MARCH 2024

TECHNICAL SUMMARY

2022–2023

SOUTH EAST TEXAS REGIONAL PLANNING COMMISSION HOUSEHOLD TRAVEL SURVEY

TEXAS DEPARTMENT OF TRANSPORTATION
TRAVEL SURVEY PROGRAM

Texas Department of Transportation

Texas A&M Transportation Institute

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SOUTH EAST TEXAS REGIONAL PLANNING COMMISSION (SETRPC) HOUSEHOLD TRAVEL SURVEY

TEXAS DEPARTMENT OF TRANSPORTATION TRAVEL SURVEY PROGRAM

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Performed in cooperation with the
Texas Department of Transportation
and the
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DISCLAIMER

ACKNOWLEDGMENTS

The authors would like to thank Sonya Solinsky, TxDOT Travel Survey Program manager, and TxDOT for its continuing program to collect and analyze urban travel data to support travel demand modeling.

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The purpose of the surveys and the external study was to collect data and information needed as input to the SETRPC travel demand model.

HOUSEHOLD TRAVEL SURVEY

INTRODUCTION

THE PURPOSE

Between December 2021 and May 2023, the Texas Department of Transportation (TxDOT) sponsored a household survey, an establishment survey, and an external origin-destination study for the South East Texas Regional Planning Commission (SETRPC), the designated Metropolitan Planning Organization (MPO), for the Jasper, Jefferson, Orange, and Hardin Regional Transportation Study (JJOHRTS) area. The purpose of the surveys and the external study was to collect data and information needed as input to the SETRPC travel demand model. Each survey/study collected a different component of travel needed for use in the model, and all efforts were designed to capture characteristics of weekday travel during the school year.

This technical summary summarizes the results of the household survey for the SETRPC study area that was conducted from December 2022 through May 2023. The survey was conducted using state-of-the-practice methods where the surveys were collected via smartphone applications (10 percent), survey website (45 percent), and traditional computer-assisted telephone interview methods (45 percent).

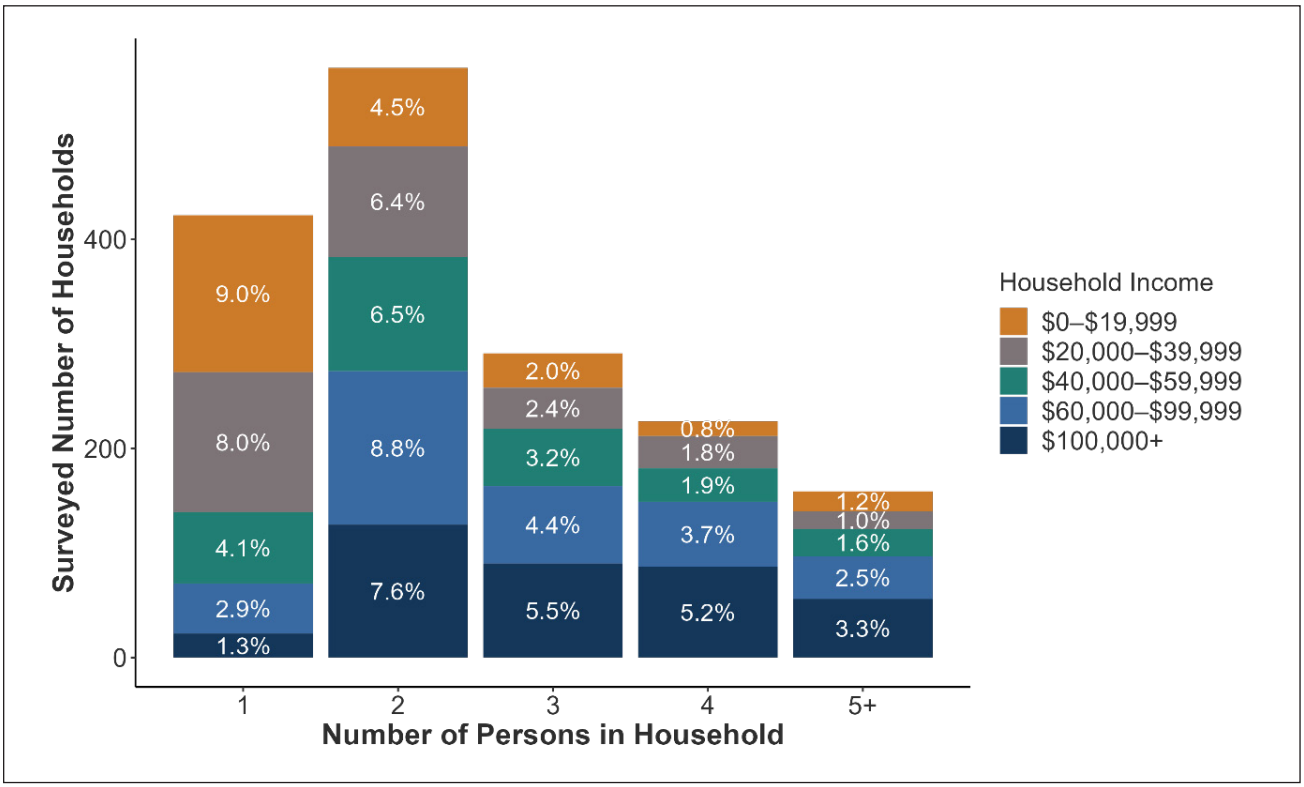

Figure 1. Completed Survey Sample Stratification by Household Size and Income.

SAMPLE DESIGN AND COMPLETED SURVEYS

The household survey sample design was based on a predetermined number of households within certain ranges of household income, number of people employed, and household size to obtain travel information. A sample size of 1,700 households was developed using the estimated distribution of households in the modeling area counties in 2015 and was based on a desired level of trip rate accuracy of ±10 percent at a 95 percent confidence level.

A total of 1,663 households in the SETRPC study area completed the household travel survey. Figure 1 and Figure 2 show the stratification and spatial distribution, respectively, of the surveyed households.

