Summary of Urban Rural Rides 2023 Travel Data in the Southeast Region of New Brunswick (excluding Moncton origins)

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Executive Summary

Urban Rural Rides is a car-based volunteer driver program with its origins in the Greater Moncton (Southeast) Region of New Brunswick and expanding eastward to support other communities in New Brunswick. Urban Rural Rides maintains two spreadsheets of drive data for the Southeast Region as a function of its drive dispatching: drives originating in the City of Moncton; drives originating outside City of Moncton. This report covers an analysis of travel data for calendar year 2023 provided by Urban Rural Rides for the Southeast Region of New Brunswick focused on drives originating outside the City of Moncton.

While Urban Rural Rides will be moving to an automated drive data collection platform soon, the data analyzed here is from an Excel spreadsheet maintained by the organization and populated through manual data entry. This introduces the potential for missing records or entry errors, though it is expected the dataset as a whole and the conclusions drawn from it to be accurate. A total of 393 of 1787 drives (22%) were missing information on travel distances and drive times; these values were estimated using a 3-step process and are included in overall calculations. Urban Rural Rides was consulted throughout the analysis to ensure proper interpretation of the dataset and to confirm the approach for populating missing drive attribute data.

Of the 1787 drives observed in the southeast region of New Brunswick in 2023, 88.5% were for health reasons, 11.1% were for Life Maintenance, or errands, and 0.4% were for Quality of Life, or Social events. There were on average 1.75 stops (trip stop) per drive (trip chain) and an estimated 97.2 kilometers per drive, 55.4 kilometres per stop, taking 2.8 hours per drive and 1.6 hours per stop. Health-related drives had the longest average travel distances. There was a cancelled drive for every six offered. Broken down by region, 60% of drives originated from the regions of Salisbury (30% of drives), Fundy Albert (16%) and Riverview (14%), and 70% of drives had destinations set as Moncton. Trends were found for drives by time of day, day of the week, and time of year. The results were compared with broader trends observed from other volunteer driver programs in New Brunswick studied in 2017.

1 Introduction

New Brunswick as a province heavily depends on the automobile for transportation, with over 90% of people using a car, van or truck to commute (Government of Canada, 2022). The province's population has also been getting older, with 22% of New Brunswick's population being 65 years and older in 2021 (Government of Canada, 2024), up from 20% of the population in 2016 (Government of Canada, 2017). The combination of the high cost of automobile ownership along with health effects that can make driving difficult or impossible over time is leading to the desire for alternatives to driving and owning one's own automobile. The relative low population density of New Brunswick outside of cities, in concert with the prevalence of available automobiles, has led to the support and development of Volunteer Driving Programs (VDPs) throughout New Brunswick. One such group is Urban Rural Rides, a non-profit organization that operates across New Brunswick with its roots in the Southeast Region (Greater Moncton and Westmorland-Albert Counties).

Urban Rural Rides maintains two spreadsheets of drive data for the Southeast Region as a function of its drive dispatching: drives originating in the City of Moncton; drives originating outside City of Moncton. This report covers an analysis of travel data for calendar year 2023 provided by Urban Rural Rides for the Southeast Region of New Brunswick focused on drives originating outside the City of Moncton.

2 Background

2.1 Importance of Volunteer Driver Programs (VDPs)

VDPs have been identified as an effective means of providing on-demand transportation, especially for seniors. Both the National Aging and Disability Transportation Center (NADTC, 2021) and the Walsh Center at the University of Chicago (The Walsh Center for Rural Health Analysis, 2018) have identified VDP services as effective in providing transportation to rural areas, to those with additional accessibility needs, and to older adults. Given that New Brunswick has a high proportion of older adults, has the second highest rate of disability of any province in the country (Government of Canada, 2023), nearly 50/50 urban/rural population distribution, (Government of Canada, 2022), high automobile dependence and lack of rural transit, VDPs can be an effective service delivery model.

2.2 Development of VDP in The Province

The first VDP program was the Charlotte Dial-a-Ride service, which began operating out of St. Stephen in 2005, servicing Charlotte County (*Charlotte Dial-a-Ride*, n.d.). Identification of a need for a VDP was first formally identified in 2009 with the creation of an anti-poverty government entity which, among

other roles, had a goal of establishing an on-demand, car-based, and membership-supported VDP (Hanson & Goudreau, 2019).

Since then, other groups have begun offering VDP services throughout the province, including Urban Rural Rides which formed with the combination of three groups: Rural Rides Affordable Transportation, Tele-Drive Albert County, and the Volunteer Centre of Southeastern New Brunswick's volunteer drive program. The three groups joined together to better serve the Southeast Region of New Brunswick, and have expanded to the Fredericton area, the Greater Saint John region, the Northwest region, and the Western Valley region. In many of the communities where these services are offered, there are no other alternatives of travelling long distances besides a personal vehicle, so having and expanding VDP services throughout the province is very beneficial to these rural communities.

The success of VDPs in the province has been noticed by the provincial government, which has backed these services more and more, notably with a $2,000,000 commitment over four years in May 2024 to Urban Rural Rides (Silberman, 2024).

Multiple VDP services have worked with the University of New Brunswick in the past to identify and quantify trends in usage of their services (Hanson & Goudreau, 2019).

3 Methodology

Ride data were collected throughout the 2023 calendar year in the Southeast Region of New Brunswick by Urban Rural Rides. Attribute data were recorded for each ride, with anonymized information provided to UNB-CTRL:

- The origin and destination of the drive.
- The address of the driver.
- The time and date of the ride.
- The distance driven and time taken to complete the journey.
- The number of users of the service
- The number of helpers accompanying the user(s).
- Whether a delivery was made as part of the drive.
- Whether the drive was to administer a vaccine.
- The purpose of the drive.
- The total number of stops.
- If a trip was cancelled.

3.1 Definitions and Terminology

Given the nature of the data and the complications of different lengths and types of journeys, some of the terms could be used interchangeably, and it can be difficult to determine their meaning. To simplify this, the following terms will be used through the rest of this report to define different characteristics of the data.

Drive: A drive is considered a journey from start to finish while the passenger is in the vehicle. For example, if a passenger travels from Riverview to Moncton and back, that is considered one drive, and a one-way trip from Dieppe to Moncton would count as one drive. A drive ends when the driver is free to serve other clients.

Stop: A stop is considered a "leg" of a journey or going from one point to another. In the first example going from Riverview to Moncton and back, the first trip from Riverview to Moncton counts as one stop, as does the return leg, leading to a total of two stops within the drive. In the example going from Dieppe to Moncton, since the trip is one-way there is only one stop within the drive.

The recording of data resulted in all drives being either one-stop or two-stop drives, where all two stop drives are return drives that take the passenger back to their origin region. Throughout this document, the terms "two-stop" and "return" will be used interchangeably to describe this type of drive. "One-stop" and "One way" drives will be used interchangeably as well.

The purpose, or primary reason for the drive was recorded as well. The purpose was divided into four different types of trips: Health trips, which include doctor's appointment, dialysis treatment, or anything health related; Life Maintenance include trips to the bank, government service buildings, grocery stores, etc.; Quality of Life drives include social events; and Work/Education drives. Since the data only differentiated drives by one-stop and two-stop (i.e. one way and round-trip journeys), both drives and stops can both be described by the purpose of the journey.

3.2 Origin-Destination Data

The original Origin-Destination data was recorded manually by the driver, with varying levels of detail of the location. To simplify the data, origins and destinations were aggregated to local government districts. For example, if a ride originated in Sackville, it would be grouped in with other drives originating from the Tantramar local government district.

For 211 drives, either the origin region or destination region had two different origins that were in different local government regions. So, for example, the origin region would include both the town Riverside-Albert, located in the Fundy Albert local government district; and Lewis Mountain, which is in

the Salisbury local government district. For all 211 drives, one of the two regions mentioned, and the address of the driver were in the same region. It was assumed that the region furthest away from the address of the driver was the result of an error when inputting the data and was omitted from the Origin-Destination data. Since the further origin region was typically over an hour away from the driver's address, this was deemed a reasonable assumption.

3.3 Missing Data

Of the 1787 drives recorded, 393 (22%) had incomplete values for distance and/or hours driven. Drivers are responsible for recording their travel distances for reimbursement purposes, and in some cases, drivers are delayed in providing their information. Excluding these records was expected to lead to significant underreporting of travel activity, therefore a three-step approach was used to populate data for the missing records with the intent of providing a better estimate of travel behaviour.

