Understanding the State of Accessible Taxi Vehicles and Shared Mobility Services in Atlantic Canada: A pilot project

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Executive Summary

Taxis and shared mobility services are dominant modes of transportation for Canadians. In 2017, Statistics Canada reported that the overall spending on ridesharing services in Canada totaled $1.31 billion (Statistics Canada, 2017). Based on the rising popularity of these services in Canada, this total spending has presumably increased in the years since. The COVID-19 pandemic has further increased user interest in taking personalized ridership to their destinations. Yet, the accessibility of shared mobility services remains an underdeveloped area of policy with limited research and available data.

A 2021 Statistics Canada report found that 62.5% of Canadians with disabilities faced barriers while using federally regulated modes of transportation (Statistics Canada, 2021b). There is currently a lack of data with which to assess unregulated transportation sectors such as shared mobility services. A better understanding of the availability of accessible vehicles among taxi companies and shared mobility services will allow an improvement of transportation opportunities and the development of alternative options for persons with disabilities. Taxis and shared mobility services provide their users with last-minute, short-term, and spontaneous transportation options. The accessibility of these services is indispensable and the ability for persons with disabilities to access them consistently provides or hinders their ability to participate in society fully.

The Accessibility Institute (formally the READ Initiative) at Carleton University and its partners undertook a pilot research study between January and May 2022. The study examined the alignment between the public service, private transportation companies, the taxi and rideshare industries, and non-profit services that support accessible transportation. We approached the research with a holistic view of the ecosystem to determine if and where people fall through the cracks. This pilot study focused on Atlantic Canada, with a particular interest in rural areas with limited options for accessible taxi and ridesharing services.

Our pilot revealed an existing consumer experience and perception that both private taxi services and public transport services are unreliable, resulting in feelings of confusion, frustration, and desperation among service users. There is a significant gap in services, the negative impacts of which are not grasped or well understood by those who do not rely on accessible transportation. Our study revealed chasms between the various services provided by public transportation, private taxis, and not-for-profit transportation services. One or more might be present, depending on the setting, but their availability, cost, and reliability vary widely, leading to negative experiences and safety issues for many of the people with disabilities who rely on them.

Public transportation services are only provided at certain times and must often be pre-booked. Non-profit services also largely require pre-booking and often prioritize rider requests based on level of need and service capacity (number of vehicles available and/or drivers available). Taxi services are able to offer on-demand service and off-peak coverage but, to many persons with

disabilities, they are unavailable, unreliable, and expensive. Generally, they do not fill the need for service outside the hours covered by the public and some non-profit providers.

This project also revealed impacts stemming from the COVID-19 pandemic. First, COVID-19 restrictions impacted service users' ability to use the creative solutions and workarounds that they had employed pre-pandemic to cope with the gaps in accessible transportation. Many of these strategies were rendered impossible. Second, we noted a decrease in the number of total taxis available across the pilot region, though the number of accessible taxis remained stable.

Last-minute service is not effectively available. Service generally requires scheduling in advance within time periods that are often not conducive to the actual goal of transport (to attend an event, receive health care at an appointment, engage socially, etc.). Fees are also prohibitive to service use. Most critically, there is a lack of alignment between the various transportation offerings (taxis, public and not-for-profit) to promote seamless connectivity for individuals with disability-related accessibility requirements.

Our study produced the following key recommendations:

- Conduct further research into the collective impact of legislation, policy, and financial resources.

- Assess the alignment of policy and practice at municipal, provincial and federal levels.

- Investigate the most impactful prospective areas for Federal funding, such as manufacturing and insurance.

- Determine ways to support the supply chain, especially for rural areas.

- Determine ways to improve company access to funding opportunities to improve accessibility and navigability of service.

- Support research into the real-world consequences of transportation disparities for people with disabilities.

- Integrate subject matter expertise from various perspectives, starting with lived experience of disability.

- Ensure there is continued focus on accessible transportation and funding options in rural settings.

- Extend research into other Canadian regions by leveraging the learnings of this pilot project.

- Stimulate a change in attitudes toward accessible taxis and ridesharing services, anchored in need rather than demand and guided by the ideal of seamless connectivity.

Introduction

Investment in the accessibility of built environments, transportation, service provision, information, and communications benefits the entirety of society. Facilitating equitable engagement with lived environments through the prevention and removal of barriers is critical for persons who currently live with disabilities and ensures future access for everyone who may experience temporary, recurring, or permanent impairment through accident, illness, or aging. Seamless connectivity, an important concept in accessibility, is achieved when many accessible parts fit together to create a holistic, accessible experience (ESCAP, 2016). When seamless connectivity is lacking, the disjointed experience of interrupted accessibility can be frustrating and limiting. Illustrative examples of accessibility gaps would be an accessible business workspace on a floor not accessible by elevator or an accessible ferry that travels to an island without accessible transportation from the ferry port.

Disability itself is a variable and non-static experience. The degree to which an environment can be considered accessible is often influenced by a multitude of variables in different contexts. The goal of universal design requires a combination of overlapping accessible policies and practices. Accessible transportation plays a critical role in seamless connectivity and its availability impacts the physical, social, emotional, mental, and financial wellbeing of persons with disabilities (Levesque, 2020). For those who require it, whether regularly, intermittently, or in the future, gaps in accessible transportation are a life-impacting concern. Reliable, safe, and available modes of accessible public and private transportation are simply a necessity for many.

The taxi industry and ridesharing companies comprise one part of the transportation ecosystem that can provide accessible transport for a wide range of people with disabilities, particularly wheelchair users and those who utilize assistive devices and supports. Taxis and shared mobility services are intended to provide last-minute, spontaneous options for their users. The accessibility of these services is indispensable and the ability for persons with disabilities to access them consistently facilitates or hinders their ability to participate in daily living fully. However, the picture of accessible offerings from the taxi and ridesharing industries has been inconsistent with availability and quality. Examples of end-users raising alarms about unacceptable situations brought about by inadequate services can be found across the Canadian media (See Appendix A for a brief review in the Atlantic Provinces).

In 2021, Transportation Canada and the READ initiative at Carleton University began preliminary research into the current availability and demand for wheelchair accessible taxi and ridesharing vehicles in Canada. This study focuses on wheelchair accessible taxis and ridesharing vehicles, meaning vehicles used in commercial applications that have been "built or modified to allow someone using a wheelchair to gain access into the vehicle whilst remaining seated in their wheelchair." As commercially operated vehicles, these are "passenger only vehicles […] where the person in the wheelchair is not the driver" (The Accessible Planet, 2021). Ridesharing companies also called ridesourcing, ridehailing, or peer-to-peer companies, offer on-demand taxi-like services from privately-owned vehicles arranged through online digital applications (Crawford, *et al.*, 2020).

Background and Scope

In March 2021, Transport Canada sought to explore the primary research question "Are the demands for accessible taxi and rideshare transportation being met in Canada" by investigating the following four objectives:
- Determine the number of wheelchair accessible taxi and ridesharing vehicles operating in Canada.
- Determine the state of demand for wheelchair accessible taxi and ridesharing services in Canada.
- Determine how many more wheelchair accessible vehicles would be needed to meet this demand (if applicable).
- Determine the cost of increasing the supply of wheelchair accessible vehicles to meet current demand (completed March 2021).

Investigating these initial objectives uncovered a complex ecosystem of taxi and ridesharing companies across cities, regions and provinces. The public visibility, transparency and communication methods exhibited by companies varied significantly. Thus, a key research objective in March of 2021 was methodological. We developed a systematic strategy to identify taxi and ridesharing companies across Canada and developed a survey specific to the objectives above (see Report 1). We also spoke with three subject matter experts who gave feedback on the initial survey questions.

Thus, the foundational outputs from this preliminary work included:
- The identification of 2524 taxi companies and two rideshare companies,
- A survey data collection tool, and
- Lessons learned incorporated into our developing strategic framework for outreach to the industry.

The initial environment scan also identified factors that could influence the quality and interpretation of the project objectives (*Table 1*).

Table 1: Identified Risk Factors for the Pilot Research in the Atlantic Provinces

Risk	Description
Communication channel	The industry's lack of digital presence (e.g., no website/e-mail contact listed) presents a significant challenge to reaching necessary individuals. This factor may affect the response rate and geographical coverage.
Type of records kept by companies	Some of the sought-after numerical data (e.g., number of calls for accessible vehicles received) may not be tracked by all companies.
Quantitative data collection method	Subject matter experts noted that accessible services go beyond wheelchair accessible vehicles, which may impact how people respond to survey questions and thus affect the quality of the data set.
User experience	The numerical data obtained from companies may not accurately reflect the lived experience of a person trying to access accessible transportation.

