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Research & Analysis

The Transportation Impacts of Vehicle-for-Hire in the City of Toronto: October 2018 to July 2021

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TORONTO

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1 Introduction

1.1 Background

The City of Toronto's Vehicle-for-Hire (VFH) Bylaw was adopted by City Council on July 15, 2016 to regulate taxicabs, limousines and private transportation companies providing personal transportation services (like Facedrive, Lyft, and Uber). In 2019, Municipal Licensing and Standards (MLS) undertook a comprehensive review of the VFH bylaw. One key element of that review was the ongoing need to report to City Council on the impact that the ground transportation industry has on transportation within the City.

A key part of the 2019 reporting was a comprehensive study titled The Transportation Impacts of Vehicle-for-Hire in the City of Toronto (Data & Analytics Unit, Transportation Services), which noted that there had been rapid growth in Private Transportation Company (PTC) trips from September 2016 (when PTC services were first licensed) to September 2018. While there were no directly observed adverse effects from this rapid growth, the report highlighted the need to continue monitoring the situation and to collect a more comprehensive set of data. New data requirements were included in the amended Vehicle-for-Hire bylaw, adopted by City Council on July 16, 2019 requiring more data to be collected from the entire vehicle-for-hire industry as well as additional requests for study (see Section 2.1 for further details on the updated data requirements).

The purpose of this report is to provide an update on trends in the vehicle-for-hire industry since the end of the last report and to explore the impacts of the COVID-19 pandemic in 2020 and 2021 on the industry to July 2021. In addition to describing the industry trends, this report will also present analyses on accessible PTC services, and the broader transportation network impacts. A limitation of this report is that the ability to report and consider policies comprehensibly is significantly limited due to the absence of data from the taxi and limousine sectors and due to the disruption and uncertainty caused by the COVID-19 pandemic.

1.2 The Role of Research and Partnerships

An important success from the 2019 Transportation Impacts study was the partnership between the City of Toronto and the University of Toronto Transportation Research Institute (UTTRI). Researchers at

UTTRI worked closely with City staff to study various elements of the impacts of PTCs on transportation in the City, with a particular focus on understanding the behavioural and mode choice impacts of PTCs as well as the impact on public transit.[1]

As part of this research, the City shared PTC data with researchers at UTTRI. While the data sharing was a one-time initiative to support the 2019 report, it has shown the benefits that can be achieved by ongoing data sharing and research programs with post-secondary institutions to provide independent and in-depth study of key policy questions surrounding the vehicle-for-hire industry.

The six month long engagement with UTTRI resulted in 12 distinct research papers that were published across various academic journals and conferences, covering topics ranging from transportation equity, to public transit impacts to demographic analyses, further broadening the state of knowledge around the impacts of private transportation companies on municipalities. Continued engagement and data sharing with researchers will be a key component moving forward in order to answer questions and understand the implications of rapidly evolving transportation choices for Toronto residents.

1.3 Summary of 2019 Report Findings

The 2019 Transportation Impacts Report was the City's first deep dive using PTC data on the trip making patterns and trends of PTCs in the City of Toronto. This report studied detailed trip data for the period of September 2016 to September 2018 and MLS-summarized records from October 2018 to March 2019.

Some key findings of that period included:

- There was rapid growth in PTC trip-making in the City from September 2016 to March 2019, with trips growing by 180% over 2.5 years to 176,000 daily trips in March 2019. This was consistent with the experience observed in other large North American cities including San Francisco, Chicago and New York. Chicago saw rapid trip growth to the point where daily trips exceeded 300,000 trips a day.
- PTC trips were largely concentrated in the inner City, with 60% of all trips happening within the old cities of Toronto and East York. Outside the downtown core, trips were concentrated

[1] https://uttri.utoronto.ca/research/research-reports/

around major transit stations, shopping destinations, and post-secondary institutions.

- Friday and Saturday night time trips were the largest trip market, with the busiest period in the week being midnight on Saturday peaking at an average of 13,100 trips per hour.
- PTCs in downtown Toronto were found to conservatively make up 5-8% of total traffic. This estimate does not account for circulating vehicles that are waiting for trip requests (Period 1, see Section 2.1 for a definition).
- While PTC trips in Downtown Toronto increased by 96% over an 18 month period, travel times for all vehicles remained stable.
- The University of Toronto Transportation Research Institute (UTTRI) surveyed a sample of Toronto residents in May 2019 to determine the factors that influence residents' choices of when they use PTC services. 49% of the respondents stated that they would have taken public transit in the absence of PTCs for their most recent PTC trip, while 33% would have taken a taxi. The remaining 18% would have driven, been driven by someone, walked, biked, or would have not made the trip at all. These percentages do not represent overall trips taken because they do not account for the frequency of respondents' travel.

2 Data & Methodology

2.1 Data Sources

The 2019 amended Vehicle for Hire bylaw included new data requirements[2] for the vehicle-for-hire industry effective January 1st, 2020. These new data requirements include the provision of driver availability and collision records as well as some refinements to how trip data were logged and submitted. 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:

> (a) 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;
>
> (b) 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
>
> (c) 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).

Respective requirements of the PTC, taxi and limousine industries are provided below.

2.1.1 Data Requirements for Private Transportation Companies

Private Transportation Companies (PTC) are required to provide the following datasets:

- **Trip Records:** Locations of pick-up and drop-off must be precise to within 10 meters. The request, acceptance time, driver arrival time, pick-up time, and drop-off time must be precise to a minute. If the trip was cancelled, a cancellation reason for the driver or passenger must be recorded. The fare paid must

[2] See § 546-26, § 546-27.D, § 546-82, § 546-116.C-F of Chapter 546 of the Toronto Municipal Code https://www.toronto.ca/legdocs/municode/toronto-code-546.pdf

be included. A unique identifier for the vehicle is required and vehicle identification numbers (VIN) are provided.

- **Driver Availability Records (Period 1):** In order to understand the complete impact of driver activity on the City's streets, it is necessary to understand where drivers spend time between trips waiting for trip requests. The start and end time and location for these availability periods must be provided to within one minute and 10 meter precision.
- **Collision records:** The location, timestamp, and VIN of any PTC vehicle involved in a collision is required.

2.1.2 Data Requirements for Taxicab Brokers

Taxicab brokers are required to provide similar records (trip records, driver shift logs and collisions):

- **Trip Records:** Locations of pick-up and drop-off must be precise to the nearest intersection. The driver arrival time, pick-up time, and drop-off time, as well as the time elapsed between the passenger's request and the start of the trip must be precise to a minute. If the trip was cancelled by the passenger or the driver. If the driver cancelled, the reason for the cancellation must be provided. The fare paid must be included. A unique identifier for the vehicle is required and VIN are provided.
- **Daily Service Logs:** the time at which each vehicle went on the road each day, any times it was off duty, and the time at which it was last available for trip requests.
- **Collision records:** The location, timestamp, and VIN of any taxicab vehicle involved in a collision is required.

Individual owner-operators, who hold 382 of the 3672 active licenses, are not required to provide data.

2.1.3 Data Requirements for Limousine Service Companies

Limousine Service Companies are also required to provide trip and collision records but not details on vehicle availability:

- **Trip Records:** Locations of pick-up and drop-off must be precise to the nearest intersection. The driver arrival time, pick-up time, and drop-off time, as well as the time elapsed between the passenger's request and the start of the trip must be precise to a minute. If the trip was cancelled by the passenger or the driver. If the driver cancelled, the reason for the cancellation

must be provided. The fare paid must be included. A unique identifier for the vehicle is required and VIN must be provided.

- **Collision records:** The location, timestamp, and VIN of any limousine involved in a collision is required.

2.1.4 Extent of Data Submitted

Currently all PTC companies (Facedrive, Lyft and Uber) submit records in accordance with the bylaw requirements. A significant amount of communication with PTCs was required in order to ensure standard definitions were being applied (for example, to Period 1 activity logs) and to correct other data issues.

Of the 29 taxi brokerages, one has submitted the complete required data, one has submitted partial data, and one has submitted some limited aggregate summary-level data. A summary of what has been provided includes:

- Scarborough City Cab has provided dispatched trip records, collision records and activity logs from July 2020 to July 2021
- Co-op Cabs has provided dispatched trip records from April 2020 to April 2021 but has not provided collision records or activity logs.
- Beck Taxi has provided summary-level dispatched trip totals from May 2021 to August 2021 but has not provided any individual trips records, collision records or activity logs.

The remaining 26 brokerages, representing 58% of the 3,290 currently active taxicab licenses attached to brokerages, provided no data. Since taxicab brokerages are not required to provide records on trips hailed on the street, this remains another data gap. The lack of comparable data from the taxicab and limousine industry creates significant challenges in understanding the operation of the industry as a whole and its impact on Toronto's streets.

