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Research & Analysis

The Transportation Impacts of Vehicle-for-Hire in the City of Toronto

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Note: The Executive Summary of this report is included as Attachment 5 to the City of Toronto staff report 2024.EX19.4. This report represents the full transportation analysis and research undertaken to support the 2024 Review of the Vehicle-for-Hire By-Law and Industry, including Appendices with the HDR Survey Analysis Report and U of T Mobility Network report.

Table of Contents

Appendices

Table of Figures

Executive Summary

In December 2021, City Council directed staff to evaluate the impact of the vehicle-for-hire (VFH) industry on Toronto's mobility landscape. These impacts include effects on traffic flow, emissions, transit ridership and revenue, road safety, and equitable access to transportation for all residents. In addition, Council requested staff to develop a framework that optimizes VFH operations, focusing on balancing supply and demand for rides, ensuring economic fairness for drivers, enhancing passenger service, and minimizing disruptions to public transit, traffic, and the environment.

This report provides an analysis of the VFH sector's effects on Toronto's transportation network. Toronto's transportation system is constantly evolving due to factors such as roadwork, evolving street infrastructure, and changing commuting trends, which makes isolating the specific impact of VFH challenging. However, this report aims to examine and evaluate these effects as thoroughly as possible.

The VFH sector in Toronto includes Private Transportation Companies (PTCs), taxis, and limousines. Limousines are a small proportion of the sector and are not a focus of this report and analysis.

Comprehensive data is available from all PTCs (Lyft and Uber) operating in the City, covering each vehicle's entire shift, including times with and without passengers. Detailed trip data from six taxi brokerages, representing 62% of all active taxi licenses, has been used in this analysis. While this is more data than have been available for previous studies, it is still not as comprehensive as PTC data, and does not include street hailed trips or data from independent taxicabs.

In addition to analysis conducted by the Transportation Data and Analytics Unit, the City also commissioned two additional studies to provide additional insights on the sector:

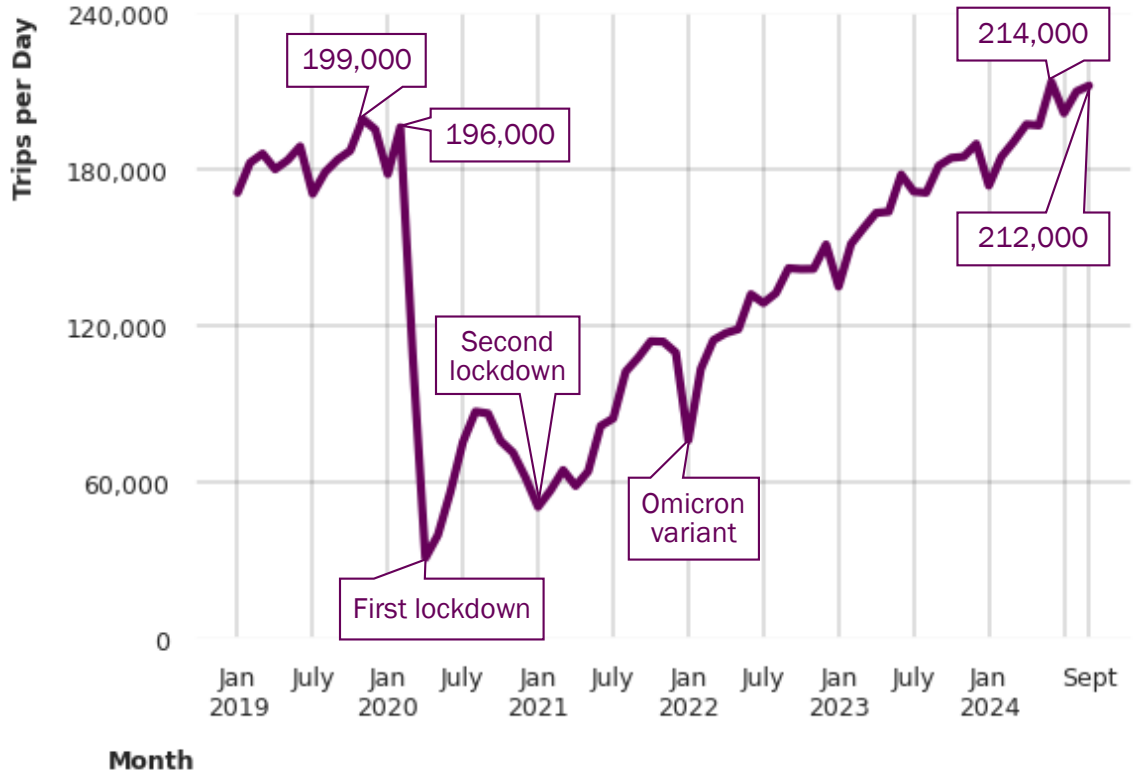
1. The City retained HDR in collaboration with market research firm Maru/Blue to complete a survey of VFH users in the City, and
2. The City engaged with the University of Toronto Mobility Network to conduct a research and modelling study to understand supply, demand and travel behaviour trade-offs in the VFH sector.

The findings are intended to provide City Council with insights to guide effective policy-making for the VFH sector and to build a foundation for informed decision-making in this sector.

PTC trips have continued to grow and are 7% higher than pre-pandemic peak levels as of September 2024

During the COVID-19 pandemic, the average daily PTC trips declined sharply from a peak of 199,000 in November 2019 to a low of 31,000 in April 2020. Since then, the number of trips has steadily increased, with only minor declines related to various pandemic stay-at-home orders and seasonal fluctuations, reaching a peak of 214,000 trips in June 2024. In September 2024, the average daily trips were at 212,000, approximately 7% above November 2019 peak levels.

Figure ES-1 Average daily trips by month from January 2019 to September 2024



These 212,000 daily trips are completed by 26,300 active PTC vehicles per day in Toronto

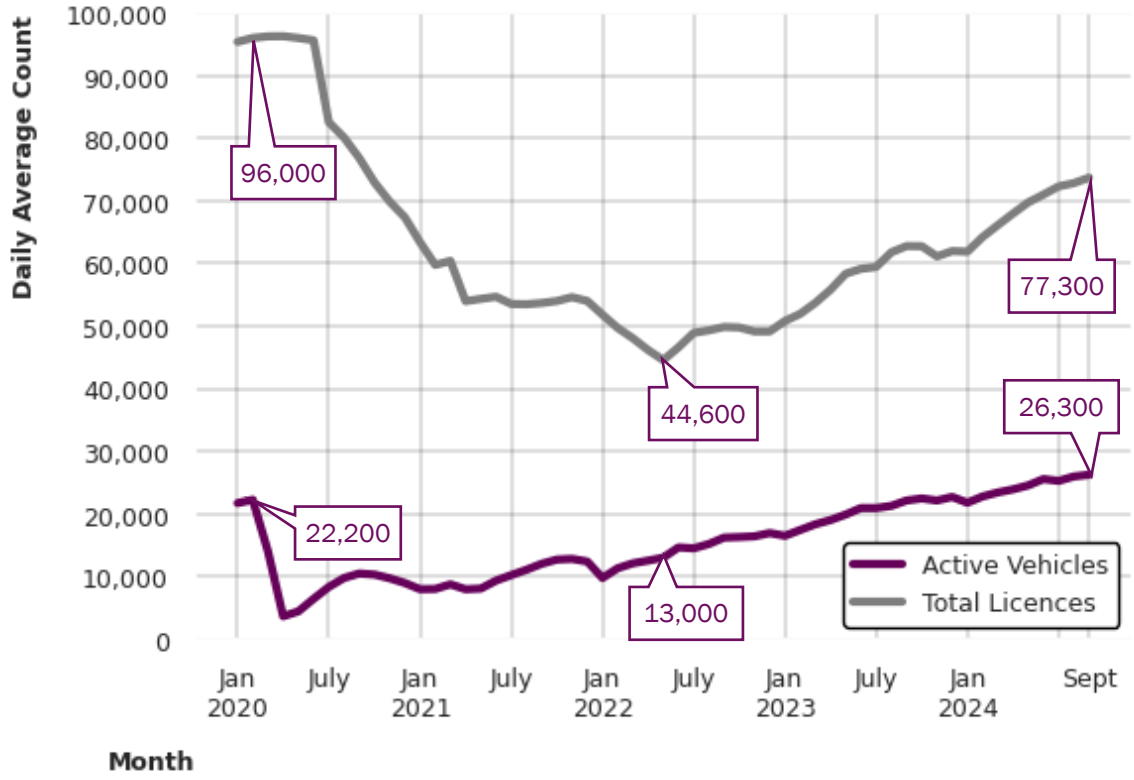
Due to the flexible nature of PTC driving, the number of licences does not always directly correlate with the actual number of vehicles in service at any given time. For this analysis, an active vehicle is defined as one with a driver who has accepted at least one customer trip. This measure provides a more accurate measure of the sector's impact on the road network.

As of September 2024, there were an average of 26,300 active PTC vehicles operating daily in the City out of the 77,300 total active PTC

licences. Licences have been growing since May 2022 at a rate of about 1,000 new PTC driver licences per month on average. This growth in licenced drivers has coincided with a monthly growth of 470 additional active vehicles on the road on an average day.

Due to the low barrier to entry and variable nature of PTC driving, there is a wide variety in activity levels among drivers as some work full time hours, while others may only complete a handful of trips per month. Further analysis has shown that the top 50% most active PTC vehicles are responsible for 96% of the overall trip making, further demonstrating the large range in activity levels between different licence holders.

Figure ES-2 Active licences and daily average active vehicles by month from January 2020 to September 2024



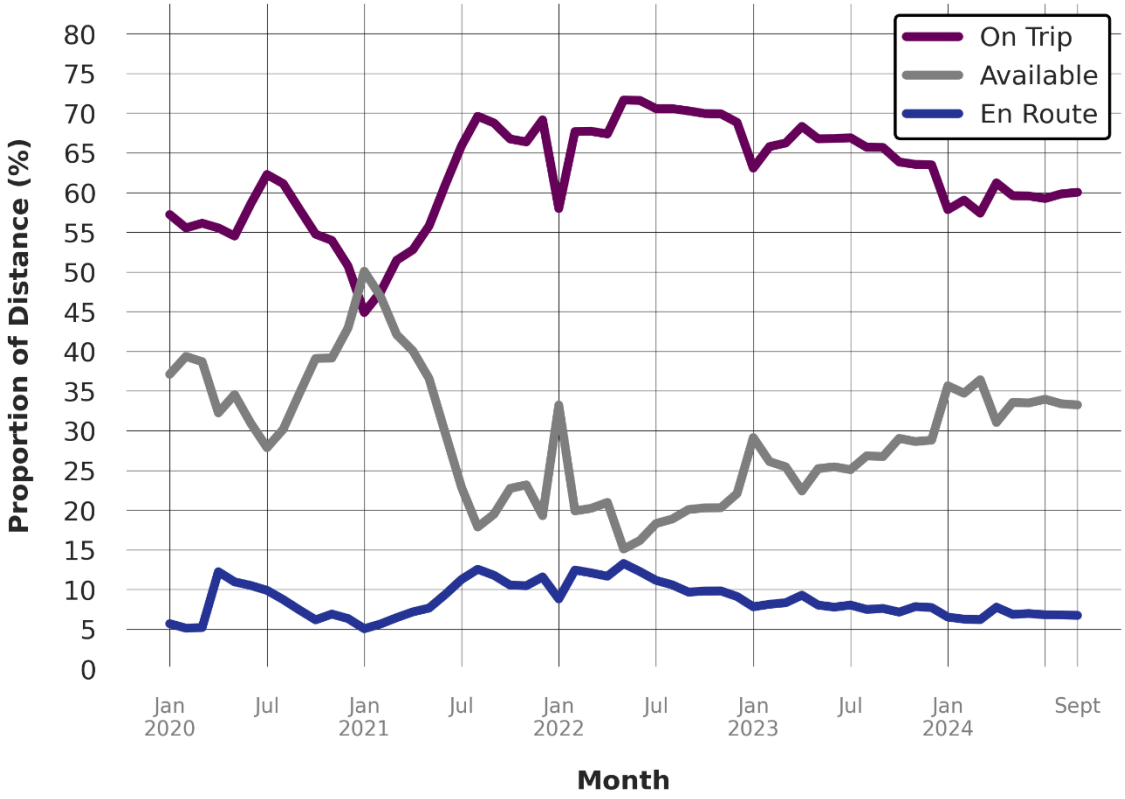
PTC vehicles are travelling an increasing amount empty since March 2022

One way to measure the efficiency of the sector is by measuring the distance travelled by PTC vehicles when they are carrying a passenger versus when they are empty waiting for their next customer. As shown in Figure ES-3, the percentage of distance travelled by PTC vehicles cruising for a passenger has steadily increased from 15% in May 2022 to 33% in September 2024. While this high degree of availability leads

to higher service quality and lower wait times for PTC customers, it also results in increased vehicles on the road for the same amount of trips.

The increase in empty travel is partially due to the number of active PTC vehicles growing faster than the number of trips, leading to a trend of fewer trips per active vehicle since 2022. In September 2024, a PTC vehicle completed an average of 8.1 trips per day, a decrease from the peak of 9.4 trips in March 2022 (and 8.8 trips per day prior to the pandemic).

Figure ES-3 Breakdown of PTC vehicle distance spent in each period



The annual distance travelled by vehicles for hire has increased since the emergence of PTCs, while the proportion driven by taxis has fallen

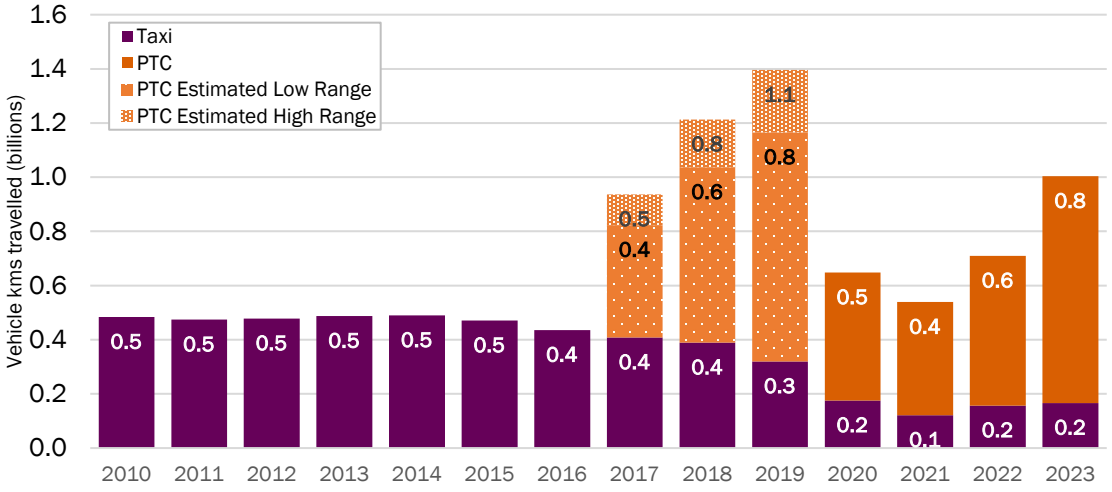
Distance travelled is used as an indicator of activity in the sector as complete trip records are not available for the taxi sector. PTC distances are measured based on trip and shift records while taxi distance travelled is measured based on taxi odometer readings that are collected annually.

There has been a significant shift in the distance travelled by licenced vehicles for hire in the City. The distance travelled by taxis has declined sharply, dropping from 484 million kilometres in 2010 to just under 167 million kilometres in 2023.

The City began receiving sufficiently complete data on distance travelled by PTC vehicles in 2020. However, estimates were made for earlier years when PTCs were legally operating. At its peak in 2019, PTC distance travelled was estimated to range between 0.85 and 1.08 billion kilometres, combining with taxis to reach a maximum of 1.40 billion kilometres travelled on City streets.

By 2023, as the sector recovered from the pandemic, PTC vehicles logged just under 837 million kilometres. Combined, taxis and PTC vehicles travelled a total of 1.00 billion kilometres on City streets in 2023.

Figure ES-4 Estimated annual distance travelled in kilometres for PTCs and taxis from 2010 to 2023



PTCs make up 14.2% of vehicle travel in the downtown core in 2024

The impact of PTCs on the transportation network is largely a function of the amount of driving its vehicles are adding on to the City's road network, measured in vehicle-kilometres travelled (VKT). Together with any potential impacts on traffic volumes and congestion, additional VKT can also directly affect the City's ability to meet its climate change goals under the TransformTO Climate Action Strategy. Increased VKT has also been found to have adverse impacts on air quality, health, safety, and noise.

An analysis of PTC supply on Toronto streets shows that their share of total distance traveled varies widely across different areas of the city with much higher concentrations in the downtown core. In September 2024, PTCs accounted for 14.2% of total traffic in the downtown core, compared to 3.6% in the suburban areas, and 4.5% city-wide. Comparable data is not available for taxis until digital meters are rolled out, but taxi VKT was estimated as being 27% of the VFH mix in 2023.

A key concern is the impact of these vehicles on traffic congestion in Toronto which has been particularly relevant in the context of the increases in downtown congestion observed in 2024. These increases have largely been driven by extensive road and development construction projects such as the reconstruction of the Gardiner Expressway and various Ontario Line-related construction sites and lanes closures.

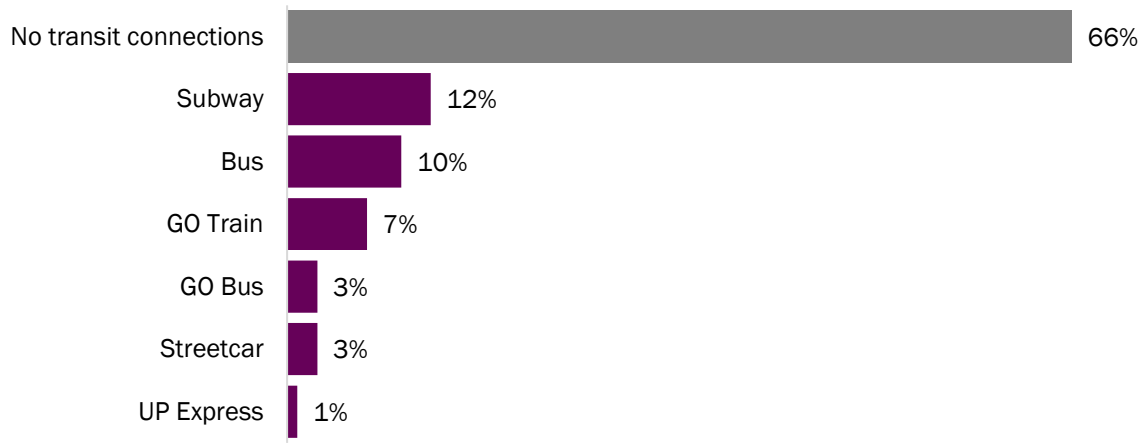
Figure ES-5 Vehicle kilometres travelled by PTC by different areas of the City in 2024

Average daily vehicle kilometres travelled	Downtown TOCore	Toronto and East York Outside Downtown	Etobicoke, York, North York, and Scarborough	City of Toronto Overall
From PTC vehicles Sept 2024 weekdays	374,900	623,300	2,121,300	3,119,400
From all vehicles 2023 average daily values	2,645,300	7,626,500	59,573,200	69,845,000
% of PTC vehicles	14.2%	8.2%	3.6%	4.5%

34% of PTC users indicated they used it to connect to transit

In the survey of VFH users, 34% of PTC users and 40% of taxi users indicated that their trip involved a connection to public transit. This suggests that vehicles for hire play a complementary role in filling gaps in transit service coverage and frequency within the city.

Figure ES-6 Percentage of respondents indicating they connect to/from transit on their last PTC trip



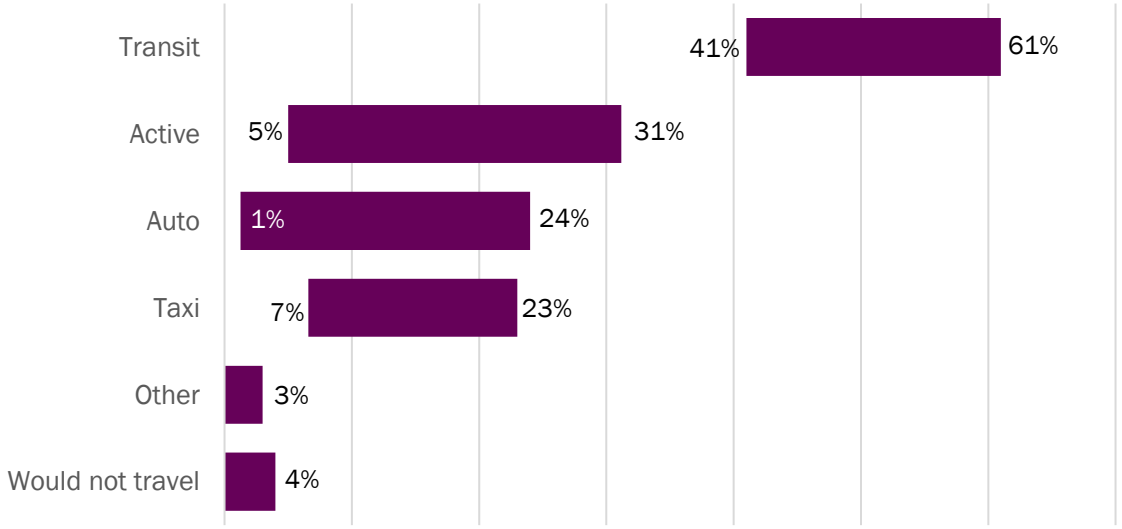
41% to 61% of PTC users would choose transit as an alternative if PTC services were not available

The introduction of PTCs has impacted transit systems in cities worldwide, including Toronto, with both positive and negative effects. To assess the influence of PTCs on transit in Toronto, the City employed two methods:

1. Conducted a VFH survey by HDR Corporation, in collaboration with market research firm Maru/Blue, to explore alternative transportation options to PTCs and taxis, and
2. Analyzed transportation impacts using a model developed by the University of Toronto, simulating a scenario in which PTC services were unavailable.

Based on this research, it was estimated that 41 to 61% of PTC users would choose transit as an alternative, while 5 to 31% would opt for cycling or walking if PTCs were not available for their trip. Additionally, 1 to 24% would either drive themselves or rely on a ride from someone else. While these ranges are broad, it is clear that a significant proportion of PTC trips are competing with transit services for riders. The VFH user survey noted similar response for taxi trips as well, with 37% of taxi trips selecting transit as their first alternative.

Figure ES-7 Alternative modes chosen by PTC users if service was not available based on the VFH user survey and University of Toronto's transportation model



These figures can be contextualized against TTC's daily riders, with the more recent data published for 2024 as part of the TTC's corporate KPIs[1]. Based on an average weekday PTC trip volume of 193,000 (July 2024 figures) and applying the 41% to 61% rate of PTC users stating they would use transit as the alternative if PTC is not available, approximately 79,000 to 118,000 of these trips would have used transit for at least part of the journey. The TTC's daily number of revenue rides was 1,300,000 on a typical weekday in July 2024. After accounting for the 24% of PTC trips that would still connect to TTC services such as subway, bus, or streetcar routes, the shift from PTC trips to transit would represent approximately 4.6% to 6.9% in weekday TTC ridership. It is challenging to estimate which routes are most impacted, however previous research on the topic indicated that ridehailing from 2016-2018 in Toronto generally improved subway ridership while reducing surface transit ridership[2].

Beyond the numbers, it is important to note that PTC users are also transit users, according to data from the VFH user survey. The survey shows that 37% of VFH users reported using transit frequently (several times a week or more), while only 14% of VFH users reported using PTC services at the same frequency. As a result, while PTC use may contribute to some shifts away from transit, it also serves to

[1] Corporate KPIs Toronto Transit Commission for July 2024, Published in September 2024

[2] Li, Wenting, A. Shalaby, and K. N. Habib. "Exploring the Ridership Impacts of Ride-Hailing on Multimodal Public Transit in Toronto." *Transportation Research Record: Journal of the Transportation Research Board* (2018).

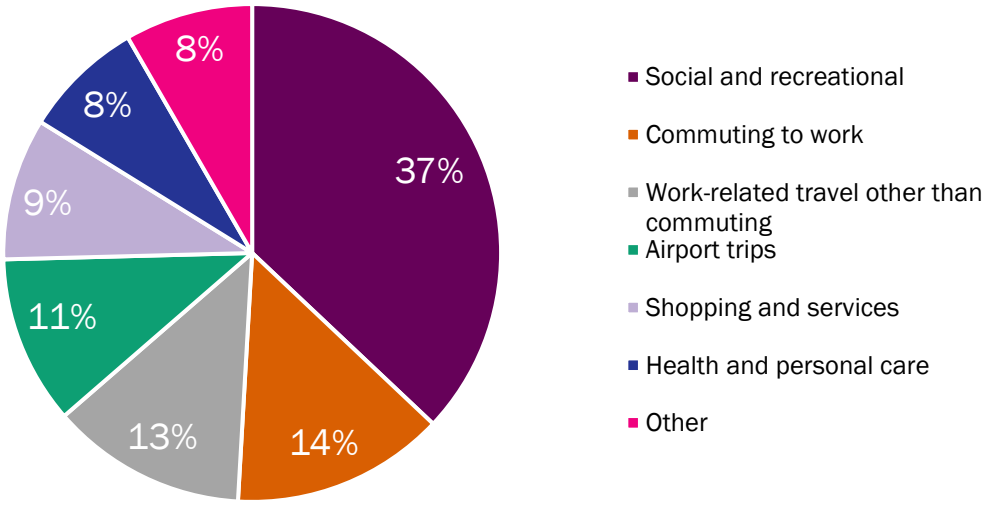
complement transit particularly when there is greater urgency for speed and reliability of travel, for example during subway disruptions where PTCs can complement bus bridging to help passengers get to their destinations[3].

Vehicles for hire serve a wide range of trip purposes

VFH services have been found to have a unique role in Toronto's transportation system and are used regularly for a wide range of trip purposes. The most common purposes for using vehicles for hire are as follows:

- **Social and recreational trips (37%)**: A large proportion of users depend on VFH services for social and leisure activities such as visiting friends, going to bars and restaurants, attending events, and recreational outings. VFH services are recognized as being an important option for residents to be able to access entertainment options while drinking responsibly.
- **Work-related travel (27%)**: Many rely on taxis and PTCs for commuting to and from work (14%) as well as other work-related travel (13%)
- **Airport trips (11%)**: A significant number of respondents use these services for airport transportation

Figure ES-8 Primary trip purpose of user's last trip based on VFH user survey



[3] Liu, Rick, et al. "A social equity lens on bus bridging and ride-hailing responses to unplanned subway disruptions." *Journal of Transport Geography* 88 (2020): 102870.

User satisfaction with PTC and taxi services is high

Satisfaction levels were found to be high among both PTC and taxi users, with 80% of PTC users and 72% of taxi users reporting they were "satisfied" or "very satisfied" with the services. The ratings were based on seven customer service indicators, including service availability, customer support, vehicle comfort, travel information, ease of requesting service, and cost. Satisfaction was high across all categories, with lower satisfaction for cost.

Figure ES-9 Percentage of users reporting 'Satisfied' and 'Very satisfied' on major quality of service measures in the VFH user survey

Major quality of service measures	Taxis	PTCs
Cost	54%	59%
Ease to request service	80%	86%
Knowing the fare in advance	63%	85%
Receive real-time pick-up information	70%	83%
Safety	80%	83%
Service availability	79%	82%
Vehicle comfort	78%	84%

Wait times for trips in wheelchair accessible vehicles (WAVs) are higher than for non-WAV trips

Wait times are an indicator of service quality for passengers, and the Accessibility for Ontarians with Disabilities Act, 2005 (AODA) requires municipalities to meet local needs for on-demand accessible taxicabs. The AODA also requires PTCs with more than 500 drivers on their platforms are required to provide wheelchair accessible services to the public. The bylaw requires that the average wait time for this service must be the same as the average wait time for non-accessible taxicab service.

From 2023 to 2024, wait times for taxis improved across all trip types (WAV and non-WAV). However, data from January 2023 to March 2024 indicates that wait times for taxi and PTC WAV trips remain 60% to 160% higher than for their non-WAV counterparts. This disparity underscores the need for continued efforts to address the service gap in accessible transportation.

Figure ES-10 Taxi wait times comparison between WAV and non-WAV trips, January 2023 to March 2024

	Taxi trips*	PTC trips
WAV trips	24 minutes Representing on average 14 trips per day	13 minutes Representing on average 28 trips per day
Non-WAV trips	15 minutes	5 minutes

*Based on data available from six taxi brokerages representing 62% of all taxicabs. Figures do not include WAV taxi trips under contract with the TTC to provide Wheel-Trans services. In March 2024 Wheel-Trans did an average of 5100 WAV trips per day, of which 2800 were contracted taxis.

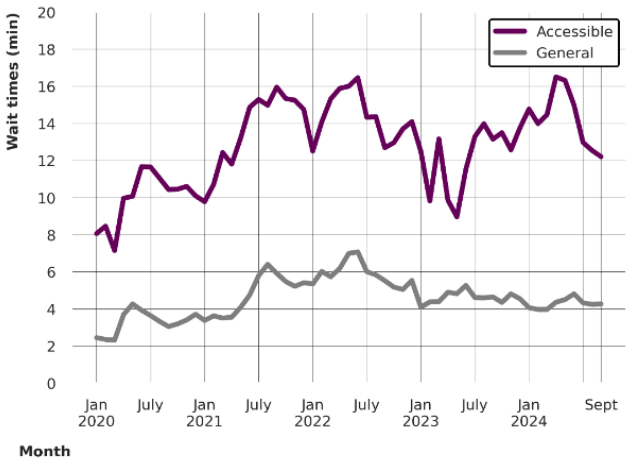
PTC WAV service quality has declined since 2020, with longer wait times and an increased proportion of cancellations by passengers

The quality of PTC WAV services has worsened since 2020, evidenced by longer wait times and a rise in passenger-initiated trip cancellations. Although changes in wait times for both WAV and non-WAV trips are somewhat related over time, wait times for PTC WAV trips remain consistently two to four times longer than for non-WAV trips. In September 2024, customers seeking WAV trips waited an average of 12 minutes, up from a pre-pandemic low of 8 minutes in February 2020. Due to data limitations, this average wait time does not include trips where the rider cancelled the trip before driver arrival.

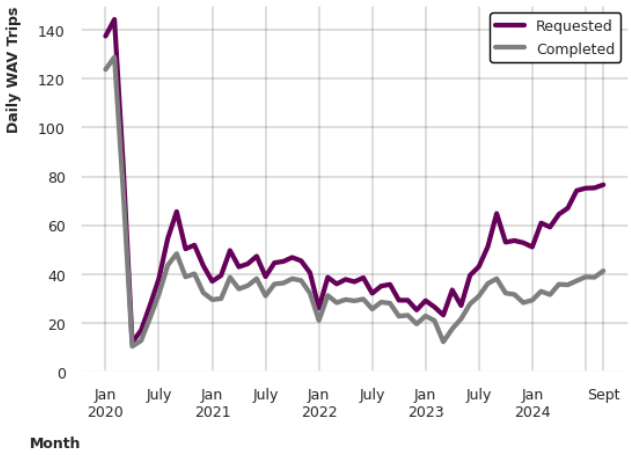
Since March 2023, the demand for PTC WAV trips has increased, but the number of completed trips has not kept pace as riders cancelled 15% to 45% of trip requests while driver cancellations were consistently below 2%. From January 2020 to March 2023, 81% of requested PTC WAV trips were successfully completed. However, this completion rate dropped significantly to 57% between March 2023 and September 2024.

Figure ES-11 Wait times and unfulfilled trip rates for WAV and non-WAV services by month

Average wait times for PTC WAV and non-WAV services by month from January 2020 to September 2024



Average daily PTC trips requested and completed for WAV by month from January 2020 to September 2024

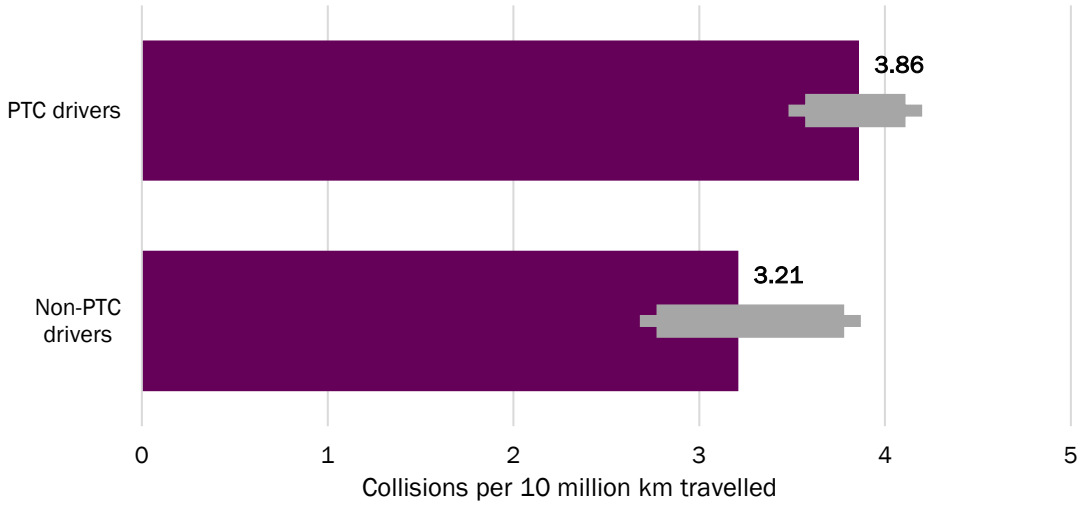


Collision rates are highly variable and PTC collisions rates are slightly higher than other vehicle types

To understand whether PTCs have a significant or outsized impact on road safety, a study of collision data was completed comparing PTCs with other vehicle types. Comparable rates for taxis could not be calculated due to data limitations. These rates are based on collisions and kilometres travelled within Toronto, excluding 400-series highways. For PTCs, only collisions that occurred while the vehicle was operating on a platform were included.

From 2020 to 2023, 666 PTC vehicles were involved in collisions resulting in minor, major, or fatal injuries. This equates to a rate of 3.8 PTC vehicle collisions per 10 million kilometres travelled. This can be compared to a rate 3.2 for other (non-PTC) vehicles. It should be noted that these estimates are highly variable, fluctuating annually, and therefore have significant uncertainty. In addition, there are significant challenges with reported PTC collision data that has resulted in difficulties linking VFH collision data to police collision data. To address this, this study is recommending further enhancements to the by-lawed PTC and taxi collision reporting requirements to require the inclusion of a police report number for all VFH collision records. Further monitoring and analysis will be required to better understand the collision rates of PTCs and taxis and what factors might drive differences.

Figure ES-12 PTC rate of collisions per distance travelled from 2020 to 2023



There are no significant differences in PTC service characteristics between equity-deserving communities and the rest of the City

Various trip and service quality characteristics were analyzed including average trip distance, fare, wait times, and cancellation rates of PTCs across equity-deserving communities and other areas in Toronto. The analysis specifically compared trips originating in Neighbourhood Improvement Areas (NIAs) with those from non-NIAs. NIAs are designated based on lower performance in economic opportunities, health, and social development.

The analysis showed no significant differences in PTC service provision and service characteristics between equity-deserving communities and the rest of the City. The analysis also considered variations between urban neighborhoods (Toronto and York) and more suburban areas (Etobicoke-York, North York, and Scarborough), but no significant differences between NIAs and non-NIAs were observed.

Summary and Recommendations

The key findings of the study are summarized as follows:

- **Record level of PTC trips**: PTC trips reached an all-time high in June 2024 with 214,000 average daily trips, surpassing pre-pandemic levels.
- **Decline in PTC utilization efficiency**: Since early 2022, the percentage of distance travelled by PTC vehicles with customers on-board and the number of trips per active vehicle have both decreased.

- **Record high distance travelled by vehicles for hire**: Vehicles for hire made up 1.12 billion kilometres of travel on City streets in 2023, with PTCs accounting for 74% of the total VFH distance travelled.
- **High PTC share of downtown travel distance**: In 2024, PTCs accounted for 14% of all vehicle travel distance in the downtown area on a typical day.
- **Transit as the main alternative for PTC users**: If PTCs were unavailable, 41% to 61% of trips would switch to transit, though a portion of these PTC trips already connect to transit.
- **An important transportation mode for VFH users**: Surveys conducted highlight the important role the mode plays within the transportation system, serving a wide variety of trip purposes and providing redundancy to resident's mobility choices.
- **Disparities in wait times between WAV and non-WAV trips**: Wait times for WAV trips remain significantly longer than for non-WAV trips, highlighting accessibility challenges.
- **Decline in PTC WAV service quality**: Since 2020, WAV trips have experienced longer wait times and decreasing trip completion rates.

The major recommendations drawn from the study include:

- **Consider licensing limits to address negative trends:** Some trends suggest that licensing limits may help address observed negative trends, though it remains unclear whether limits would notably reduce congestion.
- **Mandate digital meters for taxis:** Digital meters would enable more detailed analysis of the taxi sector and consistent reporting and monitoring of industry trends.
- **Incorporate collision identification numbers:** All PTC and taxi collision records should include the identification number provided by police or the Collision Reporting Centre.
- **Expand data fields for improved analysis:** Additional data fields, including driver number and quoted arrival time, should be provided to enable more detailed analysis of driver-specific metrics and overall service quality.

1 Introduction

In December 2021, City Council directed staff to evaluate the impact of the vehicle-for-hire (VFH) industry on Toronto's mobility landscape. These impacts include effects on traffic flow, emissions, transit ridership and revenue, road safety, and equitable access to transportation for all residents. In addition, Council requested staff to develop a framework that optimizes VFH operations, focusing on balancing supply and demand for rides, ensuring economic fairness for drivers, enhancing passenger service, and minimizing disruptions to public transit, traffic, and the environment.

This report provides an objective analysis based on available data to inform decisions on managing the VFH sector. Toronto's transportation network is dynamic and constantly evolving, shaped by factors such as evolving street infrastructure, construction projects, and changing commuting trends which makes isolating the specific impact of vehicles-for-hire on the transportation network challenging. This report will assess the effects of the VFH industry on the transportation network and its role within the wider transportation system, with the goal of providing a clearer understanding of its broader impact on Toronto's transportation conditions.

The VFH sector in Toronto includes Private Transportation Companies (PTCs), taxis, and limousines. Limousines are a small proportion of the sector and are not a focus of this report and analysis.

This report is the third report studying the impacts of the Vehicle-for-Hire industry on the City of Toronto's transportation network that has been completed by Transportation Services. Previous studies were published in 2019 and 2021 to support reports to City Council on the Vehicle-for-Hire industry.

In addition to analysis conducted by the Transportation Data and Analytics Unit, the City also commissioned two additional studies to provide additional insights on the sector:

1. The City retained HDR in collaboration with market research firm Maru/Blue to complete a survey of VFH users in the City (see Section 2.1.3 and Appendix A), and
2. The City engaged with the University of Toronto Mobility Network to conduct a research and modelling study to understand supply, demand and the behavioural and mode choice impacts from the

rise of PTCs, as well as their effects on transit (see Section 2.2.4 and Appendix B).

The City of Toronto has maintained a long-standing partnership with the University of Toronto Mobility Network, previously known as the University of Toronto Transportation Research Institute. Their work contributed to key findings in the 2019 and 2021 reports on vehicles-for-hire, and this collaboration has continued for this report.

2 Data and Methodology

2.1 Data sources

Several data sources were used as part of the Transportation Impacts of Vehicle-For-Hire study, including detailed records from Private Transportation Companies, a more limited set of records from taxicab brokerages, a VFH user survey conducted by HDR with Maru/Blue and a number of additional complementary datasets.

2.1.1 Private Transportation Company records

Vehicles for hire are required to provide trip and availability records as a condition for operating in the City. For the purposes of understanding the full cycle of the vehicle-for-hire driver's activity while performing their duties, it is useful to refer to the definition of the different phases of activity for PTC drivers from § 546-116.E.5:

- **Period 1:** Period a PTC driver had activated or was logged into a PTC Platform and available to receive or accept requests to provide passenger transportation service;
- **Period 2:** Period elapsing between the time a passenger request for transportation is accepted by a PTC driver and the arrival of the PTC driver at the passenger's pick-up location; and
- **Period 3:** Period elapsing between the time a PTC driver picks up a passenger(s) until the passenger(s) has arrived at their destination(s).

Private Transportation Companies (PTCs) are required to provide the following datasets in § 546-116:

- **Trip Records:** Pick-up and drop-off locations must be accurate within 10 metres. The request, acceptance, driver arrival, pick-up, and drop-off times must be precise to the minute. If the trip was cancelled, the reason for cancellation by either the driver or passenger must be recorded. The fare paid must be included. A unique vehicle identifier and the Vehicle Identification Number (VIN) must also be provided.
- **Driver Availability Records (Period 1):** To understand the impact of driver activity on the City's streets, the periods during which drivers are available between trips must be recorded. The start and end times, as well as the location of these availability periods, must be accurate within one minute and 10 metres.

- **Collision Records:** The location, timestamp, and VIN of any PTC involved in a collision must be reported.

Currently all PTC companies (Lyft and Uber) submit records in accordance with the bylaw requirements. Ongoing communication with PTCs took place to clarify data assumptions, as well as to correct any data issues.

2.1.2 Taxicab broker records

Taxicab brokers are required to provide similar records, including trip records, driver shift logs, and collision reports, as referenced in § 546-26:

- **Trip Records:** Pick-up and drop-off locations must be accurate to the nearest intersection. Driver arrival, pick-up, drop-off times, and the time between the passenger's request and the start of the trip must be precise to the minute. If the trip is cancelled by the driver or passenger, the reason for the driver's cancellation must be provided. The fare paid must be included, along with a unique vehicle identifier and the VIN.
- **Daily Service Logs:** These logs must record the time each vehicle went into service, any off-duty periods, and the time the vehicle was last available for trip requests.
- **Collision Records:** The location, timestamp, and VIN of any taxicab involved in a collision must be reported.