Current project 2021-2022

In this second phase of the research, we piloted data collection in the Atlantic region to inform, and better assess the feasibility of, collection at a national level. The goals of the Atlantic pilot phase were:

- Determine the efficacy of current data collection methods in addressing the three overall main objectives.
- Provide complimentary contextual information to give nuanced insight into relevant topics or issues surrounding accessible vehicle requests.
- Recommend a strategy for collecting the relevant data at a national scale to fulfill Transport Canada's overall objectives.

The pilot study focused on the Atlantic provinces of Nova Scotia (NS), New Brunswick (NB), Prince Edward Island (PEI), and Newfoundland and Labrador (NL). These provinces were selected because they contain both large urban centres and rural communities. Interviews were conducted with self-advocates and industry stakeholders to gain insight from the lived experience of those who use accessible transportation and the providers of taxi services. The difficulties encountered in gathering information from taxi companies across the Atlantic provinces demonstrated that a national survey would be far beyond the scope of this pilot project.

It was hoped the project would also provide some insights into the effects of the COVID-19 pandemic on the accessible transportation and taxi industries in these provinces. Taxi companies were asked to provide information on the supply and perceived demand for accessible transportation in both 2019 and 2021. These two years were selected to provide

data on the state of the industry both before the pandemic and during the pandemic, when public health measures were beginning to be removed.

While the focus of the current project was to examine the state of the taxi industry in providing accessible transportation in Atlantic Canada, respondents offered many reflections on the broader state of accessible transportation demand and service. This included public transportation, private taxis, and not-for-profit accessible transportation services. The results from the project survey and interviews provide some insight into the interplay between these three modes of accessible transportation while keeping a primary focus on the question; *Are accessible taxi and shared mobility services meeting demand*?

Methods

A mixed-methods approach that draws on both quantitative and qualitative data collection methods was chosen for this research phase. This combines personal insights into the complex issues associated with accessible transport with quantifiable data from the taxi services within the pilot region of Atlantic Canada, allowing a more fulsome understanding of whether the demand for accessible taxi services was being met. Information was collected from taxi companies via a questionnaire asking both quantitative and qualitative questions. We also interviewed persons with lived experience about their access to accessible transportation. Most of our interviewees were associated with disability advocacy organizations. The interviews inform the majority of the qualitative analysis.

The following section will discuss the methodology of the survey and then that of the interviews. The results section will likewise begin with the survey results, followed by interview analysis.

Survey

Sampling and Inclusion Criteria
The survey targeted publicly visible taxi and ridesharing companies operating in the Atlantic provinces. A total of 422 companies fitting these target population criteria were identified from online searches. As very few companies had their own websites, in March of 2022, two research assistants attempted to contact each of the companies by phone. A maximum of two calls were made to each number. If a second call was required, it was made at a different time and roughly three days later than the first. Companies were recorded as "no response" if both phone calls went unanswered. Our media scan of the Atlantic region revealed considerable variability in the extent to which ridesharing services are offered (See Appendix A).

The research assistants documented the outcome of each outreach according to the following categories:

1. Confirmed Taxi business by speaking with a representative.
2. No response.
3. Not operating as a taxi company (e.g., towing, limo only, or bus service).
4. Invalid or private number.
5. Duplicate number.
6. Business closed.

For this study, we defined the total number of taxi companies (n) as the number of confirmed contacts (Category 1) plus the number of non-responses (Category 2):

n = (Category 1) + (Category 2) = 282.

This number represents 66.8% of the initial target population (422) and includes 17 additional numbers discovered during the outreach phase.

Survey Design

The survey distributed to the taxi and ridesharing companies was primarily designed to learn the number of taxis and other private vehicles available for hire across the Atlantic provinces. We asked each company's location, the regions to which they provide service, the number of vehicles in their fleet prior to the COVID-19 pandemic (2019), and the number of vehicles in their fleet a year into the pandemic (2021). We asked how many of their vehicles were wheelchair accessible and how many requests they had received for wheelchair accessible service in those two time periods. Finally, we asked if they thought they had enough vehicles to fulfill requests for accessible service, how many more they might need to meet demand, and whether customers were subject to any extra charges for accessible vehicles. In addition, the survey had an open comment box for respondents to write any additional information they wished relating to accessible vehicles and service.

Sample Size and Response Rate

The first contact with companies was made by phone. Of those who agreed to participate, 39 requested that an e-mail with a survey link be sent and 24 companies requested that the survey be conducted over the phone with the RA. However, of the 39 companies that requested an e-mail link, only six of these companies completed the questionnaire online. Thus, the total number of participating companies was 30 (six self-administered through a survey link and 24 by phone with an RA).

Considering the total number of eligible Taxi company phone numbers (n = 282), this was a total response rate of 10.6% of estimated taxi businesses. This is substantially below the acceptable rate of responses (25%) that was set in the proposal for the project in July 2021. The low response rate does not appear to be a consequence of any problems with the questionnaire design. The research assistants recorded that many of the companies they contacted were simply unwilling to participate in the study, some hanging up on them as soon as they indicated the reason for the call. At least one respondent asked how the study could

benefit their company and agreed to receive an e-mail link only after the research assistant read the "possible benefits" response we had prepared before beginning the research.

As we worked through the call list, we also realized that there had been substantial changes in the industry in some regions over the previous year. Several companies in St. John's NL and Halifax NS had been bought and absorbed by larger companies, their numbers re-routed to a single dispatcher who answered multiple different phone numbers. Some of the companies had closed, although it was not always clear when this had occurred. One person said that their company had closed 10 years ago.

Taxi Company Characteristics
Despite the low response rate, we did receive 30 completed questionnaires across all four Atlantic provinces and from communities of all sizes (*Table 2*).

Table 2: Provinces where each Company Operated

Province	Number of Companies
New Brunswick	3
Newfoundland & Labrador	4
Nova Scotia	19
Prince Edward Island	6
Total*	32

* One company operated in New Brunswick, Nova Scotia and Prince Edward Island. Thus, the total number is larger than the number of completed questionnaires. All other companies operated in a single province.

In addition to asking in which province their company operated, we also asked, "What city or town is your company located in?" and "What are the first three digits of your company's postal code?". We then used Canada Post's 2021 listing of forward sortation codes to check each company's location (Canada Post Corporation, 2021). The locations were then used to determine each local population from Statistics Canada 2021 census data (*Table 3*). Although the response rate was low, some of the responding companies serve areas with large populations, and therefore represent a larger market share of taxi services in the Atlantic provinces.

Table 3: Communities and Populations Served by Province, as Determined by the First Three Digits of Respondent Postal Codes (Statistics Canada, 2021a).

Province	Community	Population
New Brunswick	Moncton	119,785
	Metropolitan Moncton	157,717
Newfoundland and Labrador	Conception Bay South	27,168
	Grand Falls-Windsor	13,853
	St John's	110,525
Nova Scotia	Halifax	439,819
	Liverpool	2,546
	New Glasgow	9,471
	Sydney Mines	12,353
	Truro	12,954
	Yarmouth	10,067
Prince Edward Island	Charlottetown	38,809
	Summerside	16,001

Interviews

Sampling and Inclusion Criteria

E-mail outreaches were sent to an initially targeted sample of disability advocacy organizations that were either located in the Atlantic provinces or of national scope with Atlantic representation. These e-mails requested interviews with spokespeople who had some knowledge of the use of local transportation by people with disabilities. The intention was to speak to people with insight into the state of accessible taxis and ridesharing, preferably those with lived experience, who were already comfortable speaking publicly about accessible transportation to minimize any potential risks in self-disclosure for participants.

From the initial target sample, the snowball method of sampling was used to contact 30 publicly visible organizations which yielded 12 confirmed interviews. Two of the arranged interviews were cancelled by the participants, resulting in a total of 10 interviews for our qualitative data collection.

We note that the pool of self-advocates in these provinces available for interviews was quite small. However, we were able to interview people who use, and who help provide, accessible transportation in all four of the Atlantic provinces and in both urban and rural areas. The youngest participant was in their twenties and the oldest was in their seventies. The majority of interview participants represented private organizations and were located in Nova Scotia. However, many of them described connections and familiarity with disability advocacy in all four Atlantic provinces and were able to speak to issues applicable to all these provinces. They spoke about a variety of disabilities and accessibility needs.

Interview Design and Procedure

A semi-structured interview guide was used to ask general information about each participant's community, their advocacy work, and the challenges they observed in their everyday lives or the lives of people with accessibility needs in their community. Participants were asked about their experiences and observations of both barriers and facilitators in finding accessible transportation. We asked for suggested solutions to problems and ways to make transportation more accessible. The interview guide was designed to encourage the participants to give concrete examples they had observed or experienced and concrete ideas for solutions that would be most relevant to people who depend on these transportation systems in their daily lives.

