FTA Report No. 0239

FTA RESEARCH
FEDERAL TRANSIT ADMINISTRATION

Mobility on Demand (MOD) Sandbox Demonstration: Los Angeles County and Puget Sound First and Last Mile Partnership with Via

Evaluation Report

PREPARED BY
Elliot Martin, Ph.D., Stephen Wong, Ph.D., Adam Cohen, Sena Soysal, Susan Shaheen, Ph.D.
Transportation Sustainability Research Center
University of California, Berkeley

Les Brown
ICF

U.S. Department of Transportation
Federal Transit Administration

DECEMBER
2022

COVER PHOTO

Images courtesy of LA Metro and King County Metro.

DISCLAIMER

Mobility on Demand (MOD) Sandbox Demonstration: Los Angeles County and Puget Sound First and Last Mile Partnership with Via

Evaluation Report

DECEMBER 2022

FTA Report No. 0239

PREPARED BY
Elliot Martin, Ph.D., Stephen Wong, Ph.D.,
Adam Cohen, Sena Soysal, Susan Shaheen, Ph.D.
Transportation Sustainability Research Center (TSRC)
University of California, Berkeley
2150 Allston Way, #280
Berkeley, CA 94704

Les Brown
ICF
9300 Lee Highway
Fairfax, VA 22031

SPONSORED BY
Federal Transit Administration
Office of Research, Demonstration and Innovation
U.S. Department of Transportation
1200 New Jersey Avenue, SE
Washington, DC 20590

AVAILABLE ONLINE
https://www.transit.dot.gov/about/research-innovation

Metric Conversion Table

SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL
LENGTH				
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km
VOLUME				
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liters	L
ft^3	cubic feet	0.028	cubic meters	m^3
yd^3	cubic yards	0.765	cubic meters	m^3
NOTE: volumes greater than 1000 L shall be shown in m^3				
MASS				
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams (or "metric ton")	Mg (or "t")
TEMPERATURE (exact degrees)				
^oF	Fahrenheit	5 (F-32)/9 or (F-32)/1.8	Celsius	^oC

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
December 2022	Final	January 2019–August 2020

4. TITLE AND SUBTITLE
Mobility on Demand (MOD) Sandbox Demonstration: Los Angeles County and Puget Sound First and Last Mile Partnership with Via Evaluation Report

5a. CONTRACT NUMBER
5b. GRANT NUMBER
5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)
Elliot Martin, Ph.D., Stephen Wong, Ph.D., Adam Cohen, Sena Soysal, Susan Shaheen, Ph.D. (UC Berkeley); Les Brown (ICF)

5d. PROGRAM NUMBER
5e. TASK NUMBER
5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESSE(ES)
Transportation Sustainability Research Center (TSRC)
University of California, Berkeley
2150 Allston Way, #280, Berkeley, CA 94704

ICF
9300 Lee Highway, Fairfax, VA 22031

8. PERFORMING ORGANIZATION REPORT NUMBER
FTA Report No. 0239

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
U.S. Department of Transportation
Federal Transit Administration
Office of Research, Demonstration and Innovation
1200 New Jersey Avenue, SE,
Washington, DC 20590

US Department of Transportation
Office of the Assistant Secretary for Research and Technology
Intelligent Transportation Systems Joint Program Office (ITS JPO)
1200 New Jersey Ave., SE, Washington, DC 20590

10. SPONSOR/MONITOR'S ACRONYM(S)
FTA

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12 . DISTRIBUTION/AVAILABILITY STATEMENT
Available from: National Technical Information Service (NTIS), Springfield, VA 22161; (703) 605-6000, Fax (703) 605-6900, email [orders@ntis.gov]; Distribution Code TRI-30

13. SUPPLEMENTARY NOTES [www.transit.dot.gov/research-innovation/fta-reports-and-publications] [https://www.transit.dot.gov/about/research-innovation] [https://doi.org/10.21949/1527652] Suggested citation: Federal Transit Administration. Mobility on Demand (MOD) Sandbox Demonstration: Los Angeles County and Puget Sound First/Last Mile Partnership with Via Evaluation Report. Washington, D.C.: United States Department of Transportation, 2022. https://doi.org/10.21949/1527652.

14. ABSTRACT

This report presents the results of an independent evaluation of the Los Angeles County and Puget Sound First and Last Mile Partnership with Via demonstration, part of the Federal Transit Administration (FTA) Mobility on Demand (MOD) Sandbox program. The demonstration, a joint pilot project in Los Angeles County and the Puget Sound region, executed an on-demand service in partnership with Via providing first- and last-mile access to transit stations within the Los Angeles and Seattle metropolitan regions. Upon launch, customers were able to request subsidized Via rides to or from the participating transit stations within specified zones and times of the day. The Los County Metropolitan Transportation Authority (LA Metro), King County Metro, Sound Transit, and Via (an on-demand transportation network company or TNC) worked together to develop and deploy two analogous pilot projects designed to test the viability of public-private partnerships to deliver access to and from core lines within the public transit networks. Three zones were selected in the Los Angeles region, and five zones were selected in the Puget Sound region. The evaluation of this MOD Sandbox project included 13 hypotheses that explored a number of potential impacts from the project, including mobility, accessibility, public transit ridership, fuel consumption, safety, costs, and lessons learned.

15. SUBJECT TERMS
Mobility on Demand, MOD, sandbox, evaluation, Puget Sound, Los Angeles, King County Metro, Sound Transit, Via, transportation network company TNC, public transportation, transit, first and last mile, public private partnership

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			19b. TELEPHONE NUMBER
Unclassified	Unclassified	Unclassified	Unlimited	201	

Standard Form 298 (Rev. 8/98)
Prescribed by ANSI Std. Z39.18

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

Acknowledgments

ICF and the Transportation Sustainability Research Center (TSRC) of the Institute of Transportation Studies at the University of California, Berkeley thank the U.S. Department of Transportation for generously funding this study. The authors also thank the transportation professionals, public agencies, and service providers that made this research possible.

Abstract

This report presents the results of an independent evaluation of the Los Angeles County and Puget Sound First and Last Mile Partnership with Via demonstration, part of the Federal Transit Administration (FTA) Mobility on Demand (MOD) Sandbox program. The demonstration, a joint pilot project in Los Angeles County and the Puget Sound region, executed an on-demand service in partnership with Via providing first- and last-mile access to transit stations within the Los Angeles and Seattle metropolitan regions. Upon launch, customers were able to request subsidized Via rides to or from the participating transit stations within specified zones and times of the day. The Los County Metropolitan Transportation Authority (LA Metro), King County Metro, Sound Transit, and Via (an on-demand transportation network company or TNC) worked together to develop and deploy two analogous pilot projects designed to test the viability of public-private partnerships to deliver access to and from core lines within the public transit networks. Three zones were selected in the Los Angeles region, and five zones were selected in the Puget Sound region. The evaluation of this MOD Sandbox project included 13 hypotheses that explored a number of potential impacts from the project, including mobility, accessibility, public transit ridership, fuel consumption, safety, costs, and lessons learned.

Executive Summary

The Federal Transit Administration (FTA) has led an initiative, the Mobility on Demand (MOD) Sandbox Program, to explore how public transportation agencies could incorporate emerging technologies that complement and support the traditional functions of public transportation. One of the projects in this program was the Los Angeles County and Puget Sound First and Last Mile Partnership with Via demonstration, a joint pilot project in Los Angeles (LA) County and the Puget Sound (PS) region, which implemented first- and last-mile access to transit stations within the Los Angeles and Seattle metropolitan regions. Upon launch, customers were able to request subsidized Via rides to or from the participating transit stations within specified zones and times of the day.

The Los Angeles County Metropolitan Transportation Authority (LA Metro), King County Metro, Sound Transit, and Via (an on-demand transportation network company or TNC) worked together to develop and deploy two analogous pilot projects designed to test the viability of public-private partnerships to deliver access to and from core lines within the public transit networks. The service for the Los Angeles region was named "Via Rideshare Service," and the service in the Puget Sound region was named "Via to Transit."[1] Three service zones were selected in the LA region, and five service areas (zones) were selected in the PS region for the pilot. Zone locations were selected with consideration for equity, geographic diversity, current first/last mile access, potential trip generators, operational density, and current available transit service. Areas were also assessed to determine where there was untapped demand, such as employment centers that continue to be challenging to reach with the existing networks. In both regions, the marketing and communications teams disseminated information about ways to access the Via service for those who did not have access to credit cards or debit cards, such as pre-paid gift cards.

This report presents the results of the independent evaluation (IE) of the Los Angeles County and Puget Sound First and Last Mile Partnership with Via demonstration. The project was one of 11 MOD Sandbox demonstrations partially funded by FTA. The IE was sponsored by the USDOT Intelligent Transportation Systems Joint Program Office (ITS JPO) and FTA. The evaluation of this MOD Sandbox project included 13 hypotheses that explored a number of potential impacts of the project, including mobility, accessibility, public transit ridership, fuel consumption, safety, costs, and lessons learned. Results of the evaluation are summarized below and in Table ES-1.

[1] LA Metro also referred to the project in the Los Angeles region as "MOD Partnership with Via."

Hypothesis 1: Mobility in both the LA and PS regions will increase as a result of this new service.

Hypothesis 1 examined whether mobility in the Los Angeles and Puget Sound regions increased as a result of the new service (i.e., Via Rideshare Service, Via to Transit). It was evaluated using reported changes in travel time, wait times, and access of respondents to the survey. The survey in both regions asked questions in the context of the stations that were supported by the project with Via services.

The results from the survey given to respondents in Los Angeles indicated that average travel time and wait time to/from stations decreased as a result of the Via Rideshare Service for a significant number of respondents, supporting Hypothesis 1. Reported increases in public transit usage as a result of the Via Rideshare Service along with the general ability to access activities and public transit stations (bus/rail) offered further partial support for Hypothesis 1 in improving mobility. Even though some metrics did not improve between early- and late-pilot surveys, Hypothesis 1 was generally found to be supported from the survey data from Los Angeles.

The results from the survey given to respondents in the Puget Sound region found that causal questions that directly related Via to Transit to travel times and wait times to/from Link light rail stations displayed significant improvements. A significant portion of respondents across stations stated that their average travel and wait times decreased as a result of Via to Transit. Similarly, a sizable proportion of respondents stated that their usage of Link light rail either increased or significantly increased. Respondents also rated their overall access to activities and stations relatively high and were satisfied or very satisfied with many elements of the Via to Transit program. The causal questions in the surveys lent enough support to suggest that mobility in the Puget Sound region increased as a result of Via to Transit. Overall, Hypothesis 1 was supported for both regions.

Hypothesis 2a: Users who previously did not have access to TNCs for first-mile/last-mile (FMLM) trips will now have access to TNCs to complete FMLM trips.

The second hypothesis explored whether users who previously did not have access to TNCs for FMLM trips now had access to Via to complete these trips. Spatial access to TNCs is generally ubiquitous within the Los Angeles and Puget Sound region. This hypothesis focused on evaluating whether lower income households perceived an increase in access to TNCs. The hypothesis evaluated changes within households whose annual household incomes are below $50,000. Access to Via trips was considered across multiple metrics including

cost savings, perceived access, mode choice, mode replacement, travel times, and wait times.

To determine new access, lower-income households (i.e., households with annual income below $50,000) were assessed on their mode choice alongside higher-income households. Although differences between income groups were not substantial, the comparison of mode choice indicates that Via Rideshare Service in Los Angeles County became more prevalent, indicating increased access to FMLM trips. This suggests that all income levels obtained more access.

Most who did not have access to TNCs used the Via Rideshare Service in the late-pilot, and use of Via Rideshare Service also increased between early- and late-pilot. Mode replacement indicates that lower-income households typically do not use TNCs or pooled-TNCs for FMLM trips. Cost savings were realized for most lower-income respondents. Average travel times as a result of the Via Rideshare Service decreased. Stated access also improved for lower-income respondents between early- and late-pilot.

A similar analysis was conducted for Puget Sound. In both the early- and late-pilot, the Via to Transit service usage was similar by income. TNC usage was more prevalent by higher-income households, but usage by all households regardless of income dropped between early- and late-pilot. Most importantly, the results show that lower-income households used Via to Transit far more than TNCs and pooled TNCs in general. For individuals with a lower-income who did not use TNCs or pooled TNCs, a significant number (83% and 85%, respectively) used Via to Transit in the early-pilot stage. These values rose in the late-pilot stage to 93% and 92%.

Overall, the results from the analysis of the Via service in both the Puget Sound and Los Angeles region were found to support Hypothesis 2a. A higher proportion of lower income respondents chose Via to Transit as a mode (as compared to TNCs or pooled TNCs) relative to higher income respondents. A significant proportion of those who did not use TNCs or pooled TNCs (i.e., indicating lack of access) did use Via, and this rate increased between the early-pilot and the late-pilot. Mode replacement indicated that most lower-income households did not use TNCs or pooled TNCs for FMLM trips. Accessibility to get to activities was fairly high for lower-income respondents, and the cost savings as a result of Via was notable. Moreover, the Via FMLM trips offered improved mobility and access for lower-income respondents through reduced average travel times and average wait times to/from stations. Altogether, the results supported Hypothesis 2a.

Hypothesis 2b: Integration of Via into the ORCA card will increase its (Via to Transit's) use among 1) low-income populations, 2) unbanked populations, and 3) minority populations.

Hypothesis 2b explored whether the integration of Via into the Puget Sound region's ORCA regional fare payment card would increase Via to Transit use within several underserved populations. The analysis used survey data from early- and late-pilot surveys along with activity data from Via to Transit that captured the payment type used for each trip. Based on survey data, the usage of the ORCA card for public transit was very high among all populations, including underserved populations, and this did not change much between the early- and late-pilots. The sample size of unbanked respondents was relatively small within the broader sample (20 or less), but within this small sample, they generally reported using the ORCA card at a lower rate than other populations. However, the survey responses also showed that low-income and unbanked subsamples increased their use of the ORCA card to pay for Via to Transit relative to the full sample. In addition, certain subgroups did report some difficulty with using the ORCA card when paying for Via to Transit. Almost 30% of the full sample reported some difficulty with using the ORCA card to pay for Via to Transit at least half of the time. This was most pronounced for unbanked individuals, although not drastically different from the full sample. However, nearly all populations used an ORCA card for Via to Transit, indicating widespread usage of the payment mechanism and equity in terms of payment accessibility. The share of Via to Transit transactions across all activity by the ORCA card was quite high. Across all Via to Transit transactions, not just those included in the survey, 96% were purchased using the ORCA card. Although the data available could not establish whether the availability of the ORCA card was the specific and critical difference enabling any given trip, the extraordinarily high adoption rate within the population suggests that the ORCA card offered significant utility to public transit users. It was, by far, the preferred method of payment, and had it not been available for this purpose, 96% of all 231,073 trips would have had to have been paid by a different method. Other payments were possible, including the second most common payment method, the Transit Go app, but the dominance of the ORCA card for Via to Transit trips among all populations suggests that it was the preferred method to pay for the trips and available alternatives would not have had relative advantages for the subgroups evaluated in this hypothesis. The ORCA card was clearly an integral tool that was used by the vast majority of riders to pay for Via to Transit trips. Although linking the use of the card to specific Via to Transit trips, this high prevalence of use (96% of 231,073 trips) suggests that some trips would not have occurred had the integration not been done. It is very possible that this effect could have been large if the payment process was considerably cumbersome. The fact that subgroups explored in this hypothesis increased their ORCA use as a result of it being integrated with Via to Transit suggests that it was an important

contributor to their use of the service. Taken together, the findings suggest Hypothesis 2b to be supported.

Hypothesis 3: The number of public transit users in both regions will increase, as this new service will create more options for riders, specifically for FMLM.

Hypothesis 3 used data from survey questions focusing on public transit usage, mode choice, and mode replacement to evaluate whether the number of public transit users increased. The data captured changes in public transit usage overall and evaluates whether public transit was used differently in the aggregate. Mode choice and mode replacement questions were used to help identify if Via provided more options for riders, especially for FMLM trips.

In Los Angeles, the data suggest that the use of public transit at stations increased among users between pilot periods and as a result of the Via Rideshare Service. Use of the Via Rideshare Service increased, and most other modes of transportation (including those that are used for FMLM) decreased between pilot periods. Moreover, analyses of mode choice and mode replacement indicate that the Via Rideshare Service offered a new travel option that was better than options prior to the pilot. Within the Puget Sound region, public transit and Link light rail usage was also found to have increased as a result of the Via to Transit service. The percentage of respondents who used all stations increased between the early-pilot and late-pilot. Regarding the increase in travel options, especially for FMLM trips, Via to Transit clearly replaced typical FMLM with likely more convenient and accessible service. Via to Transit usage was also very high in the survey sample, and it increased slightly between the early-pilot and late-pilot. The results collectively support Hypothesis 3.

Hypothesis 4: At the selected transit stops, the availability of the new service TO a transit station will increase transit ridership for that system.

Hypothesis 4 evaluated whether the Via service resulted in increased ridership to the pilot stations. Survey results were taken from the late-pilot survey. The analysis focused on two groups—1) riders that travel both to and from stations and 2) riders that travel only to stations.

In Los Angeles, analyses on the change in public transit use and urban rail found that ridership moderately increased across stations for respondents who travel both to and from stations. For those that traveled only to stations, the sample size was lower, limiting the analysis of this specific cohort. For those that increased their public transit usage, most stated that access improved both to and from stations with some additional individuals that noted improvements in access just to stations. Overall, the findings supported Hypothesis 4 in Los Angeles.

In Puget Sound, a similar analysis was conducted and found that public transit usage (or ridership) increased across all stations for respondents traveling to (and from) stations. Link light rail ridership also increased across pilot stations due to Via to Transit for respondents traveling to (and from) stations. Via to Transit also improved access both to and from bus stops and rail stations (and just to stations). Broadly, the results supported Hypothesis 4 in that Via service to the stations in both Los Angeles and Puget Sound helped increase public transit ridership.

Hypothesis 5: At the selected transit stops, the availability of the new service FROM a transit station will increase transit ridership for that system.

Similar to Hypothesis 4, Hypothesis 5 focused on the increase in transit ridership as a result of new Via service but, in this case, the analysis is evaluating how the availability of the service from the stations influenced ridership. To evaluate this hypothesis, survey results were taken from the late-pilot survey. As with the analysis of Hypothesis 4, results were evaluated for two groups—1) riders that travel both to and from stations and 2) riders that travel only from stations.

Based on the analysis from these two groups, the results suggest that public transit and urban rail usage increased moderately across pilot stations within the pilot zones of Los Angeles County. Individuals also had better access both to and from bus stops and/or stations, including just from stops/stations. Overall, the results indicated an increase in public transit ridership due to new service through Via service from stations.

Within the Puget Sound region, the analysis showed that public transit usage and Link light rail usage generally increased across stations for respondents traveling to/from and just from stations. Moreover, a large number of respondents stated that they had improved access both to/from and just from stations. Collectively, the results support Hypothesis 5 that the availability of Via providing service from public transit in in both the Los Angeles and Puget Sound regions helped increased ridership and public transit usage.

Hypothesis 6: The availability of the new service will decrease fuel consumption and greenhouse gas (GHG) emissions associated with the customers using the service.

Hypothesis 6 explored whether the availability of Via FMLM service in the demonstration decreased fuel consumption and greenhouse gas (GHG) emissions. This hypothesis was evaluated using survey data from Via users and activity data (for trips and vehicles) provided by the operator. Carbon dioxide (CO_2) was used in the calculations to measure the environmental effect of the service. In addition, survey questions of Via users, such as mode substitution

as a result of Via, were taken into consideration. Via provided activity data that reported the distance traveled for 199,134 vehicle trips to/from the 10 stations in the Los Angeles area from January 2019 to August 2020; it similarly provided the distance traveled for the 231,073 Via trips to/from the 5 stations in the Puget Sound area. Vehicle miles traveled (VMT) and passenger miles traveled (PMT) were used in conjunction with the survey data to evaluate the plausible range of net VMT and GHG changes as a result of the FMLM systems.

The survey reported single-occupant vehicle (SOV) mode substitution rates of about 40% to the stations and 30% from the stations in Los Angeles. In the Puget Sound region, the mode substitution from SOV trips to a participating transit station amounted to 36%, and SOV mode substitution from the transit station amounted to 27%.

The analysis executed a simulation of the mode substitution that occurred as a result of Via's deployment in both regions. The evaluation of mode substitution and its impact on emissions is a function of the specific modes reported as substituted by the surveys. To generate a rough estimate of VMT, fuel consumption, and CO_2 emissions-related to trips, assumptions were made regarding mode substitution. Mode substitution is not observed within vehicle activity data, only in the surveys. The distribution of mode substitution as reported in the survey is used to repeatedly draw a mode substitution for each given trip. The simulation repeats this draw of mode substitution for all trips, as informed by the distribution, many times to generate a distribution of likely impacts. The average of these simulations is taken as the behavioral impact result for comparison against the measured impact from the Via activity. The key mode substitutions of interest were those shifting from SOVs. Such SOV trips are creating separate additional emissions that are prevented when users travel by Via. Via vehicles themselves produce VMT and emissions, and the reduction in emissions from substituted SOV trips has to be compared against the additional VMT produced by Via vehicles. For example, if one Via trip takes three people to a given destination who otherwise would have driven three separate cars to that destination, that specific trip is reducing VMT. But if such a trip is only carrying one person, then the system is not increasing VMT by much; at the same time, it is also not reducing it. System VMT increases with non-revenue miles (traveled without passengers) or with trips that are substituting non-SOV trips such as walking, bicycling, or travel with fixed-route public transit. The net change in VMT is determined by the balance of VMT reductions from SOV shifts and VMT increases from non-revenue miles and non-SOV shifts. These systems also must have an average passenger occupancy greater than one for VMT reductions to be possible.

The results of the analysis showed that the overall VMT driven by vehicles of the two pilot systems was too high to produce a reduction in net VMT. In part, this result was driven by the fact that non-revenue miles—those driven by vehicles

without a passenger—were considerable relative to the share of revenue miles. At the start of the pilot in Los Angeles, non-revenue miles were 85% of all miles driven. This share quickly dropped, such that by three months into the pilot, the non-revenue share was just below 60%. As the pilot continued, the share of non-revenue miles dropped further still but never crossed below 50% for any month within the evaluated dataset. In Puget Sound, the story was similar. Non-revenue miles began the pilot above 70% of all miles driven by Via vehicles. This share declined gradually and hovered around 60% for most of the evaluation period. As the majority of miles were passenger-empty non-revenue miles, Via would have had to have SOV substitution rates well above 50% and high occupancies within passenger-transporting revenue miles to compensate. The analysis found that in Los Angeles, the pilot vehicles drove about 759,635 miles and displaced about 153,183 SOV miles. In the Puget Sound region, the pilot vehicles drove 779,081 miles and displaced about 162,473 miles. Fuel economy factors were applied to both vehicle types, and naturally the calculated net change in gasoline consumption and emissions showed an increase in both.

Taken together, the analysis found that the Los Angeles and Puget Sound FMLM deployments of Via increased both VMT and emissions as compared to travel prior to the pilot. It was found that the availability of the new service did not decrease fuel consumption or CO_2 emissions and, thus, Hypothesis 6 was not supported.

Hypothesis 7: The availability of the new service will decrease congestion from personal (non-TNC) vehicles.

Hypothesis 7 explored whether the system would decrease congestion from personal vehicles. This analysis combined data describing mode replacement—Via trips by the hour—and conducted a comparison of Via VMT (a proxy for congestion in this case) against personal vehicle VMT. As noted in the evaluation of Hypothesis 6, mode substitution was identified through the participant surveys, and trips by hour were calculated using individual ride data.

Assumptions derived from survey data about mode substitution with SOV travel were combined with data on trips by Via trips by time of day. An analysis was conducted looking at mode replacement and VMT differences between the Via vehicle fleet and the individual ride data (acting as a proxy for personal vehicle trips). For the Los Angeles pilot, the results indicate that personal vehicle VMT (and, thus, congestion) may have decreased, including relative to VMT produced by personal vehicle trips. However, when considering the additional VMT produced by Via—for example, through non-revenue miles—congestion may have increased.

A similarly-executed analysis for Puget Sound also produced mixed results. Via to Transit service replaced some personal vehicle trips, especially in peak

hours, and produced less revenue VMT than if all individuals had driven a personal vehicle. However, when considering all VMT produced by Via to Transit, the pilot may have increased congestion overall (while still decreasing personal vehicle congestion). Collectively, the analysis proved to be inconclusive for Hypothesis 7.

Hypothesis 8: Mobility for persons with disabilities will be improved due to WAVs through the Via platform.

For Hypothesis 8, survey data were used to evaluate whether mobility for persons with disabilities had improved due to the wheelchair accessible vehicles (WAVs) provided by the program. The survey asked questions about disabilities that would impact the respondent's ability to use transportation services. For example, the survey asked questions as to whether respondents 1) used a wheelchair, 2) had a disability that prevented them from driving an automobile, and 3) required special accommodation such as vehicles that accommodate wheelchairs to get around. These questions were used to assess whether an individual had a disability that impacted their mobility. Within the Los Angeles sample, about 4% of early-survey (N = 85) and 11% (N = 55) of late-survey respondents reported mobility limitations of some kind that required some kind of accommodation within the transportation vehicle. Within the Puget Sound sample, about 3% (N = 731) of early-survey and 2% (N = 402) of late-survey respondents reported mobility limitations that required similar accommodations.

All respondents were asked questions about their wait times and travel times and how the Via system may have improved or worsened them overall. Within the subsample of persons with disabilities in Los Angeles (n = 9), a majority (5 to 4) felt that system had increased their wait times traveling to the station. Regarding travel from the station, the responding subsample (n = 6) was split 50/50, with half stating that the system had decreased their wait times and the other half reporting that the system had increased them. The same respondents were asked questions about travel time. The results indicate that the Via FMLM service improved the travel times of the responding persons with disabilities in Los Angeles, with 6 of 9 reporting that travel times decreased going to the station and 8 of 9 reporting that travel times decreased coming from the station. For the Puget Sound demonstration, where the sample sizes were larger, just under half (47% of 17) of respondents reporting disabilities stated that Via FMLM service decreased their wait time traveling to the station. The remainder of the subsample reported "no change" in wait times. Traveling from the stations exhibited similar results, with a slight majority of the same subsample (n = 14) reporting Via reduced their wait times.

Regarding impacts on travel times in Puget Sound, nearly half of respondents reported (47% of 17) that their travel times to the station declined as a result of Via; the remaining 53% reported that Via had not changed their travel times to

the station. The respondents reported in higher percentages (65% of 14) that Via had improved their travel times from the station. Among the remaining respondents, only one reported that Via had increased their travel times from the station, and the remaining subsample reported no change as a result of Via.

Overall, results from the analysis of the survey subsample of persons with disabilities suggest that, on balance, Via FMLM service enabled them to travel to and from the stations faster. Impacts on waiting time were more mixed. Taken together however, the results suggest that the systems improved mobility for persons with disabilities, supporting Hypothesis 8.

Hypothesis 9: Riders will have a safer option to and from the station as a result of Via.

Hypothesis 9 evaluated whether Via FMLM serviced offered riders a safer option to and from the station. Survey data and crime data both were used to assess if Via offered riders a safer option to/from stations. The survey asked questions about the changes in the perceived safety of respondents when they were traveling to/from stations explicitly due to Via and across any mode. Crime data collected from the Los Angeles stations participating in the pilot were also analyzed.

For the Los Angeles pilot, about 16% of respondents stated that they felt much safer when traveling to/from public transit stations that participated in the pilot. An additional 47% of respondents said that they felt more safe. No respondents in the sample said that they felt less safe due to the Via Rideshare Service. Survey respondents were also asked about their general perception of safety across many modes.

For several selected stations, crime activity data from LA Metro were collected between January 2015 and August 2020. These data included crimes at stations, broken down by crime type (e.g., robbery, aggravated assault, trespassing, etc.). Data were aggregated to a monthly level across the entire period. The data showed that for the North Hollywood Station and the El Monte Station, crime increased quickly but then tapered off near the end of the pilot. For the Artesia Station, crime started low but increased over the pilot time period. Across all figures, low sample size of crime data at the selected stations ultimately produced inconclusive findings with regards to improvements of safety due to the project.

In the Puget Sound region, survey questions also evaluated the change in perceived safety as a result of Via to Transit. Across all participating stations within the pilot, about 34% of respondents said they felt much more safe, and about 33% said that they felt more safe; just 1% of respondents said that they felt less safe. By station, Tukwila International Boulevard, Rainier Beach, and

Othello experienced above-average improvements in safety, and the Mount Baker Station experienced the smallest improvements in safety. Taken together, the results from the analysis supported Hypothesis 9 in both Los Angeles and the Puget Sound region.

Hypothesis 10: Subsidies per rider on Via are lower than the subsidies provided on other FMLM options.

The analysis for Hypothesis 10 used activity data, information about the cost of the pilots, and data from National Transit Database (NTD) from FTA to evaluate the relative magnitude of subsidies per rider (per trip) of local FMLM options. NTD data provide a snapshot of both LA Metro and King County Metro in terms of number of boardings, operational and capital costs, revenue hours, and passenger miles. These data are also separated by transportation mode.

The cost of Via Rideshare Service in the Los Angeles area was approximately $21.07 per revenue hour, which is nearly the same as the LA Metro vanpool program ($21.49 per revenue hour). The cost of LA Metro Bus Rapid Transit (BRT) was the most, at $231.80 per revenue hour, similar to LA Metro buses, at $184.69 per revenue hour. The results indicate that Via Rideshare Service was considerably cheaper to operate on a per-revenue-hour basis compared to fixed modes of transit.

In contrast to the low operating cost per revenue hour, the cost per trip of the Via Rideshare Service was not as favorable to other modes based on average operating costs per trip. The trip subsidy (i.e., cost per trip to the operator) is considered to be the difference between the operating costs per trip and the revenue per trip. The cost of Via Rideshare Service was about $11.09 per trip, which was more than the LA vanpool program ($4.74 per trip), LA Metro bus ($4.73 per trip), and LA Metro BRT ($3.74 per trip). In the case of the Los Angeles project, fares were free for much of the program for transfers to/from LA Metro stations; in total, fare revenue was just $3,564. Revenues were zero between April 2019 and January 2020 (due to free fares). Consequently, the final subsidy per trip for Via Rideshare Service was calculated to be $11.07 per trip. For the other modes in Los Angeles, LA Metro bus service required a per-trip subsidy of $4.04; the LA BRT subsidy was $3.01. In addition, the LA Metro vanpool program produced a profit of +$0.06 per trip. It is important to note, however, that these average per-trip subsidies are calculated as system-wide metrics; that is, they account for ridership routes that are high-ridership and, thus, cost-efficient along with routes that are low-ridership and cost-inefficient.

A similar analysis of the costs of Via to Transit in the Puget Sound region compared to other FMLM modes (with available data) also found that the program had relatively low cost per revenue hour. As with the analysis within Los Angeles, the average cost per trip for Via to Transit service was higher than

the average cost for other modes. Revenue captured through the program was again limited in the case of the pilot.

The results indicate that the Via to Transit service exhibited lower subsides and better farebox recovery than some transportation modes (i.e., demand-response transportation [mostly paratransit] and demand-response taxis). The operating cost per revenue hour was highest for King County Metro buses, followed by demand-response transportation (mostly paratransit). Via to Transit and the on-demand King County Metro taxi service exhibited similar values, at $48.70 and $47.46 per revenue hour, respectively. King County Metro vanpool had the lowest value, at $19.09 per revenue hour. Compared to other similar services provided by King County Metro, Via to Transit performed significantly better than fixed-route buses and most demand-response services on a per-hour basis. Via to Transit was cheaper to operate than some (but not all) services provided by King County Metro.

Via to Transit in Puget Sound experienced an operating cost of about $11.91 per trip. This was lessened by the average revenue per trip of about $1.10 per trip from fares. As some riders received discounts based on the King County Metro fare structure and riders paying with an ORCA card could receive a free fare transfer between Via to Transit and fixed-route transit, the revenue-per-trip value was low. However, it was similar to other transportation modes for King County Metro. The result is that Via to Transit had a per-trip subsidy of $10.81. Compared to other similar vehicular-modes, Via to Transit performed better than demand-response transportation of mostly paratransit and demand-response taxi service ($83.56 and $16.87 per trip, respectively). However, Via to Transit was not as cost-efficient as the average per-trip subsidy for fixed-route bus ($4.58) and vanpool ($0.80).

In both environments, Via was most cost-effective on an hourly basis but less cost-effective on a per-trip basis when compared to the average performance of the LA Metro and King County Metro systems. It should be noted that because the per-trip cost comparisons are made against the average costs of the entire system, the comparison is not entirely fair, given that Via does not operate high-volume vehicles. Via costs are within range of and perhaps competitive with specific regions in which fixed-route transit operates but does not carry a significant number of passengers (e.g., lower ridership fixed-route bus services). Slightly higher fares or efficiency-based reductions in cost may further narrow the gap in subsidies computed in this analysis. Given the comparisons of efficiencies observed in this analysis, in which Via could be seen both favorably and unfavorably, the results suggest that Hypothesis 10 was partially supported.

Hypothesis 11: The perceived accessibility of travel to and from selected stations will increase as a result of the project.

Hypothesis 11 was analyzed using mostly activity data, as the early- and late-pilot surveys did not contain a question specifically related to distance of travel or geographic spread of travel. However, several analyses using the survey data are still presented that serve as partial proxies for distance related to accessibility, public transit usage, and satisfaction with geographical elements of Via.

Within Los Angeles, between the early- and late-pilot, perceived accessibility as measured across the survey sample did not change drastically, especially for those reporting lower levels of accessibility at the beginning of the pilot. However, more people in the late-pilot stated that their rating was an 8 or 9, and more people in the early-pilot stated that their rating was a 7 or a 10. These results did not show much change in accessibility rating. However, about 61% (early-pilot) and 59% (late-pilot) of respondents stated that their rating was a seven or higher, indicating that a fair number of respondents had easy access to daily activities.

Within the Puget Sound region, a significant number of respondents reported high levels of accessibility at both pilot time periods; the level of accessibility did not increase notably between the early- and late-pilot periods. That analysis also evaluated the distribution of distances traveled by station for pilot regions in the Los Angeles and Puget Sound regions. The data could not provide evidence that geographical spread in travel increased. Altogether, the results provide inconclusive support for Hypothesis 11.

Hypothesis 12: The average velocity per dollar spent to access and egress the station is competitive with public transit.

The analysis evaluating Hypothesis 12 explored the user cost-efficiency of mobility to and from stations through the project. The analysis applied a cost-effectiveness metric to evaluate how cost-effective mobility was delivered to users by the project relative to fixed-route alternatives. The exact metric was calculated as the average velocity divided by (1 + trip fare). This metric was designed to increase with higher speed and fall with higher cost. The fare has 1 added to it so the metric would be interpretable at a $0 fare. The maximum possible value of the metric is the average velocity; at an arbitrarily high cost, the metric will asymptotically approach zero. The metric was computed for every trip and evaluated across all trips. The analysis found that that systems in both Los Angeles and Puget Sound delivered mobility (average velocity, in this case) at a cost-efficiency that was better than a standard public bus. In this project, Via had some advantage in Los Angeles in that many trips were conducted at zero user cost. In Puget Sound, a standard fare was paid by users.

In this system, the difference in cost-effectiveness was tighter but still slightly above a bus that traveled at 11 mph average speed. Overall, the performance of Via in delivering cost-effective mobility to users was found to be competitive with public transit. Hypothesis 12 was supported.

Hypothesis 13: The project produces a series of lessons learned that will be documented through expert interviews with project stakeholders.

Both LA Metro and Puget Sound partners believed their demonstrations were a success, although they acknowledge that the projects took longer to plan and launch than they would have liked. LA Metro submitted the MOD Sandbox Demonstration application to FTA with the plan to integrate the on-demand service with its TAP fare card; however, it acknowledged that it did not fully understand both the technical and contractual complexities of TAP card integration and decided that fare integration could not be completed within the demonstration timeline. In Puget Sound, King County Metro and Sound Transit were able to integrate their on-demand service with the ORCA card.

LA Metro asked Via to execute a terms agreement and outlined expectations for both parties prior to developing a scope of work and contract. The terms sheet outlined data categories that would be shared. It was agreed that Via would provide trip-level data and the origin where a ride was requested (not where a ride was picked up) and drop-off location. Via agreed to manage WAV service, provide call center support, and work with LA Metro to integrate fares. Metro emphasized the importance of a flexible contract that allowed it to adjust its zones and fares with Via. The flexible contract also allowed LA Metro to pivot and provide end-to-end trips (not requiring an FMLM trip to be linked to transit station within the zone) and food delivery in partnership with local food banks in response to the global pandemic. This was done in response to the extraordinary events of early 2020 and was not part of the official demonstration and ended after the FTA-funded demo had ended. These changes came about in March 2020 when Via contacted LA Metro and explained that ridership was dropping and suggested that the Metro make changes to make the service more cost-effective and safe.

LA Metro originally envisioned that the demand-responsive service would have an additional cost. However, in practice, the agency found that the service was not attracting riders because it was cost-prohibitive and not competitive with other FMLM options. The initial fares paid varied through the first three months of the project, from $0 to $5. LA Metro transitioned to a free transfer, and ridership began to increase considerably. A free-fare transfer, such as transferring from a Metro bus to Link light rail using ORCA, was already being offered for the project in Puget Sound. LA Metro said that after this change was implemented, ridership met its internal expectations. However, LA Metro emphasized that ridership is a critical indicator but not its only measure of

success. It emphasized a mix of quantitative and qualitative metrics to measure program success, such as the importance of "conquest riders" (e.g., new riders to public transit) and improvements to the customer experience. Other metrics discussed included the ratio between PMT and VMT, safety (both accidents and customer perceptions), equity (e.g., user demographics compared to the general population), cost-efficiency compared to fixed-route service, and wait times for people with disabilities.

LA Metro received approval from its Board of Directors to extend the service for an additional year. At the end of the project, it was in the process of considering whether to issue a Request for Proposals to continue the service because of procurement restrictions that prohibited a sole-source contract beyond two years. In January 2021, however, LA Metro was able to extend service for all three service zones with a new on-demand rideshare service, Metro Micro. In Puget Sound, King County Metro continued the service, expanding both spatial and temporal coverage. However, Sound Transit did not continue to participate in the program, as they are not a local transit provider and do not provide local feeder service. Collectively, the experience gained from the project in Los Angeles and Puget Sound produced a number of lessons learned that will support future deployments of similar services, supporting Hypothesis 13.

Table ES-1 *Summary of Findings*

	Hypothesis	Status	Key Finding Los Angeles	Key Finding Puget Sound
1	Mobility in both the LA and PS regions will increase as a result of this new service.	Supported	An analysis of travel times, wait times, and accessibility metrics yielded improvements in mobility or no change, depending on the metric. Causal metrics as a result of Via Rideshare Service provided strong evidence that mobility increased in the Los Angeles region.	Similar to Los Angeles, a significant portion of respondents across participating stations stated that their average travel times and average wait times declined due to Via to Transit. Results suggest that overall mobility increased in the Puget Sound regions.
2a	Users who previously did not have access to TNCs for first-mile/last-mile (FMLM) trips will now have access to Via to complete FMLM trips.	Supported	Key accessibility metrics (e.g., travel time, wait time) generally improved due to Via Rideshare Service for lower-income respondents, and cost savings were realized. Mode choice and mode replacement suggest that lower-income respondents had minimal access to (or chose not to use) TNCs and pooled TNCs in the region in general and that Via provided important FMLM gap-filling.	Access to activities was fairly high for lower-income respondents, and cost savings as a result of Via to Transit were notable. Moreover, Via to Transit FMLM trips offered improved mobility and access for lower-income respondents through reduced average travel times and average wait times to/from stations.

Table ES-1 (cont.) *Summary of Findings*

	Hypothesis	Status	Key Finding Los Angeles	Key Finding Puget Sound
2b	Integration of Via into the ORCA card will increase its (Via to Transit's) use among 1) low-income populations, 2) unbanked populations, and 3) minority populations.	Supported	This hypothesis did not apply to the Los Angeles system.	ORCA card usage was very high among all populations, although some people experienced difficulty in paying for Via to Transit, especially unbanked people. Nearly all people used an ORCA card to pay for Via to Transit according to linked activity and survey data, but a slightly lower percentage of unbanked people used the ORCA card. Nevertheless, the extraordinarily high adoption rate within the population suggests that the ORCA card offered significant utility to public transit users. The fact that subgroups explored in this hypothesis increased their ORCA use as a result of it being integrated with Via to Transit suggests that it was an important contributor to their use of the service.
3	The number of public transit users in both regions will increase as this new service will create more options for riders, specifically for FMLM.	Supported	In Los Angeles, public transit usage generally increased across participating stations as a result of Via and between the early- and late-pilot. Via also generally replaced key FMLM modes to/from stations, indicating that Via was a convenient and feasible option for trips, especially FMLM trips.	Via to Transit usage increased slightly between the early-pilot and late-pilot. There was a general increase in Link light rail station usage among Via to Transit users, as a result of their use of the service. This finding suggests the number of public transit users likely increased as a result of the project, and hence ridership would have been lower in its absence.
4	At the selected transit stops, the availability of the new service TO a transit station will increase transit ridership for that system.	Supported	In Los Angeles, a small sample of respondents traveling to/from stations and just to stations increased their public transit usage (and ridership) due to Via FMLM services.	The findings were stronger for Via to Transit in Puget Sound. Most respondents stated that access improved both to and from stations.
5	At the selected transit stops, the availability of the new service FROM a transit station will increase transit ridership for that system.	Supported	As with Hypothesis 4, a small sample of respondents traveling to/from stations and just from stations increased their public transit usage (and ridership) due to Via FMLM services.	The results were stronger for Via to Transit in Puget Sound. Most respondents stated that access improved both to and from stations.

Table ES-1 (cont.) *Summary of Findings*

	Hypothesis	Status	Key Finding Los Angeles	Key Finding Puget Sound
6	The availability of the new service will decrease fuel consumption and greenhouse gas (GHG) emissions associated with the customers using the service.	Not Supported	In the Los Angeles region, the availability of the new service (Via) did not decrease fuel consumption and GHG emissions associated with the customers using the service.	In the Puget Sound region, the availability of the new service (Via) did not decrease fuel consumption and GHG emissions associated with the customers using the service.
7	The availability of the new service will decrease congestion from personal (non-TNC) vehicles.	Inconclusive	In the Los Angeles region, Via decreased personal vehicle usage and hence VMT from this mode. Revenue VMT was lower for Via than a proxy for personal vehicle VMT. However, non-revenue VMT from Via may have increased congestion overall.	The Puget Sound analysis produced mixed results. When considering all VMT produced by Via to Transit (revenue and non-revenue VMT), the pilot may have increased congestion overall, while still decreasing personal vehicle congestion.
8	Mobility for persons with disabilities will be improved due to WAVs through the Via platform.	Supported	Respondents who were classified as persons with disabilities reported an improvement in average travel times within Los Angeles.	Respondents who were classified as persons with disabilities reported average travel times and wait times improved in Puget Sound.
9	Riders will have a safer option to and from the station as a result of Via.	Supported	Although the analysis of crime data was inconclusive, perceived safety as a result of Via increased. Perceived safety traveling to/from stations (any mode) somewhat increased between early- and late-pilot.	Perceived safety as a result of Via increased. Perceived safety traveling to/from stations (any mode) somewhat increased between early- and late-pilot. Respondents were highly satisfied with Via to Transit program elements related to safety in Puget Sound.
10	Subsidies per rider on Via are lower than the subsidies provided on other FMLM options.	Partially supported	Via FMLM subsides in Los Angeles were considerably higher than vanpool, fixed-route bus service, and bus rapid transit. Via subsidies were competitive on a per-hour with other modes, but not as competitive on a per-trip basis.	Similar metrics from Puget Sound indicate that Via FMLM subsidies were lower than some modes (e.g., demand response (mostly paratransit)) but higher than others (e.g., vanpool, fixed-route bus service).

Table ES-1 (cont.) *Summary of Findings*

	Hypothesis	Status	Key Finding Los Angeles	Key Finding Puget Sound
11	The perceived accessibility of travel to and from selected stations will increase as a result of the project.	Inconclusive	In Los Angeles, perceived accessibility, while generally high, did not change much during the pilot. However, more people in the late-pilot survey gave higher ratings for their accessibility relative to the early pilot-survey. Public transit usage generally increased as a result of the project.	In the Puget Sound region, perceived accessibility was high and public transit usage generally increased as a result of Via to Transit. However, satisfaction with geographic elements yielded inconclusive support.
12	The average velocity per dollar spent to access and egress the station is competitive with public transit.	Supported	The system in Los Angeles was found to provide mobility at a cost-effectiveness that was equal to or competitive with a typical city bus.	The system in Puget Sound was found to provide mobility at a cost-effectiveness that was equal to or competitive with a typical city bus.
13	The project produces a series of lessons learned that will be documented through expert interviews with project stakeholders.	Supported	LA Metro partners believed their demonstration was a success and continue to work on challenges associated with maintaining and expanding similarly designed deployments.	Puget Sound partners believed their demonstration was a success and continue to work on challenges associated with maintaining and expanding similarly designed deployments.

Section 1

Introduction

Overview of MOD Sandbox Demonstrations

The Federal Transit Administration (FTA)'s Mobility on Demand (MOD) effort developed around a vision of a multimodal, integrated, automated, accessible, and connected transportation system in which personalized mobility is a key feature. FTA selected 11 MOD Sandbox Demonstration projects that are testing strategies that advance the MOD vision. In partnership with public transportation agencies, the MOD Sandbox is demonstrating the potential for new innovations to support and enhance public transportation services by allowing agencies to explore partnerships, develop new business models, integrate transit and MOD strategies, and investigate new, enabling technical capabilities.

The evaluation of each project's benefits and impacts will guide the future implementation of innovations throughout the U.S. Broadly, MOD Sandbox projects take several approaches, including the development of new or improved trip planners, integration of new mobility services with traditional public transportation functions, and implementation of new integrated payment and incentive structures for travel using public transportation. Several Sandbox projects focus on improving first/last mile access to public transportation through collaboration with private sector operators, including bikesharing, carsharing, ridesourcing/transportation network company (TNC), and other shared mobility operators.

More information about the MOD Sandbox Program can be found at https://www.transit.dot.gov/research-innovation/mobility-demand-mod-sandbox-program. In addition, Table 1-1 provides a summary of all the projects in the MOD Sandbox Program.

Table 1-1 *Overview of MOD Sandbox Projects*

Region	Project	Description
Chicago	Incorporation of Bikesharing Company Divvy	Releases updated version of Chicago Transit Authority's (CTA) existing trip planning app. New version incorporates Divvy, a bikesharing service, and allows users to reserve and pay for bikes within the app.
Dallas	Integration of Shared-Ride Services into GoPass Ticketing Application	Releases updated version of Dallas Area Rapid Transit's (DART) existing trip planning app. Updated version incorporates shared-ride services to provide first/last-mile connections to public transportation stations and allows users to pay for services within the app.
Los Angeles and Puget Sound	Two-Region Mobility on Demand	Establishes partnership between Via and LA Metro. Via provides first/last-mile connections for passengers going to or leaving from transit stations. There is a companion project in Seattle, WA.
Phoenix	Smart Phone Mobility Platform	Releases updated version of Valley Metro's existing trip planning app. New version updates trip planning features and enables payments.
Pinellas County (Florida)	Paratransit Mobility on Demand	Improves paratransit service by combining services from taxi, ridesourcing/TNCs, and traditional paratransit companies.
Portland	Open Trip Planner Share Use Mobility	Releases updated version of TriMet's existing multimodal app. New version provides more sophisticated functionality and features, including options for shared mobility.
San Francisco Bay Area	Bay Area Fair Value Commuting (Palo Alto)	Reduces SOV use within Bay Area through commuter trip reduction software, a multimodal app, workplace parking rebates, and first/last-mile connections in areas with poor access to public transportation.
	Integrated Carpool to Transit (BART System)	Establishes partnership between Scoop and Bay Area Rapid Transit (BART). Scoop matches carpoolers and facilitates carpooling trips for passengers going to or leaving from BART stations with guaranteed parking.
Tacoma	Limited Access Connections	Establishes partnerships between local ridesourcing companies/TNCs and Pierce Transit. Ridesourcing companies provide first/last-mile connections to public transportation stations and park-and-ride lots with guaranteed rides home.
Tucson	Adaptive Mobility with Reliability and Efficiency	Builds integrated data platform that incorporates ridesourcing/TNC and carpooling services to support first/last-mile connections and reduce congestion.
Vermont	Statewide Transit Trip Planner	Releases new multimodal app for VTrans that employs fixed and flexible (non-fixed) transportation modes to route trips in cities and rural areas.

An independent evaluation (IE) is required by Federal public transportation law (49 U.S.C. § 5312(e)(4)) for demonstration projects receiving FTA Public Transportation Innovation funding. The IE for the MOD Sandbox Demonstration projects was sponsored by the USDOT Intelligent Transportation Systems Joint Program Office (ITS JPO) and FTA.

This report focuses on the independent evaluation of the Los Angeles County and Puget Sound First and Last Mile Partnership with Via project, which aimed to demonstrate a first and last mile (FMLM) system to connect people to public transit stations on rail and main bus rapid transit lines in the Los Angeles and the Puget Sound regions. The project deployed a FMLM shared mobility on-demand system that operated within zones around the participating stations. Users could use an app to request Via to pick them up within the zone and take them to the station within the zone. Users could also use Via to take them from the station to a destination within the zone. The evaluation of this project involved exploring a number of hypotheses surrounding the project's impact on the mobility and accessibility of users, vehicle miles traveled (VMT) and greenhouse gas (GHG) emissions, public transit ridership, congestion, safety, cost-effectiveness of mobility, and lessons learned from deployment. Following a more detailed overview of the project, these hypotheses are explored in the sections that follow.

Evaluation Framework

For each of the 11 MOD Sandbox projects, the IE team developed an evaluation framework in coordination with the project team. The framework is a project-specific logic model that contains the following entries:

1. **MOD Sandbox Project** – Denotes the specific MOD Sandbox project.
2. **Project Goals** – Denotes each project goal for the specific MOD Sandbox project and captures what each MOD Sandbox project is trying to achieve.
3. **Evaluation Hypothesis** – Denotes each evaluation hypothesis for the specific MOD Sandbox project. The evaluation hypotheses flow from the project-specific goals.
4. **Performance Metric** – Denotes the performance metrics used to measure impact in line with the evaluation hypotheses for the specific MOD Sandbox project.
5. **Data Types and Sources** – Denotes each data source used for the identified performance metrics.
6. **Method of Evaluation** – Denotes the quantitative and qualitative evaluation methods used.

Section 2

Los Angeles County and Puget Sound MOD Sandbox Project Summary

Los Angeles Metro, King County Metro, Sound Transit, and Via developed an experimental project implementing first/last-mile access to transit stations within the Los Angeles and Seattle metropolitan regions. Upon pilot launch, customers were able to request subsidized Via rides to or from the participating transit stations within specified zones and times of the day.

The MOD Sandbox demonstration was initially conceived by staff at LA Metro's Office of Extraordinary Innovation (OEI). For OEI, pursuing the MOD demonstration presented a unique opportunity to explore different partnerships with TNCs to provide first/last mile connections to public transit for low-income households and people with disabilities. Through a partnership-driven approach, Los Angeles Metro, King County Metro, Sound Transit, and Via worked together to develop, deploy, and analyze two analogous pilot programs designed to test the viability of transit agency-TNC partnerships to deliver equitable first/last mile access to the transit networks. The service for the Los Angeles region was named "Via Rideshare Service" and the service in the Puget Sound region was named "Via to Transit."[2] Three service zones were selected in the Los Angeles region, and five service areas (zones) were selected in the Puget Sound (PS) region for the pilot. Zone locations were selected with consideration for equity, geographic diversity, current first and last mile access, potential trip generators, operational density, and current available transit service. Areas were also assessed to determine where there was untapped demand, such as employment centers that continue to be challenging to reach with the existing networks. In both regions, the marketing and communications teams disseminated information about ways in which to access the Via service for those who did not have access to credit cards or debit cards, such as pre-paid gift cards.

Los Angeles Pilot Details – Via Rideshare Service

In the Los Angeles region, the selected station areas were North Hollywood, El Monte, and Artesia (Figure 2-1). Users could book rides to and from the following stations in each station area (zone)[3]:

- North Hollywood (Figure 2-2)
  - North Hollywood B Line/G Line Station (LA Metro)
  - Burbank Airport South Station (Metrolink – Ventura County Line)
  - Burbank Downtown Station (Metrolink – Ventura County Line)

[2] LA Metro also referred to the project in the Los Angeles region as "MOD Partnership with Via."
[3] LA Metro Red Line is now B Line, LA Metro Orange Line is now G Line, LA Metro Silver Line is now J Line, LA Metro Blue Line is now A Line, and LA Metro Green Line is now C Line.

- El Monte (Figure 2-3)
  - El Monte J Line Station (LA Metro)
  - El Monte Station (Metrolink – San Bernardino Line)
- Artesia (Figure 2-4)
  - Artesia A Line Station (LA Metro)
  - Avalon C Line Station (LA Metro)
  - Compton A Line Station (LA Metro)
  - Long Beach Boulevard C Line Station (LA Metro)
  - Willowbrook - Rosa Parks C/A Line Station (LA Metro)

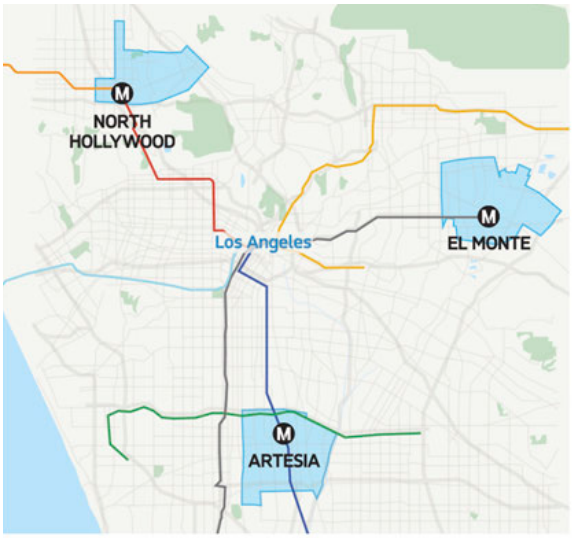


Figure 2-1 *Service Zones for Los Angeles Metro Pilot with Via*

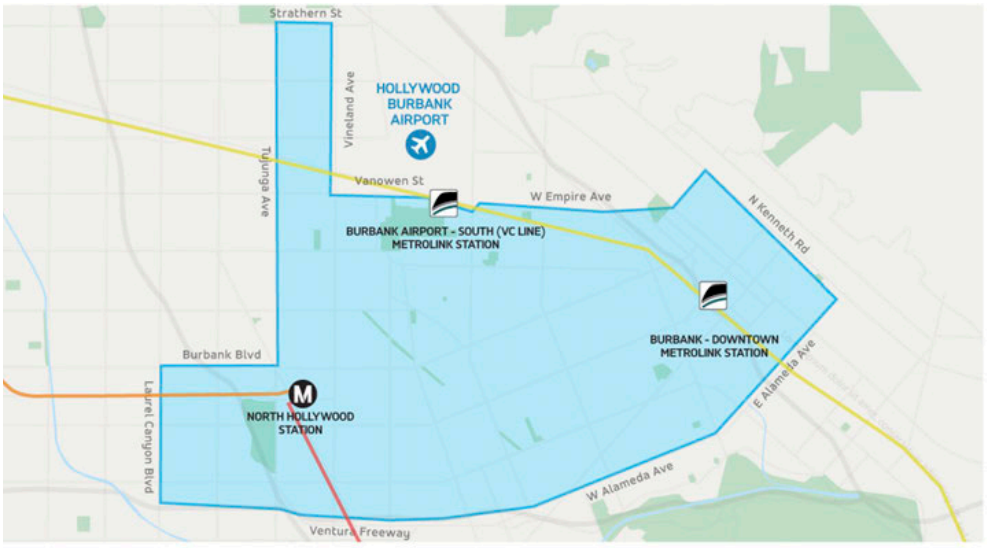


Figure 2-2 *Boundary for Via Rideshare Service – North Hollywood*

Figure 2-3 *Boundary for Via Rideshare Service – El Monte*

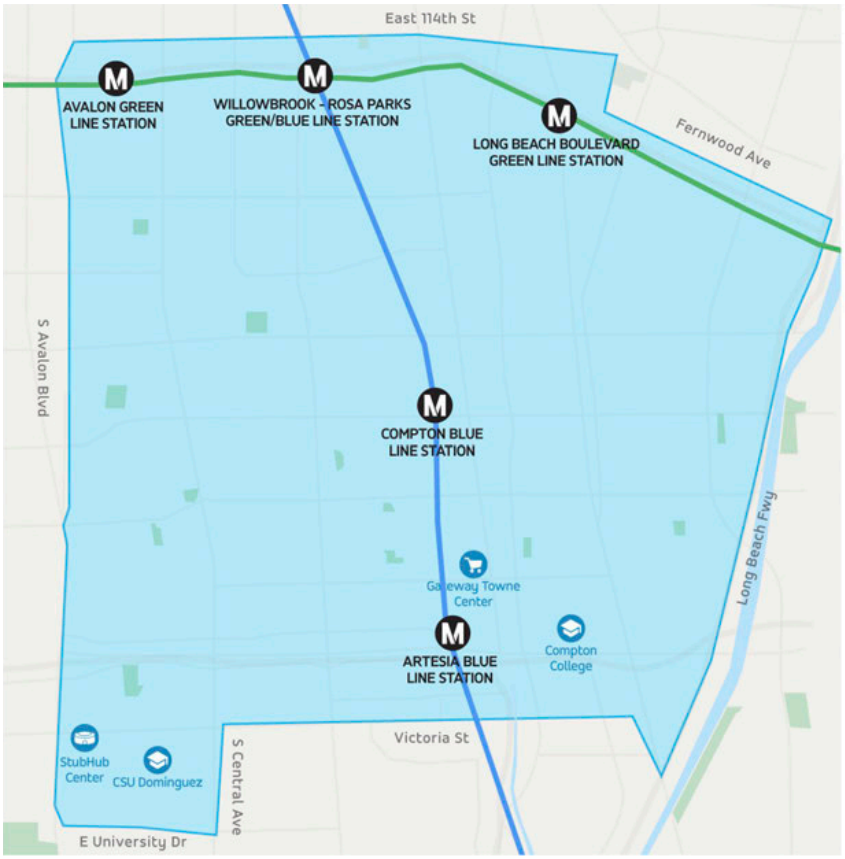


Figure 2-4 *Boundary for Via Rideshare Service – Artesia*

In Los Angeles, TAP is the regional payment system that allows customers to add value to transit, pay for bikeshare, and eventually pay for parking. In the Los Angeles pilot, there was a "lite-TAP integration," which allowed customers to input their TAP card number when registering for a Via account to receive $2 off each Via ride,[4] although they were not actually paying with their TAP card. Instead, customers booked and paid for their Via rides through the Via app, which required them to enter a credit card or prepaid debit card number. Although this pilot did not have full integration with TAP, it still incentivized customers to use TAP based on the fare policy structure.

The pilot also included the following elements:

- Riders could transfer for free from Metro. No credit card or bank account information was required to book a transfer from Metro to Via.
- Operating hours were Monday to Friday 6:00–12:00 AM and Saturdays and Sundays, 8:00 AM–10:00 PM.
- Riders had the opportunity to rate their driver from 1 to 5 stars.

[4] The service became free during the third month of operations.

- LA Metro stations included a specific Via pick-up area. In some cases, individuals had to walk a short distance to a pickup location when traveling to the station.
- In response to the COVID-19 pandemic, riders were able to go anywhere in the zone, not just to or from stations. The pilot also suspended shared rides in support of social distancing, offered point-to-point services to accommodate essential trips, and added new essential destinations beyond zone boundaries.
- The Via app allowed riders to toggle a "Wheelchair Accessible" option in the account profile.
- Customers were able to call a Via customer service representative to book a ride over the phone. Translation services were also available.

Puget Sound Pilot Details – Via to Transit

In the Puget Sound region, the selected stations were concentrated in southeast Seattle and Tukwila and were all part of Link light rail (operated by Sound Transit). Users could book rides to and from the following stations (Figures 2-5 and 2-6).

- Mount Baker Station
- Columbia City Station
- Othello Station
- Rainier Beach Station
- Tukwila International Boulevard Station

The service operated within defined areas around each station. The service areas were determined to ensure that each area's unique mobility circumstances were properly considered.

In the pilot, there was full integration with ORCA, the regional payment system in the Puget Sound area. Each Via vehicle was equipped with an ORCA reader, allowing customers to pay for their Via rides with their ORCA cards. Customers could use the Via app to book rides, and those without ORCA cards could also use a credit, debit, or pre-paid card to pay for the service through the app. A telephone dispatch service operated by Via allowed customers without a smartphone (or access to the Via app) to register for accounts, along with the ability to book and pay for Via rides.

The Via to Transit pilot in Puget Sound also included the following elements:

- The service was the same price as a Metro Bus ride.
- Riders could transfer between Via to Transit, Metro buses, and Link light rail using the ORCA card (no cash or paper transfers were allowed).

- Operating hours for the service in Southeast Seattle were Monday to Friday, 5AM to 1AM and Saturdays and Sundays, 6:00–12:00 AM. Operating hours for the service in Tukwila were Monday to Friday 6:00–9:00 AM and 3:30–6:30 PM.
- The Via app allowed individuals to toggle a "Mobility assistance" option in the account profile, which dispatched a wheelchair accessible vehicle (WAV) directly to the starting point.
- Cancellations were allowed, but riders were highly discouraged from cancelling a ride unless necessary.

Figure 2-5 *Boundary for Via to Transit Service – Southeast Seattle*

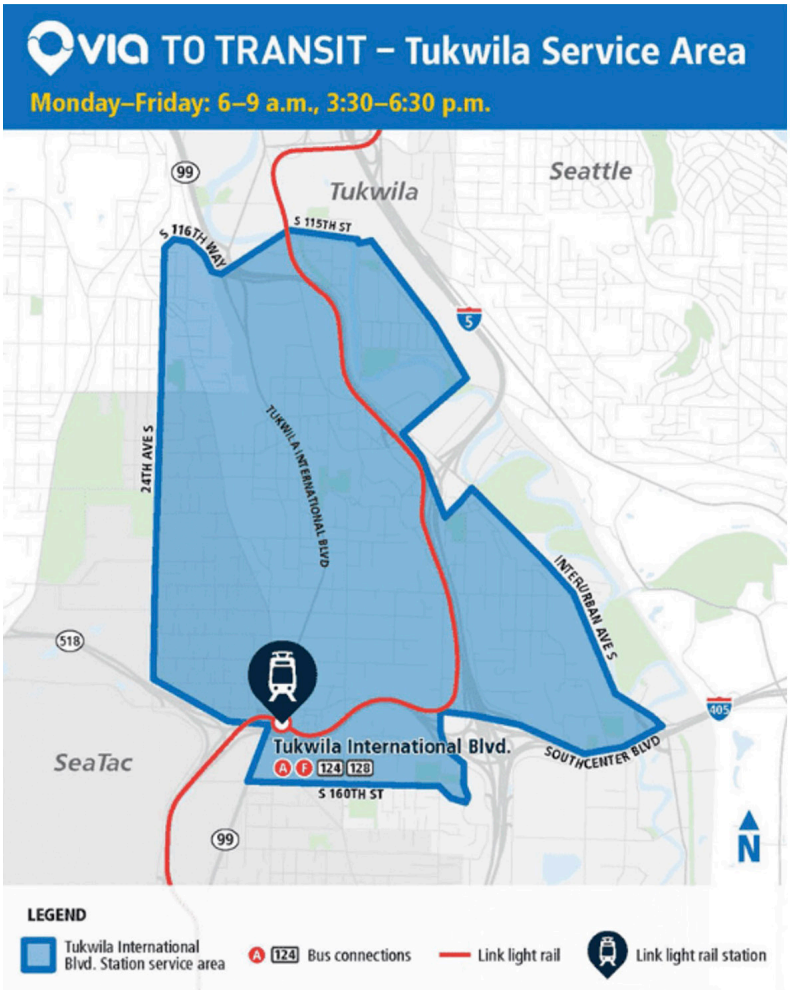


Figure 2-6 *Boundary for Via to Transit Service – Tukwila*

Project Timeline

The main project milestones are captured in the following timeline:

- **February 10, 2017** – Agreement Execution Date with FTA
- **January 2019** – MOD Sandbox Field Demonstration Starts (LA)
- **April 2019** – MOD Sandbox Field Demonstration Starts (PS)
- **June 2019** – Early Pilot Survey Launch (LA)
- **September 2019** – Early Pilot Survey Launch (PS)
- **December 2019** – Preliminary and Interim Analysis (LA and PS)
- **January 2020** – MOD Sandbox Field Demonstration Ends (LA)[5]

[5] Following the end of this field demonstration, LA Metro extended the Via Rideshare Service pilot, transitioning it to Metro Micro. Zones were modified, and a new LAX/Inglewood Zone was added. LA Metro used its own funding for a second year until December 2020, when it transitioned to Metro Micro.

- **March 2020** – MOD Sandbox Field Demonstration Ends due to COVID-19 (PS)[6]
- **August 2020** – Later Pilot Survey Launch (LA and PS)
- **January 2021** – Final Data Analysis/ Independent Evaluation
- **April 2021** – Expert (stakeholder/project partner) Interview Summary/ Complete IE Reporting and Data Submission to the USDOT.

The LA County and PS team collected data relevant to this MOD Sandbox demonstration (as outlined in this evaluation plan) for January 2019–June 2020 and shared the data with the IE team for conducting the evaluation. Details on the data collection planning are provided in Sections 3 and 4.

[6] Following the end of this field demonstration, King County Metro extended the Via to Transit pilot for a second year from June 22, 2020, to April 2021; however, service was resumed for only Rainier Beach, Othello, and Tukwila International Boulevard stations.

.

Section 3

Evaluation Approach, Planning, and Execution

The evaluation of each MOD Sandbox project was guided by an evaluation plan developed at the outset of the project. The evaluation plan was built primarily upon a logic model constructed by the IE team. The logic model had five basic components:

- Project Goal – The stated goals of the project were defined from the proposal, project summary, and discussion with project team members.
- Evaluation Hypothesis – Each project goal had a corresponding hypothesis. The hypothesis was a stated question that could be answered with a "Yes" or a "No" that was related to measuring the achievement of the associated project goal.
- Performance Metric – Described the measurement that was proposed to be used to evaluate the hypothesis.
- Data Sources – Data sources that followed from the performance metric and described the data type and source necessary to compute or evaluate the performance metric.
- Method of Evaluation – Defined how the hypothesis would be evaluated; with the logic model, this was very general, declaring whether the evaluation would be completed via survey analysis, activity data analysis, time series analysis, or other methods.

The logic model was a table, with one row containing five cells, each populated with the components described above. The content of the logic model was also populated in advance of project implementation, with knowledge of the project trajectory and exact data collected uncertain. The components of the logic model constructed for the evaluation of the Los Angeles County and Puget Sound First and Last Mile Partnership with Via MOD Sandbox project are presented in Table 3-1.

Table 3-1 *Project Goals, Evaluation Hypotheses, Performance Metrics, and Data Sources*

Number	Project Goals	Evaluation Hypothesis	Performance Metric	Data Elements	Data Sources
1	Expand mobility in both regions.	Mobility in both the LA and PS regions will increase as a result of this new service.	Travel times of all users to and from selected pilot stations, wait times of all users traveling to and from selected pilot stations, travel time reliability	Survey data	Via travel activity data, rider/ passenger survey
2	Promote equitable mobility benefits across all populations.	(a) Users who previously did not have access to TNCs for FMLM trips now have access to TNCs to complete FMLM trips;	Number of low-income people who previously did not have access to TNCs as a FMLM option	Survey data	Rider/passenger survey
		(b) integration of Via into the ORCA card will increase its (Via to Transit's) use among 1) low income populations, 2) unbanked populations, and 3) minority populations.	Number of trips conducted by underserved populations through use of ORCA	Survey data, payment data	Rider/passenger survey, ORCA payment data
3	Expand number of unique users of public transit and increase overall ridership.	Number of public transit users in both regions will increase, as this new service will create more options for riders, specifically for FMLM.	Count of unique public transit users in the pilot areas; change in public transit usage at participating stations; mode choice and replacement, especially FMLM modes	Survey data	Rider/passenger survey
4	Increase access to transit stations.	At the selected transit stops, the availability of the new service TO a transit station will increase transit ridership for that system.	Change in public transit usage due to Via services to/ from stations, with a focus on respondents traveling to stations; access improvements due to Via services	Survey data	Rider/passenger survey

Table 3-1 (cont.) *Project Goals, Evaluation Hypotheses, Performance Metrics, and Data Sources*

Number	Project Goals	Evaluation Hypothesis	Performance Metric	Data Elements	Data Sources
5	Increase egress from transit stations.	At the selected transit stops, the availability of the new service FROM a transit station will increase transit ridership for that system.	Change in public transit usage due to Via services to/from stations, with a focus on respondents traveling from stations; access improvements due to Via services	Survey data	Rider/passenger survey
6	Preserve or enhance the environment.	The availability of the new service will decrease fuel consumption and GHG emissions associated with the customers using the service.	CO_2 emissions from the pilot, change in fuel consumption and GHGs resulting from shift in behavior as a result of the pilot	Survey data, ridership and activity data	Rider/passenger survey, Via travel activity data, fuel economy of Via fleet
7	Reduce congestion from personal vehicles.	The availability of the new service will decrease congestion from personal (non-TNC) vehicles.	Total distance of travel by personal vehicle by hour by users of the system/ program	Survey data, ridership and activity data	Rider/passenger survey, Via travel activity data
8	Improve mobility for persons with disabilities.	Mobility for persons with disabilities will be improved due to WAVs through the Via platform.	Trip time (including wait time) of Via WAV rides / trip time (including wait times) of original mobility option that the customer would have used	Survey data, ridership and activity data	Via travel activity data, rider/ passenger survey
9	Ensure travelers feel safe on public transit and at public transit facilities	Riders will have a safer option to and from the station as a result of Via.	Improved actual safety getting to and from transit station, perceived safety between previous option and TNC option	Survey data, crime data	Rider/passenger survey, crime statistics

Table 3-1 (cont.) *Project Goals, Evaluation Hypotheses, Performance Metrics, and Data Sources*

Number	Project Goals	Evaluation Hypothesis	Performance Metric	Data Elements	Data Sources
10	Improve cost efficiency of access to and egress from transit	Subsidies per rider on Via are lower than the subsidies provided on other FMLM options.	Subsidies paid to Via relative to existing subsidy per ride of other agency access modes	Payment data, ridership and activity data	Traditional access and egress mode subsidy data per passenger; Via travel activity data or Via subsidy data per passenger data; unlinked trips at targeted stations with LA Metro, Foothill Transit, and Puget Sound transit agencies (ridership data); other revenue from traditional modes
11	Improve accessibility for all populations.	The perceived accessibility of travel to and from selected stations will increase as a result of the project.	Distance of travel, change in perceived accessibility and user satisfaction, change in public transit usage as a result of Via	Ridership and activity data	Rider/passenger survey, existing bus service travel and ridership, Via travel activity data
12	Improve level of service per user cost	The average velocity per dollar spent to access and egress the station is competitive with public transit.	Average Trip Velocity / (Fare ($) +1)	Ridership and activity data	Via travel activity data
13	Produce lessons learned through stakeholder interviews	The project produces a series of lessons learned that will be documented through expert interviews with project stakeholders.	Qualitative documentation from stakeholder interviews	Stakeholder interview data	Stakeholder interviews

The quantitative and qualitative evaluation methods used in the evaluation included the following:

- Survey analysis
- Activity data analysis
- Payment data analysis
- Crime data analysis
- Summary of expert (stakeholder/project partner) interviews

The content of the logic model was translated into a data collection plan, which, in turn, was incorporated into a broader evaluation plan. The evaluation plan contains further details on the proposed data structures and analytical approaches to address each hypothesis. The evaluation plan was reviewed by project stakeholders and finalized towards the inception of the project. The project team then executed the project, working with the evaluation team to collect and transfer data at key junctures of the project. In the section that follows, the report presents background on the data collected in support of the evaluation, followed by a presentation and discussion of the results from the evaluation.

Data Collected

A variety of datasets was used to conduct the evaluation. These datasets were collected in collaboration with the LA and PS teams and were in the form of surveys, activity data, payment data (PS only), crime data (LA only), and stakeholder interview data. General descriptions of the available datasets are as follows:

- *Survey data* – An early- and late-pilot survey were distributed in the LA and PS regions, focusing on topics that were a part of the pilot study. Both surveys captured traveler behavior patterns related to mode used to travel, use of Via, and public transit ridership. Respondents were asked about their average wait and travel times to and from the stations, along with perceived impact of Via on average wait times and travel times (late-pilot survey). The late-pilot survey also asked about how Via affected public transit usage, mode choice and replacement, and cost savings. Perceptions of accessibility, perceptions of safety, payment type, and demographic variables were also collected. Several additional questions were added to the PS survey related to satisfaction with different elements of the Via pilot. The following shows the number of completed responses used for the survey analysis:
  - Los Angeles Early-Pilot: N=85
  - Los Angeles Late-Pilot: N=55

  - Puget Sound Early-Pilot: N=731
  - Puget Sound Late-Pilot: N=402
- *Via activity data* – Data for each Via trip taken during the pilot were captured by Via and provided to the analysis team. Via trip data included de-identified passenger ID, the vehicle make/model/year, the ORCA ID (PS only), and the Zone ID. Activity data included information about the requested pick-up and drop-off locations, estimated pick-up and drop-off times, actual pick-up and drop-off times, actual wait and travel time, distance of the ride, trip cost, number of passengers, and trip outcome (i.e., completed, cancelled, etc.). The data also included information about whether the ride was accepted, if the ride was shared, how the ride was booked, and what payment type was used. Altogether, these data provided comprehensive metrics that could be used to address multiple hypotheses. Moreover, survey data from the late-pilot survey from Puget Sound could be linked to the activity data by deidentified passenger ID.
- *Crime data* – Data from three LA Metro stations in LA County—North Hollywood Station, Artesia Station, and El Monte Station—were collected by the Los Angeles Police Department from January 2015 to August 2020. These data included crimes at stations broken down by crime type (e.g., robbery, aggravated assault, trespassing, etc.). Due to the low numbers of crimes, data were aggregated to a monthly total.
- *Stakeholder interview data* – The evaluation team conducted expert interviews with several people who were directly connected to the project team and had deep knowledge of the project. This included people at LA Metro, King County Metro, and Sound Transit.

These datasets were applied to evaluate the hypotheses defined within the evaluation plan. In the sections that follow, these hypotheses are explored and evaluated using the data available. The methods applied for the different analyses depended on the hypothesis being addressed. Survey data were analyzed through a direct analysis of questions and response distributions. Data were also appropriately cross-tabulated with demographic attributes (such as income) to evaluate the impact of the program on underserved populations. Several other survey questions were cross-tabulated to identify nuances in the data that could better inform the hypothesis. The analysis was separated between the Los Angeles pilot and the Puget Sound pilot. To address some hypotheses, the early-pilot and late-pilot surveys were directly compared. Although deidentified IDs were not the same between the surveys, the cross-sectional analysis at the aggregate level produced key results for several hypotheses. Survey results were also often broken down by station to highlight geographical differences in survey responses. One important note is that the survey data also captured causal relationships. Questions were asked about the direct impact of Via on multiple performance metrics.

Limitations to the study include standard limitations associated with survey data and self-reported responses as well as limitations in the precision of fields in the activity data, payment data, and fuel usage data. The sample size for both the early-pilot and late-pilot surveys for Los Angeles was low, inhibiting the conclusive power of the analyses.[7] Links between datasets could be established only between the activity data and the late-pilot survey for Puget Sound. Stakeholder interviews were also limited by self-interpreted responses and recollection of project details and events.

[7] The second Puget Sound survey occurred during the early months of the COVID-19 pandemic. Respondents were directed to answer the questions as they pertained to the service prior to the pandemic..

Section 4

Evaluation Results

Hypothesis 1: Mobility in both the Los Angeles and Puget Sound regions will increase as a result of this new service.

Performance Metric	Key Finding – Los Angeles	Key Finding – Puget Sound
Travel times of all users to and from selected pilot stations, wait times of all users traveling to and from selected pilot stations, travel time reliability	An analysis of travel times, wait times, and accessibility metrics yielded improvements in mobility or no change, depending on the metric. Causal metrics as a result of the Via Rideshare Service provided strong evidence that mobility increased in the LA region.	Similar to LA, a significant portion of respondents across participating stations stated that their average travel times and average wait times declined due to Via to Transit. Results suggest that overall mobility increased in the Puget Sound region.

The first hypothesis explored as part of the evaluation was whether mobility in the Los Angeles and Puget Sound regions increased as a result of the new service (i.e., Via Rideshare Service, Via to Transit). This hypothesis was evaluated using reported travel times, wait times, and access from surveys of respondents. Results were derived through 1) an analysis of late-pilot survey questions that focused on causal questions related to Via Rideshare Service or Via to Transit, 2) a comparison of the early-pilot survey and a late-pilot survey, and 3) an exploration of an early-pilot survey question on public transit accessibility.

Los Angeles

Travel Times

Change in travel times as a result of Via Rideshare Service were explored using data from the late-pilot survey. Figures 4-1 and 4-2 show a change in the average travel to/from the participating stations by station and in aggregate. In both cases, a significant number of respondents reported decreases in average travel time. Across all participating stations, 20% of respondents reported average travel time decreases to stations and 22% reported decreases from stations. Just 4% (to stations) and 1% (from stations) of respondents reported increases in average travel time as a result of Via Rideshare Service. These results suggest that mobility increased in terms of lower travel times as a result of Via Rideshare Service. However, an analysis of travel times regardless of travel mode (Figures 4-3 and 4-4) indicate that travel time improvements between early- and late-pilot surveys were not consistent across time segments. Consequently, results suggest that travel time improvements were not even across modes of transportation.

