicycle-friendly places** including schools, stores, and bike shops. They would also like to see work places become bicycle-friendly by offering showers, lockers, and secured bike parking (Figure 3).

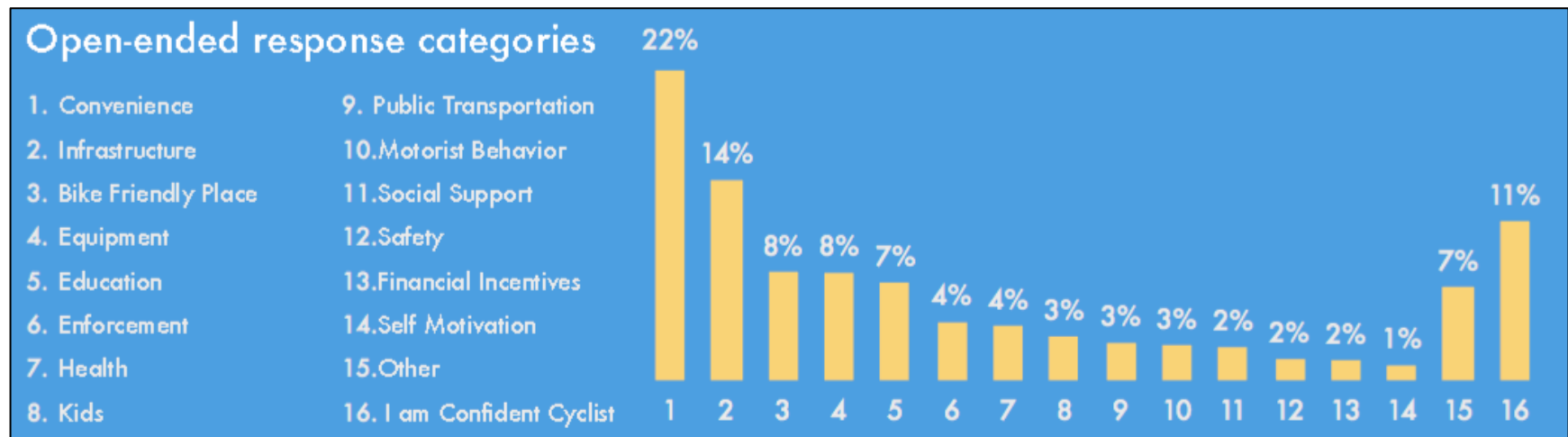


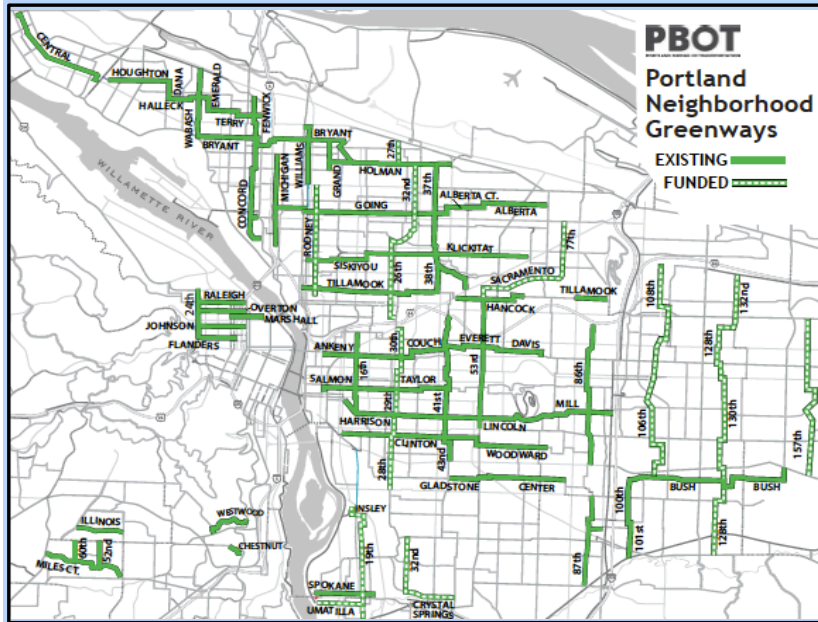
Figure 3. APBP Women Cycling Project, 2011

These solutions are not necessarily the complete answer to increasing women cycling. Understanding how to increase women cycling is a complex issue and will not include a one-size fits all solution. The research can help provide evidence to cities and transportation planners as far as what types of infrastructure should be built, how to create convenient bicycle networks near popular destinations, and to ensure that there is an abundance of bike parking. However, since bicycling as a form of transportation is not common for many women, there is still a lot of education and encouragement that is needed to help women feel comfortable in participating. The goal is to change the current biking culture of primarily white men and normalize biking for women. We need to break down the barriers and provide education so if women want to bike, they can bike and show that it can be fun, convenient, and empowering.

Chapter 3: Model City Case Studies

In this section, case studies of each of the model cities examine the conditions and the programs that may contribute to more women cycling. It is useful to look at the conditions of the city including: population size, density, climate, and topography to understand the environmental and demographic conditions that may affect the desire to bike as well as for comparison purposes to other cities. These conditional factors were identified since they were among the characteristics of John Pucher's 2011 case study analysis of North American bicycling cities. Programs are listed that are provided by government agencies as well as advocacy organizations that contribute to increased bicycling in the city. Some programs may be useful for increasing bicycling overall, however; it is still useful to look at all bike friendly characteristics because the overall increase in people bicycling increases the number of women bicycling as well.

PORTLAND, OR



TRANSPORTATION
2030 PLAN-

INCREASE
PERCENTAGE OF
TRIPS BY BIKE TO
25% BY 2030.



CASE STUDIES

6.3% bicycle mode share; U.S. average 0.6%

4.5% women commute by bike

35% of bicycle commuters are women

- 350 miles of bicycle infrastructure
- 85 miles off-street paths
- 17 miles of protected lanes
- 6,500 bike racks

Tilikum Crossing



Hawthorne Bridge



Background

Portland, OR has a population of 602,568 living on 133 square miles, which is a population density of more than 4,000 people per square mile (U.S. Census Bureau, 2014). Portland experiences a temperate climate with warm, dry summers and cool, rainy winters. The topography of Portland is mostly flat other than the foothills of the Tualatin Mountains through the northwest and southwest regions. The Willamette River flows through the center of the city separating the east and west neighborhoods. Ten bridges span across the river with eight providing access for safe bicycle crossing and one recently opened in September 2015, Tilikum Crossing, which is the first major bridge in America designed to serve transit, bicycles, and pedestrians but not cars (Figure 4 & 5).



Figure 4. Tilikum Crossing.
Photo Credit: bikeportland.org



Figure 5. Hawthorne Bridge. Photo
Credit: bicycletuscon.com

In 1996, the Portland Bureau of Transportation developed its first bikeway design guidelines when the current bicycle mode share was roughly 2% for commute trips (Portland Bureau of Transportation, 2010). An update to the bikeway design guidelines was created in 2010 to help inform the Portland Bicycle Plan for 2030 to accomplish the goal of 25% bicycle mode share. Portland was recently ranked the #1 of most populous cities in the United States with the highest percentage of people biking to work at 6.3% (U.S. Census Bureau, 2014). Between 2007-2013, bike commute rate grew by 1.5%. Portland ranked sixth out of the most populous cities to have a low percentage of bike/pedestrian fatalities at 3.4% (Alliance for Biking and Walking, 2016). In 2008, the League of American Bicyclists granted Portland the platinum-level status as a bicycle friendly community.

The Portland Bureau of Transportation (PBOT) states on their website that they “work to make bicycling an integral part of daily life.” They seek to accomplish this by three approaches: planning, implementing, and maintaining a bikeway network, providing secure bicycle

parking, and educating people about the role of bicycle transportation in keeping our communities livable, and encouraging residents to choose bicycling for more of their daily trips (Portland Bureau of Transportation, 2016).

Programs

Portland Bicycle Plan for 2030

Portland's first Bicycle Master Plan was adopted by City Council in 1996 and based on that plan, more than 300 miles of a bicycle network was completed. Thousands of bike parking spaces were added and the number of people bicycling increased exponentially. To continue to provide for the expected growth in people bicycling, the updated Bicycle Plan for 2030 includes expanding the current planned network from 630 miles to 962 miles based on three strategies: introducing safe, comfortable and attractive bikeways to serve all types of users and abilities using the best design practices of great bicycling cities from all around the world, constructing a dense network of bikeways so residents can easily find and access a route, and creating a cohesive network that take people where they want to go. A major theme of the Plan is that the City must plan and design for people who are not yet riding, and must create conditions that make bicycling more attractive than driving for short trips. The Plan expects to grow the number of trips by bike to 25% and reduce automobile usage to no more than 30% with neighborhood greenways as a major component of the bicycle network.

2030 Portland Bicycle Plan Vision (abbreviated):

- *All Portlanders have equal access to the benefits of bicycling.*
- *Portland's streets are livable places that accommodate many activities.*
- *Portland is the hub of a connected regional bicycle network that includes bicycle lanes and bicycle boulevards, paths, trails, and greenways, as well as protected bikeways separated from traffic on busy streets.*

Neighborhood Greenways

Neighborhood Greenways are a vital part of Portland's transportation network that has been operating for more than 30 years. There are currently over 70 miles of neighborhood greenways in Portland (Figure 6). Neighborhood Greenways, formerly known as bike boulevards, are residential streets with low volumes of traffic and low speeds where bicycles and pedestrians are given priority (Figure 7). Vehicle speed is 20 mph or less and traffic calming techniques such as speed bumps and traffic diverters are used to keep people from using these streets as cut-through routes. Neighborhood greenways typically include two shared travel lanes and two parking lanes. The primary pavement marking is a shared roadway marking, also known as a sharrow. Signage is displayed throughout the route to indicate where the Greenway goes and what is nearby. Protected crossings at major intersections are provided to encourage people of all ages and abilities to walk and bike.

