

Evaluating the impacts of Mobi's equity program on access and use of public bike share in Vancouver

Research
Report

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Analysis of system and survey data

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**MOBILIZING
JUSTICE** _____

Towards Evidence-Based
Transportation Equity Policy

About Mobilizing Justice

The Mobilizing Justice Partnership is funded by the Social Sciences and Humanities Research Council (SSHRC). Based at the University of Toronto Scarborough, the national intersectoral research partnership aims to understand and address transportation poverty in Canada and to improve the well-being of Canadians at risk of transport poverty. Learn more at www.mobilizingjustice.ca.

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This report was prepared on the unceded ancestral territories of the x^wməθk^wəyəm (Musqueam), Sḵwxwú7mesh (Squamish), and səlilwətaɬ (Tsleil-Waututh), Kwikwetlem (k^wik^wəɬəm), and Tsawwassen First Nations. We are grateful to our traditional hosts for access to the lands on which our work took place

Executive Summary

In 2016, the City of Vancouver launched its public bike share system (Mobi by Rogers) to provide a convenient and affordable mode of transportation for people's daily trips. Since this time, the City of Vancouver and Mobi have introduced several equity initiatives to make bike share more accessible for residents.

With funding from the Mobilizing Justice Innovative Pilots & Policies, our research team evaluated the impacts of these equity initiatives on access and use of Vancouver's public bike share system. **This report shares findings from analyses of system and survey data to characterize bike share members and their use of the system, with a focus on Community Pass members and e-bike usage.**

The [Community Pass](#) is Mobi's signature equity program which reduces financial barriers to bike share by providing a discounted membership, cash payment options, and reduced liability for bikes that are lost, stolen, or damaged. There are numerous ways to qualify for the Community Pass including providing proof of enrollment in other subsidized programs (e.g., subsidized leisure pass, subsidized bus pass, food bank membership), proof of an annual income less than \$27,000, Persons with Disabilities (PWD) designation, or referral from a community partner.

The findings show that the Community Pass has made gains towards transport equity by extending bike share membership to more diverse segments of the population and increasing access to different types of destinations. The addition of e-bikes is benefitting Community Pass members who qualify through a PWD designation and are able to use e-bikes at no additional cost for the first 60 minutes, as the majority of their trips were made by e-bike. However, regular Community Pass members were far less likely to have tried or regularly use e-bikes.

The key takeaways from these analyses are summarized as follows:

- Compared to the Vancouver population, older adults, women, people with lower household incomes, racialized populations are less likely to have an annual or monthly bike share membership. The Community Pass is reaching more diverse populations, in particular people with lower incomes, racialized populations, and people with a disability.
- Community Pass members have comparable (if not slightly higher) frequency of bike share use compared to standard pass members.
- Compared to the profile of members overall, frequent bike share users are more likely to be younger, men, racialized, and have a lower household income.
- E-bikes are more readily adopted by standard pass and Community Pass members who qualify through a PWD designation.
- There are distinct travel patterns between standard and Community Pass members.
- Community Pass members are more likely to self-report using bike share for social purposes, exercise, and accessing shopping, public transportation and school on a weekly basis compared to standard pass members.



Table of Contents

About Mobilizing Justice	2
Acknowledgements	2
Executive Summary	3
Project Background.....	5
Mobi Membership Options and Pricing.....	6
Methods	7
<i>System data and analysis</i>	<i>7</i>
<i>Survey data and analysis</i>	<i>7</i>
<i>Reporting</i>	<i>7</i>
Results	8
Conclusions	14
References	15

Project Background

Vancouver's public bike share system, Mobi by Rogers [Mobi], has been operating since 2016. Previous research conducted by our research team found there were inequities in terms of access and use of public bike share. The bike share service area disproportionately served higher socioeconomic status neighbourhoods and attracted riders who were wealthier, more educated, and less racially diverse than the general Vancouver population.(Hosford et al., 2018; Hosford and Winters, 2018)

Mobi has since implemented numerous changes to reduce barriers, enhance uptake, and make bike sharing more equitable. The specific changes include hiring an equity coordinator, expanding the service area, adding e-bikes to the fleet, reducing financial barriers through a Community Pass program, and partnering with community organizations to reach more diverse populations.