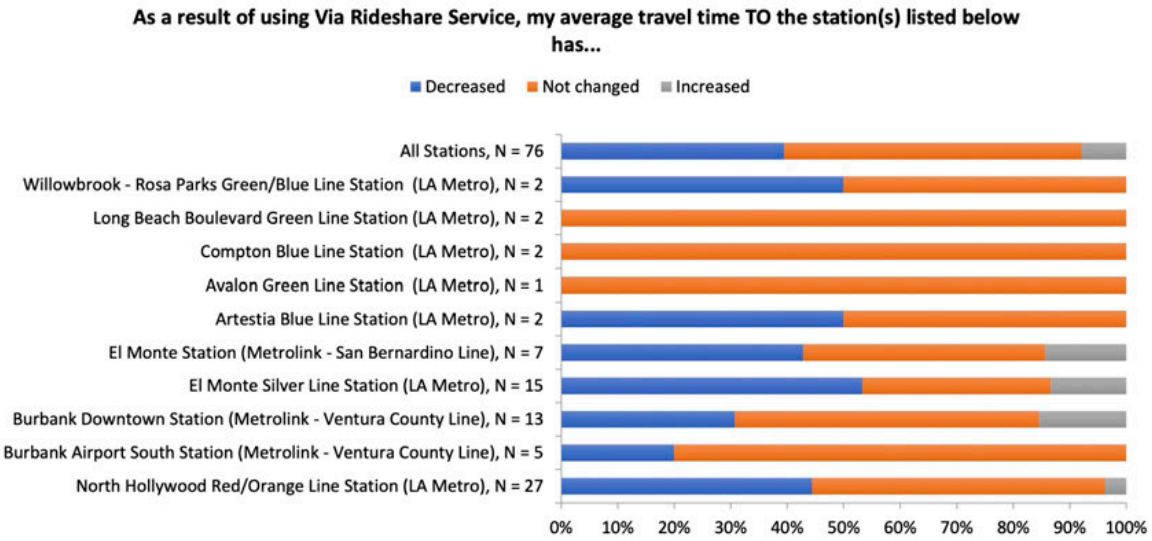


Figure 4-1 *Change in Average Travel Time to Stations Due to Via Rideshare Service – Los Angeles*

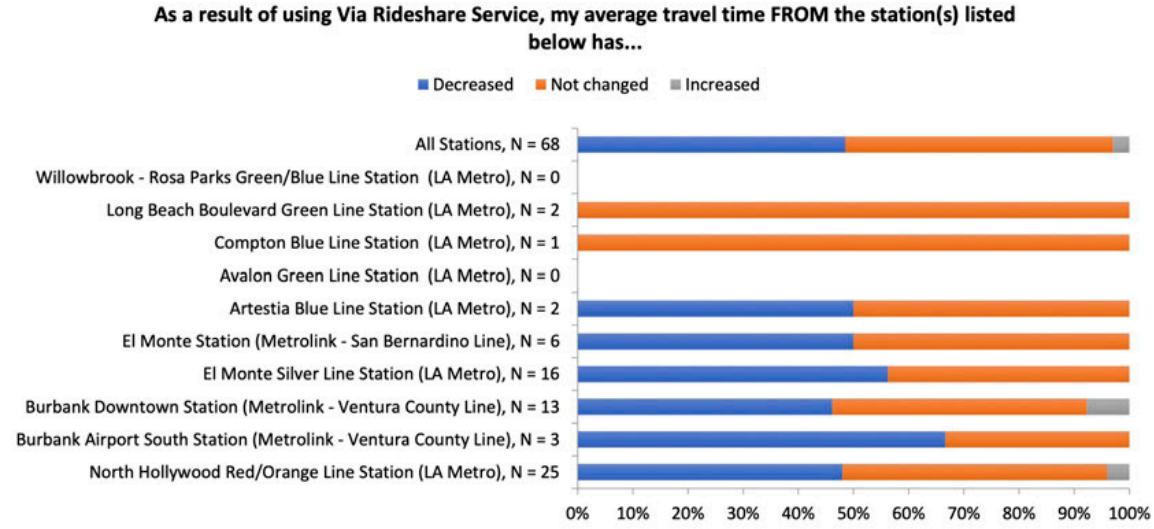


Figure 4-2 *Change in Average Travel Time from Stations Due to Via Rideshare Service – Los Angeles*

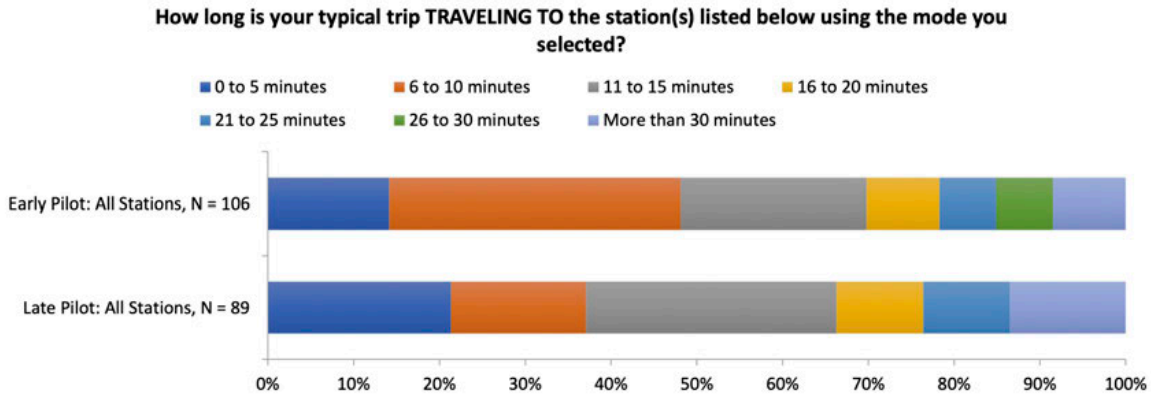


Figure 4-3 *Length of Typical Trip Travel TO Stations (All Modes) – Los Angeles*

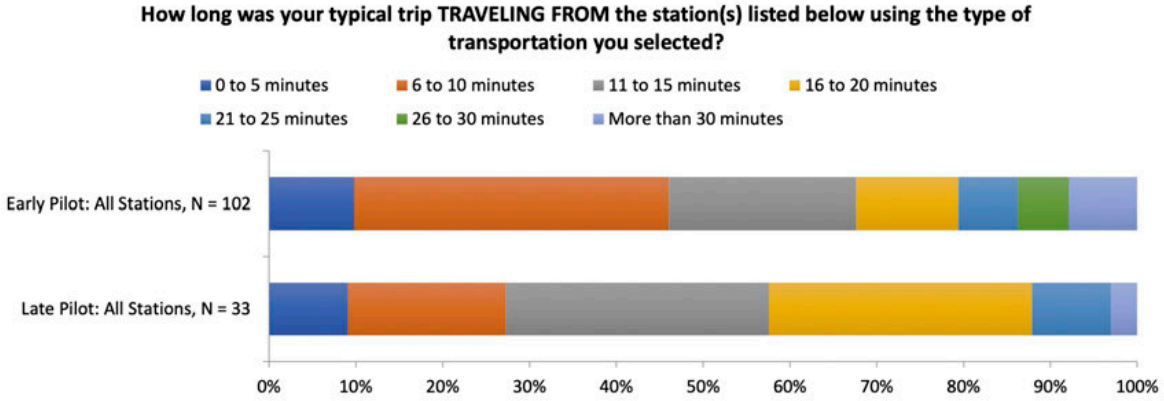


Figure 4-4 *Length of Typical Trip Travel FROM Stations (All Modes) – Los Angeles*

Wait Times

For wait times across all participating stations, about 30% of respondents stated that their average wait times decreased to stations as a result of the Via Rideshare Service (see Figure 4-5). Alternatively, 17% said that their average wait times increased to stations (and 53% stated no change). Across all participating stations, about 48% stated that their average wait times decreased from stations (see Figure 4-6) compared to 15% who said that said their average wait times increased (37% said their average wait time did not change). The results show that more respondents experienced shorter wait times to and from stations as a result of Via Rideshare Service than longer wait times, suggesting an improvement in mobility. Figures 4-7 and 4-8 display average wait times between early- and late-pilot for traveling to stations and from stations, respectively. Wait times on any mode of transportation between early- and late-pilot traveling to stations was largely unchanged. However, very short

wait times traveling from stations worsened somewhat. Consequently, wait time improvements from the Via Rideshare Service do not extend across other modes of transportation.

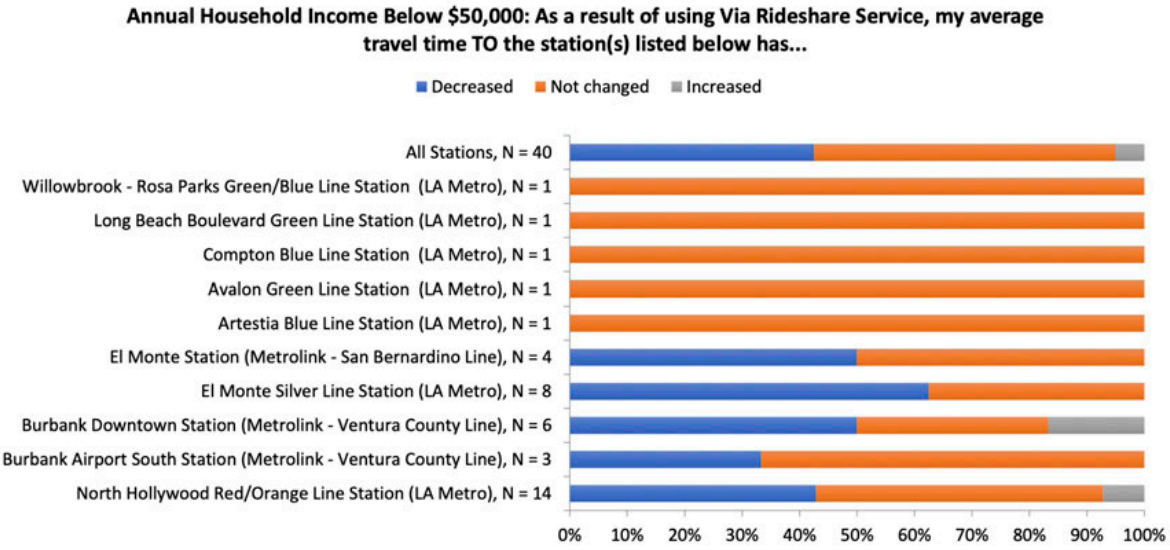


Figure 4-5 *Change in Average Wait Time TO Stations Due to Via Rideshare Service – Los Angeles*

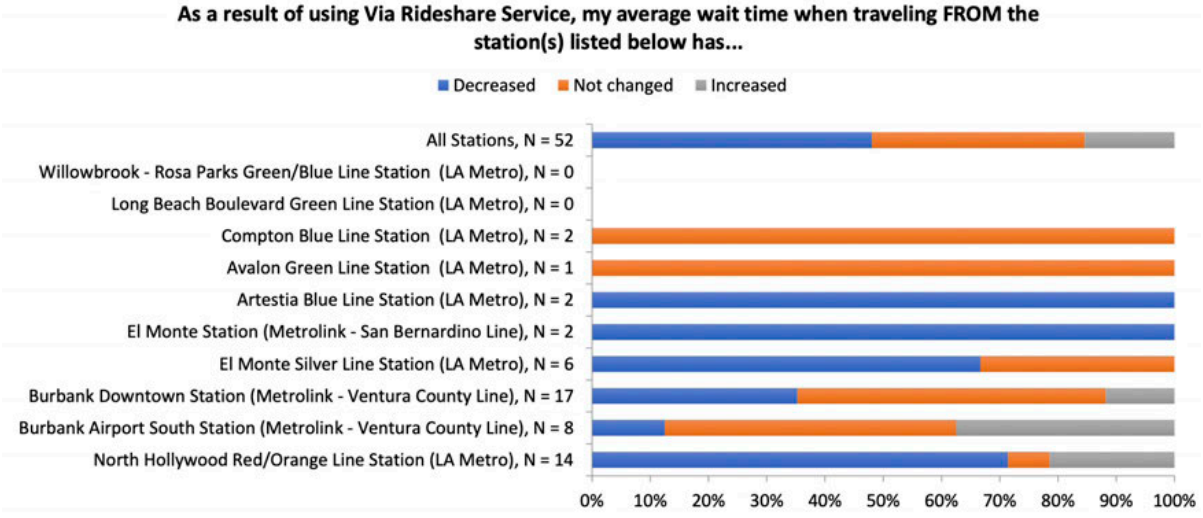


Figure 4-6 *Change in Average Wait Time FROM Stations Due to Via Rideshare Service – Los Angeles*

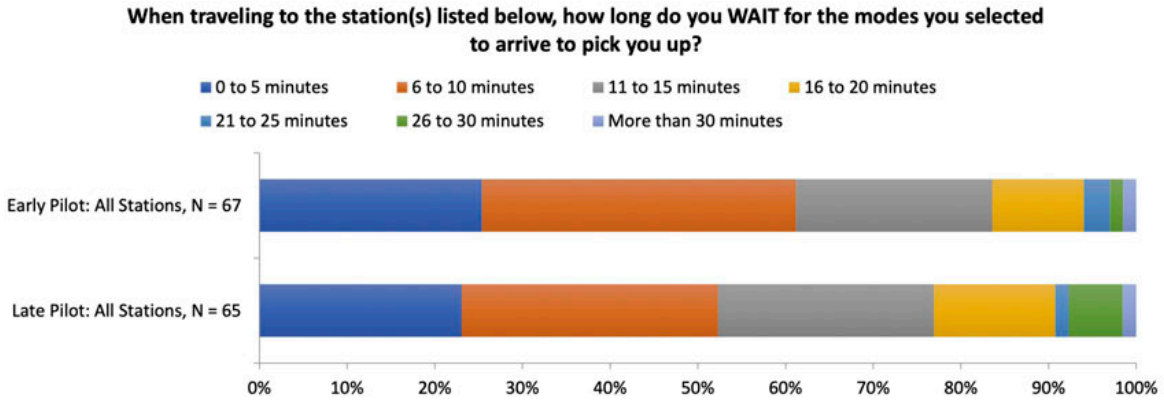


Figure 4-7 *Typical Wait Times Traveling TO Stations (All Modes) – Los Angeles*

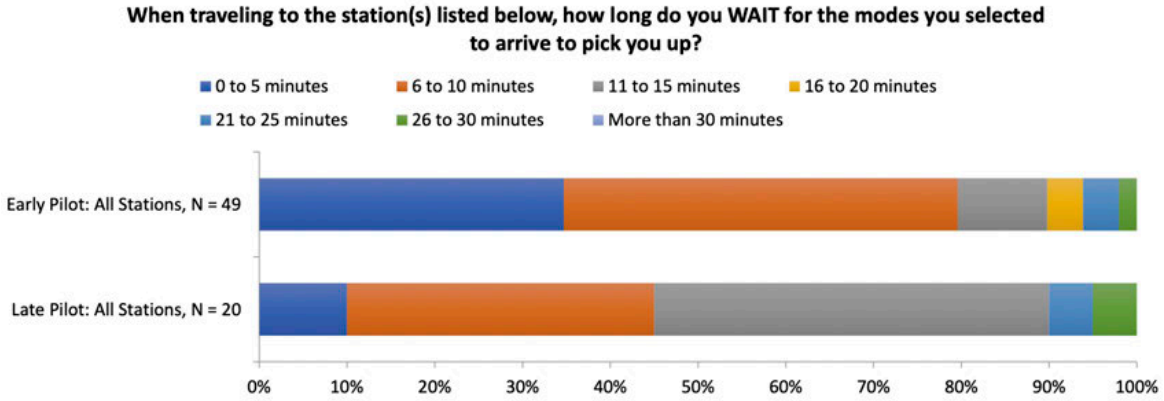


Figure 4-8 *Typical Wait Times Traveling FROM Stations (All Modes) – Los Angeles*

Access to Daily Activities

Participants in the early-pilot survey were asked about their ability to get to/from bus stops and rails stations in the Los Angeles area (see Figure 4-9). Across trip types, 26–47% of respondents had a high ease of access (9/10 on a 10-point scale). In the late-pilot survey, a significant number of respondents stated that their public transit usage at their chosen stations had increased relative to before the pilot as a result of Via, thus providing them with more access to destinations and increasing their mobility (see Figure 4-10). Across stations, 35% respondents said their use of public transit increased or significantly increased as a result of Via (compared to 15% who said their use decreased or significantly decreased). In terms of ability to travel to daily activities on any transportation mode, 29% of respondents in the early-pilot and 34% of respondents in the

late-pilot (Figure 4-11) rated their ability a 9 or 10 a 10-point scale (10 points represents that it is easy to get to almost all of their activities). However, the percentage of respondents (23% and 24%) on the lower end of the scale (5 or lower) failed to shift substantially between early- and late-pilot. Overall, the data suggest that a significant portion of respondents still struggled traveling to activities and accessibility did not substantially improve between surveys.

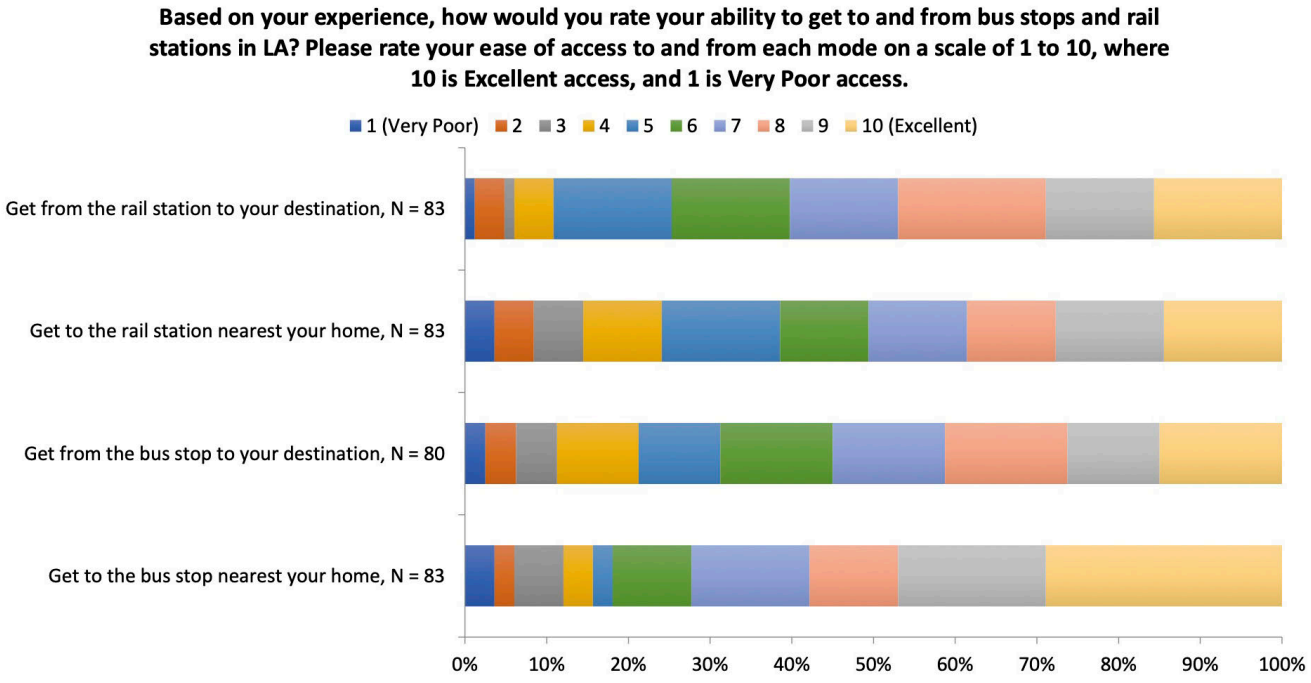


Figure 4-9 *Stated Accessibility TO/FROM Bus Stops and Rail Stations – Los Angeles*

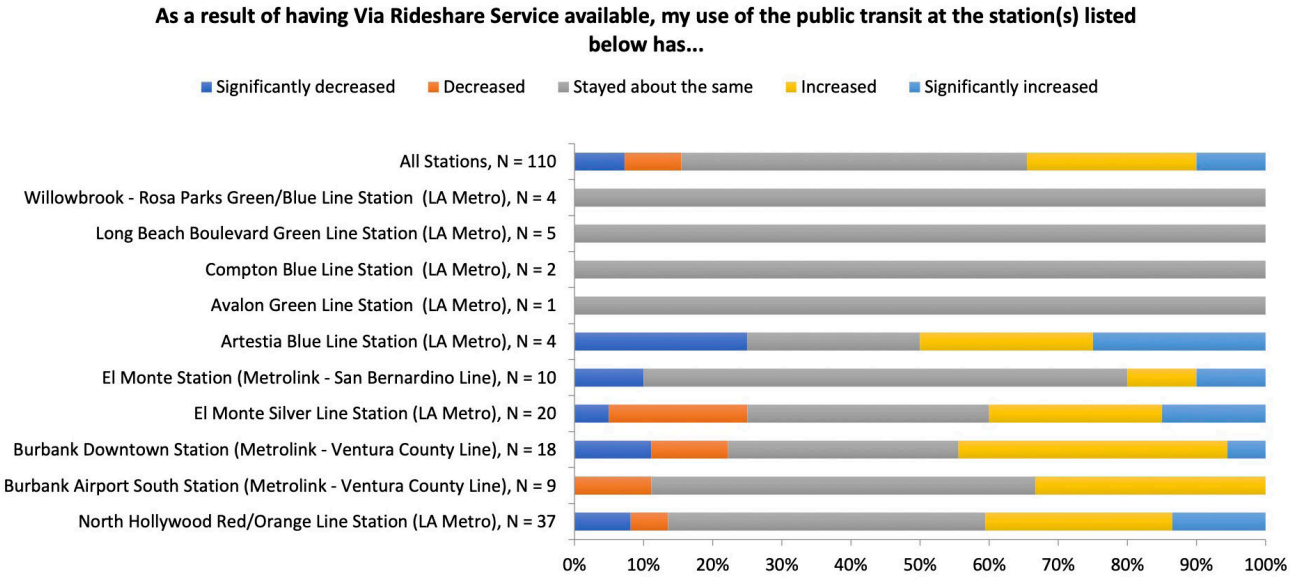


Figure 4-10 *Change in Public Transit Usage at Bus Stops and Rail Stations Due to Via Rideshare Service – Los Angeles*

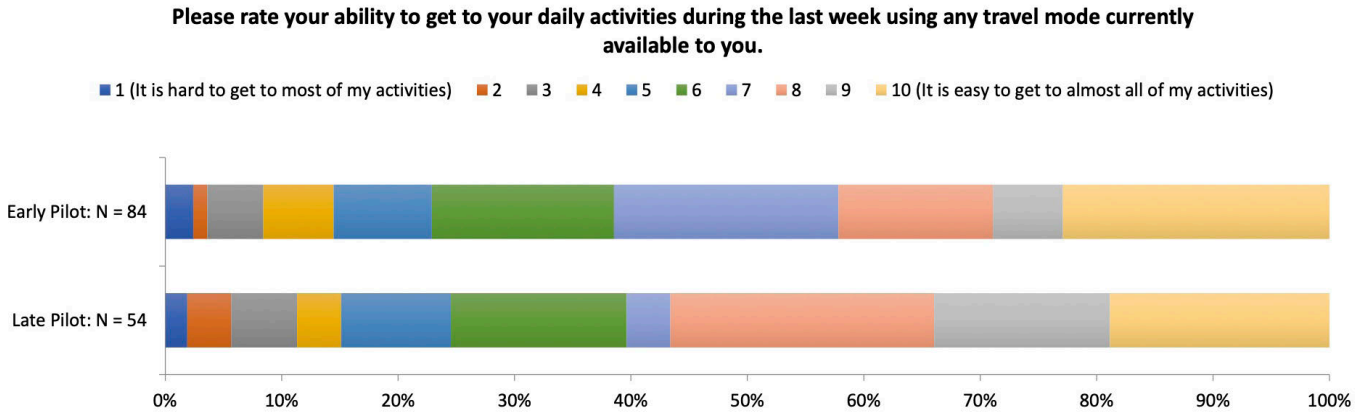


Figure 4-11 *Change in Ability to Get to Daily Activities (Any Mode) – Los Angeles*

Conclusion

The results from the survey indicate that average travel time and wait time to/from stations decreased as a result of Via Rideshare Service for a significant number of respondents. A comparison of travel times, wait times, and accessibility between early- and late-pilot surveys (all mode agnostic) yielded little meaningful change. Increases in public transit usage as a result of Via Rideshare Service along with general ability to access activities and public transit stations (bus/rail) suggest that there was some improvement in mobility. Even though some metrics did not improve between early- and late-pilot surveys, Hypothesis 1 is supported, as both surveys were administered *during* the pilot.

Puget Sound

Travel Times

Similar to the Los Angeles Metro analysis, station-by-station and aggregate analyses were conducted on changes to average travel times as a result of using Via to Transit. In the late-pilot survey, approximately 40% of respondents said that their average travel time to participating stations decreased, but only 9% said that it increased (Figure 4-12). The Rainier Beach Station experienced the largest improvements, with 53% of respondents stating that their average travel time to the station decreased. Average travel time from participating stations exhibited similar improvements. About 40% of respondents stated that their average travel time from stations decreased, while 11% stated that it increased (Figure 4-13). The Rainier Beach Station again experienced the largest improvements. Both the Tukwila International Boulevard Station and Mount Baker Station experienced only moderate improvements (23% and 28% stated that their average travel time decreased). These results support Hypothesis 1. However, a comparative analysis of average travel times on any mode of transportation from early-pilot and late-pilot yielded a slight worsening in travel times (Figures 4-14 and 4-15). This result does not support Hypothesis 1. However, it should be noted that these questions were not formulated in the context of Via to Transit (i.e., the question asked for average travel time across any mode), the questions were not causal (such as those posed in Figures 4-12 and 4-13), and the results do not capture average travel times before the pilot began.

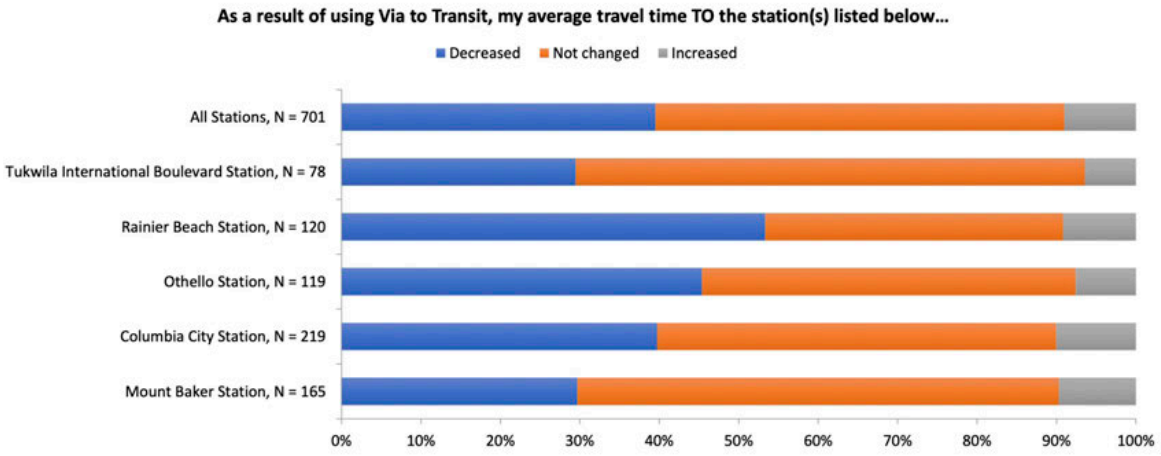


Figure 4-12 *Change in Average Travel Time TO Stations Due to Via to Transit – Puget Sound*

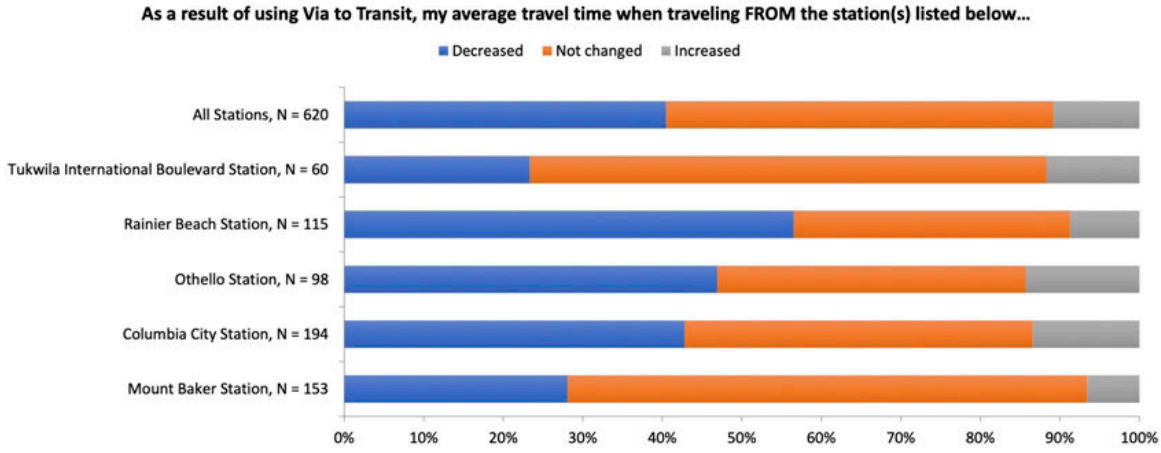


Figure 4-13 *Change in Average Travel Time FROM Stations Due to Via to Transit – Puget Sound*

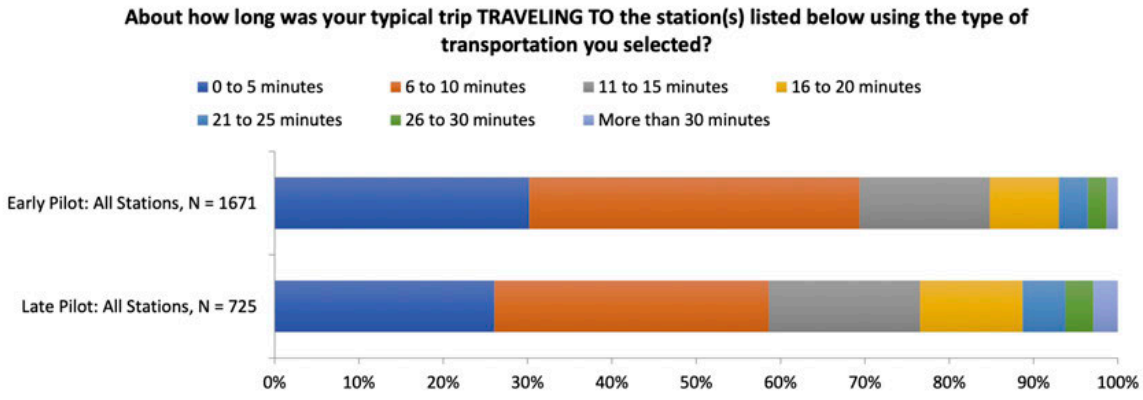


Figure 4-14 *Length of Typical Trip Travel TO Stations (All Modes) – Puget Sound*

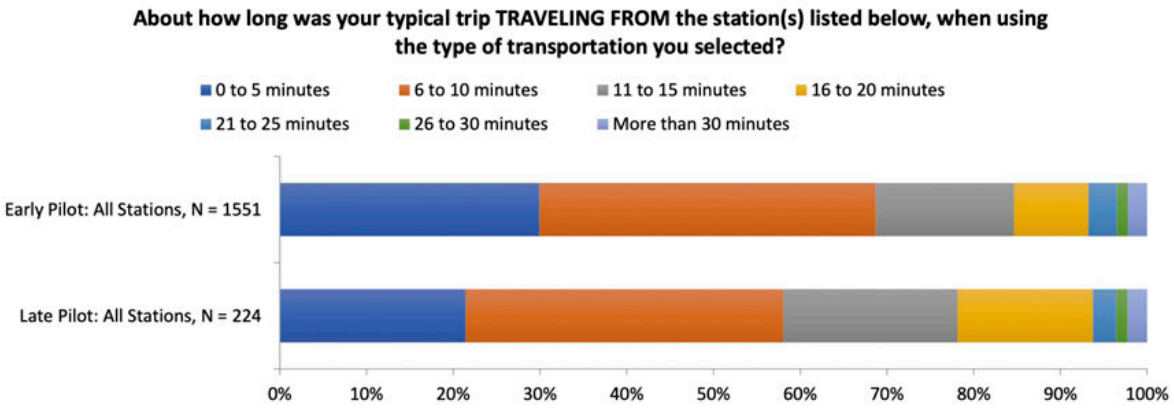


Figure 4-15 *Length of Typical Trip Travel FROM Stations (All Modes) – Puget Sound*

Wait Times

Similar to average travel times, average wait times both to and from participating stations generally improved as a result of Via to Transit. Figure 4-16 shows how approximately 36% of respondents stated that their average wait times to stations decreased across all participating stations (13% of respondents said that wait times increased). The Rainier Beach Station experienced the greatest number of respondents who saw a decrease in average wait times, while respondents going to the Mount Baker Station experienced only modest improvements. For wait times from stations, about 37% of respondents stated that their average wait time decreased as opposed to 15% who said it increased (Figure 4-17). Rainier Beach Station performed the best followed by the Othello Station and the Columbia City Station. These results support Hypothesis 1. However, average wait times across any mode to/from stations worsened slightly between early- and late-pilot (Figure 4-18 and 4-19). While this result does not support Hypothesis 1, the figures give an imperfect representation of mobility benefits from Via to Transit (as noted in the travel times section above).

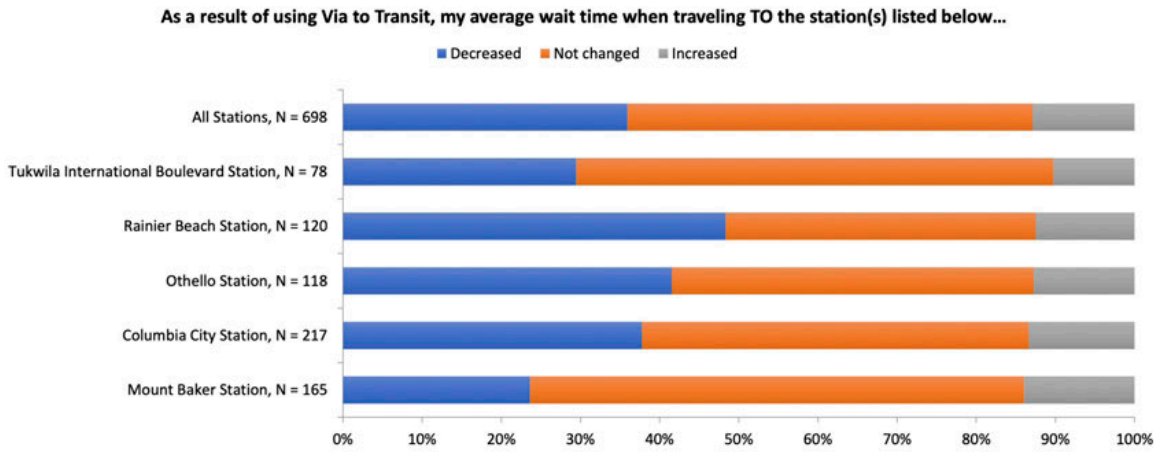


Figure 4-16 *Change in Average Wait Time TO Stations Due to Via to Transit – Puget Sound*

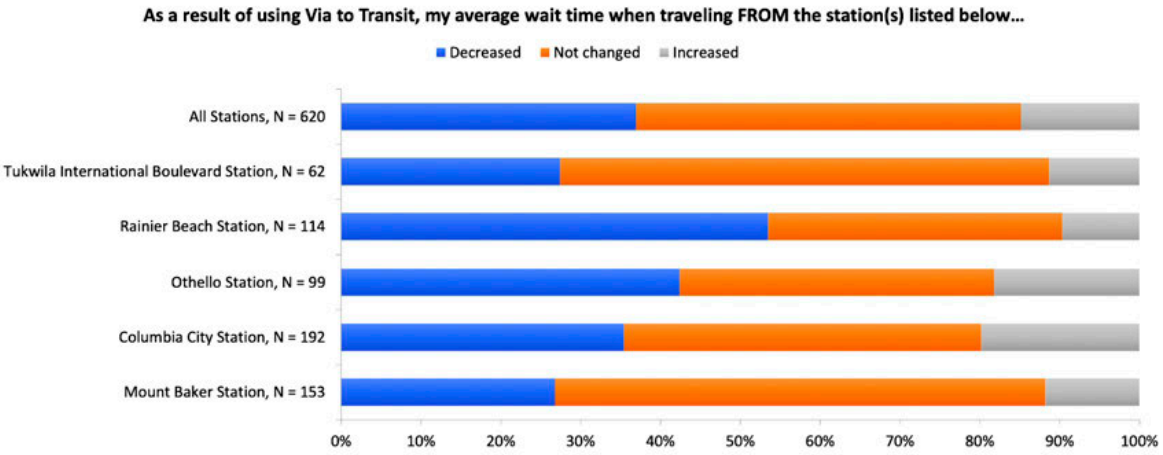


Figure 4-17 *Change in Average Wait Time FROM Stations Due to Via to Transit – Puget Sound*

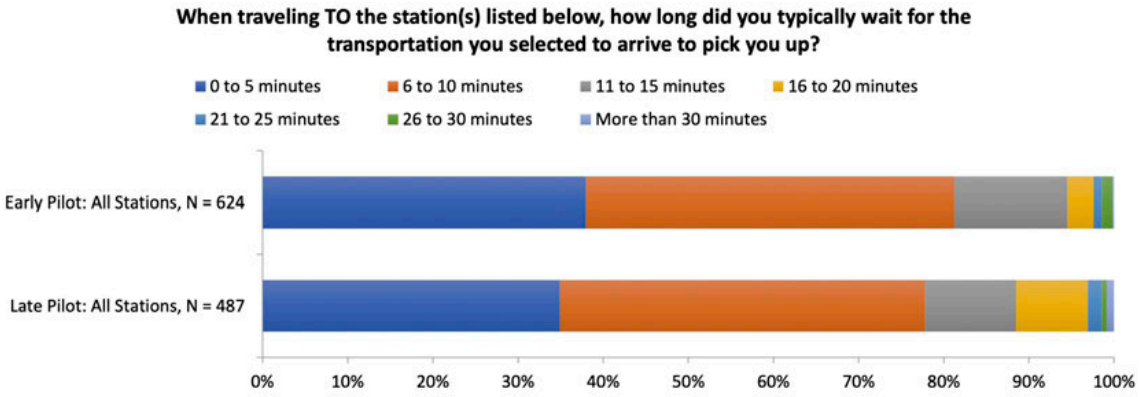


Figure 4-18 *Length of Typical Wait Times TO Stations (All Modes) – Puget Sound*

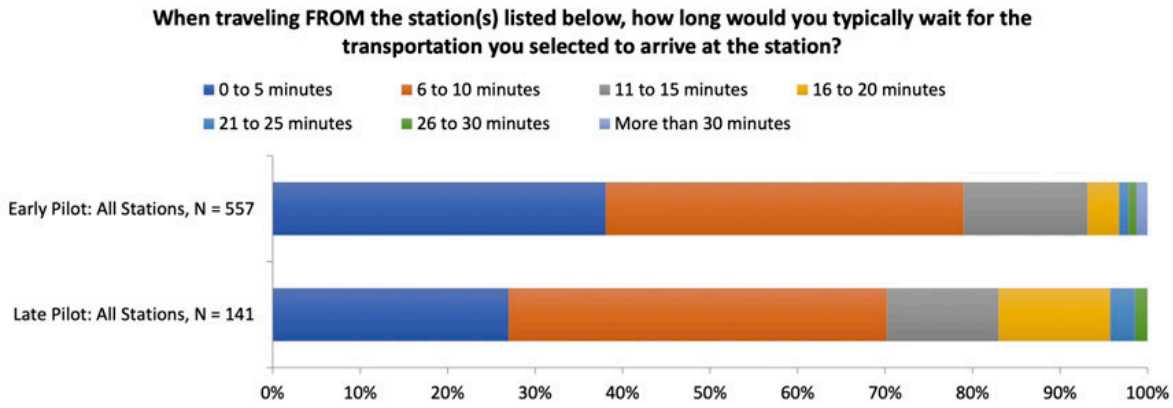


Figure 4-19 *Length of Typical Wait Times FROM Stations (All Modes) – Puget Sound*

Access to Daily Activities

Participants were asked about their ability to access daily activities using any travel mode in both the early- and late-pilot surveys (Figure 4-20). The results indicate relatively high accessibility for both the early- and late-pilot. About 37% of respondents in the early-pilot and 35% of respondents in the late-pilot gave an accessibility rating of 9 or 10 (on a 10-point scale). Just 18–19% of respondents rated their access as a 5 or below. The results offer partial support for Hypothesis 1, as mobility is fairly high, but further evidence of accessibility ratings before the pilot is needed for more conclusive support. In the early-pilot survey, a question was posed regarding mobility to and from bus stops and Link rail stations in the Puget Sound area (Figure 4-21). Ratings of a 9 or 10 ranged from 24% (getting to the Link light rail station nearest to home) to 45% (getting from the link light rail station to a destination). The results offer partial support for Hypothesis 1, indicating that FMLM connections are relatively strong. However, a sizable number of individuals rated their ability at 5 or below (21–35%, depending on trip type), suggesting considerable unmet mobility needs. Finally, Figure 4-22 displays respondent usage of Link light rail stations as a result of Via to Transit. Across all participating stations, approximately 29% of respondents said that their usage increased or significantly increased, compared to 11% of respondents who said that it decreased or significantly decreased. With Link light rail offering more access to services, jobs, and opportunities, the results support Hypothesis 1 in the increase in mobility as a result of the Via to Transit service.

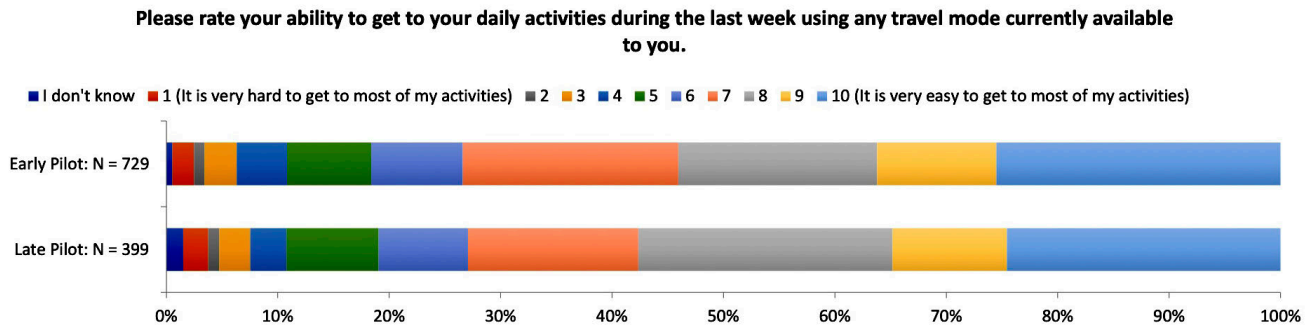


Figure 4-20 *Change in Ability to Get to Daily Activities (Any Mode) – Puget Sound*

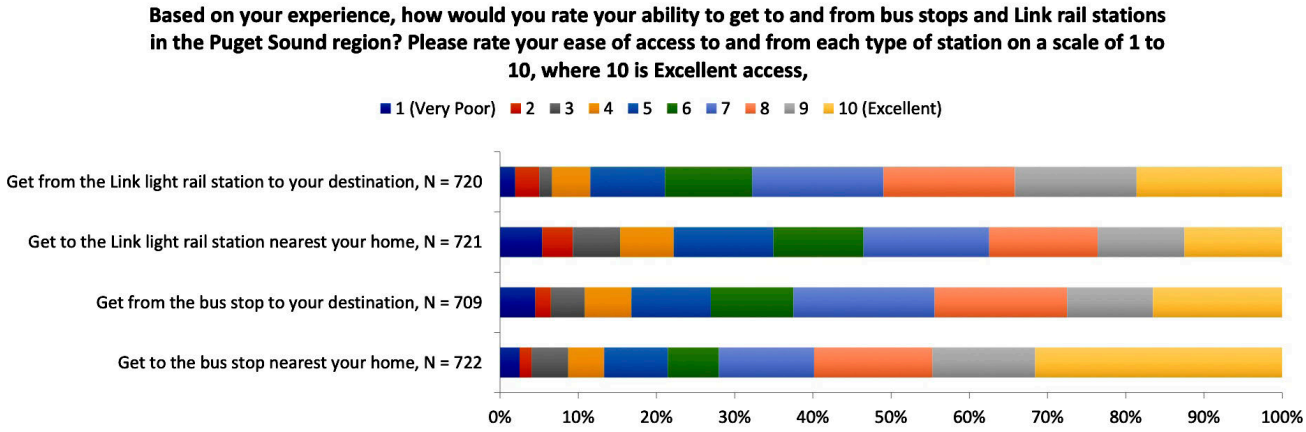


Figure 4-21 *Stated Accessibility TO/FROM Bus Stops and Rail Stations – Puget Sound*

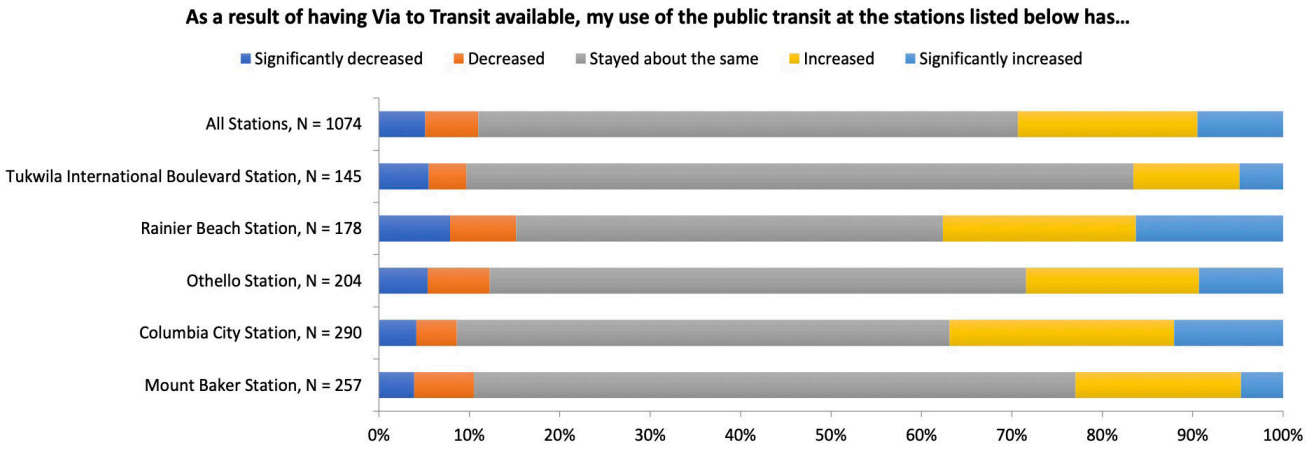


Figure 4-22 *Change in Public Transit Usage at Rail Stations Due to Via to Transit – Puget Sound*

Pilot Satisfaction

In the late-pilot survey, respondents were asked about their level of satisfaction of Via to Transit program elements. Across the metrics in Figure 4-23, more than 57% of respondents were satisfied or very satisfied, with 87% satisfied or very satisfied with the overall Via to Transit experience. Importantly, measures of convenience (90%), timing of service during the day (83%), and length of trip (78%) were all highly rated. Even metrics with fewer positive ratings, such as wait time length (57% satisfied/very satisfied) and reliability of the service (67% satisfied/very satisfied), were still highly rated.

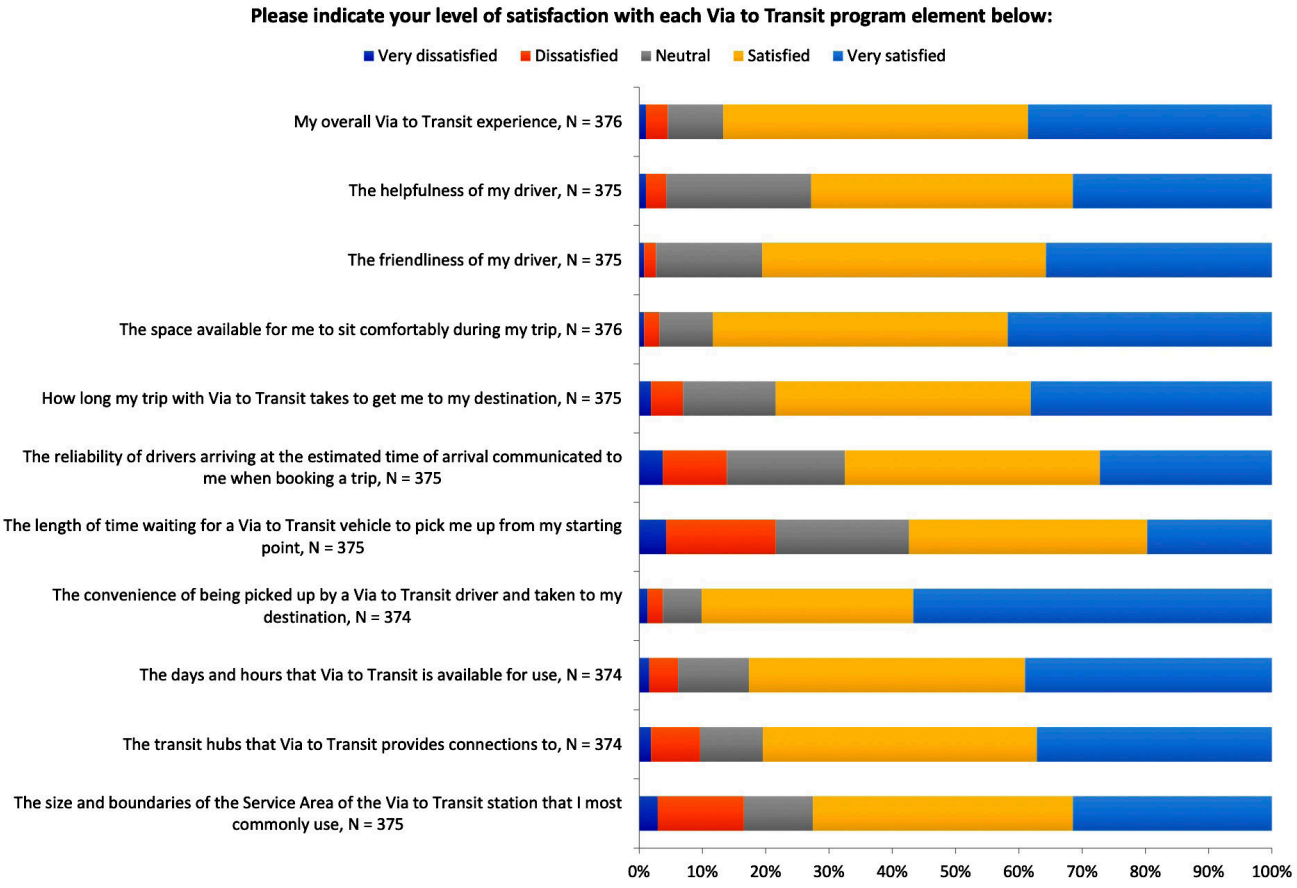


Figure 4-23 *Satisfaction of Via to Transit Program Elements – Puget Sound*

Conclusion

Causal questions that directly related Via to Transit to travel times and wait times to/from Link light stations displayed significant improvements. A significant portion of respondents across participating stations stated that their average travel times and average wait times as a result of Via to Transit decreased. Similarly, a sizable proportion of respondents stated that their usage of Link light rail increased or significantly increased. Respondents also rated their overall access to activities and stations relatively high and were satisfied or very satisfied with many elements of the Via to Transit program. Responses to the survey suggest that mobility, in the form or improved travel and wait times, in the Puget Sound region increased as a result of Via to Transit.

Conclusion – Overall

Overall, the results from the analysis of survey data in Los Angeles and Puget Sound suggest that Hypothesis 1 is supported.

Hypothesis 2a: Users who previously did not have access to TNCs for FMLM trips will now have access to TNCs to complete FMLM trips.

Performance Metric	Key Finding – Los Angeles	Key Finding – Puget Sound
Number of low-income people who previously did not have access to TNCs as a FMLM option.	Key accessibility metrics (e.g., travel time, wait time) generally improved due to Via Rideshare Service for lower-income respondents, and cost savings were realized. Mode choice and mode replacement suggest that lower-income respondents had minimal access to (or chose not to use) TNCs and pooled TNCs and that Via provided important FMLM gap-filling.	Access to activities was fairly high for lower-income respondents, and cost savings as a result of Via to Transit were notable. Moreover, the Via to Transit FMLM trips offered improved mobility and access for lower-income respondents through reduced average travel times and average wait times to/from stations.

The second hypothesis explored as part of the evaluation was whether users who previously did not have access to TNCs for FMLM trips now had access to Via to complete these trips. To assess this hypothesis, respondents who stated that they had an annual household income below $50,000 were considered, as these individuals are generally less likely to be able to afford TNCs. Access to Via trips was considered across multiple metrics including cost savings, perceived access, mode choice, mode replacement, travel times, and wait times.

Los Angeles

Mode Choice

To determine new access, lower-income households (i.e., households with annual income below $50,000) were assessed on their mode choice. Figures 4-24 and 4-25 display mode choice for lower-income and higher-income households for the early-pilot and late-pilot. While use of Via Rideshare Service initially lagged behind non-pooled and pooled TNCs in the early-pilot, usage grew substantially in the late-pilot with around 90% of respondents for both income groups. Use of non-pooled TNCs (e.g., Uber, Lyft) fell slightly between pilot stages for all households. Pooled TNC (e.g., UberPOOL, Lyft Shared) usage dropped for all households but more so for lower-income households between early- and late-pilot. While differences between income groups were not substantial, the comparison of mode choice indicates that Via Rideshare Service became more prevalent, indicating increased access to FMLM trips. This partially supports Hypothesis 2a since all income levels displayed more access.

An analysis of lower-income households was also conducted for modes that they did NOT use. This analysis focused on the non-use of TNCs and pooled TNCs and indicates people that had little access to forms of TNCs or chose not to take different forms of TNCs. Figure 4-26 shows that about 50% of those who did not use a TNC did use Via Rideshare Service (early-pilot). This jumped substantially to 100% for the late-pilot. Similarly, 45% of those who did not use pooled TNCs did use the Via Rideshare Service in the early-pilot, increasing to 89% for the late-pilot.

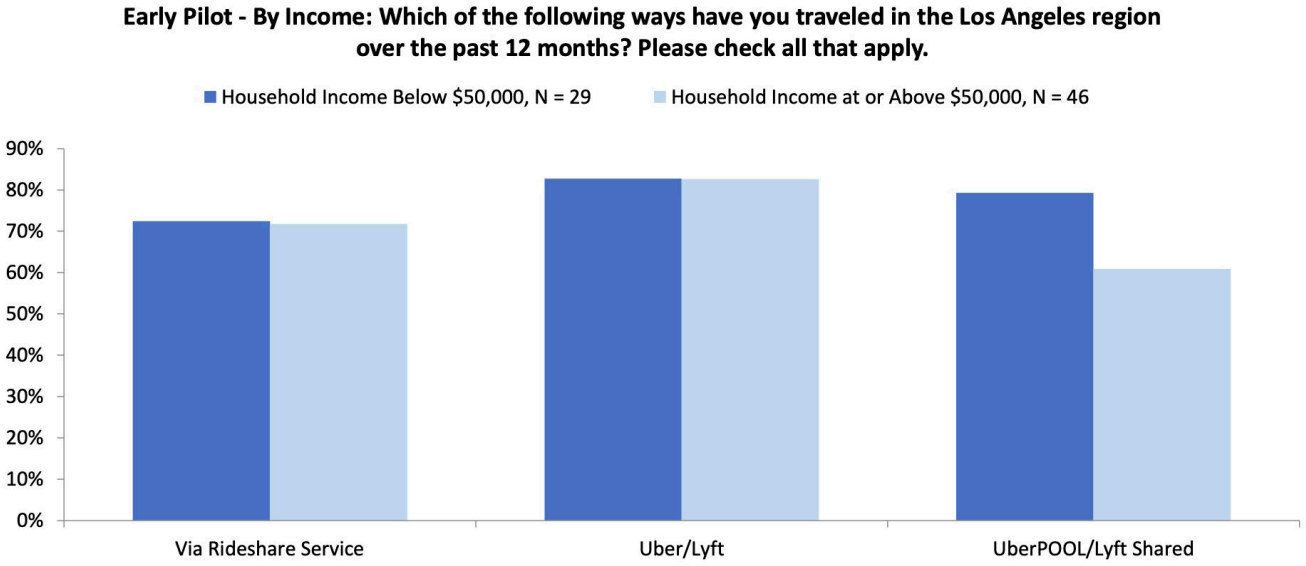


Figure 4-24 *Mode Choice by Income Level for Early-Pilot – Los Angeles*

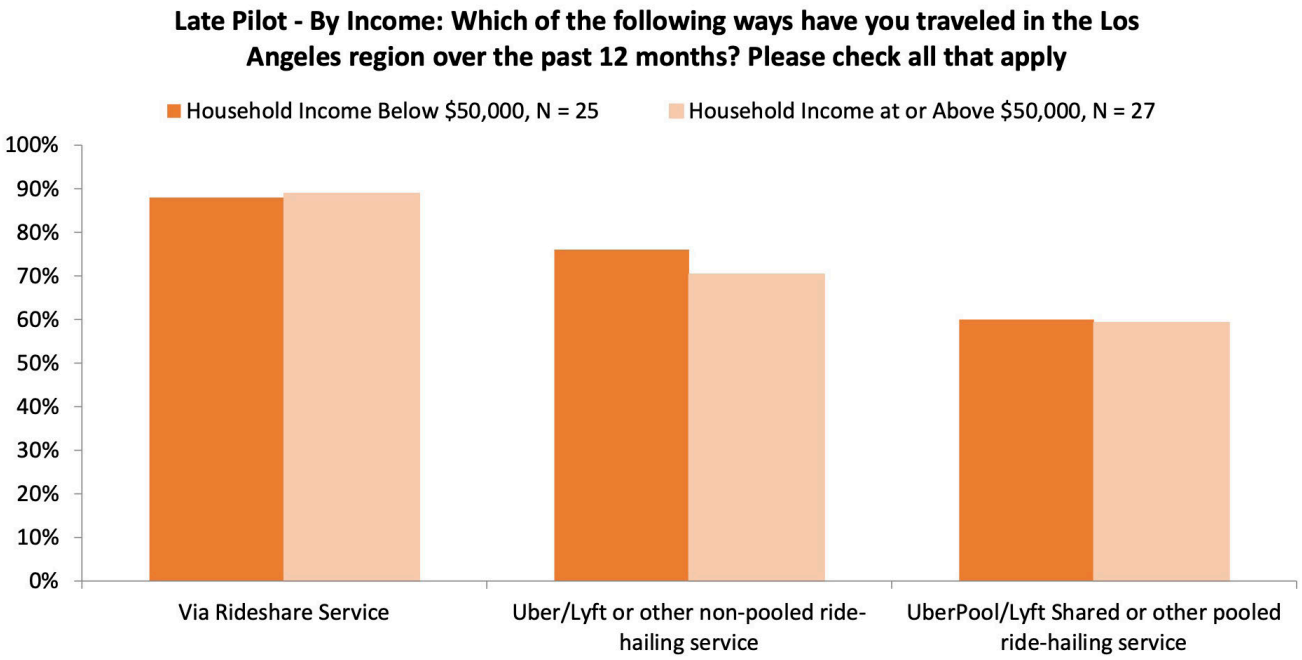


Figure 4-25 *Mode Choice by Income Group for Late-Pilot – Los Angeles*

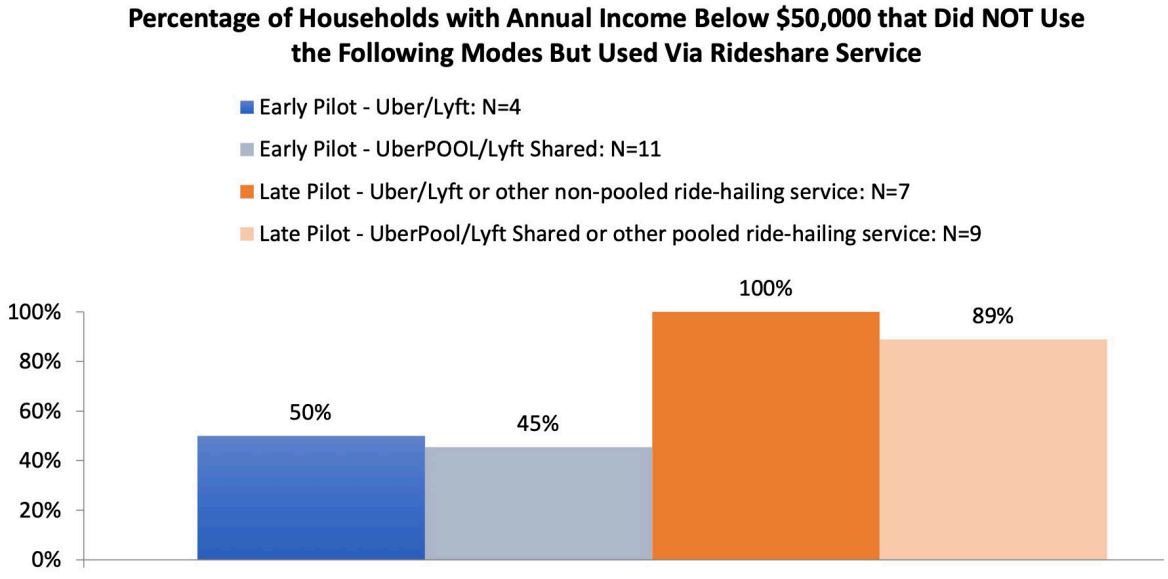


Figure 4-26 *Change in Mode Choice of Lower-Income Respondents – Los Angeles*

Mode Replacement

Lower-income respondents were asked what mode of transportation they would have taken to rail or connecting bus if they had not taken Via Rideshare Service (Figures 4-27 and 4-28). Across all stations, approximately 37–40% of respondents would have taken a public bus to/from the stations. About 30–34% of respondents would have driven a personal vehicle, and 10% would have walked. However, only 0–7% of respondents would have taken a TNC and only 2–10% of respondents would have taken a pooled TNC. The results suggest that lower-income respondent who used Via Rideshare Service for FMLM trips did not have access to TNCs/pooled TNCs before the pilot.

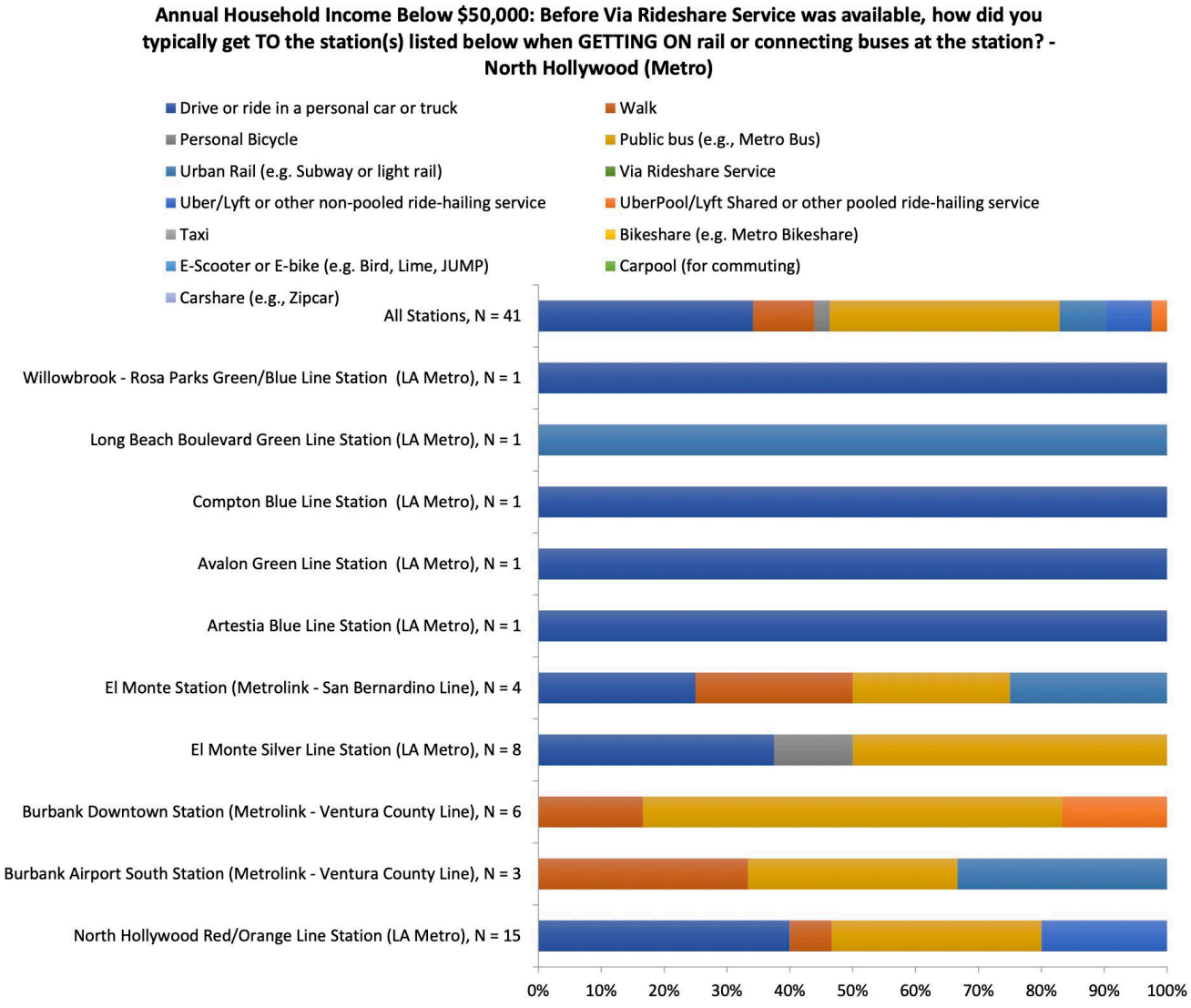


Figure 4-27 *Mode Replacement for Via Rideshare Service TO Stations – Los Angeles*

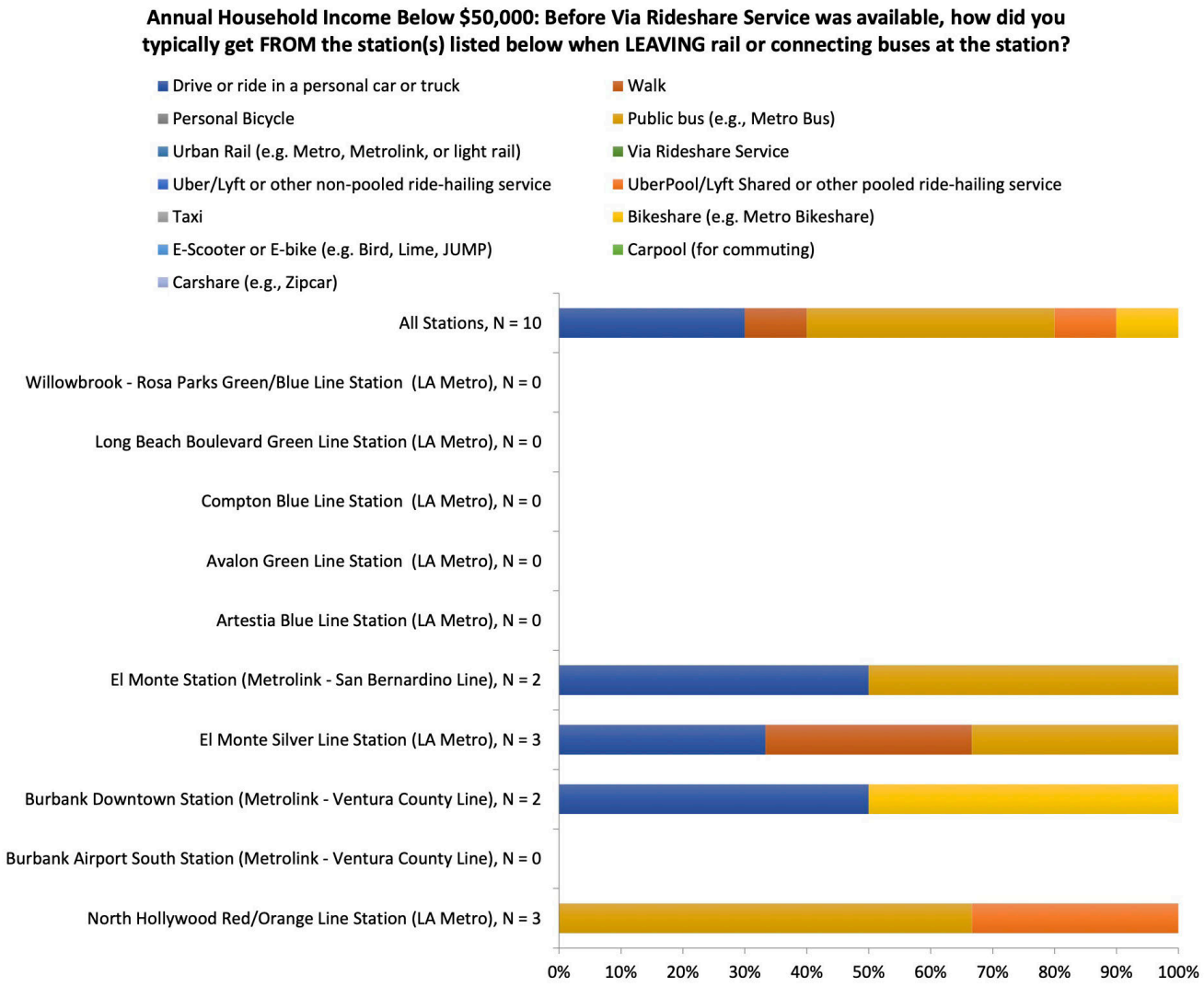


Figure 4-28 *Mode Replacement for Via Rideshare Service FROM Stations – Los Angeles*

Perceived Access

Figure 4-29 displays respondents' rating of their ability to get to their daily activities regardless of travel mode. About 21% of respondents in the early-pilot rated their access to be very high (9 or 10 on a 10-point scale). This increased to 40% in the late-pilot, indicating improvements in accessibility and FMLM trip-taking.

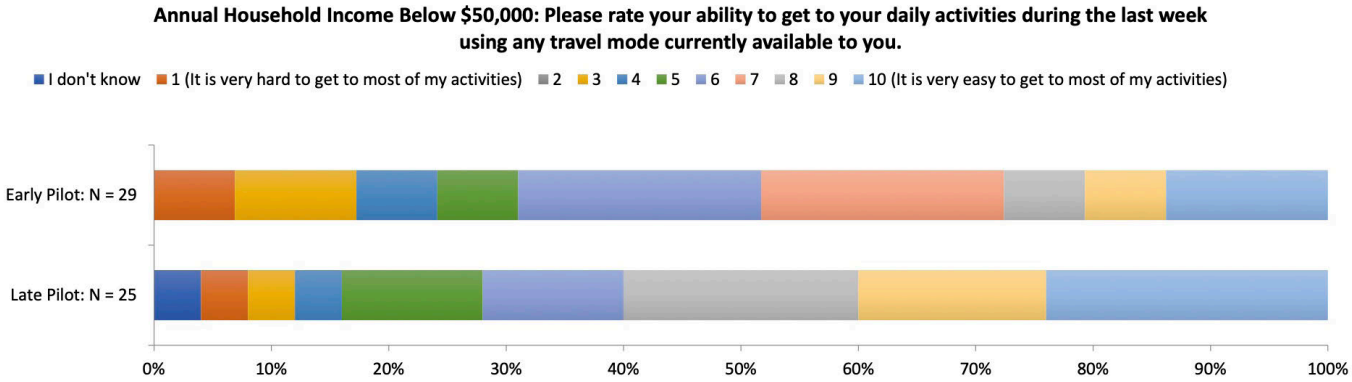


Figure 4-29 *Change in Ability to Get to Daily Activities (Any Mode) for Lower-Income Respondents – Los Angeles*

Cost Savings

Respondents were asked in the late-pilot survey how their use of Via Rideshare Service had impacted their transportation costs and savings. Figure 4-30 shows that for lower-income respondents, about 38% reported that they experienced significant transportation cost savings and another 38% reported some transportation cost savings. Just 8% of respondents stated that they experienced an increase in transportation costs. The results suggested that the system reduced the financial burden of transportation on people that traditionally do not have access to TNCs.

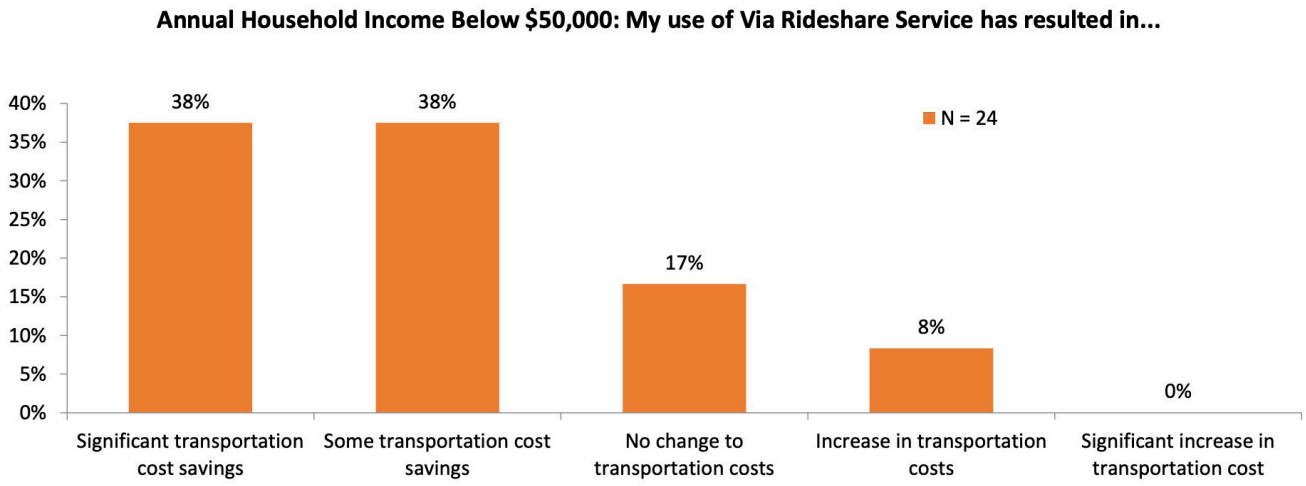


Figure 4-30 *Cost Savings Resulting from Via Rideshare Service – Los Angeles*

Travel Times

To further assess newly realized access, an analysis of change in average travel time was conducted across stations for lower-income respondents. The results in Figure 4-31 present clear decreases in average travel time to several participating stations and in aggregate. Overall, approximately 43% of respondents said their average travel time decreased and just 5% said that it increased. Similar results were found for average travel time from several stations and in aggregate (Figure 4-32). Overall, approximately 43% of respondents said their average travel time decreased and just 3% said that it increased. The results suggest that there were improvements in travel time for individuals with lower access to TNCs.

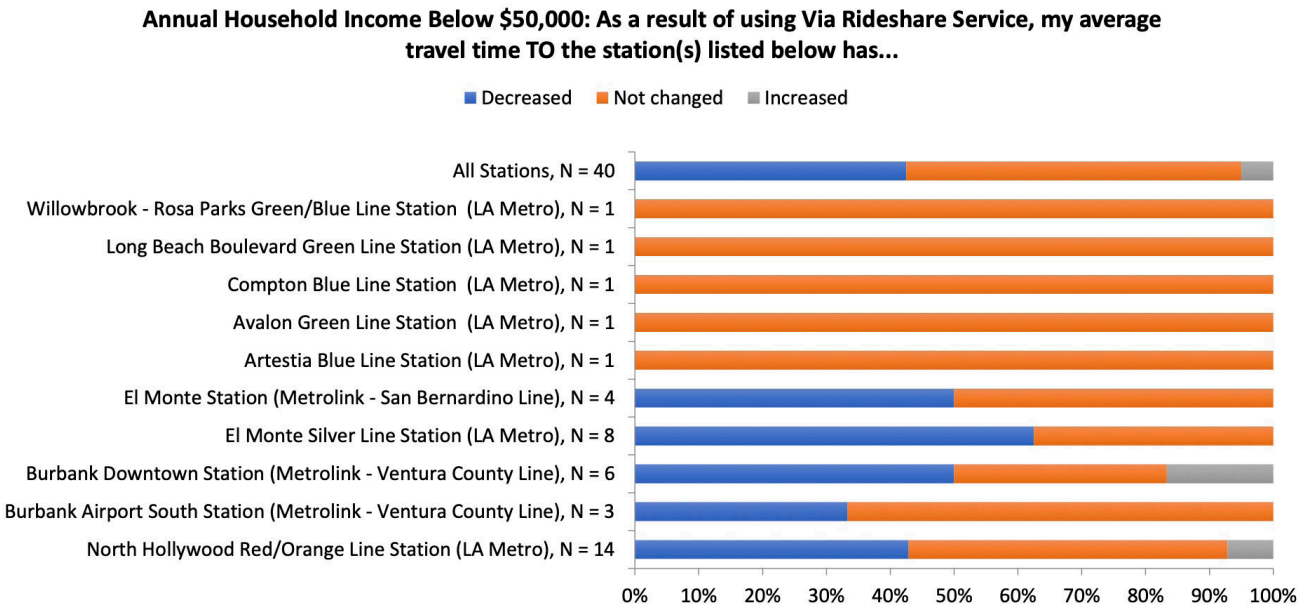


Figure 4-31 *Change in Average Travel Time TO Stations for Lower-Income Respondents – Los Angeles*

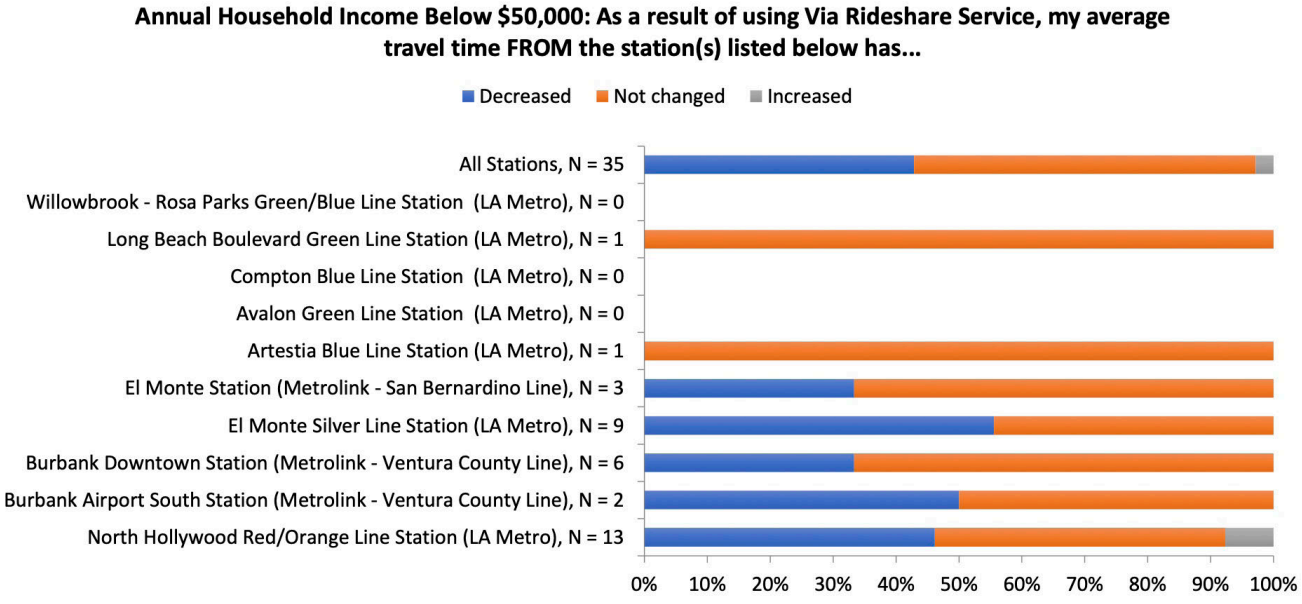


Figure 4-32 *Change in Average Travel Time FROM Stations for Lower-Income Respondents – Los Angeles*

Wait Times

An analysis on change in wait times as a result of Via Rideshare Service was also conducted. Figure 4-33 displays the change in wait times to participating stations and in aggregate across all participating stations for lower-income respondents. Overall, approximately 28% of respondents stated that their average wait time decreased to stations while a comparable 25% stated that it increased. For wait times from stations overall, approximately 42% of respondents said that their average wait time decreased to stations and 19% said that it increased (Figure 4-34). Taken together, changes in wait times going to the station exhibited mixed results with improvements for some, no change for most, and worsened for others.