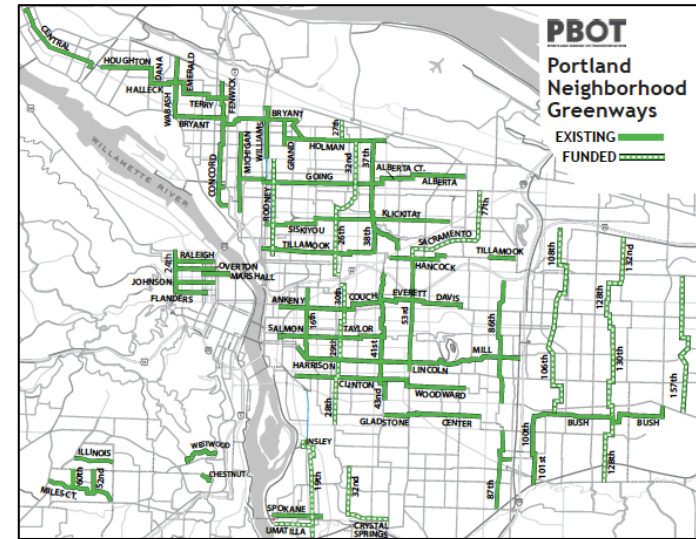


Figure 6. 2015 Portland Neighborhood Greenway Map.

Portland By Cycle

Portland By Cycle is a free program offered by PBOT that includes bike rides and classes for adults new to cycling, new to the area, or just getting back on a bike. Some of the classes offered include: Shop by Bike, Cycling Essentials, Bike Maintenance Basics, and Riding through the Rainy Season. The guided bike rides last for about 2 hours and include themes such as: Family Ride to the Tram, Bike Non-Profits Tour, Sweet Summer Cycle, Bridges of North Portland, and Welcome to BIKETOWN.



Figure 7. Portland Neighborhood Greenway. Photo Credit: bagshaw.seattle.gov

SmartTrips

PBOT's SmartTrips program provides information and resources for all forms of transportation needs in Portland. This program includes bicycle resources such as: Portland Biking Guide, information that includes tips and techniques for riding a bike safely as well as how to get around Portland, Family Biking Guide, information on how to bike while pregnant or with young children, Road Etiquette for Drivers and Cyclists, and a brochure on Portland's Bicycle Symbols and Markings. Numerous bicycle maps are available that cover the entire city, individual neighborhoods, Downtown, recreational ride maps, and routes taken by Portland By Cycle. Bicycle maps are also made available in Spanish.

Women on Bikes

Women on Bikes was a PBOT program led by Janis McDonald from 2005-2013. It offered women specific rides and clinics such as how to start riding your bike, how to change a flat tire, how to clean your bike, all weather cycling, and shopping by bike. The rides were meant to be social and teach women how to ride on the streets, how to use the infrastructure, and hopefully make a friend that they can ride with later on their own. Some of the women joined if they were new to the city and wanted to connect and see different parts of the city. Some women were older or retiring and wanted to bike for their health. Some women really wanted to learn how to be super independent. All of them wanted to join for social reasons.

Safe Routes to School

PBOT's Safe Routes to School program is part of a national effort to promote active transportation in and around school campuses. The program currently serves 100 schools and is a partnership between the City of Portland, schools, neighborhoods, community organizations and agencies that advocate for and implement programs that make walking and biking around Portland neighborhoods. The Safe Routes program focuses on 6 E's: Encouragement, Education, Enforcement, Evaluation, Engineering, and Equity. The 6 E's include activities to promote walking, biking and rolling to and from school, pedestrian and bike safety education in schools, partnering with the Portland Police to reduce speeding around schools, student travel survey and program assessment, improvements to streets, signs and signals around schools, and providing services to reduce health and wealth disparities in Portland.

Bike Parking

PBOT will install up to two free bicycle racks in front of a business as long as the location meets the minimum requirements. Bicycle lockers are available for a monthly fee for safe and secure storage at many locations throughout Portland. Businesses can apply for on-street bike parking corrals for \$2,600 that will provide bike parking for 12-24 bicycles. Temporary event bicycle parking is provided by

several local businesses and can be achieved by applying for a permit for use of a parking lane. The City of Portland recommends that event organizers reserve space for bike parking equal to a minimum of 2% of expected crowd attendance, however 5% or greater is ideal. TriMet, the regional transportation agency, offers secured, enclosed bike parking with keycard access at five locations. Electronic lockers with keycard access are available at 14 locations. Lockers are available for rent at most rail and transit centers. Bike racks are available at most stations as well.

Community Cycling Center

The Community Cycling Center is a non-profit agency that since 1994 has provided bikes and bike related activities to thousands of youth and adults. They have a full-service bike repair shop with mechanics ready to help any level of experience. They offer used bikes for sale as well as an “Earn a Bike” program. The Earn a Bike program provides adults on low incomes a fully functioning bike with lights, lock, helmet, rack and tools after completing a hands-on bike safety and maintenance course.

BIKETOWN

Portland launched its first bikeshare system on July 19, 2016 called BIKETOWN with 100 stations throughout the central city and many eastside neighborhoods. The stations house 1,000 “smart bikes” with the latest technology that allows users to check out a bike using a smartphone, computer, member card, or PIN on the keypad on the bike. Exact locations of the bikes can be viewed on the website or smartphone app. Bikes can be parked at any public bike rack for an additional

Andando en Bicicletas en Cully

In 2010, the Community Cycling Center worked with the Hacienda CDC, an affordable housing community with a primarily Latino population, to help the residents strengthen their community through bicycling. The organizers call themselves Andando en Bicicletas en Cully (ABC). ABC is a group of predominantly Latina moms that didn’t come together because of bikes but rather to connect their community in a healthy way. The bicycle became a tool for them to stay healthy and connect with their neighbors. They also enjoyed advocating for safe routes to school and storage for their bicycles in their affordable housing community. One of the barriers for the women was having a way to bike with their kids so the Community Cycling Center was able to help them with donations of bike trailers. The success of this program came from not trying to assimilate the community to bike culture but by creating their own bike culture by using the bicycle as a social tool. The ABC organization created a mission and set of goals and enjoys sharing and inspiring other people in Portland.



Figure 8. Andando en Bicicletas en Cully. Photo Credit: ABC Facebook page

fee or back at a bike station and receive a credit. Annual memberships can be purchased for \$12 a month and include 90 minutes of riding time each day. Single-ride passes and 24-hour passes will also be available.

Bicycle Transportation Alliance Women Bike Program

The Bicycle Transportation Alliance (BTA) is a very active bicycle advocacy organization in the City of Portland. They host a “Women Bike” program led by Nicole Davenport that aims to “inspire more women to incorporate a bike in their lives and utilize biking to meet their personal health, fitness, and transportation needs” (Bicycle Transportation Alliance, 2016). The program offers monthly workshops and clinics to learn about laws, riding practices, and bike skills. There are monthly rides as well as social meet-ups to meet other women and share biking experiences.

Other Organizations

There are many other organizations throughout Portland that offer women bike clubs or women group rides and clinics. These can be found at: Women on Wheels, Gladys Bikes, River City Bicycles, Sorella Forte, and North Portland Bike Works.

Success

In Portland, neighborhood greenways have greatly contributed to the increase in cycling in the city. Since 2000, the number of Portlanders commuting to work by bike has increased nearly 250 percent with some neighborhoods experiencing 25% mode share (Figure 9). The neighborhood greenway with the highest bicycle traffic volume is SE Lincoln-Harrison with 4,230 daily bicycle trips (Portland Bureau of Transportation, 2015). The percentage of women commuting by bike has also increased from 4.1% to 4.5% from 2010 to 2014 with the total increase of bicycle mode share.

Since starting in 2005, the Safe Routes to School program has expanded from 8 initial partner schools to over 100 partner schools across 5 school districts. The Safe Routes to School program has increased walking and biking to Portland schools by 35% since 2006. These programs have helped Portland students walk and bike to school at a rate nearly four times the national average (Portland Bureau of Transportation, 2016).

The ABC organization has been successful in getting parents and kids on bikes. They lead community rides and went from 20 people participating in 2014 to 50 participating in 2015. “They described a positive feedback loop: parents get the kids involved to keep them active and productive, then the kids start having fun and they, in turn, get the moms and dads on bikes. Before long, the entire family is biking in the neighborhood” (Maus, 2015). “Many of the moms in Cully are stay-at-home and are busy,” continued Rosaisela Portugal, “and a way they stay healthy is to load up the kids in the trailer and go to the store. That’s childcare, exercise, and a trip to the gym all at once!” (Maus, 2015).

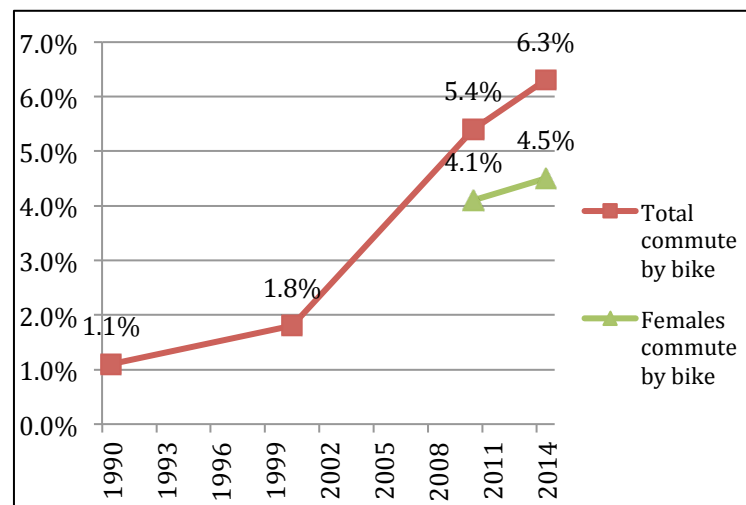


Figure 9. Percent commute by bike 1990-2014. Source: U.S. Census and ACS (1990, 2000, 2010, 2014).

WASHINGTON D.C.

CAPITAL BIKESHARE



15TH STREET

PROTECTED BIKE LANES



PENNSYLVANIA AVENUE

2005 BICYCLE
MASTER PLAN-

INCREASE
PERCENTAGE OF
TRIPS BY BIKE TO
5% BY 2015.



153 miles of bicycle infrastructure
60 miles off-street paths
6 miles of protected lanes
3,000 bike racks

CASE STUDIES

3.9% bicycle
mode share

2.9% women
commute by
bike

38% of
bicycle
commuters
are women

Background

Washington D.C. has a favorable environment for cycling due to its population density, interconnected grid of streets, and renowned park system (District Department of Transportation, 2005, p. 5). The high-density land use pattern and flat terrain of the valley in the District is conducive to supporting high levels of bicycle transportation. More than 633,736 people live on 61 square miles of land, over 10,000 people per square mile (U.S. Census Bureau, 2014). Washington D.C. is in the humid subtropical climate zone where summers are hot and humid and winters are chilly with light snow.