3.3.1 Time and Distance Estimation Method 1: Using data from identical records

The drives with missing attribute data were first compared with others in the database to see if there were records with identical attributes: same origin and destination, the same driver address, the same purpose, the same number of stops, and had similar pickup times. In that case, the attributes from the known drives were used to populate the missing values. These “close copies” accounted for 105 drives.

3.3.2 Time and Distance Estimation Method 2: Averaging distance and time from similar drives

For drives from addresses that had similar origin-destination, purpose, and stop values, but had varying distance and time values, the average distance and time values of the remaining records was used to populate the missing records. For example, if a driver recorded four similar (but not identical) health drives, with one drive having unknown distance and time data, the attributes for the unknown drive were created by averaging the travel distances and times for the other three drives. This estimation method was used for 231 drives. This may lead to underestimating or overestimating travel distances and times for some specific drives, though it is expected to provide a better estimate than excluding the unknown travel distances and times entirely.

3.3.3 Time and Distance Estimation Method 3: Google map distance function

For the remaining 57 drives with attributes that could not be determined from method 1 or 2, Google Maps travel distances were used from driver origin to the presumed destination, with time estimates made based on other drives with similar purposes and distances. This estimation method is broken down into multiple components depending on the drive characteristics.

Origins were set as the address of the driver when the two were in the same community. Since it is unknown whether the address of the driver is nearer or farther to the destination compared to the pickup location, it is assumed that these values average out over the whole of the dataset.

To calculate the distance, different strategies were used depending on the purpose of the drive. For health trips, the distance was calculated from the address to the largest Hospital in the destination region. For Life Maintenance and Quality of Life trips, distance was calculated from the given address to the center, or central area of the destination community. For drives that returned to the origin, the distance was doubled. The distance was chosen by selecting the shortest route by distance between the origin and destination when both are put into Google Maps. This was performed on May 28th and 29th, 2024.

To calculate the time for the remaining drives, the average of other drives with the same purpose, number of stops, and had the same distance ±5 km was taken (unless no other trips were within 5 km, in which case ±15 km was used). Most Quality-of-Life trips had no time data, so similar drives with different purposes were used. Since it is difficult to estimate the amount of time a trip would take based on distance alone, this method was used.

4 Results

Results were collected between January 1st and December 31st, 2023. Over 173,000 kilometers were driven by volunteer drivers across 1787 drives. Some data from the 2021 Canadian Census was used as well to add further context to the data being shown. It should be noted that some data collected largely in the Moncton area has not been included in this data.

4.1 Aggregate Summary

Several parameters were collected throughout the year. Some of the total, average, and rate values for these variables are shown below in Table 1. It should be noted that many of these variables include time and/or distance data that has been estimated using the methods outlined in Section 3.3. The City of Moncton was excluded from the population-based estimates since Moncton-originating rides were not included in this analysis.

Table 1 Summary data of Urban Rural Rides Data for 2023

Variables	Values
Population of Southeast Region* (excluding City of Moncton)	112,525
Number of Drives	1,787
Number of Stops	3,133
Total Hours Driven (Estimated)	4954
Total Distance Driven (km)	173,614
Drives per 1000 population*	15.9
Stops per 1000 Population*	27.8
Est. Hours Driven per 1000 population*	44.0
Est. Kilometers Driven per 1000 population*	1,543
Stops per Drive	1.8
Est. Hours per Drive	2.8
Est. Hours per Stop	1.6
Est. Kilometers Driven per Drive	97.2
Est. Kilometres Driven per Stop	55.4
Cancelled Drives	354

*** – Based on 2021 Census Data. Source: Government of Canada, 2022.**

4.2 Origin-Destination Data

The data in Table 3 show an origin-destination table for the drives taken in the Southeast Region. The Salisbury, Fundy Albert and Riverview areas account for 30%, 16%, and 14% of drive origins respectively. Moncton accounts for 70% of all drive destinations. It should be noted that three drives originated outside of the southeast region in Beausoleil. These drives originated in Shediac Bridge, which

is near the border between the Beausoleil and Shediac governance regions. There are two drives that originated in a rural district that has been labelled “RD South Riverview,” which is the rural district directly south of the Riverview local district. Figure 1 shows this region on a map.

Figure 1 Southeast Rural District described as "RD South Riverview". Source: GeoNB (n.d.)

Table 2 Origin-Destination Table of Drive Data for the Southeast Region in 2023. Cells are colour coded: red shows lowest volumes and scales to green for highest volumes.

Drives	Destination Region																	
Origin Region	Amherst, NS	Beaurivage	Beausoleil	Cap Acadie	Dieppe	Fredericton	Fundy Albert	Halifax	Lake George	Moncton	Riverview	Salisbury	Shediac	Strait Shores	Sussex	Tantramar	Three Rivers	Grand Total
Beausoleil										3								**3**
Cap Acadie					13					123			12					**148**
Dieppe						9		4										**13**
Fundy Albert					11		5			260	10							**286**
Maple Hills										23								**23**
Memram-cook					1					8								**9**
Moncton							8		1	18	10	18	81					**136**
RD South Riverview										2								**2**
Riverview					24		25			172	36						1	**258**
Salisbury					22					384	9	105					11	**531**
Shediac		1	2		14					91			25					**133**
Strait Shores										4				4		1		**9**
Tantramar	19			4	16	1				102			1			15	1	**159**
Three Rivers					8					67					1		1	**77**
Grand Total	**19**	**1**	**2**	**4**	**109**	**10**	**38**	**4**	**1**	**1257**	**65**	**123**	**119**	**4**	**1**	**16**	**14**	**1787**

Thirty-eight drives had destinations outside of the southeast region as well. These drives are summarized in Table 3. Half of these drives originated in Sackville, within the Tantramar region going to Amherst, Nova Scotia, and appear to be the same passenger. All but one of these drives were health-related, and all were two-stop return drives.

Table 3 Origin-Destination Table of drives with destinations outside of the southeast region

Drives	Destination							
Row Labels	Amherst, NS	Beaurivage	Beausoleil	Frederict on	Halifax	Lake George	Sussex	Grand Total
Dieppe				9	4			13
Moncton						1		1
Shediac		1	2					3
Tantramar	19			1				20
Three Rivers							1	1
Grand Total	**19**	**1**	**2**	**10**	**4**	**1**	**1**	**38**

4.3 Purpose of Travel

Health-related travel was the most common use of the Urban Rural Rides service, accounting for 88.5% of all drives and 93.1% of all stops. Life Maintenance trips accounted for a significantly higher percentage of drives compared to stops due to most Life Maintenance trips being one-stop. The distribution of drives and stops by purpose can be seen in Table 4. There were no Work/Education drives in this data set, and thus it will not be used in any further results.

Table 4 Counts and rates of Drives and Stops by purpose

Purpose	Count	Percentage
Health		
Drives	1582	88.53%
Stops	2917	93.11%
Stops per Drive	1.84	–
Life maintenance		
Drives	199	11.14%
Stops	204	6.51%
Stops per Drive	1.03	–
Quality of Life		
Drives	6	0.34%
Stops	12	0.38%
Stops per Drive	2.00	–
Work/Education		
Drives	0	0.00%
Stops	0	0.00%
Stops per Drive	0.00	–
Total Drives	**1787**	**100.00%**
Total Stops	**3133**	**100.00%**

4.4 Distance Distribution

The distribution of drives by distance shows a considerable proportion of drives in the 60-80 km range as well as in the 100-120 km range, each accounting for 18% and 19% of all drives, respectively. It was found that 21% of drives were less than 40 km, with a negligible amount being less than 5 km. A small spike of drives were in the 220-240 km range, 6.2% of all drives. These appeared to be recurring passengers. Figure 2 shows the distribution of drives by distance, differentiating by Purpose.