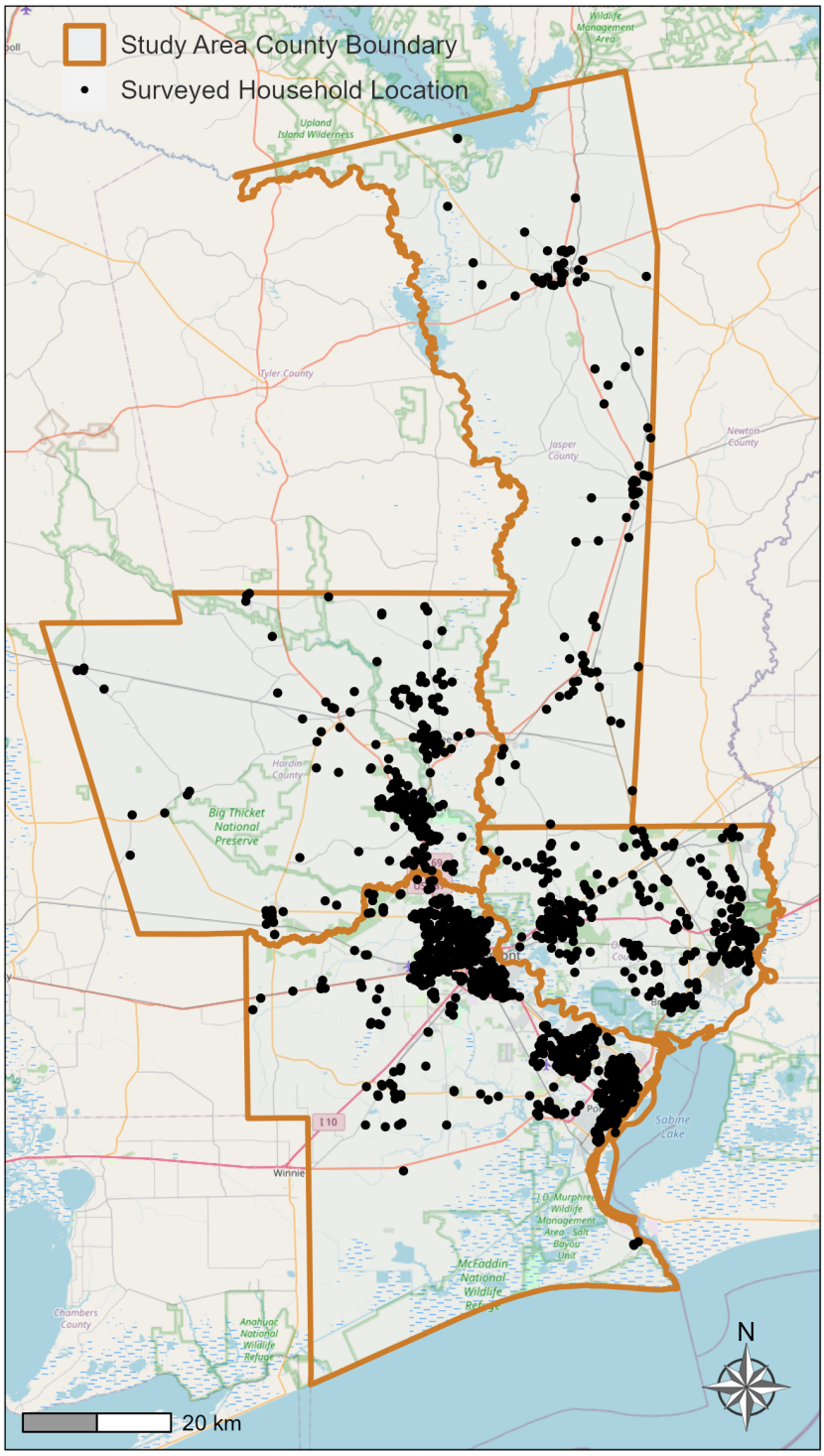

Figure 2. Surveyed Household Locations within the SETRPC Study Area.

KEY POINTS REGARDING HOUSEHOLD SURVEY DATA

The following are important points about the household survey data:

- Persons living in group quarters, such as nursing homes, prisons, or dormitories, were not surveyed.
- The survey data are for persons of all ages unless otherwise noted.
- The survey data do not include non-household-based travel such as travel by tourists or persons staying in hotels.
- The survey data are for internal trips that began and ended within the SETRPC study area. Trips that began inside the study area and ended outside the study area, or vice versa, are external trips, which are captured in an external travel study. External trips are not included in household survey reporting.
- The values and estimates reported throughout this summary report are based on the analysis of the survey data only and pertain to characteristics of trips made within the SETRPC study area.

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HOUSEHOLD SURVEY RESULTS

The results included in this technical summary are preliminary, unexpanded results that provide a general indication of travel and trip-making amounts and trends in relation to past surveys, and what can be expected when final expanded survey results are produced.

Final results will be developed at a later stage to coincide with the next update or calibration of the SETRPC travel demand model to ensure that any changes or updates to the area's demographics, traffic analysis zones (TAZs), and model area boundary are taken into account in the analysis of these data.

In the subsequent analysis to produce final results, the data will be expanded using household and demographic data from the study area, considering household income, number of people employed, household size, and age and gender of respondents. Responses from cohorts who are overrepresented are given less weight, while those underrepresented are given more weight. This expansion process helps to account for the fact that certain cohorts tend to be more responsive and overrepresented in these types of surveys. Expanded results provide estimates of daily travel behavior produced by households and persons that reside in the study area.

STATISTICS

SUMMARY STATISTICS OF SURVEYED HOUSEHOLDS

The following are summary statistics relating to surveyed households in the SETRPC study area:

- Researchers surveyed 1,663 households in the study area. All occupants of the surveyed households totaled 4,214 persons.
- The survey recorded 13,049 internal trips.
- Over 78 percent of the households had at least one employed person.
- About 95 percent of the households had at least one vehicle available.
- Over 97 percent of the households had a licensed driver.
- Over 11 percent of the persons that were employed 30 hours or more worked from home or telecommute on a regular basis.
- On average, each person made 3.1 internal person trips per day, and each household made 7.8 internal person trips per day.
- About 2 percent of the surveyed households, equating to 18 percent of the surveyed persons, did not make an internal trip within the study area. Persons ages 25 to 45 on average traveled more often than the rest of the population age groups.
- The average travel distance of person trips, based on the origin and destination longitudes and latitudes, was 5.2 miles. Due to their nondiscretionary nature, home-based work trips had the longest trip distance, which averaged about 8.9 miles.
- K–12 school was the most reported destination in the survey, followed by restaurants/food locations and grocery places.
- Among the recorded internal person trips, 65 percent drove a vehicle, 29 percent rode as a passenger in a vehicle, about 1.5 percent walked/biked, and about 4 percent used the bus (of which 87 percent is contributed by school bus use).
- The peak hour for household travel was from 7 a.m. to 8 a.m., during which over 12 percent of the trip starts occurred. The second highest hour for trip starts was from 3 p.m. to 4 p.m. when nearly 11 percent of the daily trip starts occurred.

On average, each person made 3.1 internal person trips per day, and each household made 7.8 internal person trips per day.

SUMMARY STATISTICS

Southeast Texas study area

1,663 households surveyed

4,214 people surveyed

13,049 Internal trips

97% of households had at least one licensed driver

95% of households had at least one vehicle

3.1 internal person trips per person per day

7.8 internal person trips per household per day

Top Destinations

1. School
2. Restaurants
3. Grocery Places

12% trip starts between 7:00 a.m. and 7:59 a.m.

18% of the surveyed persons did not make a trip within the study area

25- to 45- year olds traveled more often than others

5.2 miles average travel distance

65% drove a vehicle

29% rode as a passenger

1.5% walked/biked

4% used the bus

11% of full-time employed work from home or telecommute on a regular basis

TRAVEL
TRAVEL CHARACTERISTICS

The amount of travel generated by residents within a study area is estimated based on the characteristics of household travel found in the household survey. The amount is typically measured by the number of person trips and the average travel distance of these trips. The number of person trips is estimated based on the average trip rate per household and the total households in the study area. The average travel distance for these trips is estimated based on the survey trip origin and destination location information.

PURPOSE OF TRAVEL

To develop average trip rates, household travel is grouped by the purpose of the trip. As a part of their travel diary, each household member was asked to identify what they did at each trip destination from a list of choices, which was used to categorize trip purpose. Three internal trip purposes are typically used in travel demand modeling: home-based work (HBW), home-based non-work (HBNW), and non-home-based (NHB) trips (see the terminology section for the definitions of these terms). Figure 3 shows the distribution of person trips by trip purposes presented in the survey. About 50 percent of the person trips are HBNW trips (i.e., trips that started or ended at the home location and are non-work related).