With funding from the Mobilizing Justice Innovative Pilots & Policies, our research team aimed to evaluate the impacts of these equity initiatives on access and use of Vancouver's public bike share system. The three research objectives were:

1. To assess whether the bike share service area expansion improved equity in spatial access,
2. To characterize bike share members and their use of the system, with a focus on Community Pass members and e-bike usage, and
3. To explore the benefits, facilitators, and barriers of Mobi's Community Pass program.

This report shares results from the second objective. Reports for the first and third objective can be found [here](#) and [here](#), respectively.

Mobi Membership Options and Pricing

Mobi's different pass options are listed in **Table 1**. The Community Pass reduces financial barriers to bike share by providing a discounted membership, cash payment options, and reduced liability for bikes that are lost, stolen, or damaged. There are numerous ways to qualify for the Community Pass including providing proof of enrollment in other subsidized programs (e.g., subsidized leisure pass, subsidized bus pass, food bank membership), proof of an annual income less than \$27,000, Persons with Disabilities (PWD) designation, or referrals from a community partner. E-bikes were added to the fleet in the summer of 2022 and as of June 2023 comprised nearly 1 in 5 of the system's 2,527 bikes. Given Vancouver's hilly topography, e-bikes have the potential to attract more riders, including those with mobility limitations. E-bikes cost an additional fee per minute depending on the pass type purchased and length of trip.

Table 1. Membership options for Mobi by Rogers.

Pass Type	Subscription Fee	Unlock fee	Rate per minute 0-30 min	Rate per minute >30 min	Rate per minute
Pay per ride		\$1 (\$1.50)			\$0.25 (\$0.35)
Daily	\$19	-	\$0 (\$0.25)	\$0.25 (\$0.35)	-
Monthly	\$39	-	\$0 (\$0.25)	\$0.25 (\$0.35)	-
Annual	\$139	-	\$0 (\$0.15)	\$0.25 (\$0.35)	-
Annual Plus*	\$169	-	\$0 (\$0.15)	\$0.25 (\$0.35)	-
Community*	\$20	-	\$0 (\$0.15)	\$0.25 (\$0.35)	-

Note. E-bike prices are in parentheses.

*Community and Annual Plus pass rates are for 60-minute trips instead of 30-minute trips. Community Pass members that qualify through a PWD designation are able to use e-bikes for the first 60 minutes of trips at no additional cost.

Methods

We used system and survey data to characterize use of the public bike share system across pass type, bike type (e-bike or classic), and socio-demographic characteristics. For the purposes of this report, we focused on members who had monthly, annual, or Community Passes because we were interested in the equity implications for longer-term users of the system as opposed to one-off users and tourists. Throughout the report, we refer to members who paid for an annual or monthly membership at regular price as *standard pass members* and those qualified for a Community Pass as *Community Pass members*. For e-bike use, we further stratified Community Pass members by PWD status because members who qualify through a PWD designation are able to use e-bikes at no additional cost for the first 60 minutes.

SYSTEM DATA AND ANALYSIS

The system data we used captured all trips made on bike share between July 1, 2021 and June 30, 2023. This dataset included 2,242,407 trips. We excluded trips that were less than one minute, were flagged for maintenance or rebalancing purposes, or made by pay per ride or day pass users. This left a total of 1,322,374 trips, of which 1,217,015 trips were made by annual or monthly members and 105,359 by Community Pass members. We created a measure of trips per month for each member, where we summed the total number of trips made by each member and divided by the number of months that they were active in the system (month of most recent trip – month of first trip).