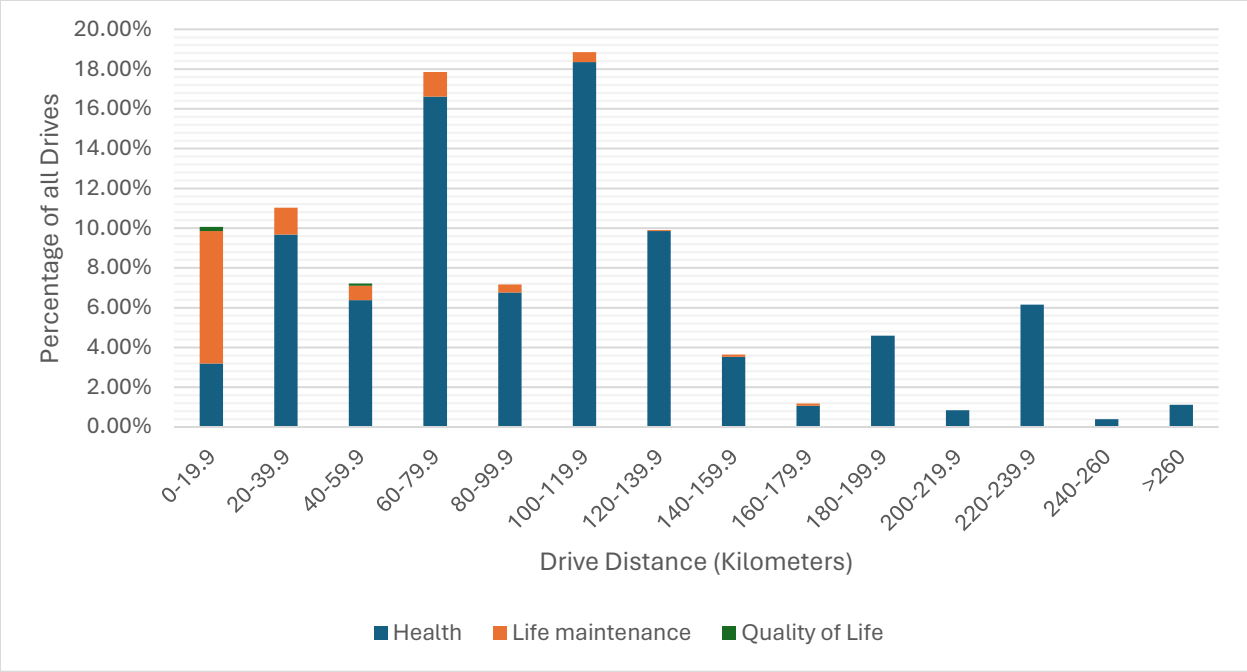

Figure 2 Distribution of drive distance by purpose

It was also found that 7% of all drives were Life Maintenance drives shorter than 20 km in length, representing 60% of all Life Maintenance drives. A total of 88% of Life Maintenance drives were 80 kilometers or less.

Estimated distances were concentrated in the 60-80 km and 100-120 km ranges. In the former these estimates were mainly “average-similar” estimates (5.5% of all drives), while the latter had mainly “close copy” estimates (4.6% of all drives). The highest proportion of drives estimated using Google Maps were in the 0-20 km range, representing 1.1% of all drives. Distribution of drives by distance, separated by data procurement method can be seen in Figure 3.

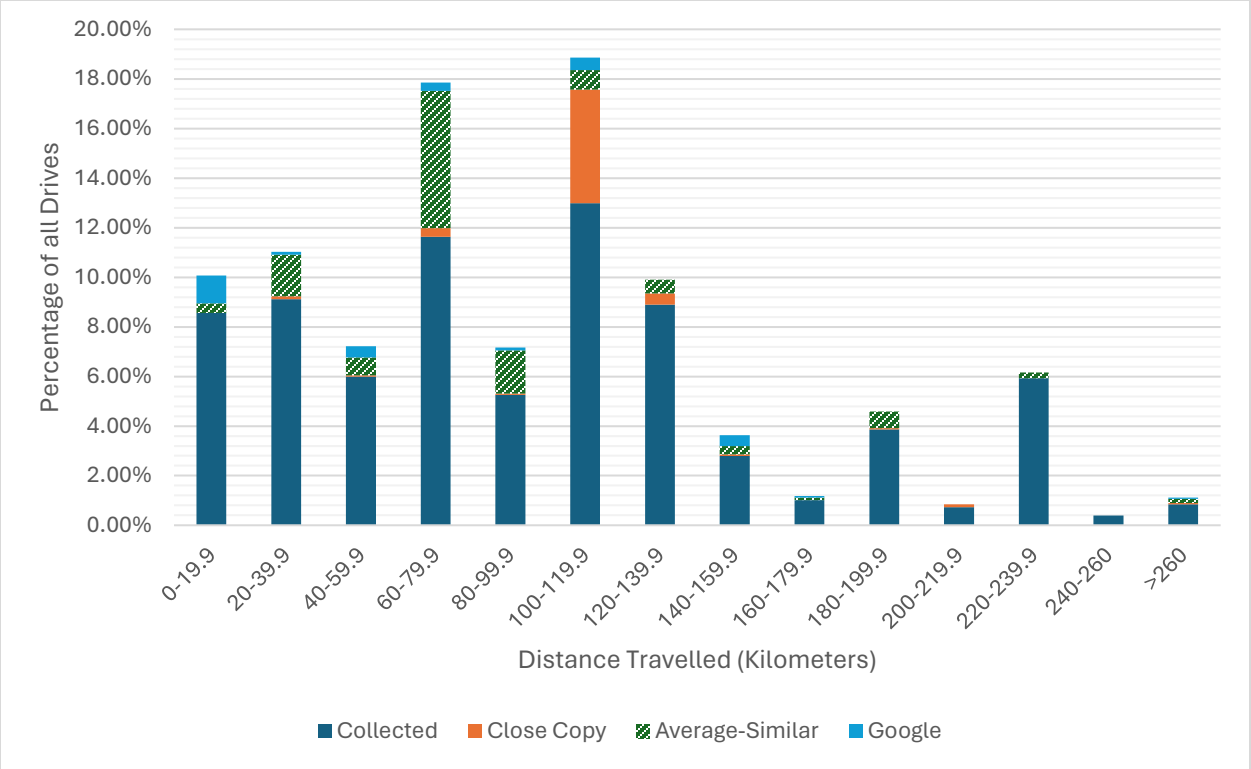

Figure 3 Distribution of drive distances, separated by data procurement method

4.5 Time Distribution

Over three-quarters (76%) of all drives were four hours or less, with 51% between one and three hours. The number of drives in each grouping decreases progressively after three hours except for the six-to-seven-hour range, which accounts for 6.1% of all drives. These can be seen in Figure 4.

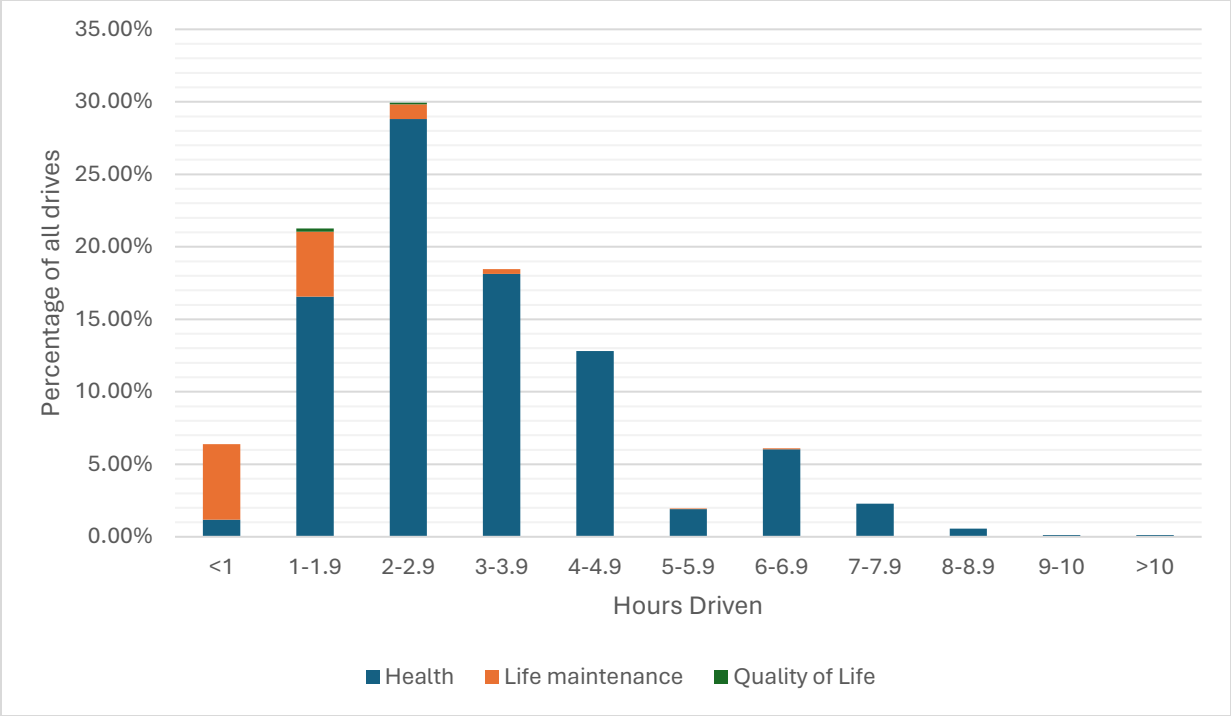

Figure 4 Distribution of drives by time, separated by purpose

The time distribution of drives, as with the distance distribution, varies based on the purpose of the drive. Life Maintenance drives tended to be shorter, with the vast majority being three hours or less, while health drives varied in time. The slight uptick in drives lasting between six and eight hours mostly are return drives that travel less than 200 kilometers. This implies that they are trips that involve a lot of downtime while the passengers are at their destination, before returning to their origin area.