Cycling has a long history in the District of Columbia since the late 19th and early 20th century. Today, cycling makes D.C. one of the most livable cities in the United States. In the year 2000, Washington D.C. had not had a Bicycle and Pedestrian Coordinator in 10 years, the latest bike plan was from 1976, and the city had only 3 miles of bike lanes. In 2001, a Bike Coordinator was hired and a new Bicycle Master Plan was released in 2005. By 2010, there were 50 miles of bike lanes, and Washington D.C. was ranked second of most populous cities in the United States with 4.0% of people biking to work. Between 2007-2013, bike commute rates grew by 2.3%. DC was ranked first out of the most populous cities to have the least bike/pedestrian fatalities per 10k commuters at 1.6% (Alliance for Biking and Walking, 2016).

The District Department of Transportation (DDOT) has a very successful and established bicycle program that is committed to: “providing safe and convenient bicycle access throughout the city “ (District Department of Transportation). DDOT has created 153 miles of bicycle infrastructure, installed over 3,000 bicycle parking racks, launched the first public bike sharing program in the United States (Capital Bikeshare), built the Bikestation D.C. facility at Union Station offering secure bike parking, and installed the first counter flow bike lane on 15th Street NW. Safe and convenient bicycle transportation is part of their broader initiative to create a sustainable, multi-modal transportation system.

Programs

District of Columbia Bicycle Master Plan

Washington D.C. approved their Bicycle Master Plan in 2005 with a vision statement including “the District of Columbia will be a world-class bicycling city that offers a safe and convenient network of bikeways for all types of trips” (District Department of Transportation, 2005, p. 15). The Plan proposes to accomplish this by providing more and better bicycle facilities, more bicycle-friendly policies to address bicycle accommodation, and more bicycle-related education, promotion and enforcement. The goal is to increase bicycle trips from about 1% in 2000 to at

2005 D.C. Bicycle Master Plan Vision Statement:

“The District of Columbia will be a world-class bicycling city that offers a safe and convenient network of bikeways for all types of trips.”

least 5% of all trips by 2015. The bicycle network plans to provide all D.C. residents access to a bicycle route or trail within ½ mile of where they live.

Cycle Tracks

In 2009 and 2010, the District implemented its first two-way cycle track on 15th Street NW and a center buffered median bicycle lane on Pennsylvania Avenue NW to separate people on bikes from motor vehicles (Figure 10). The success from these two facilities led to the addition of the cycle tracks on L Street and M Street in 2013 and 2014 for a total of 6 miles of cycle tracks in the District.



Figure 10. Pennsylvania Avenue. Photo Credit: peopleforbikes.org

Capital Bikeshare

Capital Bikeshare launched the first North American bikeshare in September 2010 and offers access to a bicycle all over the Washington D.C. metro region. The bikeshare system has more than 350 stations throughout the city with over 3,000 bikes. A person can rent a bike for as low as \$2 for a 30-minute ride, \$8 for a 24-hour ride, or an annual membership with monthly installments of \$8/month. The bikes include a step through frame, adjustable seat height, front and rear flashing LED lights, tire reflectors, and reflective brands on the front and rear tire sidewalls. Bikeshare is an excellent resource for touring the city and the national monuments, running errands, riding to events, commuting to work, avoiding the cost of parking and traffic. An app called Spotcycle can be downloaded to locate the available bikes nearby as well as display bike paths and points of interest. As of 2015, there were 31,500 members a 2014 survey revealed that 41% of the users were female (Lazo, 2015).



Figure 11. Bikeshare station. Photo Credit: www.cityphile.com



Figure 12. Capital Bikeshare on 15th Street NW. Photo Credit: www.peopleforbikes.org

GoDCGO

DDOT offers a program called GoDCgo, a sustainable transportation options program that offers free consultations to organizations and businesses to promote alternatives to driving as a single occupant. This service provides customized bicycle information to employees and customers so they can quickly determine the nearest bike lanes and facilities to the business. They can host Confident City Cycling Classes at the business and also organize events to promote bicycle travel by the employees. DDOT offers free bike racks by request from businesses.

Bike Parking

DDOT offers the first self-service bike parking program with secured, indoor bike parking called Bikestation at Union Station. This station is located next to the District's busiest transit hub, is available 24 hours a day, can house over 100 bikes, and offers changing rooms, lockers, bike rentals, repairs, and retail sales. DDOT as has installed over 1,000 bike racks and is constantly adding more. Off street

WABA

The Washington Area for Bicyclists Association is an advocacy group that serves the Washington D.C. metro region. In 2013, they started a program called Women & Bicycles run by Nelle Pierson to inspire more women to bike, participate, teach, advocate, and lead in the bike movement. The program includes workshops, monthly rides, weekly coffee clubs, and a mentorship program called Roll Models. The Roll Models program is a peer-to-peer network system where a volunteer becomes a Roll Model and hosts women they know for a dinner party to talk about biking and answer any questions. The events are sponsored by Chipotle and during the dinner party, the women go through a workbook provided by WABA and then ideally go for a bike ride using their own bikes or bike share. After that, it is up to the Roll Models what they would like to do or they can bring the women to the events hosted by WABA. The program first began with 10 Roll Models and now has grown to 50. Since the program launched in 2013, Roll Models helped host 150 events, engage over 3,000 participants, and inspire more than 400 women to make biking a new part of their lives (Washington Area Bicyclist Association, 2016). It is WABA's goal to not only encourage women to bike more but to also help them become advocates themselves and demand for better biking infrastructure.



Figure 13. Photo Credit: waba.org

bike parking is also required in all commercial buildings, usually in a garage, and must provide enough spaces equivalent to 5% of the required car parking. It is also required that some bike parking spaces be provided on the ground as opposed to vertical racks, which may affect women in terms of strength.

Black Women Bike

Black Women Bike was founded in May 2011 by co-founders Nse Ufot, Najeema Washington, and Veronica O. Davis by starting a Facebook group as a way to connect with other women. The mission of the group is “to build community and interest in biking among black women through education, advocacy, and recreation” (Black Women Bike). Many clinics are offered such as “How to Ride the Streets of DC Safely,” “How to Fix a Flat,” and “How to Bike Through Winter and Night.” There are monthly rides and also a Sisterhood Saturday that rides with WABA Women & Bicycles and Girl Trek. The group has been very effective by helping to eliminate excuses. They have shown women if they don’t have a bike, they can use bikeshare; if they don’t have a helmet, they get her a helmet; if they don’t know how to get somewhere, a woman will bike with her.



Figure 14. Black Women Bike group ride. Photo Credit: blackwomenbike.blogspot.com

Success

Since 1990, D.C. has had an increase in bicycle mode share from around 1% to 4% 2014 (Figure). The percentage of women commuting by bike has also increased from 1.3% to 2.9% between 2010 and 2014 (U.S. Census Bureau, 2014). Due to budget cuts, the District was without a Bicycle Coordinator until 2001, so implementation of bicycle infrastructure had been at a slow pace. Since around 2009, with the implementation of the cycle tracks and Capital Bikeshare, total bicycle mode share has increased by 77% and the percent of women commuting by bike has increased 123%.

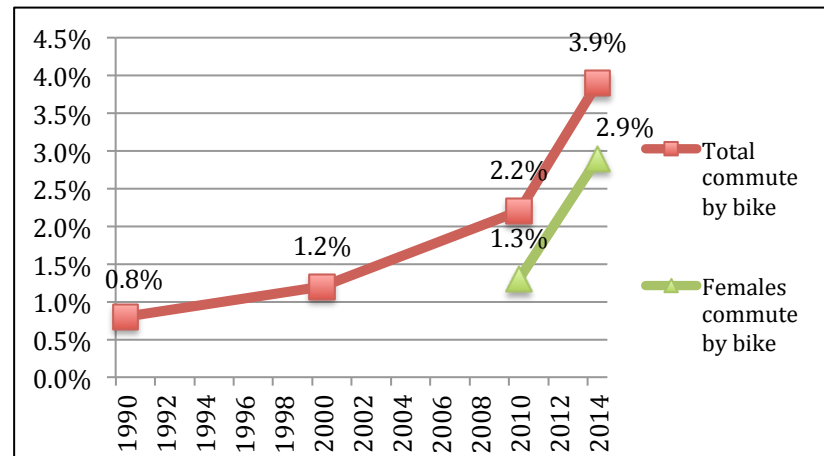


Figure 15. Percent commute by bike 1990-2014. Source: U.S. Census and ACS (1990, 2000, 2010, 2014).

VANCOUVER B.C



“create cycling facilities that are safe, comfortable, and convenient for people of all ages and abilities.”

BIKEWAYS, GREENWAYS, & PROTECTED LANES

- Bikeway: routes on city streets made comfortable by traffic calming
- Greenway: off-street paths connecting neighborhoods to parks, retail, and cultural features
- Protected lanes: protected downtown lanes increased women cycling from 28% to 37%.

TRANSPORTATION PLAN 2040-

INCREASE PERCENTAGE OF TRIPS BY BIKE TO 12% BY 2040.

184 miles of bicycle infrastructure

34 miles off-street paths

12 miles of protected lanes

1,500 bike racks

HUB

“get more people cycling, more often.”

EDUCATION
SOCIAL EVENTS
WORK WITH GOVERNMENTS

CASE STUDIES

10% bicycle mode share

41% of bicycle commuters are women

Canadian average:

1.3% bicycle mode share

29% women

Background

Vancouver, B.C. has a population of 603,500 living on 44 square miles of land, which is a population density of over 13,000 people per square mile (Statistics Canada, 2016). The climate in Vancouver averages cooler temperatures around 50 degrees with it's coastal location. Winters are rainy with an annual average of 46 inches (Climatemps.com, 2009-2015).

Pro-bike Mayor Gregor Robertson has spearheaded the expansion of Vancouver's bike lane network to include two separated lanes that bisect the downtown core, distinct routes on one of the city's major bridges, and bicycle boulevards where car traffic is discouraged using roundabouts and lower traffic speeds. There's also the seawall, the 14-mile separated bike path that follows the ocean around the popular tourist destinations of Stanley Park and False Creek all the way over to Kitsilano Beach (Ripplinger, 2012).