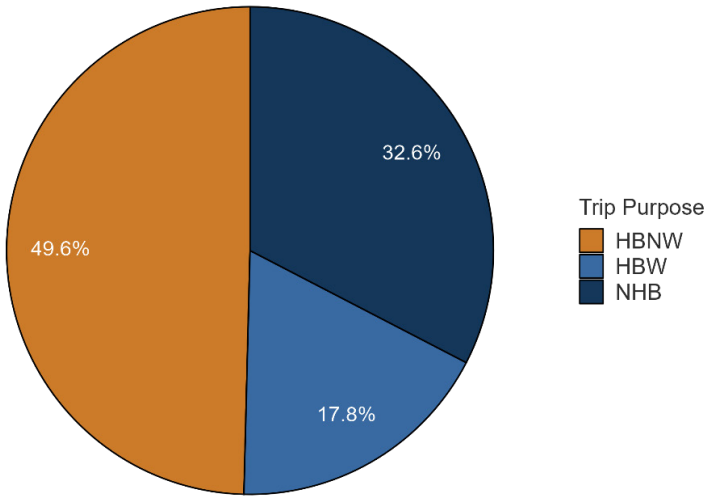


Figure 3. Distribution of Daily Person Trips by Purpose.

3 TRIP TYPES

1. Home-based work
2. Home-based non-work
3. Non-home based

Household trip rates are estimated based on household characteristics such as household size, income, number of employed persons, number of vehicles, etc.

HOUSEHOLD TRIP RATES

Household trip rates are estimated based on household characteristics such as household size, income, number of employed persons, number of vehicles, etc. For travel forecasting applications, households with the same characteristics are grouped, and an average trip rate is used to represent that group.

Figure 4 shows the SETRPC household trip production rates as a function of household size and trip purpose.

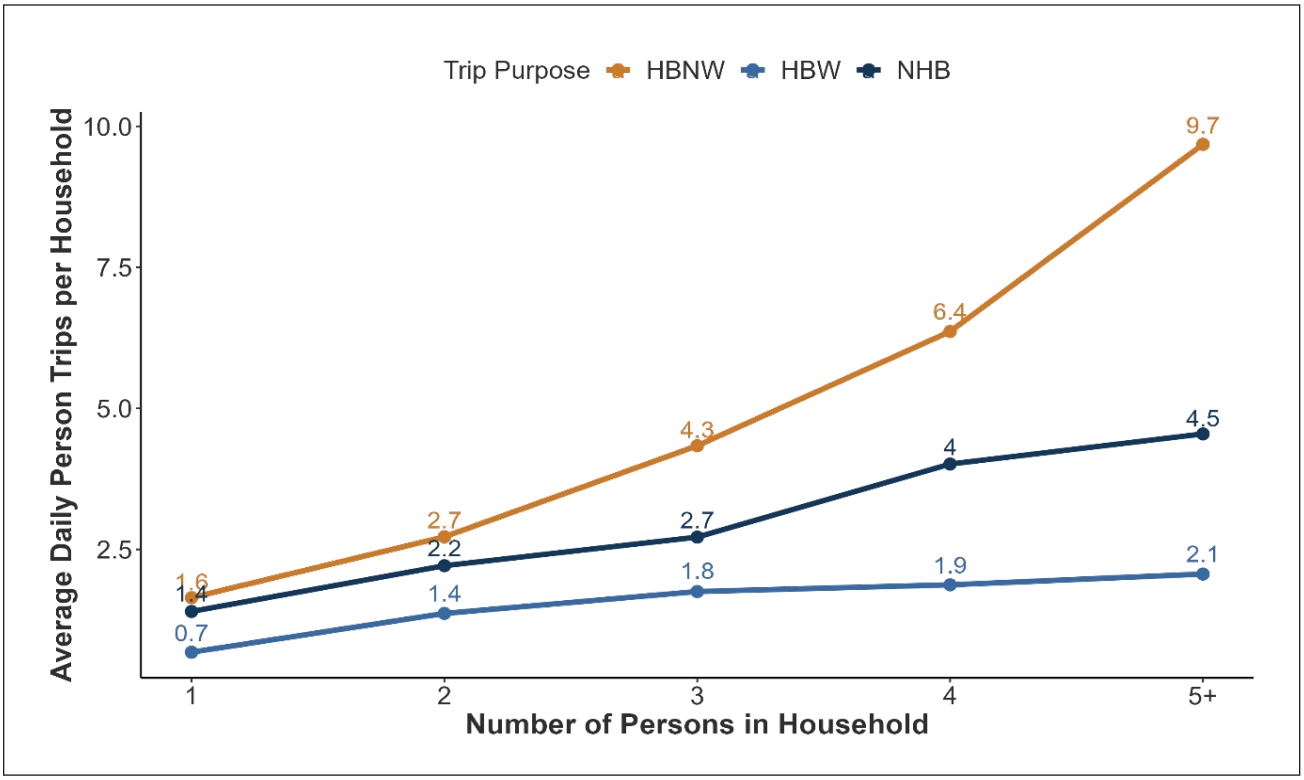


Figure 4. Household Trip Rates by Household Size and Trip Purpose.

As expected, as the household size increases, the household trip rates increase across trip purposes. Figure 5 shows household trip rates as a function of the household income range. The number of household HBW trips tends to increase as household income increases. However, the NHB trip rates do not continually increase in relation to household income. The NHB trip rates drop for the last two higher income groups, which goes against initial expectations. This intriguing trend may indicate the existence of trip under-reporting, especially for NHB trips that might be more susceptible to being inaccurately reported due to the burden of the survey.

As expected, as the household size increases, the household trip rates increase across trip purposes.

