Triangle Travel Trends Analysis

2016, 2018, 2021 and 2022 Household Travel Surveys

Institute for Transportation Research and Education,
North Carolina State University
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Triangle Recurring Household Travel Survey

Unweighted households, people and trips, after processing and cleaning.

🏠 4,169	1,498	1,120	1,404
👥 9,207	3,119	2,188	2,837
📍 38,065	12,249	12,326	26,829
March & April	October & November	February & March	September - December
2016	**2018**	**2021**	**2022**

Recurring Household Travel Survey was launched. Relatively large dataset was collected in order to calibrate the TRM v6.1 model. Subsequent survey waves are smaller sample sizes as suggested by best-practice industry standards.	Second survey wave. Sample ensured low-income households, zero-car households, and larger households were oversampled to include a sufficient number of these often under-surveyed household.	The survey was postponed from fall to spring due to the COVID pandemic. A new survey collection method involving the optional use of smart phones was also implemented.	The survey returns to the desired Fall timeframe. The targeted number of households was significantly exceeded. Post-pandemic patterns are the main curiosity.

Overall Trip Statistics[1]

	2016	2018	2021	2022
Total Person Trips	7,058,973	6,857,412	4,293,700	6,745,868
Total Vehicle Trips	5,762,139	5,717,259	3,843,879	5,805,168
Average Trip Length (all modes)	6.1	6.2	5.0	7.0
Average Trip Length (auto)	7.0	7.0	5.4	7.5
Average Daily Trips per Household	10.8	9.8	5.7	8.8
Average Daily Trips per Person	4.4	4.0	2.4	3.6

1 - Using weighted and expanded survey data.

Key Takeaways by Travel Mode

Generally, mode of travel has remained stable across the Triangle region in the past 5 years, though the COVID pandemic did have a significant impact on transit.
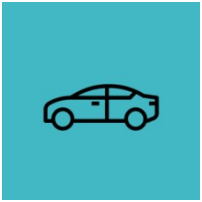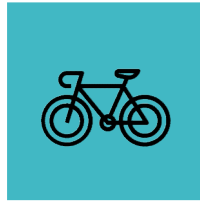
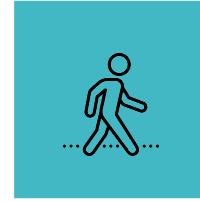| Automobile	Transit	Bike	Pedestrian	Other
Automobile is still the dominant mode in the Triangle.	Transit ridership declined by 90% in 2021 due to the pandemic.	The predominance of travel by bicycle is seen for trips between one and six miles.	Walking trips consistently show up as an important means of travel for trips less than one mile.	During this time period we saw an emergence of new modes like e-scooters, e-bikes and hover boards.

Demographics

This section provides an overview of the household and population characteristics in the Triangle region.

Triangle Demographics

Average household metrics have remained stable across the years.

	2016	2018	2021	2022
Persons per Household	2.47	2.46	2.36	2.44
Workers per Household	1.22	1.25	1.26	1.27
Drivers per Household	1.77	1.80	1.75	1.74
Vehicles per Household	1.84	1.90	1.88	1.80
Vehicles per Worker	1.51	1.52	1.50	1.43
Vehicles per Driver	1.04	1.05	1.08	1.04

Household Characteristics

Size & Workers

Household Size

Legend: 2016, 2018, 2021, 2022

Categories: 1 Person, 2 People, 3 People, 4+ People

Number of Workers

Legend: 2016, 2018, 2021, 2022
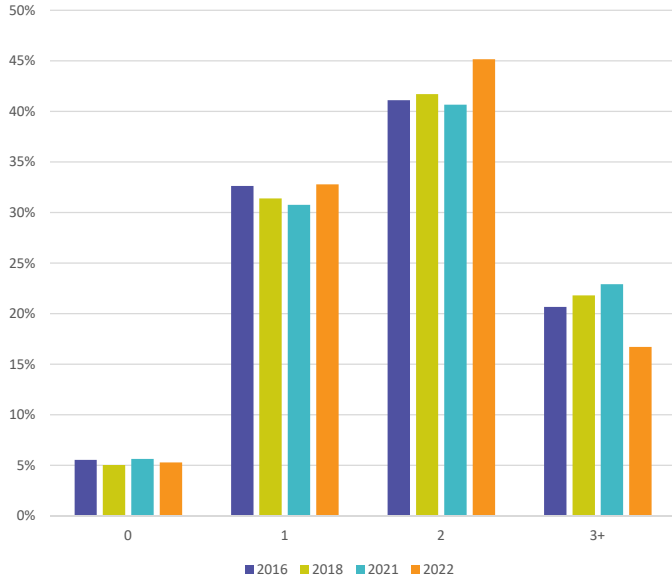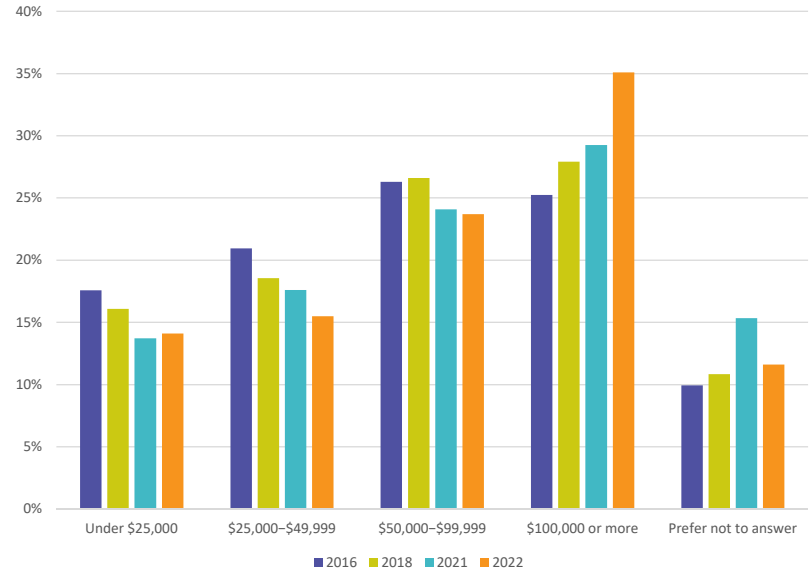
Categories: 0, 1, 2, 3+
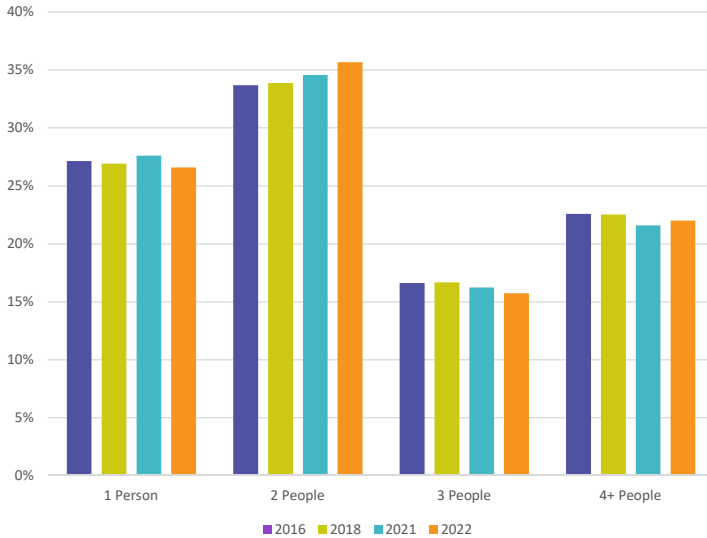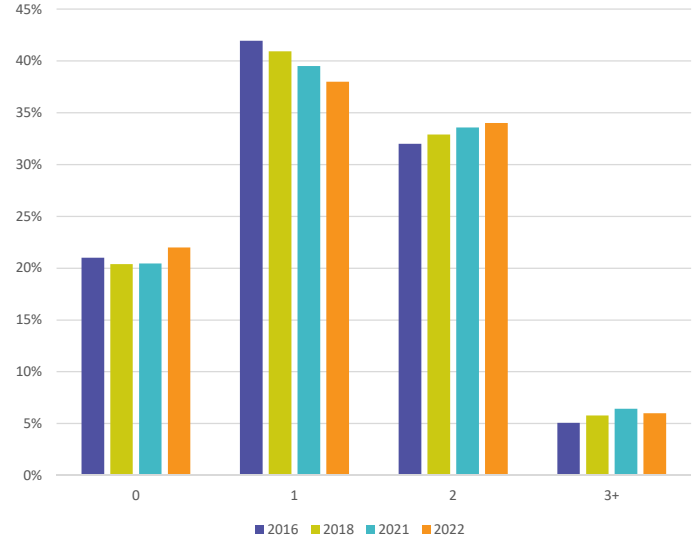
Household size is stable while the number of workers per household has shown an upward trend.