Trip records are only required for trips that are dispatched by the brokerage, meaning any street hailed trips or trips completed by an individual owner-operator taxicab are not required to provided.

Of the 25 taxi brokerages, eight submitted full or partial data. Among them, six of those brokerages (representing 62% of active taxi vehicles) submitted data that was usable in some components of the analysis and findings in this report.

2.1.3 2024 VFH user survey

In August and September 2024, the City conducted a Vehicle-for-Hire user survey to gain qualitative insights into why people choose taxis and PTCs. This survey specifically targets individuals who have used taxis or PTCs to or from Toronto in the past six months.

The survey was contracted to HDR Corporation with a panel from the market research firm Maru/Blue. The survey included 1,036

respondents, reflecting household locations in both urban and suburban communities in Toronto and beyond—including Mississauga, Brampton, Vaughan, Richmond Hill, Markham, Pickering, and Ajax.

Participants were asked about their pick-up and drop-off locations, trip purposes, levels of customer satisfaction, and alternative modes they would consider if taxis and PTCs were unavailable. The survey also collected sociodemographic information and data on current and future car ownership intentions to understand how the flexibility and responsiveness of VFHs may serve as an alternative to car ownership.

A full report on the survey, including the details of the questionnaire and detailed results are included in Appendix A.

2.1.4 Other sources of data

- Traffic Emission Prediction Scheme (TEPs): The Traffic Emission Prediction Scheme (TEPs) is a model developed by the University of Toronto's Transportation and Air Quality (TRAQ) group to predict road traffic volumes and emissions in urban areas. TEPs predicts annual traffic volumes and greenhouse gas emissions for each roadway segment in the City's network and was used to measure traffic volumes on all City roads to estimate the proportion of total traffic on City roads that is taxis and PTC vehicles.
- Toronto Police Services collision records: Transportation Services receives data from the Toronto Police Services on the details of all reported collisions occurring on roads within the City of Toronto's jurisdiction. This data was used alongside available PTC and taxi data sources to analyze collision rates of these drivers in comparison to the rest of the driver population in the City. Refer to Section 2.2.5 for details on the methodology used in this analysis.
- HERE traffic speed data: Traffic speed data from HERE Technologies, provided by Transport Canada, recorded in five-minute intervals for city streets, was used to estimate vehicle paths using historic traffic conditions and to monitor congestion trends.

2.2 Methodology

This section explains the specialized analysis steps taken to support the findings presented in the subsequent chapters. This includes processes to reconcile driver records who are operating on multiple PTC platforms simultaneously, processes to estimate the distance

traveled by PTC vehicles and taxis, steps undertaken by U of T to model the sector and processes used to analyze collision data.

2.2.1 Reconciling overlapping PTC records

PTC drivers may operate on multiple platforms simultaneously (e.g., Lyft, Uber), resulting in overlapping availability records. A methodology was developed to reconcile overlapping entries by comparing availability and trip records for each VIN, eliminating overlapping periods to ensure accuracy.

2.2.2 Estimating street-level vehicle volumes from PTC data

To evaluate the contribution of vehicles-for-hire to traffic volumes, an estimate of PTC vehicle activity on city streets was made using available trip and driver availability records. Trip origin and destination points were used to chart the shortest path through the city's street network based on the network conditions when the trip was made using HERE travel times described above, allowing the calculation of vehicle volumes on various streets. Given the computational intensity of this process, a representative week was selected for each month from 2020 to 2024. Weeks with statutory holidays were excluded to ensure consistency and account for the seasonality commonly observed in PTC operations.

2.2.3 Estimating annual distance travelled by taxis

As described in Section 2.1.2, the City has received records from only six taxi brokerages, that portrays only a limited picture of taxi travel in the city from those brokerages (e.g. street hailed trips are not covered, and information about time and distance travelled without a passenger is limited). This limited data restricts the ability to conduct a comprehensive analysis of supply and demand conditions. Instead, odometer readings from inspection reports provided by MLS, covering the period from January 2005 to March 2024, were used to estimate the annual vehicle kilometres travelled (VKT) by taxis each year.

When taxi plate owners renew their licenses on an annual basis, they must complete a vehicle inspection report. This report records the vehicle’s odometer reading at the time of inspection. Because these estimates are derived entirely from odometer readings, there is no available data on where vehicles travel or whether travel was entirely for business purposes. For example, one third of taxi owners live outside of Toronto. Therefor the estimates include travel that is made outside the City of Toronto or for personal use.

2.2.4 Adapting U of T's GTAModel to support VFH analyses

The City partnered with the University of Toronto Mobility Network to leverage their expertise, particularly in transportation modelling, to study the effects of various PTC supply levels on the transportation network.

The University of Toronto has a long history of travel modelling in the City of Toronto through their development of the GTAModel. This model is designed to forecast travel patterns and test different policy decisions, and GTAModel Version 4 has been used by the City of Toronto and other GTA agencies since 2016, with previous versions being used for travel demand forecasting by City staff for over 2 decades. Since early 2024, the City has been sponsoring research at the University to expand the GTAModel for the purposes of this study, incorporating available PTC data to simulate how different levels of PTC supply would influence traveller behaviour across the city's road network. The model is calibrated to a pre-pandemic 2020 road & transit network, population data, January 2020 PTC trip data, while being calibrated on the 2016 TTS travel survey. Future updates of the model will re-calibrate it using 2022 TTS data when that data is published and available for us.

Two scenarios were run with results from the model appearing in section 5.3:

- The base case: modelling business as usual for January 2020.
- No-PTC: takes the activities and trips generated in the base case, removes the option of choosing PTC and re-runs the mode choice model for trips that had chosen PTC to force them to choose another mode. To determine how passenger demand would respond had there been no PTCs.

These insights will support decision-making regarding VFH supply and its broader impacts on the city's transportation network.

A detailed report from U of T is provided in Appendix B that provides further detail on the modelling methodology and findings.

2.2.5 Estimating VFH collision rates

An investigation was conducted into collisions involving the drivers of vehicles for hire to determine whether there is any road safety concern with the VFH industry on the City's road network. Due to several limitations with the available taxi data, this analysis could only be

conducted for PTCs. The analysis was conducted by matching Toronto Police collision records with the ML&S licensing database to identify PTC vehicles that were involved in collisions. These collisions were then filtered to confirm that the driver had been active on the platform on the day of the collision. After filtering, the collisions were normalized against the total VKT travelled by PTCs to estimate a collision rate. This collision rate was then compared against the full vehicle population's collision rate to measure whether collisions are more or less frequent in the PTC vehicle population compared to general city-wide vehicle population. A few additional notes and assumptions from the analysis methodology include:

- The analysis focused only on collisions that involved minor, major or fatal injuries, meaning at a minimum, one person required treatment in an emergency room.
- As described in Section 2.1.1, PTCs are required to submit collision records to the city that include the location, timestamp, and VIN of any PTC involved in a collision. However, there is significant uncertainty in the information contained and how complete the records are of PTC-involved collisions in the City.
- Attempts were made to match these PTC-reported collisions to Police collision records; however this linking was extremely challenging as they could only be matched by time and location as there are no additional common identifiers in the data and significant uncertainty in how the PTC records were collected. As a results, the PTC collision records were not used for this analysis.
- Due to the occasional nature of PTC driving, most drivers also frequently use their vehicle for personal use. For a fair comparison, it is necessary to determine whether the driver has been active on a PTC platform when the collision occurred. Due to uncertainty in the data around the recorded date and times of collisions, collisions were assumed to be on the platform if the PTC vehicle recorded platform activity within 24-hours of the reported collision time.

Given the challenges with determining whether a vehicle for hire was actively engaged when a collision occurs, a recommendation from this study is that vehicles for hire involved in collisions should be required to provide an incident identification number issued by the Toronto Police Service or Collision Reporting Centre so these datasets can be more effectively linked and analyzed going forward.

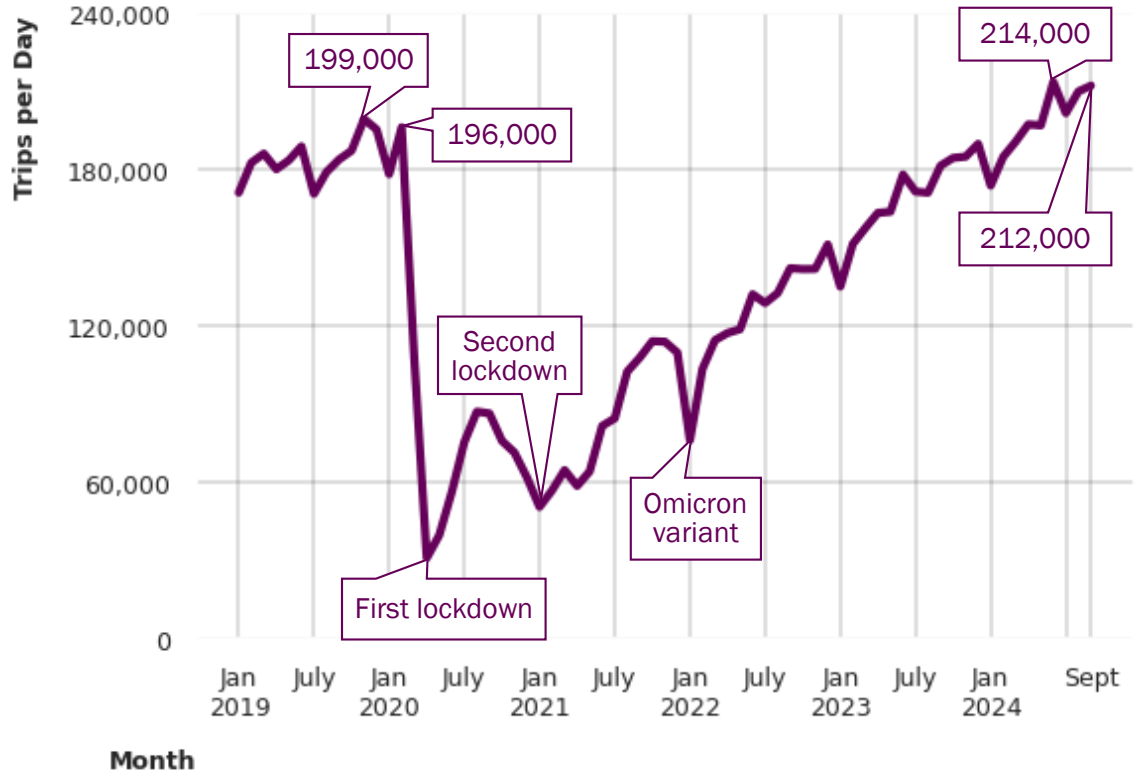
3 VFH Demand and Travel Trends

This section examines trends in PTC trip-making and looks at customer preferences for VFH and their shifts in terms of trip patterns over time and by geography. Additionally, it draws on results from surveying 1,036 VFH users to analyze the benefits taxi and PTCS users derive from taking these modes.

3.1 PTC trips have continued to grow and are 7% higher in September 2024 than pre-pandemic peak levels

Figure 3-1 shows the average daily number of PTC trips by month from January 2019 to September 2024. During the COVID-19 pandemic, the average daily PTC trips declined sharply from a peak of 199,000 in November 2019 to a low of 31,000 in April 2020. Since then, the number of trips has steadily increased, with only minor declines related to various pandemic stay-at-home orders and seasonal fluctuations, reaching a peak of 214,000 trips in June 2024. In September 2024, the average daily trips were at 212,000, approximately 7% above November 2019 peak levels.

Figure 3-1 Average daily trips by month from January 2019 to September 2024

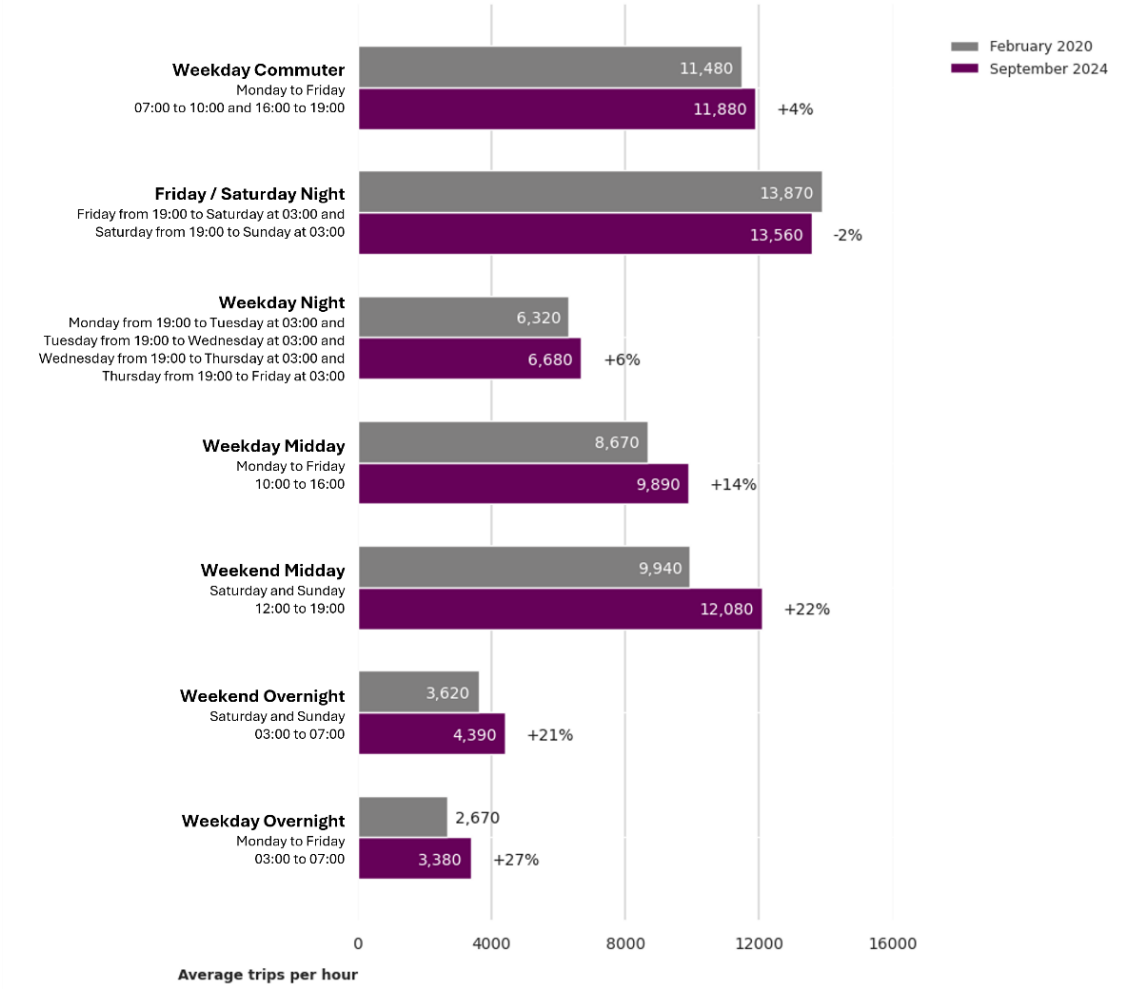


3.2 Friday and Saturday night trips and commuter trips remain the busiest trip markets but fewer than pre-pandemic levels

Figure 3-2 shows the changes in time-of-week travel patterns by comparing February 2020 (before the pandemic) with September 2024. Trips increased by 9.2% over this time span. Similarly, all trip markets increased from 2020 to 2024, except for the Friday/Saturday night trip market. The weekend and weekday overnight trip markets experienced the largest increases (over 20 percent growth in each case) which is partly driven by the rise in trips to and from Pearson Airport (see Section 3.4 for details).

The weekend midday trip market increased by an average of over two thousand trips per hour, surpassing the weekday commuter trip market. The average number of trips per hour on Friday/Saturday nights declined by two percent (or 300 trips per hour) but it remains the trip market with the highest hourly trip count.

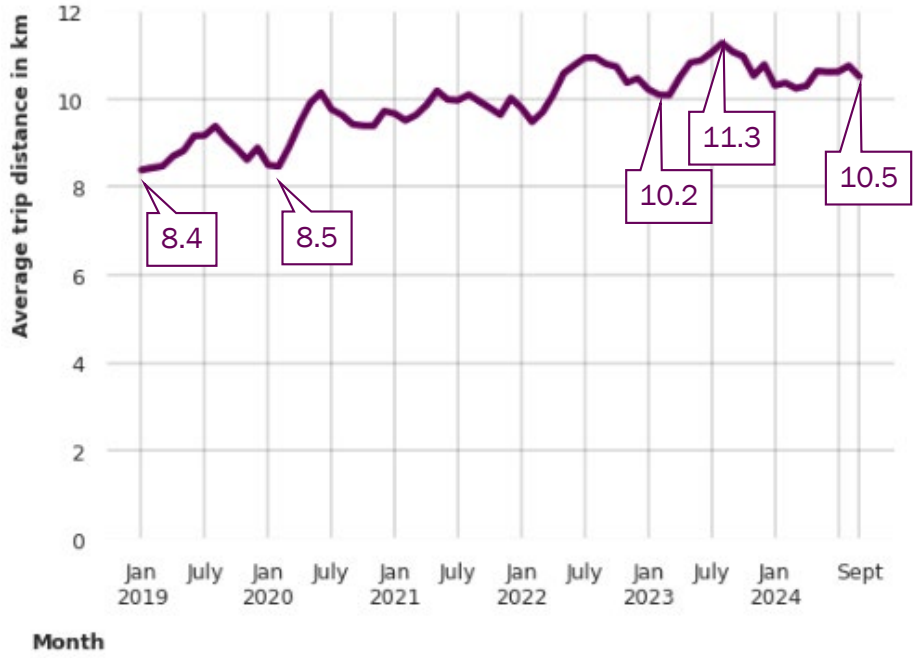
Figure 3-2 Change in time-of-week trip markets between February 2020 and September 2024



3.3 Average PTC trip distance has increased since before the pandemic

Figure 3-3 shows the average trip distance by month from January 2020 to September 2024. In February 2020, the distance of an average trip was 8.5 km. This figure peaked at 11.2 km in August 2023, before slightly decreasing to 10.2 and 10.5 km in March 2024 and September 2024 respectively. This change is partly due to shifts in trip patterns away from within the denser Toronto & East York and towards the less dense Etobicoke-York, North York and Scarborough (see 3.5). The proportion of trips under 5km fell from 50% of all trips in February 2020, to 40.5% in September 2024. The increase in the average trip distance starting in early 2022 is partly the result of increasing trips to and from Pearson Airport.

Figure 3-3 Average trip distance by month from January 2019 to September 2024



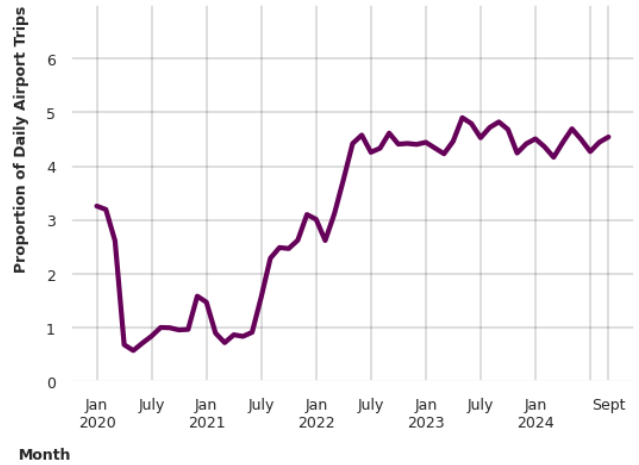
3.4 Proportion of travel to Pearson Airport has increased since before the pandemic

An important trip market for all Vehicle-for-Hire services is trips to and from Pearson Airport. Figure 3-4 shows the percentage of daily PTC trips to Pearson and the number of daily pickups and drop-offs at the airport. About 3.2% of PTC trips were to or from Pearson airport in February 2020. This figure dropped to as low as 0.6% in May 2020, due to pandemic-related travel restrictions. The percentage has been mostly stable, fluctuating between 4 and 5% since mid- 2022.

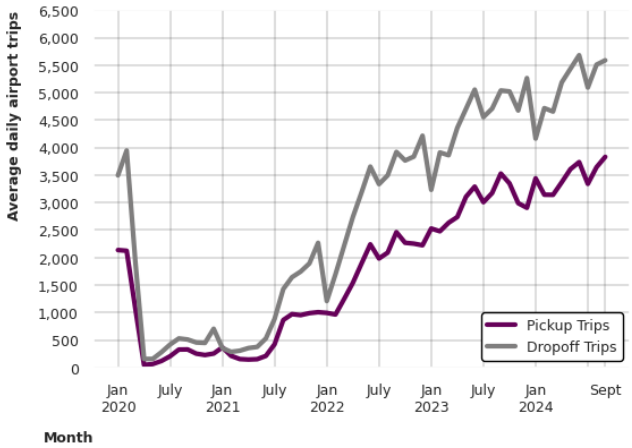
The number of drop-offs at Pearson is approximately 60% higher than the number of pickups. In September 2024, there were 6,000 drop-offs and 3,800 pickups daily for PTC airport customers.

Figure 3-4 Proportion of airport trips and overall daily airport trips from January 2020 to September 2024

A. % of daily PTC trips to and from Pearson Airport



B. Number of daily airport trips



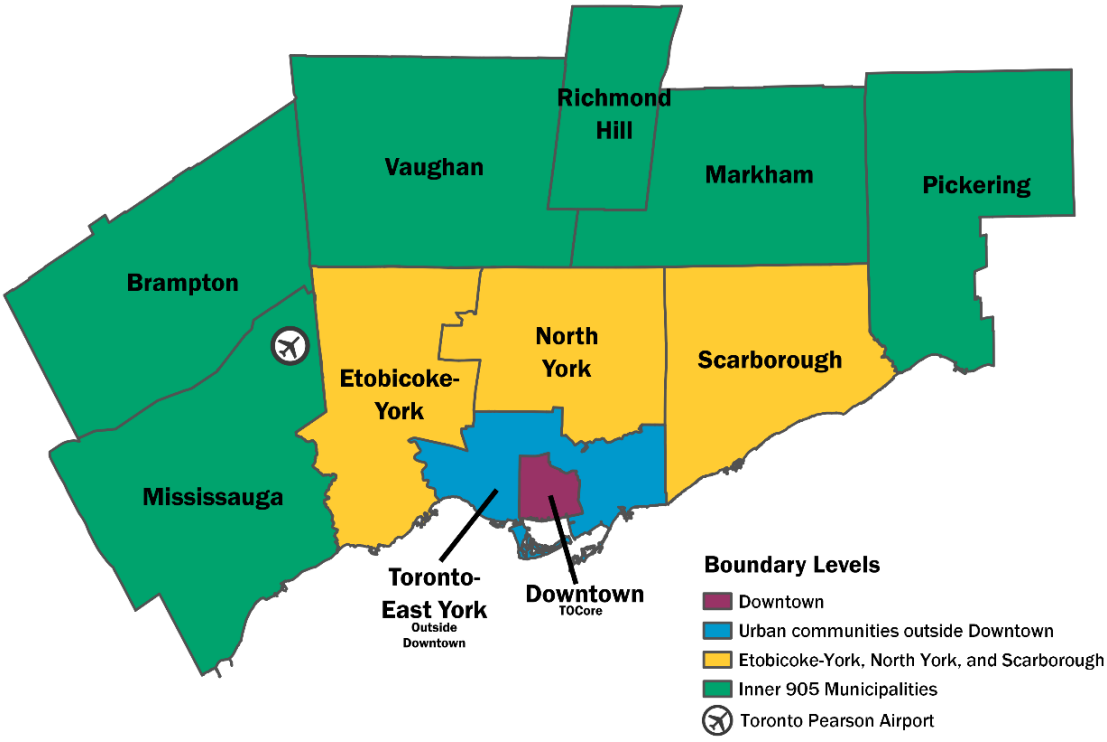
3.5 Growth in PTC trips higher in suburban communities since the pandemic

In September 2024, PTC demand continues to be oriented towards the center of Toronto, 61% of trips start or end within Toronto and East York and 42% of trips start or end within the smaller Downtown zone (see map in Figure 3-5).

However, looking at how travel patterns have changed since February 2020, the table in Figure 3-5 shows there has been a significant shift in trips away from the center of Toronto towards more suburban communities. Trips to or from Downtown Toronto have decreased by 8% since February 2020, while trips to or from Etobicoke, North York and Scarborough have increased by 18-20% and trips to or from 905 municipalities have increased by about 50%. Looking more closely at downtown trips, trips contained within downtown Toronto have decreased by 18% while trips between downtown and suburban areas in Toronto or the 905 have increased.

This trend suggests a shift in PTC demand toward more suburban communities, likely influenced by a rise in remote work since the pandemic, given the high concentration of employment in the downtown area. Additionally, a decrease in trips related to downtown activities, such as visiting bars or attending events after work, has further contributed to the reduction in trips starting from or destined to the downtown core.

Figure 3-5 Changes in daily average trips by zones between February 2020 and September 2024



From Zone	To Zone					
	Downtown	Toronto and East York*	Etobicoke-York, North York, and Scarborough	Inner 905 Municipal-ites**	Toronto Pearson Airport	**Total**
Downtown	-18% -6,700 trips	-5% -800 trips	18% +1,200 trips	37% +700 trips	45% +600 trips	**-8%** **-5,000 trips**
Toronto and East York*	-6% -1,100 trips	-14% -2,800 trips	21% +1,700 trips	71% +700 trips	28% +300 trips	**-3%** **-1,200 trips**
Etobicoke-York, North York, and Scarborough	23% +1,500 trips	23% +1,700 trips	13% +6,600 trips	54% +4,300 trips	47% +800 trips	**20%** **+14,900 trips**
Inner 905 Municipal-ites**	52% +600 trips	81% +500 trips	41% +2,500 trips	N/A	N/A	**46%** **+3,600 trips**
Toronto Pearson Airport	80% +600 trips	66% +300 trips	89% +800 trips	N/A	N/A	**80%** **+1,700 trips**
Total	**-8%** **-5,100 trips**	**-2%** **-1,000 trips**	**18%** **+12,800 trips**	**53%** **+5,600 trips**	**42%** **+1,600 trips**	**7%** **+14,000 trips**

* Excludes the area within Downtown

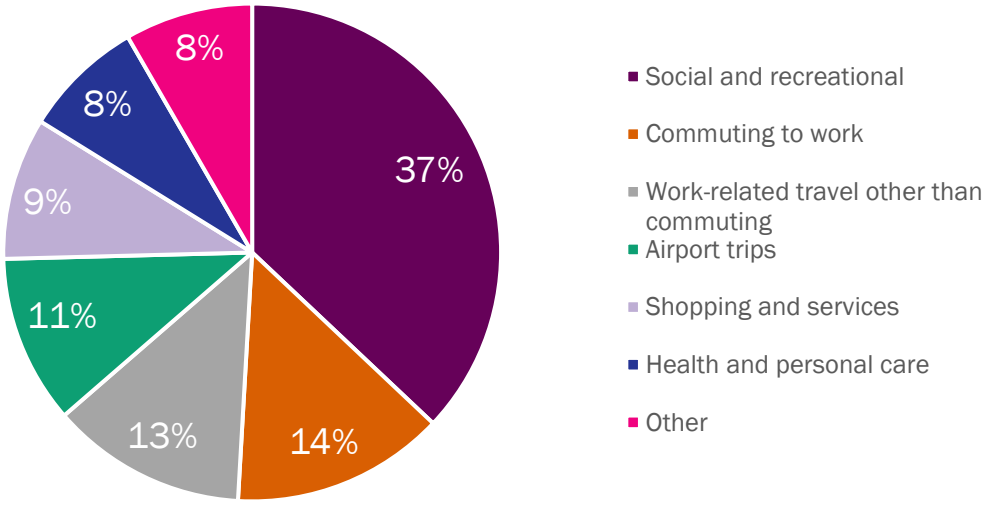
** Excludes Toronto Pearson Airport

3.6 Vehicles for hire serve a wide range of trip purposes

VFH services (both PTCs and taxis) have been found to have a unique role in Toronto's transportation system and are used regularly for a wide range of trip purposes. Figure 3-6 illustrates the diverse reasons for using these services, which include:

- **Social and recreational trips (37%)**: A large proportion of users depend on VFH services for social and leisure activities such as visiting friends, going to bars and restaurants, attending events, and recreational outings. VFH services are recognized as being an important option for residents to be able to access entertainment options while drinking responsibly.
- **Work-related travel (27%)**: Many rely on taxis and PTCs for commuting to and from work (14%) as well as other work-related travel (13%), however this is a much lower proportion than is typically seen in other modes like driving and transit trips.
- **Airport trips (11%)**: A significant number of respondents use these services for airport transportation

Figure 3-6 Primary trip purpose of user's last trip based on VFH user survey



3.7 Speed and reliability are the major reasons users choose taxi and PTCs

Speed and reliability are the primary reasons users opt for taxi and PTC services. The VFH user survey confirmed these preferences, highlighting the importance of timely and dependable transportation options. Survey results shown in Figure 3-7 indicate that 47% of

respondents prioritize speed, while 40% emphasize reliability when selecting VFH services over other transportation options. Additionally, ease of requesting service (36%) and cost (33%) are notable factors influencing user decisions.

Figure 3-7 Top reasons for choosing taxi and PTCs based on vehicle for hire user survey

Reason for choosing taxi or PTC	% of responses
Speed - Get there as soon as possible	47%
Reliability - Get there at the time I want confidently	40%
Easy to request service – Easy to request a trip on an app	36%
Cost – Lower cost than driving and parking, knowing fare in advance, group travel saves money	33%
Driving hassle – Navigating congestion, low parking availability, high parking cost	33%
Limited transit – Poor/lack of transit service, service disruptions	29%
Weather – Manage travel in poor weather conditions	28%
Entertainment or social outings – Choosing a safer travel option after entertainment or social events	25%

3.8 User satisfaction with PTC and taxi services is high

Satisfaction levels were found to be high among both PTC and taxi users, with 80% of PTC users and 73% of taxi users reporting they were "satisfied" or "very satisfied" with the services. The ratings were based on nine customer service indicators, including service availability, customer support, vehicle comfort, travel information, ease of requesting service, and cost. Satisfaction was high across all categories, with lower satisfaction for cost.

Figure 3-8 Percentage of users reporting 'Satisfied' and 'Very satisfied' on major quality of service measures in the VFH user survey

Major quality of service measures	Taxis	PTCs
Cost	54%	59%
Ease to request service	80%	86%
Knowing the fare in advance	63%	85%
Receive real-time pick-up information	70%	83%
Safety	80%	83%
Service availability	79%	82%
Vehicle comfort	78%	84%

3.9 There are approximately two passengers per taxi or PTC trip

According to the VFH user survey, the average number of occupants for taxi trips is 2.0, while for PTC trips it is 1.9. Figure 3-9 shows the percentage breakdown of trip companions during a user's most recent taxi or PTC journey, based on the VFH user survey. A 61% majority of VFH trips include at least one companion with around one-third of users reported traveling with family members (with or without children), and just under one-fifth travelled with friends. Fewer than 40% of respondents travelled alone on their most recent trip

Figure 3-9 Percentage of the trip companions on most recent taxi or PTC journey from VFH user survey

	Taxis	PTC
Travelled alone	39%	38%
Other family members (10 years old and over)	28%	25%
Friend	18%	19%
Children (Under 10 years old)	7%	8%
Colleague	6%	6%
Other	2%	3%

4 VFH Supply and Efficiency Trends

This section examines how drivers have been providing VFH services, examines changes in total distance travelled by the industry, analyzes its efficiency through how much of that was done without passengers, and how the matching of driver supply to consumer demand results in changes in wait times for customers.

4.1 The annual distance travelled by vehicles for hire has increased since the emergence of PTCs, while the proportion driven by taxis has fallen to 17%

Distance travelled is used as an indicator of activity in the sector as complete trip records are not available for the taxi sector. Figure 4-1 shows the estimated distance travelled annually by all licensed taxis and PTCs. The estimates for annual distance travelled are based on:

- PTCs: Distances calculated using PTC trip and availability data submitted to the City (see Sections 2.2.1 and 2.2.2).
- Taxis: Odometer readings collected during ongoing vehicle inspections (see Section 2.2.3).

There has been a significant shift in the distance travelled by licenced vehicles for hire in the City. The distance travelled by taxis declined sharply, dropping from 484 million kilometres in 2010 to just under 167 million kilometres in 2023.

The City began receiving sufficiently complete data on distance travelled by PTC vehicles in 2020. However, estimates were made for earlier years when PTCs were legally operating based on trip distances reported and the proportion of PTC distance travelled spent on trip (see Section 4.5 below), using 55% and 70% of distance travelled on trip as the high and low range of the estimates. At its peak in 2019, PTC distance travelled was estimated to range between 0.85 and 1.08 billion kilometres, combining with taxis to reach a maximum of 1.40 billion kilometres travelled on City streets.

By 2023, as the sector recovered from the pandemic, PTC vehicles logged just under 837 million kilometres. Combined, taxis and PTC vehicles travelled a total of 1.00 billion kilometres on City streets in 2023, still slightly below the combined peak levels in 2019.

Figure 4-1 Estimated annual distance travelled in kilometres for PTCs and taxis from 2010 to 2023

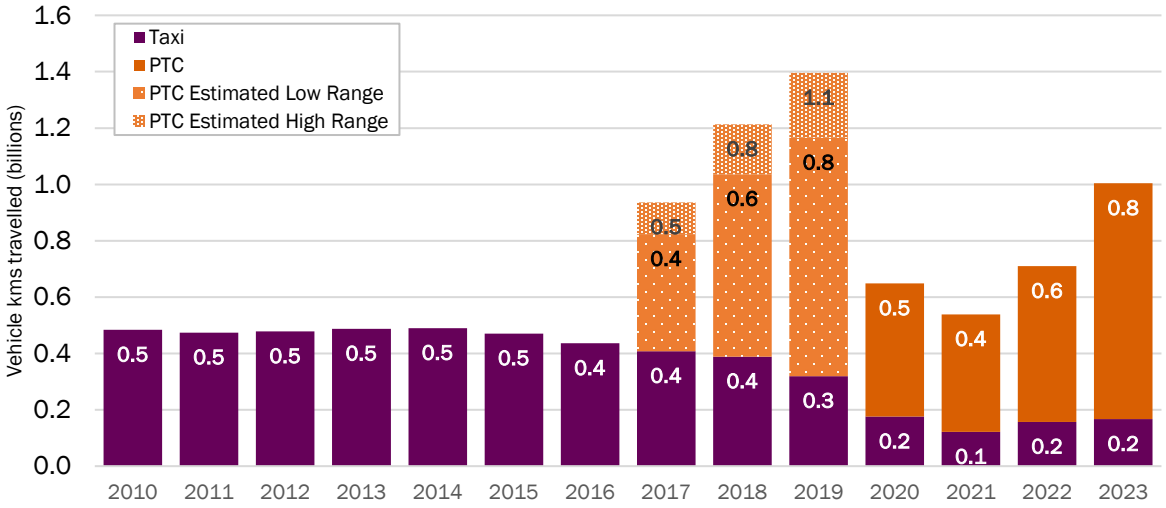


Figure 4-2 shows the number of licenses and the distance travelled by taxis and PTCs in 2023. Taxis significantly exceed their proportional share of distance travelled, accounting for 6% of total VFH licenses but covering 17% of the total distance travelled. In contrast, PTCs hold 94% of licenses yet account for 83% of the distance travelled. Consistent with the part-time nature of many PTC drivers, PTCs drove 18,900 kilometres per vehicle while taxis drove 57,700 kilometres per vehicle in 2023.

Figure 4-2 Drivers and vehicle kilometres travelled by taxis and PTCs in 2023

	Taxis	PTCs
Number of active vehicles	3,350	54,950
% of vehicles	6%	94%
Vehicle kilometres travelled*	167,000,000	837,000,000
% of vehicle kilometres travelled*	17%	83%
Kilometres travelled per vehicle	57,700	18,900

* Includes reported distance travelled while travelling outside the City of Toronto

4.2 The number of daily active PTC vehicles increased to 26,300 in September 2024

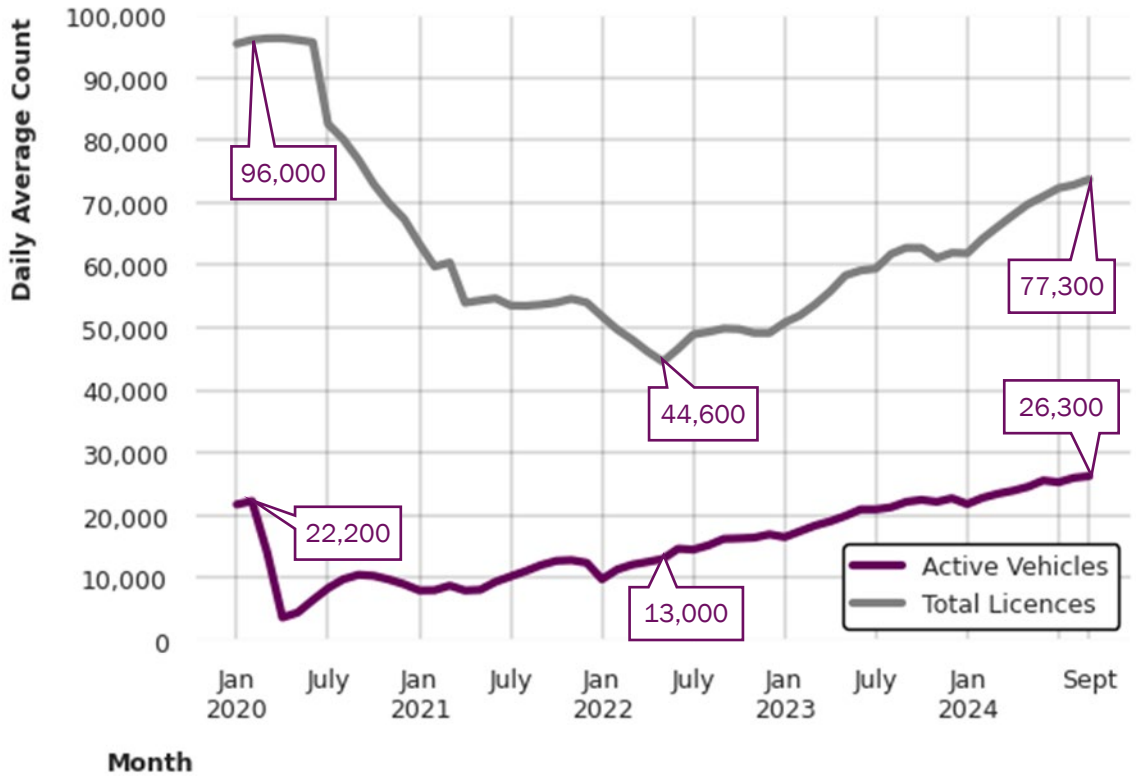
Due to the flexible nature of PTC driving, the number of licenses does not always reflect the actual number of vehicles in service at any given time. For this analysis, an active vehicle is defined as one with a driver who has accepted at least one customer trip. This measure provides a more accurate measure of the sector's impact on the road network.

Figure 4-3 illustrates changes in active licences and the daily average of active vehicles over time, from January 2020 to September 2024.

The number of licensed drivers reached a low of 44,600 in May 2022. This decline coincided with the City's licensing pause, enacted in November 2021, which required PTC drivers to complete mandatory training before renewing their licences. Licences began to be reissued around May 2022 as drivers met these training requirements.

In May 2022, when the number of licensed drivers was at its lowest, active vehicles dropped to 13,000. Since then, approximately 1,000 net new PTC driver licenses have been issued each month on average. This growth in licensed drivers has coincided with a monthly growth of 470 additional active vehicles on the road on an average day. As of September 2024, there were an average of 26,300 active PTC vehicles operating daily in the City out of the 77,300 total active PTC licences.

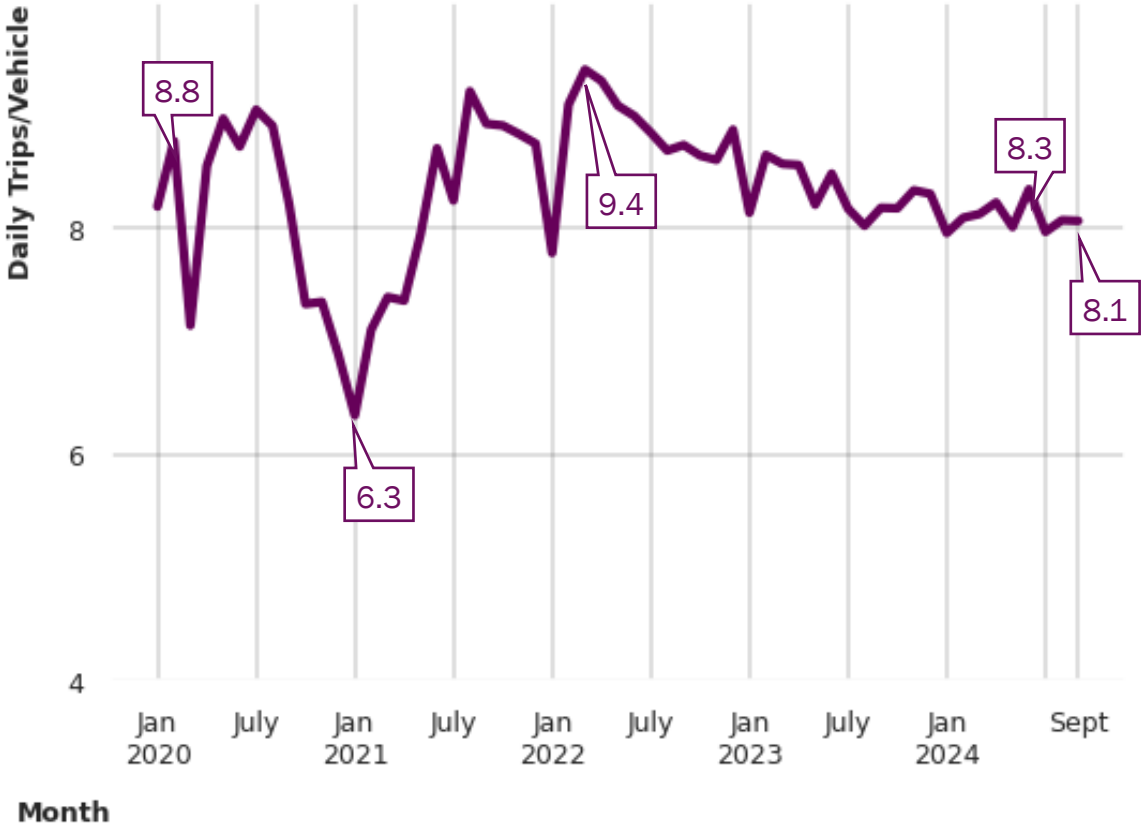
Figure 4-3 Active licences and daily average active vehicles by month from January 2020 to September 2024



4.3 Each PTC vehicle carries just over 8 trips per day each month in 2024

Figure 4-4 shows by month the average number of trips each PTC vehicle makes each day it is active. The number of daily trips per vehicle has been steadily declining since its peak of 9.4 in March 2022. However, the figures show some stabilization in 2024, with trips ranging from 8.0 to 8.3 per day.