2.2 Methodology

Given the absence of data from taxis and limousines, the majority of this report will focus on the impact of PTCs. A set of methodologies outlined below have been applied to records provided by PTCs to account for drivers operating on multiple platforms simultaneously and to generate on-street vehicle volumes to examine any potential congestion impacts.

2.2.1 Reconciling Overlapping Records

Because PTC drivers can be active on multiple platforms simultaneously (Uber, Lyft, and Facedrive), availability records for one platform can overlap with time spent available en-route to a trip or on a trip on another platform. In order to account for the amount of time vehicles spend in each period accurately, a methodology was developed to reconcile overlapping entries. This methodology compares availability and trip records for each Vehicle Identification Number (VIN) to eliminate overlapping periods.

2.2.2 Estimating Street-Level Vehicle Volumes from Provided Datasets

In order to examine the link between vehicle-for-hire activity and congestion, it is necessary to estimate vehicle volumes on the city's streets and highways.

While completing the 2019 study, only trip records were available from PTCs. As a result, the methodology in 2019 included a process to estimate where PTC vehicles could have driven between when they received a trip request and when they arrived at the passenger pick-up location by assuming drivers were at their prior passenger drop-off location when they received a subsequent trip request. In the absence of data on driver activity while waiting for trip requests, the previous study did not estimate the street-level volumes from this significant period of activity accounting for approximately 40% of driver time while on PTC applications.

With the new datasets of availability and enhanced trip records, it was possible to route most of the PTC driver's cycle of activity on the platforms within the City of Toronto boundary. Routing is a process of taking trip origin and destination points, and charting the shortest path of the vehicle through the street network. The volume of vehicles on any street can then be determined by adding up all of the vehicle paths. Routing is performed to estimate the total amount of PTC travel in the City, the volumes of PTC vehicles on City streets at key times, and study the relationship with changes in traffic congestion patterns. Because this process of estimating vehicle volumes takes a lot of computing time, a single day, February 6th 2020, representative of typical conditions at the height of PTC trip activity was used for this analysis.

Traffic speed data from HERE Technologies, a navigation and mapping company, was used for routing records and to examine congestion impacts. The data was provided to Transportation Services by Transport Canada in five-minute bins for all the city streets where data are available. This data was used in this study for simulating the routing of PTC vehicles to be reflective of travel time and congestion on city streets and to measure overall congestion trends.

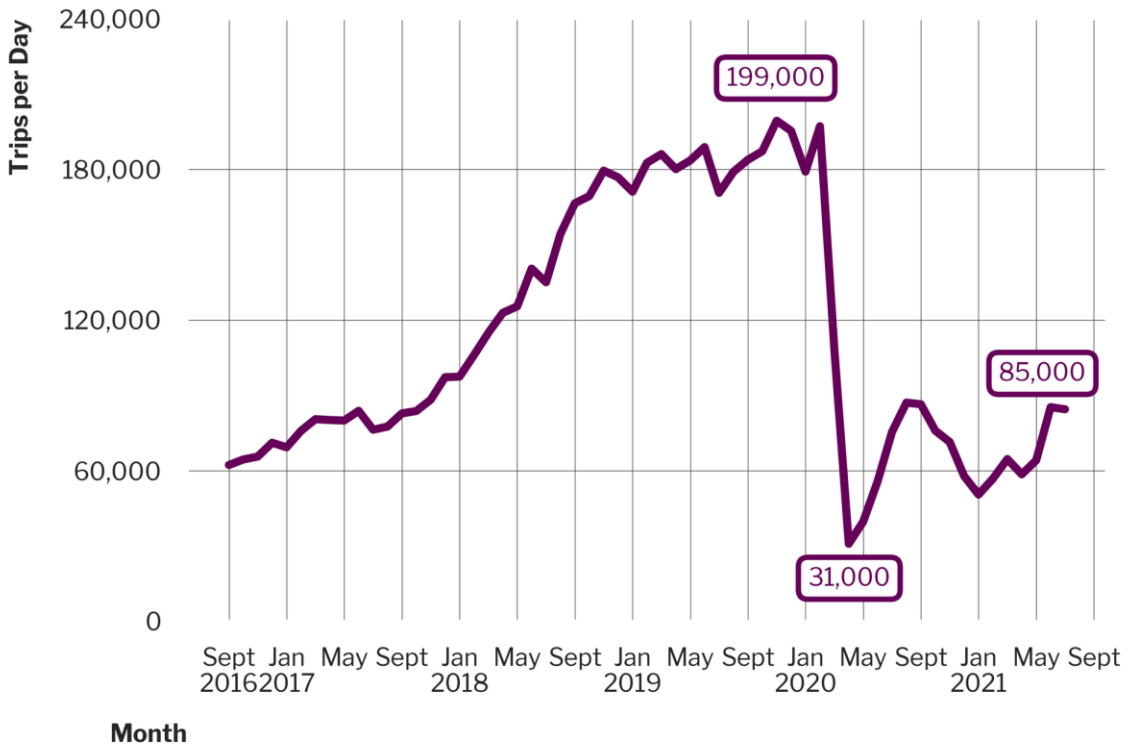
3 PTC Trends from September 2018 to July 2021

This section will provide an overview of how PTC travel has evolved in the city after the conclusion of the 2019 study, excluding the taxi and limousine sectors. The trends were examined first for the 17 month pre-pandemic period from September 2018 to February 2020, and then will look at the impacts of the pandemic on PTC travel demands for the 17 months from March 2020 to July 2021.

3.1 PTC Trip Growth Slowed to 5% Year-Over-Year Pre-Pandemic

Following rapid growth in PTC trips from 2016 to 2018, the rate of growth in PTC trips in the City slowed considerably after September 2018, with trips peaking at 199,000 daily trips in November 2019. Figure 3-1 shows the average daily number of PTC trips by month from September 2016 through to July 2021. Year-over-year growth was 5% from January 2019 to January 2020, compared to 70% the previous year from January 2018 to January 2019. This trend in the slowing of PTC trip growth was also witnessed in Chicago and New York City.

Figure 3-1 Average Daily Trips by Month from September 2016 to July 2021



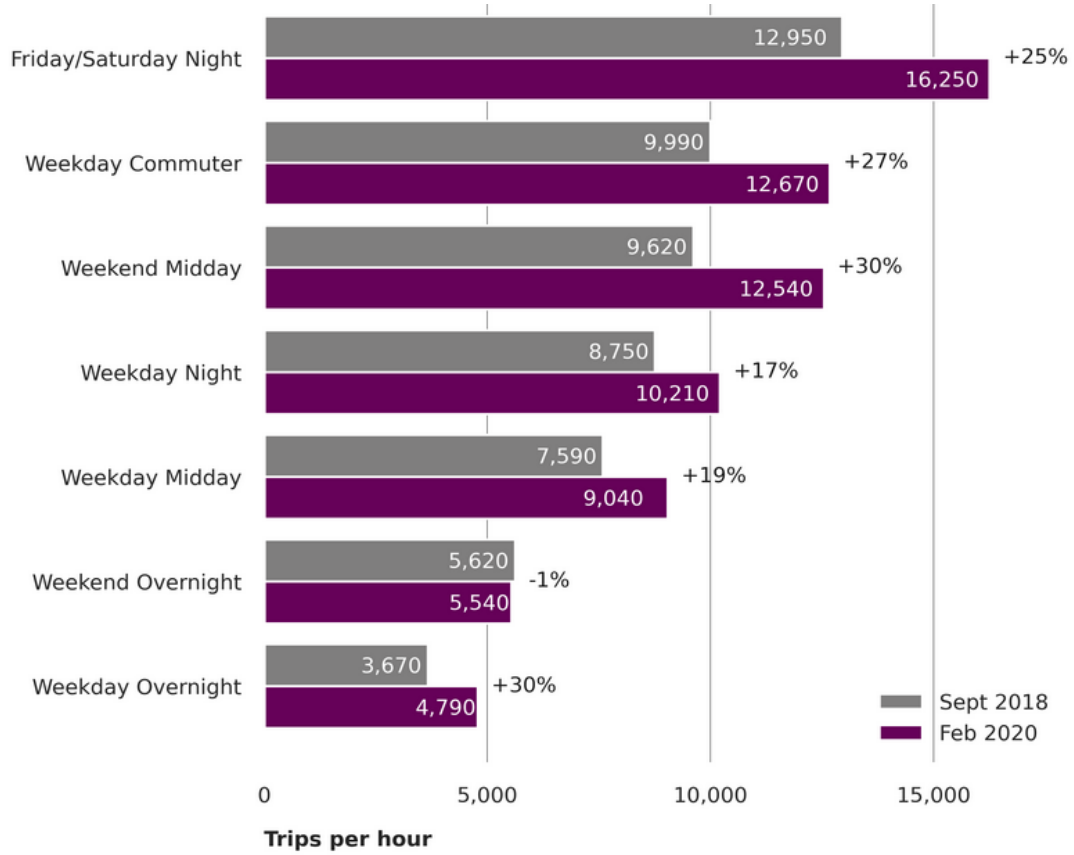
Along with the slowing growth in trips came a sharp decrease in the number of shared trips. The proportion of shared trips peaked at

26.8% in September 2018 and declined to 12.8% in February of 2020 before shared services stopped being offered during the COVID-19 pandemic.

