PERSONAL TRAVEL IN OREGON: A SNAPSHOT OF DAILY HOUSEHOLD TRAVEL PATTERNS

FINAL REPORT

PREPARED FOR
Oregon Department of Transportation

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Introduction

The Oregon Household Activity Survey (OHAS) is a comprehensive study of the demographic and travel behavior characteristics of Oregon residents. The survey results document demographic and travel behavior characteristics associated with typical weekday personal travel across the state. The resulting data has supported the update and development of several regional and statewide travel demand models as well as informed policy-related questions.

The survey was conducted from 2009-2011. Operationally, the state was divided into ten survey regions that were surveyed on a rolling basis (determined by funding availability). Households within each region were randomly sampled and invited to participate in the study through a combination of mail and telephone. Households that agreed to participate were asked to have all household members keep a diary of all travel-related activities for an assigned 24-hour period. Travel periods were evenly distributed throughout the weeks when school was in session for that region. Completed logs were collected by mail and telephone and results were compiled into a statewide database.

The survey documented daily weekday household travel patterns of 17,941 households randomly sampled from among the 1.5 million Oregon households. Table I-1 lists sample size and when the survey was conducted by region. Figure I-1 shows the survey regions in a map format.

Table I-1: Survey Regions

Survey Region	Surveys	Survey Seasons
ODOT Region 2*	3,577	Spring and Fall 2009
ODOT Region 3**	1,951	Spring 2009
ODOT Region 4	1,210	Spring 2009
ODOT Region 5	1,220	Spring 2010
ODOT Region 1/ Portland Metro***	4,516	Spring and Fall 2011
Central Lane	1,786	Fall 2009
Salem/Keizer	1,821	Spring 2010
Medford/Rogue Valley	1,061	Fall 2011
Bend	799	Spring 2011
Statewide Total	17,941	

*Includes Albany and Corvallis metropolitan areas; **Includes Grants Pass; ***Defined as Clackamas, Multnomah, and Washington counties.

Figure I-1: Survey Regions
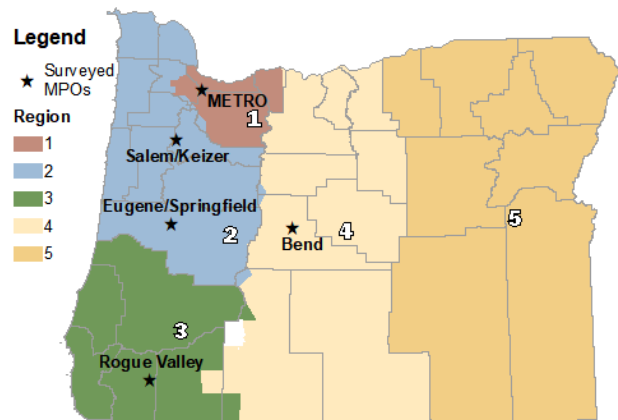
INTRODUCTION

KEY TERMS AND REPORT STRUCTURE

The purpose of this report is to tell the story of "typical" daily weekday travel by Oregon residents through the lens of the OHAS data. This includes a summary of daily weekday travel patterns by different demographic and geographic characteristics and an exploration of the demand for transportation based on activities reported by participating households. The goal is to provide a snapshot of who travels when, where, why, and how, beyond what can be gleaned through annual traffic volume counts or reports on vehicle miles traveled. In order to tell that story, the report will use specific terms as defined in Table I-2.

Table I-2: Key Terms

Term	Survey Definition
Household	Persons living at the same residential address who share meals and have some type of relationship.
Trip	Travel between two addresses for the purposes of carrying out one or more activities (e.g., a trip from home to work or family trip from home to the beach).
Tour	A series of trips that are combined. A tour ends when the traveler(s) return home (e.g., a trip from home to the beach and then from the beach to home with a stop on the way home for ice cream).
Activity	Reason for travel.
Worker	Worker status is as self-reported by each respondent age 16+. Full-time employment is considered as 35+ hours per week, while part-time employment is considered as less than 35 hours a week. The survey included questions to distinguish between those who reported they work for pay vs. those who volunteer.
Travel Mode	The vehicle(s) (or by foot) that a person uses to travel from one place to another.
Trip Length	The length of the trip in miles between the reported trip origin and destination. For vehicle trips, this is an approximate route distance (e.g., the most likely route a respondent may have taken to get to the beach). Due to survey limitations, walk and bike trip lengths reflect a straight-line or "crow flies" distance.
Trip Duration	The length of the trip in minutes, as reported by the respondent.
Place Type	A derived variable used to convey the population density, built form, and number of amenity options available at a specific destination or home location.

Following this introduction, daily travel in Oregon is explored across eight chapters.

- Chapter 1 presents a summary of general travel trends for a typical weekday – the overall number of trips, miles traveled, and reported travel times.
- Chapter 2 explores who is traveling through a presentation of travel at the person level, focusing on specific demographic groups.
- Chapter 3 looks at the reasons for travel by summarizing how daily activities shape the system usage.
- Chapter 4 answers the question of "how we travel" through an exploration of the survey results by travel mode.

- Chapter 5 introduces the concept of when travel takes place (time of day and day of week).
- Chapter 6 provides insights into how travel varies based on characteristics of the built environment in which it takes place.
- Chapter 7 summarizes these different aspects of travel in profiles statewide and for each Survey Region.
- Chapter 8 concludes the report by evaluating the results of the OHAS effort in light of emerging survey methods and technologies.

SURVEY CAVETS AND LOOKING AHEAD

The 2009-2011 OHAS was a comprehensive effort that provided significant details about how Oregon's transportation infrastructure is used. The survey methods, sampling, and post-processing of the data conformed to industry standards. These included the use of state-of-the-practice methods and technologies as well as stringent quality control checklists. While these all help to ensure that the survey results as discussed in this report are an accurate portrayal of daily travel, there are certain limitations that should be noted:

1. Participating households were randomly sampled from a list of residential addresses and contacted by mail and phone (where a phone number was available). As a result, daily travel by those Oregon residents living in group quarters (such as military personnel living on a base, students living in dormitories, and those in assisted living homes) is not captured in this survey.
2. The sample design focused on achieving specific goals with respect to geography, household size, and the number of household workers. Census data was used to create statistical weights to balance on other important demographic characteristics but lower participation rates by minorities and young adults, as well as small geographic areas, limit the extent to which their travel can be discussed in this report.
3. By design, the survey focused on documenting typical weekday travel when school is in session. This means that weekend, summer, and holiday travel details are missing from this report. In addition, since each survey region was studied for a specific time period and the households were assigned to specific days of week to record travel, it is not possible to understand seasonal or daily (weekday) differences in travel.
4. While the bulk of the travel patterns in this report remain stable today, smaller pockets of travel have emerged since the survey was conducted in 2009-2011 such as ride-hailing and bike- and car-sharing services.

More sophisticated survey technologies and methods are now available to help remedy these shortcomings. In particular, agencies today are migrating to a continuous survey design that can provide seasonal and weekend data (if desired) as well as collect data in "real time" as travel trends are emerging. These and other considerations for future surveys are described in more detail in Chapter 8 of this report.
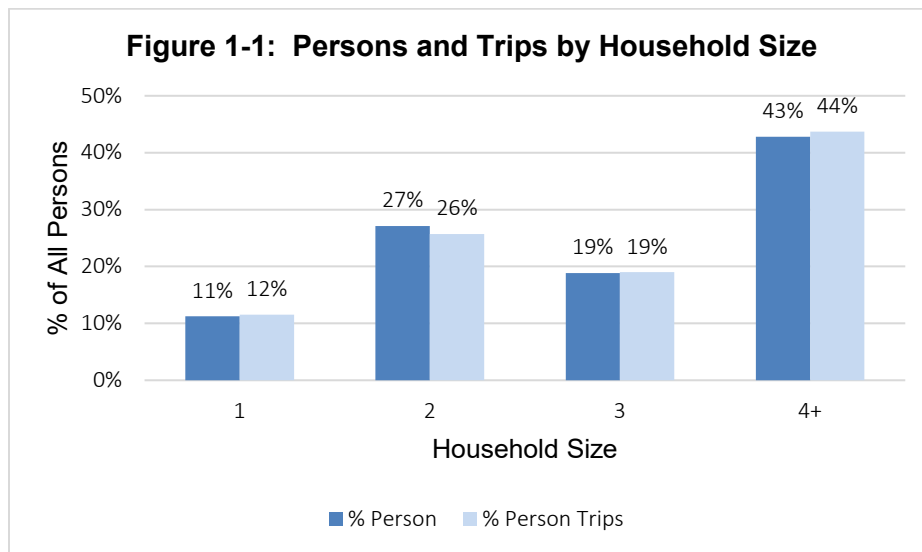
CHAPTER 1

Daily Weekday Travel in Oregon

As the ninth largest state in the U.S. by area, Oregon's 98 million square miles of land area are supported by a transportation network comprised of 74 thousand roadway miles. When the survey results are weighted and expanded to represent the population, Oregonians are reported to make almost 14 million trips along those roadways, spending 4 million hours traveling 86 million miles to fulfill daily activities such as work, school, shopping, and recreational activities on a typical weekday in 2011. These trips vary based on demographic characteristics, the reasons for travel, and travel modes used. This chapter explores the general travel trends and variation in average daily weekday household travel in Oregon.

WHO IS TRAVELING

In 2011, Oregon's population was comprised of 1.5 million households and 3.7 million people. When combined across all household members, households reported making 8.9 daily weekday trips on average, spending a combined 3 hours a day (or 12% of their day) traveling a total of 61 miles across all household members. On a per capita basis, this equates to 3.7 person trips on a typical weekday, with each person traveling an average of 75 minutes and 26 miles across the entire day. Travel at the household level varies based on household size and the number of household workers, household vehicles, and children in the household. In addition, travel patterns vary based on household income. At the person level, travel varies based on gender, age, and worker status.

As to be expected, the average number of trips varies by household size, with persons living in 1-person households comprising the smallest proportion of the population and generating the lowest proportion of travel. As shown in Figure 1-1, large households (4 or more members) comprise 43% of the Oregon population and generate 44% of trips on a typical average weekday. Along the same lines, households with more workers, more children and more income also generate more travel.

Figure 1-1: Persons and Trips by Household Size

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The per capita differences in travel based on household income are illustrated in Figure 1-2. If all persons, regardless of household income, travel the same then the proportions of persons, person trips, miles and minutes traveled per capita would generally show the same proportions. While the four measures show a similar pattern, the range is greater in the miles traveled. Specifically, persons living in households reporting an income of less than $25,000 report shorter-than-expected trips while those in households reporting incomes of $75,000 or greater reported traveling longer distances than expected.

Figure 1-2: Person Travel by Household Income
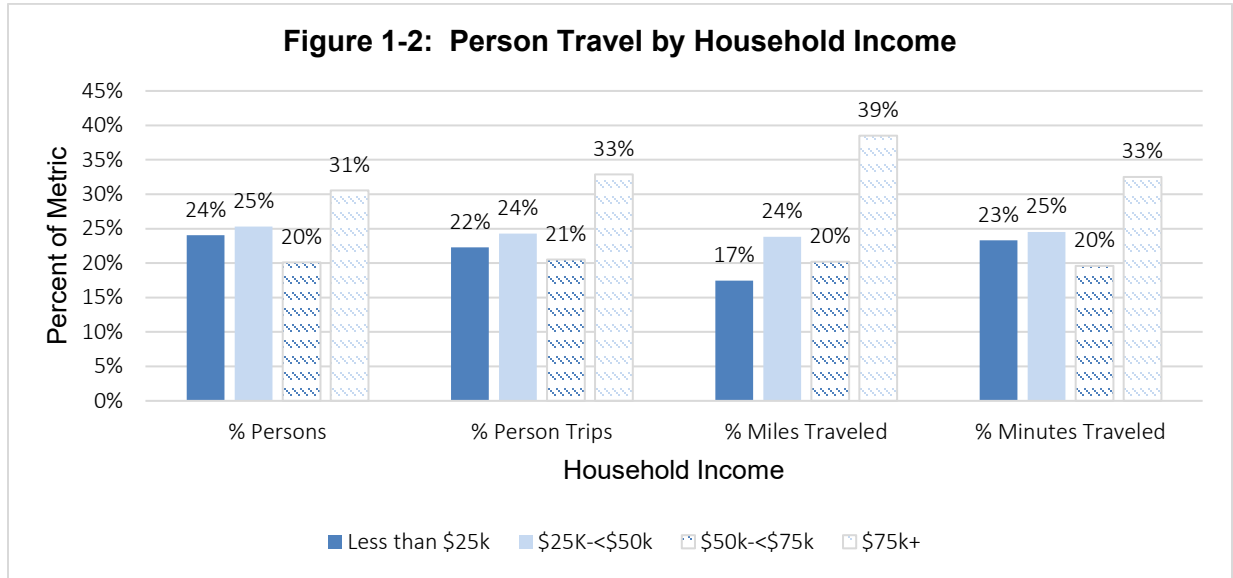
A large part of the differences among the households with respect to travel patterns can be explained by the gender, age and worker status of the household members. As illustrated in Figure 1-3, females comprise a slightly higher portion of the population and contribute more to overall number of trips and time spent traveling. However, males reported traveling more miles on an average daily weekday.

Figure 1-3: Person Travel by Gender
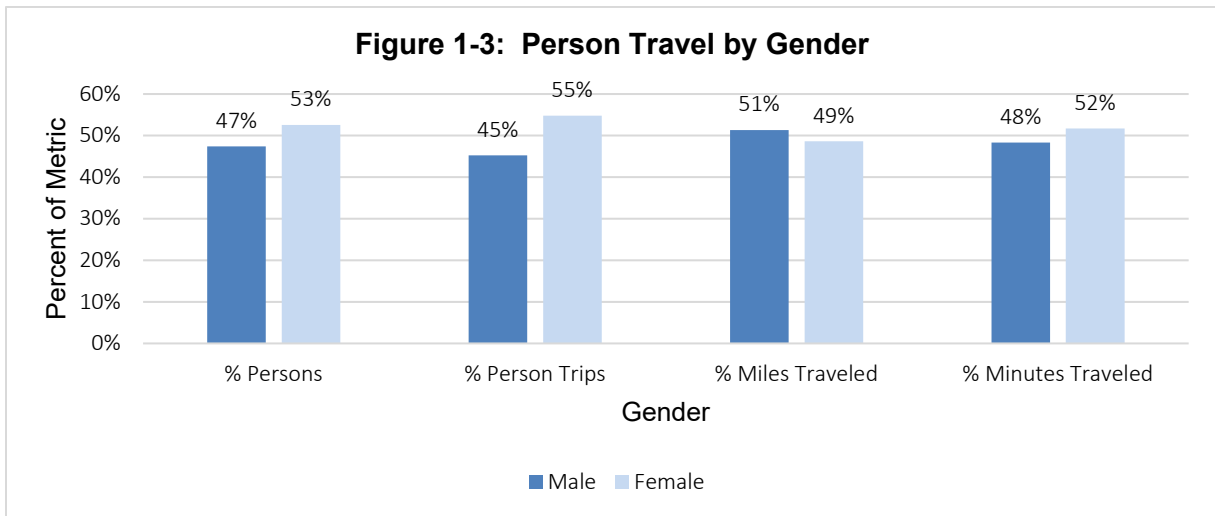
Oregonians ages 35 to 54 are the largest contributors to the volume of travel across the state, comprising 27% of the population but generating about one-third of the trips, miles and time spent traveling.

Figure 1-4: Person Travel by Age

% Persons	% Person Trips	% Miles Traveled	% Minutes Traveled
0-17: 27%	0-17: 23%	0-17: 15%	0-17: 21%
18-34: 20%	18-34: 21%	18-34: 21%	18-34: 22%
35-54: 27%	35-54: 31%	35-54: 34%	35-54: 32%
55-64: 13%	55-64: 14%	55-64: 17%	55-64: 14%
65+: 13%	65+: 12%	65+: 12%	65+: 12%

Legend: 0-17, 18-34, 35-54, 55-64, 65+. Y-axis: Percent of Metric. X-axis: Age.
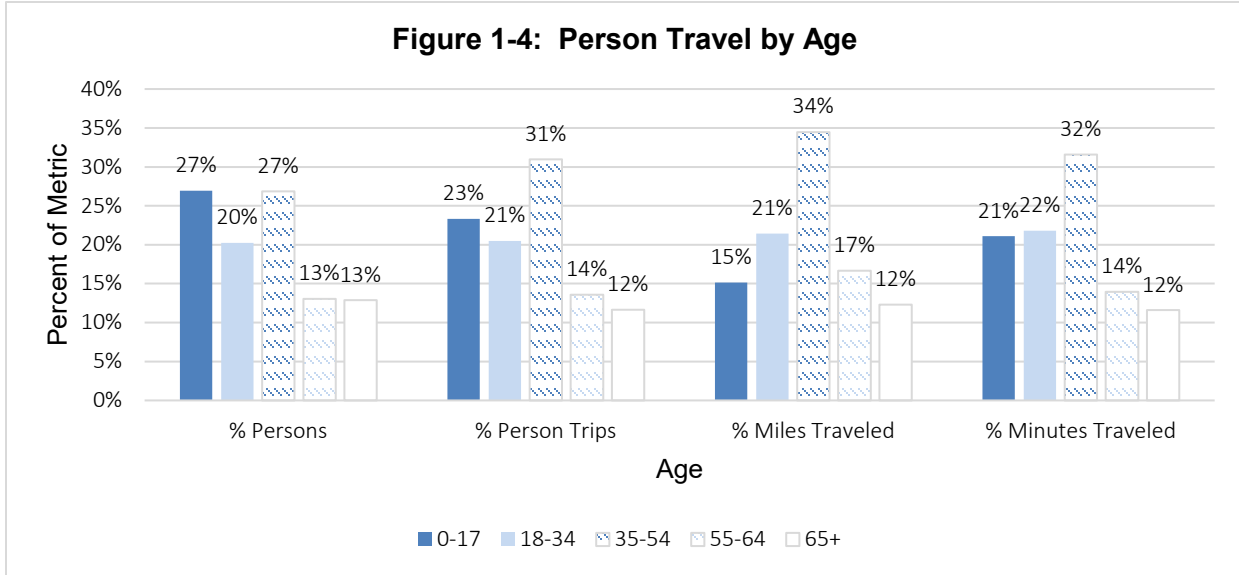
Full-time workers report the largest travel footprint among those ages 16+. Not only do workers comprise the largest proportion of those ages 16+, full-time workers also report the most and longest trips in terms of both miles and minutes traveled.

Figure 1-5: Person Travel by Worker Status

% Persons	% Person Trips	% Miles Traveled	% Minutes Traveled
Employed FT: 40%	Employed FT: 40%	Employed FT: 49%	Employed FT: 44%
Employed PT or Volunteer: 26%	Employed PT or Volunteer: 31%	Employed PT or Volunteer: 26%	Employed PT or Volunteer: 28%
Not Employed: 34%	Not Employed: 29%	Not Employed: 26%	Not Employed: 28%

Legend: Employed FT, Employed PT or Volunteer, Not Employed. Y-axis: Percent of Metric. X-axis: Worker Status.

WHY WE TRAVEL

Work and recreational trips represent a large number of the daily trips made, with work and work-related activities comprising 22% of all trips made, as shown in Figure 1-6. An additional 10% of trips are for school or school-related activities. The remaining trips are made for social/recreational activities (23%), personal errands (15%), transport others to their activities (13%) and shopping (17%).

Figure 1-6: Reasons Why We Travel

Shopping 17%
Work/Work Related 22%
Take Others to their Activities 13%
School/School Related 10%
Personal Errands 15%
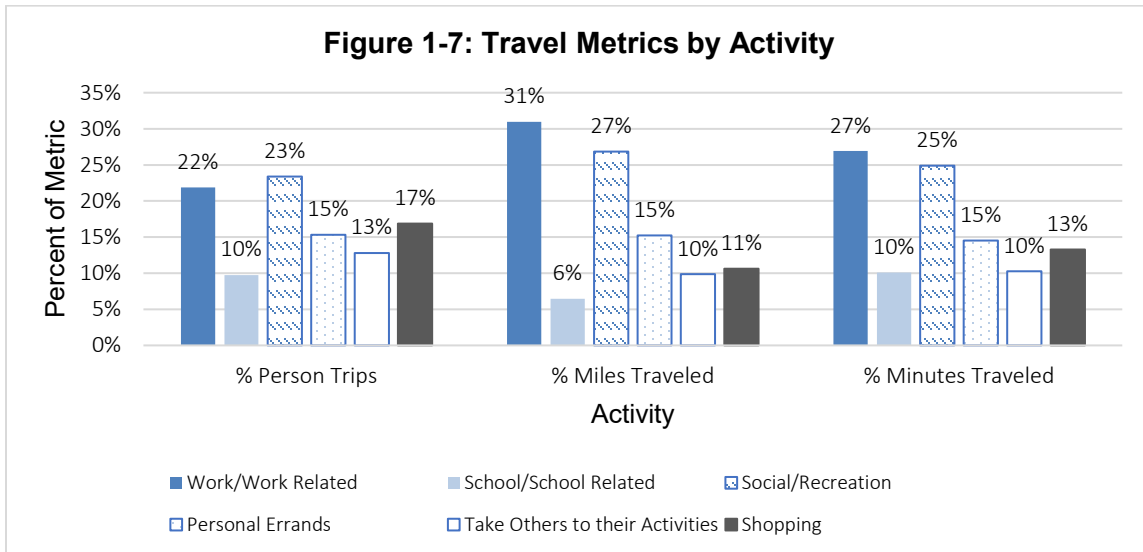Social/Recreation 23%
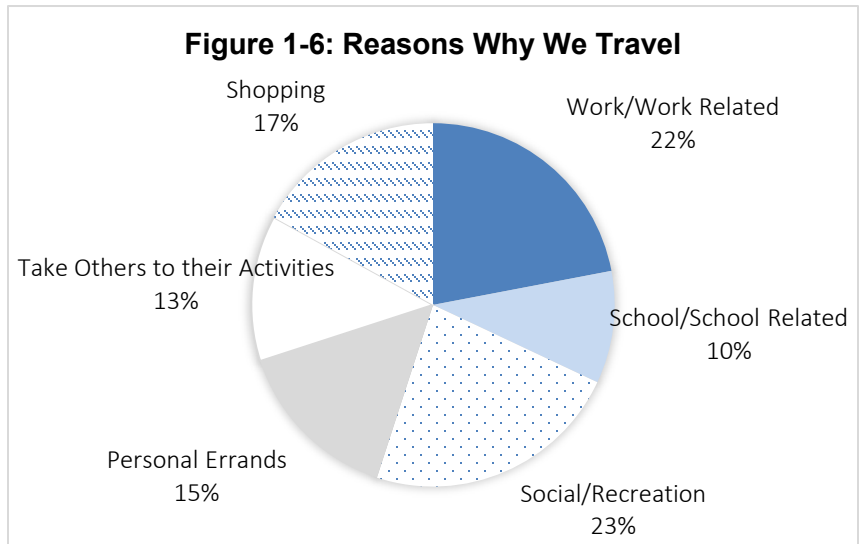
The length of trip, both in terms of distance and duration, varied based on the activity or reason for travel. As shown in Figure 1-7, Oregonians travel further for work and recreational activities than they do for all other purposes.

Figure 1-7: Travel Metrics by Activity

Percent of Metric (y-axis: 0% to 35%)

% Person Trips: Work/Work Related 22%, School/School Related 10%, Social/Recreation 23%, Personal Errands 15%, Take Others to their Activities 13%, Shopping 17%

% Miles Traveled: Work/Work Related 31%, School/School Related 6%, Social/Recreation 27%, Personal Errands 15%, Take Others to their Activities 10%, Shopping 11%

% Minutes Traveled: Work/Work Related 27%, School/School Related 10%, Social/Recreation 25%, Personal Errands 15%, Take Others to their Activities 10%, Shopping 13%

Activity

Legend: ■ Work/Work Related, School/School Related, ⊠ Social/Recreation, □ Personal Errands, □ Take Others to their Activities, ■ Shopping

HOW WE TRAVEL

Regardless of the reason for the travel, the majority of trips are made by auto. Of the 14 million trips made on a typical weekday in Oregon, 82% are auto trips. An additional 10% of trips are walk trips, 3% each are by bike and school bus and the remainder (2%) by transit. As to be expected, auto trips are the longest, comprising 94% of the 86 million miles traveled daily and 78% of the reported 4 million hours spent traveling.

Table 1-1: Travel Details by Travel Mode

Travel Mode	% Person Trips	% Miles Traveled	% Minutes Travel
Auto	82%	94%	78%
Walk	10%	1%	7%
Bike	3%	<1%	3%
Transit	2%	3%	7%
School Bus	3%	2%	5%

WHEN WE TRAVEL

At any given hour on the Oregon transportation network, residents are traveling for a variety of reasons. As shown in Figure 1-8 (next page), work and school trips patterns are the most easily discernable – peaking at 7 am. Trips for personal errands and shopping begin late morning and continue through early evening with shopping trips taking place later in the day (reflecting stops on the way home from work). Trips for social/recreation activities exhibit a strong evening peak. Trips to take others to their activities show morning and evening peaks.
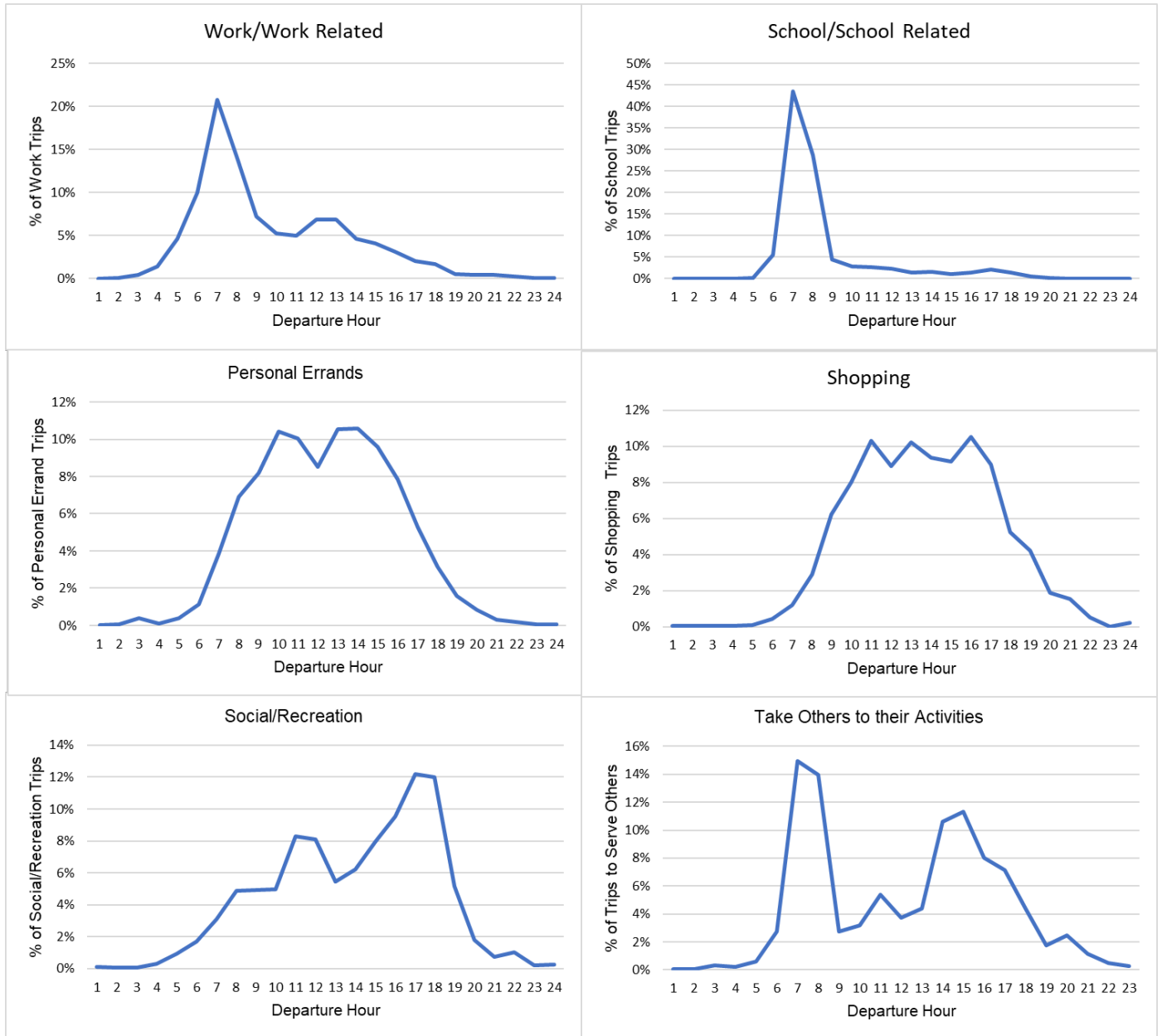
WHERE WE TRAVEL

"Place type" is a land-use descriptor developed by the Department of Land Use and Conservation (DLCD) and Oregon Department of Transportation (ODOT) to capture the neighborhood characteristics that influence transportation choices. Defined by a combination of both area type and development type, place types are data-driven descriptors of the travel environment, specifically residential and employment densities and transportation options (i.e., multi-modal and pedestrian-oriented facilities and transit service availability).[1]

This report uses nine place type categories, which are defined and explained in Chapter 6. Travel by place type varies significantly, with trip rates ranging from a low of 3.4 trips reported by those living in rural areas near major activity centers to a high of 4.1 trips reported by residents of the MPO Transit-Oriented Development (TOD) place type. With respect to daily trip miles, the range is from a low of 17 miles reported by residents of the MPO TOD place type to a high of 44 miles reported by those living in the rural place type.

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[1] For details regarding the construction of the place type variable used throughout this report, see https://www.oregon.gov/ODOT/Planning/PTVSV/PlaceType_Flyer.pdf

Figure 1-8: Time of Day of Travel by Activity

Work/Work Related

School/School Related

Personal Errands

Shopping

Social/Recreation

Take Others to their Activities

CHAPTER 1

GENERAL CONCLUSIONS

On a typical weekday in 2010, Oregonians make almost 14 million trips, spending 4 million hours traveling 86 million miles to participate in a variety of activities. The characteristics of these trips vary based on who is traveling (with workers contributing the most to the daily weekday travel volumes). Work commute trips and trips for social/recreation activities tend to be longer than those all other purposes. The majority of trips are made by auto and vary by time of day and trip purpose and based on the density and activity opportunities in various place types across the state. In the next chapter, these core aspects of daily travel are further explored to provide a better understanding of how travel varies based on demographic characteristics.

Who is traveling?

The average Oregon household surveyed[2] is comprised of 2.4 persons and owns 1.8 vehicles and 1.5 bicycles. These same households report an average of 8.9 average weekday trips covering 61 miles and taking 168 minutes to complete. This equates to 3.7 trips per person, averaging 26 miles per day and each person spending 75 minutes per day traveling to various activities.

Reminder: Time spent traveling was self-reported and respondents often "rounded up."

The actual travel patterns vary based on where the household is located. As shown in Table 2-1, households in the Salem/Keizer survey region report the highest level of trip making at 9.5 trips per day while those in ODOT Region 3 and Central Lane reported the lowest rate of 8.6 trips per day. With respect to distance traveled and the amount of time spent traveling on a typical weekday, the lowest levels of travel is by households in the Medford survey region who report traveling an average of 41 miles over 128 minutes on a typical weekday. The highest levels of miles traveled are reported by households in ODOT Region 4, while households in ODOT Region 2 and the Salem/Keizer survey region report the longest trip durations. As a reminder, a survey region map is included in the Introduction to this report.

Table 2-1: Household Trip Rates by Survey Region

Survey Region	Household Trips		Daily Trip Miles	Daily Travel Time (minutes)
	Sum (000)	Mean	Mean	Mean
ODOT Region 2	283	9.0	73	178
ODOT Region 3*	132	8.6	75	166
ODOT Region 4	91	9.3	77	168
ODOT Region 5	68	9.2	62	151
ODOT Region 1/ Portland***	642	8.8	56	175
Central Lane	105	8.6	44	143
Salem/Keizer	89	9.5	58	178
Medford/Rogue Valley	68	9.1	41	128
Bend	40	9.3	48	149
Statewide Total	1,519	8.9	61	168

See Introduction for a map of Survey Regions. *Corvallis and Albany metropolitan areas included in ODOT Region 2. **Grants Pass included in ODOT Region 3. ***Defined as Clackamas, Multnomah, and Washington counties.