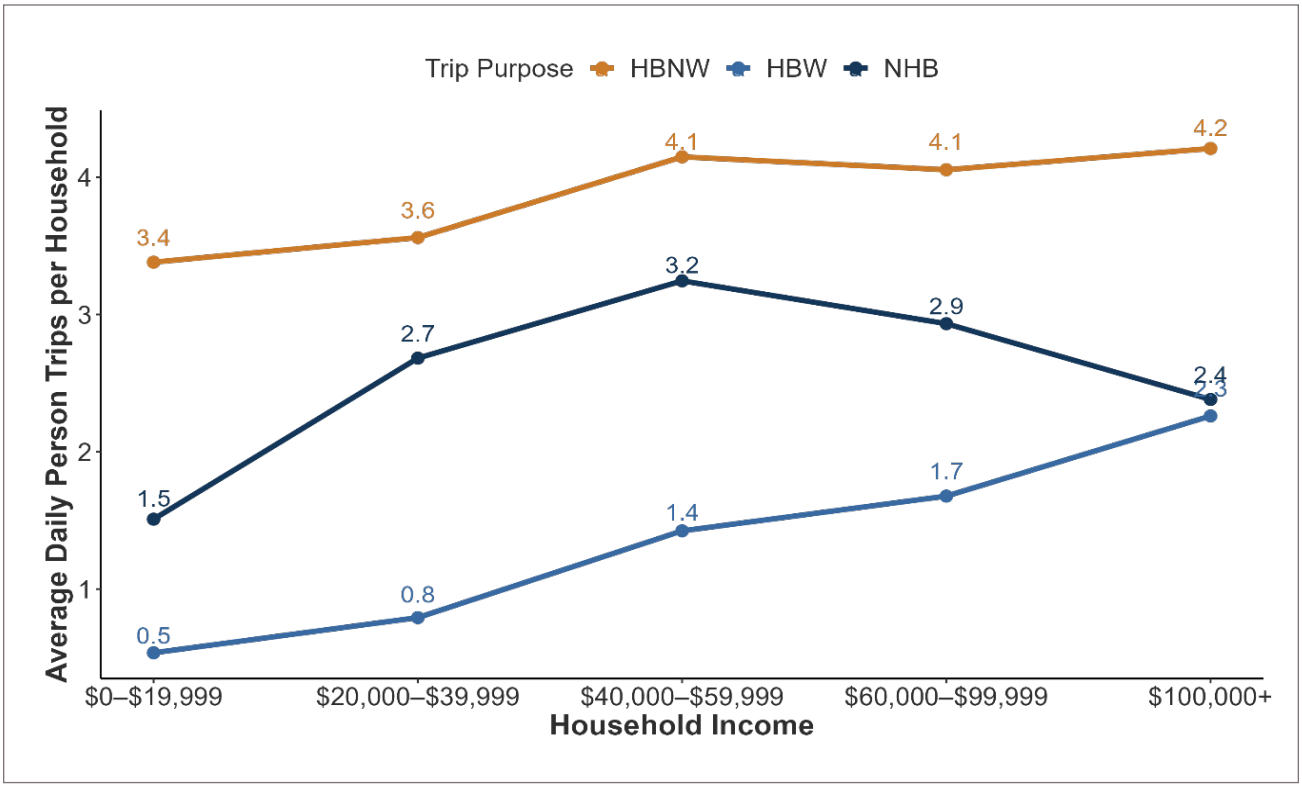


Figure 5. Household Trip Rates by Household Income and Trip Purpose.

Figure 6 shows the household trip rates by number of employed persons in the household.

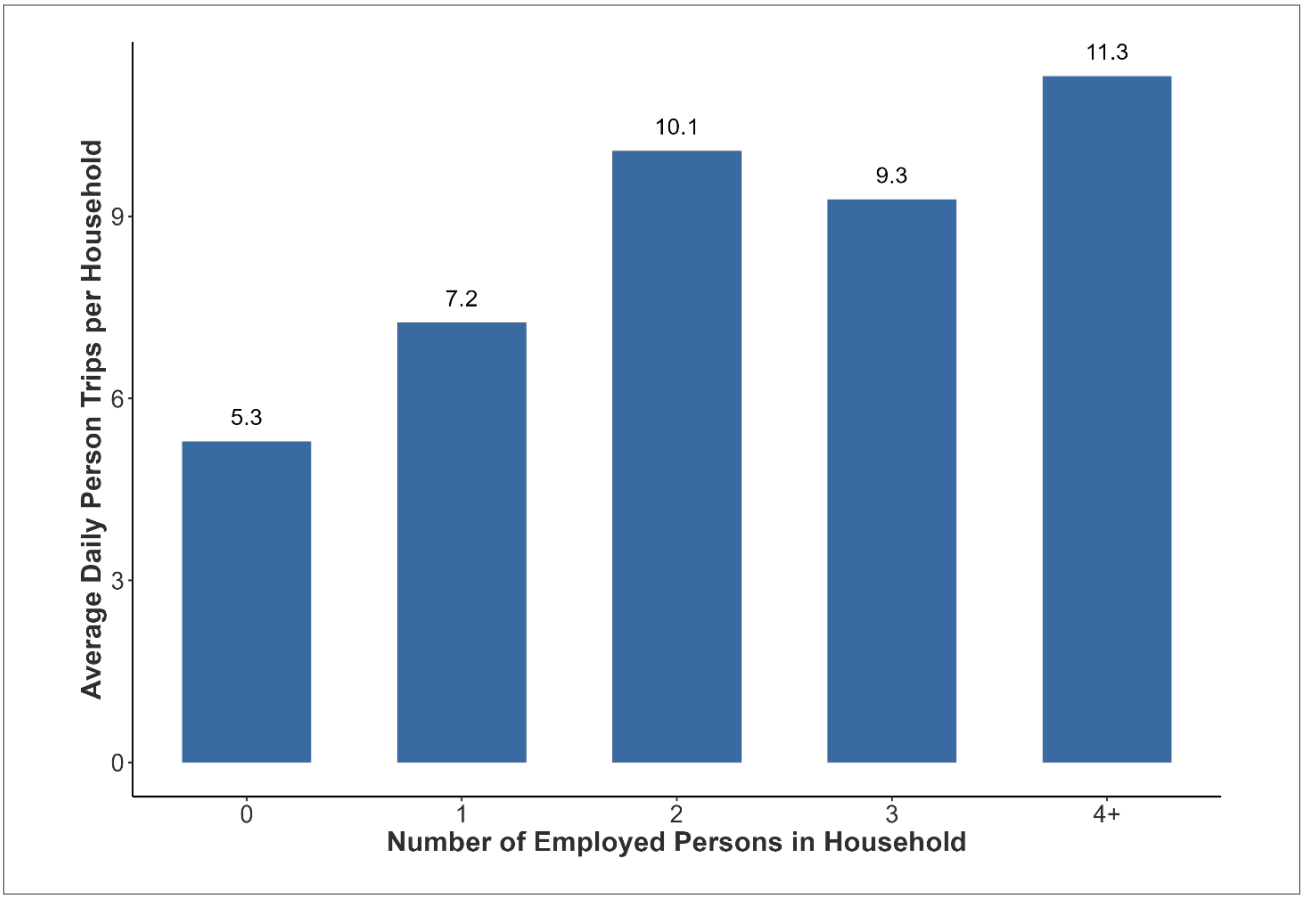


Figure 6. Household Trip Rates by Number of Employed Persons in Household.

Figure 7 shows the person trips per household cross-classified by household size and household income for all internal trips. These trip rates are for trips made by all modes of transportation, including transit, bicycle, and walk trips. The average internal person trips per household is 7.8.

For travel forecasting applications, the cross-classified trip rates are further disaggregated by trip purposes. As a part of the travel forecasting process, the person trips are divided among the modes during the mode split step.