Figure 4-4 Average daily trips per vehicle by month from January 2020 to September 2024



4.4 Wait times for PTCs have increased since before the pandemic and have stabilized since 2023

Wait times and trip cancellations are key measures of the quality and responsiveness of vehicles for hire. As shown in Figure 4-5 Graph A, wait times for PTCs have steadily decreased since mid-2022, from a peak of 6.8 minutes to 4.3 minutes in September 2024. Despite this improvement, wait times remain above the pre-pandemic level of 2.3 minutes recorded in February 2020.

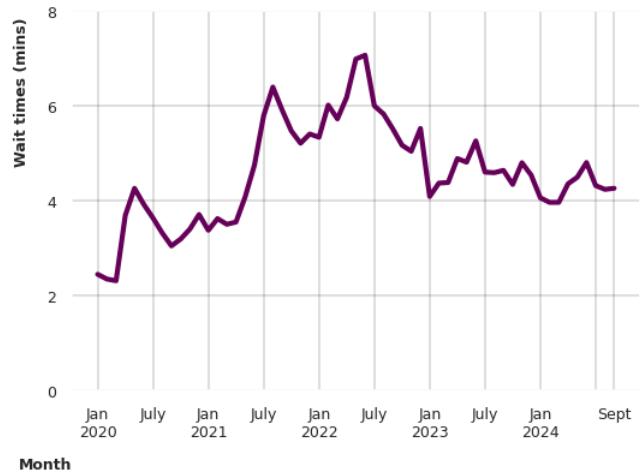
Graph B shows that PTC driver cancellations have remained relatively stable, ranging between 0.8% and 1.7%. As shown, rider cancellations often increase as wait times rise, with some riders opting for other

transportation options or abandoning their trips entirely. For example, in February 2020, when wait times were 2.3 minutes, trip cancellation rates were low at 3.3%. In June 2022, wait times peaked at 7.1 minutes, coinciding with a rise in rider cancellations, which reached 9.2% of PTC trip requests.

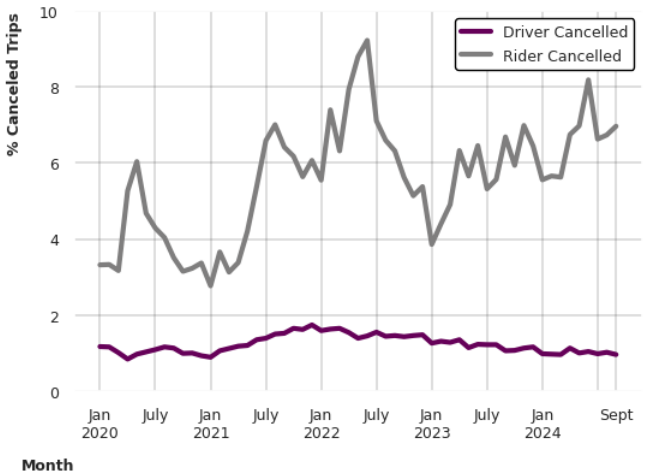
Detailed data from six taxi brokerages, available only since January 2023, is presented in Graphs C and D. Taxi wait times have remained relatively stable through October 2023, averaging around 16 minutes. However, one brokerage reported a reduction in wait times between November 2023 and March 2024, bringing the overall average down to just over 9 minutes by March 2024. Trip cancellation rates for taxis have remained relatively steady, with driver cancellations ranging from 0.5% to 2%, and passenger cancellations between 5% and 9%.

Figure 4-5 Wait times and trip cancellation rates for PTCs and taxis

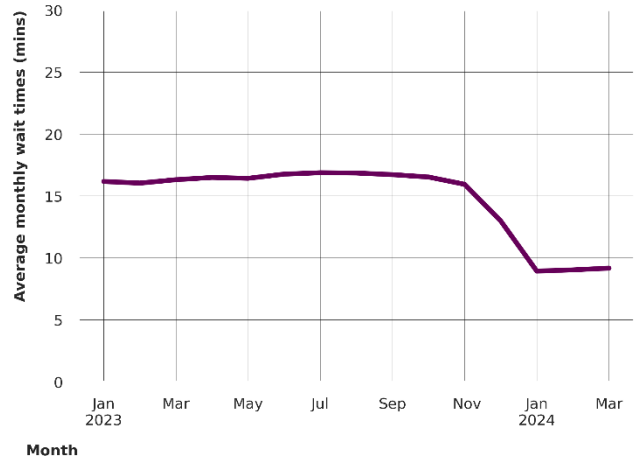
A. Average Trip Wait Times – PTCs



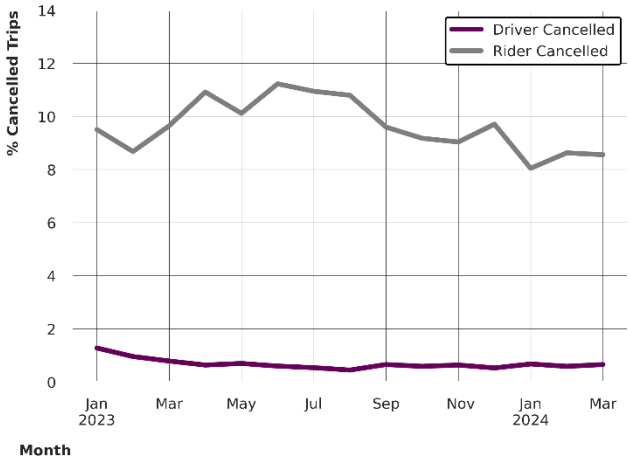
B. Trip Cancellations – PTCs



C. Average Trip Wait Times – Taxis



D. Trip Cancellations - Taxis



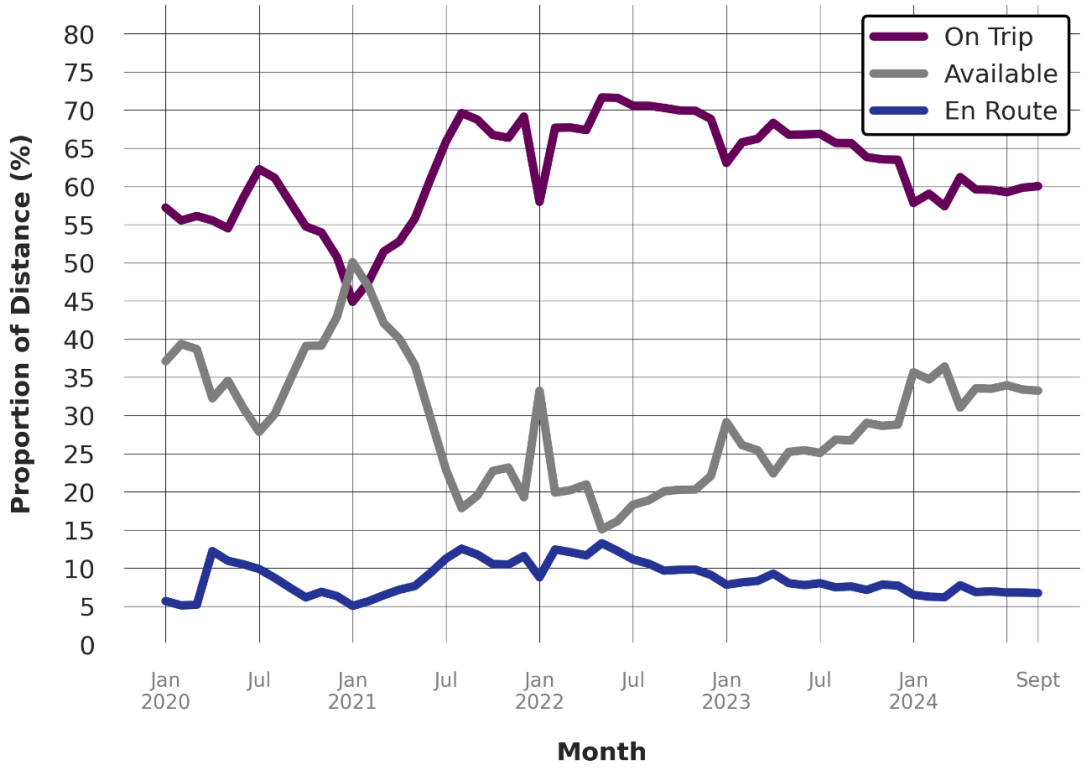
4.5 PTC vehicles are travelling an increasing amount empty since March 2022

Figure 4-6 shows the proportion of distance traveled in various phases of a PTC driver's shift:

- **Available:** the driver is logged onto the PTC application ready to take customers (while these are de-duplicated within the PTC industry, the vehicles could be active doing food delivery)
- **En route:** from accepting a trip request to the requested pick-up
- **On-trip:** from picking up the customer to their destination.

The percentage of distance travelled by PTC vehicles while on trips with passengers has declined steadily from a peak of 72% in May 2022 to 60% in September 2024. The proportion of distance travelled while empty and available has increased from 17% to 33% over this same period. While this high degree of availability leads to higher service quality and lower wait times for PTC customers, it also results in increased vehicles on the road. The increase in empty travel is partially due to the number of active PTC vehicles growing faster than the number of trips, leading to a trend of fewer trips per active vehicle.

Figure 4-6 Breakdown of vehicle distance spent in each period while on PTC applications



5 VFH Impact on the Transportation Network

This section examines the impact of vehicles for hire on the City's transportation network, beyond just supply and demand characteristics. The goal is to provide insight into their contribution to overall traffic volume relative to the demand they serve and their impacts on public transit.

5.1 PTCs make up 14.2% of vehicle travel in the downtown core in 2024

The impact of PTCs on the transportation network is largely a function of the amount of driving its vehicles are adding on to the City's road network, measured in vehicle-kilometres travelled (VKT). Together with any potential impacts on traffic volumes and congestion, additional VKT can also directly affect the City's ability to meet its climate change goals under the TransformTO Climate Action Strategy. Increased VKT has also been found to have adverse impacts on air quality, health, safety, and noise.

An analysis of PTC supply on Toronto streets shows that their share of total distance traveled varies widely across different areas of the city with much higher concentrations in the downtown core. Figure 5-1 summarizes the vehicle kilometers traveled by PTCs across various sections of Toronto in 2024. In September 2024, PTCs accounted for 14.2% of total traffic in the downtown core, compared to 3.6% in the suburban areas, and 4.5% city-wide. Comparable data is not available for taxis until digital meters are rolled out, but taxi VKT was estimated as being 27% of the VFH mix in 2023.

Given the varying concentration of PTC vehicles, supply management policies targeting the most concentrated areas would more effectively control volume and congestion while ensuring essential service coverage in the city's suburban communities.

Further examination of select weekday hours in the downtown core shows that PTCs make up about an estimated 11.6% to 12.7% of vehicle traffic during AM and PM peak hours, when traffic volume is highest (see Figure 5-2). The hour with the highest concentration of PTC vehicles on an average weeknight is between 12 am and 1 am where it is estimated to represent 25.5% of total vehicle distance travelled.

Figure 5-1 Vehicle kilometres travelled by PTC by different areas of the City in 2024

Vehicle kilometres travelled	Downtown *TOCore*	Toronto and East York outside Downtown	Etobicoke-York, North York, and Scarborough	City of Toronto Overall
From PTC vehicles Sept 2024 weekdays	248,800	421,700	1,307,800	1,978,300
From all vehicles 2023 average daily values	2,644,000	7,894,700	59,217,000	69,755,700
PTC % of all vehicles	14.2%	8.2%	3.6%	4.5%

Figure 5-2 Vehicle kilometres travelled by PTC in downtown core of the City in 2024 at select hours of the day

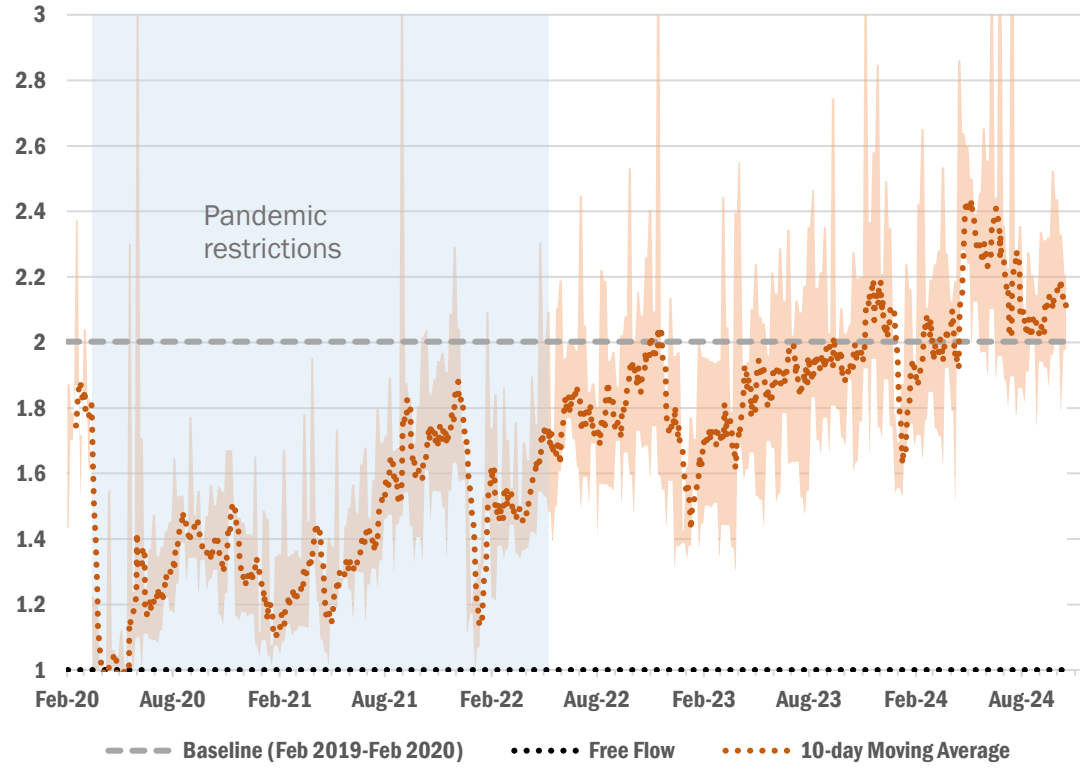
Statistic	AM Peak Hour 8-9 am	Midday 12-1 pm	PM Peak Hour 5-6 pm	Weeknight 12-1 am	All day
PTC vehicles Sept 2024 weekdays	17,300	16,700	20,100	14,200	374,900
All vehicles 2023 average day	148,800	143,800	157,900	55,600	2,645,300
% PTC	11.6%	11.6%	12.7%	25.5%	14.2%

5.2 Increased vehicle volumes downtown is occurring during increased congestion

The downtown transportation network is complex and ever changing. Ongoing road, transit, utility, and development construction has affected travel times downtown, in particular rehabilitation work on the Gardiner that began in May 2024. While it is difficult to isolate the congestion impact of the 14.2% of vehicular traffic being PTCs in a changing environment, it is unquestionable that they are contributing to slowing down traffic. Figure 5-3 shows the travel time index for the Weekday PM Peak Hour (5-6 PM) since February 2020. The pre-pandemic baseline of 2.0 means that on average travel times were double what they would be overnight in the absence of congestion. Downtown started reaching these levels of congestion again consistently starting in November 2023, with travel times increasing sharply in May 2024 when Gardiner rehabilitation led to lane closures. As PTCs are operating within this congested downtown, they make up

14.2% of this traffic and as a result play a role in the overall congestion levels in the downtown. While there is no specific evidence that these PTC volumes are driving acute growth in congestion, they are a significant part of the mix of vehicles circulating in downtown Toronto.

Figure 5-3 Downtown Travel Time Index (TTI), Weekday PM Peak Hour (February 3, 2020 - October 18, 2024)



5.3 Impact of vehicles for hire on transit

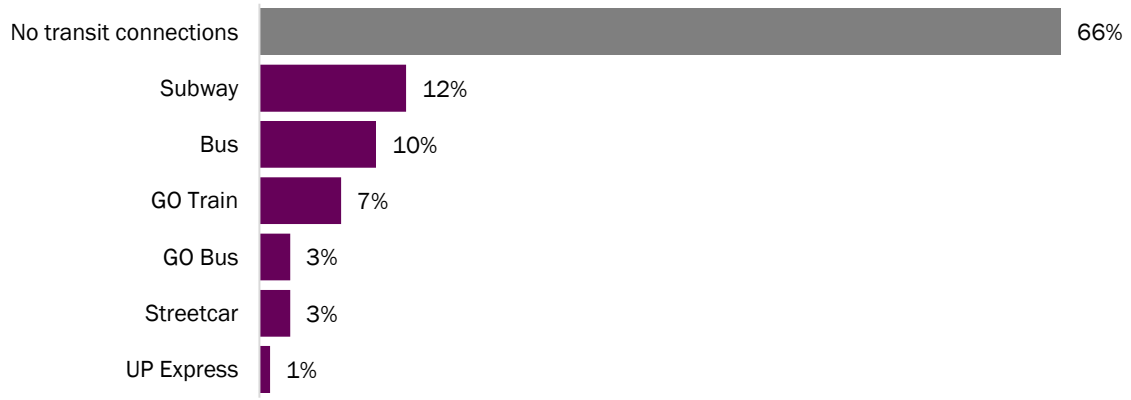
The introduction of PTCs has affected transit systems in cities worldwide, including Toronto. To assess the influence of PTCs on transit in Toronto, the City employed two methods:

1. Conducted a VFH survey by HDR Corporation, in collaboration with market research firm Maru/Blue, to explore alternative transportation options to PTCs and taxis (as discussed in Section 2.1.3 and Appendix A), and
2. Analyzed transportation impacts using a model developed by the University of Toronto, simulating a scenario in which PTC services were unavailable (as discussed in Section 2.2.4 and Appendix B).

5.3.1 34% of PTC users indicated they used taxis and PTC to connect to transit

In the survey of VFH users, 34% of PTC users and 40% of taxi users indicated that their trip involved a connection to public transit. This suggests that vehicles for hire play a complementary role in filling gaps in transit service coverage and frequency within the city. Figure 5-4 shows the percentage of respondents who indicated using a PTC to connect to or from transit on their most recent trip.

Figure 5-4 Percentage of respondents indicating they connect to/from transit on their last PTC trip



5.3.2 41% to 61% of PTC users would choose transit as an alternative if PTC services were not available

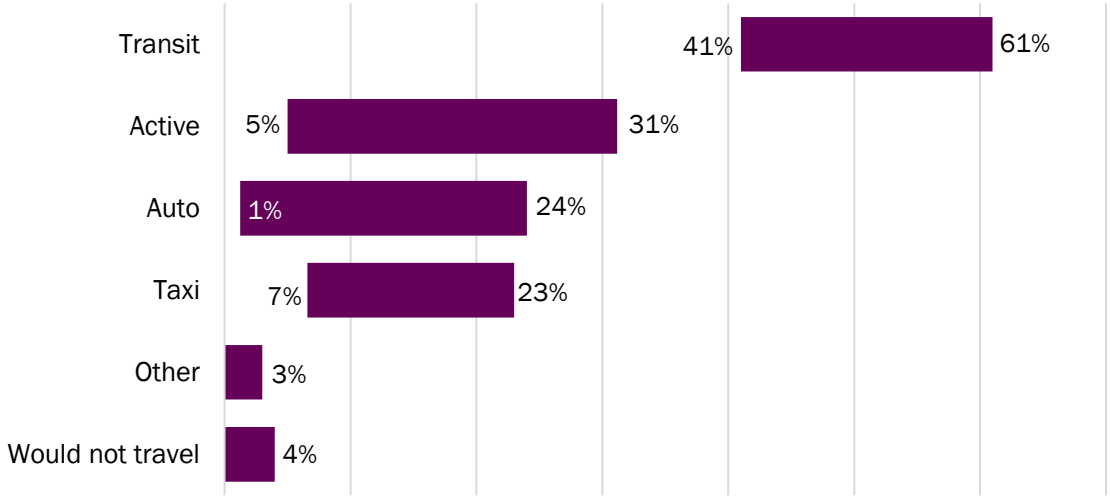
Figure 5-5 shows the percentage ranges from the VFH user survey and the University of Toronto's modeling work, indicating alternative modes selected in a hypothetical scenario where PTC services were unavailable. It is estimated that 41 to 61% of PTC users would choose transit as an alternative, while 5 to 31% would opt for cycling or walking. Additionally, 1 to 24% would either drive themselves or rely on a ride from someone else.

These figures can be contextualized against TTC's daily riders, with the more recent data published for 2024 as part of the TTC's corporate KPIs[4]. Based on an average weekday PTC trip volume of 193,000 (July 2024 figures) and applying the 41% to 61% rate of PTC users stating they would use transit as the alternative if PTC is not available, approximately 79,000 to 118,000 of these trips would have used transit for at least part of the journey. The TTC's daily number of revenue rides was 1,300,000 on a typical weekday in July 2024. After

[4] Corporate KPIs Toronto Transit Commission for July 2024, Published in September 2024

accounting for the 24% of PTC trips that would still connect to TTC services such as subway, bus, or streetcar routes, the shift from PTC trips to transit would represent approximately 4.6% to 6.9% in weekday TTC ridership. It is challenging to estimate which routes are most impact, however previous research on the topic indicated that ridehailing from 2016-2018 in Toronto generally improved subway ridership while reducing surface transit ridership[5].

Figure 5-5 Alternative modes chosen by PTC users if service was not available based on the VFH user survey and University of Toronto's transportation model



Beyond the numbers, it is important to note that PTC users are also transit users, according to data from the VFH user survey. The survey shows that 37% of VFH users reported using transit frequently (several times a week or more), while only 14% of VFH users reported using PTC services at the same frequency. As a result, while PTC use may contribute to some shifts away from transit, it also serves to complement transit particularly when there is greater urgency for speed and reliability of travel, for example during subway disruptions where PTCs can complement bus bridging to help passengers get to their destinations[6].

[5] Li, Wenting, A. Shalaby, and K. N. Habib. "Exploring the Ridership Impacts of Ride-Hailing on Multimodal Public Transit in Toronto." *Transportation Research Record: Journal of the Transportation Research Board* (2018).
[6] Liu, Rick, et al. "A social equity lens on bus bridging and ride-hailing responses to unplanned subway disruptions." *Journal of Transport Geography* 88 (2020): 102870.

5.3.3 28% of PTC trips would take at least 30 minutes longer on transit

As part of the modelling work described above, the research team from the University of Toronto Mobility Network analyzed the trip level data of people who would switch from PTC to transit in the scenario where PTCs are not available in Toronto in order to study the benefits passengers derive by using PTC over transit. Figure 5-6 summarizes the change in travel time that a PTC rider would face switching to transit in the case that PTCs were not available for the trip. The data indicate that 28% of PTC trips would take 30 minutes or longer on transit when transit was chosen as the best available alternative. These proportions are generally consistent regardless of where in Toronto the trip originated from.

Figure 5-6 Increase in travel times switching from PTC to transit if PTC services were not available

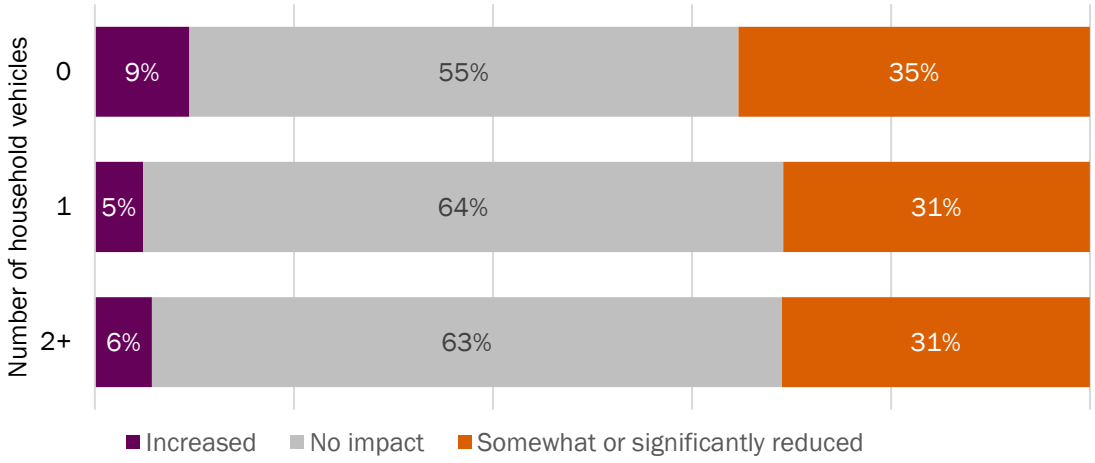
Increase in travel times switching from PTC to transit	Proportion of PTC trips
Between 0.0 and 14.9 minutes	7%
Between 15.0 and 29.9 minutes	26%
Between 30.0 and 59.9 minutes	21%
60 minutes or greater	7%
Total	61%

5.4 Taxi and PTC services help households live car-light or car-free

Taxi and PTC services provide additional mobility options, reducing people's reliance on vehicle ownership. Figure 5-7 illustrate the impact on households:

- Among households with no vehicles, a significant majority of users reported that PTCs had either no impact or reduced the need for vehicle ownership. This was the case for 90% of taxi and PTC users.
- In households with one or more vehicle, a larger proportion of users indicated that these services reduced the need to own additional vehicles (31% of taxi and PTC users) compared to those who reported an increased need (5 to 6% of taxi and PTC users).

Figure 5-7 Access to taxi and PTC services and its impact on reducing or increasing need for a personal car by number of household vehicles owned



6 VFH Impact on Road Safety

The City is dedicated to reducing traffic-related fatalities and injuries on Toronto's streets. The Vision Zero Road Safety Plan focuses on protecting vulnerable road users through proactive, targeted, and data-driven measures. From a VFH perspective, understanding its impact on road safety is the first step in determining whether additional policy measures are needed.

A review of studies using aggregate collision statistics in North America & Europe has found that there isn't a clear trend between the introduction of PTCs and collision rates[7]. The analysis performed for this report (outlined in Section 2.2.5) is the first known study that matches collisions involving vehicles for hire and performs a comparison between PTCs and the rest of the vehicle population.

6.1 Collision rates are highly variable and PTC collisions are slightly higher than from other vehicle types

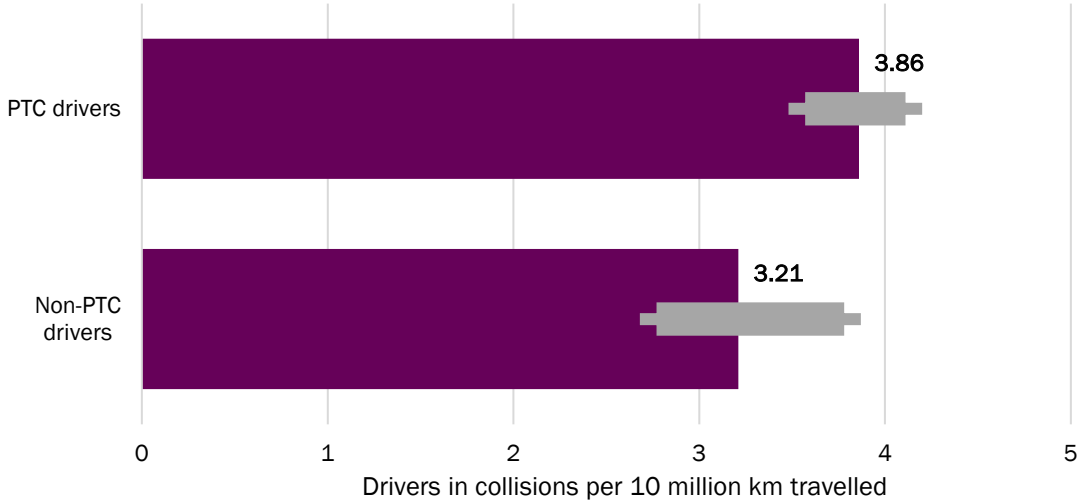
From 2020 to 2023, 666 PTC vehicles were involved in collisions resulting in minor, major, or fatal injuries. During this period, 3.9 PTC drivers were involved in collisions per 10 million PTC kilometres travelled, as shown in Figure 6-1. In comparison, the rate for other (non-PTC) vehicles was slightly lower at 3.2. This was estimated based on the methodology described in Section 2.2.5.

It should be noted that these estimates are highly variable, fluctuating annually, and therefore have significant uncertainty. In addition, there is significant uncertainty introduced in the method of how PTC collisions are identified and recorded. Especially challenging is determining whether PTC driver involved in a collision was active on a platform at the time of the collision. The PTC collision rate ranged from 3.6 to 4.1, while the rate for other vehicles ranged from 2.8 to 3.8. Notably, in 2020, PTCs recorded a lower collision rate of 3.6, compared to other vehicles at 3.8. These rates are based on collisions and kilometres travelled within Toronto, excluding 400-series highways. While the estimates show a slightly higher collision rate than the general vehicle population, the significant amount of uncertainty in the data means that this is not a conclusive finding.

[7] Goyal, V. S., et al. "Do transportation network companies increase or decrease road crashes? Evidence from San Francisco." *Transportation Research Board Annual Meeting*. 2023.

Comparable rates for taxis are not available due to data limitations. There are significant challenges with reported PTC collision data that has resulted in difficulties linking VFH collision data to police collision data. To address this, this study is recommending further enhancements to the by-lawed PTC and taxi collision reporting requirements to require the inclusion of a police report number for all VFH collision records. Further monitoring and analysis will be required to better understand the collision rates of PTCs and taxis and what factors might drive differences.

Figure 6-1 Rates of drivers involved in collisions per distance travelled from 2020 to 2023



7 An Equitable and Accessible VFH Industry

This section evaluates how well the VFH industry serves all segments of the population. This is done by analyzing specific measures related to trip characteristics and quality of service for equity-seeking segments of Toronto's population against the overall population, as well as looking at trends in the provision of wheelchair accessible services.

7.1 PTC trip and service characteristics have no differences between equity-deserving communities and the rest of the City

To assess differences in trip and service quality for equity-deserving populations, this analysis compares several VFH indicators, specifically for PTCs, between communities identified as Neighbourhood Improvement Areas (NIAs) and non-NIAs.

The City identified NIAs, characterized by lower outcomes in economic opportunities, health, and social development as a means to prioritize funding directed at community development and sustainability[8].

Figure 7-1 Neighbourhood Improvement Areas in the City of Toronto

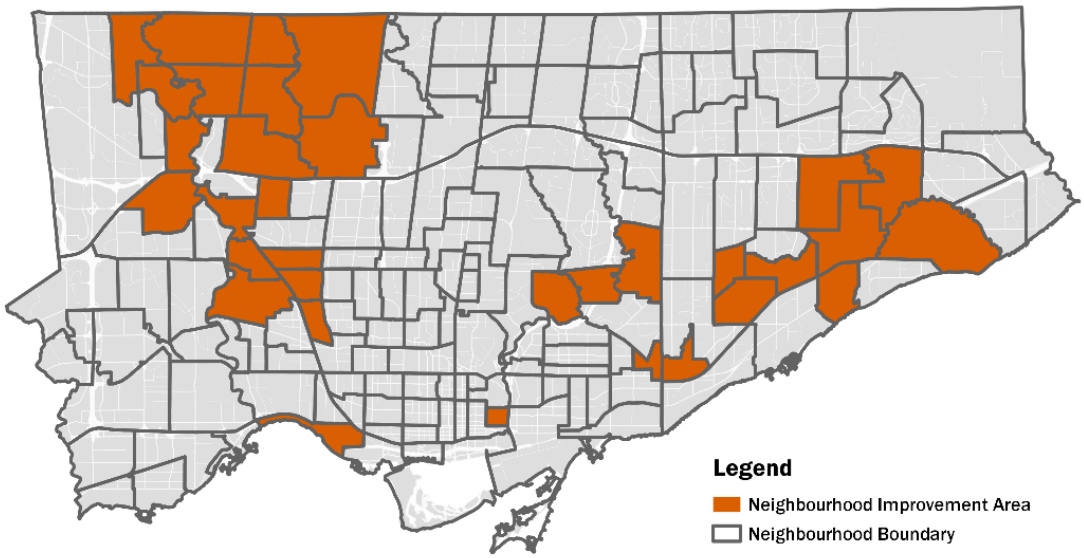


Figure 7-2 compares trip and service quality characteristics between NIA and non-NIA areas in January and February 2024. Overall, no significant differences were found between them.

[8] See the Toronto Strong Neighbourhood Strategy for more information

In terms of trip characteristics, the fare per kilometre for trips starting in an NIA was lower than for trips starting in non-NIA areas. For service quality, wait times and cancellation rates were similar between NIAs and non-NIAs.

Figure 7-2 Comparison of trip and quality of service characteristics between NIAs and Non-NIAs in January and February 2024

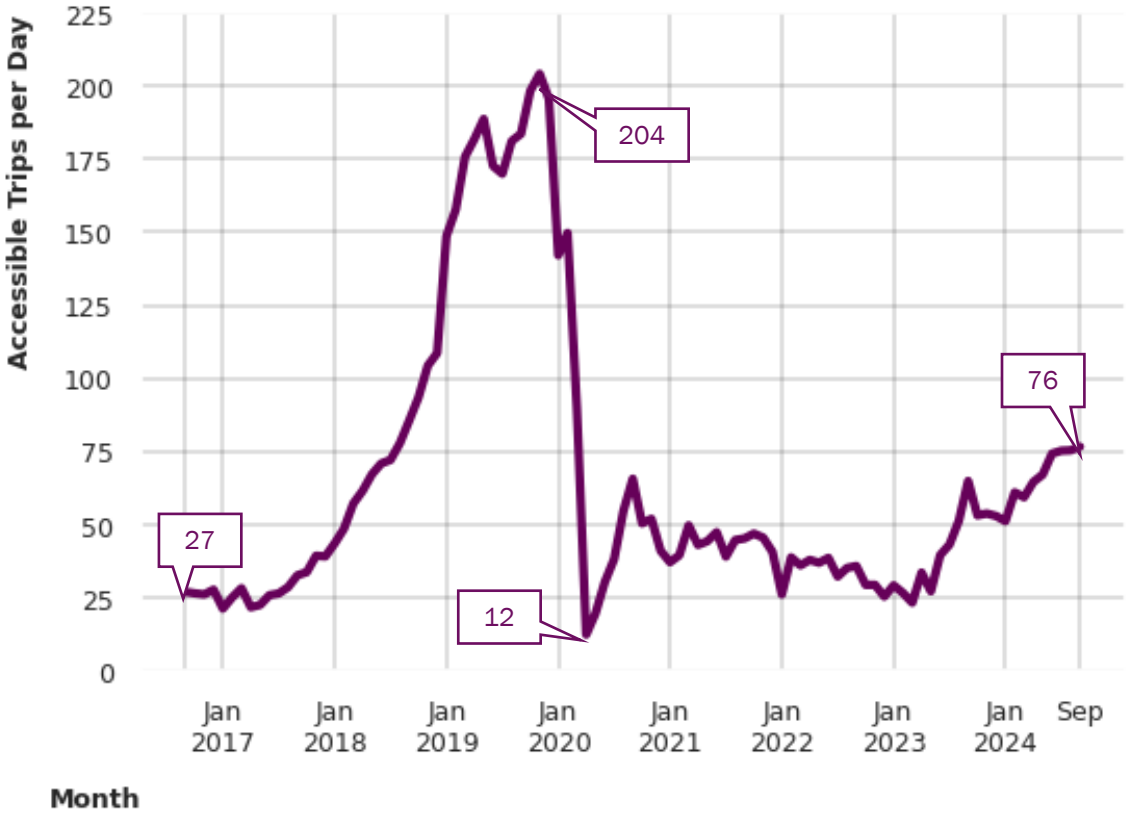
	City of Toronto Overall		Toronto, East York		Etobicoke-York, North York, Scarborough	
	NIA*	Not-NIA*	NIA*	Not-NIA*	NIA*	Not-NIA*
Trip characteristics						
Total trips	789,900	4,198,700	124,500	2,782,400	664,800	1,413,600
Distance	9.61	8.52	7.91	7.53	9.92	10.48
Fare	18.35	18.64	17.47	18.09	18.51	19.68
Fare/km	1.91	2.19	2.21	2.40	1.87	1.88
Quality of Service						
Wait times	5.20	4.95	5.24	4.97	5.20	4.90
Cancellation Rate – Driver	0.86%	0.93%	0.72%	1.01%	0.88%	0.77%
Cancellation Rate – Passenger	3.88%	5.08%	5.63%	5.67%	3.53%	3.85%

* Based on trip origin

7.2 PTC WAV trips never recovered after the pandemic

In 2019, PTC WAV trips increased significantly, reaching over 200 trips per day. Following the initial pandemic lockdowns, this figure sharply declined to approximately 15 trips per day. Although some growth has been observed since late 2023, recent data from September 2024 indicates that only 76 trips per day are currently being made, as illustrated in Figure 7-3.

Figure 7-3 Average WAV trip requests per day by month from September 2016 to September 2024



7.3 Wait times for wheelchair accessible taxi trips are higher than other trips

Wait times are an indicator of service quality for passengers, and the Accessibility for Ontarians with Disabilities Act, 2005 (AODA) requires municipalities to meet local needs for on-demand accessible taxicabs. The AODA also requires PTCs with more than 500 drivers on their platforms are required to provide wheelchair accessible services to the public. The bylaw requires that the average wait time for this service must be the same as the average wait time for non-accessible taxicab service.

As shown in Figure 7-4 , wait times for taxis improved across all trip types (WAV and non-WAV) from 2023 to 2024. However, data from January 2023 to March 2024 indicates that wait times for taxi and PTC WAV trips remain 60% to 160% higher than for their non-WAV counterparts. This disparity underscores the need for continued efforts to address the service gap in accessible transportation.

Figure 7-4 Wait times comparison between WAV and non-WAV trips from January 2023 to March 2024

	Taxi trips*	PTC trips
WAV trips	24 minutes Representing on average 14 trips per day	13 minutes Representing on average 28 trips per day
Non-WAV trips	15 minutes	5 minutes

*Based on data available from six taxi brokerages representing 62% of all taxicabs. Figures do not include WAV taxi trips under contract with the TTC to provide Wheel-Trans services. In March 2024 Wheel-Trans did an average of 5,100 WAV trips per day, of which 2,800 were contracted taxis.

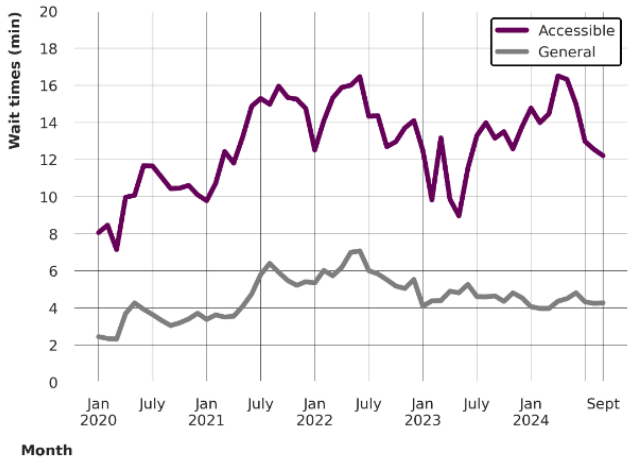
7.4 PTC WAV service quality has declined since 2020, with longer wait times and an increased frequency of passenger trip cancellations

The quality of PTC WAV services has worsened since 2020, evidenced by longer wait times and a rise in passenger-initiated trip cancellations. Although changes in wait times for both WAV and non-WAV trips are somewhat related over time, wait times for PTC WAV trips remain consistently two to four times longer than for non-WAV trips. As shown in Figure 7-5 A, customers seeking WAV trips waited an average of 12 minutes in September 2024, up from a pre-pandemic low of 8 minutes in February 2020. Due to data limitations, this average wait time does not include trips where the rider cancelled the trip before driver arrival.