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[2] All demographic characteristics summarized in this report reflect those of survey respondents across the 2009-2011 survey time period. These characteristics may differ from other publicly available descriptions of Oregon residents.
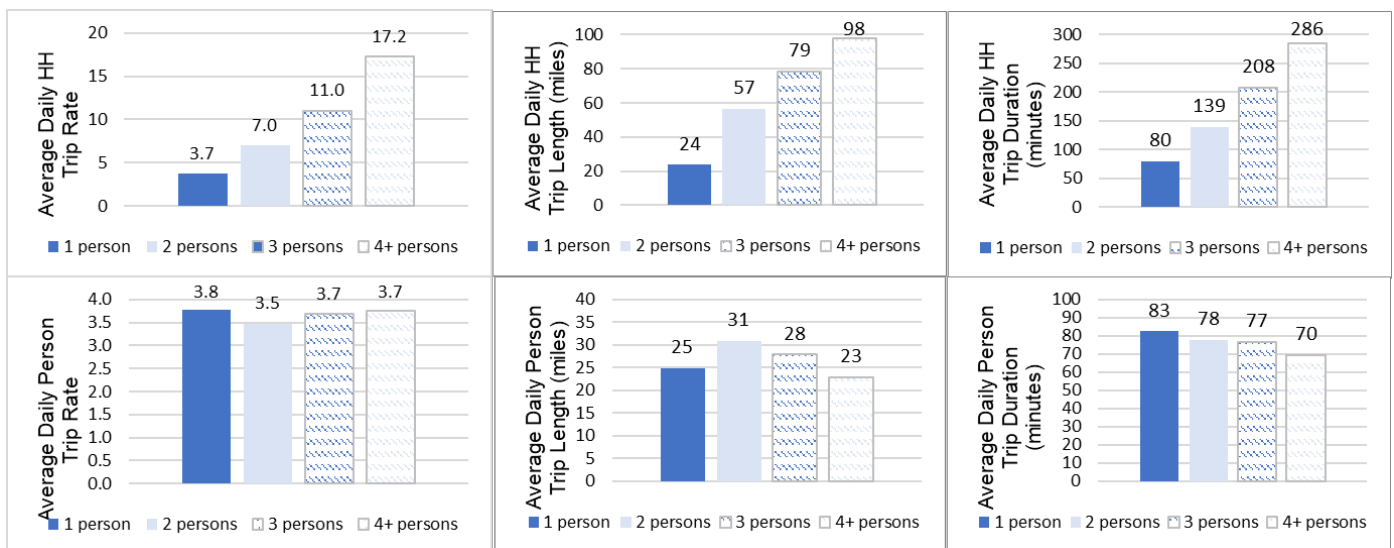
HOUSEHOLDS

The average daily number of weekday trips increases as household size increases (which is to be expected). 1-person households report 3.7 daily trips, while 4+ person households report 17.3 trips. Similarly, the distance and time spent traveling increases as the household size increases. As indicated in Figure 2-1, the average daily weekday trip distances and time spent traveling doubles between 1- and 2-person households (24 miles and 57 miles, and 80 and 139 minutes traveled, respectively), but then reflects a more moderate increase for 3- and 4+ person households.

Residential Sample

The Oregon Household Activity Survey was based on a sample of residential addresses. As such, daily travel by those Oregon residents living in group quarters (such as military personnel living on a base, students living in dormitories, and those in assisted living homes) is not captured in this survey.

On a per person basis, the average daily person trip rate does not vary that much across the different household size categories: persons living in a 1-person household report 3.8 trips per day as compared to 3.5 trips for those living in 2-person households and 3.7 trips for those living in households with 3 or more members. However, the per person length of the trip does vary by both distance and duration, with those living in 2-person households reporting traveling the longest distances in a day and those living 4+ person households reporting the shortest trips in terms of both distance and time.

Figure 2-1: Travel Metrics by HH Size

Average daily weekday travel patterns vary based on the type of household traveling. Households with children tend to make three times the number of trips on average as compared to households without children, with the former spending twice as long traveling in terms of both distance and time (see Figure 2-2). At a per person level, the differences are not as dramatic: persons living in households with children have a slightly higher person trip rate and report shorter daily travel in terms of both time and distance.

Figure 2-2: Travel Metrics by Presence of Children
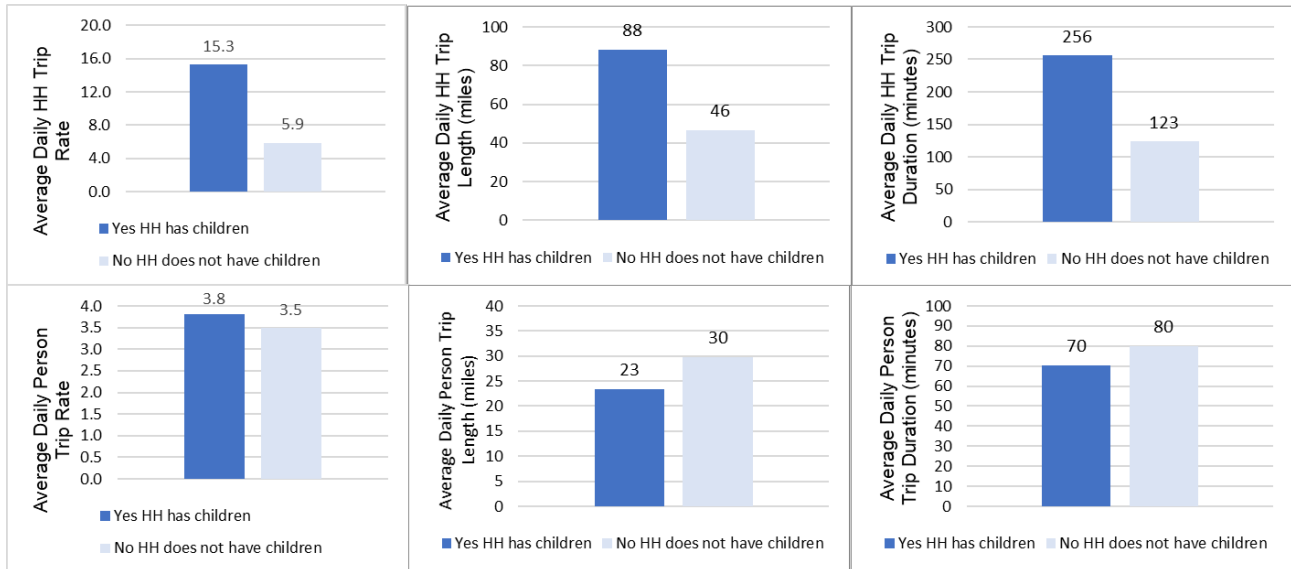
Most of the survey participants (55%) report owning their home and most (71%) report living in a single-family dwelling. As indicated in Table 2-2, respondents living in single-family dwellings and those who own their home report similar travel patterns. Those who rent and/or live in non-single-family dwellings report slightly lower person trip rates and trip lengths. Those living in non-single-family dwellings report spending the most time traveling at 77 minutes daily, despite having the lowest trip miles.

Table 2-2: Travel Metrics by Home Ownership and Residence Type

|		Person Trips	Daily Trip Miles	Daily Travel Time (minutes)
Home Ownership Status	Owns Home	3.8	29	74
	Does Not Own Home	3.5	22	75
Residence Type	Single Family Dwelling	3.7	28	73
	Other Type of Residence	3.5	21	77

Household income is a key explanatory variable for understanding travel patterns. As shown in Table 2-3, persons in households with incomes over $75,000 generate one-half trip more than those living in households under $25,000 (3.9 and 3.4, respectively). Trip miles traveled increases as income increases, but daily trip duration remains fairly constant – all households face the same daily 24-hour time budgets.

Table 2-3: Travel Metrics by Household Income

| Household income	Person Trips	Daily Trip Miles	Daily Travel Time (minutes)
Less than $25k	3.4	20	76
$25k-<$50k	3.5	25	73
$50k-<$75k	3.7	26	72
$75k+	3.9	31	76

Overall, at the household level, when considering both household size and reported income, the average daily weekday household trip rate remains fairly steady. As shown in Figure 2-3, the greatest variation in travel by income groups is with large 4+ person households, where rates ranged from 15.2 to 18.0 daily trips.

Figure 2-3: HH Trips by Size and Income
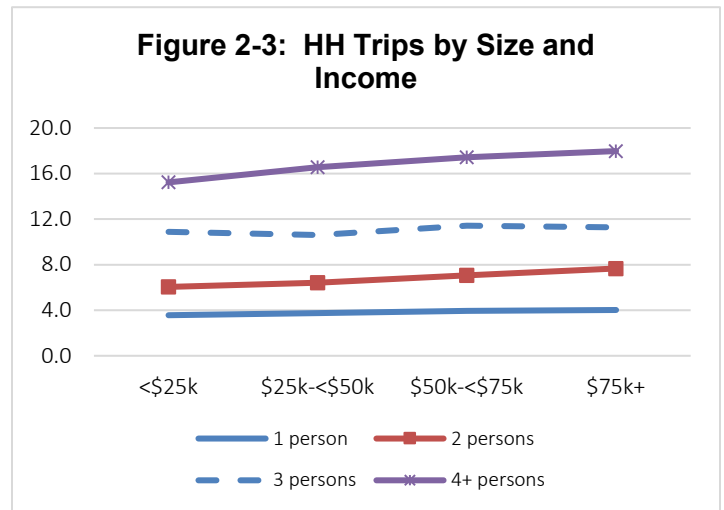
Another measure of household status considers the ratio of household vehicles to household workers. Households where each worker has access to at least one vehicle report different travel patterns than those households with a ratio of less than one vehicle per worker. Note that this metric does not differentiate between those households who own fewer autos by choice vs. circumstances.

Travel metrics for four categories of vehicle availability are shown in Figure 2-4, at both the household and person levels. Vehicle availability is presented in four categories: (1) households reporting zero vehicles ("0 Veh"), (2) more workers than vehicles ("W>V"), (3) equal number of workers and vehicles ("W=V"), and (4) fewer workers than vehicles ("W<V"). As indicated in Figure 2-4, mobility levels are lowest for zero-vehicle households, and when travel takes place, the travel is shorter in terms of both distance and duration. For households with vehicles, the trip rates for households reporting more workers than vehicles ("W>V") are lower than those reporting equal or lower ratios of workers to vehicles (W=V" and "W<V"). Daily trip length and duration were highest for households with were fewer workers than vehicles.

Figure 2-4: Travel Metrics by Vehicle Availability
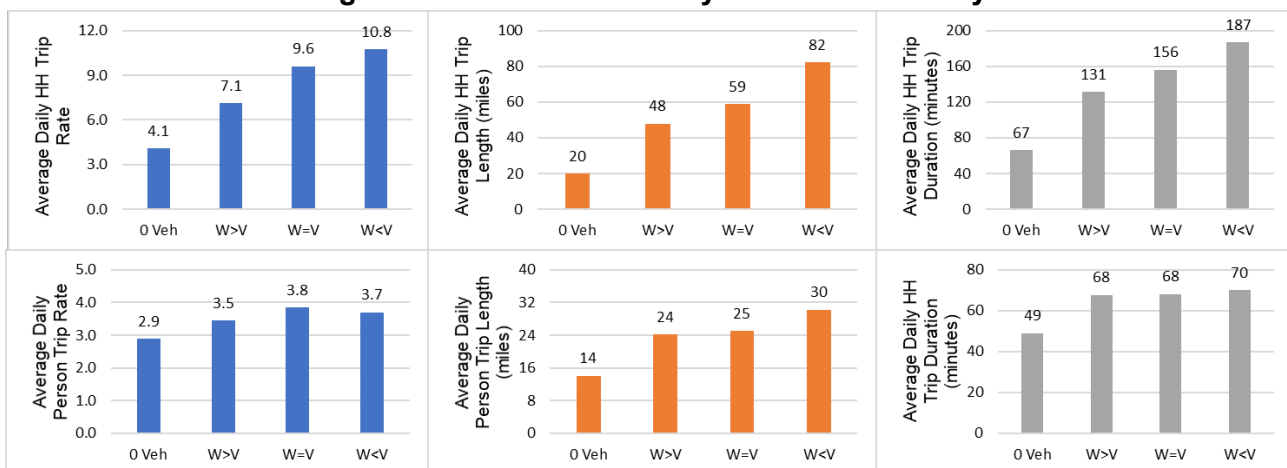
HOUSEHOLD MEMBERS

The average household member reports 3.7 trips on a typical weekday, traveling 26 miles and spending 75 minutes doing so. Men report fewer trips on average (3.5 trips) but travel more miles daily and spend more time doing so (28 miles and 76 minutes).

Table 2-4: Travel Metrics by Gender

Gender	Person Trips	Daily Trip Miles	Daily Travel Time (minutes)
Male	3.5	28	76
Female	3.8	24	73
Overall Avg	3.7	26	75

Children (ages 0-17) report the lowest levels of average weekday travel, while those ages 35 to 54 report the most trips and the longest trip durations, as indicated in Table 2-5. Those ages 18-34 report an average of 3.7 daily weekday trips traveling 28 miles across 79 minutes on a typical weekday. This compares to the elderly (ages 65+) who report an average of 3.3 trips, traveling 28 miles as well but across 77 minutes.

Table 2-5: Travel Metrics by Age Cohort

Age Group	Person Trips	Daily Trip Miles	Daily Travel Time (minutes)
0-17	3.2	14	57
18-34	3.7	28	79
35-54	4.2	32	85
55-64	3.8	33	80
65+	3.3	28	77
Overall Avg	3.7	26	75

Workers

Forty percent of household members age 16+ report that they work full-time (35 hours or more), while 26% report they are employed part-time or volunteer on a regular basis. The remaining respondents in this age group indicate they are not employed. Within each age cohort, the proportion of full-time workers varies: more than half of all adults ages 35-54 are employed full-time (56%), as compared to 43% of those ages 55-64 and 9% of those ages 65-74.

The proportion of workers in the OHAS data approximates the 2011 Oregon Labor Participation Rate

Table 2-6: Worker Status by Age Cohort

Worker Status	Age Groups						Total Ages 16+
	16-17	18-34	35-54	55-64	65-74	75+	
Employed FT	0%	42%	56%	43%	9%	2%	40%
Employed PT or Volunteer	20%	30%	24%	26%	32%	23%	26%
Not Employed	80%	28%	20%	31%	58%	75%	34%
Total	100%	100%	100%	100%	100%	100%	100%

As part of the survey, workers were asked for details about their jobs. Full-time workers (defined in this report as working 35+ hours per week) report working an average of 43.6 hours over a 5-day work-

week while part-time/volunteer workers spend an average of 20.5 hours working over a 3-day work-week. The average number of jobs held is 1.1 across both worker categories. A majority of workers who participated in the survey work in the service industry (49% of those employed full-time and 66% of those working part-time or in volunteer positions).

Respondents were asked the extent to which they had flexibility in terms of their work start time. Most workers report having full (27%) or some (43%) flexibility in their work schedule. Only 30% of respondents report having no flexibility in their work schedule. In addition, one in four (26%) of all workers indicate that their job requires them to have a personal vehicle available. These two aspects (flexibility in work schedule and required to have vehicle available) help to explain the extent to which workers can adjust what time they leave for work and how they travel to work and are important metrics to monitor with respect to goals for reduced vehicle miles traveled. Two related metrics in terms of commute mode choice are the proportion of workers who state that their employers provide free parking (82%) and free transit passes (7%). It is important to note that this is what the employee reports and may not reflect where an employer has a related program that the employee does not know about.

Thirteen percent of workers report their employers permit teleworking, where teleworking is defined as working from home in lieu of a commute (not working from home then going into the office on the same day). As shown in Figure 2-5, of those workers eligible to telework, 40% do so at least once a week, 26% do so at least once a month, 19% report teleworking almost every day and the remaining 15% report only teleworking a few times a year at most.
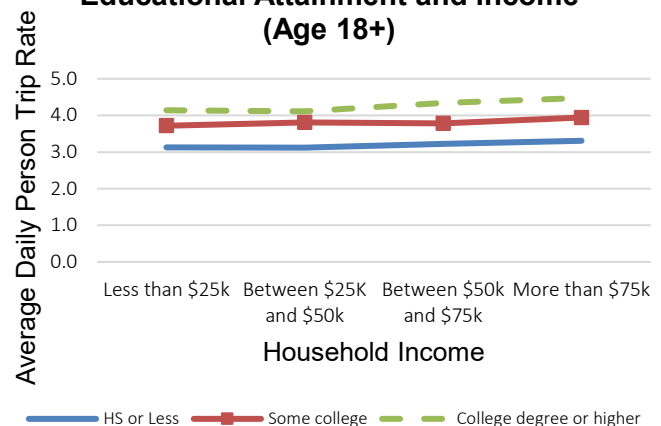
Figure 2-5: Frequency of Telework in Lieu of Commute

- Once a year, 2%
- A few times a year, 13%
- Almost every day, 19%
- Once a month or more, 26%
- Once a week or more, 40%
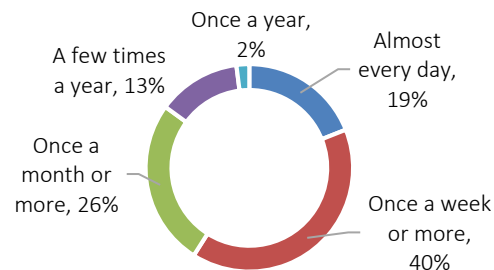
Educational Attainment

One-fourth of adult survey participants report having a high school education or less (27%), while 31% reported having some college. The remaining 42% of respondents report having a college degree or higher. As indicated in Figure 2-6, the level of trip-making increases as the level of education increases, with those having a high school diploma or less reporting the lowest levels of trip making. Within educational group, those with a high school degree or lower remain fairly stable across income groups, while trip rates show slight increases across income with each of the other education groups.

**Figure 2-6: Average Daily Travel by Educational Attainment and Income (Age 18+)**

Average Daily Person Trip Rate vs. Household Income (Less than $25k, Between $25K and $50k, Between $50k and $75k, More than $75k)

Legend: HS or Less, Some college, College degree or higher

CHAPTER 2

Current students

One-fourth of surveyed persons (28%) are currently students. Most (82%) report they are full-time students. The distribution of students by current level of school attended is shown in Figure 2-7. Most of the current students are in K-8 (48%) or 9-12 grades (18%).

**Figure 2-7: School Level of Current Students**
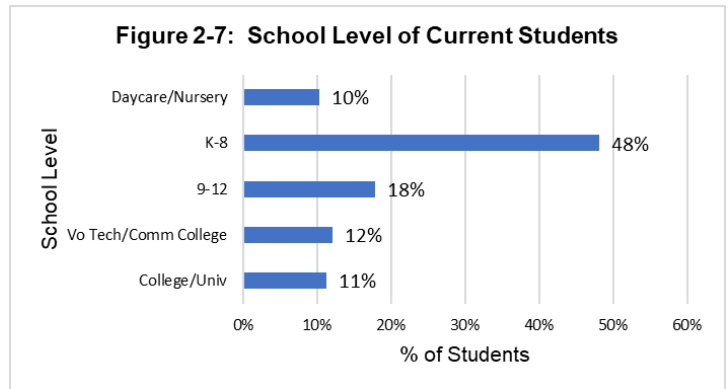
The typical mode to school varies based on the type of school attended. The majority of children in daycare travel to school by auto. Students in grades K-8 report almost equal levels of traveling to school by auto-passenger and school bus, with one in five walking to school. Similar mode usage was reported by those attending 9-12 grades. Students attending vocational or community college report the highest levels of auto-driver (72%), while those attending college report a greater variety of mode usage.

Table 2-7: Typical Mode to School by Student Status

	Daycare/ Nursery	K-8	9-12	VoTech/Comm College	College/Univ
School Bus	10%	35%	28%	0%	0%
Transit	1%	1%	8%	10%	18%
Walk	7%	19%	20%	3%	13%
Bike	1%	3%	4%	3%	12%
Auto-Drive	0%	0%	14%	72%	36%
Auto-Passenger	79%	36%	24%	6%	1%
Home-schooled	2%	6%	3%	6%	20%
Total	100%	100%	100%	100%	100%

Children in daycare and Pre-K report the same level of trip-making as those attending K-12. Students attending any type of college or trade school report more trips that are longer in terms of both length and duration.

### Figure 2-8: Travel Metrics by Student Type
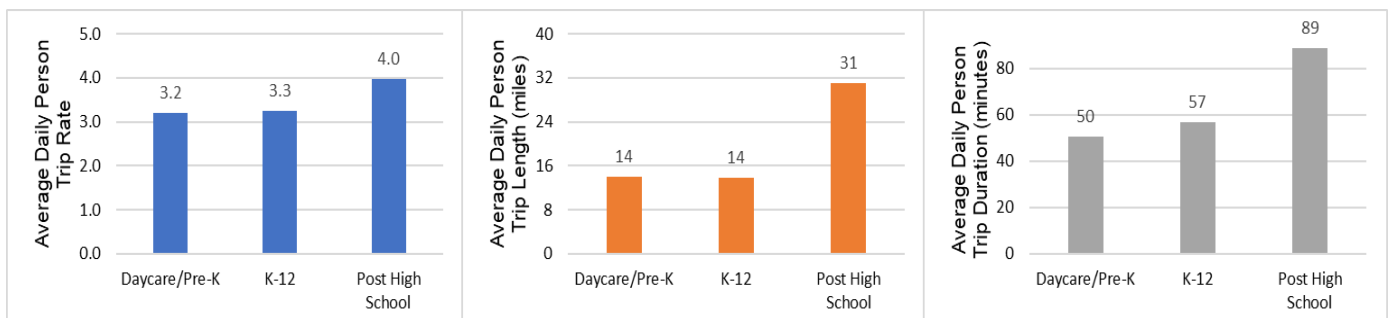
People who do not travel

Whether the non-travel occurred by choice or due to circumstances, it is important to remember that not everyone travels on a typical weekday. The survey results show that on any given weekday, about 12% of Oregon residents report no travel. Reasons for non-travel include: telecommuting/day off (33%); sick or taking care of others who were sick (21%); homebound due to old age or disability (12%); and being out-of-state on the assigned travel day (4%) The remaining 30% of non-travelers did not report a specific reason for their non-travel.

The differences between Travelers and Non-Travelers is shown in Figure 2-9. The main differences include:

- Non-travelers are more likely to be elderly (age 65+), disabled or not employed.

- Travelers are more likely to be employed, with a college level education (or higher) and have children in the household.

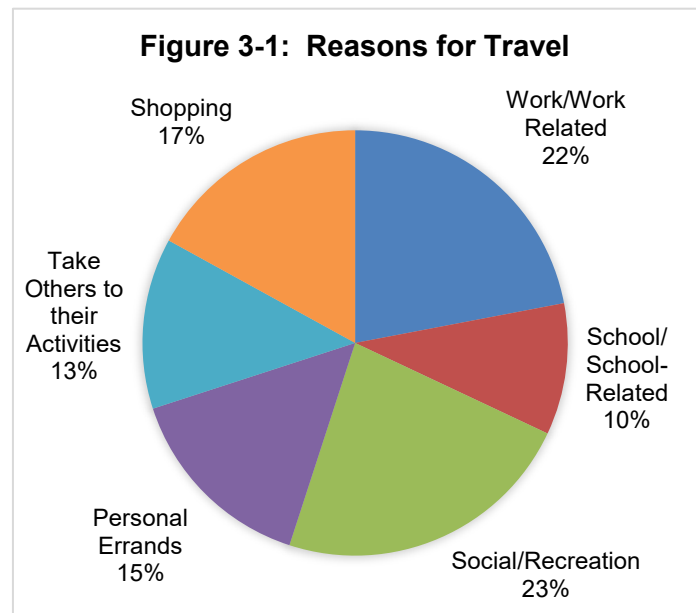**Figure 2-9: Characteristics by Travel Status**
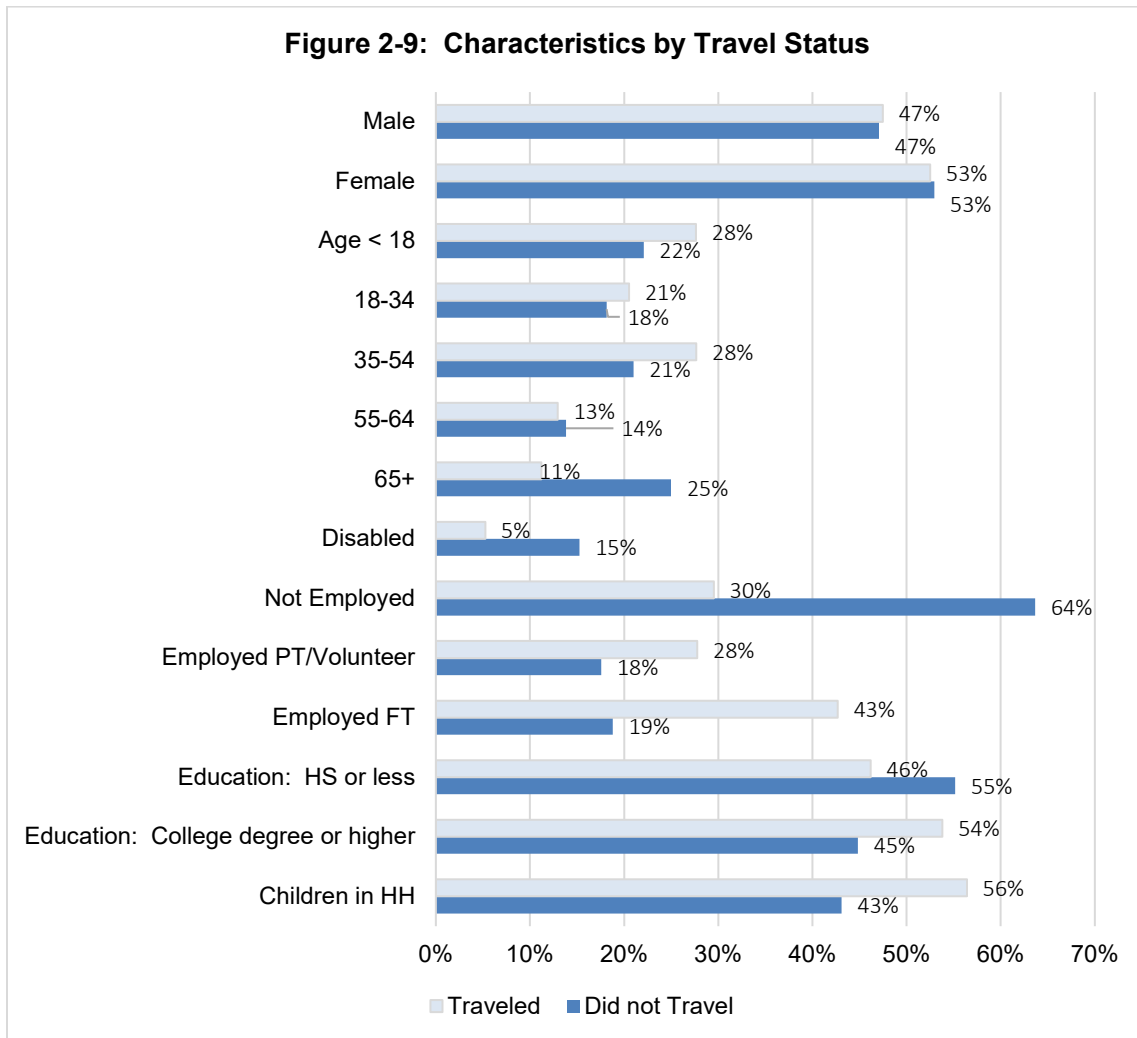
Why do we travel?

With very few exceptions, travel is simply a mechanism that allows us to participate in daily activities. Some of our daily activities are structured in that we are required to be at certain places at set times (like work or school). Other activities are flexible in nature and can be scheduled, rescheduled, or take place on the spur of a moment, such as going out to eat or getting together with friends. Some trips are scheduled to avoid traffic, others take place because we take children to their events or because we need groceries. The factors that influence where and how we structure our activities (and thus our travel) on a typical weekday vary based on where we live geographically, who we are demographically, and what resources we have available to us.

Ultimately, policy decisions regarding transportation investments influence daily travel patterns as well. The decisions to modify bus routes or adjust signal timing to ease peak period traffic combined with employer decisions to offer parking, flexible work shifts, or telework options impact how we organize our daily activities, which then shapes our travel patterns. An understanding of activities taking place on a typical weekday can help guide planners and decision makers in setting priorities and related policies. To link why we travel with how we travel, the Oregon Household Activity Survey asked participating households to have all members record all activities and related travel for an assigned 24-hour period. Respondents used travel logs to detail their activities, where those activities took place, and the time spent at each location. The reporting of activities was organized into six categories, illustrated in Figure 3-1, for purposes of reporting and discussion here:

1. Work/Work-related[3]
2. School/School-related[4]
3. Social and Recreational
4. Personal Errands (personal business, chores, medical appointments, etc.)
5. Taking Others to their Activities, and
6. Shopping.

Average trip distance and duration for each activity are shown in Figure 3-2. As indicated therein, trips for work tend to be the longest in terms of both distance (9 miles) and duration

Figure 3-1: Reasons for Travel

Shopping 17%
Work/Work Related 22%
Take Others to their Activities 13%
School/School-Related 10%
Personal Errands 15%
Social/Recreation 23%

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[3] Work/Work-related travel includes travel to go to work (the typical morning commute) as well as travel made during the day where the person returned to work after lunch or after other activities such as meetings or personal errands.

[4] School/School Related includes travel to go to school as well as school-related travel such as field trips, school-sponsored sporting events, etc.

(21 minutes). The shortest trips in length are for school and shopping, while the shortest trips in duration are for taking others to their activities and for shopping.

Figure 3-2: Travel Metrics by Activity
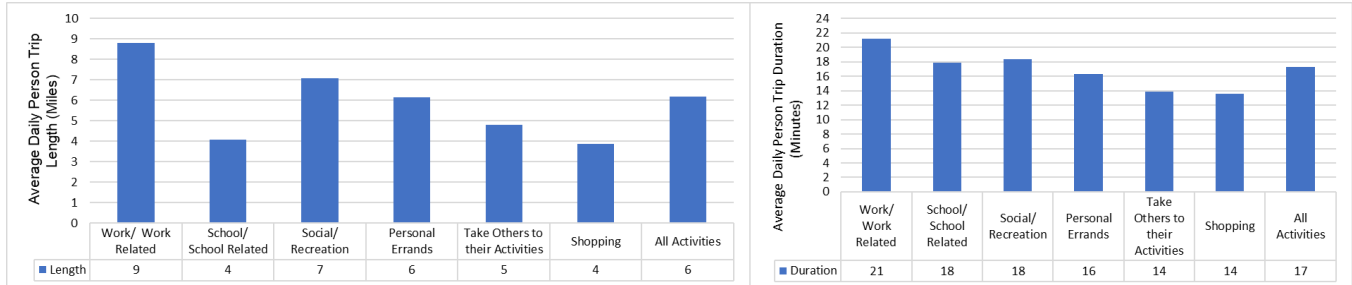
The distribution of daily activities is fairly consistent across the state. As indicated in Table 3-1, residents in the non-metropolitan ODOT Regions (which tend to be smaller cities and more rural in nature) report a higher level of personal errands and shopping on a typical weekday as compared to those living in more metropolitan areas.
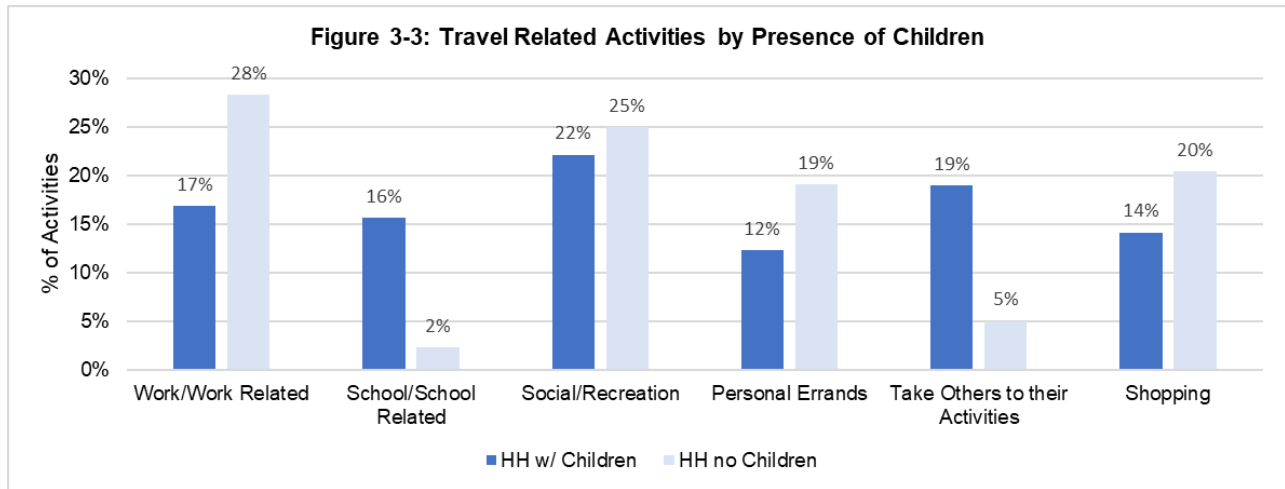
Table 3-1: Travel Related Activities by Survey Region

	Work/Work Related	School/ School Related	Social/ Recreation	Personal Errands	Take Others to their Activities	Shopping	Total
ODOT Region 2*	21%	10%	22%	17%	11%	19%	100%
ODOT Region 3**	21%	6%	22%	18%	11%	22%	100%
ODOT Region 4	20%	8%	23%	19%	12%	19%	100%
ODOT Region 5	23%	10%	20%	21%	12%	15%	100%
ODOT Region 1/Portland	23%	10%	26%	13%	13%	15%	100%
Central Lane	21%	11%	19%	14%	17%	18%	100%
Salem/Keizer	22%	11%	20%	13%	17%	17%	100%
Medford	21%	9%	23%	16%	12%	19%	100%
Bend	22%	10%	24%	15%	14%	15%	100%
Statewide	22%	10%	23%	15%	13%	17%	100%

See Introduction for a map of Survey Regions. *Corvallis and Albany metropolitan areas included in ODOT Region 2. **Grants Pass included in ODOT Region 3. ***Defined as Clackamas, Multnomah, and Washington counties.