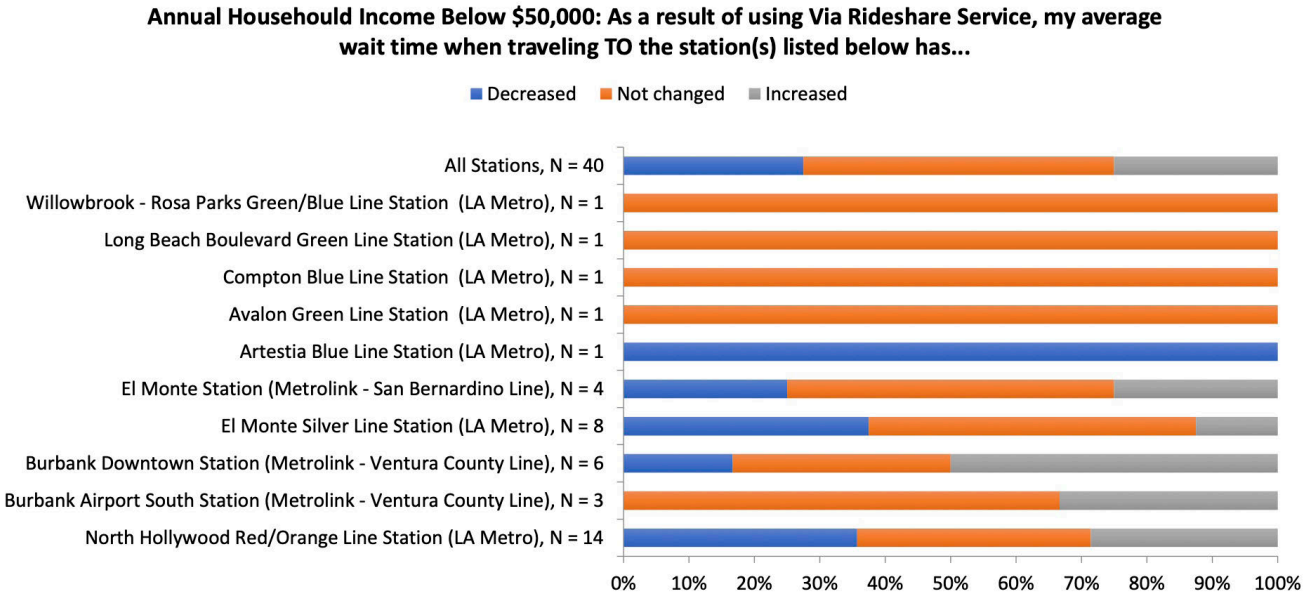


Figure 4-33 *Change in Wait Times TO Stations for Lower-Income Respondents – Los Angeles*

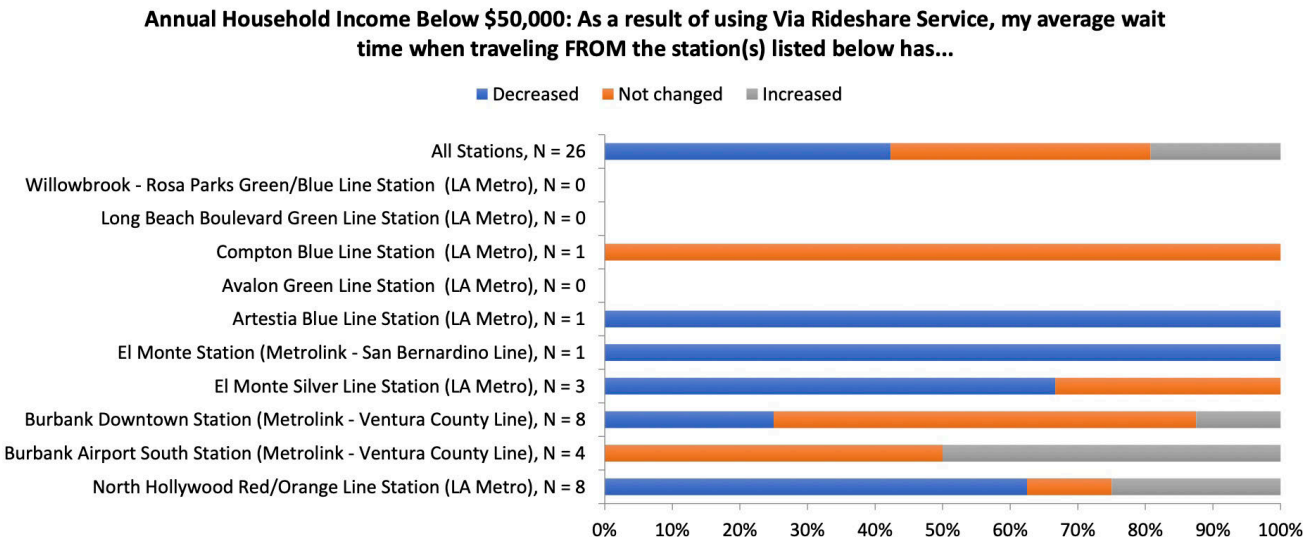


Figure 4-34 *Change in Wait Times FROM Stations for Lower-Income Respondents – Los Angeles*

Conclusion

Most of those who did not have access to TNCs before the pilot did use the Via Rideshare Service in the late-pilot and use of Via Rideshare Service also increased between early- and late-pilot. Mode replacement indicates that lower-income household do not typically use TNCs or pooled-TNCs for FMLM trips. Cost savings were realized for most lower-income respondents. Average travel times as a result of the Via Rideshare Service decreased. Stated access also improved for lower-income respondents between early- and late-pilot.

Puget Sound

Mode Choice

For Via to Transit in the Puget Sound area, mode choice was first examined by annual household income. Figures 4-35 and 4-36 display mode choice of Via to Transit, TNCs (e.g., Uber, Lyft), and pooled TNCs (e.g., UberPOOL, Lyft Shared) for the early-pilot and late-pilot, respectively. In both the early- and late-pilot, the Via to Transit service usage was similar by income. TNC usage was more prevalent by higher-income households, but usage by all households regardless of income dropped between early- and late-pilot. While use of pooled TNCs was slightly higher for lower-income households, all households used this mode less in the late-pilot. Most importantly, the results show that lower-income households used Via to Transit far more than TNCs and pooled TNCs.

For individuals with a lower-income who did not use TNCs or pooled TNCs, a significant number (83% and 85%) used Via to Transit (Figure 4-37) in the early-pilot stage. These values rose in the late-pilot stage to 93% and 92%. The results show that those without access to TNCs do have access to Via to Transit to complete FMLM trips.

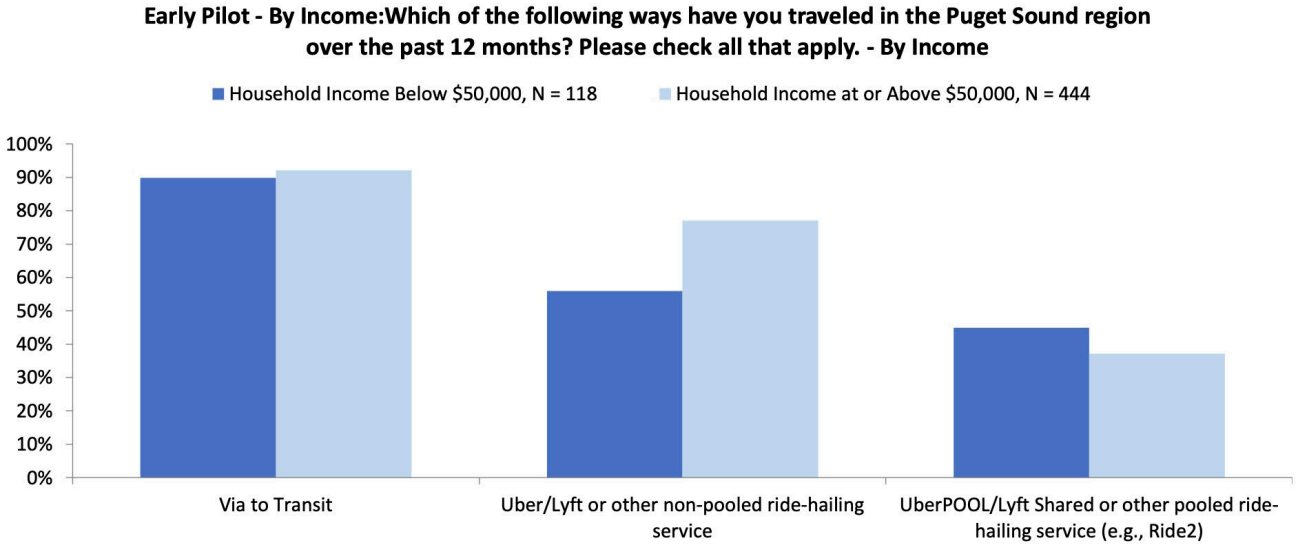


Figure 4-35 *Mode Choice by Income Level for Early-Pilot – Puget Sound*

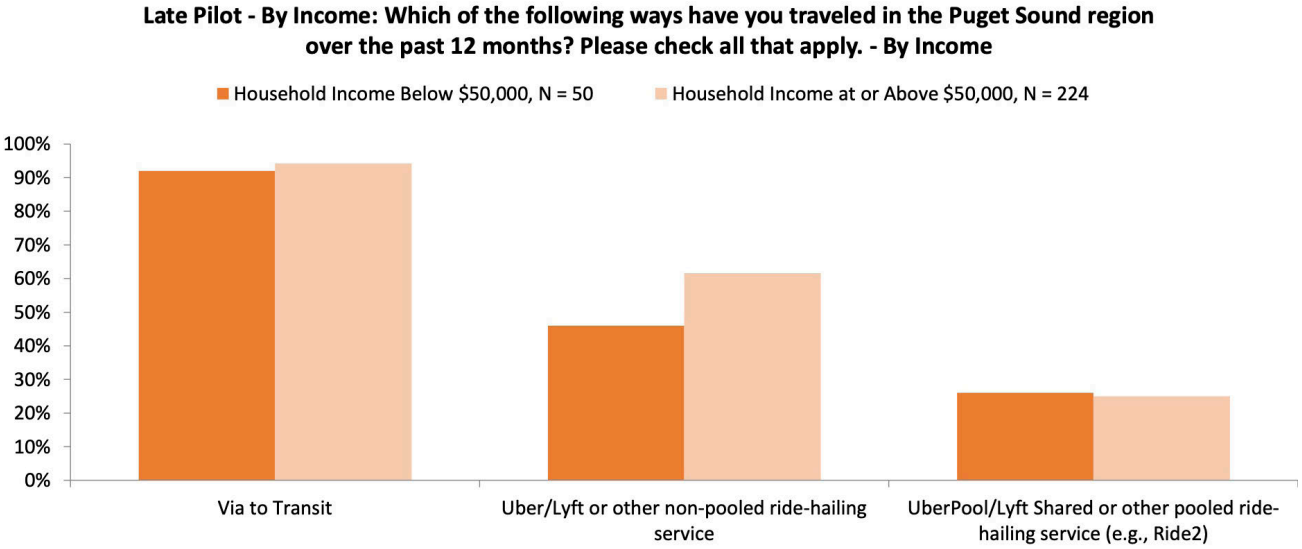


Figure 4-36 *Mode Choice by Income Group for Late-Pilot – Puget Sound*

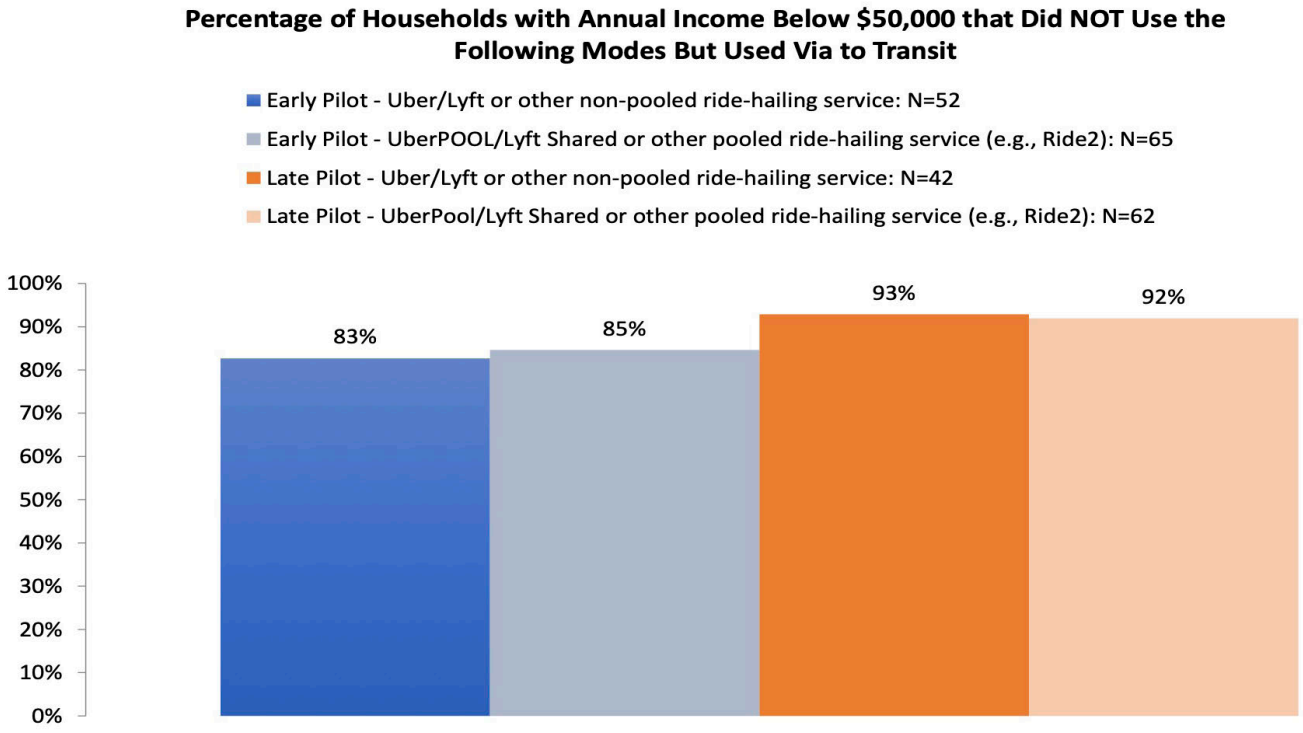


Figure 4-37 *Change in Mode Choice of Lower-Income Respondents – Puget Sound*

Mode Replacement

Figures 4-38 and 4-39 present the modes that respondents have taken to/from stations before the Via to Transit service was available. About 27% (to) and 43% (from) of respondents would have taken a public bus. A sizable portion would have walked (26% to, 21% from) and 14% (to) and 9% (from) would have driven a personal vehicle.[8] Most importantly, almost no lower-income respondents would have taken TNCs (2% to, 4% from) and no respondents would have taken pooled TNCs. The results suggest that these respondents did not have access to (or did not use) TNCs/pooled TNCs but now have access to FMLM trips to/from the participating stations through Via to Transit.

[8] Some respondents may have misinterpreted the question as 29% (to) and 23% (from) said they would have taken Link light rail.

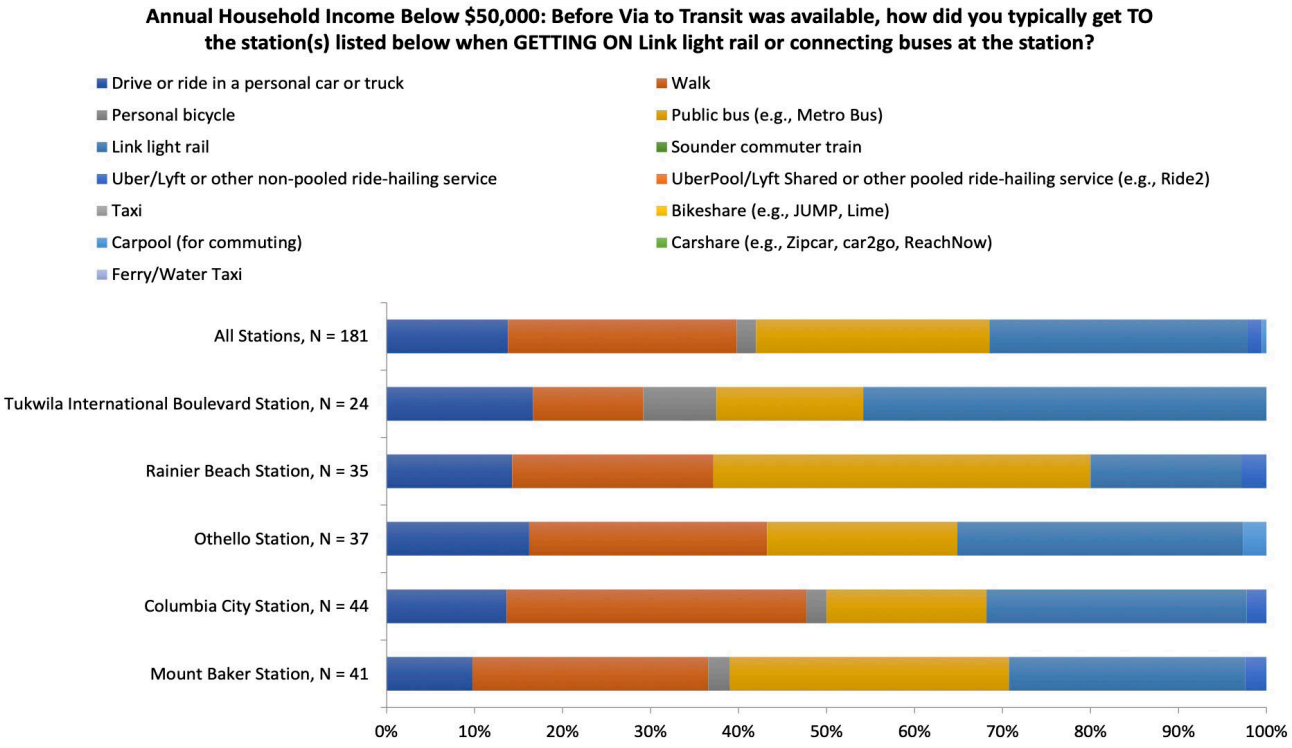


Figure 4-38 *Mode Replacement for Via to Transit TO Stations – Puget Sound*

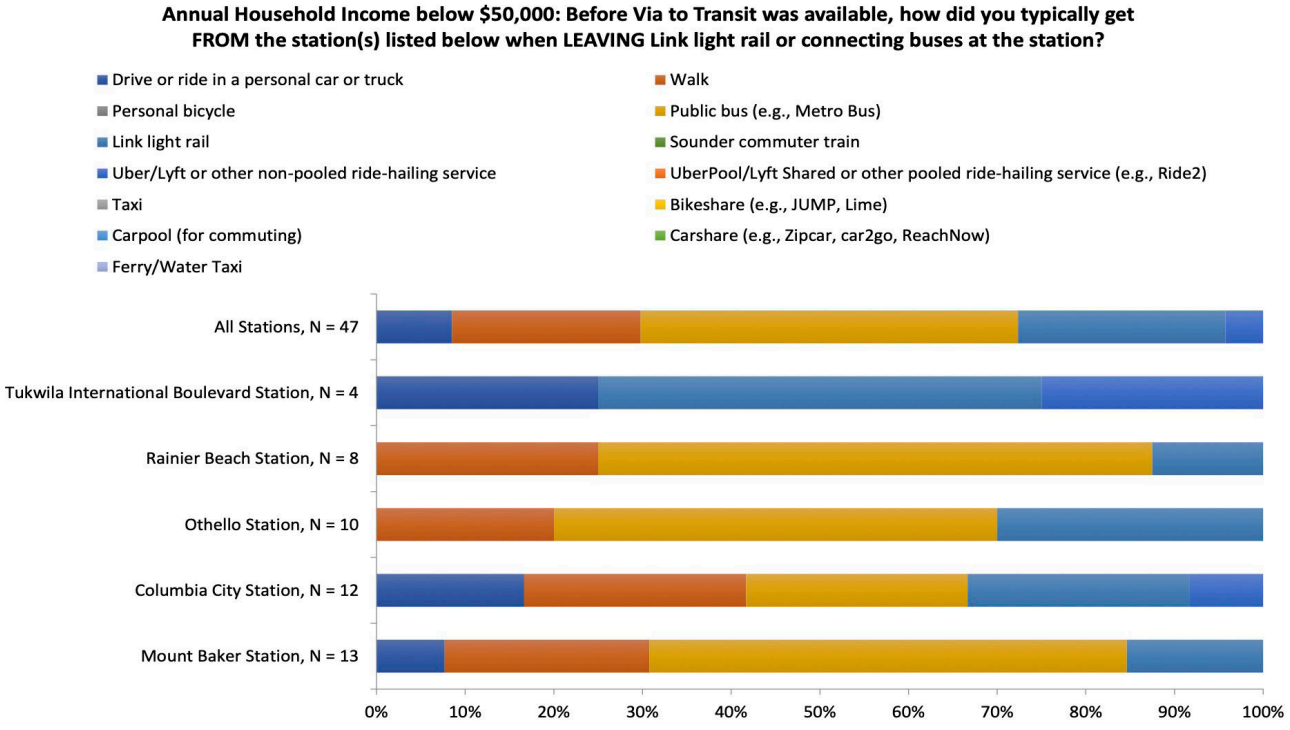


Figure 4-39 *Mode Replacement for Via to Transit FROM Stations – Puget Sound*

Perceived Access

Figure 4-40 displays the differences in ability to get to daily activities between the early-pilot and the late-pilot for lower-income households. Respondents in both the early- and late-pilot surveys rated their ability to get to activities fairly high, with 36% of respondents providing a rating of nine or ten in the early-pilot and 38% of respondents giving those ratings in the late-pilot. The relatively high access ratings are indicative of the ability to complete FMLM trips. While the access ratings involve any mode and do not capture access before the pilot, most of the survey respondents were Via to Transit users, indicating at least some improvement of FMLM trips due to Via to Transit.

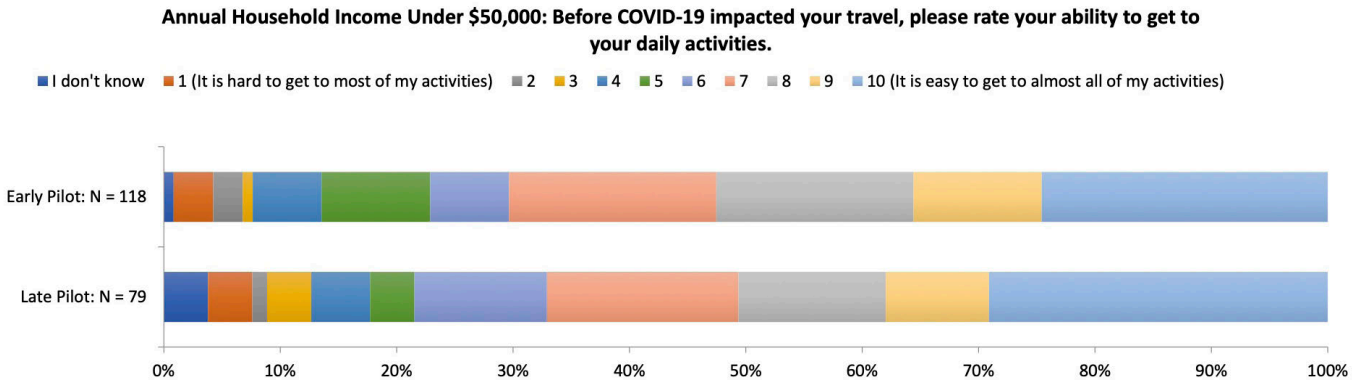


Figure 4-40 *Change in Ability to Get to Daily Activities (Any Mode) for Lower-Income Respondents – Puget Sound*

Cost Savings

From the late-pilot survey, Figure 4-41 presents cost savings of lower-income households as a result of Via to Transit. The results clearly show that Via to Transit decreased the cost of transportation, leading to significant transportation cost savings for 39% of respondents and some transportation cost savings for 21% of respondents. Only 4% of respondents stated that they experienced an increase in transportation costs. The results suggest that Via to Transit offered a low-cost alternative for FMLM trip-making, especially compared to more expensive TNCs and pooled TNCs.

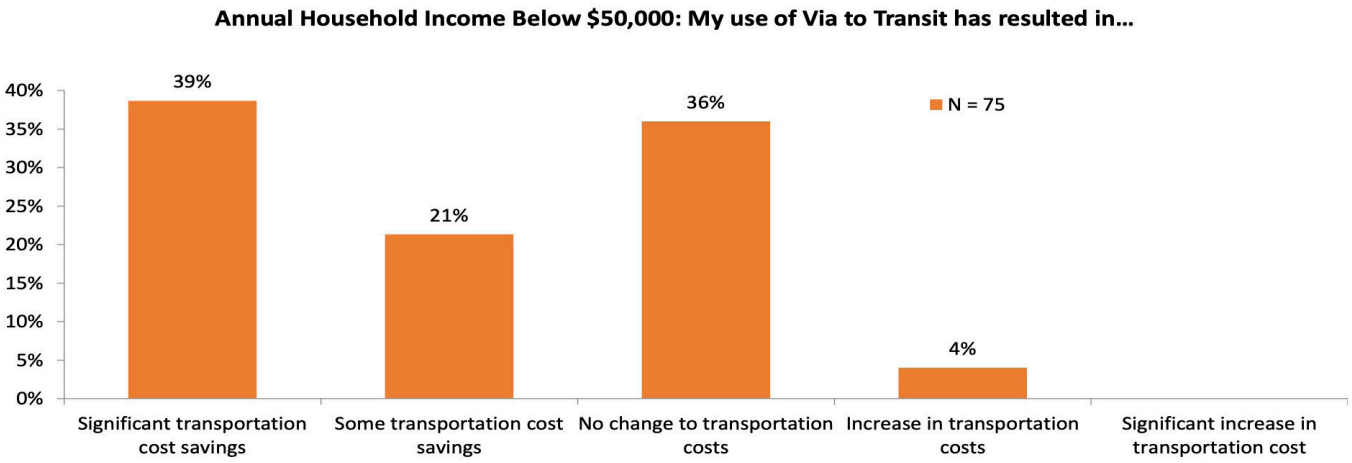


Figure 4-41 *Cost Savings Resulting from Via to Transit – Puget Sound*

Travel Time

An analysis was also conducted on travel time changes as a result of Via to Transit to see if these new trips helped increase mobility and access for lower-income households. Results in Figure 4-42 show that about 46% of lower-income respondents experienced a decrease in their average travel time to participating stations, with the Rainier Beach Station experiencing the highest improvements. Just 8% of respondents experienced an increase in average travel time. For travel time from stations (Figure 4-43), 42% of respondents experienced a decrease in average travel time while just 10% experienced an increase.

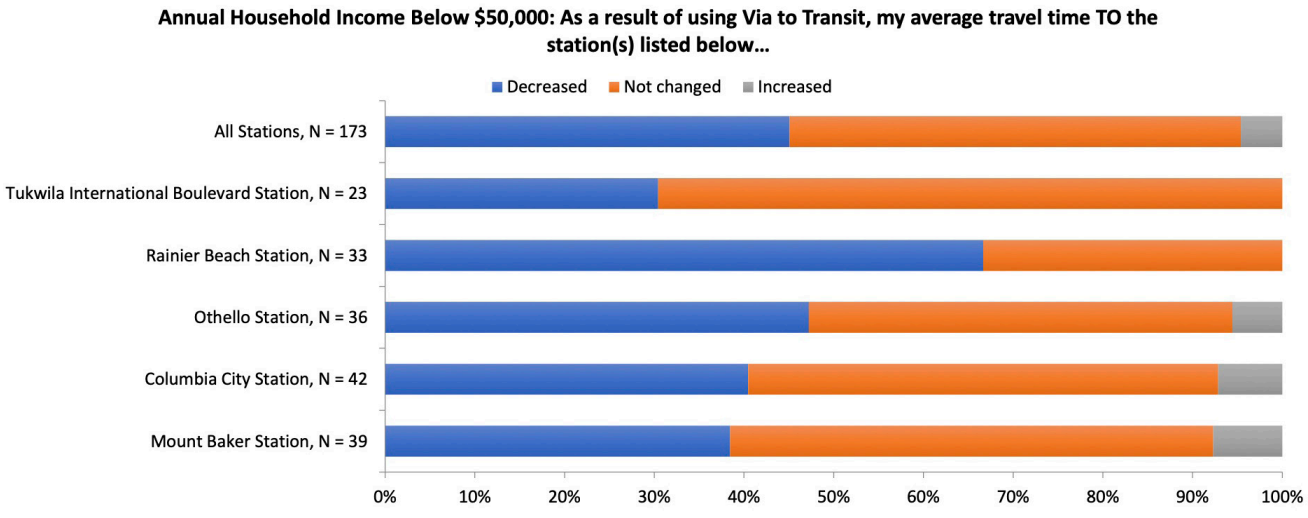


Figure 4-42 *Change in Average Travel Time TO Stations for Lower-Income Respondents – Puget Sound*

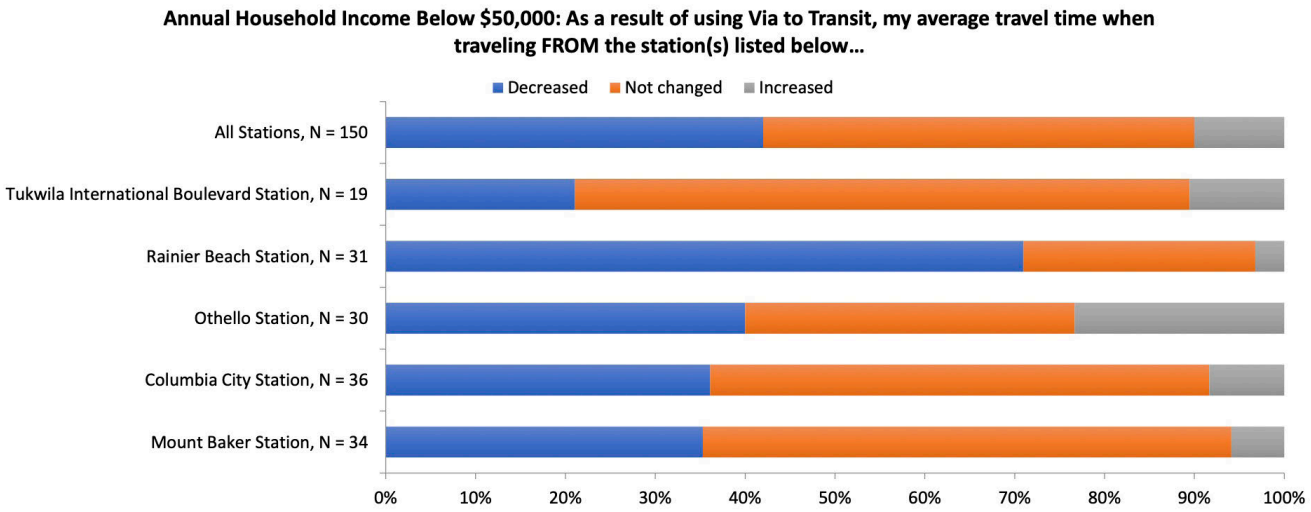


Figure 4-43 *Change in Average Travel Time FROM Stations for Lower-Income Respondents – Puget Sound*

Wait Times

For change in wait times as a result of the Via to Transit service, Figure 4-44 displays significant improvements for lower-income households. About 46% of respondents stated that their average wait time to a participating station decreased while only 8% stated that it increased. The Rainier Beach Station experienced the largest improvement, followed by the Othello Station. In Figure 4-45, about 39% of respondents said that their average wait time decreased from stations, compared to 12% who said that it increased. It should be noted that average wait time increases were most common at the Othello Station, while decreases were most common at the Rainier Beach Station. The results suggest that Via to Transit offered improved mobility and lower wait times overall as compared to other FMLM options.

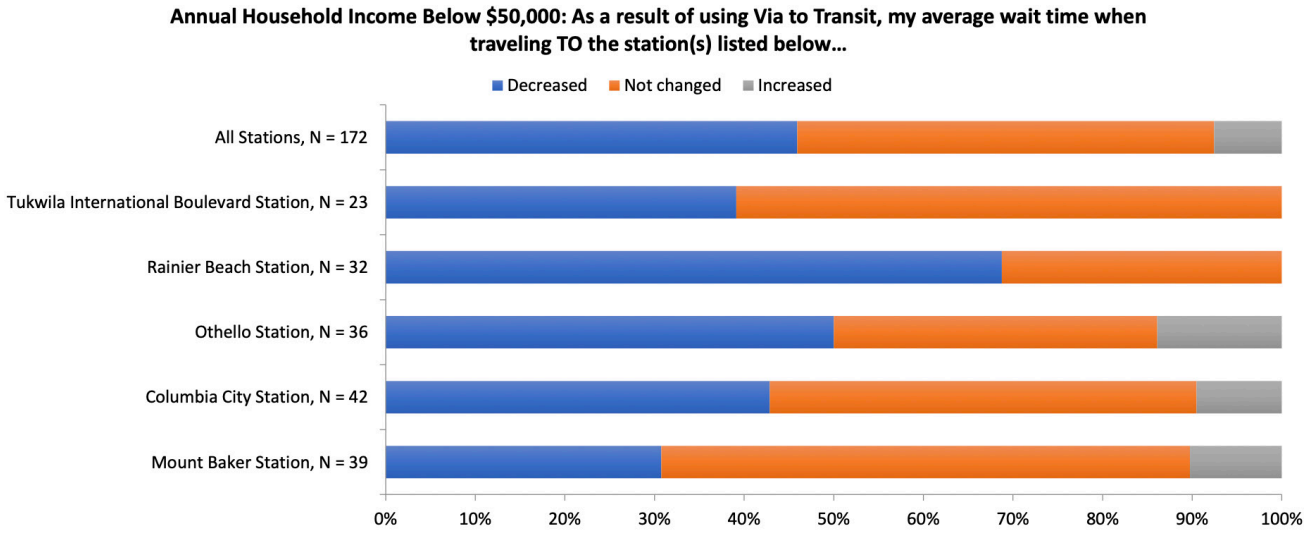


Figure 4-44 *Change in Wait Times TO Stations for Lower-Income Respondents – Puget Sound*

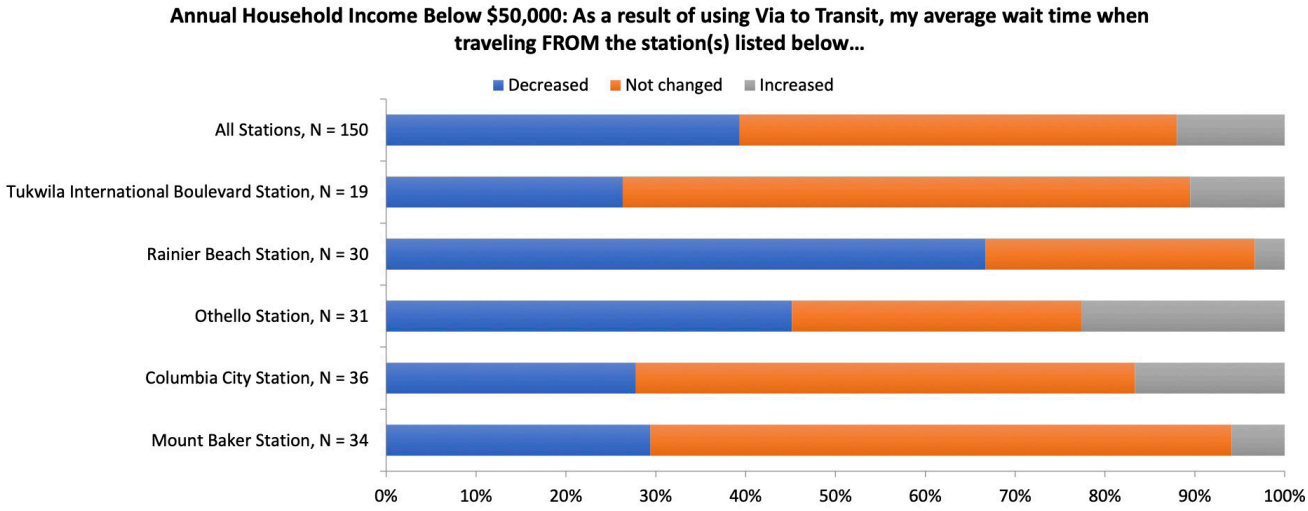


Figure 4-45 *Change in Wait Times FROM Stations for Lower-Income Respondents – Puget Sound*

Conclusions

Overall, the results from the analysis of the Via to Transit service in the Puget Sound region found support for Hypothesis 2a. First, lower-income respondents have access to Via to Transit and a higher proportion of these respondents chose Via to Transit as a mode (as compared to TNCs or pooled TNCs). A significant proportion of those who did not use TNCs or pooled TNCs (i.e., indicating lack of access), use Via to Transit, and this rate increased between

the early-pilot and the late-pilot. Mode replacement indicates that most lower-income households do not use TNCs or pooled TNCs for FMLM trips. Access to activities was fairly high for lower-income respondents, and cost savings as a result of Via to Transit were notable. Moreover, the Via to Transit FMLM trips offered improved mobility and access for lower-income respondents through reduced average travel times and average wait times to/from stations.

Conclusion – Overall

Taken together, the findings from the analysis of survey data in the Los Angeles and the Puget Sound regions supported Hypothesis 2a.

Hypothesis 2b: Integration of Via into the ORCA card will increase its (Via to Transit's) use among 1) low-income populations, 2) unbanked populations (without banking/credit-card accounts), and 3) minority populations.

Performance Metric	Key Finding – Los Angeles	Key Finding – Puget Sound
ORCA card usage, Difficulty using ORCA card, Change in use of ORCA card, Percentage of Via to Transit trips using ORCA card	This hypothesis did not apply to the Los Angeles system.	Although ORCA card usage was very high among all populations, some people experienced difficulty in paying for Via to Transit, especially unbanked people. Nearly all used an ORCA card to pay for Via to Transit according to linked activity and survey data, but a slightly lower percentage of unbanked people used the ORCA card. Nevertheless, the extraordinarily high adoption rate within the population suggests that the ORCA card offered significant utility to public transit users. The fact that subgroups explored in this hypothesis increased their ORCA use as a result of it being integrated with Via to Transit suggests that it was an important contributor to their use of the service.

Hypothesis 2b was analyzed using survey data from early- and late-pilot surveys along with activity data from Via to Transit that captured the payment type of each trip. The following analyses evaluate the impact of integrating the ORCA card with Via to Transit using these two data sources. The analysis only applied to the Puget Sound region, which uses the ORCA card.

Use of the ORCA Card

As shown in Figure 4-46, respondents described their usage of the ORCA card with public transit in the early-pilot survey. This metric was split based on four key populations related to social equity—1) racial/ethnic minority, 2) do not have a debit/credit card, 3) annual household income below $50,000, and 4) the full sample of all respondents to the question for comparison. The rates of using an ORCA card for public transit were very high for all participants. About 92% of respondents from lower-income households and 96% of racial/ethnic minority respondents used an ORCA card every time. Just 1% of respondents from these groups, along with the full sample, stated that they never used an ORCA card because they do not have one. Low sample size for those who do not have a credit/debit card makes drawing conclusions for this group unclear. Figure 4-47 presents results for the late-pilot survey. Rates of ORCA card use were similar, ranging from 90% to 93% depending on the population. The largely unchanged results offer no specific support for the effect of integration of ORCA with Via to Transit on the use of Via to Transit for underserved populations. However, the results indicate that the ORCA card is widely adopted among Via to Transit and public transit riders.

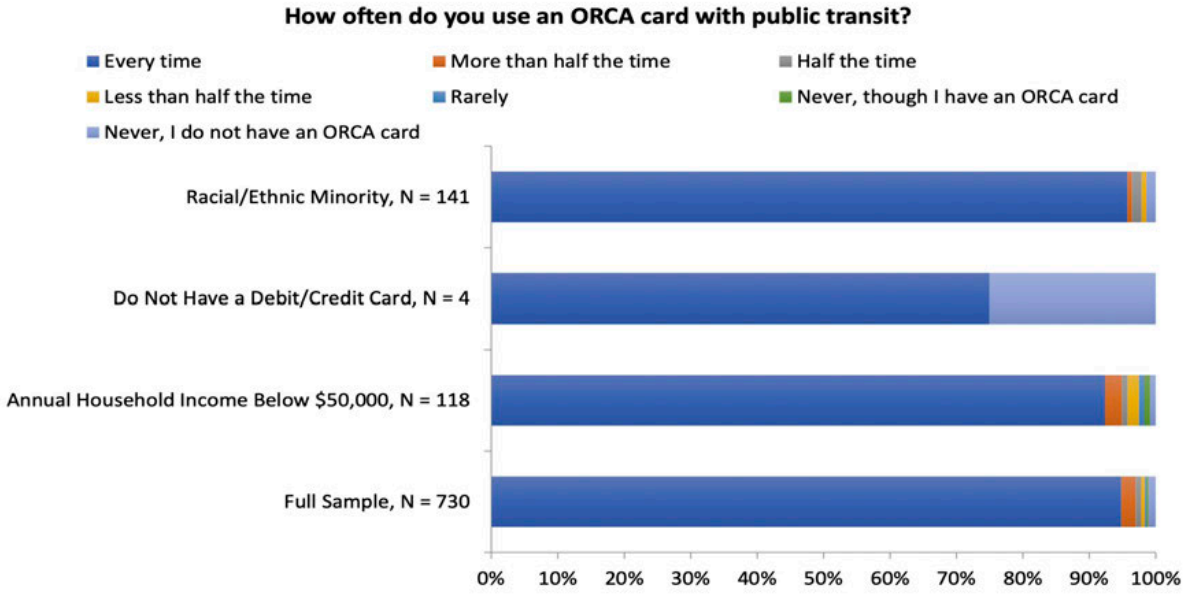


Figure 4-46 *Use of ORCA Card in Early-Pilot – Puget Sound*

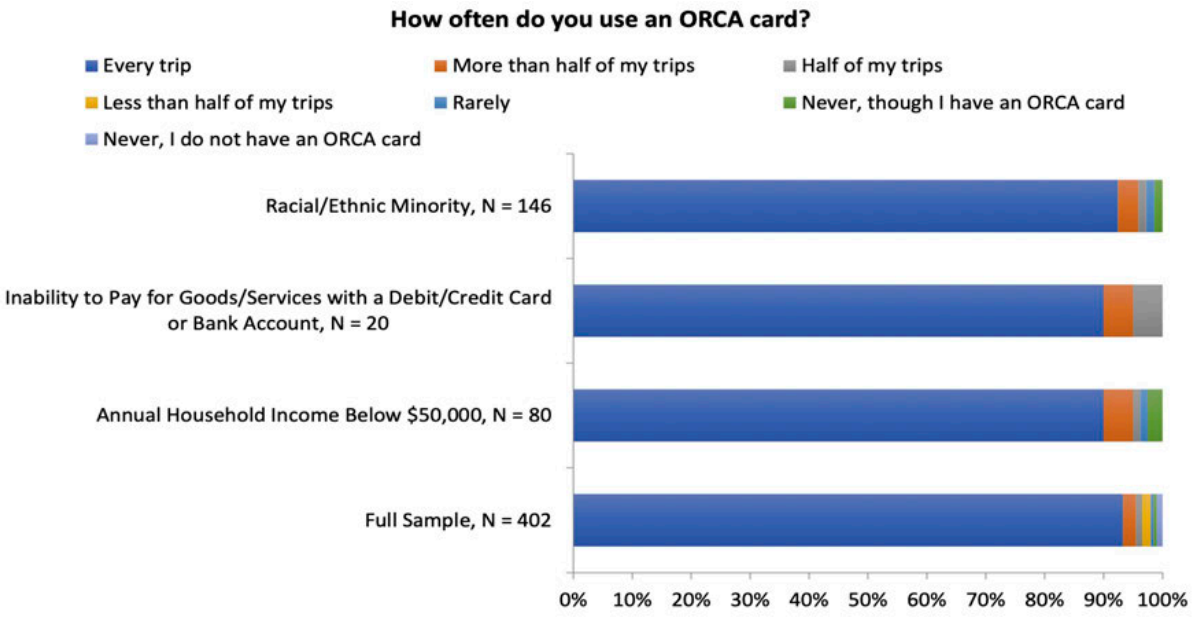


Figure 4-47 *Use of ORCA Card in Late-Pilot – Puget Sound*

Use of the ORCA Card for Via to Transit

Figure 4-48 captures the difficulty that respondents had in using the ORCA card to pay for Via. Most respondents in all populations stated that they never or rarely had difficulty in paying with the ORCA card. However, between 6% and 12% of respondents, depending on population, stated that they had difficulty on every trip. A notable difference was that those with the inability to pay for goods/service with a debit/credit card or bank account experienced more difficulty in general. About 35% of this population said that they had difficult at least half the time (compared to 28% for the full sample, 26% for lower-income, and 24% for racial/ethnic minority). The difficulty of using ORCA across populations for Via to Transit, especially for those unbanked, is important to note.

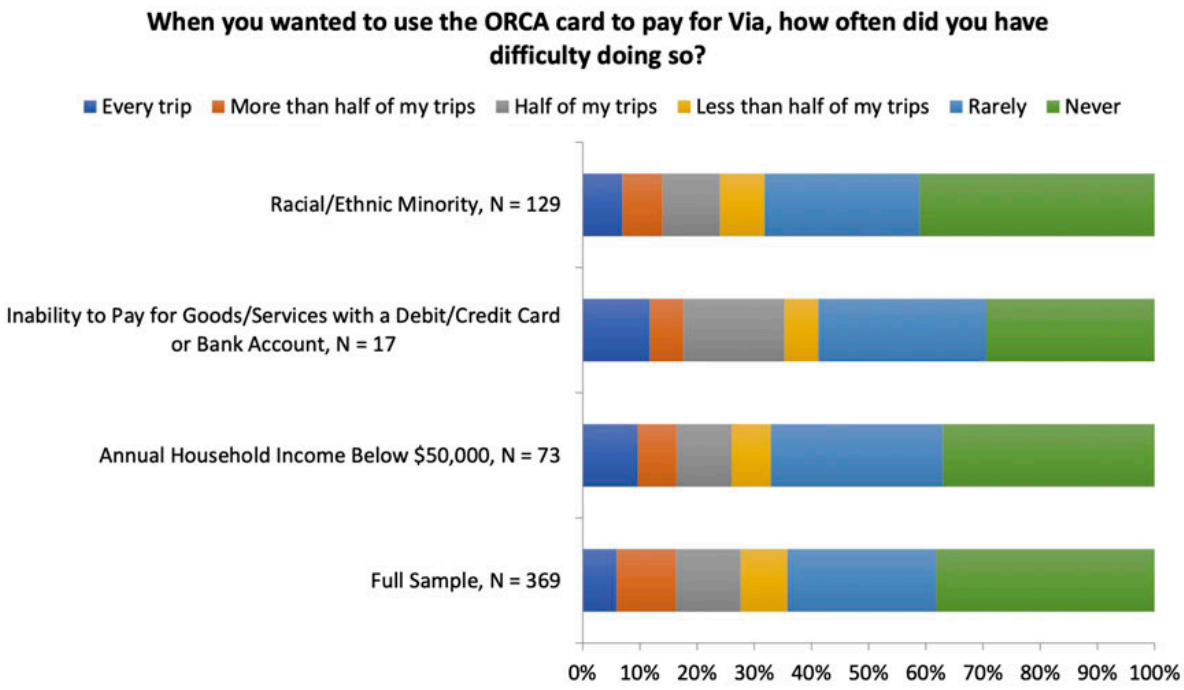


Figure 4-48 *Difficulty of Using ORCA Card to Pay for Via to Transit – Puget Sound*[9]

Figure 4-49 presents the change in the usage of the ORCA card due to the ability to pay for Via to Transit using the card. The question focuses on causal change in ORCA usage as a result of integration with Via. The results indicate that across populations, a notable proportion significantly or moderately increased their use of the ORCA card. In a positive direction, the percentage of those who stated that their ORCA card usage significantly and moderately increased was higher for all three considered underserved groups than the full sample (40–45% compared to 35% for the full sample). Although the result indicates increases in ORCA card usage, it offers no evidence related to an increase in Via to Transit usage as a result of ORCA card integration.

[9] King County Metro has noted that the fare collection devices in the vehicles were at the end of their life-cycle and were often faulty. As a result, it was noted that the reported difficulty of using the ORCA card to pay for Via could be interpreted a few different ways. One possibility was that the devices were not working, another was that there could have been difficulty loading money on to an ORCA card, and a third possible explanation could have been the expense of fare. The reasons for these difficulties were not clear.

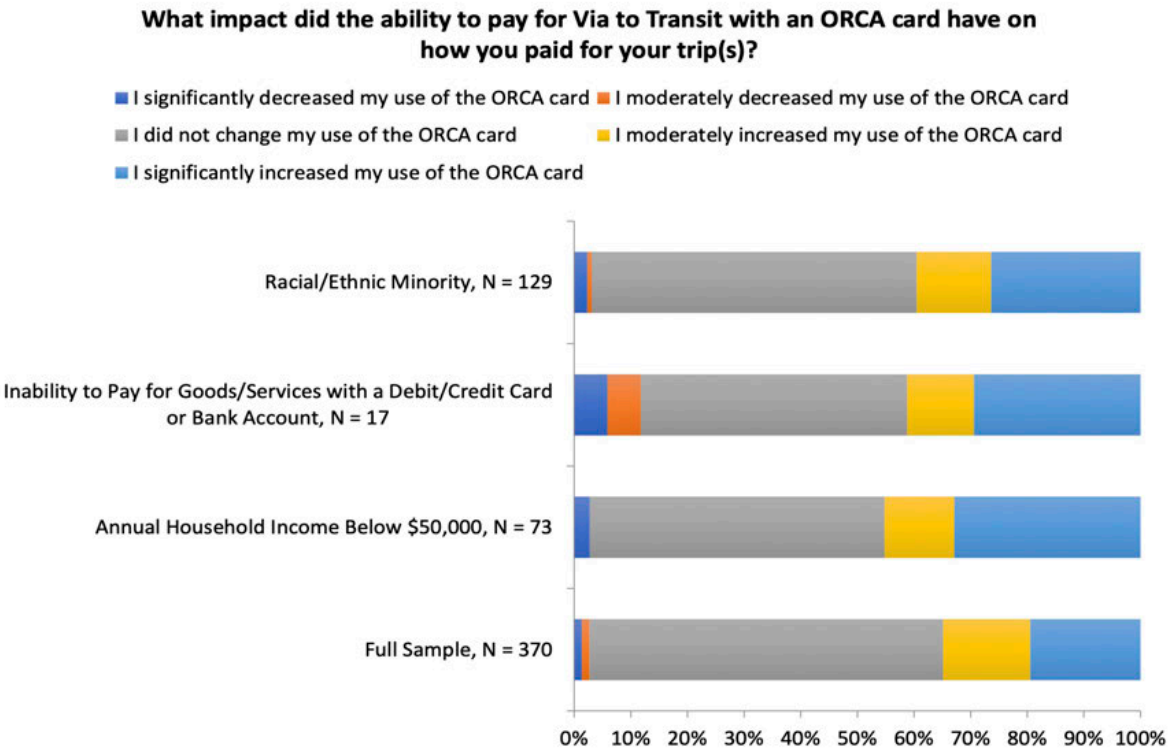


Figure 4-49 *Change in Usage of ORCA Card Due to Ability to Pay for Via to Transit Using ORCA Card – Puget Sound*

The survey data were also linked to the Via to Transit activity data, which included information about ride payments. For each individual in the activity dataset, a set of summary statistics was developed—total spending, number of trips, number of ORCA transactions, and number of other types of transactions (e.g., Transit Go, ride credits, credit card, debit card, etc.). Respondents from only the late-pilot survey were linked to the activity dataset through a deidentified ID. Using these data (late-pilot survey and activity data), a percentage of all trips using ORCA was calculated and key demographic variables were linked to these percentages. Figure 4-50 shows the summary of this analysis. The results show that nearly all Via to Transit transactions were completed using the ORCA card, regardless of demographic group. However, unbanked people on average used their ORCA card for 89% of transactions, which was slightly lower than the other underserved populations and the full sample. As noted in Figure 4-48, unbanked people had more difficulty using their ORCA card, which could explain these results. While these results do not show if Via to Transit ridership increased because of the ORCA card, Figure 4-50 indicates that ORCA usage was widespread and that integration was a crucial component of the pilot.

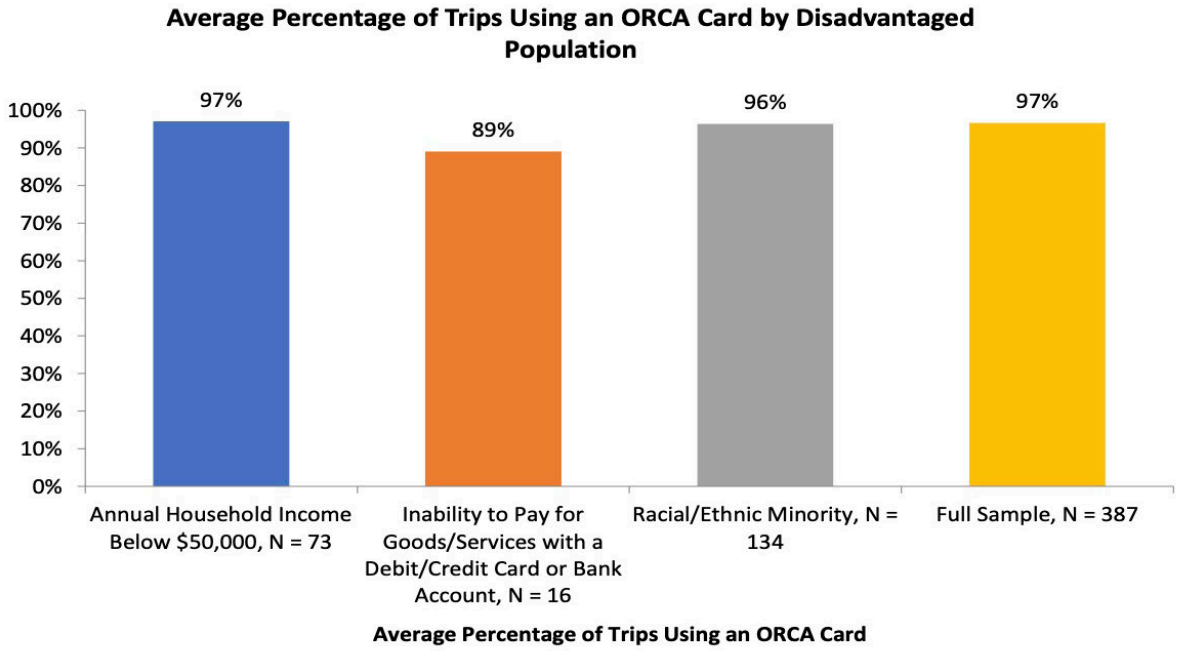


Figure 4-50 *Average Percent of Trips Using ORCA Card by Key Demographic Group – Puget Sound*

Conclusion

Based on survey data, the usage of the ORCA card for public transit was very high among all populations, including underserved populations, and did not change much between the early- and late-pilots. Some underserved people did experience difficulty in using the ORCA card when paying for Via to Transit service. This was most pronounced for unbanked individuals, although it was not drastically different from the full sample. However, nearly all underserved populations used the ORCA card on Via to Transit, indicating widespread usage of the payment mechanism and equity in terms of payment accessibility. Furthermore, survey responses showed that low-income and unbanked subsamples increased their use of the ORCA card to pay for Via to Transit relative to the full sample. The high adoption rate within the population suggests that the ORCA card offered significant utility to public transit users. It was, by far, the preferred method of payment, and had it not been available for this purpose, 96% of all 231,073 trips would have had to have been paid by a different method. Other payments were possible, including the second most payment common method, the Transit Go app. However, the dominance of the ORCA card for Via to Transit trips among all populations suggests that it was the preferred method to pay for the trips and available alternatives would not have had relative advantages for the subgroups evaluated in this hypothesis. The ORCA card was clearly an integral tool that was used by the vast majority

of riders to pay for Via to Transit trips. Although linking the use of the card to specific trips Via to Transit, this high prevalence of use (96% of 231,073 trips) suggests that some trips would have not occurred had the integration not been done. It is very possible that this effect could have been large if the payment process was considerably cumbersome. The fact that subgroups explored in this hypothesis increased their ORCA use as a result of it being integrated with Via to Transit suggests that it was an important contributor to their use of the service. However, it is difficult to ascertain whether the ORCA card was the specific factor that increased the use of the Via to Transit service in its absence. Overall, the findings suggest Hypothesis 2b to be supported.

Hypothesis 3: The number of public transit users in both regions will increase as this new service will create more options for riders, specifically for FMLM.

Performance Metric	Key Finding – Los Angeles	Key Finding – Puget Sound
Count of unique public transit users in the pilot areas; change in public transit usage at participating stations; mode choice and replacement, especially FMLM modes	In Los Angeles, public transit usage generally increased across participating stations as a result of the Via Rideshare Service and between the early- and late-pilot. Via also generally replaced key FMLM modes to/from stations, indicating that Via Rideshare Service was a convenient and feasible option for trips, especially FMLM trips.	Via to Transit usage increased slightly between the early-pilot and late-pilot. There was a general increase in Link light rail station usage among Via to Transit users, as a result of their use of the service. This finding suggests the number of public transit users likely increased as a result of the project, and hence ridership would have been lower in its absence.

For this hypothesis, survey data focusing on public transit usage, mode choice, and mode replacement were analyzed. The data did not capture the number of public transit users, but it did capture changes in public transit usage overall. In other words, the survey data cannot identify a new user of the system, but the data can determine if public transit was used differently in the aggregate. Mode choice and mode replacement help identify if Via provided more options for riders, especially for FMLM trips. It is important to note that the analysis is focused on evaluating the change in use among Via system users and not the whole population of transit users. As such, there may be changes in the use of public transit by Via system users that moves in the opposite direction of transit ridership overall, which is influenced by a number of exogenous and macroscale factors that are independent of the project. This analysis only evaluates the impact of transit use among Via system users.

Los Angeles

Public Transit Usage at Participating Stations

To see if the number of public transit user increased, a focus was placed on change in behavior as a result of the Via Rideshare Service. Figure 4-51 displays change in use of public transit at identified stations as a result of Via Rideshare Service. About 10% of respondents across all stations stated that their use significantly increased and 25% said that use increased. This compares to just 7% and 8% of respondents who said that their use significantly decreased or decreased, respectively.

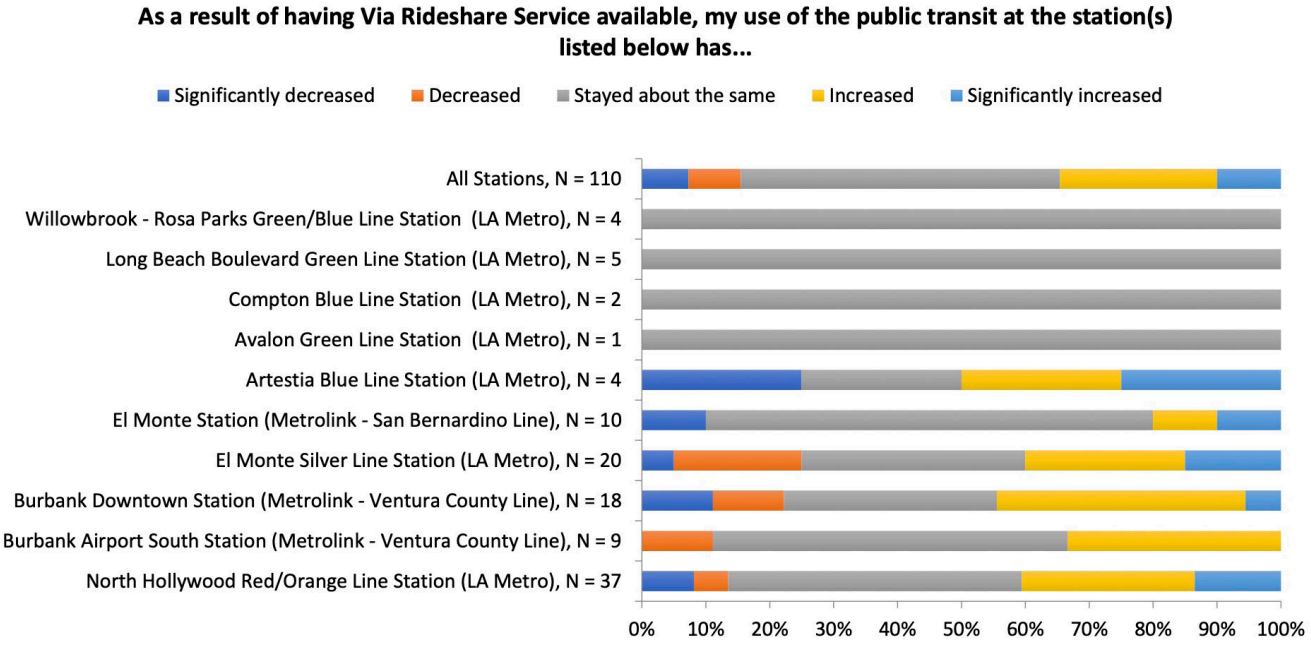


Figure 4-51 *Change in Public Transit Use Due to Via Rideshare Service – Los Angeles*

Figure 4-52 displays the percentage of the early pilot sample that used participating stations in the past 12 months. The most-used station was North Hollywood Red/Orange Line Station (62% of respondents), followed by the El Monte Silver Line Station (30% of respondents). Figure 4-52 displays the percentage of the late pilot sample that used the participating stations in the past 12 months. It is important to note that the formulation of the question was different between surveys, leading to different sample sizes calculations and figures. Comparing Figure 4-52 and Figure 4-53, use of transit stations increased across nearly all stations, with notable increases for the North Hollywood Station, both Burbank Stations, and both El Monte Stations. While this question does not directly assess the causal impact of the Via Rideshare Service, the results lent partial support that the number of public transit users increased.

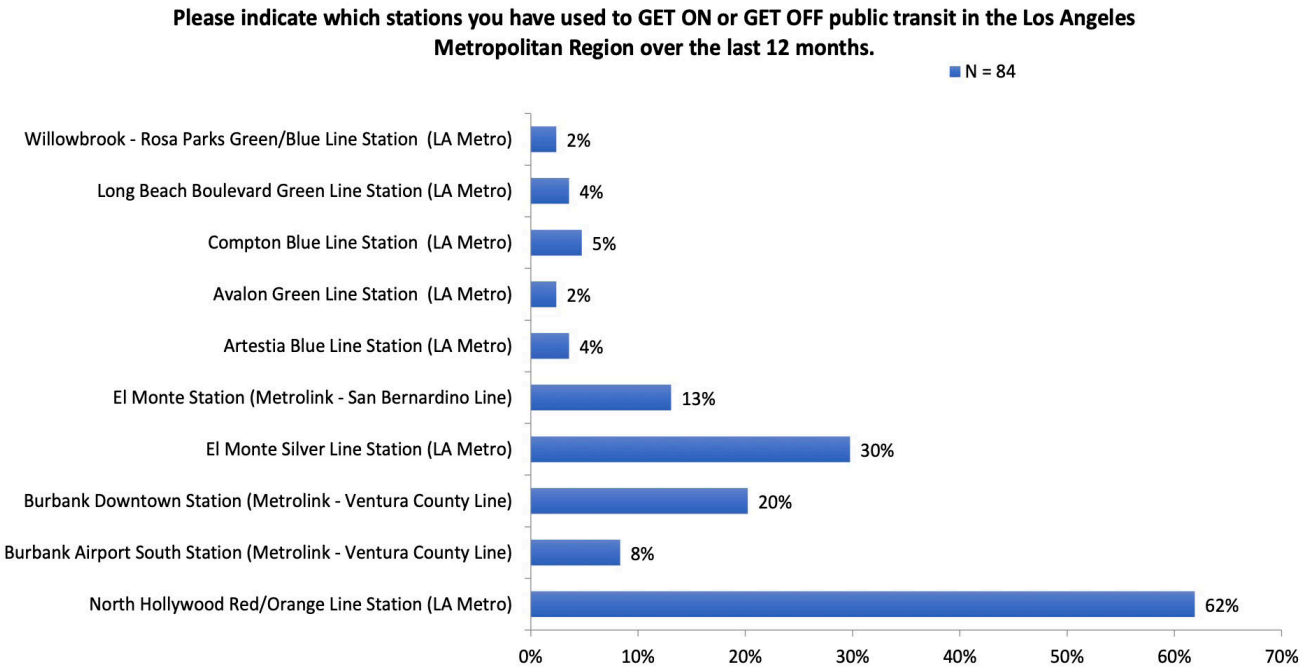


Figure 4-52 *Usage of Public Transit Stations (Rail and Bus) in Early-Pilot Survey – Los Angeles*

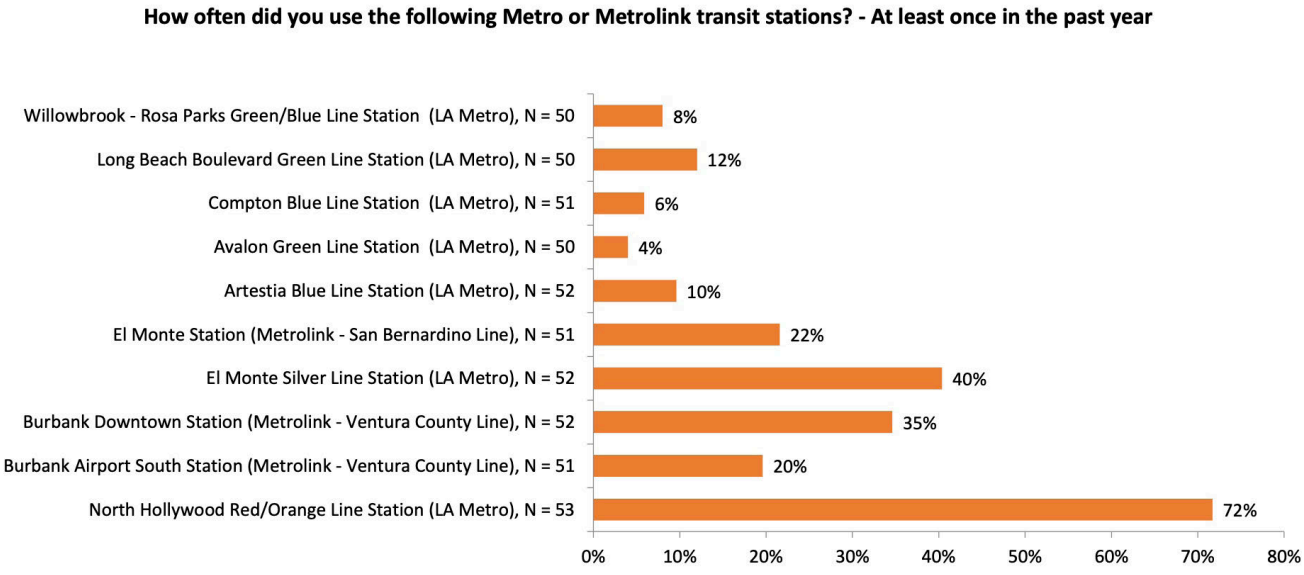


Figure 4-53 *Usage of Public Transit Stations (Rail and Bus) in Late-Pilot Survey – Los Angeles*

Mode Choice and Replacement

Figure 4-54 shows the mode choices of respondents for both the early-pilot and late-pilot. Although driving or riding in a personal car or truck decreased slightly, public transit options such as public bus and urban rail also decreased. Between surveys, the Via Rideshare Service was the only mode that increased the share of respondents who used the mode. It should be noted that the late pilot survey did not reference COVID-19, and the results are likely impacted by the pandemic, which caused a decrease in nearly all travel across almost all modes. However, the result that upwards of 70% of the sample used the Via Rideshare Service suggests that Via created more FMLM options for respondents.

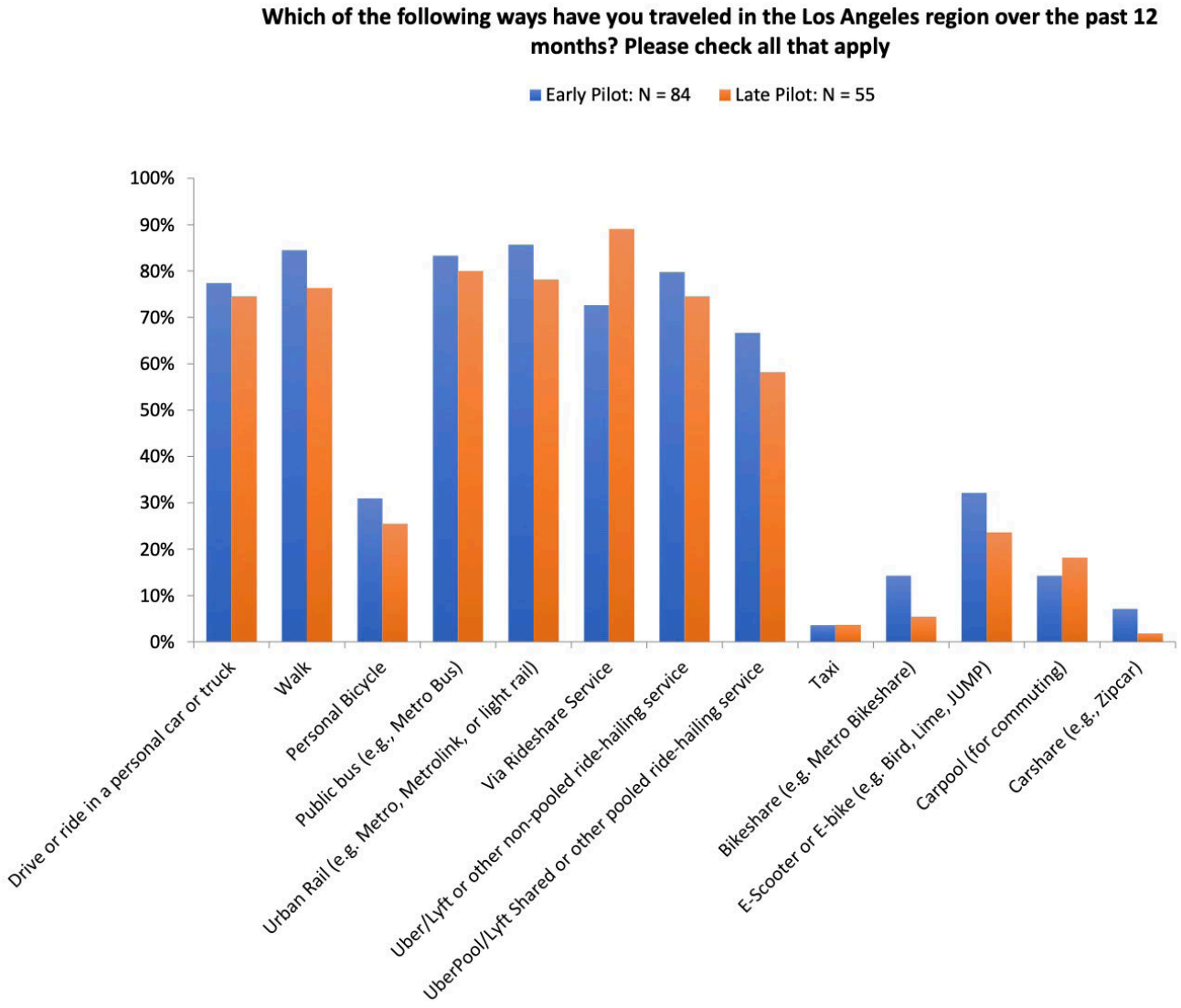


Figure 4-54 *Mode Choice of Respondents in Last 12 Months – Los Angeles*

An analysis was also conducted on the frequency of use change for various transportation modes as a result of the Via Rideshare Service. Urban rail (e.g., Metro, Metrolink, or light rail) experienced the greatest increase with 17% and 15% of respondents stating that they used rail much more often and more often, respectively (Figure 4-55). This compares to some decreases in urban rail use (7% much less often and 10% less often). Figure 4-55 also displays modes that experienced decreases in use, which indicates their replacement through another FMLM option—in this case, the Via Rideshare Service. Public bus, TNCs, driving or riding in a personal car/truck, walking, bikesharing, personal biking, and e-scooter/e-bike all experienced net decreases in usage as a result of the Via Rideshare Service. The results suggest that the Via Rideshare Service offered another FMLM option that replaced some current FMLM options that were likely more expensive (TNCs), took longer (walking, bikeshare, personal bike e-scooter/e-bike), were less convenient (public bus), or caused more GHGs (driving/riding in personal car/truck). The result suggests an increase in FMLM options since respondents used Via to replace (and sometimes used in addition to) other modes.

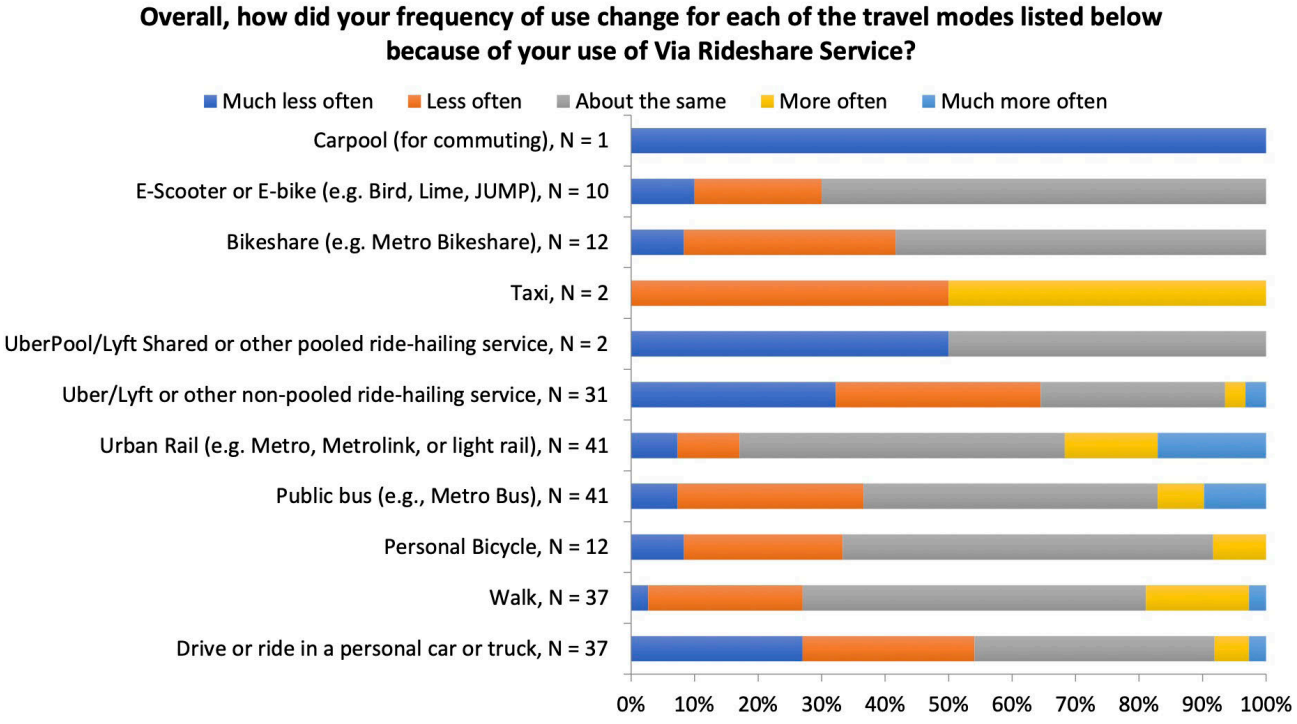


Figure 4-55 *Change in Frequency of Use of Travel Modes due to Via Rideshare Service – Los Angeles*

Figures 4-56 and 4-57 display results from a direct question regarding replacement of modes to/from stations as a result of the Via Rideshare Service. In aggregate to stations (Figure 4-56), Via Rideshare Service replaced a significant number of trips for respondents who typically used public bus, drove/rode in a personal car/truck, used urban rail, and walked (38%, 27%, 15%, and 9% of respondents, respectively). For trips from stations (Figure 4-57), respondents no longer used public bus (38%), drove/rode in personal car/truck (17%), walked (17%), used a TNC (13%), and biked on a personal bike (8%). With replacement higher for typical FMLM options, the Via Rideshare Service offered an alternative way to travel to/from stations, increasing options for respondents.