Vancouver was the site of the 2012 Velo-city Global conference that gathered 700 delegates from 40 countries and close to 200 speakers. The international active transportation conference, Pro Walk, Pro Bike, Pro Place, will be held in Vancouver on September 12-15, 2016 and showcase Vancouver's infrastructure.

Programs

Transportation 2040 Plan

The City of Vancouver adopted the Transportation 2040 Plan in October 2012 to set a long-term strategy to accomplish their vision of an affordable, thriving economy with healthy citizens in a city that enhances its natural environment. The Plan supports the City's wide-range Greenest City Action 2020 Plan, which has the goal to be the greenest city by 2020. The Transportation 2040 Plan's cycling goal is to increase mode share to 12% by 2040. They acknowledge that in the past, cycling facilities have been mostly built for people already comfortable riding in traffic but now efforts will be made to make cycling appeal to a wider audience such as children, seniors, and novice cyclists (City of Vancouver, 2012, p. 25). To create a more comfortable cycling experience, the Plan calls for: providing physically separated bicycle facilities on major arterials, traffic calming measures on neighborhood streets, develop a cycling comfort index to identify routes that do not meet guidelines for all ages and abilities, accommodate cargo bikes, provide comfortable, well-connected routes, and provide convenient and abundant bike parking are just some of the goals mentioned.

Transportation 2040 Vision Statement:

"By 2040, we envision a city with a smart and efficient transportation system that supports a thriving economy while increasing affordability; healthy citizens who are mobile in a safe, accessible, and vibrant city; and a city that enhances its natural environment to ensure a healthy future for its citizens and the planet."

Safe, Comfortable, and Convenient Infrastructure for People of All Ages and Abilities

The City of Vancouver has made it a priority in their Transportation 2040 Plan to create cycling facilities that are safe, comfortable, and convenient for people of all ages and abilities. Bikeways and Greenways are the primary infrastructure that is built to make cycling safe and comfortable for people of all ages and abilities. Bikeways are routes on the city streets that are made to feel safe and convenient through traffic calming measures. Greenways are linear public corridors for pedestrians and cyclists that connect parks, nature reserves, cultural features, historic sites, neighborhoods, and retail areas” (City of Vancouver, 2016a). The City is working towards the goal of ensuring that there is a city greenway no more than a 25-minute walk or 10-minute bike ride from every residence in Vancouver. One of Vancouver’s essential greenways is the Seaside Greenway, which starts downtown, traces the waterfront around Stanley Park and False Creek to Spanish Banks Beach near the University of British Columbia. Another popular greenway is the Central Valley Greenway, a fairly flat 15-mile path popular with commuters. Investments in protected bike lanes in the downtown core have demonstrated an increase in the proportion of women cycling on those routes. Data from the Hornby Street protected bike lane indicate that the proportion of women cycling on that street increased from 28% to 37% when it was a typical painted bike lane converted to a protected bike lane (City of Vancouver, 2016).



Figure 16. South False Creek Seawall is Greenway. Photo Credit: City of Vancouver

HUB

HUB Cycling is a charitable non-profit organization, originally established in 1998 to improve cycling conditions in Metro Vancouver. Their mission is to get more people cycling, more often. They provide bicycle education to people of all ages, host fun & community social events, programs and courses, work with governments, businesses, and community organizations, research, and write letters and reports. They teach city cycling courses to get comfortable riding on city streets. They offer classroom and outdoor riding courses for Grades 2 and up. HUB actively works with TransLink and the city to provide input on infrastructure improvements.

Mobi Bikeshare

On July 20, 2016, the City of Vancouver launched its bikeshare system Mobi with 250 bikes at 23 stations. By the end of Summer 2016, 1,500 bikes at 150 locations will be available. The initial service area includes the downtown peninsula because of the high number of homes, offices, and businesses with potential for many short-distance trips (City of Vancouver, 2016c). Helmets are provided at no additional cost, as it is a law to ride a bicycle with a helmet in BC. The goal of the bikeshare system is as Mayor Gregor Robertson stated is “to be another way for residents and visitors to access our active transportation network for commuting, short haul trips, or simply exploring the city” (City of Vancouver, 2016b).

Success

In 1997, the City of Vancouver's city council passed a landmark Transportation Plan with 76 major initiatives to increase walking, cycling, and transit. There was only one bike route at the time and within a couple of years, the city was celebrating the accomplishment of completing 100km of the bicycle network. Within a decade, cycling almost tripled and there were more than 50,000 trips on an average day (City of Vancouver, 2006). By 2013, the City reported from a Transportation Panel Survey 83,000 trips made by bike, 2014 there were 99,000 and 2015, there were 131,000 total trips by bike, which is equal to a 7% mode share. This survey provided data for travel trips to work, which showed the mode share increasing from 7% in 2013 to 10% in 2015 (CH2M HILL Canada Limited, 2016).

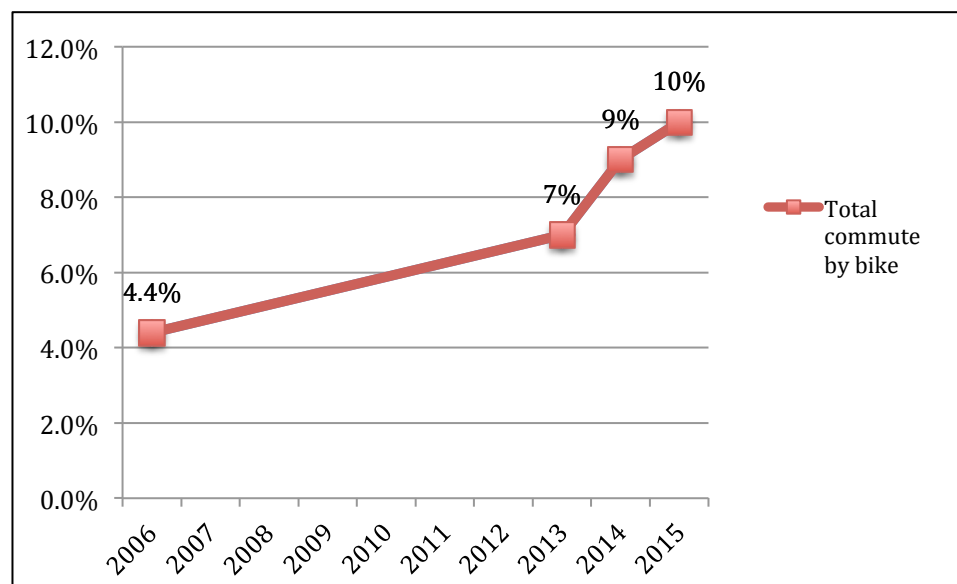


Figure 17. Percent commute by bike 2006-2015. Source: 2011 Canadian Statistics, 2015 Transportation Panel Survey

Chapter 4: Interviews from Model Cities

This section includes the responses from 12 interviews collected from government agencies, advocacy groups, and bike experts from the model cities of Portland, OR, Washington D.C., and Vancouver B.C. The government agencies interviewed include: Portland Bureau of Transportation, Washington D.C.'s Department of Transportation, the City of Vancouver's Department of Transportation, and Vancouver's regional transportation agency, TransLink. The advocacy groups interviewed include: Portland's Bicycle Transportation Alliance, Portland's Community Cycling Center, Washington Area Bicyclist Association, and Black Women Bike. A bicycle expert I spoke with was a researcher and professor from the University of British Columbia. The responses are organized by the questions found in the interview guide (Appendix IV), separated by city, and inclusive of all participant answers. The questions highlighted here include the general questions, similar questions under each profession, and unique questions found for Planners and Advocacy Groups.

1. What characteristics of this city do you feel contribute to it being a bike friendly city?

All three model cities shared similar characteristics of being a bike friendly city. They each state forms of safe infrastructure either through quiet residential streets, trails, and protected bike lanes as well as an extensive network that continues to expand. There are very active cycling advocacy groups and local clubs. There are many social rides that make biking visible and fun. The bicycle culture is seen as an identity for the city. Each of the cities had other unique characteristics mentioned such as Portland's strong business support of bicyclists, Washington D.C.'s Capital Bikeshare, and Vancouver's system of residential bikeways with bicycle-activated traffic lights at major arterials. A summary of the interview responses is listed below.

Portland

- Expanding bicycling infrastructure, neighborhood greenways, bike boulevards, and biking trails.
- Pretty extensive network except for East Portland.
- Free bicycle information and resources provided by Portland Bureau of Transportation (PBOT).
- Businesses supporting and encouraging biking with discounts to cyclists, providing bike parking (indoors and out).
- Laws requiring new buildings to have a minimum number of bike parking spaces.
- Robust Safe Routes to School program.
- Open Streets project called Sunday Parkways that hosts car-free routes in 5 areas of the city each year.
- Portland has the largest car-free bridge, Tilikum Crossing, in the United States.
- Strong bicycle advocacy groups and partners: Bicycle Transportation Alliance (BTA), BikePortland.org bike blog, Better Block, Bike Loud PDX, Andando en Bicicletas en Cully, Community Cycling Center.
- Community led bike events like Pedalpalooza.

- Portlander's progressive values and support of clean energy, active transportation, and healthy lifestyles.

Washington D.C.

- The Capital Bikeshare program, launched in 2010, pretty much gives everyone in the city proximity to a bike.
- The investment in infrastructure, particularly protected bike lanes that have been installed around the city particularly around the downtown.
- Growing social culture around biking.
- Fun social rides by groups and bike shops like the Cupcake Scramble and Popsicle Ride.
- Non-traditional groups are using biking as a way to get people around such as Mural D.C. where people will bike from mural to mural. The D.C. public library has a Tour de Library where they will bike from library to library.
- Secured bike parking station at Union Station where you can pay to securely lock your bike that is monitored by a security guard.
- Some office buildings are adding bike rooms and showers to remain competitive.

Vancouver B.C.

- A system of residential bikeways with bicyclist-activated traffic lights at intersections with arterials.
- Relatively compact and dense urban core that makes cycling a feasible option for short to moderate distance trips for many purposes.
- There are very active cycling advocacy groups such as: HUB and BEST.
- There are lots of cycling clubs.
- It is part of the culture and identity of being in Vancouver.