As to be expected, travel related-activities vary based on whether children are in the household. Figure 3-3 illustrates the differences in daily weekday activities for people living in households with and without children. Those living in households with children report more school trips (16% as compared to 2% respectively) and fewer work trips (17% as compared to 28% respectively). This group also reports fewer trips for shopping or personal errands but almost four times as many trips for taking others to their activities.

Figure 3-3: Travel Related Activities by Presence of Children

Travel patterns also vary based on the level of vehicle-availability for the workers in the household. As indicated in Table 3-2, respondents living in zero-vehicle households report a similar proportion of activities as those with more workers than vehicles, with the exception of trips to take others to their activities (4% vs. 11%). Respondents where there is an equal or greater ratio of workers to vehicles exhibit similar trends in the proportions of activities reported.
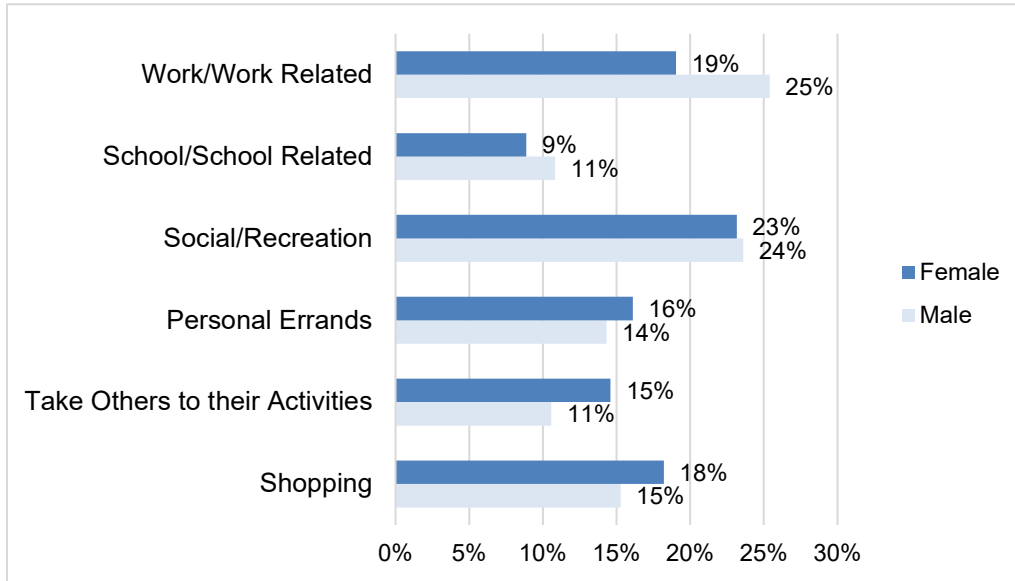
Table 3-2: Travel Related Activities by Auto Availability

	Work/Work Related	School/ School Related	Social/ Recreation	Personal Errands	Take Others to their Activities	Shopping	Total
Zero Vehicle HH	19%	8%	27%	17%	4%	25%	100%
Workers>Vehicles	14%	7%	26%	20%	11%	21%	100%
Workers=Vehicles	25%	11%	22%	13%	14%	16%	100%
Workers < Vehicles	23%	10%	23%	16%	14%	15%	100%

Figure 3-4 illustrates travel-related activities vary based on gender, with males reporting a higher proportion of work-related travel and females reporting more trips to take others to their activities. While males and females spend about the same amount of time traveling (18 minutes on average), men's trips to work take about 24 minutes as compared to women's trips at 19 minutes.

Figure 3-4: Travel Related Activities by Gender

As expected, travel for those ages 0-17 centers around school and social/recreational activities (see Table 3-3). School related activities decline for each successive age group, while the proportion of trips for personal errands and shopping increases with age.

Table 3-3: Travel Related Activities by Age Group

Age	Activity						Total
	Work/Work Related	School/School Related	Social/Recreation	Personal Errands	Take Others to their Activities	Shopping	
0-17	0%	37%	27%	11%	13%	12%	100%
18-34	29%	7%	22%	13%	14%	15%	100%
35-54	32%	1%	20%	14%	17%	16%	100%
55-64	30%	0%	23%	19%	7%	21%	100%
65-74	15%	0%	28%	24%	6%	27%	100%
75+	9%	0%	29%	30%	5%	27%	100%

The proportions of weekday activities vary based on worker status (Table 3-4). Half of all typical weekday trips reported by full-time workers are work-related, as compared to 26% of trips for part-time workers. Conversely, discretionary trips for social/recreation, personal business, and shopping increase as the hours worked decreases. Interestingly, travel to take others to their activities remained at about the same level regardless of worker status, ranging from 11% to 14% of travel across each worker category.

Table 3-4: Travel-Related Activities by Worker Status

Worker Status	Activity						Total
	Work/Work Related	School/ School Related	Social/ Recreation	Personal Errands	Take Others to their Activities	Shopping	
Employed FT	47%	1%	19%	11%	11%	12%	100%
Employed PT or Volunteer	26%	4%	22%	16%	14%	18%	100%
Not Employed	0%	8%	28%	25%	12%	27%	100%

The reasons for travel vary based on a person's disability status, as reported in Table 3-5. For survey respondents who report a disability, most trips (28%) are for personal errands (which includes medical appointments), with an additional 25% of trips each for social/recreational and shopping purposes. Those respondents not reporting a disability have higher levels of travel for work and school activities, as well as to take others to their activities.

Table 3-5: Travel-Related Activities by Disability Status

Disabled	Activity						Total
	Work/Work Related	School/ School Related	Social/ Recreation	Personal Errands	Others to their Activities	Shopping	
Yes	11%	3%	25%	28%	8%	25%	100%
No	23%	10%	23%	15%	13%	16%	100%

CHAPTER 4

How do we travel?

Of the 14 million person trips made on a typical weekday in Oregon, 82% are auto trips. An additional 10% of trips are walk trips and 3% of trips each are by transit and school bus with the remaining 2% made by bicycle. As to be expected, auto trips are the longest, comprising 94% of the 86 million miles traveled daily and 78% of the reported 4 million hours spent traveling (Table 4-1).

Table 4-1: Travel Metrics by Travel Mode

Travel Mode	% Person Trips	% Miles Traveled	% Minutes Traveled
Walk	10%	1%	7%
Bike	2%	<1%	3%
Auto	82%	94%	78%
Transit	3%	3%	7%
School Bus	3%	2%	5%

Two-thirds of all adult travelers report that there are no alternative modes to make their trip – this proportion is higher for those traveling by auto and transit than those traveling by all other modes.

While auto travel is the dominant mode across the state, residents report more non-auto travel (particularly walk, bike, and transit) in the higher-density metropolitan areas (Figure 4-1).

Figure 4-1: Travel Modes by Survey Region – Auto vs. Non-Auto
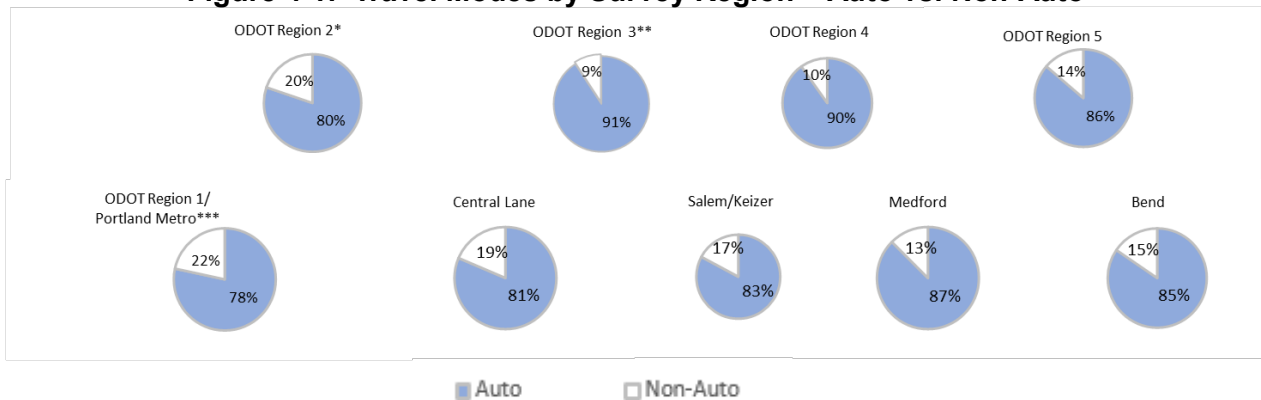
See Introduction for a map of Survey Regions. *Corvallis and Albany metropolitan areas included in ODOT Region 2. **Grants Pass included in ODOT Region 3. ***Defined as Clackamas, Multnomah, and Washington counties.

In a region where most travel takes place by auto, a common question is "what about people who do not own a car?" Table 4-2 reveals adult travelers living in 0-vehicle households report a significantly different way of getting around as compared to adults in 1+-vehicle households:

- Adults in 0-vehicle households report traveling primarily by walk, transit or as an auto-passenger.
- Less than one in ten trips made by adults in 0-vehicle households (9%) are as auto-drivers, with those trips made in borrowed or company-owned vehicles.

A second group that also shows different travel patterns are adults that live in households with more workers than vehicles. These adults tend to report a lower level of auto-driver trips and higher auto-passenger trips compared to households with more equal ratios of workers to household vehicles.

Table 4-2: Travel Mode by Auto Availability for Adults

Auto Availability	Travel Mode					Total
	Auto-Driver	Auto-Passenger	Walk	Bike	Transit	
Zero Vehicle Households	9%	26%	34%	5%	25%	100%
Workers>Vehicles	64%	19%	9%	4%	3%	100%
Workers=Vehicles	77%	10%	8%	3%	2%	100%
Workers<Vehicles	83%	10%	5%	1%	1%	100%
All Adult Travelers	73%	13%	8%	3%	3%	100%

As to be expected, most children travel as auto-passengers (65%), walk (15%), or take the school bus (14%). Young adults (ages 18 to 34) report making majority of their trips (66%) trips by driving, as auto passengers (15%), or by walking (12%). The survey results also reflect a shift in travel mode for the elderly, with a slight decline in driving and an increase in auto-passenger trips after age 65 (Table 4-3).

Table 4-3: Travel Mode by Age

Age Groups	Travel Mode						Total
	Auto-Driver	Auto-Passenger	Walk	Bike	School Bus	Transit	
0-17	3%	65%	15%	2%	14%	2%	100%
18-34	66%	15%	12%	3%	0%	4%	100%
35-54	77%	9%	8%	3%	0%	3%	100%
55-64	79%	11%	6%	2%	0%	2%	100%
65+	73%	17%	6%	1%	0%	2%	100%

Adults who work, either full-time or part-time, report a higher level of auto-driver trips than those who are not employed (79%, 73%, and 63% respectively). Conversely, those who are not employed report more walk (11%) and transit (4%) trips (Table 4-4).

Table 4-4: Travel Mode by Worker Status

| Worker Status	Travel Mode					Total
	Auto-Driver	Auto-Passenger	Walk	Bike	Transit	
Employed FT	79%	8%	7%	3%	3%	100%
Employed PT or Volunteer	73%	12%	9%	3%	3%	100%
Not Employed	63%	20%	11%	2%	4%	100%

Work and work-related travel is largely by auto (85%). However, 11% of trips are by walk and bike combined and 4% of trips are by transit. School and social recreation travel have the highest levels of walk trips, while adult school trips have the highest reported levels of transit usage (12%). The travel modes shown in Table 4-5 for school travel vary by age: children are more likely to travel to school as auto passengers or by school bus/walking, while adults travel to school as auto drivers or by transit/walking.

Table 4-5: Travel Modes by Activities

| Activity	Travel Mode						Total
	Auto-Driver	Auto-Passenger	Walk	Bike	School Bus	Transit	
Work/Work Related	78%	7%	8%	3%	0%	4%	100%
School/Related (Age<18)	4%	47%	16%	2%	29%	1%	100%
Schoo/Related (Age 18+)	52%	16%	12%	4%	3%	12%	100%
Social/Recreation	50%	32%	13%	2%	1%	2%	100%
Personal Errands	69%	25%	5%	1%	1%	0%	100%
Take Others to Activities	69%	25%	5%	1%	1%	0%	100%
Shopping	59%	26%	10%	2%	0%	4%	100%

Travel by Auto

11 million of the 14 million average daily weekday trips (82%) are made by auto, which is also the dominant mode for all trip purposes except school/school related travel for those under the age of 18. As noted in Figure 4-2, reported licensure rate vary by age. Only 40% of survey respondents age 16-17 reported they were a licensed driver. The reported licensure rate more than doubled for those ages 18 to 74, then declined for those age 75+.


Figure 4-2: Driver's License by Age Group
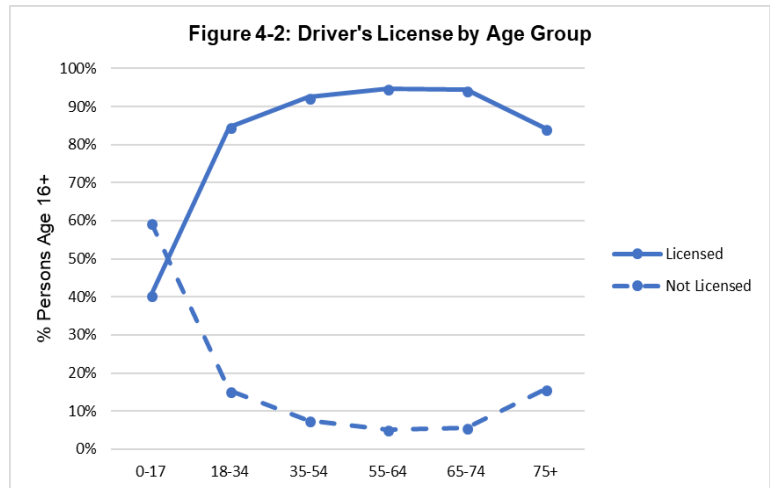
The licensure rates for young adults varies based on how close they live to major activity centers[5]. As shown in Figure 4-3, the licensure rates for 18-34-year-olds are relatively the same, with slightly higher rates closer to the major centers. There is a much greater variation in licensure rates for those ages 16-17 where two-thirds of all young adults ages 16-17 who live in cities near major centers are licensed to drive, as compared to only one-third of those living in a metropolitan region.

Figure 4-3: % Licensed Driver for Young Adults by Place Type
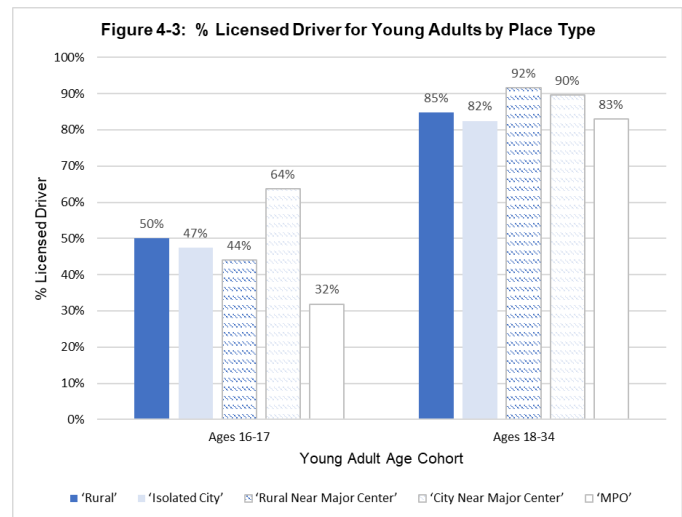
As illustrated in Figure 4-4, almost one-fourth (22%) of all auto trips are for work (work or work related) and an equal amount (23%) are for social/recreational activities. Personal errands and shopping trips by auto account for one-third of all auto trips and taking others to their activities account for 14% of all auto trips. School-related auto travel comprises the remaining 6% of auto trips.

Figure 4-4: Auto Trip Activities
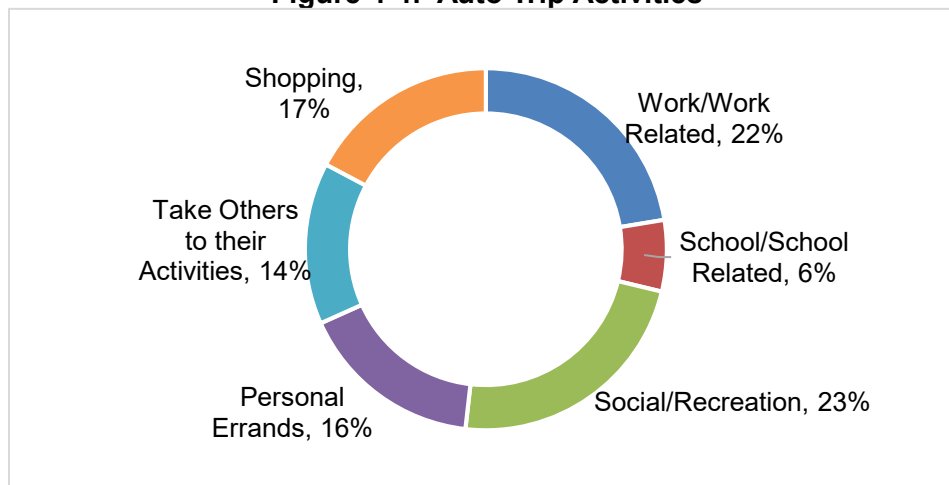
As illustrated in Table 4-6, one-way auto person trips for work tend to be the longest, averaging 20 minutes for auto-drivers and 24 minutes for auto-passengers, while trips for shopping average 13 minutes for both auto-drivers and auto-passengers. In terms of trip length, work related trips are the longest (9 and 11 miles, respectively), while those for shopping shortest (4 and 5 miles, respectively).

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[5] Cities near major centers are defined as those cities within 15 miles of metropolitan areas and tend to lack transportation options and major activity destinations.

Table 4-6: Weekday Person Trip Metrics: Auto Mode by Activity

Activity	Auto-Driver		Auto-Passenger	
	Time Spent Traveling (minutes)	Trip Length (miles)	Time Spent Traveling (minutes)	Trip Length (miles)
Work/ Related	20	9	24	11
School/ Related	20	9	12	4
Social/Recreation	18	8	19	8
Personal Errands	15	6	17	8
Take Others to their Activities	14	5	15	5
Shopping	13	4	13	5
All Activities	17	7	16	6

Virtually all auto drivers (97%) indicate they park for free on-site at their destination. Most (80%) park in a lot or parking garage.

The OHAS database includes details about the household vehicles used to make these trips.

- Most of the auto trips are made in a car or sedan style vehicle (52%), with an additional 21% of trips made in an SUV. Thirteen percent of trips are made using a pickup truck and 14% of trips are made by van. A small proportion of trips (0.3%) are made by other types of vehicles such as motorcycles and recreational vehicles.

- In terms of vehicle age, 11% of the auto trips are made in a vehicle newer than three years, while 19% of auto trips are made in a vehicle that was four to six years old. One-third of trips (34%) are made in vehicles seven to ten years old. An additional 21% of auto trips are made in vehicles that are between 10 and 14 years old, and the remaining trips are made using vehicles that are at least 15 years old. Seventy percent of all trips are made in vehicles older than seven years.

Travel by Transit

Across the state, travelers report using transit for 2% of all trips. At the time of the survey, regular transit service was available in all metropolitan regions of the state. The majority of reported transit trips (89%) are on local bus service. The remaining transit trips are equally divided across light rail (available only in Portland) and bus rapid transit (available in Eugene/Springfield).

Transit riders are more likely to live in a household with no children (62%) and report an annual household income of less than $25k (42%) or $25k-$50k (25%).

A little more than half of the transit riders report paying fares by cash (56%), while the remainder report they paid using a bus pass. Among those employed full or part-time, 7% report that their employer provides free transit passes.

One-third of all transit trips (33%) are made by travelers who live in zero-vehicle households. As shown in Figure 4-5, transit trips are also more likely to be made by those who live in households with more workers than vehicles (24%) or an equal number of workers-to-vehicles (36%). Only 7% of transit trips reported in the survey are made by travelers living in households with more vehicles than workers.

As shown in Figure 4-6, one-third of all transit trips are for work or work-related travel (32%). An additional 25% of transit trips are for shopping. The remaining transit trips are made for social/ recreation (17%), school (13%), or personal errands (12%). Only 1% of transit trips are taken for the purpose of escorting others to their activities.
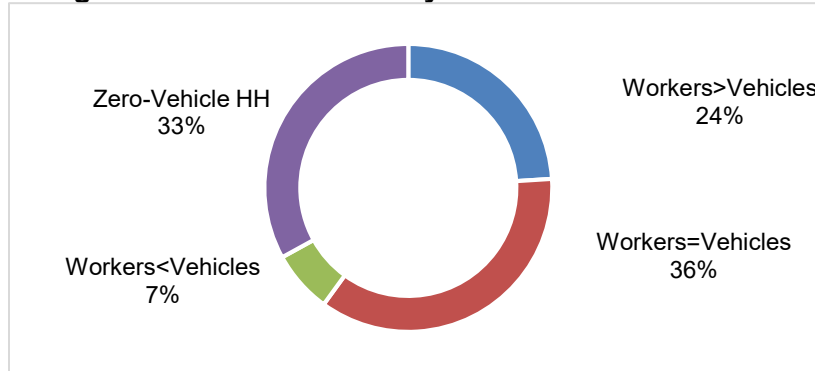
Figure 4-5: Auto Availability Levels for Transit Riders

Zero-Vehicle HH 33%
Workers>Vehicles 24%
Workers<Vehicles 7%
Workers=Vehicles 36%

Figure 4-6: Transit Trip Activities

Shopping 25%
Take Others to their Activities 1%
Personal Errands 12%
Social/Recreation 17%
Work/Work Related 32%
School/School Related 13%

Transit trips reported by survey respondents average 6 miles in length and take 45 minutes on average (Table 4-7). Trips for work purposes tend to be the longest (51 minutes) while those for shopping and to take others to their activities are the shortest (36 minutes). Trip length ranges from 4 miles for shopping trips to 9 miles for work trips.
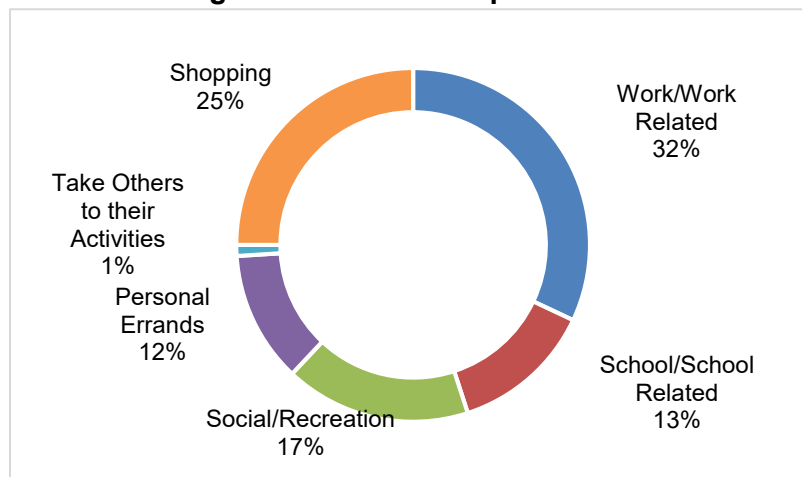
Table 4-7: Weekday Person Trip Metrics: Transit Mode by Activity

Activity	Time Spent Traveling (minutes)	Trip Length (miles)
Work/Work Related	51	9
School/School Related	42	6
Social/Recreation	49	8
Personal Errands	46	6
Take Others to their Activities	36	5
Shopping	36	4
All Activities	45	6

CHAPTER 4

Travel by Walking and Bicycling – Active Travel

Ten percent of all reported trips are made by walking, and an additional 2% of trips are made by bicycle. Of these, most are made for social or recreational activities (31%), work (21%), or shopping (16%) (see Figure 4-7).

Figure 4-7: Walk and Bike Trip Activities
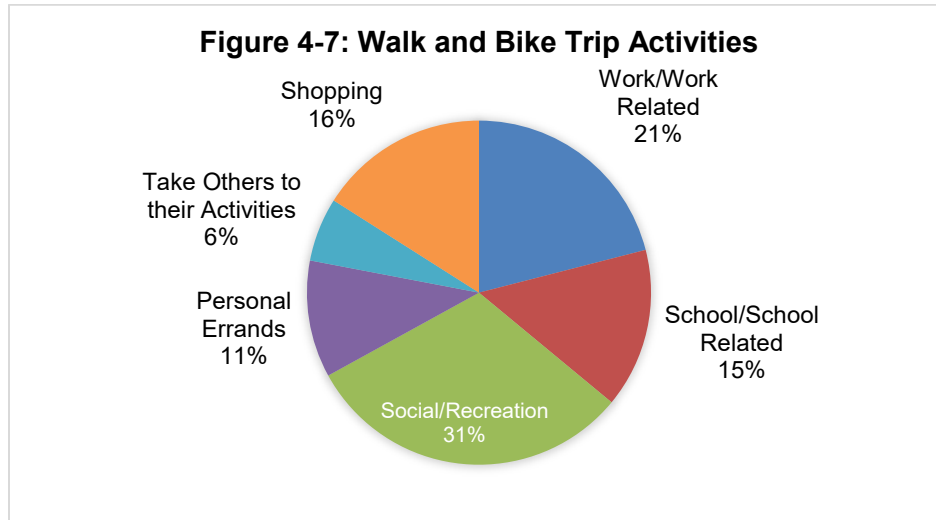
The average walk trip is 0.4 miles in length and takes 11.8 minutes to traverse. For bicycle trips, the average trip length is 1.6 miles and takes 18.1 minutes. There was some variation in trip duration and length by trip purpose, as shown in Table 4-8. The majority of walk and bicycle trips are reported by respondents who live in the metropolitan areas of the state.

Table 4-8: Non-Motorized Trip Metrics by Trip Purpose

Activity	Walk		Bike	
	Time Spent Traveling (minutes)	Trip Length (miles)	Time Spent Traveling (minutes)	Trip Length (miles)
Work/Work Related	9.8	0.4	22.3	2.2
School/School Related	12.7	0.5	14.9	1.3
Social/Recreation	13.6	0.4	20.1	1.5
Personal Errands	10.0	0.4	14.0	1.2
Take Others to their Activities	9.1	0.3	10.7	0.9
Shopping	11.9	0.3	12.4	1.0
All Activities	11.8	0.4	18.1	1.6

More than half of all non-motorized trips (walk and bicycle combined) are made by female travelers (55%). Similarly, 59% of all walk trips are made by females. However, 63% of all bicycle trips are reported by male travelers as indicated in Figure 4-8.

62% of all walk trips are made by people living in households with children, as compared to 53% of all bicycle trips

Figure 4-8: Non-Motorized Trips by Gender
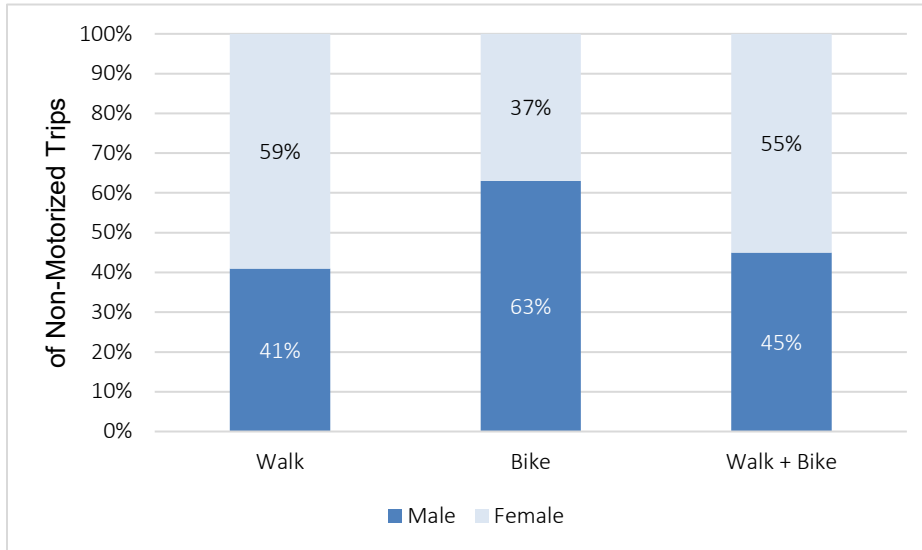
There are differences in non-motorized travel based on the age of the traveler as well. As shown in Table 4-9, more than one-third (35%) of all walk trips are made by travelers under the age of 18. An additional 49% of walk trips are made by travelers between the ages of 18 and 54. The remaining walk trips are made by those age 55+, with that proportion decreasing as the traveler's age increases. The age of those traveling by bicycle shows a much different pattern: 42% of all bicycle trips are made by those age 35-54, with an additional 28% reported among 18-34-year olds and 17% reported by those under the age of 18.

Table 4-9: Non-Motorized Trips by Age

| Age Group	Walk	Bike
0-17	35%	17%
18-34	24%	28%
35-54	25%	42%
55-64	8%	11%
65-74	5%	2%
75+	2%	0.4%
Total	100%	100%

CHAPTER 5

When do we travel?

The Oregon Household Activity Survey asked respondents to record all trips made by all household members during a specific 24-hour period. The survey was designed to achieve an equal distribution of travel by day of week for weekdays (Monday through Friday) and cover only months when school was in session. As a result, this report does not address weekend travel or summer travel. In this chapter, we explore statewide differences in travel by time of day and day of week.

TIME OF DAY

The Oregon weekday travel patterns captured in the survey reflect the reality of most US residents: clearly defined morning and afternoon peaks, with increased activity during the lunch hour (as shown in Figure 5-1).
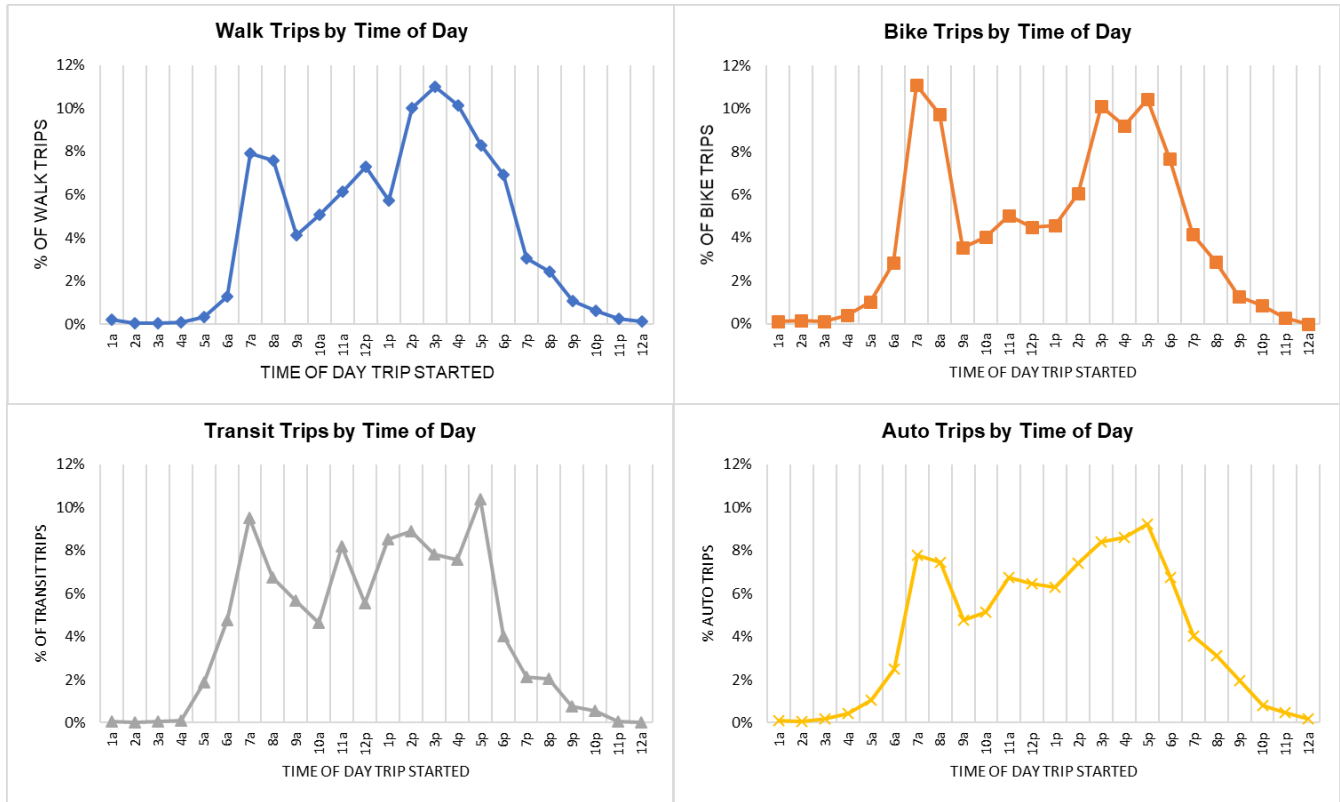

Figure 5-1: Time of Day of Travel
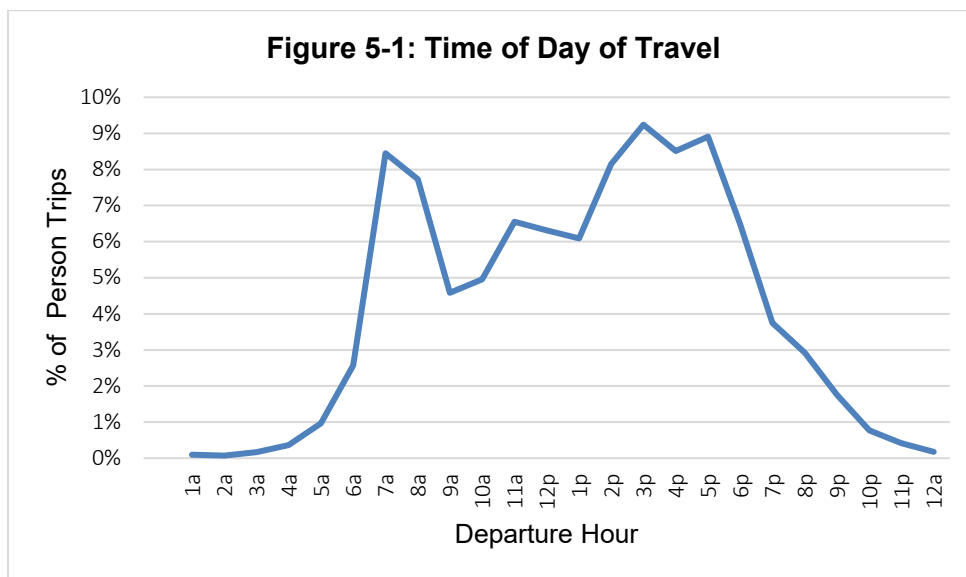
The peaks in the distribution of trips and average trip duration by time of day can be explained with details regarding mode usage and trip purpose patterns by time of day, as shown in Figure 5-2.