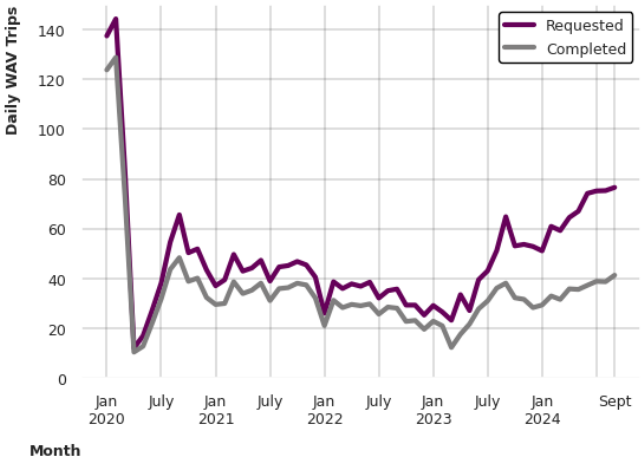
Figure 7-5 B shows a significant increase in the percentage of unfulfilled WAV trips. While some level of unfulfilled trips is expected due to cancellations by either drivers or passengers, a notable shift occurred after March 2023. Demand for PTC WAV trips has increased since that time, but the number of completed trips has not kept pace. Between January 2020 and March 2023, 81% of requested PTC WAV trips were successfully completed. This completion rate dropped sharply to 57% for trips in March 2023 to September 2024.

Figure 7-5 Wait times and unfulfilled trips for WAV and non-WAV services, January 2020 to September 2024

A. Average wait times for PTC WAV and non-WAV services



B. Average daily PTC WAV trips requested and completed



8 Summary and Next Steps

The key findings of the study are summarized as follows:

- **Record level of PTC trips**: PTC trips reached an all-time high in June 2024 with 214,000 average daily trips, surpassing pre-pandemic levels
- **Decline in PTC utilization efficiency**: Since early 2022, the percentage of distance travelled by PTC vehicles with customers on-board and the number of trips per active vehicle have both decreased
- **Record high distance travelled by vehicles for hire**: Vehicles for hire made up 1.12 billion kilometres of travel on City streets in 2023, with PTCs accounting for 74% of the total VFH distance travelled
- **High PTC share of downtown travel distance**: In 2024, PTCs accounted for 14% of all vehicle travel distance in the downtown area on a typical day
- **Transit as the main alternative for PTC users**: If PTCs were unavailable, 41% to 61% of trips would switch to transit, though a portion of these PTC trips already connect to transit
- **An important transportation mode for VFH users**: Surveys conducted highlight the important role the mode plays within the transportation system, serving a wide variety of trip purposes and providing redundancy to resident's mobility choices.
- **Disparities in wait times between WAV and non-WAV trips**: Wait times for WAV trips remain significantly longer than for non-WAV trips, highlighting accessibility challenges
- **Decline in PTC WAV service quality**: Since 2020, WAV trips have experienced longer wait times and decreasing trip completion rates

The major recommendations drawn from the study include:

- **Consider licensing limits to address negative trends:** Some trends suggest that licensing limits may help address observed negative trends, though it remains unclear whether limits would notably reduce congestion.
- **Mandate digital meters for taxis:** Digital meters would enable more detailed analysis of the taxi sector and consistent reporting and monitoring of industry trends.
- **Incorporate collision identification numbers:** All PTC and taxi collision records should include the identification number provided by police or the Collision Reporting Centre.

- **Expand data fields for improved analysis:** Additional data fields, including driver number and quoted arrival time, should be provided to enable more detailed analysis of driver-specific metrics and overall service quality.

8.1 Potential research next steps

The insights presented in this report as well as previous reporting on the transportation impacts of Vehicle for Hire have relied heavily on strong collaboration with researchers, in particular with the University of Toronto's Mobility Network. To continue to further the City's understanding of the sector, continued research will be critical. Potential next steps for this research could include:

- Continue working with the University of Toronto's Mobility Network to refine their model, update it with 2022 TTS when it becomes available and model various policy scenarios and analyze their impacts on transit usage, congestion, greenhouse gas emissions, as well as equity impacts in communities with lower access to transit.
- Further work to model and analyze collision rates for the Vehicle-for-Hire industry, and
- Analyzing congestion impacts downtown from pick-up and drop-off activity and study potential curbside management strategies that could potentially address hotspots.

Appendix A

Survey Analysis Report: Travel Behaviour and Policy Opinion Survey for Vehicle for Hire

Survey Analysis Report

Travel Behaviour and Policy Opinion Survey for Vehicle for Hire

City of Toronto

Toronto, Ontario

December 9, 2024

Table of Contents

1 Introduction

This document outlines the findings and analyses from the Travel Behaviour and Policy Opinion Survey conducted as part of the Vehicle for Hire (VFH) Study for the City of Toronto. The survey aimed to understand how residents use taxis and ride hails (also known as Private Transportation Companies or "PTCs") like Uber and Lyft, their preferences, and how these services interact with other transportation modes. This report focuses on analyzing the survey data, which will provide insights into travel patterns, how travellers use VFH services, and the alternatives that they prefer.

2 Survey Design

The survey aimed to capture representative travel behaviour and policy opinions from residents in Toronto who used taxi or ride-hailing services (like Uber or Lyft) within the last six months. The survey was conducted online through panelists retained by Maru/Blue. The primary objective was to understand how taxis and ride-hailing services integrate with other transportation modes in Toronto, such as transit, cycling, and personal vehicle use. Respondents were selected to represent the four Toronto Community Council Areas (also known as "Districts"), as well as 7 adjacent municipalities.

2.1 Survey Questionnaire Structure

The survey contained 41 main questions which took approximately 20 minutes to complete. The questionnaire was divided into several sections:

1. **Screening**: Initial questions determined eligibility based on recent taxi or ride-hail use. The screening level demographic details such as age and geographic location (by Forward Sortation Area) were captured.
2. **Travel Behaviour:** Questions explored the frequency and purpose of taxi and ride-hail use within the last six months, such as recent origins and destinations, change in frequency, reasons for mode choice, and insight into alternative travel choices.
3. **Attitudinal and Policy Opinions**: Participants were asked to evaluate their satisfaction with taxi and ride-hail services and how these modes of transport met their travel needs. The survey also gathered views on transportation-related policies such as congestion reduction, transit quality, and potential limits on taxi and ride-hail licenses.
4. **Household and Demographics**: Collected demographic and household details including gender, employment, income, education, household size, children, ethnicity, and disability.

The full survey is provided in **Appendix A** for reference.

2.2 Sampling Methodology

The survey was conducted using Maru/Blue's network of panelists, targeting individuals who had used either a taxi or ride-hailing service within the last six months. The final sample

consisted of 1,036 completed surveys, exceeding the initial target of 1,000 respondents. The geographical distribution allocated the budgeted samples across the three strata, capturing a representative sample from key areas within Toronto and its surrounding municipalities.

- City of Toronto centre (Toronto and East York): 385 respondents (target: 375)
- City of Toronto suburbs (Etobicoke, North York, and Scarborough): 412 respondents (target: 400)
- Outside municipalities (Mississauga, Brampton, Vaughan, Richmond Hill, Markham, Pickering, and Ajax): 239 respondents (target: 225)

The respondent breakdown by mode of transportation was as follows:

- Ride-hail Only users: 57% (590 respondents)
- Taxi Only users: 18% (187 respondents)
- Both Ride-hail and Taxi users: 25% (259 respondents)

In total, 82% of respondents reported using ride-hailing services, while 43% reported using taxis, reflecting a significant overlap of users who utilized both services.

Of the 2,763 total responses recorded, 1,036 completed the survey, with 439 dropouts, 67 disqualified due to regional quotas being reached, and 1,221 were screened out for not meeting the eligibility criteria such as age, geography, and VFH usage.

2.3 Raking Algorithm and Weighting Analysis

The raking, or iterative proportional fitting, algorithm was applied to the survey data to adjust respondent weights, aligning demographic representation with the 2021 census for Toronto's population by age, gender, and location. This adjustment process aimed to make the survey data representative of the target survey respondents — those who used a taxi or ride-hail (RH) service at least once in the past six months within the broader population. The process includes:

1. **Input Parameters**: The raking process began with baseline counts of respondents segmented by age, gender, and geographical location based on Forward Sortation Areas (FSAs). These FSAs were aligned with census tracts to reflect demographic representation.
2. **Weight Adjustment**: The algorithm iteratively adjusted each respondent's weight, making the distribution across the key demographics (age, gender, and FSA-based location strata) converge to the target proportions in the census. This method adjusted the sample to reflect the true population, compensating for potential oversampling or under sampling in certain demographic groups.
3. **Eligibility Constraints**: Only individuals from eligible FSAs who met age and usage criteria were included in the analysis. For non-eligible respondents (those who did not use a taxi or RH in the last six months but met all other criteria), demographic details

were collected to initially assign sample weights to calibrate sample representation to the broader population base.

4. **Final Weights**: The final weights, where each response ranges from 0.5 to 2.0, reflect adjustments for differences in the survey population compared to the total adult population. The weighted data thus represented the demographic distribution for the population that uses either taxis or RH services at least once in the last six months, allowing for more representative inferences about taxi and RH usage patterns in Toronto.

The weighting process adjusted for the specialized subset (recent taxi/RH users) of the population. Extreme weights, which can sometimes occur in raking, were monitored; however, none of the weights fell outside the targeted bounds of 0.5 to 2.0, minimizing variability in the final dataset. The final weights had minimal impact compared to the unweighted results, where most percentage swings in key category results were in single digits.

Besides the sample sizes presented above, all analyses presented henceforth in this report are based on the weighted results.

3 Survey Data Analysis

The key findings of the survey and their associated visuals compiled using PowerBI are presented in this section of the report. Additional visuals are provided in **Appendix B** for some data points discussed in the text but not visualized.

3.1 Demographics

To increase the respondent's willingness to complete the survey, demographic questions were raised last (Q34-41) upon completing all the travel behaviour, attitudinal, and policy support questions. The following were the key describing characteristics of the respondent demographics.

- Age: The 25-34 age group led the distribution at 26%, followed by the 35-44 age group at 21%. The 45-54 age group made up 17%, and the 55-65 group 13%. Younger respondents aged 18-24 represented 12%, while those aged 65 and above comprised the remaining 10%.
- Gender: The survey respondents were distributed with 52% identified as women and 46% as men. A small percentage identified as non-binary or chose not to specify.
- Employment: Most respondents were employed full-time (62%). Other categories included part-time employment (11%), retired individuals (11%), unemployed or looking for work (5%), with smaller groups of students or stay-at-home caregivers.
- Household Income: Income distribution showed 22% of respondents earning between $100,000 and $149,999 and another 22% in the $70,000 to $99,999 range. A significant portion, 16%, reported incomes between $50,000 and $69,999, while 14% earned between $30,000 and $49,999. Only 9% reported earning under $29,999, and 7% had incomes over $150,000.

- Education: The majority of respondents (56%) had completed a degree or diploma from a post-secondary institution, while 29% held graduate or professional degrees. A smaller portion, 13%, completed high school, and 1% reported less than high school education.
- Ethnicity: The largest ethnic group identified as White/Caucasian (42%), followed by South Asian (15%) and East Asian (9%). Other groups included Arab/Middle Eastern (8%), Black (4%), and Southeast Asian (3%).
- Disability Status: A substantial majority of respondents (88%) did not identify as having a disability, while 10% reported living with a disability.
- Children under 15: About 31% of respondents reported having children under the age of 15 living in their household, while the remaining 69% did not.

The survey sample leaned towards younger and middle-aged adults, with the largest representation from those aged 25-34, and a balanced gender representation. Most respondents had mid-to-high incomes, with significant representation in the $70,000-$149,999 range, indicating an affluent sample relative to census data. Educational attainment was also high, as over half held a post-secondary degree, and nearly a third had graduate-level education, suggesting a skew towards higher educational backgrounds. Ethnic diversity was evident, with White/Caucasian respondents as the largest group, followed closely by significant representation from South Asian and East Asian communities, in line with Toronto's diverse population.

3.1.1 Statistics Canada Data Comparison

The Statistics Canada Census data (2021) and Statistics Canada labour data for Ontario (August 2024) were used to validate demographic and employment distribution in more detail.

- Age: The 2021 Census showed 6.6% of Toronto's population in the 20-24 age range, lower than the 12% in our survey. The 25-34 group represented 18% in the census and 26% in the survey, while the 35-44 group accounted for 15% in the census and 21% in the survey. The 45-54 group made up 17% in the survey and 13% in the census. The 55-65 group was similar in both, at 13%, but the 65+ group occurred at a lower incidence in the survey at 10% compared to 17% in the census, indicating lower take-up of either taxis or ride-hails than observed in other age groups.
- Gender: The survey's gender distribution (52% women, 46% men) closely aligned with Toronto's general population gender balance as per the 2021 Census.
- Employment: Full-time employment was higher in the survey (62%) than in Ontario's census data (50%), with part-time employment similar between the survey and census (11%). Unemployment was lower in the survey at 5%, compared to Ontario's rate of 7%.
- Household Income: Lower-income respondents (under $29,999) were underrepresented in the survey at 9% versus 39% in the census, while mid-to-upper income brackets were overrepresented. The survey had 22% earning $70,000 to $99,999 (census: 12%) and another 22% earning $100,000 to $149,999 (census: 8%). Those earning $150,000+ were slightly overrepresented at 7% in the survey versus 6% in the census.
- Education: The census showed 41% of Toronto's adults held a bachelor's degree or higher (10% with a master's), similar to the survey's 56% with post-secondary credentials and 29% with graduate/professional degrees. However, 23% of the

population had only a high school education, compared to 13% in the survey, suggesting the surveyed sub-population tends to have higher educational attainment.

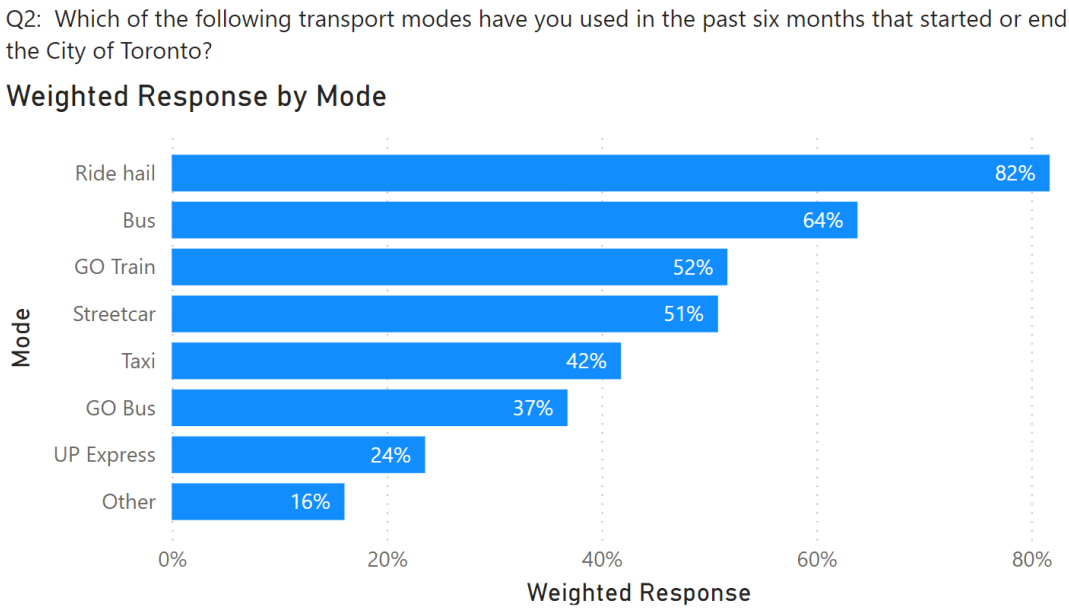
- Ethnicity: White/Caucasian respondents were 42% in the survey and 44% in the census. South Asians were well represented at 15% in the survey and 14% in the census. East Asians were slightly underrepresented, at 9% in the survey versus 13% in the census. Arab/Middle Eastern respondents were overrepresented (8% survey vs. 2% census), while Black respondents were underrepresented (4% survey vs. 10% census). Southeast Asians were slightly overrepresented at 3% in the survey compared to 2% in the census.

The survey was designed to represent the specific characteristics of active taxi and ride-hail users rather than the general population. This approach allows for targeted insights into this sub-population of travellers, whose travel behaviours and mode choices differ from broader commuting trends in Toronto. The demographic and socioeconomic differences observed, such as higher rates of full-time employment, mid-to-upper income brackets, and post-secondary education, reflect a unique subset of users who may have distinct transportation needs and preferences. Understanding these differences is essential, as the perspectives and behaviours of this group reflect the travel dynamics of a distinct subset of Toronto's population, offering insights into how VFH services intersect with broader urban mobility patterns.

3.2 Travel Behaviours

For respondents who had used VFH services in the last six months and were screened to exclude those who did not use either taxis or ride-hails, **Figure 1** shows 82% reported using ride-hail or ride-share services for trips starting or ending in the City of Toronto. Buses were the next most frequently used mode, with 64% of respondents indicating usage, followed by GO Train at 52%, streetcars at 51%, and taxis at 42%. Less frequently used options included the GO Bus (37%), UP Express (Union Pearson Express) (24%), and other modes at 16%.

Figure 1: Respondents' usage by mode within the City of Toronto in the past six months



Since this question allowed respondents to select multiple modes, the percentages in **Figure 1** reflected combined usage across various options rather than a single primary mode.

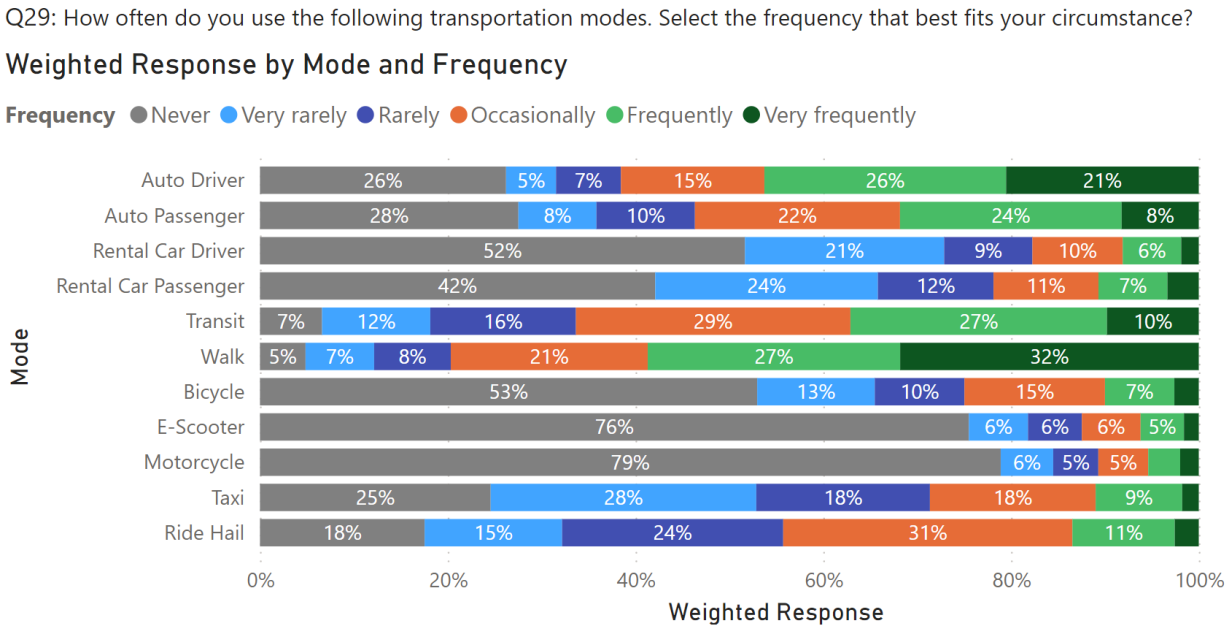
In comparison to the 2022 Transportation Tomorrow Survey (TTS) for the City of Toronto, which recorded 46% of trips by auto drivers, 1% for paid rideshare, and 0.3% for taxis, the VFH survey presented a significantly higher proportion of VFH users. The TTS data showed 16% transit usage (excluding GO Rail) and 1% for GO Rail alone, while the VFH survey data indicated much higher transit engagement among VFH respondents (e.g., 64% bus usage and 52% GO Train usage).

The screening approach effectively targeted a distinct demographic and road user group with higher engagement in ride-hail services and public transit compared to the broader population.

3.2.1 Frequency of Transportation Mode Use in General (Q29)

As shown in **Figure 2**, household-owned autos, both as a driver and a passenger, were used frequently, with 26% and 21% of respondents, respectively, using these modes daily. Transit and walking were also common, with 10% using transit daily and 35% walking several times a week. Modes like bicycling and e-scooters were used much less frequently, with 77% and 79% of respondents, respectively, never using them. Taxi and ride-hail services were used less frequently, with 24% reporting taxi use and 31% using ride-hail services a few times a month, but only a small percentage used these services daily.

Figure 2: Respondents' frequency of transportation mode usage

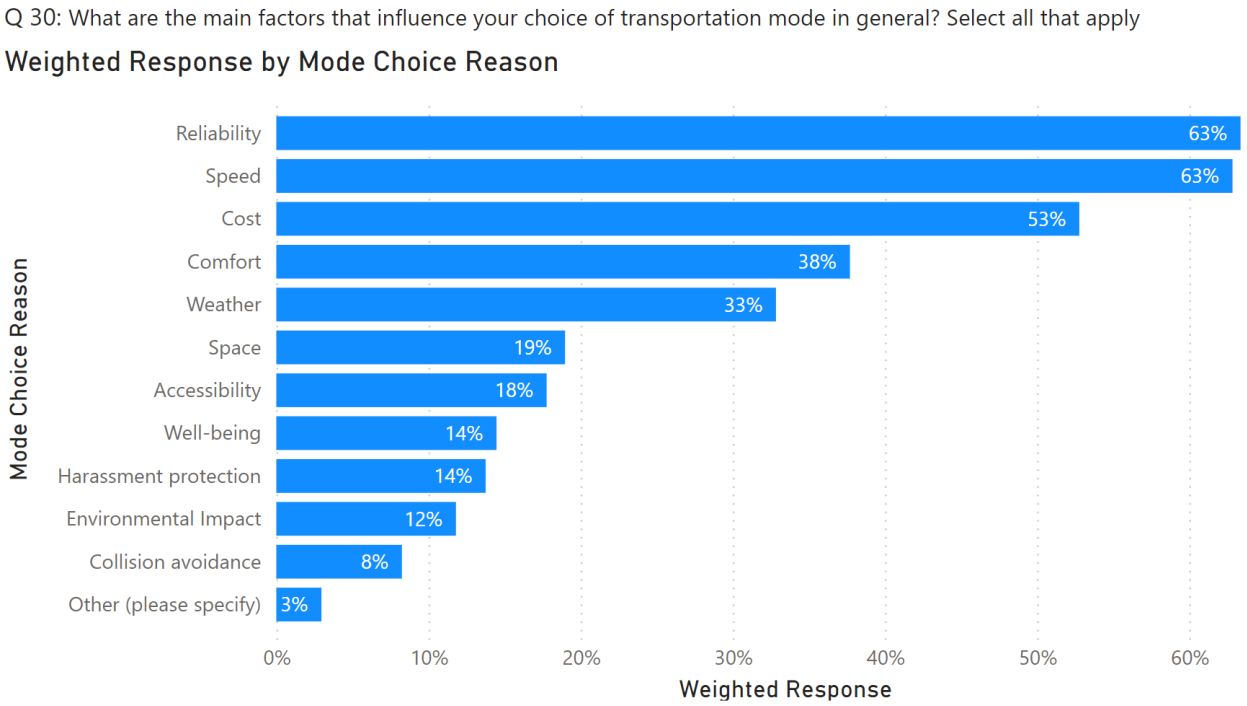


3.2.2 Main Factors Influencing Mode Choice (Q30)

Figure 3 illustrates that reliability and speed were the primary factors influencing mode choice, each selected by 63% of respondents, followed by cost (53%) and comfort (38%). Weather considerations mattered for 33%, while space for passengers or goods influenced 19%. Accessibility needs were cited by 18%, and health and safety factors, including well-being

(14%), harassment protection (14%), and collision avoidance (8%), were also noted. Environmental impact influenced 12%, and 3% listed “Other” reasons, including convenience, availability, privacy, employment needs, and traffic avoidance.

Figure 3: Factors influencing respondents' choice of transportation mode



3.2.3 Key Insights from General Mode Choice Questions

Private vehicle use, both as a driver and passenger, remained the dominant mode of transportation, with many respondents using cars daily or several times a week. Transit and walking were also popular, particularly among those without access to private vehicles or those who preferred more sustainable options, while bicycling and e-scooters had limited uptake. When selecting transportation modes, most users prioritized reliability, speed, and cost, highlighting the importance of convenient, efficient, and affordable travel options. Additional factors, such as accessibility, weather, and comfort, played a significant role for some respondents, particularly those with specific needs or during poor weather conditions.

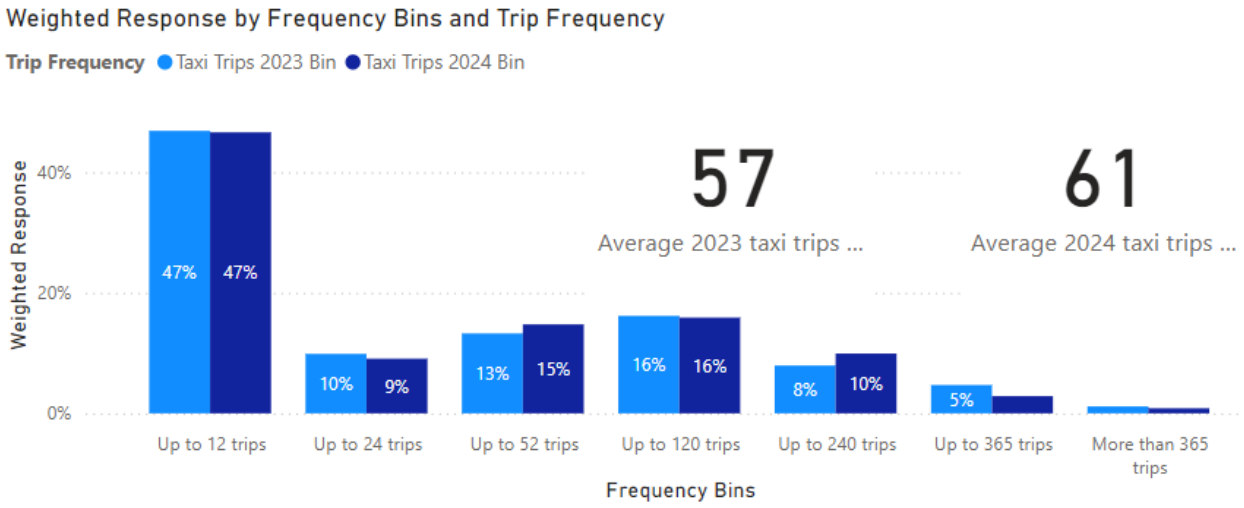
3.3 Trip Frequency

3.3.1 Taxi Trip Frequency (Q3, Q4)

- Taxi Trip Frequency (Q3): As shown in **Figure 4**, the majority of respondents took up to 12 taxi trips per year (i.e., approximately once a month), with 47% in both 2023 and 2024. Fewer respondents fell into higher frequency bins, with 16% reporting up to 120 trips per year (i.e., 10 trips per month), and progressively smaller percentages for higher trip counts. Only 5% reported taking up to 365 trips annually (i.e., daily), and a very small percentage used taxis more than 365 times per year.

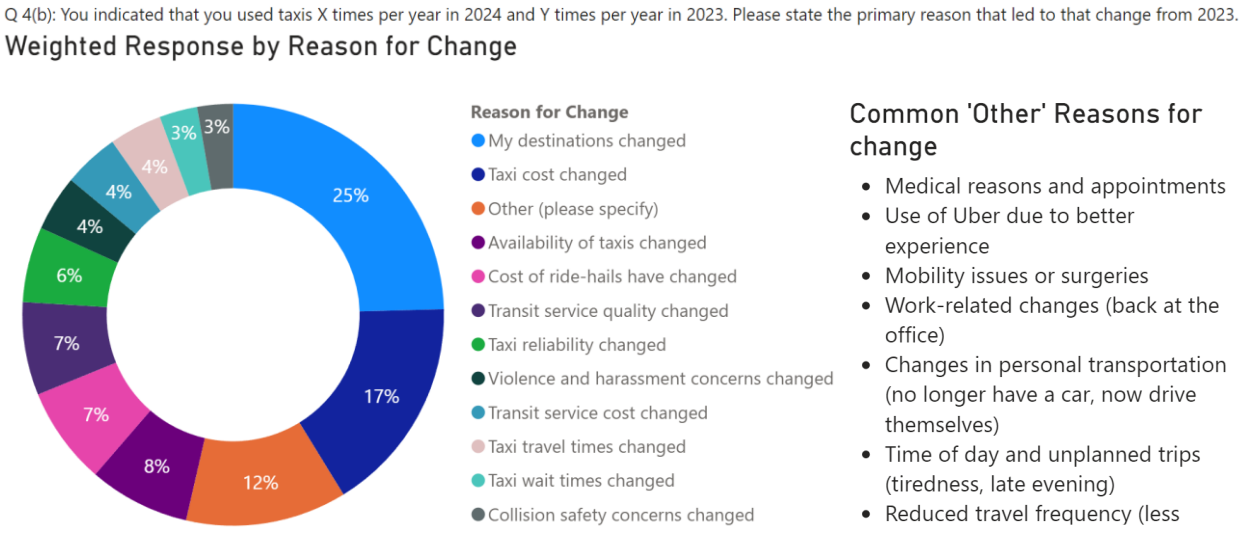
- Average Taxi Trips (Q3): On average, respondents reported 57 taxi trips per year in 2023, increasing slightly to 61 taxi trips per year in 2024.

Figure 4: Taxi trip frequency distribution for 2023 and 2024



- Reasons for Change (Q4): As shown in **Figure 5**, the most common reason for a change in taxi use was destination changes (25%). Other significant reasons included taxi cost changes (17%) and changes in the availability of taxis (8%). Smaller portions of respondents attributed the change to cost of ride-hails (7%) or transit service quality (7%). Additionally, medical reasons, personal preferences, or car-related changes were frequently mentioned as "Other" reasons for adjusting taxi usage.

Figure 5: Primary reasons for changes in taxi usage between 2023 and 2024

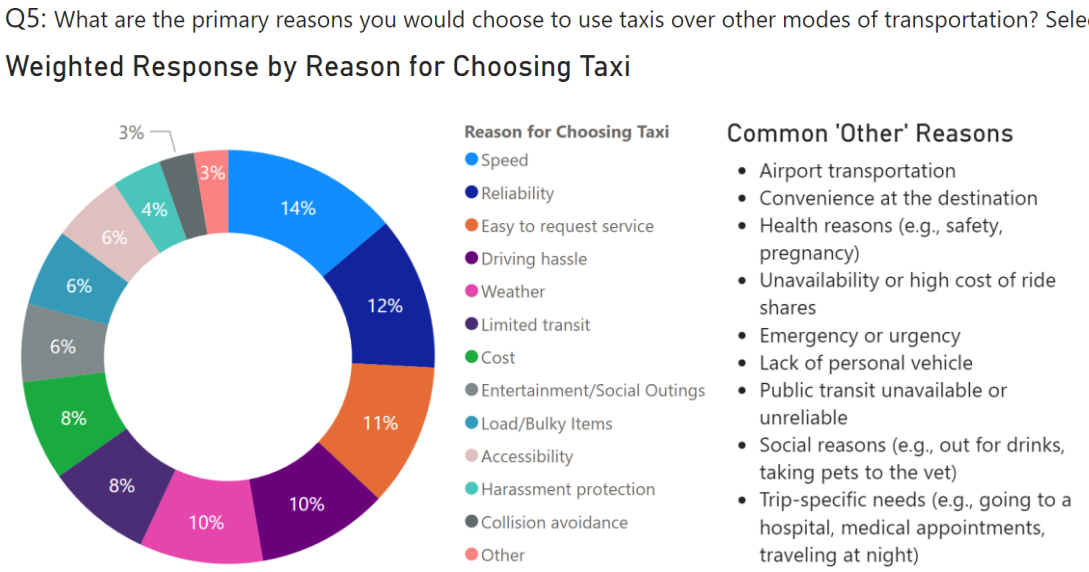


- Taxi Request Methods (Q8): The most common method for requesting a taxi was by calling the taxi company by phone (37%), followed by using a smartphone app (31%). Traditional methods like flagging a taxi on the street (14%) and requesting one at a taxi stand (11%) are still frequently used, though platforms like company websites (8%) are

less popular. This indicates that while app-based requests are gaining traction, many users still rely on more traditional booking methods such as phone calls and flagging taxis in urban areas.

- Reasons for Choosing Taxis (Q5): As shown in **Figure 6**, The most common reason for choosing taxis was speed, with 13% of respondents selecting this option to get to their destination as quickly as possible. This was closely followed by reliability (12%), where respondents valued getting a taxi exactly when they needed it. Ease of request (11%) and weather considerations (10%) were also significant factors, particularly for managing travel during poor weather conditions. Additional reasons included avoiding the hassle of driving and navigating congestion, along with lower cost compared to parking or driving oneself.

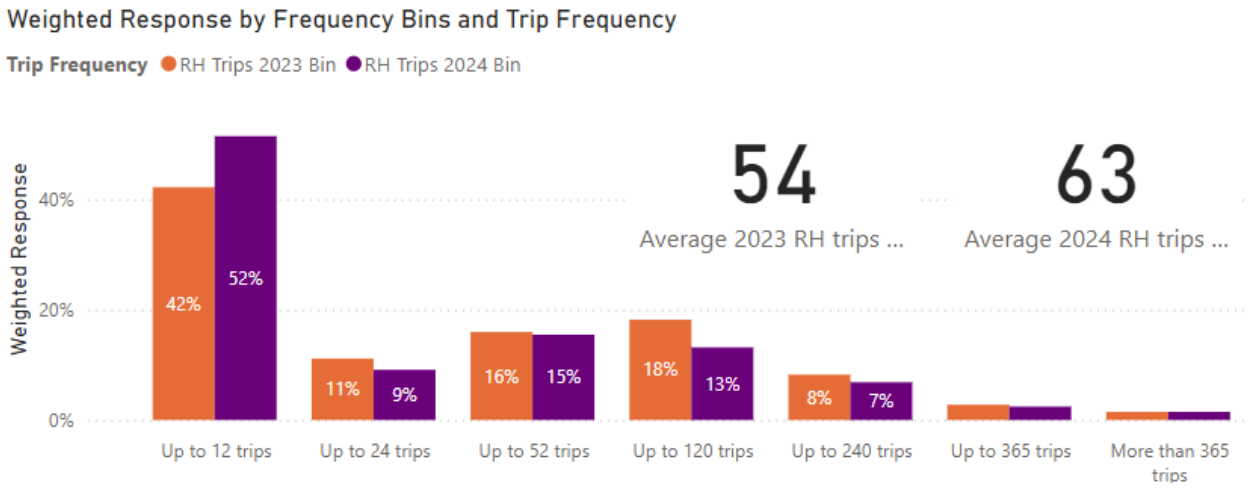
Figure 6: Primary reasons for choosing taxis over other modes of transportation



3.3.2 Ride-Hail User Characteristics

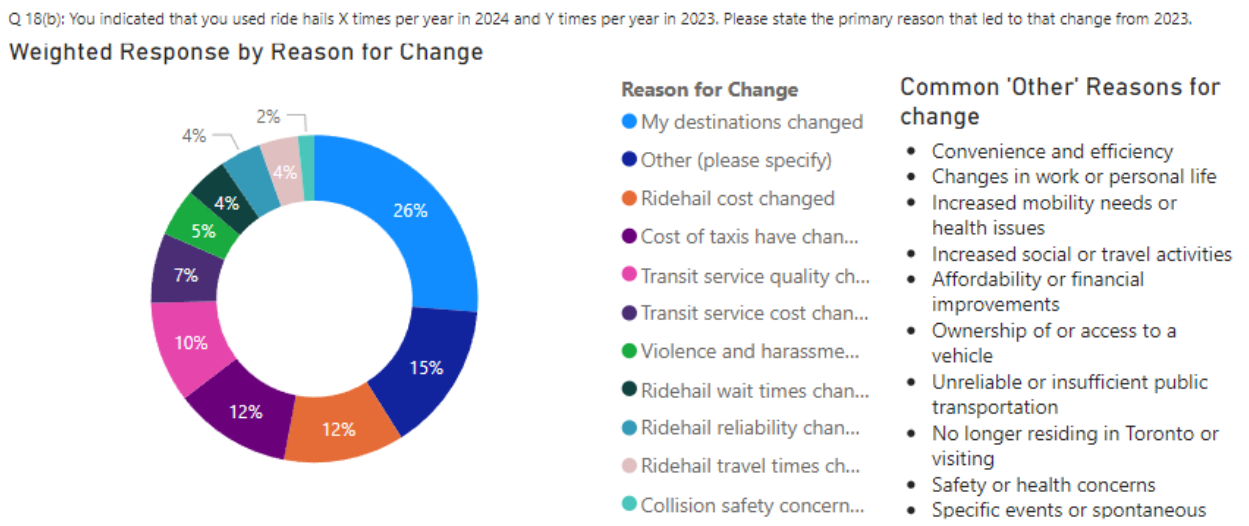
- Ride-Hail Trip Frequency (Q17): As shown in **Figure 7**, The largest group of respondents took up to 12 ride-hail trips per year (around once a month), with 42% in 2023 and an increase to 52% in 2024. A smaller but consistent portion of respondents used ride-hail services more frequently, with 13-18% reporting up to 120 trips annually (approximately 10 trips per month). Less frequent categories included respondents taking up to 52 trips or once a week (17% in 2023 and 16% in 2024), and 7-8% reporting higher usage up to 240 trips or more. A very small percentage of users (2-3%) reported daily use or more than 365 trips annually.
- Average Ride-Hail Trips (Q17): On average, respondents reported taking 54 ride-hail trips in 2023, which increased to 63 trips in 2024.

Figure 7: Ride-hail trip frequency distribution for 2023 and 2024



- Reasons for Change (Q18b): **Figure 8** shows that the primary reason respondents reported a change in their ride-hail usage was due to destination changes (26%). Other notable reasons included ride-hail cost changes (15%) and cost of taxis (12%). A portion of respondents also cited transit service quality (12%) or ride-hail reliability (4%) as key factors. Under the "Other" category, respondents commonly noted reasons such as convenience, health concerns, lifestyle changes, and access to vehicles influencing their ride-hail usage.

Figure 8: Primary reasons for changes in ride-hail usage between 2023 and 2024



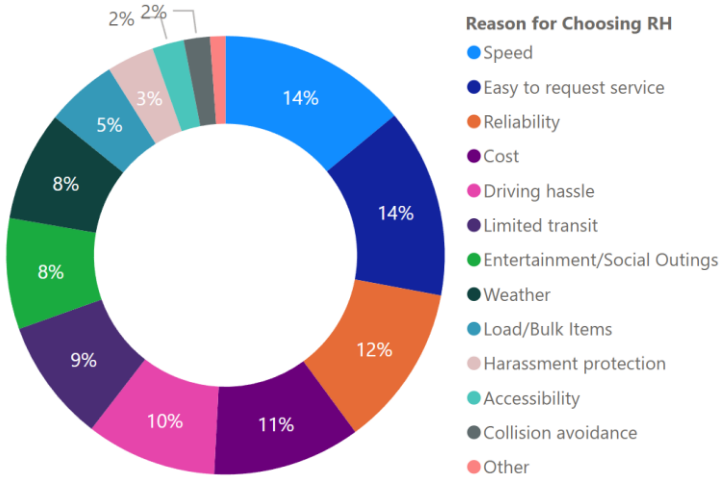
- Reasons for Choosing Ride-Hails (Q19): **Figure 9** shows for ride-hails, speed (14%) and ease of request (14%) were equally important for respondents, particularly for quickly securing transportation via apps like Uber or Lyft. Reliability (12%) and cost (10%) were also crucial, with many finding ride-hails a cost-effective alternative. Other key factors included limited transit options (9%) and driving hassle (8%), with respondents preferring

ride-hails when navigating busy or congested routes. Weather, entertainment outings, and the need to carry bulky items also influenced ride-hail choices.

Figure 9: Primary reasons for choosing ride-hails over other modes of transportation

Q 19: What are the primary reasons you would choose to use RHs over other modes of transportation? Select all that apply.

Weighted Response by Reason for Choosing RH



Common 'Other' Reasons

- Convenience
- Car unavailable
- Comfort
- Medical reasons
- Drinking
- Stress-free travel
- Clean vehicles
- Paid by someone else
- Safety for kids
- No owned vehicle
- Shorter wait times
- Saving energy
- Accompanying friends or family

3.4 Trip Purpose

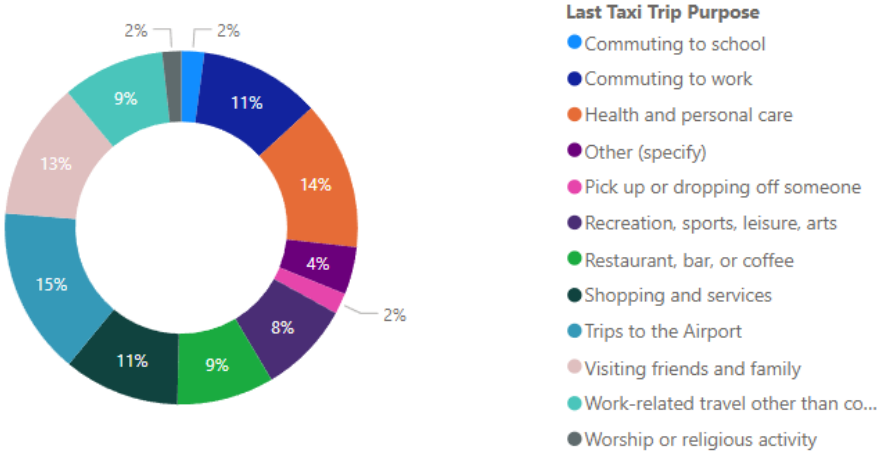
3.4.1 Taxi Trip Purpose Characteristics

- Taxi Trip Purpose (Q6a): **Figure 10** shows the most common reason for using a taxi was commuting to work (11%), followed by work-related travel other than commuting (9%) and visiting friends and family (13%). Other significant purposes included health and personal care trips (14%) and shopping and services (11%), highlighting a mix of professional, personal, and recreational uses. Trips to the airport represented 15%.