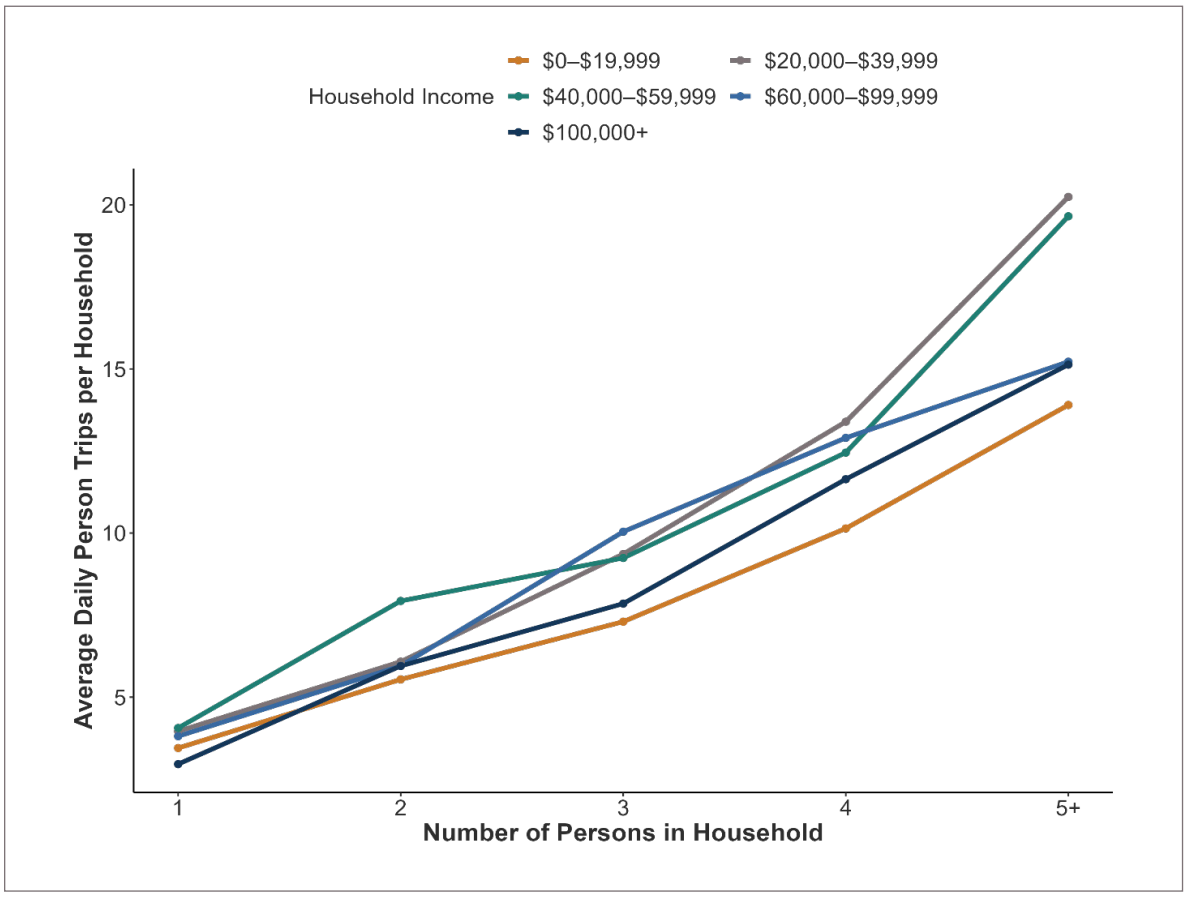
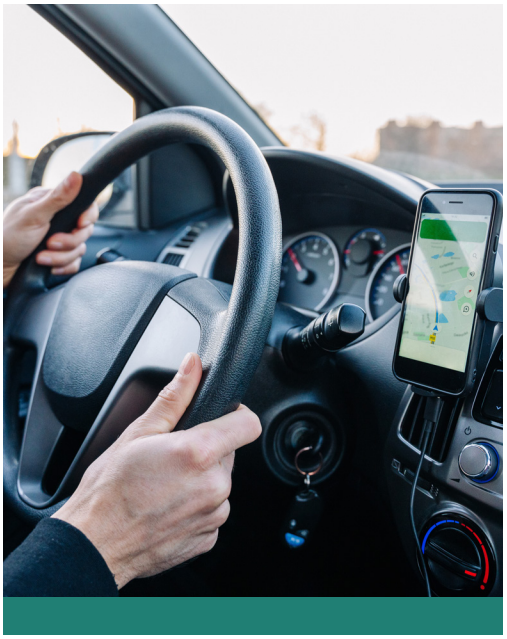


Figure 7. Average Person Trips per Household by Household Size and Income.

PLACE OF TRAVEL

The travel diary recorded trip origin and destination locations, and the type of places at these trip ends. Figure 8 illustrates the observed density of trip attractions at the TAZ level from the survey, which reflects where people traveled. The attraction ends reflect where people are attracted to, and thus this figure reflects the top travel destinations within the study area based on the household survey.



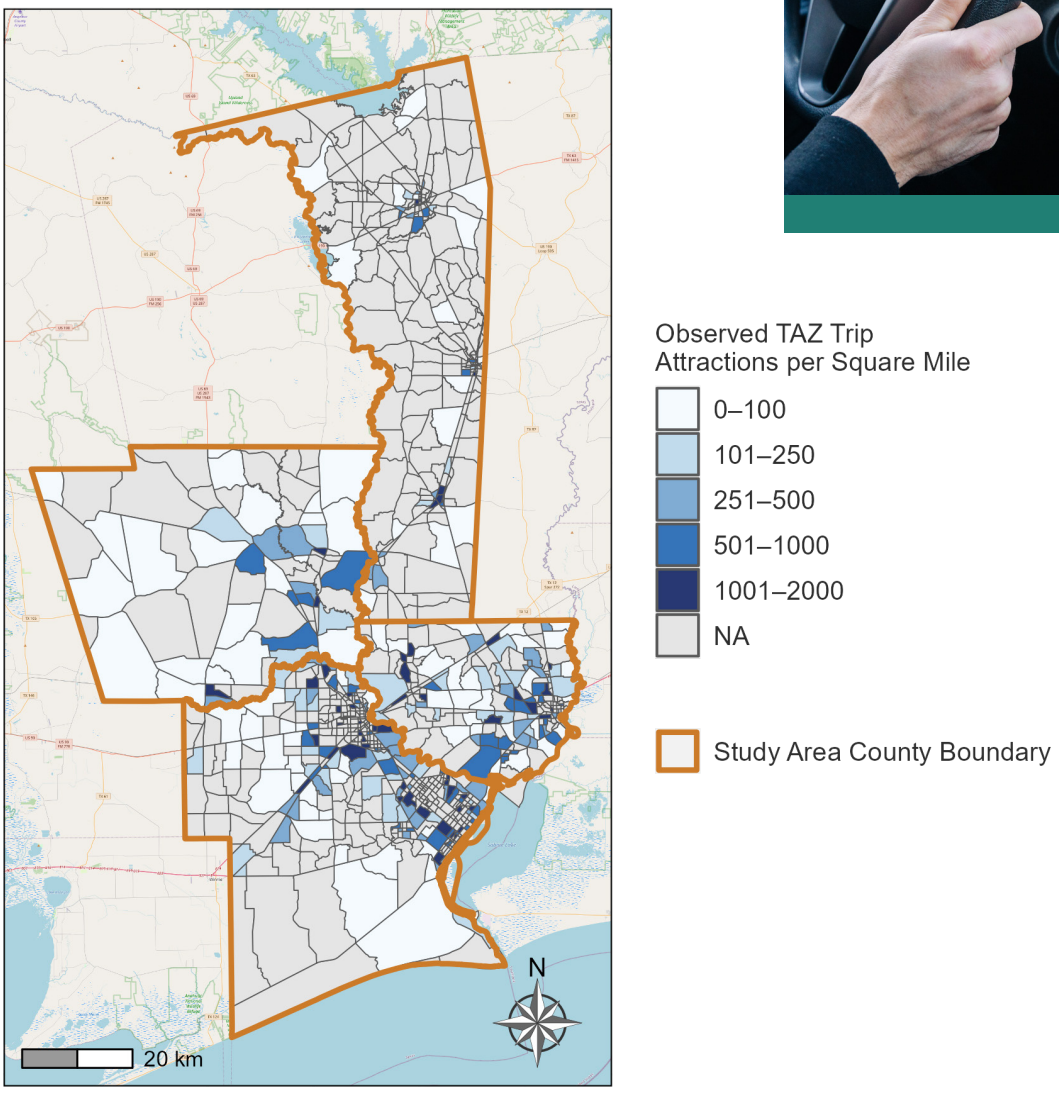
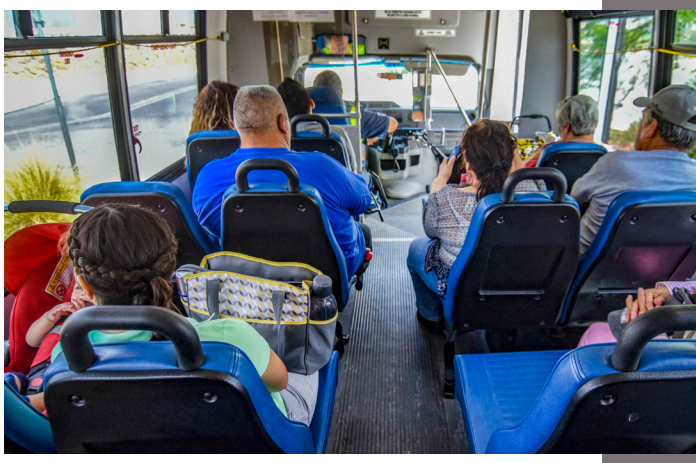