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Auto Ownership & Income

Auto Ownership

Income Group

Zero-vehicle households remain stable while households with more than 2 vehicles increased over time. Household income within the Triangle region is also increasing over the years.

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Workers by Auto Ownership

	2016				2018				2021				2022			
	Number of Vehicles															
Number of Workers	**0**	**1**	**2**	**3+**	**0**	**1**	**2**	**3+**	**0**	**1**	**2**	**3+**	**0**	**1**	**2**	**3+**
0	3%	10%	6%	2%	3%	11%	5%	1%	3%	9%	7%	2%	4%	9%	7%	2%
1	2%	20%	15%	6%	2%	18%	15%	6%	2%	18%	14%	5%	1%	19%	14%	4%
2	0%	3%	19%	9%	0%	3%	20%	10%	0%	4%	20%	10%	0%	4%	23%	7%
3+	n/a	0%	1%	4%	n/a	1%	1%	4%	n/a	0%	1%	6%	0%	1%	1%	4%

The percentage of households with a given number of workers and vehicles has remained fairly stable in the past 5 years.
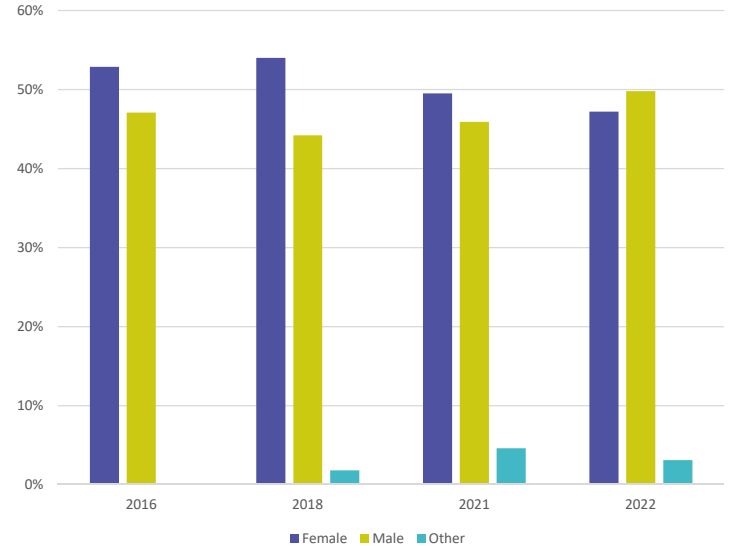
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Person-level Characteristics

Age & Gender

Age
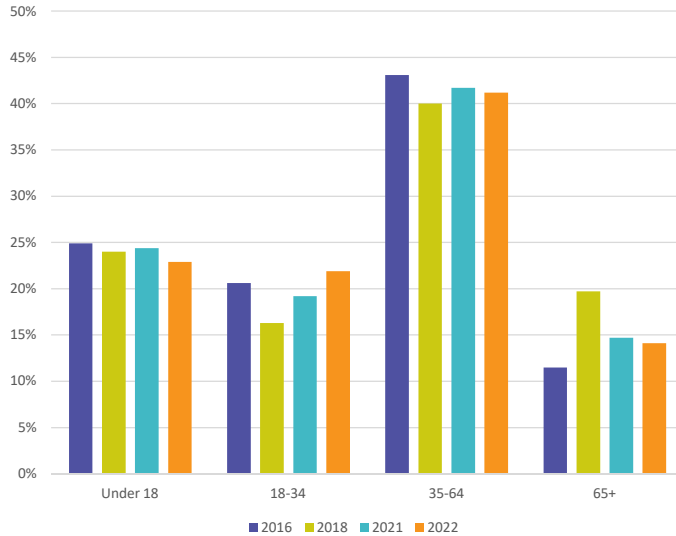
Gender

The distribution of survey data by age shows some lumpiness in the various age categories, likely attributed to small sample sizes and the fact that age is not a control factor in the data weighting and expansion. Even so, seniors are a growing segment of the Triangle's population. Also, in 2018, survey data became more inclusive with new non-binary gender categories.

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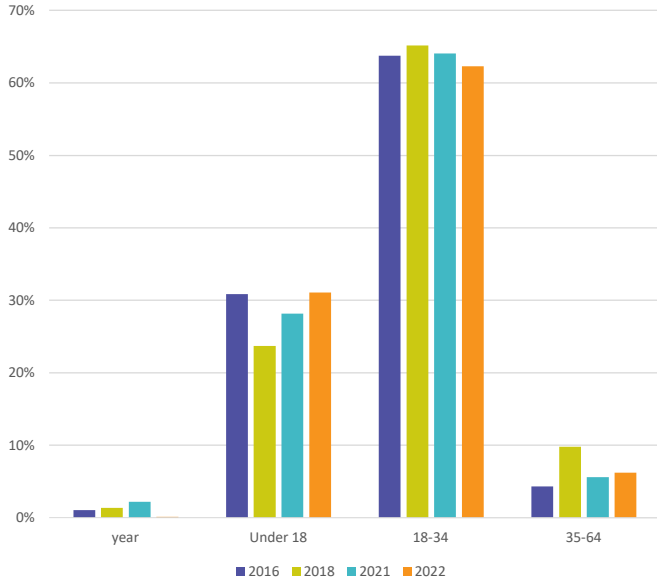# Drivers

Licensed Drivers by Age
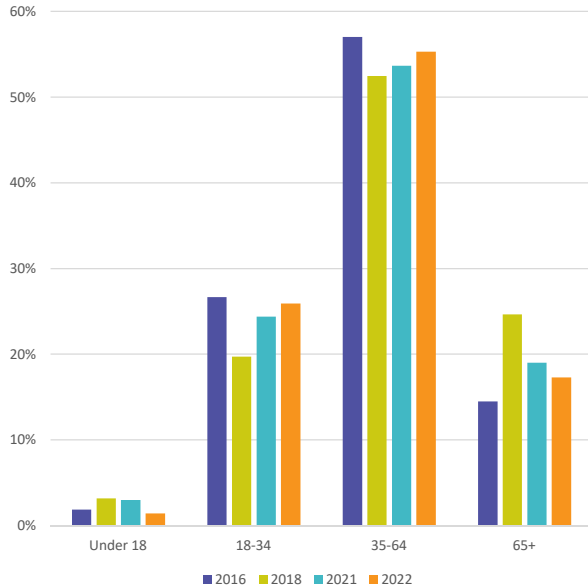
Licensed Drivers by Gender