Interviews were conducted over Zoom, utilizing some inbuilt accessibility features such as closed captioning. Some participants used additional accessibility aids, which they provided. Consent forms and information about the research project were sent to participants by e-mail ahead of the interviews. We reviewed and confirmed each interviewee's consent to participate at the beginning of each interview. Participants were given the option of receiving a $15 e-gift card for either Walmart or Amazon. These companies were chosen because they could be accessed and used in various communities across Atlantic Canada. One interview participant declined this compensation, while the other nine opted to receive an e-gift card.

The research lead conducted all interviews. Audio and video (if available) recordings were securely stored before being transcribed by research assistants. Transcriptions were then reviewed by the research lead along with the audio recordings to ensure that the meanings conveyed in the transcripts matched those expressed by the participants. Some identifying information and personal details were removed from the transcripts at this point and new versions were created for coding.

A descriptive coding method of codes and further detailed subcodes was applied to the interview data, generating the initial categories for our thematic analysis and providing a grounding for the next cycle of coding and any future analysis.

Results and Discussion from Survey

The results from the taxi company survey will be discussed first, followed by the interviews with advocates familiar with accessible transportation usage.

Company Demographics

Twenty-nine companies stated that they had between 1 and 99 employees, while one company indicated between 100 and 499 employees. Respondents were given an option to identify their company as one of the following: head office; franchise or regional company; independent; other. Three respondents identified their workplace as a "head office" and twenty-seven described themselves as "independent businesses" and/or "franchise or regional company". Of those that selected "head office," one was located in New Brunswick and two in Newfoundland and Labrador. No definitions for these categories were provided to the survey participants and

there may be variances of interpretation. For example, "head office" could mean the office of a small regional company that is also independent of any larger company.

Twenty-nine respondents described their companies as taxi services and one as a rideshare service. The rideshare company was not affiliated with Uber or Lyft, and no details were recorded as to what was meant by a rideshare service in this context. Two of the respondents commented that their companies also provided wheelchair accessible buses, one of them specifically for schools.

Respondents frequently reported working in multiple positions within their companies. Some of them chose all five possible positions. The person answering our outreach call typically had the job of a dispatcher, but they could also fill many other positions. Occasionally, the call went directly to a driver. The job position responses are listed in *Table 4*. The number of job positions listed exceeds the total number of companies surveyed because each respondent had the option to choose multiple positions. This table also reflects the high number of small companies where the owner may also be doing much of the work on their own.

Table 4: Self-reported Company Positions of Survey Respondents

Current title or position	Total number
Owner	17
Manager	5
Administrator	4
Dispatcher	12
Driver	8
Total	46

Total Numbers of Vehicles and Wheelchair Accessible Vehicles
One of the key objectives of the survey was to determine the total number of accessible taxis in operation. We also wished to estimate the demand for wheelchair accessible transportation and whether the current service providers could meet the need. We asked respondents to report how many vehicles were in their fleet, how many of these were wheelchair accessible, and how many requests they had received in each given year for wheelchair accessible vehicles. We also asked for the number of requests they received in their busiest month, but there were no responses to that question.

Roughly half of the companies who responded to the survey had four or fewer accessible vehicles in their fleet in both years (n = 17 in 2019 and n = 15 in 2021) (see Appendix B). *Table 5* shows the total number of vehicles from the 30 companies that responded in 2019 (n = 760) and 2021 (n = 235) broken down by province and municipality. One respondent did not report their total vehicle fleet in 2021, leaving this value blank. When the company with the missing data in 2021 is removed from datasets for both years, (n = 29), responses show a 35 percent drop in the total number of vehicles between the two years (n = 360 in 2019 and n = 235 in 2021). The median number of total vehicles for the 29 companies dropped from four to three.

Table 5: Total Number of Taxis and Wheelchair Accessible Taxis by Postal Code

Province	Community Postal Code	Number of Taxis 2019		Number of Taxis 2021	
		Total	Accessible	Total	Accessible
PEI					
	Charlottetown	22	0	20	0
	Summerside	4	0	3	0
NB					
	Moncton Area	213	4	101	3
NS					
	Amherst	6	1	2	0
	Digby	1	0	1	0
	Halifax	41	1	38	1
	Lakeside	2	0	2	0
	Liverpool	2	0	2	0
	New Glasgow	4	4	12	4
	Sydney Mines	2	0	2	0
	Truro	20	2	20	2
	Yarmouth	8	0	7	0
NL					
	Conception Bay South	16	0	11	0
	Grand Falls-Windsor	15	1	12	0
	St. John's	403*	50	1*	50
Unknown					
	Unknown	1	0	1	0
Total		760	63	235**	60

* Represents a single company that reported 2019 fleet size but not 2021 fleet size.
** Due to missing survey value, does not reflect the actual drop in vehicle numbers.

Despite drops in the total number of vehicles, the number of wheelchair accessible vehicles remained relatively stable among these 30 companies. Notably, most companies reported zero accessible vehicles, 22 companies in 2019 and 24 in 2021. The number of wheelchair accessible vehicles changed from 63 to 60.

Fifteen companies also provided comments that will be discussed in the qualitative section of this report. Pertinent to this section, six companies indicated that cost was a barrier to them having accessible vehicles (e.g., "cannot pay insurance," "Not affordable for independent taxi companies," "We aren't big enough to spend that kind of money on a special van"). One company indicated that they had lost their only accessible vehicle during the pandemic and the other stated that they had lost four vehicles total due to the pandemic, one of which was accessible.

Demand for Wheelchair Accessible Vehicles

We asked companies whether they track the number of client requests for accessible vehicles. Five companies out of 30 reported that they do track requests for wheelchair accessible vehicles, though only four reported those numbers on the survey (See Appendix C). Another five companies in 2019, and three in 2021, reported they were unsure if they tracked requests for accessible vehicles. The total number of requests reported on the survey by the four companies was 2,555 in 2019, which dropped substantially to 356 in 2021 (*Table 6*).

Table 6: Reported Number of Requests for Wheelchair Accessible Vehicles

	2019			2021		
	Total Fleet	Accessible Vehicles	Accessible Vehicle Requests	Total Fleet	Accessible Vehicles	Accessible Vehicle Requests
Company 1	15	1	50	12	0	50
Company 4	2	0	15	2	0	15
Company 3	4	4	12	12	4	12
Company 26	132	2	2478	51	1	279
Total	153	7	2555	77	5	356

There were four comments that indicated that they received requests but passed them on to other companies or organizations that could provide accessible vehicles. It is also relevant that wheelchair accessible vehicles can be used by people who do not use a wheelchair, but not vice versa. Accessible vehicles can easily be used for any type of service.

We asked whether the number of wheelchair accessible vehicles "in [the company's] fleet" was sufficient to meet demand. Of the 30 individuals who filled out the questionnaire, five answered "yes", 13 "I'm not sure", and 12 "no". The 12 who responded that there were not enough wheelchair accessible vehicles were asked a follow-up question about how many would be needed to fulfill the current demand. Five companies said one vehicle, and one company said two vehicles.

We also asked if there were additional costs to the consumers requesting rides in wheelchair accessible vehicles. Most (n = 16 or 53.3%) companies reported there were no additional costs. Three companies said there was an additional charge, but 11 were not sure whether there were additional charges.

Discussion of Survey Results

The difficulty in contacting taxi companies and the low response rate to the survey indicate that the industry may be undergoing some dramatic changes. Many of the phone numbers that we tried were no longer connected to a business and multiple numbers were redirected to a single company that had bought and absorbed smaller companies. Negative responses to the cold calls and refusals to participate may also be signs of an industry under stress. Comments from participants suggest some of this may be due to the COVID-19 pandemic. For example, one respondent noted that they had lost four cars, one of them accessible to wheelchairs, due to COVID-19. Another used to have a wheelchair accessible bus but lost it during COVID-19. Disruption in the industry is also reflected in the drop of total vehicles between 2019 and 2021, a reduction of about 35% (if the company from St. John's with the missing 2021 value is also discounted from the 2019 value).

In contrast to the drop in total vehicles, the number of accessible taxis dropped slightly from 63 to 60. This may indicate that, in general, the demand for accessible taxis is not as elastic as the demand for taxis. One respondent noted that the number of requests for accessible rides remained consistent over the two years because they served "the same people over and over again." From the service provider's perspective, this means that they have a basic, secure level of business they can count on. However, as we found from interviews with people associated with advocacy organizations, the corollary of this is that there may only be a single local taxi company that has an accessible vehicle for people who need accessible transportation.

Despite the consistent demand, only eight (in 2019) and six (in 2021) out of 30 companies reported having accessible vehicles. About six participants wrote in the comments that they had no or low demand for accessible vehicles. "I have never been asked if my vehicle is accessible," noted one taxi provider. Four participants stated that they refer clients to other "organizations" or "services" that provide accessible transportation. It is difficult to conclude whether the presence of these other organizations makes it possible for taxi companies to ignore the need for accessible transportation, or if these other organizations arose because that need was not being met in the first place. It is also important to note that the majority of companies (n = 22) did not track the number of requests for accessible rides, and many were not sure if they met the need for accessible transportation in their area. Only three companies responded that more accessible vehicles would help them meet this need.