Figure 8. Observed TAZ Person Trip Attraction Density.

MODE OF TRAVEL

The modes of travel include automobile driver, automobile passenger, school bus, walk, bicycle, taxi and rideshare, public transportation, and other modes. These modes are grouped into broad categories; for example, school bus is categorized as transit, and taxi and rideshare are categorized as auto passenger, etc. Figure 9 provides the distribution of person trips by broad categories of modes (percentages do not sum to 100 due to rounding).



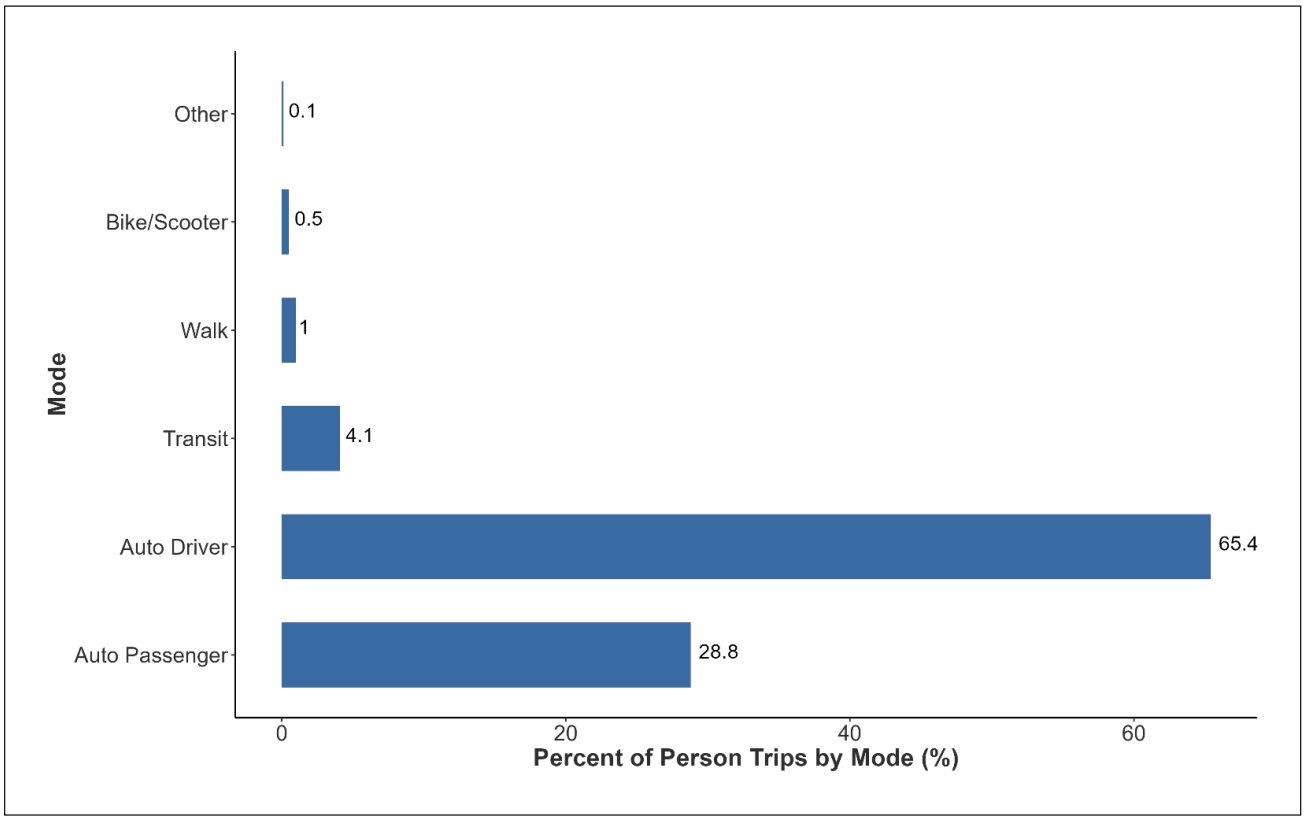


Figure 9. Distribution of Person Trips by Mode of Travel.

As traffic during peak periods becomes more congested, some drivers choose to make trips earlier or later to avoid traffic congestion.

TIME OF TRAVEL

The time of travel refers to the start time of a trip. At the person level, the time of travel is determined by an individual's daily schedule, and these individual choices for time of travel result in the traffic fluctuations on the regional roadway network. As traffic during peak periods becomes more congested, some drivers choose to make trips earlier or later to avoid traffic congestion. Figure 10 shows the distribution of trip departure times for a 24-hour weekday during the school year observed in the SETRPC survey by trip purpose.