14
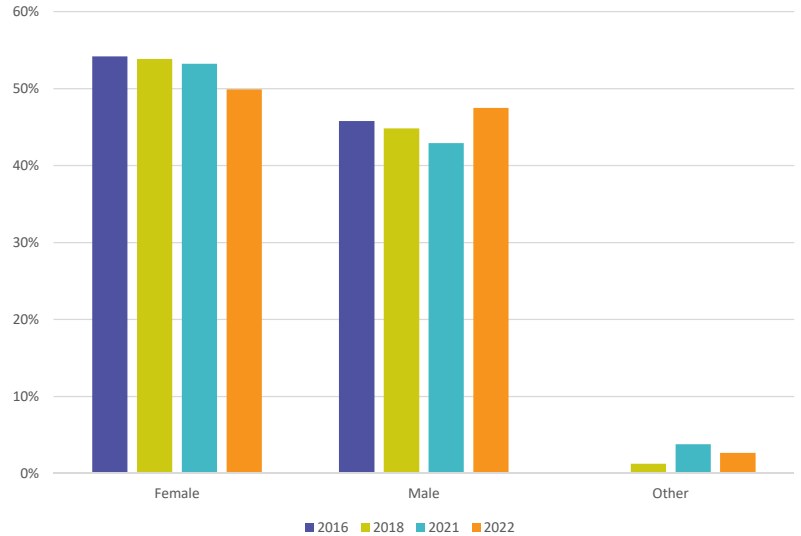
Workers

Workers by Age

Workers by Gender
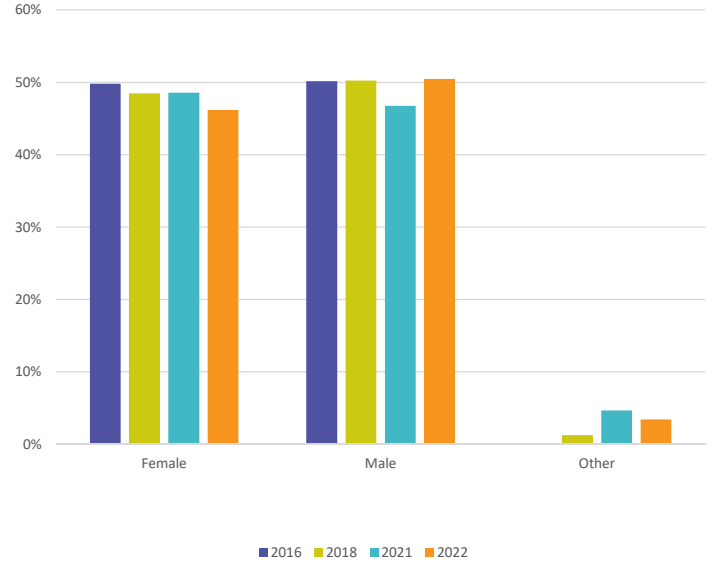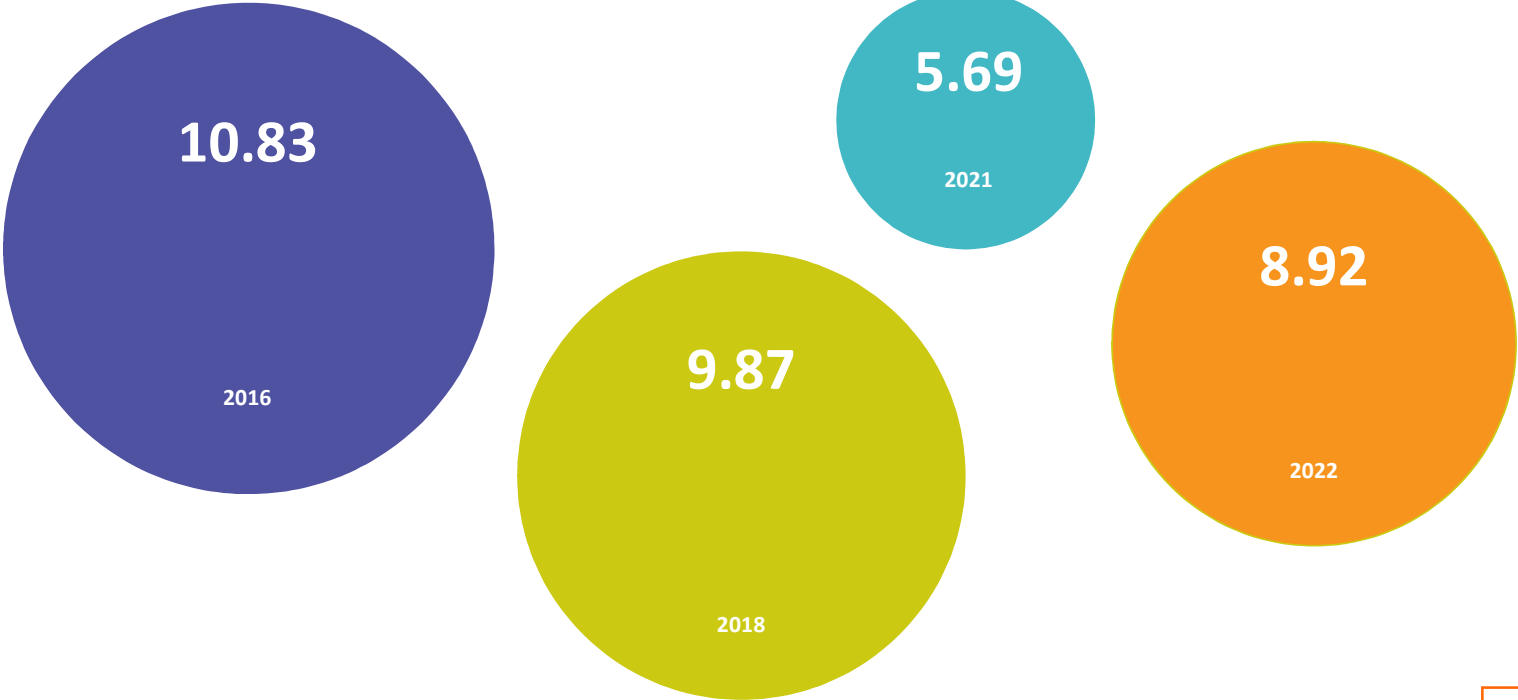
Household Travel

This section shows details of household level trips including why people travel and how it varies based on income groups, household size and auto ownership.

Average Daily Trips by Household

10.83

2016

5.69

2021

9.87

2018

8.92

2022

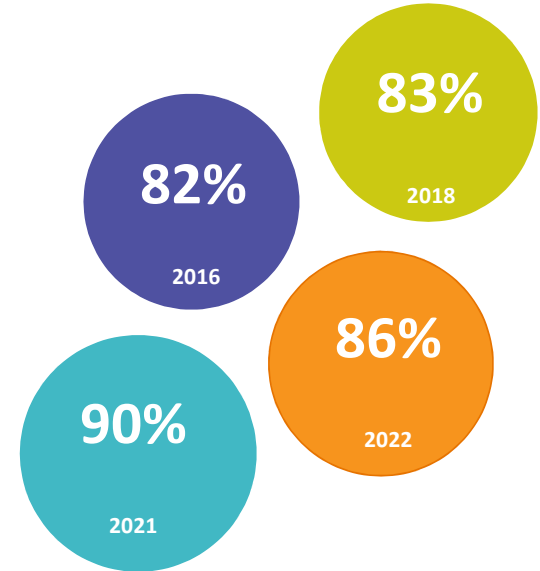The number of average daily trips made by households in the Triangle region is closer to rates observed pre-pandemic.