Our questions about the demand for accessible taxis and whether demand was being met elicited fewer responses than the questions about the number of taxis. This may indicate a lack of interest in providing this service, though there were also indications that some wanted to provide an accessible service but were limited by cost. Some respondents cited the cost of the vehicles and associated maintenance as barriers to supporting this service model. "We aren't big enough to spend that kind of money on a special van," said one person. "I guess somebody should be doing that around us but it's so rural, it's hard," they added. Another respondent noted that there was a "desperate need for accessible vehicles, but we cannot afford the insurance." One fact limiting our ability to accurately measure demand is that most of the

companies surveyed do not track accessibility in customer requests. The overall picture from the survey is of an industry that has suffered from the COVID-19 pandemic, recognizes that there are unmet needs among their potential customers, but does not have the capacity to meet those needs.

Results and Discussion from Interviews

The qualitative interviews for this pilot research provided an additional route to understand and contextualize the quantitative survey questionnaire responses. The interviews gathered insights and perspectives both from disability advocates who offer non-profit accessible transportation services and self-advocate users of accessible transportation services. The voice of people with lived experience of disability and navigating barriers is a crucial component of any research endeavour and is essential to research into the accessibility of services. Many advocates and activists have emphasized that there should be "nothing about us, without us," particularly in policy and planning decisions.

One of the key objectives of this research was to determine if the demand for accessible taxis was being met by current service providers. The stories of our 10 interviewees led to a reframing of that question to a more fundamental one: are the transportation needs of persons with disabilities being met?

We must highlight the difference between meeting demand and meeting needs. When a community's needs are not being met by a service, the demand for that service may, in consequence, drop off. One respondent stated, "I think a lot of times they'll say, well there's a lack of demand, it's like 'well if we don't have anything available you don't have any idea what the demand is'." A report produced by Taxi Research Partners for the City of Toronto noted, "Demand for accessible vehicle use is affected by several factors, including the availability of appropriate services, their reliability and cost, and perceptions of service accessibility" (Taxi Research Partners, 2013, p.44). The report points to examples from large urban centres where an increase in the accessible capacity of a fleet subsequently increased demand for accessible services.

The next section will provide an analysis of whether transportation needs are being met for persons with disabilities based on interview data. Several barriers to accessible transportation will be explored, including availability, attitudes and confidence, and cost.

Are the Needs Being Met?

We found that the needs of individuals who require accessible transportation are not currently being met by taxi and rideshare services. The interview data revealed multiple ways that neither demand nor need was being met by the taxi and rideshare industry, as well as other issues impacting the state of accessible transportation. Participants provided examples of gaps in service that had negatively impacted their lives.

While the focus of our research was the taxi and rideshare industry, respondents further indicated that there were few transportation services of any kind, public or private, that were adequately meeting the needs of riders with disabilities. Our results demonstrate that these modes of transportation are connected and that any future research should investigate the interactions between modes rather than focus on any one mode in isolation. Accessible transportation and seamless connectivity are only achieved through the alignment of all accessible transportation modes.

Lack of Availability
Our research shows that the role of taxis in providing service for people with varied accessibility needs is part of a complex and malleable transportation system. Some taxi companies recognize the need for more accessibility, particularly for people who use wheelchairs. However, the gaps are most often being filled by non-profit organizations that are, to varying degrees, dependent on government funding and volunteer support. There is a desire by some providers of taxi services to fill the service gap, but their industry is facing numerous challenges. Last-minute service is not effectively available. Service generally requires advanced scheduling within time periods that are often not conducive to the actual goal of transport (to attend an event, receive health care at an appointment, engage socially, etc.). In some cases, fees are also prohibitive to service use.

In Halifax, one interviewee phoned several taxi companies to book a wheelchair accessible taxi. They were given the direct cellphone number of the driver of an accessible van and told that he could not be booked through regular taxi dispatchers. Another participant in Halifax phoned for a taxi and was told that there were only five accessible taxis in the city and that these were often not available. This same participant had visited London, United Kingdom, with their family and was astonished to find that every cab they called for or hailed in the street was wheelchair accessible. She noted that many people think a wheelchair accessible vehicle must be large but "they don't always have to be big vans. In London they were just these little black cabs that you see in the movies. They weren't big vans; they were the little black cars". Participants were unanimous in saying that wheelchair accessible taxis were difficult to find and access and did not meet the needs of potential users.

Some respondents spoke of alternative modes of transportation. In some areas, the need for accessible transportation is assigned to one specific public service but, according to one user, "they don't have the resources they need for the demand that they have." Another respondent living in a more rural area noted the challenge of relying on public service: "Now they do run a bus that is also wheelchair accessible, but I can't use it, it doesn't have a bus stop close to me for 6 months of the year." Restricted availability is evident in non-profit services as well. One respondent said of the transportation provider in a rural setting, "they say they can't afford to run evenings and weekends because they're on a shoestring budget and they have no drivers." This further emphasizes the need for the on-demand services that taxis can provide.

Several representatives of taxi companies referred to other organizations that provided accessible transportation in their area. "There's a transportation service around us that

[provides accessible rides]." And another comment, "We just re-direct them to the organization that does that sort of thing." Some company representatives felt that the availability of other organizations created a situation that allowed taxi companies to opt out of providing accessible transportation. While they indicated that they did try to be as inclusive as possible, "we do try to help anyone…But I don't have a special [vehicle] or nothing", many of them were small businesses (some with only a single vehicle) and were willing to let other organizations handle some of the transportation needs in their areas.

Administrative or Operational Practices. Some respondents familiar with the taxi industry noted administrative or operational reasons for the lack of accessible taxi availability. While a taxi company may issue accessible taxi licences, many drivers are independent contractors for whom the company does not regulate work days, hours, or length. Thus, companies cannot schedule drivers to ensure the predictable availability of accessible service. In rural settings, some companies may have one or two taxis in total and the hours of service for each taxi are reportedly set by each car's owner. In such circumstances, requests for an accessible taxi can be viewed as taking a car out of circulation for too long, reducing the number of other fares and reducing the cost-effectiveness of accessible bookings.

The COVID-19 pandemic has impacted vehicle supply chains. One of the not-for-profit transportation providers informed us that they want to increase the number of vehicles in their fleet, but, "…it's going to be a minimum of two years before we can even get one of those right now. Ford and Chrysler both have their order books closed and they won't even take an order." COVID-19 has disrupted vehicle supply in Canada for over two years and shows no immediate signs of stabilizing (Statistics Canada, 2022).

Issues identified by taxi company respondents in this pilot region are also echoed in other regions. As recently as July 2022, a taxi company representative made the following comment in response to a complaint from a client who had booked an accessible cab in Toronto and received two no-shows after receiving a booking confirmation: "Wendy and her brother should be able to receive on-demand wheelchair accessible service in the city of Toronto. Bad regulation, lack of enforcement and access to affordable insurance, purchase prices and gas prices are some of the reasons that wheelchair accessible taxicabs are not being replaced in Toronto" (CBC, 2022). In some Canadian cities, such as Calgary, the city authorities have explored possible incentives to encourage drivers of accessible taxis to meet set goals to increase their availability to those relying on accessible transportation (City of Calgary, 2019).

Attitudinal Barriers, Disability Confidence, and Safety Issues
Those interviewees who use accessible transportation appreciated the care and efforts of the workers in this field, but some pointed to gaps in training, skills, attitude, and safety practices. One person stated, "what is really missing in all the training is skills and attitude training. Sensitivity training as to what's appropriate and what is not appropriate to say to a disabled person". She noted that workers must have the skills to drive a vehicle so other skills can also be learned. This could include training for those who design or modify vehicles for use, particularly for people in wheelchairs. She observed brand new vans that had ramps that were

too steep for many wheelchair users and questioned the oversight of vehicle construction or modification. Resources and training for making all aspects of the environment accessible need to be available at every stage of the process, from design to use and repair. Users of accessible transportation may not know what level of government or department is responsible for helping with these aspects of the transportation system, but their experience and ideas may be the best place to start in improving the systems that exist or building new systems that are better for both individuals and communities.

Attitudinal and knowledge barriers also contributed to difficult travel experiences. One respondent noted, "Attitudinal barriers are probably the worst of all, and I don't even know if what I'm saying right now makes any sense, but like to the general public or people who aren't familiar with hearing stories of people living with disability – some of these things just sound like you're being nitpicky or you're too sensitive and for a lot of drivers they're probably just trying to make a living that day. I'm not sure things like chemical sensitivity are well understood, so typically I would [not] even bother trying to explain."

The lack of adequate training for drivers, lack of accessibility awareness, attitudinal stigma fueling avoidance of taking fares despite having an accessible vehicle, and societal ignorance of the realities for people who rely on accessible transportation all lead to safety issues. These may be related to unsafe securing practices in transit, being stranded for hours without access to transportation, or challenges in getting timely healthcare appointments.