Figure 10: Primary purposes of respondents' most recent taxi trips

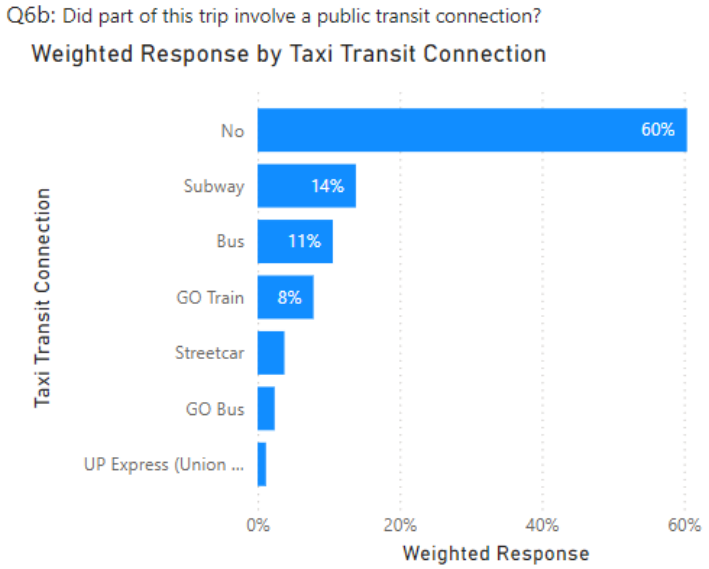
Q6a: Thinking about your most recent trip using a taxi, what was the primary purpose of this trip?

Weighted Response by Last Taxi Trip Purpose



- Taxi Transit Connections (Q6b): **Figure 11** illustrates a majority of taxi trips (60%) did not involve a public transit connection. However, for the 40% that did, the most common connections were with the subway (14%) and bus (11%). Smaller percentages connected to GO Train (8%) and other modes like the streetcar and GO Bus.

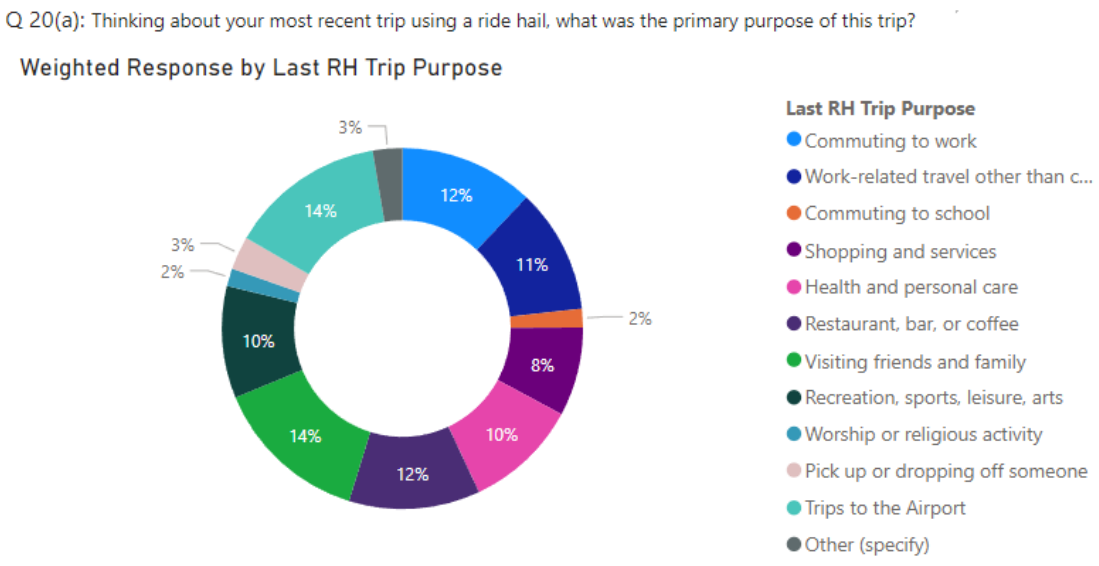
Figure 11: Public transit connections during taxi trips



3.4.2 Ride Hail Trip Purpose Characteristics

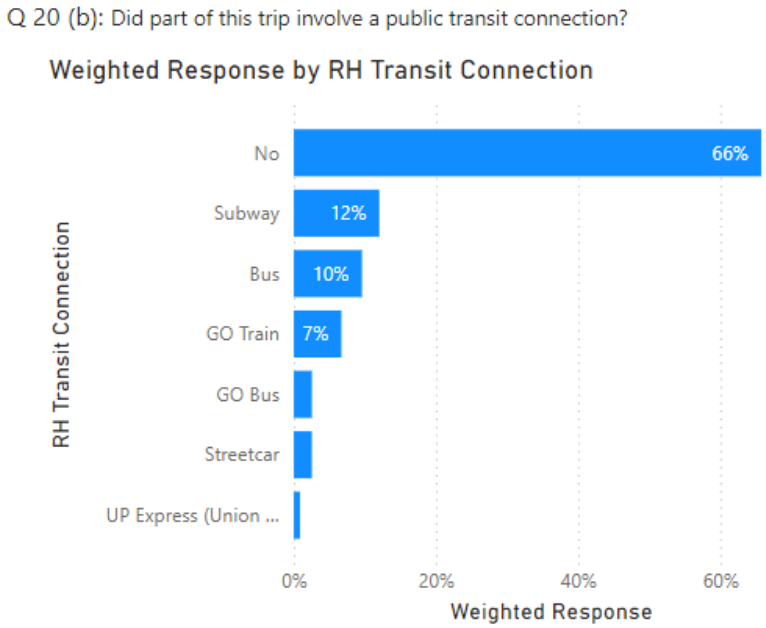
- Ride-Hail Trip Purpose (Q20a): **Figure 12** shows for ride-hails, the leading trip purpose was also commuting to work (12%), followed by recreation, sports, and leisure (14%) and visiting friends and family (14%). Ride-hails were also frequently used for shopping and services (8%) and health and personal care trips (10%), reflecting similar personal and professional needs as taxis. Trips to the airport represented 14%.

Figure 12: Primary purposes of respondents' most recent ride-hail trips



- Ride-Hail Transit Connections (Q20b): **Figure 13** shows that similar to taxis, the majority of ride-hail trips (66%) did not involve a public transit connection. Among the 34% of trips that did, the subway was the most common connection (12%), followed by bus (10%). Fewer respondents connected to other forms of transit such as GO Train (7%) or streetcar.

Figure 13: Public transit connections during ride-hail trips



Key take away from Trip Purpose and Frequency Data

- High Use for Commuting and Leisure: Commuting is a significant reason for using both taxis and ride-hails. However, recreational and social outings are equally important, especially for ride-hail services, where leisure activities and visiting friends/family are common trip purposes. This shows that while these services are critical for professional needs, they also cater to personal and social mobility, often during non-peak hours or in situations where public transit may be less convenient or unavailable.
- Role in Complementing Public Transit: Despite the low percentage of direct transit connections, the 14% (taxi) and 12% (ride-hail) users who connect to subways highlight that these services play a role in first-mile/last-mile transportation. Users may rely on taxis or ride-hails to bridge gaps where public transit is not readily accessible, or to complete the more inconvenient portions of their journey. The higher subway connection for taxis and ride-hails suggests that these modes are potentially critical in improving access to Toronto's transit network.
- Service Flexibility and Convenience: A notable insight from the trip purpose data is the clear use of ride-hails and taxis for health/personal care and shopping/services trips, reflecting the flexibility and ease of use these services provide for personal tasks. This highlights the potential for these services to support those with mobility challenges, time

constraints, or in areas where public transit may not be the most practical option (e.g., for carrying groceries or when visiting medical facilities).

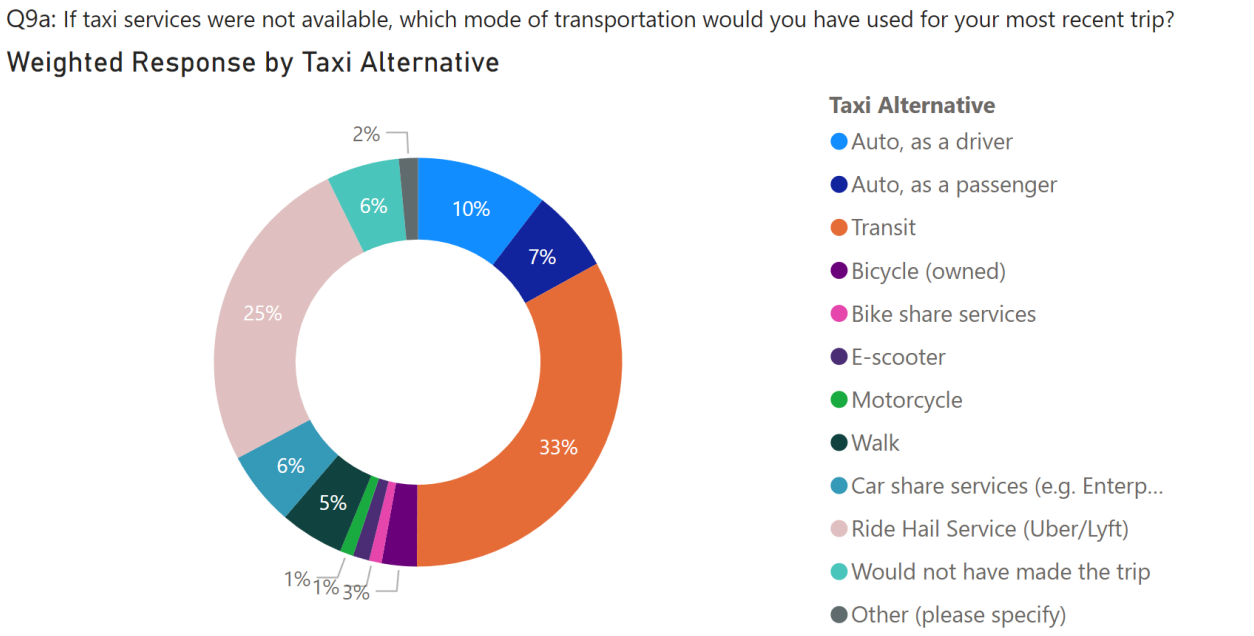
- Limited Transit Integration: Both taxi and ride-hail services show relatively low levels of integration with public transit, with 60% of taxi users and 66% of ride-hail users indicating that their trips did not involve a public transit connection. This suggests that many users view taxis and ride-hails as standalone modes rather than part of a multimodal trip. This could highlight an opportunity for better coordination between these services and public transit systems.

3.5 Alternative Trip Modes

The survey findings suggest that public transit is the most likely alternative when taxis or ride-hails are unavailable, with personal vehicle use also being a significant fallback option. Furthermore, the data show that while users engage with these services for their specific trip purposes, the frequency of usage is relatively moderate, with most respondents using these services between 1-6 times over the last six months. This indicates that ride-hails and taxis serve as occasional transportation solutions, likely complementing other primary travel modes such as personal vehicles or public transit.

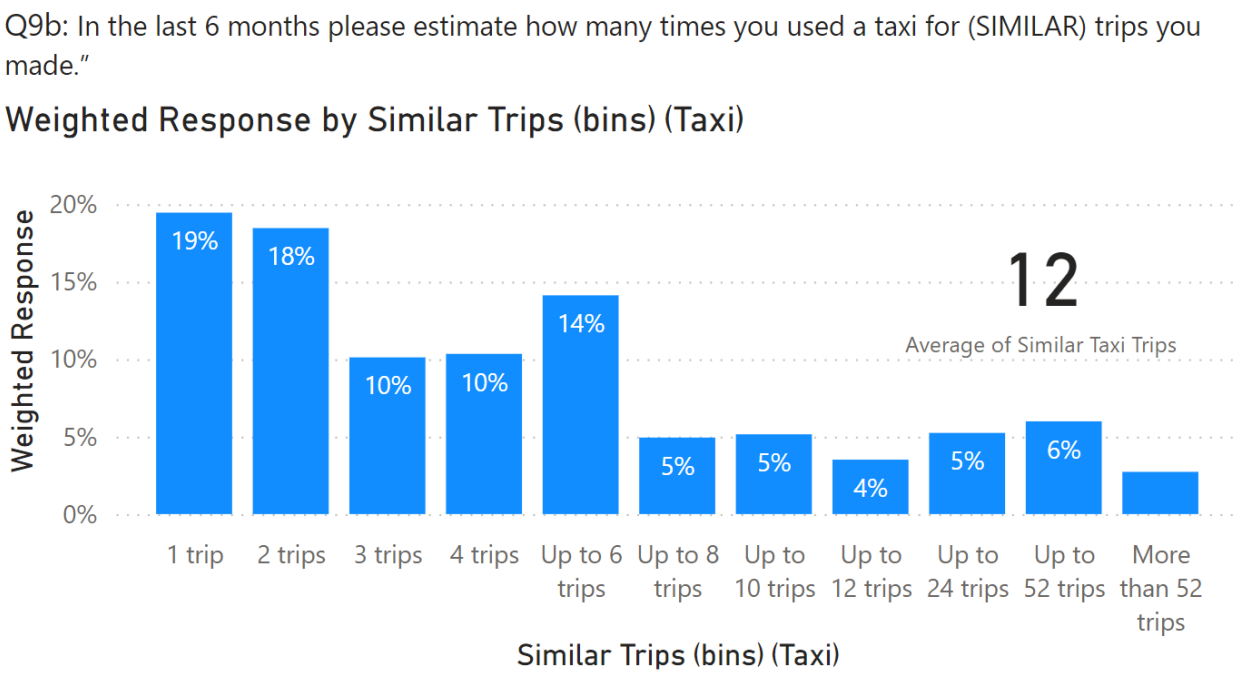
- Taxi Alternatives (Q9a): **Figure 14** shows if taxis were unavailable, public transit was the most frequently chosen alternative, where 33% of respondents would choose this option. Following transit, 10% would drive their own vehicle, and 7% would be passengers in someone else's vehicle. Additional alternatives included walking (6%), car-share services (6%), bike-share services (1%), and e-scooters (1%). Notably, 25% indicated they would have used a ride-hail service (e.g., Uber/Lyft) if taxis were unavailable, and 3% stated they would not have made the trip. This distribution underscores a strong reliance on transit and private vehicle options as primary backups for taxi services.

Figure 14: Alternative transportation modes if taxi services were unavailable



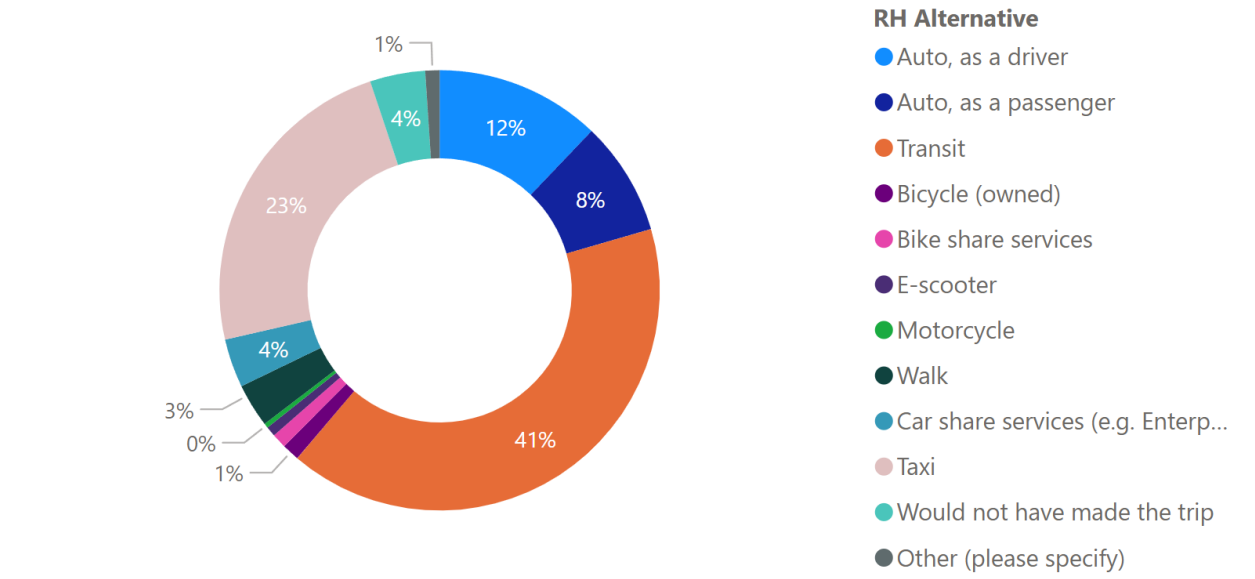
- Similar Taxi Trips Taken in the Last 6 Months (Q9b): **Figure 15** shows in the last six months, respondents indicated an average of 12 similar taxi trips for trips matching their recent purpose (e.g., similar personal trip purpose). The most common response was 1 trip (19%) followed by 2 trips (18%). About 14% of respondents took up to 6 similar trips, while smaller percentages reported more frequent taxi use, with 6% taking up to 52 trips or more over the same period.

Figure 15: Frequency of similar taxi trips taken in the last six months



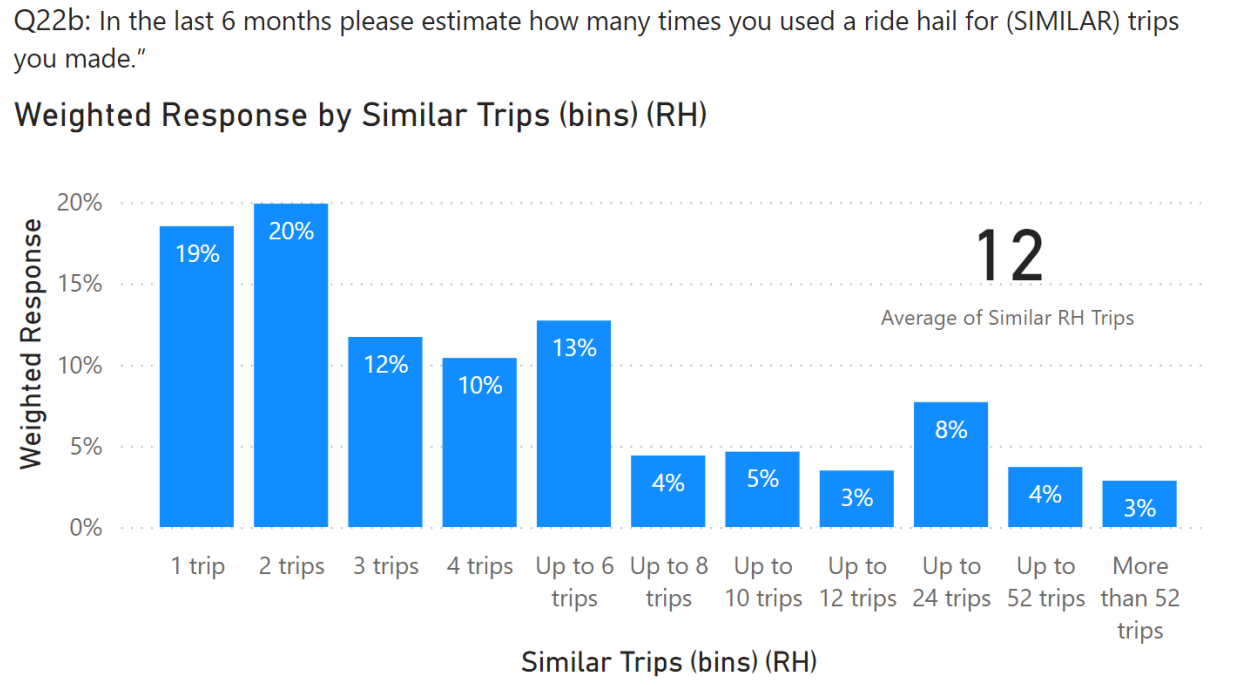
- Ride-Hail Alternatives (Q22a): **Figure 16** shows when ride-hail services were unavailable, 41% of respondents indicated they would have used transit as an alternative. Personal vehicle use was also a significant fallback, with 12% choosing to drive themselves and 8% opting to be passengers in another vehicle. Other alternatives included walking (4%), car-share services (4%), and bike-share services (1%). Notably, 23% indicated they would have used a taxi if ride-hail options were unavailable, and 3% stated they would not have made the trip. This suggests that ride-hail services often serve as a flexible alternative to public transit and private vehicles.

Figure 16: Alternative transportation modes if ride-hails were unavailable



- Similar Ride-Hail Trips Taken in the Last 6 Months (Q22b): Similarly, **Figure 17** shows for ride-hails, respondents also reported an average of 12 similar trips over the last six months. The highest response was 1 trip (19%), followed closely by 2 trips (20%) and up to 6 trips (13%). While 4% of respondents took up to 52 trips, very few reported more than that within the six-month period.

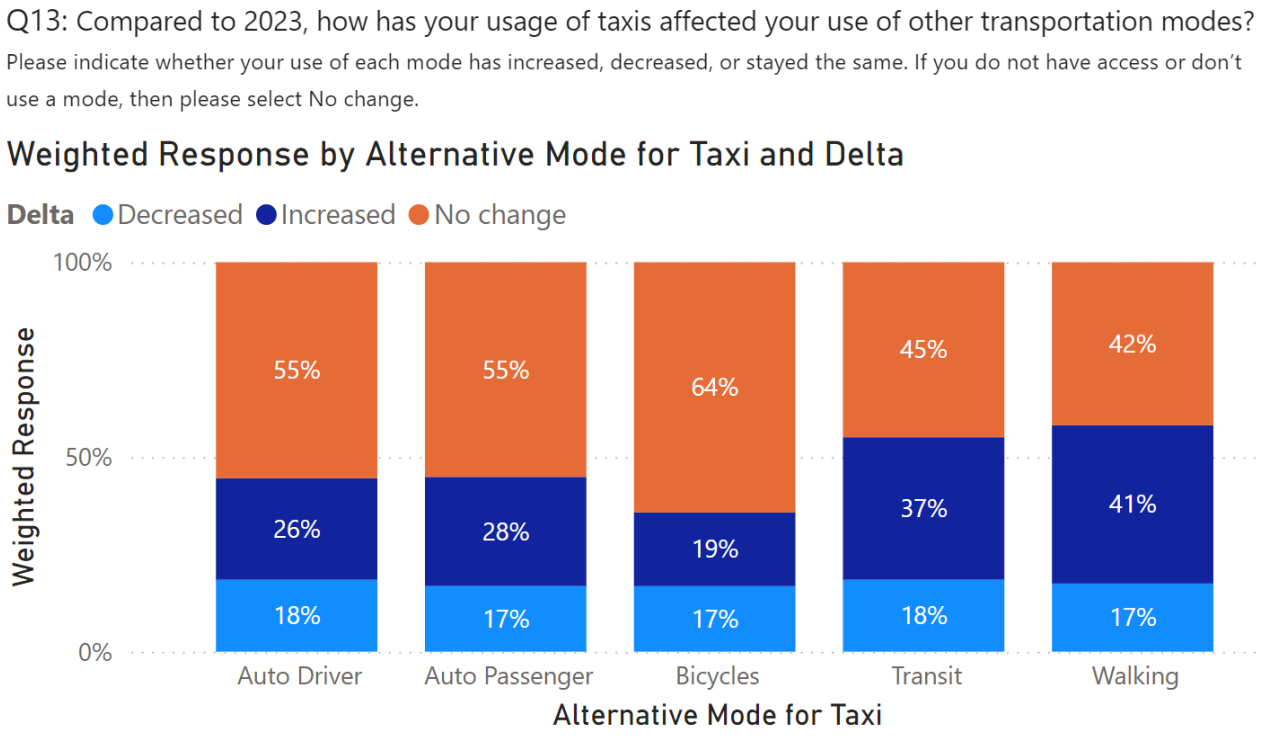
Figure 17: Frequency of similar ride-hail trips taken in the last six months



In terms of impact on alternative mode usage, Ride-hail services had a stronger impact on driving and walking, while both taxis and ride-hails encouraged more transit use for a segment of users.

- Impact on alternative modes due to Taxi use (Q13): **Figure 18** shows taxi usage impacted transit and walking behaviors notably, with 37% of respondents indicating increased transit use and 18% noting a decrease. For walking, 41% of respondents walked more, while 17% reported a decrease in walking due to taxi use. Driving patterns were mixed, with 26% of respondents driving less, 18% driving more, and 55% indicating no change. Bicycle use showed the least variation, with 19% of respondents cycling more, 17% cycling less, and 64% experiencing no change. Auto passenger trips showed similar results, with 28% increasing, 17% decreasing, and 55% remaining unchanged. Overall, these findings suggest that taxi usage has a significant impact on transit and walking, while the effects on driving and biking show smaller variations.

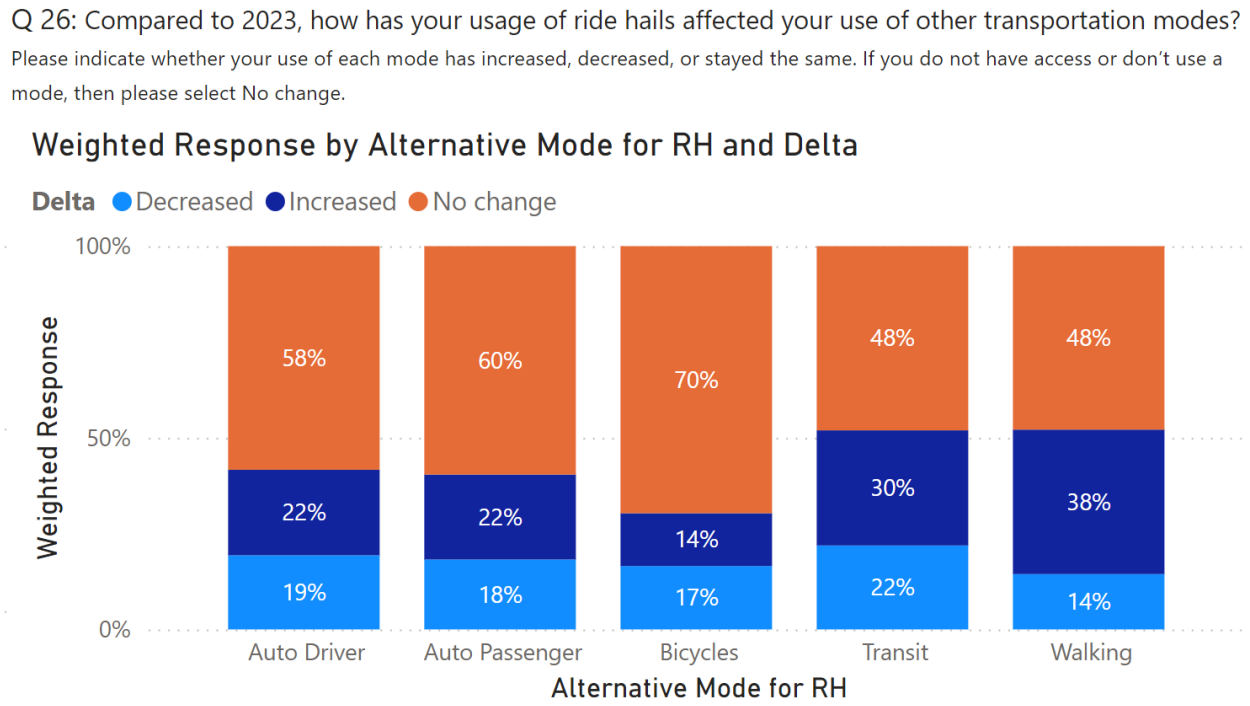
Figure 18: Changes in the use of alternative transportation modes due to taxi usage



- Impact on alternative modes due to ride hail use (Q26): **Figure 19** shows ride-hail services impacted driving behaviour, with 22% of respondents reporting they drove less, while 19% drove more. Walking showed a significant increase, as 38% of ride-hail users walked more frequently, while 14% reported walking less. Transit use also increased, with 30% of respondents using transit more often and 22% experiencing a decrease. Bicycling saw a smaller impact, with 17% of users reporting an increase in usage, 14% a decrease, and the majority (70%) indicating no change. These patterns suggest that

ride-hail services influenced an increased use of transit and walking for some users, while effects on driving and biking varied.

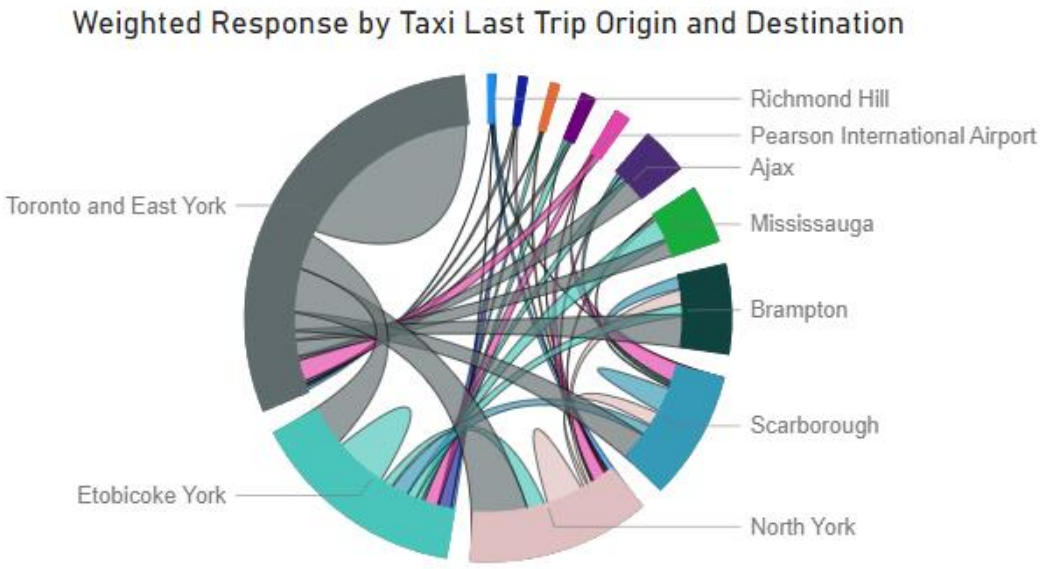
Figure 19: Changes in the use of alternative transportation modes due to ride-hail usage



3.6 Geographic Patterns

Respondents were asked (Q7) to report their last taxi trip patterns that started or ended in the City of Toronto. As shown in **Figure 20**, Toronto and East York was a primary hub, with 20% of trips originating and ending within the area and significant connections from Etobicoke York (4%), North York (6%), and Scarborough (2%). Etobicoke York and North York showed notable internal trips at 6% and 4%, respectively, with strong links to Toronto and East York. Suburban areas like Mississauga and Brampton had lower reported shares, each around 1% to 2%, reflecting less frequent taxi use. Pearson International Airport was a key destination, particularly from Toronto and East York (2%) and Etobicoke York (1%). More distant areas, such as Vaughan and Richmond Hill, reported less than 1% of trips, emphasizing that taxi activity was concentrated in central urban regions.

Figure 20: Weighted response by origin and destination of the last taxi trip



Respondents were asked (Q21) to report their last ride-hail trip patterns that started and ended in the City of Toronto. **Figure 21** shows that Toronto and East York was a primary hub, with 19% of trips originating and ending within the area and significant connections from North York (4%), Etobicoke York (5%), and Scarborough (4%). Etobicoke York and North York showed notable internal trips at 5% and 4%, respectively, with strong links to Toronto and East York. Suburban areas like Mississauga and Brampton had lower reported shares, each around 2%, reflecting less frequent ride-hail use. Pearson International Airport was a key destination, particularly from Toronto and East York (3%) and North York (1%). More distant areas, such as Vaughan and Richmond Hill, reported less than 1% of trips, emphasizing that ride-hail activity was concentrated in central urban regions.

Figure 21: Weighted response by origin and destination of the last ride-hail trip

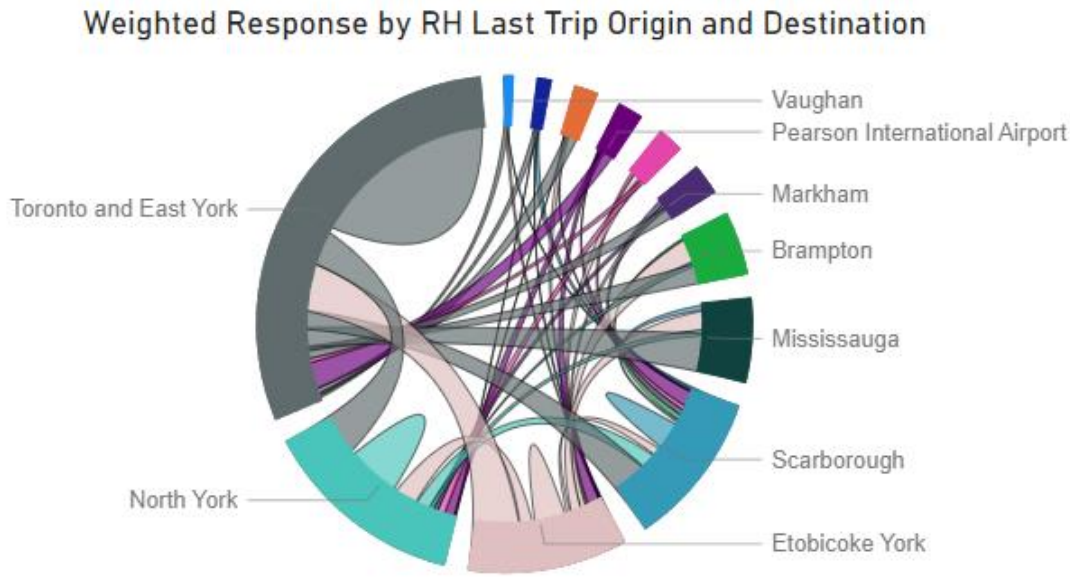
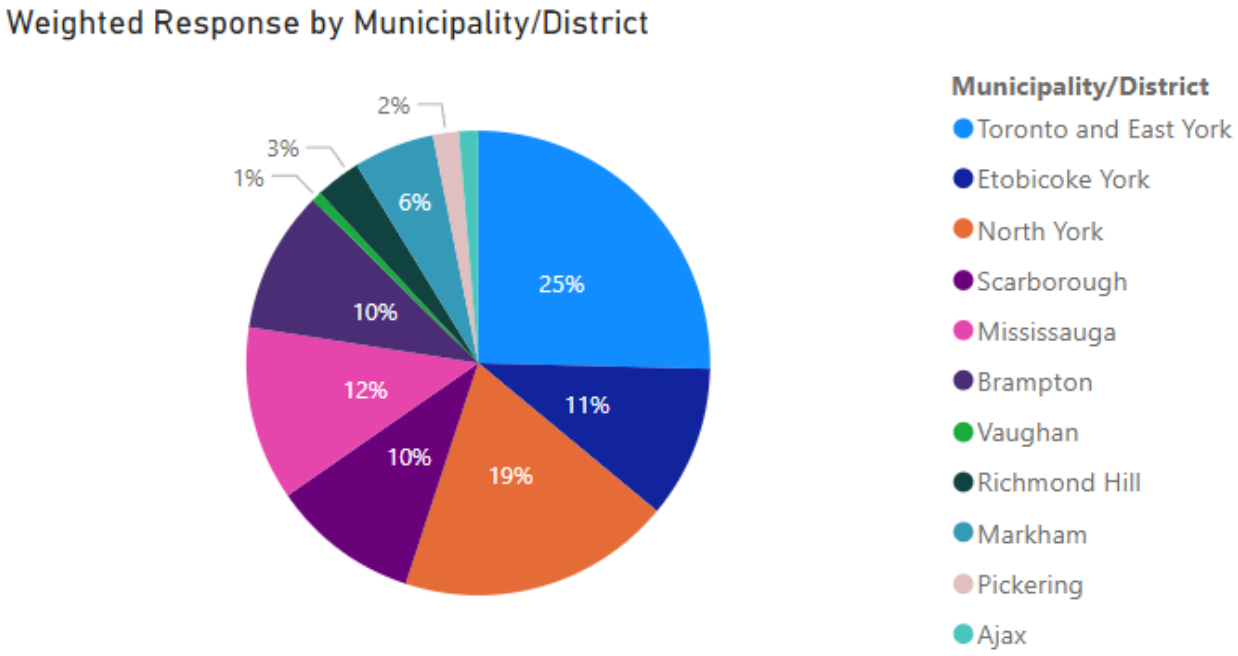


Figure 22 shows that the last taxi/ride-hail trip patterns are largely explained by the reported place of residence (as part of screening). Toronto and East York was the most represented area, accounting for 25% of respondents, which aligns with its prominence as a major origin and destination hub for trips. North York followed with 19%, and Etobicoke York at 11%, indicating significant participation from central Toronto districts that matched their reported trip shares. Scarborough and Mississauga each accounted for 10%, while Brampton had 12%, reflecting active engagement from these suburban regions. Other municipalities such as Vaughan contributed 6% of the responses, with Richmond Hill at 3%, and Markham at 2%. Pickering and Ajax had the lowest representation, at just 1% each. This geographic split of respondents' residential distribution corresponds with where taxi and ride-hail activity is concentrated.

Figure 22: Weighted response distribution by municipality or district



3.7 Travel Companions

Overall, the patterns indicated that both taxis and ride-hails were commonly used for solo travel, with family members and friends being the most frequent companions when trips were shared. Ride-hails had a slightly higher tendency to be used for shared travel compared to taxis.

1. Taxi Companion Patterns (Q10a, 10b): **Figure 23** shows the majority of taxi users (43%) reported travelling alone for their most recent trip. The next largest group (28%) travelled with family members, while 21% travelled with friends. A smaller portion of respondents (9%) were accompanied by children under 10 years old, and 7% reported travelling with a colleague. **Figure 24** shows the number of companions per trip was typically low, as 31% of respondents travelled with one companion, and 14% reported being in a group of three. Groups of four made up 9%, and only a very small percentage reported larger groups, with the average and median taxi occupancy both being 2.0.

Figure 23: Weighted response by taxi companion type

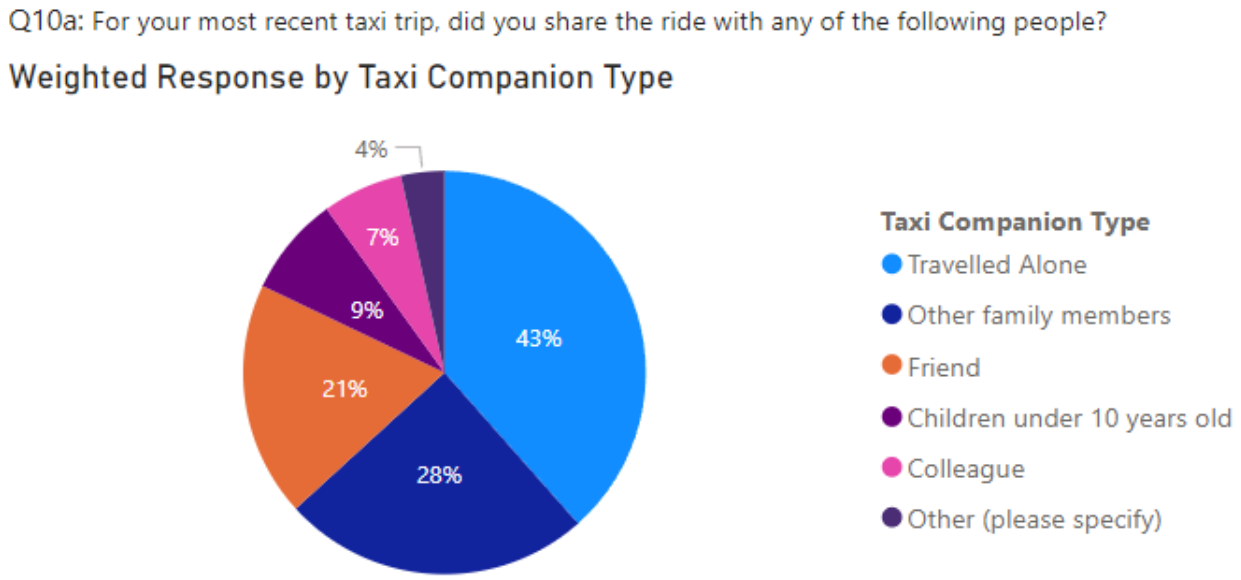
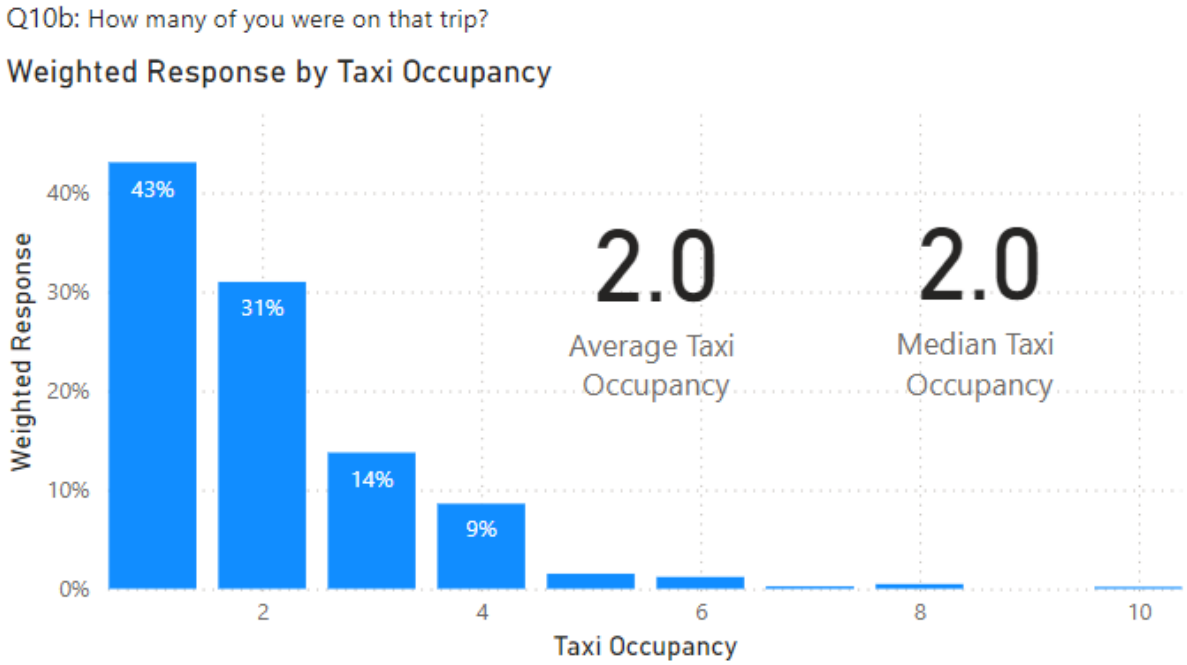


Figure 24: Weighted response by taxi occupancy



2. Ride-Hail Companion Patterns (Q23a, 23b): **Figure 25** illustrates that the majority of ride-hail users (44%) reported travelling alone for their most recent trip. Among those who travelled with companions, 31% travelled with other family members, while 21% travelled with friends. Additionally, 8% of ride-hail trips included children under 10 years old, and 7% involved a colleague. **Figure 26** shows the group size, where 32% of respondents reported traveling with one companion, while 14% were in groups of three, and 7% reported being in a group of four. The average ride-hail occupancy was 1.9, with

a median of 2.0, indicating that ride-hails were often shared with small groups or family members.