3.2 Friday and Saturday Night Trips and Commuter Trips Continued to Be the Largest Trip Markets Pre-Pandemic.

An examination of growth in time-of-week trip markets is shown in Figure 3-2. This showed growth between 25% and 30% in the top three markets: Friday/Saturday night trips, weekday commuter trips and weekend mid-day trips. Weekend overnight trips were the only market to show a decrease from 2018 to 2020.

Figure 3-2 Growth in Time of Week Trip Markets from September 2018 to February 2020



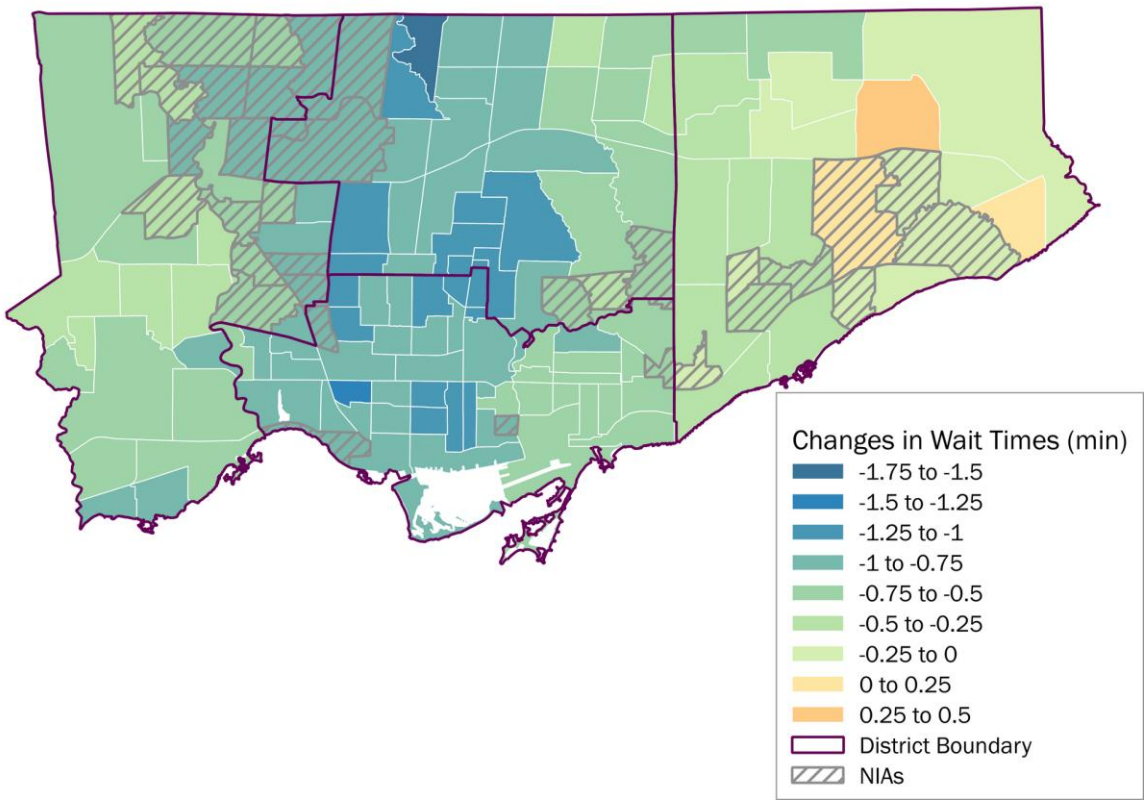
3.3 Wait Times Continued to be Low Pre-Pandemic,

The average wait time for a PTC trip in February 2020 was 2.3 minutes. Wait times were measured from the time of the passenger request to the time that the driver arrives at the pick-up location. The

wait time does not include the time the driver spends waiting for the passenger. Anecdotal evidence suggests that drivers will often notify they have arrived before being physically stopped. This average wait time is 26% lower than the 3.1 minutes reported for September 2018 in the previous report, however it should be noted that wait times in September 2018 were only provided by one Private Transportation Company at an aggregate resolution so the figure is not directly comparable.

Figure 3-3 shows how wait times have changed by neighbourhood since September 2018, showing the largest reductions in several mid-town and North York neighbourhoods, while some Scarborough neighbourhoods show some marginal increases in wait times.

Figure 3-3 Changes in Wait Times by Neighbourhood from September 2018 to February 2020



3.4 PTC Trips Fell to 15% of Pre-Pandemic Levels in April 2020, and Have Recovered to 43% by July 2021

Like the broader transportation sector, PTC trips were significantly impacted by the COVID-19 pandemic starting in March 2020. Trips initially fell to about 15% of their original levels and only gradually recovered over the course of the pandemic to reach 43% of pre-pandemic levels in July 2021.

To a large degree, the PTC trip trends mirrored other trends in transportation indicators citywide during the pandemic as shown in Figure 3-4, recovering a bit ahead of TTC ridership and pedestrian volumes downtown. Bicycle and vehicle volumes at downtown intersections were less impacted in comparison with PTC ridership throughout the COVID-19 pandemic.

Figure 3-4 Transportation Indicators through the Pandemic as a % of Pre-pandemic

Month	PTC Trips	TTC Ridership	Downtown Bicycle Volumes	Downtown Pedestrian Volumes	Downtown Vehicle Volumes
April 2020	15%	16%	66%	17%	42%
May 2021	33%	28%	75%	26%	67%
July 2021	43%	38%	76%	33%	74%

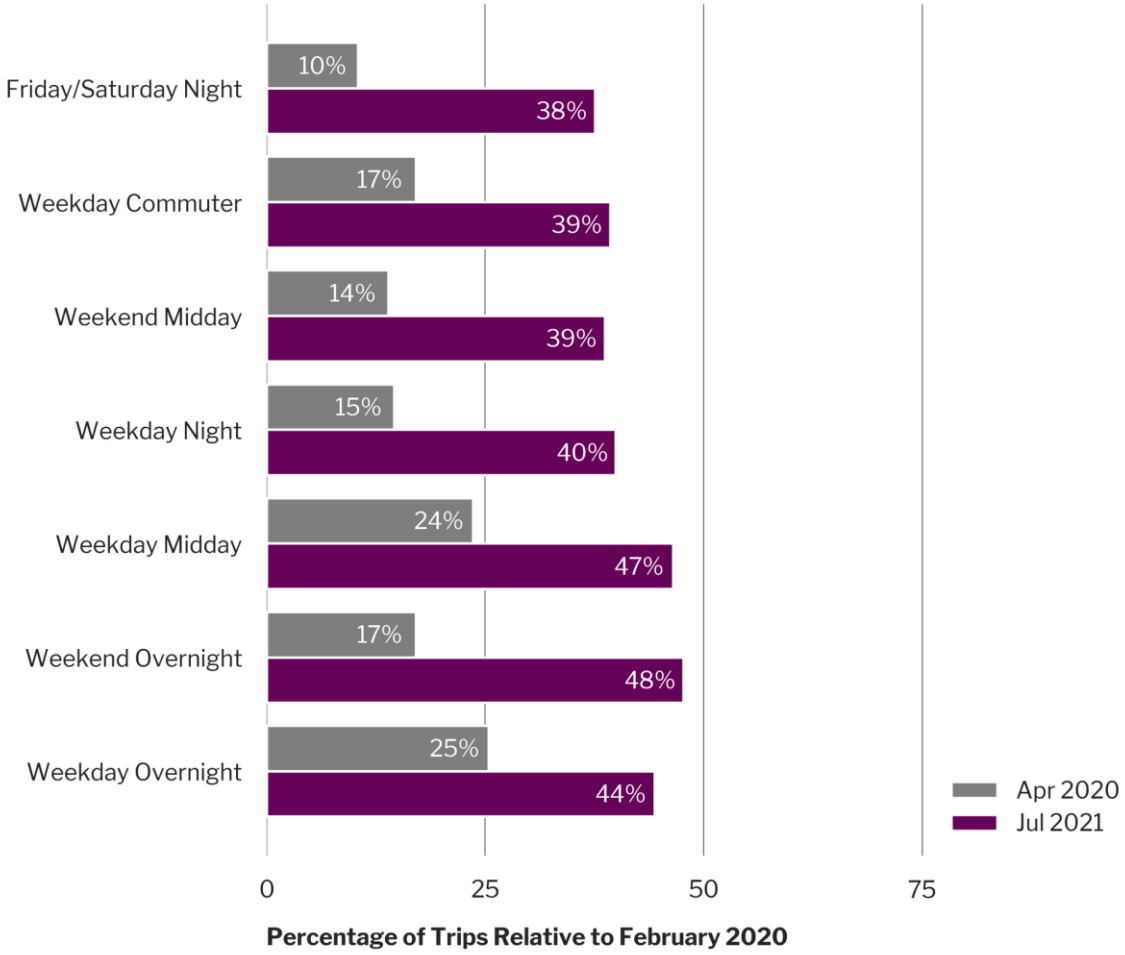
3.5 Friday and Saturday Night Trips Were the Most Severely Impacted by the Pandemic

During the pandemic, the types of trips being fulfilled by PTCs changed significantly. As Figure 3-5 shows, Friday/Saturday night trips dropped to 10% of pre-pandemic travel, weekday commuter trips dropped to 17% and weekday midday trips dropped to 24%. By July 2021, Friday/Saturday night trips and weekday commuter trips had recovered to nearly 40% of February 2020 trip rates while weekend overnight trips recovered to 48% of February 2020 trip rates.