Money as a Barrier to Accessible Transportation
Cost-related barriers to accessible transportation services featured prominently in our qualitative interview data. These can be grouped into cost to the individual, cost to private business, and cost to non-profit private services.

Cost to the Individual. Some respondents reported that they perceived taxi fares to be an expensive alternative to accessible public transportation. Due to the minimal scope of service provided by public transport or, in some cases, the absence of it in their area, this was an expense that they had to take on. One participant noted that they called a private company specializing in accessible transportation only when public transportation could not meet their needs: "I called a company called [company], who are wonderful, and they're so easy to work with, and they will do anything to help a long way. But they're expensive…".

Some noted that a lack of available and reliably scheduled accessible transportation to workplaces negatively impacted their ability to secure and maintain work, negatively impacting their financial situation. This made taxi fares even more out of reach for them. One self-advocate stated, "If I had accessible transportation, I might be able to get a paid job. Right now, I can't get a job because I don't know if I'll be able to get to work every day. Because I'm dependent on our transportation system."

The availability and cost of accessible transportation can vary widely even within the same province in this pilot region. For instance, the cost of wheelchair accessible transportation

reported by someone living North of Halifax was approximately double the cost reported by someone living a similar distance South of Halifax. There may be good market reasons for this cost difference, but the people who need accessible transportation often have limited incomes, making the high costs resulting from their place of residence an unmanageable burden. One respondent noted that "getting to Halifax, and to my medical appointments...is $350 a trip. My annual income is $24,000 and I have to go there about six times a year." This was the cost of accessing necessary transportation through a non-profit organization in that region. Another respondent from a different region reported that a similar trip would cost $165. The financial burden of these gaps in accessible transportation are passed down to individuals, who must utilize a more costly private service (which our data revealed is itself often not reliable) or rely on family who may also face financial or work-related limitations to providing support.

The "cost of costs" severely limits options for individuals, who may forego activities important to their physical, mental, or emotional well-being due to the additional costs of transportation, impacting their quality of life. Choices to engage with the community, attend appointments, seek employment, or nurture important social relationships become infused with financial stresses. One self-advocate stated, "I've pretty much given up on ever going to Canada Day again, or ever going to any public event that the town holds".

Cost to Private Business. Taxi companies that responded to the qualitative question in the survey (n = 15) noted that there were many challenges in improving accessible service. Cost and complexity were two of the primary problems discussed. "[It's] not affordable for independent taxi companies to have accessible taxi vehicles," wrote one and "[I] cannot pay the insurance," wrote another. One respondent wrote of various problems with the mechanics of accessible vehicles such as powered ramps and complicated restraint systems. "They need to be made simple," they asserted. One self-advocate stated of their efforts to increase the availability of accessible transportation in their community: "I tried my darndest to try and get a local cab company. There was money available from the government for a local cab company to transition to accessible transit, but they said 'No, it's not worth our money'."

The costs to companies and individual drivers were frequently cited as reasons for the lack of progress in expanding the accessibility of taxi fleets. While all regions have their own market forces, there is something to be learned from regions who have explored the financial implications of increasing accessibility. The Review of Accessible Taxi Operations for the City of Toronto is a report by Taxi Research Partners detailing the impact of increasing the accessibility of the Toronto fleet. While not fully generalizable, other regions could learn from the report's methods for measuring both the business and service impacts of fleet changes (Taxi Research Partners, 2013).

Cost to Non-Profit Private Services Providing Accessible Transportation. The non-profit transportation providers spoke about the value of government funding for accessible vehicles. This funding came from multiple levels of government, from local to federal. However, some expressed that the funding was too limited and overly complicated to access. One person noted that it would cost them more in labour to fill out the required paperwork for some of the

funding than would be received from the funds themselves. One interviewee states, "From what I understand, that [management] spends most of the time just looking for money, just to just to keep things operational and to try to get another vehicle." Coordination and simplification of funding sources would make the funds invested more useful and allow them to serve accessibility rather than going to administrative overhead.

The following section will provide further reflections that emerged from subject expert interviews, including the essential interplay between the three modes of accessible transportation (public, taxi, and not-for profit services) in seamless connectivity.

Further Reflections from the Interviews

In improving our understanding of the interconnected layers of accessible transit service, our research also revealed additional vulnerable points in transportation systems. The following section will outline the anticipated growth in demand, the importance of seamless connectivity, and the widespread desire for flexibility and choice based on personal needs and desires.

A Growing Demand on the Horizon for Accessible Transportation
Respondents were clear that existing public and private accessible transport services were insufficient for their needs. Not-for-profit services were sometimes seen as filling gaps left by the other two modes of transport, but not sufficient to meet demand. One respondent from a not-for-profit voiced concerns about meeting demand. Their ridership had exceeded their projections during every year of the service's operation, except during pandemic closures. They noted that new types of need arose as they made more vehicles available. For instance, they provided rides for around 300 wheelchair users one year yet required wheelchair accessible vehicles for 460 rides. They realized that "many of the seniors can't comfortably get into one of our regular vans, without too much bending over, as they can't even get up the step to the van, whereas with the wheelchair vans, they can use a ramp to walk-up into the vehicle." This is an indication of the increasing accessibility needs of an aging population. Another respondent noted that many people in their community could no longer drive due to age-related barriers and that even the children of some seniors were reaching ages that limited their own driving ability. Both respondents were concerned that the need for accessible transportation could increase dramatically in the coming years. One self-advocate pondered, "And I asked, who are people preparing to be disabled? The boomer population that I'm a part of, a lot of them are going to get some form of disability in their older age and as a society, we are not prepared for that in any way, shape or form, either through infrastructure, but more importantly, transportation."

The Critical Role of Transportation in Seamless Connectivity.
Seamless connectivity, an important concept in accessibility, is achieved when many accessible parts fit together to create a holistic, accessible experience (ESCAP, 2016). Accessible transportation plays a critical role in seamless connectivity. As expressed by some participants, a lack of seamless connectivity can cause anger and frustration. Interviewees emphasized that improvements to accessibility in other areas were often rendered moot because of the lack of

usable transportation. "What good is it if you make all of the town accessible, if I can't leave my home, and what good is it if every hospital in Halifax is accessible if I can't get there? It doesn't make any sense." Several of the interview participants displayed anger and frustration with the state of accessible transportation even in a large urban centre like Halifax. "It's a joke, like there are so many disabled people. Like if you land at the Halifax airport, and you're in a wheelchair, and think you're going to get to downtown Halifax, well good luck." According to one respondent, the recent introduction of the rideshare company Uber into Halifax has not provided any additional accessibility options. His friends' inquiries to the company revealed that drivers are not required to provide accessible rides: "...they've been told, No we won't do it word for word. It's up to our...What are they called? They don't call them employees. Because they're independent contractors." This is also seen in communities outside the pilot region, with some cities such as Ottawa applying an accessibility levy per ride intended to contribute to the city's accessibility initiatives instead of requiring that companies offer accessible rides (City of Ottawa, 2016; Randjibar, 2017).

Promotions on Uber's website highlight that wheelchair accessible vehicles are offered in some cities, yet the company's accessibility policies have been the subject of several recent legal cases. In 2021, the United States Justice Department sued Uber for breach of the Americans with Disabilities Act for charging "wait fees" for riders with disabilities who required additional time to get in rideshare cars. The company settled the lawsuit in July 2022, agreeing to waive wait time fees for riders who certify their disabilities and paying $1.7 million USD in compensation for riders who had received such charges (Browning, 2022). Elsewhere in July 2022, a United States Federal court ruled against a suit claiming that Uber is in breach of the Americans with Disabilities Act for failing to provide wheelchair accessible service in some cities. The ruling stated that Uber need not provide wheelchair accessible services in every US market it serves, though urged state legislatures to pass accessibility requirements enforceable within local jurisdictions (Stempel, 2022).

For seamless connectivity in daily living, transportation systems need to synergize with each other and leave no gaps between them. The accessible aspects of one system may be rendered moot by the lack of accessibility in another, for example, if a social service agency is accessible yet there are no accessible options for transport to that agency. Conversely, an accessible transportation system that brings riders to inaccessible spaces is rendered less useful. Such disconnects have financial implications. One person noted that some government policies designed to save money had caused adverse consequences for people with disabilities: "There should be government provided transportation to medical appointments from the rural communities, because everything is so centralized medically, especially if you are in a wheelchair and you tend to have really unique needs and you need to see specialists not located in smaller regional centers." They did not argue with the centralization of services but felt that, if money is being saved through this policy, some of those savings should be put into transportation. They noted that providing accessible transportation can reduce other costs: "I would really think that at the end of the day, they would save money, because people who are disabled would not get sick, because they would show-up to all their medical appointments, they would go when they need testing."