The estimation process appeared to have an insignificant effect on the trend of the data. Without it, most drives would still be equal to or less than four hours. Almost all estimated drives fell between one and five hours. Figure 5 shows the distribution of time for each trip separated by the estimation process.

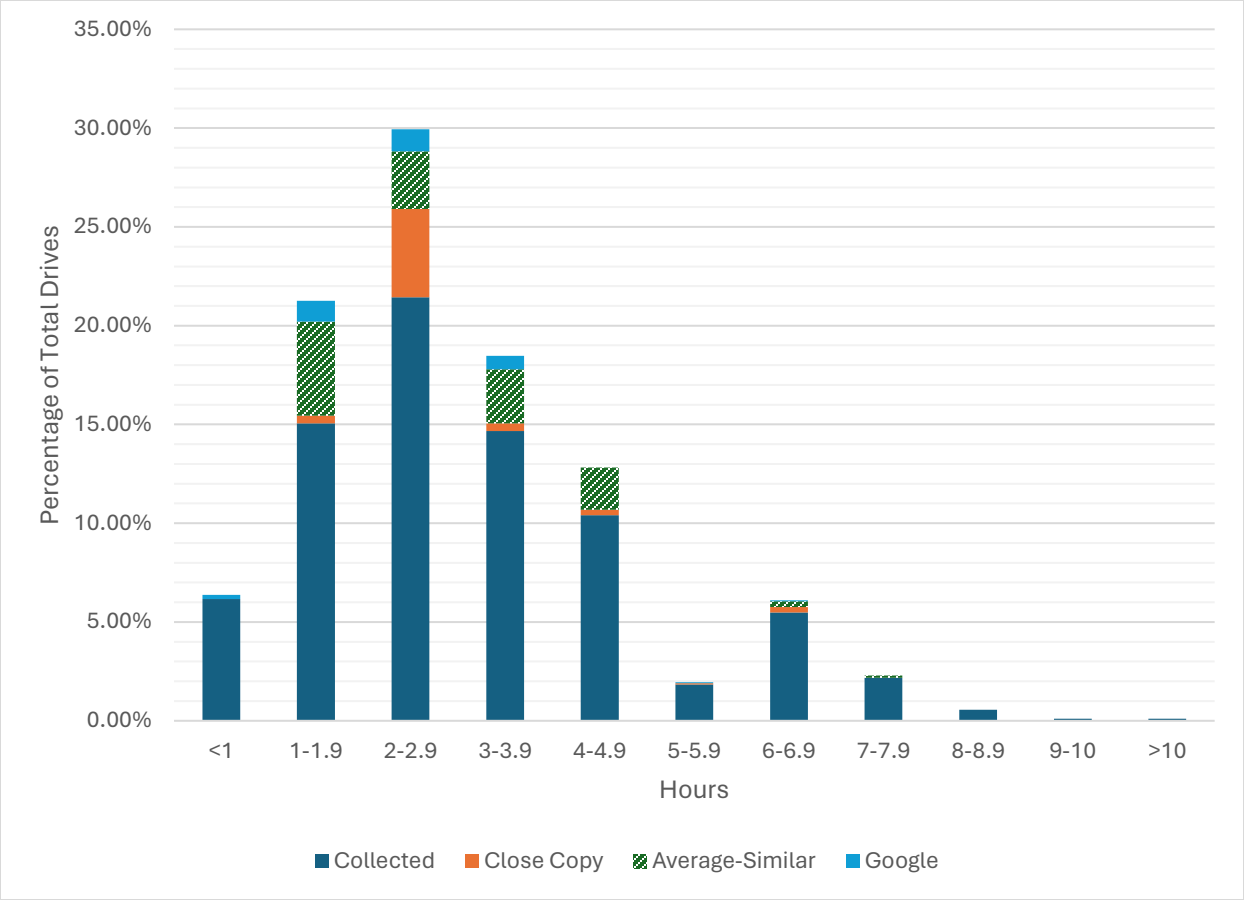

Figure 5 Distribution of drives by time, separated by how the values were obtained

4.6 Distribution of Rides by Time of Day, Day of Week, and Time of Year

Understanding what times passengers are picked up can provide valuable insight into both the travel needs of the passengers who currently use Urban Rural Rides, as well as how demand for the service fluctuates throughout the day. Figure 6 shows the distribution of drives by time of pickup, broken down by the purpose of the drive. As can be seen there are two small morning spikes between 8:00 – 8:30 and 9:00 – 9:30, mainly for health-based drives, representing 4.6% and 6.7% of all drives respectively. There are two peaks and a significant drop off around lunchtime. The first peak occurs at 11:00 – 11:30; mostly health drives. Drives drop off significantly between 11:30 and noon before increasing to their highest level at 12 – 12:30 and staying near that level from 12:30 – 13:00. From 13:00 to 14:00 drives stay high with an increase in Life Maintenance drives, before decreasing through the rest of the day.

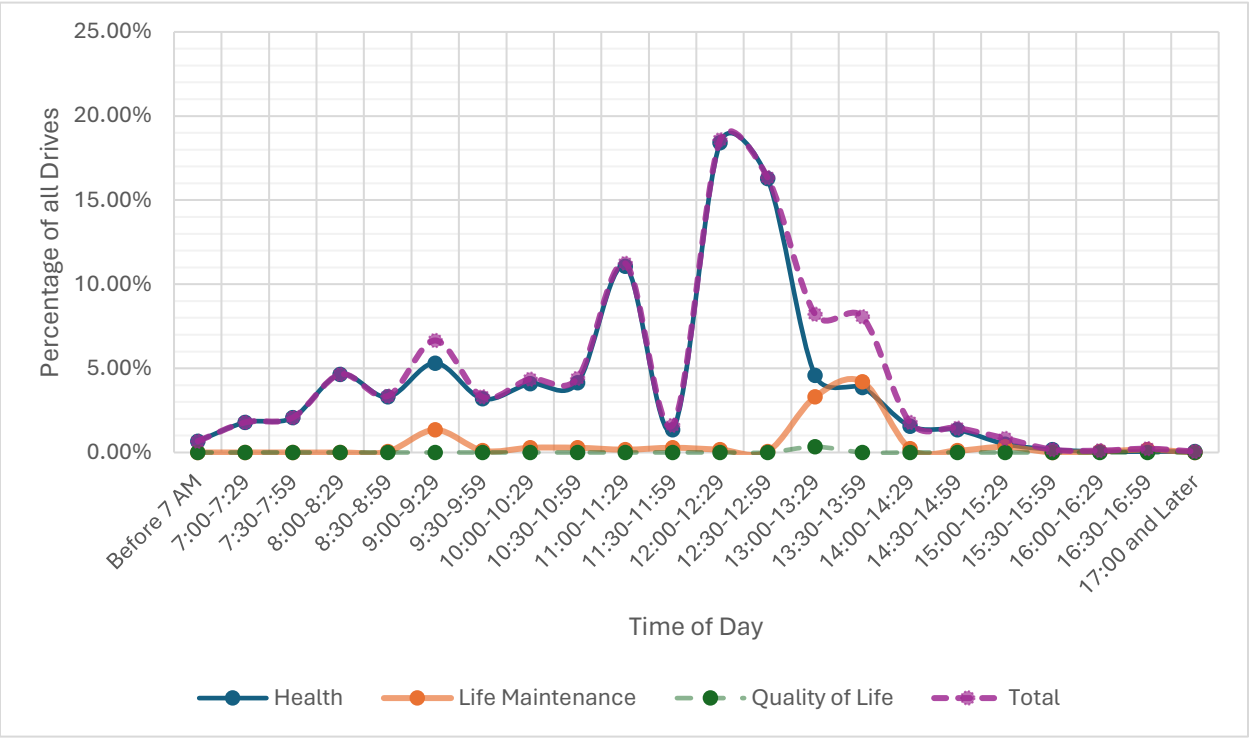

Figure 6 Distribution of drives by time of day, separated by purpose

On a weekly basis, drives are most frequent on Tuesdays at 24.6% of all drives, followed by Wednesdays and Fridays at 22.1% and 21.0% of all drives respectively. Thursdays have the lowest number of drives for weekdays at 14.6%, with less than 1% of drives occurring during weekends. The distribution of drives by day of the week can be seen in Figure 7 below.