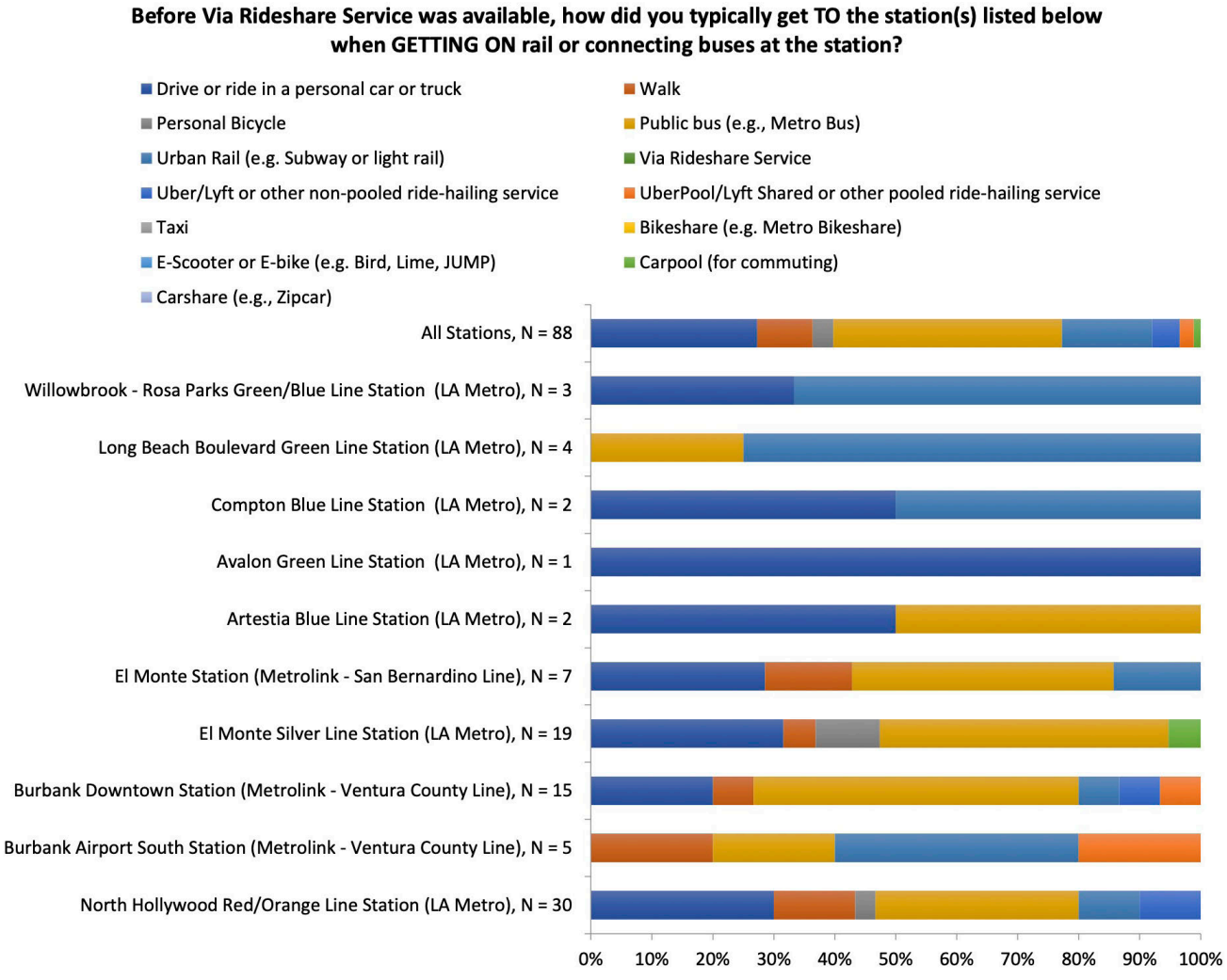


Figure 4-56 *Via Rideshare Service Mode Replacement TO Stations – Los Angeles*

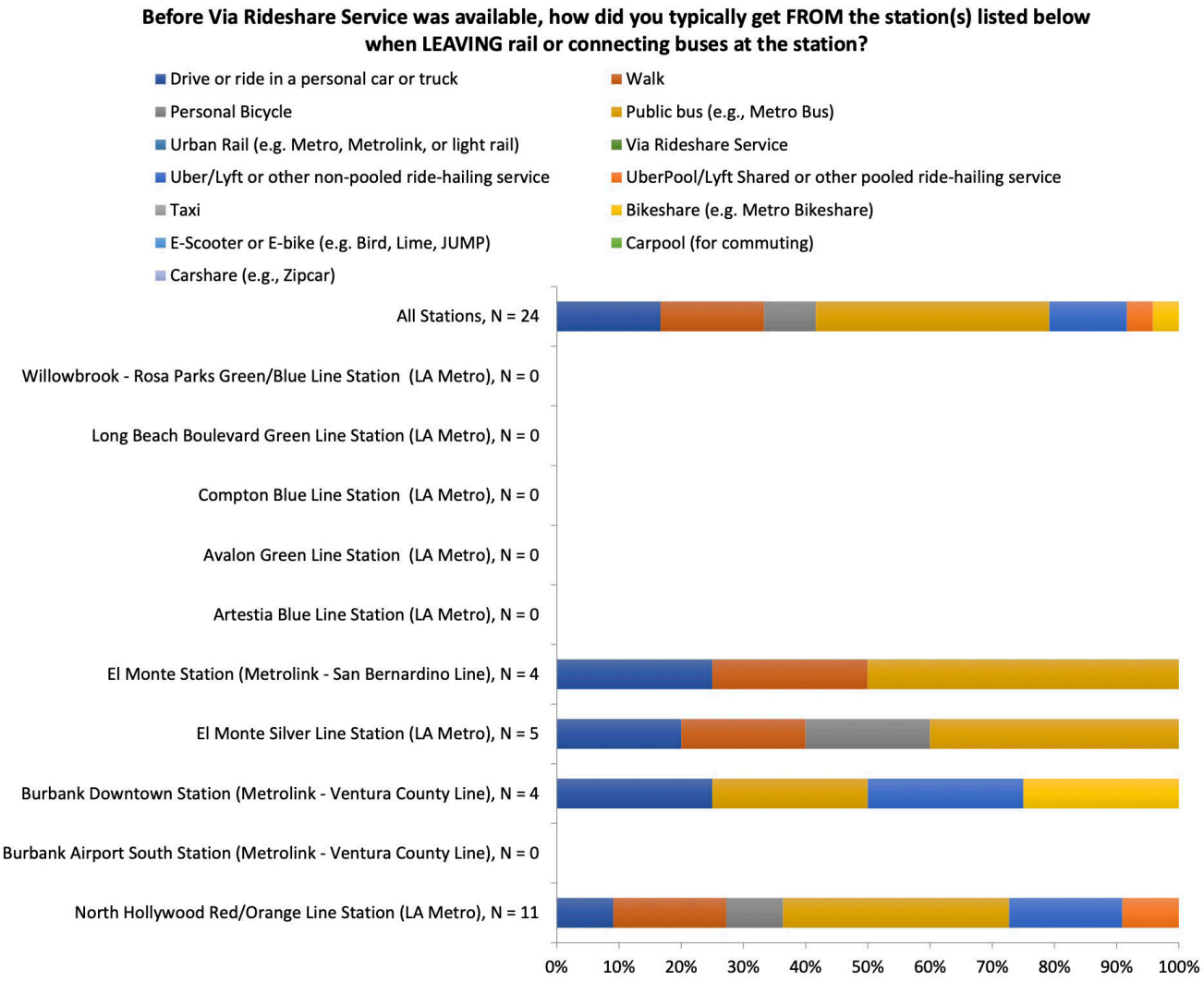


Figure 4-57 *Via Rideshare Service Mode Replacement FROM Stations – Los Angeles*

Conclusions

The results suggest that the use of public transit at participating stations increased generally during the pilot period and as a result of the Via Rideshare Service. Use of the Via Rideshare Service also increased while most other modes of transportation (including those used for FMLM) fell during the pilot period. Moreover, analyses of mode choice and mode replacement indicate that the Via Rideshare Service offered a new travel option that was better than options prior to the pilot. The number of public transit users could not be identified, and so the change in the number of unique users of public transit could not be directly determined. However, other measurements showed a general increase in public transit that was coupled with the arrival a new FMLM option that replaced other modes. The results of these other measurements collectively supports Hypothesis 3.

Puget Sound

Public Transit Usage at Participating Stations

An analysis was conducted on public transit usage at identified Link light rail stations as a result of Via to Transit (Figure 4-58). Across all stations, 9% of respondents stated that their use of public transit at stations significantly increased, and 20% said that usage increased. About 11% stated that their use decreased or significantly decreased. Increases in usage were highest for the Rainier Beach Station and the Columbia City Station. The results suggest that the use of public transit at participating stations increased. However, the increase in unique users could not be identified.

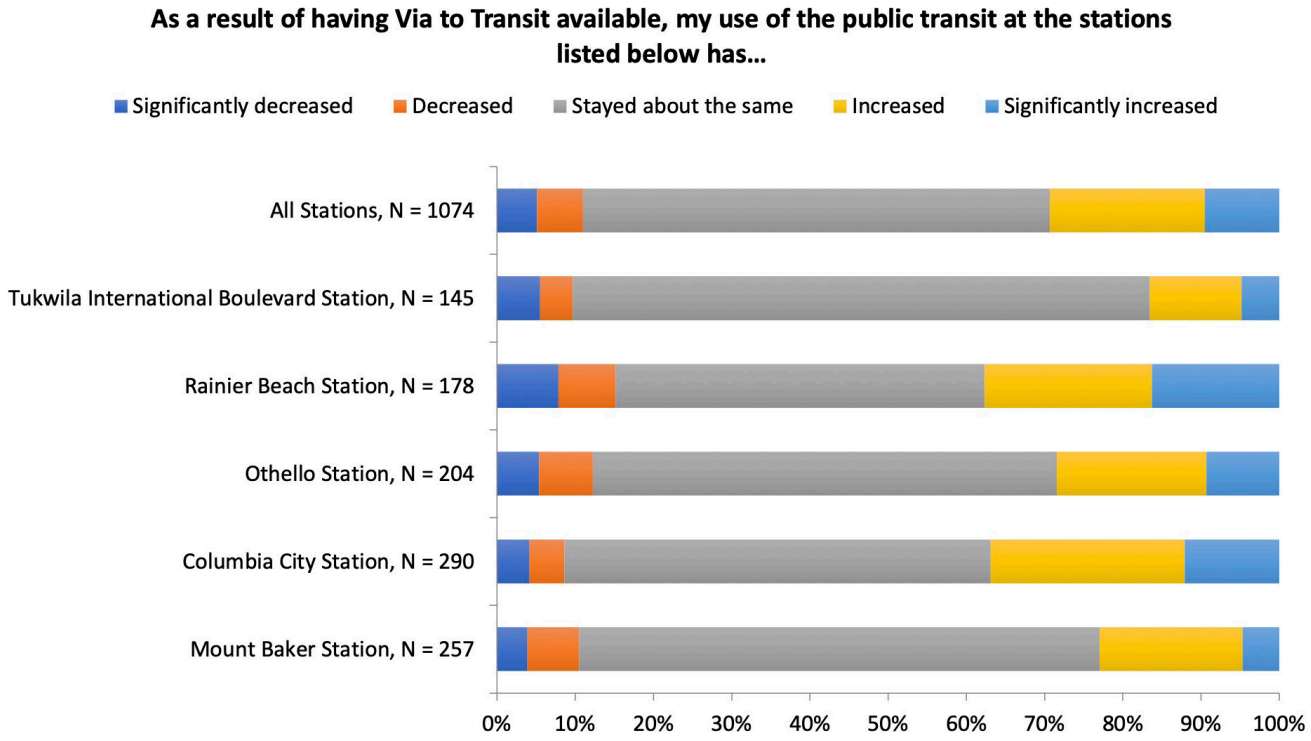


Figure 4-58 *Change in Public Transit Use Due to Via to Transit – Puget Sound*

Figures 4-59 and 4-60 present the number of respondents in the survey that used the five Link light rail stations in the last year for the early-pilot and late-pilot, respectively. Results in Figure 4-59 show that Columbia City Station was most used out of the respondents, and the Tukwila International Boulevard Station was least used. Comparing these percentages to those in Figure 4-60 (late-pilot survey), use of Link light rail stations increased significantly for all participating stations. The largest gains were made at the Mount Baker Station (+32%), and the lowest gains were made at the Rainier Beach Station (+14%).

The results support that more people are using the Link light rail stations, supporting Hypothesis 3. It should be noted that the questions in the surveys were constructed differently between early-pilot and late-pilot.

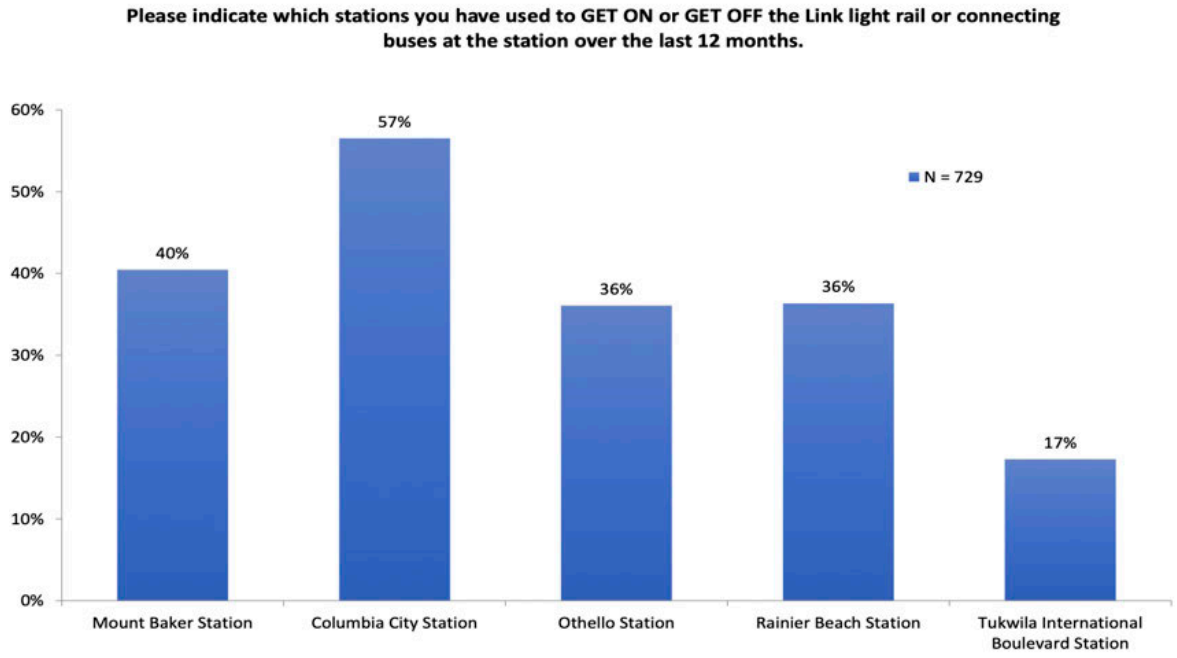


Figure 4-59 *Usage of Public Transit Stations (Rail) in Early-Pilot Survey – Puget Sound*

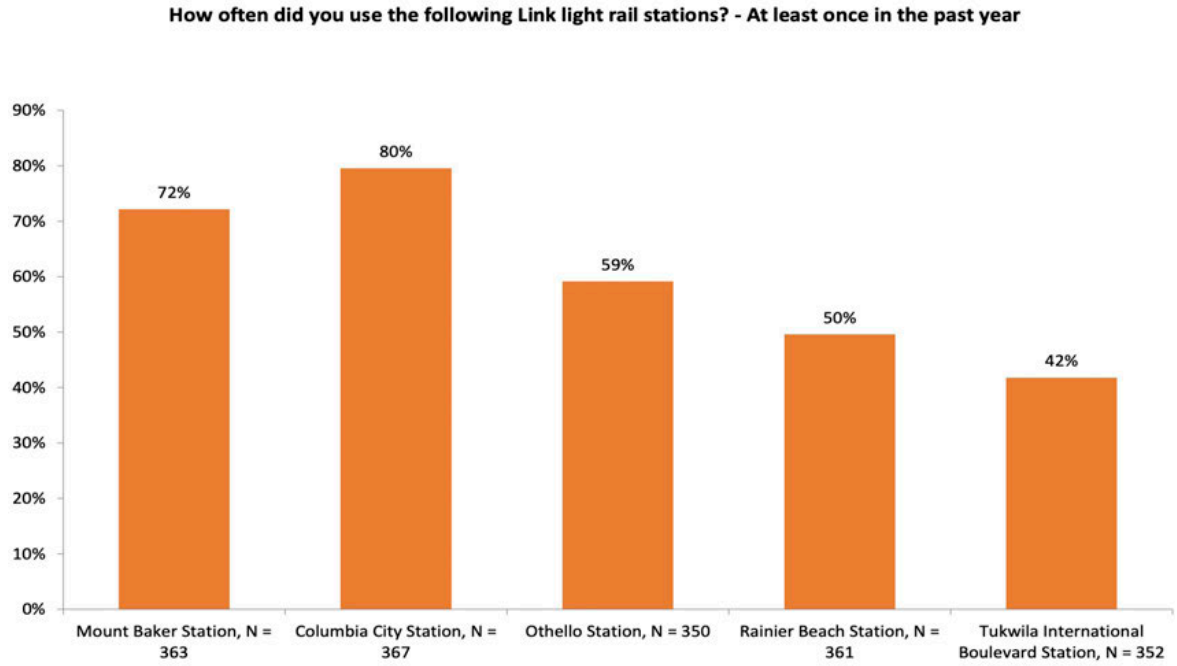


Figure 4-60 *Usage of Public Transit Stations (Rail) in Late-Pilot Survey – Puget Sound*

Mode Choice and Replacement

The mode choice of respondents in the last 12 months for each survey was asked (Figure 4-61). The comparison shows that all modes, with the exception of a slight increase of Via to Transit use, decreased between early-pilot and late-pilot.

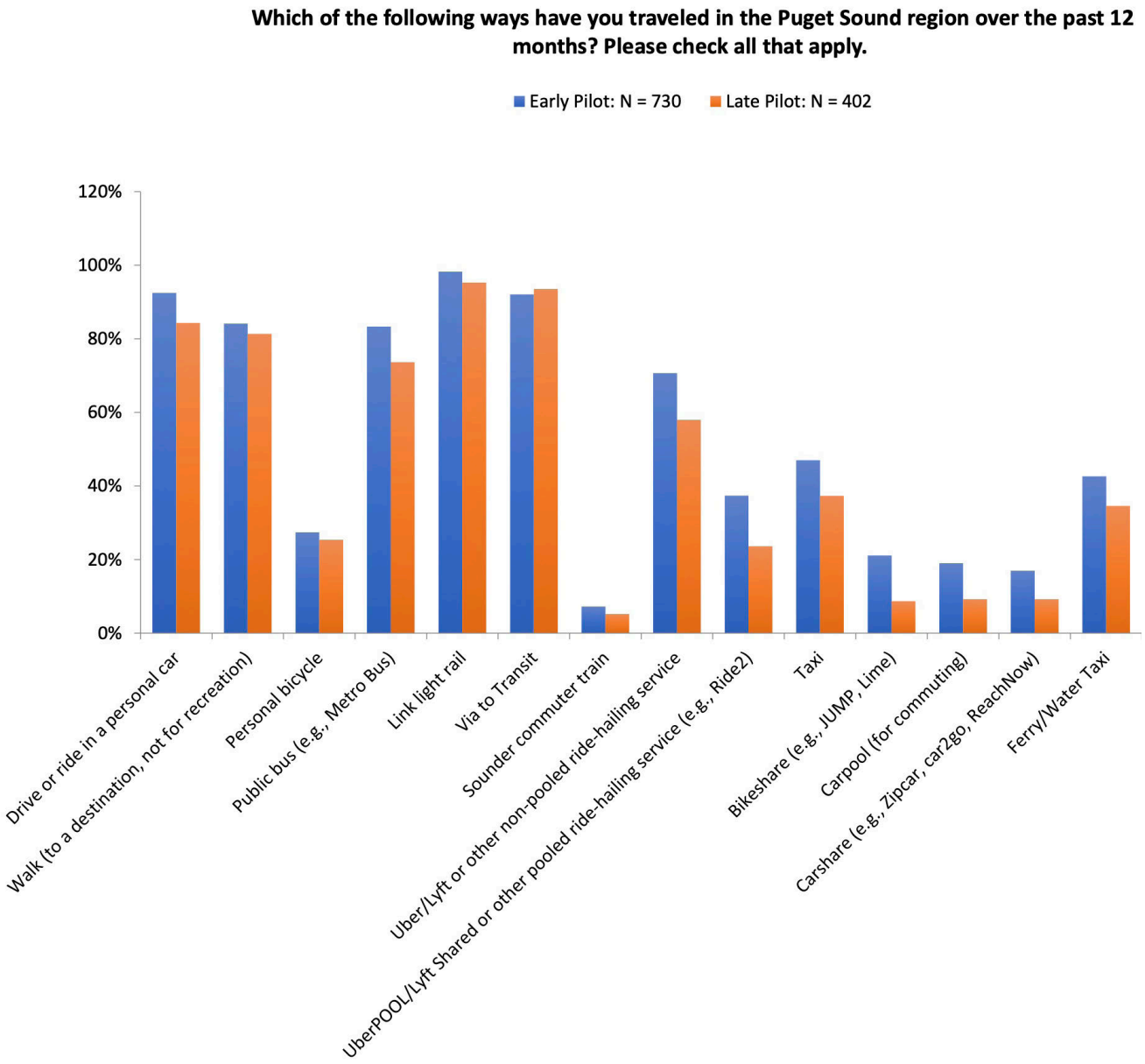


Figure 4-61 *Mode Choice of Respondents in Last 12 Months – Puget Sound*

Figure 4-62 displays the change in frequency of travel modes due to Via to Transit (late-pilot survey). The figure indicates that most individuals either decreased their usage of modes or used the mode about the same. However, use of Link light rail jumped significantly, with 13% of respondents stating that they used Link light rail much more often. An additional 33% stated that they used Link light rail more often. Figure 4-62 also shows the decrease of key FMLM options such as TNCs, pooled TNCs, taxis, driving/riding in a personal car or truck, public bus, carsharing walking, and carpooling. This replacement of mode indicates that Via to Transit was used as a FMLM option that is considered more convenient and accessible than other FMLM mode options.

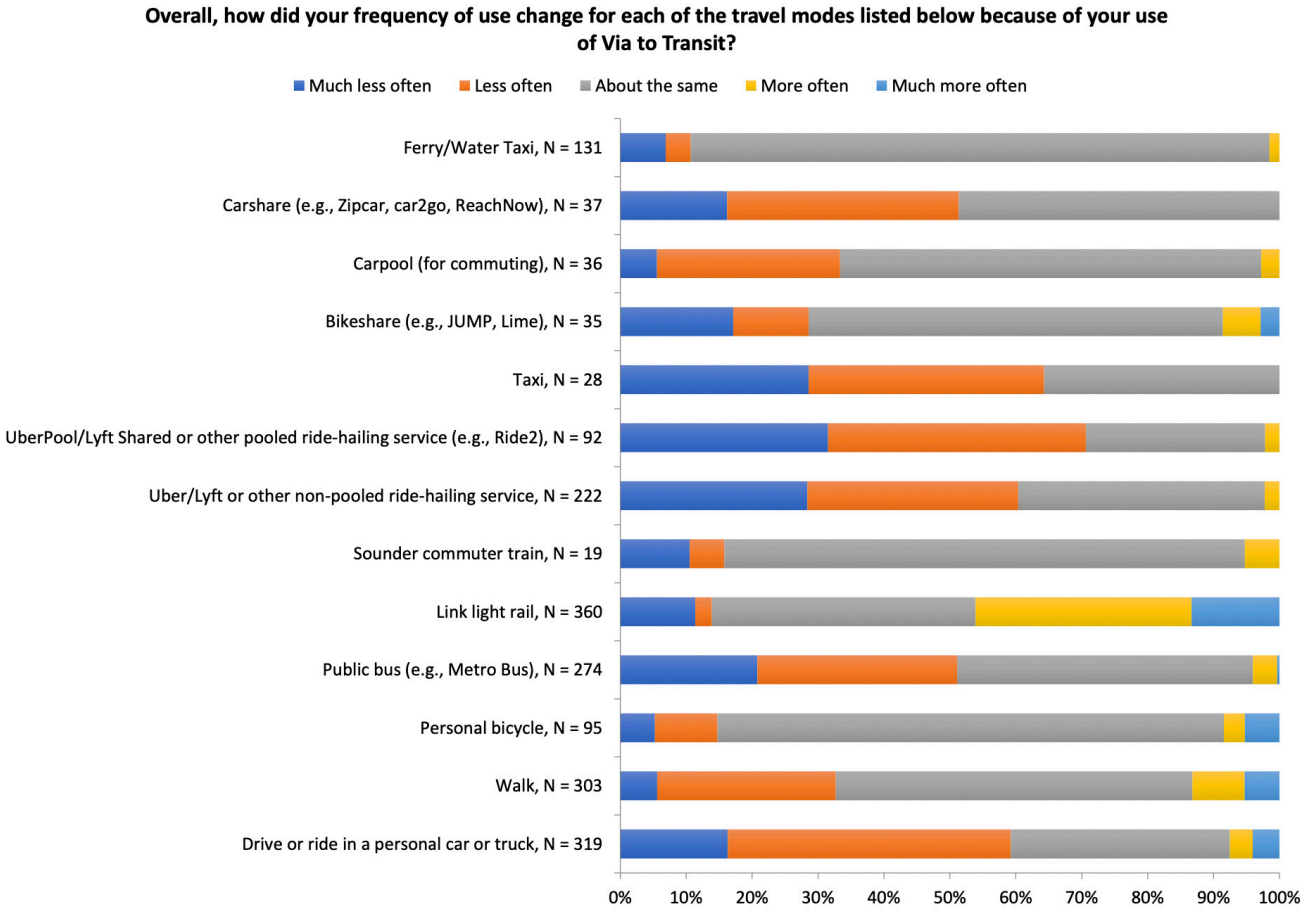


Figure 4-62 *Change in Frequency of Use of Travel Modes Due to Via to Transit – Puget Sound*

Similarly, Figures 4-63 and 4-64 display the mode of transportation individuals took to/from participating stations before Via to Transit was available. Most respondents said that they had driven/ridden in a personal car/truck, walked, took a public bus, or used Link light rail service before Via to Transit was available. The replacement of vehicle trips is encouraging, and Via to Transit was likely faster and more convenient than walking or taking the bus. It is unclear why the use of Link light rail service was so high for these questions, especially since individuals were unable to take Via to Transit trips outside of the designated light rail station service areas (zones) (i.e., trips were not allowed between Link light rail stations on Via to Transit). However, the results indicate that Via to Transit offered another FMLM option (i.e., replacing other FMLM options).

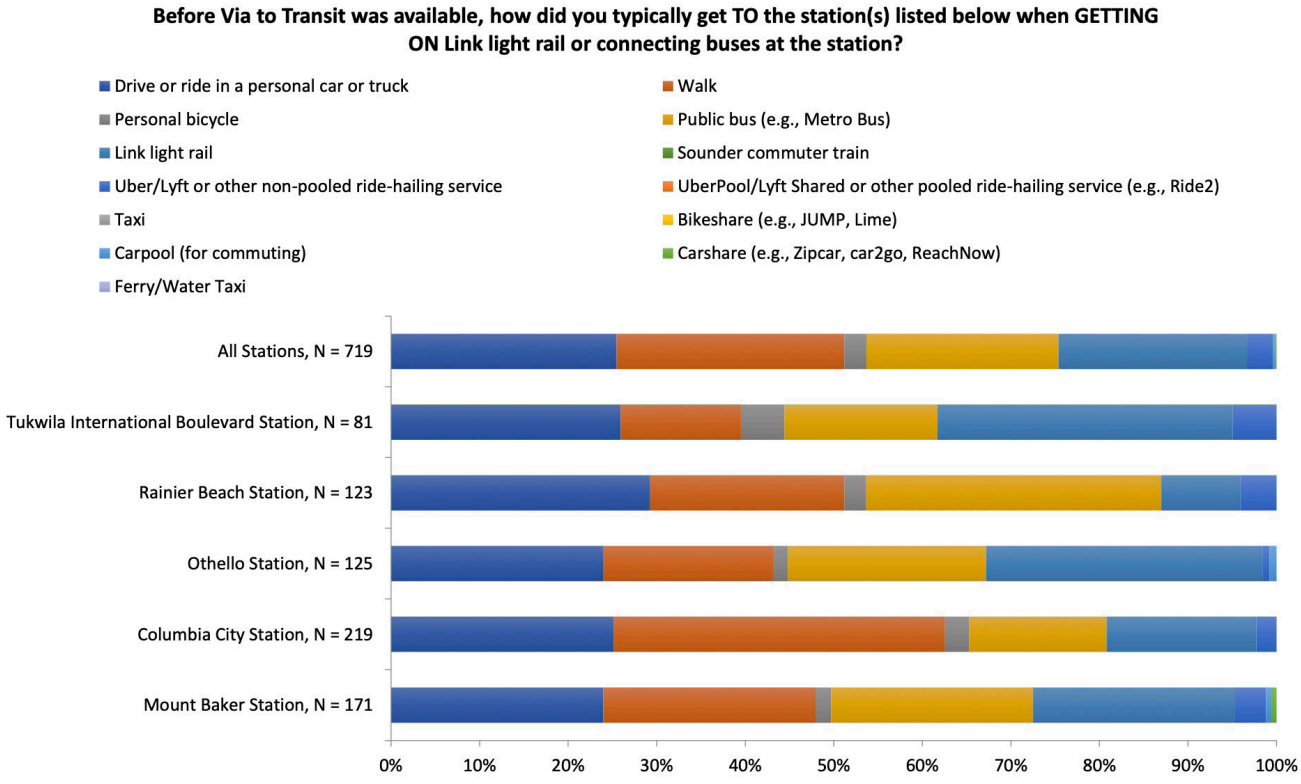


Figure 4-63 *Via to Transit Mode Replacement TO Stations (Late-Pilot) – Puget Sound*

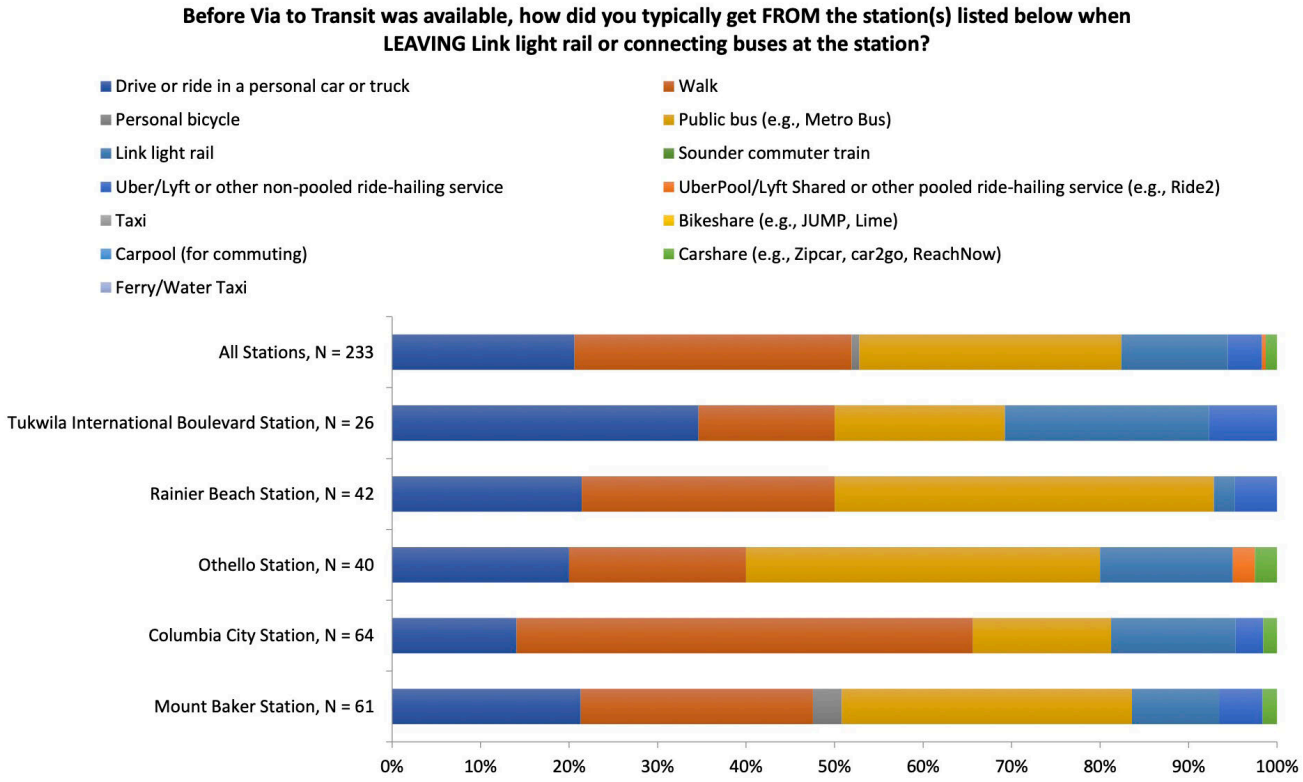


Figure 4-64 *Via to Transit Mode Replacement FROM Stations (Late-Pilot) – Puget Sound*

Conclusions – Puget Sound

Overall, public transit and Link light rail usage increased as a result of Via to Transit, and the percentage of respondents who used all stations increased between the early-pilot and late-pilot. However, as these results do not capture unique public transit users, the first part of Hypothesis 3 is only partially supported. Regarding the increase in travel options, especially for FMLM trips, Via to Transit clearly replaced typical FMLM options with service that was more convenient and accessible. Via to Transit usage was also very high in the survey sample, and it increased slightly between the early-pilot and late-pilot. The results support the second part of Hypothesis 3 referring to the increase in travel options. Despite the inability to identify new public transit users, the general increase in Link light rail station usage as a result of Via to Transit, together with the new travel options provided by Via to Transit, suggest the number of public transit users likely increased as a result of the project.

Conclusion – Overall

Overall, the results of the analysis in Los Angeles and Puget Sound finds that Hypothesis 3 is supported.

Hypothesis 4: At the selected transit stops, the availability of the new service TO a transit station will increase transit ridership for that system.

Performance Metric	Key Finding – Los Angeles	Key Finding – Puget Sound
Change in public transit usage due to Via services to/ from stations, with a focus on respondents traveling to stations; access improvements due to Via services	In Los Angeles, a small sample of respondents traveling to/from stations and just to stations increased their public transit usage (and ridership) due to Via FMLM services.	The findings were stronger for Via to Transit in Puget Sound. Most respondents stated that access improved both to and from stations.

Hypothesis 4 focused on the increase in public transit ridership due to new Via service to stations. With the need for a causal relationship, survey results were taken from the late-pilot survey. Results were broken into two groups of people—1) riders that traveled both to and from participating stations and 2) riders that traveled only to participating stations. It was assumed that individuals going to and from stations could offer insights for Hypothesis 4, even though the hypothesis focuses on only new service to stations.

Los Angeles

Public Transit Usage

To assess if the availability of the Via Rideshare Service to a transit station increased public transit ridership, an analysis was first conducted on changes to public transit usage due to the Via Rideshare Service. Figure 4-65 presents this change for respondents who traveled both to and from participating stations. Across all stations, about 32% of respondents stated that their usage of public transit increased or significantly increased, and about 18% of respondents stated that it decreased or significantly decreased. This small net gain indicates some increase in ridership. Figure 4-66 presents results of respondents who just travel to participating stations. No respondents said that their usage decreased or significantly decreased.

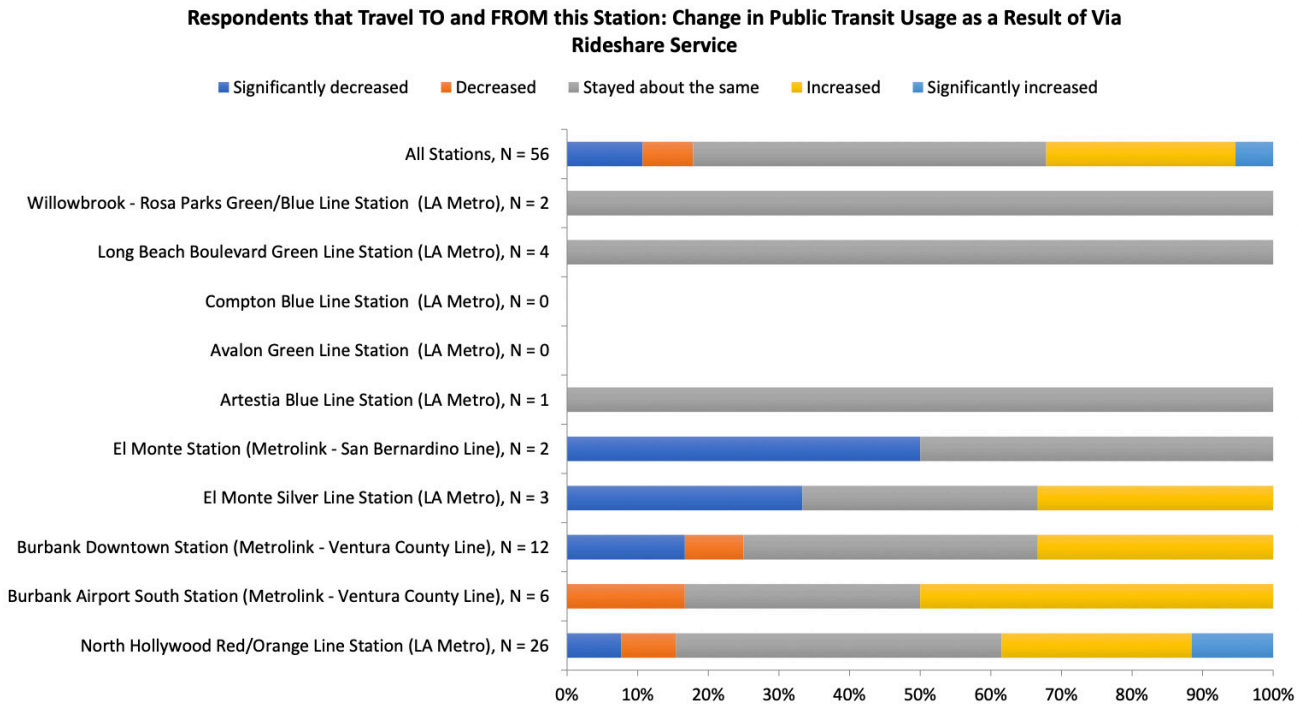


Figure 4-65 *Change in Public Transit Usage due to Via Rideshare Service – Respondents Who Travel TO and FROM Stations – Los Angeles*

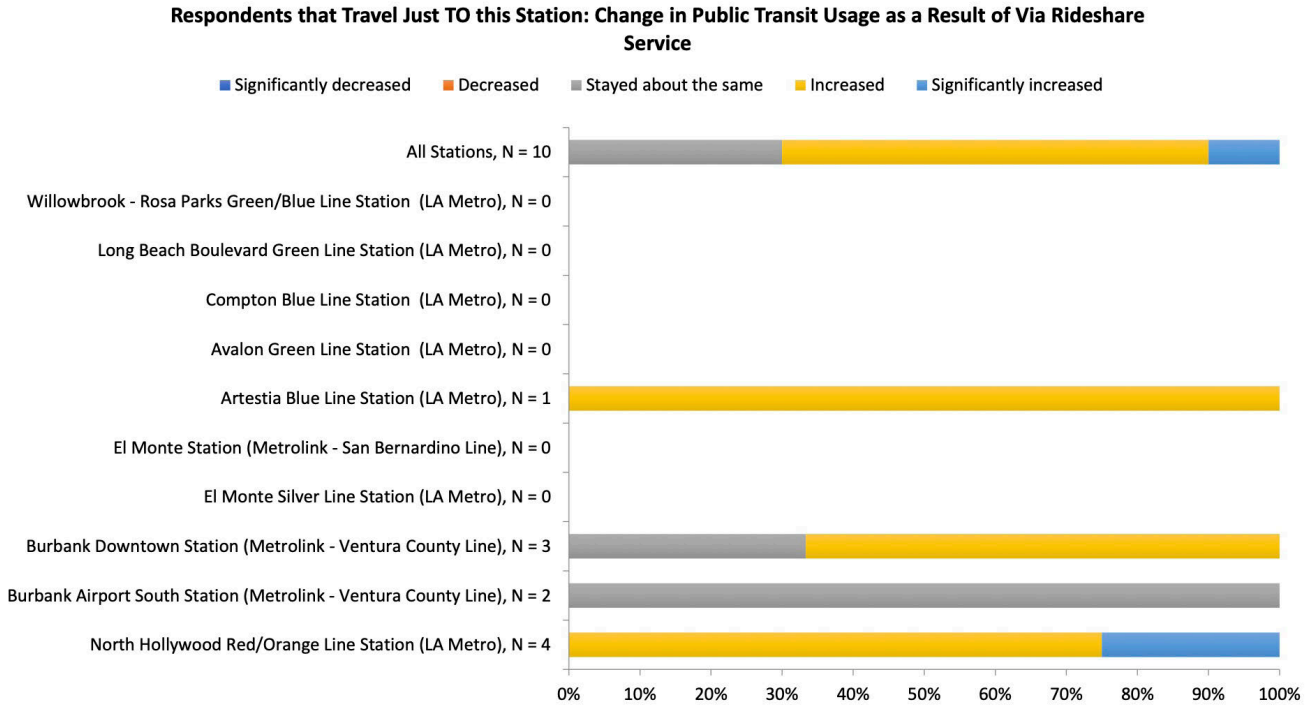


Figure 4-66 *Change in Public Transit Usage Due to Via Rideshare Service – Respondents Who Travel Just TO Stations – Los Angeles*

Urban Rail and Metro Usage

The section above explores the usage of public transit broadly defined as including all forms of public transit. An analysis was also conducted specifically focusing on reported changes to usage of urban rail and Metro (e.g., Metro Rail, Silver line, Metrolink, light rail), corresponding to the station types in the study pilot. The aggregate station results in Figure 4-67 show that 33% (of respondents who traveled both to and from a participating station) stated that they used urban rail more often or much more often. Approximately 23% of respondents stated that they used urban rail less often or much less often. Figure 4-68 presents results for only respondents who travel to the station. The aggregate station results, though a small sample size, indicates increases in ridership in urban rail.

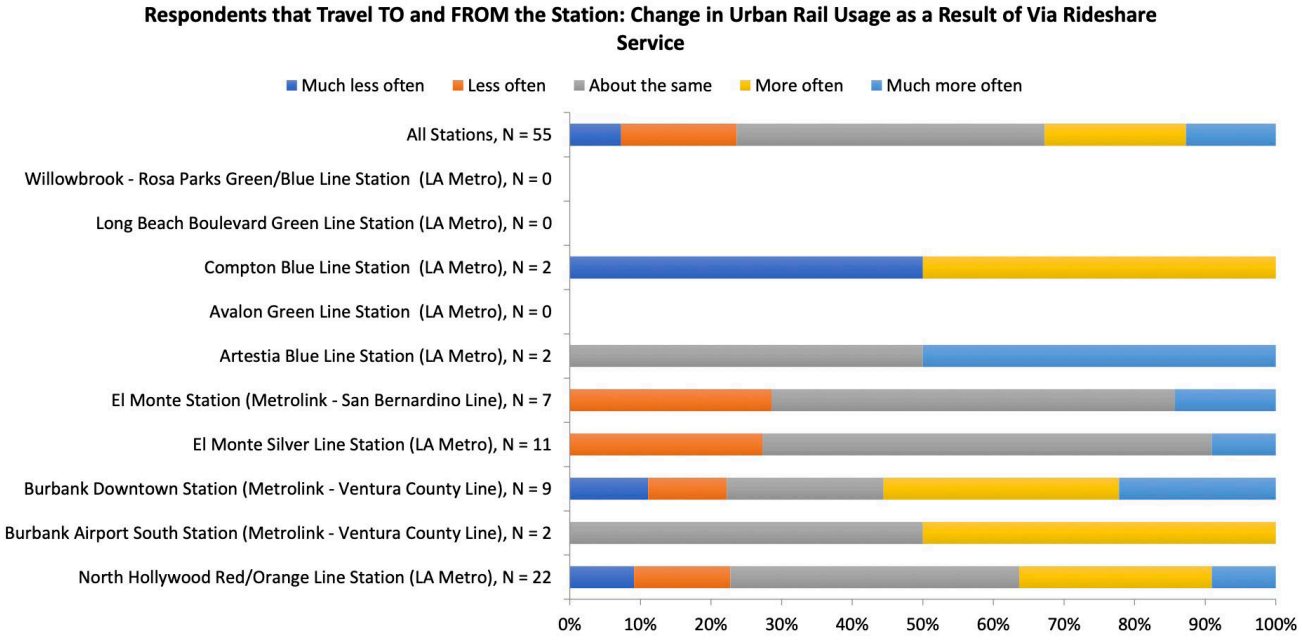


Figure 4-67 *Change in Urban Rail (e.g., Metro, Metrolink, Light Rail) Usage Due to Via Rideshare Service – Respondents Who Travel TO and FROM Stations – Los Angeles*

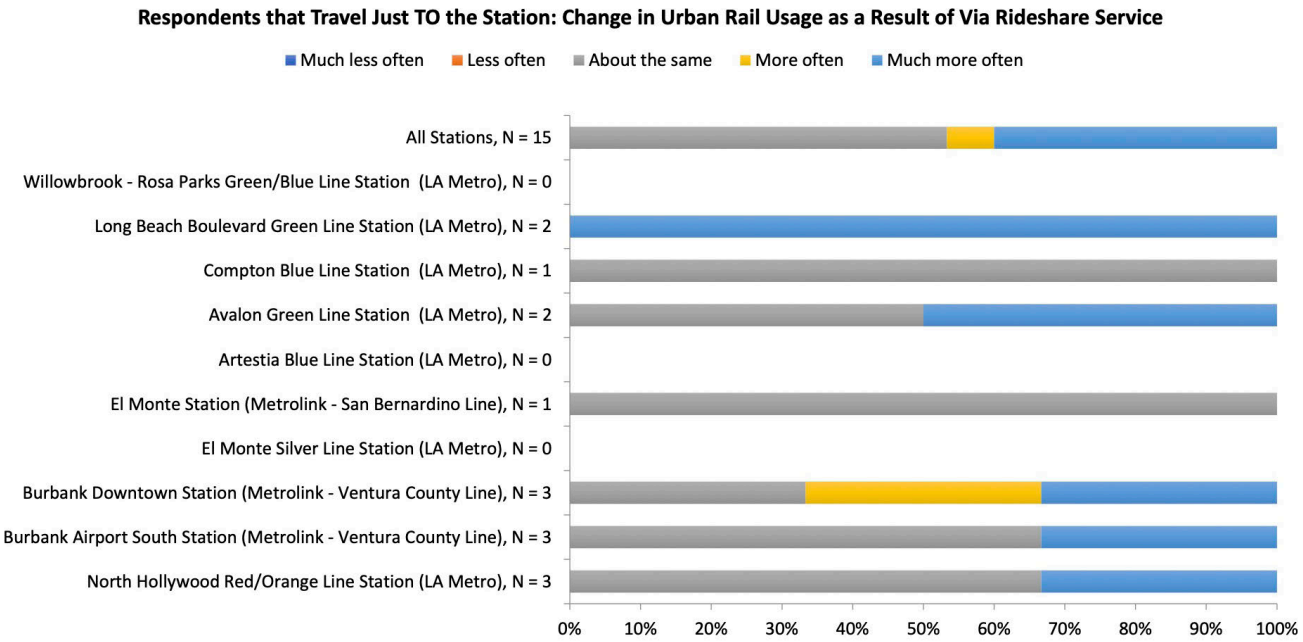


Figure 4-68 *Change in Urban Rail (e.g., Metro, Metrolink, Light Rail) Usage Due to Via Rideshare Service – Respondents Who Travel Just TO Stations – Los Angeles*

Reason for Increasing Public Transit Usage

For individuals that increased their public transit usage more due to Via Rideshare Service, a question was asked about their improvement of accessibility. Figure 4-69 shows that about 71% of respondents said that access improved for travel both to and from bus stops or rail stations. An extra 12% of respondents said that access improved for travel to stops/stations. The results suggest that the Via Rideshare Service offered an accessible option to key stations.

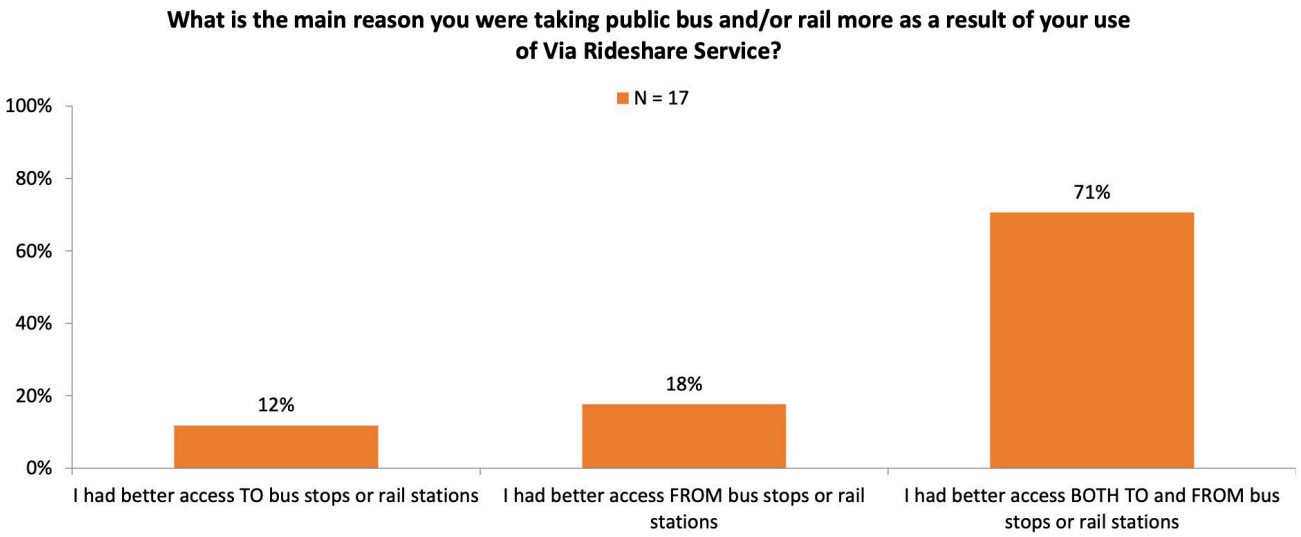


Figure 4-69 *Primary Reason for Taking Public Transit More Due to Via Rideshare Service – Los Angeles*

Conclusion

Analyses on change in usage of public buses and urban rail indicate that ridership moderately increased across stations for respondents who traveled both to and from participating stations. However, low sample size hindered a station-based analysis along with an analysis of respondents who traveled only to stations. For those who increased their public transit usage, most stated that access improved both to and from stations with some additional individuals that noted improvements in access just to stations. The results support Hypothesis 4 in that the availability of the Via Rideshare Service to stations increased public transit ridership moderately.

Puget Sound

Public Transit Usage

To determine if Via to Transit increased transit ridership to stations, an analysis was conducted for respondents who traveled to and from participating stations, along with respondents who only traveled to participating stations. Figure 4-70 displays changes in public transit usage due to Via to Transit for respondents who traveled to and from stations (the majority of the sample). Across all participating stations combined, about 15% of respondents significantly increased their public transit usage and another 27% increased their usage. This compares to only 14% who said that their public transit usage decreased or significantly decreased. Public transit usage rose the most for Rainier Beach, Columbia City, and Othello Stations. In Figure 4-71 for travelers only going to stations, the majority said that their public transit usage remained about the same as before Via to Transit. However, a slightly higher percentage

across stations (19%) said that their usage increased or significantly increased, compared to those who said their usage decreased or significant decreased (10%). All stations experienced similar changes in usage.

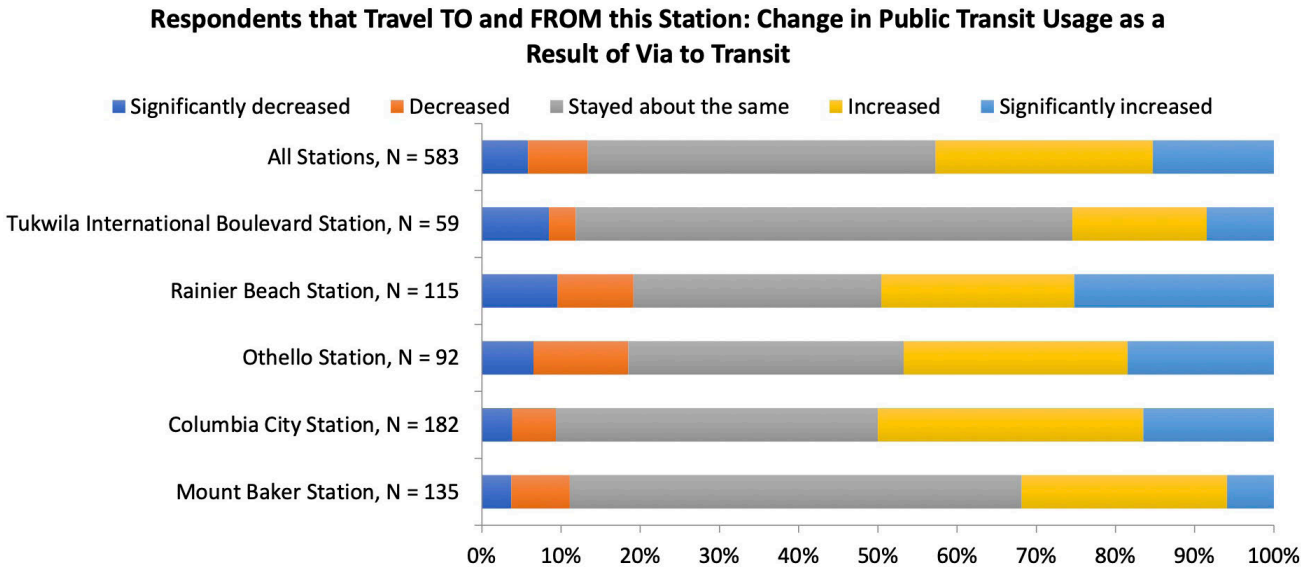


Figure 4-70 *Change in Public Transit Usage Due to Via to Transit – Respondents Who Travel TO and FROM Stations – Puget Sound*

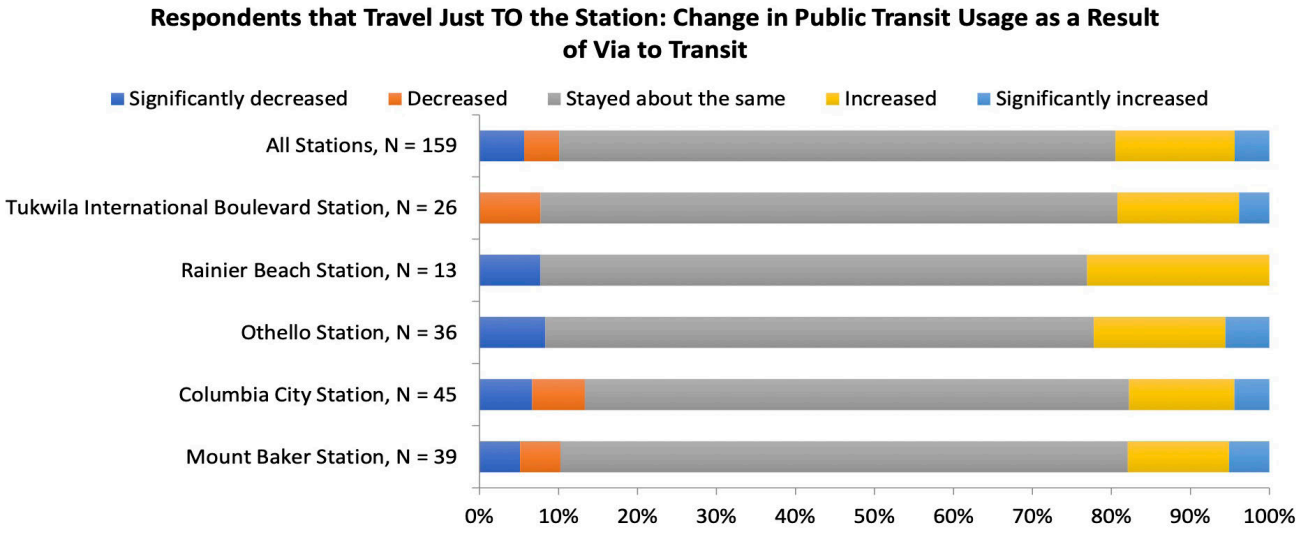


Figure 4-71 *Change in Public Transit Usage due to Via to Transit – Respondents Who Travel Just TO Stations – Puget Sound*

Link Light Rail Usage

The section above explored the usage of public transit broadly defined as including all forms of public transit. A more specific analysis was conducted on the Link light rail system to determine if public transit ridership increased. Figure 4-72 shows how respondents traveling to and from participating stations changed their usage due to Via to Transit. The results across stations show an increase in public transit usage with 13% saying that they used Link light rail much more often (with an additional 33% saying that they used the system more often); just 16% said that they used Link light rail less often or much less often. Results were similar across stations, but Columbia City Station experienced the most positive change while Tukwila International Boulevard Station saw the least improvement. Focusing only on respondents traveling to stations, Figure 4-73 shows similar results to Figure 4-72. Use of Link light rail increased on average, though some respondents reported using Link light rail much less often as a result of Via to Transit.

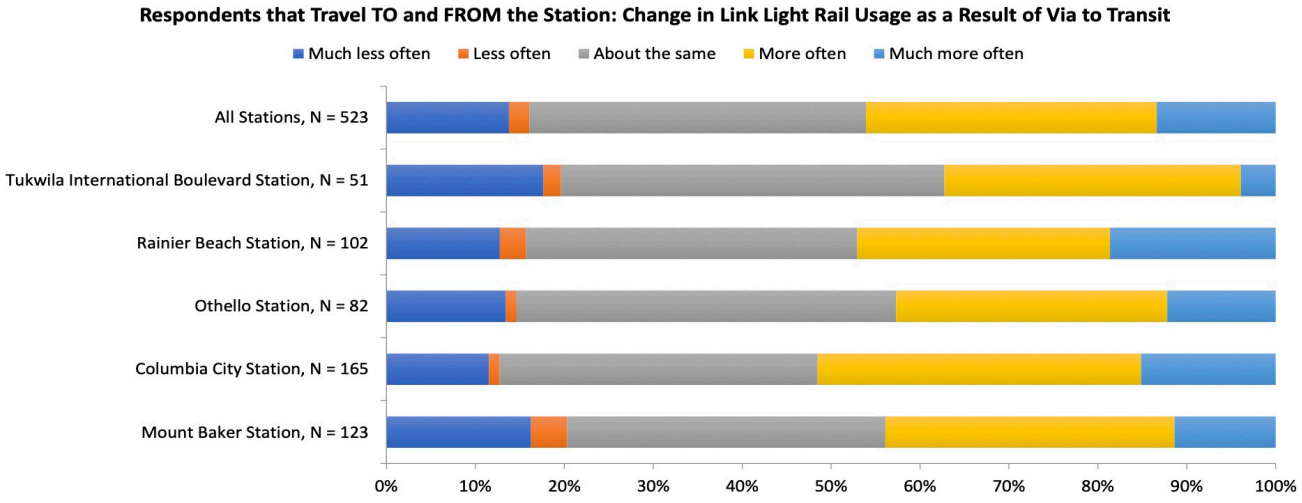


Figure 4-72 *Change in Link Light Rail Usage due to Via to Transit – Respondents Who Travel TO and FROM Stations – Puget Sound*

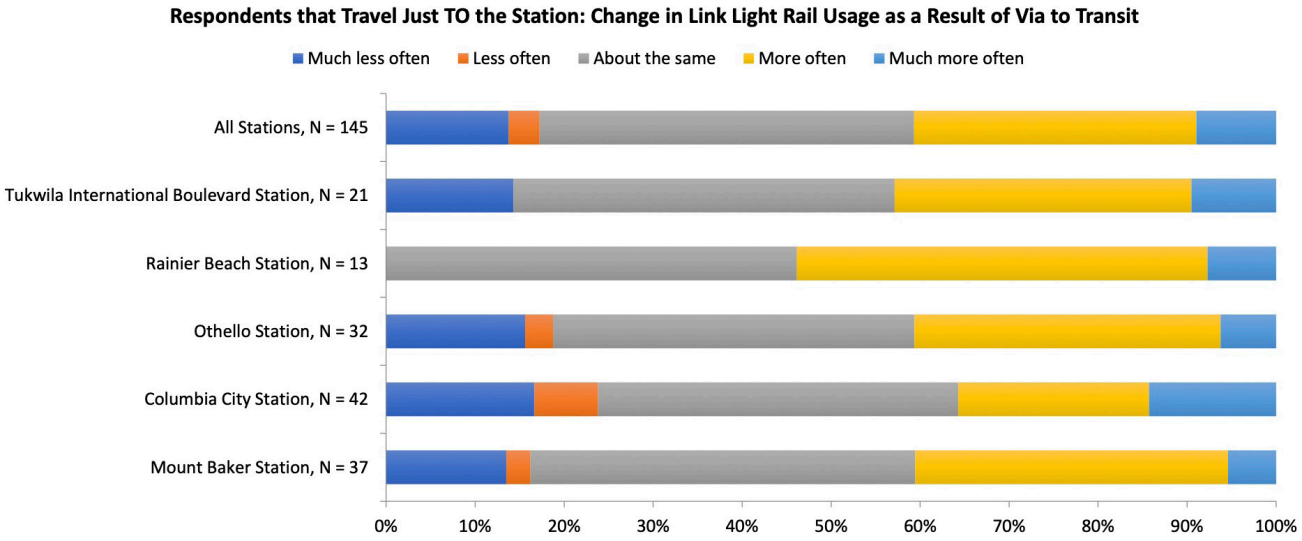


Figure 4-73 *Change in Link Light Rail Usage due to Via to Transit – Respondents Who Travel Just TO Stations – Puget Sound*

Reason for Increasing Public Transit Usage

An additional question in the late-pilot survey was related to why respondents increased their use of public transit (bus and/or rail). Figure 4-74 shows that most respondents said that they had better access to and from stations (84%), and 6% said they had better access to stations. The results suggest that most respondents felt that high access was largely equivalent, whether traveling to or from the participating station.

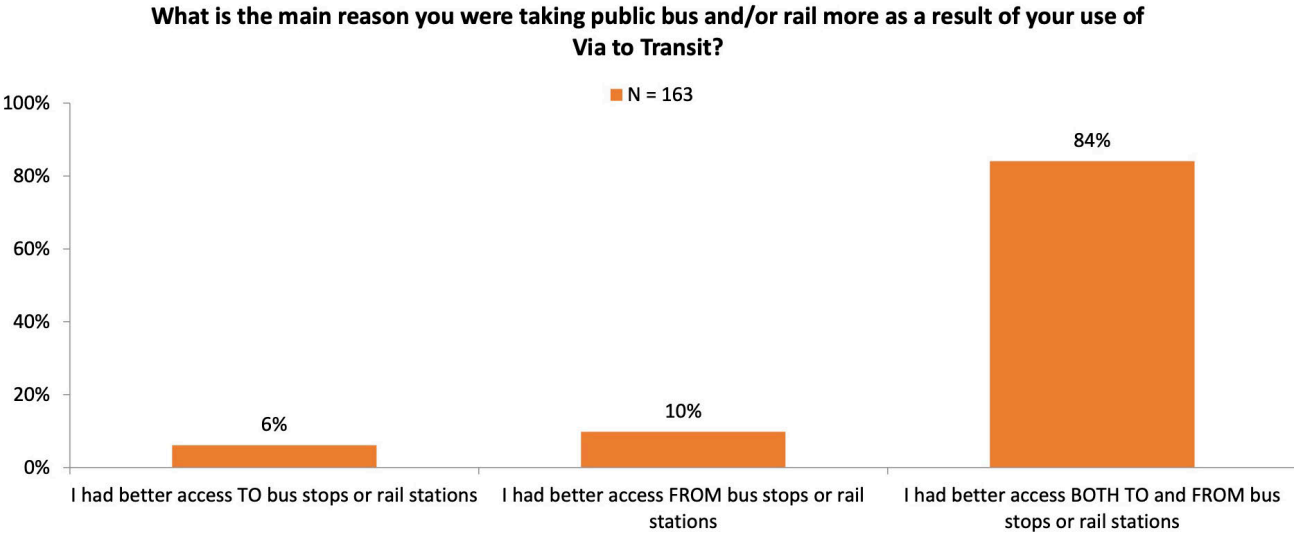


Figure 4-74 *Primary Reason for Taking Public Transit More Due to Via to Transit – Puget Sound*

Conclusion

Focusing on change in public transit usage due to Via to Transit, the analysis found that public transit usage (or ridership) increased across all stations for respondents traveling to (and from) participating stations. Link light rail ridership also increased across all stations due to Via to Transit for respondents traveling to (and from) participating stations. Via to Transit also improved access both to/from bus stops and rail stations.

Conclusion – Overall

The results in Los Angeles suggested that Hypothesis 4 was supported, albeit moderately in part due to the limited size of the survey sample. The sample in Puget Sound was larger and more definitively supported the hypothesis. Overall, the results collectively support Hypothesis 4 in that Via provided options to stations that helped increase ridership on public transit.

Hypothesis 5: At the selected transit stops, the availability of the new service FROM a transit station will increase transit ridership for that system.

Performance Metric	Key Finding – Los Angeles	Key Finding – Puget Sound
Change in public transit usage due to Via services to/from stations, with a focus on respondents traveling from stations; access improvements due to Via services	As with Hypothesis 4, a small sample of respondents traveling to/from stations and just from stations increased their public transit usage (and ridership) due to Via FMLM services.	The results were stronger for Via to Transit in Puget Sound. Most respondents stated that access improved both to and from stations.

Similar to Hypothesis 4, Hypothesis 5 focused on the increase in transit ridership as a result of new Via service but in this case from stations. With this need for a causal relationship, survey results were taken from the late-pilot survey. Results were broken up between two groups of people—1) riders that traveled both to and from participating stations and 2) riders that traveled only from participating stations. It was assumed that individuals going to and from stations provide insights for Hypothesis 5, even though the hypothesis focuses on only new service from stations.

Los Angeles

Public Transit Usage

Similar to Hypothesis 4, the analyses provided in Figures 4-75 and 4-76 present changes in public transit usage due to the Via Rideshare Service. Figure 4-75 offers insights for respondents who traveled to and from participating stations, finding that 33% of these respondents said that their public transit usage increased or significantly increased. On the other hand, 18% of respondents said that their usage decreased or significantly decreased.

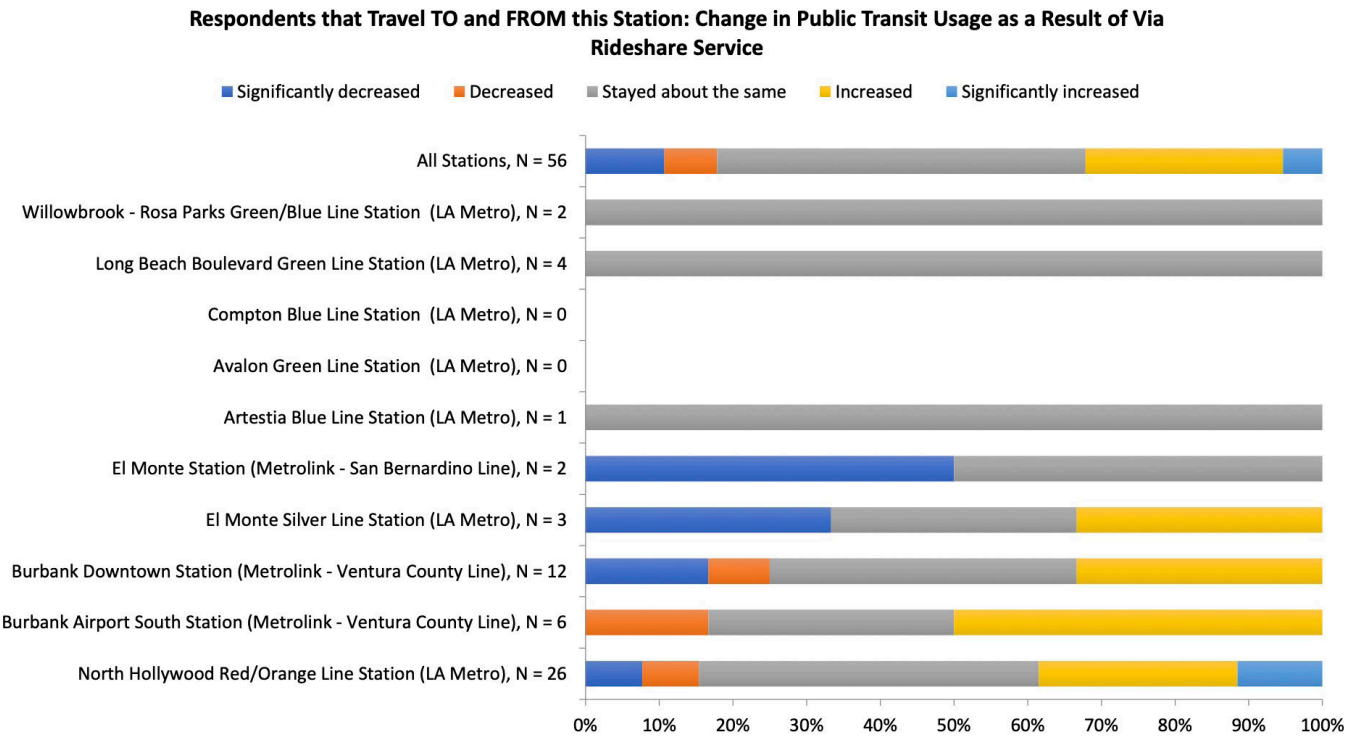


Figure 4-75 *Change in Public Transit Usage due to Via Rideshare Service – Respondents Who Travel TO and FROM Stations – Los Angeles*

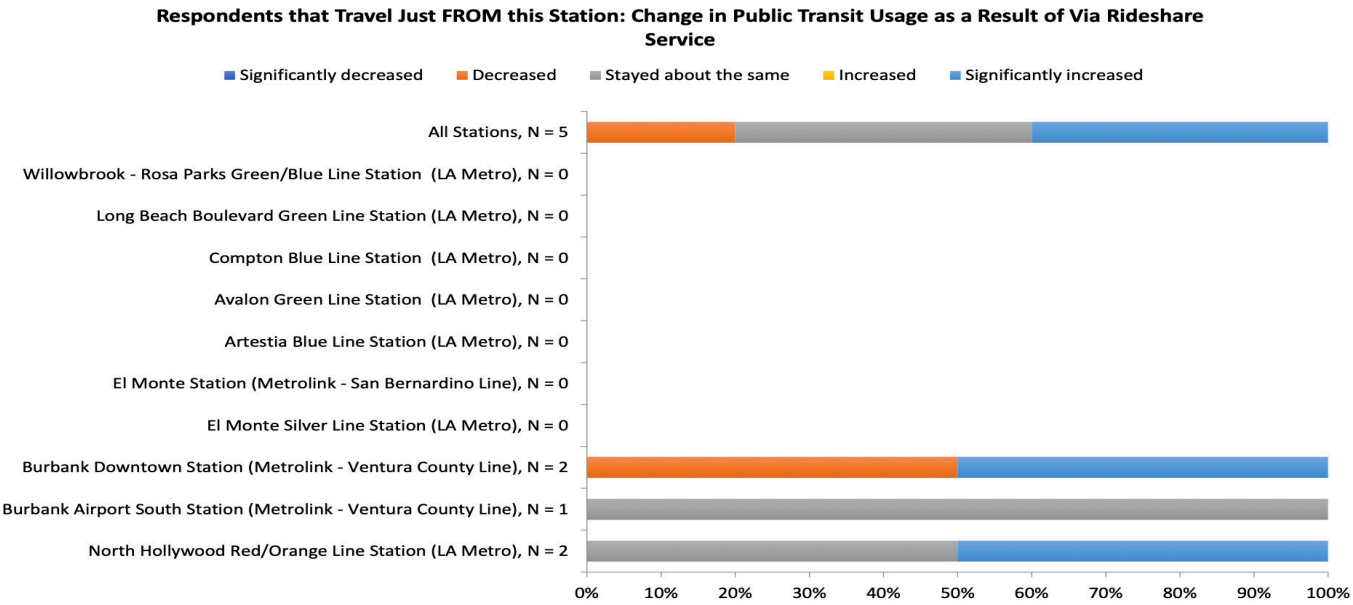


Figure 4-76 *Change in Public Transit Usage due to Via Rideshare Service – Respondents Who Travel Just FROM Stations – Los Angeles*

Urban Rail and Metro Usage

The section above explores the usage of public transit broadly defined. This section presents data focusing specifically on urban rail and Metro usage change (e.g., Metro Rail, Silver line, Metrolink, light rail). Figure 4-77 displays changes due to Via Rideshare Service of respondents traveling both to and from participating stations. About 33% of these respondents reported that they used urban rail more often or much more often, compared to 23% who used it less often or much less often. The results together only lend moderate support to Hypothesis 5 in terms of increasing ridership due to a new FMLM service from stations.

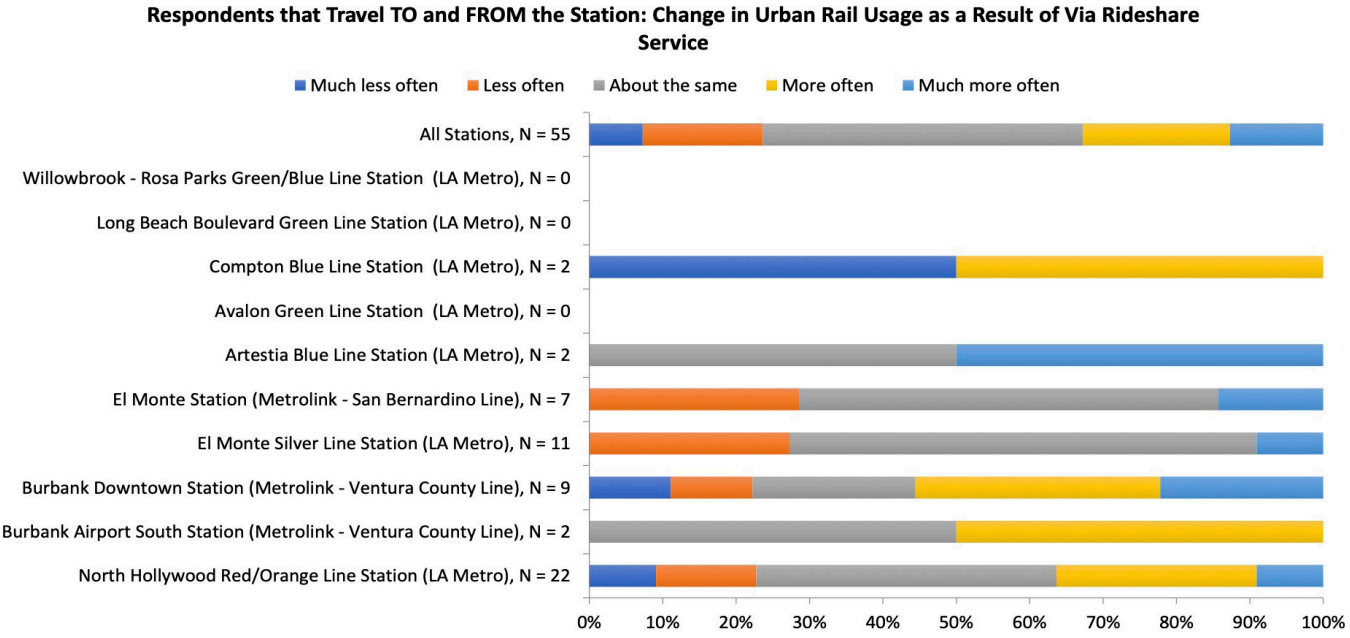


Figure 4-77 *Change in Urban Rail (e.g., Metro, Metrolink, Light Rail) Usage Due to Via Rideshare Service – Respondents Who Travel TO and FROM Stations – Los Angeles*

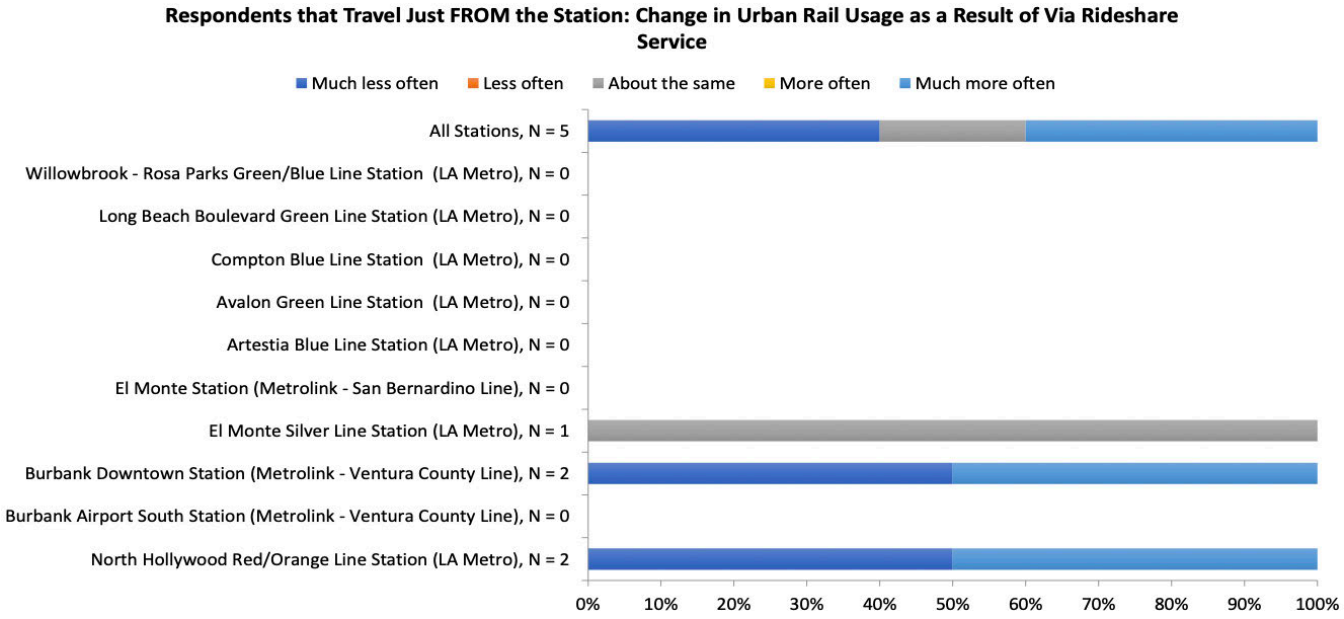


Figure 4-78 *Change in Urban Rail (e.g., Metro, Metrolink, Light Rail) Usage Due to Via Rideshare Service – Respondents Who Travel Just FROM Stations – Los Angeles*

Reason for Increasing Public Transit Usage

Similar to the analysis of Hypothesis 4, Figure 4-79 shows that access was better going both to and from bus stops and/or rail stations (71%). An additional 18% stated that they had better access from participating stops/stations. This helps support that the Via Rideshare Service offered improved accessibility that likely increased ridership at public transit stops/stations.

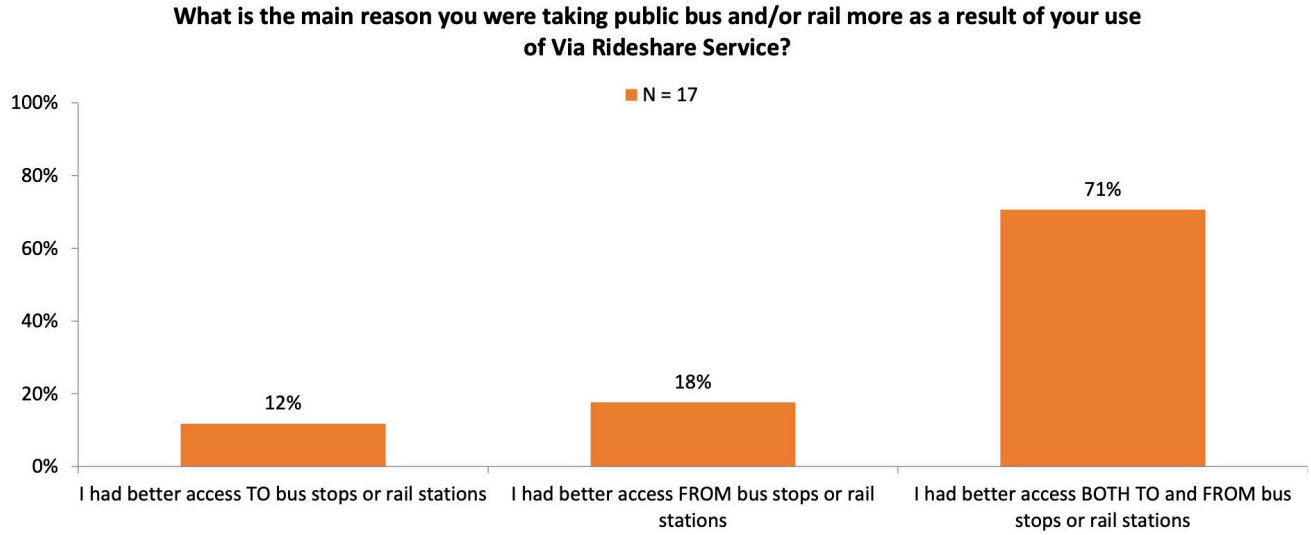


Figure 4-79 *Primary Reason for Taking Public Transit More Due to Via Rideshare Service – Los Angeles*

Conclusion

Focusing on riders traveling to and from participating stations and just from participating stations, the results indicate that public transit and urban rail usage increased moderately across all stations. Individuals also had better access both to and from bus stops and/or stations, including just from stops/stations. Although the results indicate an increase in public transit ridership due to new FMLM service through Via from stations, the limited sample sizes reduces the power of the conclusions in Los Angeles.