2. What changes have occurred to help increase cycling in this city?

The numbers of people cycling increased mainly around 2009-2010, when the cities made major investments in bicycle infrastructure including more bike lanes and separated, protected bike lanes. Infrastructure was added to bridges, extensions of the network to downtown businesses, and developing greenways helped increase cycling. The cities made it a priority to increase bicycle mode share in their long-range transportation plans and investments in the infrastructure have followed. A summary of the interview responses is listed below.

Portland

- Right around 2010, the city had a bike friendly mayor and with the encouragement from the BTA, major investments in bicycle infrastructure were made and the mode share jumped from 2% to 6%.
- Advocacy work like from the Community Cycling Center has been helping thousands of people with low-incomes since 1994 get access to bikes, safety education, and training.
- The Community Cycling Center helped the Cully neighborhood start a bike club *Andando en Bicicletas en Cully*, a mostly Spanish-speaking community in and around the Hacienda housing development in Northeast Portland.
- The City's Bicycle Master Plan has a goal that by 2020, 15% of all trips will be made by bike and 25% by 2030. This goal encourages the City to create policies around bike infrastructure, which directly tie to planning and engineering.
- PBOT has programs that interface with the public to educate about transportation options.

Washington D.C.

- Back in 2003, there were only 3 miles of bike lanes and not a lot of bike parking. The new Director of Transportation initiated a lot of infrastructure improvements and now increased the miles of bike lanes from 3 to 76. The first protected bike lane was installed in 2009 and more have been added since.
- **“The Capital Bikeshare program launched in 2010 and was rolled out into the city in such a grand scale. It provides affordable access and normalizes biking. It is no longer for the exceptional. It’s something that everybody can do and the design of the bike, with a step through frame and all of the safety components included, makes it an approachable mode. “ - Planner, District Department of Transportation**

Vancouver B.C

- Since 2009, there has been the addition of separated bike lanes on downtown streets that allow more access to businesses.
- Separated bike lanes added to main bridges such as Broad Street Bridge and the Georgia Viaduct provide East-West and North-South connections to downtown.

- Recent extension of the Seaside Greenway to the western area of the city has finally made it possible to cycle most of the downtown waterfront on off-street paths or low-volume streets.
- The transit system is bike friendly by providing bike parking, allowing bikes on trains, and bike racks on buses, which has happened in the last decade or two.
- There has been an increase in programming from partners in the non-profit and health sectors to encourage more people to cycle more often.

3. What do you think has contributed to the increase in women’s ridership in this city?

Safe cycling infrastructure was the dominant answer to increasing women’s ridership in the city. Safe infrastructure that is family friendly through quiet, residential streets or separated from traffic. Other elements such as car-free events like Sunday Parkways in Portland, women cycling groups, Bikeshare, and advertising women on bikes in in publications all help to normalize biking for women and be visible. A summary of the interview responses is listed below.

Portland

- Safe infrastructure, programs like Sunday Parkways, and seeing people like yourself biking around town.
- PBOT used to have a “Women on Bikes” program.
- BTA’s Women Bike program.
- Other groups such as: CycloFemme, Women on Wheels, Ladies Let’s Ride, Mujeres en Movimiento, Ride Like A Girl, Let’s Race Bikes, and The Sweetpea Ladies’ Auxiliary.
- **“The Sprockettes is an all women’s bike dance troupe that is very visible in Portland and helped spin off many other bike-dance troupes up and down the west coast. They are a presence of strength and empowerment for their audience. They also host girl’s bike camps where the girls have a chance to perform and gain skills on bikes, feel empowered, support one another, and trust them to take risks.” –Community Cycling Center**

Washington D.C.

- **“The Capital Bikeshare program has a pretty good split compared to other bikeshare programs. There is a lot of female leadership so there might be issues that will come to mind that maybe wouldn’t if there was a less diverse group running it.” –Planner, District Department of Transportation**

Vancouver B.C.

- Building family friendly cycling infrastructure through quiet, residential streets.
- Off-street paths or traffic-separated paths.
- Including cycling infrastructure as part of their parks programs.
- Developing infrastructure along the waterfront and seawall that are all traffic separated cycling facilities.
- Focus on profiling women who use bikes for transportation in publications like Vancouver-based Momentum Magazine.
- Having women in leadership roles in local cycling advocacy.

4. How do you think an increase in women’s ridership can occur? Is there more the city can do to increase cycling among women or do you think it occurs due to other factors?

Each of the interviewees gave several great recommendations as to how an increase in women’s ridership can occur. The first, most common response is to continue to build safer infrastructure in the form of separated paths, off-street paths, or residential bikeways. The primary concern for most women and families is safety and physical separation or distance from car traffic is the best way to provide that safety. Cities need to continue to ensure that the bicycle network is complete, that the network connects to key destinations such as employment areas, schools, shopping centers, and parks, and that there aren’t gaps in the network that drop people into poor facilities. Cities can also continue to encourage compact, dense land use that allows for short trip distances and makes cycling a feasible option. There is also a need for other infrastructure such as secured bike parking as well as offices to provide facilities such as bike rooms and showers. Safe Routes to School programs continue to be beneficial in encouraging kids and mothers to ride a bike. The second recommendation is that the city can help by providing the infrastructure, dense land uses, and programming but there are needs from the community and advocacy groups to provide targeted outreach to encourage more women to feel confident in riding a bike. Advocacy groups can also help by reaching out to underrepresented cultural groups as well as help women to become advocates themselves. A summary of the interview responses is listed below.

Portland

- **“Targeted outreach, women-specific businesses/classes/rides/groups, and peer-to-peer “normalizing”. The more things like this exist, and the more women know and hear about it, then I feel the more women are more apt to try it out, continue practicing, and then become advocates for their female peers.” –Planner, Portland Bureau of Transportation**
- Efforts of the Safe Routes to School program to reach out to families and kids. This has a direct correlation to mothers and getting them to ride with their kids, whether that’s to school or recreationally outside of school.
- Biking is becoming so normalized here that the increase overall (both genders) is an increase in women’s ridership.

- **“A lot of Portland’s bike shops and their products are targeted to men, specifically cis-white males who wear lycra. We need to work together to create bike shops that are inclusive for all genders, abilities, and backgrounds.” – Community Cycling Center**
- New riders of any gender want to feel safe on the streets, they want to ride with friends, and they want to see people like themselves riding.
- **“I believe in the twofold approach, that the city can build it, provide some programming, provide information and resources, but that the community needs to continue with its own programming and disseminate the information and resources and encourage usage on the infrastructure/network that was built by the city. It has to be from all angles and sides.” – Planner, Portland Bureau of Transportation**
- Continuing to build safer infrastructure such as protected bike lanes would make people feel more safe, especially in downtown Portland.
- Continue to work with different cultural groups and women of color to improve access to bicycling.
- Hoping that the new bikeshare is successful and can later on expand their stations to provide access to further out neighborhoods.

Washington D.C.

- Continue to increase good bike infrastructure such as protected bike lanes.
- Appropriate bike racks where you can lock your bike.
- More offices need to have bike rooms, showers, and irons.
- **“The conversation also has to be linked with quality neighborhood schools because particularly for women of color, their kids are not going to their neighborhood school and if you have to get your kid all the way across town, you’re not biking.”-Black Women Bike**
- A shift in advocacy towards biking trips other than biking to work.
- **“Continue the work of advocacy groups such as WABA who provide a safe space for women to talk about issues and have their questions answered.” – Planner, District Department of Transportation**
- “Marketing, making sure that you’ve got women, men, people of all colors and sizes, and socio-economic status represented in your marketing materials also goes a long way.” – Planner, District Department of Transportation
- **“The City helps by making bikes available through bikeshare and making infrastructure good, safe, and attractive to people.” – Planner, District Department of Transportation**
- DDOT has helped local schools purchase hundreds of bikes so every second grader could receive bike education, which helps engage parents as well.

- Safe Routes to School programs like Bike to School Day and the ABC's of Family Biking help encourage mothers and families to ride with their children.
- **“Strong political leaders are key because they are the people that control the budget, the parking, and the resources.” -Washington Area Bicyclist Association**
- **“Help turn women into advocates themselves, get involved in the conversations, and demand better infrastructure.” - Washington Area Bicyclist Association**
- There needs to be good infrastructure for the first and last mile issue to connect to trails.
- There needs to be a focus on multi-modalism, where you can take your bike on the metro or bus. The public transportation system needs to fully integrate biking.
- Social organizations for specific groups like Latina women who may only speak Spanish and need Spanish speakers and information.

Vancouver B.C.

- **“Women are less willing to ride on less preferred bike routes such as: streets without any infrastructure, streets with painted bike lanes, and sharrow streets so if the city wants to attract women, they have to build preferred route types such as: off-street bike paths, residential street bikeways, and physically separated bike lanes.” - Researcher, University of British Columbia**
- “It’s really important to have a complete network that doesn’t dump you from great facilities to poor facilities. You can train people but then they still don’t feel confident when they’re off on their own and they stay inside.” -Researcher, University of British Columbia
- “Continue to build out a broader network of routes that appeals to all ages and abilities, particularly focused on serving key destinations like shopping streets, employment areas, schools, community facilities, parks, and so forth that would benefit young families.” -Planner, City of Vancouver
- “Parents are less willing to cycle on poor facilities so the city has to build greater facilities.” Researcher, University of British Columbia
- **“A lot of cities are being much too timid in their implementation. They should go big like they did in Seville, Spain and in New York. Seville, Spain increased their mode share from 0.1% to 7% in 4 years by adding over 140km of separated bike lanes on major streets so they were visible and people saw people bicycling.” -Researcher, University of British Columbia**
- “Outreach programs are useful in showing women how bicycling can be a part of their everyday travel.” -TransLink
- **“Investments from the local government made to make cycling safe and comfortable for people of all ages and abilities will only help to increase the number of women cycling.” -Planner, City of Vancouver**

- “Complimentary focus on compact, dense, and bike-friendly land use that makes trip-chaining possible for busy people. “ – Planner, City of Vancouver
- **“Some cultural evolution is needed to make cycling more “normal” for all people, but particularly busy women who might otherwise think they need to drive for most of their local trips. This is a combined role for government and private entities in how cycling is portrayed visually and in the media.” –Planner, City of Vancouver**
- “Make more flexible work arrangements possible and acceptable to more employers, so that working moms and other busy moms can juggle the many things that compete for their time and that they may make them choose to drive for too many short, local trips. “ –Planner, City of Vancouver
- “Women in leadership roles visibly demonstrate that it is possible to cycle for many local trips in work clothing on a range of possible bikes. “ –Planner, City of Vancouver

5. What resources, data, or guides are used to help the city increase cycling for women? Or new riders in general?

All three cities indicated using bike count data to help guide the city with increasing ridership. The City of Vancouver uses progressive design sources such as the NACTO guide and the Dutch CROW manual for ideas of safe and comfortable infrastructure. A summary of the responses is listed below.