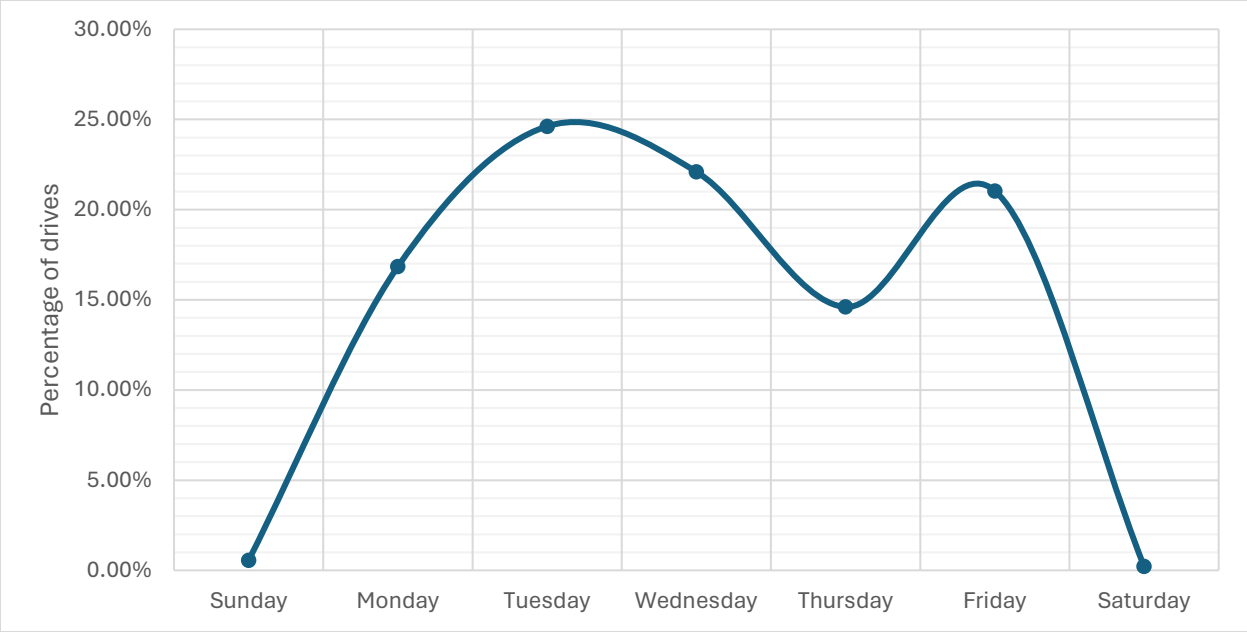

Figure 7 Distribution of drives by day of week

By purpose, Life Maintenance drives peak on Tuesdays at 3.8% of all drives, compared to the next highest on Thursdays at 2.2%. Health drives follow a similar trend to the overall distribution, with Tuesdays and Wednesdays at 20.8% and 20.0% of all drives respectively.

On a monthly basis, comparing the number of drives in a month to the Average Annual Monthly drive rates can help illustrate where peaks and valleys in demand are. This is done by taking total drives in a month and dividing it by the monthly average. Using this method can help see how certain times of year may correlate to higher or lower drive volumes. This distribution of drives can be seen in Figure 8. As can be seen, drives peak in October at nearly 30% above the average for the year. The lowest month in terms of drive volume is July, at 13% less than average. Summer months have less than average drive volumes, while late winter and early spring have above average drive volumes.

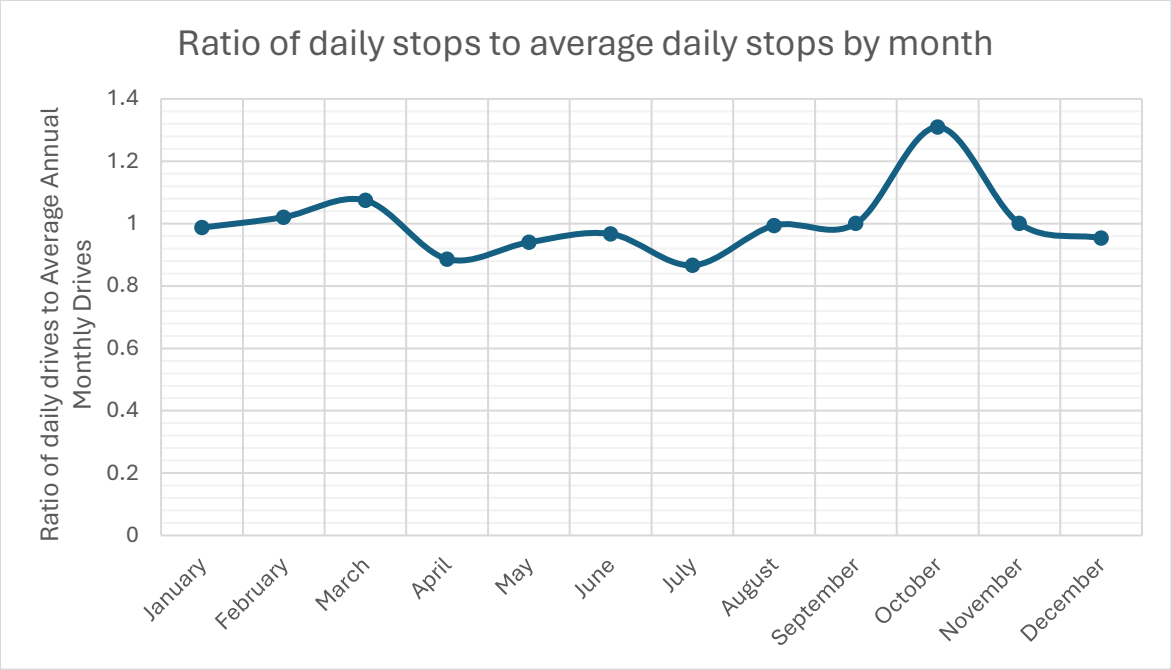

Figure 8 Ratio of drives to Average Annual Monthly drive per month

4.7 Drive Purpose Characteristics

Broken down by purpose, health-related drives were much longer than any other type of drive. One-way health drives were lengthy, averaging 90.5 kilometers compared to return drives at 108.3 kilometers. In comparison, return Life Maintenance drives were much closer to doubling the length of one-way drives. Table 5 shows the average drive length based on the purpose and number of stops of the drive. Table 5 also shows the average number of riders and the average length of each drive in terms of time.

Almost all drives had one user, with only 20 drives having more than one non-escort user, in comparison to 80 drives that included an escort (for a total of 91 drives with more than one passenger in the vehicle), ranging from one to five on any given drive. All drives with escorts were health-related, the majority of which were two-stop drives.

The difference between one way and return health drives is more drastic compared to the distance values, with return drives taking roughly 75% longer than one-way drives, compared to 20% longer by distance. Two-stop Life Maintenance drives took over three times longer than one-stop drives, despite the return distance being less than twice as long. Overall, return drives were more than twice as long as one-way drives.

Table 5 Average drive parameters based on different drive purposes

	Kilometers per drive		Riders per Drive (including escorts)		Hours per Drive		Total Kilometers per drive	Total Riders per Drive	Total Hours per Drive
Purpose	One Way	Return	One Way	Return	One Way	Return			
Health	90.5	108.3	1.00	1.08	1.83	3.22	105.5	1.07	3.01
Life Maintenance	32.4	59.7	1.00	1.00	0.94	3.10	33.1	1.00	0.99
Quality of Life	—	23.4	—	1.00	—	1.44	23.4	1.00	1.44
Grand Total	**64.9**	**107.7**	**1.00**	**1.01**	**1.44**	**3.21**	**97.2**	**1.01**	**2.78**

4.8 Rate of Cancellations

For every cancelled drive there were six completed drives. The numbers associated with each can be found in Table 6. It should be noted that the exclusion of data from the Moncton region may have skewed these values.