- Walk trips show a morning peak between 7 and 8 am, then an afternoon peak between 2 and 4 pm, with a semi-peak during the noon lunch-hour.
- Similarly, bike trips peak between 7 and 8 am, with an evening peak of 3 to 5 pm, but with little peaking in the mid-day period.
- Transit trips peak in the morning at 7 am, at noon, at 2 pm and again at 5 pm.
- Auto trips peak at the same time in the morning but peak slightly later at 6 pm in the evening.
- The overall afternoon peak at 3 pm (showing in Figure 5-1) is a combination of strong walk, bike, and auto trips.

Figure 5-2: Mode Usage by Time of Day

Most assume that the morning and afternoon peaks are related to work and school schedules and related activities (business meetings). Figure 5-3 shows the time of day of travel for the different activities and confirms this assumption for the morning peak: work and school/school-related travel have the most clearly defined morning peaks, with the school morning peak being the strongest. Since parents drop kids off at school, their morning peak is typically reflected by a combination of work trips and trips to take others to their activities (labeled as "serve passenger" trips in Figure 5-3). Trips in the afternoon are largely comprised of non-work and non-school trip purposes, particularly personal business, shopping, and serve passenger trips. The evening peak is smaller and comprised of social, recreational and eating out trips.

Figure 5-3: Activities by Time of Day
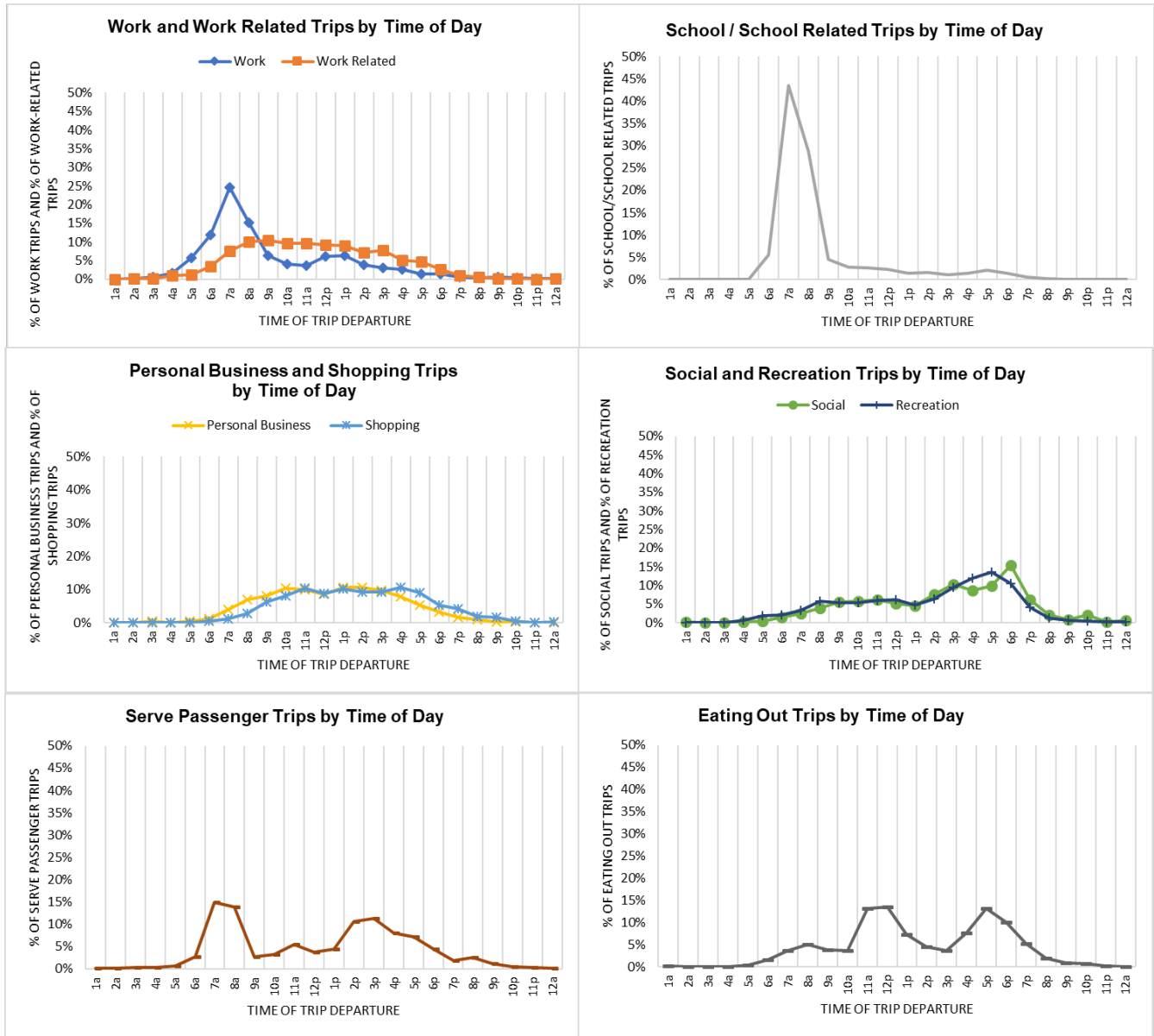
Travel patterns by time of day are fairly consistent by household size, income, and vehicle availability. What accounts for more variation in travel are the personal characteristics of age and worker status. While children travel has the most pronounced morning and afternoon peaks, the elderly travel shows the most pronounced mid-day peaks, particularly those travelers age 75 and older as indicated in Figure 5-4.

Figure 5-4: Time of Day Travel by Age Group
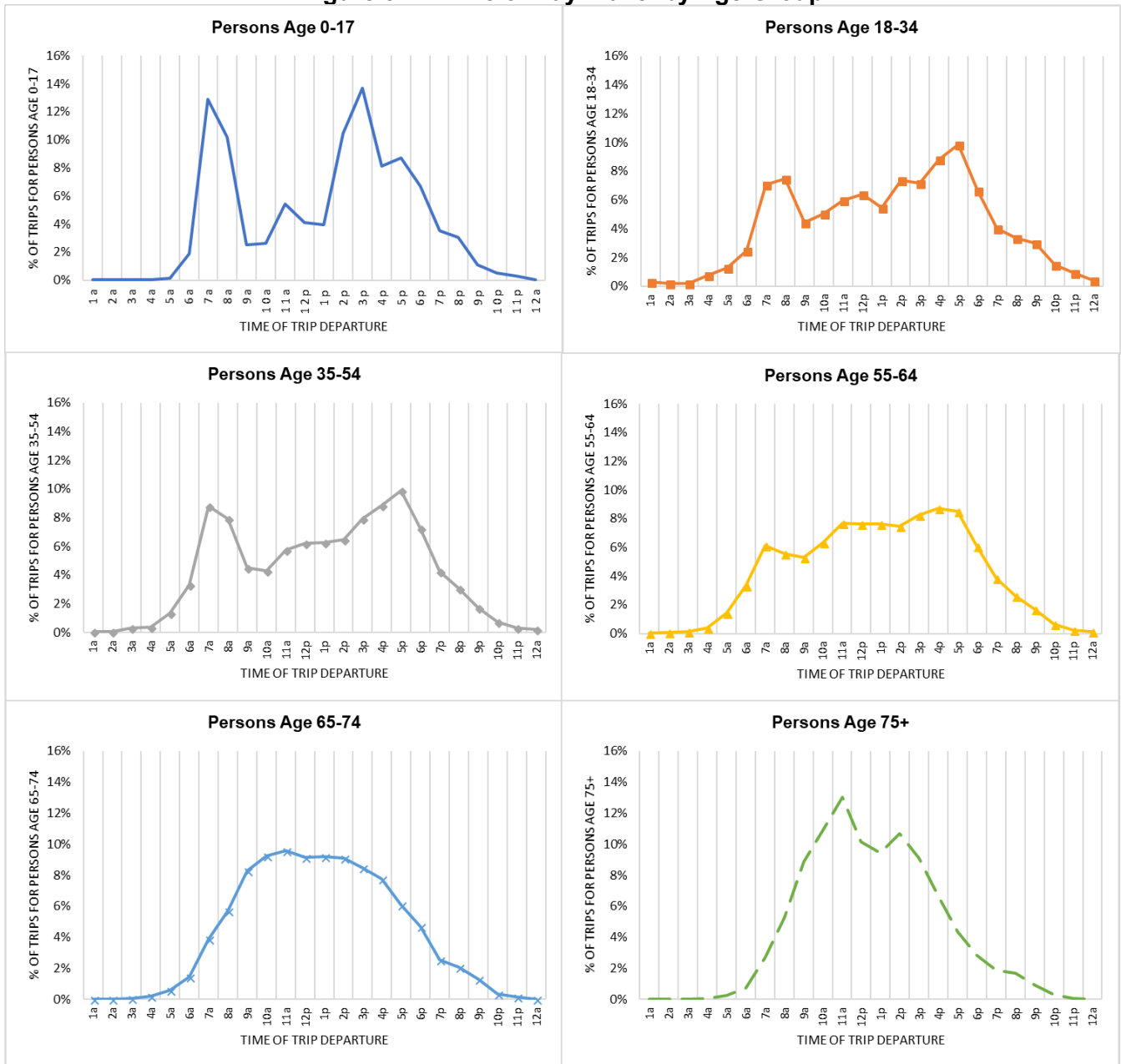
With respect to worker status, the full-time workers report travel consistent with expectations of fully-defined morning and afternoon peaks (see Figure 5-5). Workers employed part-time or who volunteer have a defined morning peak, show mid-day activity and then peak around 2 pm each weekday afternoon. Comparatively, non-workers show activity peaking mid-morning to mid-afternoon.

Figure 5-5: Time of Day Travel by Worker Status
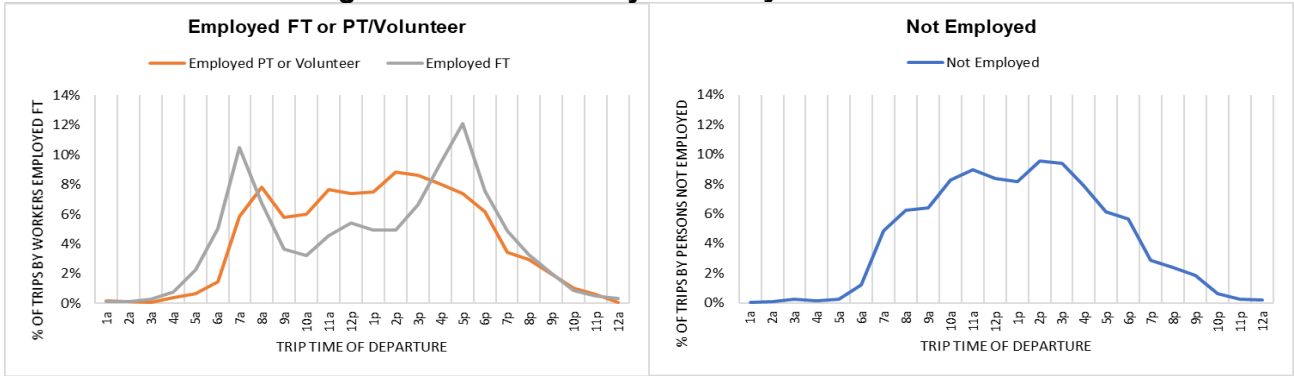
DAY OF WEEK

The overall travel patterns by time of day show some variation by day of week. As shown in Figure 5-6, Friday travel exhibits a longer afternoon peak as compared to other days. In addition, Wednesdays and Fridays show higher levels of mid-day travel as compared to Mondays, Tuesdays, and Thursdays.

Figure 5-6: Time of Day Travel by Day of Week

How does built form influence travel?

The focus of previous chapters was on describing travel patterns based on characteristics of the traveler. In addition to who the traveler is, travel patterns are also influenced by the environment in which travel takes place, which includes a broad spectrum of land use and transportation infrastructure elements. "Plac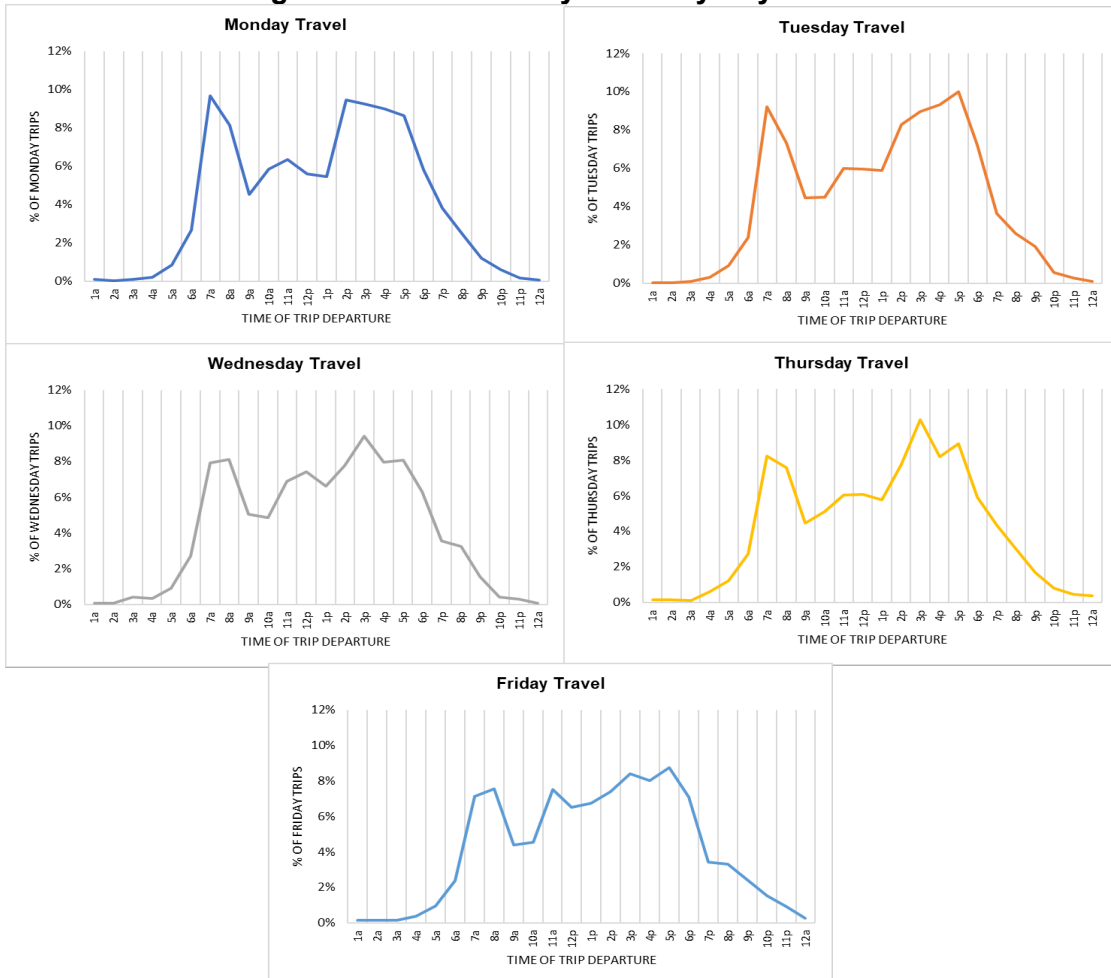e type" is a land use descriptor developed jointly by the Department of Land Conservation and Development and the Oregon Department of Transportation (ODOT) to capture the neighborhood built form characteristics that influence transportation choices. Place types are data-driven attributes of the travel environment, specifically residential and employment densities and diversities, transportation options (i.e., multi-modal and pedestrian-oriented facilities and transit service availability), and overall employment accessibility that classify areas into a combination of both area type and development type.[6]

The purpose of this chapter is to explore travel patterns as they relate to the built environment where the travelers live and travel to (their destinations) in order to better understand the connections between place type and travel behavior. To that end, nine place type categories are used in this chapter, reflecting the diversity of communities across the state. The distribution of OHAS households by place type is shown in Table 6-1.

Table 6-1: Distribution of Surveyed Households by Place Type

Place Type	Surveyed Households	%
Rural	109,246	7.2
Isolated City	134,279	8.8
Rural Near Major Center	148,374	9.8
City Near Major Center	154,592	10.2
MPO Low Density	67,623	4.5
MPO Residential	549,952	36.2
MPO Employment	64,132	4.2
MPO Mixed Use	220,257	14.5
MPO TOD	70,469	4.6
Statewide	1,518,924	100

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[6] For details regarding the definition and construction of the MPO place type (development type) variable used throughout this chapter, see https://www.oregon.gov/ODOT/Planning/PTVSV/PlaceType_Flyer.pdf. Non-MPO place types are based on accessibility, measured as the distances needed to reach 2,500 and 50,000 people, respectively. **City Near Major Center**: Less than 1 and greater than 15 miles. **Isolated City**: Less than 2 and greater than 15 miles; **Rural Near Major Center**: Greater than 1 and less than 15 miles; **Rural**: Greater than 2 and greater than 15 miles.

CHAPTER 6

Figure 6-1 provides an example of the variation in place type patterns within a metropolitan area. Here, higher density Transit Oriented Development (TOD) occurs in the downtown area (red) where there is a diversity of households and employment, walkable design, and higher transit service. This is surrounded by mixed use areas (blue and pink) that extend along corridors with a slightly lower level of transit and density. Adjacent areas of medium density (gold and light blue) contain more homogenous land uses, either residential or employment, in character. The edge of the MPO is characterized by auto-dependent low density/rural land use (light yellow).

Figure 6-1: Regional Example of Variations in Place Types

Source: Place Types Tool - https://www.oregon.gov/lcd/CL/Pages/Place-Types.aspx
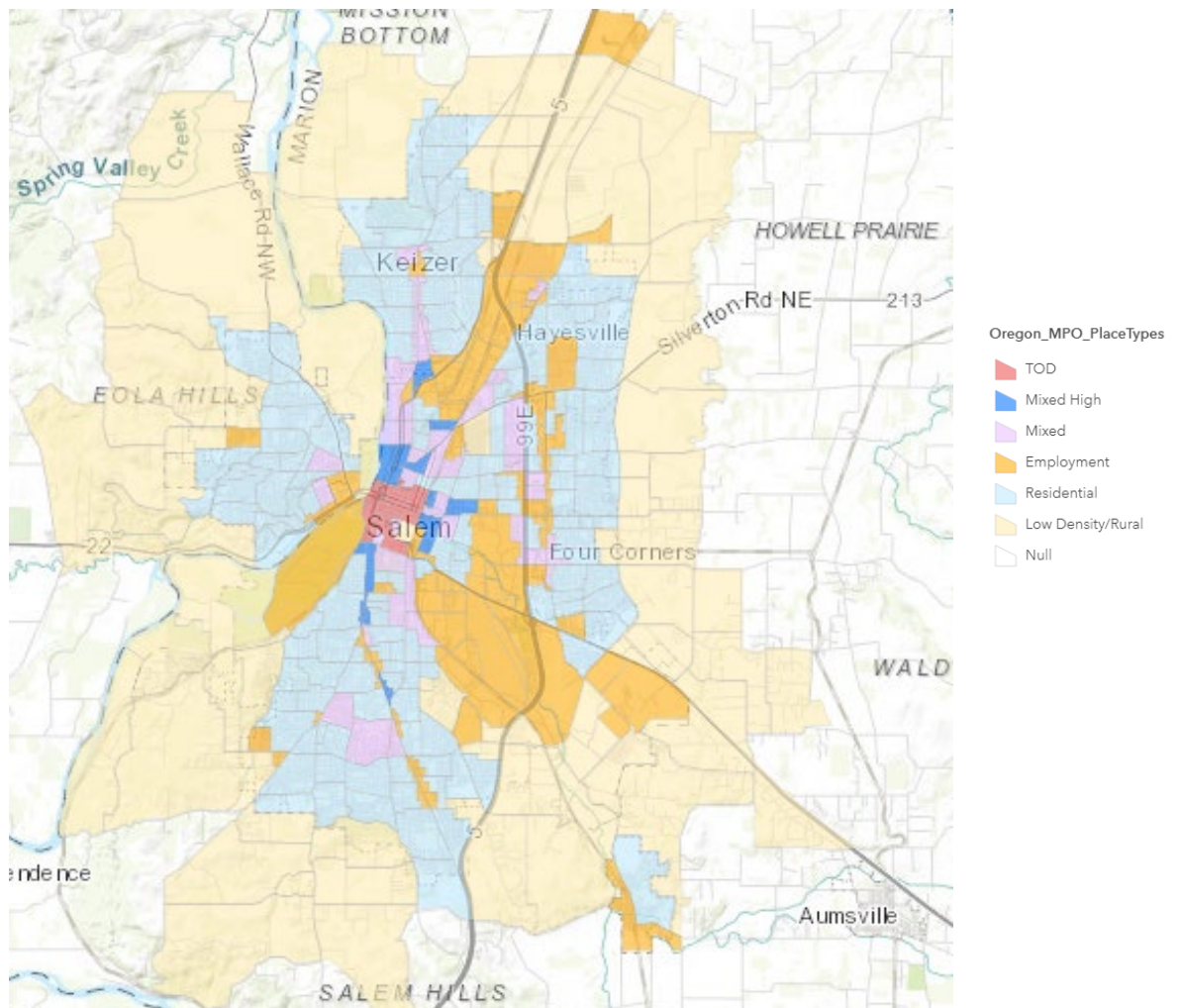
CHAPTER 6

As part of OHAS, respondents recorded all places visited during an assigned 24-hour weekday period. The home location and all reported destinations were geocoded as part of the survey process. After the survey was completed, ODOT staff assigned a place type for all home locations and all reported places visited (destinations). For presentation purposes, the discussion in this chapter includes a detailed look at differences according to the nine place types shown in Table 6-1 as well as grouping of the place types into: (1) MPO/non-MPO, (2) Density level (low, medium, high, or aggregations thereof), or (3) according to a Hub/Spoke concept (rural areas feed into higher density centers). Table 6-2 shows how each grouping relates to the nine underlying place type categories.

The low, medium, and high density place type groupings reflect the level of density as well as population, activity and employment opportunities in each area.

Table 6-2: Place Type Groupings Used in This Report

Place Type	MPO/ Non-MPO	Low/Medium/ High Density	High/ All Others	Hub/ Spoke
Rural	Non-MPO	Low	Other	Spoke
Isolated City	Non-MPO	Medium	Other	Hub
Rural Near Major Center	Non-MPO	Low	Other	Spoke
City Near Major Center	Non-MPO	Medium	Other	Hub
MPO Low Density	MPO	Low	Other	Spoke
MPO Residential	MPO	Medium	Other	Hybrid
MPO Employment	MPO	Medium	Other	Hybrid
MPO Mixed Use	MPO	High	High	Hub
MPO TOD	MPO	High	High	Hub

The analysis presented in this chapter provides a statewide perspective on travel behavior by place type as there is insufficient sample to support a more detailed analysis within each survey region. The one exception to this statewide perspective is the MPO TOD category. This place type exists in several MPO regions but TODs are most mature in terms of scale and scope in the Portland region. As such, any results pertaining to TODs most closely portray Portland TODs and should therefore be interpreted with care in any other regions of the state.

There are four parts to this chapter:

(1) A summary of travel metrics (number of trips, trip duration and length, modes, and activities) that explores how travel varies across residents' home place type;
(2) A demographic summary of who lives in each place type and factors that may influence where different types of households locate, based on responses to the OHAS questions;
(3) A presentation of the differences in travel by home place type using demographic profiles of key groups of household types; and
(4) A review of travel flows between where the traveler lives and where their travel destinations are located.

CHAPTER 6

Travel Metrics by Place Type

Statewide, Oregonians report an average of 3.7 weekday trips per person, traveling 26 miles each day and spending 75 minutes to do so. As illustrated in Table 6-3, the person trip rates are fairly constant across place types, ranging from a low of 3.4 trips reported by those living in the rural near major center place type to a high of 4.1 trips reported by residents of the MPO TOD place type. Daily trip miles vary more: the range is from a low of 17 miles (9 miles below the state average) reported by residents of the MPO TOD place type to a high of 44 miles (18 miles above the state average) reported by those living in the rural place type. Low density areas within MPOs have roughly half the vehicle miles of rural place types. Time spent traveling ranges from 65 minutes for respondents in isolated cities to 87 minutes for residents in the rural place type. Isolated City breaks the trend, closer approximating that of the larger urban areas in trip rates and daily miles; perhaps lacking congestion and dominated by faster auto modes, the daily travel time is the lowest of all areas.

Table 6-3: Average Travel Metrics by Household Place Type

Household Place Type	Person Trips	Daily Trip Miles	Daily Travel Time (minutes)
Statewide	3.7	26	75
Rural	3.5	44	87
Isolated City	3.7	24	65
Rural Near Major Center	3.4	39	82
City Near Major Center	3.6	26	73
MPO Low Density	3.7	25	71
MPO Residential	3.7	24	73
MPO Employment	3.4	23	74
MPO Mixed Use	3.7	20	74
MPO TOD	4.1	17	80

When grouped into broader categories, the following observations about personal travel in Oregon are noted:

- Trip rates increase as density/accessibility increases. Trip rates for those living in the Non-MPO, Low Density, and Spoke place types are the lowest.
- At the same time, daily miles traveled and the daily travel time in minutes are highest for households living in the Non-MPO, Low Density, and Spoke place types.
- Combined, this confirms the generally accepted understanding that people in the rural areas travel longer distances and travel times to fulfill daily activities.

Table 6-4: Average Travel Metrics by Household Place Type Groupings

Household Place Type Groupings	Households (weighted)	Person Trips	Daily Trip Miles	Daily Travel Time (minutes)
Statewide	100%	3.7	26	75
Non-MPO	36%	3.6	32	76
MPO	64%	3.7	23	74
Low Density	21%	3.5	37	81
Medium Density	59%	3.7	24	72
High Density	19%	3.8	20	75
Spoke	21%	3.5	37	81
Hybrid	40%	3.7	24	73
Hub	38%	3.7	22	72

Weekday travel in Oregon is characterized as largely auto-dominant, with 82% of all trips made by auto. An additional 10% of trips are walk trips and 3% of trips each are by transit and school bus with the remaining 2% of trips made by bicycle. The proportion of non-auto trips is more than double in higher density MPO-TOD and Mixed Use place types, with 6% of trips by transit, 5% of trips by bike, and 18% of trips by walk, as shown in Table 6-5. School bus trips primarily occur outside MPO areas.

Table 6-5: Mode Usage by Household Place Type

Travel Mode	High Density	All Other Place Types	Statewide
Auto	70%	84%	82%
Transit	6%	2%	3%
Bike	5%	2%	2%
Walk	18%	8%	10%
School Bus	1%	4%	3%
Total	100%	100%	100%

Note: sampling limitations restrict analysis to only two place types: high density (MPO TOD and MPO Mixed Use) and all other place types.

Demographic Characteristics by Place Type

As part of the OHAS survey, households were asked for the length of time lived at their current location. As shown in Figure 6-2, 37% of households statewide report a tenure at their current location of at least 10 years, while 23% report a tenure of 5-10 years, and 21% at 2-5 years. One in five respondents (19%) report they moved to their current location in the past two years.

By place type, half of households living in the lower density place types (50%) report a tenure of at least 10 years, as compared to 34% in medium-density place types and 31% in the higher density place types. Conversely, the more recent movers are more likely found in the high density place types (24% reporting tenure of less than 2 years as compared to 20% in medium and 14% in low density locations).

Figure 6-2: Tenure by Place Type

■ <2 years   ■ 2-<5 years   ▨ 5-<10 years   ▢ 10+ years

| Place Type	<2 years	2-<5 years	5-<10 years	10+ years
Statewide	19%	21%	23%	37%
Low Density	14%	17%	19%	50%
Medium Density	20%	22%	24%	34%
High Density	24%	21%	24%	31%

% Years Lived at this Location
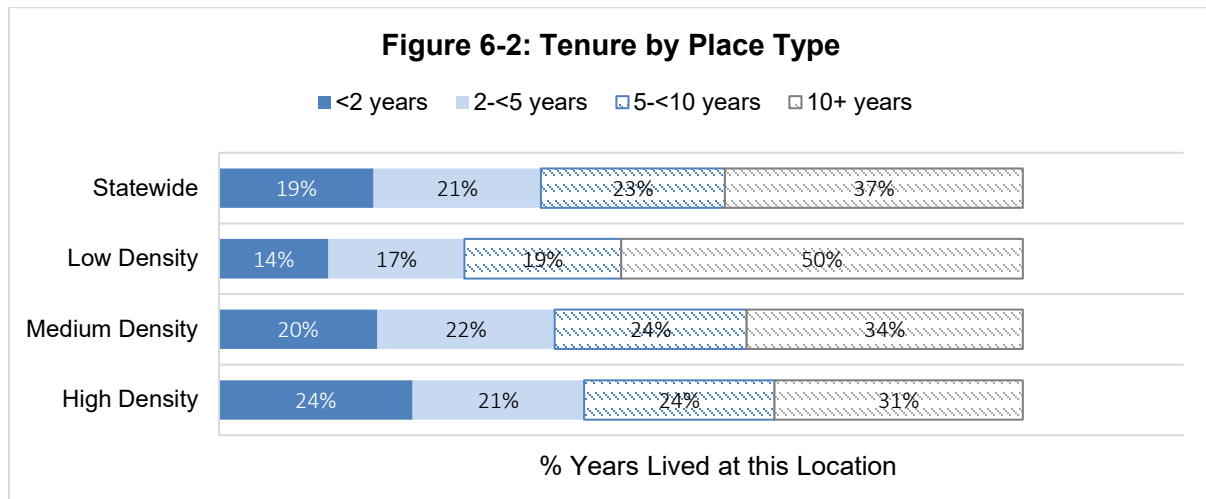
Households that reported living at their current location for less than two years were asked for the main reasons they selected that particular residence.[7] The differences in which factors are most important to responding households (based on frequency of response) across density (low, medium, high and statewide) are shown in Figure 6-3:

- The price and "other characteristics about the house" (presented to the respondent in those general terms) explained one-third of the reasons a home location is selected. This is consistent across all households, regardless of place type of the current residence.
- Access to amenities (including: shopping, entertainment, restaurants; social, religious, civic, cultural or recreational facilities; desirable neighborhood views or other natural amenities) was the second most preferred location attribute, particularly for those recently locating to a higher density area.
- The importance of the remaining attributes is split, with households relocating to higher density areas reporting a greater importance on access to transit while those relocating to low and medium density areas reporting a higher importance on access to work, school, and friends/families.