SURVEY DATA AND ANALYSIS

To look at self-reported bike share use patterns and socio-demographic characteristics, we used survey data from the 2022 Mobi Member Survey. The 2022 Mobi Member survey was conducted by Mobi between January 18 and February 3, 2023, and included questions about travel behaviour, bike share use, user experience, and sociodemographic characteristics. There were 1,582 bike share members who responded to the survey. We restricted the analysis to those respondents who could be linked to the system data and had completed at least one trip during the two-year period for which we downloaded system data (July 1, 2021-June 30, 2023), which reduced the sample size to 813. We further excluded pay per ride and day pass users, for a final survey sample of 707 members, of which 54 were Community Pass members. We relied on the system data for assigning membership type, rather than the self-reported membership type from the survey. A few survey respondents had switched from a standard to a Community Pass (or vice versa) during the two-year period. In these cases, we classified the survey respondent as being a Community Pass member. We compared bike share use patterns and socio-demographic characteristics (age, gender, income, race, and disability status) by membership type. We also compared socio-demographic characteristics to the general Vancouver population using 2021 census data. A survey was also conducted between November 22 and December 22, 2023, with 520 bike share members, of which 79 were Community Pass members. We focused on comparing the findings between both surveys for Community Pass members specifically. Results were largely consistent with 2022, and we highlight specific new findings within the report.

REPORTING

We've organized the results according to six key takeaways. We conclude with reflections about the equity implications of these findings as well as recommendations for future analyses.

Results

Key takeaway #1: Compared to the Vancouver population, older adults, women, people with lower household incomes, racialized populations are less likely to have an annual or monthly bike share membership. The Community Pass is reaching more diverse populations, in particular people with lower household incomes, racialized populations, and people with a disability.

The socio-demographic characteristics of standard and Community Pass members compared to the Vancouver population are provided in **Table 2**. Members with standard passes were more likely to be between the ages of 35-64, men, have an annual household income greater than \$100,000, and be white relative to the Vancouver population. Members with Community Passes were also disproportionately between the ages of 35-64, however were more comparable to the Vancouver population in terms of gender and race, and were more likely to have a lower household income. Community Pass members were also more likely to indicate that they had a disability compared to standard pass members. It's important to note that these socio-demographic characteristics reflect those of members who completed the survey and may differ from members who did not complete the survey.

Table 2. Socio-demographic characteristics of standard and Community Pass members from the 2022 Mobi Member Survey compared to the Vancouver Population.

	Members Overall	By Pass Type		Vancouver Population
		Standard Pass	Community Pass	
	n=707	n=656	n=54	n=662,248
Age				
12-35 years*	34.5%	35.8%	17.6%	36.4%
35-64 years	61.0%	59.9%	74.5%	45.0%
65 years+	4.5%	4.3%	7.8%	18.6%
Gender				
Women	39.4%	38.9%	45.1%	51.0%
Men	58.2%	58.7%	52.9%	49.0%
Non-binary	2.4%	2.4%	2.0%	-
Annual household income				
<\$35,000	12.1%	7.4%	81.1%	19.0%
\$35,000-\$99,999	40.0%	41.6%	16.2%	40.7%
\$100,000-\$149,999	21.8%	23.3%	0.0%	17.8%
>\$150,000	26.1%	27.7%	2.7%	22.4%
Race				
White	70.9%	72.3%	54.2%	45.5%
Racialized	29.1%	27.7%	45.8%	54.5%
Disability status (yes)	1.5%	2.8%	16.7%	-

*Users of Mobi have to be at least 12 years old

Key takeaway #2 Community Pass members have comparable (if not slightly higher) frequency of bike share use compared to standard pass members.

A total of 22,776 members made 1,322,374 trips between July 1, 2021 and June 30, 2023 (**Table 3**). Community Pass members accounted for only 4% of the membership base but made 8% of all bike share trips. Trip rates per month were comparable for standard and Community Pass members; standard pass members had a higher median trip rate per month compared to compass pass members (6.5 trips per month compared to 5), but slightly lower mean trip rate per month (9.8 trips per month compared to 10.5).

Table 3. Frequency and duration of bicycle share trips for all Mobi by Shaw Go members, overall and by pass type, July 1, 2021 to June 30, 2023, Vancouver, Canada.