In addition to time of day differences, average trip distance increased from 8.5 km pre pandemic to between 9.5 and 10 km per trip as

fewer short trips were being made overall. The proportion of trips under 5km decreased from 50% to 42%.

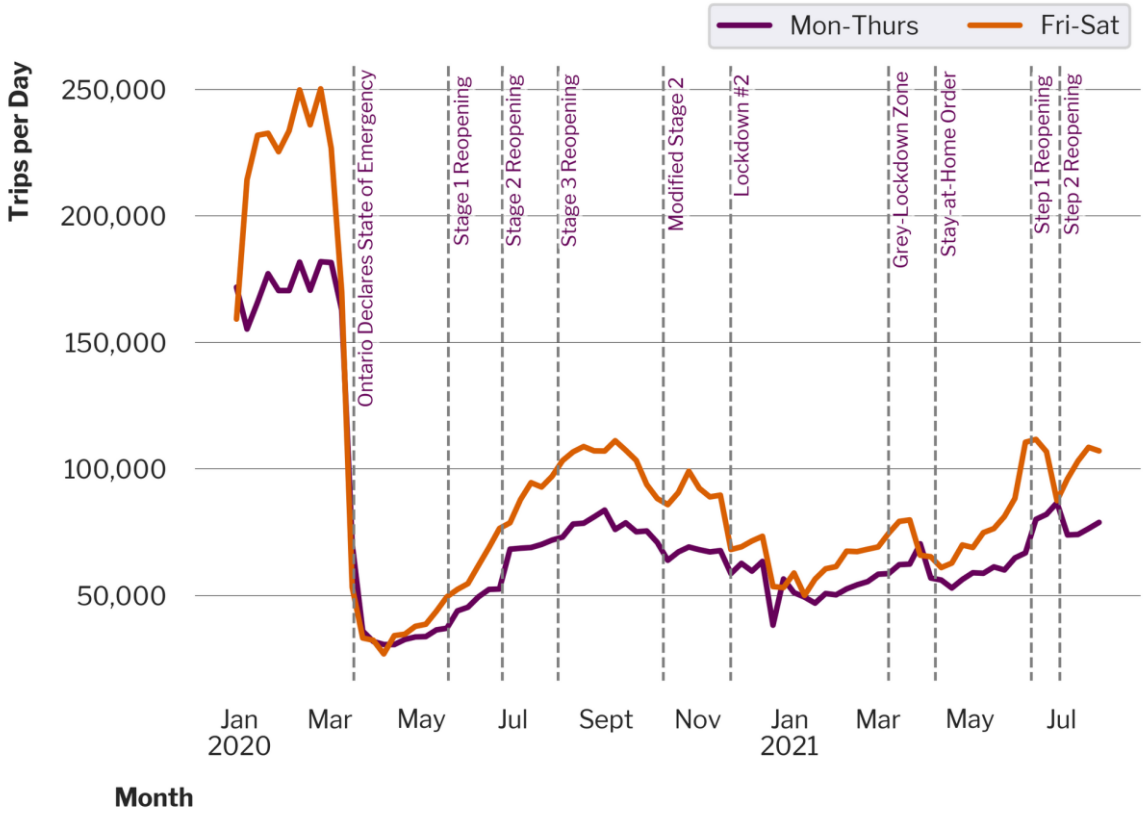
Figure 3-5 Change in Time of Week Trip Markets Relative to February 2020



3.6 PTC Trips Fluctuated Throughout the Pandemic in Step with Public Health Orders

Figure 3-6 shows how weekday (Monday-Thursday) and weekend (Friday and Saturday) trips responded to the waves of the COVID-19 pandemic and provincial public health orders. During periods of loosening restrictions, trips on Fridays and Saturdays recovered proportional to their pre-pandemic trip rates. Meanwhile, during periods of increased restrictions such as in March 2020 and January and April 2021, daily trip rates on Friday & Saturday are closer to weekday trip rates. It is notable that daily PTC trips were not higher in July 2021 than the previous peak in September 2020.

Figure 3-6 Daily Trips by Week during Monday-Thursday and Friday-Saturday along with Notable Provincial Restrictions



3.7 The Pandemic Impacted Driver Supply and Trip Demand, Resulting in Impacts on Both Passenger Wait Times and Trip Cancellation Rates

Figure 3-6 shows a set of indicators showing how the pandemic and associated public health orders affected PTC driver supply and passenger demand. The supply of drivers at the beginning of the pandemic dropped more slowly than the number of trip requests. The number of vehicles dropped to 27% of pre-pandemic levels (from 26,000 active vehicles per day in February 2020 to 7,000 in April 2020) while the number of trips dropped to 15% of pre-pandemic levels. This resulted in fewer trips per vehicle in the first months of the pandemic.

As trip demands recovered starting in June 2020, the growth in the number of available vehicle appeared to lag behind trip growth resulting in more trips per vehicle and slightly longer passenger wait times. During the gradual reopening of 2020, trips peaked in September but the daily number of active vehicles peaked in October

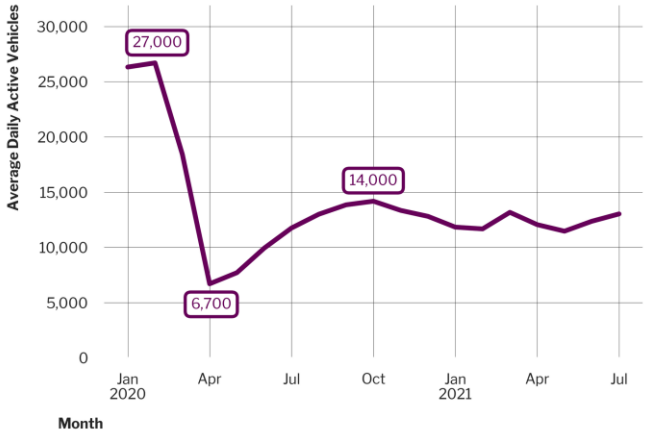
and supply came online faster than demand, such that trips per active vehicle continued to decrease by 30% until January.

Since April 2021, as the trip rate again grew, vehicle supply lagged behind, such that the number of trips per vehicle grew again. In July 2021, the end of the analysis period, there were an average of 13,000 drivers per day, one thousand fewer than in October of the previous year.

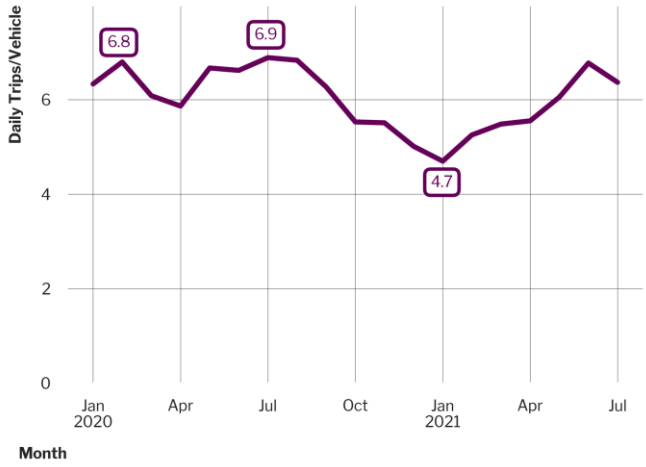
This interplay of supply and demand has an effect on wait times and trip cancellation rates. With trip rates low and the number of trips per vehicle high in May 2020, wait times rose to 4.3 minutes, nearly double February 2020. With rising wait times, riders cancelled more trips: over 6% of trips were cancelled by riders in May 2020 when only 3.6% were cancelled in February 2020. As both supply and demand rose into the summer and fall of 2020, the average wait times fell to 3 minutes before rising again as trip demand decreased. As trips rose in 2021, the number of trips per vehicle remained within the variation of the previous year, however wait times and trip cancellation rates increased dramatically.