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[7] Respondents chose one or more of the following relocation factors: (1) housing or rental price, (2) closer to a job site, (3) closer to a desirable school district, (4) closer to shopping, entertainment, restaurants, (5) closer to social, religious, civic, cultural, or recreational facilities, (6) access to transit, (7) closeness to friends or relatives, (8) desirable neighborhood views or other natural amenities, (9) other characteristics of the house, or (10) other.

Figure 6-3: Location Choice by Household Place Type

■ Statewide   □ High Density   ■ Medium Density   ■ Low Density
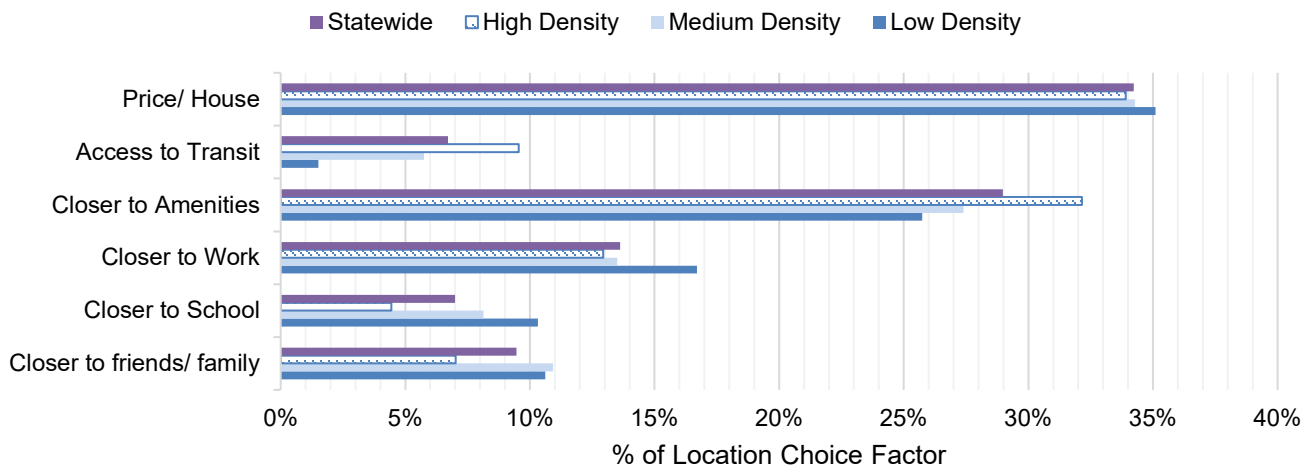
Household demographic variation by place type may also contribute to the choice of home location. Figure 6-4 summarizes the differences in average household size, vehicle ownership, workers, and children by household place type, grouped by density (low, medium, or high). The low values in the MPO TOD category may be biased towards Portland area high density place types.

- Household size: average household sizes are largest in the low density place types. As density increases, average household size decreases.
- Household vehicles: Vehicle ownership is highest in the rural areas and decreases as density increases, with the lowest in TOD place types.
- Household workers: the average number of household workers is fairly consistent by place type.
- Household children: the average number of children per household is fairly consistent across the low and medium density place types, with fewer kids reported by those living in the TOD place types.

Figure 6-4: Household Characteristics by Place Type
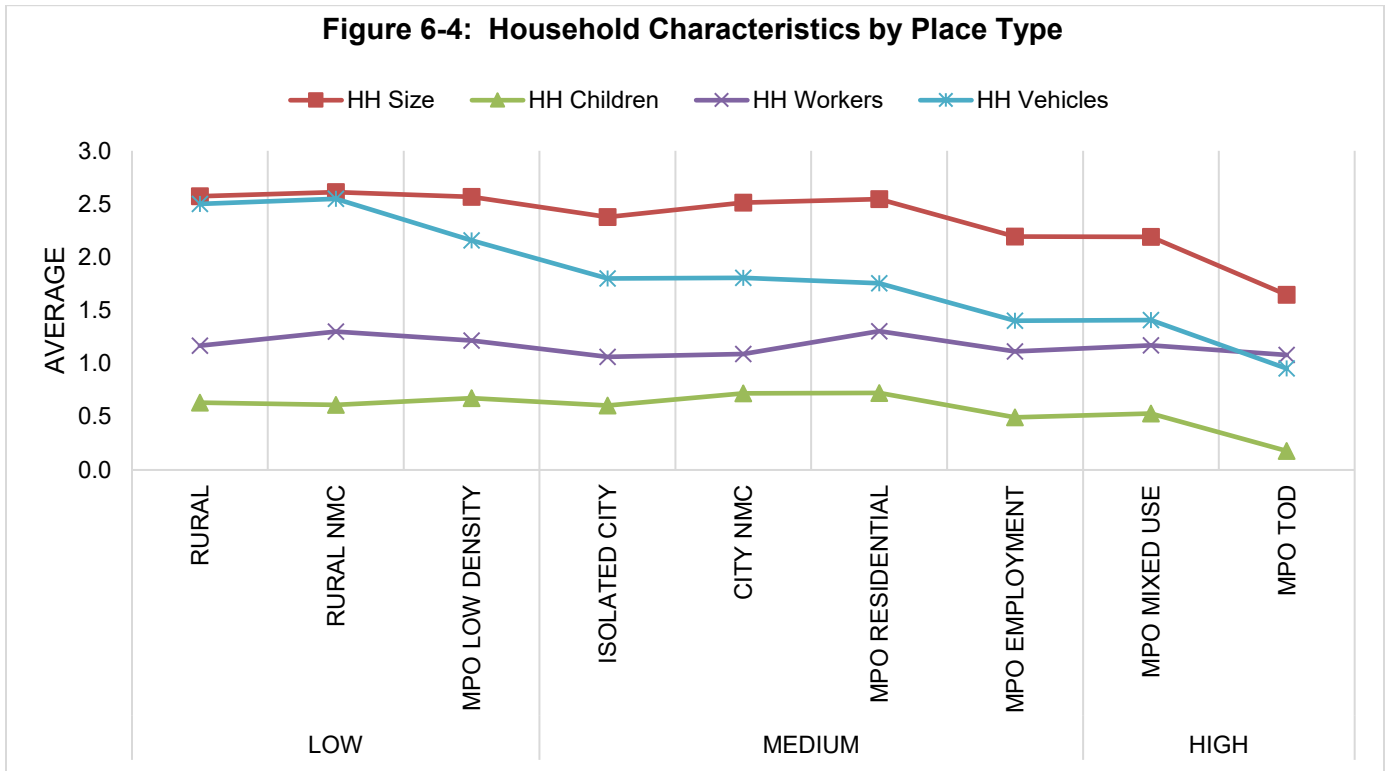
Vehicle ownership varies based on household means/ability to own a vehicle and choice to own a vehicle. Vehicle availability in the form of a ratio of household workers-to-vehicles is used here to illustrate differences in auto availability. As shown in Table 6-6:

- The majority of households (98-99%) in the low density place types own at least one vehicle and almost half of these households report owning more vehicles than there are workers present in the household.
- For households living in the medium-density areas, there are higher reports of 0-vehicle households (6-10%), slightly higher proportions of households with more workers than vehicles but the majority of medium-density households report owning the same number or more vehicles as compared to household workers.
- Households living in the high density place types report the highest proportion of 0-vehicle households (13-28%), with the lowest worker-to-vehicle ratios.
- Households in the denser areas ("High Density" and higher "Medium density") tend to have only as many vehicles as workers, likely due to storage limitations and costs.

Table 6-6: Vehicle Availability by Household Place Type

Household Place Type		Workers > Vehicles	Workers = Vehicles	Workers < Vehicles	0-Vehicle Household	Total
Low Density	Rural	26%	26%	46%	2%	100%
	Rural Near Major Center	24%	25%	51%	1%	100%
	MPO Low Density	23%	34%	40%	2%	100%
Medium Density	Isolated City	28%	31%	31%	10%	100%
	City Near Major Center	28%	35%	29%	8%	100%
	MPO Residential	22%	46%	26%	6%	100%
	MPO Employment	24%	43%	19%	14%	100%
High Density	MPO Mixed Use	23%	44%	20%	13%	100%
	MPO TOD	21%	43%	8%	28%	100%
Statewide		24%	39%	29%	8%	100%

As to be expected, the proportion of households living in single-family dwellings decreases as density increases. Multifamily dwellings are more common as density increases.

Figure 6-5: Dwelling Type by Household Place Type
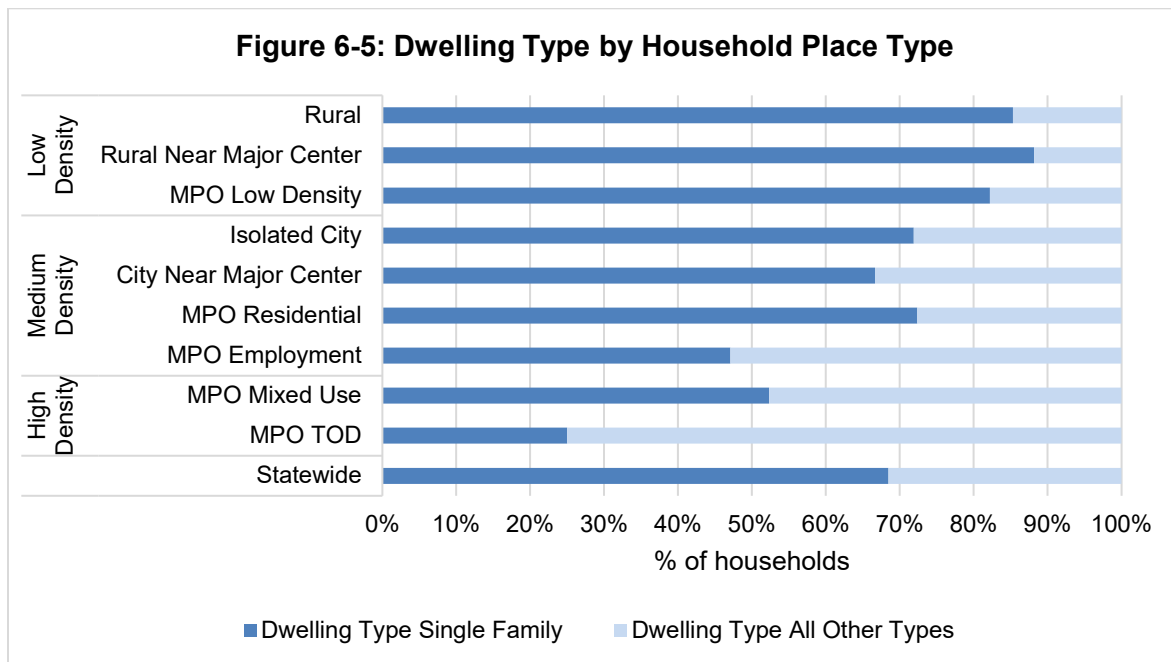
As indicated in Figure 6-6, the areas with the largest low income and smallest high income shares in the state are those characteristics as non-MPO medium density place types. The high density place types show high shares of both high and low income, while the lower density place types reflect more shares of higher income (and 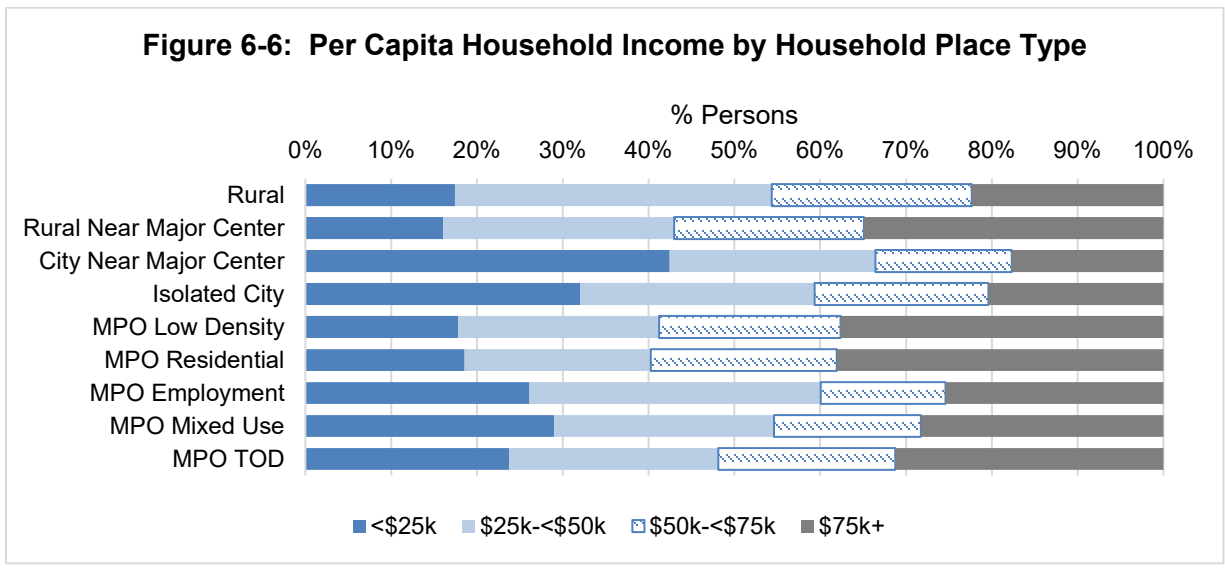fewer shares of low income). However, this pattern may be changing due to economic conditions. According to a recent report from Portland Metro, "*Communities where it is easy to walk, bike and take transit saw the greatest price increases, so people of color and low-income households – who are the most likely to rely on these options because they are more affordable than driving – are being displaced to areas that lack good transit service and safe bicycling and walking facilities.*"[8]

Figure 6-6: Per Capita Household Income by Household Place Type

% Persons

■ <$25k $25k-<$50k $50k-<$75k   ■ $75k+

Persons with disabilities are most likely to report living in the higher density place types, which tend to offer easier access to services (see Figure 6-7). The highest proportion (9%) is reported by those living in the MPO TOD place type and the lowest proportion (4%) is reported by those living in the MPO low density place type.

[8] Portland Metro. "Emerging Technology Strategy." https://www.oregonmetro.gov/sites/default/files/2018/07/02/Metro-Emerging-Tech-Strategy-06-2018-Public-Review-Draft.pdf

Figure 6-7: % Disabled by Household Place Type

		% of Persons
Low Density	Non-MPO	
	MPO	
Medium Density	Non-MPO	
	MPO	
High Density	MPO Mixed Use	
	MPO TOD	
	Statewide	
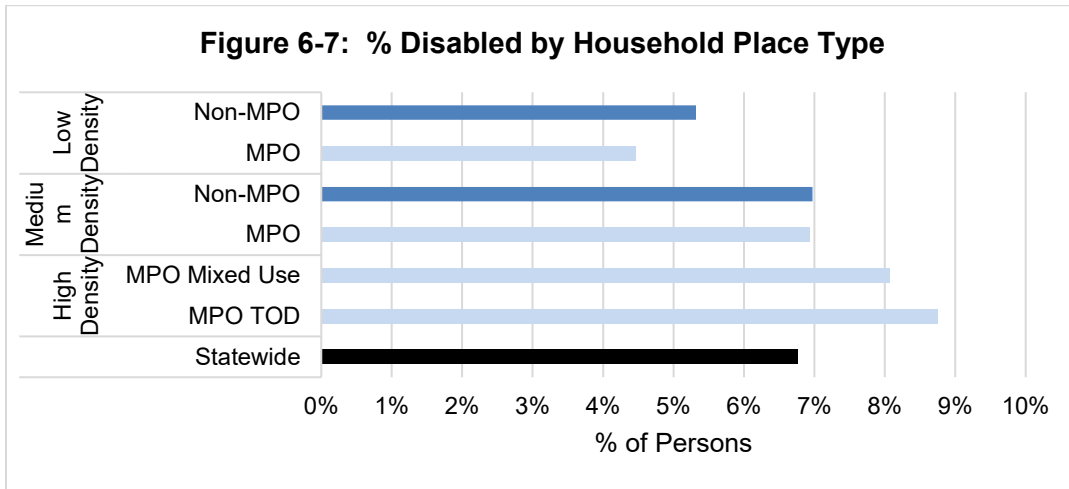
The distribution of household members by age across the household place types are shown in Table 6-7 and reveals the following patterns:

- Children ages 0-17 are most likely to live in the medium or low density areas. Within the high density place types, children are twice as likely to live in the MPO mixed use place type as compared to the MPO TOD place type. This distribution is consistent with where single family dwellings are found.
- Young adults ages 18-34 are most likely to live in the high density or non-MPO medium-density place types (isolated city or city near major center).
- Senior citizens (ages 65+) are distributed almost uniformly across all household place types, with the highest proportion living in the MPO TOD place type (consistent with the easier access to services) or the low density place types (associated with a lower cost of living or potentially aging in place).

Table 6-7: Age by Household Place Type

Household Place Type		0-17	18-34	35-54	55-64	65+	Total
Low Density	Non-MPO	25%	17%	27%	16%	15%	100%
	MPO	27%	16%	27%	14%	15%	100%
Medium Density	Non-MPO	30%	23%	23%	11%	13%	100%
	MPO	28%	19%	28%	13%	12%	100%
High Density	MPO Mixed Use	25%	22%	28%	12%	12%	100%
	MPO TOD	11%	30%	30%	14%	15%	100%
	Statewide	27%	20%	27%	13%	13%	100%

CHAPTER 6

An important aspect of understanding daily weekday travel patterns is evaluating the trip purpose or activities to be undertaken given the characteristics of the household and where they live. For example, Table 6-8 illustrates place types attractive to households with children have a higher proportion of school/school-related travel and travel to serve passenger needs. On the contrary, the MPO TOD place type, characterized by smaller households and fewer children, have lower reports of school travel or travel to serve passenger needs and with higher proportions of social/recreation and shopping trips to take advantage of nearby amenities. The results otherwise do not show large differences indicating the need for a variety of trip purposes by all population groups.

Table 6-8: Weekday Travel Activity by Household Place Type

Household Place Type		Work/ Related	School/ Related	Social/ Rec	Personal Errands	Serve Passenger	Shopping	Total
Low Density	Rural	20%	7%	20%	19%	13%	20%	100%
Low Density	Rural Near Major Center	23%	9%	21%	18%	11%	17%	100%
Low Density	MPO Low Density	21%	9%	25%	15%	12%	17%	100%
Medium Density	Isolated City	24%	8%	23%	18%	11%	16%	100%
Medium Density	City Near Major Center	19%	11%	23%	16%	11%	20%	100%
Medium Density	MPO Residential	22%	11%	23%	13%	14%	16%	100%
Medium Density	MPO Employment	20%	11%	26%	15%	12%	17%	100%
High Density	MPO Mixed Use	22%	10%	24%	15%	15%	15%	100%
High Density	MPO TOD	25%	6%	28%	13%	6%	21%	100%
Statewide		22%	10%	23%	15%	13%	17%	100%

Travel Profiles by Place Type

To better understand how travel differs based on the place type in which a household locates, the OHAS households were classified into five types:[9]

1. HHKIDS: Households with children (defined as all households where at least one member was age 0 to 17) – 32% of households
2. HHYOUNG: Young adult households (defined as households without children, where at least one member was age 18-34) – 14% of households
3. HHSENIOR: Senior households (defined as households without children or young adults where at least one member reported age 65+) – 24% of households
4. HHOTHER: All other households (defined as households with members ages 35-64 with no children and not retired) often characterized by dual workers and/or empty nesters – 30% of households.

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[9] The first four groupings reflect mutually exclusive categories into which households were assigned. The assignment was made based on a hierarchy: if a household included members ages 0-17, 18-34, and 65+, the presence of children is dominant, followed by those ages 18-34, then those ages 65+. If no conditions exist, then the household was assigned to the "other" category. The "ALL HH" group includes all households regardless of composition as a comparison point.

5. ALL HH: All households (provided as a comparison group and reflects the statewide average) – 100% of households

As shown in Table 6-9, regardless of type, the majority of households are located in the MPO residential place type. This is particularly true for households with children, where 42% of this type of household are located. The second highest concentration of households (regardless of type) are located in the MPO mixed use place type. Higher than average shares of seniors, young adults, and households with children are found in small cities, MPO TOD, and MPO residential place types, respectively.

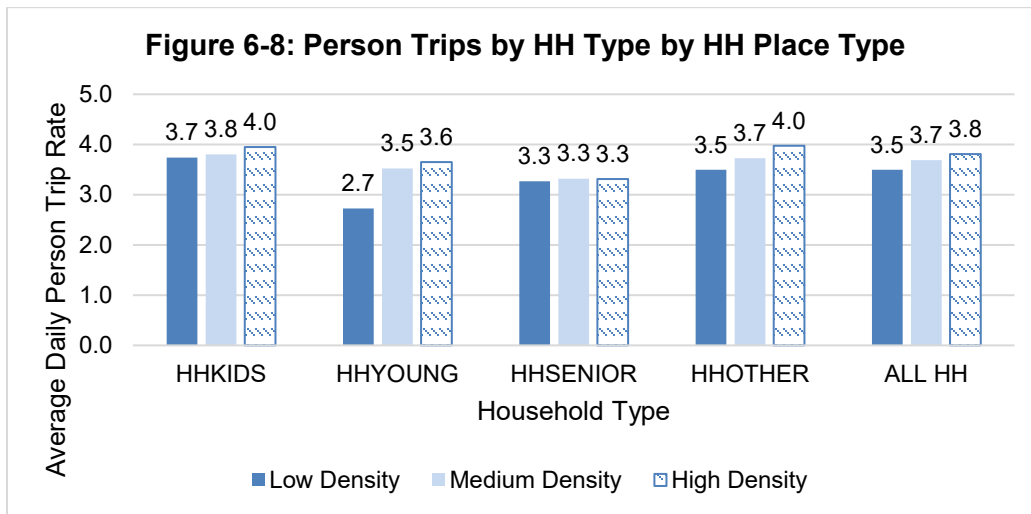**Table 6-9: Household Type by Household Place Type**

Household Place Type		HHKIDS	HHYOUNG	HHSENIOR	HHOTHER	All HH
Low Density	Rural	7%	5%	7%	8%	7%
	Rural Near Major Center	9%	9%	10%	10%	10%
	MPO Low Density	5%	3%	5%	4%	4%
Medium Density	Isolated City	8%	7%	12%	9%	9%
	City Near Major Center	10%	10%	12%	9%	10%
	MPO Residential	42%	37%	31%	34%	36%
	MPO Employment	3%	5%	4%	5%	4%
High Density	MPO Mixed Use	14%	16%	14%	15%	15%
	MPO TOD	2%	9%	4%	6%	5%
Total		100%	100%	100%	100%	100%

The following summarizes the differences in travel by type of household across place types based on travel metrics, trip purpose, and travel mode. For ease of presentation and discussion, the household place types are grouped according to density levels: low, medium, and high.

Travel Metrics

Person trips for those living in households with children (HHKIDS) and households with seniors (HHSENIOR) remain relatively stable across place type. However, person trips for those living in households with young adults (HHYOUNG) and other households (HHOTHER) increase as the density level increases, as shown in Figure 6-8. Senior households generally report the fewest trips, except for young adult households in low density areas. These results are consistent with research, which shows that proximity is associated with higher numbers of often shorter trips.

Figure 6-8: Person Trips by HH Type by HH Place Type

The amount of time spent traveling on a typical weekday varies based on both household type and place type, illustrated in Figure 6-9. HHKIDS report more time traveling (10 minutes on average) if they live in the low density place types than if they live in the medium or high density place types. On the other hand, HHYOUNG report more time spent traveling if they live in the medium or high density place types than those living in the low density place types. HHSENIORS report traveling 10 minutes less (on average) if they live in medium-density place types. HHOTHER reported traveling more per day than all other household types living in most place types, despite having the statewide average number of trips. The HHOTHER group is comprised of households with no children, ages 35-64 and not retired. This group's high amount of travel, especially in low density areas is notable because they make up 30 percent of all households.

Figure 6-9: Daily Person Travel Time by HH Type by HH Place Type
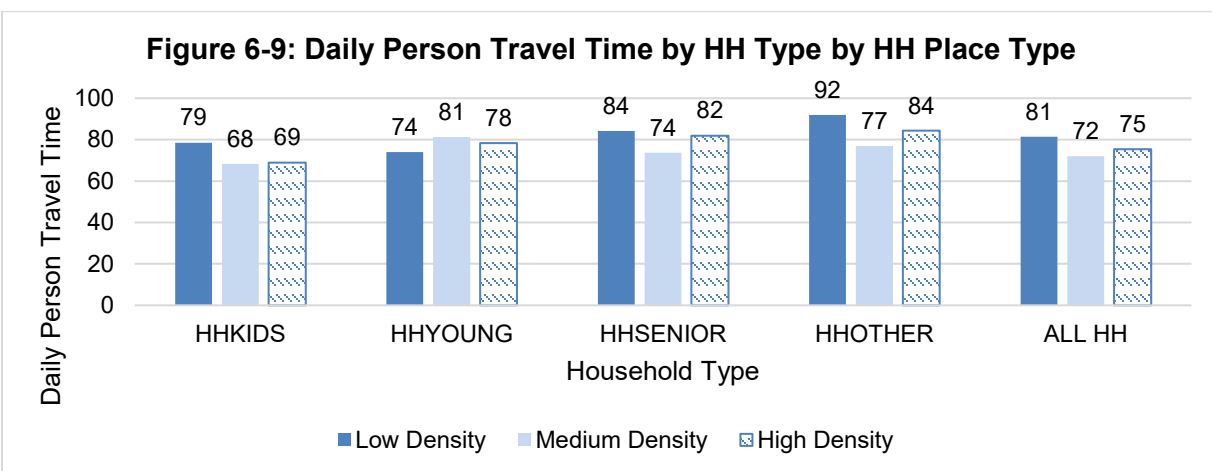
The total daily person trip miles reported, illustrated in Figure 6-10, varies by place type by nearly a factor of two. Daily travel miles are lowest for those living in the high density place types (around 20 miles on average) and increased as the density levels decrease. The daily person trip miles for those living in the high density place types is relatively stable (lowest for those in young households). For medium and low density level place types, the distance traveled for those living in

households with children is lower than for other household types. Finally, the low density level place type's daily trip miles vary the most across household type. As with time spent travelling, HHOTHER reports the highest daily distance traveled, especially for those in low density areas.

Figure 6-10: Daily Person Trip Miles by HH Type by HH Place Type

A grouped bar chart titled "Figure 6-10: Daily Person Trip Miles by HH Type by HH Place Type." The y-axis is labeled "Daily Person Trip Miles" ranging from 0 to 50. The x-axis is labeled "Household Type" with categories HHKIDS, HHYOUNG, HHSENIOR, HHOTHER, and ALL HH. Three bars per category represent Low Density, Medium Density, and High Density.

- HHKIDS: Low Density 34, Medium Density 21, High Density 20
- HHYOUNG: Low Density 36, Medium Density 29, High Density 18
- HHSENIOR: Low Density 39, Medium Density 30, High Density 21
- HHOTHER: Low Density 47, Medium Density 29, High Density 20
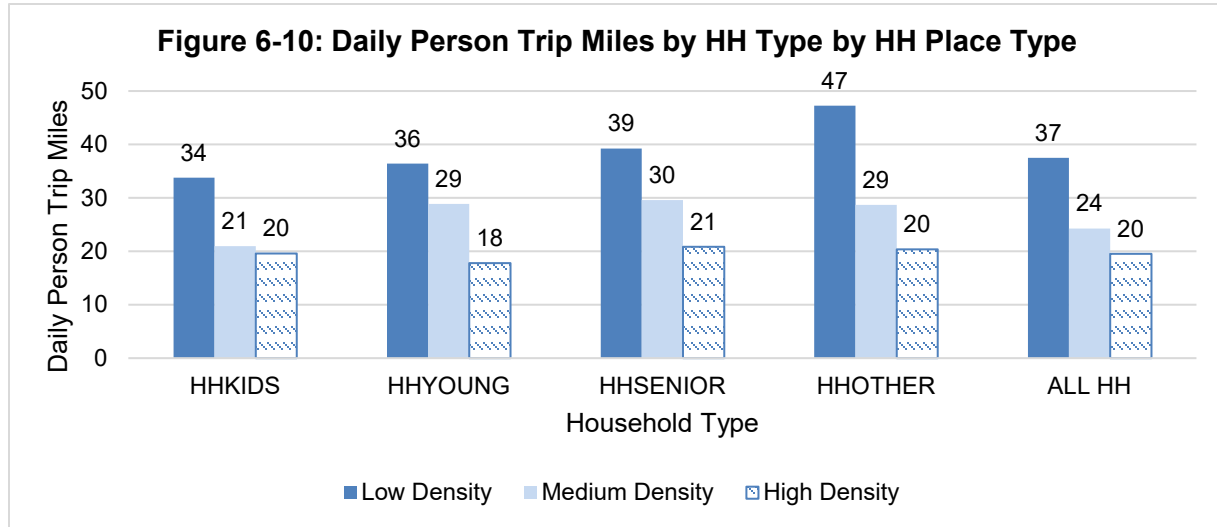- ALL HH: Low Density 37, Medium Density 24, High Density 20

Figure 6-11 reveals for those living in households with kids, work trips are the longest (regardless of density). Social/recreation trips are the longest for those living in households with young adults along with school trips by those living in the low density areas. For households with seniors, the social/recreation trips are the longest for those living in the low and medium densities. For those living in the "other" household type, trip lengths decrease with density across all trip purposes and are consistently the longest trip length for all purposes in low density areas . The trips of all types were consistently around 4-5 miles in the high density areas, and more variable for households in other densities.