Flexibility and Choice

Need for Multiple Transportation Options. Our research shows that taxis can play a critical role in the accessible transportation ecosystem. People look to taxis as a mode of transport in situations when public or not-for-profit transportation services are not available or convenient. One respondent noted that, in his city, "…we do also have buses, and so the decision to take a bus or to take a cab is another factor that plays in rural areas, you're not afforded the luxury of making that decision, there might only be taxis in your area." Participants pointed out that the constraints of public and not-for-profit transportation (number of accessible vehicles available, where and how far they will transport an individual, operating times) often necessitate reliance on taxi services (where available). The qualitative interviews revealed that, in the pilot region, taxi services are not fulfilling this critical role and there are no accountability mechanisms (such as legislation) to facilitate an increase in accessible taxi service. Despite the existence of the three modes of accessible transportation (public, taxi, and not-for-profit) in differing degrees throughout the Atlantic region, the lack of alignment between services creates accessibility gaps that cause negative impacts for individuals.

Respondents expressed frustration and discouragement, noting that the negative impacts they experience are missed or invisible to many who have never experienced them. One respondent states, "I just don't understand, with transportation, why people with disabilities face more problems and must plan so much more in advance than other people." This is echoed by Micheal Lifshitz in Ottawa, who told *CTV News*, "I think there needs to be a realization, it's not like I can call a buddy and say can you pick me up," (Praill, 2022).

It is also important to consider that a lack of reliable transportation to support autonomy and meet a variety of daily living needs can significantly impact individuals' mental health and wellness. As one respondent stated, "I really feel passionate about this, it's like such a big part of me, it's a part of me that's missing, and I would be a much happier person if all this [accessibility] stuff could be worked out." Of their experiences of navigating accessible transportation to manage complex health issues, another self-advocate said: "So the whole bit around transportation is so depressing. It is so unbelievably disempowering and isolating."

Disparity in Priority and Access to Service. The lack of accessible transportation creates a dynamic where individuals' needs are compared to others and prioritized by others to determine who can access services. When there are too few advanced booking spaces for accessible transportation, individuals' needs are judged and prioritized, leaving some in the community without their preferred or needed time for transport. Respondents gave examples when individuals were either denied a pick-up or experienced a feeling of guilt for tying up a service with their request. Another dynamic made evident is a sense of resentment caused when the limited accessible service available is itself contracted or booked by other organizations, further limiting the time that transportation is available to the community. One respondent stated:

> "Now if I lived in a [name of a care service] home, I would be going to every parade that happens, I would be taken to church, I would be taken to the local hiking trails, which has an accessible trail… they have a van that takes them. If you're a person just living in

the community like me, who's disabled, your options are extremely limited - and those people actually pay our local non-profit transit organizations a big contract too, when they can't use their vans, so they take priority and a person who needs dialysis in a wheelchair takes priority over me. I'm not complaining about that, I think it is important, but we basically have two wheelchair vans in our community, and those vans are running all day long between 9 and 4 and they're just booked solid. I have to book them 36 hours in advance, but even then, I have no guarantee that I will get them."

Forward planning by riders is evidently not enough, as even advanced requests are subjected to a valuation of comparative need. As noted by some respondents, this can also put a psychological burden on some riders who do not wish to tie up a resource that they know is needed by another in the community. Such worries can cause individuals to forgo their transport needs out of a sense of guilt.

Considerations for Future Research

The picture of the transportation industry uncovered by this study is one characterized by problems of interoperability, a term borrowed from the information communications world that refers to the effectiveness of systems working together. For example, we heard through interviews and comments that different stakeholders assumed the need for transportation could be met by other services (e.g., non-for-profit filling gaps in service for public systems or taxi services). These assumptions reduce persons with disabilities' ability to choose when, how and why they leave their homes. With transportation regulated by multiple levels of government and across various stakeholders, the ability to repair and make transportation seamless will need thorough attention from interdisciplinary teams that include people with disabilities.

Some work in this field is being carried out by a small and dedicated group of advocates, academics, policymakers, and organizations. A more thorough search for and survey of this work would contribute to a better understanding of problems and potential solutions. This may require establishing relationships with other researchers and organizations that would encourage the exchange of information.

Private transportation, particularly private accessible transportation, is inextricably tied to the availability and structure of public transportation. Private and public transportation are highly regional in nature and can vary even within the boundaries of small provinces. Some research into public transportation needs to be included for a clear understanding of private transportation.

Finding experts to interview was time-consuming and setting up the interviews could be a slow process. It is necessary to spend time building relationships and getting referrals to the people who have the time and expertise to speak about accessible transportation in its many different forms. Trust needs to be built with taxi companies, in particular, and also with other transportation providers and people with lived experience of using accessible transportation.

Many of these people have a great deal of knowledge of the complexity of the industry, the numbers of vehicles available, the current demand, and the potential demand if more vehicles become available. Key to establishing this trust and encouraging the best flow of information possible is to properly accommodate and compensate interviewees with lived experience. Taxi companies must also be assured that their interests and needs are being considered in the process.

The users of accessible transportation services interviewed articulated many different barriers to their ability to move around. In future research, it would be helpful to have these barriers in mind before the interviews are conducted. These barriers include:
- Physical barriers,
- Scheduling and time barriers,
- Safety concerns,
- Attitudinal barriers on the part of service providers,
- Control and agency allowed for users, and
- Comfort and ergonomic barriers.

The role of various governments in regulating and supporting transportation is complex and requires further exploration. Taxis and other forms of private transportation are regulated and supported in multiple ways and by many levels of government. Any single level of government needs to be aware of what other levels are doing and what is motivating or blocking the private sector from contributing to the availability of accessible transportation.

Limitations

It is important to acknowledge that the findings of this survey should not be generalized outside of the Atlantic regions covered by the study. The response rate from taxi and ridesharing companies to the survey was low at 10.6%. In addition, many respondents did not track requests for accessible vehicles. This makes it challenging to determine numerically if demand is being met within different regions. What we were firmly able to glean from interview data is that there is a critical need for "last-minute" service and that this need is not being met.

The inclusion of ridesharing companies was limited in this phase because ridesharing companies had only recently been introduced into a few cities in the Atlantic region. The information gathered about the accessibility of ridesharing was minimal. Only one survey was returned by a company identifying as rideshare and interviewees made minimal mention of rideshare services. Accessibility requirements for rideshare services vary in Canada, with Toronto requiring any fleet above 500 to provide accessible vehicles with the same fares and wait times as non-accessible vehicles and Ottawa applying an industry-wide accessibility levy intended to contribute to the city's accessibility initiatives (City of Ottawa, 2016; Randjibar, 2017; Rider, 2016). Terminology for ridesharing is also variable, changing, and contested in some areas, with some preferring peer-to-peer, ridehailing, or ridesourcing.

The taxi company survey could be further simplified to ask the province of operation, the first three digits of the postal code, number of vehicles, number of accessible vehicles, and number of requests for accessible vehicles. The space for comments should be retained as it produced useful qualitative information. The diversity of the industry and company organization poses a challenge in constructing a questionnaire applicable to all respondents. In addition, a survey collection tool should be used for future research that allows researchers to ask clarifying questions of companies (e.g., missing values or large fluctuations in numbers) while maintaining company anonymity.

In Phase 1 of this study, it was discovered that the taxi industry has very little online presence, making it difficult to estimate the number of service providers and direct outreach efforts accordingly. By contrast, advocates for accessible transportation, those with lived experience, and service providers have prominent online presences. There were nonetheless challenges to making contact and conducting interviews with these organizations and people. We accomplished the goals set out in the proposal through interviews with 10 subject matter experts. We contacted 30 organizations, many of which did not respond or were unavailable. Several challenges became evident through the outreach process:

- The number of people involved in advocacy work is small in the Atlantic provinces. Many are too busy with day-to-day problems to participate in research, even if interested.
- The COVID-19 pandemic still poses significant problems for organizations that serve people with disabilities. One interview had to be postponed indefinitely due to a resurgence of COVID-19 at an institution.
- Many advocates have other jobs that take up much of their time. One person expressed their willingness to be interviewed but not until a later date due to work pressures.
- Some people with lived experience of disabilities may be vulnerable and unwilling to speak out because of their dependence on government or private organizations for meeting their day-to-day needs.

Recommendations

Our findings can facilitate a provincial/territorial catalyst discussion on how to support seamless connectivity throughout the various modes that make up the accessible transportation ecosystem in Canada. It is hoped that our study will encourage knowledge exchange between the provinces and territories of any successes in programs and policies to removed barriers and promote increased accessibility in transportation.

We recommend that future research studies:
- Investigate how legislation, policy, and financial resources can be combined to increase high-quality accessible transportation across Canada.
- Explore the alignment of policy, practice, and funding on transportation use between municipal, provincial, and federal levels, focusing on particularly vulnerable points (e.g., enough accessible vehicles to service rural communities).