Person Trips by Mode of Travel

Non-Auto Modes

Legend: 2016, 2018, 2021, 2022

Auto Mode

82% 2016
83% 2018
90% 2021
86% 2022
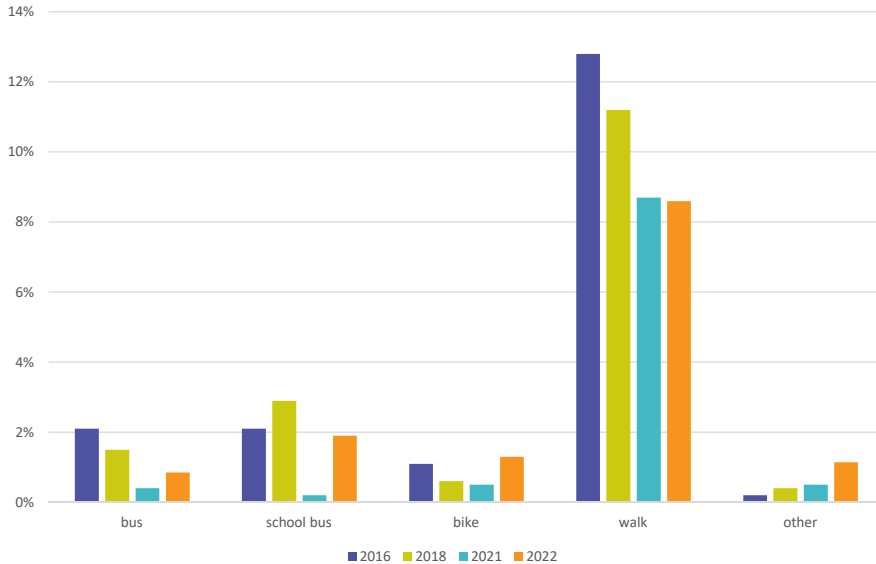
Post pandemic, the share of trips made by people traveling in autos has dropped as people are using alternative modes more than they did during the pandemic.

Average Trip Lengths
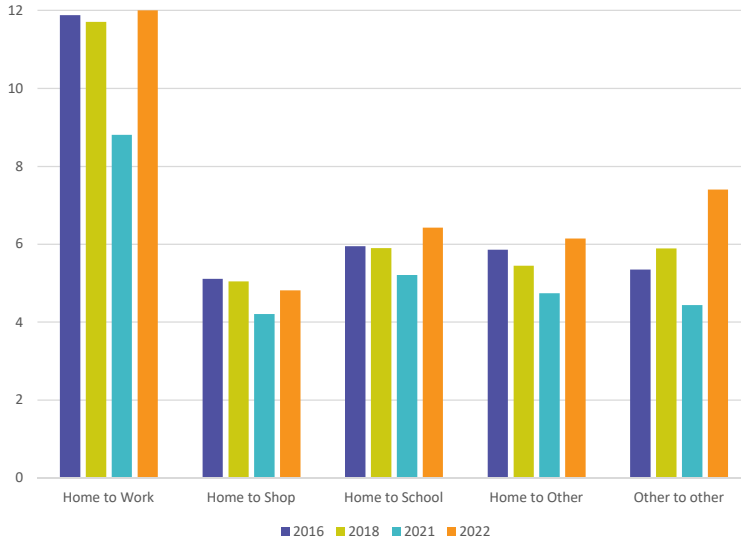
Average Lengths	2016	2018	2021	2022
Home to Work	11.89	11.71	8.81	12.01
Home to Shop	5.11	5.05	4.21	4.82
Home to School	5.95	5.90	5.21	6.43
Home to Other	5.86	5.45	4.74	6.15
Other to Other	5.35	5.89	4.44	7.40

Trip lengths post pandemic are returning to pre-pandemic levels and sometimes increasing. The most dramatic increase is for other to other trips.

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Reason for Travel
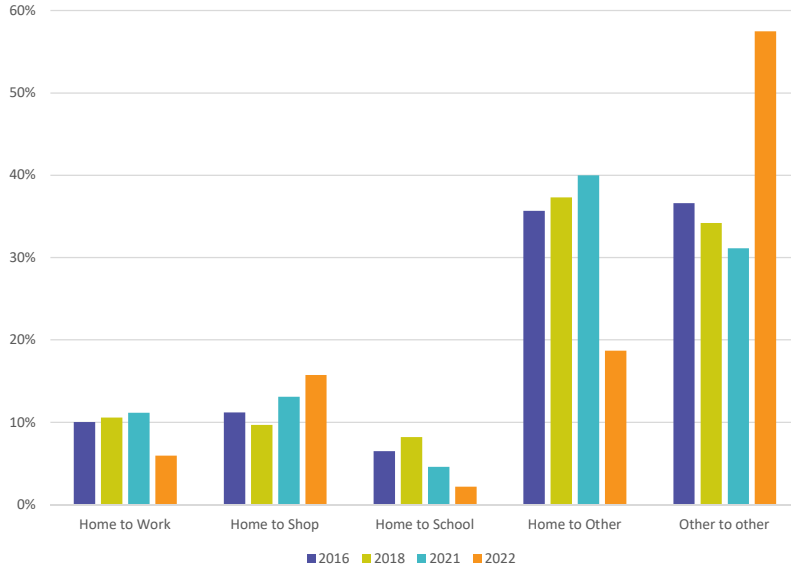
Average Trips	2016	2018	2021	2022
Home to Work	1.06	1.03	0.63	0.53
Home to Shop	1.19	0.94	0.74	1.40
Home to School	0.69	0.80	0.26	0.19
Home to Other	3.79	3.63	2.25	1.67
Other to Other	3.89	3.33	1.76	5.13
Total	10.62	9.73	5.64	8.92

The reasons people travel remain fairly stable over time. Post pandemic, the average number of trips per day has increased almost back to original levels. The largest increase was for trips that neither began nor ended at home.

Travel by Income Groups
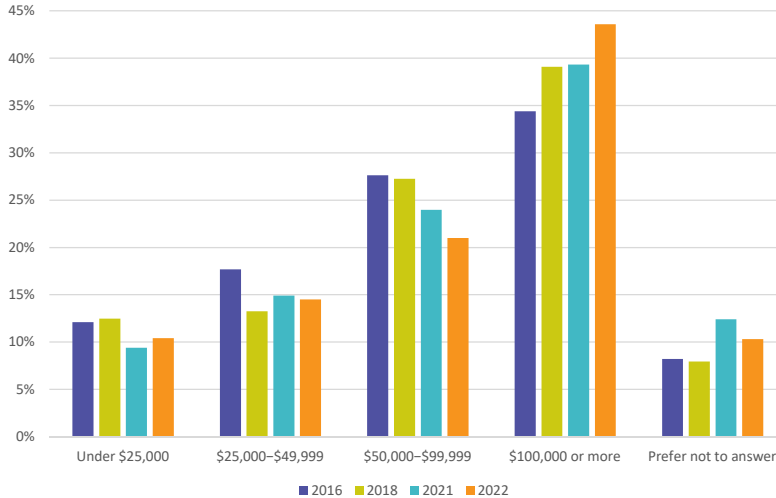
Average Trips	2016	2018	2021	2022
Under $25,000	7.46	7.66	3.90	6.50
$25,000-$49,000	9.14	7.05	4.81	8.21
$50,000-$99,000	11.37	10.11	5.66	7.86
$100,000 or more	14.76	13.82	7.65	10.96
Prefer not to answer	8.95	7.25	4.59	7.84

While the percentage of trips made by households with income greater than $100K has increased, the average number of trips per day is almost what it was pre-pandemic.

Travel by Household Size
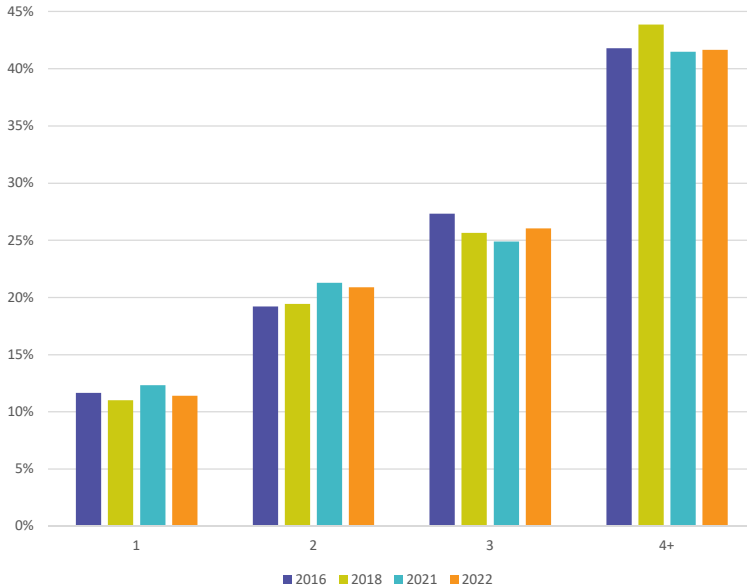
Average Trips	2016	2018	2021	2022
One-person	5.35	4.58	2.95	4.23
Two-people	8.81	8.10	5.10	7.75
Three-people	12.54	10.68	5.96	9.67
Four+ people	19.18	18.27	9.93	15.46

Across all years, one-person households average slightly more trips on a per person basis. However, in terms of total trips, larger households make more trips due to the greater number of people in the household.