Figure 6-11: Average Trip Length (Miles) by Household Type by Household Place Type by Trip Purpose
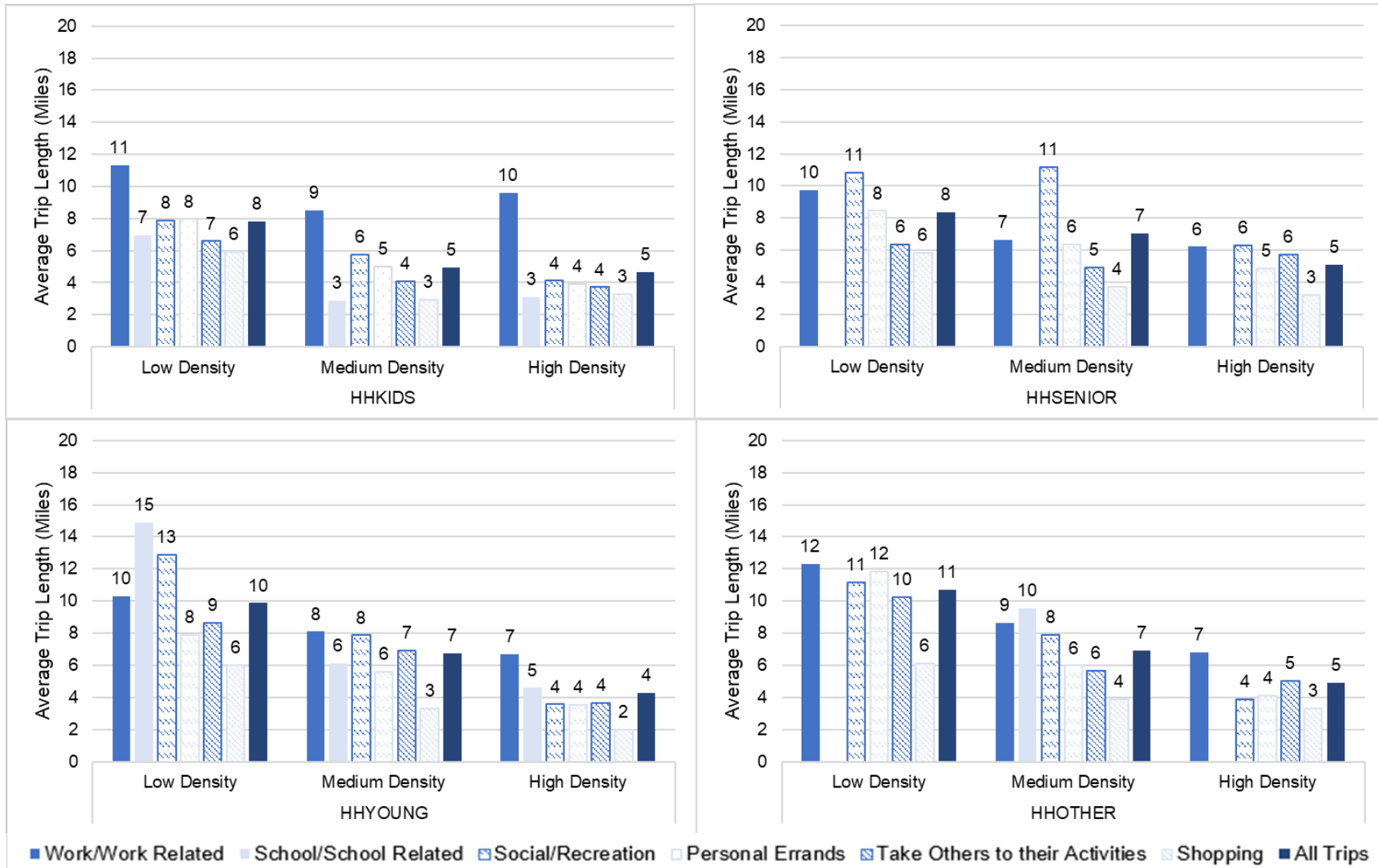
*Insufficient sample for HHSENIOR school trips (all densities) and HHOTHER school trips (low and high density)
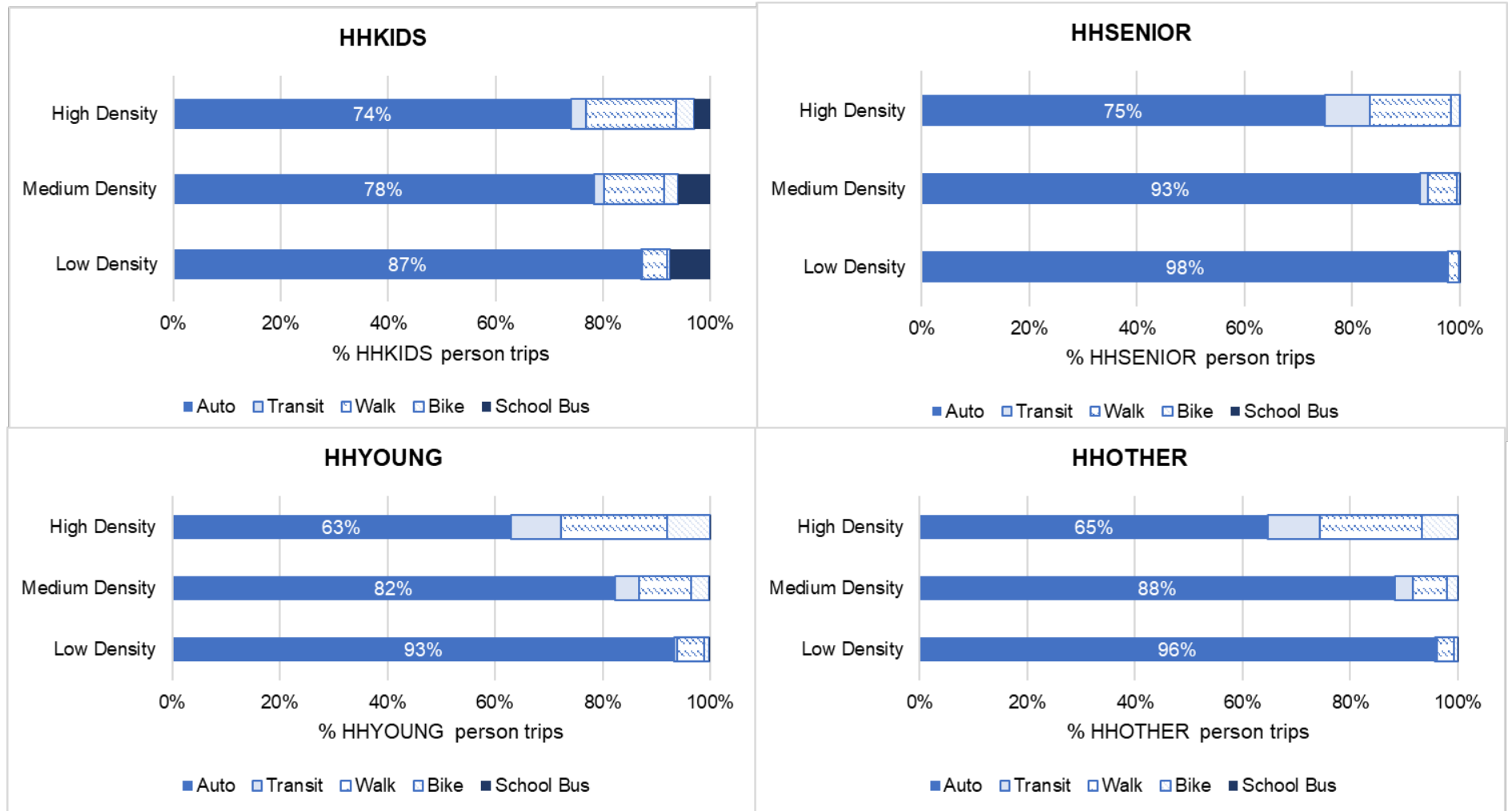
CHAPTER 6

Travel Mode

The reported travel mode varies dramatically based on mode availability by density, but also by household type. Figure 6-12 summarizes this three-dimensional comparison. Overall, the use of non-auto modes increases as density increases, regardless of household type; Travel by school bus is reported by persons in households with children, particularly those living in the lower density place types. Otherwise, travel by transit, walk and bike increases as density levels increase.

- High density – Lowest auto mode share and bulk of the transit and bicycle trips.
    - Residents of households with children (HHKIDS) report 74% of trips by auto, and 26% of trips by non-auto, including 17% of trips by walk. Transit, bike, and school bus each comprise 3% of trips for this group.
    - Those living in households with young adults (HHYOUNG) report the lowest level of auto trips (63% of trips) and the highest proportion of walk trips (20%). Nine percent of their trips are by transit.
    - HHSENIOR household members report the highest level of auto trips (75%) and a strong level of walk (15%) and transit (8%) of trips. Virtually no trips are made by bike.
    - HHOTHER residents report 65% of trips by auto, 19% by walk, and 10% by transit.
- Medium density – Mid-level mode split, but closer to low density mix.
    - HHKIDS residents report 78% of trips by auto, 11% of trips by walking and 6% of trips by school bus. Transit and bike trips each comprise 2% of trips, respectively.
    - HHYOUNG household members living in medium-density place types report 82% of trips by auto, 10% of trips by walk and 4% of trips by transit.
    - HHSENIOR household members again report the highest level of auto trips (93%). Of the remaining trips, 5% are by walk and 1% each are by transit and bike.
    - HHOTHER residents report 88% of trips by auto, 6% by walk, 3% by transit, and 2% by bike.
- Low density –Highest auto mode share, particularly if exclude school bus. Significant walking, but very few, if any, transit and bike isolated to non-senior households.
    - HHKIDS residents report 87% of trips by auto, 7% of trips by school bus, 5% of trips by walk and 1% of trips by bike.
    - HHYOUNG household report 93% of trips by auto, 5% of trips by walk and 1% of trips by bike.
    - HHSENIOR household members report 98% of trips by auto. Of the remaining trips, 2% are by walk.
    - HHOTHER residents in low density areas are second only to HHSENIORS in auto-reliance, reporting 96% of trips by auto, 3% by walk, and 1% by bike.

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Figure 6-12: Travel Mode by HH Type by HH Place Type Density

CHAPTER 6

Travel Flows

In addition to understanding travel based on home location and demographic characteristics, the travel flows between origins and destinations provide an additional layer of detail and insight regarding the factors that influence travel. Specifically, the trip characteristics (length, duration, time of day, travel mode, etc.) summarized in the first three sections of this chapter are a direct reflection of how far residents travel in order to access work, shopping, medical and recreational opportunities. This final section of the chapter shows how trip characteristics are influenced based on the extent to which destination opportunities exist within the same place type classification as the home location.

This analysis uses the place type grouping of hub, spoke, and hybrid categories. Like hub-and-spoke concepts in airline or computer networks, dispersed, lower density spoke sites are connected like spokes of a wheel to each other via more concentrated central Hub sites. The "hub and spoke" grouping acknowledges regions with higher density levels offer more destination choices for the traveler. Whether it is work, shopping, medical facilities, or recreation, the traveler's destination choices increase as the density levels increase. Thus, people living in rural and lower density place types (rural, rural near major center, and MPO low density) travel further to access viable destinations as compared to those who live in the higher density place types. The definitions of each group based on their underlying place types include:

- The "hub" group includes the isolated city, city near major center, MPO mixed use, and MPO TOD place types, which are considered "self-sufficient" in the sense that the job opportunities as well as shopping, medical, and recreation options should cover most of the needs of the residents of those place types. Across all survey participants, 38% live in hub place types.
- The "spoke" group, which includes the rural, rural near major city, and MPO low density place types, generally have much fewer destinations nearby. As a result, spoke residents typically travel to the higher density place types in order to fulfill household and personal needs. One out of every five participating households (21%) reported living in a spoke place type.
- The "hybrid" group, which contains all remaining place types, was so named to reflect that fact that the development patterns have some viable destinations to fulfill some but not all needs. As a result, they have a mix of travel to destinations nearby as well as to the higher density place types in the "hub" group. Two out of every five participating households (40%) lived in a hybrid place type.

Figure 6-13 provides a visual example of how the place types are interspersed across a hypothetical region. In this region, there are two "hub" regions with clusters of the higher density MPO place types. The lower density "spoke" communities are concentrated in the lower right corner of the map and to the north of the central hub. The residents of these areas travel into the hub areas for work, social/recreation, and services not available in their lower density communities.

Figure 6-13: Travel Mode by HH Type by HH Place Type Density
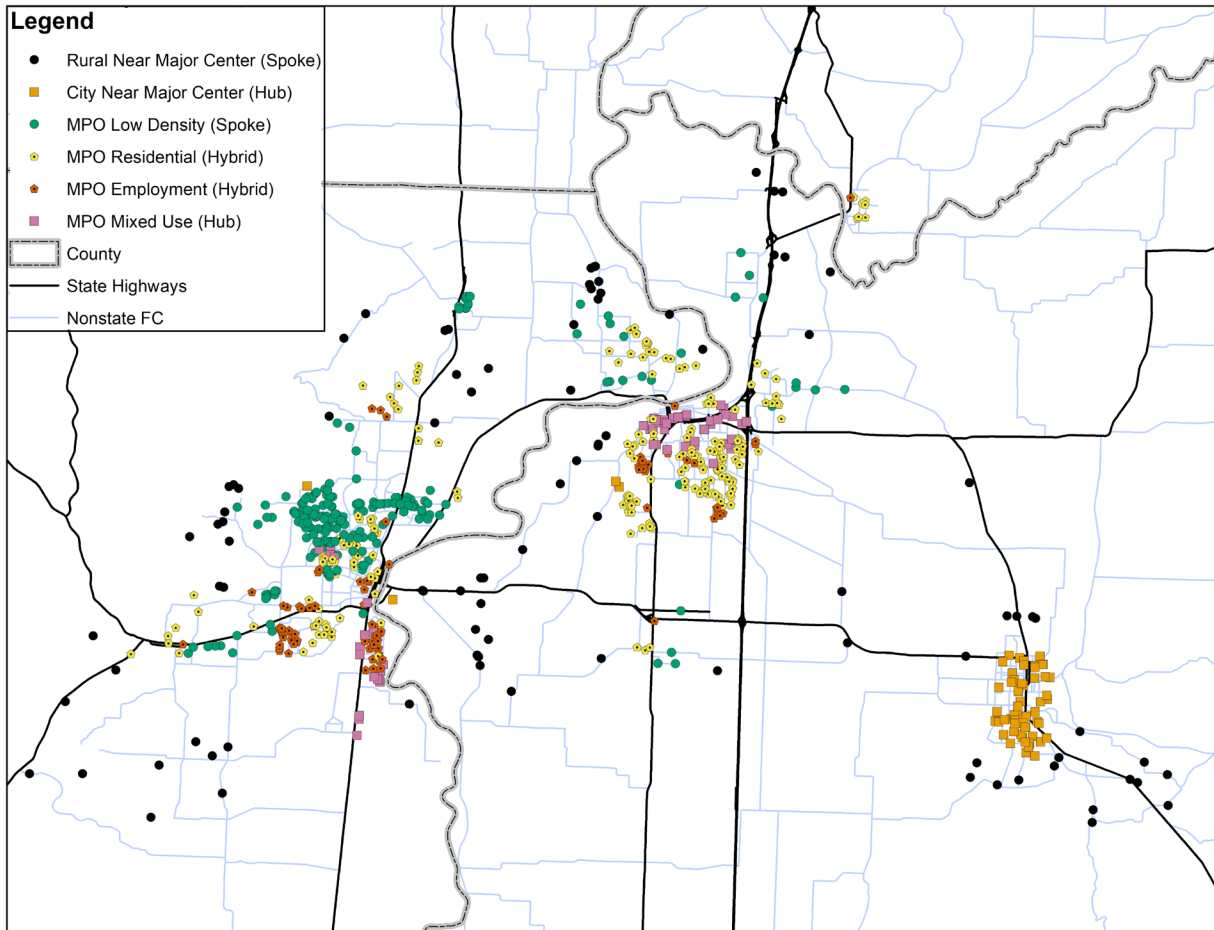
Demographically, as shown in Figure 6-14, those who live in the hub place types tend to report the lowest average household size, children, workers, and vehicles. Hybrid households report the highest average number of children and workers, with a larger household size as compared to hub households but smaller than spoke households. In addition, hybrid household vehicle ownership is closer to that of hub households than spoke households. Finally, lower density spoke households are the largest in terms of size and vehicles.

Figure 6-14: Household Characteristics by Place Type
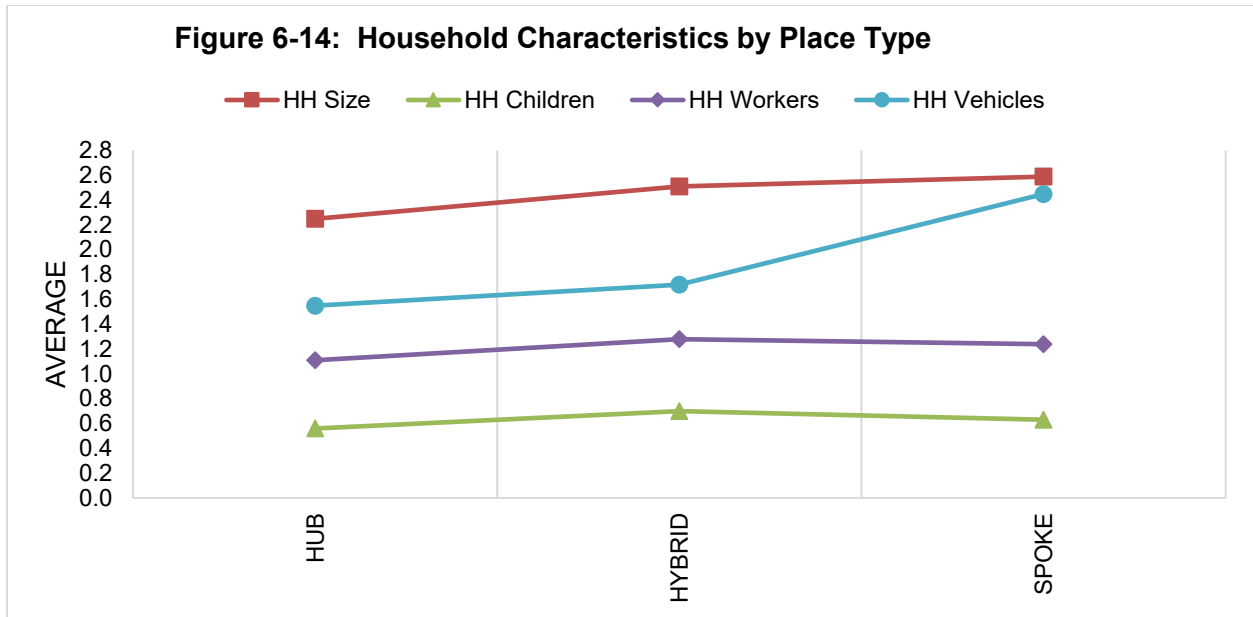
Person trip levels follow the statewide average except for fewer trips in lower density spoke locations (Table 6-10). Despite reporting fewer trips, spoke residents travel more than other residents each day in terms of both distance (37 miles) and duration (81 minutes).

Table 6-10: Average Person Travel Metrics by Household Place Type

Home Location	% Persons	Person Trips	Daily Trip Miles	Daily Travel Time (minutes)
Hub	37%	3.7	22	72
Hybrid	41%	3.7	24	73
Spoke	22%	3.5	37	81
Statewide	100%	3.7	26	75

The concept of hub locations being more "self-sufficient" (i.e., most activity destinations for hub residents are made to locations within the hub place types) is illustrated in Figure 6-15. This figure shows the distribution of home-based trips for work, non-work, and all trips combined in three respective columns. Each column depicts the home-location (hub, spoke, or hybrid) on the left and the trip destination location (again in terms of hub, spoke or hybrid) on the right. The travel is also color coded: hub is red, spoke is green, and hybrid is blue. The thickness of the line reflects the proportion of trips for each home-destination pair. The text annotations identify the proportion or share of travel originating from the home place type as well as the average trip distance (miles) traveled for that trip.

Figure 6-15: Home-based Trip Destination Locations
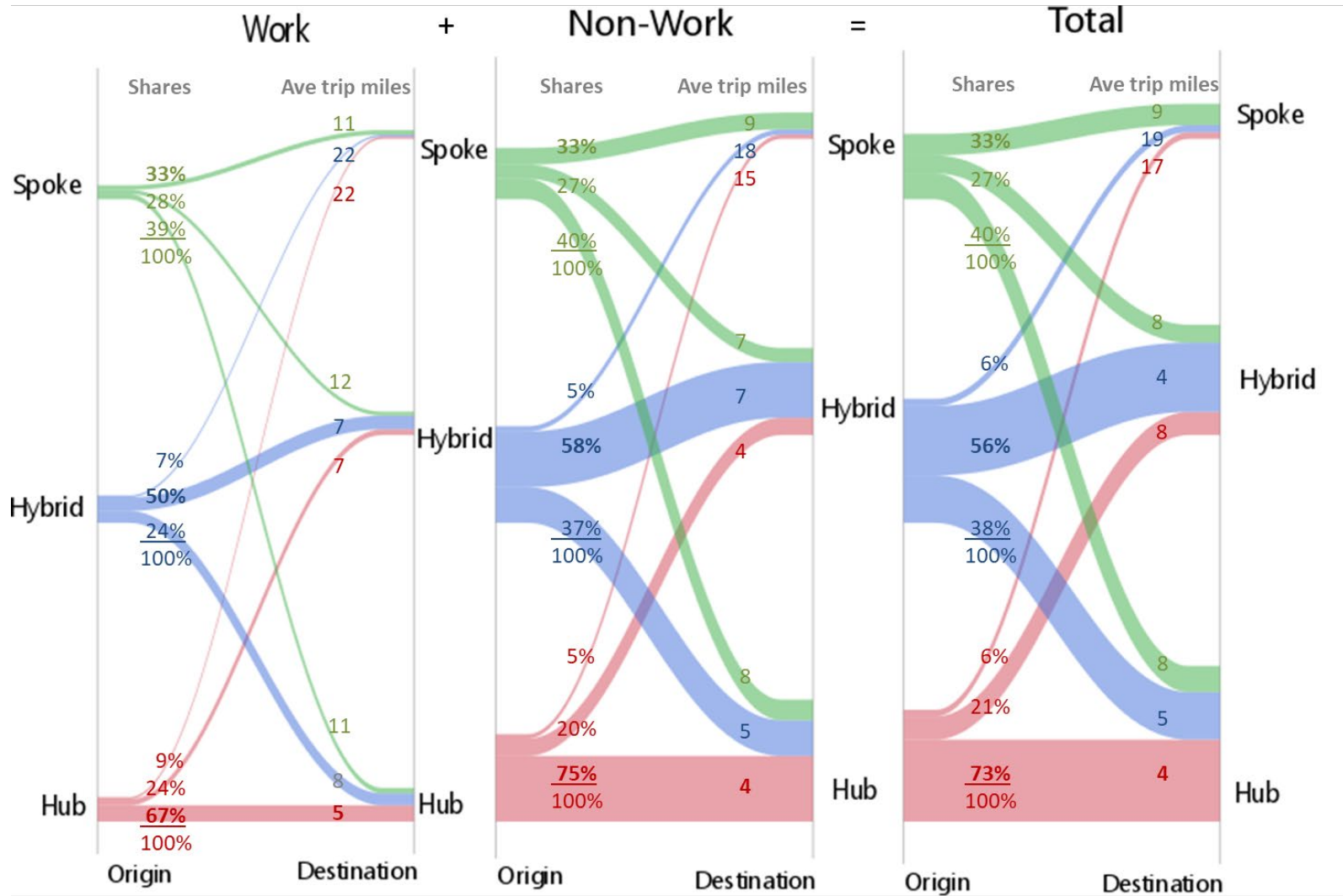
In general, as shown in Figure 6-15 (focusing primarily on "all trips" depicted in the right-most panel), hub residents are most likely to travel to destinations within their home place type:

- **Hub Residents**. The majority of trips generated by residents of hub place types are made to destinations also located within the hub place types (73% of all trips). Overall, 21% of all trips reported by hub residents are destined to hybrid place types, while 6% of all trips are made to spoke place types.
- **Hybrid Residents**. A much lower portion of hybrid-generated trips are made to destinations also within the hybrid designation: 56% of all trips made by hybrid residents are to destinations within the hybrid place types, 38% of trips are to hub destinations, and 6% are to spoke locations. This strong interaction with the hub locations is consistent with the hub-spoke theory in that hybrid locations offer enough mixtures of activity and work locations for some residents, but limited land use diversity and close proximity encourages travel to hub destinations.
- **Spoke Residents**. Spoke residents have the greatest variation in their trip destination locations: 40% of trips are to hub locations, 27% to hybrid locations, and 33% remain within the spoke place types.

In general, more trips cross hub-spoke boundaries for work. The choice of travel destination location for residents of the three place type groupings also varies depending on whether the travel is for work or non-work purposes, shown in the left and center panels of Figure 6-15. An important note to consider when comparing the patterns of work vs. non-work travel is the scale itself: as evidenced by the thickness of the lines, work trips are only about one-third of all trips, although work commutes are often longer than other trips:

Trip purpose does not seem to affect the mix of destinations for those living in spoke place types. These residents continue to be drawn to the diverse job and non-work (e.g., shopping) destinations of the hub and hybrid place types. Likewise, both hub and hybrid residents remain in their own place type for over half and up to three-quarters of their trips for any purpose. Nonetheless, hub and hybrid residents are more inclined to travel outside their own place type for work trips (roughly 8% point increase) over non-work trips. This is mostly experienced in increased commuting between the hub and hybrid place types, but there is also a 3-4% increase in work trips from these places to spoke locations, relative to non-work trips. Also apparent is the hub-spoke theory dominance of denser areas accommodating more trip destinations from all origins and having an increased share of trips staying with the same place type (horizontal flows).

Trip distance (in miles) is an important metric in transportation planning. Figure 6-15 (on the previous page) depicts the trip distance for each home-destination pair (by work and non-work trip purposes). In general, trips that stay outside spoke boundaries are the shortest, while the longest trips are infrequent and cross hub-spoke boundaries. As indicated therein, residents of hub and hybrid place types travel about the same distance to their hub and hybrid trip destination locations,

reporting slightly shorter trips that stay in hub locations. In contrast, spoke residents appear to travel the same distance regardless of place type (7-12 miles). The longest trips appear to be hub and hybrid residents traveling to spoke areas (15-22 miles). The figure also depicts that work trips are consistently 3-4 miles longer than non-work trips for each home-destination pair. Although trip durations narrow the gap between long and short trips, the challenges posed by longer trip distance should not be understated, given the impact of vehicle miles traveled (VMT) on other goals -- increasing congestion and demand for roads, and emission impact on health and the environment.

Mode usage also follows expected patterns. As indicated in Figure 6-16, those living in the hub place types report a higher proportion of walk trips and transit usage than those living elsewhere. At the same time, auto-usage is highest in the spoke place use types (as is typical for low density areas where residential and commercial areas are separated; this makes it harder to serve these trips by walking and biking (longer trips), or transit (hard to serve dispersed locations).

Figure 6-16: Report Mode Usage based on Home Location
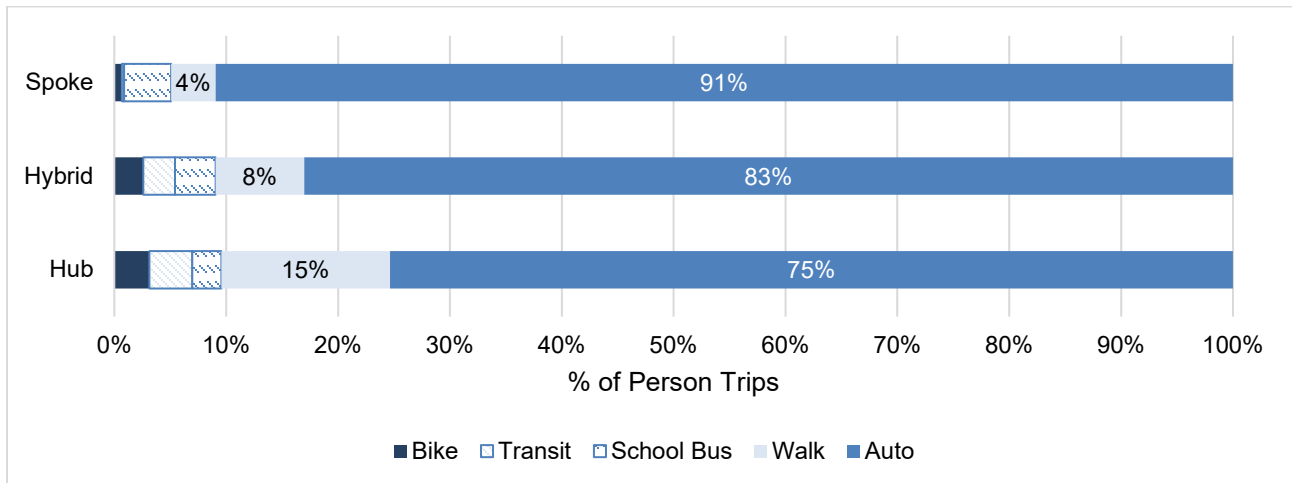
OD Flow Summary

- Hub households are smaller and own fewer vehicles, while spoke households are larger and own more vehicles. Hybrid households are large (like spoke households) but own fewer vehicles (like hub households).
- At the per capita level, hub and hybrid household members report slightly more trips than those living in the spoke area. However, overall household travel for hub households is 10-15 miles less.
- Spoke households report about 40% more miles traveled on a typical weekday (37 miles per day) although trip durations are only about 10% higher than those reported by households living in the other regions. This may be due to faster modes (auto) and/or less congestion.

- Across all trips reported by hub residents, 73% are made to a destination within the hub place type. This compares to 56% of trips by hybrid residents being made to a hybrid destination and 33% of spoke resident trips remaining within the spoke place type group.
- Consistent with the hub and spoke theory, trips that stay within the same place type were shorter. People living in spoke place types had the same average trip length for all trips, while other residents' trip lengths increased when venturing outside their home place types. Longer trip lengths were observed in all spoke-spoke work trips (11 miles) as compared to work trips within the same place type for other workers (5-7 miles) although the work trip difference is muted when considering trip duration instead of miles.
- With respect to work trips, 67% of workers living in a hub place type commute to a work location also in the hub place type group. This compares to 50% of hybrid workers traveling to a hybrid place type work location and 33% of spoke workers commuting to jobs within the spoke place type group.
- The work commute trip for hub workers is the shortest reported at 5 miles if staying within the hub, 8 miles on average. Spoke workers travel an average of 11 miles for work, and hybrid falls between the other two place type groups at 8 mile average.
- Mode usage also follows expected patterns, with those living in the hub place types reporting a higher proportion of walk trips and transit usage than those living elsewhere. At the same time, auto-usage is highest in the spoke land use types (which is typical for low density areas).

Summary

This chapter summarizes the results of an investigation into how daily travel varies based on the built form environment. Using the Oregon DOT concept of "place type" the analysis focused on differences in travel based on place type, the demographic characteristics of residents within each place type, profiles of specific types of households across all place types, and the place types of the trip destinations.

The survey captured household travel based on where they currently live. The factors that influence location choice are varied and only minimally investigated as part of the OHAS effort. For example, households with one worker may choose to locate close to the place of employment or near desirable school districts despite a lengthy commute. Multi-worker households may locate equidistant between workplaces or may chose a home location based on amenities and without regard to the work location (especially where the workers have an option to telecommute).

Demographically:

- Household size: average household sizes are largest in the low density place types. As density increases, average household size decreases.
- Household vehicles: vehicle ownership is highest in the rural areas and MPO low density and decreases as density increases with the fewest vehicles in TOD place types.

- Household workers: the average number of household workers is fairly consistent by place type.
- Household ages: the average number of children per household is fairly consistent across the low and medium density place types, with fewer kids reported by those living in the TOD place types. Senior and young adult households have higher than average concentration in small cities and TODs, respectively.
- Household income: households with the lowest income categories tend to live in hub rather than spoke place types. Higher income households are more likely to be located in middle densities near major cities.
- As to be expected, the proportion of households living in single-family dwellings decreases as density increases. Tenure also decreases with density.

With respect to general differences in travel based on place type, the analysis found:

- Trip rates do not vary much statewide, although trip rates for those living in the Non-MPO, low density, and spoke place types are the lowest.
- At the same time, daily travel (miles and travel time) are highest for this same group of lower density place types. Low density areas within MPOs have roughly half the vehicle miles of rural place types.
- Combined, this confirms the generally accepted understanding that people in the rural areas travel longer distances in fewer trips, mostly in autos (91% auto mode share) to fulfill daily activities. Conversely high density areas make more frequent, shorter trips by non-auto modes (75% non-auto). Medium density areas are closer to the low density auto-dominated mode split.

An analysis of travel based on specific household "types" (households with kids, with seniors, with young adults, or all others) helped to illustrate where and how travel was affected by the home location built environment. Specifically:

- Regardless of household type, of the 9 place types, most live in the MPO residential place type (36% of all households). This is a medium-density place type associated with the "hybrid" place type group (where most daily needs are easily accessible within the same place type but residents may still travel to higher density areas for work and specialty shopping/medical/recreational opportunities).
- Households with seniors or kids are the most auto-dependent, although walking and transit usage (especially for seniors) increase with density. Young adult households (and all other households) are similarly auto-dependent in low density areas but are the least auto-dependent (63% auto mode share) at higher densities.
- Households with kids have few transit trips regardless of place type. Walk and bike mode increases with density for all groups, except for senior households who rarely travel by bike anywhere.
- Workers living in households with children report the longest work trips (regardless of place type), while school and social/recreation trips are longest for those living in households with

young adults. For households with seniors, social/recreation trips are by far the longest for those living in the low and medium densities, but similar length across all trip purposes when living in the higher density place types.

- Trips consistently average between 4 and 5 miles for residents in the high density areas, with more variability (and increase length) for trips reported by other respondents.

The hub and spoke grouping of place types allowed for a closer analysis of trip destinations and the ability to analyze the extent to which people living in the "hub" place types had more destination opportunities closer to home as compared to those living elsewhere. Findings included:

- Spoke households report the most miles travelled, about 40% more miles traveled on a typical weekday (37 miles per day), although trip durations are only about 10% higher than those reported by households living in the other regions. This may be due to faster modes (auto) and/or less congestion.
- Hub residents are most likely to travel to destinations within their home place type. Across all trips reported by hub residents, 73% are made to a destination within the hub place type. This compares to 56% of trips by hybrid residents being made to a hybrid destination and 33% of spoke resident trips remaining within the spoke place type group.
- More trips cross hub-spoke boundaries for work. At the same time, with 67% of workers living in a hub place type commuting to a work location also in the hub place type group. This compares to 50% of hybrid workers traveling to a hybrid place type work location and 33% of spoke workers commuting to jobs within the spoke place type group.
- Trips that stay outside spoke locations are the shortest. Hub work commute trips are the shortest, reported at 5 miles if staying within the hub, 8 miles on average. Spoke workers travel an average of 11 miles for work and hybrid fell between the other two place type groups at 8 mile average. Spoke residents appear to travel the same distance regardless of purpose or destination place type (7-12 miles).
- The longest trips are infrequent and cross hub-spoke boundaries, especially hub and hybrid trips to spoke locations (often an additional 10 or more miles). Work trips are 3-4 miles longer than non-work trips. Longer trips use faster modes and roadways, so trip durations show less distinction.
- Mode usage also follows expected patterns, with those living in the hub place types reporting a higher proportion of walk trips and transit usage than those living elsewhere (75% auto mode share). At the same time, auto-usage is highest (91%) in the spoke land use types (which is typical for low density areas).

This new analysis using place types reveals patterns arising from individual people making personal choices related to where they live, work, attend school, recreate, shop and conduct personal business. The transportation system provides the mobility needed to participate in the activities that contribute to Oregon's quality of life and the economy. Understanding the relationship between land use form supports making informed policy decisions to optimize system performance while avoiding unintended consequences.

CHAPTER 7

Travel Profiles

This chapter of the report provides a summary of travel statewide and for each survey region. The travel profiles include the same details for each geography and are presented in the following order:

- Statewide
- ODOT Region 2*
- ODOT Region 3**
- ODOT Region 4
- ODOT Region 5
- ODOT Region 1/Portland Metro***
- Central Lane
- Salem/Keizer
- Medford/Rogue Valley
- Bend

Notes: See Introduction for a map of Survey Regions. *Corvallis and Albany metropolitan areas included in ODOT Region 2. **Grants Pass included in ODOT Region 3. ***Defined as Clackamas, Multnomah, and Washington counties.