Table 6 Cancellation rates of Drives in 2023.

	Cancelled	Total	Ratio of Total to Cancelled
Drives	354	2141	6.1:1

5 Discussion

5.1 Origin-Destination Data

Most drives originated from the Salisbury, Fundy Albert, and Riverview regions. All three of these regions have well established VDP programs and were the main operating regions of Rural Rides Affordable Transportation, Tele-Drive Albert County, and the Volunteer Centre of Southeastern New Brunswick's volunteer drive program, which joined together to form Urban Rural Rides in 2018. This could indicate that many of the other regions could see increases in the use of VDP services as they become more prevalent in the region, however more insight needs to be made into whether there are other reasons for the higher level of use in these regions, such as better knowledge of the program or other reasons.

5.2 Life Maintenance Drive Time & Distance Comparison

Of the 199 Life Maintenance drives, it was found that 175, or 88%, were less than or equal to 80 kilometers in distance and took two hours or less. Travel distances were plotted against drive times (Figure 9) with a goodness of fit showing that 1 kilometer of drive distance is associated with approximately 1 minute of drive time. This relationship could be useful in estimating drive times for planning purposes. If the purpose of travel were further subdivided, a clearer relationship could be identified as well.

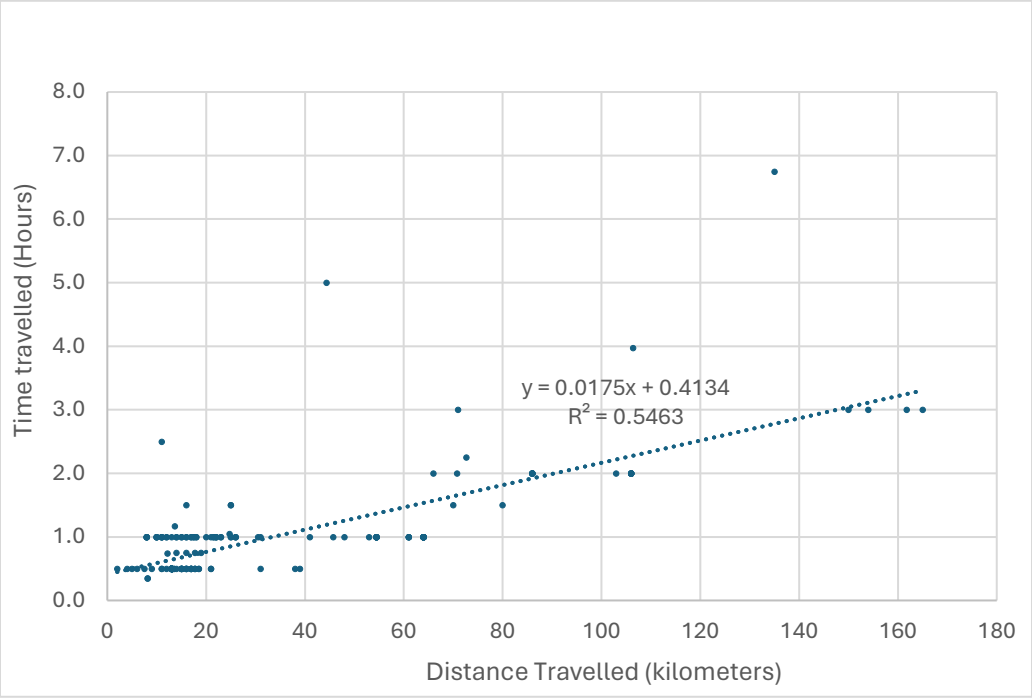

Figure 9 Time and Distance scatterplot of Life Maintenance drives.

5.3 Health Drive Time & Distance Comparison

Health-related drives distances were plotted against drive times in a similar plot to Figure 9 above, but the goodness of fit of the model was poor and excluded from here. There are likely other factors influencing health trips that may not be evident in Life Maintenance trips to the same degree (e.g. volunteer accompanying client on the appointment). Table 7 is a cross-classification table that shows average travel times by drive distance bins. Cross-classification tables can be useful ways to present information when the underlying distribution of the data is suspected to be non-linear (i.e. travel time does not change uniformly as distance changes). In this case, average drive time increases with increased travel distance, but not uniformly. There are very few observations of drives longer than 250 km, meaning fewer samples

to calculate average distances therefore those values should be used with caution. Having a better understanding of the type of health facility is being accessed, or whether passengers are receiving treatment that takes several hours may provide a relationship that better fits the data, and give better estimates into how long a drive is expected to take to complete.

Table 7: Cross-classification table of mileage bins and average drive time

Drive distance (km)	Average drive time (hrs)	Total number of drives
<50 or (blank)	2.0	281
50-99	2.4	481
100-149	3.4	545
150-199	3.9	123
200-249	3.9	129
250-349	4.2	5
350-399	3.5	2
400-449	7.1	10
450-499	8.7	3
500-549	8.5	1
550-599	7.3	1
750-799	7.0	1
Grand Total	**3.0**	**1582**

5.4 Drive Purpose Characteristics

As was seen in Table 5 on page 19, the difference between one-stop and two-stop drives varied based on the purpose of the drive. It makes sense for return drives to be longer than one-way drives, but the similarity in distance values for one-stop and two-stop health drives was noticeable. The difference between time values found make sense since there are often wait times to access health services, let alone actually accessing the services, but there was only a 20% difference between the two distance values. One potential explanation for this is that one-way health drives generally go to more centralized healthcare facilities, where they expect a longer wait or to be there for longer a longer period of time, and thus do not book a return drive in that booking. Return health drives in this scenario would be used for closer healthcare facilities, however this would need to be further examined to form any conclusions.

Most drives had only one passenger, including any escorts who would go with the passenger, such as healthcare workers or social workers, with roughly one in 20 drives having more than one passenger. There are very few drives that would require a vehicle with the capacity for more than two passengers, with only 13 such drives being recorded in 2023. Having high-capacity vehicles in the fleet of a VDP in Southeastern New Brunswick is likely only necessary in rare instances. Having sufficient space for passengers to easily enter and exit the vehicle is important, especially for the elderly, but based on the 2023 data, there is no need for most vehicles to have high passenger capacities.

5.5 Comparison to Previous Analyses

A similar analysis was conducted by Hanson & Goudreau (2019). of VDP data from February 2017 to January 2018 across the province of New Brunswick. The data collection methods were similar, collecting data on the date, time of pickup, distance travelled, time taken, purpose of the journey, and how many stops were made. There were some variations in how the data was collected, with the 2023 data only having drives with one or two stops, or one-way and round-trip drives, and the 2017-18 data having large proportions of data with three or more stops. Drives from the 2017-18 data could also have multiple purposes, which would be fractioned to account for it. So, for example, if a drive included a health-related stop and a life maintenance related stop, the drive would count for 0.5 health drives and 0.5 Life Maintenance drives. Most data from 2017-18 separated data by the size of the organization that was doing the drives, one with less than 100 riders, and one with more. Since it was using data from multiple groups across the province, a lot more data points were used (9028 drives compared to 1787 in the data of this study). With different regions being included in the 2017-18 study, it is also expected that the results would differ from what was found in the southeast region.

The 2017-18 data had a lower average distance per drive and per stop, at 61.3 km and 39.2 km respectively. This is compared to the 97.2 km per drive and 55.4 km per stop found in 2023. Since the recording method of stops did not appear to be the same, the two cannot be compared directly. Both data sets had health as the most common purpose of travel, but at much different percentages (49.3% of all stops in 2017-18 compared to 93.1 % in 2023). Work/education made up 20.7% of all stop purposes in 2017-18, compared to none of the 2023 data. Life Maintenance and Quality of Life stops made up 17.1% and 12.9% of stops respectively.

By time of day, there is some variance in the time-of-day passengers are picked up. In the 2017-18 data, there are more pronounced peaks in the morning. Between 8:30 and 10:30 there is consistently a higher rate of drives compared to the 2023 data from both small VDP groups and large ones. Peaks were seen in both data sets around lunch time, and the 2017-18 data had an uptick in drives around 16:00. Since the

2023 data has no drives or stops that were for work/education it would make sense for the morning and evening peaks seen in 2017-18 to not be as pronounced in the collected data. The two data sets can be compared using Figures 10 and 11 below, which show the distribution of drives by time of day for the 2023 data and the 2017-18 data, respectively.