- Integrate in-depth subject matter expert interviews from varied perspectives, including those with lived experience, transportation companies, and policymakers. Our interview data demonstrated that interviews can provide rich information about the state of transportation beyond the availability of accessible taxis.
- Explore methods to support ease of access to funding opportunities for companies to increase their accessibility and navigability.
- Identify, through an environmental scan, where federal funding could most effectively impact accessible transportation (e.g., supporting the manufacturing of accessible vehicles, subsidizing insurance costs, etc.).
- Investigate solutions to support relevant supply chains. There is a need for accessible vehicles for purchase by non-profits, cab companies, and transit services, especially in rural areas where non-profits are responding to needs but are limited in their ability to meet demands.
- Conduct environment scans and explore solutions for accessible transportation in rural settings. Practical considerations could include a fund for new accessible vehicles for rural communities to meet local demand (both disability-related and aging).
- To best identify the real-world consequences of transportation disparities for people with disabilities, root future studies in the voice of those with lived experience. The number of requests made to taxi companies alone may not demonstrate the actual local need for service. This project illuminated the important distinction between an existing need for transportation and its measurable demand; there may be a need, yet no requests made of taxi services due to previous negative experience, known lack of availability, or cost.

Conclusion

A specific goal of this pilot in the Atlantic provinces was to recommend a data collection strategy for the overall objective of this project, to determine the number of, and demand for, wheelchair accessible taxi and ridesharing vehicles in Canada. Through this pilot research, it has become clear that the transportation industry is complex and variable between regions, provinces and municipalities. To ensure that those with lived experience were represented, this pilot study interviewed self-advocates in accessible transportation within this complex ecosystem.

The initial inquiry centred on demand. Through interviews, we heard why people look to on-demand services in all aspects of daily living (medical appointments, social events, commuting to work, outings into nature, etc.). What we heard was more than a demand for transportation services, but also why these services are essential in the lives of people with disabilities. Temporary, intermittent, and systemic limitations of service diminish people's autonomy and result in their exclusion from participating in society.

In light of the interview results, we recommend further inquiry into why people with disabilities look to on-demand accessible transportation services and the impact caused when such services are unavailable. A comprehensive understanding of needs and impacts from those with lived experience would be an essential base. Further, an investigation is also required into how those without disabilities view the provision of accessible transportation. Evidence from this study indicates that the impacts of accessible transportation are not well understood by those who do not rely on them. Building up this knowledge base and amplifying the voice of those with lived experience may help catalyze action to improve the state of accessible transportation in Canada.

Similarly, we would recommend continuing to work with the taxi and ridesharing industry as subject experts, as they can offer insights into the barriers to providing accessible services that their industry faces. It also became clear from advocates and taxi companies that other services are integrated into the transportation space (public and not-for-profit organizations) and must be included in future studies.

Overall, we feel that the lens with which we view accessible taxis and ridesharing must be reconceptualized to focus on need rather than demand, guided by the notion of seamless connectivity. Reorienting the focus to the needs of people with disabilities, while building a base of critical subject matter knowledge on the ways that multi-modal transportation systems function, can leverage a national discussion on accessible transportation.

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Appendix A

This section is a preliminary review of the available academic and grey literature on the current availability and governance options for accessible taxis and rideshares in Canada's Atlantic provinces. This review guided and provided context for our parallel pilot survey and interview study.

Nova Scotia

In 2017, concerns were raised regarding the unreliability of accessible transportation services in Halifax (Berman, 2017). One source of this problem was a dramatic decline in the number of accessible taxis. In 2015 there were 47 wheelchair accessible cabs in Halifax, while in 2018 there were only 18 (Chiu, 2018). *Casino Taxi,* the city's largest taxi dispatch company, had 35 accessible taxi drivers in 2015-2016, with only 5 remaining in 2018 (Chiu, 2018). Much of this decline was attributed to drivers quitting their jobs or being let go by taxi companies for "poor performance." Some alleged that drivers repeatedly refused ride requests from people with disabilities, though others disputed these claims. Accessible calls for taxis require additional time, compared to other calls, to load and unload the passenger. Because of this, drivers may earn less from accessible fares per unit of time (Chiu, 2018).

Halifax Transit offers and funds Access-A-Bus, a multi-passenger, door-to-door, transit service for people with disabilities that are unable to use the conventional Halifax Transit service (Halifax Transit, 2021). However, this paratransit requires that requests be made at least seven days in advance (Chiu, 2018; Wentzell, 2021). This service was reviewed in 2021 as part of the "Access-A-Bus Continuous Improvement Service Plan" implementation, aiming to improve the service and ensure that people with disabilities have equitable access to transportation (Myers, 2021).

The province used to offer a grant for accessibility retrofitting, spending nearly $200,000 to transform 11 taxi vehicles. However, this funding has since been reallocated to not-for-profit community transit groups (Chiu, 2018). As of 2018, the municipality planned to disburse $3.9 million for the addition of 10 new accessible buses and the replacement of 21 of the 40 Access-A-Bus vehicles. To further incentivize growth, the city did not place a cap on the number of accessible vehicles allowed, whereas conventional taxis were at that time capped 1,000 (Chiu, 2018).

Nova Scotia had explored the option of mandating that all taxis be accessible to relieve pressure on their Access-A-Bus system (Levesque, 2020). Halifax proposed to alter the existing three license classification system for taxis to a single standard taxi license requiring all taxis to be accessible. The proposal was rejected in 2016, however, due to industry concerns of vehicle expense and lower fare returns for accessible rides (Levesque, 2020). In 2019, the Halifax City Council expanded the number of taxi licenses from 1,000 to 1,600, consolidated the three taxi zones into one, and required all drivers to complete several training courses which included an accessibility course (Campbell, 2019). In February 2021, the Regional Council approved a new

accessible taxi-style service. Users of this service pay a standard taxi rate for rides, which the municipality subsidizes by paying an additional fee to the contract company (Wentzell, 2021).

New Brunswick
In 2014, there were several transportation services for people with disabilities in the Moncton area. However, many of them ran on limited schedules and had limited space for pick-ups (Steeves, 2014).

In 2018, New Brunswick signed a Memorandum of Understanding with Transport Canada to supply funding for 11 projects to improve accessibility, including a new accessible intercity bus, additional driver training, and new vehicle retrofitting (Abilities Canada, 2018). In 2020, the New Brunswick Department of Transportation and Infrastructure collaborated with Ability New Brunswick on a pilot project in which a non-profit organization implemented the province's Vehicle Retrofit Program (Government of New Brunswick, 2020a, 2020b). The program included funding for 80 percent of the cost of eligible accessibility features (such as wheelchair lifts/ramps) for vehicles to a limit of $8,000.

In November 2020, provincial legislation was passed allowing the introduction of ridesharing services under certain conditions, but local municipalities must also change bylaws to permit such services (Gill, 2021). Fredericton began permitting ridesharing in April 2021 (Gill, 2021). *Uride*, a ridesharing service that announced plans to operate in Fredericton, does not currently have wheelchair accessible vehicles but has expressed a willingness to add them to their platform (Saulnier, 2021; Uride, 2022).

Prince Edward Island
In 2018, Charlottetown taxi companies struggled to keep up with demand during peak hours due to difficulties finding enough drivers (MacMillan, 2018). In 2019, the government of PEI permitted a ride-booking phone application, PEI Online Taxi, to operate on the island in response to the shortage of taxis (MacMillan, 2019a, 2019b; Yarr, 2019). Although it resembles popular ridesharing applications like Uber and Lyft, PEI Online Taxi is a licensed taxi stand (MacMillan 2019a).

Nonetheless, in 2020 the lack of wheelchair accessible taxis remained an issue that varied across the province (Brown, 2020). The City of Summerside, for example, has three accessible taxis that claim to operate at all times of day, yet none of Charlottetown's five taxi companies had wheelchair accessible vehicles in their fleets (Brown, 2020). Moreover, PEI has no rural and small-town public transit services (Levesque, 2020).

In 2021, the province announced the launch of the Accessible Transportation Rebate Program, which aims to increase accessible transportation options by subsidizing the costs of wheelchair accessible vehicles for both taxi owners and ridesharing companies (Government of Prince Edward Island, 2021). The province announced $95,000 to be administered by the PEI Council of People with Disabilities, with the City of Charlottetown adding $5,000 more (Yarr, 2021). Transportation operators can apply for rebates for both vehicle and equipment purchases.

Drivers of accessible vehicles are required to complete a training course on the needs of passengers with disabilities (Government of Prince Edward Island, 2021).

Newfoundland & Labrador
Newfoundland and Labrador has focused on St. John's in addressing issues associated with accessible transit. Other communities in the province continue to lack accessible transportation (Levesque, 2020). In 2017, taxi companies in the St. John's metro area struggled to meet demand for accessible transportation. In response, the City of St. John's provided $190,000 and the province $25,000 to acquire several accessible taxis (Fitzpatrick & Power, 2017).