CHAPTER 7 – STATEWIDE TRAVEL PROFILE

STATEWIDE TRAVEL PROFILE

Statewide, the 17,941 households that participated in the OHAS survey report an average of 2.4 household members and own 1.8 vehicles and 1.5 bicycles, on average. These same households report an average of 8.9 daily weekday trips, traversing 61 miles per day and spending 168 minutes per day traveling. Per capita, this equates to 3.7 trips, 26 miles, and 75 minutes respectively. Household income and size are key explanatory variables in understanding travel patterns.

As shown in Table 7-1, people with household incomes over $75,000 report the highest level of trip-making and longest distances traveled.

Table 7-1: Person Travel Metrics by Household Income

Household income	Person Trips	Daily Trip Miles	Daily Travel Time (minutes)
Less than $25k	3.4	20	76
$25k-<$50k	3.5	25	73
$50k-<$75k	3.7	26	72
$75k+	3.9	31	76

Figure 7-1: Person Trips by Size and Income
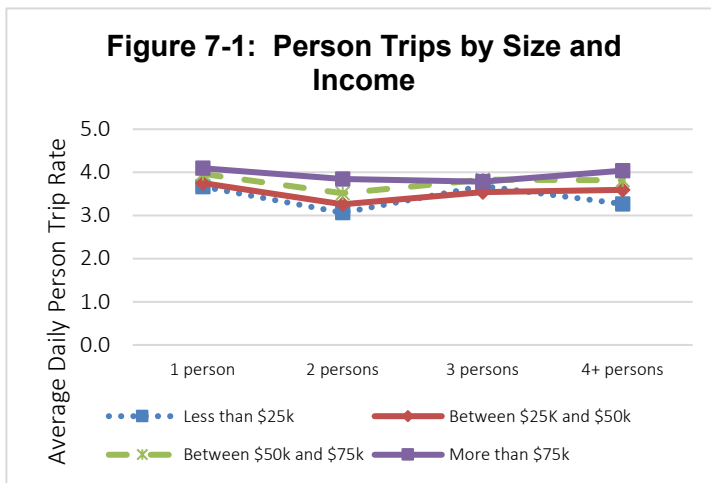
The average daily weekday person trip rate remains fairly steady for persons when considering both household income and size. As shown in Figure 7-1, the greatest variation in trip rates across size is for persons reporting household incomes less than $25,000.

Children (ages 0-17) report the lowest levels of average weekday travel, while those ages 35 to 54 report the highest, as indicated in Table 7-2. Those ages 18-34 report an average of 3.7 daily weekday person trips traveling 28 miles and 79 minutes. The elderly (ages 65+) report an average of 3.3 trips, with similar distances and durations as those ages 18-34.

Table 7-2: Travel Metrics by Age Cohort

Age Group	Person Trips	Daily Trip Miles	Daily Travel Time (minutes)
0-17	3.2	14	57
18-34	3.7	28	79
35-54	4.2	32	85
55-64	3.8	33	80
65+	3.3	28	77
All Persons	3.7	26	75

Table 7-3 illustrates 40% of household members age 16+ report that they work full-time (35 hours or more), while 26% work part-time or volunteered on a regular basis. The remaining respondents age 16+ are not employed. Within each age cohort, the proportion of full-time workers varies: more than

half of all adults ages 35-54 are employed full-time (56%), as compared to 43% of those ages 55-64, 42% of those ages 18-34, and 9% of those ages 65-74.
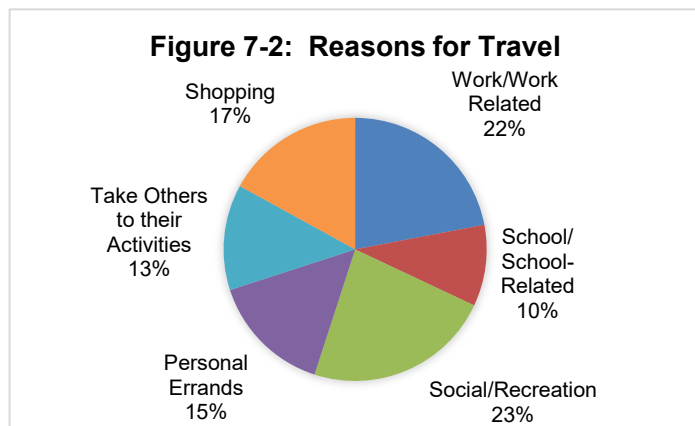
Table 7-3: Worker Status by Age Cohort

Worker Status	Age Groups						Total Ages 16+
	16-17	18-34	35-54	55-64	65-74	75+	
Employed FT	0%	42%	56%	43%	9%	2%	40%
Employed PT or Volunteer	20%	30%	24%	26%	32%	23%	26%
Not Employed	80%	28%	20%	31%	58%	75%	34%
Total	100%	100%	100%	100%	100%	100%	100%

Work is a cornerstone of daily activity, and many aspects of our jobs influence when and how we travel during our non-work hours. The OHAS survey captured the following work-related details:

- Full-time workers report working an average of 44 hours over a 5-day work-week while part-time/volunteer workers spend an average of 21 hours working over a 3-day work-week.
- Most workers who participated in the survey work in the service industry (49% of those employed full-time and 66% of those working part-time or in volunteer positions).
- Most workers report having full (27%) or some (43%) flexibility in their work schedule. Only 29% of respondents report having no flexibility in the work schedule.
- One in four (26%) of all workers indicate that their job requires them to have a personal vehicle available while at work.
- Most workers report that their employers provide free parking (82%) and 7% indicate their employers provide free transit passes. *It is important to note that this is what the employee reported and may not reflect actual workplace programs*.
- Thirteen percent of workers report their employers permit teleworking, where teleworking was defined as working from home in lieu of a commute (not working from home then going into the office on the same day). Of those workers eligible to telework, 40% do so at least once a week, 26% do so at least once a month, 19% report teleworking almost every day and the remaining 15% report only teleworking a few times a year at most.

To link why we travel with how and when we travel, OHAS survey respondents recorded all activities and related travel for a 24-hour weekday period, including:

1. Work/Work-related
2. School/School-related
3. Social and Recreational
4. Personal Errands
5. Taking others to their activities
6. Shopping

Figure 7-2: Reasons for Travel

Average trip distance and duration for each activity are shown in Figure 7-3. Trips for work tend to be the longest at 9 miles and 21 minutes. Those for school and shopping are the shortest (4 miles), while shopping trip duration and taking others to their activities are the quickest at 14 minutes on average.

Figure 7-3: Travel Metrics by Activity
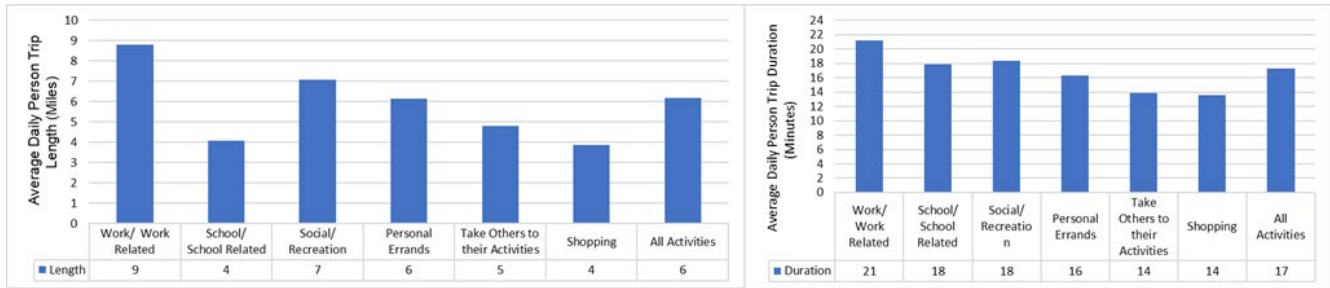
Households with children report more school-related trips and fewer work trips than households with no children. The households with children also report more trips for taking others to their activities and fewer trips for social/recreational, errands, or shopping.

Figure 7-4: Travel Related Activities by Presence of Children
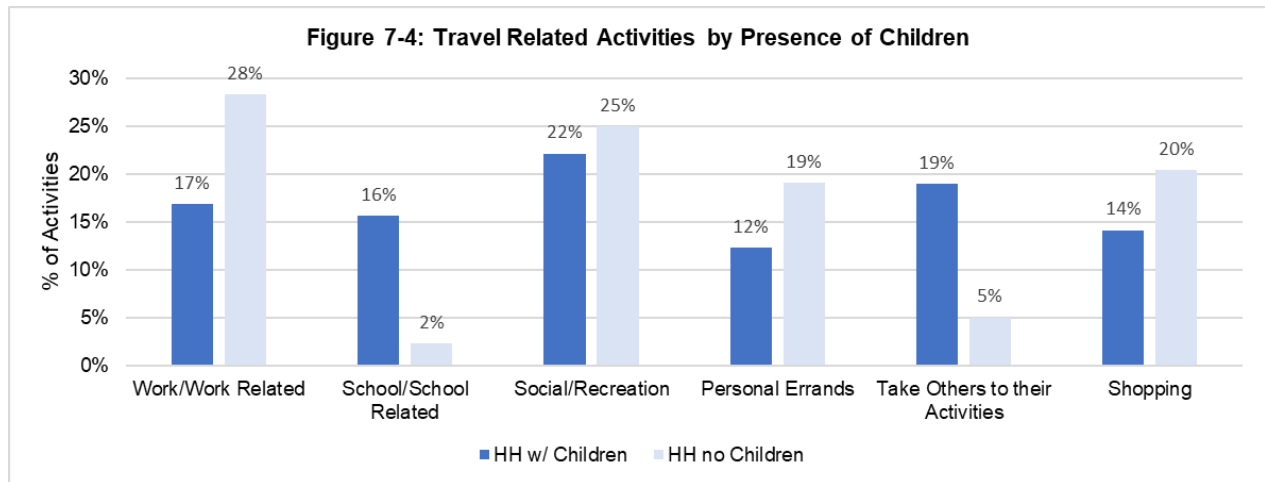
When considering weekday travel by age groups, travel for those ages 0-17 center around school and personal errands, with a fair amount of social/recreation travel as well (see Table 7-4). School related activities decline for each successive age group, while the proportion of trips for personal errands and shopping increases with age.

Table 7-4: Travel-Related Activities by Age Group

Age	Activity						
	Work/Work Related	School/School Related	Social/Recreation	Personal Errands	Others to their Activities	Shopping	Total
0-17	0%	37%	27%	11%	13%	12%	100%
18-34	29%	7%	22%	13%	14%	15%	100%
35-54	32%	1%	20%	14%	17%	16%	100%
55-64	30%	0%	23%	19%	7%	21%	100%
65-74	15%	0%	28%	24%	6%	27%	100%
75+	9%	0%	29%	30%	5%	27%	100%

Regardless of the reason for the travel, the majority of reported trips are made by auto. Of the 13.5 million trips made on a typical weekday in Oregon, 82% are auto trips. Of the remaining 18% of trips,

10% are walk trips, 2% bike trips, 3% transit trips, and 3% school bus trips. By age, those ages 18-34 who are not auto drivers are either passengers (15%) or walk (12%) as indicated in Table 7-5.

Table 7-5: Travel Mode by Age

Age Groups	Travel Mode						Total
	Auto-Driver	Auto-Passenger	Walk	Bike	School Bus	Transit	
0-17	3%	65%	15%	2%	14%	2%	100%
18-34	66%	15%	12%	3%	0%	4%	100%
35-54	77%	9%	8%	3%	0%	3%	100%
55-64	79%	11%	6%	2%	0%	2%	100%
65+	73%	17%	6%	1%	0%	2%	100%

Table 7-6 reveals work and work-related travel is largely by auto (85%). School and social/recreation travel show the highest levels of walk trips, while adult school trips have the highest reported levels of transit usage (12%).

Table 7-6: Travel Modes by Activities

Activity	Travel Mode						Total
	Auto-Driver	Auto-Passenger	Walk	Bike	School Bus	Transit	
Work/Work Related	78%	7%	8%	3%	0%	4%	100%
School/Related (Age<18)	4%	47%	16%	2%	29%	1%	100%
Schoo/Related (Age 18+)	52%	16%	12%	4%	3%	12%	100%
Social/Recreation	50%	32%	13%	2%	1%	2%	100%
Personal Errands	69%	25%	5%	1%	1%	0%	100%
Take Others to Activities	69%	25%	5%	1%	1%	0%	100%
Shopping	59%	26%	10%	2%	0%	4%	100%

The distance and time spent traveling vary by both activity as well as travel mode. Transit trips tend to be about the same miles as auto trips but take almost three times longer in terms of minutes spent traveling. Walk trips average the shortest distance and time (Table 7-7).

Table 7-7: Miles and Minutes Traveled by Activity and Travel Mode

Activity	Auto		Transit		Walk		Bike	
	Miles	Minutes	Miles	Minutes	Miles	Minutes	Miles	Minutes
Work/Work Related	9	21	8	51	0.4	10	2	22
School/School Related	5	14	6	42	0.5	13	1	15
Social/ Recreation	8	18	8	49	0.4	14	1	20
Personal Errands	7	16	6	46	0.4	10	1	14
Take Others to their Activities	5	14	5	36	0.3	9	1	11
Shopping	4	13	4	36	0.3	12	1	12
All Purposes	7	17	6	45	0.4	12	2	18

With respect to the time of day (Figure 7-5) that travel took place, walk trips peak between 7 and 8 am, then again 2 and 4 pm, with activity also reported during the noon lunch-hour. Bike trips peak between 7 and 8 am, with an evening peak of 3 to 5 pm. Transit trips peak in the morning at 7 am, at noon, a 2 pm and again at 5 pm. Auto trips peak at the same time in the morning but peak slightly later at 6 pm in the evening.

Figure 7-5: Mode Usage by Time of Day
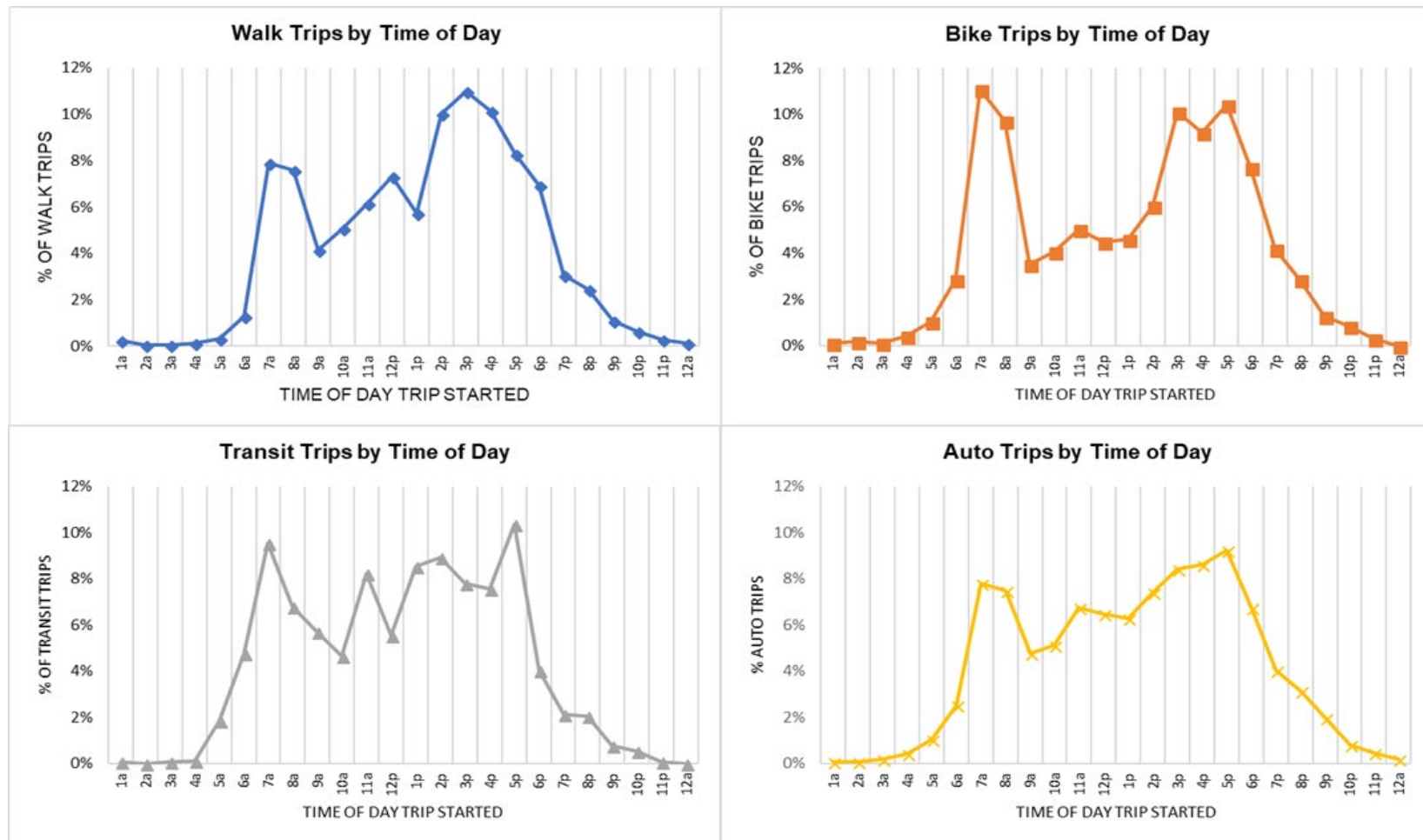
Travel patterns by time of day are fairly consistent by household size, income, and vehicle availability. What accounts for more variation in travel is the age of the traveler. While children report the most pronounced morning and afternoon peaks, the elderly, particularly those travelers age 75 and older, report the most pronounced mid-day peaks as indicated in Figure 7-6.

Figure 7-6: Time of Day Travel by Age Group
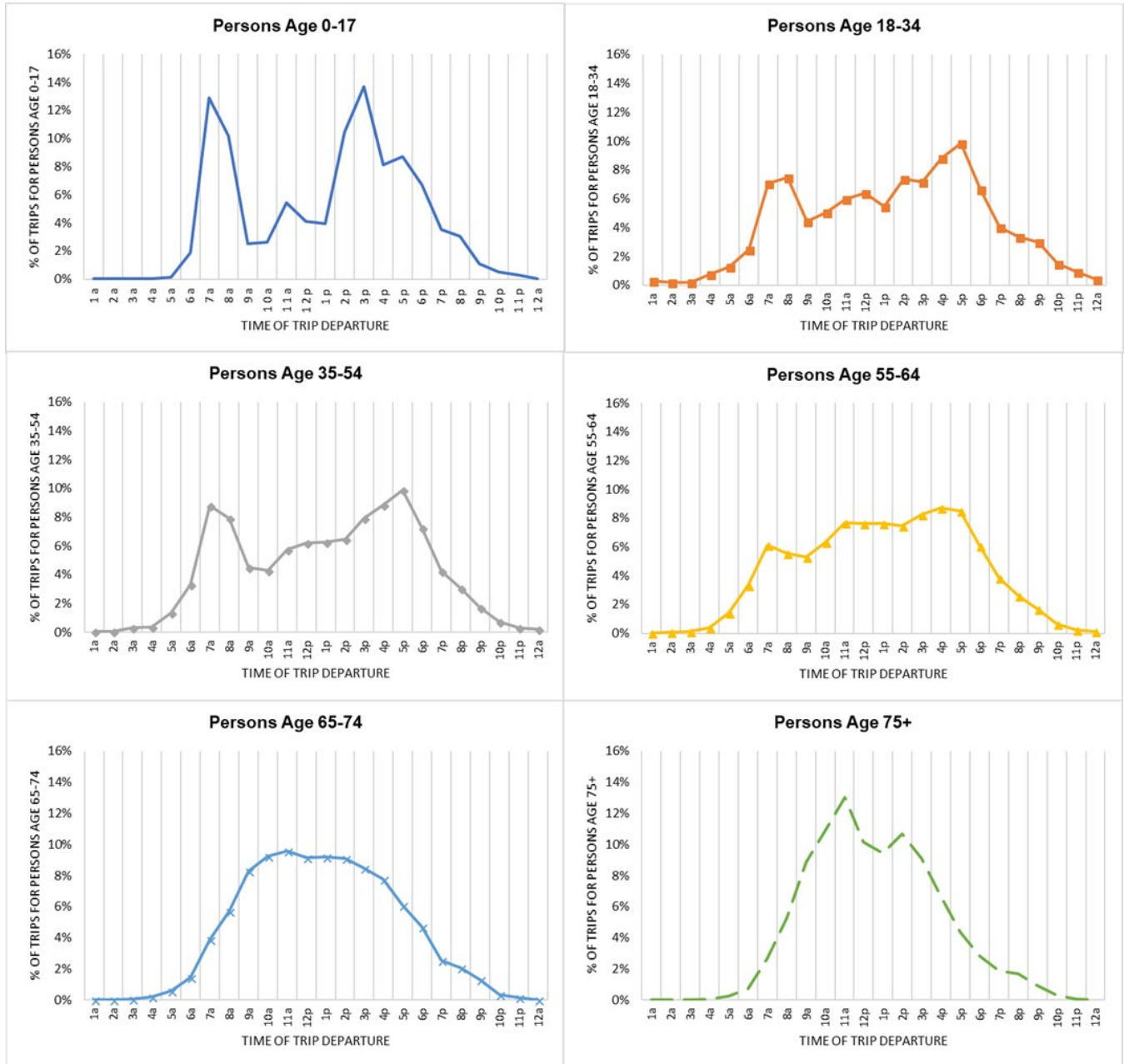
CHAPTER 7 – ODOT REGION 2 TRAVEL PROFILE

ODOT REGION 2 TRAVEL PROFILE

Across ODOT Region 2, the 3,577 households that participated in the OHAS survey report an average of 2.5 household members and own 2.0 vehicles and 1.3 bicycles, on average. These same households report an average of 9.0 daily weekday trips, traversing 73 miles per day and spending 178 minutes per day traveling. Per capita, this equates to 3.6 trips, 30 miles, and 76 minutes respectively. Household income and size are key explanatory variables in understanding travel patterns.

As shown in Table R2-1, people with household incomes under $25,000 report the highest level of trip-making. Those in households with incomes over $75,000 report longer trips (in miles).

Table R2-1: Person Travel Metrics by Household Income

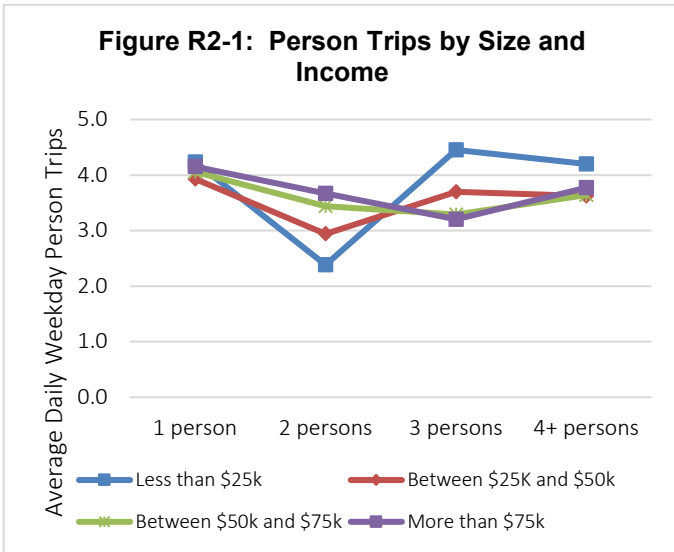| Household Income	Person Trips	Daily Trip Miles	Daily Travel Time (minutes)
Less than $25k	3.9	24	80
Between $25K and $50k	3.5	31	77
Between $50k and $75k	3.5	30	71
More than $75k	3.6	35	74
All Persons	3.7	30	76

Figure R2-1: Person Trips by Size and Income

The average daily weekday person trip rates show variations in per capita trip rates when considering both household income and size. As shown in Figure R2-1, the greatest variation in trip rates across size is for those living in 2-person households. Person travel is most consistent across the $75,000+ income group regardless of household size.

Seniors (ages 65+) report the lowest average weekday trip rates, while those ages 35 to 54 report the highest rates, as indicated in Table R2-2. Respondents ages 18-34 report an average of 3.6 daily weekday person trips traveling 38 miles and 85 minutes.

Table R2-2: Travel Metrics by Age Cohort

Age Group	Person Trips	Daily Trip Miles	Daily Travel Time (minutes)
0-17	3.4	14	59
18-34	3.6	38	85
35-54	4.1	36	85
55-64	3.8	41	83
65+	3.3	34	77
All Persons	3.6	30	76

Thirty-seven percent of household members age 16+ report that they work full-time (35 hours or more), while 26% report they work part-time or volunteered on a regular basis. The remaining respondents age 16+ are not employed. Within each age cohort, the proportion of full-time workers varies: more than half of all adults ages 35-54 are employed full-time (52%), as compared to 42% of those ages 55-64, 41% of those ages 18-34, and 8% of those ages 65-74.
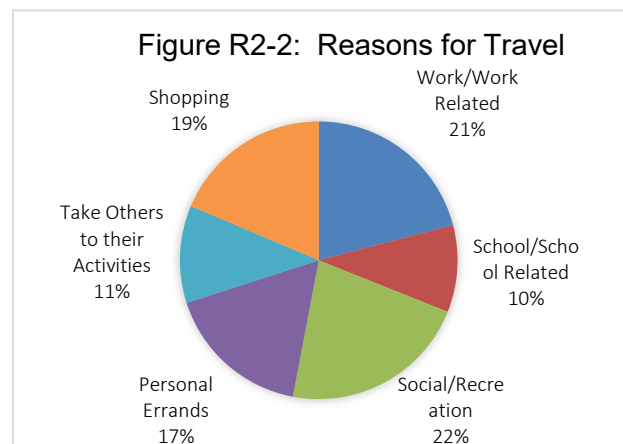
Table R2-3: Worker Status by Age Cohort

Worker Status	Age Groups						Total Ages 16+
	16-17	18-34	35-54	55-64	65-74	75+	
Employed FT	0%	41%	52%	42%	8%	1%	37%
Employed PT or Volunteer	12%	31%	24%	26%	30%	21%	26%
Not Employed	88%	28%	24%	32%	62%	79%	37%
Total	100%	100%	100%	100%	100%	100%	100%

Work is a cornerstone of daily activity, and many aspects of our jobs influence when and how we travel during our non-work hours. The OHAS survey captured the following work-related details:

- Full-time workers report working an average of 44 hours over a 5-day work-week while part-time/volunteer workers spend an average of 20 hours working over a 3-day work-week.
- Most workers who participated in the survey work in the service industry (48% of those employed full-time and 64% of those working part-time or in volunteer positions).
- Most workers report having full (31%) or some (41%) flexibility in their work schedule. However, one-third of respondents (28%) report having no flexibility in their work schedule.
- Twenty-nine percent of all workers indicate that their job requires them to have a personal vehicle available while at work.
- Most workers report that their employers provide free parking (87%) and 5% indicate their employer provides free transit passes. *It is important to note that this is what the employee reported and may not reflect actual workplace programs*.
- Eleven percent of workers report their employer permits teleworking, where teleworking was defined as working from home in lieu of a commute (not working from home then going into the office on the same day). Of those workers eligible to telework, 23% report working from home daily, 41% do so at least once a week, 24% do so at least once a month, and the remaining report only teleworking a few times a year at most.

To link why we travel with how and when we travel, OHAS survey respondents recorded all activities and related travel for a 24-hour weekday period, including:
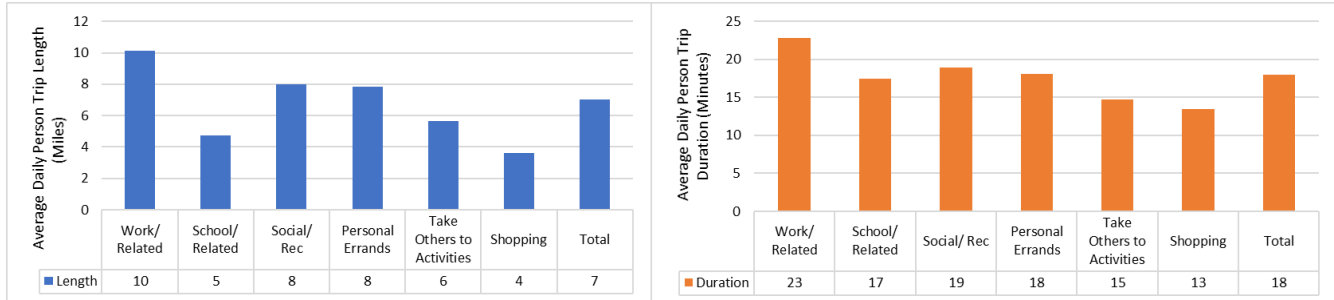
1. Work/Work-related
2. School/School-related
3. Social and Recreational
4. Personal Errands
5. Taking others to their activities
6. Shopping

Figure R2-2: Reasons for Travel

- Shopping 19%
- Work/Work Related 21%
- School/School Related 10%
- Social/Recreation 22%
- Personal Errands 17%
- Take Others to their Activities 11%

Average trip distance and duration for each activity are shown in Figure R2-3. Trips for work tend to be the longest at an average of 10 miles while shopping trips are shortest at 4 miles. In terms of average trip duration, trips for work take the longest at 23 minutes while trips for shopping average 13 minutes.

Figure R2-3: Travel Metrics by Activity

	Work/Related	School/Related	Social/Rec	Personal Errands	Take Others to Activities	Shopping	Total
Length	10	5	8	8	6	4	7
Duration	23	17	19	18	15	13	18

Households with children report more school-related trips and more trips to take others to their activities as compared to households with no children. The households with children also report fewer trips for work and errands.

Figure R2-4: Travel-Related Activities by Presence of Children
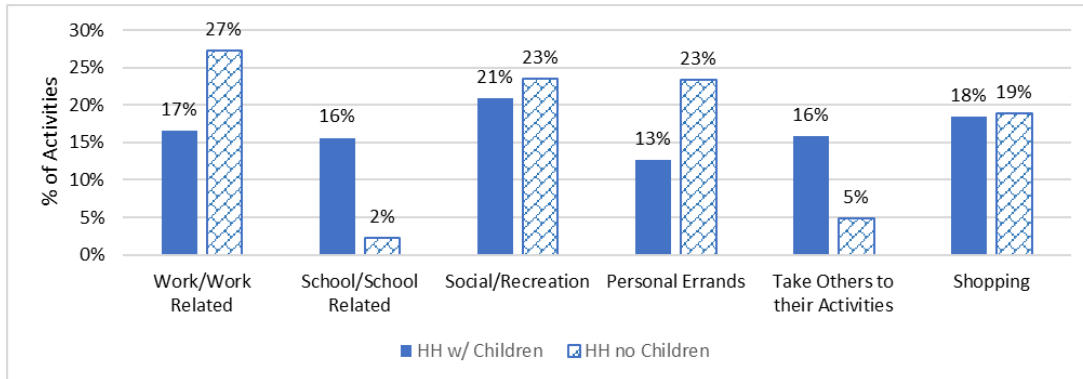
When considering weekday travel by age groups, travel for those ages 0-17 center about school and social/recreation activities (see Table R2-4). School related activities decline sharply for adults while the proportion of trips for shopping and errands increases with age.

Table R2-4: Travel-Related Activities by Age Group

Age	Activity						Total
	Work/Work Related	School/School Related	Social/ Recreation	Personal Errands	Take Others to their Activities	Shopping	
0-17	0%	34%	26%	12%	11%	17%	100%
18-34	33%	6%	21%	15%	12%	14%	100%
35-54	30%	1%	18%	16%	16%	19%	100%
55-64	30%	0%	21%	22%	7%	20%	100%
65-74	13%	0%	27%	27%	7%	27%	100%
75+	8%	0%	28%	32%	5%	27%	100%
All Ages	21%	10%	22%	17%	11%	19%	100%

Regardless of the reason for the travel, the majority of reported trips are made by auto. Of the 2.7 million trips made on a typical weekday in ODOT Region 2, 80% are auto trips. Of the remaining 20% of trips, 12% are walk trips, 2% bike trips, 2% transit trips, and 4% school bus trips. Those ages 18-34 who do not travel by auto either walk (10%) or ride their bike (4%) as indicated in Table R2-5.

Table R2-5: Travel Mode by Age

| Age | Travel Mode | | | | | |
---	Auto	Walk	Bike	Transit	School Bus	Total
0-17	58%	22%	1%	3%	15%	100%
18-34	85%	10%	4%	0%	0%	100%
35-54	85%	8%	3%	3%	0%	100%
55-64	93%	5%	2%	1%	0%	100%
65-74	96%	4%	0%	0%	0%	100%
All Ages	80%	12%	2%	2%	4%	100%

Work and work-related travel is largely by auto (87%). Travel to school (regardless of age) shows the highest levels of walk trips, while shopping trips have the highest reported levels of transit usage (8%).