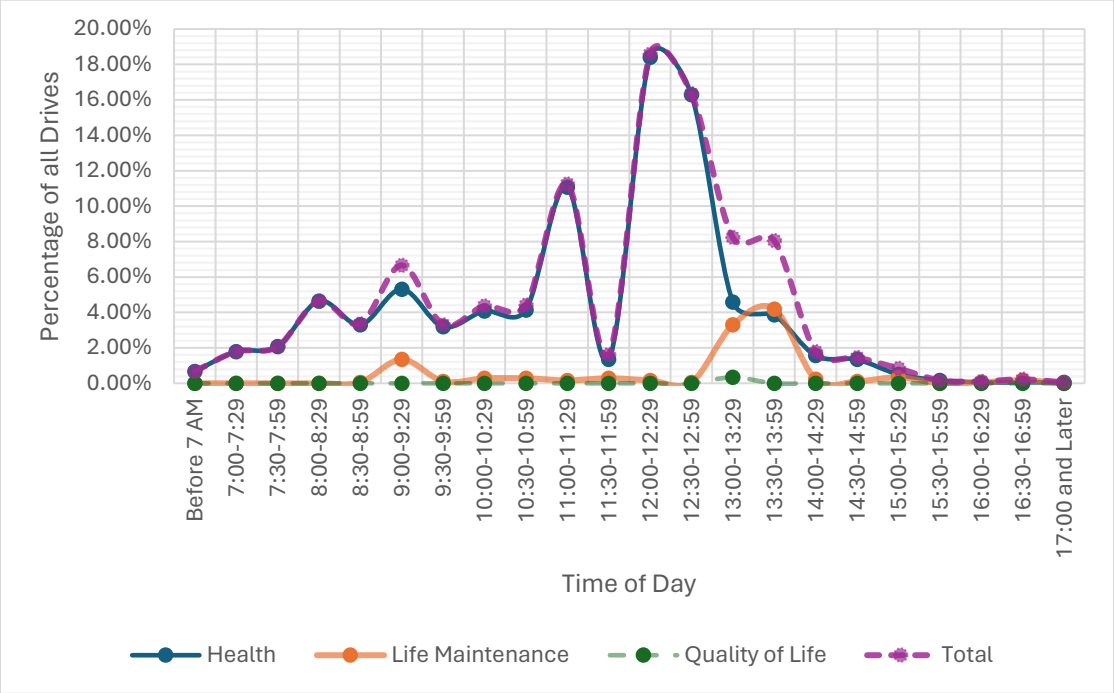

Figure 10 Distribution of 2023 drive data by time of day.

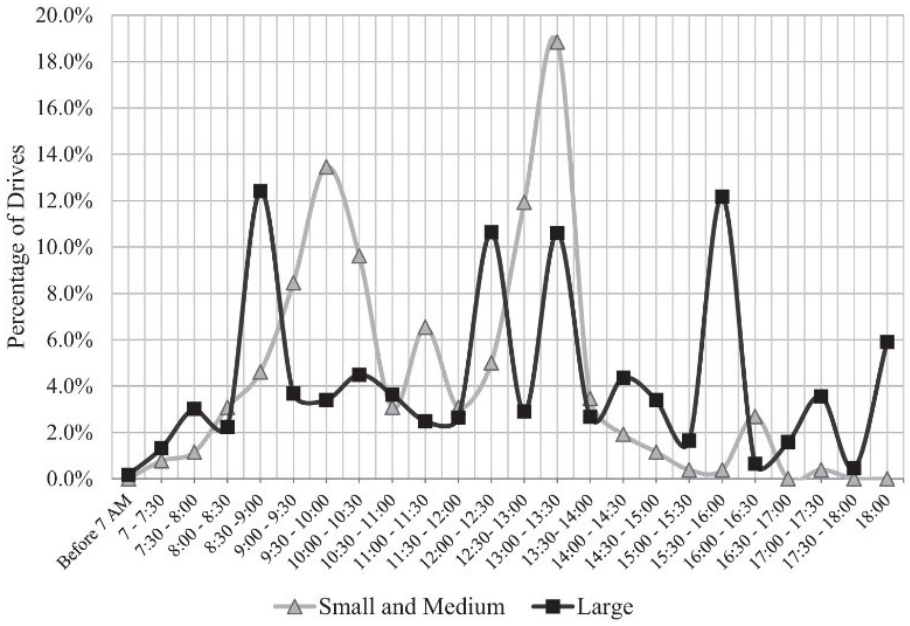

Figure 11 Distribution of 2017-18 drive data by time of day. Source: Hanson & Goudreau, 2019.

The two data sets had different peaks throughout the week. The 2017-18 data with small and medium sized VDP groups peaked on Wednesdays and Thursdays, with Tuesday being the lowest weekday, which can be seen in Figure 12. The 2023 data is the opposite in that Tuesday is the busiest day, and Thursday is the least, as seen in Figure 13. Large groups in 2017-18 were much more consistent across the work week, with a slight dip on Tuesdays. The difference in drive purpose may be the reason for this, with far more health-related journeys in the 2023 data. Further insight is necessary to see why drives on Tuesdays are more popular in the southeast region in 2023 compared to 2017 across the province.

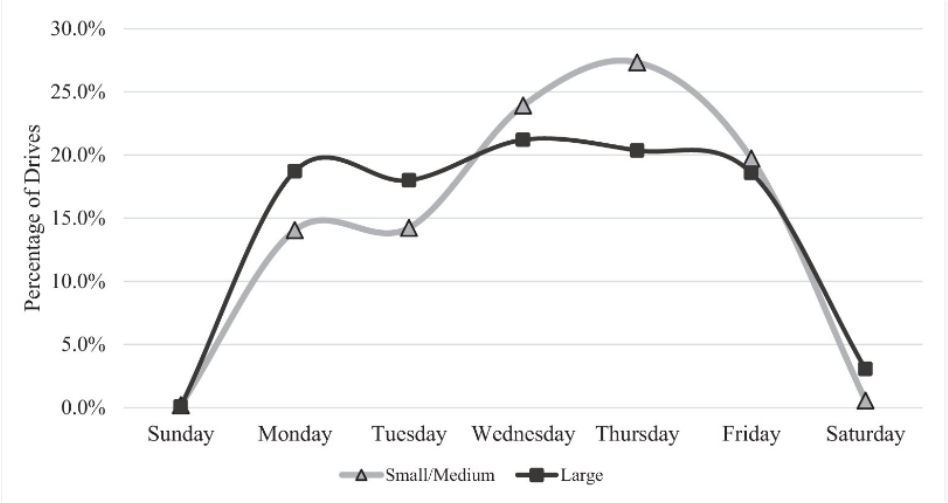

Figure 12 Distribution of drives by day of week in DAE. Source: Hanson & Goudreau, 2019.

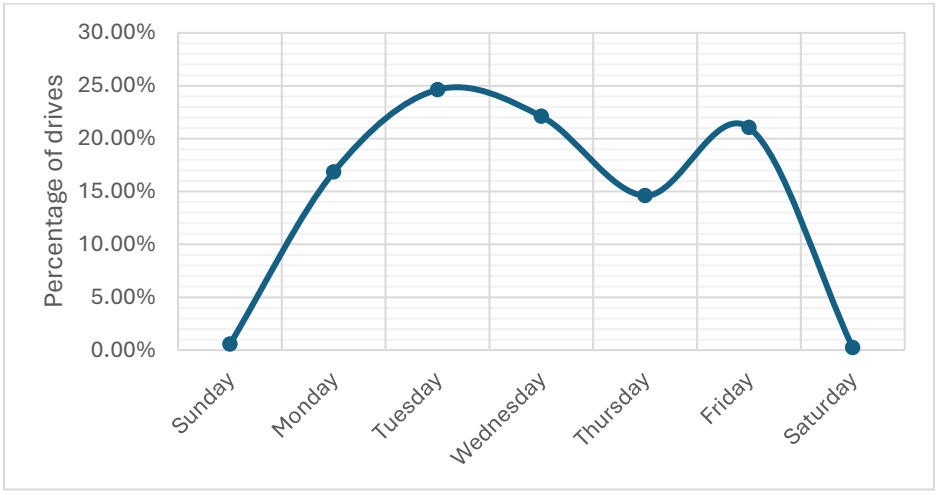

Figure 13 Distribution of 2023 drive data by day of week.