Puget Sound

Public Transit Usage

To determine how Via to Transit impacted transit ridership for those traveling from stations, an analysis was conducted for respondents who traveled to and from participating stations, along with respondents who only travel from participating stations. Figure 4-80 displays change in public transit usage due to Via to Transit. Across all stations, 15% of respondents said that their usage significantly increased, and an additional 27% said their usage increased. This compares to just 14% who said their public transit usage decreased or significantly decreased. Columbia City Station experienced the highest increase in public transit usage, and Tukwila International Boulevard Station saw only modest increases in usage. Figure 4-81, which presents results for respondents who only traveled from stations, shows significant increases (6%) and increases (25%) in public transit usage. About 6% of respondents across all participating stations said their usage significantly decreased and 5% said that their usage decreased.

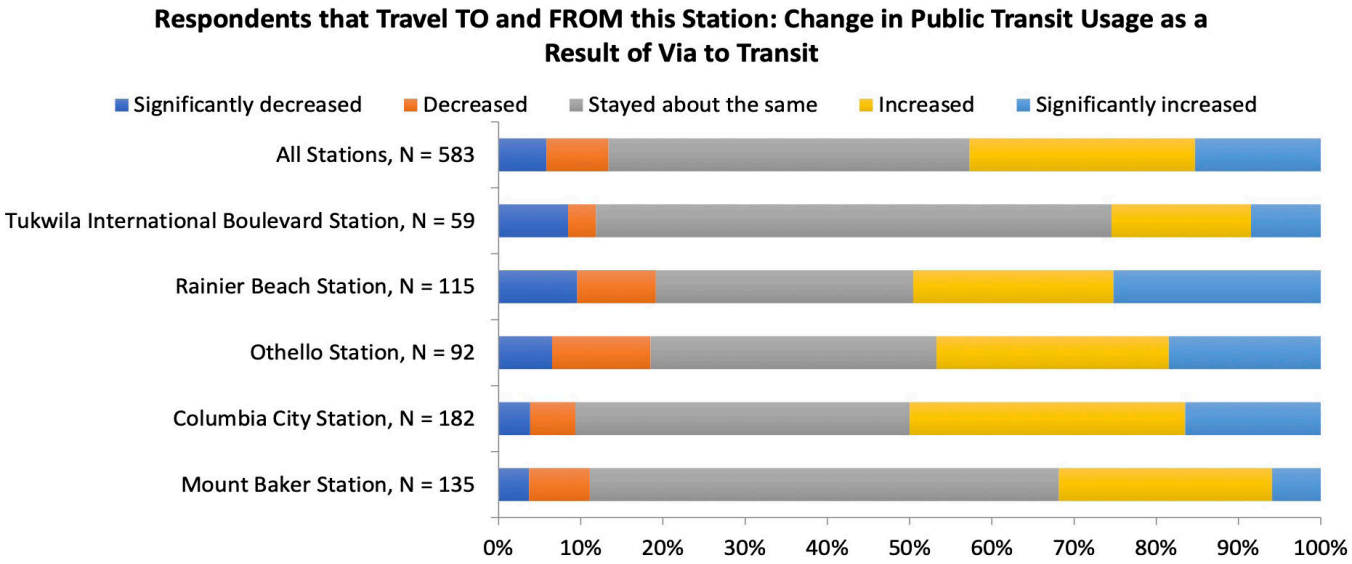


Figure 4-80 *Change in Public Transit Usage Due to Via to Transit – Respondents Who Travel TO and FROM Stations – Puget Sound*

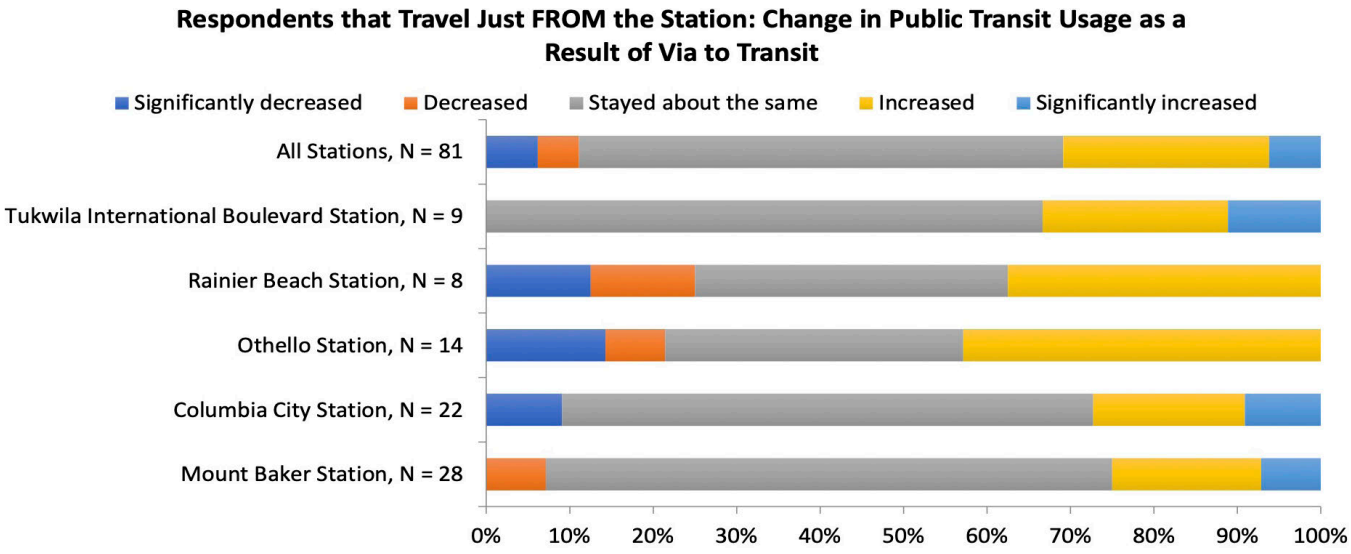


Figure 4-81 *Change in Public Transit Usage due to Via to Transit – Respondents Who Travel Just FROM Stations –Puget Sound*

Link Light Rail Usage

The section above explored the usage of public transit broadly spanning all forms of public transit. An analysis was also conducted specifically focusing on Link light rail usage changes due to Via to Transit. Figure 4-82 presents results from respondents who traveled to and from participating stations. Across all stations, 46% said they used Link light rail more often or much more often, compared to just 16% who said that they used Link light rail less often or much less often. In addition, Figure 4-83 shows that respondents who traveled only from stations also increased their Link light rail usage as a result of Via to Transit. About 48% of respondents said they used Link light rail more often or much more often, while just 8% of respondents said they used it much less often or less often.

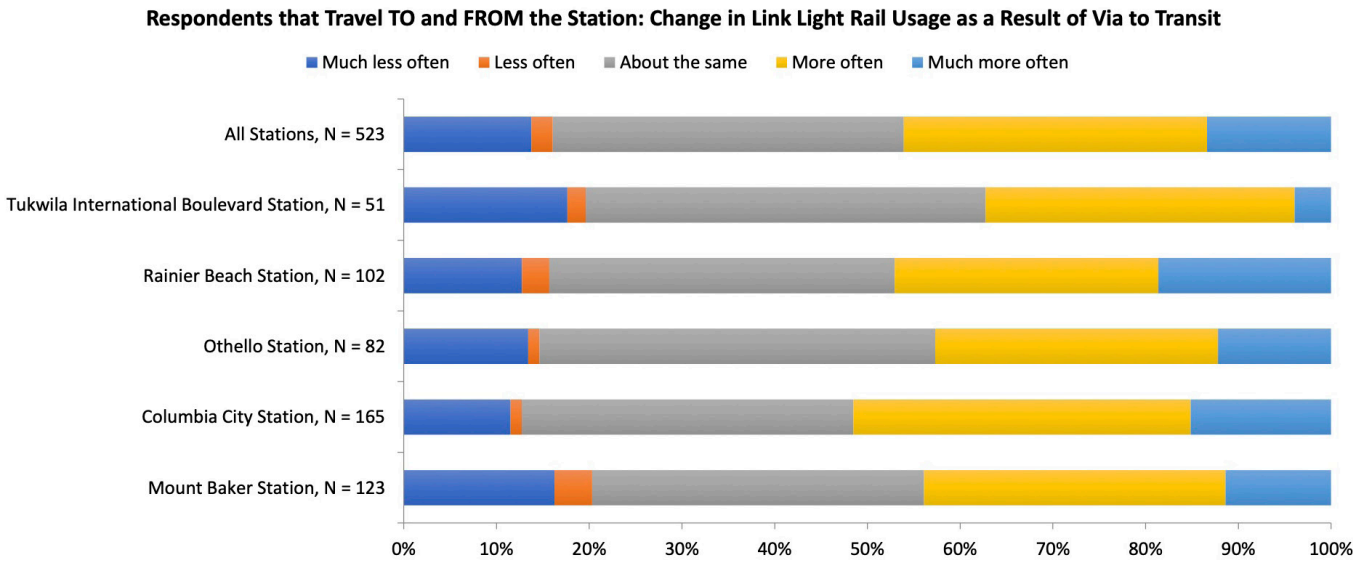


Figure 4-82 *Change in Link Light Rail Usage due to Via to Transit – Respondents Who Travel TO and FROM Stations – Puget Sound*

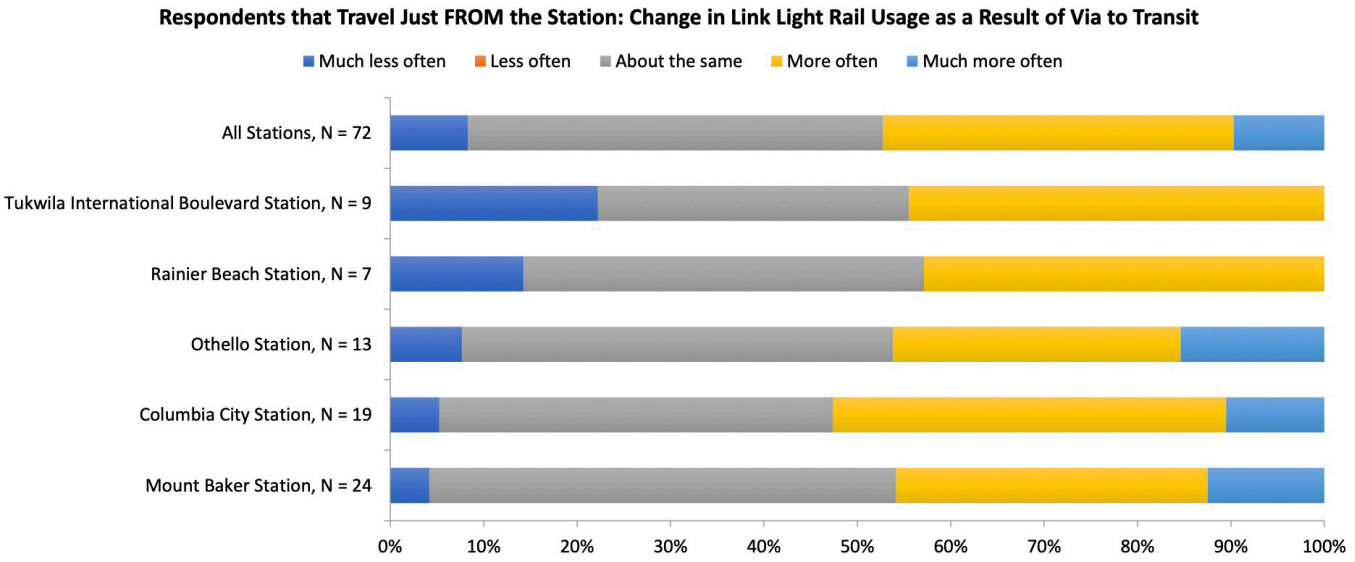


Figure 4-83 *Change in Link Light Rail Usage Due to Via to Transit – Respondents Who Travel Just FROM Stations – Puget Sound*

Reason for Increasing Public Transit Usage

Figure 4-84 presents the primary reason for taking public transit more due to Via to Transit. About 84% of respondents said that Via to Transit gave them better access to and from bus stop or rail stations, and an additional 10% said that they had better access just from stops/stations.

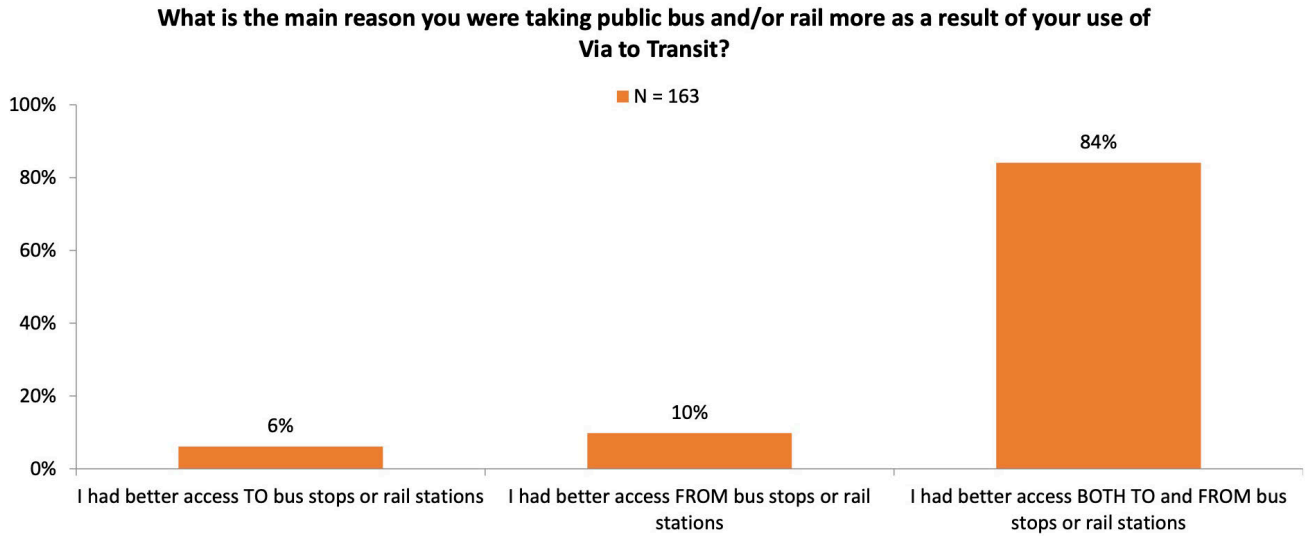


Figure 4-84 *Primary Reason for Taking Public Transit More Due to Via to Transit – Puget Sound*

Conclusions

Analysis results show that public transit usage and Link light rail usage generally increased across participating stations for respondents traveling to/from and just from those stations. Moreover, a large number of respondents stated that they had improved access both to/from and just from the stations. The results support Hypothesis 5 that the availability of Via to Transit from public transit helped increased ridership and public transit usage.

Conclusion – Overall

The results in Los Angeles were less robust due to a more limited sample size, albeit supporting the hypothesis moderately within this region. However, the more robust sample in Puget Sound found that public transit usage increased due to the availability of Via FMLM service from the stations. Overall, the results of the analysis in Los Angeles and Puget Sound finds that Hypothesis 5 was supported.

Hypothesis 6: The availability of the new service will decrease fuel consumption and GHG emissions associated with the customers using the service.

Performance Metric	Key Finding – Los Angeles	Key Finding – Puget Sound
CO_2 emissions from the pilot, Change in fuel consumption and GHGs resulting from shift in behavior as a result of the pilot	In the Los Angeles region, the availability of the new service (Via Rideshare Service) did not decrease fuel consumption and GHG emissions associated with customers using the service.	In the Puget Sound region, the availability of the new service (Via to Transit) did not decrease fuel consumption and GHG emissions associated with customers using the service.

Hypothesis 6 focuses on whether the availability of the Via FMLM service decreased fuel consumption and GHG emissions. This hypothesis was evaluated using survey data from Via pilot users and activity data (for trips and vehicles) provided by Via. As CO_2 is the primary GHG emitted through transportation activities, CO_2 is used in the calculations to measure the environmental effect of the service. In addition, survey questions of Via pilot users, such as mode choice, were taken into consideration in the following analysis.

Los Angeles

Trip Analysis

Via provided activity data that reported the distance traveled for 199,134 vehicle trips to/from the 10 participating stations in the Los Angeles area from January 2019 to August 2020. Figures 4-85 and 4-86 show that most of the trips were conducted during the weekdays and during peak commute hours around 7:00 am and 5:00 pm.

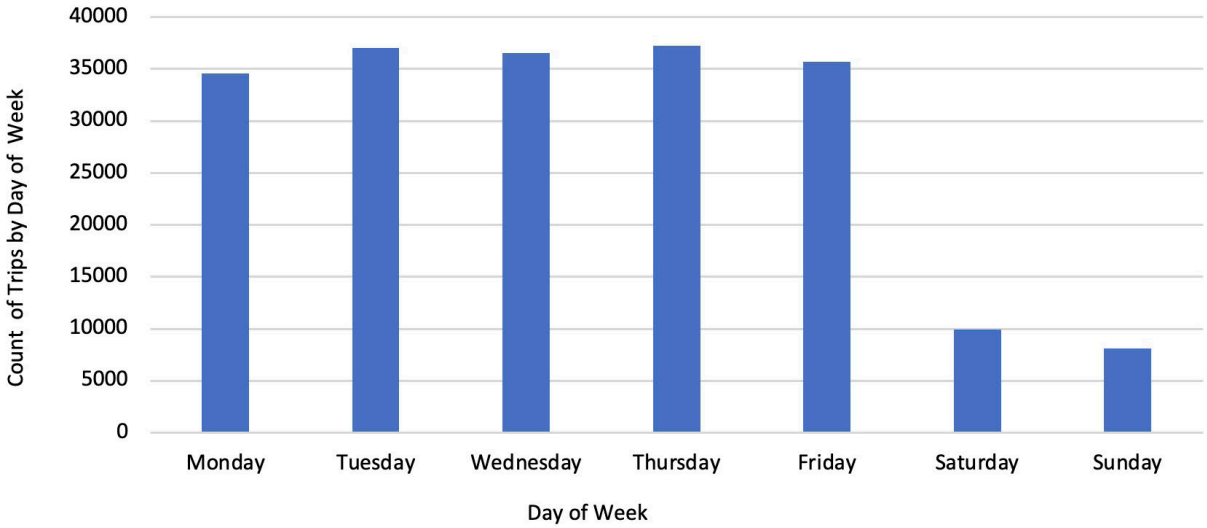


Figure 4-85 *Distribution of Trips by Day of Week for Via Rideshare Service – Los Angeles*

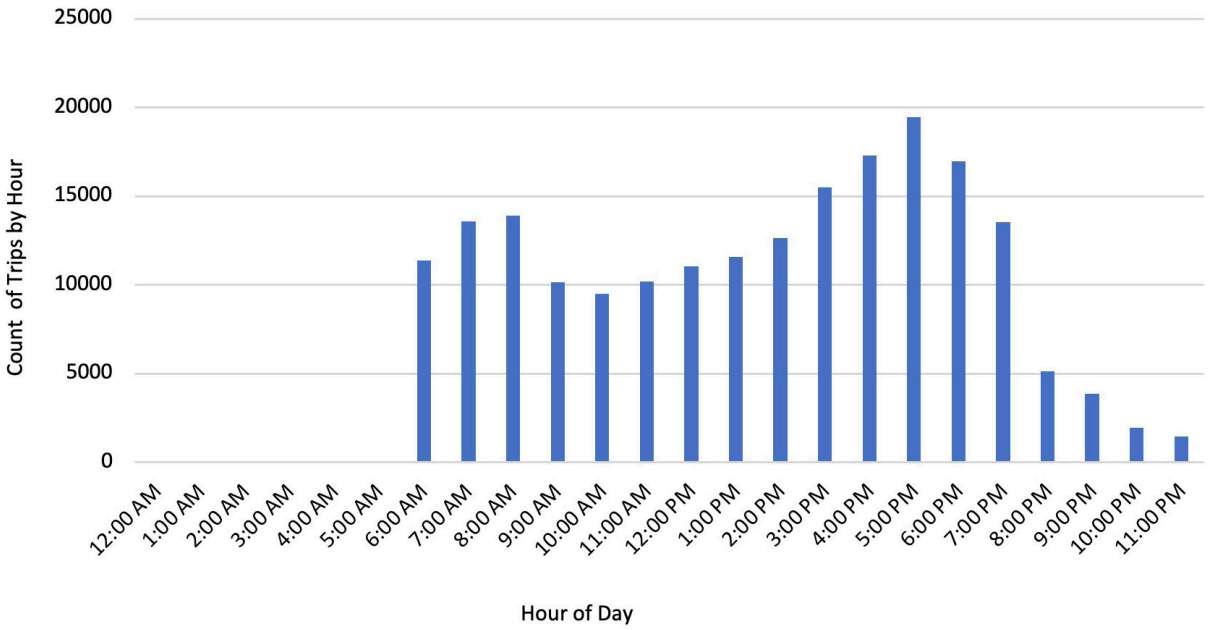


Figure 4-86 *Distribution of Trips by Hour of Day for Via Rideshare Service – Los Angeles*

Figure 4-87 displays Via Rideshare Service trips per month between January 2019 and August 2020. Despite fluctuations by month, the number of trips largely increased between January 2019 and January 2020. The maximum number of trips occurred in August 2020 at 21,581 trips, and the minimum occurred at the beginning of the pilot in January 2019, at 316. After March 2020, a small decline of trips was observed, which may be related to stay-at-home restrictions implemented by local governments and the State of California in response to the COVID-19 public health emergency.

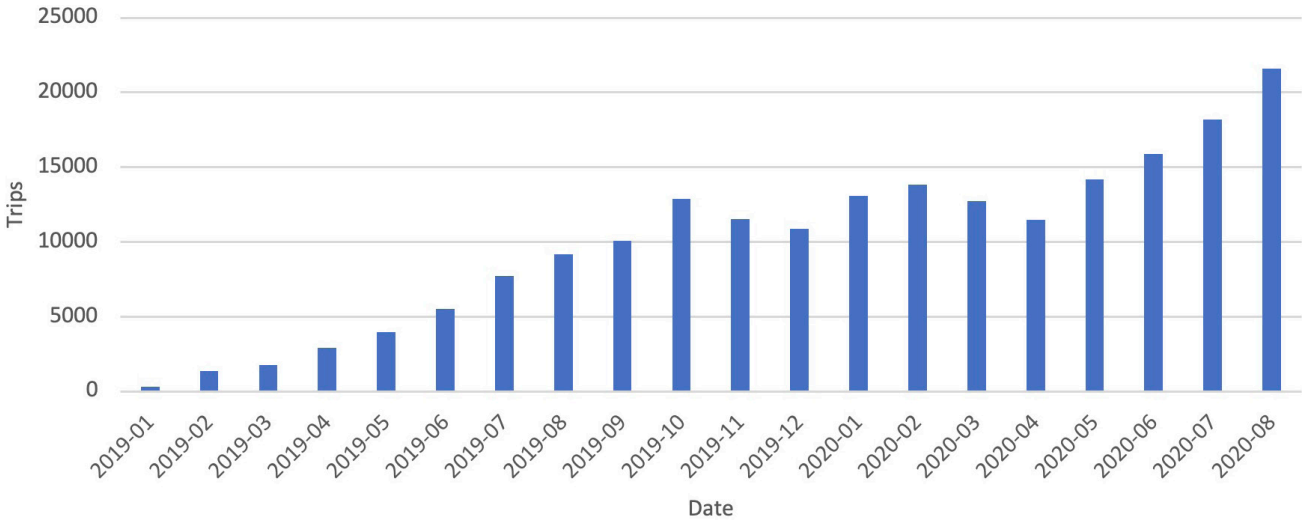


Figure 4-87 *Monthly Total Number of Trips for Via Rideshare Service – Los Angeles*

Figure 4-88 presents monthly revenue and non-revenue miles driven. For all months, non–revenue miles were higher than revenue miles. There was a consistent increase in both non-revenue and revenue miles in the pilot program. The percentage of total miles distributed between revenue and non-revenue is shown in Figure 4-89.

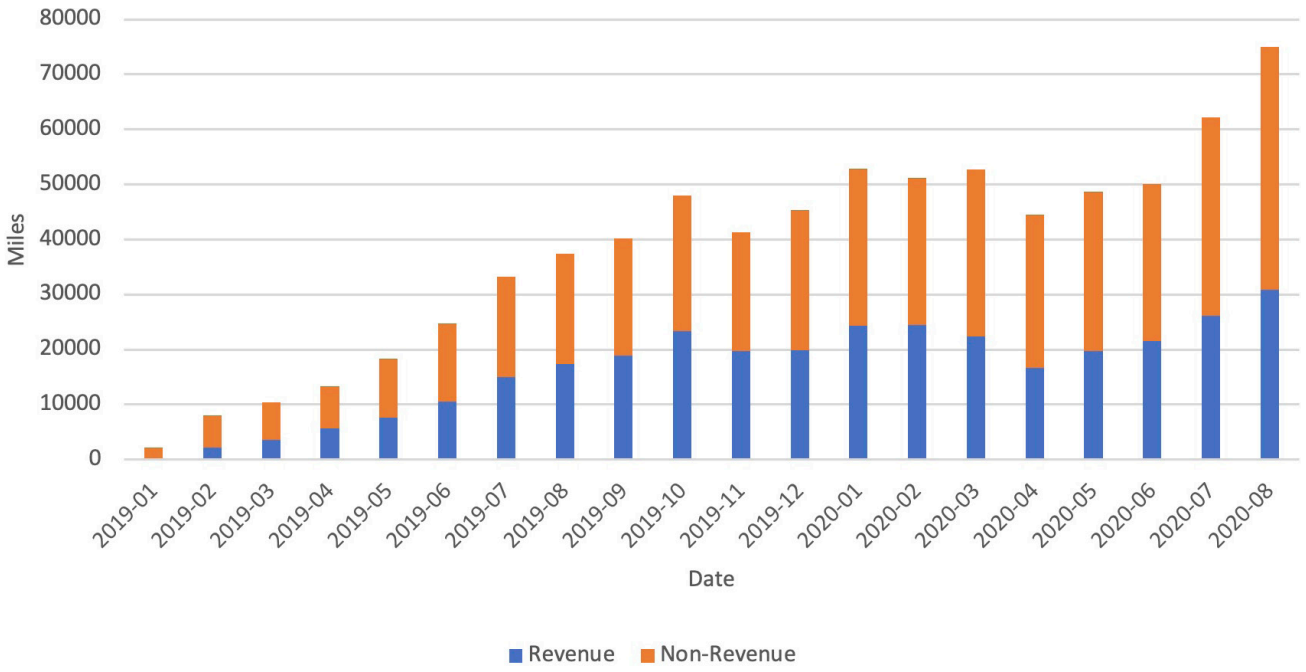


Figure 4-88 *Monthly Revenue and Non-Revenue Miles for Via Rideshare Service – Los Angeles*

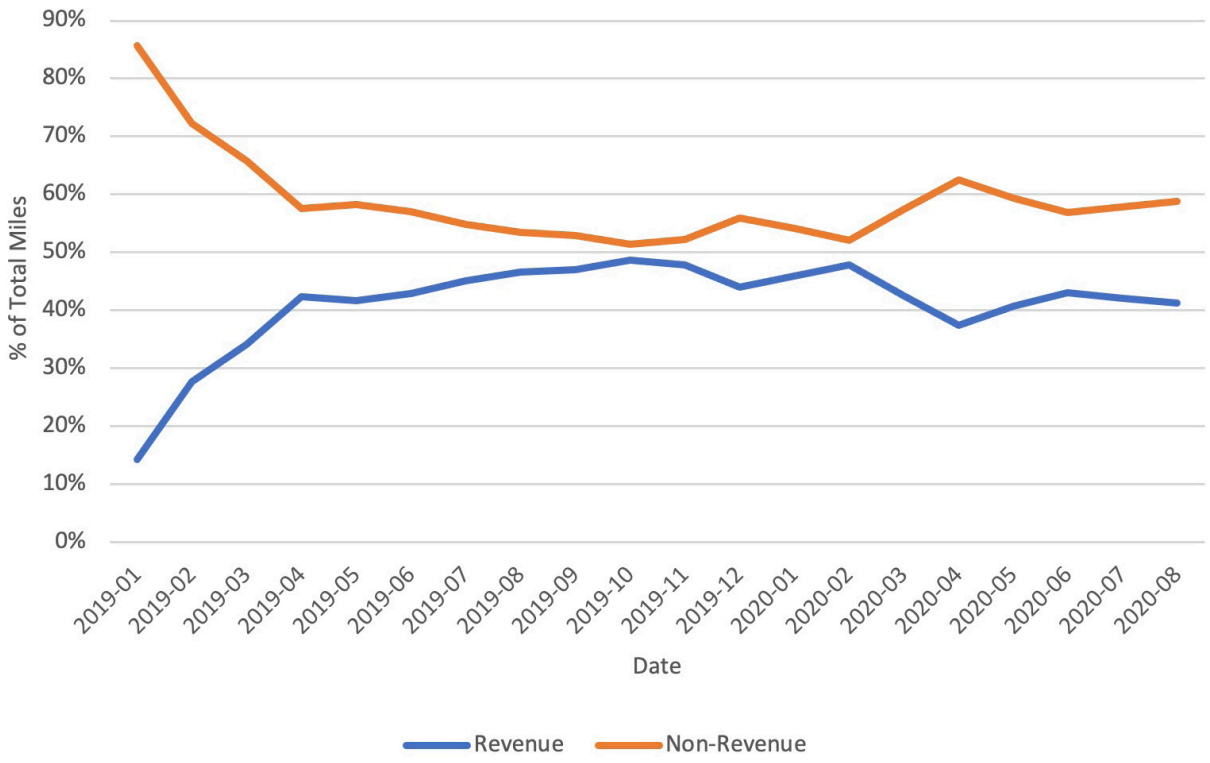


Figure 4-89 *Revenue and Non-Revenue Miles as a Percentage of Total Miles for Via Rideshare Service – Los Angeles*

Fuel Economy and CO_2 Emissions

For each of the 199,134 vehicle trips, the fuel economy city average miles per gallon (MPG) of the vehicle was obtained from the fuel economy database published by the Environmental Protection Agency (EPA). Figure 4-90 shows the distribution for 84 different vehicle types; 75% had a city fuel economy of 20–48 MPG. Figure 4-91 displays total gasoline consumed by month for both revenue and non-revenue miles using the fuel economy data and distance traveled by Via Rideshare Service vehicles.

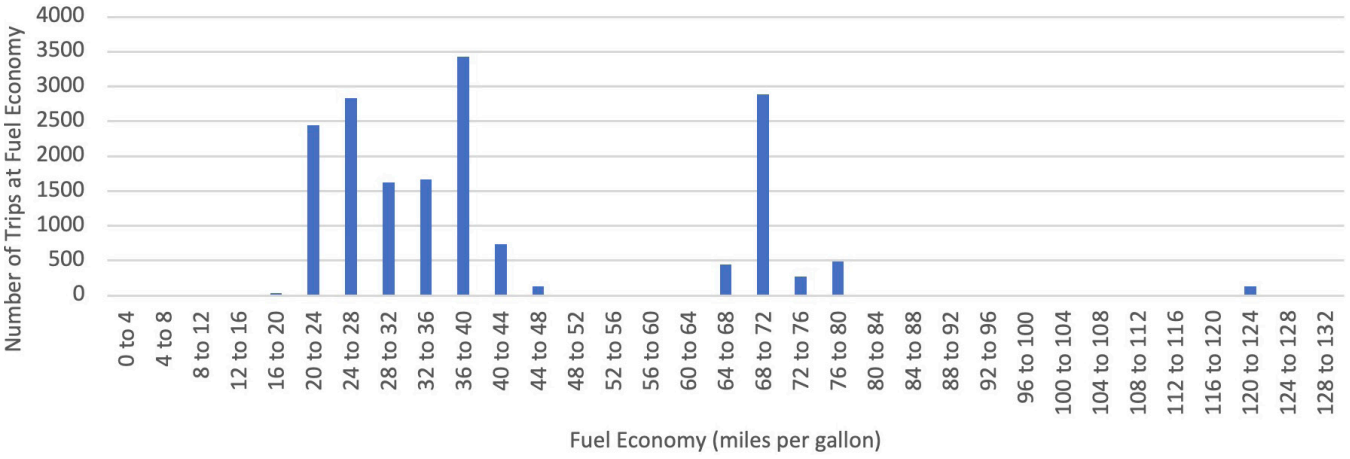


Figure 4-90 *Trip-Weighted City Fuel Economy Distribution of Via Rideshare Service Vehicles – Los Angeles*

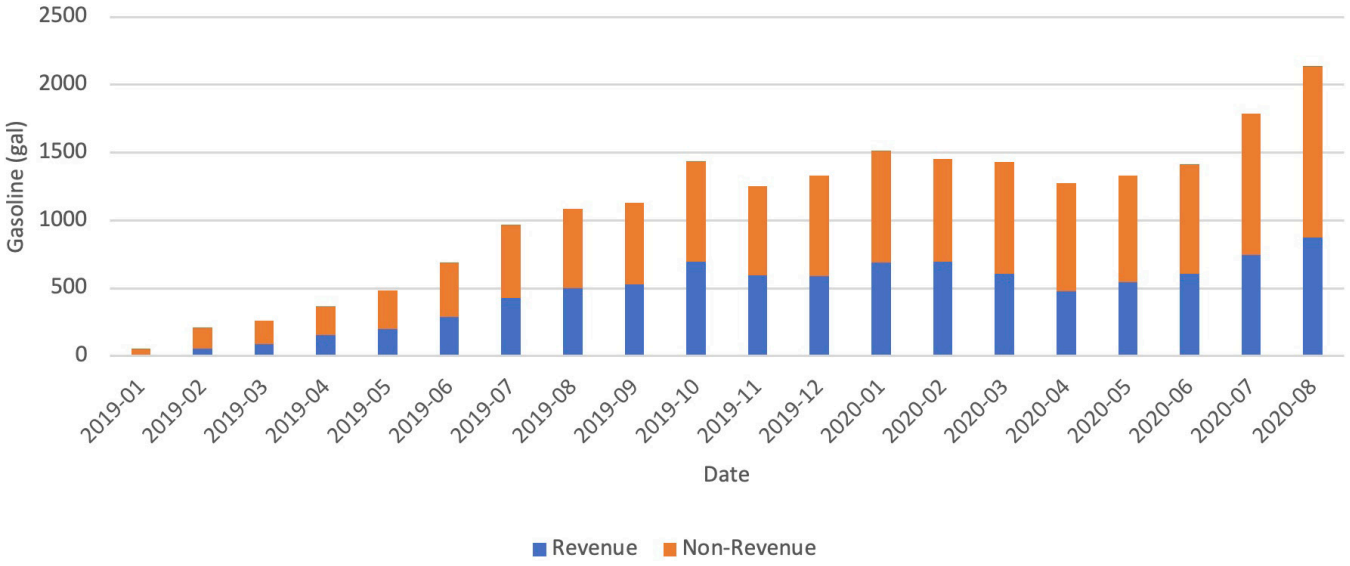


Figure 4-91 *Monthly Gasoline Consumed for Revenue and Non-Revenue Miles for Via Rideshare Service – Los Angeles*

Using monthly gasoline consumed, monthly CO_2 emissions for the Via Rideshare Service were calculated in Figure 4-92. The total maximum CO_2 emissions occurred in August 2020. During the pilot program, CO_2 emissions rose from January 2019 to October 2019. At this point, CO_2 emissions largely stabilized until July 2020 when emissions again began to rise. The pattern reflects the total miles traveled by Via Rideshare Service vehicles per month. One key finding is that more gasoline was consumed and more CO_2 was emitted for non-revenue miles than revenue miles (which stems from the higher percentage of non-revenue miles compared to revenue miles) as seen in Figure 4-93.

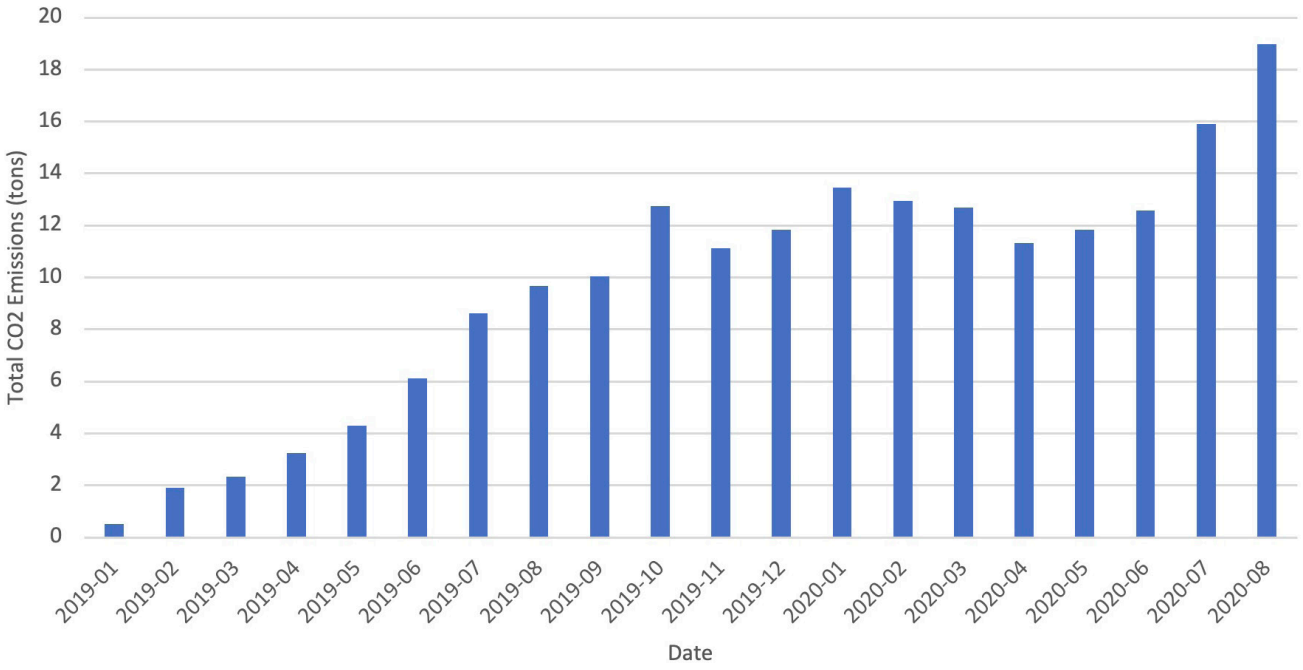


Figure 4-92 *Monthly CO_2 Emissions for Via Rideshare Service – Los Angeles*

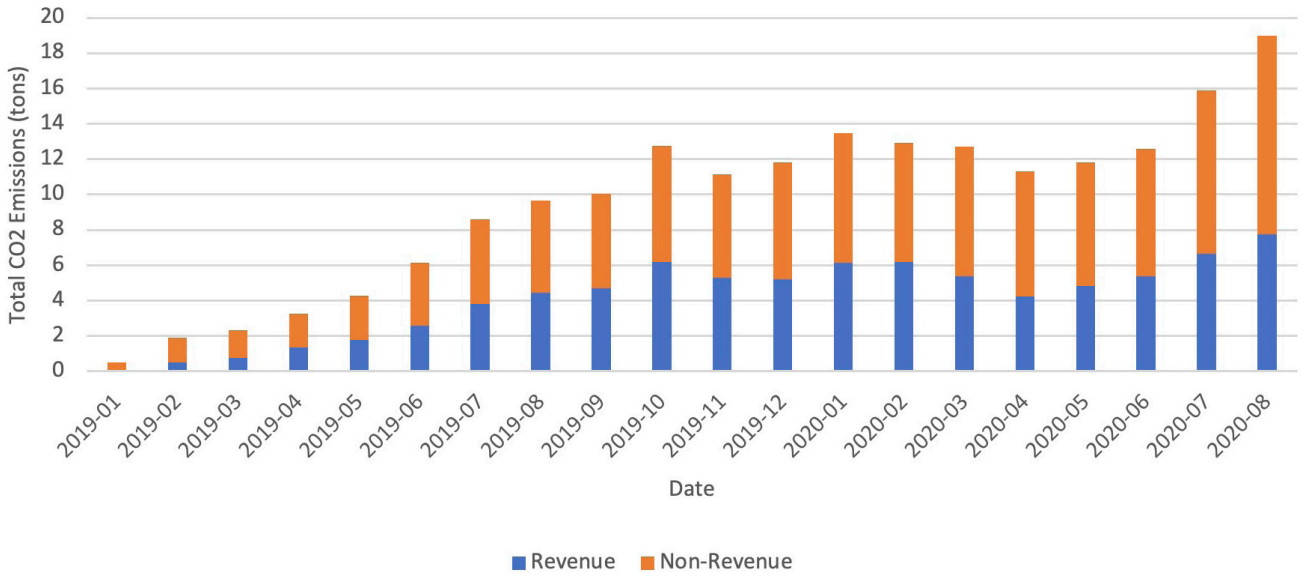


Figure 4-93 *Monthly CO_2 Emissions for Revenue and Non-Revenue Miles for Via Rideshare Service – Los Angeles*

Mode Substitution

The survey asked respondents to report how they typically traveled to and from stations before the Via Rideshare Service. The question determined mode substitution as a result of Via to Rideshare Service. For example, the question identified the percentage of SOV trips that were avoided as a result of the Via Rideshare Service. This mode substitution (e.g., for SOV, bus, cycling, walking, etc.) was used to calculate fuel consumption and GHG emissions prior to and during the pilot.

Figure 4-94 shows the distribution of trips to stations. The distribution of responses shows that a significant portion of respondents (32%) would have driven alone to the LA Metro station in the absence of FMLM Via service. Another 5% indicated that they would have taken Uber or Lyft or other non-pooled ride hailing instead. Taken together, 37% of respondents indicated that Via Rideshare Service substituted for travel in an SOV. Other mode substitutions included public bus (44%), carpooling (1%), pooled ride-hailing (5%), personal bike (4%), walk (11%).

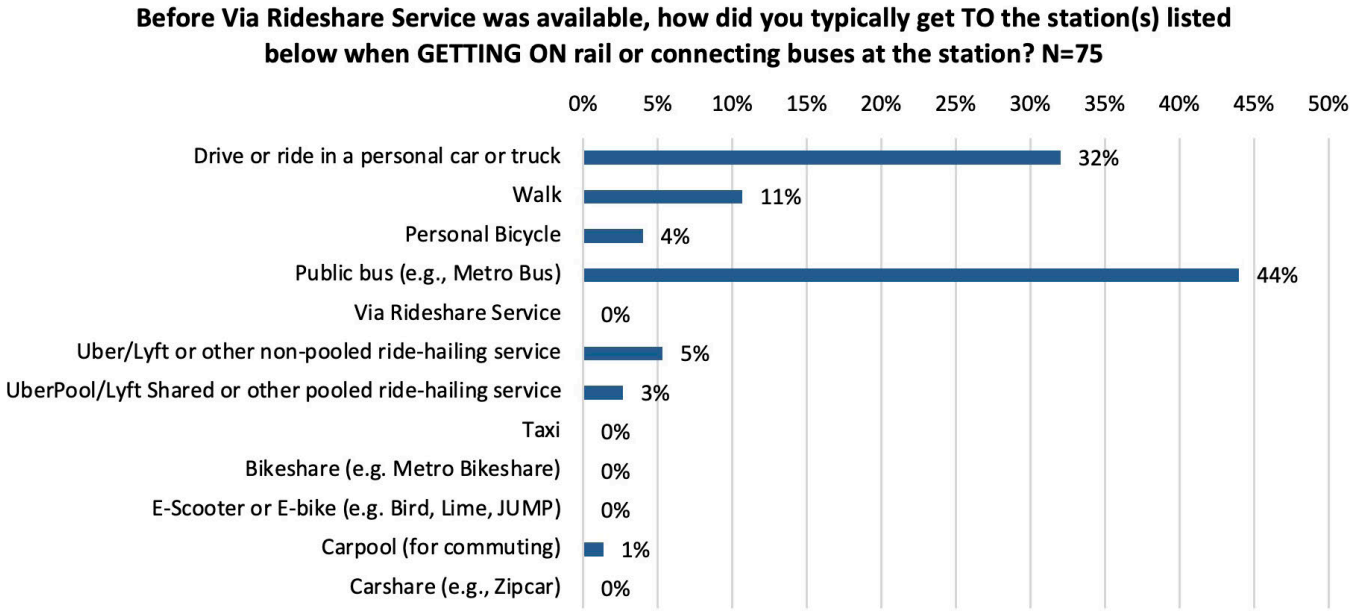


Figure 4-94 *Mode Substitution as a Result of Via Rideshare Service TO Stations – Los Angeles*

Figure 4-95 shows the distribution of modes from stations. The distribution of responses shows that some respondents (17%) would have driven alone from the LA Metro stations in the absence of the FMLM Via service. Another 13% indicated that they would have taken Uber or Lyft or other non-pooled ride hailing instead. Taken together, 30% respondents indicated that Via Rideshare Service substituted for travel from stations in an SOV. Other mode substitutions included public bus (38%), pooled ride-hailing (4%), personal bike (8%), bikeshare (4%), and walk (17%).

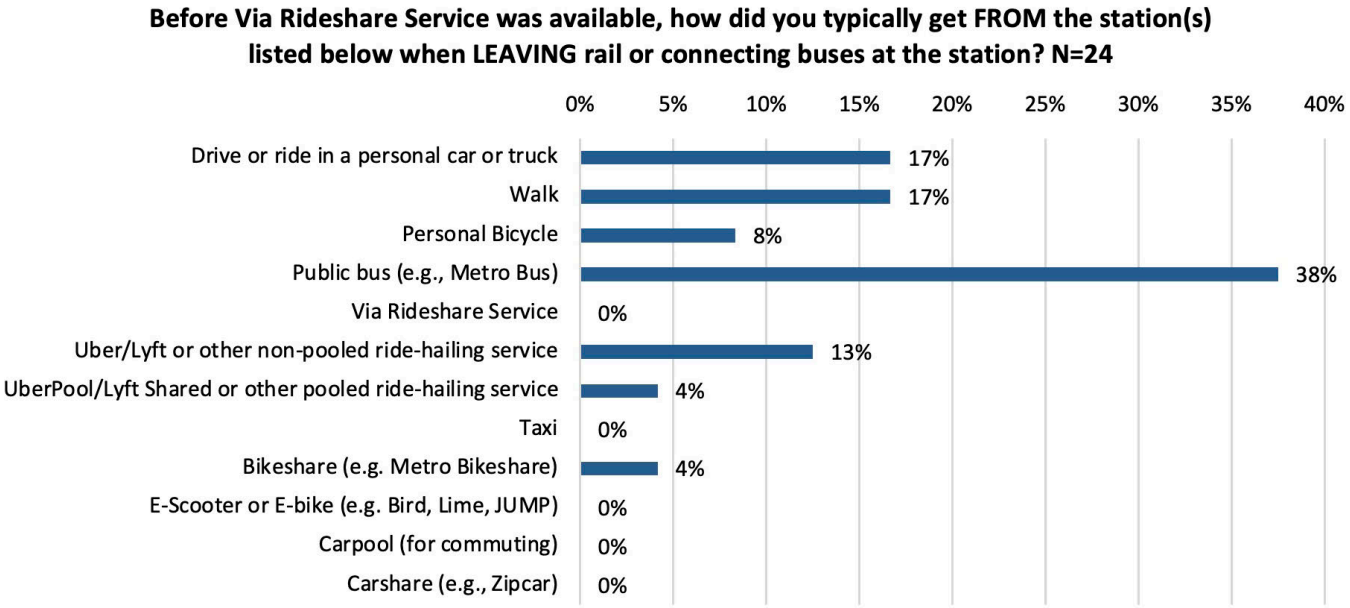


Figure 4-95 *Mode Substitution as a Result of Via Rideshare Service FROM Stations – Los Angeles*

Emissions Simulation

The evaluation of mode shift and its impact on emissions is a function of the specific modes that are substituted. For example, if a Via Rideshare Service user formerly accessed LA Metro stations by bus, walking, or bicycle, then a shift to the Via Rideshare Service would result in an increase in VMT. The new Via Rideshare Service vehicle would have to travel more miles (as a vehicle) to complete the same equivalent trip as the previous modes. However, if a Via Rideshare Service user formerly accessed LA Metro by driving alone, using a personal vehicle, or using a service such as a TNC or taxi, then the VMT would be similar. If the Via Rideshare Service trip was pooled (i.e., a trip with other passengers), the VMT from this scenario would likely be lower than driving alone, using a personal vehicle, or using a SOV taxi/TNC. However, in some cases, additional miles traveled by the Via Rideshare Service vehicle (e.g., empty miles traveling to pick up a passenger) could increase VMT. Since VMT is linked to GHGs and fuel consumption (i.e., more VMT from gasoline-powered vehicles

will increase emissions and fuel consumption), the modal shift and correlating VMT changes are important to consider.

To generate a rough estimate of VMT, fuel consumption, and CO_2 emissions related to trips, assumptions were made regarding mode substitution. However, the vehicle activity data did not provide mode substitution. To overcome this data limitation, a simulation was developed using a distribution of possible mode substitutions gathered from rider survey data (see Figures 4-94 and 4-95). Riders were randomly assigned a mode shift within the dataset. To simplify the analysis, the mode assignment was either an SOV or a non-SOV shift. These assignments were then repeated across the vehicle activity dataset multiple times to evaluate the robustness and sensitivity of the resulting VMT change, fuel consumption, and CO_2 emissions prior to the introduction of Via Rideshare Service. As a note, since trip distance generally effects mode choice (and thus mode shift), calculations were also conducted to assess if a conditional distribution based on distance was needed. However, the analysis that linked survey data and activity data did not yield clear results, likely due to the low sample sizes in the LA Metro survey data.

The final mode distribution included data for trips to and from stations as seen in Figure 4-96. The distribution of responses shows that a significant portion (28%) of respondents (on average) would have driven alone to or from stations in the absence of Via Rideshare Service. Another 7% indicated that they would have taken Uber or Lyft or other non-pooled ride hailing instead. Taken together, 35% respondents indicated that they substituted their SOV trip with Via Rideshare Service.

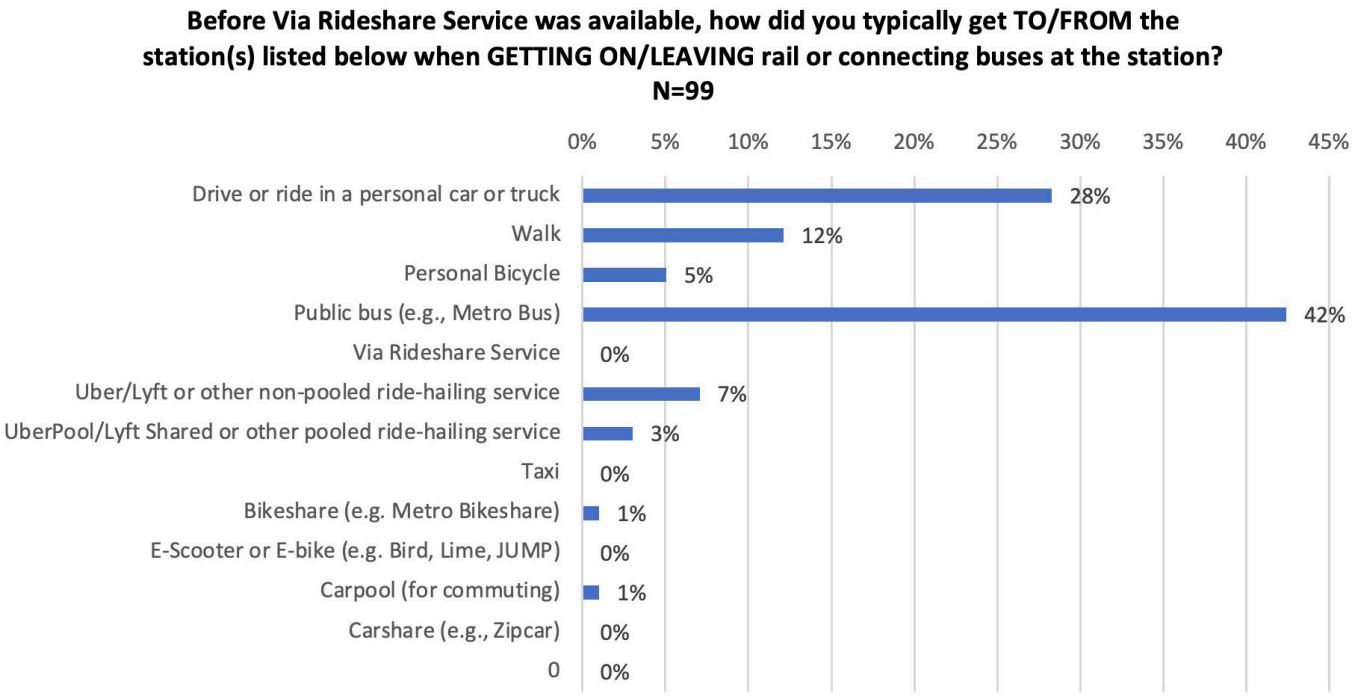


Figure 4-96 *Mode Substitution as a Result of Via Rideshare Service TO and FROM Stations – Los Angeles*

With an SOV substitution rate of 35%, the simulation identified that VMT before the Via pilot was 153,183 miles for 199,134 trips. Since VMT during the Via pilot was 759,635 miles for the same number of trips, the availability of the new service (Via) increased VMT, fuel consumption, and CO_2 emissions as seen in Table 4-1.

If all Via users had driven a vehicle or used a TNC service prior to the Via pilot (i.e., 100% SOV population), the total miles driven would have been 437,679 miles. Even if all Via users had used an SOV to go to/from stations, the Via pilot still had a higher VMT due to non-revenue miles. Non-revenue miles (e.g., miles where a vehicle is traveling without a passenger, such as when going to pick up a passenger) were 428,946 miles, which accounted for 56% of the total miles driven in the Via pilot (759,635 miles).

Table 4-1 *Comparison of VMT, Gasoline Consumed, and CO_2 for Via Rideshare Service – Los Angeles*

Metric	Via Pilot	Prior to Pilot	
		35% SOV (Survey Result)	100% SOV (Hypothetical)
VMT (miles)	759,635	153,183	437,679
Gasoline (gal)	21624	4344	12412
CO_2 (tons)	192	38	110

Conclusions

One goal of this MOD Sandbox project was to reduce energy use by providing FMLM service for public transit riders that would otherwise drive or use SOVs. In this case, Via Rideshare Service increased VMT compared to travel prior to the pilot. From our analysis, we found that the availability of the new service did not decrease fuel consumption or CO_2 emissions. The results do not support Hypothesis 6.

Puget Sound

Trip Analysis

Between the pilot dates of April 2019 and April 2020, 231,073 Via to Transit trips were taken to/from Link light rail stations according to Puget Sound activity data. From Figures 4-97 and 4-98, most trips were completed during weekdays and during peak commute hours around 7:00 AM and 5:00 PM.

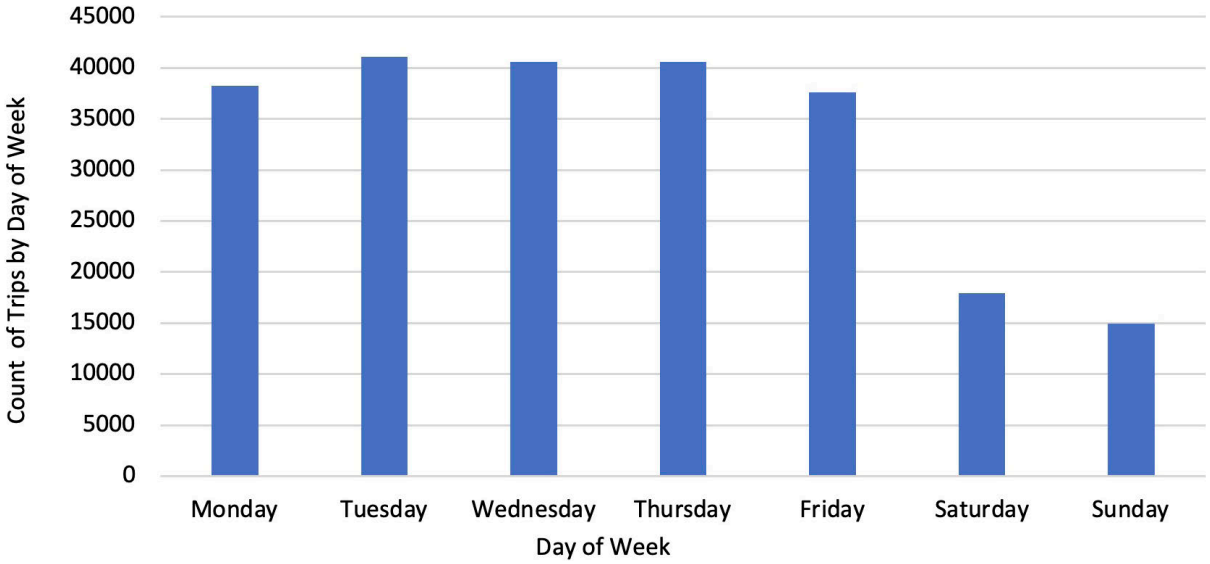


Figure 4-97 *Distribution of Trips by Day of Week for Via to Transit – Puget Sound*

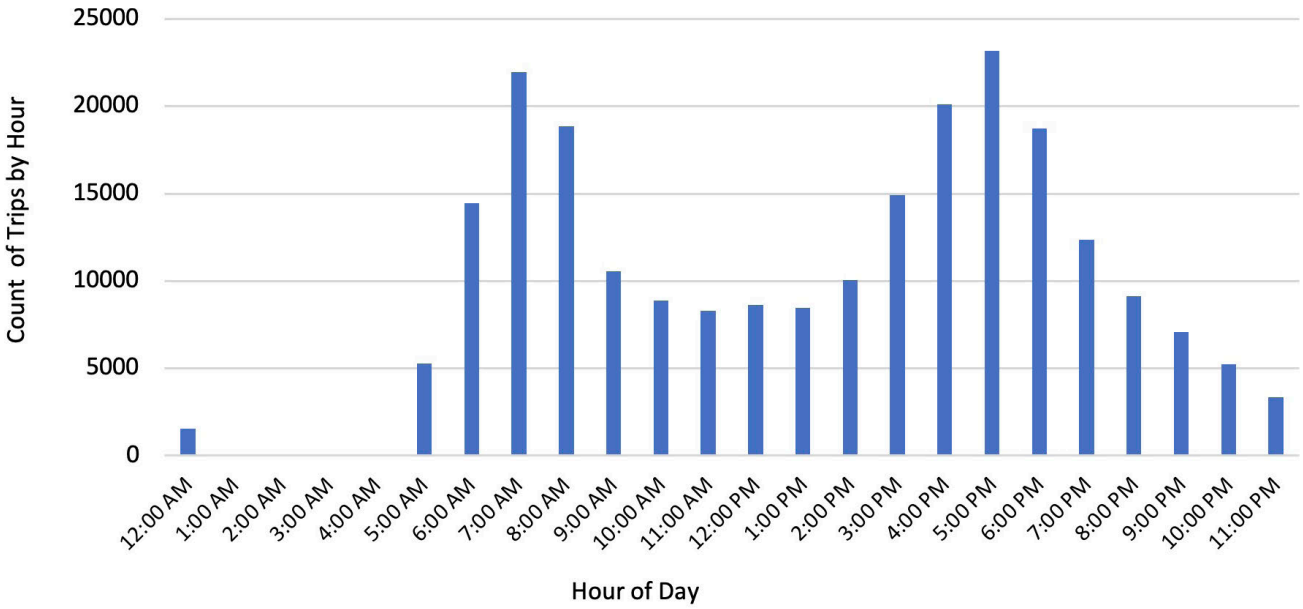


Figure 4-98 *Distribution of Trips by Hour of Day for Via to Transit – Puget Sound*

Figure 4-99 displays Via to Transit trips per month between April 2019 and April 2020. Despite fluctuations by month, the number of trips largely increased between April 2019 and August 2019. The maximum number of trips occurred in October 2019 at 22,255. After February 2020, a significant decline of trips was observed, which was related to stay-at-home restrictions implemented in response to the COVID-19 public health emergency. With the exception of just two completed trips, the service completely suspended in April 2020.

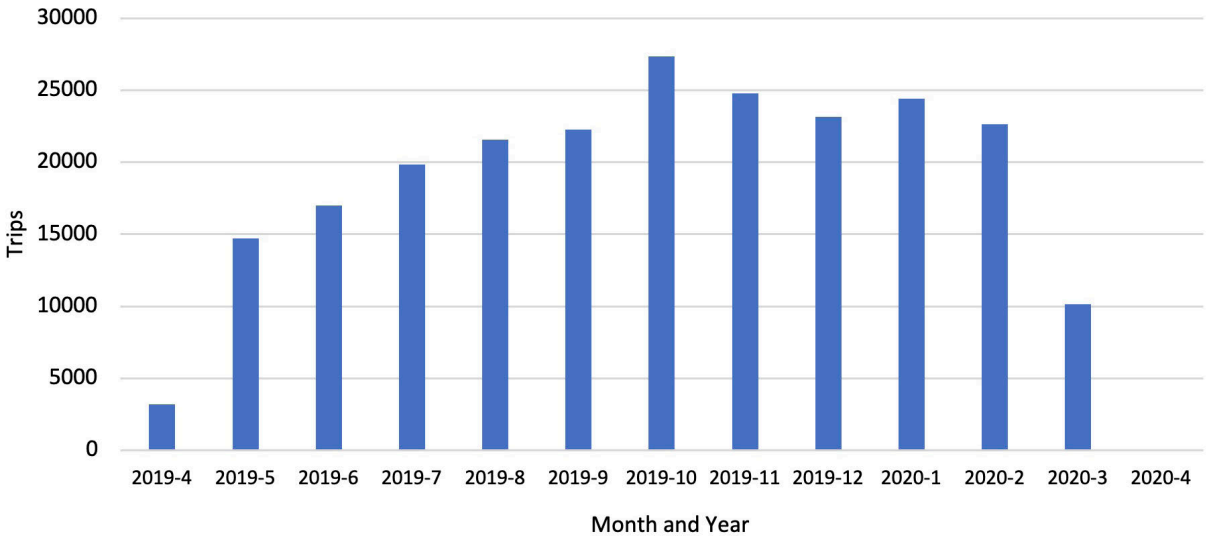


Figure 4-99 *Monthly Number of Trips for Via to Transit – Puget Sound*

Figure 4-100 presents monthly revenue and non-revenue miles driven. For all months, non–revenue miles were higher than revenue miles, contributing to fuel inefficiencies and more GHG emissions according to Figures 4-101 and 4-102.

One important note is that the percent of non-revenue miles largely decreased as the total number of miles increased, indicating efficiencies at greater ridership.

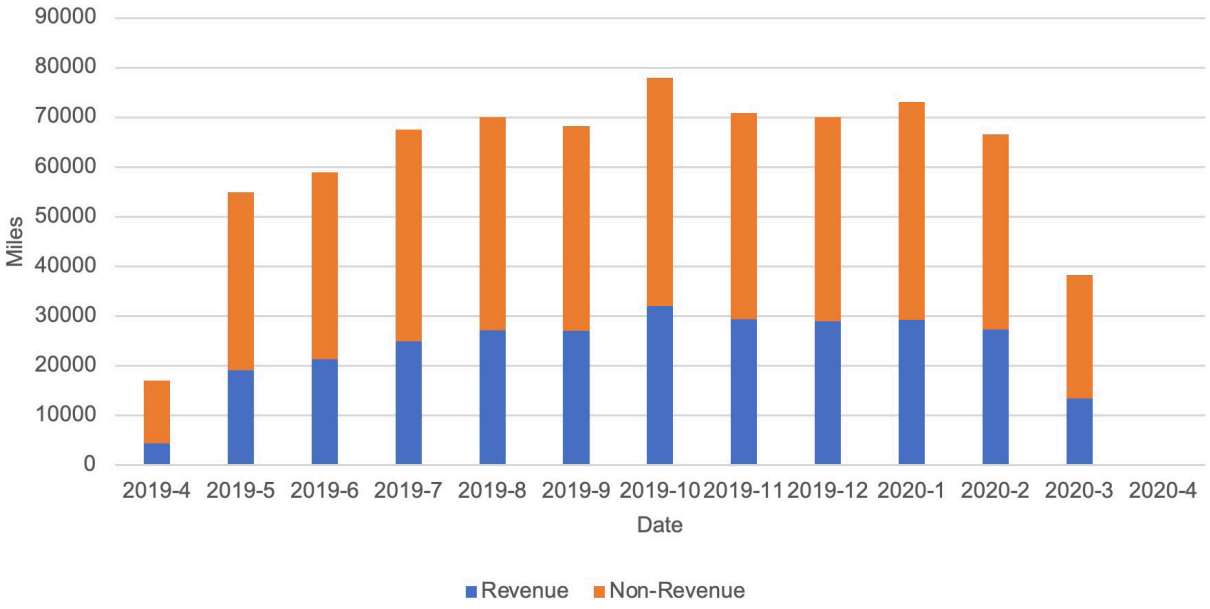


Figure 4-100 *Monthly Revenue and Non-Revenue Total Miles for Via to Transit – Puget Sound*

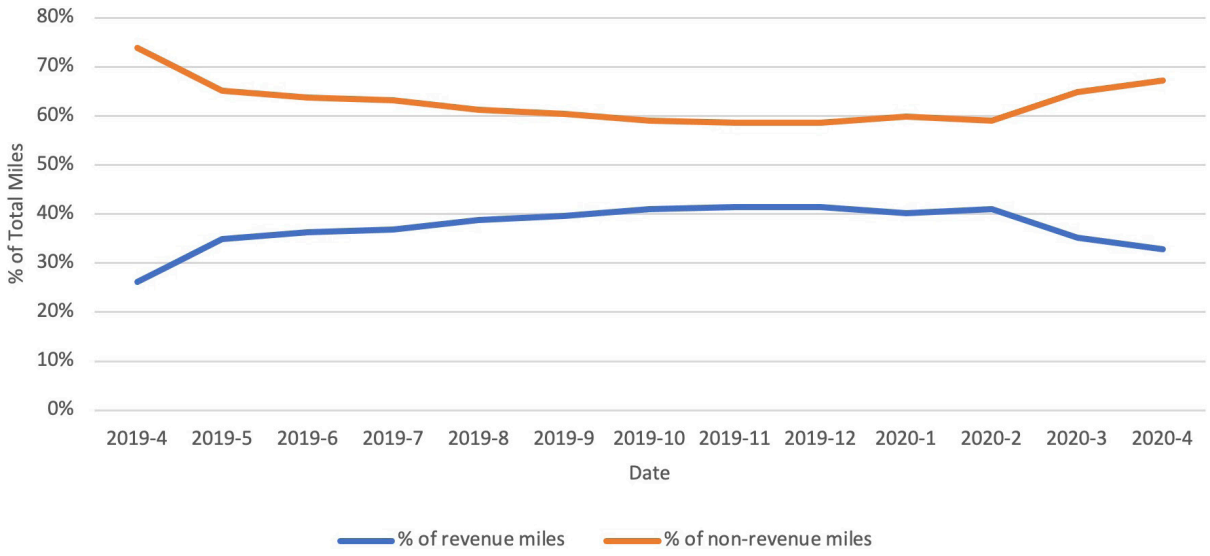


Figure 4-101 *Revenue and Non-Revenue Miles as a Percent of Total Miles for Via to Transit – Puget Sound*

Fuel Economy and CO_2 Emissions

For each of the 322,562 vehicle trips, the fuel economy city MPG of Via to Transit vehicles was obtained from the fuel economy database published by the EPA. Figure 4-102 presents the total gasoline consumed by month for both revenue and non-revenue miles. Using these results, Figure 4-103 displays CO_2 emissions for the Via to Transit pilot by month. The total maximum CO_2 emissions occurred in October 2019. During the pilot program, CO_2 emissions rose from April 2019 to October 2019. At this point, CO_2 emissions largely stabilized until March 2020. The pattern reflects the total miles traveled by Via to Transit vehicles per month. To better compare the impact of revenue versus non-revenue miles, Figure 4-104 displays monthly CO_2 emissions for revenue miles and non-revenue miles of Via to Transit. One key finding from this figure is that non-revenue miles produced more CO_2 emissions than revenue miles (which results from the higher percentage of non-revenue miles compared to revenue miles).

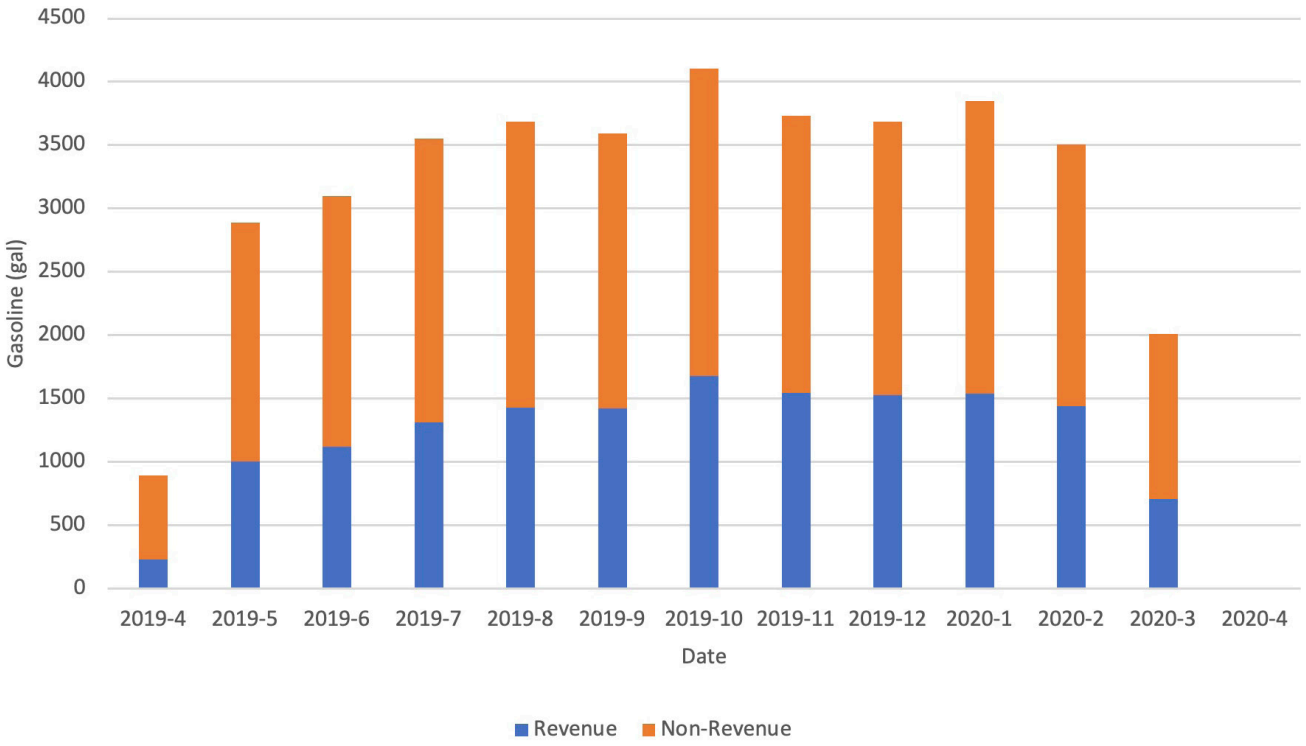


Figure 4-102 *Monthly Gasoline Consumed for Revenue and Non-Revenue Miles – Puget Sound*

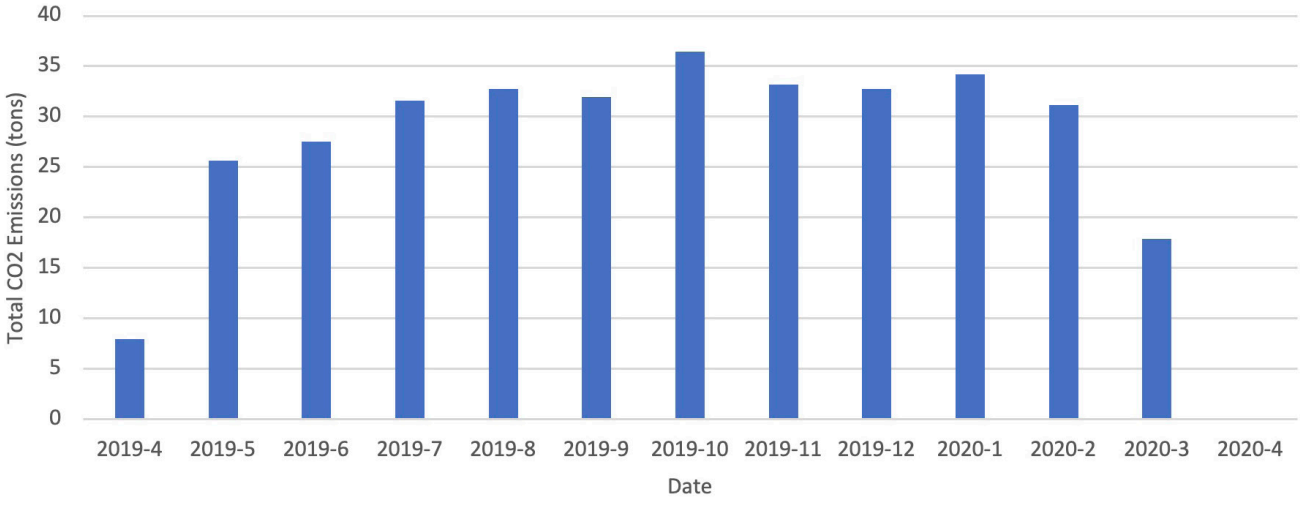


Figure 4-103 *Monthly Total CO_2 Emissions for Via to Transit – Puget Sound*

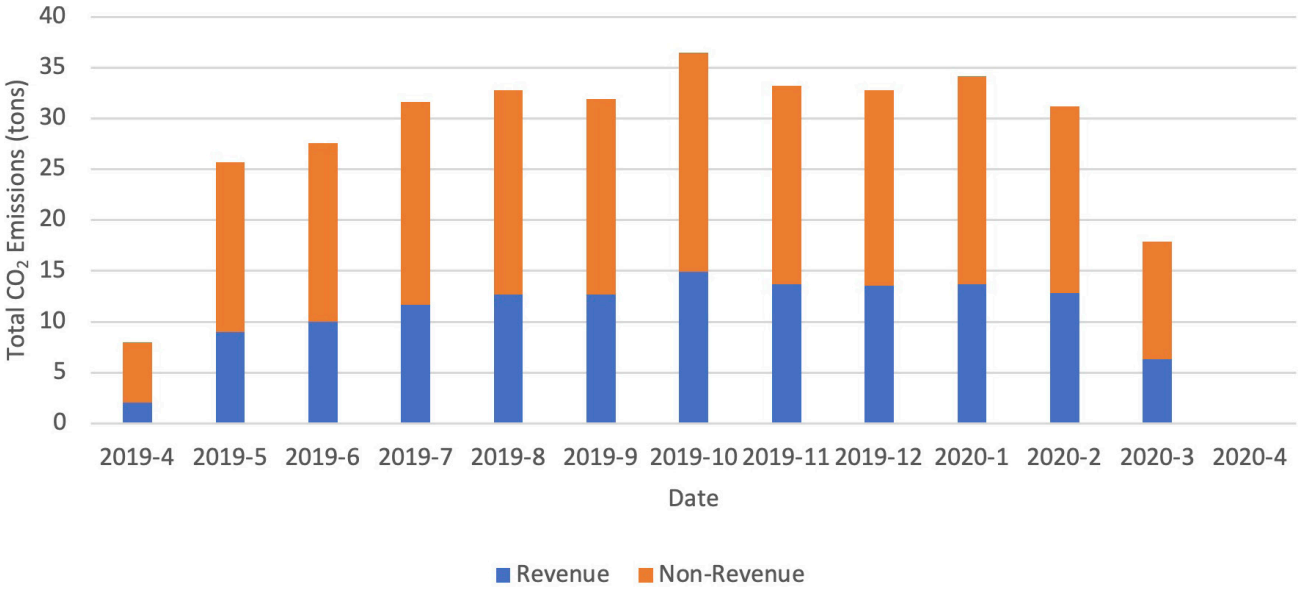


Figure 4-104 *Monthly Tons of CO_2 by Revenue and Non-Revenue Miles for Via to Transit – Puget Sound*

Mode Substitution

Figure 4-105 shows the mode distribution of trips to Link light rail stations before Via to Transit was available. The distribution of responses shows that a sizable portion of respondents (32%) drove alone before Via to Transit, which indicates that this percentage of participants substituted driving alone with Via to Transit. Another 4% indicated that they took Uber or Lyft or other non-pooled ride hailing. Taken together, 36% respondents indicated that they conducted an SOV trip before Via to Transit. This suggests that 36% of respondents substituted their SOV trips with Via to Transit. Significant portions of respondents also said that they walked (33%) or took a public bus (28%) to the stations before Via to Transit.

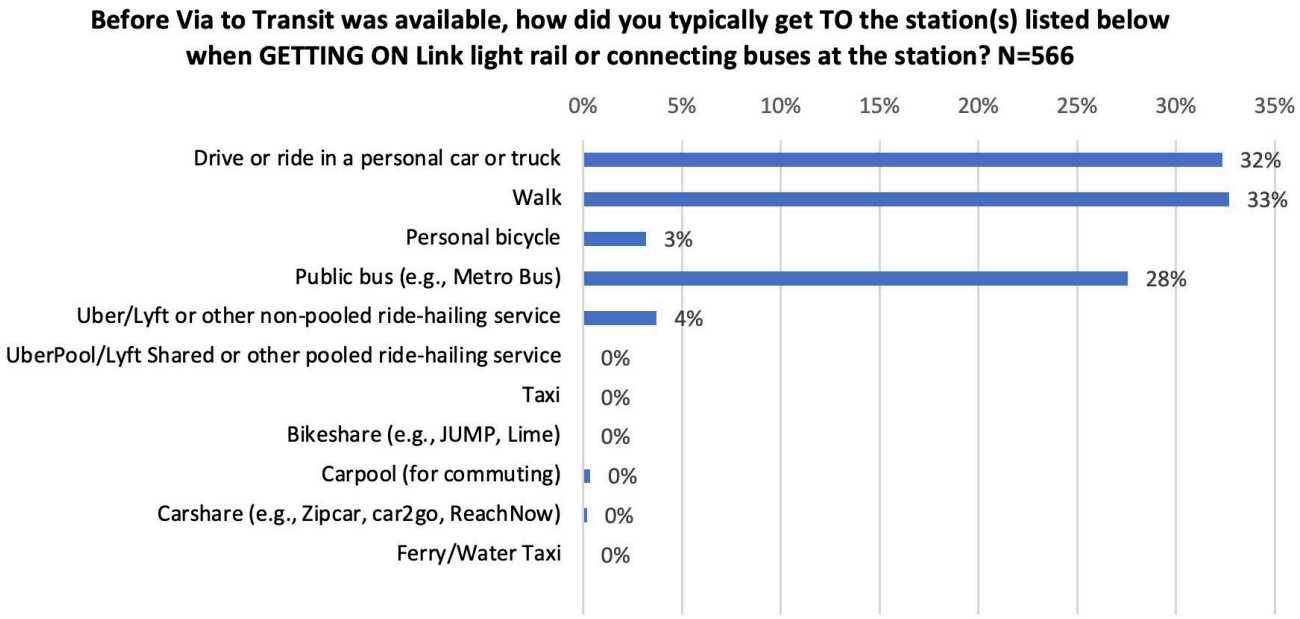


Figure 4-105 *Mode Substitution as a Result of Via to Transit TO Stations – Puget Sound*

Figure 4-106 shows the modal distribution of trips from stations. The responses show that a sizable portion of respondents (23%) drove alone from Link light rail stations before Via to Transit. Another 4% indicated that they took Uber or Lyft or other non-pooled ride hailing. Taken together, 27% respondents indicated that Via to Transit substituted for travel in an SOV. Other mode substitutions included public bus (34%), personal bike (1%), and walk (36%).