Portland

- PBOT produces a Family Biking Guide, which provides info from biking during pregnancy through when the child is biking independently.
- PBOT produces a Portland Biking Guide for new riders and hosts a series of annual guided bike rides and workshops through the Portland By Cycle program.
- PBOT conducts annual bike counts that track gender, but it only tracks people on the gender-binary. This is very challenging to address since it relies on one person’s assumption (observer) of another person’s gender (cyclist) while they bike past the observer

Washington D.C.

- DDOT collects bike counts from individual lane improvements that report on the percentage of women cycling. Higher percentages of women are shown cycling on the protected bike lanes and cycle tracks.

Vancouver B.C.

- **“We tend to rely heavily on design resources that are aimed more generally at making cycling safer and more comfortable for people of all ages and abilities, which we feel will have a complimentary benefit for encouraging more**

women to cycle. Examples include the NACTO Urban Bikeway Design Guide and the Dutch CROW Manual. These manuals are focused relatively heavily on facilities that are protected from heavy traffic. “ –Planner, City of Vancouver

- The City of Vancouver reports on the increases in cycling on individual bikeways and the proportion of women cycling on those routes. For example, data for Horny Street’s protected bike lane indicate that the proportion of women cycling on the street increased from 28% when it was a typical painted bike lane to 37% after it was converted to a protected bike lane.
- TransLink collects travel diary survey data that indicates the change in cycling over time.

6. Is there currently a city strategy or program to help increase cycling among women or new riders who are interested but concerned?

All three of the model cities do not have specific strategies or programs for increasing cycling among women but they do have strategies or programs to attract “interested but concerned” riders. Their missions are generally to make cycling safe, comfortable, and attractive for all people and abilities. Portland is the only city that used to have a specific “Women on Bikes” program, which offered education and group rides for women but it has now been discontinued. One strategy to attract women to cycling is through a secondary approach through Safe Routes to Schools programs, which educate children and parents on safe walking or riding to school. This program encourages the children to consider biking, which can encourage their mothers to bike as well. Another strategy to encourage new riders is by normalizing biking through the presence of the bikeshare system and through messaging and branding to appeal to all people.

Portland

- PBOT has the Portland By Cycle program, which addresses the “interested but concerned” riders for all genders but not specifically for women anymore like the Women on Bikes program.
- PBOT also has a robust messaging platform to Portland residents and within those messages they encourage, educate about, and normalize biking to folks who may otherwise not consider biking.

Washington D.C.

- DDOT’s strategy is about making bike available through bikeshare and making infrastructure good, and safe, and attractive to people.
- DDOT also helped local schools purchase hundreds of bikes this year because of every second grader in D.C. public schools will get bike education and reaching that many children, reaches that many parents so there’s ways that engaging families through some of the projects that we do even if it’s not directly geared at women it’s going to be the full package of increasing biking.
- The Safe Routes to School program has events like Bike to School Day and the ABC’s of Family Bike School where you get a lot of parents so you have mothers with children and fathers with children who are resourcing these programs.

Vancouver B.C.

- **“Our transportation plan-Transportation 2040- sets the policy that we will focus on making cycling safe, comfortable and convenient for people of all ages and abilities, which is primarily intended to attract people who are “interested but concerned.” –Planner, City of Vancouver**
- “We are in the process of launching a public bikeshare system, which we expect to appeal to women. “ –Planner, City of Vancouver
- “We now have an approved Active Transportation & Enabling Plan, which is also aimed at attracting more people who are “interested but concerned” to try walking or cycling for more trips. This includes a branding strategy, which aims to normalize cycling for all, including women and young families. “ –Planner, City of Vancouver
- “The city will be publishing its first annual report that will provide information about active transportation improvements and use statistics, which will raise more awareness of the city’s cycling network as it expands.” –Planner, City of Vancouver
- “Vancouver has successfully attracted an international active transportation conference (Pro Walk Pro Bike Pro Place Conference September 12-15, 2016) that will showcase Vancouver’s infrastructure. “ –Planner, City of Vancouver

7. For advocacy groups, what specific programs does your group offer to increase women’s cycling?

The following advocacy group questions only contain responses from Portland, OR and Washington D.C. because I was unable to interview an advocacy organization in Vancouver B.C. Advocacy groups from both cities offered “Women Bike” programs that included educational workshops, group rides, and social meet-ups. These programs have been successful in providing a safe place for women to ask questions as well as to socially meet other friends to bike with. A common theme among all of the programs offered is using the bicycle as a social tool to connect with other people. A summary of the responses is listed below.

Portland:

- **“The Community Cycling Center has a variety of programs but the first one to come to mind is our work with Andando en Bicicletas en Cully (ABC), which is a group of predominantly Latina moms in Cully. They didn’t come together because of bikes. They came together because they wanted to connect with their community in a healthy way. The bicycle became a tool for them to stay healthy and connect with their neighbors. They also enjoy advocating for safe routes to school and storage for their bicycles in their affordable housing community (Hacienda CDC). “ –Community, Cycling Center**
- The BTA runs a Bike More Challenge, which is a month long challenge that is employer based but also allows people to participate individually. It encourages people to get out riding and helps connect people with resources.

- BTA also has a Women Bike program, which holds numerous events throughout the month. There are social events and meetings where women can meet other women and hopefully create a bike buddy. There is an education event every month such as a winter riding clinic, saddle clinic, things that might be helpful to women to start riding. There is also a monthly ride that has a no drop policy and us usually under 10 miles to get people used to riding with cars.

Washington D.C.

- The Black Women Bike group offers seminars such as “How to ride the streets of D.C. safely” and “How to ride in the winter and at night.” There are also monthly rides and are taught by women who are certified cycling instructors.
- The Washington Area Bicyclist Association (WABA) started a program led by Nelle Pierson called Women and Bicycles in 2013, to help get more women biking. It is based around mentorship with volunteer Roll Models who facilitate conversations within their network. There were 10 Roll Models in 2013 and now there are about 50. This helps provide women a safe space to have their questions answered and learn to feel comfortable on a bike. The program also includes larger activities such as a monthly ride that includes skill sharing. There are monthly workshops and a monthly social.

8. For advocacy groups, what has been useful to attract new, women riders and have they continued bicycling afterwards?

Both Portland and Washington D.C. mentioned having people to ride with is the best way to attract new women riders and for them to continue to bicycle afterwards. It helps to ride with friends, especially if you are unsure of the route and you can pay attention better to how you are riding on the road. A summary of the responses is listed below.

Portland:

- Having a group of people to ride with is helpful when you are unsure of the route and then you can pay attention better to the road or the trail. Riding with a friend who is more knowledgeable and knows where they’re going, puts your mind at ease.
- The BTA runs commute clinics to teach women the rules of the road, which are generally given at work places.
- Teaching women the rules of the road, where you’re allowed to be, and safe riding practices are really important to help women feel safe.

Washington D.C.

- **“If you can get one woman on a bike, you can usually get two or three. Anytime you get a new person on a bike, then on their own, they’ll grab a friend. “ -Black Women Bike**

9. For advocacy groups, what have you found to be the barriers for women’s cycling and what have you seen to help reduce those barriers?

Advocacy groups have the opportunity, unlike most city agencies, to speak to and hear from individuals and groups about their questions and concerns. The common barrier for women cycling constantly emphasized is safety and fear of riding in traffic. This is why safe, protected bike lanes, low-traffic neighborhood streets, or off-street paths are the preferred route types for most women and the types of facilities that cities should build. To overcome this fear, advocacy groups help by providing educational seminars regarding how to ride in traffic and go on group rides to learn the rules of the road and not have to worry about where you are going. Having a buddy to bike with also has helped women overcome this fear. A summary of additional barriers is listed below.

Portland:

- For ABC, they realized that they would bike more if they could have access to bike trailers to carry their kids with them. They couldn’t afford trailers on their own but we were able to get donations of trailers for them.
- Other common barriers for people of all genders living on low incomes: cost, safety, and having people to ride with.
- Fear of being injured by cars so some women only like to ride on trails.
- The “Ride like a Girl” program mentors women who go from not biking at all to feeling really confident on the road by first learning to ride through neighborhoods, then paths, and then onto busier and busier streets.
- Safety is the biggest thing that is always talked about.
- Gear and clothing.
- Women with young children which may be because of the time barrier and not being able to take the time to coordinate the numerous trips and specific bike that the kids can fit on.

Washington D.C.

- One barrier is having someone to talk to and answer questions so advocacy groups have given women a safe space to talk about different challenges and have their questions answered.

Vancouver B.C.

- The dominant element is fear of riding in traffic and the cure to that is separation.
- If friends cycle, then you’re more likely to cycle.