Travel by Auto Ownership
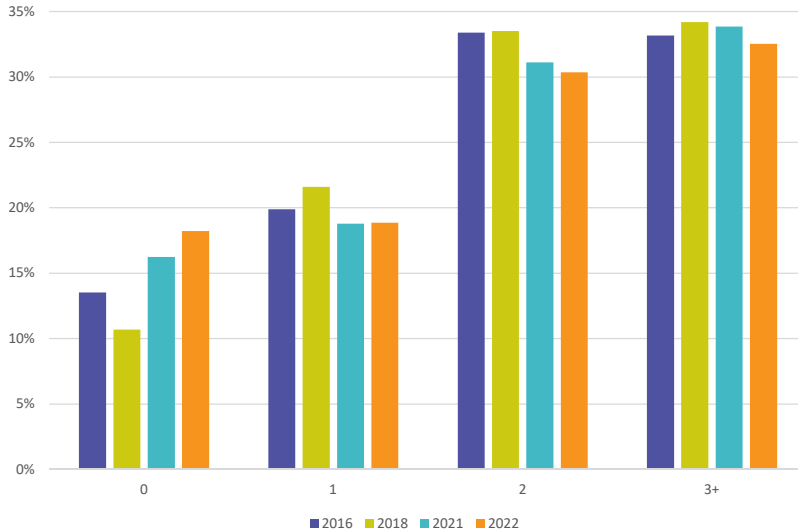
Average Trips	2016	2018	2021	2022
Zero autos	5.26	3.66	3.41	6.10
One auto	7.74	7.41	3.94	6.32
Two autos	12.99	11.50	6.53	10.17
Three+ autos	12.91	11.74	7.10	10.90

In the auto dominant Triangle region, households that do not own a vehicle have limited mobility in comparison to households with vehicles. Prior to the pandemic, auto ownership had the greatest impact on average trips for 1-auto households. As the number of autos in a household increases, total trips increase; however, the impact of the additional autos on trip making declines.
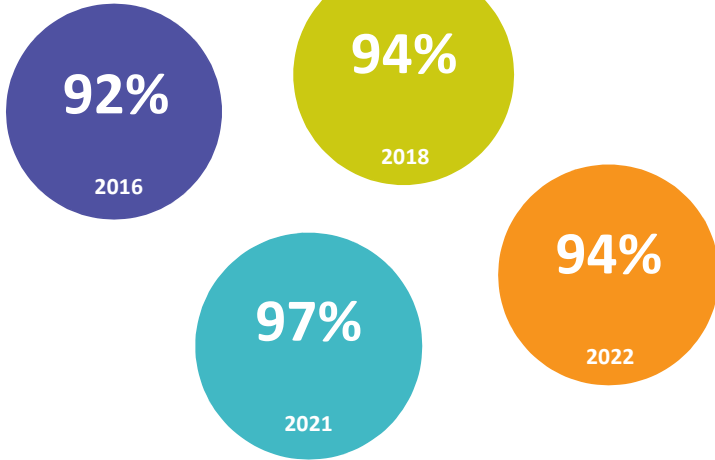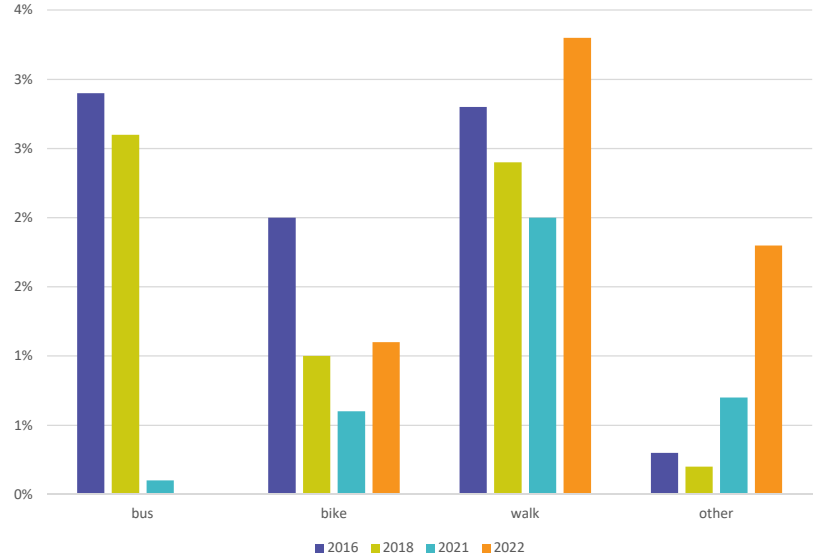
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Person Travel

This section focuses on why and how people travel.

Travel for Work

Auto Trips

92% 2016

94% 2018

97% 2021

94% 2022

Non-Auto Trips

Legend: 2016, 2018, 2021, 2022 (for bus, bike, walk, other categories)
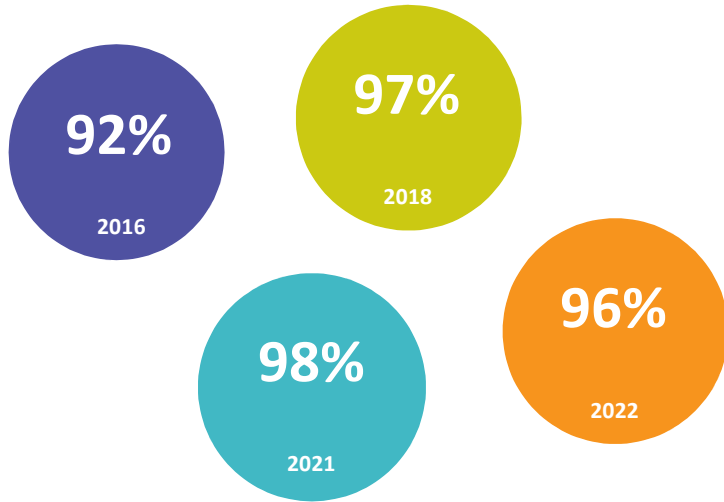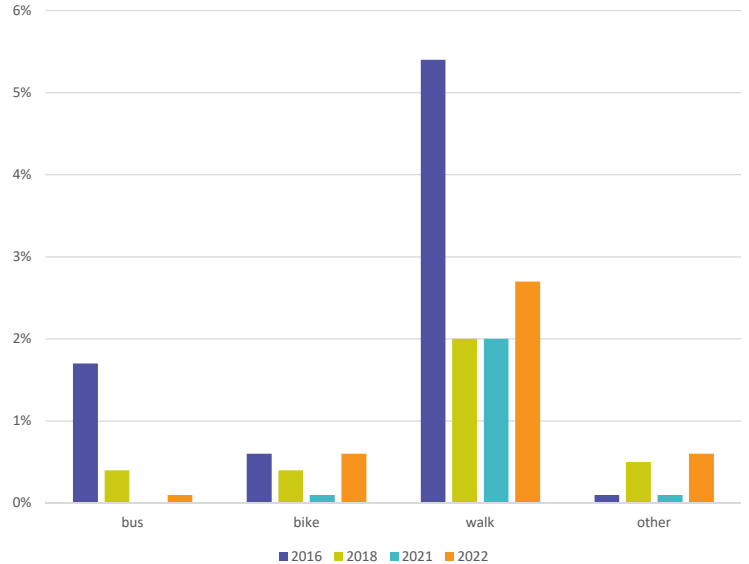
Post pandemic, the share of auto trips for work travel has returned to pre-pandemic levels. The region's very large decrease in bus ridership has continued post-pandemic. The decrease in bus ridership is likely because of a reduction in overall trips, as well as a reduction in bus service. 2022 had transit trips, but at a very low rate.