Figure 25: Weighted response by ride-hail companion type

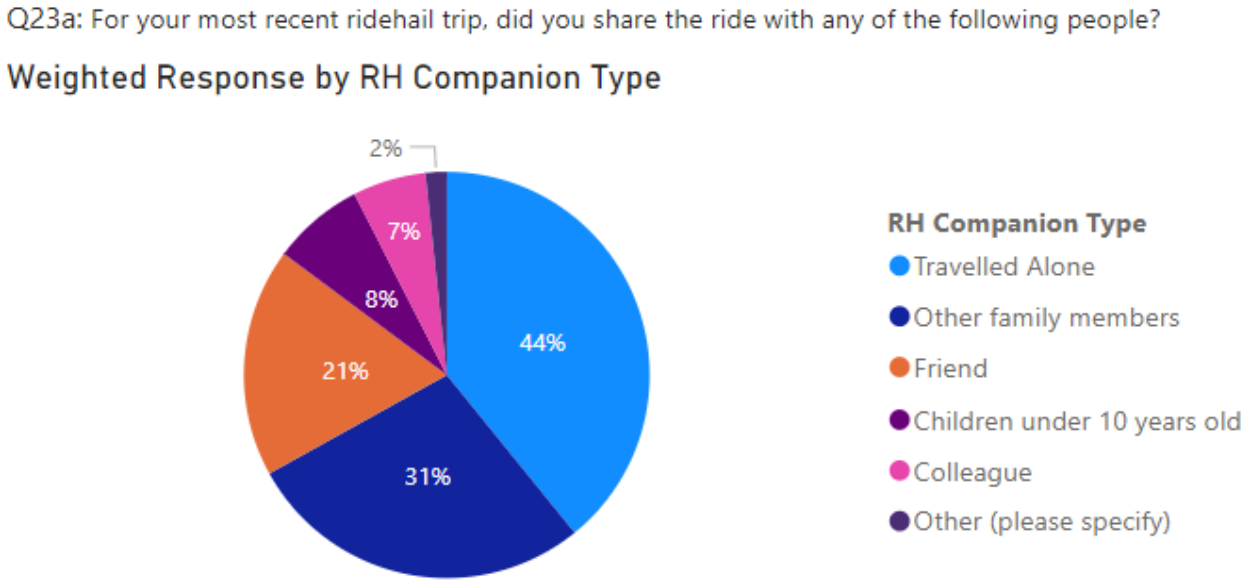
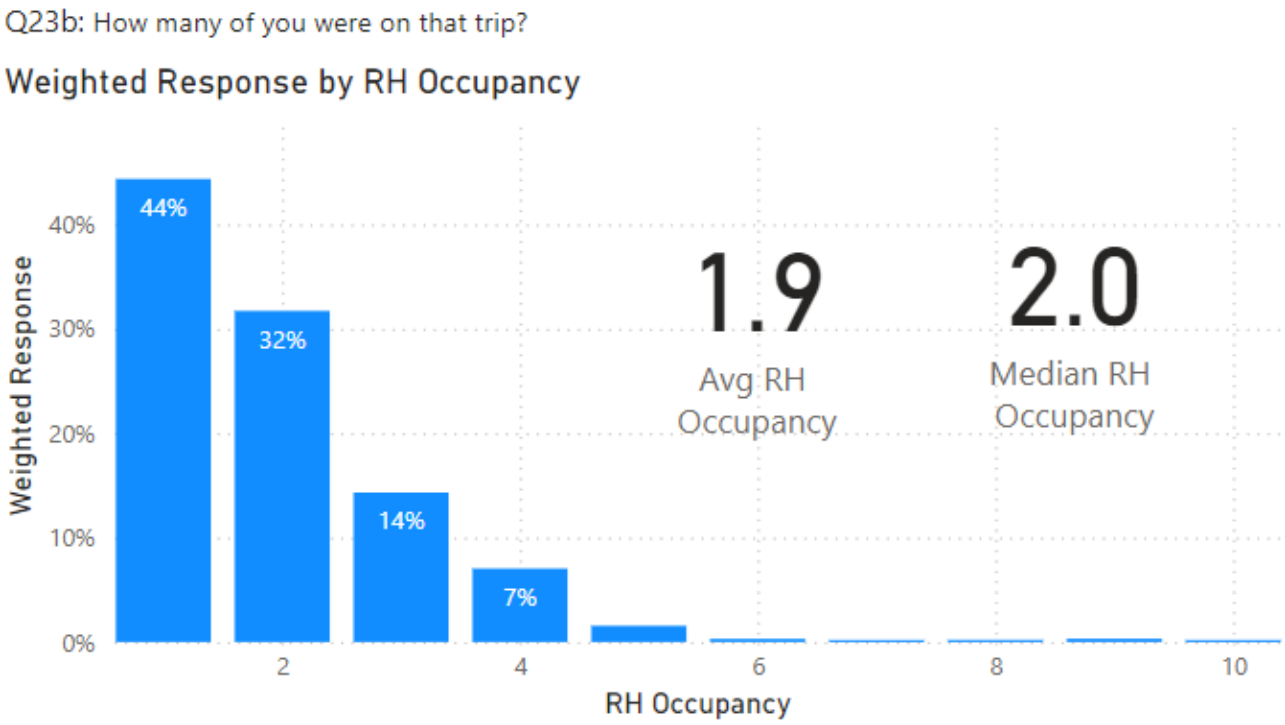


Figure 26: Weighted response by ride-hail occupancy

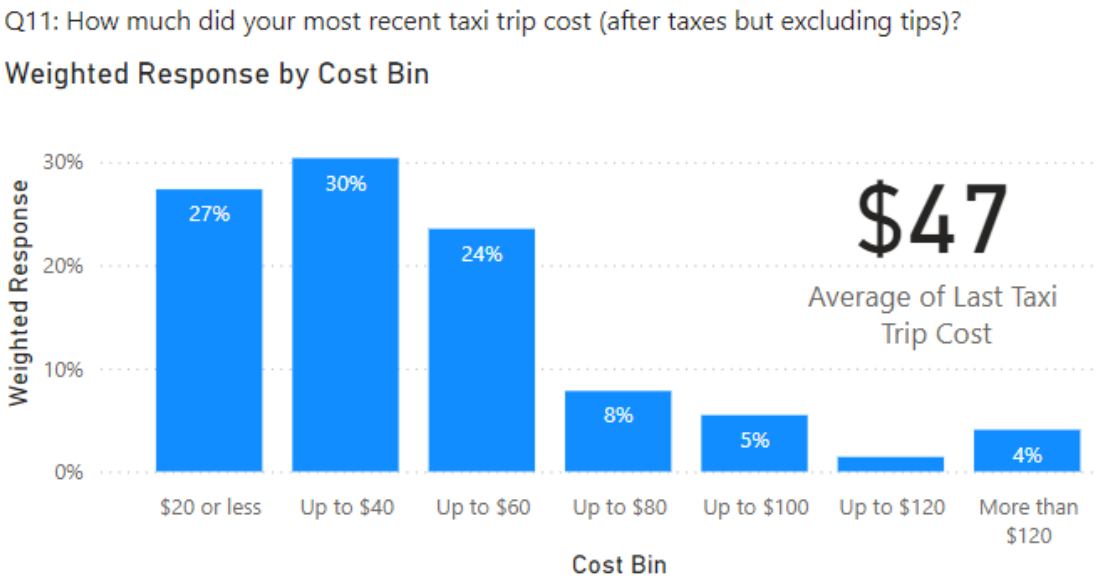


3.8 Trip Costs

For taxi trips costs (Q11), **Figure 27** shows the majority of respondents indicated their most recent trip cost up to $40, with 30% reporting costs between $20 and $40, and 27% paying $20

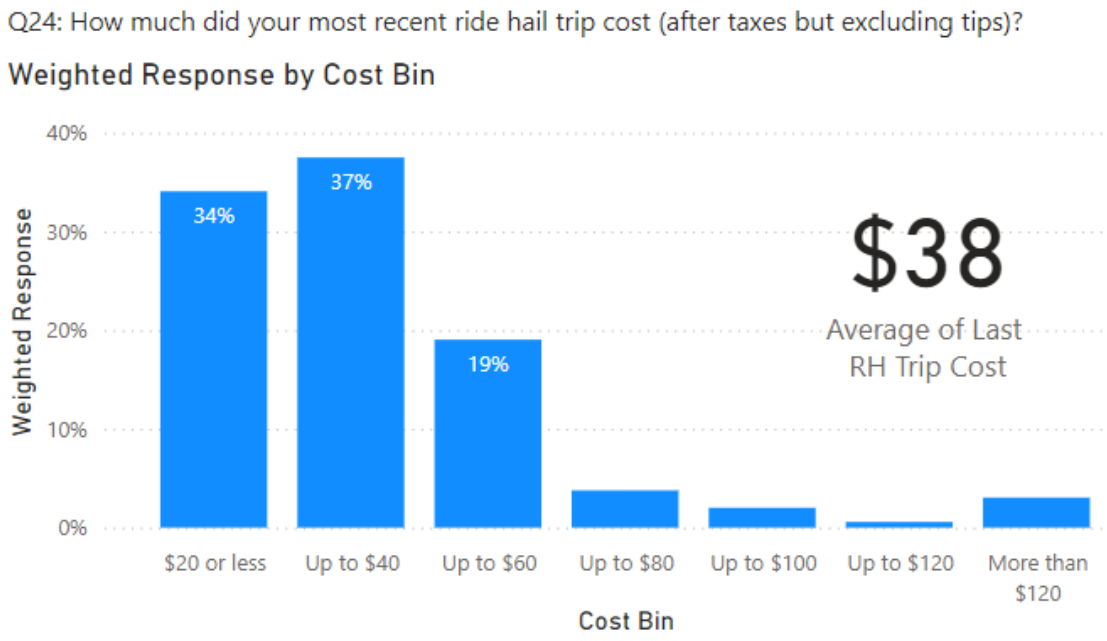
or less. A smaller portion of users (24%) reported spending up to $60, while 8% paid up to $80. Very few respondents reported higher costs, with 5% spending up to $100 and 4% incurring expenses greater than $120. The average cost of a taxi trip was $47.

Figure 27: Weighted response by cost bin for the most recent taxi trip



For ride-hail trip costs (Q24), **Figure 28** shows the cost distribution showed that most trips also fell within the $40 or less range, with 34% of users paying $20 or less and 37% spending up to $40. 19% of respondents reported trip costs up to $60, while much smaller percentages (3-4%) indicated spending up to $80 or more. The average cost of a ride-hail trip was $38, slightly lower than that of a taxi trip.

Figure 28: Weighted response by cost bin for the most recent ride-hail trip



3.9 Satisfaction Levels

In terms of satisfaction levels of various criteria (Q12, Q25), **Figure 29** shows ride-hail services generally scored better than taxis, particularly in areas like customer service and real-time updates, while taxis showed average satisfaction in availability and safety, though there are opportunities for improvement in cost and communication.

Taxi users were most satisfied with vehicle accessibility (41% very satisfied) and safety (47% very satisfied). Availability also scored well, with 46% reporting they were very satisfied, though 19% expressed some level of dissatisfaction (1-3 ratings). Cost showed a more mixed response, with only 25% very satisfied and 29% neutral. Customer service had 39% of users very satisfied, while 23% felt neutral. Real-time pick-up information and knowing the fare in advance had moderate satisfaction, with 35% and 34% very satisfied, respectively, but 17-20% of users indicated lower satisfaction (1-3 ratings). Vehicle comfort and ease of requesting service were well-rated, with 38% and 48%, respectively, very satisfied, though some room for improvement remains.

Figure 29: Weighted response by taxi satisfaction criteria and satisfaction level

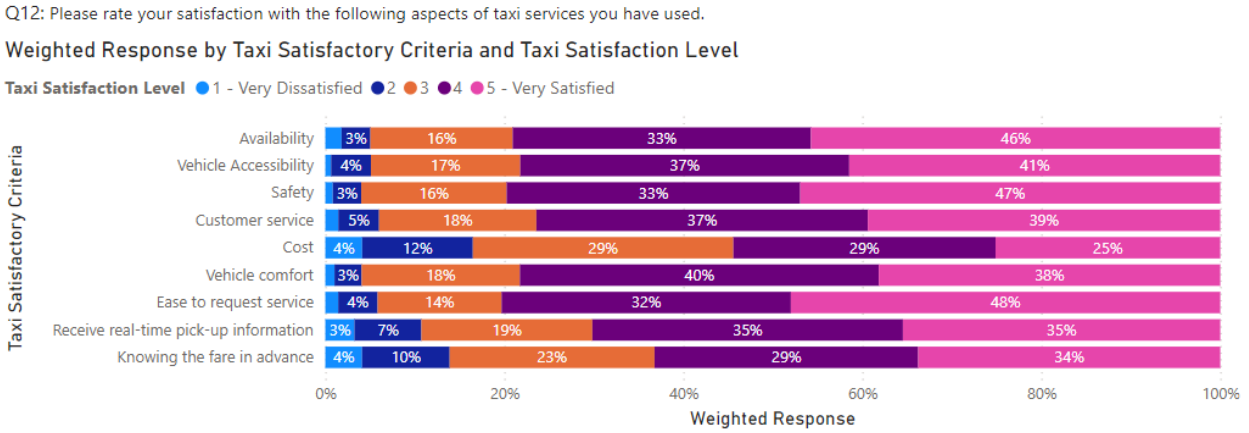
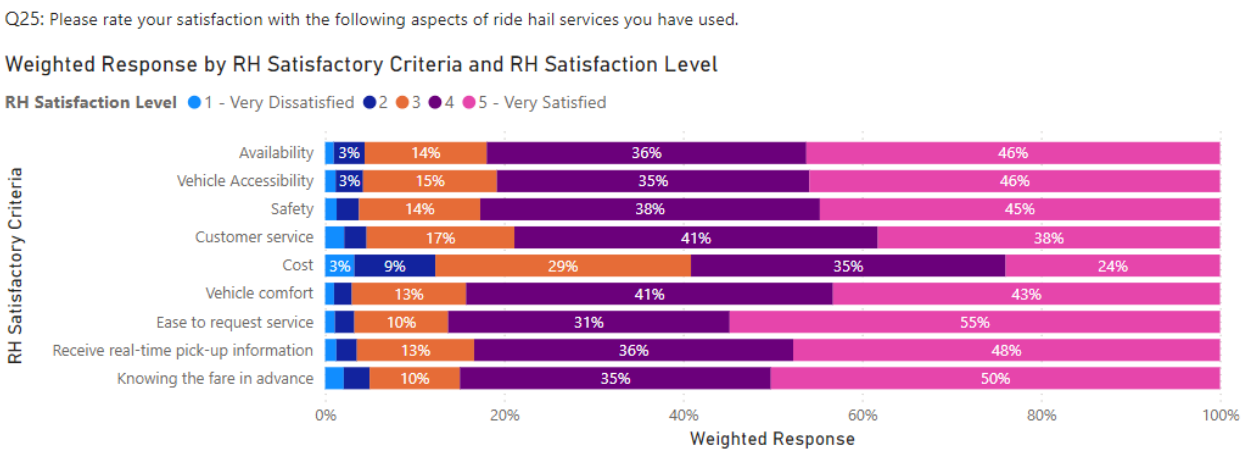


Figure 30 shows that ride-hail services outperformed taxis across most criteria. Availability and vehicle accessibility were highly rated, with 46% of users very satisfied for both. Cost had 24% of users very satisfied, with 29% neutral. Customer service showed strong satisfaction, with 38% very satisfied and 41% satisfied, reflecting positive experiences with ride-hail providers. Ease of requesting service was particularly well-rated, with 55% of users very satisfied. Real-time pick-up information and knowing the fare in advance were also highly regarded, with 48% and 50% very satisfied, respectively. Safety had 45% of users very satisfied, which was comparable to taxis, while vehicle comfort received 43% very satisfied. Overall, ride-hail services demonstrated high satisfaction across key aspects, with strong positive ratings indicating users' approval of the service experience.

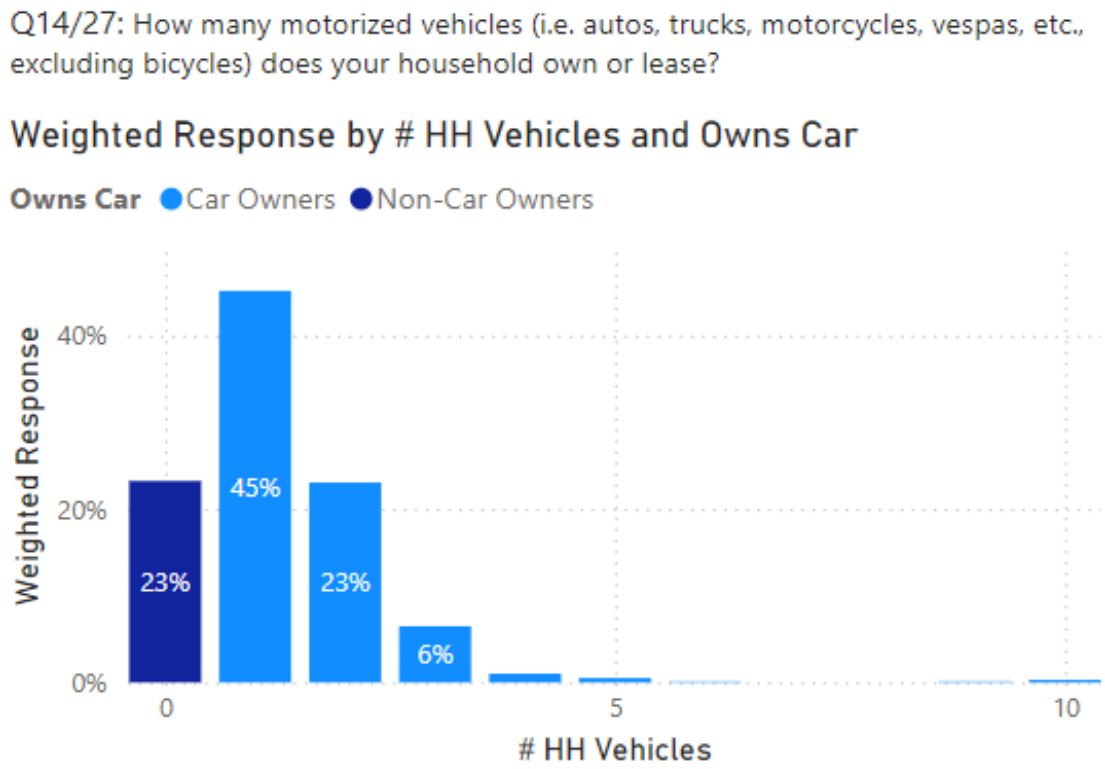
Figure 30: Weighted response by ride-hail satisfaction criteria and satisfaction level



3.10 Impact on Vehicle Ownership

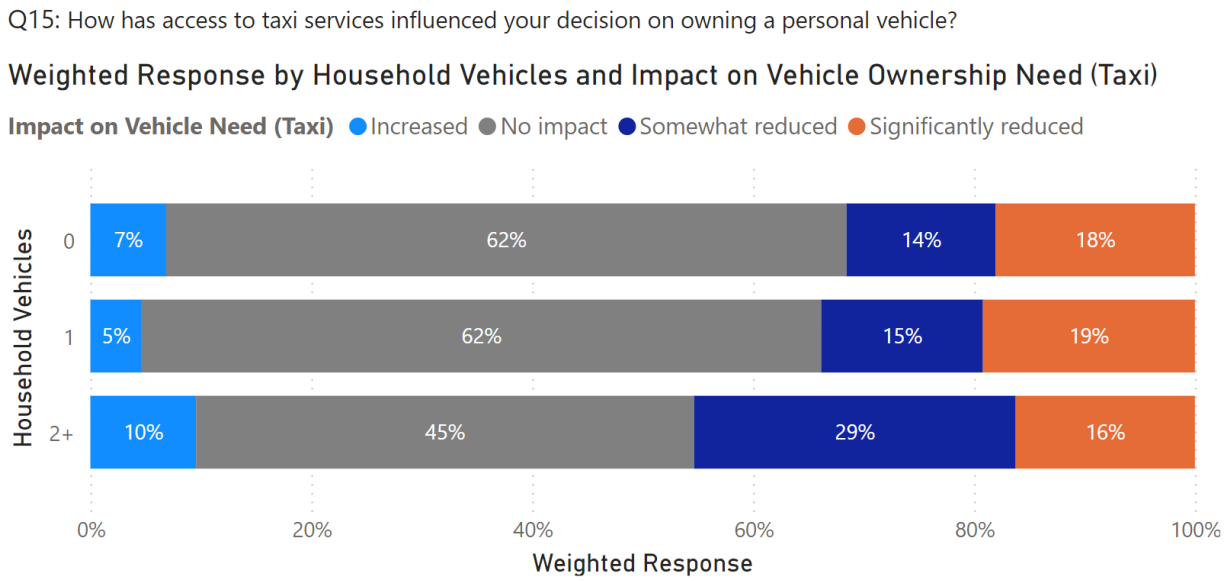
The household vehicle ownership patterns (Q14, Q27) in **Figure 31** indicate that the majority of households own at least one vehicle. The 45% of respondents reported owning one vehicle, while 23% owned two vehicles. Notably, 23% of respondents reported owning no vehicles, highlighting a significant portion of non-car owners. A smaller share, 6%, reported owning three vehicles, and ownership of four or more vehicles was rare, suggesting that multi-vehicle households are relatively uncommon.

Figure 31: Weighted response by household vehicle ownership and car ownership status



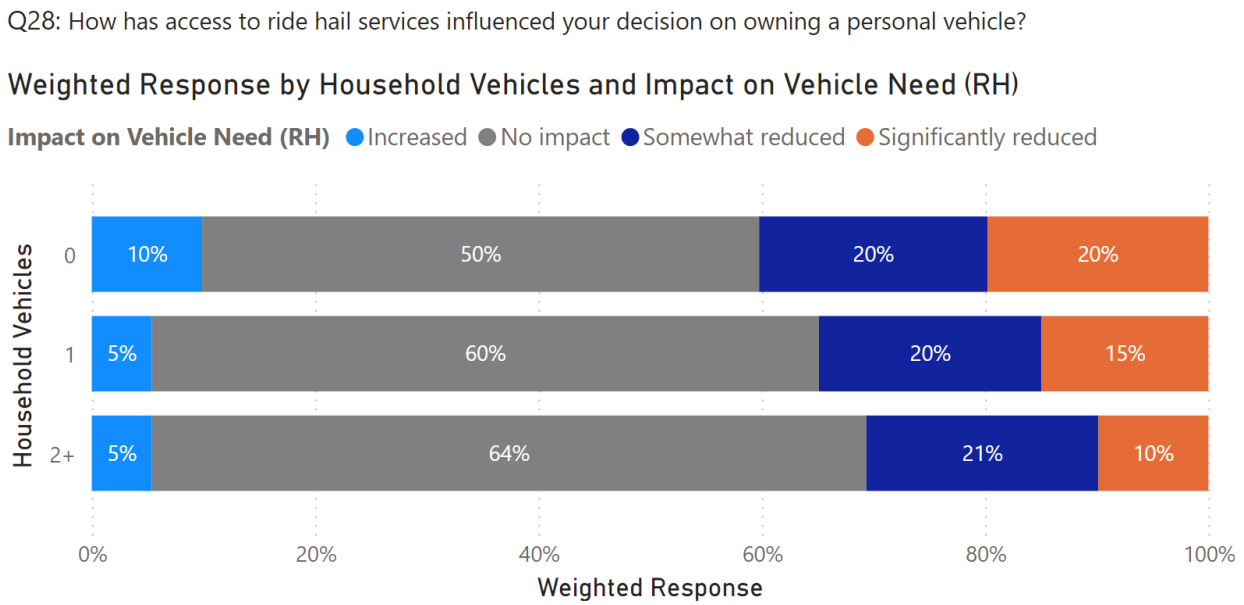
In terms of the impact of taxi services on vehicle ownership decisions (Q15) shown in **Figure 32**, the majority of respondents indicated minimal change. The 62% of households with no vehicles and 62% of single-vehicle households reported that taxi services had no impact on their need to own a personal vehicle. Among households with two or more vehicles, 45% indicated no impact. 18% of non-vehicle households and 19% of single-vehicle households reported that taxi access significantly reduced their need for a personal vehicle, while 16% of households with two or more vehicles also indicated a significant reduction. A smaller proportion, 7% of non-vehicle households and 5% of single-vehicle households, reported that taxi services increased their need for a vehicle. 10% of multi-vehicle households noted an increased need for vehicle ownership due to taxi access.

Figure 32: Weighted response by household vehicles and the impact of taxis services on vehicle ownership need



For ride-hail services (Q28), the influence on vehicle ownership in **Figure 33** varied by household vehicle ownership type. Among respondents without a vehicle, 50% reported that ride-hail services had no impact on their decision to own a personal vehicle, while 20% noted it somewhat reduced their need, and another 20% said it significantly reduced their need. In single-vehicle households, 60% reported no impact, 20% noted a somewhat reduced need, and 15% indicated a significant reduction. Among households with two or more vehicles, 64% stated no impact, 21% noted a somewhat reduced need, and 10% experienced a significant reduction. Conversely, only 10% of non-car owners, 5% of single-vehicle households, and 5% of multi-vehicle households felt that ride-hail services increased their need to own a vehicle.

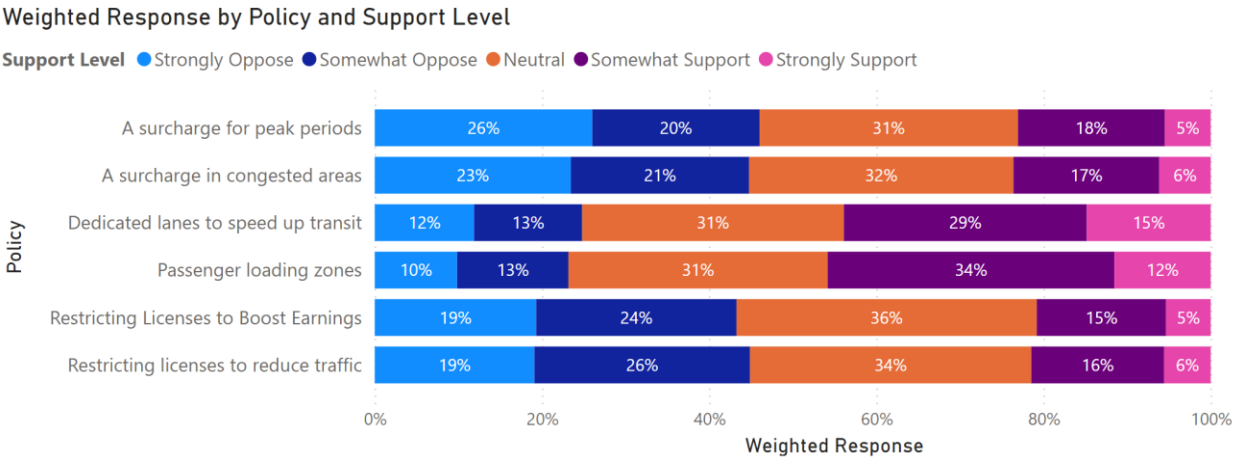
Figure 33: Weighted response by household vehicles and the impact of ride-hail services on vehicle ownership need



3.11 Policy Support for VFH Management Measures

Respondents were asked to indicate their support for various policy measures (Q31) aimed at managing taxis and ride-hail services in the City of Toronto. The results in **Figure 34** showed a clear divide in public opinion on policies that could raise user costs or wait times, such as implementing surcharges or restricting licenses. Measures aimed at improving overall traffic flow, like dedicated transit lanes and passenger loading zones, received the most support, indicating a preference for long-term infrastructure solutions over short-term demand management.

Figure 34: Weighted response by policy and support level



The six policy options were:

1. A surcharge for taxi and ride-hail trips during morning and evening commute periods to reduce traffic congestion: There was notable opposition to this measure, with 46% (26% strongly opposed and 20% somewhat opposed) against a peak period surcharge. Support was lower, with 23% (18% somewhat supporting and 5% strongly supporting) in favor. This response suggests concerns about added financial burdens during high-demand times.

2. A surcharge for taxi and ride-hail trips in highly congested areas: Significant opposition was observed, with 44% (23% strongly opposed and 21% somewhat opposed) against this policy, while 23% (17% somewhat supporting and 6% strongly supporting) were in favor. Many users appear wary of incurring additional trip costs. It is important to note that these findings reflect a subset of the traveling population—specifically, VFH users—and may not represent the views of non-VFH users who could be impacted differently by such policies.

3. More dedicated lanes to speed up buses and streetcars, even if it means longer travel times for taxi and ride-hail users: This measure received strong support, with 44% (29% somewhat supporting and 15% strongly supporting) in favor. Meanwhile, 31% were neutral, and 25% (12% somewhat opposed and 13% strongly opposed) opposed the measure, showing that many respondents view dedicated lanes as a worthwhile compromise for better traffic flow and safety.

4. The creation of passenger loading zones in high-demand areas to improve traffic flow and safety, even if it results in longer walks and reduced street parking: Support for this policy was relatively high, with 46% (34% somewhat supporting and 12% strongly supporting). 31% were neutral, while 23% (13% somewhat opposed and 10% strongly opposed) opposed the measure. This indicates that many respondents view loading zones as a reasonable trade-off for improved traffic flow and safety.

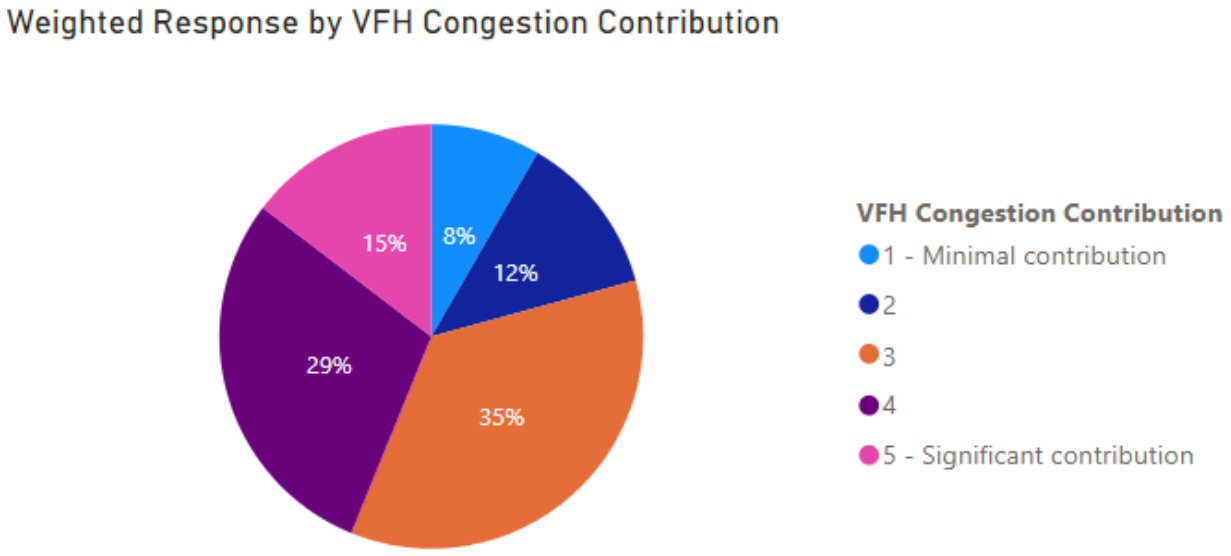
5. Restricting taxi and ride-hail licenses to boost driver earnings, even if it means an increase in wait times and fares: Moderate support was observed, with 36% (24% somewhat supporting and 12% strongly supporting). However, 43% (19% strongly opposed and 24% somewhat opposed) were against it, reflecting concerns about increased costs and longer wait times.

6. Restricting taxi and ride-hail licenses to reduce its impact on city traffic, even if it means an increase in wait times and fares: This measure saw 45% opposition (26% somewhat opposed and 19% strongly opposed), with 34% neutral and 21% (15% somewhat supporting and 6% strongly supporting) in favor. This distribution indicates mixed opinions on balancing congestion reduction with potential impacts on accessibility and affordability.

3.12 VFH Congestion Impacts

Respondents were asked to what extent they think taxis and ride-hails contribute to urban traffic congestion (Q32). The results in **Figure 35** indicated a range of opinions, with 35% of respondents believing that taxis and ride-hails had a moderate impact on congestion, while 29% felt that they contributed significantly. Another 15% viewed their impact as substantial, and 12% noted a slight contribution. Only 8% believed that taxis and ride-hails had minimal impact on traffic congestion. These findings suggest that many respondents see taxis and ride-hails as contributors to congestion, with 44% rating their contribution as notable. This may indicate public support for policies to reduce their impact on traffic, especially in high-congestion areas, though the reluctance to accept surcharges and license restrictions underscores concerns about maintaining accessibility and affordability.

Figure 35: Weighted response by perception of VFH congestion contribution



4 Conclusion

The findings of the Travel Behaviour and Policy Opinion Survey for the Vehicle for Hire (VFH) sector in Toronto provide valuable insights that align with the project's intent to inform policy and strategic planning. The survey results highlight the interplay between taxis, ride-hailing services, and other transportation modes, offering a comprehensive overview of user preferences, travel patterns, and the potential impacts on urban mobility. The key takeaways are as follow.

Usage Patterns and Preferences: The survey revealed that ride-hailing services are more frequently utilized than taxis, with the majority of respondents indicating occasional use of both services. The most common trip purposes were work-related and social or recreational travel, showcasing the significant role VFH services play in supplementing personal and professional mobility. The data indicates that while both taxis and ride-hail services cater to similar trip purposes, ride-hails have a slightly higher prevalence for social travel.

Vehicle Ownership Impact: The survey revealed varied impacts of VFH services on personal vehicle ownership, depending on household vehicle ownership. While ride-hail services notably reduced the need for vehicle ownership among some households—particularly for those without a vehicle or with only one—it had limited or no effect for most respondents. For households with multiple vehicles, the impact was even smaller. This highlights that while VFH services may reduce private vehicle dependency in certain cases, they are not universally replacing car ownership, suggesting their influence is more situational and nuanced.

Transit and Modal Integration: The survey results pointed out limited integration between VFH services and public transit, with a significant number of respondents not using VFH as part of a multimodal trip involving transit. This indicates an opportunity for enhanced coordination between VFH providers and public transit to promote more seamless multimodal travel solutions. The survey findings suggest that while VFH services can serve as first-mile/last-mile solutions, their current role remains more standalone than integrative.

Satisfaction and Service Quality: User satisfaction varied across service aspects, with ride-hail services generally receiving higher satisfaction ratings than taxis, especially in terms of customer service, ease of requesting a ride, and real-time updates. However, both services showed strong satisfaction in areas like availability and safety. This underscores the need for continuous service improvements, particularly in areas where user feedback highlighted gaps, such as cost transparency and vehicle comfort.

Policy Support and Public Opinion: Respondents showed mixed levels of support for policy measures aimed at managing VFH operations. While there was notable resistance to policies that could increase costs or wait times, such as surcharges and license restrictions, there was strong support for initiatives aimed at improving traffic flow, such as dedicated loading zones and transit-priority lanes. This suggests that policy efforts that balance the enhancement of urban mobility with maintaining affordability will likely receive more public endorsement.

Appendix A – VFH Survey

Travel Behaviour and Policy Opinion Survey for Vehicle for Hire

Purpose of the Survey:
This survey is being conducted on behalf of the City of Toronto to understand the travel behaviours and opinions of residents regarding **taxis and Private Transportation Company (PTC) services (i.e. ride hail services such as Uber, Lyft).**

The insights gathered will help shape future transportation planning and policy development to better serve the needs of all Torontonians. Whether you use taxis or ride hails frequently, occasionally, or even if you haven't used them at all recently, your feedback is valuable.

Confidentiality and Data Protection:
We are committed to protecting your privacy and the confidentiality of your responses. All data collected will be anonymized, meaning that no personally identifiable information will be linked to your responses. The aggregated data will be used solely for the purpose of enhancing the City's transportation services and will not be shared with any third parties in a manner that can identify you.

Estimated Time to Complete:
The survey will take approximately 20 minutes to complete.

Sampling:
Canadians who have used a taxi or ride share service to travel to/from the suburbs or downtown area of Toronto in the past six months. Approximately 30% of target audience will have used a taxi and 70% a ride share service. Respondents will be representative based on gender and age, so we will be able to commit to the following:

Geographical Stratum	Target Size
Toronto and East York	375
Etobicoke York	400
North York	
Scarborough	
Mississauga, Brampton, Vaughan, Richmond Hill, Markham, Pickering, Ajax	225
Target Sample Size (Completed surveys)	1000

[MULTIPLE CHOICE]
[Q2]
Base = Total
Which of the following transit modes have you used in the past six months that started or ended in the City of Toronto? Please select all that apply.
A trip is a one-way journey from one location to another for a single main purpose.

For reference, please click the link to view the city's map, which includes all of Toronto and East York, Etobicoke York, North York and Scarborough. – Map of City of Toronto Boundary
[PN: USE URL BELOW AS HYPERLINK FOR "Map of City of Toronto Boundary" TEXT

https://www.toronto.ca/city-government/data-research-maps/neighbourhoods-communities/community-council-area-profiles/

Taxi [IF SELECTED, ASK TAXI BLOCK Q3-15]
Ride hail or ride share (i.e. Uber, Lyft) [IF SELECTED, ASK RIDE HAIL BLOCK Q16-28]
Bus
Streetcar
GO Train
GO Bus
UP Express (Union Pearson Express)
Other
I have not used any of these

[TERMINATE IF TAXI AND RIDE HAIL NOT SELECTED]

TAXI USERS

[SINGLE CHOICE]
[Q3]
Base = Total
In 2024, how many times would you say you've used a taxi to or from the City of Toronto (weekly, monthly or annually), whichever is easiest to recall? If you are not sure on the number, please provide your best guess. Select one option.
[ENABLE TEXTBOX FOR SELECTED OPTIONS]

Please specify the number of times per week?: **[TEXTBOX] [RANGE 1 - 50]**
Please specify the number of times per month?: **[TEXTBOX] [RANGE 1 - 200]**
Please specify the number of times per year?: **[TEXTBOX] [RANGE 1 - 1200]**

IF "PER WEEK" SELECTED MUTIPLY THE ENETERED VAUE BY 52 AND STORE VALUE]
IF "PER MONTH" SELECTED MUTIPLY THE ENETERED VAUE BY 12 AND STORE VALUE]
IF "PER YEAR" SELECTED STORE ENETERED VAUE]

[SINGLE CHOICE]
[Q4a]
Base = Total
We are interested to learn how your use of taxis in 2024 changed compared to the year before. In 2023, how many times would you say you've used a taxi inside the City of Toronto (weekly, monthly or annually), whichever is easiest to recall? If you are not sure on the number, please provide your best guess.

[PN: SHOW ALL THREE OPTIONS.
Please specify the number of times per week?: **[TEXTBOX] [RANGE 1 - 50]**
Please specify the number of times per month?: **[TEXTBOX] [RANGE 1 - 200]**
Please specify the number of times per year?: **[TEXTBOX] [RANGE 1 - 1200]**

IF "PER WEEK" SELECTED MUTIPLY THE ENETERED VAUE BY 52 AND STORE VALUE]
IF "PER MONTH" SELECTED MUTIPLY THE ENETERED VAUE BY 12 AND STORE VALUE]
IF "PER YEAR" SELECTED STORE ENETERED VAUE]

[PN: CALCULATE Q4AQ3_DIFF = Q4A – Q3.]

[ASK IF Q4AQ3_DIFF NOT EQUAL TO 0]
[SINGLE CHOICE]
[Q4b]
Base = Q3 DOES NOT EQUAL Q4a
You indicated that you used taxis [ENTER STORED VALUE FROM Q3 WITH TEXT " times per year in 2024 and " ENTER STORED VALUE FROM Q4A WITH TEXT " times per year in 2023"]. Please state the primary reason that led to that change from 2023.