Seasonally, the 2017-18 data showed different trends depending on the size of the VDP group. Large groups saw above average stops from February to June, peaking in March and May. Smaller groups had above average stops from June to November, with peaks in July, and October-November. Both had the lowest stop volumes in the winter; December and January for large groups, and December, January, and February for small groups. The 2023 data, as seen in Figure 14 varied quite a bit from this (the drive and stop data followed the same trends). The variance between the two could be explained by the difference in sample size, and the difference of travel purposes, however further examination of this would need to be done to determine the reason behind the difference; whether the difference in purposes is the reason

behind it, or if it is representative of a change in travel behavior. The 2017-18 data can be seen below in Figure 15.

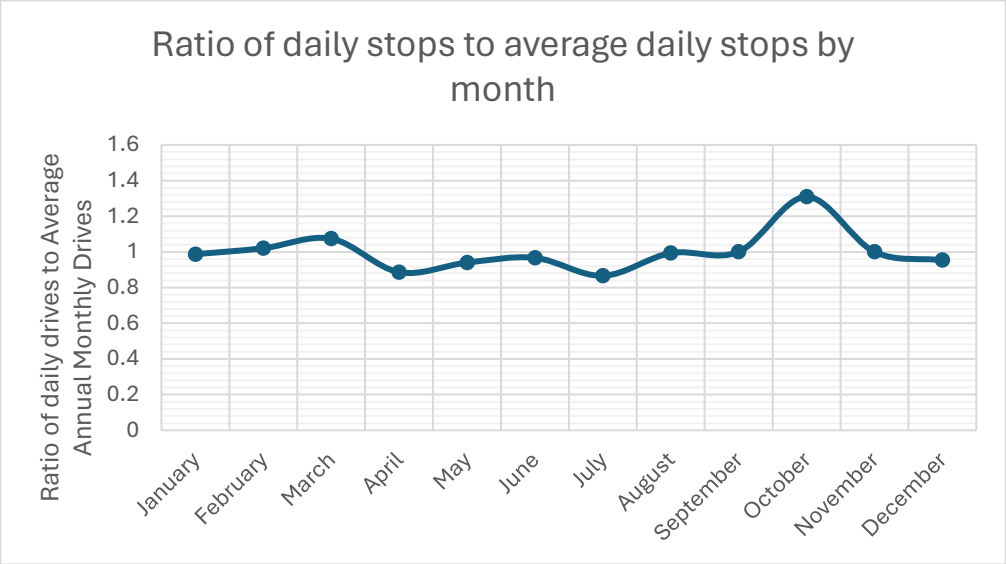

Figure 14 Distribution of 2023 drive data by time of year.

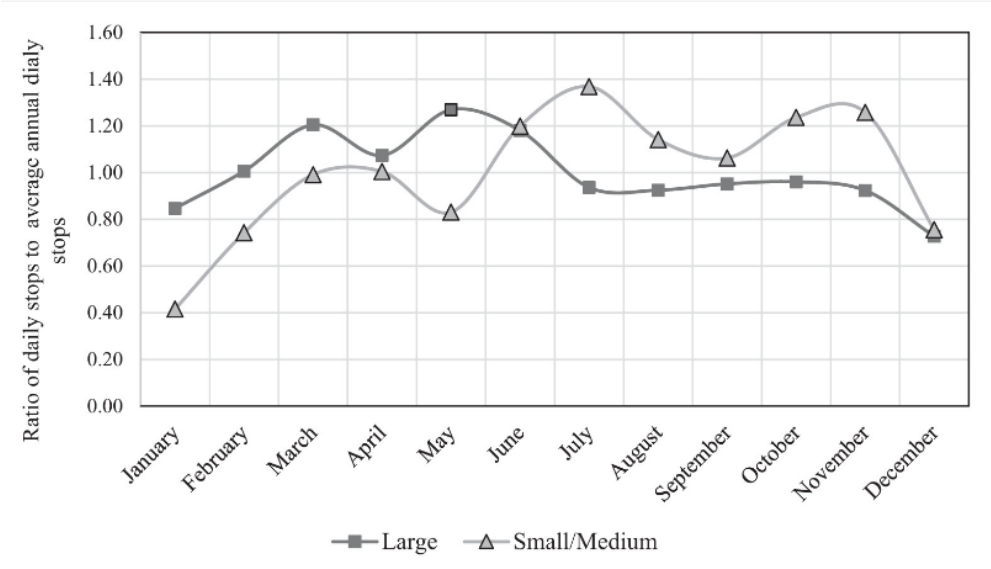

Figure 15 Distribution of drives in 2017-18 by time of year and size of group. Source: Hanson & Goudreau, 2019.

There appeared to be a much higher rate of cancellations in the collected data set compared to a general rule of thumb that was established for cancelled drives in the 2017-18 study, which concluded that for every cancelled drive, there would be ten completed drives, compared to the six that was found in the data. The average drive in the 2023 data was roughly 60% longer than those in 2017-18 by distance. Since longer drives take more time to complete, the larger time commitment could be part of the reason for the increase in the rate of cancellations, but further study into this would need to be done to definitively determine the reason for the increase.

6 Conclusion

Analyzing data provided by Urban Rural Rides gives insight into how their VDP services are used, and to find any trends. It also offers the opportunity to see if previously identified “rules of thumb” found in VDP drive data compares to drives within the southeast region of New Brunswick. Better understanding how VDP services in the region are used can help Urban Rural Rides identify pertinent trends in their operation, aid in future development of transportation models and help with transportation planning in the region. Further research is necessary to find the reasons behind differences in previously collected data across the province and that collected specifically in the southeast region, as well as methods to differentiate between different health drives, which could make their time and length more predictable.

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8 References

About—Charlotte Dial-a-Ride. (n.d.). Charlotte Dial-a-Ride. Retrieved June 7, 2024, from https://charlottedial-a-ride.com/about/

GeoNB map viewer. (n.d.). Retrieved June 11, 2024, from https://geonb.snb.ca/geonb/

Government of Canada, S. C. (2017, February 8). *Census profile, 2016 census—New brunswick [province] and canada [country]*. https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=PR&Code1=13&Geo2=PR&Code2=01&SearchText=New%20Brunswick&SearchType=Begins&SearchPR=01&B1=All&TABID=1&type=0

Government of Canada, S. C. (2022a, February 9). *Add/Remove data—Population counts, population centre size groups and rural areas*. https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=9810000801

Government of Canada, S. C. (2022b, November 30). *Commuting destination by main mode of commuting, age and gender: Canada, provinces and territories, census divisions and census subdivisions*. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=9810046201

Government of Canada, S. C. (2023, December 1). *New data on disability in Canada, 2022*. https://www150.statcan.gc.ca/n1/pub/11-627-m/11-627-m2023063-eng.htm

Government of Canada, S. C. (2024, March 20). *Special interest profile, 2021 census of population - profile of interest: Age - geography: new brunswick [province]*. https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/sip/details/page.cfm?Lang=E&PoiId=1&Dguid=2021A000213

Hanson, T. R., & Goudreau, M. (2019). Developing transportation engineering and planning metrics for rural volunteer driver programs. *Transportation Research Record: Journal of the Transportation Research Board*, *2673*(10), 852–861. https://doi.org/10.1177/0361198118821377

National Aging and Disability Transportation Center (NADTC). (2021). *Rural Volunteer Transportation Programs*. https://www.nadtc.org/wp-content/uploads/7-Rural-Volunteer-Transportation-Programs-508.pdf

Silberman, A. (2024, May 27). N.B. commits $2M to launch AI-powered volunteer ride platform. *CBC News*. https://www.cbc.ca/news/canada/new-brunswick/nb-commits-2m-ai-powered-volunteer-ride-platform-1.7216085

The Walsh Center for Rural Health Analysis. (2018). *Promising Practices for Increasing Access to Transportation in Rural Communities*. NORC at the University of Chicago. https://www.norc.org/content/dam/norc-org/pdfs/Rural%20Evaluation%20Brief_April2018.pdf

Weldon, T. (2018, July 3). Rural transportation service expands to meet “overwhelming need.” *CBC News*. https://www.cbc.ca/news/canada/new-brunswick/rural-ride-expansion-affordable-transportation-1.4727972