Figure 3-7 Post-Pandemic Trends in PTC Service Levels and Vehicle Use January 2020 to Jul 2021.

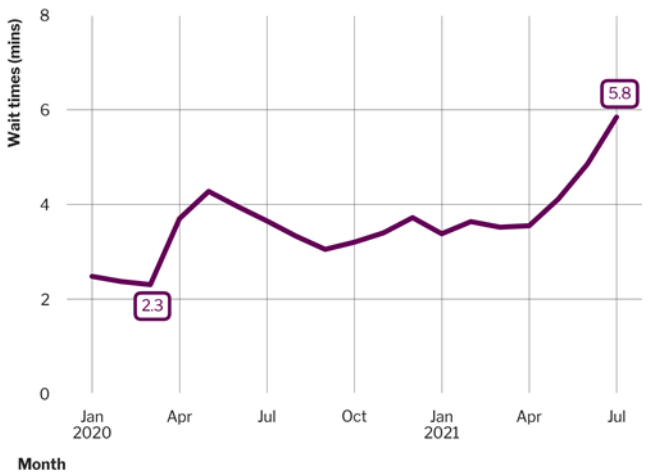
A. Average Daily Active Vehicles



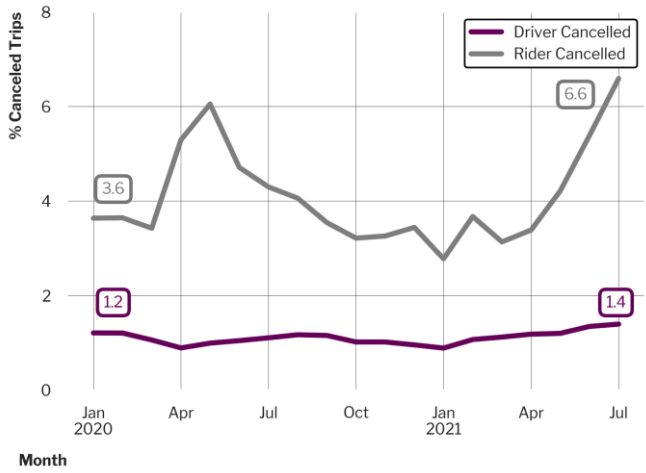
B. Average Daily Trips per Vehicle



C. Average Trip Wait Times



D. Trip Cancellations



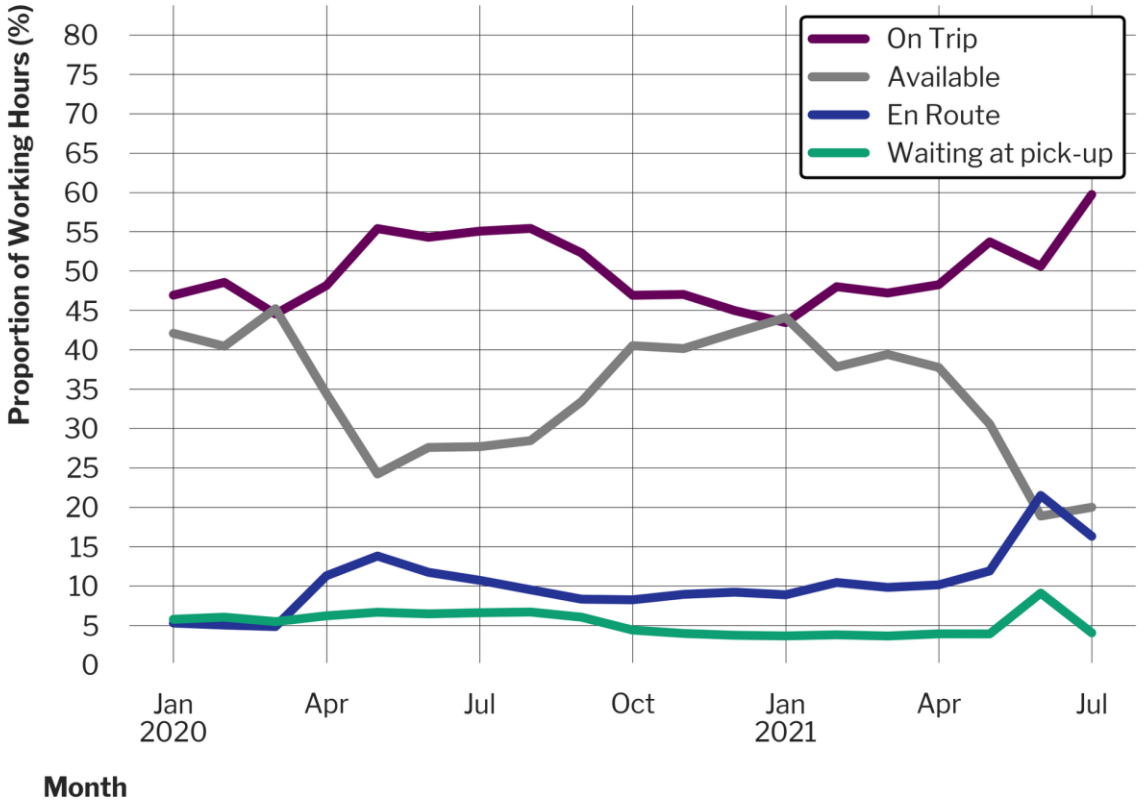
3.8 The Changes in Driver Supply and Trip Demand Impacted the Amount of Time PTC Vehicles Spent Empty

Figure 3-8 shows how the interplay between supply and demand impacts how drivers spend their time on PTC apps. As the number of trips per driver fell in March 2020 and January 2021, the percentage of time that drivers spent empty waiting for trip requests increases. During the gradual reopening of the summer of 2020, drivers spent significantly more time completing trips and driving to pick-up passengers and substantially less time spent empty waiting for a trip request. In the 2021 reopening following the third pandemic wave,

there appeared to be a mismatch in supply and demand that is not captured in the above graphs, such that drivers ended up spending more time driving to pick-up passengers than they did waiting for trip requests, and passenger wait times increased dramatically.

While all of these high-level changes impacted levels of driver supply and trip demand, these numbers suggest an impact on the reliability of work for drivers.

Figure 3-8 Breakdown of Vehicle Time Spent in Each Period While on PTC Applications

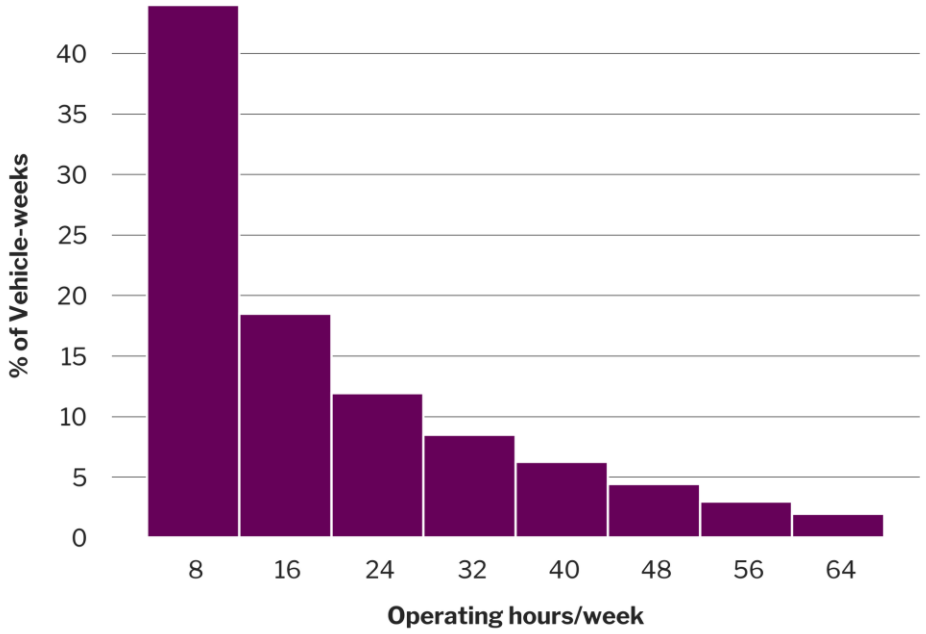


3.9 The Average PTC Vehicle Operates 20 Hours per Week

Figure 3-9 below shows the distribution of hours worked per PTC vehicle per week in January and February 2020. The figures show that PTC vehicles were typically being used for considerably less than full-time work, with 10% of vehicles being operated for more than 40 hours/week and 0.61% above 72 hours/week. This is consistent with the findings from the survey conducted as part of the 2019 Economic

Impact Analysis[3] which found that PTC drivers on average drove 30 hours/week while the average taxi driver drove nearly 50 hours/week (It should be noted that 1,561 PTC drivers responded while only 79 taxicab drivers provided a response).