[RANDOMIZE]
Taxi cost changed
Taxi travel times changed
Taxi reliability changed
Taxi wait times changed
Availability of taxis changed
Transit service quality changed
Transit service cost changed
Cost of ride-hails have changed
Changing violence and harassment concerns
Changing collision safety concerns
Changes to places I wish to go
Other (please specify) **[ANCHOR]**

[MULTI SELECT]

[Q5]

What are the primary reasons you would choose to use taxis over other modes of transportation? Select all that apply.

[RANDOMIZE]

Speed - Get there as soon as possible
Reliability - Get there at the time I want confidently
Accessibility – Need special travel assistance
Easy to request service – Easy to hail a taxi on-street or request a trip on the phone/web/app
Collision avoidance - Protection from traffic accidents
Lower cost – Group travel saves money
Harassment protection - Safety from harassment or violence
Weather – Manage travel in poor weather conditions
Load - Carry heavy/bulky items
Limited transit – Poor/lack of transit service, service disruptions
Driving hassle – Navigating congestion, low parking availability, high parking cost
Entertainment or Social Outings – Choosing a safer travel option after entertainment or social events
Other (please specify) **[ANCHOR]**

[SINGLE CHOICE]
[Q6A]
Base = Total

Thinking about your most recent trip using a taxi, what was the primary purpose of this trip?

[RANDOMIZE]

Commuting to work
Work-related travel other than commuting (e.g., business meetings, conferences, airport connection, etc.)
Commuting to school
Shopping and services (Mall, groceries, banking, haircut)
Health and personal care
Restaurant, bar, or coffee (including takeout)
Visiting friends and family
Recreation, sports, leisure, arts
Worship or religious activity
Pick up or dropping off someone (including daycare)
Trips to the Airport
Other (specify) **[ANCHOR]**

[SINGLE CHOICE]
[Q6B]
Base = Total

Did part of this trip involve a public transit connection?

No
Subway
Bus
Streetcar
GO Train
GO Bus
UP Express (Union Pearson Express)

[PN: SHOW Q7A AND Q7B ON SAME PAGE]
[SINGLE CHOICE]
[Q7A]
Base = Total
Please identify the origin of your most recent taxi trip that started OR ended in the City of Toronto. For reference, please click the link to view the city's map – Find Your Neighbourhood
[PN: PLEASE INSERT LINK
https://www.toronto.ca/city-government/data-research-maps/neighbourhoods-communities/neighbourhood-profiles/find-your-neighbourhood/#location=&lat=&lng=&zoom=
]

[DROP DOWN LIST OF CITY OF TORONTO NEIGHBOURHOODS]

[SINGLE CHOICE]
[Q7B]
Base = Total
Please identify the destination of your most recent taxi trip that started OR ended in the City of Toronto.

[DROP DOWN LIST OF CITY OF TORONTO NEIGHBOURHOODS]

[PN: ONE OF THE ORIGIN OR DESTINATION NEED TO BE WITHIN THE CITY OF TORONTO NEIGHBOURHOOD LIST. SO PLEASE ADDVALIDATION THAT ANY COMBINATION OF THE FOLLOWING SELECTIONS ARE NOT ALLOWED BETWEEN Q7A AND Q7B. IF Q7A AND Q7B BOTH ONLY IINCLUDE SELECTIONSBELOW, THEN SHOW THE FOLLOWING MESSAGE: "Please update your origin or destination with a Toronto neighborhood location"

Ajax
Brampton
Markham
Mississauga
Pearson International Airport
Pickering
Richmond Hill
Vaughan

[PN: ADDITIONAL CHOICES PROVIDED FOR SURROUNDING MUNICIPALITIES IN THE GTA, AS WELL AS AIRPORT]
[PN: ONE OF THE ORIGIN OR DESTINATION NEED TO BE WITHIN THE CITY OF TORONTO NEIGHBOURHOOD LIST.

[SINGLE CHOICE]
[Q8]
Base = Total
For your most recent trip, how did you request your taxi service?

[RANDOMIZE]
By calling the taxi company by phone
By using a smartphone app
By using the taxi company website
By flagging a taxi on-street
Other (please specify) **[ANCHOR]**

[SINGLE CHOICE]
[Q9A]
Base = Total
If taxi services were not available, which mode of transportation would you have used for your most recent trip?

Auto, as a driver
Auto, as a passenger
Transit
Bicycle (owned)
Bike share services
E-scooter
Motorcycle
Walk
Car share services (e.g. Enterprise Carshare)
Ride Hail Service (Uber/Lyft)
Would not have made the trip **[ANCHOR]**
Other (please specify) **[ANCHOR]**

[NUMERIC OPENEND]
[Q9B]
Base = Total
In the last 6 months please estimate how many times you used a taxi for trips similar to [PIPE-IN RESPONSE FROM Q6 TAXI TRIP PURPOSE] trips you made." For example, if you had three personal

appointments where you took a taxi each way in the last 6 months, that would total to 6 trips. A trip is a one-way journey from one location to another for a single main purpose.

[TEXTBOX] [RANGE 1 - 1200]

[MULTI SELECT]
[Q10A]
Base = Total
For your most recent taxi trip, did you share the ride with any of the following people?

Travelled Alone **[EXCLUSIVE]**
Children under 10 years old
Other family members
Friend
Colleague
Other (please specify)

[NUMERIC TEXT]
[Q10B]
Base = Not "Travelled alone"
How many of you were on that trip?

[TEXTBOX] [RANGE 2 -10]

[NUMERIC TEXT]
[Q11]
Base = Total
How much did your most recent taxi trip cost (after taxes but excluding tips)? If you are not sure on the number, please provide your best guess.

Please enter the amount $_____. **[RANGE $1 - $500]**

[SINGLE CHOICE GRID]
[Q12]
Base = Total
Please rate your satisfaction with the following aspects of taxi services you have used.

[ROWS] [RANDOMIZE]
Availability (Prompt pickup)
Vehicle Accessibility
Safety
Customer service (driver friendliness, platform support, etc.)

Cost
Vehicle comfort
Ease to request service
Receive real-time pick-up information
Knowing the fare in advance

[COLUMN]
1 - Very Dissatisfied
2
3
4
5 - Very Satisfied
N/A

[SINGLE CHOICE GRID]
[Q13]
Base = Total
Compared to 2023, how has your usage of taxis affected your use of other transportation modes? Please indicate whether your use of each mode has increased, decreased, or stayed the same. If you do not have access or don't use a mode, then please select No change.

[ROWS][RANDOMIZE]
Transit
Auto, as a driver
Auto, as a passenger that's not a ride hail or taxi
Bicycles
Walking

[COLUMN]
Increased
Decreased
No change

[NUMERIC OPENEND]
[Q14]
Base = Total

How many motorized vehicles (i.e. autos, trucks, motorcycles, vespas, etc., excluding bicycles) does your household own or lease?

[TEXTBOX] [RANGE 0 - 10]

[SINGLE CHOICE]
[Q15]
How has access to taxi services influenced your decision on owning a personal vehicle?

Significantly reduced my need to own a personal vehicle
Somewhat reduced my need to own a personal vehicle
No impact on my vehicle ownership decision
Increased my need to own a personal vehicle

RIDE HAIL USERS

[SINGLE CHOICE]
[Q16]
Base = Total
Have you taken a ride hail (i.e. Lyft or Uber) that started or ended in the City of Toronto in the past 6 months?

For reference, please click the link to view the city's map – Map of City of Toronto Boundary

Yes
No
[TERMINATE IF Q2 = NO AND Q16 = NO]

[SINGLE CHOICE]
[Q17]
Base = Q16 = Yes
In 2024, how many times would you say you've used a ride hail (i.e. Lyft or Uber) to or from the City of Toronto (weekly, monthly or annually, whichever is easiest to recall? If you are not sure on the number, please provide your best guess. Select one option.
[ENABLE TEXTBOX FOR SELECTED OPTIONS]

Please specify the number of times per week?: **[TEXTBOX] [RANGE 1 - 50]**
Please specify the number of times per month?: **[TEXTBOX] [RANGE 1 - 200]**
Please specify the number of times per year?: **[TEXTBOX] [RANGE 1 - 1200]**

IF "PER WEEK" SELECTED MUTIPLY THE ENETERED VAUE BY 52 AND STORE VALUE]
IF "PER MONTH" SELECTED MUTIPLY THE ENETERED VAUE BY 12 AND STORE VALUE]
IF "PER YEAR" SELECTED STORE ENETERED VAUE]

[SINGLE CHOICE]
[Q18A]
Base = Q16 = Yes

We are interested to learn how your use of ride hails in 2024 changed compared to the year before. In 2023, how many times would you say you've used a taxi inside the City of Toronto (weekly, monthly or annually), whichever is easiest to recall? If you are not sure on the number, please provide your best guess. Select one option.

~~**[PN: SHOW SAME OPTION SELECTED IN Q3]**~~
[PN: SHOW ALL THREE OPTIONS.
Please specify the number of times per week?: **[TEXTBOX] [RANGE 1 - 50]**
Please specify the number of times per month?: **[TEXTBOX] [RANGE 1 - 200]**
Please specify the number of times per year?: **[TEXTBOX] [RANGE 1 - 1200]**

IF "PER WEEK" SELECTED MUTIPLY THE ENETERED VAUE BY 52 AND STORE VALUE]
IF "PER MONTH" SELECTED MUTIPLY THE ENETERED VAUE BY 12 AND STORE VALUE]
IF "PER YEAR" SELECTED STORE ENETERED VAUE]

[ASK IF Q17 DOES NOT EQUAL Q18]
[SINGLE CHOICE]
[Q18B]
Base = Q17 DOES NOT EQUAL Q18
You indicated that you used ride hails [ENTER STORED VALUE FROM Q17 WITH TEXT " times per year in 2024 and " ENTER STORED VALUE FROM Q18A WITH TEXT " times per year in 2023"]. Please state the primary reason that led to that change from 2023.

[RANDOMIZE]
Ride hail cost changed
Ride hail travel times changed
Ride hail reliability changed
Ride hail wait times changed
Transit service quality changed
Transit service cost changed
Cost of taxis have changed
Changing violence and harassment concerns
Changing collision safety concerns
Changes to places I wish to go
Other (please specify) **[ANCHOR]**

[MULTI SELECT]
[Q19]
Q16 = Yes
What are the primary reasons you would choose to use ride hail services over other modes of transportation? Select all that apply.

[RANDOMIZE]

Speed - Get there as soon as possible
Reliability - Get there at the time I want confidently
Easy to request service – Easy to request a trip on an app
Accessibility – Need special travel assistance
Collision avoidance - Protection from traffic accidents
Cost – Lower cost than driving and parking, knowing fare in advance, group travel saves money
Harassment protection - Safety from harassment or violence
Weather – Manage travel in poor weather conditions
Load - Carry heavy/bulky items
Limited transit – Poor/lack of transit service, service disruptions
Driving hassle – Navigating congestion, low parking availability, high parking cost
Entertainment or Social Outings – Choosing a safer travel option after entertainment or social events
Other (please specify) **[ANCHOR]**

[SINGLE CHOICE]
[Q20A]
Q16 = Yes
Thinking about your most recent trip using a ride hail, what was the primary purpose of this trip?

[RANDOMIZE]
Commuting to work
Work-related travel other than commuting (e.g., business meetings, conferences, airport connection, etc.)
Commuting to school
Shopping and services (Mall, groceries, banking, haircut)
Health and personal care
Restaurant, bar, or coffee (including takeout)
Visiting friends and family
Recreation, sports, leisure, arts
Worship or religious activity
Pick up or dropping off someone (including daycare)
Trips to the Airport
Other (specify) **[ANCHOR]**

[SINGLE CHOICE]
[Q20B]
Q16 = Yes
Did part of this trip involve a public transit connection?

No
Subway
Bus

Streetcar
GO Train
GO Bus
UP Express (Union Pearson Express)

[PN: SHOW Q21A AND Q21B ON SAME PAGE]
[SINGLE CHOICE]
[Q21A]
Q16 = Yes
Please identify the origin of your most recent ride hail trip that started OR ended in the City of Toronto. For reference, please click the link to view the city's map – Find Your Neighbourhood
[PN: PLEASE INSERT LINK
https://www.toronto.ca/city-government/data-research-maps/neighbourhoods-communities/neighbourhood-profiles/find-your-neighbourhood/#location=&lat=&lng=&zoom=
]

[DROP DOWN LIST OF CITY OF TORONTO NEIGHBOURHOODS]

[SINGLE CHOICE]
[Q21B]
Q16 = Yes
Please identify the destination of your most recent ride hail trip that started OR ended in the City of Toronto.

[DROP DOWN LIST OF CITY OF TORONTO NEIGHBOURHOODS]

[PN: ADDITIONAL CHOICES PROVIDED FOR SURROUNDING MUNICIPALITIES IN THE GTA, AS WELL AS AIRPORT]
[PN: ONE OF THE ORIGIN OR DESTINATION NEED TO BE WITHIN THE CITY OF TORONTO NEIGHBOURHOOD LIST. SO PLEASE ADD VALIDATION THAT ANY COMBINATION OF THE FOLLOWING SELECTIONS ARE NOT ALLOWED BETWEEN Q21A AND Q21B. IF Q21A AND Q21B BOTH ONLY IINCLUDE SELECTIONSBELOW, THEN SHOW THE FOLLOWING MESSAGE: "Please update your origin or destination with a Toronto neighborhood location"

Ajax
Brampton
Markham
Mississauga
Pearson International Airport
Pickering
Richmond Hill
Vaughan

[SINGLE CHOICE]
[Q22A]
Q16 = Yes
If ride hail services were not available, which mode of transportation would you have used for your most recent trip?

Auto, as a driver
Auto, as a passenger
Transit
Bicycle (owned)
Bike share services
E-scooter
Motorcycle
Walk
Car-share services (i.e. zip car)
Taxi
Would not have made the trip **[ANCHOR]**
Other (please specify) **[ANCHOR]**

[NUMERIC OPENEND]
[Q22B]
Q16 = Yes
In the last 6 months please estimate how many times you used a ride hail for similar [PIPE-IN RESPONSE FROM Q20 TAXI TRIP PURPOSE] trips you made." For example, if you had three personal appointments where you took a ride hail each way in the last 6 months, that would total to 6 trips. A trip is a one-way journey from one location to another for a single main purpose.

[TEXTBOX] [RANGE 1 - 1200]

[MULTI SELECT]
[Q23A]
Q16 = Yes
For your most recent ride hail trip, did you share the ride with any of the following people?

Travelled Alone **[EXCLUSIVE]**
Children under 10 years old
Other family members
Friend
Colleague
Other (please specify)

[NUMERIC TEXT]

[Q23B]
Base = Not "Travelled alone"
How many of you were on that trip?

[TEXTBOX] [RANGE 2 -10]

[NUMERIC TEXT]
[Q24]
Q16 = Yes
How much did your most recent ride hail trip cost (after taxes but excluding tips)? If you are not sure on the number, please provide your best guess.

Please enter the amount $_____. **[RANGE $1 - $500]**

[SINGLE CHOICE GRID]
[Q25]
Q16 = Yes
Please rate your satisfaction with the following aspects of ride hail services you have used.

[ROWS] [RANDOMIZE]
Availability (Prompt pickup)
Vehicle Accessibility
Safety
Customer service (driver friendliness, platform support, etc.)
Cost
Vehicle comfort
Ease to request service
Receive real-time pick-up information
Knowing the fare in advance

[COLUMN]
1 - Very Dissatisfied
2
3
4
5 - Very Satisfied
N/A

[SINGLE CHOICE GRID]
[Q26]
Q16 = Yes

Compared to 2023, how has your usage of ride hails affected your use of other transportation modes? Please indicate whether your use of each mode has increased, decreased, or stayed the same. If you do not have access or don't use a mode, then please select No change.

[ROWS][RANDOMIZE]
Transit
Auto, as a driver
Auto, as a passenger that's not a ride hail or taxi
Bicycles
Walking

[COLUMN]
Increased
Decreased
No change

[PN: SHOW IF Q14 IS NOT ASKED]
[NUMERIC OPENEND]
[Q27]
Q16 = Yes

How many motorized vehicles (i.e. autos, trucks, motorcycles, vespas, etc., excluding bicycles) does your household own or lease?

[TEXTBOX] [RANGE 0 - 10]

[SINGLE CHOICE]
[Q28]
Q16 = Yes
How has access to hail ride services influenced your decision on owning a personal vehicle?

Significantly reduced my need to own a personal vehicle
Somewhat reduced my need to own a personal vehicle
No impact on my vehicle ownership decision
Increased my need to own on a personal vehicle

ATTITUDINAL QUESTIONS

[SINGLE CHOICE GRID]
[Q29]
Base = Total
How often do you use the following transportation modes. Select the frequency that best fits your circumstance?

[ROWS][RANDOMIZE]
Household-owned auto, as a driver
Household-owned auto, as a passenger
Car rental/car share, as a driver
Car rental/car share, as a passenger
Transit
Walk
Bicycle
E-Scooter or other electric mobility device
Motorcycle, moped, motor-scooter
Taxi
Ride Hail Services
Other

[COLUMNS]
Never
Very rarely (once or twice a year)
Rarely (A few times every six months)
Occasionally (A few times a month)
Frequently (Several times a week)
Very frequently (Daily basis)

[MULTI SELECT]
[Q30]
Base = Total
What are the main factors that influence your choice of transportation mode in general? Select all that apply.

Speed - Get there as soon as possible
Reliability - Get there at the time I want confidently
Accessibility – Need special travel assistance
Comfort - Free from noise, comfortable seating, not crowded
Cost
Collision avoidance - Protection from traffic accidents

Harassment protection - Safety from harassment or violence
Weather – Manage travel in poor weather conditions
Space – Carry enough people and goods
Well-being - Staying fit
Environmental Impact - Concerns about emissions, energy use, and the ecological footprint of transportation options
Other (please specify)

[SINGLE CHOICE GRID]
[Q31]
Base = Total
To improve urban mobility, mitigate congestion, and improve effectiveness of vehicle for hire drivers, the City of Toronto can apply various management measures to taxis and ride-hail services. These include implementing vehicle or license limits to reduce the number of vehicles, introducing peak period surcharges to manage demand, and speeding up transit service.

Indicate your support level for the following management measures and their potential consequences.

[ROWS][RANDOMIZE]
Restricting taxi and ride hail licenses to boost driver earnings, even if it means an increase in wait times and fares.
Restricting taxi and ride hail licenses to reduce its impact on city traffic, even if it means an increase in wait times and fares.
A surcharge for taxi and ride hailing trips in the morning and evening commute periods to reduce its impact on city traffic.
A surcharge for taxi and ride hailing trips in highly congested areas to reduce its impact on city traffic.
The creation of passenger loading zones in areas with high vehicle for hire demand to improve traffic flow and safety, even if it results in longer walks and reduced street parking.
More dedicated lanes to speeding up buses and streetcars, even if it means longer travel times for taxi and ride hail users

[COLUMNS]
Strongly Oppose
Somewhat Oppose
Neutral
Somewhat Support
Strongly Support

[SINGLE CHOICE]
[Q32]

Base = Total

Taxis and ride hail vehicles, while providing flexible transportation options, are often discussed in the context of their contribution to urban traffic congestion.

To what extent do you think taxis and ride hails contribute to traffic congestion in the city?

1 - Minimal contribution
2
3
4
5 - Significant contribution

[SINGLE CHOICE]
[Q34]
Base = Total
What best describes your gender?

Woman
Man
Trans woman
Trans man
Gender non-binary (including ender fluid, genderqueer, androgynous)
Two-Spirit
Not listed, please describe: _____
Prefer not to answer

[SINGLE CHOICE]
[Q35]
Base = Total
Which of the following best describes your current employment status?

Employed - full-time
Employed - part-time
Employed - casual, on-call, temporary or seasonal
Unemployed or looking for a job
Stay at home caregiver
Student
Retired
Unable to work
Not listed
Prefer not to answer

[SINGLE CHOICE]
[Q36]
Base = Total
What is your household's annual income before taxes?

Under $29,999
$30,000 to $49,999
$50,000 to $69,999
$70,000 to $99,999
$100,000 to $149,999
$150,000 or more
Prefer not to answer

[SINGLE CHOICE]
[Q37]
Base = Total
What is the highest level of education you have completed?

Less than high school
High school or equivalent
Degree or diploma from a college or university
Graduate or professional degree (examples: Master, PhD, MD or LLB/JD)
Prefer not to answer

[NUMERIC OPENEND]
[Q38]
Base = Total
Including yourself, how many people live in your household on a regular basis?

[TEXTBOX]

[SINGLE CHOICE]
[Q39]
Base = Total
Do you have any children aged 15 or under?

Yes
No

[MULTI SELECT]
[Q40]
Base = Total
Which ethnic/race categories best describe you? Please select all that apply.

Arab, Middle Eastern or West Asian
Black
East Asian
First Nations, Inuit or Métis
Latin American
Southeast Asian
White/Caucasian
Another Race (Not listed)
Prefer not to answer

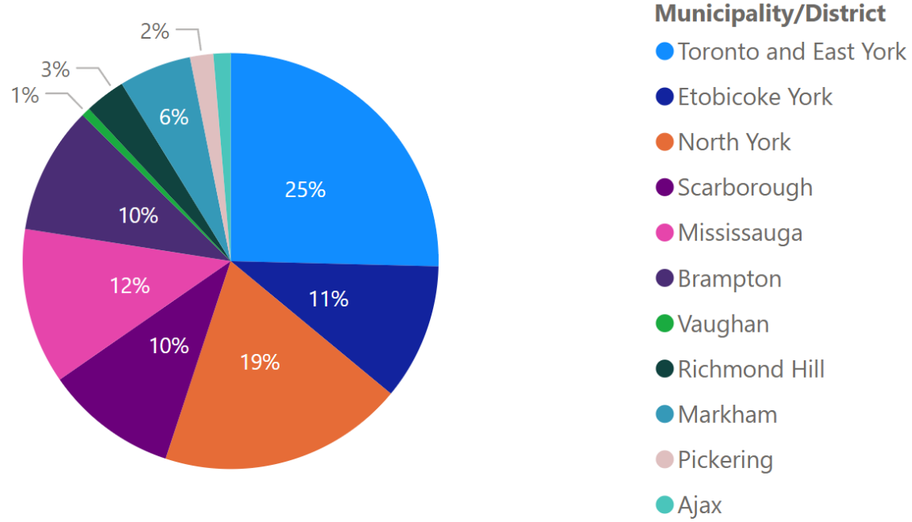
[SINGLE CHOICE]
[Q41]
Base = Total
Do you identify as a person with a disability?

Yes
No
Prefer not to say

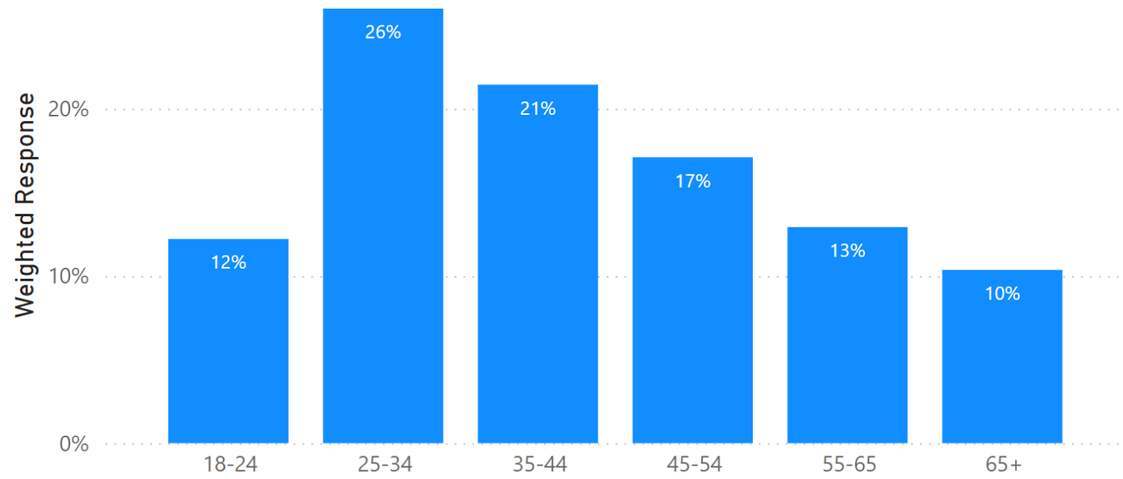
Appendix B – Additional Survey Data Visuals

Travel Behaviour and Policy Opinion Survey for Vehicle for Hire

Weighted Response by Municipality/District

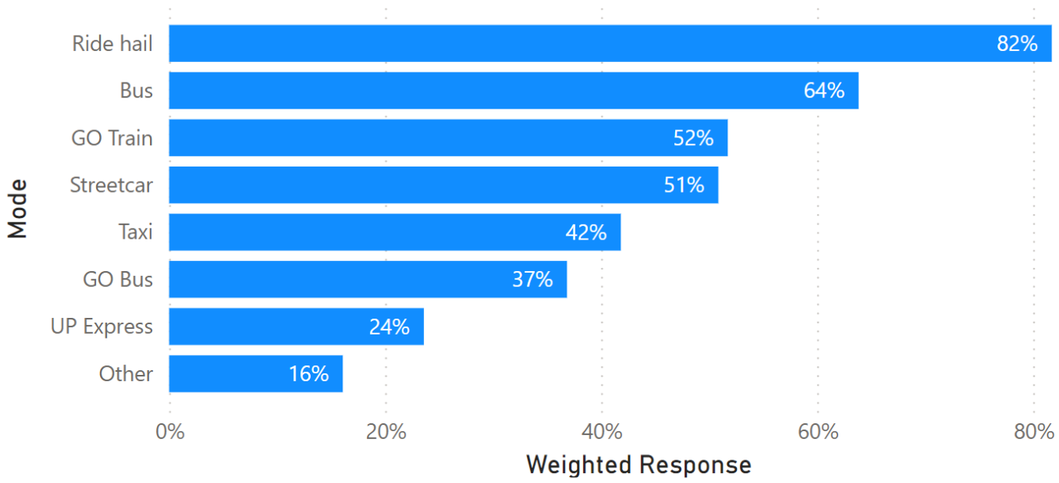


Weighted Response by Age (bin)

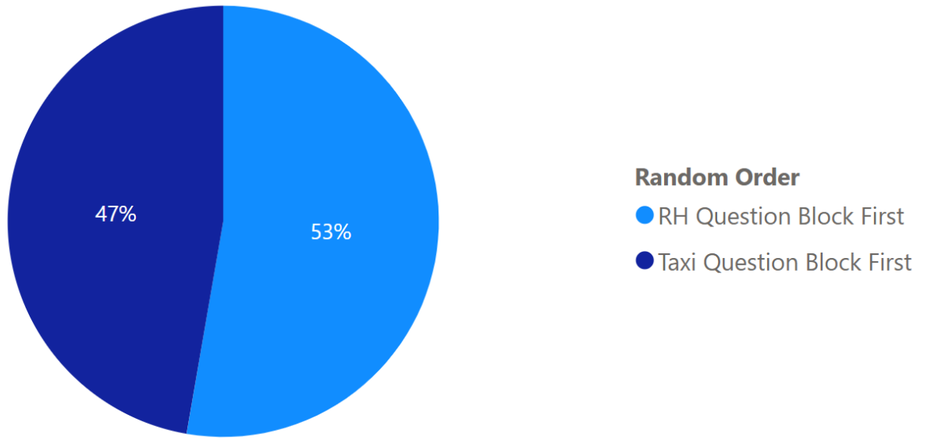


Q2: Which of the following transport modes have you used in the past six months that started or ended in the City of Toronto?

Weighted Response by Mode



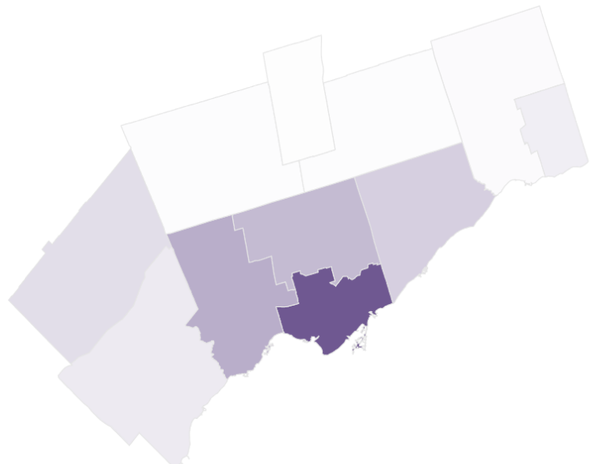
Weighted Response by Random Order



Travel Behaviour and Policy Opinion Survey for Vehicle for Hire

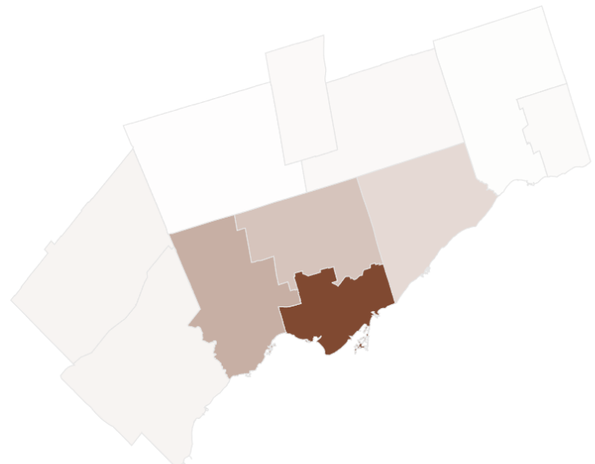
Q7a: Please identify the origin of your most recent taxi trip that started OR ended in the City of Toronto.

Weighted Response by Last Taxi Trip Origin Municipality/District

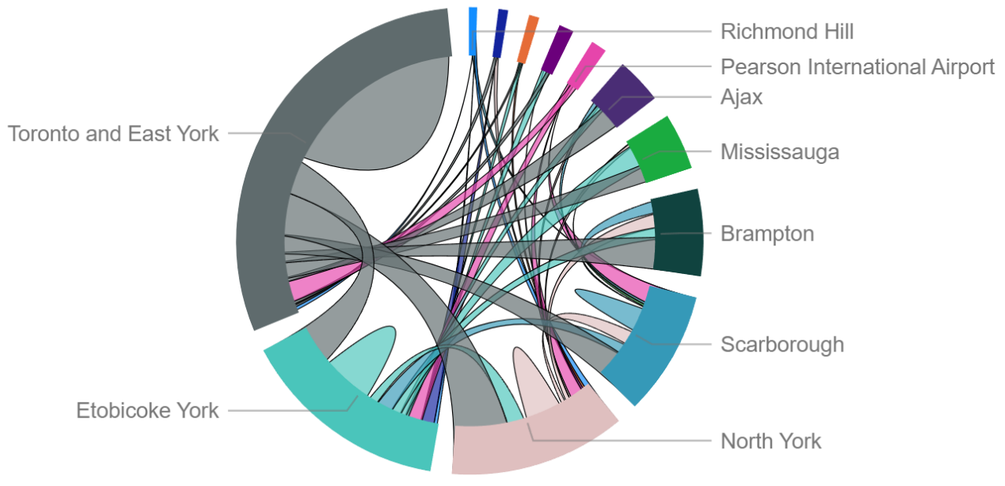


Q7b: Please identify the destination of your most recent taxi trip that started OR ended in the City of Toronto.

Weighted Response by Last Taxi Trip Destination Municipality/District



Weighted Response by Taxi Last Trip Origin and Destination



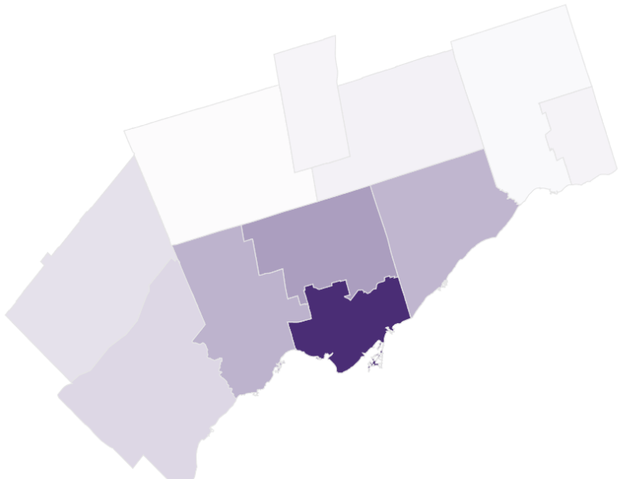
433

Weighted Response

Travel Behaviour and Policy Opinion Survey for Vehicle for Hire

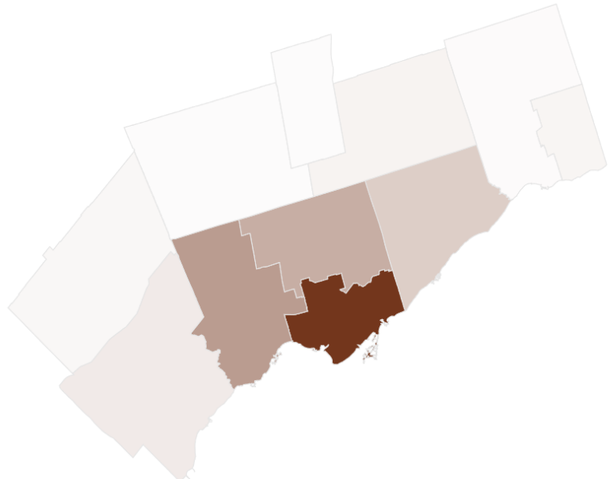
Q20a: Please identify the origin of your most recent ridehail trip that started OR ended in the City of Toronto.

Weighted Response by Last RH Trip Origin Municipality/District

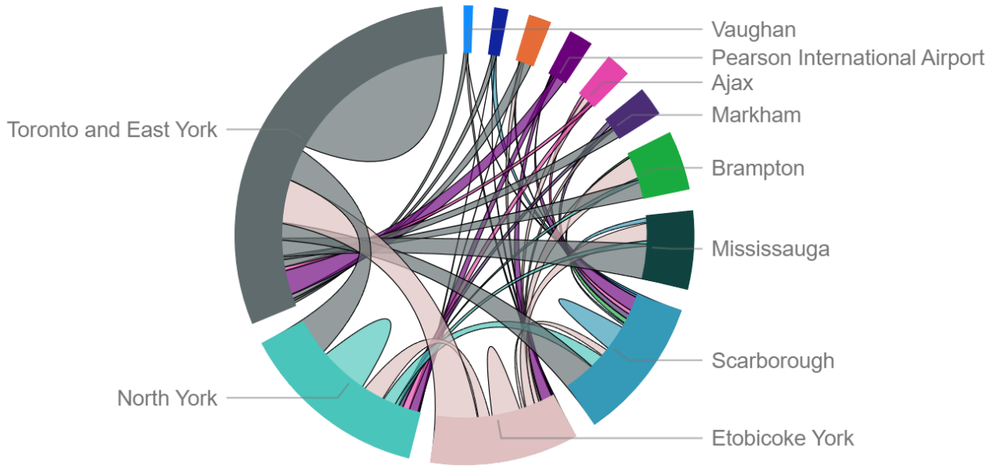


Q21b: Please identify the destination of your most recent ridehail trip that started OR ended in the City of Toronto.

Weighted Response by Last RH Trip Destination Municipality/District



Weighted Response by RH Last Trip Origin and Destination



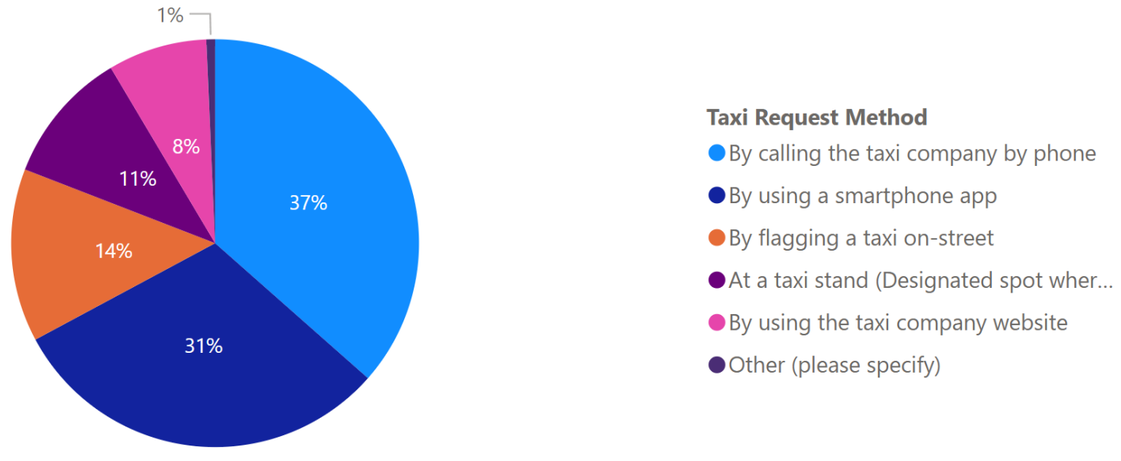
847

Weighted Response

Travel Behaviour and Policy Opinion Survey for Vehicle for Hire

Q8: For your most recent trip, how did you request your taxi service?

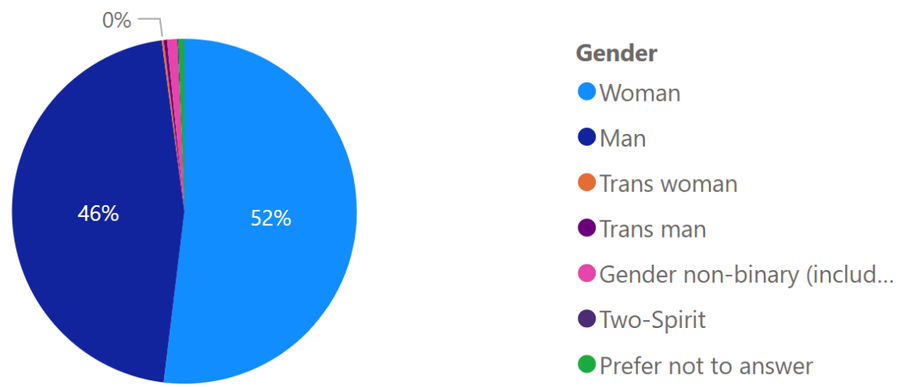
Weighted Response by Taxi Request Method



Travel Behaviour and Policy Opinion Survey for Vehicle for Hire

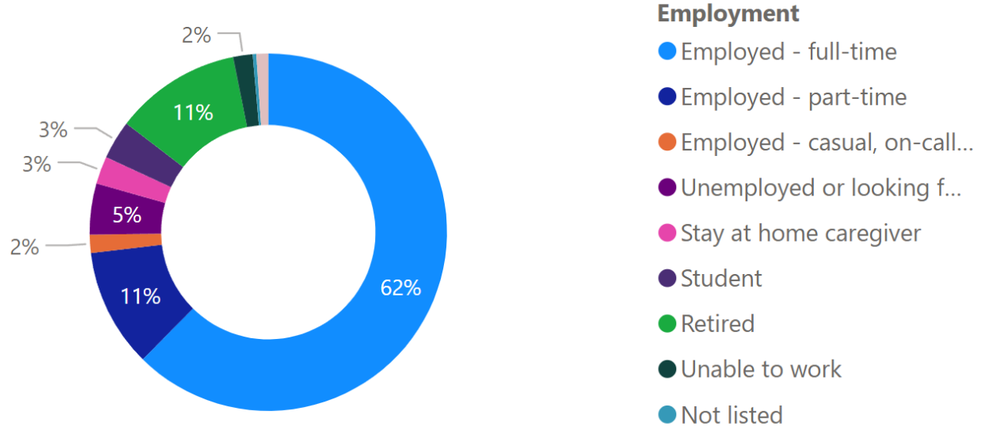
Q34: What best describes your gender?

Weighted Response by Gender



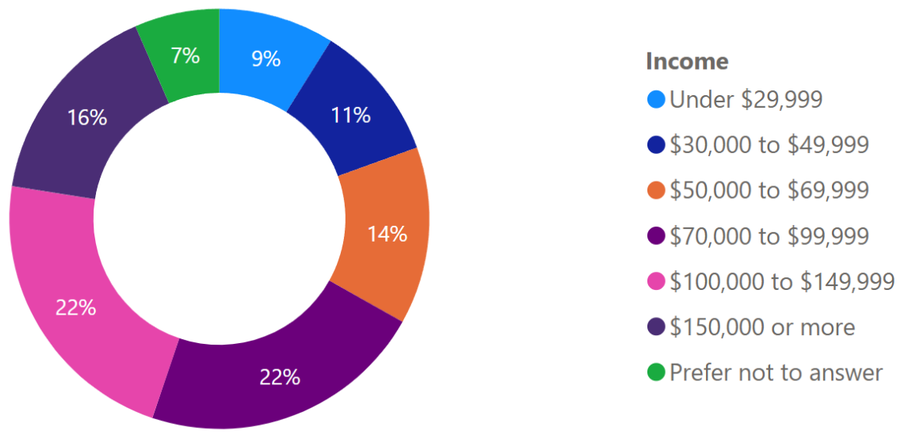
Q35: Which of the following best describes your current employment status?