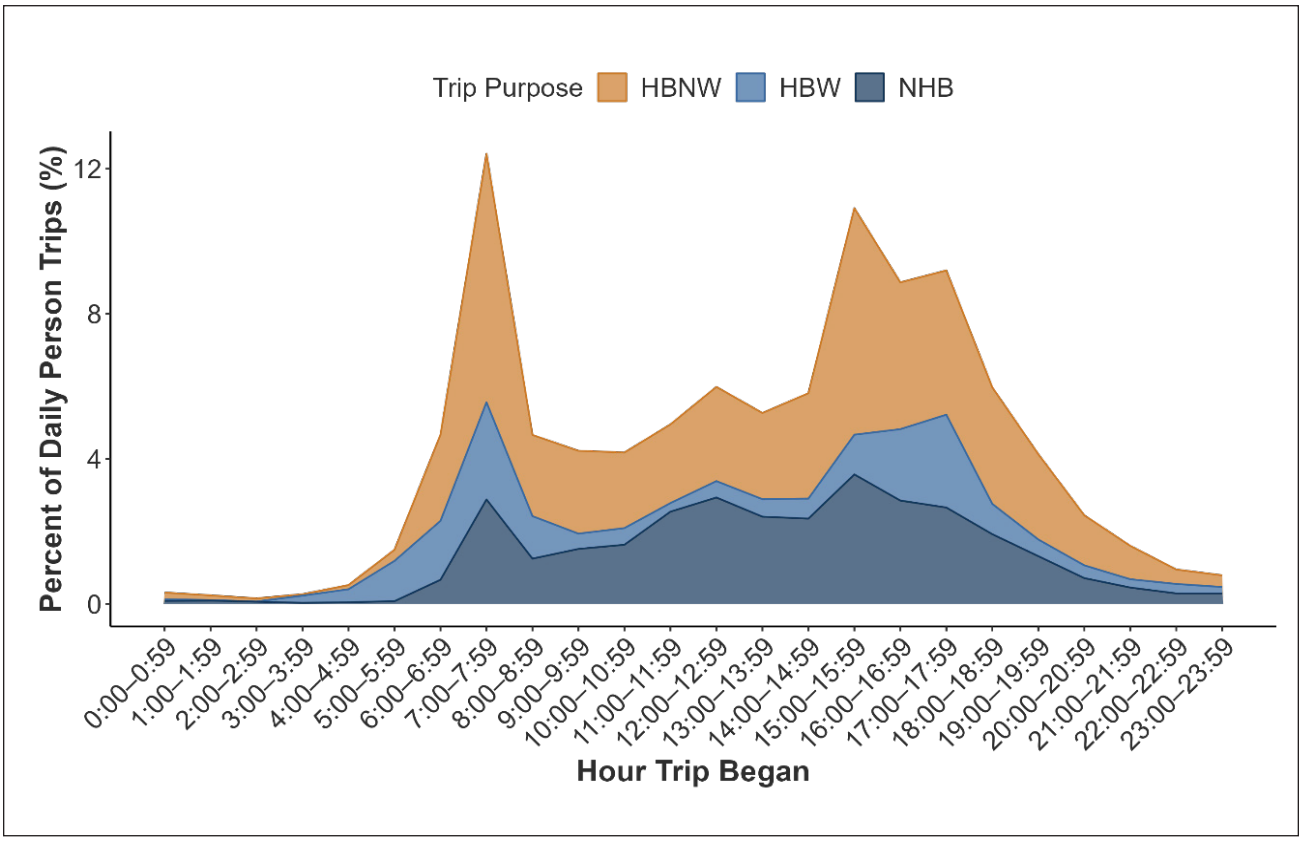


Figure 10. Distribution of Daily Person Trips by Departure Hour.

WORK
REMOTE WORK CHARACTERISTICS

The survey also collected information about telecommuting. The survey included 3,312 respondents that were age 16 or above, of which 2,067 respondents (79 percent) were employed. The survey had 1,770 respondents employed 30 hours or more per week, of which 198 (11 percent) reported working from home on a regular basis. Of the individuals that reported working from home on a regular basis, 70 percent worked at home 5 or more days in the past 7 days. Figure 11 shows that about 67 percent of the full-time employees reported zero work-at-home days, and the remaining 33 percent reported at least 1 work-at-home day in the past 7 days though only one-third of these identified themselves as working from home regularly.

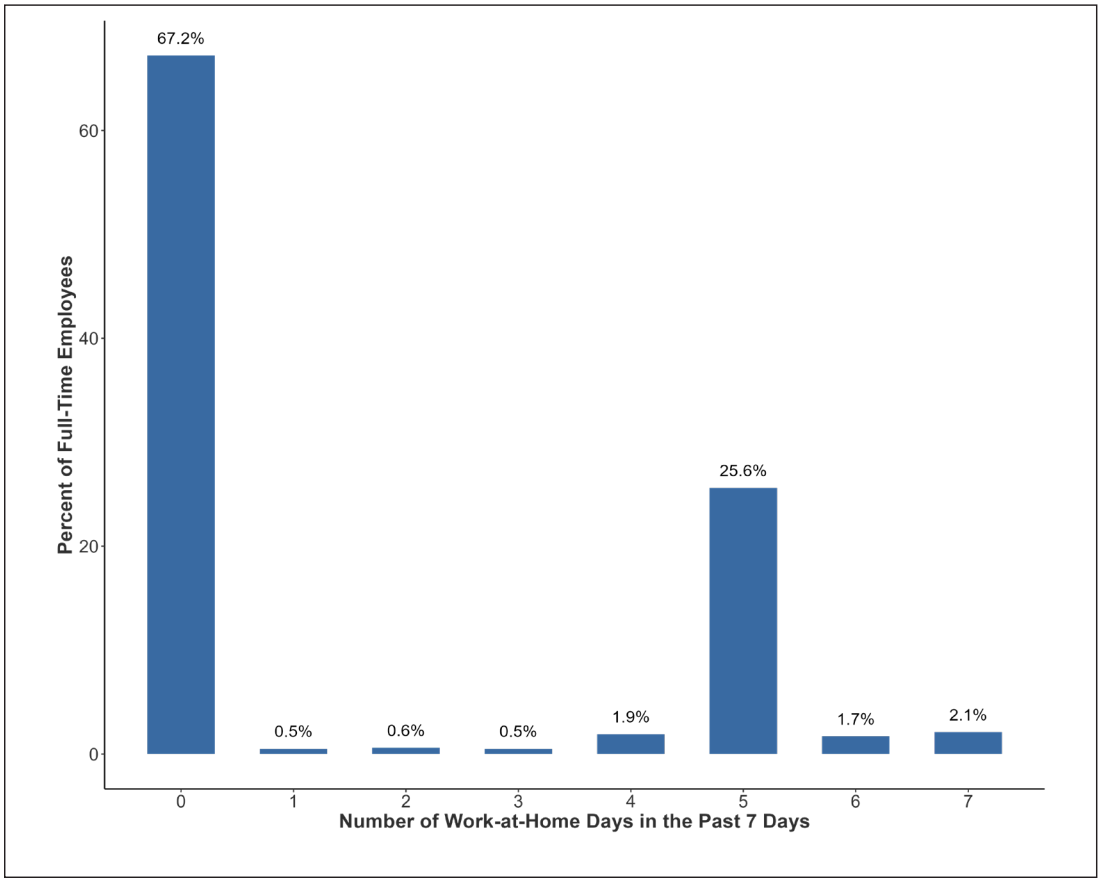


Figure 11. Distribution of Number of Work-at-Home Days.

Table 1 shows the percent of people who worked at home by industry type for surveyed respondents who were employed 30 hours or more per week and who worked at home at least 1 day of the last 7 days and reported primary industry information.

Table 1. Work at Home by Industry.

Industry	NAICS (2-digit)	Surveyed Full-Time Employees (≥30 Hours/Week)	Employees Working at Home (≥1 Day)	Percent Working at Home (≥1 Day)
Professional, scientific, management, administrative, and waste management services	54, 55, 56	154	77	50%
Information	51	62	30	48%
Other services (except public administration)	81	241	94	39%
Construction	23	189	72	38%
Finance, insurance, real estate, and rental and leasing	52, 53,	89	34	38%
Retail trade	44-45	96	32	33%
Transportation, warehousing, and utilities	22, 48-49	200	60	30%
Education, health, and social services	61, 62	462	125	27%
Arts, entertainment, recreation, accommodation, and food service	71, 72	99	24	24%
Agriculture, forestry, fishing and hunting, and mining	11, 22	26	6	23%
Manufacturing	31-33	57	12	21%
Public administration	92	55	7	13%
Wholesale trade	42	12	1	8%
Total		1,742	574	33%

Figure 12 shows the percentage of surveyed full-time employees who worked from home regularly across different occupations. The farming, fishing, and forestry category includes only 16 surveyed full-time employees. Excluding this category, sales and office occupations have the highest rate of employees working from home.