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Travel for Shopping

Auto Trips

92% 2016

97% 2018

98% 2021

96% 2022

Non-Auto Trips

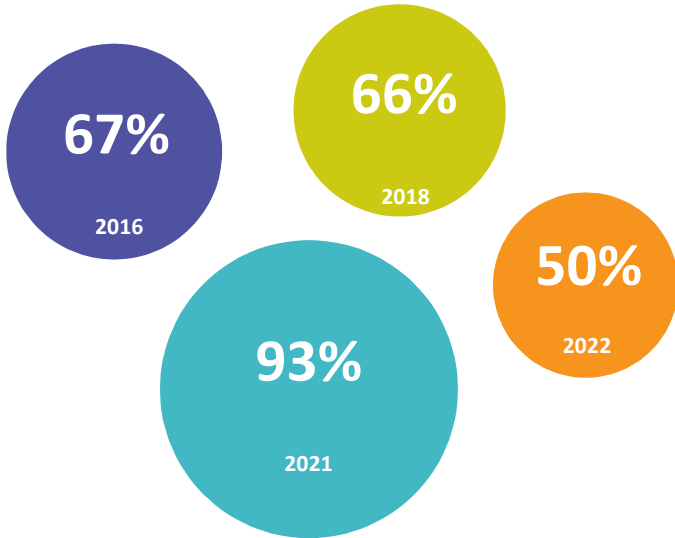
Legend: 2016, 2018, 2021, 2022
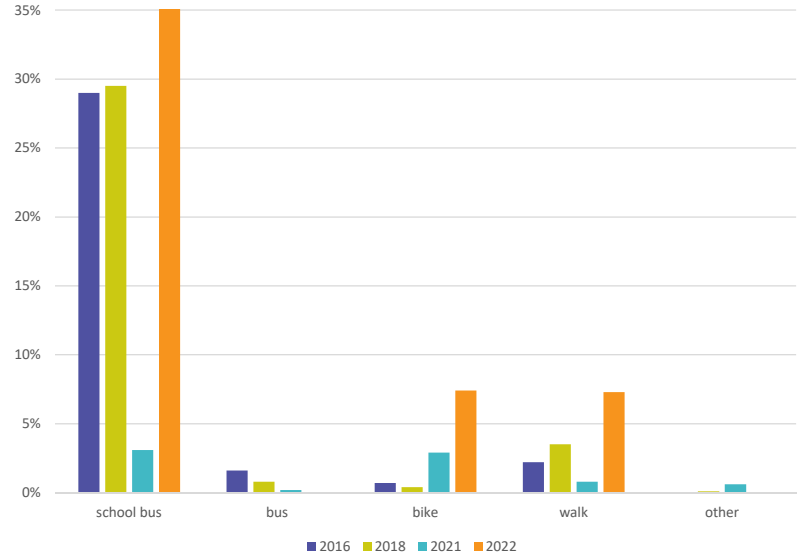
Chart categories: bus, bike, walk, other

The share of shopping trips by auto increased during the pandemic as a result in decreased shopping trips by other modes. For shopping trips not made by auto, walking is the most favored mode.

Travel for School

Auto Trips

67% 2016

66% 2018

93% 2021

50% 2022

Non-Auto Trips

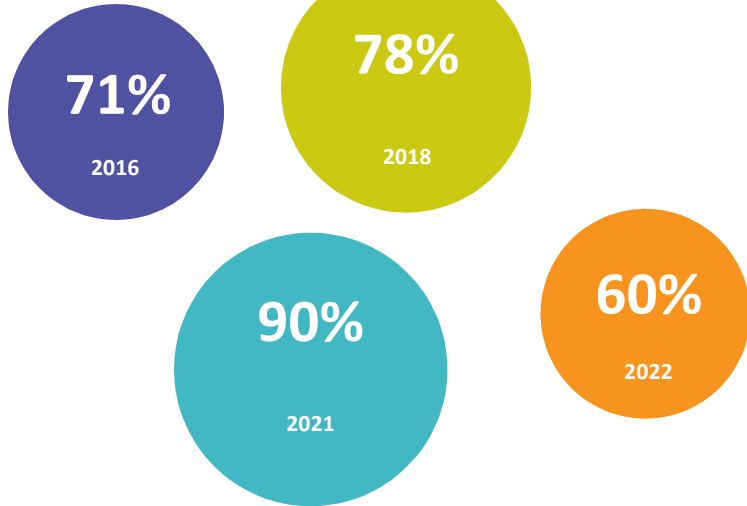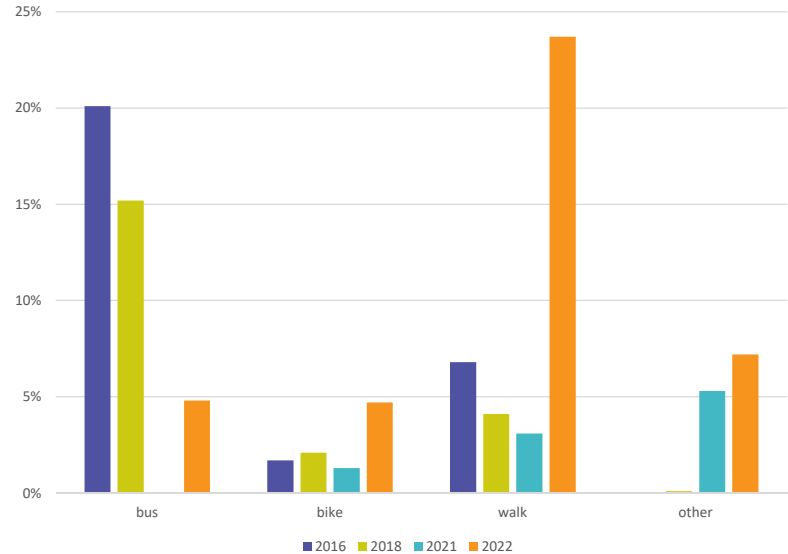|	school bus	bus	bike	walk	other
2016					
2018					
2021					
2022					

Auto and school bus trips are more similar to pre-pandemic levels. Proportionately, kids are biking and walking more to school.

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Travel for University

Auto Trips

71% 2016
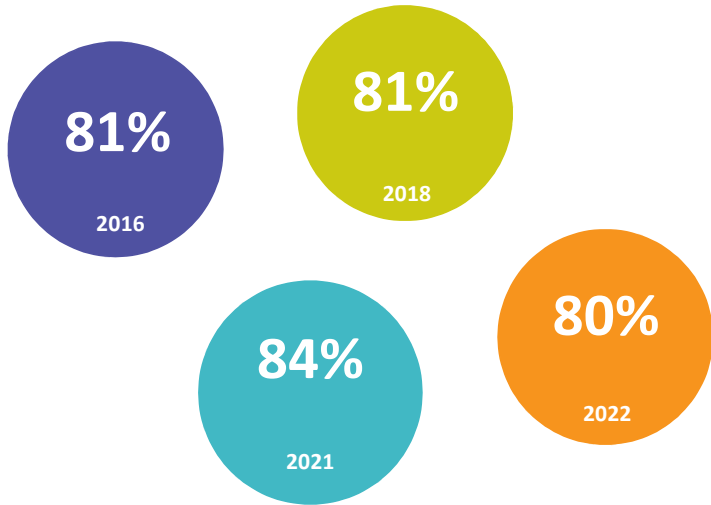
78% 2018

90% 2021

60% 2022

Non-Auto Trips

Although the shares of university travel by mode have shifted fairly significantly, these trips still hold a majority with auto followed by non-motorized modes. As seen for other trip purposes, transit shares have reduced post-pandemic.