Figure 3-9 Distribution of Weekly Operating Hours by Vehicle-week for January and February 2020

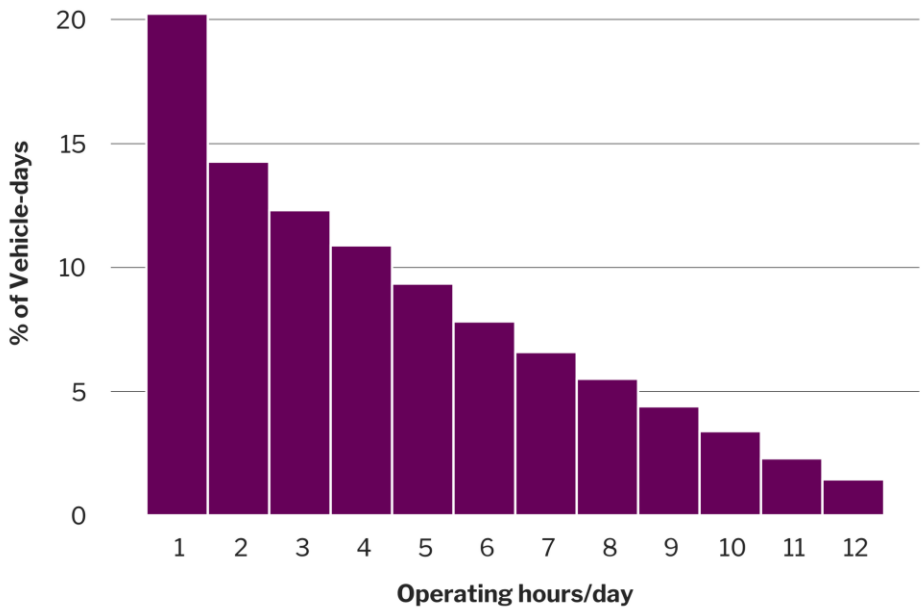


3.10 The Average PTC Vehicle Operates 4 Hours per Day

Figure 3-10 below shows the distribution of hours worked per PTC vehicle per day in January and February 2020. Looking at the length of time worked on single days, 87% of vehicles were active on a platform fewer than 8 hours per day, with around 12% operating between 8 and 13 hours per day, 0.65% operate above 13 hours per day (though these could be vehicles shared between multiple drivers such as those provided by car sharing services such as Autzu). In comparison, and in the absence of data submitted by taxi brokerages, it is understood that shifts for taxi vehicles are often 12 hours per day, with 2-3 drivers sharing access to each vehicle.

[3] Attachment 5 - Economic Impact Analysis of Toronto's Taxicab, Limousine, and Private Transportation Companies (May 17, 2019) (http://www.toronto.ca/legdocs/mmis/2019/gl/bgrd/backgroundfile-134427.pdf)

Figure 3-10 Distribution of Daily Operating Hours by Vehicle-day for January and February 2020



4 Accessible Service

In accordance with the Toronto Municipal Code, Chapter 546-119 Wheelchair Accessible Vehicle (WAV) service must be operated by any PTC in Toronto with more than 500 licensed drivers. The service is required to:

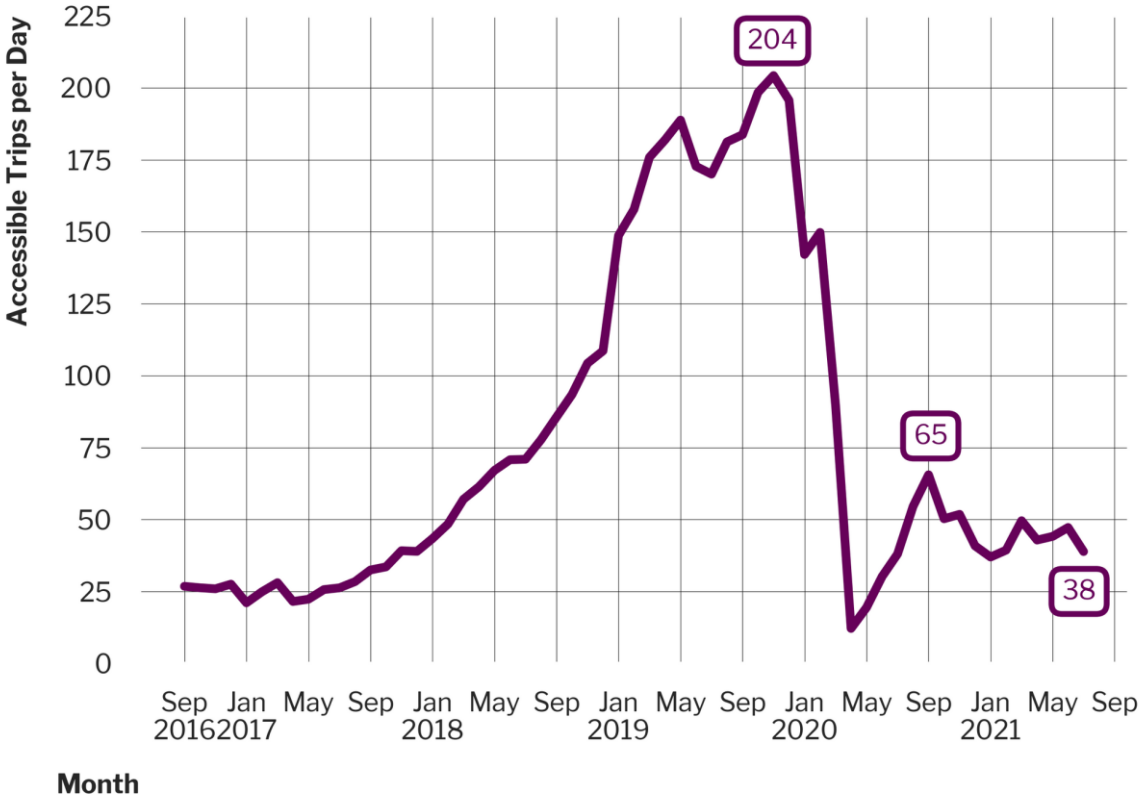
- Ensure wheelchair accessible vehicles are available when requested by a passenger through the PTC's platform within the average wait time for non-accessible taxicab services; and,
- Charge fares for accessible vehicles that are the same or less than the fare charged by that PTC for its lowest cost non-accessible service.

This analysis specifically looks at Wheelchair Accessible Vehicles which can accommodate mechanized wheelchairs. People who use wheelchairs that can fold and be put in a trunk and are able to get into a standard vehicle may be using services that are not designated as WAV.

4.1 Accessible PTC Trips Fell to 10% of Pre-Pandemic Levels in April 2020, and Have Recovered to 25% by July 2021

The changes in WAV trips are shown in Figure 4-1. WAV trips increased and more than doubled from 85 trips/day in September 2018 to 204 trips/day in November 2019 before falling to an average of about 150 trips/day in February 2020. They continued to be a small portion of the PTC trip market, around 0.1% of daily trips. While non-WAV trips fell to around 15% of February 2020 levels in April, WAV trips fell to 8% of pre-pandemic levels, an average of 12 trips/day. By July 2021, WAV trip demand had only recovered to 25% of pre-pandemic levels (38 trips/day) compared to 38% for non-WAV trips.

Figure 4-1 Average Daily Wheelchair Accessible Vehicle (WAV) Trips by Month January 2018 to July 2021