	Members Overall	Pass Type	
		Standard Pass	Community Pass
All members (% of overall)	n=22,776	n=21,836 (95.9%)	n=940 (4.1%)
Total trips (% of overall)	1,322,374	1,217,015 (92.0%)	105,359 (8.0%)
Trips per month			
min	0.13	0.13	0.17
max	170	154	170
median (Q ₁ , Q ₃)	6.5 (3.0, 13.0)	6.5 (3.0, 13.0)	5.0 (2.0, 12.9)
mean ± SD	9.8 +/- 10.6	9.8 +/- 10.3	10.5 +/- 15.5
Mean distance per trip +/- SD (km)	3.0 +/- 2.9	3.0 +/- 2.9	2.7 +/- 1.8
Mean minutes per trip +/- SD	18.91 +/- 9.50	18.83 +/- 9.37	20.77 +/- 12.36

Q₁ = First quartile, Q₃= Third quartile

SD = Standard deviation

km = kilometers

Key takeaway #3: Compared to the profile of members overall, frequent bike share users are more likely to be younger, men, racialized, and have a lower household income.

Drawing on the linked system and survey data, we compared the socio-demographic profile of members who were infrequent users, which we defined as those members who were the bottom quartile of trips per month (<3 trips per month), and frequent users, defined as those members who were in the upper quartile of trips per month (13+ trips per month) (**Table 4**). Compared to the profile of members overall, infrequent users were more likely to be between the ages of 35-64 years, non-binary, have a household income >\$150,000, be white, and self-report a disability. On the other hand, frequent users of bike share were more likely to be less than 35 years, men, racialized, and have a household income <\$35,000.

Table 4. Socio-demographic characteristics standard and Community Pass members from the 2022 Mobi Member Survey compared to the Vancouver Population.

	Members Overall	Frequency of use	
		Infrequent user (<3 trips/month)	Frequent user (13+ trips/month)
	n=707	n=122	n=264
Age			
12-34 years	34.5%	24.4%	39.3%
35-64 years	61.0%	71.4%	56.7%
65 years+	4.5%	4.2%	4.0%
Gender			
Women	39.4%	36.1%	33.2%
Men	58.2%	58.8%	63.6%
Non-binary	2.4%	5.0%	3.2%
Annual household income			
<\$35,000	12.1%	9.9%	18.9%
\$35,000-\$99,999	40.0%	33.7%	45.8%
\$100,000-\$149,999	21.8%	20.8%	19.3%
>\$150,000	26.1%	35.6%	16.0%
Race			
White	70.9%	78.0%	65.2%
Racialized	29.1%	22.0%	34.8%
Disability status (yes)	1.5%	4.1%	2.7%

Key takeaway #4: E-bikes are more readily adopted by standard pass and Community Pass members who qualify through a PWD designation.

Since the introduction of e-bikes in August 2022, just under half (44.4%) of members had tried an e-bike (**Table 4**). E-bikes were more readily adopted by standard pass members (45.5% had tried an e-bike) and Community Pass members who qualified through a Persons with Disability designation (80.6% had tried an e-bike) compared to members with a regular Community Pass (only 20.5% had tried an e-bike). This is expected given that Community Pass PWD members are able to use e-bikes at no additional cost for trips less than 60 minutes. The vast majority of trips made by Community Pass PWD members were by e-bike (80.9% of all trips) compared to only 1 in 5 (19.7%) by standard pass members and less than 1 in 10 (6.7%) by regular Community Pass members.

Table 4. Adoption of e-bikes by pass type, July 1, 2022 to June 30, 2023, Vancouver, Canada.