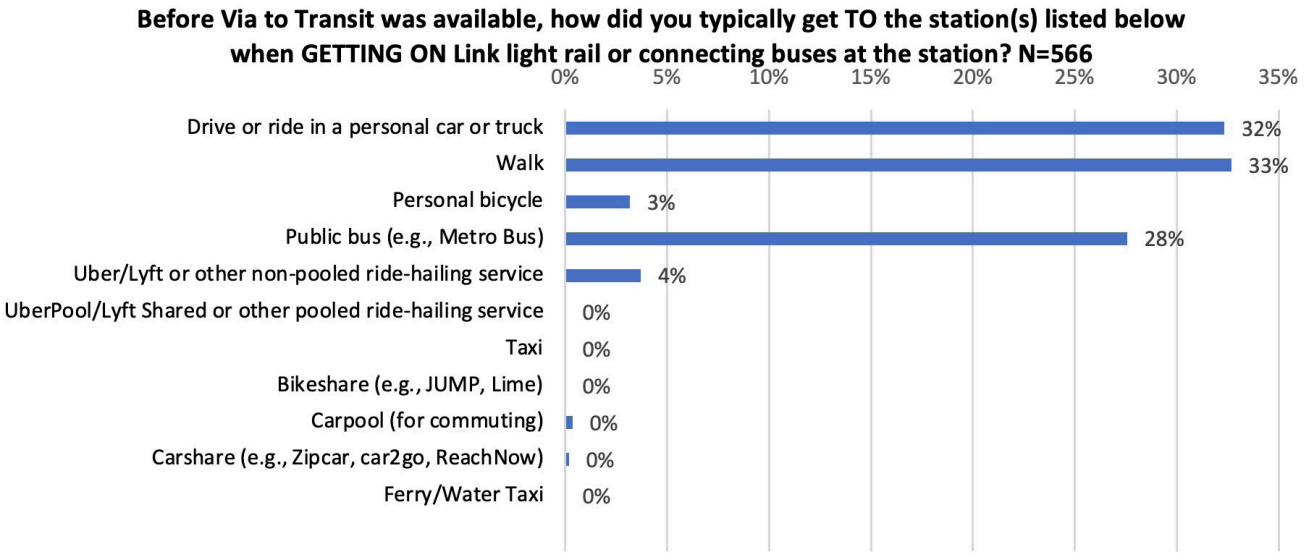


Figure 4-106 *Mode Substitution as a Result of Via to Transit FROM Stations – Puget Sound*

Emissions Simulation

The evaluation of mode shift and its impact on emissions is a function of the specific modes that are substituted. To generate a rough estimate of VMT, fuel consumption, and CO_2 emissions related to trips, assumptions were made regarding mode substitution. However, the vehicle activity data did not provide mode substitution. To overcome this data limitation, a simulation was developed using a distribution of possible mode substitutions gathered from rider survey data.

The final mode distribution used for the simulation is presented in Figure 4-107, which shows the mode of trips to and from the station. The distribution of responses shows that a significant portion (30%) of respondents (on average) drove alone to or from stations before Via to Transit. Another 4% indicated that they took Uber or Lyft or other non-pooled ride hailing. Inferring mode substitution, about 34% respondents substituted their SOV trip with Via to Transit. Walking to stations (33%) and taking a public bus (29%) were also high responses for traveling to/from stations prior to Via to Transit. The data indicate that a sizable number of Via to Transit users previously used sustainable modes of transportation to get to/from stations.

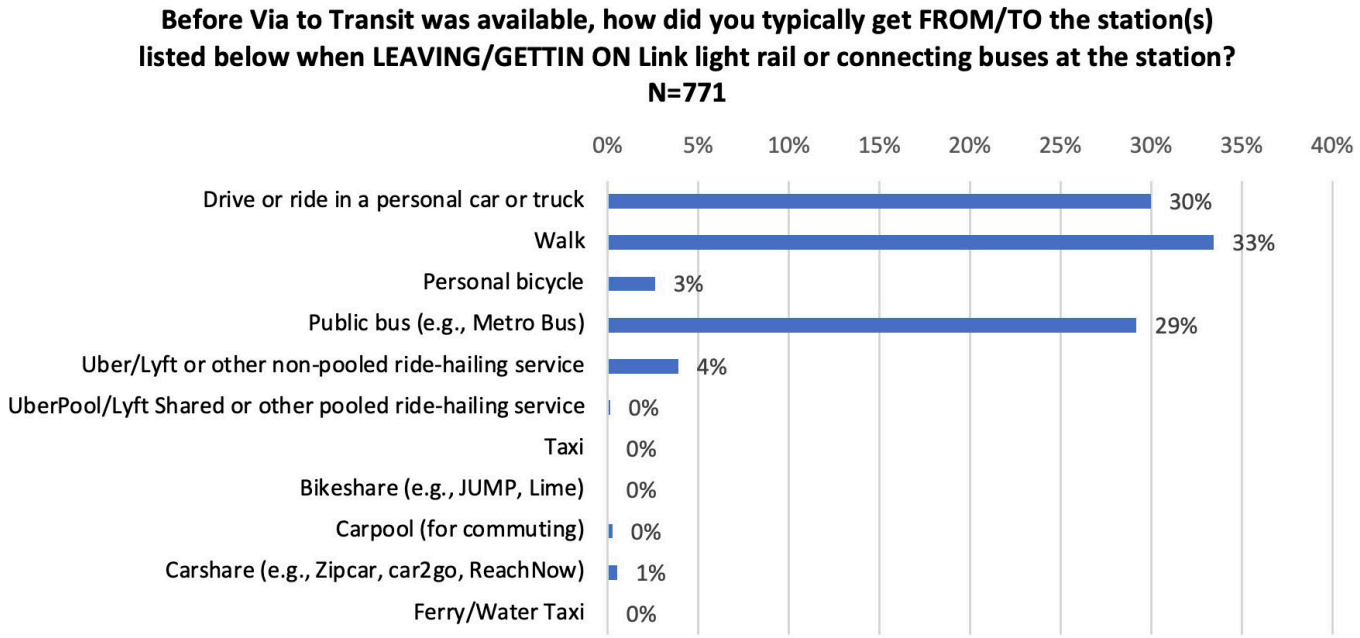


Figure 4-107 *Mode Substitution as a Result of Via to Transit TO and FROM Stations – Puget Sound*

With an SOV substitution rate of 35%, the simulation identified that VMT before the Via pilot was 162,473 miles for 322,561 trips. As VMT during the Via pilot was 779,081 miles for the same number of trips, the availability of the new service (Via) increased VMT, fuel consumption, and CO_2 emissions as seen in Table 4-2.

If all Via users had driven a vehicle or used a TNC service prior to the Via pilot (i.e., 100% SOV population), the total miles driven would have been 477,839 miles. Even if all Via users had used an SOV to go to/from stations, the Via pilot still had a higher VMT due to non-revenue miles. Non-revenue miles were 479,600 miles, which accounted for 62% of the total miles driven in the Via to Transit pilot (779,081 miles).

Table 4-2 *Comparison of VMT, Gasoline Consumed, and CO_2 for Via to Transit – Puget Sound*

Metric	Via Pilot	Prior to Pilot	
		34% SOV (Survey Result)	*100% SOV (Hypothetical)*
VMT (miles)	779,081	162,473	477,839
Gasoline (gal)	41,006	8,551	19,921
CO_2 (tons)	364	76	177

Conclusions

One goal of this MOD Sandbox project was to reduce energy use by providing FMLM service for public transit riders that would otherwise drive or use SOVs. In this case, Via to Transit increased VMT compared to that travel prior to the pilot. The analysis found that the availability of the new service did not decrease fuel consumption or CO_2 emissions. The results do not support Hypothesis 6.

Conclusion – Overall

Overall, the results did not support Hypothesis 6 in either Los Angeles or in the Puget Sound region.

Hypothesis 7: The availability of the new service will decrease congestion from personal (non-TNC) vehicles.

Performance Metric	Key Finding – Los Angeles	Key Finding – Puget Sound
Mode replacement, trips by time of day, VMT from the pilot, VMT from personal vehicles (proxy)	In the Los Angeles region, Via Rideshare Service decreased personal vehicle usage and, hence, VMT from this mode. Revenue VMT was lower for Via than a proxy for personal vehicle VMT; however, non-revenue VMT from Via may have increased congestion overall.	The Puget Sound analysis produced mixed results. When considering all VMT produced by Via to Transit (revenue and non-revenue VMT), the pilot may have increased congestion overall, while still decreasing personal vehicle congestion.

Hypothesis 7 was evaluated using considerations of mode replacement, trips per hour, and a comparison of Via VMT (a proxy for congestion in this case) and personal vehicle VMT. Mode replacement was identified through the participant surveys while trips by hour were calculated using individual ride data. To develop a "counterfactual" for personal vehicle VMT, a proxy was created using the individual ride data. This could be compared to vehicle VMT from the vehicle data. The key difference between the two datasets is that the vehicle data captures efficiencies through sharing a vehicle (e.g., overlapping routes) and individual ride data includes any miles traveled by a customer.

Los Angeles

Mode Replacement

To better understanding the impact of Via Rideshare Service on congestion from personal (non-TNC) vehicles, Figure 4-108 displays mode substitution as a result of Via Rideshare Service. Approximately 28% of respondents stated that they drove or rode in a personal car or truck prior to the pilot. Using this result as an input, Figure 4-109 displays the approximate VMT by Via Rideshare Service, split between a mode replacement of 28% for personal vehicles and 72% for non-personal vehicles, by time of day. VMT was highest at 5:00 pm and 6:00 pm with a strong peak at 7:00 pm and 8:00 pm. Moreover, the congestion reduction (based on VMT), was highest during peak commute hours.

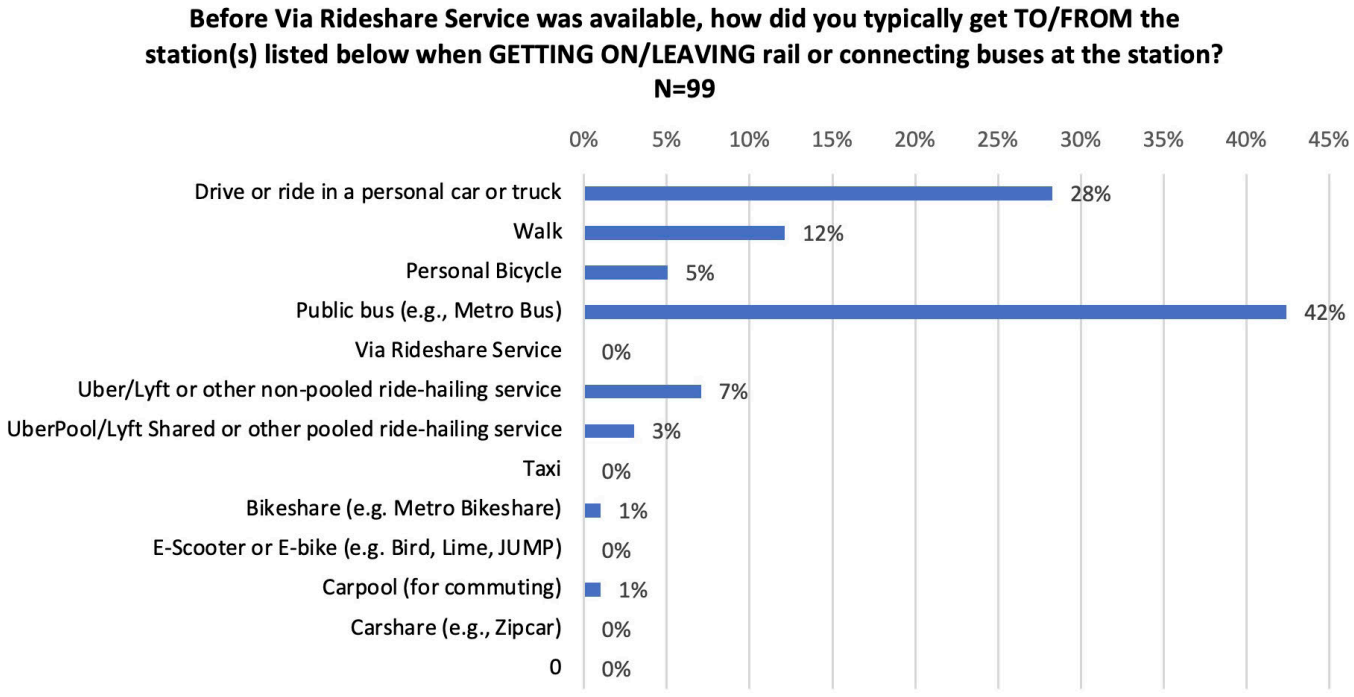


Figure 4-108 *Mode Substitution as a Result of Via Rideshare Service TO and FROM Stations – Los Angeles*

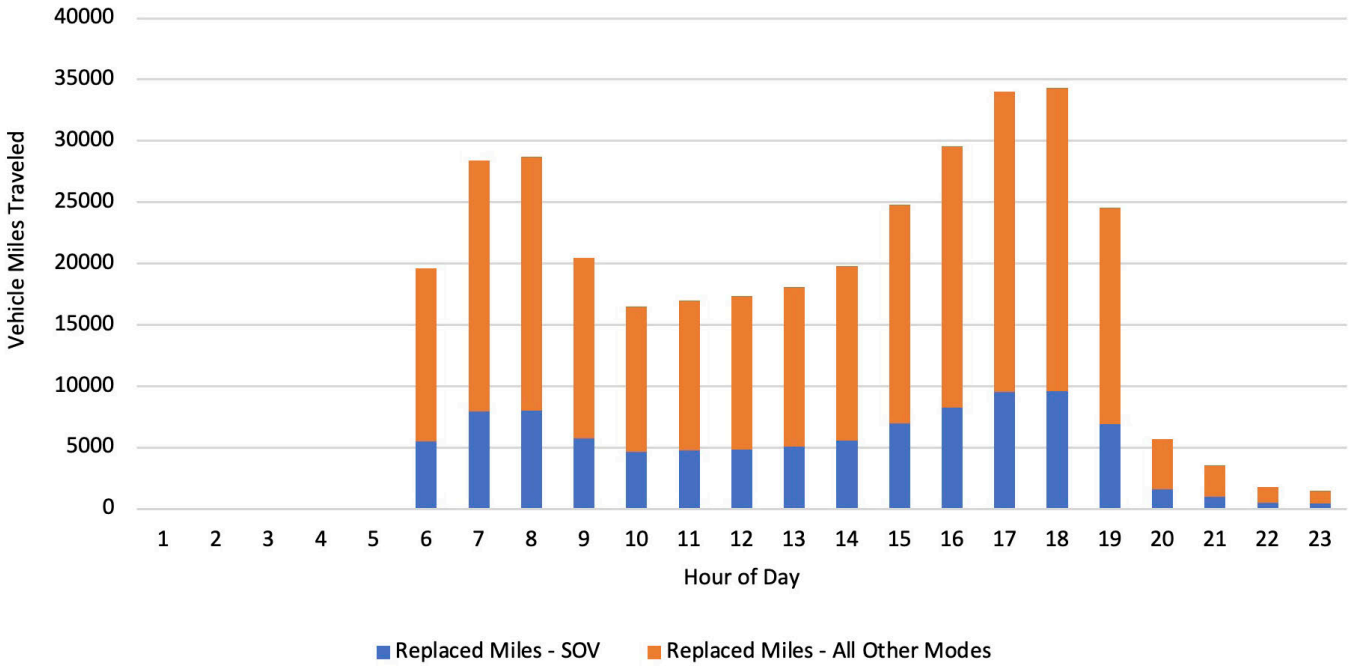


Figure 4-109 *Individual Ride VMT of Personal Vehicles vs. Other Modes by Time of Day – Los Angeles*

Comparison of Via VMT and Personal Vehicle VMT (Proxy)

In addition, an analysis was conducted using activity data. Vehicle data provides the total number of miles traveled by all Via vehicles in the program. The individual ride data provides the number of miles traveled for all Via rides in the program. While similar, these two numbers are not synonymous. For example, consider a vehicle that picks up two different riders at a rail station in a shared vehicle. The vehicle drops off one passenger along the way (at two miles) to the destination of the second passenger (at four miles). The individual ride data would indicate a total number of six miles traveled (two miles + four miles). However, if the destination of the first passenger was already on the way, the vehicle data may indicate that the vehicle traveled only four miles. This difference is helpful for comparing personal vehicle travel and non-personal vehicle travel. The individual trip data offers a proxy for personal vehicle VMT.

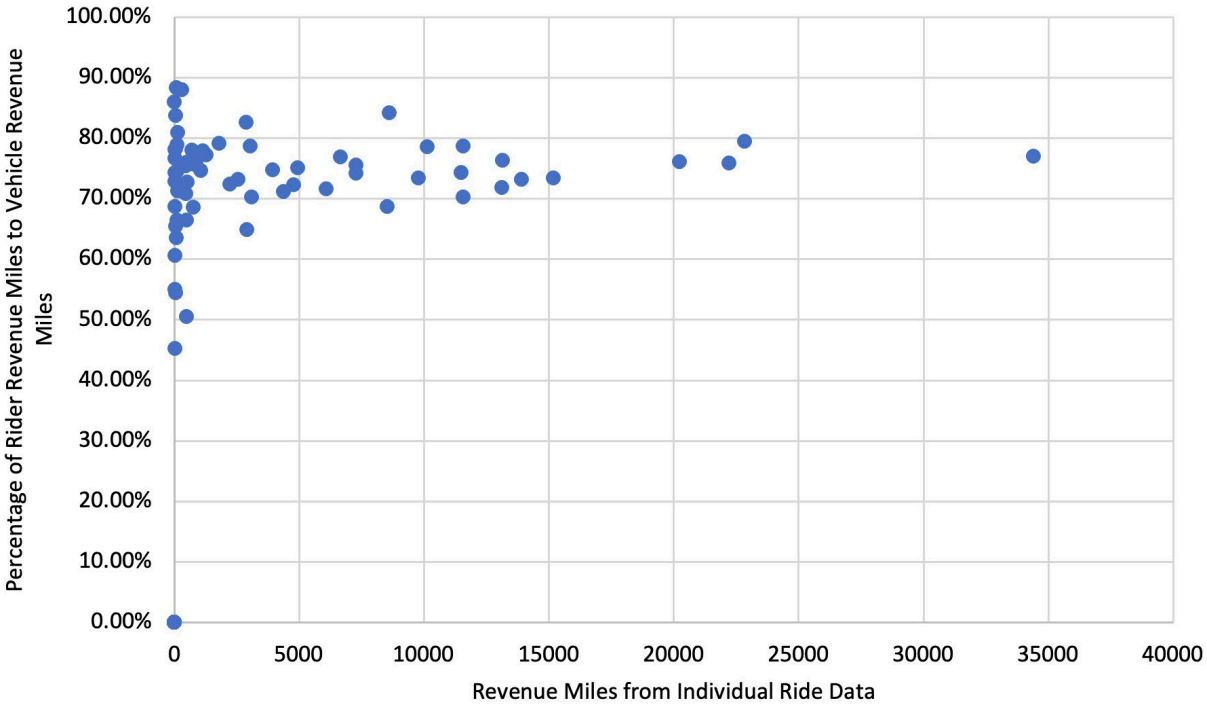
For Los Angeles, the VMT was calculated for both the individual ride data and the vehicle data for each vehicle used by Via. Revenue miles were calculated by vehicle from both datasets. However, non-revenue miles and total miles were only available from the vehicle dataset. Calculations are presented in Table 4-3 for the top 10 vehicles by revenue VMT in the pilot.

Table 4-3 *Aggregate VMT and Percentage Comparison by Vehicle (Top 10 Via Vehicles by Revenue VMT)*

Vehicle	Vehicle Data			Rides Data	Revenue VMT Comparison (Vehicle Data/ Rides Data)	Total VMT Comparison (Vehicle Data/ Rides Data)
	Total VMT	Revenue VMT	Non-Revenue VMT	Revenue VMT		
Toyota Prius	128,464	56,361	72,104	74,417	76%	173%
Mercedes Metris	103,905	45,984	57,921	60,109	77%	173%
Nissan Altima	60,535	26,463	34,071	34,396	77%	176%
Hyundai Sonata	39,386	18,148	21,238	22,848	79%	172%
Toyota Camry	39,182	16,843	22,339	22,205	76%	176%
Kia Optima	39,032	15,387	23,645	20,225	76%	193%
Honda Accord	24,323	11,143	13,180	15,191	73%	160%
Honda Clarity	21,300	10,183	11,118	13,912	73%	153%
Honda Civic	22,114	10,030	12,084	13,154	76%	168%
Chevy Sonic	23,226	9,422	13,803	13,120	72%	177%

Note: Rides data includes VMT of trips not completed (e.g., cancelled). Vehicle data are assumed to include this same VMT, as miles are calculated in that dataset by a "booking," not a completed ride.

Table 4-3 also presents the percentage ratio of revenue VMT from the vehicle data and revenue VMT from the individual rides data (i.e., a proxy for personal vehicle trips). A percentage ratio below 100% indicates that VMT produced by Via was lower than VMT produced by a similar set of trips using a personal vehicle. The results indicate a range of ratios between 72% and 79%, which accounts for the sharing of Via Rideshare Service vehicles. This comparison is also made in Figure 4-110 for all vehicles in the pilot, arranged by revenue VMT. However, it should be noted that since Via contributed to non-revenue VMT, a comparison of total VMT from Via vehicles and revenue VMT of rides (i.e., personal vehicle proxy) yielded significantly more VMT (and congestion).



Note: Each dot represents a vehicle make and model. Outliers and vehicles with missing data are excluded from the above figure.

Figure 4-110 *Comparison of Revenue VMT by Vehicle – Los Angeles*

Conclusion

An analysis was conducted looking at mode replacement and VMT differences between the Via vehicle fleet and the individual ride data (acting as a proxy for personal vehicle trips). The results indicate that personal vehicle VMT (and thus congestion) may have decreased, including relative to VMT produced by personal vehicle trips. However, when considering the additional VMT produced by Via, for example through non-revenue miles, congestion may have increased. Consequently, the results in Los Angeles are inconclusive for Hypothesis 7.

Puget Sound

Mode Replacement

Figure 4-111 presents the modes of transportation that people took before Via to Transit was available. This is aggregated for responses to and from stations. The results show that 30% of respondents took a personal vehicle to/from a Link light rail station. A significant proportion also said that they walked (33%) or took a public bus (29%) as their primary transportation mode before Via to Transit. Using the result of personal vehicles, Figure 4-112 displays approximate miles that were replaced by Via to Transit. This supports the decrease in congestion of personal vehicles, especially during peak times (assuming the modal distribution).

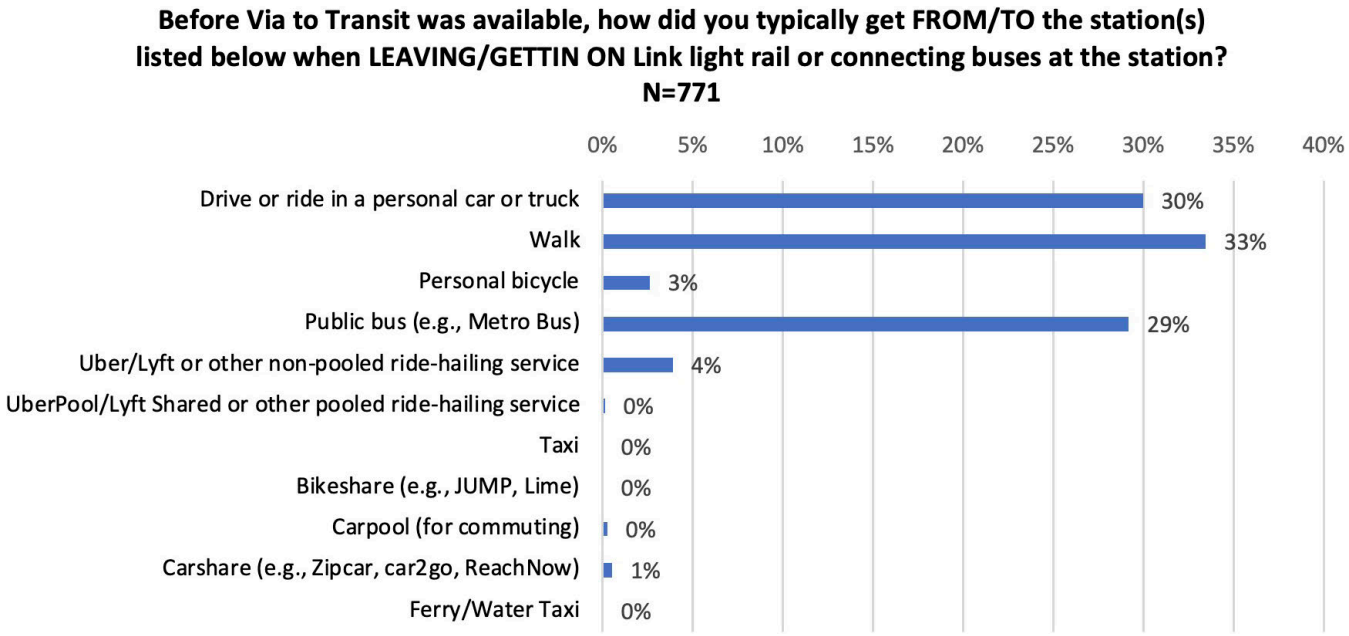


Figure 4-111 *Mode Substitution as a Result of Via to Transit TO and FROM Stations – Puget Sound*

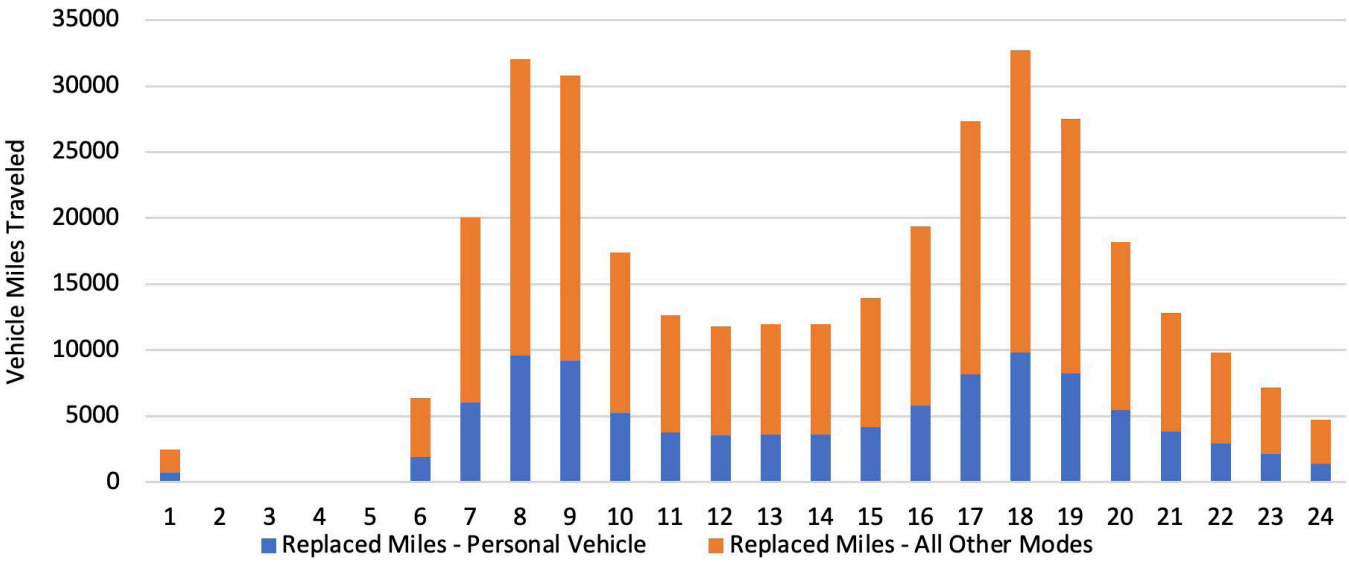


Figure 4-112 *Individual Ride VMT of Personal Vehicles vs. Other Modes by Time of Day – Puget Sound*

Comparison of Via VMT and Personal Vehicle VMT (Proxy)

A similar analysis was conducted for Puget Sound as Los Angeles to identify the difference between Via to Transit VMT and equivalent personal vehicle VMT. The Puget Sound pilot used the Toyota Sienna as the primary vehicle. Table 4-4 displays total, revenue, and non-revenue VMT from the vehicle data. The data display the actual mileage driven by Via to Transit vehicles. The rides data with revenue VMT display a proxy for personal vehicles since each trip distance does not factor in if the ride route overlapped with another shared ride route. Comparing the vehicle data to the rides data, a percentage ratio of 63% was calculated, indicating that Via to Transit produced VMT efficiencies compared to equivalent personal vehicle trips. This supports a decrease in congestion from personal vehicles. However, when comparing the total VMT of Via to Transit to revenue VMT of the personal vehicle proxy, the percentage jumps to 163%. When considering the non-revenue VMT of Via to Transit vehicles, congestion may have actually increased since more VMT was produced than the equivalent personal vehicle travel.

Table 4-4 *Aggregate VMT and Percentage Comparison – Puget Sound*

Vehicle	Vehicle Data			Rides Data	Revenue VMT Comparison (Vehicle Data/ Rides Data)	Total VMT Comparison (Vehicle Data/ Rides Data)
	Total VMT	Revenue VMT	Non-Revenue VMT	Revenue VMT		
Toyota Sienna	778,943	299,457	479,486	477,831	63%	163%

Note: From vehicle data, several trips (equaling 138 miles) were also taken by a Mercedes-Benz vehicle that are not included in the above table. Rides data include VMT of trips not completed (e.g., cancelled). Vehicle data are assumed to include this same VMT since miles are calculated in that dataset by a "booking," not a completed ride.

Conclusion

Similar to Los Angeles, the Puget Sound analysis produced mixed results. Via to Transit replaced some personal vehicle trips, especially in peak hours, and produced less revenue VMT than if all individuals had driven a personal vehicle. However, when considering all VMT produced by Via to Transit (revenue and non-revenue VMT), the pilot may have increased congestion overall (while still decreasing personal vehicle congestion). The results were similarly inconclusive for Hypothesis 7 within Puget Sound.

Conclusion – Overall

Overall, the results were found to be inconclusive for Hypothesis 7 in both Los Angeles and in the Puget Sound region.

Hypothesis 8: Mobility for persons with disabilities will be improved due to WAVs through the Via platform.

Performance Metric	Key Finding – Los Angeles	Key Finding – Puget Sound
Change in average wait times due to Via for persons with disabilities, change in average travel times due to Via for persons with disabilities, change in public transit usage due to Via for persons with disabilities, change in perceived accessibility for persons with disabilities	Respondents who identified as persons with disabilities reported an improvement in average travel times in the Los Angeles region.	Respondents who identified as persons with disabilities reported an improvement in average travel times and wait times in the Puget Sound region.

The analysis of this hypothesis uses survey data focused specifically on persons with disabilities. The sample size for persons with disabilities was relatively small. As seen in Figures 4-113 and 4-114 for Los Angeles, responses were only gathered from people that have a disability that prevents them from driving an automobile. The data in Figures 4-115 and 4-116 for Puget Sound have similar numbers. To ensure that all persons with disabilities related to mobility challenges were counted, a combined variable was created designating if the person had any one of the three identified disabilities. This combined variable was used in the analyses.

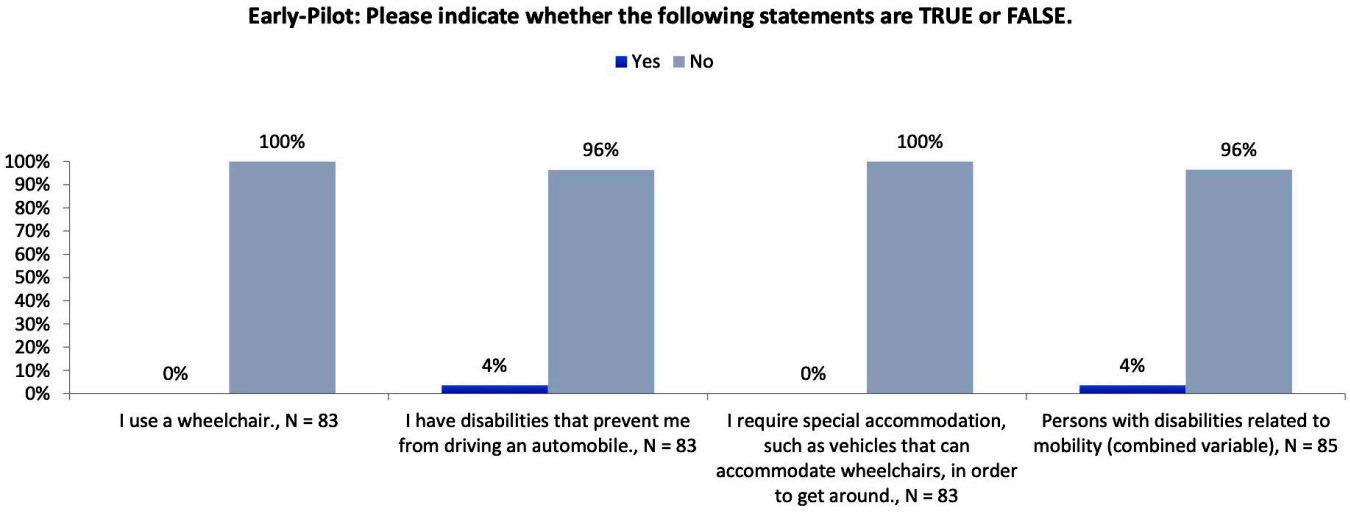


Figure 4-113 *Persons with Disabilities in Early-Pilot Survey – Los Angeles*

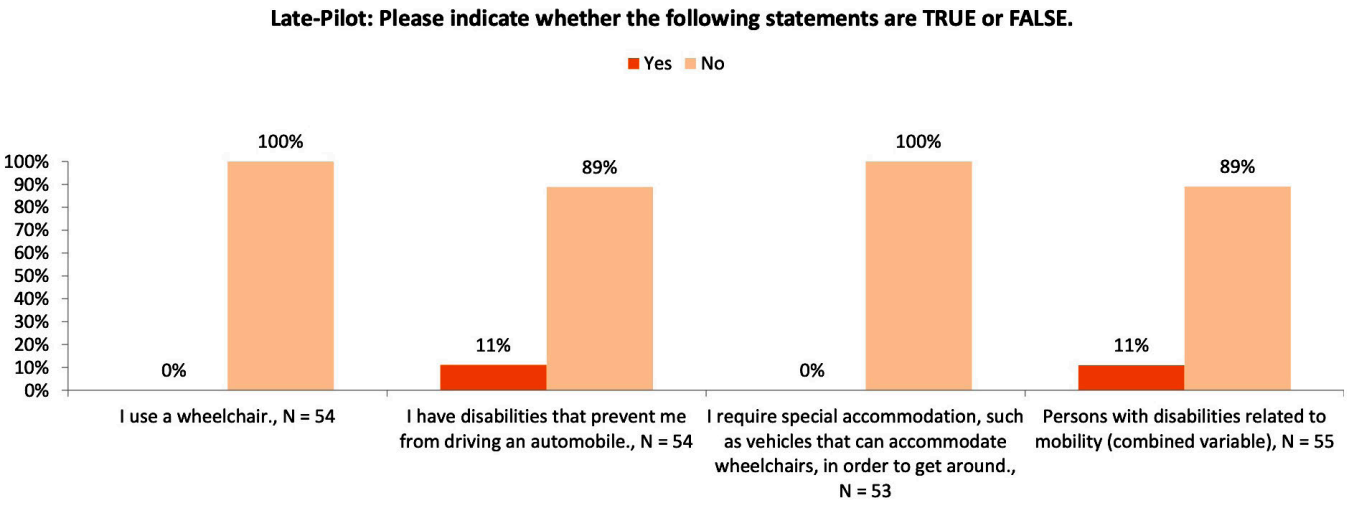


Figure 4-114 *Persons with Disabilities in Late-Pilot Survey – Los Angeles*

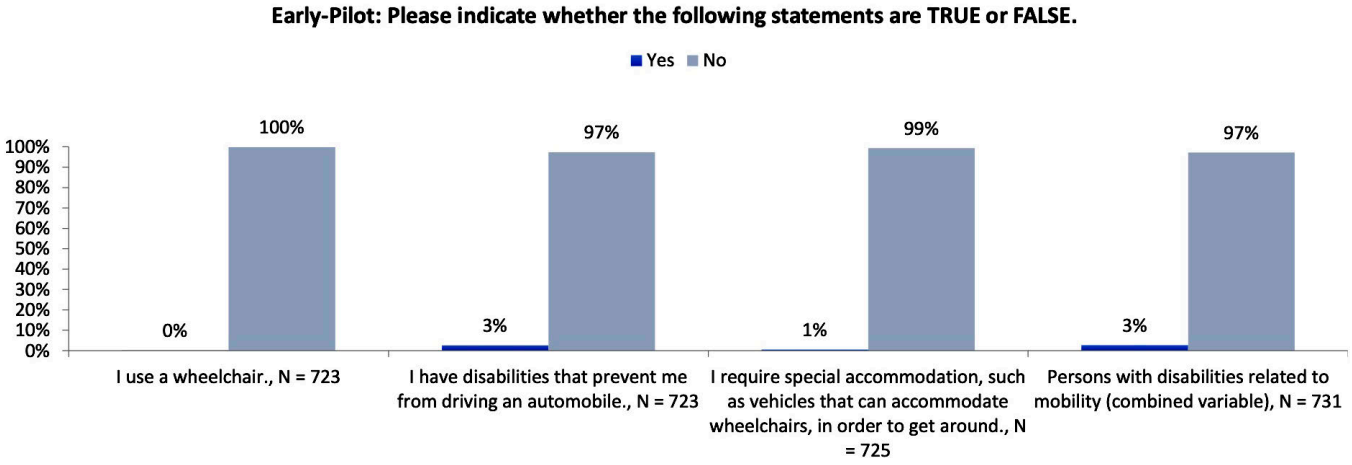


Figure 4-115 *Persons with Disabilities in Early-Pilot Survey – Puget Sound*

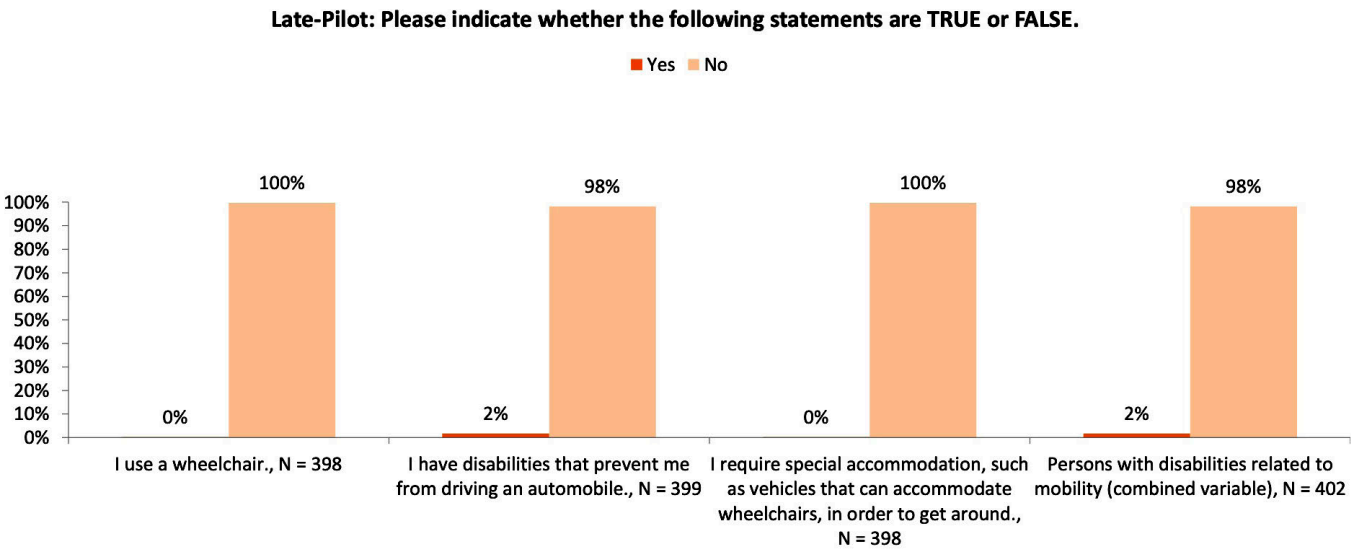


Figure 4-116 *Persons with Disabilities in Late-Pilot Survey – Puget Sound*

Los Angeles

Mobility for Persons with Disabilities

Figures 4-117 and 4-118 present the change in average wait time for persons with disabilities traveling to and from participating stations, respectively, as a result of Via Rideshare Service. In both cases, the average wait time change was largely split between increasing and decreasing.

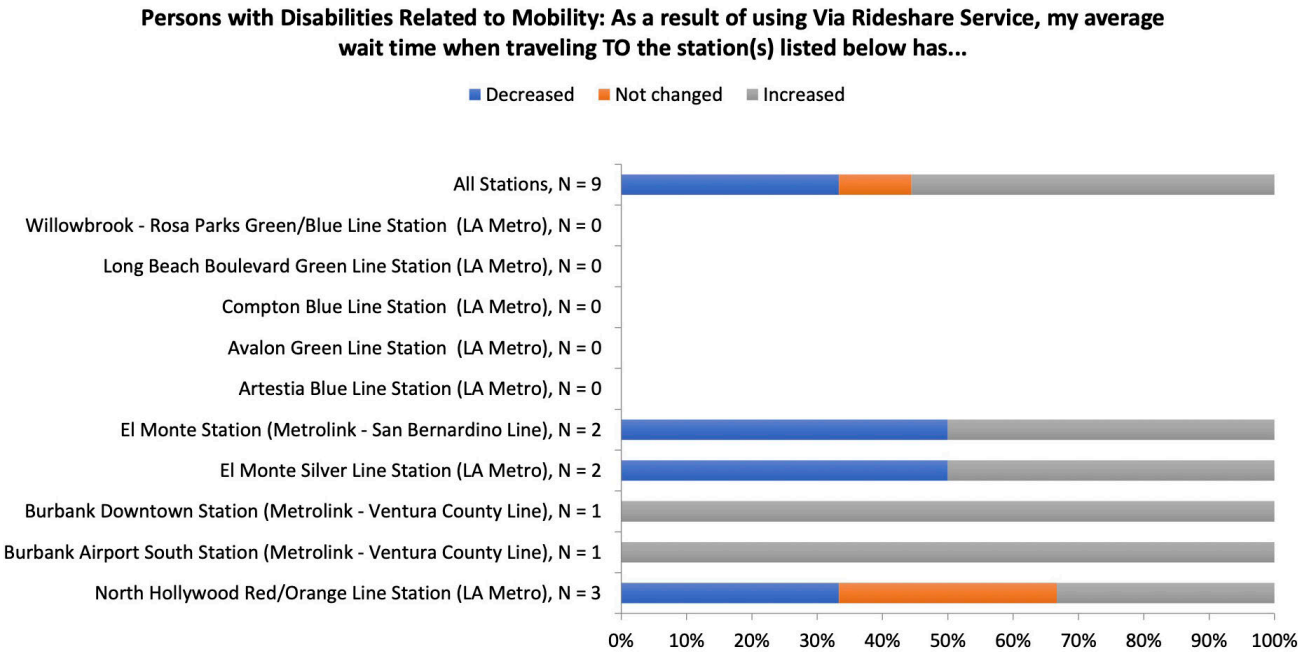


Figure 4-117 *Persons with Disabilities Related to Mobility – Change in Average Wait Time TO Stations Due to Via – Los Angeles*

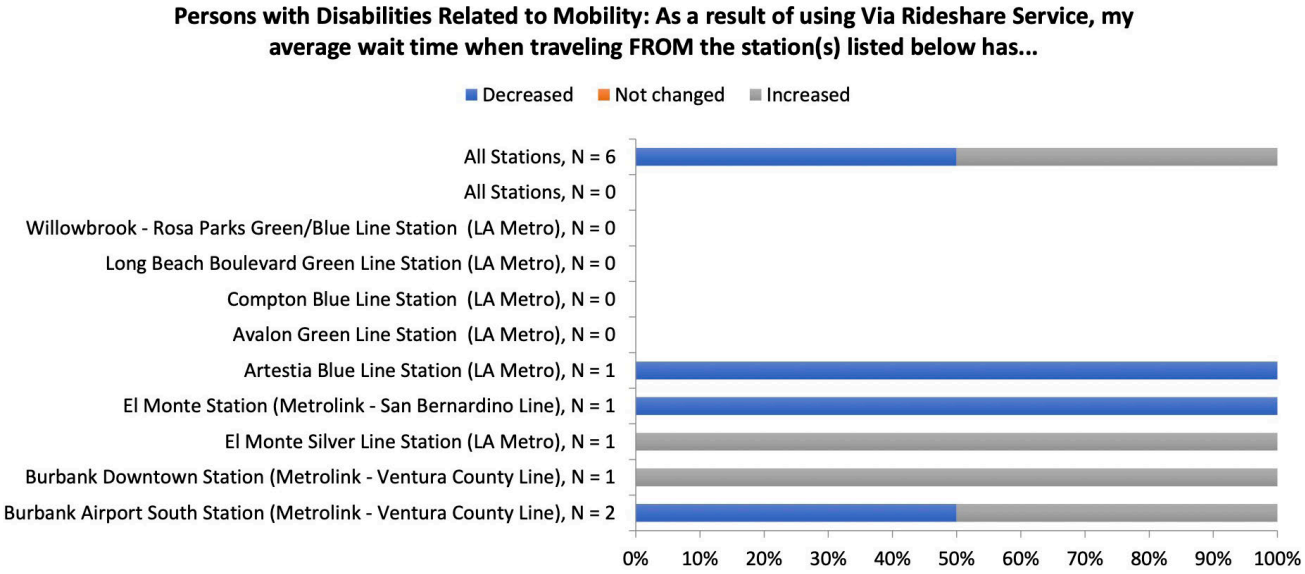


Figure 4-118 *Persons with Disabilities Related to Mobility – Change in Average Wait Time FROM Stations Due to Via – Los Angeles*

Figures 4-119 and 4-120 present the change in average travel time to and from stations, respectively, as a result of Via Rideshare Service. Although the sample size is small, the results show general improvements in travel time going both to and from the stations.

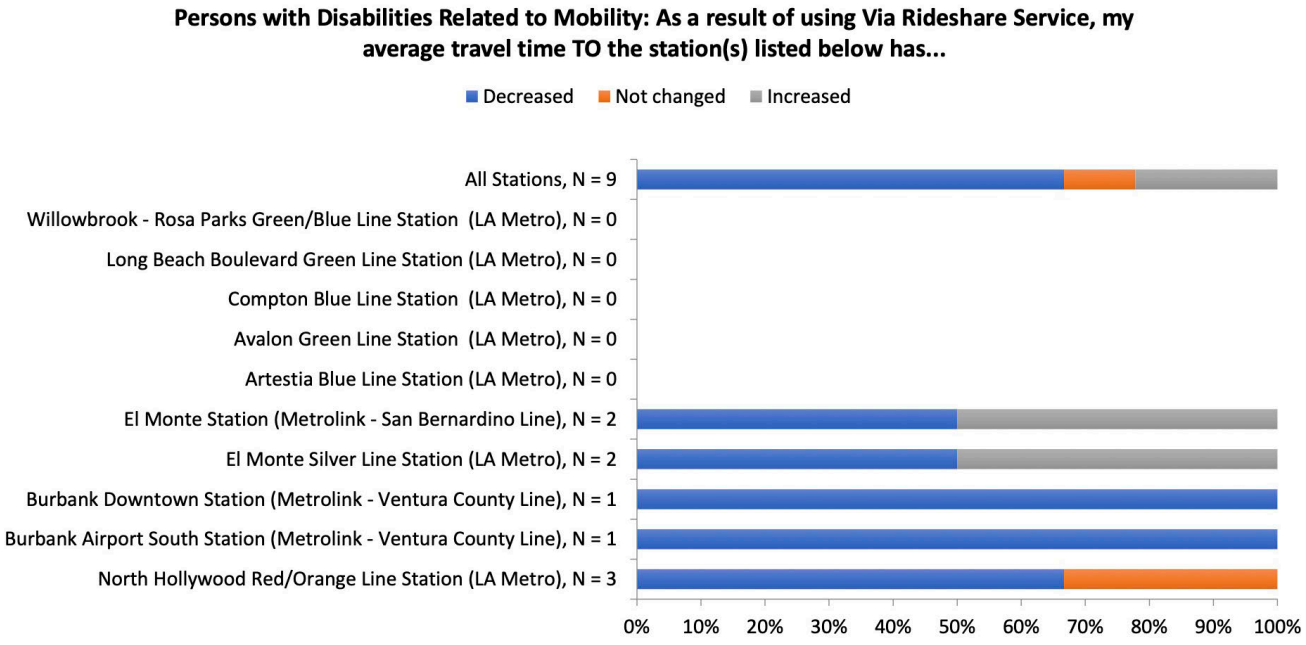


Figure 4-119 *Persons with Disabilities Related to Mobility – Change in Average Travel Time TO Stations Due to Via – Los Angeles*

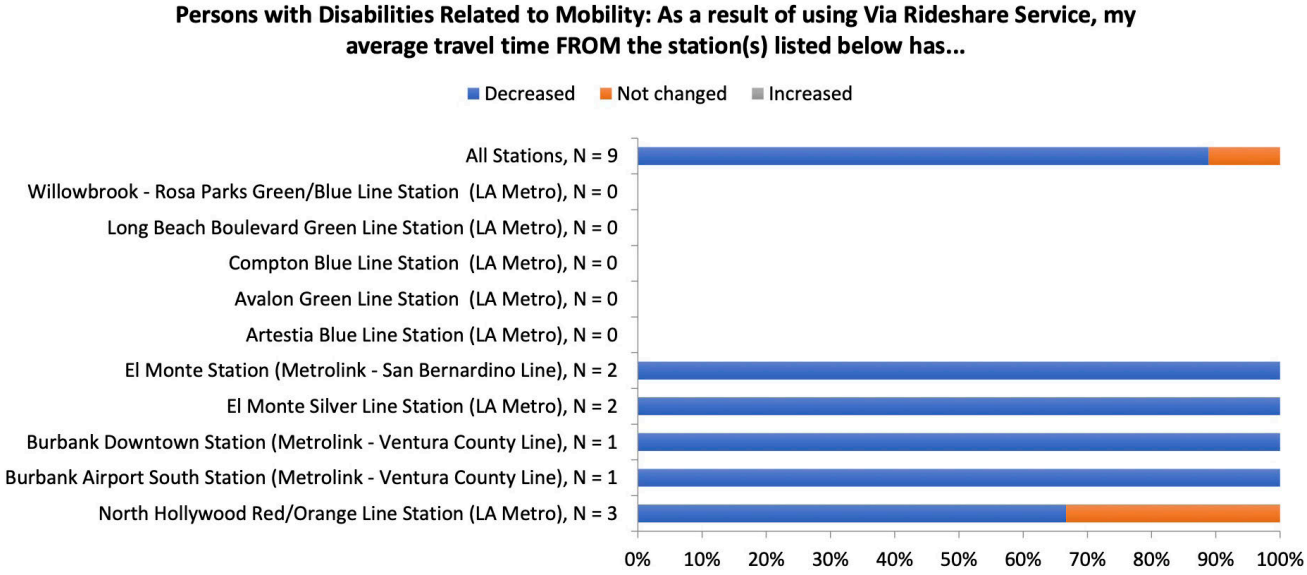


Figure 4-120 *Persons with Disabilities Related to Mobility – Change in Average Travel Time FROM Stations Due to Via – Los Angeles*

Figure 4-121 displays impacts on public transit usage change due to Via Rideshare Service for persons with disabilities. Between the early- and late-pilot surveys (Figure 4-122), perceived accessibility across any mode did improve.

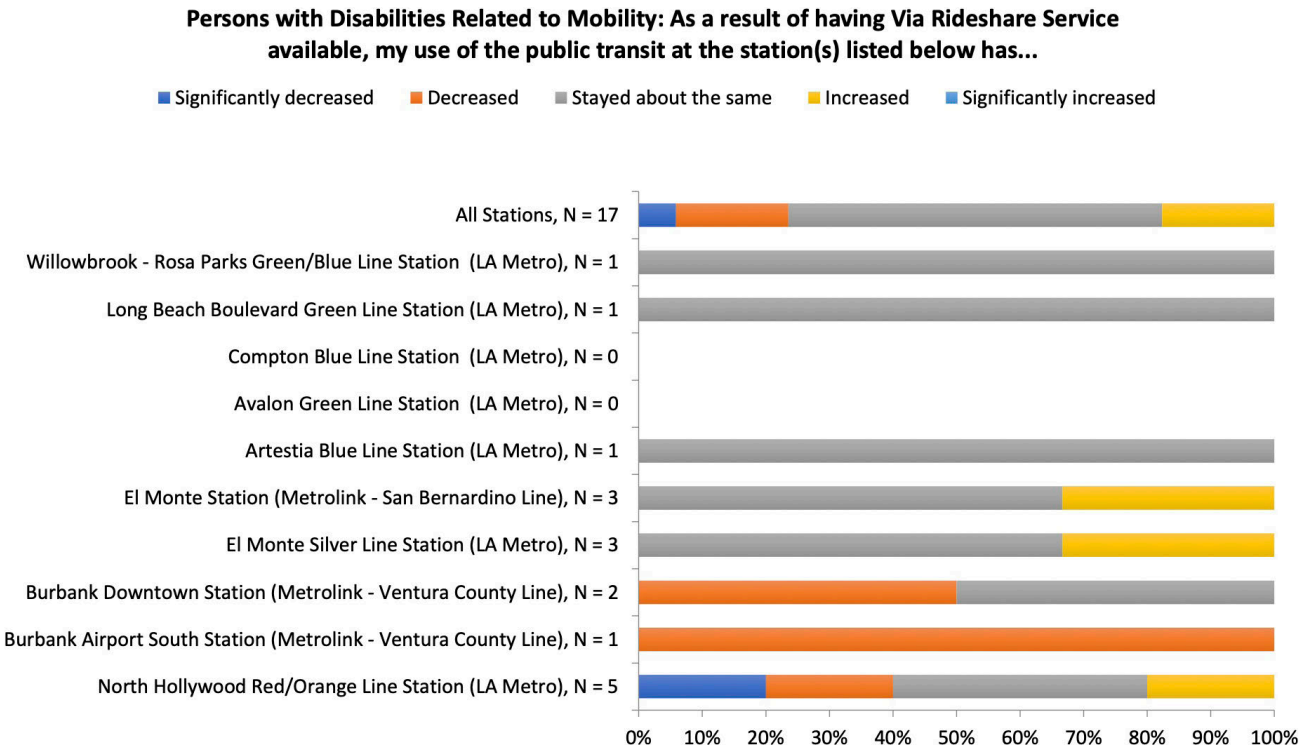


Figure 4-121 *Persons with Disabilities Related to Mobility – Change in Public Transit Usage Due to Via – Los Angeles*

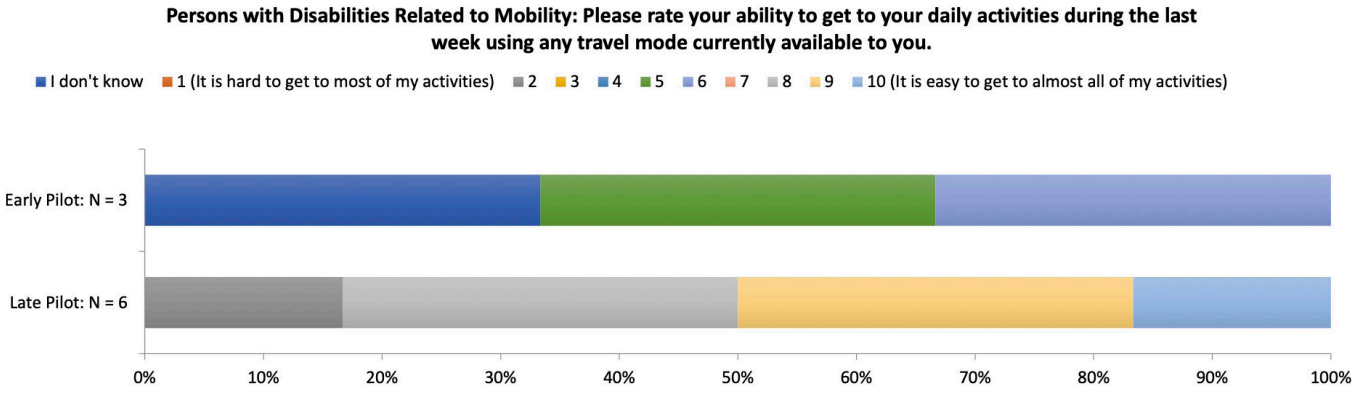


Figure 4-122 *Persons with Disabilities Related to Mobility – Change in Accessibility Rating (Any Mode) – Los Angeles*

Conclusions

Average travel time to and from participating stations in the Los Angeles County pilot due to the Via Rideshare Service generally decreased. Other metrics of mobility for persons with disabilities (as classified in this survey), with regards to pilot FMLM wait time and use of public transit, produced more inconclusive results. Overall, however, the balance of reduction in average travel time suggest some improvements to mobility for the limited sample of persons with disabilities.

Puget Sound

Mobility for Persons with Disabilities

Figures 4-123 and 4-124 present the change in average wait time for persons with disabilities traveling to and from participating stations, respectively, as a result of Via to Transit. The results indicate that a significant number of persons with disabilities experienced decreases in average wait time. No persons with disabilities experienced increases in average wait time.

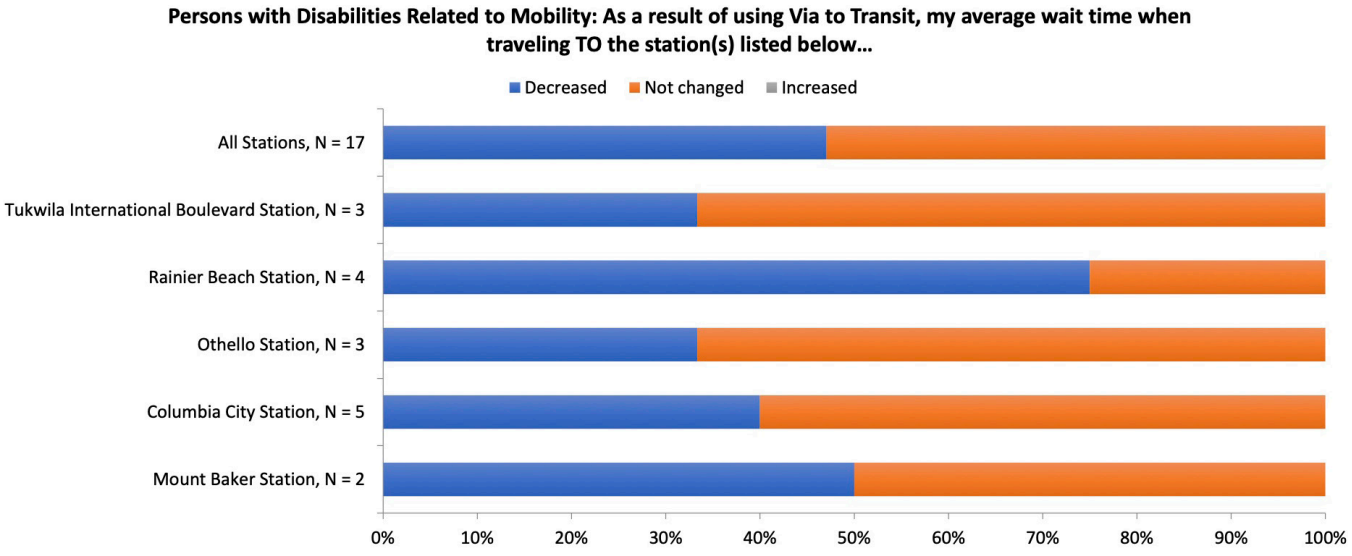


Figure 4-123 *Persons with Disabilities Related to Mobility – Change in Average Wait Time TO Stations Due to Via – Puget Sound*

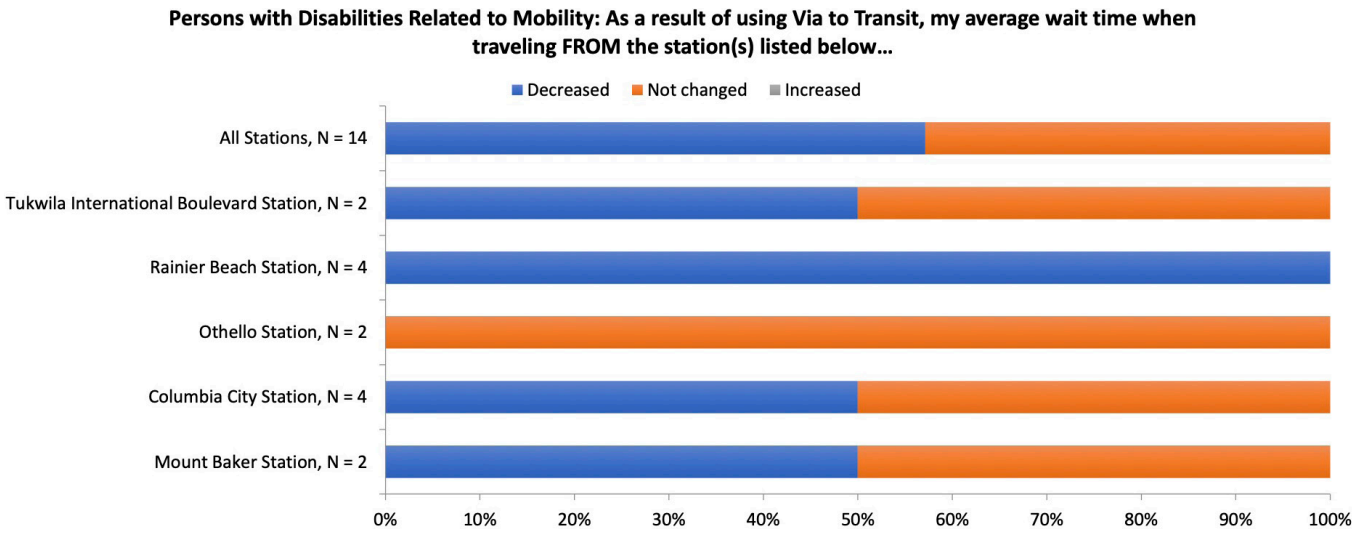


Figure 4-124 *Persons with Disabilities Related to Mobility – Change in Average Wait Time FROM Stations Due to Via – Puget Sound*

For change in average travel time for persons with disabilities, Figures 4-125 and 4-126 present the impacts due to Via to Transit. For both travel to and from stations, a sizable number of respondents stated that their average travel time decreased, with almost no respondents saying that their travel time increased.

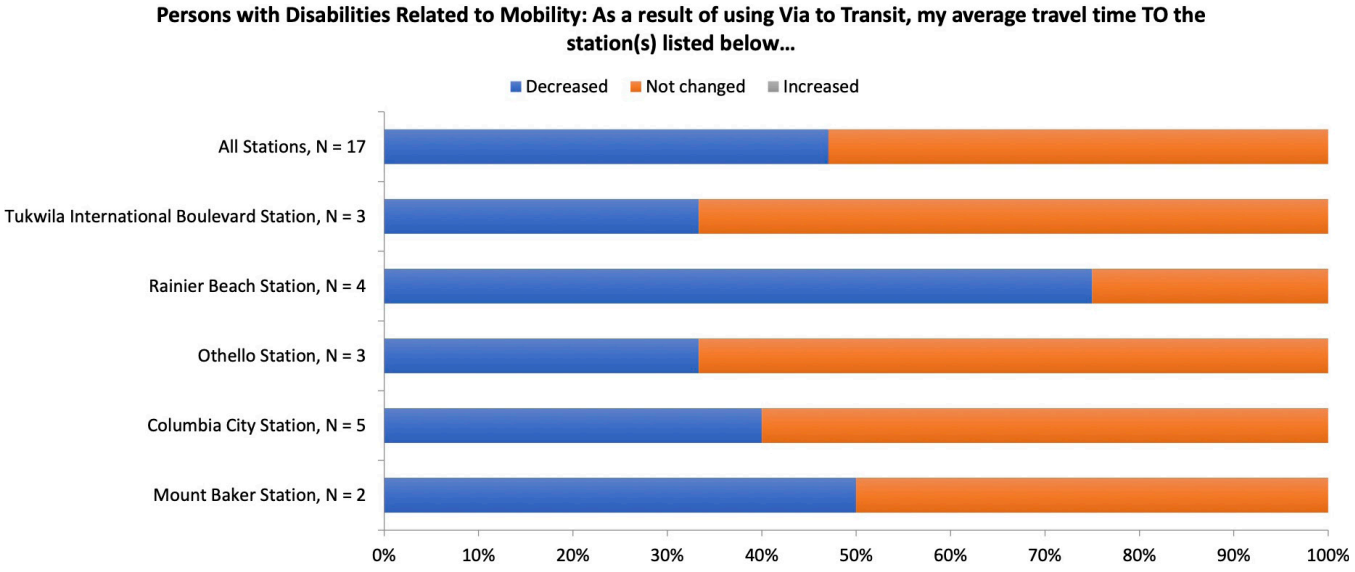


Figure 4-125 *Persons with Disabilities Related to Mobility – Change in Average Travel Time TO Stations Due to Via – Puget Sound*

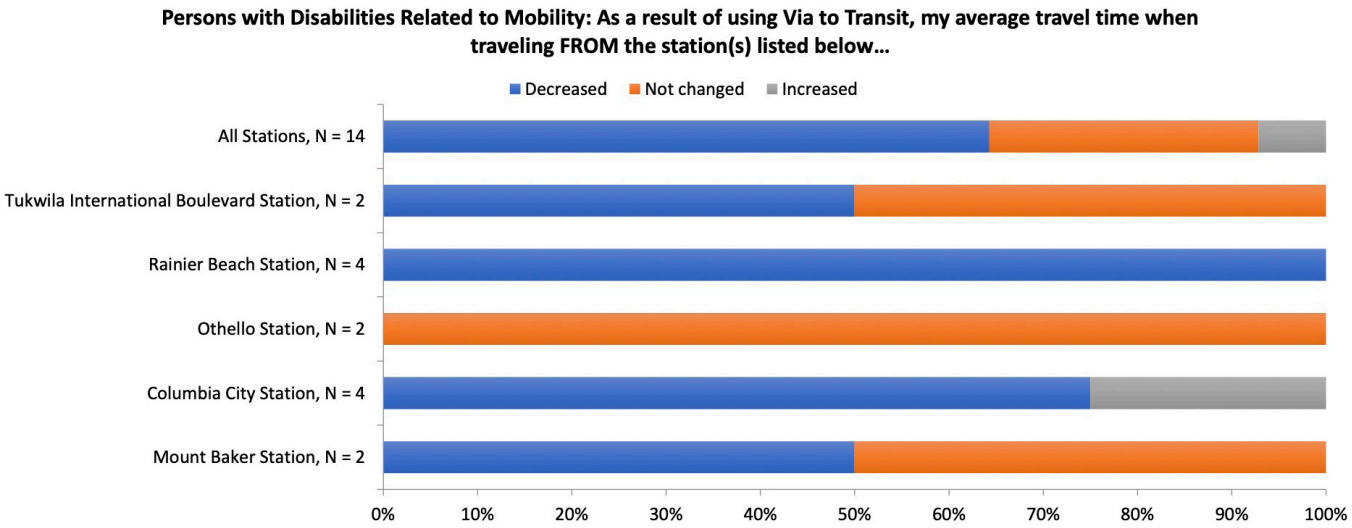


Figure 4-126 *Persons with Disabilities Related to Mobility – Change in Average Travel Time FROM Stations Due to Via – Puget Sound*

Figure 4-127 presents changes in public transit usage as a result of Via to Transit. A similar number of respondents stated that their usage significantly decreased as those who said that their usage increased or significant increased. The implication is public transit usage did not change drastically in the aggregate. Via to Transit may be substituting for some public bus rides for persons with disabilities but also may be increasing access to Link light rail. Figure 4-128 displays changes in perceived accessibility on any mode between the early- and late-pilot surveys.

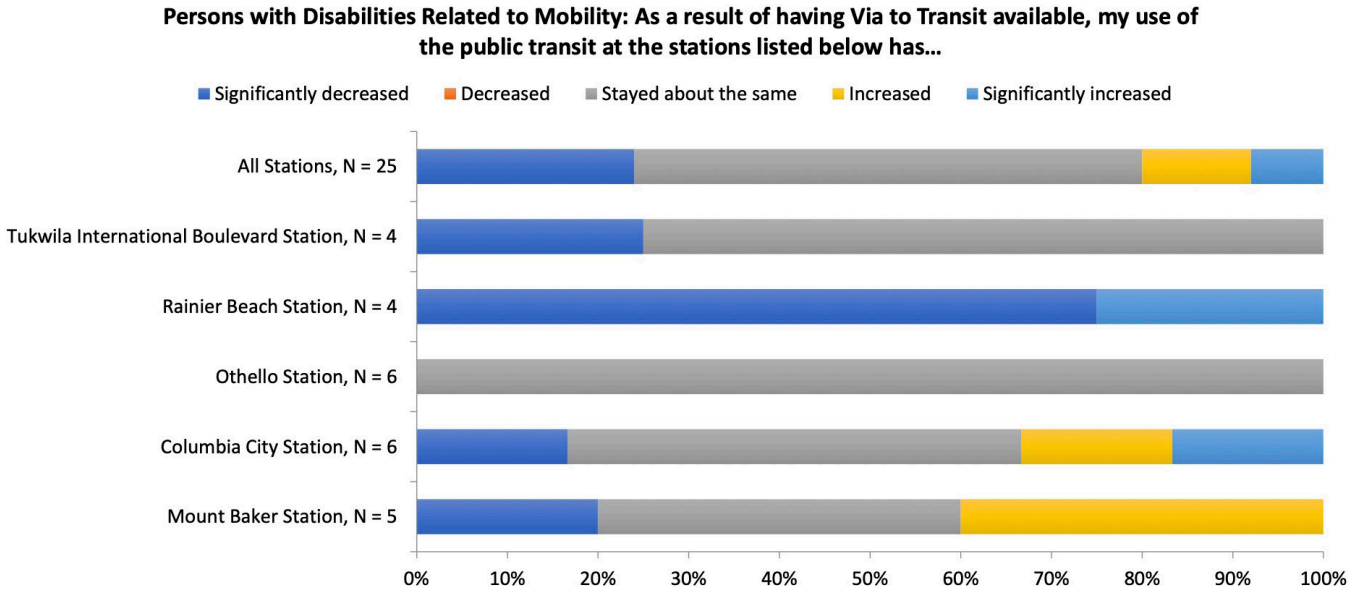


Figure 4-127 *Persons with Disabilities Related to Mobility – Change in Public Transit Usage Due to Via – Puget Sound*

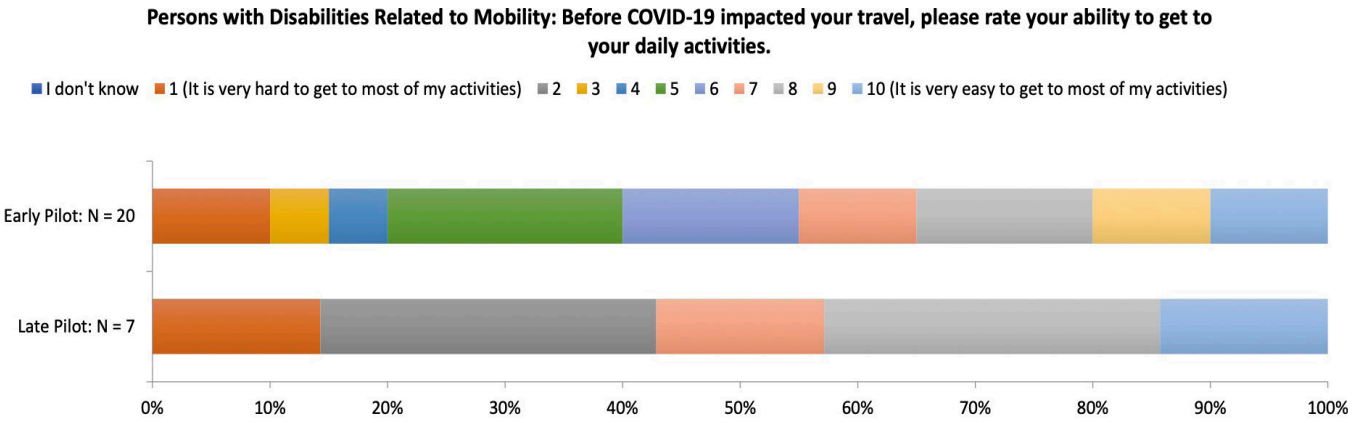


Figure 4-128 *Persons with Disabilities Related to Mobility – Change in Accessibility Rating (Any Mode) – Puget Sound*

Conclusions

Metrics for average wait time and average travel time for persons with disabilities generally improved as a result of Via to Transit. However, public transit usage did not change substantially, and perceived accessibility did not provide any conclusive evidence. Sample sizes were low; however, the data available ultimately suggested that mobility for persons with disabilities improved because of Via to Transit.

Conclusion – Overall

Overall, the results of the analysis suggested that the project improved the mobility for persons with disabilities. The sample sizes of respondents with disabilities in both Los Angeles and Puget Sound analyses were relatively small but, as this demographic is a subset of the general population, this is a limitation within a general user survey. The data suggested that, on a balance, wait times and travel times declined as a result of Via FMLM service. Hypothesis 8 was found to be supported.

Hypothesis 9: Riders will have a safer option to and from the station as a result of Via.

Performance Metric	Key Finding – Los Angeles	Key Finding – Puget Sound
Change in perceived safety as a result of Via, change in perceived safety traveling to/from stations (any mode), satisfaction with safety elements of Via, incidents of crime at select Los Angeles stations	Perceived safety as a result of Via increased. Perceived safety traveling to/from stations (any mode) somewhat increased between early- and late-pilot time periods. Respondents were highly satisfied with the Via Rideshare Service elements related to safety in the Los Angeles region.	Perceived safety as a result of Via increased. Perceived safety traveling to/from stations (any mode) somewhat increased between early- and late-pilot time periods. Respondents were highly satisfied with Via to Transit elements related to safety in the Puget Sound region.

For Hypothesis 9, survey data and crime data were both used to identify if riders had a safer option to/from stations as a result of Via FMLM pilot. The analysis focuses on changes in perceived safety when traveling to/from participating stations explicitly due to Via (e.g., causal relationship) and across any mode (i.e., on a 10-point scale). Crime data from select Los Angeles stations (collected by the Los Angeles Police Department [LAPD]) were also analyzed as was satisfaction with safety elements of the Via to Transit program in Puget Sound.

Los Angeles

Perceived Safety

Figure 4-129 presents the change in perceived safety as a result of Via Rideshare Service. Across all participating stations about 16% of respondents stated that they felt much more safe when traveling to/from participating stations. An additional 47% of respondents said that they felt more safe. However, no respondents in the small sample (n=32) said that they felt less safe due to Via Rideshare Service. A second analysis was conducted comparing results of the early- and late-pilot surveys on respondents' perceived safety traveling to/from participating stations on any mode (Figure 4-130). The results show slight improvements in perceived safety, with more individuals more likely to rate their safety as a 9 in the late-pilot survey, compared to the early-pilot survey.