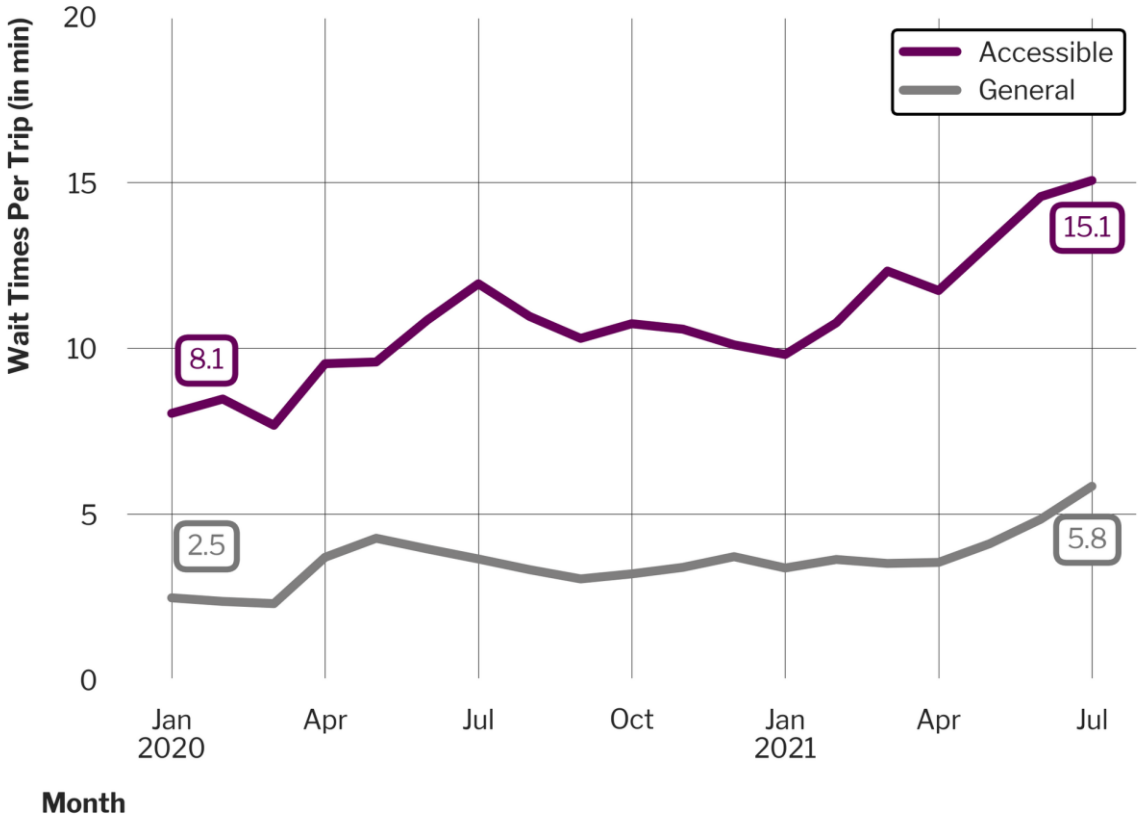


4.2 Wait Times for Accessible Service Increased Throughout the Pandemic

In accordance with the bylaw, MLS has determined the average wait for accessible PTC service should be 11 minutes based on the average wait time for non-accessible taxicab service, specifically the time that elapses between a passenger's request and the arrival of a taxicab at the passenger's location.

Due to gaps in PTC data availability, wait time data was previously only available until March 2017 when WAV wait times were 9.8 minutes on average. With the new data requirements in effect starting on January 1, 2020, wait times were again available for analysis and are shown in Figure 4-2. WAV wait times were on average 8.1 minutes pre-pandemic. During the pandemic, as demand for WAV trips dropped, average wait times have continued to increase and reached an average of 15.1 minutes as of July 2021.

Figure 4-2 Wait Time per Trip by Month, January 2020 to July 2021

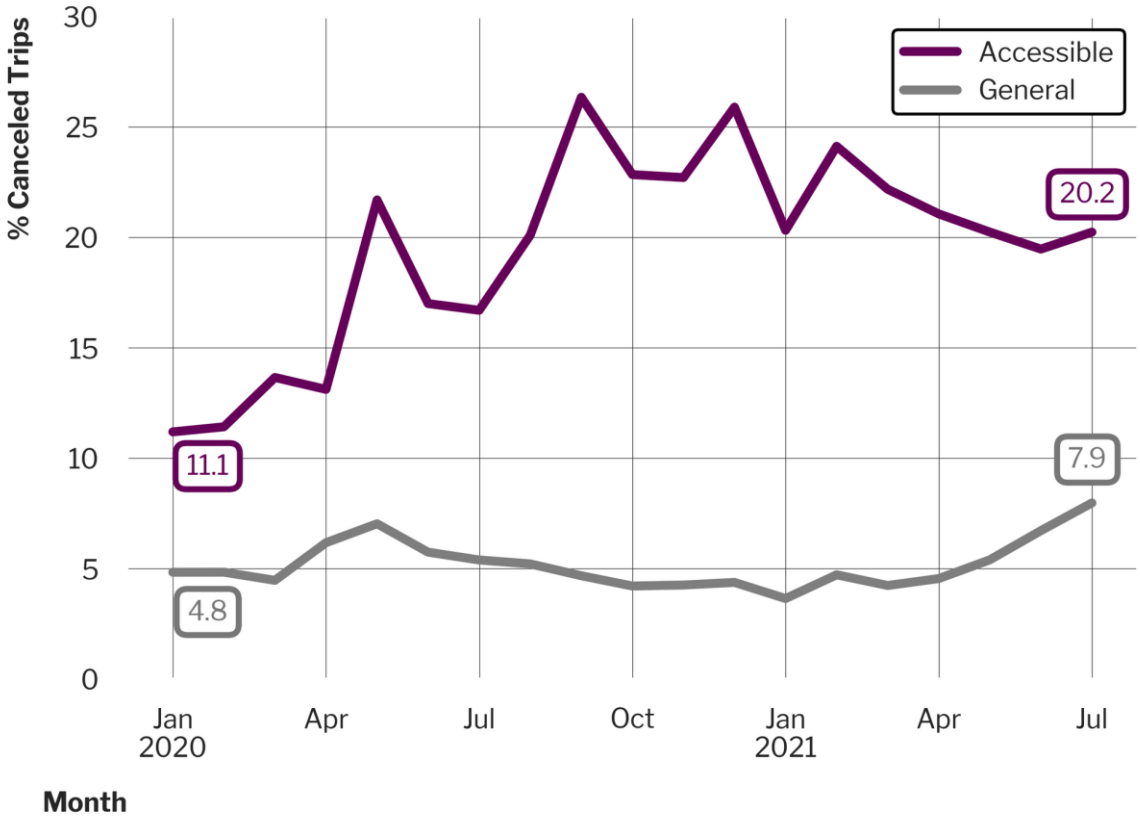


4.3 Increased Wait Times Resulted in More Trip Cancellations

Figure 4-4 shows that WAV trips are more than twice as likely to be cancelled as general service trips, and this continued to increase as wait times increased during the pandemic. Figure 4-3 shows that 87% of WAV trip cancellations were performed by riders compared to 77% of general service trips.

Figure 4-3 Distribution of Cancellations between Rider and Driver by Service Type for 2020

Figure 4-4 Proportion of WAV Trips that Are Cancelled January 2020 to July 2021



5 Transportation Network Impacts

This section describes the volume of PTC drivers that are active on City streets, how this volume of vehicles compares to the overall number of vehicles on City streets, and whether these volumes appear to result in any increased travel times on city streets.

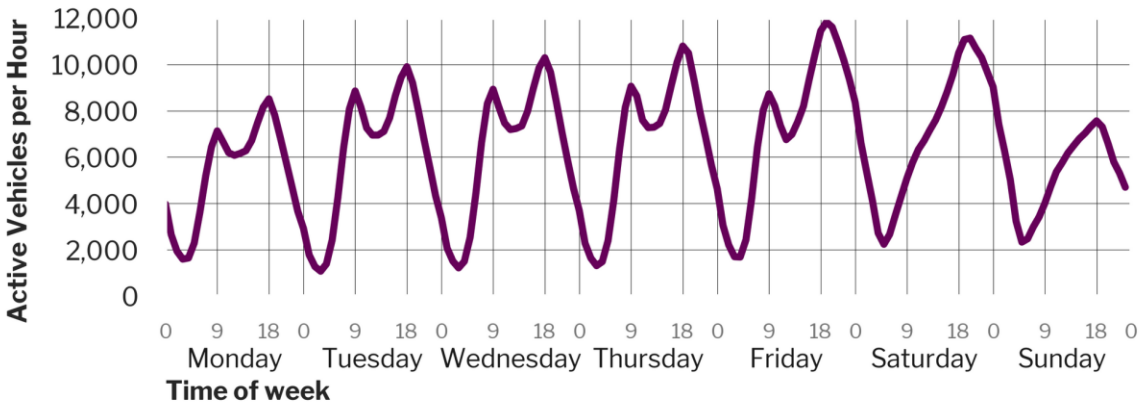
The 2019 Transportation Impact Study determined that the introduction of PTCs in Toronto did not conclusively increase travel times on downtown streets, however isolating the impacts on the transportation network from the introduction and continued growth of PTCs from other factors is extremely challenging. Factors that impact traffic and congestion are complex and tend to interact with each other, whether from high demand, population and employment growth, construction lane closures, traffic collisions, special events, weather, or other changes.

The new data reported by PTCs starting in January 2020 has enabled more detailed analysis of the volume of PTC vehicles on the City's streets. With the COVID-19 pandemic starting in March 2020, the City has only two months of complete data on pre-pandemic conditions and the pandemic has cast further uncertainty on how traffic levels will return in 2022 and beyond. Further, the absence of data on taxis and limousines creates significant challenges to holistically measure the scale and balance of trips across the vehicle-for-hire industry and their impact on traffic congestion.