Key Findings

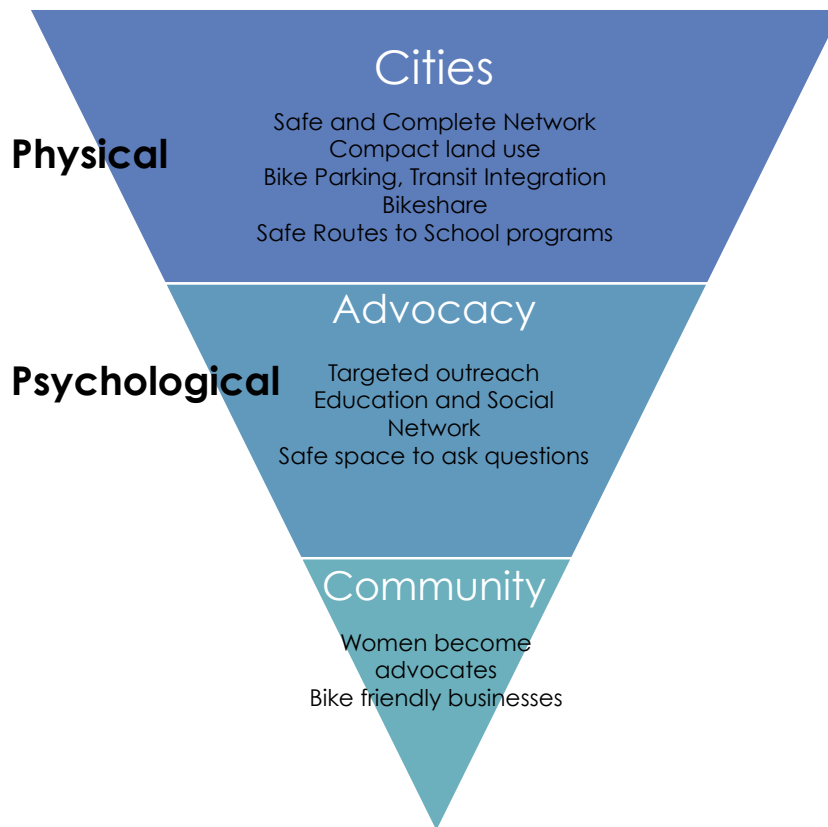
The interviews from government agencies, advocacy groups, and bike experts from the model cities of Portland, OR, Washington D.C., and Vancouver B.C. provided a list of key elements that have contributed to increased women cycling. These elements are summarized below.

1. **Strong government leadership with ambitious bicycle plans.** Each of the model cities have strong government leadership that is committed to sustainable, active transportation and make it a priority to provide access to safe and convenient infrastructure. They each have stated ambitious goals in their transportation plans to increasing bicycle mode share in the future, as high as 25% by 2030 in Portland.
2. **Safe infrastructure is the first priority.** Women are less willing to ride on less preferred bike routes such as: streets without any infrastructure, streets with painted bike lanes, and sharrow streets so if the city wants to attract women, they have to build preferred route types such as: off-street bike paths, residential street bikeways, and physically separated bike lanes. All three of the model cities have seen an increase in women's ridership by adding safe cycling infrastructure through off-street bike paths, quiet residential street bikeways or neighborhood greenways, and physically separated bike lanes particularly in the downtown core and busy streets. As studies have shown that women tend to be more "risk averse" and parents are less willing to cycle with their kids on poor facilities, it is imperative that investments in safe cycling infrastructure be made to increase women cycling.
3. **Influential advocacy groups.** Passionate and influential cycling advocacy groups such as Portland's BTA, Community Cycling Center, Washington D.C.'s WABA, and Vancouver's HUB make a tremendous difference in helping women become confident in biking and in advocating to cities for safe and improved infrastructure. These advocacy groups provide a safe and enjoyable place for women to have their questions and concerns addressed, learn from educational workshops, and go on social and skill sharing rides.
4. **Normalizing biking.** Normalizing biking for women means visibly seeing more women on bikes and making it "normal" to see people like yourself biking. Normalizing biking can happen through women bike rides through government agencies, advocacy groups, or cycling clubs. Seeing women working in bike shops, teaching workshops or leading groups rides, or riding with their kids to school with the help from Safe Routes to School programs all help to normalize biking for women. Marketing materials from government agencies that include women and families help to normalize the bike as a form of transportation for women.
5. **Bikeshare.** A public bikeshare system allows for people to have the access to a bicycle at an affordable cost. At the time of the interviews, only Washington D.C. had the bikeshare system operating and had experienced huge success in ridership with a high percentage of women. Following the interviews, Portland launched its bikeshare system BIKETOWN in July 2016 and Vancouver is set to launch their system Mobi by the end of Summer 2016. Bikeshare also helps to normalize biking as well as provide comfortable, step thru frame bikes fully equipped with baskets and safety gear to help women give biking a try.

6. ***End of trip facilities.*** Women have indicated that they are hesitant to ride their bike somewhere if they are not sure that there is secured bike parking at the end of their trip. The best cases of secured bike parking include indoor bike rooms or security monitored bike stations such as Washington D.C.'s Union Station. People are willing to pay a fee to ensure that their bike is securely monitored and safe. Office buildings that provide indoor bike rooms or other bike parking spaces are highly sought out amenities from renters. It was also highly valued if businesses and office buildings offered their employees indoor bike parking and showers to encourage biking to work.
7. ***Safe Routes to School programs.*** The Safe Routes to School programs help encourage children and therefore, their mothers and fathers, to ride their bikes to school. These programs have the potential to influence mothers to ride a bike with their children or encourage future generations of women to bike.

Chapter 5: Conclusion

The original question of this research study is “How Can Cities Increase Cycling Among Women?” The additional research questions address this in asking what the model cities have done and if there is a combination of government intervention, influence from advocacy groups, or other factors that have contributed in increasing women’s cycling. The answer is that governments alone cannot increase women cycling. It is a combination of government intervention, advocacy groups, business support, and passionate individuals that all contribute to a high percentage of women cycling.



Government intervention takes the form of affecting the physical environment in the form of: safe infrastructure, a complete bicycle network, transit integration, abundance of bike parking options, dense land uses, public bikeshare, and bicycle education. The City of Vancouver stated in their *Transportation 2040 Plan* that the city can influence travel behavior through “our public rights-of way, street infrastructure, land use, and much of the built environment” (City of Vancouver, 2012, p. 6). The most effective programs that cities implemented addressed the issues that women stated would convince them to bike more, such as safety and convenience. The top strategies that the three model cities implemented include:

- Long-range transportation plan that includes goals and an action plan to increase bicycle mode share.
- Investing in safe bicycle infrastructure such as: neighborhood greenways, off-street paths, and separated, protected bike lanes.
- Connected bicycle networks from residential neighborhoods to destinations such as downtown districts, employment areas, schools, parks, transit stations, and shopping centers.
- Transit integration with racks on all buses and trains for making long distance trips possible. Provide this access at all times of the day and not exclude the commute hours.
- Dense land uses that create shorter distances between

destinations and allow bicycling to be an accessible mode of transportation.

- Public Bikeshare to allow affordable access to a bicycle.
- Ample bicycle parking, secured bike stations at transit centers, and policies to encourage bike parking in office buildings.
- Bicycle information and education such as maps, route trip planners, free group rides, family biking guides, and safe routes to school programs that also include women in the marketing materials.

The second component of helping increase the percentage of women cycling, is addressing psychological barriers that only advocacy and grassroots organizations can address. The psychological barriers include perceived fear of riding a bike in traffic, riding alone, unsure of where to go, and how to take a bike on transit. Targeted programs for women to increase biking that have been successful include: educational classes and rides such as Portland BTA's "Women Bike" program, WABA's "Women and Bicycles" program, Community Cycling Center's "Andando en Bicicletas en Cully" neighborhood group, and Black Women Bike. These programs or organizations are specifically for women and help to create a safe place where women can have their questions answered, gain skills to become more confident when riding a bike, and meet other women to potentially cycle with. These programs have proven successful by helping one woman become confident, she in turn convinces another friend or two to begin riding as well. The top strategies that advocacy groups implemented include:

- Providing educational clinics
- Group rides that are fun and include skill sharing
- Encouraging women to be advocates themselves
- Mentorship
- Social network

Government agencies and advocacy groups in the three model cities work together in partnerships. Government agencies feel like they can't do the targeted work and provide the safe space that advocacy groups can so they have provide grant money to the advocacy groups to provide education and outreach efforts. Advocacy groups work with government agencies to make improvements to the bicycle network and infrastructure.

Besides the work that government agencies and advocacy groups can do to increase women cycling, there are also efforts that can come from the community. It is commonly mentioned that women like to ride with others and if you can convince one woman to ride, you can convince two or three. More women can be encouraged to cycle if women encourage their peers to ride with them. One of the major themes mentioned is "normalizing" biking and that can only happen when more women in your network or seen on the road are biking. Community members such as businesses can also encourage women to cycle by providing bike parking either outside or inside as well as showers to their employees. Bicycle shops can be helpful by offering bicycles that are appealing for women. The bike designs that would

address these issues would have an attractive design, comfortable saddle, baskets for carrying goods, step through frames, and be capable of carrying children. This would help address the issues of fashion, comfort, and child bearing duties, that are related to the bike design.

What more can be done?

There are many lessons to be learned from the model cities in terms of what they have implemented to achieve higher percentages of women cycling; however, there were also additional suggestions mentioned that can still be done to increase the mode share. Some additional suggestions include:

- “A lot of cities are being much too timid in their implementation. They should go big like they did in Seville, Spain and in New York. Seville, Spain increased their mode share from 0.1% to 7% in 4 years by adding over 140km of separated bike lanes on major streets so they were visible and people saw people bicycling.”-Researcher, University of British Columbia
- “The conversation also has to be linked with quality neighborhood schools because particularly for women of color, their kids are not going to their neighborhood school and if you have to get your kid all the way across town, you’re not biking.”-Black Women Bike
- Continue to work with different cultural groups and women of color to improve access to bicycling. Organizations are needed for specific groups like Latina women who may only speak Spanish and need Spanish speakers and information.

Limitations

Some of the limitations for this study include a lack of recent data regarding gender split by bike and complete travel data. The most recent U.S. National Household Travel Survey from 2009 is the nation’s largest survey focusing on all forms and purposes of travel. It provides the percentage of women traveling by bike, however, it is now outdated by 7 years old. The latest U.S. Census data is from 2010 and the 2014 American Community Survey Data is only an estimate based on responses from 3.5 million people, or 1% of the population (Alliance for Biking and Walking, 2016). The Census and ACS data only account for the commute to work journey, which only makes up less than 20% of U.S. trips (McKenzie & Rapino, 2011). Since not every woman may be employed or commute to work outside the home, their trips by bike would not be counted. Data from the 2011 Canadian Census and Canadian National Household Survey is 5 years old, only reports on the commute to work trip, and does not provide trip information by gender.

Future Research

In the future, it will be interesting to look again at the commute to work by bike data once the 2016 Canadian Census and 2015 U.S. Census are released. An updated U.S. National Household Travel Survey to reveal all trips made by bike will be useful to see if more women are

biking for trips other than the commute to work. It would also be useful to have a travel survey conducted in Canada that includes gender split information as well as complete travel data with other trip purposes besides commute to work.