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Travel for Other Reasons – Home to Other

Auto Trips

81%
2016

81%
2018

84%
2021

80%
2022
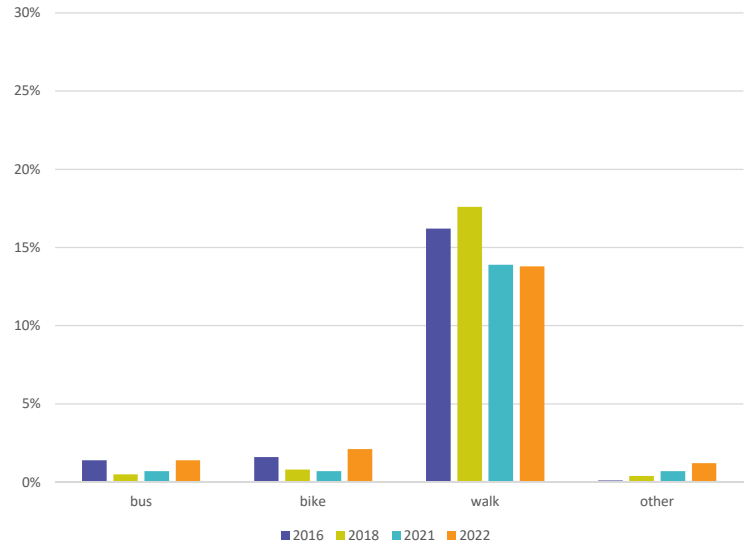
Non-Auto Trips

At close to 15% of the overall mode share, walking trips are most competitive for trips made from home for activities like recreation, social, religious, dining and medical.

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Travel for Other Reasons – Other to Other

Auto Trips

83% 2016

87% 2018

92% 2021

86% 2022

Non-Auto Trips

Legend: ■ 2016 ■ 2018 ■ 2021 ■ 2022

Categories: bus, bike, walk, other
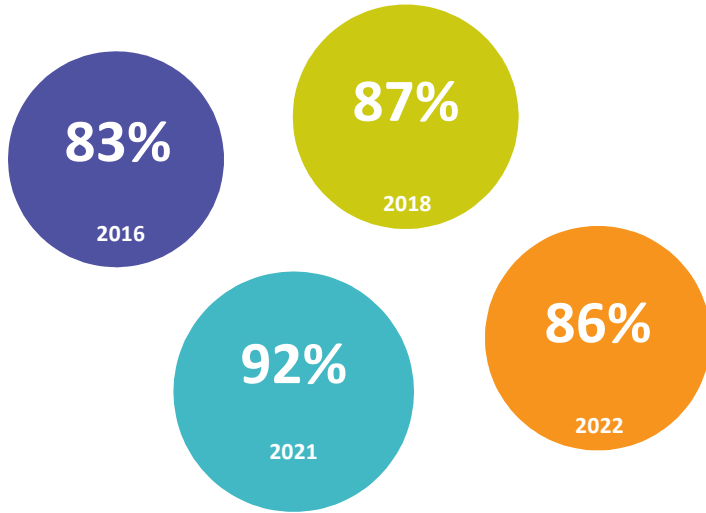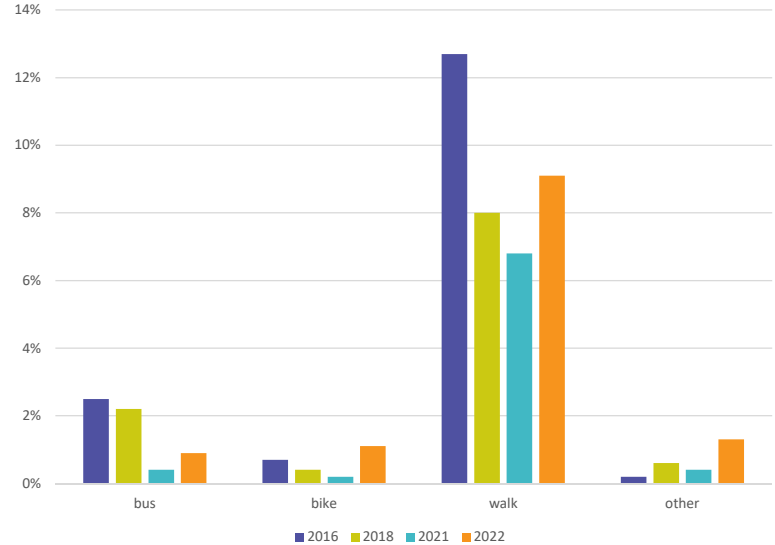
Trips that neither start nor end at home are often short distance trips. These trips are good candidates for walking.

Other Travel Metrics

This section focuses on special travel patterns – non-motorized trips, travel by seniors, work related travel, and travel post pandemic.

Non-motorized Trips

Distance Traveled

Legend: 2016, 2018, 2021, 2022

Share of Total Trips

- 14% 2016
- 12% 2018
- 9% 2021
- 10% 2022
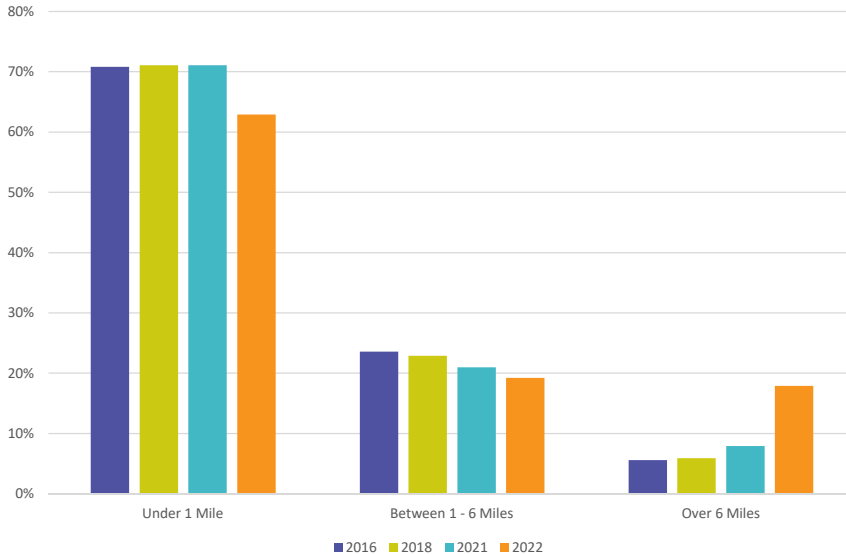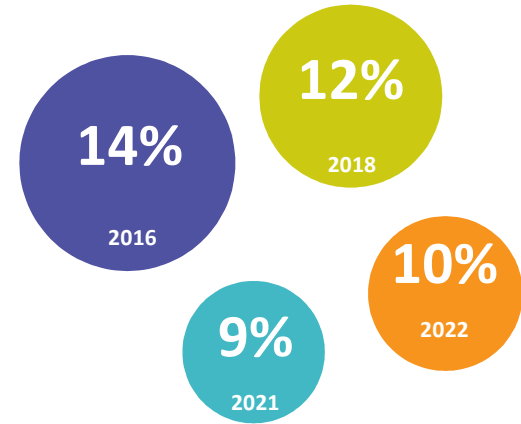
Non-motorized travel for non-recreational trips is slowly increasing back from the decline during the pandemic. Trips under 1 mile remain high and longer distance trips increased significantly, perhaps due to the new e-mobility options available on the market.