Weighted Response by Employment



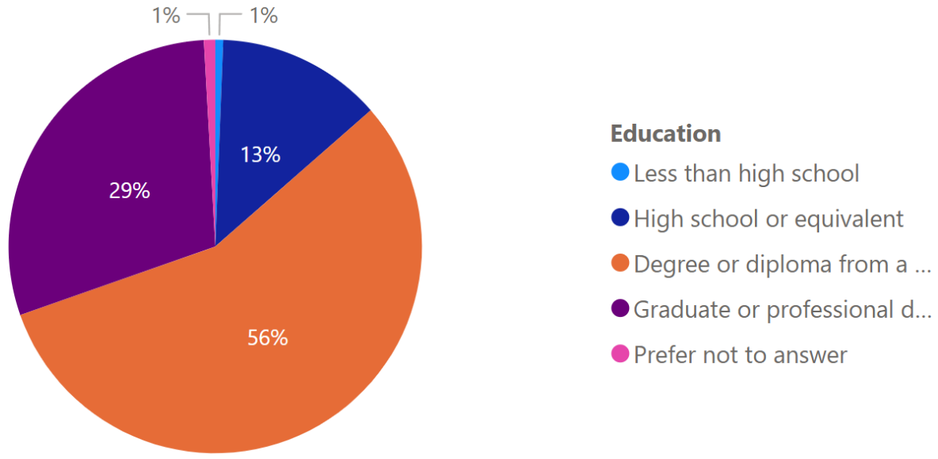
Q36: What is your household's annual income before taxes?

Weighted Response by Income



Q37: What is the highest level of education you have completed?

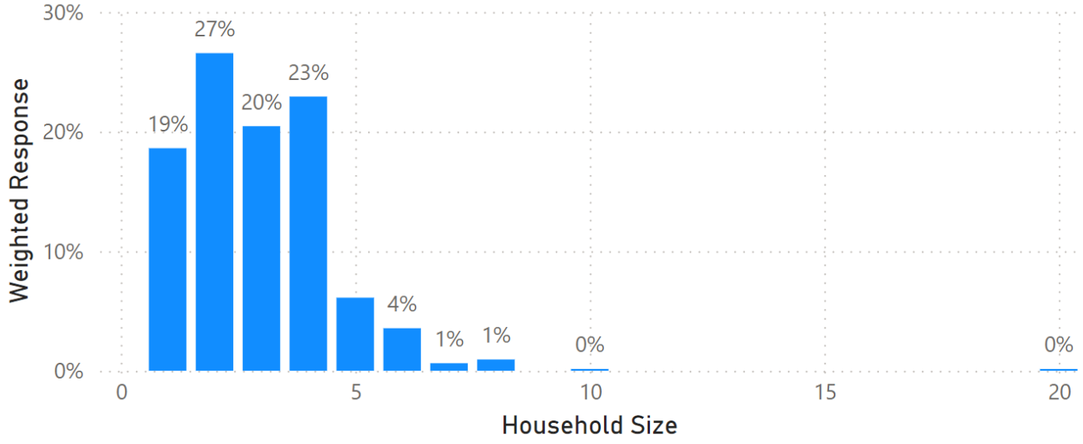
Weighted Response by Education



Travel Behaviour and Policy Opinion Survey for Vehicle for Hire

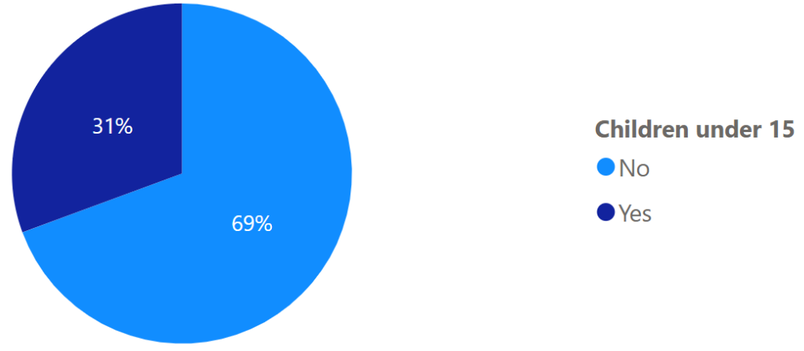
Q38: Including yourself, how many people live in your household on a regular basis?

Weighted Response by Household Size



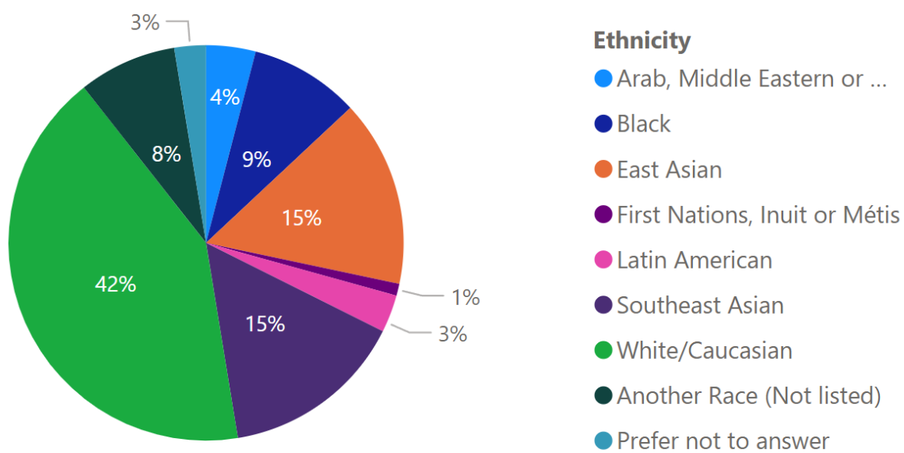
Q39: Do you have any children aged 15 or under?

Weighted Response by Children under 15



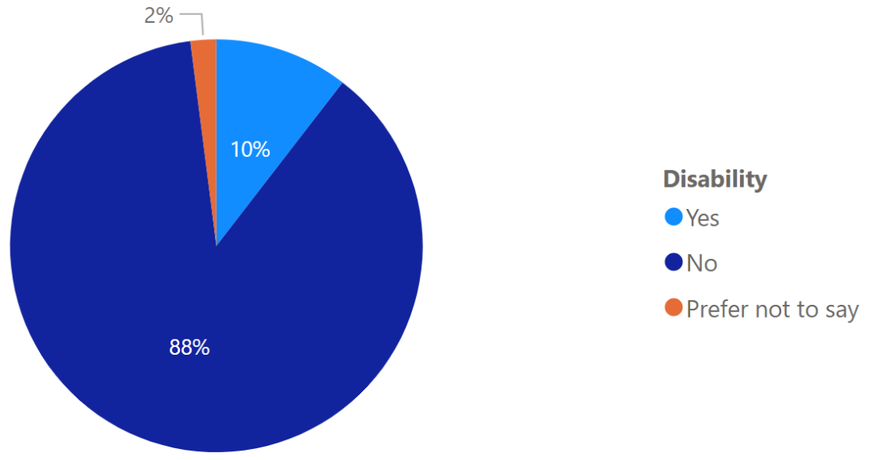
Q40: Which ethnic/race categories best describe you? Please select all that apply.

Weighted Response by Ethnicity



Q41: Do you identify as a person with a disability?

Weighted Response by Disability



Appendix B

Modelling Private Transportation Company (PTC) Demand & Assessing PTC Impacts on Transit Ridership

Modelling Private Transportation Company (PTC) Demand & Assessing PTC Impacts on Transit Ridership

Ya Gao, Ph.D.
James Vaughan, Senior Software Architect
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December 2024

UNIVERSITY OF TORONTO
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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1. Introduction

A growing concern with Private Transportation Company (PTC) services is whether and how they positively or negatively affect other more sustainable travel modes, such as public transit and active modes (walking & biking). During the pandemic, both PTC and transit experienced dramatic declines; however, PTC has recovered more quickly to pre-pandemic levels, while transit ridership has been recovering more slowly (Toronto Transit Commission, 2023). The debate over whether to cap PTC services continues to grow. Therefore, understanding PTC's impact on public transit becomes critical for city officials and transit agencies.

Existing studies have shown that the relationship between PTC and public transit is mixed. PTC services can either complement or substitute public transit, depending on the trip origin/destination, trip purpose, timing, and personal and household profile. PTC could fill the gap in poor transit service, providing first/last mile service to transit stations or night period service when transit is less frequent. It could also substitute for transit trips where riders can afford the PTC service to save time and gain convenience. This mixed relationship highlights the need to examine the relationship between PTC and public transit at a disaggregated level.

The GTAModel V4 system is a disaggregate, activity-based travel demand model for travel demand forecasting and policy analysis. It has been in operational use by the City of Toronto and other GTA agencies since 2016. Report 2 of this project's report series presented a prototype model of PTC supply and performance for inclusion in an extended version of GTAModel. This report presents further results in terms upgrading the model choice model in GTAModel to better deal with the demand for PTC services. In the current GTAModel system, the Vehicle-for-Hire (VFH) mode serves as a grouping for Taxi and Uber, Lyft, and other VFH services. In the updated model presented in this report, this composite VFH mode is split into two modes: PTC and taxi. The main household mode choice model and the air traveler airport access/egress mode choice model are both updated to predict usage of these two VFH modes (along with all other competing travel modes). 2020 PTC count data are used to update the base 2016 model parameters.

This extended model system is then used to conduct a preliminary exploration of the impact which PTC usage has on transit ridership, as well as other metrics of interest, such as vehicle kilometres travelled (VKT) by roadway vehicles and trip-makers' travel times. This is done by comparing a base 2020 scenario with a counter-factual scenario in which no PTC service exists in the city (a NO-PTC scenario).

Section 2 presents the development of the extended mode choice model. Section 3 summarizes and discusses the results of the base scenario and the NO-PTC scenario model system runs. Finally, conclusions, discussions and future steps of model development are presented in Section 4.

2. Model Development and Key Definitions

2.1 Model Inputs

The following inputs are used to modify GTAModel V4.2.

- The Transportation of Tomorrow Survey 2016 (TTS2016).
- Synthesis of 2020 first quarter population & employment totals by traffic analysis zone (TAZ).
- 2020 Emme road & transit network. The Level-of-Service (LoS) data is obtained by running Emme network assignments.
- PTC observed data for calibration: PTC mode wait time parameter, PTC mode costs parameter, mode constant and time period constants in the mode choice model are updated for 2020.

2.2 Model Process

Figure 2.1 shows how the model inputs are incorporated into the modules and the steps of the model.

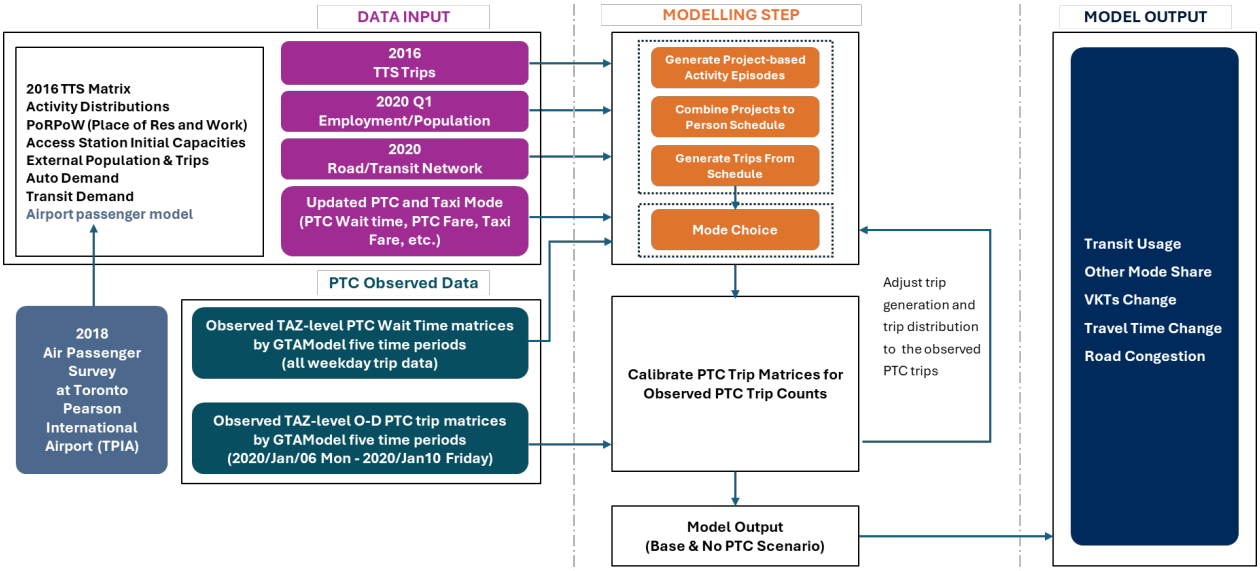

Figure 0.1 Overall Modelling Inputs and Process

To construct the model, a new mode choice model for GTAModel V4.2 was first estimated that split the vehicle-for-hire (VfH) into two new modes, taxi and PTC. To do this the 2016 TTS was used as it is the latest travel survey available. The second step was to update the model for 2020 using the observed PTC trips. For this, the inputs for 2020 (population, employment, and network) were updated and then the number of trips using PTC were calibrated to match the observed totals. The model outputs include mode choice, trip distributions, assigned demand on road/transit networks, and level-of-service matrices that could be used to compare different metrics between

the two scenarios. Currently, observed PTC wait times are used in the PTC mode utility function in the first and subsequent iterations in the full run[1].

2.3 Key Definitions

2.3.1 Assumptions

The current VfH mode is decoupled into two new modes: PTC[2] and taxi. PTC mode trips are modelled as end-to-end trips; transit trips that involve a PTC leg are modelled as Passenger-Access Transit (PAT)/ Passenger Egress Transit (PET) mode.

The data used to develop the PTC mode is only for trips that have their origin within the City of Toronto. Data on PTC trip origins are not currently available. For other mode trips, the current origin-destination (OD) demand is retained.

2.3.2 PTC Mode Update

For trips origin within the City of Toronto, the utility function of PTC mode is written as:

$$V_{ijk} = \alpha_0 + \alpha_1 Wait_i^t + \alpha_2 IVTT_{ij}^t + \alpha_3 Fare_{ij}^t + \beta X_k$$

Where:

$Wait_i^t =$ Wait time for a service request in zone i in time period t (min.)

$IVTT_{ij}^t =$ Travel time from i to j in time period t

$Fare_{ij}^t =$ PTC fare for a trip from i to j in time period t

$\beta =$ Vector of parameters relating to socio-economic parameters

$X_k =$ Vector of socio-economic parameters for person k

Wait is the wait time for the PTC mode. The average wait time by trip origin zone by time period is used, based on all weekday trip data.

IVTT is available from Emme assignments for all OD pairs and time periods.

Fare is computed with a fare model for all OD pairs and time periods. It is a linear function consisting of a base fare and a per-kilometre rate.

$$PTC\ fare = \$9.248 + \$1.174 \times Dist(i,j)$$

Where $Dist(i,j)$ is the network OD distance between zones i and j.

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[1] In the joint supply-demand model, the PTC wait time is generated from the simulation. The observed wait time matrices are still used to initialize the first iteration calculations. In subsequent iterations, the realized wait time from the previous iteration is used for PTC trips made in that iteration. This joint supply-demand version is a Phrase 2 work in progress.

[2] At the moment all PTC trips are treated as single-customer trips. In the future it is planned to model in addition multi-customer ridesharing. At that time, PTC will be split into two modes/services: PTC1 (single-customer ridehailing) and PTC2 (multi-customer ridesharing).

Socio-socioeconomic parameters: Based on analysis of 2016 TTS data, PTC usage depends on attributes such as age, income and auto ownership. Four age categories (0-19, 20-29, 30-39, 65+), a dummy variable of HH car ownership and a dummy variable indicating driving license possession are used to capture the effects of these socioeconomic characteristics on PTC usage. Income is highly correlated with occupation type in the mode choice model estimation,[3] so it is not included as a separate parameter for income.

2.3.3 Taxi Mode Update

A simple taxi fare model is also introduced for the taxi mode. Based on posted information in 2022, a base fare of $4.25 (the first 0.143 km) plus $1.748 per additional kilometre after 0.143 km and $0.517 per minute for waiting time is assumed. Thus, the taxi fare model is:

$$Taxi\ fare = \$4.25\ + \$1.748 \times Max\begin{cases} Dist(i,j) - 0.143 \\ 0 \end{cases}$$

A fare term[4] and two age categories (0-19, 65+) were added to the taxi mode utility function for trips that have their origin within the City of Toronto. The age categories are adopted since the 0-19 age group has a lower proportion of using taxi mode than the trip-making population and PTC users, and 65+ has a higher proportion of using taxi than the trip-making population and PTC users in the 2016 TTS.

2.3.4 Calibration Data & Method

The observed TAZ-level PTC OD trip matrices by GTAModel five time periods (morning peak period, mid-day, afternoon peak period, evening, overnight[5]: AM, MD, PM, EV, ON) are used for model calibration for PTC trips. One typical week of data before the pandemic (between 2020/Jan/06 Mon 04:00 am and 2020/Jan/11 Sat 03:59 am) was used to calculate average weekday trip matrices for each time period. In calibration, a constant was adjusted to match the observed PTC OD trip totals by time periods and by spatial segment.

2.4 Model Limitations

By far the most serious limitation of this study is the continuing unavailability of the 2022 Transportation Tomorrow Survey (TTS) data. When this project began, it was fully expected that the 2022 TTS data would be available to support updating GTAModel from its current 2016 base to reflect post-pandemic changes in working from home rates and transit usage, among other possible shifts in travel behaviour within the city. It would also have enabled an updated understanding of the current competition between PTC and taxi services in the city. Very unfortunately, the release of these data has been delayed beyond all expectations, and so the study

[3] Separate mode choice models exist by worker occupation type, students and non-workers/students.
[4] The fare parameter for both PTC and taxi is the same as for auto modes for each trip-maker category.
[5] In GTAModel, the "day" is defined as 04:00am to 03:59am the following morning to capture overnight trip-making.

had to proceed without them. The analysis has also been hindered by lack of data concerning taxi usage and performance comparable to that which are available for PTC, which significantly limits the ability to model the taxi mode in detail

As a result, the best that could be done was to update GTAModel to reflect PTC usage and performance immediately prior to the pandemic disruption (early 2020) as a base for testing its impact on transit ridership and roadway congestion. Whiled not completely representative of current post-pandemic conditions, it is still a useful analysis. In particular, while the 2022 absolute numbers (VKT, transit mode shifts, etc.) will undoubtedly change somewhat, qualitatively, the overall impacts of PTC on travel within the City of Toronto generated within this analysis are expected to be valid.

More minor limitations include not modelling PTC shared-ride as a separate service from PTC single-ride service,[6] and not modelling transit access/egress by PTC.[7] Again, while altering absolute numbers concerning PTC and transit usage slightly, this should not affect the overall conclusions of this study, especially given that both behaviours represent very small shares of the overall travel market.

3. Model Results and Transit Impact Evaluation

3.1 Scenarios Tested

For this project, two scenarios were run for January 2020 (pre-pandemic) conditions. The first scenario was the 2020 base case. This scenario includes the newly calibrated taxi and PTC modes running with a synthetic 2020 population, employment, and network. The second scenario, "NO-PTC", takes the activities and trips generated in the base case, removes the option of choosing PTC and re-runs the mode choice model for trips that had chosen PTC to force them to choose another mode.[8] Trips that had previously used a non-PTC mode were not reassigned. Hence, all changes in mode shares are due to the reassigned PTC trips.

Using the developed model, the "business-as-usual" base case is compared to the "counter-factual" scenario of NO-PTC service to analyze the impact of PTC on transit usage and other mode shares, as well as changes in VKT and travel times.

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[6] Shared-ride trips are currently treated as single-ride. Shared-ride currently is only a small portion of total PTC trips.
[7] Transit access/egress by taxi and bicycle are also not currently modelled.
[8] In this reassignment, the "Carpool" mode was not permitted to be chosen, where "Carpool" is an auto passenger trip made in a private vehicle driven by a non-household member (e.g., getting a ride to work with a co-worker). In preliminary tests, it was found that far too many former PTC trips were being assigned by the model to Carpool. This reflects the current GTAModel specification of the Carpool mode in which there is no constraint on its usage; i.e., it is assumed to be always available for all trips, which clearly is not correct. As currently constructed, Carpool appears within the model as essentially a free PTC mode, and, hence, is very attractive to former PTC users. This will be corrected in future versions of GTAModel, but for now, the Carpool mode is simply "turned off" for the reassigned PTC users.

3.2 PTC Impacts on Transit Usage and Other Mode Share

Given the procedure described in Section 3.1, the model predicts that the NO-PTC scenario results in the aggregate changes mode shares shown in Table 3.1. The model predicts that, in the absence of PTC, 60.72% of PTC trips change to transit, followed by 31.05% shifting to active modes (walking and cycling). A smaller proportion (6.6%) of PTC trips switch to taxis, and 1.3% to the combination of either auto driver or auto passenger.

Table 0.1 NO-PTC Scenario Shift of PTC Users to Other Modes

Base case mode choice	NO-PTC scenario mode choice	Trip counts	%
PTC	Active Travel	48943	31.05%
PTC	Auto Driver	1079	0.68%
PTC	Auto Passenger	881	0.56%
PTC	Public Transit	95714	60.72%
PTC	School Bus	672	0.43%
PTC	Taxi	10344	6.56%
Total		157633	100%

Table 3.2 expands on Table 3.1 by showing total daily trips and mode shares for the two scenarios, along with the percentage change in modal usage under the NO-PTC case. When comparing the proportional changes for each mode, taxi trips show the largest increase compared to the base case of almost 40% increased usage. While one might expect a larger absolute shift in trips from PTC to taxi, the two VFH modes tend to serve different sociodemographic markets, and the growth in taxi usage is, indeed, quite significant relative the base usage, and so the predicted shift may well be plausible. Active (walking and biking) mode trips attract the majority of short distance trips, which is also very plausible, resulting in a net increase in usage of 5.24%. Auto passenger and auto driver trips increases are almost negligible, by 0.28% and 0.04%, respectively. While this may seem to be a very small change, these are generally preferred modes for most trip-makers and so, if available, they would generally be chosen over PTC in the base case, leaving little scope for PTC users to switch to these modes in the NO-PTC scenario.

Table 0.2 Base and NO-PTC Scenario All Mode Changes

Mode	2020 Base trip counts	2020 Base (%)	NO-PTC trip counts	NO-PTC (%)	Diff. (NO-PTC-Base)	% Diff. (NO-PTC-Base)/Base	% Diff. relative to PTC trips (NO-PTC-Base)/PTC
Active Travel	932040	14.32%	980983	15.07%	48943	5.25%	31.05%
Auto Driver	2587468	39.74%	2588547	39.76%	1079	0.04%	0.68%
Auto Passenger	314728	4.83%	315609	4.85%	881	0.28%	0.56%
Carpool	602880	9.26%	602880	9.26%	0	0.00%	0.00%
PTC	157633	2.42%			**-157633**	**-100.00%**	**-100.00%**
Public Transit	1825210	28.04%	1920924	29.51%	95714	5.24%	60.72%
School Bus	64226	0.99%	64898	1.00%	672	1.05%	0.43%
Taxi	26045	0.40%	36389	0.56%	10344	39.72%	6.56%
Total	6510230	100.00%	6510230	100.00%	0		0%

As noted above, the majority of PTC users are predicted to switch to transit in the NO-PTC scenario, resulting in a 5.24% predicted increase in average daily ridership. Or, equivalently, the existence of PTC has resulted in approximately a 5% loss in ridership and revenue for public transit.

3.3 Vehicle Kilometres Traveled (VKT) Change

Vehicle Kilometres Traveled (VKT) are calculated for the Auto Driver, Auto Passenger, PTC and taxi mode based on trips and auto network distances[9]. Trips that have both their origin and destination within the City of Toronto are filtered for VKT comparison so that the total VKT aggregated by trip origin council or trip destination council remains the same.

Table 0.3 Base and NO-PTC Scenario VKT Change by Trip Origin Council

By Trip Origin Council	Mode	Base				No PTC Scenario				Change				
		Trip counts	VKT	VKT (1 million)	VKT by Council (1 million)	Trip counts	VKT	VKT (1 million)	VKT by Council (1 million)	Trip counts diff. (noPTC-Base)	VKT change (1 million)	VKT Change %	VKT Change by Council (1 million)	VKT Change % by Council
City Core	Auto Driver	176066	1434331.4	1.434	1.801	176306	1436987.9	1.437	1.613	240	0.003	0.19%	-0.188	-10.45%
City Core	Auto Passenger	26366	142118.5	0.142		26477	142741.0	0.143		111	0.001	0.44%		
City Core	PTC	48257	208779.7	0.209						-48257	-0.209	-100.00%		
City Core	Taxi	2342	15595.1	0.016		4124	32883.4	0.033		1782	0.017	110.86%		
Etobicoke York	Auto Driver	424985	3427440.9	3.427	3.914	425040	3427879.4	3.428	3.788	55	0.000	0.01%	-0.126	-3.22%
Etobicoke York	Auto Passenger	62847	310008.3	0.310		62980	310800.7	0.311		133	0.001	0.26%		
Etobicoke York	PTC	22096	141497.8	0.141						-22096	-0.141	-100.00%		
Etobicoke York	Taxi	4432	35540.8	0.036		5995	49566.8	0.050		1563	0.014	39.46%		
North York	Auto Driver	527571	4199791.6	4.200	4.774	527644	4200371.2	4.200	4.636	73	0.001	0.01%	-0.139	-2.90%
North York	Auto Passenger	75867	377612.3	0.378		76019	378448.1	0.378		152	0.001	0.22%		
North York	PTC	23974	156274.2	0.156						-23974	-0.156	-100.00%		
North York	Taxi	4811	40455.2	0.040		6504	56698.1	0.057		1693	0.016	40.15%		
Scarborough	Auto Driver	465842	3636929.5	3.637	4.139	465890	3637359.1	3.637	4.055	48	0.000	0.01%	-0.084	-2.04%
Scarborough	Auto Passenger	77644	370802.7	0.371		77834	371783.0	0.372		190	0.001	0.26%		
Scarborough	PTC	16076	96921.7	0.097						-16076	-0.097	-100.00%		
Scarborough	Taxi	4390	34824.3	0.035		5685	45940.3	0.046		1295	0.011	31.92%		
Toronto and East York	Auto Driver	292879	2138965.5	2.139	2.540	292956	2139515.4	2.140	2.376	77	0.001	0.03%	-0.165	-6.48%
Toronto and East York	Auto Passenger	42848	197546.3	0.198		42946	198130.8	0.198		98	0.001	0.30%		
Toronto and East York	PTC	34217	179163.4	0.179						-34217	-0.179	-100.00%		
Toronto and East York	Taxi	3396	24569.7	0.025		5030	38062.8	0.038		1634	0.013	54.92%		
Total		**2336906**	**17169169.0**	**17.169**	**17.169**	**2201430**	**16467167.8**	**16.467**	**16.467**	-135476	-0.702	-4.09%	-0.702	-4.09%

In the base case, VKT is 17.17 million kilometres per typical weekday. In the absence of PTC, the VKT decreases by 4.09%, reducing to 16.47 million kilometres (see Tables 3.3 and 3.4). VKT changes by origin and destination council further show that the City Core has the greatest decrease in VKT (-10.45% by trip origin, -10.38% by trip destination), followed by Toronto and East York councils (-6.48% by trip origin, -6.44% by trip destination). This is due to more PTC trips originating or terminating in the City Core and Toronto and East York Councils. The results also show that VKT fell by 3.22% in Etobicoke York and by 2.90% in North York, lower than in the

[9] For inter-TAZ trips, the auto network distance is the network distance of trips using auto mode by time period calculated in EMME. For intra-TAZ trips, an area-based geometric distance is applied.

central areas. Scarborough has the fewest PTC trips to/from the council and, therefore, experienced a relatively smaller decrease in VKT.

Table 0.4 Base and NO-PTC Scenario VKT Change by Trip Destination Council

By Trip Destination Council	mode	Base				No PTC Scenario				Change				
		Trip counts	VKT	VKT (1 million)	VKT by Council (1 million)	Trip counts	VKT	VKT (1 million)	VKT by Council (1 million)	Trip counts diff. (noPTC-Base)	VKT change (noPTC-Base) (1 million)	VKT Change % (noPTC-Base)/Base	VKT Change by Council (1 million)	VKT Change % by Council
City Core	Auto Driver	170838	1401305.22	1.401	1.832	170923	1402044.08	1.402	1.642	85	0.001	0.05%	-0.190	-10.38%
City Core	Auto Passenger	31940	218263.67	0.218		32018	218761.50	0.219		78	0.000	0.23%		
City Core	PTC	47795	201424.22	0.201						-47795	-0.201	-100.00%		
City Core	Taxi	1837	10787.45	0.011		3051	20919.27	0.021		1214	0.010	93.92%		
Etobicoke York	Auto Driver	427331	3442617.51	3.443	3.903	427444	3443843.30	3.444	3.777	113	0.001	0.04%	-0.126	-3.22%
Etobicoke York	Auto Passenger	60266	275970.55	0.276		60402	276745.31	0.277		136	0.001	0.28%		
Etobicoke York	PTC	22383	145341.78	0.145						-22383	-0.145	-100.00%		
Etobicoke York	Taxi	4669	38790.41	0.039		6463	56522.17	0.057		1794	0.018	45.71%		
North York	Auto Driver	526181	4190259.79	4.190	4.767	526307	4191612.03	4.192	4.629	126	0.001	0.03%	-0.138	-2.90%
North York	Auto Passenger	75820	377179.49	0.377		75990	378190.62	0.378		170	0.001	0.27%		
North York	PTC	24204	159430.39	0.159						-24204	-0.159	-100.00%		
North York	Taxi	4828	40527.83	0.041		6729	59157.09	0.059		1901	0.019	45.97%		
Scarborough	Auto Driver	469533	3684846.08	3.685	4.156	469598	3685608.57	3.686	4.070	65	0.001	0.02%	-0.086	-2.07%
Scarborough	Auto Passenger	75793	334779.86	0.335		75984	335786.17	0.336		191	0.001	0.30%		
Scarborough	PTC	16329	100665.34	0.101						-16329	-0.101	-100.00%		
Scarborough	Taxi	4444	35544.75	0.036		5820	48253.90	0.048		1376	0.013	35.76%		
Toronto and East York	Auto Driver	293460	2118430.32	2.118	2.511	293564	2119005.01	2.119	2.350	104	0.001	0.03%	-0.162	-6.44%
Toronto and East York	Auto Passenger	41753	191894.55	0.192		41862	192419.91	0.192		109	0.001	0.27%		
Toronto and East York	PTC	33909	175775.07	0.176						-33909	-0.176	-100.00%		
Toronto and East York	Taxi	3593	25334.72	0.025		5275	38298.85	0.038		1682	0.013	51.17%		
Total		**2336906**	**17169169.00**	**17.169**	**17.169**	**2201430**	**16467167.78**	**16.467**	**16.467**	-135476	-0.702	-4.09%	-0.702	-4.09%

3.4 Travel Time Change: PTC to Transit

Next, the change in travel time for PTC users switching to transit in the NO-PTC case is examined. When the difference between PTC trip duration and transit trip duration is significantly negative, it indicates a substantial increase in travel time when switching from PTC to transit mode. Figure 3.1 shows a substantial increase in travel time from PTC to transit, with a median increase of 28.5 min and a mean increase of 35.3 min. 46.07% of trips from PTC to transit have a travel time increase of 30 min or more, followed by 43.25% of trips with an increase of 15-30 minutes. Only 10.6% of PTC to transit trips had a modest increase of less than 15 min (Table 3.5).

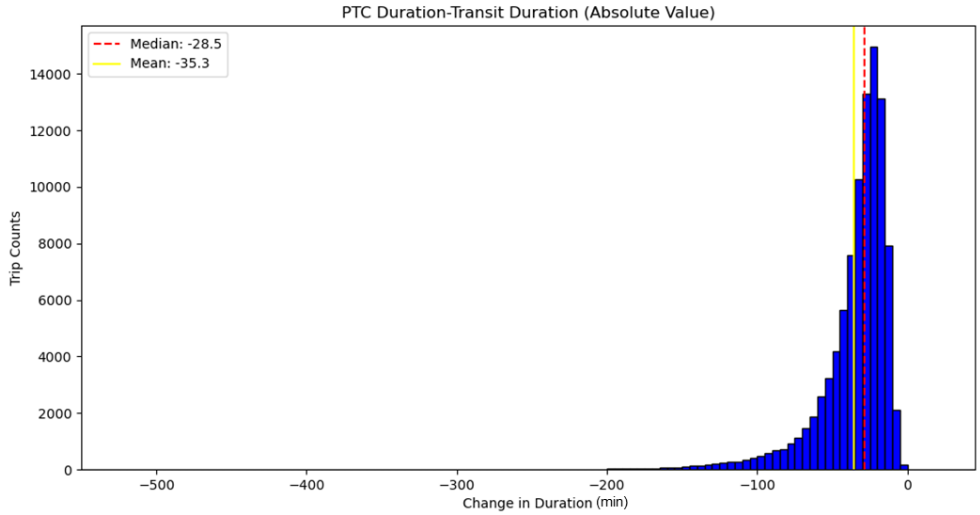

Figure 0.1 PTC to Transit Travel Time Change (in Minutes)

Table 0.5 PTC to Transit Time Change in Minutes

Change in min (PTC-Transit Duration)	**Trip counts**	**%**
(-505, -90] min	3842	4.01%
(-90, -60] min	6748	7.05%
(-60, -30] min	33522	35.02%
(-30, -15] min	41396	43.25%
(-15, -5] min	10017	10.47%
(-5, 0) min	184	0.19%
[0, 10] min	5	0.01%
Total	95714	100.00%

The proportion of travel time increases without the PTC mode is presented in Table 3.6 and Figure 3.2. On average, switching from PTC to transit results in a 236% increase in travel time. Notably, 46.09% of trips experience more than a twofold increase in travel time, while 43.25% of trips exhibit a 50%–100% increase. 10.66% of trips show a less significant increase, with travel time rising by less than 50%.

Table 0.6 PTC to Transit Percentage Time Change

% Change (PTC-Transit Duration) /PTC Duration	**Trip counts**	**%**
(-1900, -500] %	1547	1.62%
(-500, -250] %	9042	9.45%
(-250, -100] %	33522	35.02%
(-100, -50] %	41396	43.25%
(-50, 0] %	10201	10.66%
(0, 10] %	5	0.01%
Total	95713	100.00%

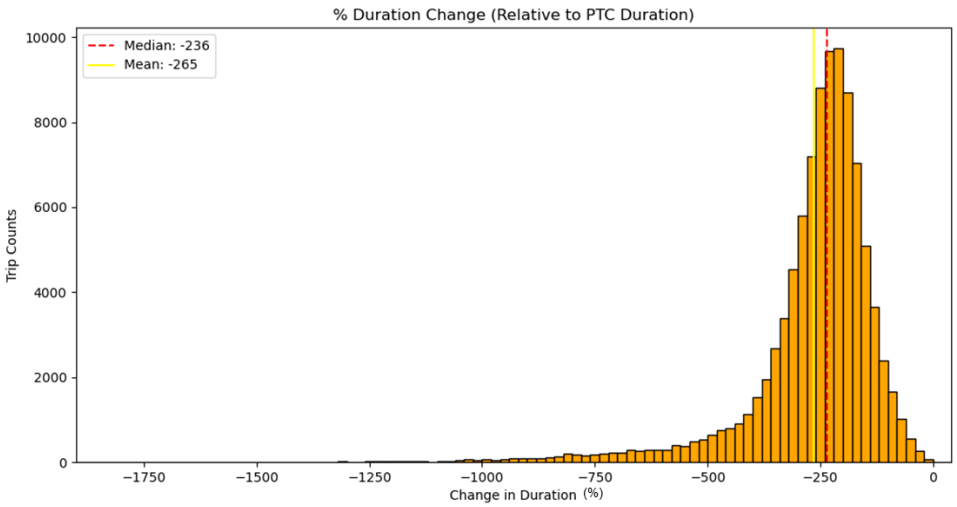

Figure 0.2 PTC to Transit Travel Time Change (%)

3.5 Spatial Distribution of PTC to Transit Trips

The spatial distribution of trips switching from PTC to transit is illustrated in Figure 3.3. The majority of these trips originate or terminate in the city core and the Toronto and East York council areas. Other significant trip origins/destinations include shopping, entertainment attractions and exhibition centers. Additionally, a greater number of East-West trips are observed compared to trips in the North-South direction.

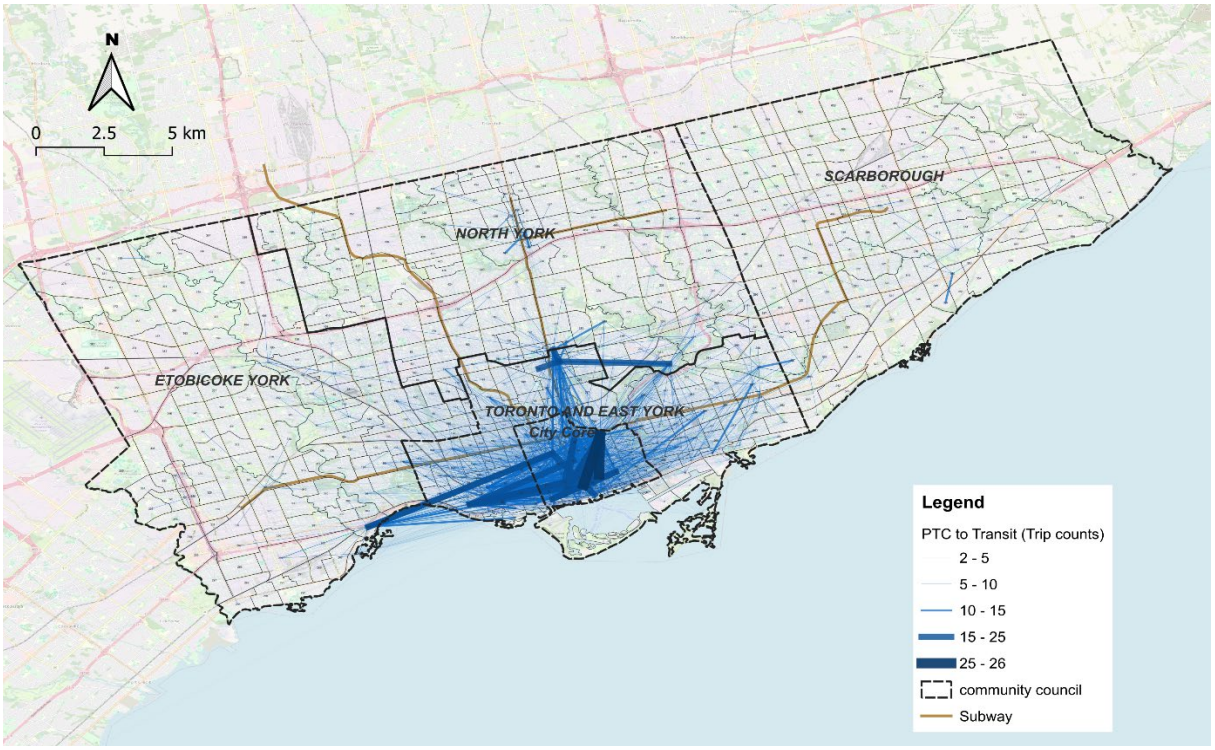

Figure 0.3 Distribution of PTC to Transit Trip Shifts

4. Conclusion

The comparison between the base case and the NO-PTC scenario indicates that 61% of PTC trips would shift to transit and 31% to active modes. Considering the small market share of total PTC trips and the large amount of transit and active trips, the increase in share is relatively small, with an increase of 5.24% for transit and 5.25% for active modes. This finding is somewhat echoed by Loa et al. (2019), who found that most PTC trips were substitutes for transit trips, followed by taxi and walking/cycling trips.

The model results reflect a January 2020 pre-pandemic situation. Considering the post-pandemic reductions in office commute rates (2-3 days on average), which has led to a decline in transit demand post-pandemic, the comparable post-pandemic shift needs to be examined. With more people working from home post-pandemic, the proportion of PTC trips that would shift to transit is likely lower than the pre-pandemic situation.

For VKT changes, excluding PTC services results a decrease of 4% in total VKT within the City of Toronto. The VKT in City Core and Toronto and East York councils reduced by 10% and 6%, respectively, higher than the other three suburb city councils. Or, put the other way, PTC operations increase roadway VKT and, hence, congestion. Other research also identifies that unless PTC trips are shared to produce higher vehicle occupancy, the impact of PTC on VKT is likely to increase (Tirachini & Gomez-Loboun , 2020; Schaller, 2021). Given the non-linear nature of the relationship between traffic volumes and congestion delays, these levels of PTC-induced congestion are non-negligible (notably in the Toronto central area), but it also is not “the prime cause” of congestion within the city, which is due to a wide variety of factors, notably the overall high level of auto usage and the very high level of lost lane-kilometres to construction activities.

In terms of travel time, the travel time increases from PTC to transit are substantial. Of the 95,714 trips diverted from PTC to transit in the NO-PTC scenario, 46% of the trips experienced a doubling or more of their travel times, while a further 43% of the trips had a travel time increase of 50-100%. Similarly, 46% of trips from PTC to transit have a travel time increase of more than 30 minutes, and 43% of the trips have a travel time increase of 15-30 min. This indicates that PTCs substitute for transit trips where users can save time and gain convenience.

Most of the PTC transit trips originate or terminate in the city core and the Toronto and East York council areas. Other trip origins/destinations include shopping, entertainment attractions and exhibition centers. Additionally, a greater number of East-West trips are observed compared to trips in the North-South direction, suggesting relatively lower pressure on East-West Road congestion without PTC.

This report presents the development of the demand side of the evolving capability of GTAModel V4.2 to mode PTC demand-supply interactions, which has been used to provide a first-cut comparison of the changes in mode share, VKT and travel time between a pre-pandemic base case and a hypothetical NO-PTC scenario. Our model calibration is limited to trips originating in the

City of Toronto due to a lack of observed PTC trip data outside of Toronto. More comprehensive data could potentially assist in extending the model to a larger region. In addition, our PTC driver generation is also limited to the City of Toronto at this stage. Extending the model will require an update to the driver simulation, which will lead to our next phase of a joint supply-demand model working to produce robust results.

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