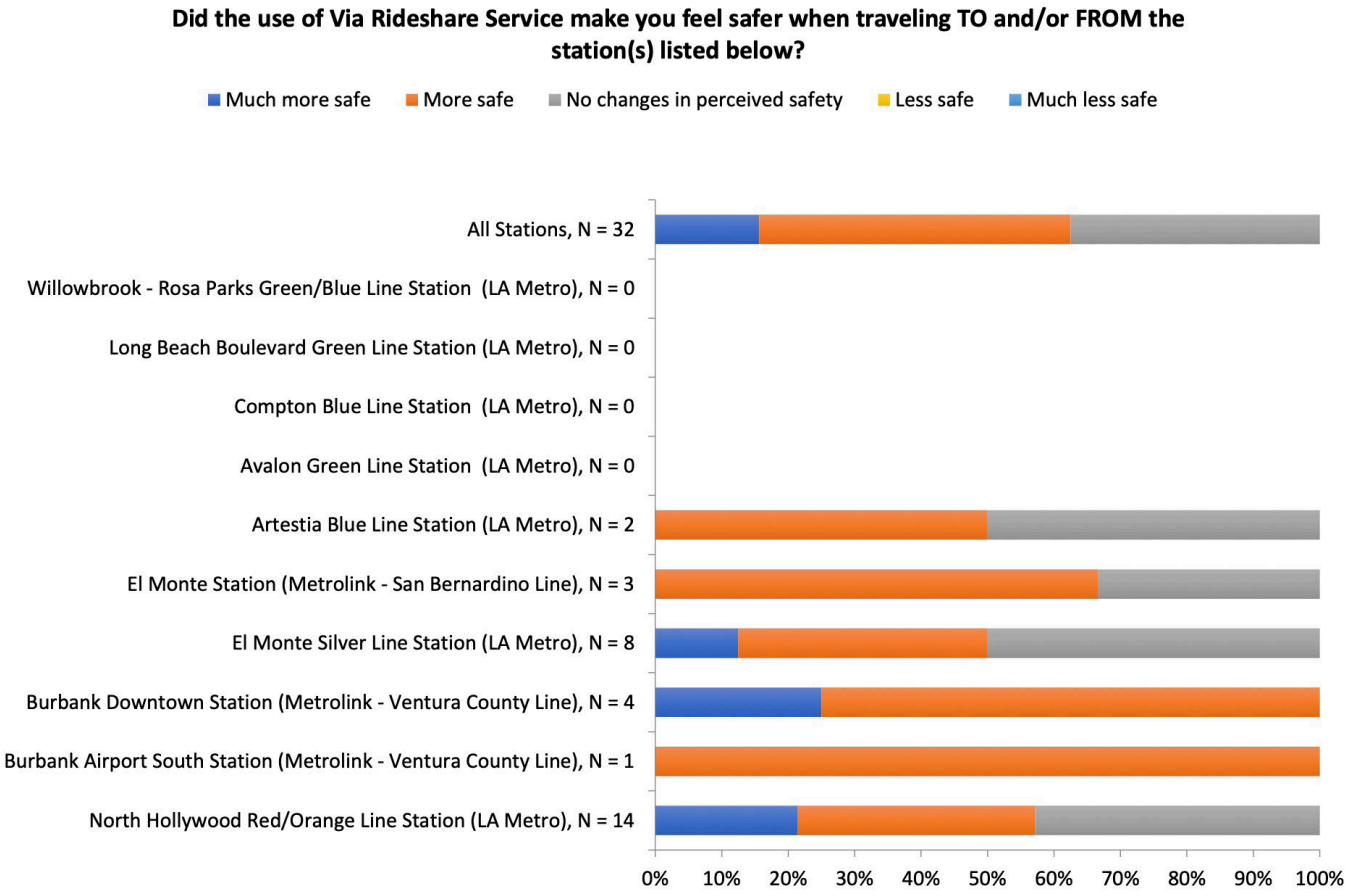


Figure 4-129 *Change in Perceived Safety as a Result of Via Rideshare Service – Los Angeles*

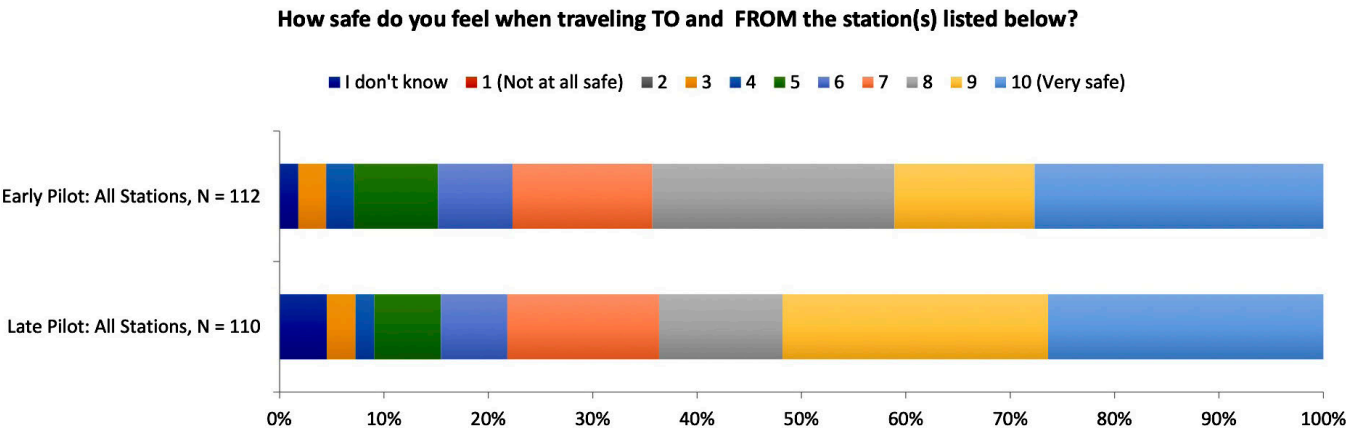


Figure 4-130 *Change in Level of Perceived Safety Between Pilot Points (All Stations Only) – Los Angeles*

Crime Data Analysis

For several select stations, data from the LAPD were collected between January 2015 and August 2020. These data included crimes at stations, broken down by crime type (e.g., robbery, aggravated assault, trespassing, etc.). Data were aggregated to a monthly total and presented for the North Hollywood Station (Figure 4-131), Artesia Station (Figure 4-132), and El Monte Station (Figure 4-133). The pilot period occurred between January 2019 and January 2020, approximated by the vertical lines on the graphs.

For the North Hollywood Station and the El Monte Station, crime increased quickly but then tapered off near the end of the pilot. For the Artesia Station, crime started low but increased over the pilot time period.

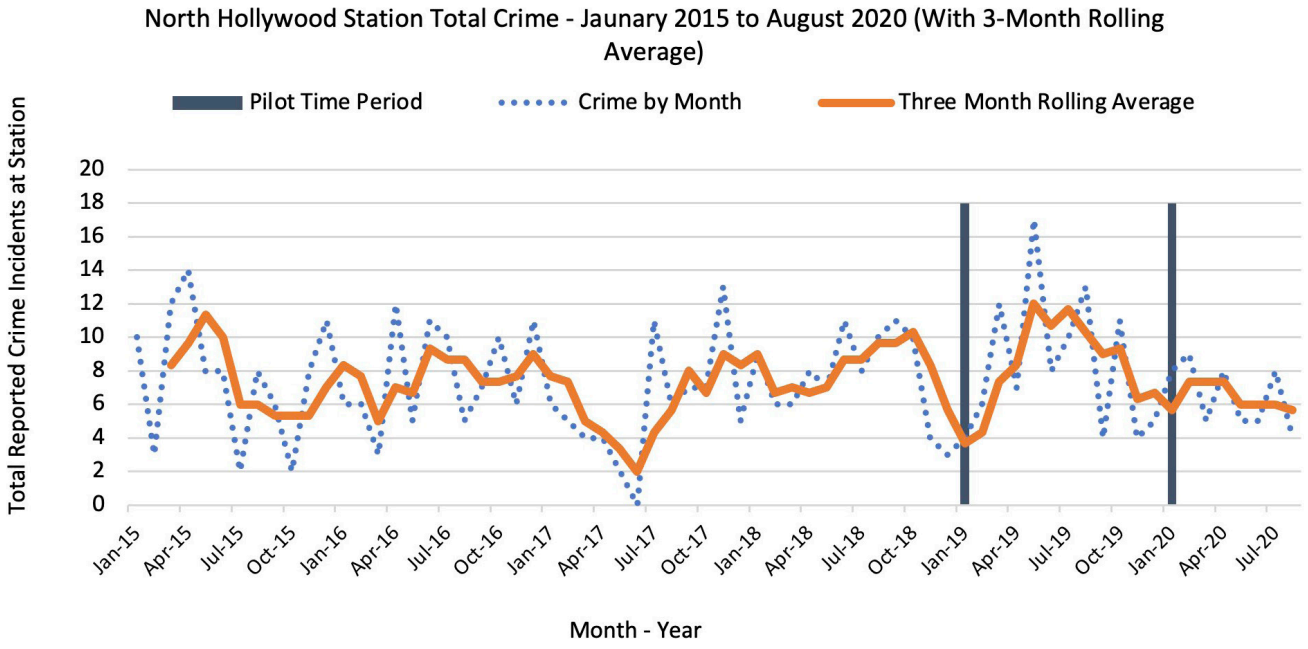


Figure 4-131 *Aggregate Crime Incidents at North Hollywood Station – Los Angeles*

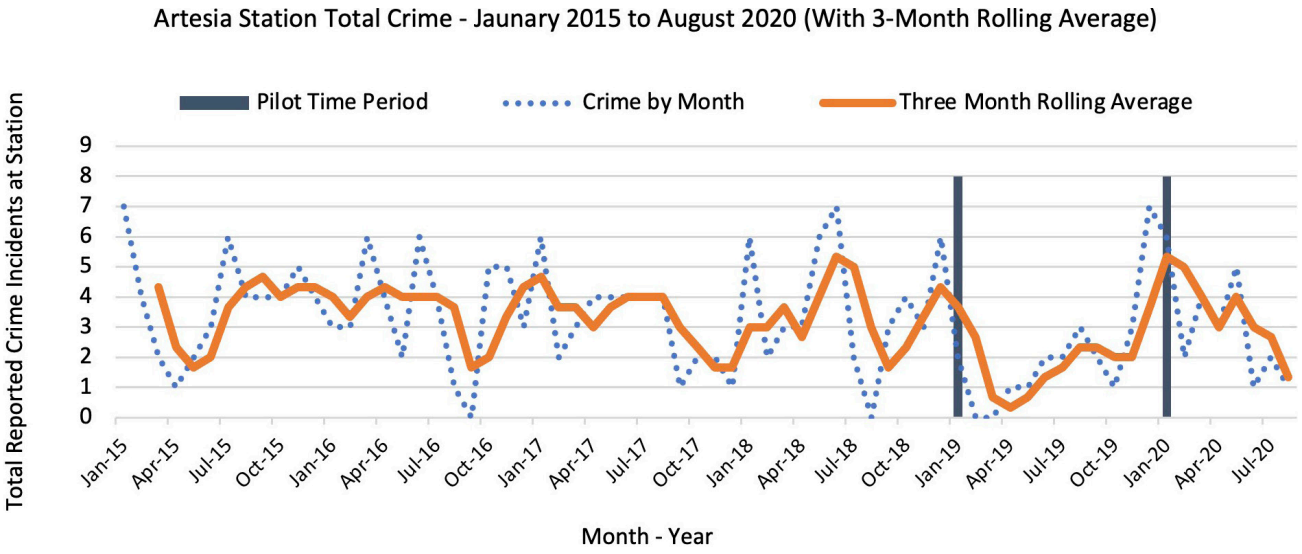


Figure 4-132 *Aggregate Crime Incidents at Artesia Station – Los Angeles*

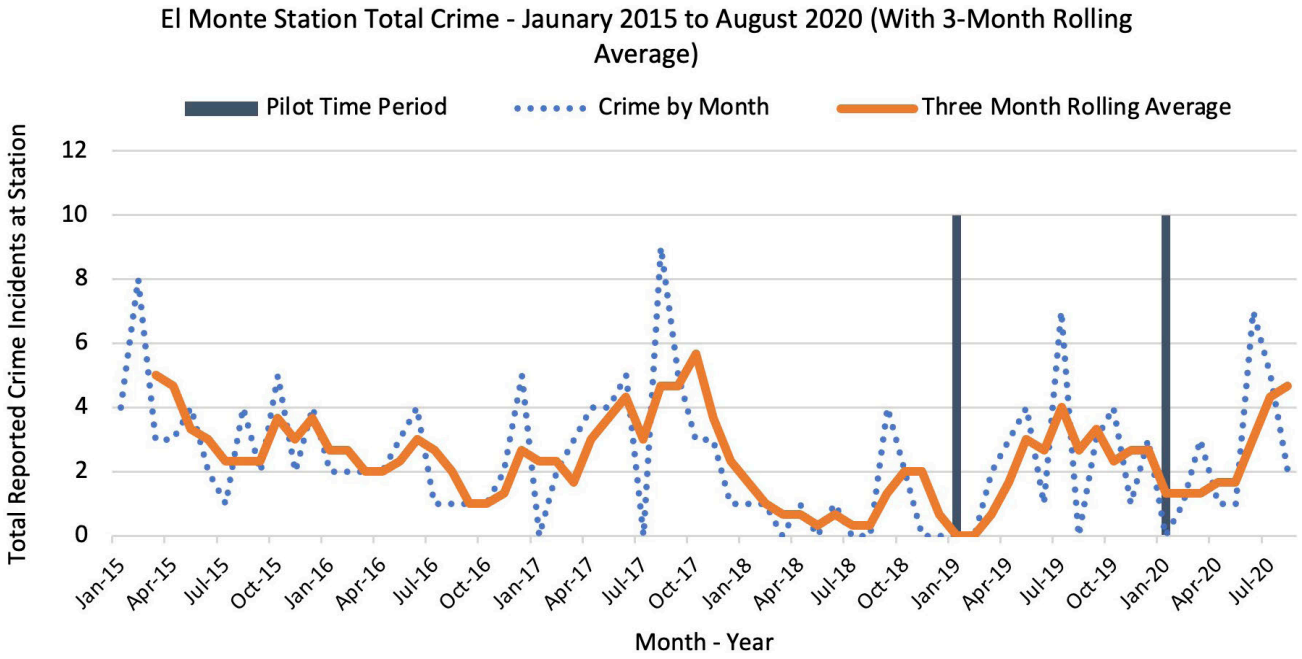


Figure 4-133 *Aggregate Crime Incidents at El Monte Station – Los Angeles*

Conclusions

Perceived safety improved as a result of the Via Rideshare Service. When traveling to/from participating stations, respondents stated slightly higher levels of perceived safety (any mode) between the early- and late-pilot. Criminal activity at three select stations did not experience clear or sustained changes. However, data from the surveys suggested that riders felt safer and no one felt less safe. The results generally support Hypothesis 9 in the Los Angeles region.

Puget Sound

Perceived Safety

Figure 4-134 presents the change in perceived safety as a result of Via to Transit for Puget Sound. Across all stations, about 34% of respondents said that they felt much more safe, and about 33% said that they felt more safe. Just 1% of respondents said that they felt less safe. By station, the Tukwila International Boulevard, Rainier Beach, and Othello experienced above average improvements in safety. The Mount Baker Station experienced the smallest improvements in safety.

Figures 4-135 and 4-136 present early- and late-pilot results related to perceived safety on a ten-point scale. Across all participating stations, the number of respondents who said their perceived safety was a nine or ten increased from 35% (early-pilot) to 44% (late-pilot). Moreover, the number of respondents who stated a perceived safety of five or lower decreased from 20% (early-pilot) to 15% (late-pilot). For both surveys, Columbia City Station had the highest perceived safety. The results, though failing to identify safety prior to Via to Transit, still indicate that safety improved throughout the pilot and that Via FMLM service likely played some role.

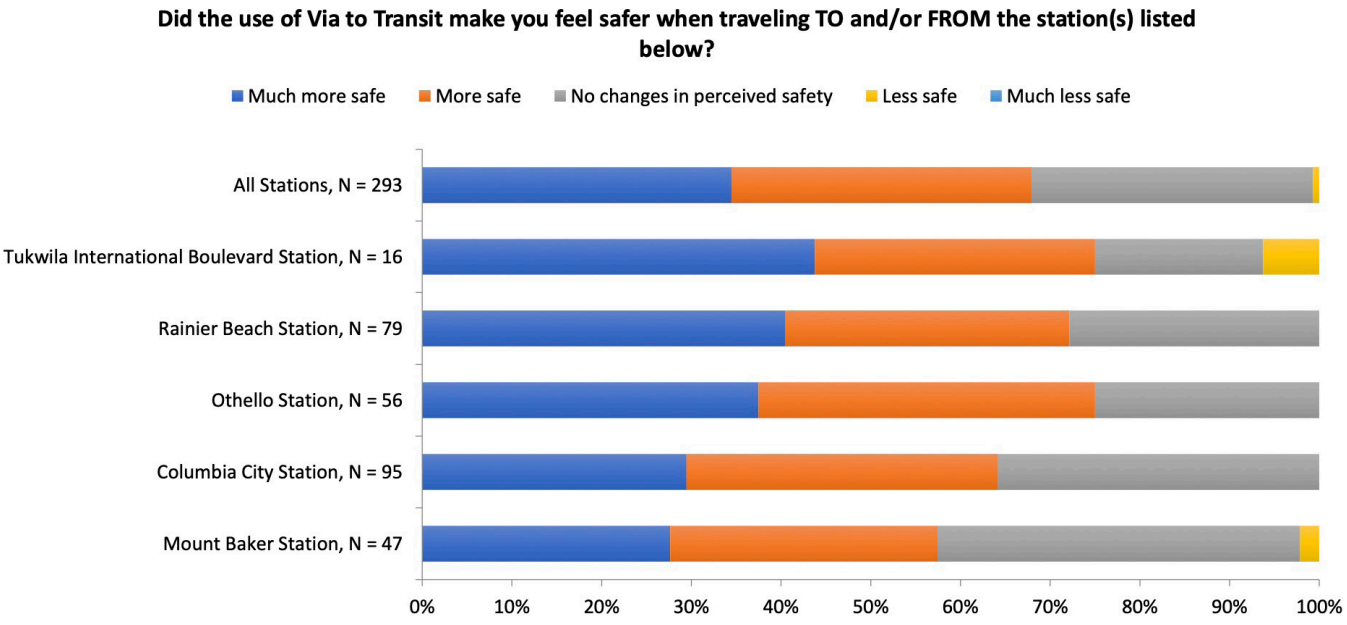


Figure 4-134 *Change in Perceived Safety as a Result of Via to Transit – Puget Sound*

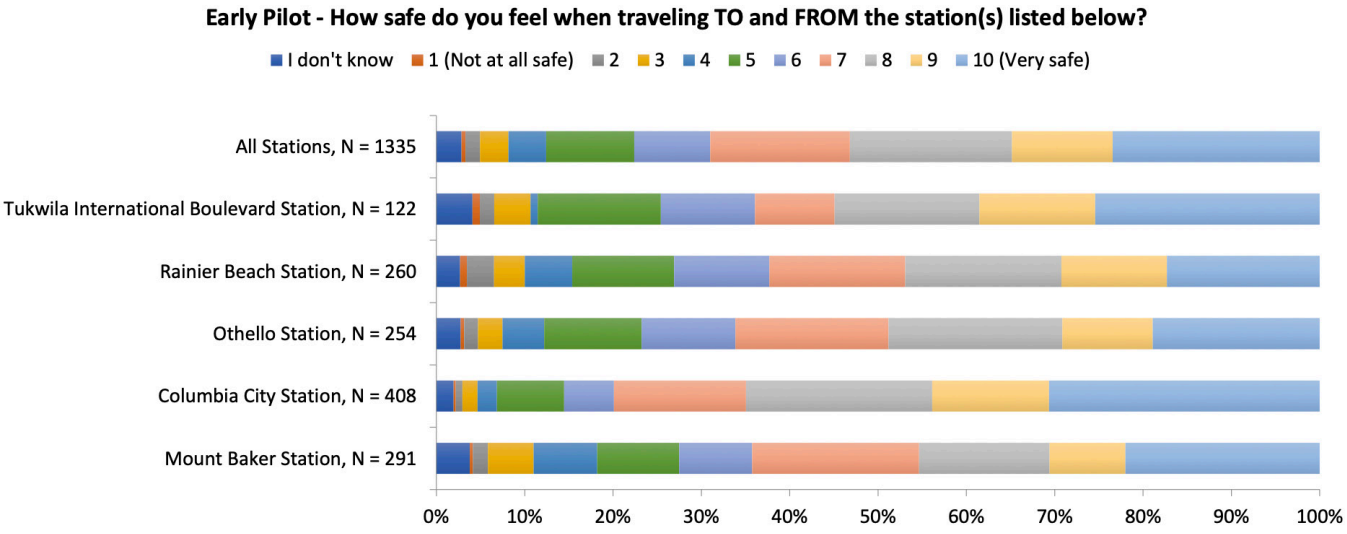


Figure 4-135 *Level of Perceived Safety in Early-Pilot – Puget Sound*

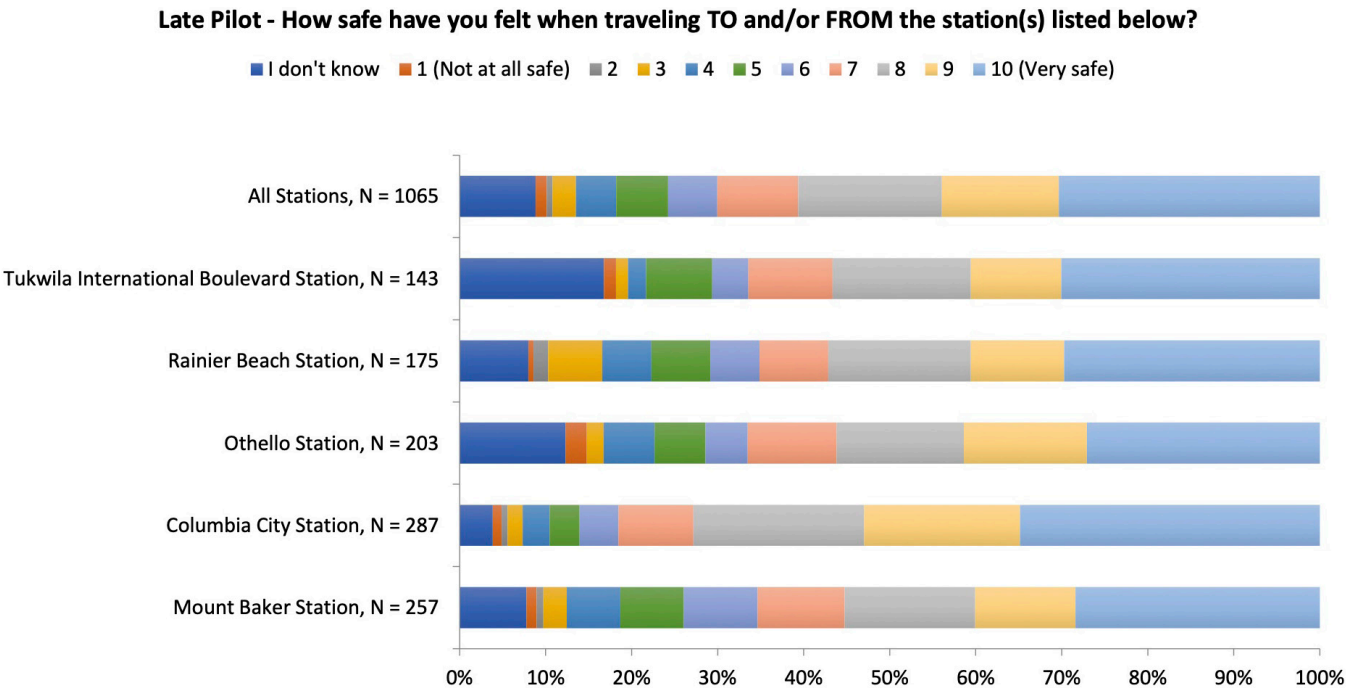


Figure 4-136 *Level of Perceived Safety in Late-Pilot – Puget Sound*

Finally, Figure 4-137 presents respondents' satisfaction with several selected Via to Transit program elements related to safety. About 76–88% of respondents, depending on the program element, were satisfied or extremely satisfied. Personal safety on the Via to Transit vehicle received the highest satisfaction rating of the safety elements. Just 2–6%, depending on program element were dissatisfied or extremely dissatisfied.

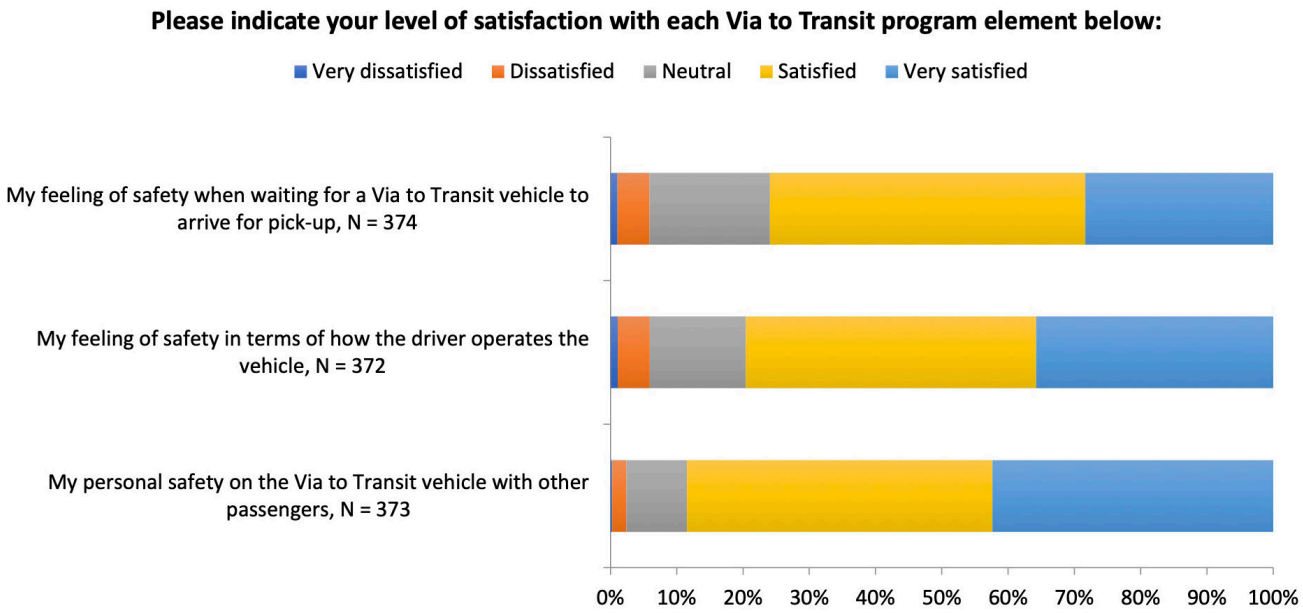


Figure 4-137 *Level of Satisfaction with Via to Transit Program Elements Related to Safety – Puget Sound*

Conclusions

Results indicate that perceived safety increased across all participating stations as a result of Via to Transit. Moreover, perceived safety of traveling to/from stations on any mode increased between the early-pilot and late-pilot. Finally, respondents were highly satisfied with Via to Transit elements related to safety (e.g., safety while waiting, safety related to driver operation, personal safety on vehicles). The results generally support Hypothesis 9 in the Puget Sound region.

Conclusion – Overall

The survey results within both regions revealed that respondents felt safe when using the Via FMLM service. The results generally supported Hypothesis 9 in both the Los Angeles and Puget Sound regions.

Hypothesis 10: Subsidies per rider on Via are lower than the subsidies provided on other FMLM options.

Performance Metric	Key Finding – Los Angeles	Key Finding – Puget Sound
Operating cost per revenue hour, operating cost per trip, revenue per trip, subsidy per trip, farebox recovery	Via FMLM subsides in Los Angeles were considerably higher than vanpool, fixed-route bus service, and bus rapid transit. Via subsidies were competitive on a per-hour basis with other modes, but not as competitive on a per-trip basis.	Similar metrics from Puget Sound indicate that Via FMLM subsidies were lower than some modes (e.g., demand response (mostly paratransit)) but higher than others (e.g., vanpool, fixed-route bus service).

Hypothesis 10 employed activity data, information about the cost of the pilots, and NTD data from FTA. The NTD data provided a snapshot of both LA Metro and King County Metro in terms of the number of boardings, operational and capital costs, revenue hours, and passenger miles. These data are also separated by transportation mode.

Los Angeles

Subsidies

Figure 4-138 displays the operating costs per revenue hour of Via Rideshare Service compared to other modes operated by LA Metro. The cost of Via Rideshare Service was approximately $21.07 per revenue hour, which is nearly the same as the LA Metro vanpool program ($21.49 per revenue hour). The cost of LA Metro Bus Rapid Transit (BRT) was the most at $231.80 per revenue hour, similar to LA Metro buses at $184.69 per revenue hour. The results indicate that Via Rideshare Service was significantly cheaper to operate on a per-revenue-hour basis compared to fixed modes of transit.

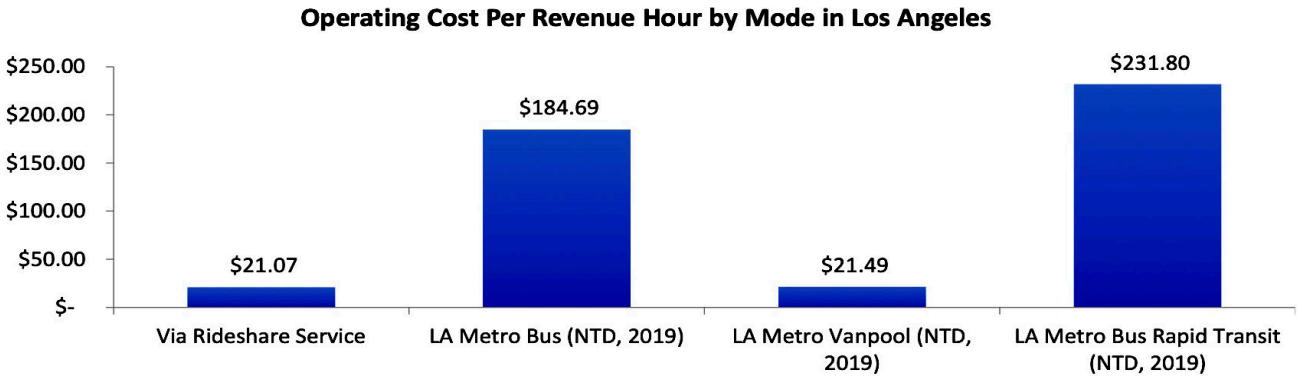


Figure 4-138 *Operating Costs per Revenue Hour – Los Angeles*

Despite the low operations cost per revenue hour, Via Rideshare Service performed less effectively as compared to other modes based on operating costs per trip. Figure 4-139 displays operating costs per trip, revenue per trip, and subsidy per trip. The trip subsidy (i.e., cost per trip to the operator) is calculated as the difference between the operating costs per trip and the revenue per trip. The results show that the cost of Via Rideshare Service was about $11.09 per trip, significantly more than the LA vanpool program ($4.74 per trip), LA Metro bus ($4.73 per trip), and LA Metro BRT ($3.74 per trip). Moreover, fare data found that the entire program made $3,564, which was, in large part, due to the free fares for transfers to/from LA Metro stations. It should also be noted that revenues were zero between April 2019 and July 2020. Consequently, the final subsidy per trip for Via Rideshare Service was $11.07 per trip. For the other modes in Los Angeles, LA Metro bus service required a per trip subsidy of $4.04, and the LA BRT subsidy was $3.01. In addition, the LA Metro vanpool program produced a profit of +$.06 per trip. A comparison was also made for farebox recovery (i.e., revenue divided by operating costs) between modes in Los Angeles (Figure 4-140). Via Rideshare Service had the lowest farebox recovery (0.2%) due to low revenue from the pilot. LA Metro bus and LA Metro BRT had farebox recovery of about 15% and 20%, respectively. As mentioned previously, LA Metro vanpool made a profit, producing a farebox recovery of about 101%. Figure 4-139 presents different per-trip metrics for valuation of different transit modes.

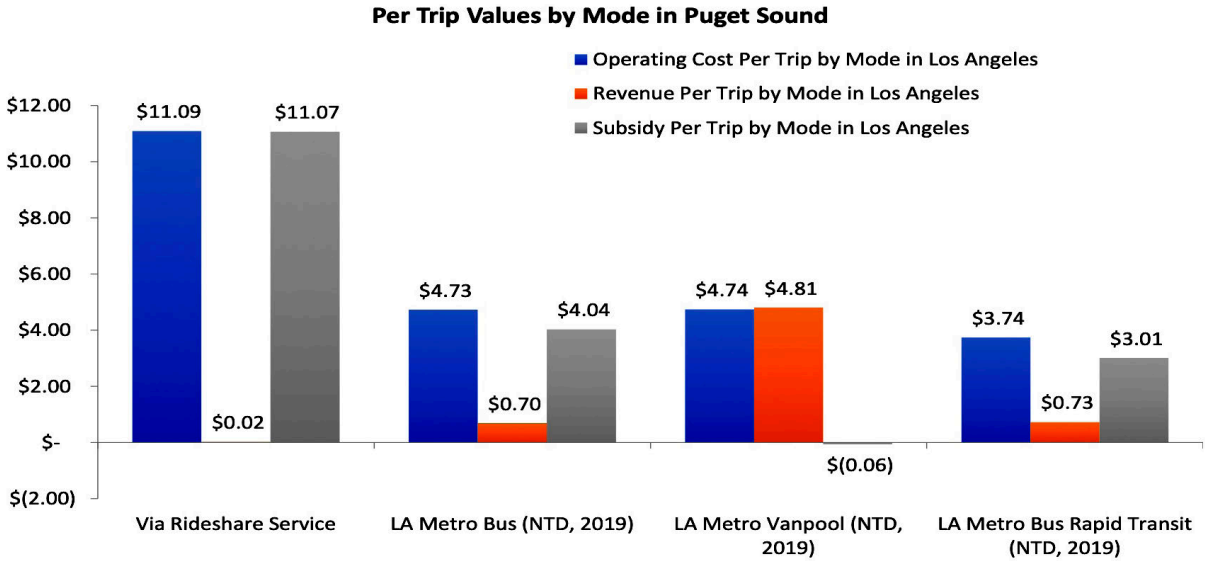


Figure 4-139 *Operating Costs, Revenue, and Subsidy by Mode – Los Angeles*

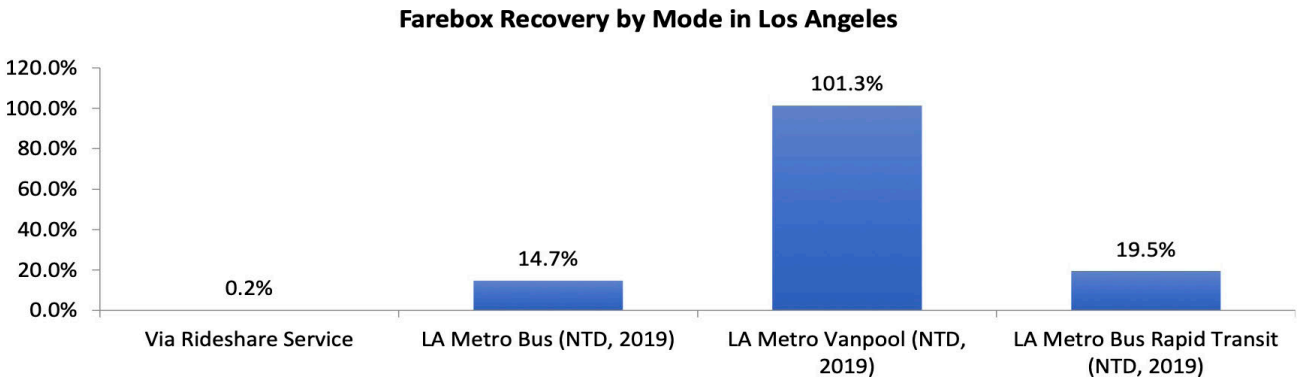


Figure 4-140 *Farebox Recovery by Mode – Los Angeles*

Conclusions

Analysis of the costs of the Via Rideshare Service compared to other FMLM modes (with available data) found that the program had relatively low cost per revenue hour. However, the cost per trip for the Via Rideshare Service was significantly higher than other modes. Moreover, revenue captured through the program was low, leading to high subsides per trip. Overall, the mixed result points to partially supported hypothesis in Los Angeles that depends on whether the metric is in the form of cost per time (relatively favorable) or cost per trip (relatively unfavorable).

Puget Sound

Subsidies

Using the total cost of the Via to Transit pilot and number of driver hours, an operating cost per revenue hour was established and is shown in Figure 4-141. This was compared to the operating cost per revenue hour of other modes of transportation operated by King County Metro. The results show that operating cost per revenue hour was highest for King County Metro buses, followed by demand response transportation (mostly composed of paratransit). Via to Transit and the paratransit services provided by taxis exhibited similar values at $48.70 and $47.46 per revenue hour, respectively. King County Metro vanpool had the lowest cost at $19.09 per revenue hour. Compared to other similar services provided by King County Metro, Via to Transit performed significantly better than fixed-route buses and demand response service (though similarly to demand response taxis). Via to Transit was cheaper to operate than some (but not all) services provided by King County Metro. While it is likely that other FMLM options (such as scootershare or bikeshare) would produce lower operating costs, the analysis is not readily available.

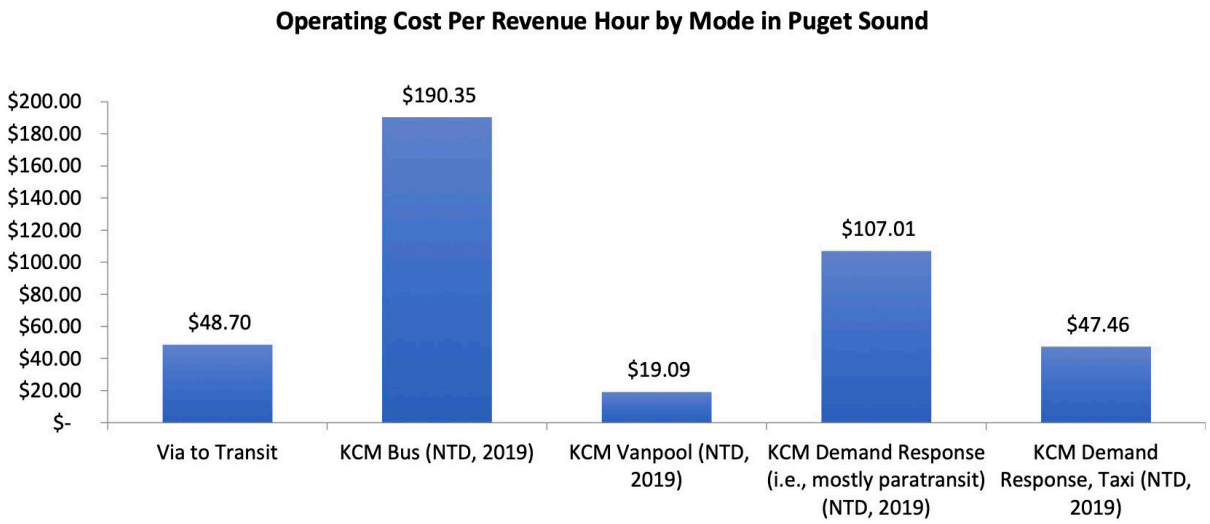


Figure 4-141 *Operating Costs per Revenue Hour – Puget Sound*

Figure 4-142 presents the operating costs, revenue, and subsidy by mode of transportation. Via to Transit experienced an operating cost of about $11.91 per trip. This was decreased by the revenue per trip of about $1.10 per trip, coming from fares. As riders received discounts based on the King County Metro fare structure and could transfer to Via to Transit, the revenue per trip value was low. However, it was similar to other transportation modes for King County Metro. The result is that Via to Transit required a per-trip subsidy of $10.81. Compared to other similar vehicular-modes, Via to Transit performed better than demand response transportation of mostly paratransit and demand response taxi service ($83.56 and $16.87 per trip, respectively). However, Via to Transit performed worse than fixed-route bus ($4.58) and vanpool ($0.80).

In addition, a comparison was made focusing on farebox recovery (i.e., revenue divided by operating costs) among modes, as shown in Figure 4-143. The results indicate that vanpool exhibited the highest farebox recovery (73.7%) followed by fixed-route buses (23.0%) and Via to Transit (9.2%). Via to Transit performed better in farebox recovery than both demand response transportation (mostly paratransit) and demand response taxis.

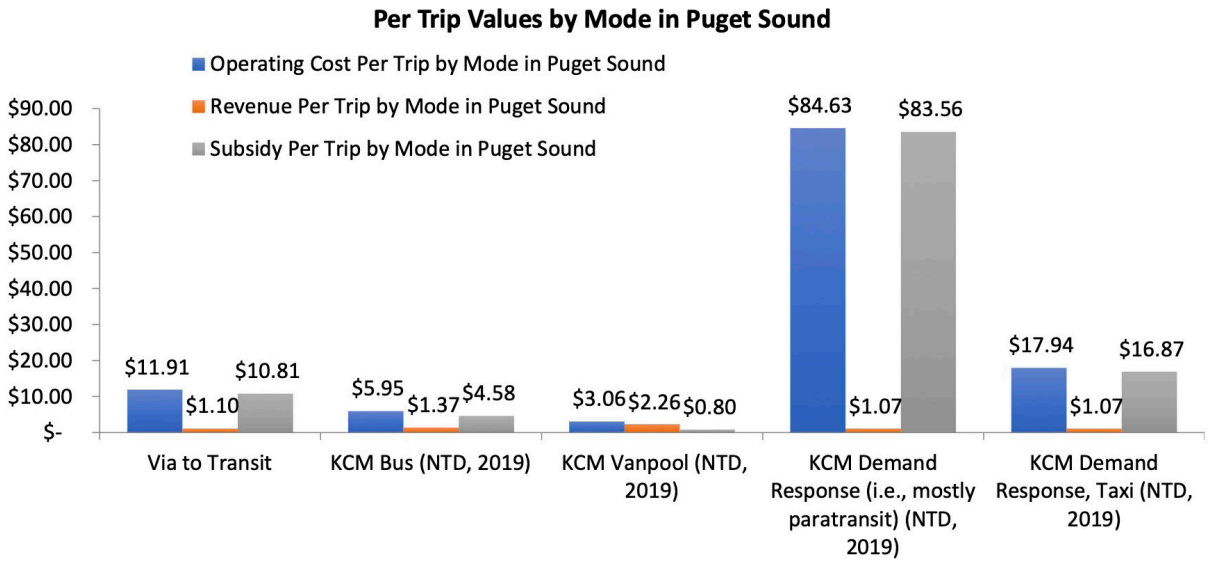


Figure 4-142 *Operating Costs, Revenue, and Subsidy by Mode – Puget Sound*

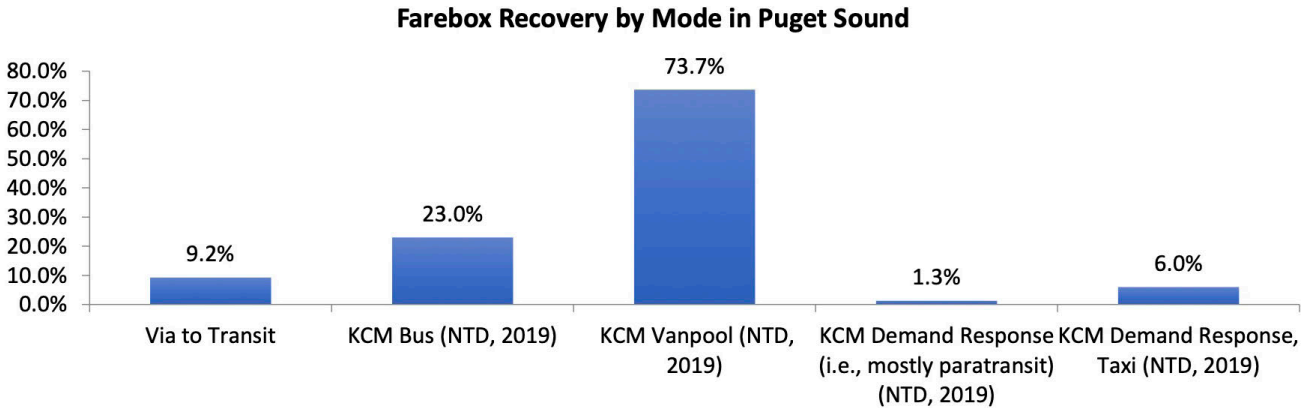


Figure 4-143 *Farebox Recovery by Mode – Puget Sound*

Conclusions

The results indicate that Via to Transit exhibited lower subsides and better farebox recovery than some transportation modes (i.e., demand response transportation [mostly paratransit] and demand response taxis). However, Via to Transit exhibited higher subsidies and poorer farebox recovery than fixed route buses and vanpool. Based on revenue hours, Via to Transit performed better than both fixed-route buses and demand response (mostly paratransit). As in Los Angeles, the results depend on whether the metric is in the form of cost per time or cost per trip. The cost per trip metrics, although unfavorable against many modes, did compare favorably against the region's demand

response service. The cost per time metric was generally more favorable to all modes except vanpool. Overall, the mixed result points to partially supported hypothesis in the Puget Sound region.

Conclusion – Overall

The analysis of subsidies per rider produced mixed results, depending on the metric used to evaluate subsidies. Overall, the collective results suggest that Hypothesis 10 is partially supported but more analysis and data are needed for a stronger conclusion.

Hypothesis 11: The perceived accessibility of travel to and from selected stations will increase as a result of the project.

Performance Metric	Key Finding – Los Angeles	Key Finding – Los Angeles
Distance traveled to and from the station, change in perceived accessibility of any mode, change in public transit usage as a result of Via, satisfaction with select elements of Via to Transit (Puget Sound region)	In the Los Angeles region, perceived accessibility, although generally high, did not change much during the pilot. However, more people in the late-pilot survey gave higher ratings for their accessibility relative to the early pilot-survey. Public transit usage generally increased as a result of the project.	In the Puget Sound region, perceived accessibility was high, and public transit usage generally increased as a result of Via to Transit. However, satisfaction with geographic elements yielded inconclusive support.

Hypothesis 11 was analyzed using the survey data that served as partial proxies for accessibility, public transit usage, and satisfaction with accessibility as provided by Via. In addition, trip distance to and from the stations was analyzed on a station-by-station basis. The analysis was ultimately limited by a lack of information on the distance and spread of travel by users prior to the project. Nonetheless, the analysis that follows is informative within the context of understanding distances traveled by zone and the shape of their distributions relative to each other. This serves to provide context to the overall spread of distances traveled by system users.

Los Angeles

Distributions of Trip Distances to the Station

Via activity data permitted the analysis of trip distances to each participating station. Stations were identified within the data set, and trip distances were aggregated into distributions of the distances from the trip origin in the zone to the station for each trip. The distributions are shown within Figures 4-144, 4-145, and 4-146.

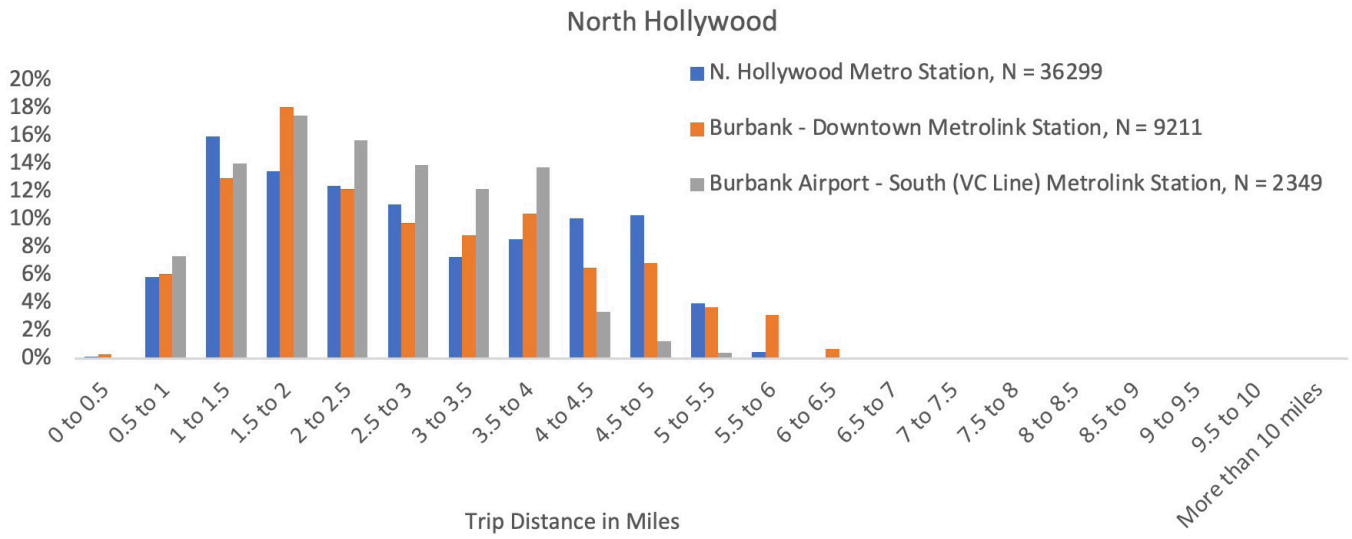


Figure 4-144 *Distribution of Trip Distances in North Hollywood Zone*

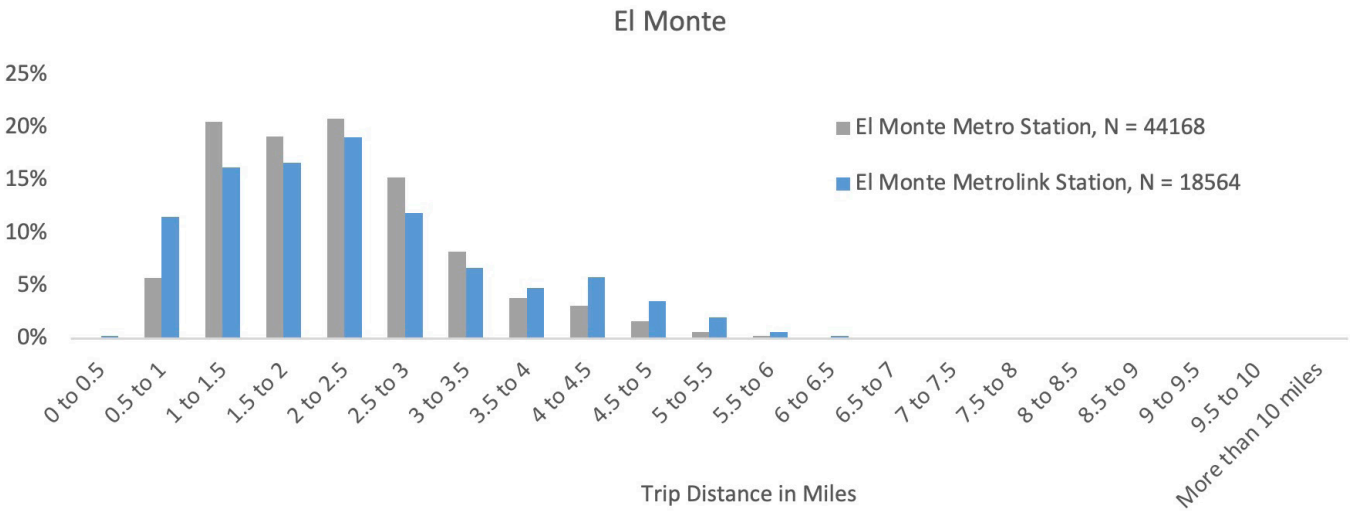


Figure 4-145 *Distribution of Trip Distances in El Monte Zone*

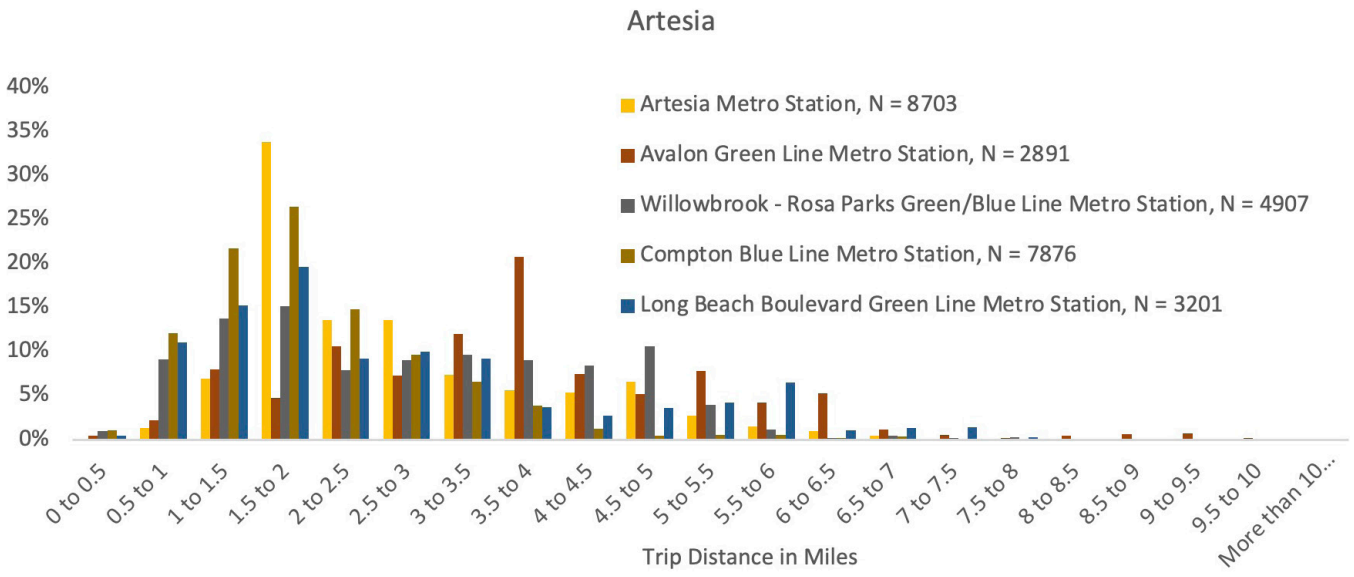


Figure 4-146 *Distribution of Trip Distances in Artesia Zone*

The distributions suggest that the vast majority of trips within the Los Angeles zones were within 6 miles. There was limited information on the distances traveled by users before the project. As a result, the change in distances could not be assessed. The station with the lowest average trip distance (1.97 miles) was Compton on the Blue Line. The station with the highest average trip distances was Avalon on the Green Line (3.65 miles). Across all trips within the project, the average trip distance was 2.5 miles.

Perceived Accessibility

As presented in Figure 4-147, respondents stated their ability to get to daily activities on any mode on a ten-point scale. Between the early- and late-pilot, perceived accessibility did not change drastically, especially for the lower values. However, more people in the late-pilot stated that their rating was an eight or nine, while more people in the early-pilot stated that their rating was a 7 or a 10. About 61% (early-pilot) and 59% (late-pilot) of respondents stated that their rating was a 7 or higher. Overall, the variable for distance (i.e., accessibility) did not improve substantially from the early stages of the pilot to the late stages of the pilot.

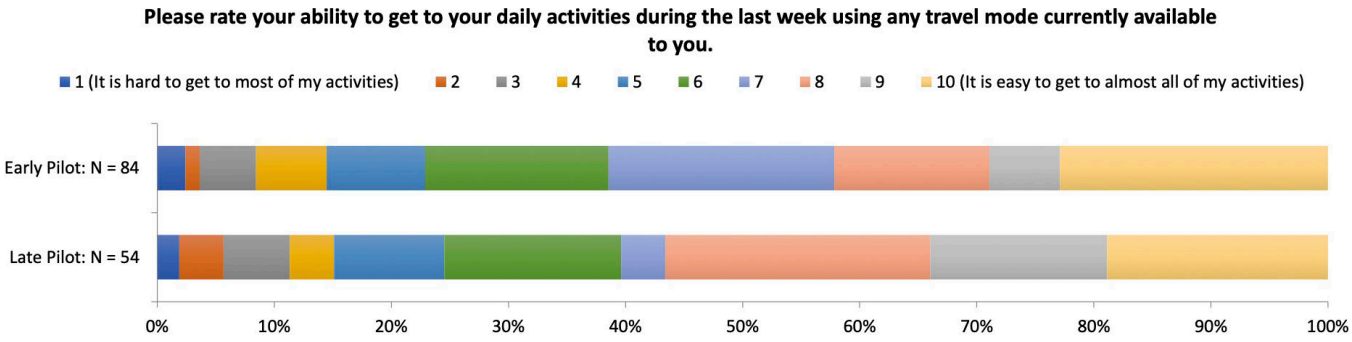


Figure 4-147 *Change in Ability to Get to Daily Activities (Any Mode) – Los Angeles*

Figure 4-148 presents stated accessibility to/from bus stops and rail stations. Respondents rated their accessibility high across all categories, with traveling to the nearest bus stop receiving the highest accessibility ratings.

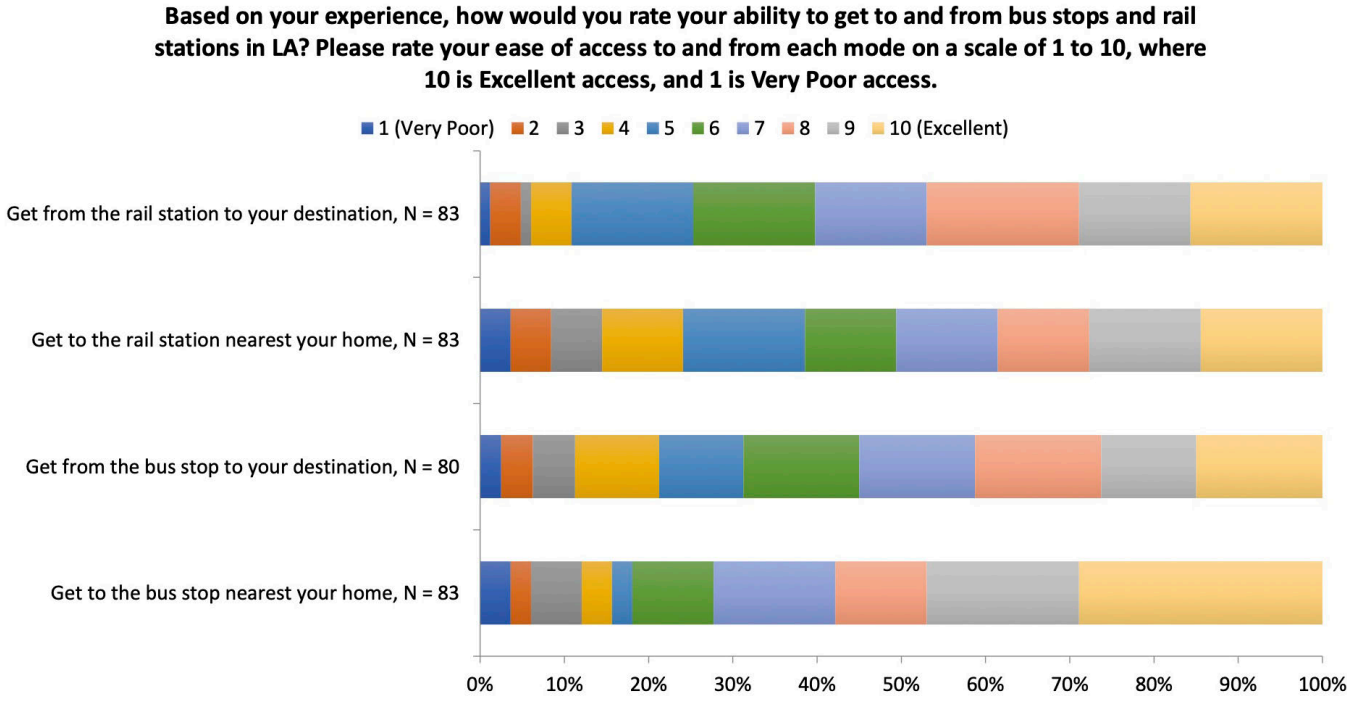


Figure 4-148 *Stated Accessibility TO/FROM Bus Stops and Rail Stations – Los Angeles*

Public Transit Usage

As shown in Figure 4-149, respondents stated the change in their public transit usage as a result of Via Rideshare Service. Across all stations, about 10% of respondents said that their usage significantly increased and 25% said that their usage increased. To the contrary, just 7% said that their usage significantly decreased and 8% noted that usage decreased. The results indicate that people generally increased their public transit usage.

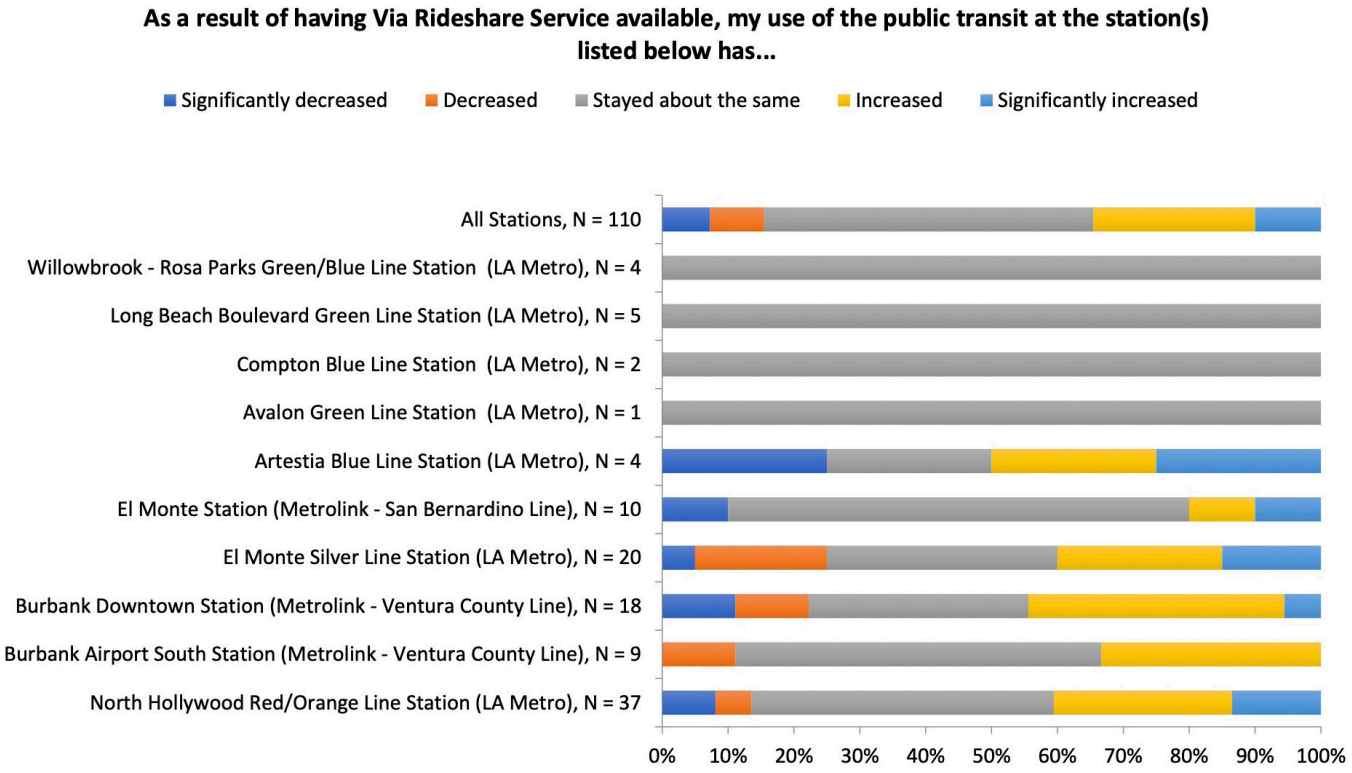


Figure 4-149 *Change in Public Transit Usage at Rail Stations Due to Via Rideshare Service – Los Angeles*

Conclusions

Perceived accessibility to get to daily activities between the early- and late-pilot surveys did not change substantially. Although accessibility measures were high traveling to/from bus stops and rail stations, a measure prior to the pilot was not taken. Public transit usage generally increased as a result of Via Rideshare Service, giving users more destination options across a wider geographic area compared to most (but not all) other modes. Trip distances showed distributions with lower bounds close to 0 and upper bounds of 9.5 miles covering the zones. Although these distributions show the station-specific performance the system, an assessment of the change in distances (if any) was not possible given that

there was no data on distances traveled prior to the project. Given the range of distances traveled and the confined nature of the zones, it is perhaps unlikely that these distances would have changed much. Nonetheless, the results are inconclusive with respect to addressing the hypothesis.

Puget Sound

Distributions of Trip Distances – Puget Sound

As with Los Angeles, data on the distances of trips to and from participating stations within Puget Sound region were evaluated by station. Data was not available on distances traveled by users prior to the project. The distribution of the trip distances are shown in Figure 4-150.

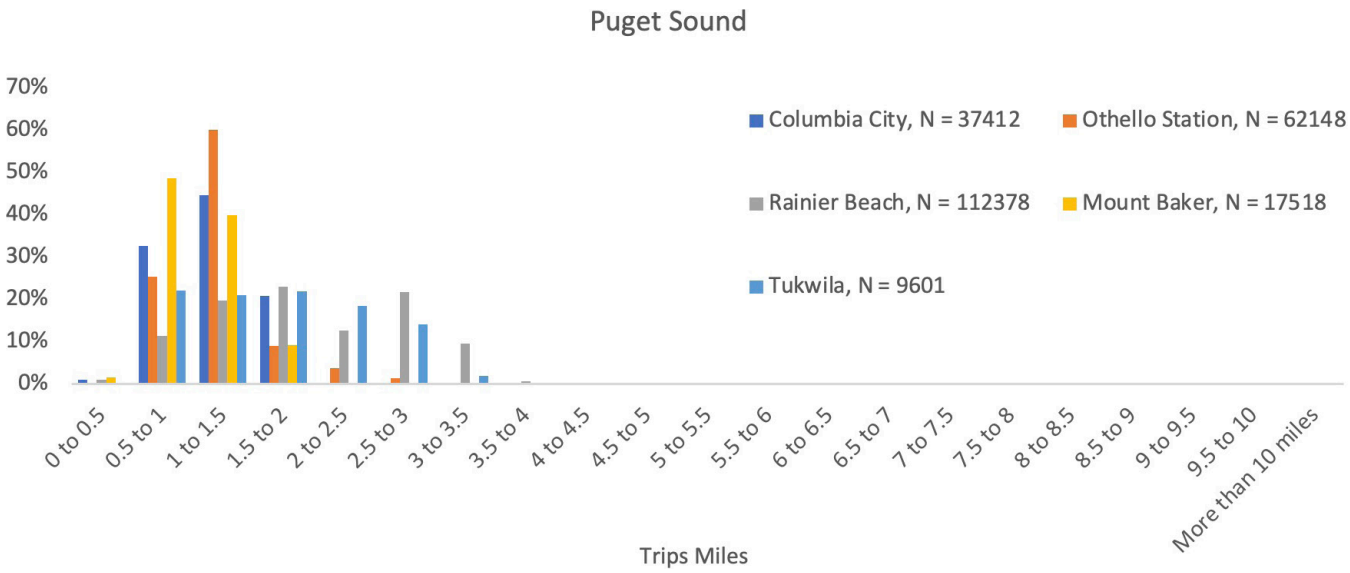


Figure 4-150 *Distribution of Trip Distances in Puget Sound*

The distribution of trip distances shows that the vast majority of trips within the zones were within two miles. Overall, the spread of trip distances with Puget Sound was tighter than those observed in Los Angeles, which was due to relative sizes of the zones. The average ride distance was 1.58 miles across all trips. Each of the zones had only one station, and average distances ranged from 1.06 miles within the Mount Baker zone to 1.73 miles within the Tukwila zone.

Perceived Accessibility

Figure 4-151 presents the perceived accessibility to get to daily activities of respondents during the early- and late-pilot surveys. Although a significant number of respondents reported high levels of accessibility at both pilot time periods, the level of accessibility did not increase notably between the early-

and late-pilots. The results provide inconclusive evidence that geographical spread in travel increased. Figure 4-152 presents stated accessibility to/from bus stops and rail stations within the Puget Sound region (including those not part of the pilot). While ratings of accessibility were high (especially for getting to the bus stop nearest to home location), the question failed to determine accessibility before the pilot.

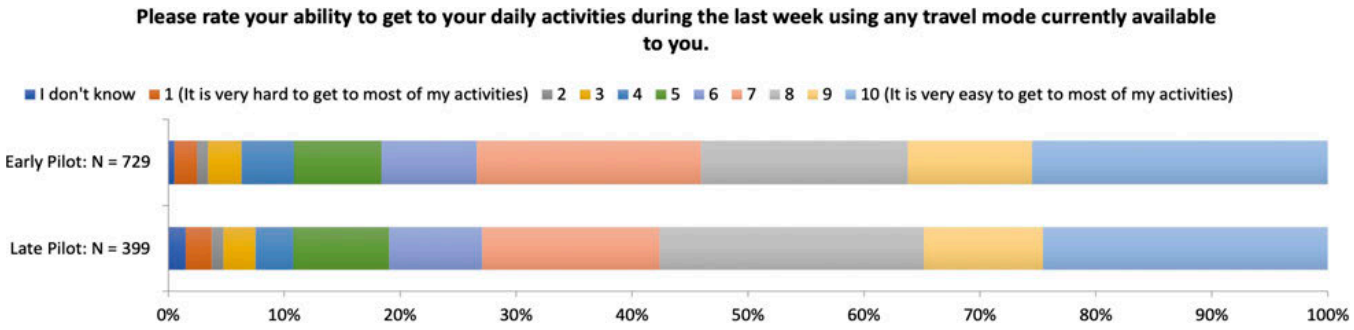


Figure 4-151 *Change in Ability to Get to Daily Activities (Any Mode) – Puget Sound*

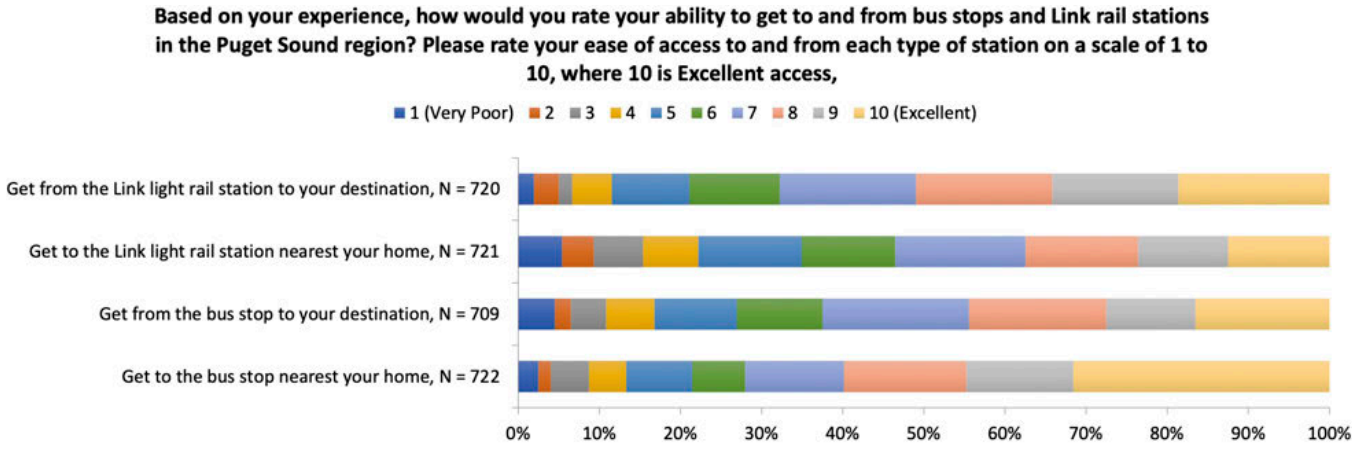


Figure 4-152 *Stated Accessibility TO/FROM Bus Stops and Rail Stations – Puget Sound*

Public Transit Usage

In Figure 4-153, respondents stated their change in public transit usage as a result of Via to Transit. Across all stations, about 9% and 20% of respondents said that their usage significantly increased or increased, respectively. On the other hand, about 5% and 6% of respondents stated that usage significantly decreased or decreased, respectively. Rainier Beach Station and Columbia City Station experienced the largest increases in public transit usage due to Via to Transit.

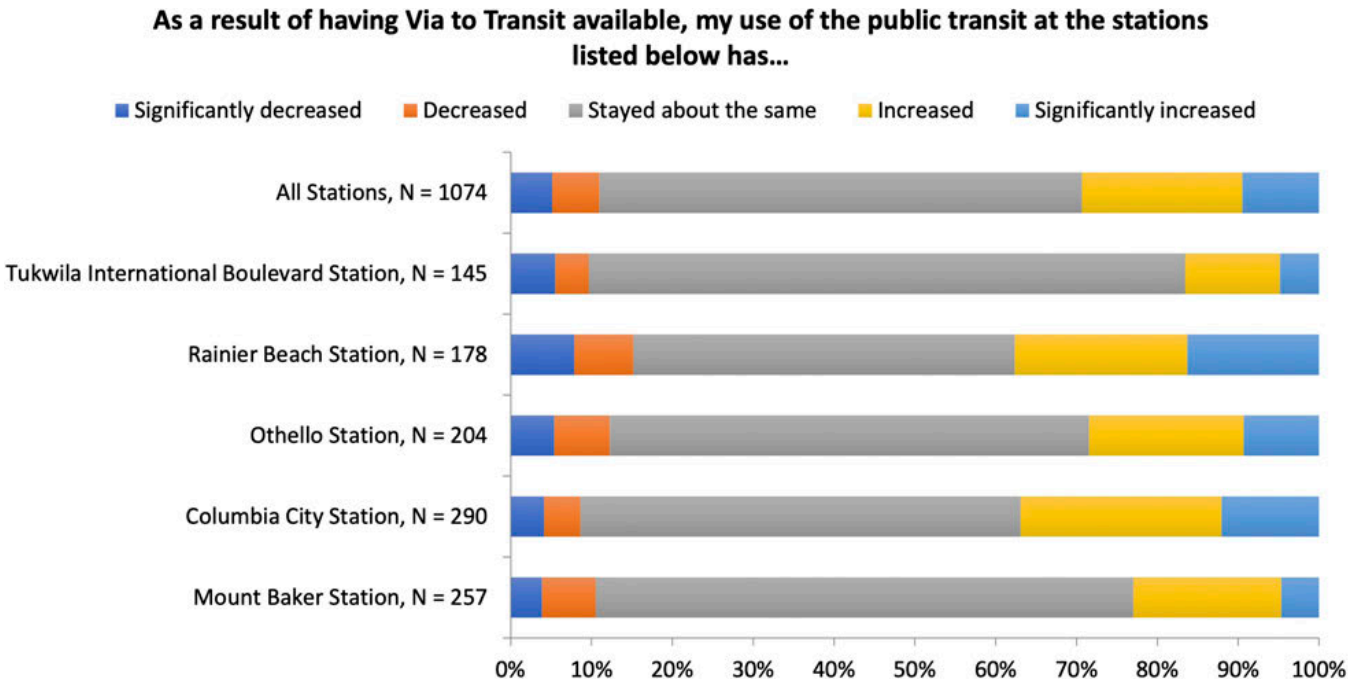


Figure 4-153 *Change in Public Transit Usage at Rail Stations Due to Via to Transit – Puget Sound*

Satisfaction with Via to Transit

Several questions were asked related to the satisfaction that individuals had with Via to Transit. Two questions were related to geography – the size and boundaries of the service area and the connecting transit hubs. In Figure 4-154, respondents were highly satisfied with these elements.

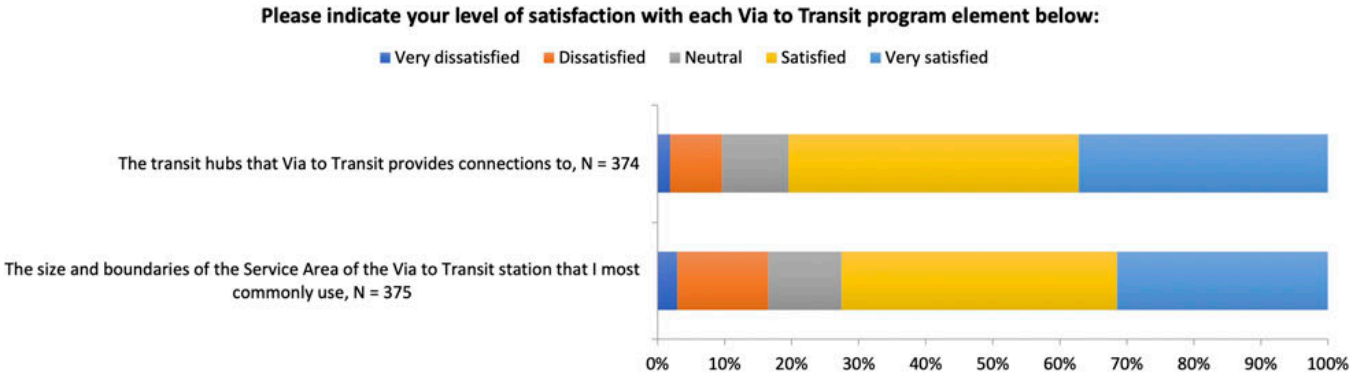


Figure 4-154 *Satisfaction of Via to Transit Program Elements – Puget Sound*

Conclusions

While perceived accessibility was high, overall there was limited information available on the degree to which the project increased the geographic spread of user destinations. Information before the pilot and the minimal change between the early- and late-pilot surveys led to inconclusive support for Hypothesis 11. Public transit usage generally increased as a result of Via to Transit. Satisfaction with geographic elements yielded inconclusive support. In addition, the distribution of trip distances showed a tight range of distances traveled by system yields. As with the analysis of Los Angeles data, there is limited rationale to believe that such distances would have spread much given the nature of the project. But a lack of data prevents the confirmation of this likelihood.

Conclusion – Overall

Collectively, the findings in Los Angeles and the Puget Sound region yields inconclusive results for Hypothesis 11.

Hypothesis 12: The average velocity per dollar spent to access and egress the station is competitive with public transit.

Performance Metric	Key Finding – Los Angeles	Key Finding – Puget Sound
Average Trip Velocity / (Fare ($) +1)	The system in the Los Angeles region was found to provide mobility at a cost-effectiveness that was equal to or competitive with a typical city bus.	The system in the Puget Sound region was found to provide mobility at a cost-effectiveness equal to or competitive with a typical city bus.

The analysis evaluating Hypothesis 12 explored the user cost efficiency of mobility to and from stations through the project. The analysis applied a translation of the average velocity per fare dollar to serve as a metric developed to evaluate how cost-effective velocity was delivered to users by the project relative to fixed route alternatives. The metric applied in this analysis was:

$$\frac{Average\ Trip\ Velocity\ (mph)}{(Fare\ (\$) + 1)}$$

This Velocity Cost-Effectiveness Metric (VCEM) increases with speed and declines with increasing fare. A value of 1 is added to fare to allow the metric to be computable for trips that have free fare. This value also bounds the maximum of the metric to be the average trip velocity. A trip that is fast and inexpensive is more cost-effective than a trip that is slow and expensive. As with any metric, there are limits to its interpretation. This particular version of the metric does not account for the distance traveled, nor the comfort or safety of the trip. It is a measure of the cost-effectiveness of the average speed of travel provided. For trips of similar distance, it can serve as a general measure of cost effectiveness of movement as faced by the user. This latter point is important

as related to the user; the metric pertains to what the user pays and can be influenced by policies that subsidize the trip. The metric does not provide much insight as to the cost of delivery of the service.

The analysis involved computing the average velocity for each trip along with the associated fare and translation. The average of these metrics are plotted over the course of the deployment. The comparison of the metric is conducted against an average velocity of public transit buses for the project area.[10] The analysis evaluates how fast an average bus would have to deliver mobility (at current fares) in order to deliver comparable service.

Los Angeles

Velocity Cost-Effectiveness Analysis

Figure 4-155 shows a plot of the calculated VCEM over the course of the project from Via FMLM trips. The data was cleaned to extract any trips that had recorded zero velocity and any trips over 45 mph, since such trips would generally exceed the legal speed limits in the region in service. The velocity was calculated as a distance divided by the travel time. The trend over the project is relatively level, with a slight downward slope. The fare paid by system users was $1.75 per trip. However, many trips were offered at zero cost, and the trend reflects the collection of all fares paid by users. To serve as a comparison, a similar metric is generated for local bus trips. This is done with an assumption of average bus speed along with the existing fare charged in the region. The flat line below shows the VCEM metric at the average speed of 11mph with the standard bus fare of $1.75. Once it stabilized, the VCEM metric stayed relatively flat for much of the pilot period. However, it rose notably from February 2020 to April 2020. These were lockdown months of the early COVID-19 pandemic response. The lockdowns removed a considerable amount of competing traffic, leading to higher velocities, which would raise the VCEM given no changes in fare.

[10] https://transfersmagazine.org/2019/06/10/bus-speed-los-angeles/.