	Overall	Standard Pass	Community Pass - Regular	Community Pass - PWD
Total members, n	12,489	11,703	683	103
Tried an e-bike (% of total)	5,543 (44.4%)	5,320 (45.5%)	140 (20.5%)	83 (80.6%)
Total trips, n	688,523	628,025	45,700	14,798
Trips by classic bike, n (% of total)	549,817 (79.9%)	504,351 (80.3%)	42,637 (93.3%)	2,829 (19.1%)
Trips by e-bike, n (% of total)	138,705 (20.1%)	123,674 (19.7%)	3,063 (6.7%)	11,969 (80.9%)

Note. Since e-bikes were introduced in the summer of 2022, we focused on the subset of trips made in the 1-year time period from July 1, 2022 to June 30, 2023 (n=688,523 trips).

Note. E-bikes are not available to youth under the age of 19 years old.

Key takeaway #5: There are distinct travel patterns between standard and Community Pass members.

The spatial patterns of trips for members overall and for standard and Community Pass members are shown in **Figure 1**. The highest concentration of trips took place between docking stations in the downtown core, which is the most densely populated area of Vancouver and the central business district for the larger metro region. There were clear differences in desire line patterns for standard and Community Pass members (centre and right panels in **Figure 1**). Standard pass members were more likely to use bike share to get to and from the downtown core and along a popular east-west bike lane corridor in the south of the service area. In contrast, Community Pass members were more likely to use bike share to get to and from the downtown core, east of the downtown, and to major outlying transit locations. Both membership types had similar patterns of use to reach more central transit locations and recreational locations (e.g., beach areas and large recreational park north of downtown core).

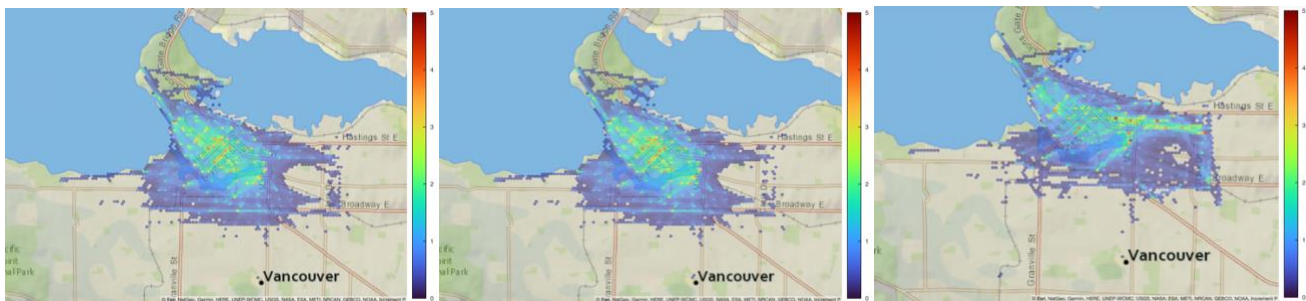


Figure 1. Spatial map of membership types: overall (left), standard (center), and community (right).

Key takeaway #6: Community Pass members are more likely to self-report using bike share for social purposes, exercise, and accessing shopping, public transportation and school on a weekly basis compared to standard pass members.

The survey data also revealed differences in the types and frequency of destinations by membership type (Figure 2). Across both pass types, members more commonly used bike share to get to/from exercise, social activities, stores, restaurants, and public transportation than getting to/from work and school. With the exception of getting to/from work, Community Pass members were more likely to use bike share to reach all destination types on a weekly basis than standard pass members, in particular for getting to/from social activities, exercise, stores, public transportation, and school.¹ In the 2023 Mobi Member survey, a question was added about if bike share improved the ability to reach destinations in Vancouver: 87% of Community Pass responded that it did (greatly or to some extent).