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Travel by Seniors

Reason for Travel by Seniors

Mode of Travel by Seniors

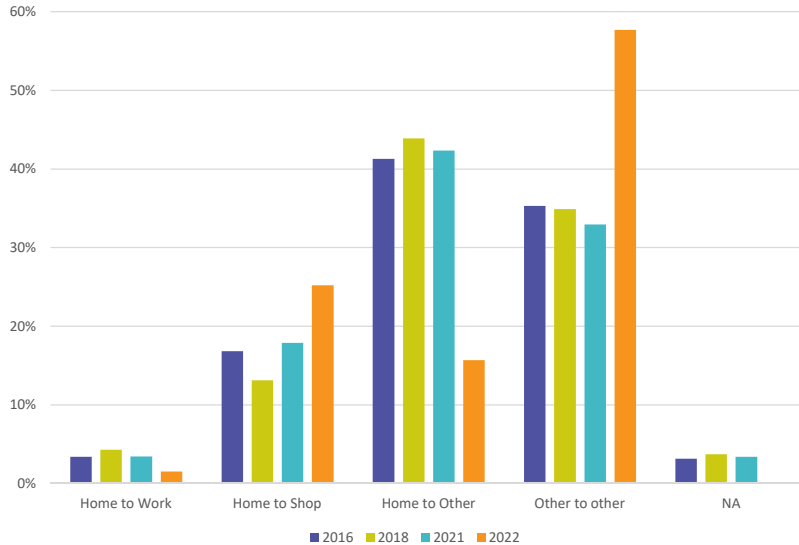|	**2016**	**2018**	**2021**	**2022**
Auto	84.0%	82.7%	91.9%	86.0%
Bus	1.6%	0.5%	1.1%	1.2%
Bike	0.3%	0.2%	0.0%	0.2%
Walk	13.8%	15.8%	6.8%	11.2%
Other	0.3%	0.8%	0.2%	1.1%

As with other travelers in the Triangle, seniors are heavily dependent on the auto. This poses challenges to transportation planners as age-related restrictions may limit seniors' ability to drive.

Work Related

Location
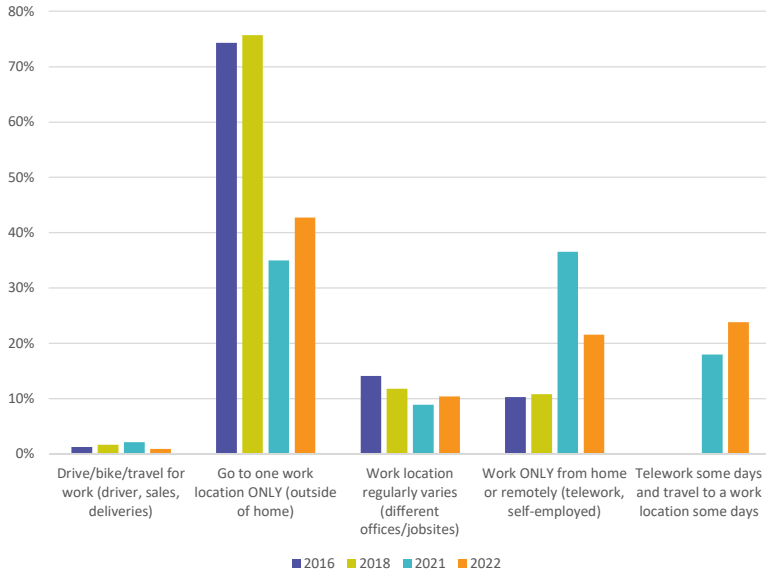
Telecommute Frequency

The pandemic had a major impact on the way people work, with the majority of workers who could work from home, doing so. Telework remains high post-pandemic.
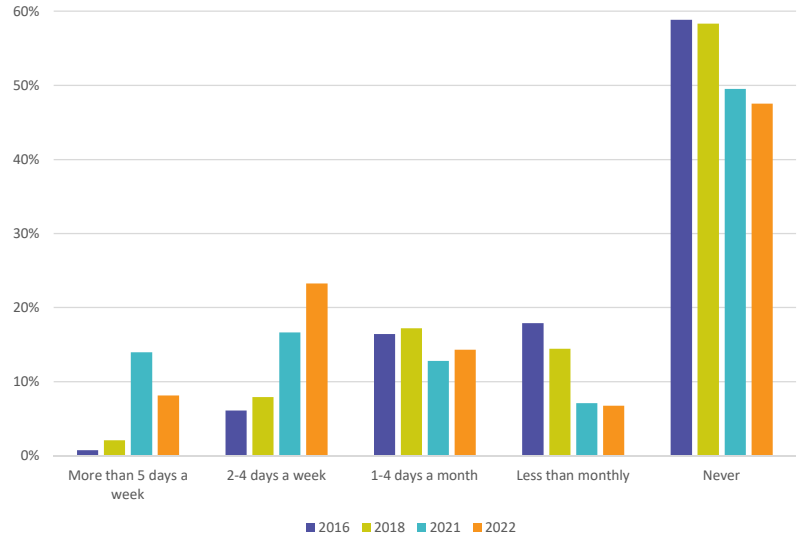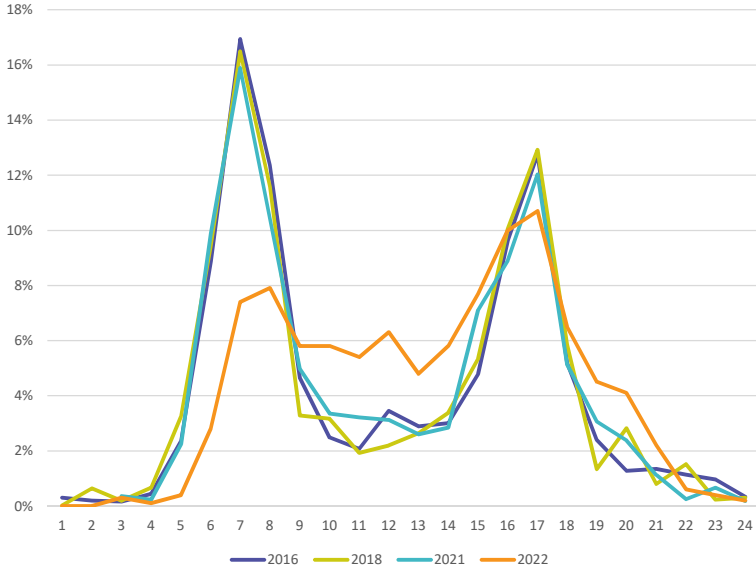
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Work Related

Time of Day

Average Trip Length

Commute Mode	2016	2018	2021	2022
Auto	12.46	12.14	8.93	12.4
Bus	8.77	10.31	n/a	n/a
Bike	3.94	2.40	n/a	2.40
Walk	1.91	1.09	2.41	0.49

Post pandemic, work related trips start later and are more spread out throughout the day; peaks are much less defined. Work-related auto trip lengths are back to pre-pandemic levels. Peak travel is quite reduced in 2022 with a higher mid-day peak. This is likely influenced by the increased number of workers who continue to telework post-pandemic reducing peak travel.

* The sample size was too small to report an average bike trip length in 2021 and transit trip length in 2021 and 2022.

This study was conducted by the Institute for Transportation Research and Education at NC State University. The work was sponsored by the North Carolina Department of Transportation, Capital Area Metropolitan Planning Organization, Durham Chapel Hill Carrboro Metropolitan Planning Organization and Go Triangle. RSG completed all four survey efforts.

About the surveys:
To support transportation planning in the Triangle region, travel behavior survey data is collected every other year. This recurring survey effort started in 2016 with 4,194 households. The sample size for subsequent years is smaller. Data collection was delayed from the fall of 2020 to the spring of 2021 due to the COVID-19 pandemic. Data collection covers the entire Triangle region which includes Durham, Orange, Wake, Chatham, Franklin, Granville, Harnett, Johnston, Nash and Person counties. The benefit of a recurring travel survey is the ability to track travel behavior changes overtime. A challenge of the recurring survey is the smaller sample size which can cause lumpiness in the data and influence trend analysis for any given year.

ITRE   CAMPO   STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION   DCHC Metropolitan Planning Organization   Planning Tomorrow Today   GO Triangle   RSG the science of insight