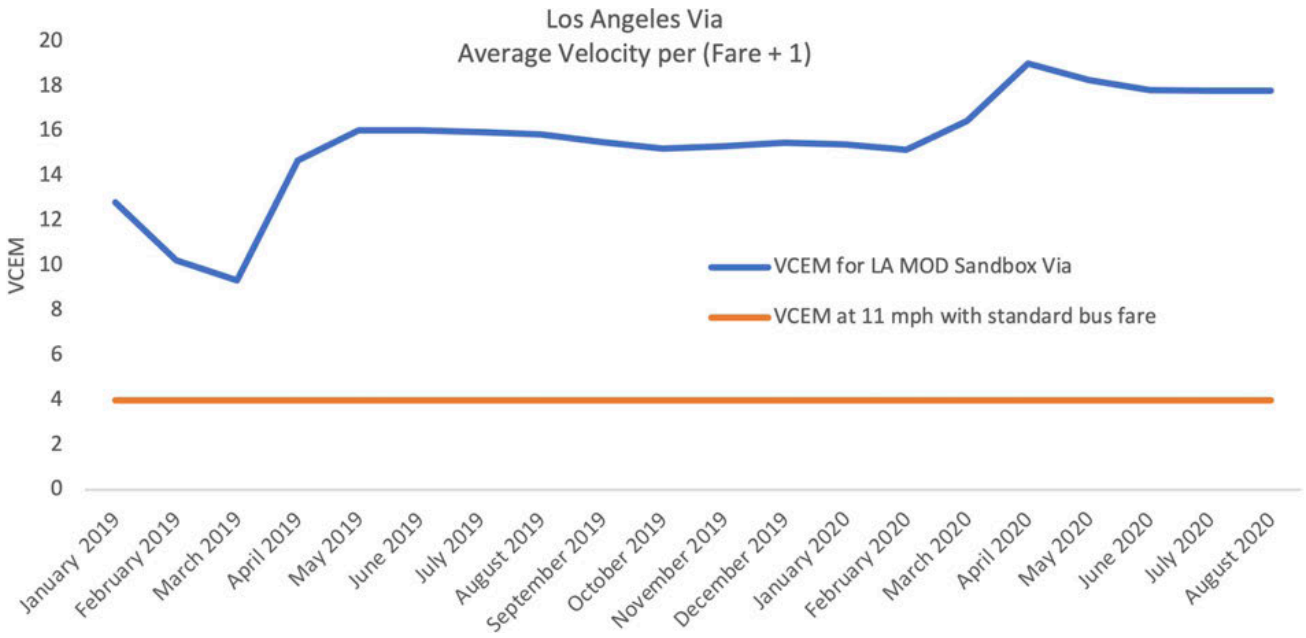


Figure 4-155 *Velocity Cost-Effectiveness Metric for Los Angeles Via Rideshare Service*

Conclusions

Figure 4-155 suggests that the project delivered mobility (average velocity, in this case) at a cost efficiency that was better than a standard public transit bus. Part of the advantage that Via had was that it was delivering trips at zero user cost. Had the costs been the same, Via would have been delivering comparable mobility to a public bus trip that traveled on average 11 mph. Overall, the performance of Via in delivering users cost effective mobility was found to be competitive with public transit. The results lend support for Hypothesis 12.

Puget Sound

Velocity Cost-Effectiveness Analysis – Puget Sound

The same metric was calculated for the Puget Sound deployment of FMLM service by Via in the pilot. The results of that calculation are shown in Figure 4-156, which shows the trend in the same VCEM metric as was calculated in Figure 4-155. The fare for King County Metro buses is $2.75. The higher fare relative to Los Angeles produces lower VCEM values within Puget Sound (as the denominator is higher than in LA). The rapid rise in the metric occurs when the fare was made free in Puget Sound at the start of the pandemic.

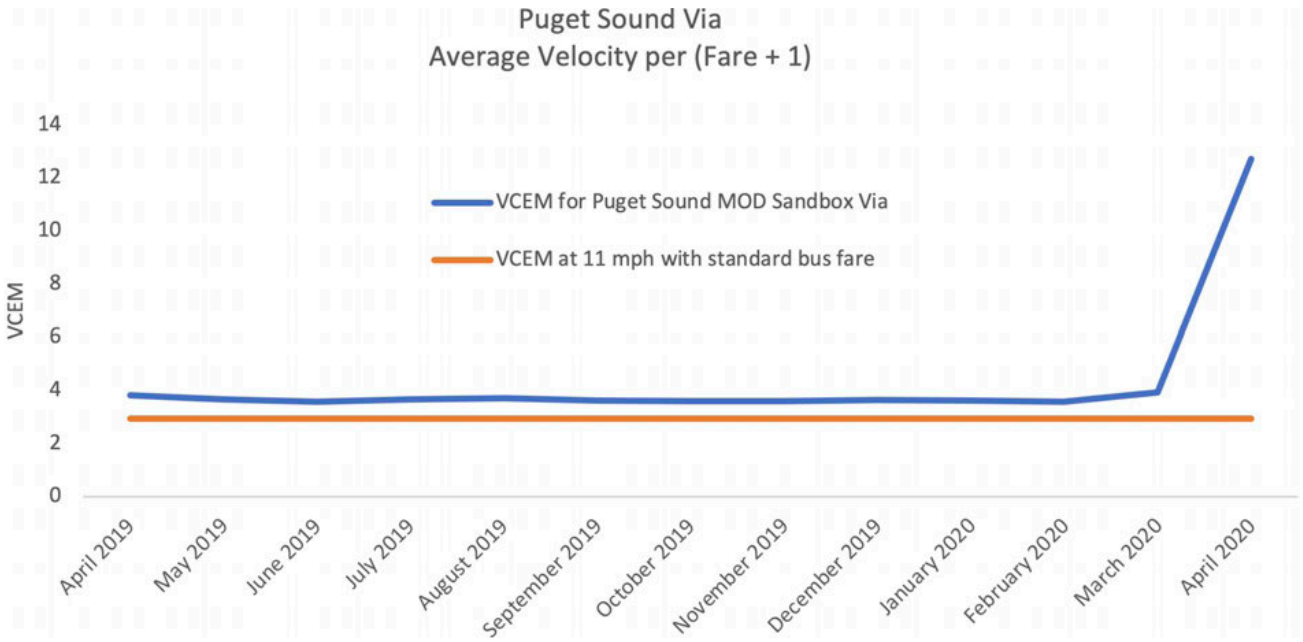


Figure 4-156 *Velocity Cost-Effectiveness Metric for Puget Sound Via to Transit*

Conclusions

The results of the VCEM calculations for Puget Sound suggests that Via to Transit delivered mobility that was cost-effective relative to that which was delivered by a public transit bus. Because trips within the Puget Sound region were not provided at a similar discount as that in Los Angeles, the separation in performance in smaller. However, the cost-effectiveness metrics calculated in this suggest that it was still cost-effective to users in delivering mobility within the region, supporting Hypothesis 12 for the region.

Conclusion – Overall

Primarily because of the free fares provided, the results were stronger in Los Angeles relative to the Puget Sound. However, the analysis within both the Los Angeles and Puget Sound region suggest that Hypothesis 12 was supported.

Hypothesis 13: The project produces a series of lessons learned that will be documented through expert interviews with project stakeholders.

Performance Metric	Key Finding – Los Angeles	Key Finding – Puget Sound
Lessons learned from the project	LA partners believed their demonstration was a success and continue to work on challenges associated with maintaining and expanding similarly designed deployments.	Puget Sound partners believed their demonstration was a success and continue to work on challenges associated with maintaining and expanding similarly designed deployments.

The evaluation team interviewed members of the Los Angeles and Puget Sound MOD Sandbox Demonstration team to better understand challenges, barriers, successes, and broader lessons learned from the implementation of the project. Interviews were conducted with representatives of LA Metro, Sound Transit, King County Metro, and Via. Section 5 provides a synthesis of those interviews and the findings related to Hypothesis 13.

Wait and Travel Time Comparisons of WAV Trips and Non-WAV Trips

The evaluation explored a comparison of wait times and travel times of FMLM trips provided to ambulatory and non-ambulatory passengers through the First and Last Mile Partnership with Via demonstration in Los Angeles County and the Puget Sound region. Trip-based activity data was used to evaluate the distribution of both wait and travel times for both WAV and non-WAV trips. The evaluation compared the general distributions of these wait and travel times within both regions. In contrast to the evaluation of Hypothesis 8, this analysis used activity data and draws comparisons between WAV and non-WAV travel. In addition, survey data regarding key questions assessing perceptions of wait and travel time are analyzed comparatively across persons with (who may be ambulatory) and without disabilities.

Los Angeles

Wait Times

Figure 4-157 shows the comparison of distributions of wait times for users of Via Rideshare Service in the Los Angeles region for WAV and non-WAV trips. The comparison shows that the distribution of wait times for non-WAV trips had a peak in frequency (mode) of 8 minutes with a long tail consistent with the general shape of a Chi-squared distribution. The distribution of wait times for WAV trips was generally of a different shape. The mode of the distribution was remarkably at 0 to 1 minutes, with a relative uniform distribution of wait times from 2 to 20 minutes. The 2nd highest frequency was the 30 or more minutes. The bi-modal nature of the distribution suggests that the system was able

to execute some pre-positioning of vehicles for certain trips while also being subject to some supply delivery constraints for other trips.

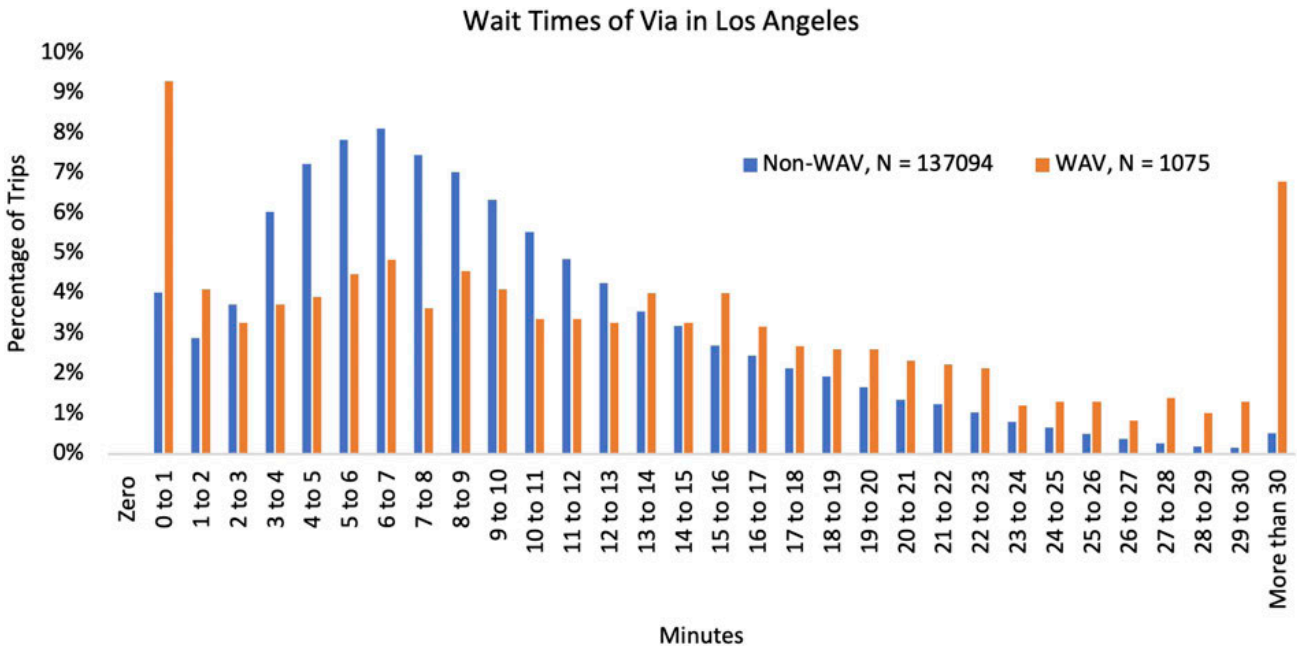


Figure 4-157 *Wait Time Comparison of Via Rideshare Service WAV and Non-WAV Trips in Los Angeles*

Travel Times

Figure 4-158 shows the distributions of travel times for the same trips in Los Angeles. The results show that the travel times registered for non-WAV trips fit a similar distribution as the wait times, peaking with mode of 9 minutes and exhibiting a Chi-squared shape. The distribution of WAV trips exhibits peaks and concentrations at slightly higher travel times, with again a more uniform shape of distribution.

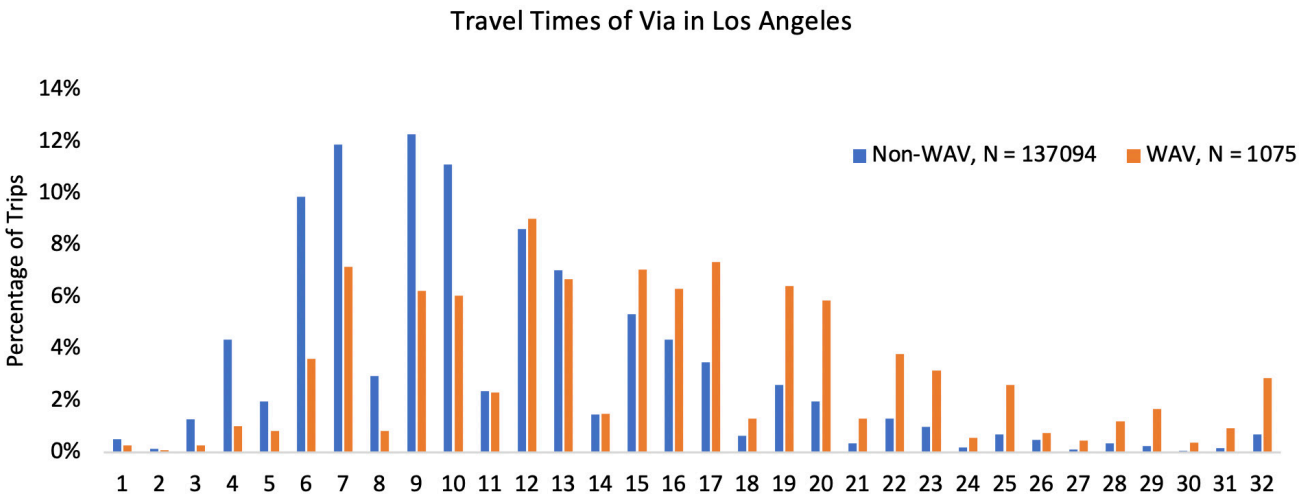


Figure 4-158 *Travel Time Comparison of Via Rideshare Service WAV and Non-WAV Trips in Los Angeles*

Perceived Average Wait Times

Data from the surveys was used to evaluate questions that assessed the impact for travel and wait times for persons with and without disabilities. Respondents were classified into each subsample using questions that defined whether the respondent used a wheelchair and/or had other disabilities that prevented them from driving a vehicle themselves. Figures 4-159 and 4-160 display change in average perceived wait time for FMLM trips to participating stations due to Via Rideshare Service for persons with disabilities (related to mobility, see Hypothesis 8 above that discusses this designation) and persons without disabilities, respectively. The percentage of those who experienced a decrease in wait time to stations was similar between the two groups. However, a higher proportion of persons with disabilities experienced increases in average wait times than persons without disabilities.

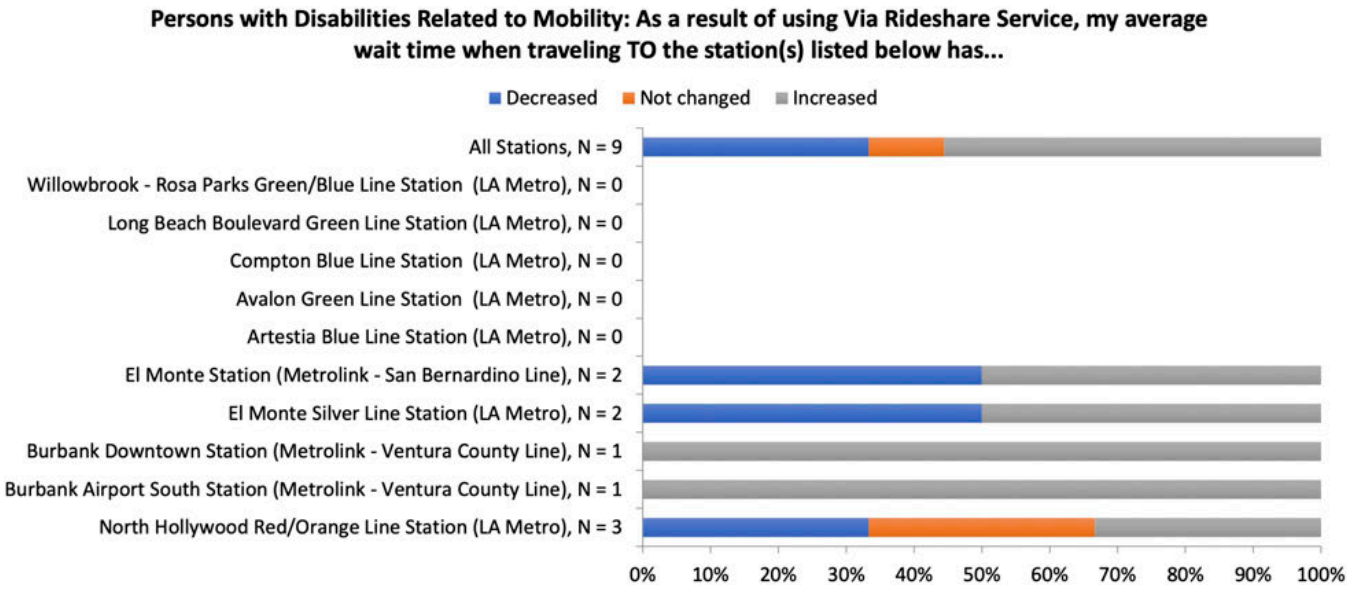


Figure 4-159 *Persons with Disabilities Related to Mobility – Change in Average Wait Time TO Stations Due to Via – Los Angeles*

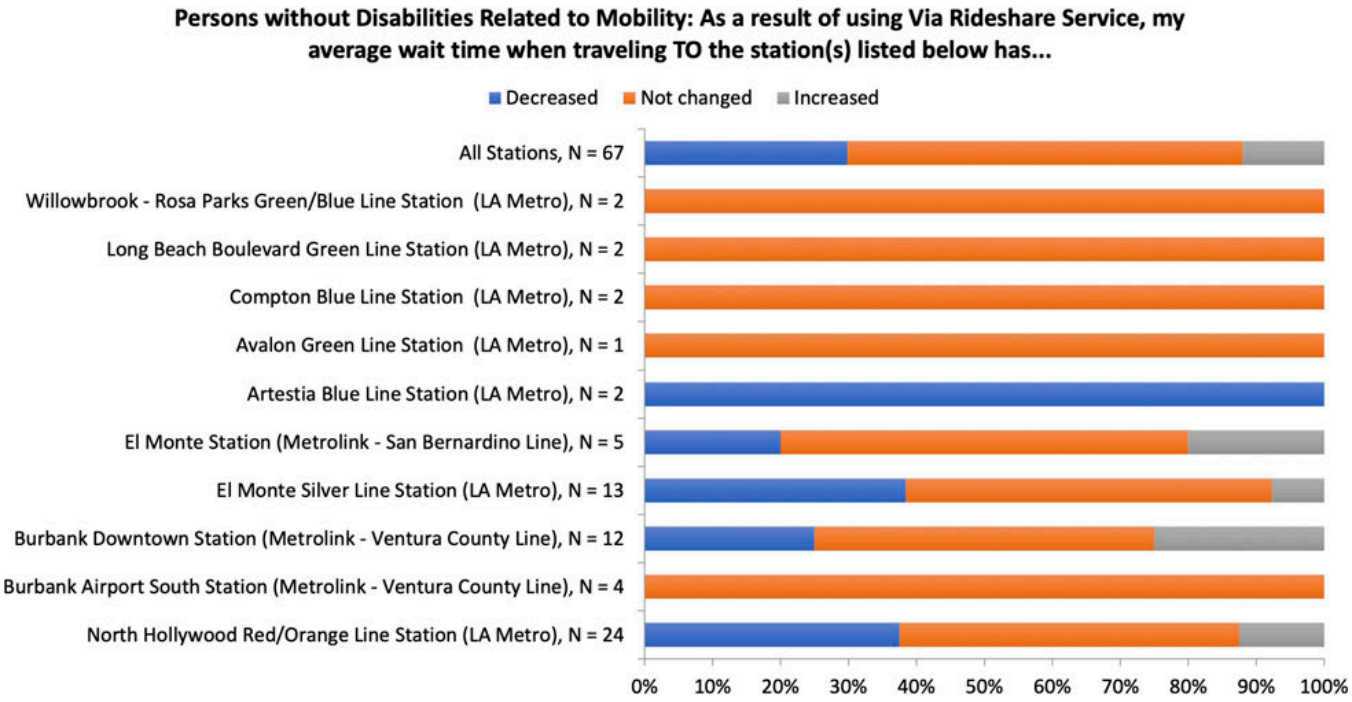


Figure 4-160 *Persons without Disabilities Related to Mobility – Change in Average Wait Time TO Stations Due to Via – Los Angeles*

In Figures 4-161 and 4-162, a similar comparison is provided but for average perceived wait times for FMLM trips from participating stations. Again, both groups experienced similar levels of decreased average wait times. However, a higher proportion of persons with disabilities experienced increases in average wait times than persons without disabilities.

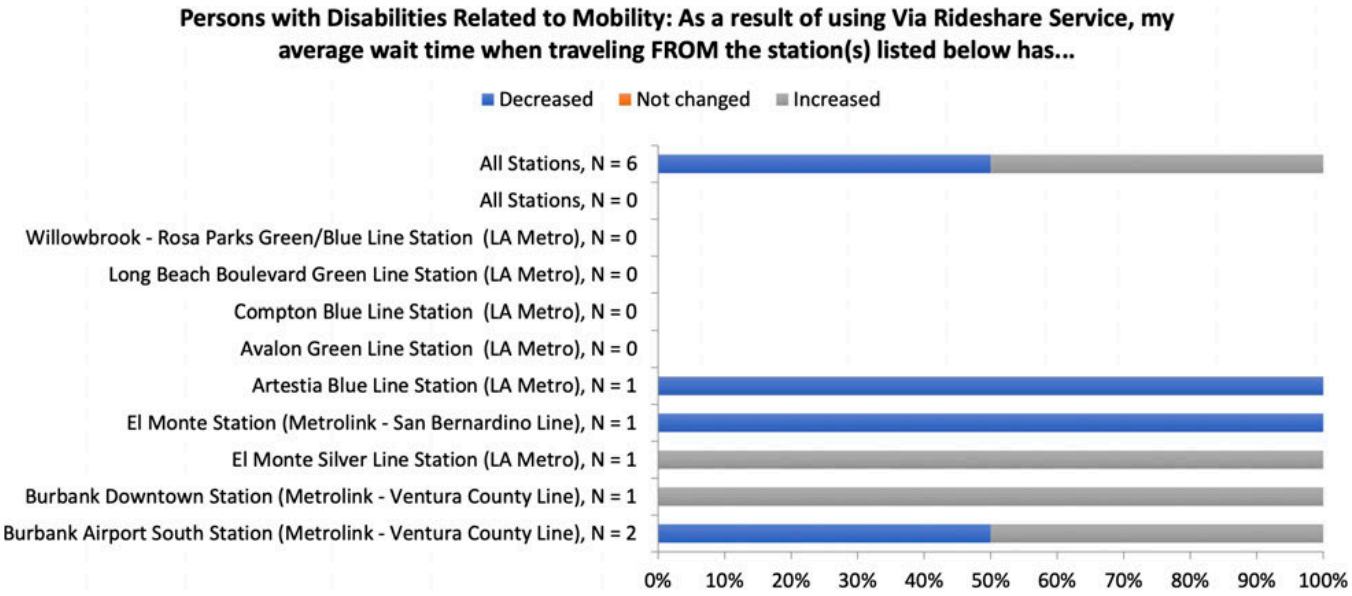


Figure 4-161 *Persons with Disabilities Related to Mobility – Change in Average Wait Time FROM Stations Due to Via – Los Angeles*

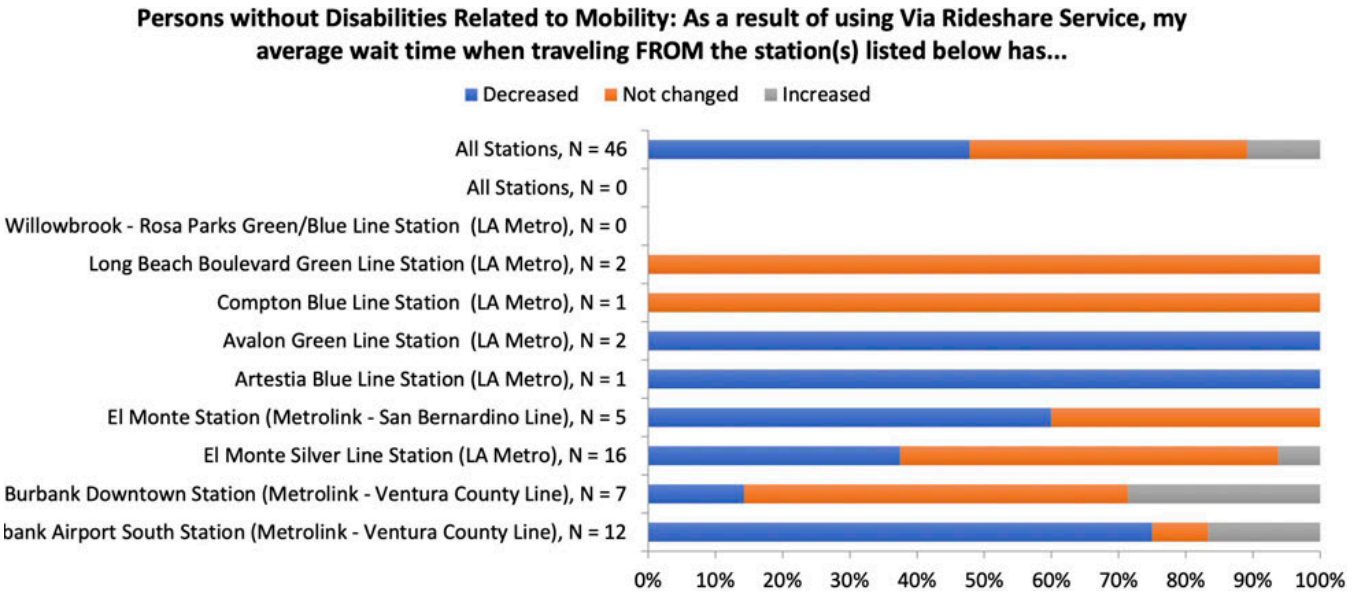


Figure 4-162 *Persons without Disabilities Related to Mobility – Change in Average Wait Time FROM Stations Due to Via – Los Angeles*

Perceived Average Travel Times

Figures 4-163 (persons with disabilities) and 4-164 (persons without disabilities) show change in average perceived travel time to participating stations due to Via Rideshare Service. Persons with disabilities noted a larger decrease in average travel times to stations than persons without disabilities. However, a higher percentage of persons with disabilities also said that their average travel times increased compared to persons without disabilities.

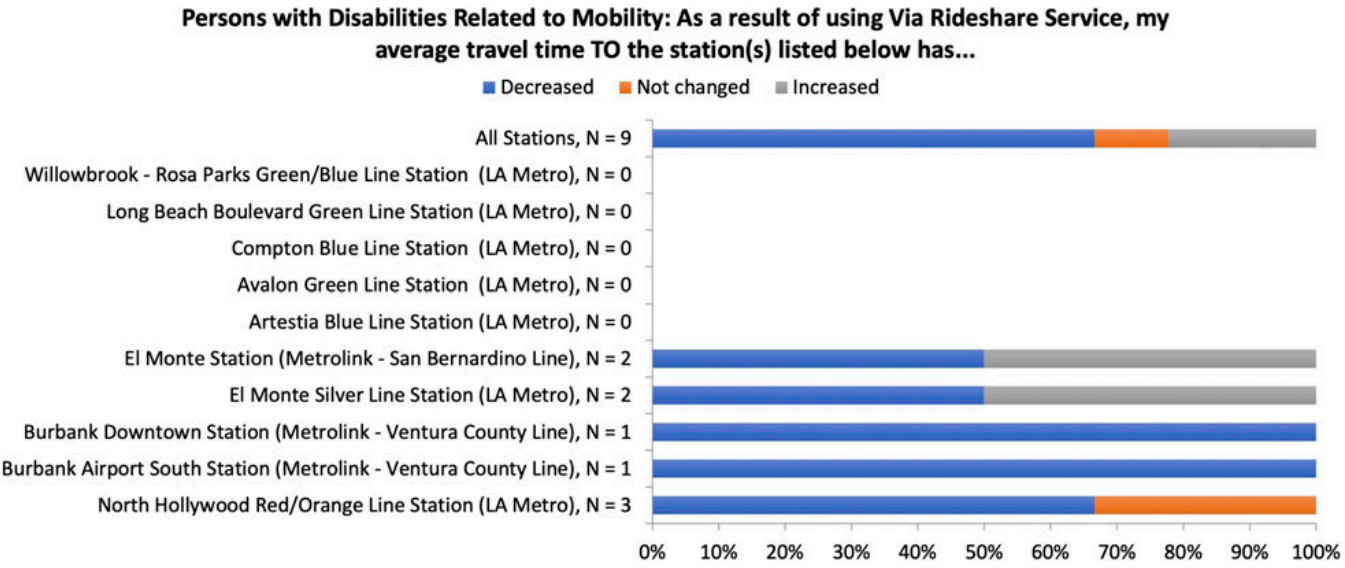


Figure 4-163 *Persons with Disabilities Related to Mobility – Change in Average Travel Time TO Stations Due to Via – Los Angeles*

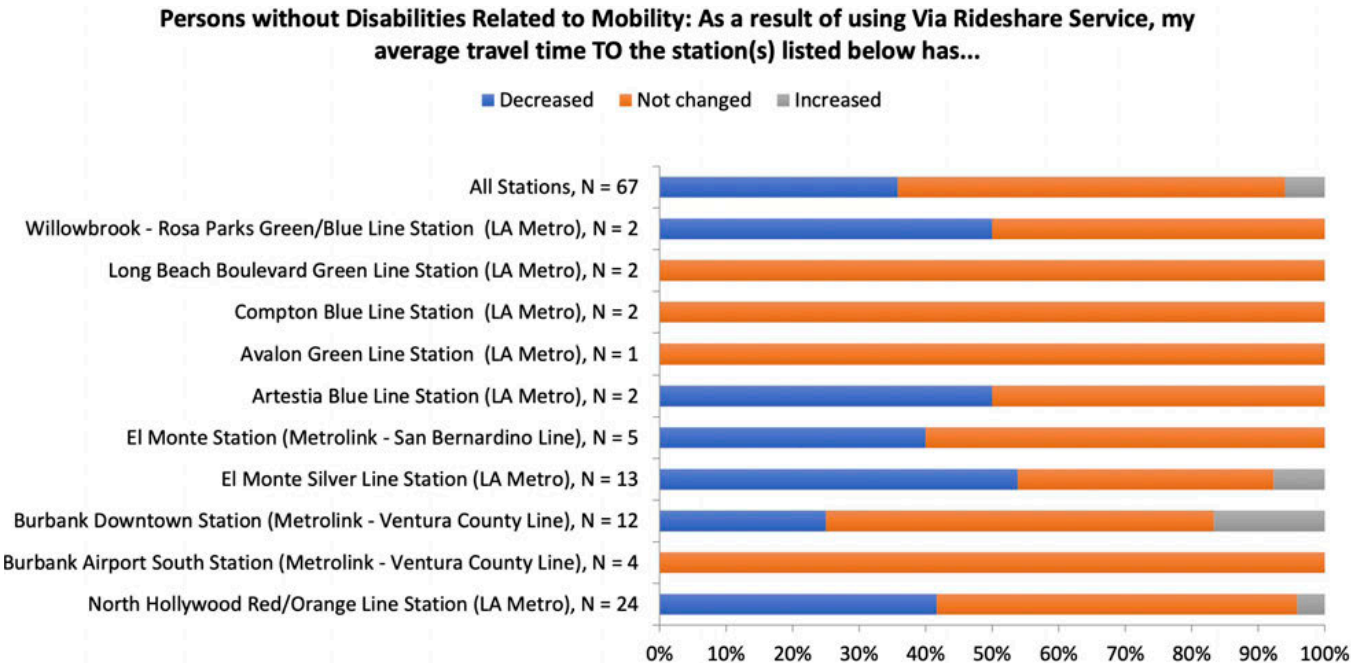


Figure 4-164 *Persons without Disabilities Related to Mobility – Change in Average Travel Time TO Stations Due to Via – Los Angeles*

Figures 4-165 and 4-166 provide the same comparison between persons with/without disabilities but for change in average perceived travel time from participating stations due to Via Rideshare Service. Nearly all respondents with disabilities said that their average travel time decreased, while less than half of respondents without disabilities said the same.

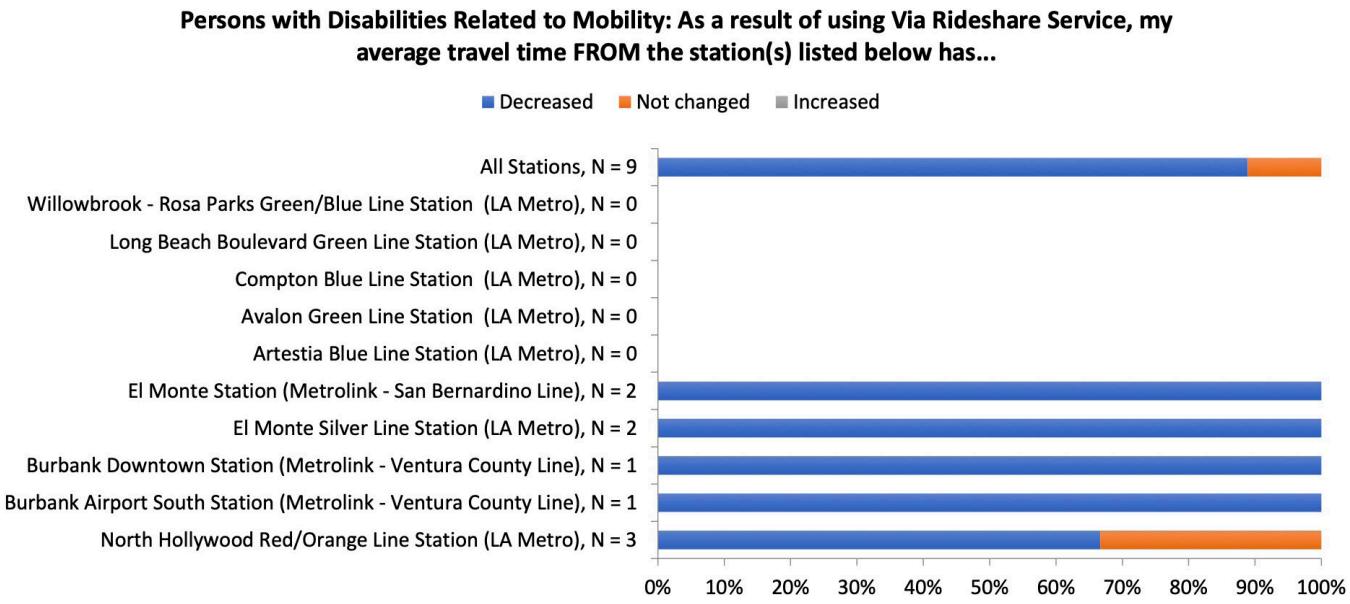


Figure 4-165 *Persons with Disabilities Related to Mobility – Change in Average Travel Time FROM Stations Due to Via – Los Angeles*

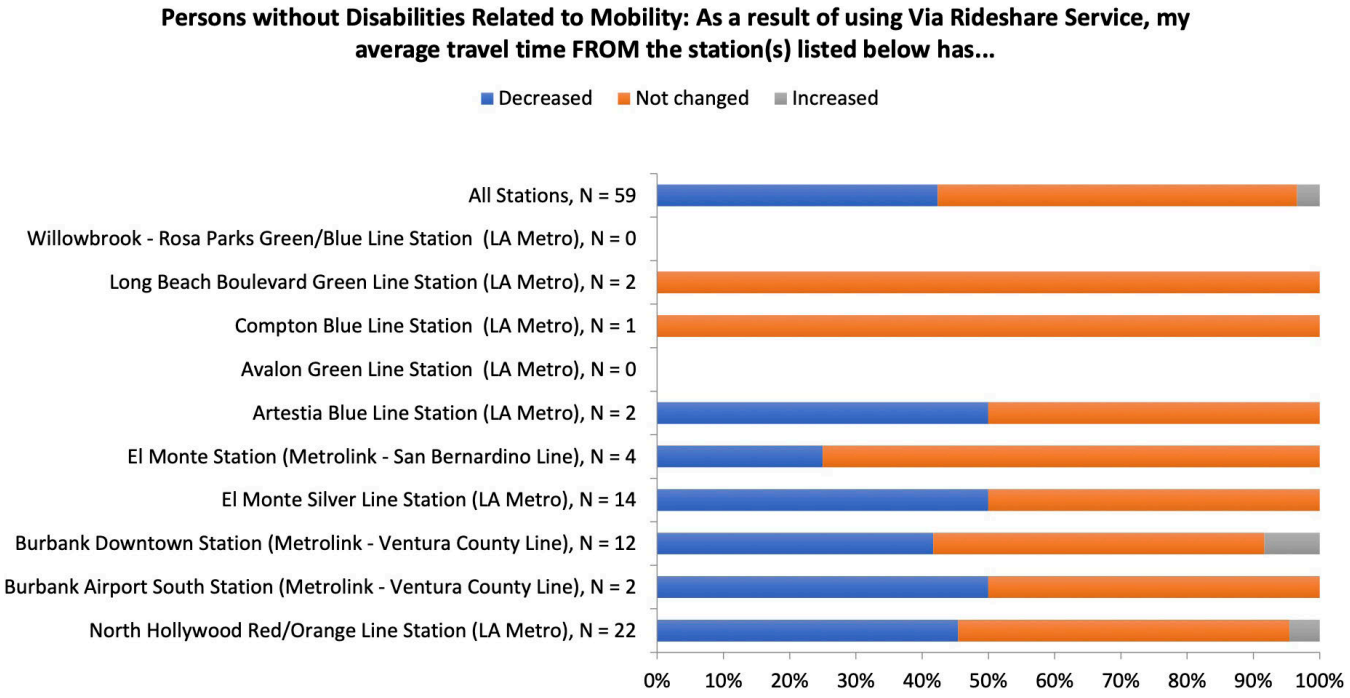


Figure 4-166 *Persons without Disabilities Related to Mobility – Change in Average Travel Time FROM Stations Due to Via – Los Angeles*

Puget Sound

Wait Times

Figure 4-167 shows the distribution of wait times for users of Via to Transit in the Puget Sound region for WAV and non-WAV trips. The comparison suggests that users of WAVs had very similar wait times to those who did not use WAVs. The shape of both WAV and non-WAV distributions fit the same general Chi-squared shape and overlap considerably, suggesting a similarity in service delivery.

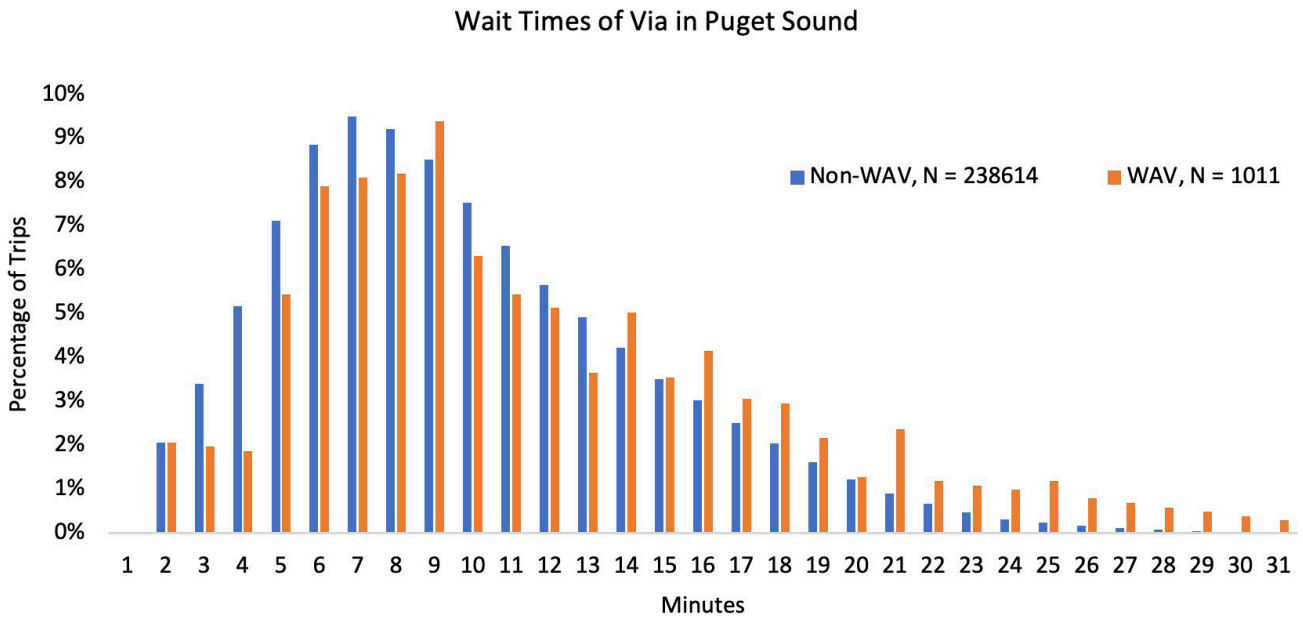


Figure 4-167 *Wait Time Comparison of Via to Transit WAV and non-WAV trips in Puget Sound*

Travel Times

Figure 4-168 shows the comparison of the same trips for travel times. The results also show similarly comparative and overlapping distributions. Average travel times for WAV trips were about the same as non-WAV trips. The comparative wait and travel times suggest that WAV and non-WAV trips had a very similar level of service within the Puget Sound region.

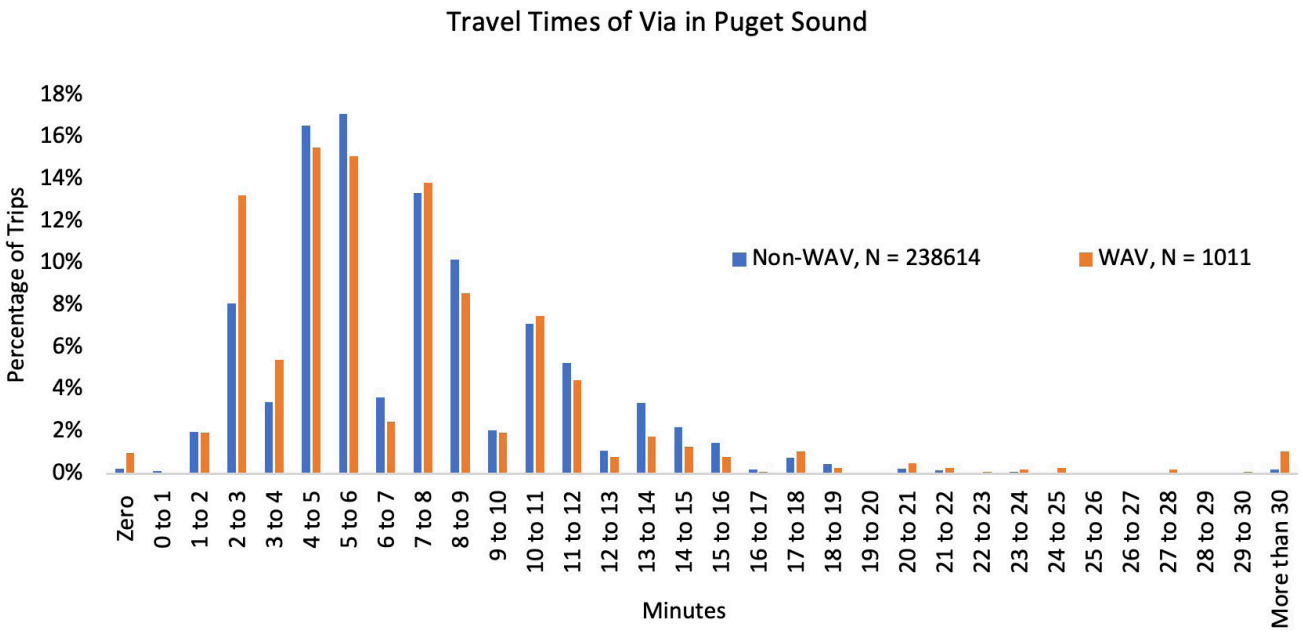


Figure 4-168 *Travel Time Comparison of Via to Transit WAV and non-WAV trips in Puget Sound*

Perceived Average Wait Times

As with Los Angeles, data from the surveys were used to evaluate comparisons of travel and wait times of Via to Transit in the Puget Sound Region for persons with and without disabilities. Figures 4-169 and 4-170 display the change in average perceived wait times for FMLM trips to participating stations due to Via to Transit for persons with disabilities and persons without disabilities, respectively. Persons with disabilities experienced higher decreases in average wait time than persons without disabilities.

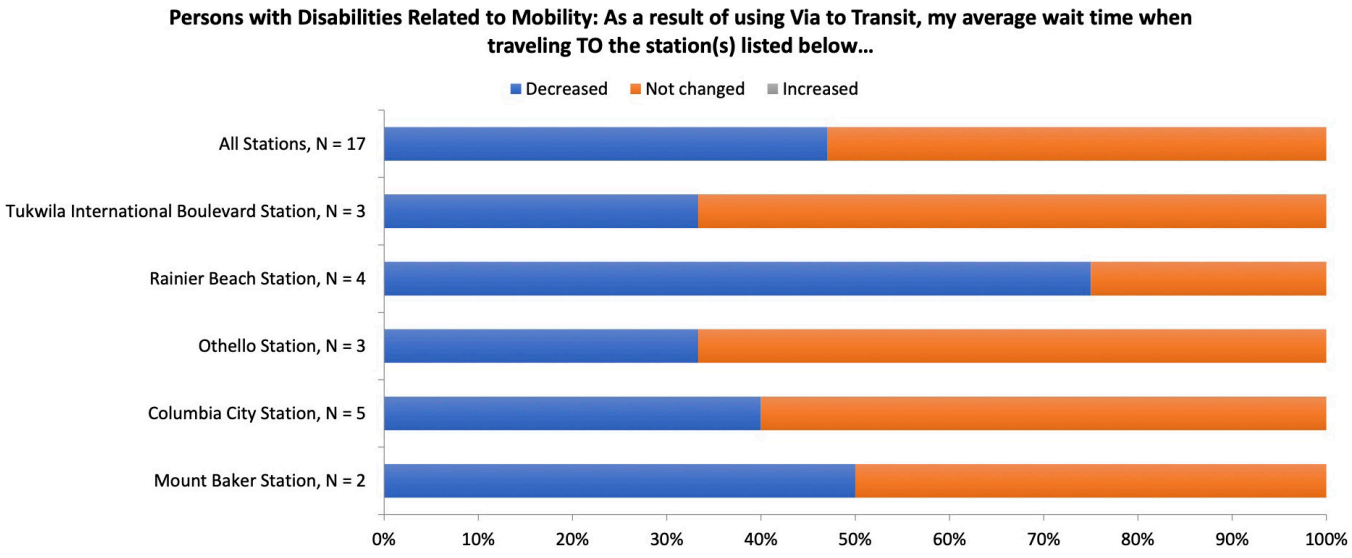


Figure 4-169 *Persons with Disabilities Related to Mobility – Change in Average Wait Time TO Stations Due to Via – Puget Sound*

Figure 4-170 Persons without Disabilities Related to Mobility – Change in Average Wait Time TO Stations Due to Via – Puget Sound

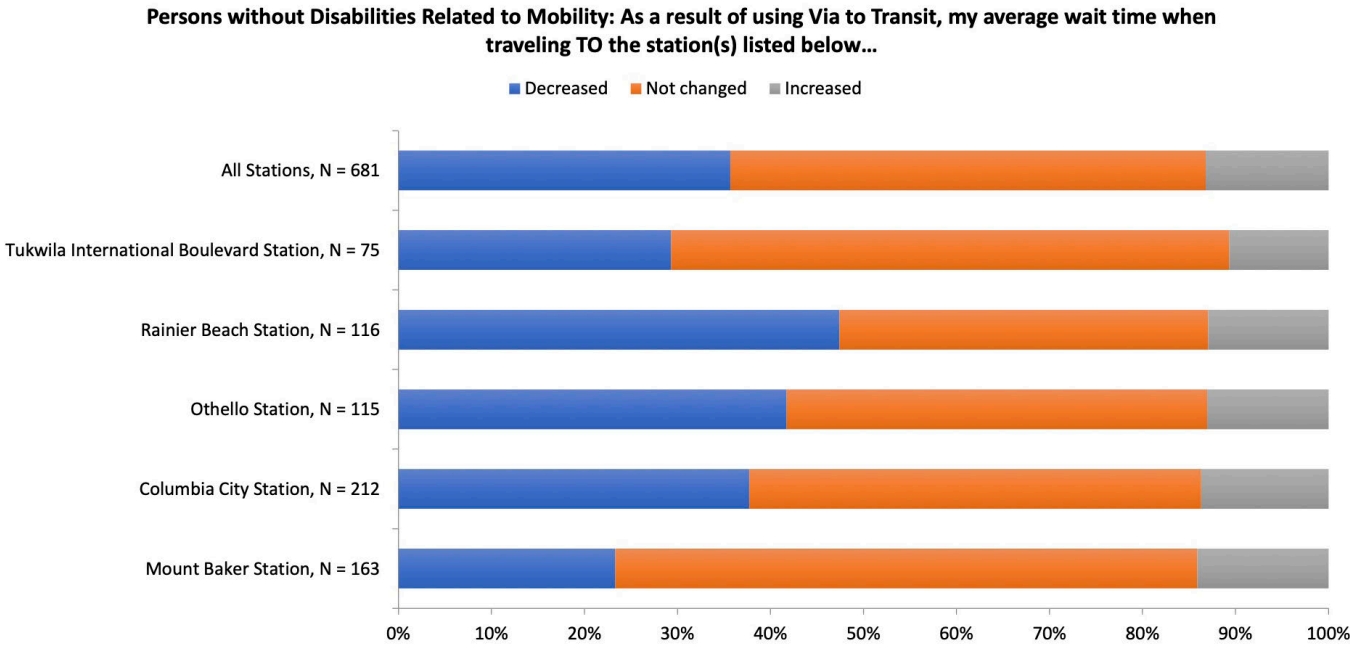


Figure 4-170 *Persons without Disabilities Related to Mobility – Change in Average Wait Time TO Stations Due to Via – Puget Sound*

Similarly, Figures 4-171 and 4-172 display change in average perceived wait times for FMLM trips from participating stations due to Via to Transit for persons with disabilities and persons without disabilities, respectively. The results indicate that persons with disabilities experienced greater improvements in average wait time as a result of Via to Transit, compared to persons without disabilities.

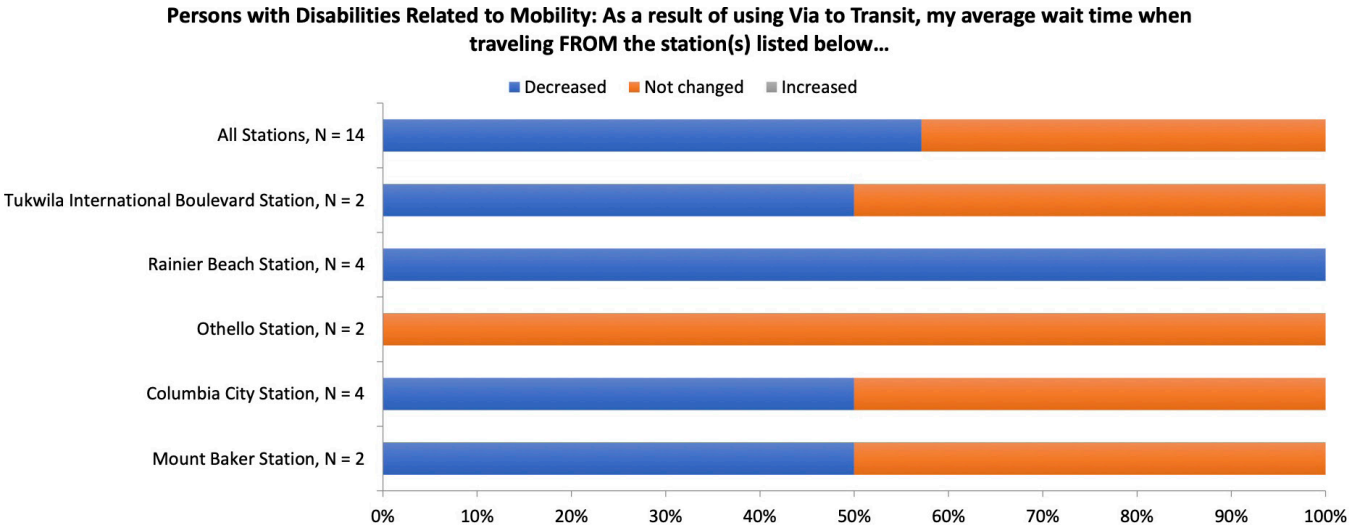


Figure 4-171 *Persons with Disabilities Related to Mobility – Change in Average Wait Time FROM Stations Due to Via – Puget Sound*

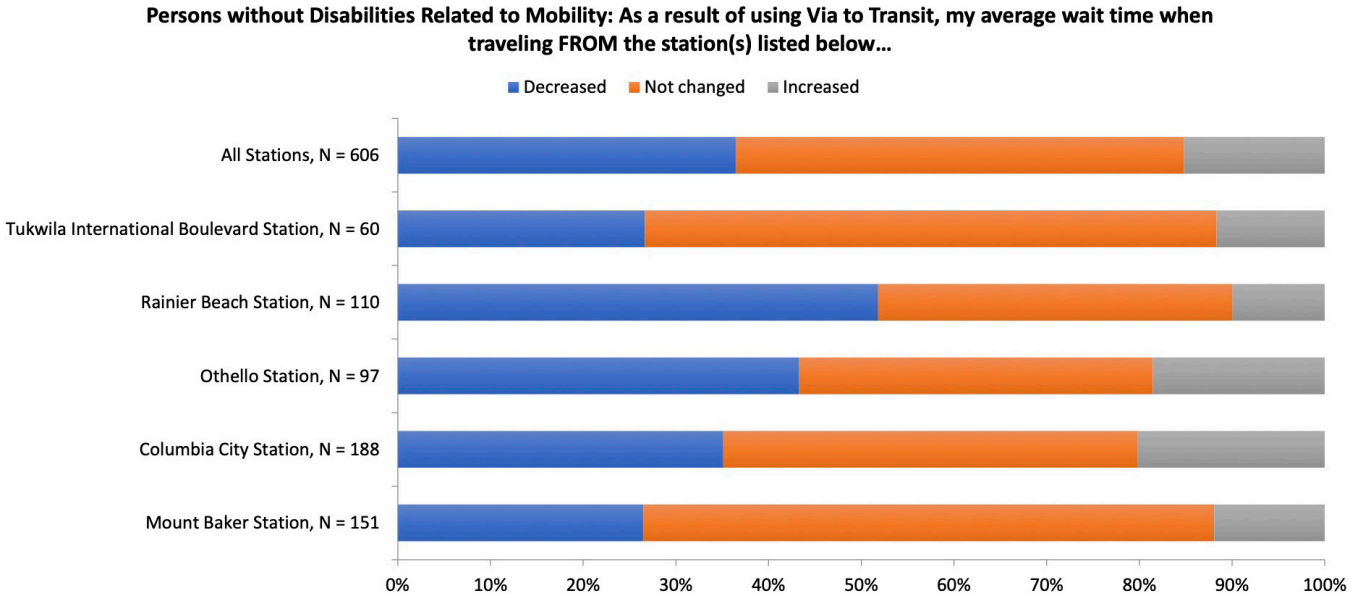


Figure 4-172 *Persons without Disabilities Related to Mobility – Change in Average Wait Time FROM Stations Due to Via – Puget Sound*

Perceived Average Travel Times

Figures 4-173 and 4-174 display change in average perceived travel times to participating stations due to Via to Transit for persons with/without disabilities, respectively. A slightly higher percentage of persons with disabilities experienced improvements in average travel time to stations than persons without disabilities.

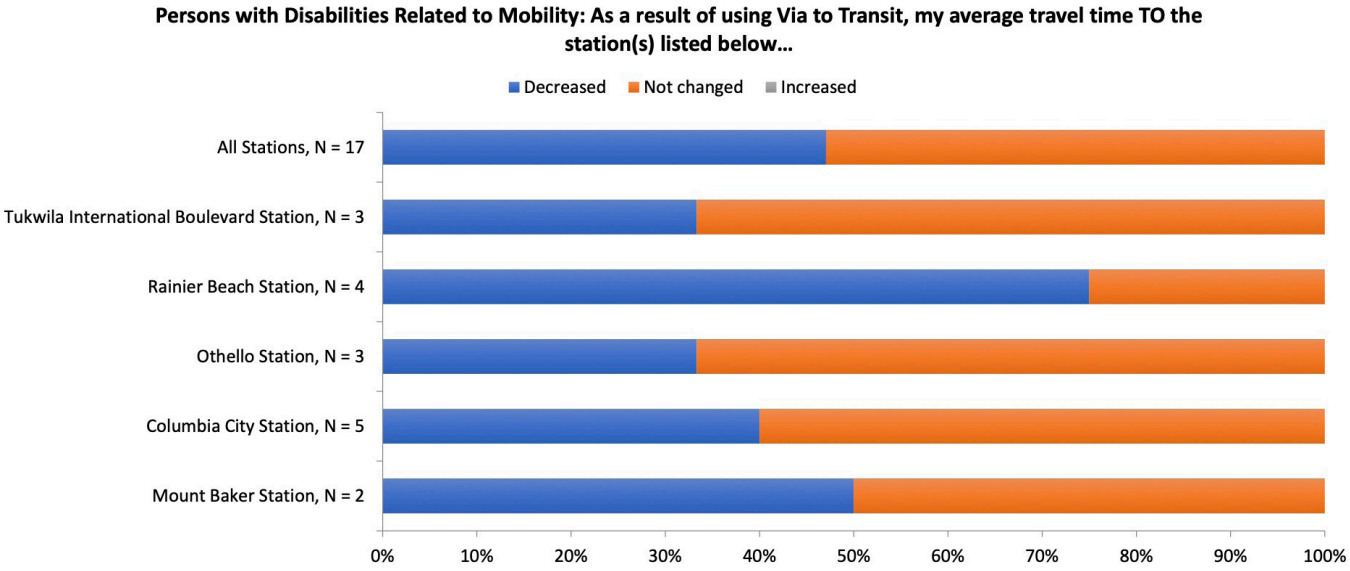


Figure 4-173 *Persons with Disabilities Related to Mobility – Change in Average Travel Time TO Stations Due to Via – Puget Sound*

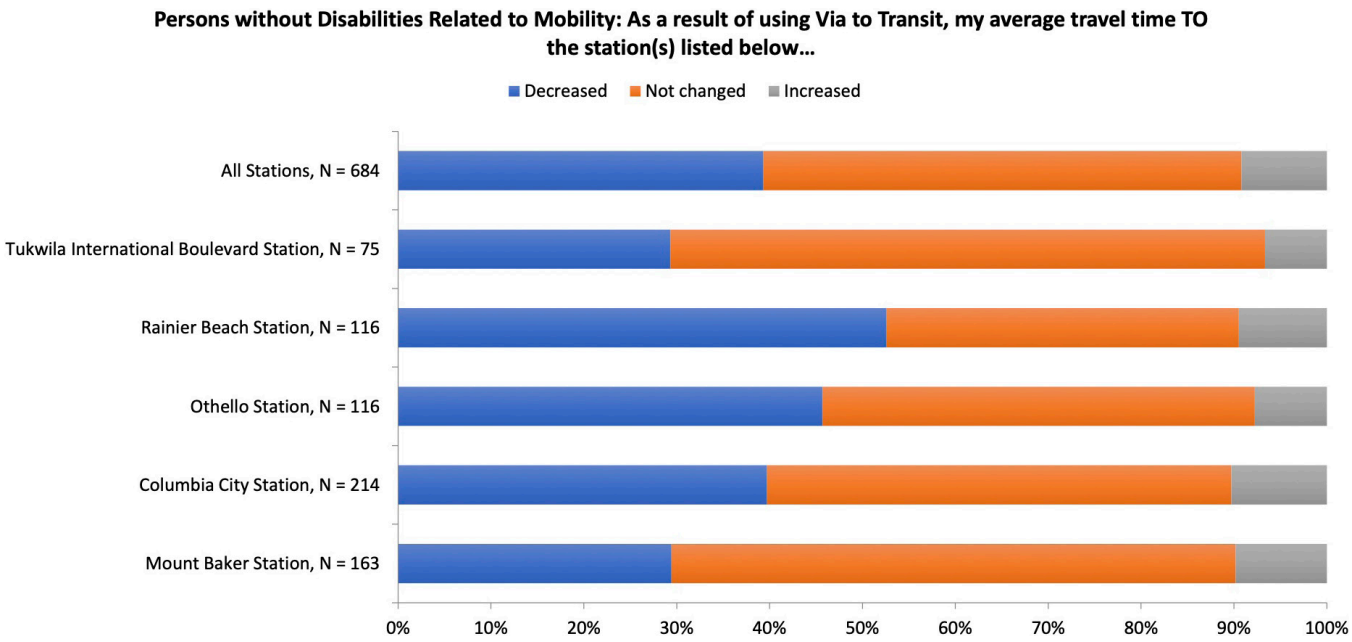


Figure 4-174 *Persons without Disabilities Related to Mobility – Change in Average Travel Time TO Stations Due to Via – Puget Sound*

For change in average perceived travel time from participating stations due to Via to Transit, Figures 4-175 and 4-176 display the results for persons with/without disabilities, respectively. Although a higher proportion of persons with disabilities said that their average travel time decreased compared to persons without disabilities, similar proportions of both groups stated that their average travel time increased.

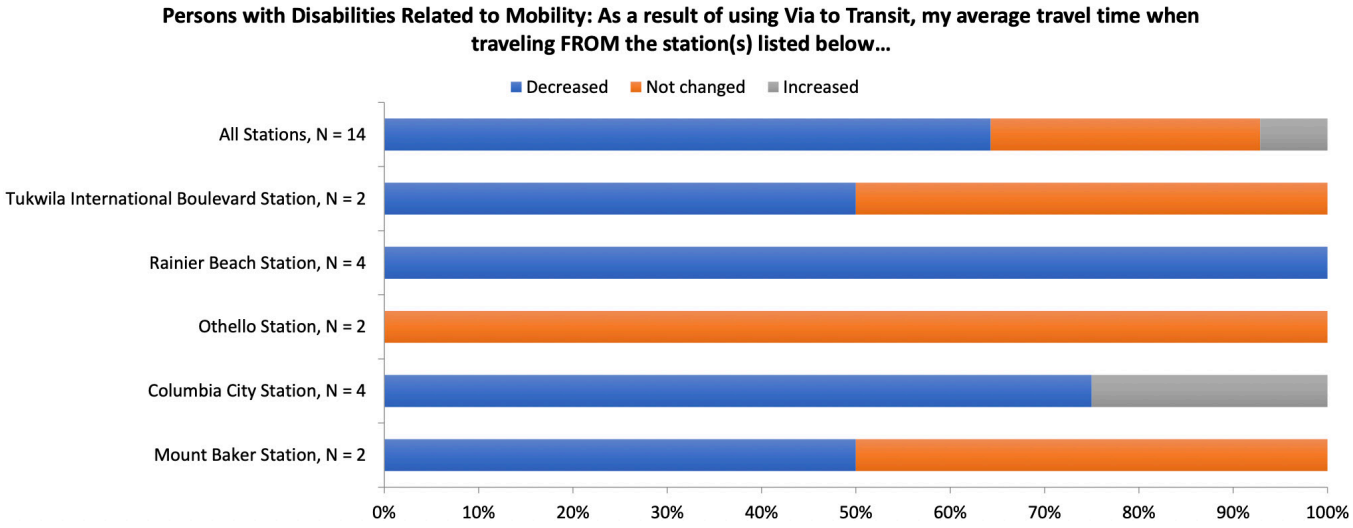


Figure 4-175 *Persons with Disabilities Related to Mobility – Change in Average Travel Time FROM Stations Due to Via – Puget Sound*

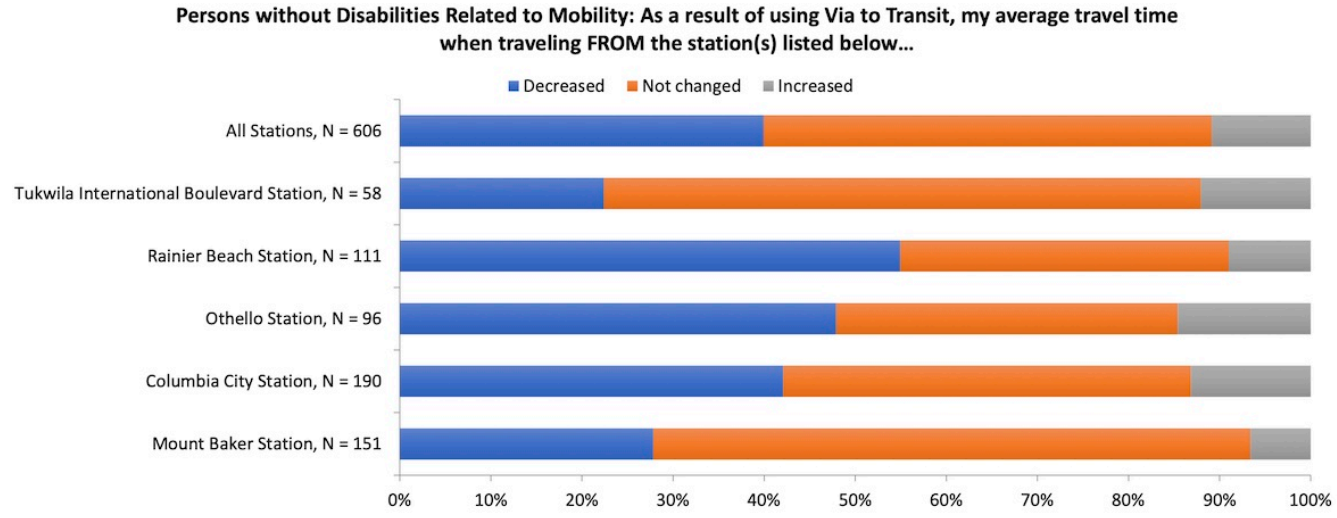


Figure 4-176 *Persons without Disabilities Related to Mobility – Change in Average Travel Time FROM Stations Due to Via – Puget Sound*

Section 5 Lessons Learned from Project Partners

The MOD Sandbox demonstration was initially conceived by staff at LA Metro's Office of Extraordinary Innovation (OEI). For OEI, pursuing the MOD demonstration presented a unique opportunity to explore different partnerships with TNCs to provide first- and last-mile connections to public transit for low-income households and people with disabilities. Metro believed that it could leverage the services offered by TNCs for a public benefit by subsidizing rides in areas without high quality access to public transportation.

Project Evolution, Partnership Changes, and Project Delays – Both LA Metro and Puget Sound partners believed their demonstrations were a success, although they acknowledge that the projects took longer to plan and launch than they would have liked. Metro submitted the MOD Sandbox Demonstration funding opportunity application with the plan to integrate the on-demand service with its TAP fare card. However, it acknowledged that it did not understand both the technical and contractual complexities and decided that fare integration could not be completed within the demonstration timeline. In Puget Sound, King County Metro was able to integrate their service with their ORCA card.

With respect to labor, FTA provided a list of requirements that they were willing to waive as part of the research demonstration (e.g., drug and alcohol testing for TNC drivers). Both LA Metro and Puget Sound worked internally within their agencies to get buy-in and understand how FTA's requirements and related waivers were being interpreted. Although LA Metro acknowledges that FTA was flexible to work with, it attributes implementation delays to a lack of sufficient time during the application development and submittal timeframe. The limited time during the application process resulted in both LA Metro and Puget Sound quickly naming partners without the time to build relationships and fully vet prospective partners. Both believed that had more time been allotted at the front-end of the application process, they would have been able to identify willing, able, and committed partners without having to change partners well into the project planning phase. The grantee also noted that they should have pulled out of their initial partnership with Lyft earlier and looked for another partner that was more willing to share data.

Lyft declined to be interviewed as part of this independent evaluation. According to other project partners, Lyft contributed to a delay in signing a non-disclosure agreement. Once the non-disclosure agreement was signed, Lyft declined to enter into a mutually-agreeable data-sharing agreement and was unable to work with the public agencies to provide WAV service. In the end, LA Metro took the issue to its Board of Advisors, who unanimously recommended starting over with a new partner. Metro invited approximately five other TNCs to submit a proposal expressing their interest to provide the FMLM MOD service.

A multi-department team evaluated the proposals and selected Via as the replacement vendor.

At the same time, the Puget Sound partners (King County Metro and Sound Transit) also cancelled their partnership with Lyft for similar reasons and also selected Via as a replacement vendor. Both agencies said they liked being able to share ideas and work collectively to overcome challenges as part of this two-site demonstration program.

As part of the transition to the new vendor, LA Metro asked Via to execute a terms agreement and outlined expectations for both parties prior to developing a scope of work and contract. The terms sheet outlined data categories that would be shared. Metro and Via then worked to develop a more detailed data sharing agreement. These parties agreed that Via would provide trip level data and the origin where a ride was requested (not where a ride was picked up) and drop-off location. As part of the agreement, Metro received a five-year license to the data and cannot publish trip-level data without aggregating it on a weekly temporal scale. Metro agreed to delete all trip level data after five years.

Contractual Best Practices – In addition to key data terms, Via agreed to manage the provision of WAV service, provide call center support, and work with LA Metro to integrate fares. LA Metro emphasized the importance of a flexible contract that allowed it to adjust its zones and fares with Via. The flexible contract also allowed LA Metro to pivot and provide end-to-end trips and food delivery in partnership with local food banks in response to the global pandemic. These changes came about in March 2020 when Via contacted LA Metro and explained that ridership was dropping and suggested that Metro make changes to make the service more cost-effective and safe. Via suggested limiting the number of people per vehicle to ensure social distancing and adding potential destinations outside of the initial service areas to service critical needs (e.g., medical offices, grocery, and pharmacy). Additionally, they began to explore end-to-end trips for essential workers who were beginning to have mobility gaps as transit service was being cut.

Similarly, King County Metro also emphasized the importance of flexible contract terms. Initially, the agency's program required riders to walk to their pick-up location. However, rider feedback was received that they did not feel safe walking to vehicles at night; this requirement was removed and instead the agency picked up riders where they made their request for rides after 10:00 pm and before 6:00 am. Additionally, upon reviewing preliminary vehicle miles traveled data, King County also asked Via to adjust its algorithms and stop pre-deploying vehicles near forecast demand and, instead, to keep vehicles near its last drop-off location. Flexible contractual terms allowed King County to execute these changes with minimal delay.

Metrics for Success – LA Metro explained that when the project was initially conceived, it envisioned that the demand-responsive service would have an additional cost. However, in practice, the agency found that the service was not attracting riders because this was cost-prohibitive and not competitive with other options. In response, LA Metro transitioned to a free transfer, and ridership began to increase considerably. A free-fare transfer was already being offered by King County Metro in Puget Sound. LA Metro said that after this change was implemented, ridership met its internal expectations. However, LA Metro emphasized that ridership is a critical indicator but not the only measure of success. It emphasized a mix of quantitative and qualitative metrics to measure program success, such as the importance of "conquest riders" (i.e., new riders to public transit) and improvements to the customer experience. Other metrics discussed included the ratio between PMT and VMT, safety (both accidents and customer perceptions), equity (e.g., user demographics compared to the general population), cost-efficiency compared to fixed-route service, and wait times for people with disabilities.

Next Steps – LA Metro explained that it had received approval from its Board of Directors to extend the demonstration for an additional year using its own money. In January 2021, the Via Rideshare Service zones transitioned to Metro Micro, Metro's new on-demand microtransit rideshare service. In Puget Sound, King County Metro is continuing the service, expanding both spatial and temporal coverage. However, Sound Transit is not continuing the program, as it is not a local transit provider. Due to Sound Transit's charter, it can participate in research but not ongoing local transit service.

Both LA Metro and the Puget Sound agencies identified a number of critical challenges that may limit their ability to continue or launch similar services in the future. Four key challenges include 1) concerns that TNCs compete with public transportation, 2) issues with labor unions who oppose TNC partnerships, 3) lack of funding for per-trip subsidies, and 4) federal drug and alcohol testing requirements that make TNC partnerships difficult to implement.[11]

Although a number of the partners acknowledged the benefits of participating in the MOD Sandbox demonstration, many said they would not participate in similar future FTA programs. First, LA Metro and King County Metro recommended that FTA not name specific private-sector partners or vendors in its recipient agreements to allow for additional flexibility to more seamlessly change recipient partners or vendors with less delay. FTA allows applicants to identify project partners with substantial project interest and involvement in the research application, which deems to satisfy the requirement for a competitive procurement for the named entities. Applicants are advised

[11] Via noted that it follows federal drug and alcohol testing requirements.

that any changes from the proposed partnership after selection will require FTA approval and may require a competitive procurement unless exception applies. Project partners noted that third-party entities do need to go through the competitive procurement process as defined by local policies even if not required by the FTA. The project partners noted that overlapping or redundant regulations at the federal and local levels (when present) may impose additional complications for project implementation. Project partners also suggested that FTA should place more resources (larger budgets) into planning to scope projects in advance of deployment and more resources to fund agency staff to administer the program. They also emphasized that FTA should evaluate project proposals based on what is achievable within a proposal's timeline and budget to discourage private-sector partners from overpromising and setting unrealistic expectations. Both LA Metro and King County Metro also recommended that FTA create communities of practice in which public transit agencies working on similar projects can exchange ideas during planning and implementation phases of the program, as was done in the MOD Sandbox Demonstrations program.

Section 6 Conclusions

The MOD Sandbox project conducted jointly in the Los Angeles and Puget Sound regions implemented a unique project testing the application of first-mile last-mile TNC access to the mainline public transit systems at selected stations within their respective regions. The Los Angeles project defined 3 zones with a total of 10 stations across LA Metro's transit network and Metrolink commuter rail lines. Most LA Metro stations that were part of the project were rail stations on the Red, Green, or Blue lines.[12] The project also included the BRT Silver Line at the El Monte station.[13] Metrolink stations with the El Monte and North Hollywood zones were also included in the project. The analogous project in Puget Sound connected to the region's Link light rail line, which had five zones, each with one station.

Evaluation of the project covered 13 hypotheses that explored the impacts of the project on user behavior and mobility, public transit usage, first/last-mile access, ORCA fare payment card integration, impacts on fuel consumption and GHGs, impacts on congestion, impacts on mobility for persons with disabilities, user safety, comparative subsidies, user cost-effectiveness of mobility, travel times and wait times, and lessons learned from deployment. The results of the evaluation revealed a project that was broadly successful in meeting many of the objectives it set out to achieve. Both LA Metro and the Puget Sound partners believed their demonstrations were a success, although they acknowledge that the projects took longer to plan and launch than they would have preferred.

The results from the survey of users in the Puget Sound region found that causal questions that directly related Via to Transit to travel times and wait times to/from Link light stations displayed significant improvements. A significant portion of respondents across stations stated that their average travel and wait times decreased as a result of Via to Transit. Similarly, a sizable proportion of respondents stated that their usage of Link light rail either increased or significantly increased as a result. Also, within the Puget Sound region, the project advanced the integration of Via into the ORCA card to increase its use within several underserved populations. The usage of the ORCA card for public transit was very high among all populations, including underserved populations, and this did not change much between the early- and late-pilots. The dominance of the ORCA card for Via to Transit trips among all populations suggests that it was the preferred method to pay for the trips and available alternatives.

In Los Angeles, the use of public transit at stations was found to increase among users between pilot periods and as a result of the Via Rideshare Service.

[12] LA Metro Red Line is now B Line, LA Metro Blue Line is now A Line, and LA Metro Green Line is now C Line.
[13] LA Metro Silver Line is now J Line.

The analyses of mode choice and mode replacement indicated that the Via to Rideshare Service offered a new travel option that was better than FMLM options prior to the pilot. Within the Puget Sound regions, public transit and Link light rail usage was also found to have increased as a result of the Via to Transit service. The percentage of respondents who used all participating stations increased between the early-pilot and late-pilot.

Also in Los Angeles, analysis of changes in public transit use and urban rail found that ridership moderately increased across stations for respondents who travel both to and from participating stations. The analysis found that public transit usage (or ridership) increased across all participating stations for respondents traveling to (and from) stations. In the Puget Sound region, the Link light rail ridership also increased across all participating stations due to Via to Transit for respondents traveling to (and from) stations. Via to Transit also improved access both to and from bus stops and rail stations (and just to stations).

The results of the analysis showed that the overall VMT driven by vehicles of the two pilot systems was too high to produce a reduction in net VMT. Although the analysis of impacts on congestion were inconclusive, the net change in both gasoline consumption and GHG emissions was found to have increased as a result of Via activity and user behavioral change.

The results from the analysis of the survey subsample of persons with disabilities suggest that on balance Via enabled them to travel to and from the stations faster. An analysis of wait and travel times of the systems in Los Angeles and Puget Sound was executed to explore a comparison of travel times and wait times of trips as provided to passengers both with and without disabilities through the Via systems operating in Los Angeles and the Puget Sound region. The results found relative comparative performance across the systems in both regions. The distributions of wait and travel times for WAV and non-WAV trips were very similar for the Puget Sound region. The comparison found less alignment within Los Angeles, but still exhibited considerable overlap within level of service delivery. Survey results also showed that most respondents who identified as persons with disabilities reported that the system improved their travel and wait times and further delivered satisfactory levels of service.

The project impacted perceptions of safety as well. In Los Angeles, about 16% of respondents stated that they felt much safer when traveling to/from public transit stations, and an additional 47% said that they felt safer. In the Puget Sound region, survey questions also evaluated the change in perceived safety as a result of Via to Transit. Across all participating stations, about 34% of respondents said that they felt much safer, and about 33% said that they felt safer. Just 1% of respondents said that they felt less safe. By station, the Tukwila International Boulevard, Rainier Beach, and Othello experienced above average improvements in safety.

The results indicate that Via Rideshare Service was considerably cheaper to operate on a per-revenue-hour basis compared to fixed modes of transit. In contrast to the low operating cost per revenue hour, the cost per trip of the Via Rideshare was not as favorable to other modes based on average operating costs per trip. The results indicate that the Via to Transit service exhibited lower subsides and better farebox recovery than some transportation modes (i.e., demand-response transportation [mostly paratransit] and demand-response taxis). The operating cost per revenue hour was highest for King County Metro buses, followed by demand-response transportation (mostly paratransit). In both environments, Via was most cost-effective on an hourly basis but less cost-effective on a per-trip basis when compared to the average performance of the LA Metro and King County Metro systems. However, this cost comparison was performed against the costs incurred by fixed-route systems that benefit from high passenger volume. The evaluation analyzed the cost-efficiency of mobility from the perspective of the user. The analysis also applied a cost-effectiveness metric in the form of a translated average velocity per fare dollar to evaluate how cost-effective mobility was delivered to users by the project relative to fixed-route alternatives. The analysis found that that systems in both Los Angeles and Puget Sound delivered mobility (average velocity, in this case) at a user cost efficiency that was better than a standard public transit bus.

Overall, the LA County and Puget Sound First and Last Mile Partnership with Via pilot project conducted a successful MOD Sandbox demonstration that tested a number of innovations and advanced the state of practice with respect to integrating TNC FMLM service into the broader public transit networks.

U.S. Department of Transportation
Federal Transit Administration

U.S. Department of Transportation
Federal Transit Administration
East Building
1200 New Jersey Avenue, SE
Washington, DC 20590
https://www.transit.dot.gov/about/research-innovation