Conclusion

Sustainable transport consultant Alix Stredwick said it well when describing the gender imbalance in London, “I’ve come to the conclusion that we get the kind of cyclists we deserve. If we have a street environment that’s hostile, that has no facilities, that has fast traffic with heavy lorries thundering past, we will get low numbers of courageous people, mainly men, on racing bikes and pretty well no one else. But if you provide a street environment where it’s much more egalitarian, where your granny can cycle to the shops safely and have somewhere to park her Dutch-style bike – that’s when we’ll get those kind of cyclists. But you have to be able to provide for them” (Slavin, 2015). This statement can apply to all cities interested in increasing women cycling and makes the point that if you want to attract all types of riders, you have to think about their needs and provide conditions that feel safe and convenient for all ages and abilities.

In the past few decades, government agencies in North America have realized the benefits of cycling and are incorporating goals to increase bicycle mode share in their transportation plans. Success in raising the mode share and percentage of women bicycling has come from cities addressing women’s needs in terms of safety and convenience. Advocacy groups have addressed psychological needs by providing targeted outreach to women with education and social support. Communities are getting involved with women becoming bicycle advocates and businesses offering bicycle amenities. Many of the barriers to cycling that women have mentioned are also barriers for men and parents. When cities begin to provide the facility types and bicycle amenities that women want, they will ultimately provide a network that is safe and comfortable for people of all ages and abilities. North American cities are finally incorporating the techniques that European cities implemented more than 30 years ago. It will take some time for this cultural evolution to catch on since the past 100 years have been focused on the private automobile and people will need to be taught how to ride a bike for transportation. A commonly mentioned theme has been to “normalize” biking for women since it has been out of the norm for so long. Some time in the future, this cultural evolution will actualize, women will embrace this newfound freedom and empowerment, and normalizing biking will finally become a reality.

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Appendix

I. Demographic Data

Statistics	United States				Portland, Oregon		Washington, District of Columbia		Canada			Vancouver, British Columbia	
SE:T1. Total Population							SE:T1. Total Population						
Total Population	314,107,084		602,568		633,736		Total Population	33,476,690		603,500			
SE:T128. Means of Transportation To Work for Workers 16 Years and Over							NH:T44. Means of Transportation for Employed Population 15 Years and over						
Workers 16 Years and over:	141,337,148		308,013		323,242		Employed Population 15 Years and over	15,385,935					
Car, truck, or van	121,545,061	86.0%	207,615	67.4%	128,651	39.8%	Car, Truck or Van:	12,260,195	79.7%				
Public transportation	7,318,224	5.2%	36,514	11.9%	124,491	38.5%	Public Transit:	1,851,520	12.0%				
Motorcycle	294,635	0.2%	1,365	0.4%	586	0.2%	Motorcycle, Scooter or Moped	24,495	0.2%				
Bicycle	832,750	0.6%	19,356	6.3%	12,531	3.9%	Bicycle	201,785	1.3%				
Walked	3,932,118	2.8%	17,690	5.7%	40,019	12.4%	Walked	880,815	5.7%				
Other means	1,242,769	0.9%	2,161	0.7%	1,657	0.5%	Other Methods	167,130	1.1%				
SE:T2. Population Density (per sq. mile)							SE:T3. Population Density (per Sq. Mile)						
Total Population	314,107,084		602,568		633,736		Total Population	33,476,690		603,500			
Population Density (per sq. mile)	88.9		4,516.1		10,380.9		Population Density (per Sq. Mile)	9.56		13,558.43			
Area (Land)	3,531,905.35		133.43		61.05		Area (Sq. Mile)	3,461,451.1		44.4			
SE:T4. Sex							SE:T4. Sex						
Total Population:	314,107,084		602,568		633,736		Total Population:	33,476,690		603,500			
Male	154,515,159	49.2%	297,452	49.4%	300,030	47.3%	Male	16,414,225	49.0%	295,095	48.9%		
Female	159,591,925	50.8%	305,116	50.6%	333,706	52.7%	Female	17,062,460	51.0%	308,400	51.1%		

SE:T9. Age (Short Version)							SE:T9. Age (Short Version)				
Total Population:	314,107,084		602,568		633,736		Total Population:	33,476,685		603,500	
Under 18 Years	73,777,658	23.5%	113,246	18.8%	107,989	17.0%	Under 18 Years	6,897,660	20.6%	88,190	14.6%
18 to 34 Years	73,583,479	23.4%	172,165	28.6%	223,260	35.2%	18 to 34 Years	7,407,765	22.1%	169,345	28.1%
35 to 64 Years	123,567,986	39.3%	251,114	41.7%	230,764	36.4%	35 to 64 Years	14,226,220	42.5%	264,040	43.8%
65 and over	43,177,961	13.8%	66,043	11.0%	71,723	11.3%	65 Years and over	4,945,055	14.8%	81,925	13.6%
SE:T18. Households By Presence of People Under 18 Years							SE:T18. Families by Presence of Children				
Households:	116,211,092		252,185		267,415		Families:	9,389,700		151,330	
Households with one or More people under 18 Years:	37,895,810	32.6%	63,368	25.1%	55,345	20.7%	Families with Children at Home:	5,637,135	60.0%	88,515	58.5%

Sources: Social Explorer Tables: ACS 2014 (5-Year Estimates); U.S. Census Bureau. Canadian Census 2011, National Household Survey 2011; Statistics Canada.

II. Bicycle Mode Split By Gender

Statistics	United States		Portland, Oregon		Washington, District of Columbia		Statistics	Canada		Vancouver, British Columbia	
Workers 16 Years and over:	141,337,148		308,013		323,242		Employed Population 15 Years and over	15,385,935		294,790	
Male	74,693,566	52.8%	158,877	51.6%	157,912	48.9%	Male	n/a		n/a	
Female	66,643,582	47.2%	149,136	48.4%	165,330	51.1%	Female	n/a		n/a	
SE:T128. Means of Transportation to Work For Workers 16 Years and Over							NH:T44. Means of Transportation for Employed Population 15 Years and over				
Workers 16 Years and over:	141,337,148		308,013		323,242		Employed Population 15 Years and over	15,385,935		294,790	
Bicycle	848,023	0.6%	19,405	6.3%	12,606	3.9%	Bicycle	201,785	1.3%	33,161	10%
Male	597,549	0.8%	12,551	7.9%	7,738	4.9%	Male	n/a		n/a	
Female	199,931	0.3%	6,711	4.5%	4,795	2.9%	Female	n/a		n/a	
Bicycle Mode Split by Gender							Bicycle Mode Split by Gender				
Male	70%		65%		61%		Male	71%		64%	
Female	24%		35%		38%		Female	29%*		37%*	

Sources: American Community Survey 2014 (5-Year Estimates); U.S. Census Bureau. Canadian Census 2011, National Household Survey 2011; Statistics Canada, 2015 Transportation Panel Survey

* Pucher, Buehler, & Seinen, *Bicycling renaissance in North America? An update and re-appraisal of cycling trends and policies*, 2011

III. Model City Bicycle Facts Matrix

	Portland, Oregon	Washington, District of Columbia	Vancouver, British Columbia
Total Percent Commute by Bicycle	6.3%	3.9%	10%
Percent of Female Bicycle Commuters	35%	38%	37%
Total Miles of Bicycle Infrastructure	350 miles	153 miles	184 miles
Miles of Protected Bike Lanes	17 miles	6 miles	12 miles
Miles of Off-Street Paths/Trails	85 miles	60 miles	34 miles
Helmet Law	Under age 16	Under age 16	All ages

	Portland, Oregon	Washington, District of Columbia	Vancouver, British Columbia
Bikeshare	Yes, Biketown. Launched July 2016. 1,000 bikes at 100 stations.	Yes, Capital Bikeshare. Launched 2010. Over 3,000 bikes at 351 stations.	Yes, Mobi Bikeshare. End of summer 2016 will be 1,500 bikes and 150 stations.
Bike Parking	6,500 public bike racks and secured rooms and lockers at some transit stations.	3,000 public bike racks and secured indoor parking at Union Station.	1,500 public bike racks
Local Government Bicycle Plan	Portland Bicycle Plan for 2030. Goal: 25% bicycle mode share by 2030.	2005 District of Columbia Bicycle Master Plan. Goal: 5% bicycle mode share by 2015	Transportation Plan 2040. Goal: 12% bicycle mode share by 2040.
Bicycle-Transit Integration	Yes. Room for 2-6 bikes. No trailers. Mostly vertical racks.	Yes. Restrictions on Metrorail during weekday commute hours. 2 bikes per car. Mostly vertical racks.	Yes. Restrictions on rail during weekday commute hours, 2 bikes per car, and no trailers. Mostly vertical racks.
Safe Routes to School	100 schools	50 schools. One school won the national Oberstar Award for the safe routes work.	No City program
Active Advocacy Groups	Community Cycling Center, Bicycle Transportation Association, Women on Wheels	Washington Area Bicyclists Association, Black Women Bike, Girl Trek	HUB, BEST

IV. Interview Questions

General

1. What characteristics of this city do you feel contribute to it being a bike friendly city?
2. What changes have occurred to help increase cycling in this city?
3. How do you think an increase in women's ridership can occur? (city infrastructure, land use patterns, outreach/education programs, provided bicycle amenities, advocacy group efforts, cultural change, personal preferences, other?) Please explain.
4. What do you think has contributed to the increase in women's ridership in this city?

Planners

1. What resources, data, or guides are used to help increase cycling for women? or new riders in general?
2. Is there currently a strategy or program to help increase cycling among women or new riders who are interested but concerned?
3. Are there any specific programs or efforts that have helped see an increase in cycling among women? Is there any data for this or is it anecdotal?
4. Is there more the city can do to increase cycling among women or do you think it occurs due to other factors?
5. Is there anything more you'd like to add regarding increasing women's ridership?

Advocacy Groups

1. What specific programs does your group offer to increase women's cycling?
2. What has been useful to attract new, women riders and have they continued bicycling afterwards?
3. What have you found to be the barriers for women's cycling and what have you seen to help reduce those barriers?
4. What do you think it will take to increase the percentage of women cycling in this city? Is there more you feel the city can do or would it be from other factors?
5. Is there anything more you'd like to add regarding increasing women's ridership?

Experts

1. What resources, data, or guides do you think is helpful for cities to understand how to increase women's cycling?
2. What do you think it will take to increase the percentage of women cycling in this city? Is there more you feel the city can do or would it be from other factors?
3. Is there anything more you'd like to add regarding increasing women's ridership?