5.1 Between 8,000 and 10,400 PTC Vehicles Were Active in the Afternoon Rush Hours in January and February 2020

Prior to the pandemic in February 2020, there were 96,000 licensed PTC drivers that completed an average of 197,000 PTC trips per day in the City of Toronto. Of those 96,000 PTC drivers, only about 57,000 vehicles actively serviced trips. Figure 5-1 shows the average number of vehicles active per hour in February 2020. In the morning peak hour (8:00 - 9:00 a.m.), there were between 6,000 and 8,200 active vehicles within the City and in the afternoon peak hour (5:00 – 6:00 p.m.) there were between 8,000 and 10,400 PTC active vehicles. The most vehicles active in 2020 was 12,900 at midnight on January 1st followed by 12,400 at 7 PM on Friday February 21st and 12,400 at 8PM on Friday February 14th, Valentine's Day.

Figure 5-1 Average Number of Active Vehicles per Hour in February 2020



5.2 PTCs in Downtown Toronto Are Estimated to Make up Between 8 and 14% of Total Traffic in February 2020.

As detailed in Section 2.2.2, February 6th 2020 was chosen as a representative day to further examine PTC activity. Figure 5-2 shows some key statistics on the composition of PTC Volumes on that date. PTC traffic was estimated to be 3.3% of total traffic in the City of Toronto, reaching as high as 8-14% of traffic in some downtown neighbourhoods. This includes all periods in the PTC trip cycle (available for trip, en-route and with-passenger).

Figure 5-2 Key Statistics on the Composition of PTC Volumes on February 6, 2020

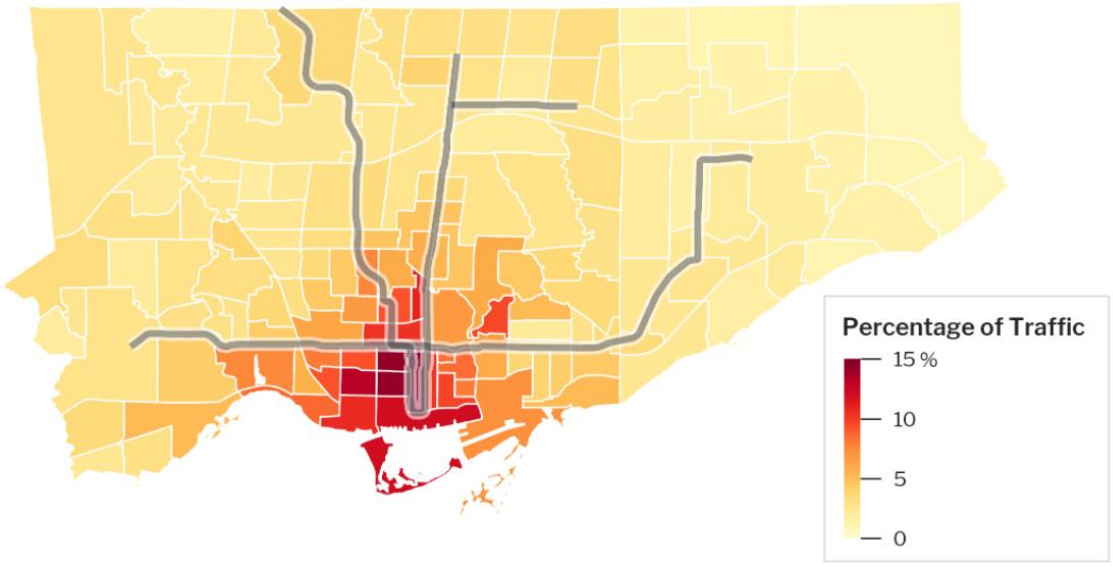
Indicator	Result
Trips Completed	193,902
Average Trip Length	8.13 km
% of Time: Period 1 (Available for trip)	40.5%
% of Time: Period 2 (En-route to pick-up)	11.2%
% of Time: Period 3 (With passenger)	48.3%
PTC Vehicle Kilometres Travelled	2,347,000 km
% of Total Vehicular Traffic	3.3%

Figure 5-3 shows the proportion of traffic by neighbourhood. The Bay Street Corridor, Kensington-Chinatown, and University neighbourhoods all had PTC vehicles make up 14% of their daily traffic. The neighbourhood in Toronto & East York with the lowest proportion is

Danforth East York with 2.0%. In Scarborough the proportion varies from 0.8% in Rouge to 3.6% in Oakridge. In North York the proportion varies from 2% in St. Andrew-Windfields to 5.9% in Leaside-Bennington. In Etobicoke-York the proportion varies from 1.5% in Humber Summit to 5.0% in Mimico.

PTCs were found to make up the highest proportion of total traffic in early morning hours, with PTCs representing between 36% and 48% of traffic between 1 and 2 AM in downtown neighbourhoods like Trinity-Bellwoods, University, Kensington-Chinatown, and Palmerston-Little Italy

Figure 5-3 Proportion of PTC Volumes by Neighbourhood as a Percentage of Total Daily Traffic, February 6 2020



5.3 Downtown Travel Times Remained Stable in the Two Years Before the Pandemic While Daily PTC Trips Continued to Increase by 17%

An updated analysis was completed to identify whether there were measurable changes in downtown vehicular travel times from September 2018 to February 2020 prior to the pandemic in downtown neighbourhoods where the PTCs make up the highest proportion of overall vehicle volumes. Over this period, PTC trips increased by 18% citywide and by 17% in these downtown neighbourhoods. This analysis used data from HERE technologies, a third party traffic data company, and also compared the results with data from the city's Bluetooth

traffic sensors and data from TomTom[4] as additional independent sources. Data from all three sources showed that travel times were stable over this period, with no noticeable changes that could be attributed to the vehicle-for-hire industry.

While no changes in downtown travel times are observed, this does not mean that the vehicle-for-hire industry is without impact on city streets. Vehicle-for-hire trips are less efficient than other modes of transportation due to the amount of time that vehicles may be driven empty. Even in neighbourhoods where vehicles-for-hire make up a small percentage of total traffic, every additional trip may generate greater congestion and emissions impact per km travelled than a private vehicle trip. While there is an impact of these trips, these services respond to a demand, and provide additional accessibility and travel options to residents.

[4] TomTom (2021) Toronto traffic report | TomTom Traffic Index. Retrieved from: https://www.tomtom.com/en_gb/traffic-index/toronto-traffic/

6 Next Steps

The goal of this study was to provide an update on trends observed during the 2019 study, present new insights from new and enhanced data requested from the last report, and to explore trends in the industry as successive waves of the COVID-19 pandemic had episodic impacts on travel behaviours.

The analysis in this report showed that the dramatic growth in PTC trips highlighted in the 2019 report had slowed by February 2020 after which the COVID-19 pandemic severely altered travel behaviour. There is also no evidence to suggest that further increases in PTC trips since 2018 resulted in increased travel times on City streets. It remains unknown how the continued pandemic recovery and re-opening of the city will impact residents' transportation modal choices and travel behaviour.

While the new datasets and data points provided following the recommendations of the 2019 report have helped expand the understanding of road usage impacts, there are still two outstanding items that are needed to be able to report comprehensively on the impacts of the Vehicle-for-Hire sector in the future:

1. Taxicab & Limousine Data: Full trip records (including both dispatched and hailed trips), availability records and collision reports are required in a consistent format from all taxi brokerages and limousine service companies to understand the impacts of the full sector.
2. Vehicles-for-Hire on MTO Motor Vehicle Collision Reports: The continued lack of taxis, PTCs and limousines as vehicle types on the MVCR form is a significant data collection gap on the safety impacts of the VFH sector.

This report has highlighted a number of directions for continued analysis and research. The following items will be the focus of Transportation Services' future work:

1. Transportation Services will continue to develop a monitoring program as part of the Congestion Management Plan to monitor the impacts of Vehicles-for-Hire on VKT, traffic congestion and GHG emissions and to better-understand the relationship with traffic congestion trends in the city.

2. Transportation Services will continue to study the impact of Vehicles-for-Hire on curbside conditions, consistent with the approach of the Curbside Management Program and related policies and in particular investigating the localized operational impacts of pick-up and drop-off activity.

3. Transportation Services will continue to investigate whether there is a road safety impact of Vehicles-for-Hire. Initial efforts to link PTC collision records with Motor Vehicle Collision Reports was not successful, however future work will continue these efforts in order to be able to understand the relative safety of Vehicle-for-Hire drivers and to understand the types and injury levels of VFH collisions.

4. Transportation Services will collaborate with universities and the TTC to investigate the impacts of Vehicles-for-Hire on transit ridership and mode choice in the context of recovering from the pandemic.

5. Transportation Services and MLS will partner with the University of Toronto to estimate the GHG and air pollutant emissions impacts from the Vehicle-for-Hire sector.