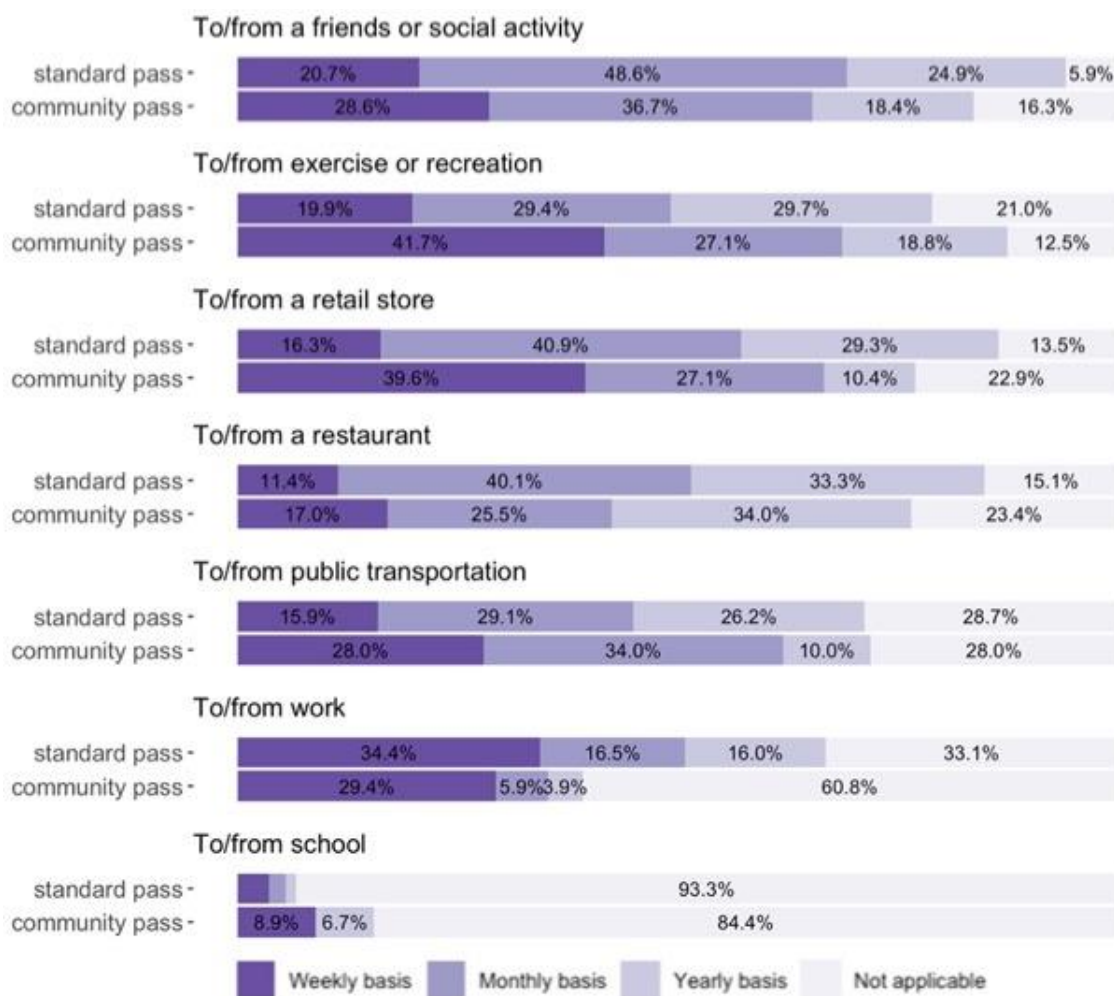


Figure 2. Frequency of using bike share to reach the following destinations by membership type, 2022 Mobi Member Survey (n=707).

Note. Percentages for to/from school not included in the figure are: weekly = 3.6%, monthly = 1.9%, yearly = 1.2%.

¹ Note. While Community Pass users are less likely to use Mobi to get to work, these members may be underemployed or not interested in employment.

Conclusions

We analyzed system and survey data to draw insights about the sociodemographic characteristics of members and patterns of use across pass and bike types. The findings show that the Community Pass has made gains towards transport equity by extending bike share membership to more diverse segments of the population and increasing accessing to different types of destinations. The effects of e-bikes on equity are mixed. Community Pass members who qualify through a PWD designation are benefiting from the addition of e-bikes as the majority of these members have tried an e-bike and make trips using the e-bikes. However, cost is likely a barrier for regular Community Pass members who were far less likely to have tried an e-bike or make trips using an e-bike compared to standard pass members.

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