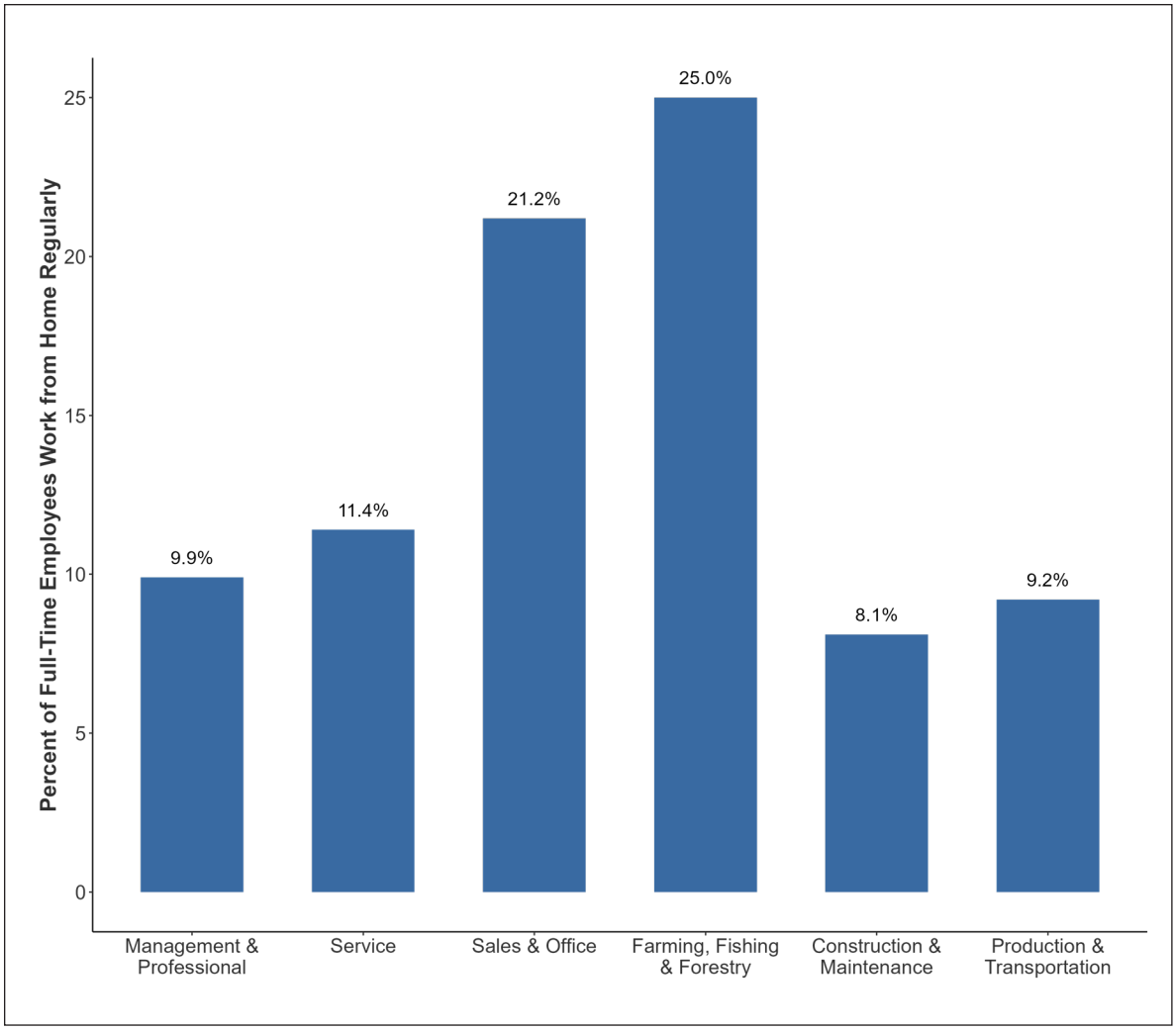
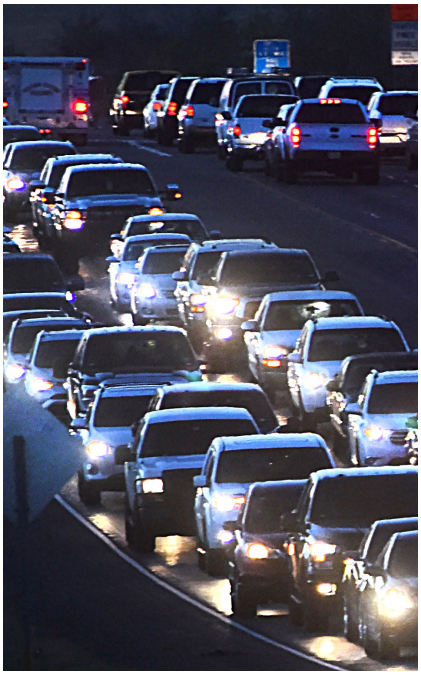


Figure 12. Percent of Full-Time Employees Work from Home Regularly by Occupation.

SUMMARY
IN CONCLUSION

This technical summary summarizes the 2022–2023 SETRPC Household Travel Survey preliminary unexpanded results on household travel characteristics on weekdays during the school year, such as the amount, place, mode, and time of travel. This technical summary also provides some insights on the remote working characteristics, which have become more prevalent since the COVID-19 pandemic.

In summary, 4,214 persons from 1,663 households participated in the survey and recorded 13,049 internal trips. On average, each person made 3.1 internal person trips per day, and each household made 7.8 internal person trips per day. About 2 percent of the households and 18 percent of the surveyed persons did not travel within the study area during the survey day. About 94 percent of all internal person trips were made via auto. The morning and afternoon peak hours were 7 a.m. to 8 a.m. and 3 p.m. to 4 p.m., respectively. Over 11 percent of the persons that were employed 30 hours or more worked from home or telecommuted on a regular basis.



TERMINOLOGY

Within the context of the household travel survey, a number of terms are used. These terms are defined in this section.

Automobile Driver Trip — The movement of a vehicle from one location to another location. These trips are recorded for the person driving the vehicle. These are also referred to as vehicle trips.

Home-Based Non-work (HBNW) Trip — A trip with one end of the trip at home and the other end of the trip at a location other than the work location. An HBNW trip is non-directional in terms of the trip activity/trip purpose.

Home-Based Work (HBW) Trip — A trip that has one end of the trip at home and the other end of the trip at work. An HBW trip is non-directional in terms of the trip activity/trip purpose (i.e., a trip from home to work or from work to home is defined as an HBW trip).

Mode of Travel — The physical means used by the household member to make a trip. The modes are walk, vehicle driver, vehicle passenger, carpool driver, carpool passenger, public transportation, school bus, rideshare service, taxi/paid limousine, bicycle, motorcycle/moped, and other.

Non-Home-Based (NHB) Trip — A trip with neither end of the trip at home.

Person Trip — The movement of an individual from one location to another location. In the household survey, trips were recorded for all persons in a surveyed household.

Trip Purpose — Stated in terms of the purpose at the location the trip began and the purpose at the location the trip ended. For example, a trip that began at home and ended at work would be referred to as a home-based work (HBW) trip. Three primary trip purposes are used in the household survey. These include HBW, home-based non-work, and non-home-based trips.

Vehicle Availability — The number of vehicles available to members of a household for making trips.

2022–2023

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