Since 2021, St. John's has maintained 374 taxi operation licenses, 10 of which are reserved for accessible vehicles (Mullaley, 2021a). During the COVID-19 pandemic, the number of taxis registered in the province decreased from 764 to 644 (Mullaley, 2021a). Provincial legislation and city bylaws currently prohibit rideshare companies from operating in the province (Mullaley, 2021b).

Company fleet sizes in 2019 (pre-pandemic)

No. of Vehicles Reported	No. of Companies	Total Vehicles
1	5	5
2	6	12
3	2	6
4	4	16
6	1	6
7	2	14
8	3	24
14	1	14
15	1	15
16	1	16
20	1	20
80	1	80
132	1	132
400	1	400
Total	**30**	**760**

Company fleet sizes in 2021 (during pandemic)

No. of Vehicles Reported	No. of Companies	Total Vehicles
0	1	0
1	6	6
2	7	14
3	1	3
4	1	4
5	2	10
7	3	21
8	1	8
11	1	11
12	2	24
13	1	13
20	1	20
50	1	50
51	1	51
missing	1	
Total	**30**	**235**

Wheelchair accessible vehicles in company fleets in 2019 (pre-pandemic)

No. of Accessible Vehicles	No. of Companies	Total Accessible Vehicles
0	22	0
1	3	3
2	3	6
4	1	4
50	1	50
Total	**30**	**63**

Wheelchair accessible vehicles in company fleets in 2021 (during pandemic)

No. of Accessible Vehicles	No. of Companies	Total Accessible Vehicles
0	23	0
1	2	2
2	2	4
4	1	4
50	1	50
missing	1	
Total	**30**	**60**

Appendix C

Requests for wheelchair accessible vehicles in 2019 (pre-pandemic)

No. of requests	No. of Companies	Total Requests
12	1	12
15	1	15
50	1	50
2478	1	2478
missing	26	unknown
Total	**30**	**2555**

Requests for wheelchair accessible vehicles in 2021 (during pandemic)

No. of requests	No. of Companies	Total Requests
12	1	12
15	1	15
50	1	50
279	1	279
missing	26	unknown
Total	**30**	**356**

Title Page and Executive Summary in French

Comprendre l'état de la situation relative à l'accessibilité des taxis et services de mobilité partagée au Canada atlantique: Projet pilote

Date : 31 août 2022
Client : Transports Canada
Rapport préparé par l'Initiative READ de l'Université Carleton

Résumé

Les taxis et les services de mobilité partagée sont des moyens de transport qui occupent une place dominante dans la vie des Canadien(ne)s. En 2017, Statistique Canada rapportait que les dépenses en services de conavettage au Canada s'élevaient collectivement à 1,31 milliard de dollars (Statistique Canada, 2017). Compte tenu de la popularité grandissante de ces services au pays, les dépenses totales ont probablement augmenté depuis ce temps. De surcroît, la COVID-19 a fait bondir l'intérêt de la population pour les services de transport personnalisés. Malgré cela, l'accessibilité des services de mobilité partagée reste un secteur sous-développé en matière de politiques publiques. Peu d'études ont été réalisées sur le sujet et peu de données sont disponibles.

Un rapport publié en 2021 par Statistique Canada démontrait que 62,5 % des personnes en situation de handicap au Canada rencontraient des obstacles lorsqu'elles utilisaient des moyens de transport sous réglementation fédérale (Statistique Canada, 2021). Il existe présentement un manque de données qui empêche l'évaluation des moyens de transport non réglementés, y compris les services de mobilité partagée. Une meilleure compréhension de la disponibilité des véhicules accessibles dans les compagnies de taxis et les services de mobilité durable permettra d'améliorer l'offre de transport et de développer des options de remplacement pour les personnes en situation de handicap. Les taxis et services de mobilité partagée offrent à leur clientèle des moyens de transport de dernière minute, à court terme et spontanés. Il est donc essentiel que ces services soient accessibles, car la capacité des personnes en situation de handicap à accéder à ces services régulièrement influence positivement ou négativement la pleine participation sociale de ces personnes.

De janvier à mai 2022, l'Initiative READ (Recherche, Éducation, Accessibilité et Design) de l'Université Carleton et ses partenaires ont entrepris un projet pilote de recherche afin d'examiner l'alignement entre la fonction publique, les transporteurs privés, l'industrie du taxi et du conavettage, ainsi que les services à but non lucratif qui soutiennent le transport accessible. Nous avons effectué cette étude en utilisant une approche holistique de l'écosystème afin de déterminer si, et dans quelle mesure, certaines personnes passaient à travers les mailles du filet. Le projet pilote était restreint au Canada atlantique et portait tout particulièrement sur les régions rurales qui affichaient une offre limitée de taxis et services de conavettage accessibles.

Notre projet pilote révèle que, selon les expériences et perceptions actuelles de leur clientèle, les services de taxis privés et les services publics de transport en commun sont tout aussi peu fiables, ce qui provoque un sentiment de confusion, de frustration et de désespoir chez les usager(ère)s. Il existe un manque considérable de service, mais les conséquences négatives de celui-ci ne sont pas bien cernées ni comprises par les personnes qui n'ont pas besoin de services de transports accessibles. Notre étude a mis en évidence l'existence d'énormes fossés entre les divers services offerts par le transport en commun public, les taxis privés, et les transporteurs à but non lucratif. Selon la région, un ou plusieurs de ces services sont offerts, mais leur disponibilité, leur coût et leur fiabilité varient énormément, ce qui entraîne des

expériences négatives et des problèmes de sécurité pour plusieurs des personnes en situation de handicap qui dépendent de ces services.

Les services de transport en commun sont offerts seulement lors de certaines plages horaires et doivent souvent être réservés à l'avance. La grande majorité des services de transports à but non lucratif doivent également être réservés à l'avance. De plus, ils procèdent souvent à un triage des demandes de transport selon l'ampleur du besoin et la capacité du service (nombre de véhicules et/ou de conducteur(rice)s). Les services de taxis sont offerts sur demande et en dehors des heures de pointe, mais, du point de vue de plusieurs personnes en situation de handicap, ils sont également indisponibles, peu fiables et coûteux. De manière générale, les services de taxis ne répondent pas au besoin de transport accessible en dehors des heures d'opération des transporteurs publics et de certains transporteurs à but non lucratif.

Le projet pilote révèle également les répercussions qu'a eues la pandémie de COVID-19 sur la situation. Premièrement, les restrictions mises en place pour lutter contre la COVID-19 ont restreint l'efficacité des multiples solutions et astuces créatives utilisées avant la pandémie pour pallier les lacunes en matière de transport accessible. Plusieurs de ces stratégies ne fonctionnaient tout simplement plus. Deuxièmement, nous avons constaté une baisse du nombre total de taxis disponibles dans la région à l'étude. Cependant, le nombre de taxis accessibles est demeuré stable.

Les services de dernière minute ne sont pas disponibles en pratique. Les services de transport doivent généralement être réservés à l'avance, selon des plages horaires qui ne s'accordent pas avec le but de la demande de transport (p. ex., assister à un évènement, se présenter à un rendez-vous médical ou participer à une activité sociale). Les frais sont également élevés et découragent l'utilisation des services. Plus important encore : les divers services de transports offerts (taxis, transport en commun et transporteurs sans but lucratif) ne sont pas alignés les uns sur les autres de manière à favoriser un trajet continu sans encombre pour les personnes ayant des besoins en matière d'accessibilité reliés à leur situation de handicap.

Notre étude nous amène à émettre les recommandations suivantes :

- Poursuivre les recherches sur les répercussions collectives des lois, politiques et ressources financières.
- Évaluer la correspondance entre les politiques et les pratiques d'ordres municipal, provincial et fédéral.
- Déterminer les secteurs les plus propices à bénéficier d'un éventuel financement fédéral, tels que la fabrication et l'assurance.
- Trouver des moyens de soutenir la chaîne d'approvisionnement, particulièrement en région rurale.
- Trouver des moyens d'améliorer l'accès des entreprises aux programmes de financement afin d'améliorer l'accessibilité et la facilité d'utilisation des services.

- Soutenir la recherche sur les conséquences réelles des inégalités en matière de transport pour les personnes en situation de handicap.
- Intégrer divers types d'expertises et de perspectives dans le secteur, en commençant par les expériences vécues par les personnes en situation de handicap.
- Garantir une sensibilisation durable au transport accessible et aux moyens de financement dans les régions rurales.
- Étendre la portée de l'étude à d'autres régions du Canada en s'appuyant sur les leçons tirées de ce projet pilote.
- Encourager un changement d'attitude envers les taxis et services de conavettage accessibles qui sera fondé sur les besoins, et non la demande, et guidé par un idéal de parfaite interconnexion.