Table R2-6: Travel Modes by Activities

Activity	Auto	Walk	Bike	Transit	School Bus	Total
Work/Work Related	87%	8%	4%	0%	0%	100%
School/School Related (age <18)	42%	24%	3%	0%	31%	100%
Schoo/School Related (age 18+)	60%	30%	3%	3%	5%	100%
Social/Recreation	84%	12%	2%	0%	1%	100%
Personal Errands	93%	5%	1%	0%	1%	100%
Take Others to their Activities	97%	1%	1%	0%	0%	100%
Shopping	76%	15%	1%	8%	0%	100%
All activities	82%	11%	2%	2%	3%	100%

Mode usage varies across typical weekday. Each of the chart components in Figure R2-5 display the distribution of all trips by each of the three main modes of walk, bike, and auto regardless of the reasons for those trips. There were insufficient transit trips to include in this graph.

Figure R2-5: Mode Usage by Time of Day
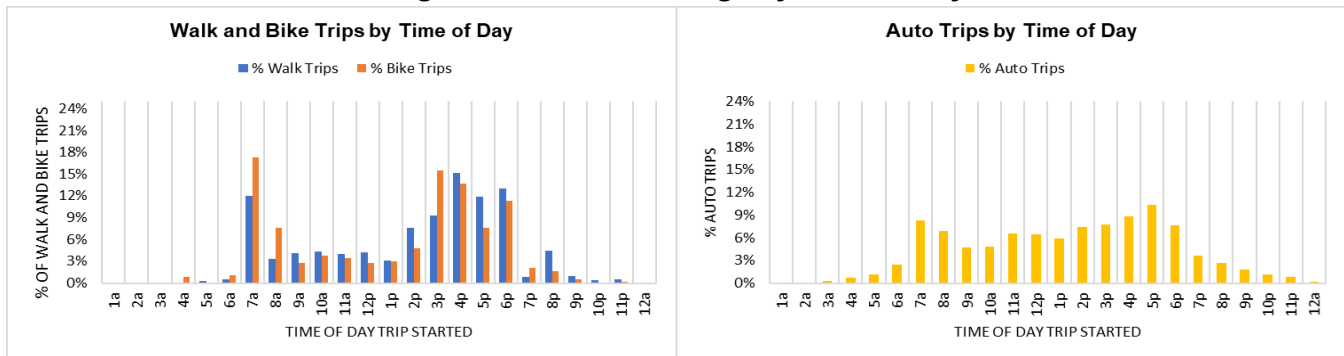
Travel patterns by time of day are fairly consistent by household size, income, and vehicle availability. What accounts for more variation in travel is the age of the traveler. While children report the most pronounced morning and afternoon peaks, the elderly report the most pronounced mid-day peaks, particularly those travelers age 75 and older, as indicated in Figure R2-6.

Figure R2-6: Time of Day Travel by Age Group
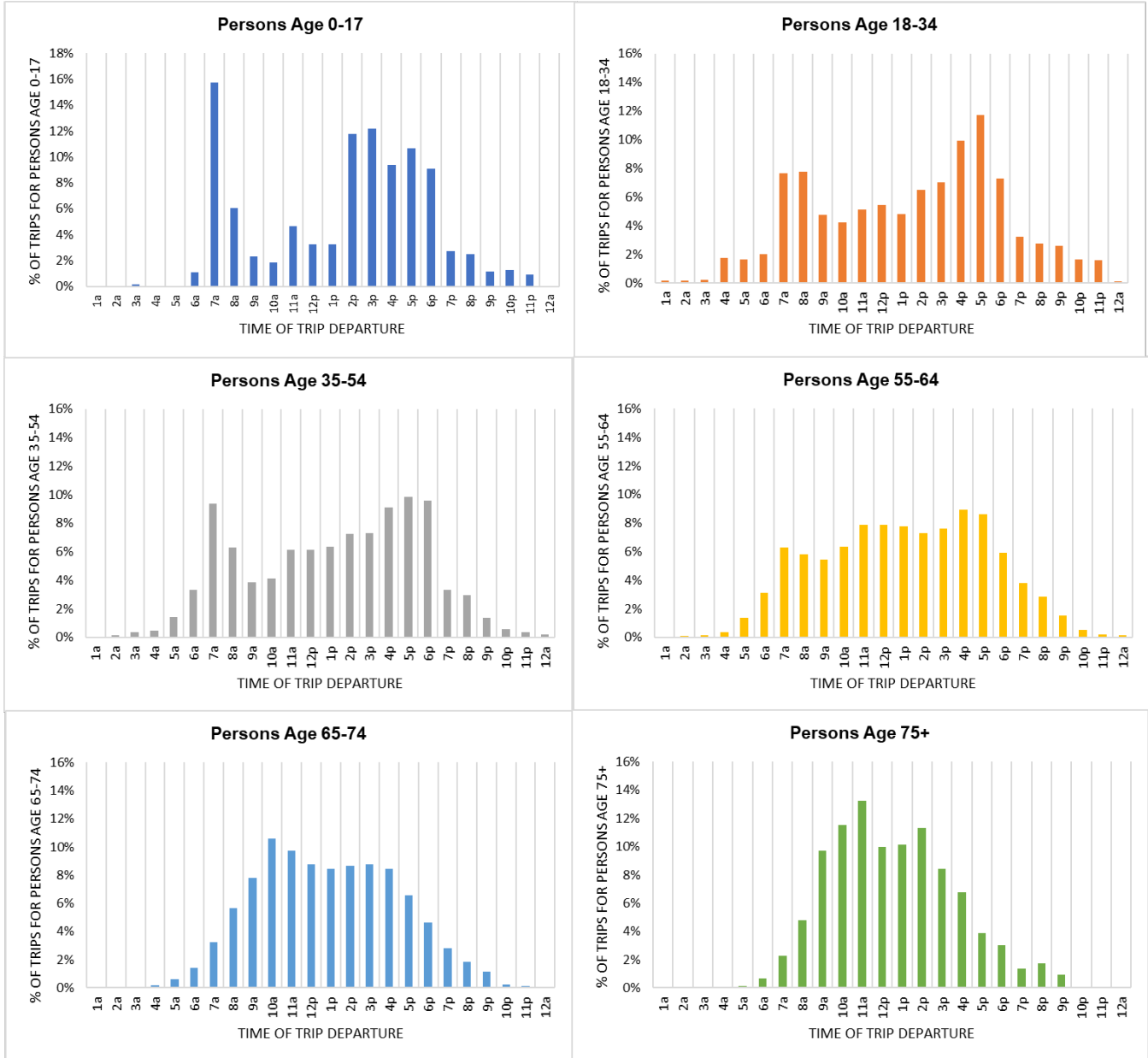
ODOT REGION 3 TRAVEL PROFILE

Across ODOT Region 3, the 1,951 households that participated in the OHAS survey report an average of 2.4 household members and own 2.1 vehicles and 1.1 bicycles, on average. These same households report an average of 8.6 daily weekday trips, traversing 75 miles per day and spending 166 minutes per day traveling. Per capita, this equates to 3.5 trips, 34 miles, and 75 minutes respectively. Household income and size are key explanatory variables in understanding travel patterns.

As shown in Table R3-1, people with household incomes under $25,000 report the lowest level of trip-making. Those in households with incomes over $75,000 report the most trips as well as the longest trips (in distance and duration).

Table R3-1: Person Travel Metrics by Household Income

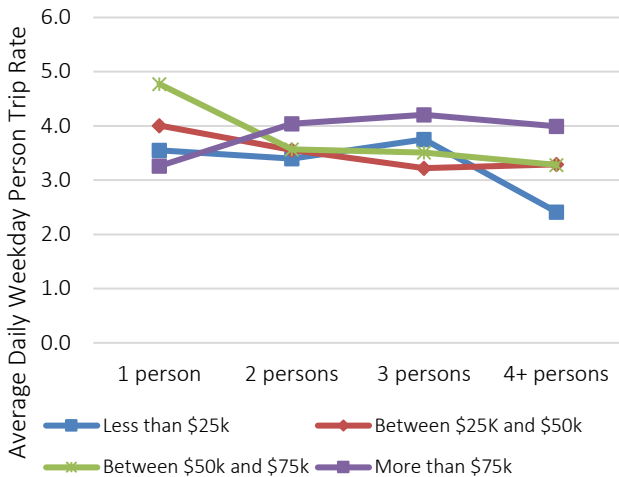| Household Income	Person Trips	Daily Trip Miles	Daily Travel Time (minutes)
Less than $25k	3.1	26	67
Between $25K and $50k	3.4	30	73
Between $50k and $75k	3.5	35	76
More than $75k	4.0	43	84
All Persons	3.5	34	75

Figure R3-1: Person Trips by Size and Income

The average daily weekday person trip rate**s** show variations in per capita trip rates when considering both household income and size. As shown in Figure R3-1, the greatest variation in trip rates across size is for those living in 4+-person households. Person travel is most consistent across the $75,000+ income group regardless of household size.

Children (ages 0-17) report the lowest average weekday trip rates, while those ages 35 to 54 report the highest rates, as indicated in Table R3-2. Respondents ages 18-34 report an average of 3.4 daily weekday person trips traveling 36 miles and 75 minutes.

Table R3-2: Travel Metrics by Age Cohort

Age Group	Person Trips	Daily Trip Miles	Daily Travel Time (minutes)
0-17	2.8	17	57
18-34	3.4	36	75
35-54	4.1	42	87
55-64	3.9	39	78
65+	3.7	35	78
All Persons	3.5	34	75

Thirty-one percent of household members age 16+ report that they work full-time (35 hours or more), while 28% report they work part-time or volunteer on a regular basis. The remaining respondents age 16+ are not employed. Within each age cohort, the proportion of full-time workers varies: more than half of all adults ages 35-54 are employed full-time (52%), as compared to 36% of those ages 55-64, 29% of those ages 18-34, and 5% of those ages 65-74.

Table R3-3: Worker Status by Age Cohort

| Worker Status	Age Groups						Total Ages 16+
	16-17	18-34	35-54	55-64	65-74	75+	
Employed FT	0%	29%	52%	36%	5%	1%	31%
Employed PT or Volunteer	25%	38%	23%	27%	28%	22%	28%
Not Employed	75%	33%	25%	38%	67%	77%	42%
Total	100%	100%	100%	100%	100%	100%	100%

Work is a cornerstone of daily activity, and many aspects of our jobs influence when and how we travel during our non-work hours. The OHAS survey captured the following work-related details:

- Full-time workers report working an average of 44 hours over a 5-day work-week while part-time/volunteer workers spend an average of 22 hours working over a 3-day work-week.
- Most workers who participated in the survey work in the service industry (47% of those employed full-time and 66% of those working part-time or in volunteer positions).
- Most workers report having full (30%) or some (40%) flexibility in their work schedule. However, one-third of respondents (30%) report having no flexibility in the work schedule.
- Twenty-seven percent of all workers indicate that their job requires them to have a personal vehicle available while at work.
- Most workers report that their employers provide free parking (94%) and 2% indicate their employers provide free transit passes. *It is important to note that this is what the employee reported and may not reflect actual workplace programs*.
- Nine percent of workers report their employers permit teleworking, where teleworking was defined as working from home in lieu of a commute (not working from home then going into the office on the same day). Of those workers eligible to telework, 28% report working from home daily, 44% do so at least once a week, 19% do so at least once a month, and the remaining report only teleworking a few times a year at most.

To link why we travel with how and when we travel, OHAS survey respondents recorded all activities and related travel for a 24-hour weekday period, including:

1. Work/Work-related
2. School/School-related
3. Social and Recreational
4. Personal Errands
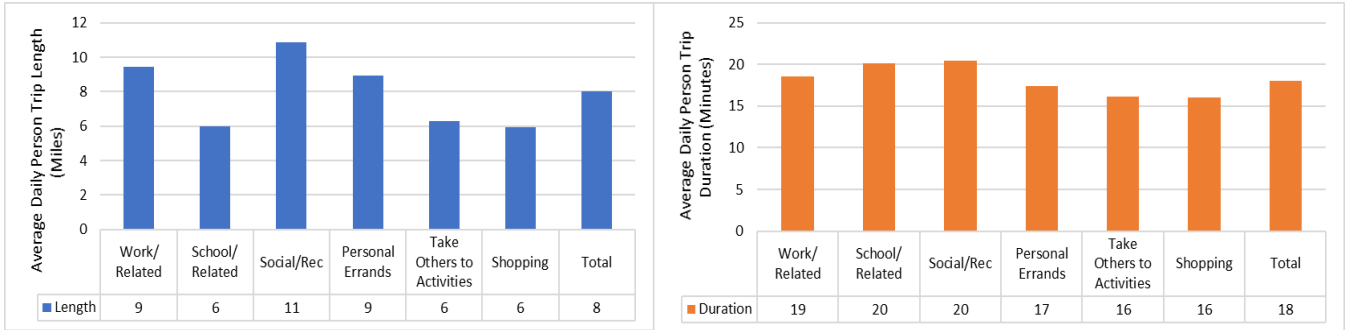5. Taking others to their activities
6. Shopping

Figure R3-2: Reasons for Travel
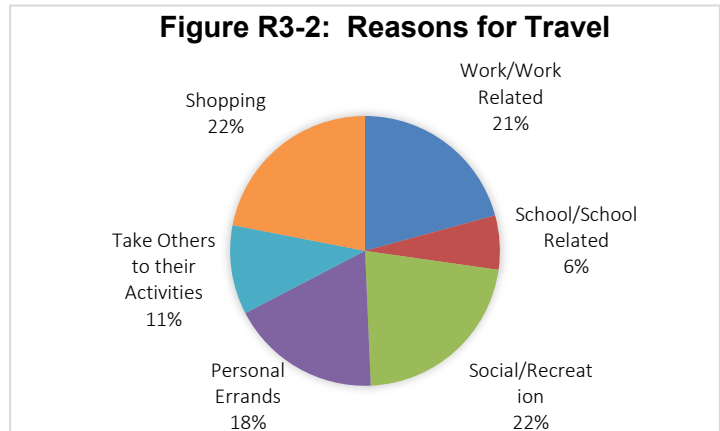
Work/Work Related 21%
School/School Related 6%
Social/Recreation 22%
Personal Errands 18%
Take Others to their Activities 11%
Shopping 22%

Average trip distance and duration for each activity are shown in Figure R3-3. Trips for social/recreation tend to be the longest at an average of 11 miles. In terms of average trip duration, trips for school and social/recreation take the longest at 20 minutes.

Figure R3-3: Travel Metrics by Activity

Length	9	6	11	9	6	6	8

Duration	19	20	20	17	16	16	18

Households with children report more school-related trips and more trips to take others to their activities as compared to households with no children. The households with children also report fewer trips for work, shopping, and errands.

Figure R3-4: Travel-Related Activities by Presence of Children
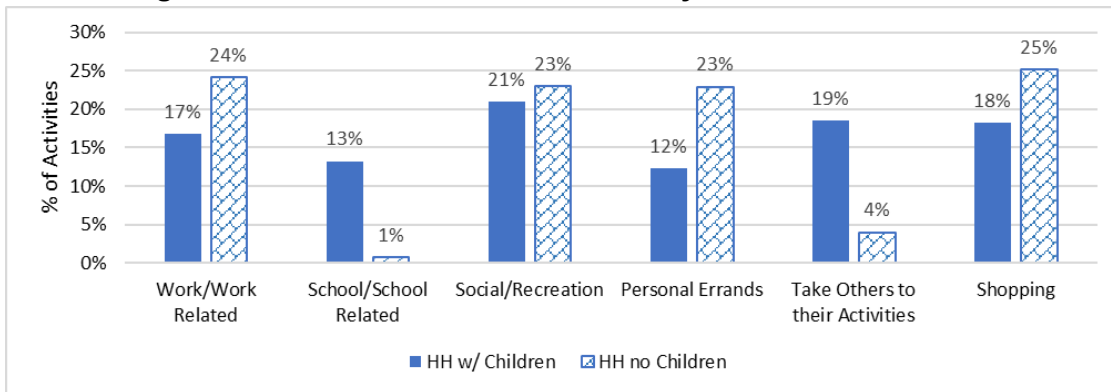
When considering weekday travel by age groups, travel for those ages 0-17 center about school and social/recreation activities (see Table R3-4). School related activities decline sharply for adults while the proportion of trips for shopping and errands increases with age.

Table R3-4: Travel-Related Activities by Age Group

Age	Work/ Related	School/ Related	Social/ Recreation	Personal Errands	Take Others to Activities	Shopping	Total
0-17	0%	31%	28%	12%	13%	15%	100%
18-34	28%	5%	19%	12%	14%	22%	100%
35-54	32%	0%	18%	15%	15%	20%	100%
55-64	29%	0%	20%	22%	5%	24%	100%
65-74	11%	0%	25%	28%	6%	30%	100%
75+	6%	0%	27%	33%	4%	31%	100%
All Ages	21%	6%	22%	18%	11%	22%	100%

Regardless of the reason for the travel, the majority of reported trips are made by auto. Of the 1.1 million trips made on a typical weekday in ODOT Region 3, 91% are auto trips. Of the remaining 9% of trips, 6% are walk trips, and 3% school bus trips. Those ages 18-34 who do not travel by auto walked (9%) as indicated in Table R3-5.

Table R3-5: Travel Mode by Age

Age	Travel Mode					
	Auto	Walk	Bike	Transit	School Bus	Total
0-17	73%	11%	1%	0%	15%	100%
18-34	90%	9%	0%	0%	0%	100%
35-54	96%	3%	1%	0%	0%	100%
55-64	95%	4%	1%	0%	0%	100%
65-74	97%	3%	0%	0%	0%	100%
All Ages	91%	6%	1%	0%	3%	100%

Work and work-related travel is largely by auto (95%). Travel for social/recreation shows the highest levels of walk trips, while adult school trips have the highest reported levels of transit usage (2%).

Table R3-6: Travel Modes by Activities

Activity	Auto	Walk	Bike	Transit	School Bus	Total
Work/ Related	95%	4%	1%	0%	0%	100%
School/ Related (age <18)	57%	7%	1%	0%	35%	100%
School/ Related (age 18+)	82%	4%	3%	2%	9%	100%
Social/Recreation	89%	10%	1%	0%	0%	100%
Personal Errands	97%	3%	0%	0%	0%	100%
Take Others to Activities	100%	0%	0%	0%	0%	100%
Shopping	94%	6%	0%	0%	0%	100%
All activities	92%	5%	0%	0%	2%	100%

Mode usage varies across typical weekday. Each of the chart components in Figure R3-5 display the distribution of all trips by each of the three main modes of walk, bike, and auto regardless of the reasons for those trips. There were insufficient transit trips to include in this graph.

Figure R3-5: Mode Usage by Time of Day
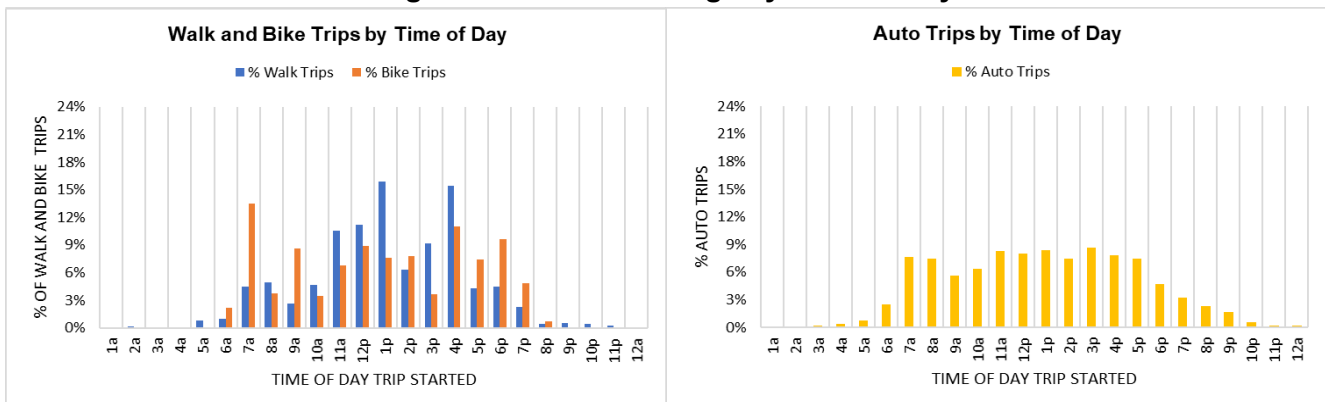
Travel patterns by time of day were fairly consistent by household size, income, and vehicle availability. What accounts for more variation in travel is the age of the traveler. While children report the most pronounced morning and afternoon peaks, the elderly report the most pronounced mid-day peaks, particularly those travelers age 75 and older, as indicated in Figure R3-6.

Figure R3-6: Time of Day Travel by Age Group
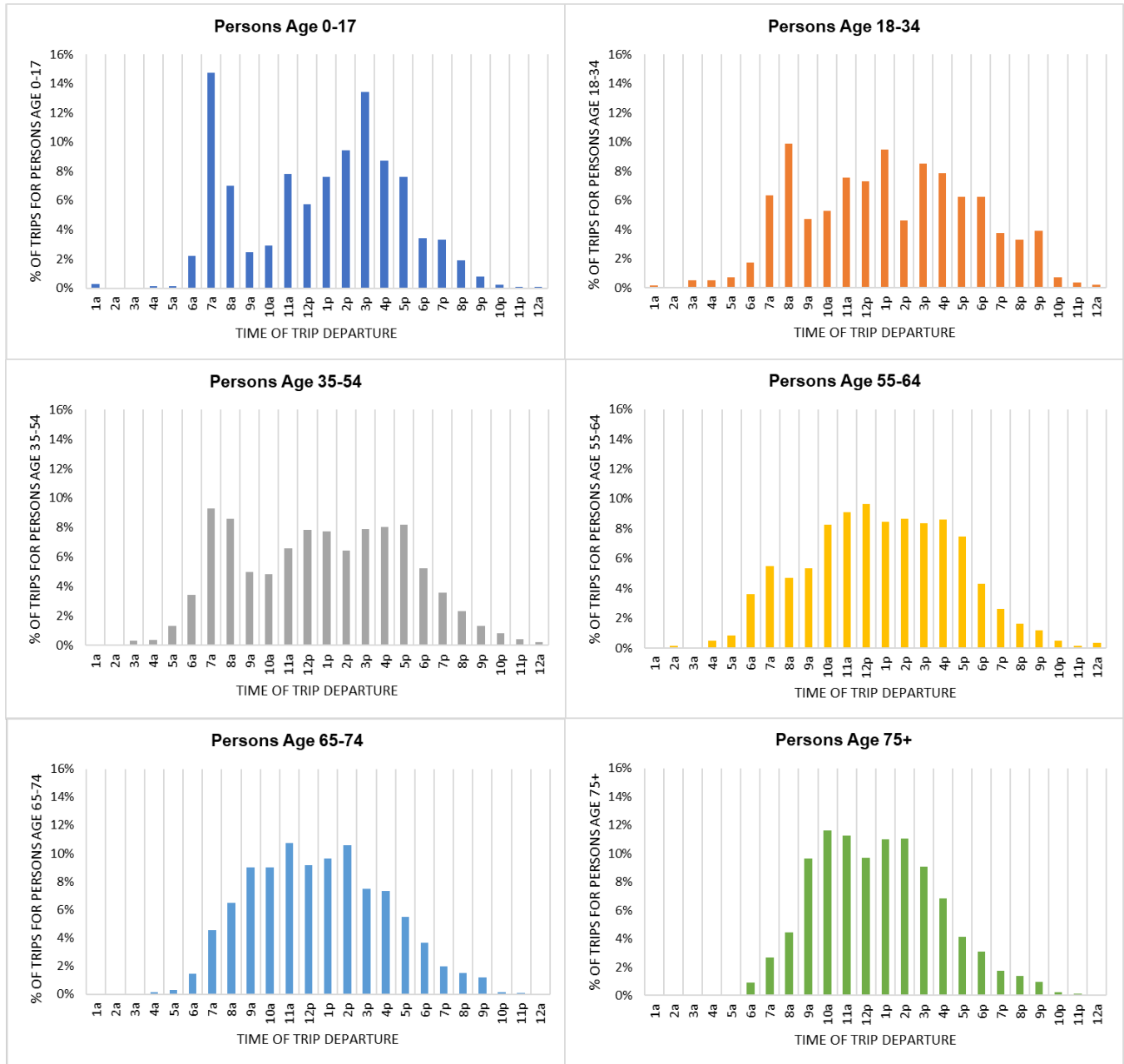
CHAPTER 7 – ODOT REGION 4 TRAVEL PROFILE

ODOT REGION 4 TRAVEL PROFILE

Across ODOT Region 4, the 1,210 households that participated in the OHAS survey report an average of 2.4 household members and own 2.1 vehicles and 1.2 bicycles, on average. These same households report an average of 9.3 daily weekday trips, traversing 77 miles per day and spending 168 minutes per day traveling. Per capita, this equates to 3.7 trips, 33 miles, and 74 minutes respectively. Household income and size are key explanatory variables in understanding travel patterns.

As shown in Table R4-1, people with household incomes under $25,000 report the lowest level of trip-making. Those in households with incomes over $75,000 report the most trips as well as the longest trips (in distance and duration).

Table R4-1: Person Travel Metrics by Household Income

Household Income	Person Trips	Daily Trip Miles	Daily Travel Time (minutes)
Less than $25k	3.4	24	72
Between $25K and $50k	3.8	31	73
Between $50k and $75k	3.7	35	75
More than $75k	4.2	43	80
All Persons	3.7	33	74

Figure R4-1: Person Trips by Size and Income

The average daily weekday person trip rate show variations in per capita trip rates when considering both household income and size. As shown in Figure R4-1, the greatest variation in trip rates across size is for those living in 4+-person households. Person travel is most consistent across the $50,000 - $74,999 income group regardless of household size.

Children (ages 0-17) and Seniors (age 65+) report the lowest average weekday trip rates, while those ages 35 to 54 report the highest rates, as indicated in Table R4-2. Respondents ages 18-34 report an average of 3.6 daily weekday person trips traveling 34 miles and 75 minutes.

Table R4-2: Travel Metrics by Age Cohort

Age Group	Person Trips	Daily Trip Miles	Daily Travel Time (minutes)
0-17	3.5	21	61
18-34	3.6	34	75
35-54	4.1	37	81
55-64	3.8	41	80
65+	3.5	36	78
All Persons	3.7	33	74

CHAPTER 7 – ODOT REGION 4 TRAVEL PROFILE

Thirty-seven percent of household members age 16+ report that they work full-time (35 hours or more), while 24% report they worked part-time or volunteer on a regular basis. The remaining respondents age 16+ are not employed. Within each age cohort, the proportion of full-time workers varies: more than half of all adults ages 35-54 are employed full-time (55%), as compared to 45% of those ages 18-34, 36% of those ages 55-64, and 7% of those ages 65-74.

Table R4-3: Worker Status by Age Cohort

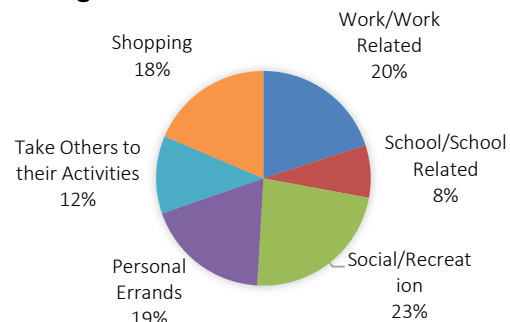| Worker Status	Age Groups						Total Ages 16+
	16-17	18-34	35-54	55-64	65-74	75+	
Employed FT	1%	45%	55%	36%	7%	4%	37%
Employed PT or Volunteer	30%	29%	22%	22%	27%	15%	24%
Not Employed	69%	26%	23%	42%	66%	81%	38%
Total	100%	100%	100%	100%	100%	100%	100%

Work is a cornerstone of daily activity, and many aspects of our jobs influence when and how we travel during our non-work hours. The OHAS survey captured the following work-related details:

- Full-time workers report working an average of 45 hours over a 5-day work-week while part-time/volunteer workers spend an average of 19 hours working over a 3-day work-week.
- Most workers who participated in the survey work in the service industry (48% of those employed full-time and 63% of those working part-time or in volunteer positions).
- Most workers report having full (31%) or some (40%) flexibility in their work schedule. However, one-third of respondents (29%) report having no flexibility in the work schedule.
- Thirty-one percent of all workers indicate that their job requires them to have a personal vehicle available while at work.
- Most workers report that their employers provide free parking (93%) and 1% indicate their employer provides free transit passes. *It is important to note that this is what the employee reported and may not reflect actual workplace programs*.
- Eight percent of workers report their employer permits teleworking, where teleworking was defined as working from home in lieu of a commute (not working from home then going into the office on the same day). Of those workers eligible to telework, 38% report working from home daily, 30% do so at least once a week, 21% do so at least once a month, and the remaining report only teleworking a few times a year at most.

To link why we travel with how and when we travel, OHAS survey respondents recorded all activities and related travel for a 24-hour weekday period, including:

1. Work/Work-related
2. School/School-related
3. Social and Recreational
4. Personal Errands
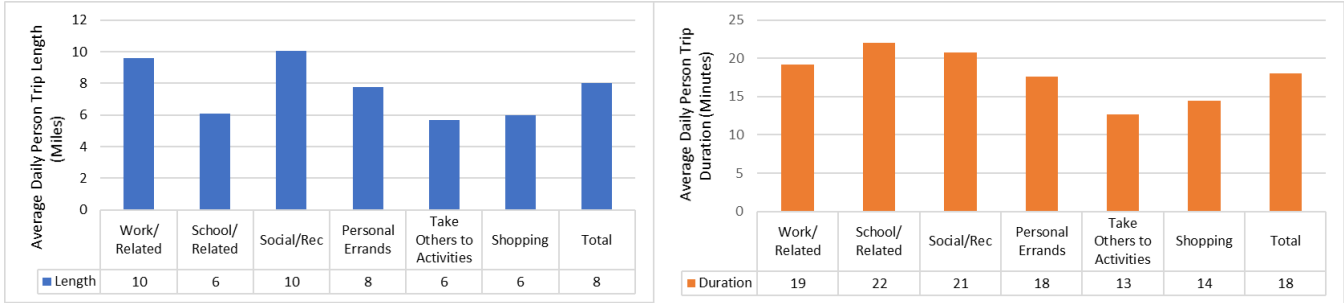5. Taking others to their activities
6. Shopping

Figure R4-2: Reasons for Travel

- Work/Work Related 20%
- School/School Related 8%
- Social/Recreation 23%
- Personal Errands 19%
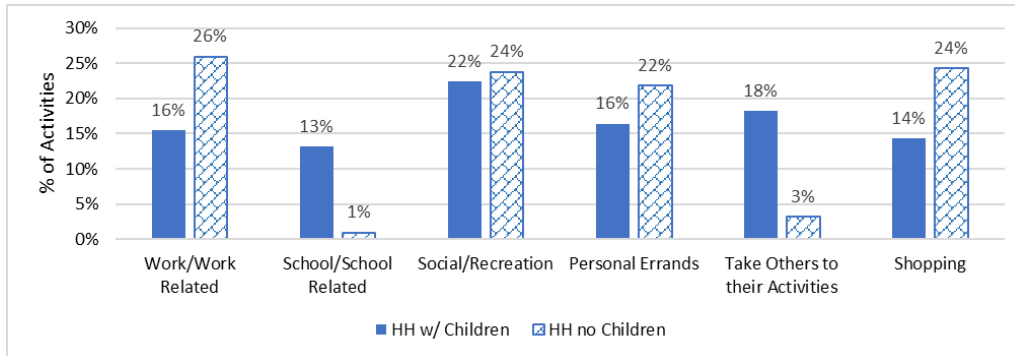- Take Others to their Activities 12%
- Shopping 18%

Average trip distance and duration for each activity are shown in Figure R4-3. Trips for work and social/recreation tend to be the longest at an average of 10 miles. In terms of average trip duration, trips for school tale the longest at 22 minutes, just slightly higher than the average duration of 18 minutes.

Figure R4-3: Travel Metrics by Activity

	Work/Related	School/Related	Social/Rec	Personal Errands	Take Others to Activities	Shopping	Total
Length	10	6	10	8	6	6	8

	Work/Related	School/Related	Social/Rec	Personal Errands	Take Others to Activities	Shopping	Total
Duration	19	22	21	18	13	14	18

Households with children report more school-related trips and more trips to take others to their activities as compared to households with no children. The households with children also report fewer trips for work, shopping, and errands.

Figure R4-4: Travel-Related Activities by Presence of Children

Activity	HH w/ Children	HH no Children
Work/Work Related	16%	26%
School/School Related	13%	1%
Social/Recreation	22%	24%
Personal Errands	16%	22%
Take Others to their Activities	18%	3%
Shopping	14%	24%

When considering weekday travel by age groups, travel for those ages 0-17 center about school and social/recreation activities (see Table R4-4). School related activities decline sharply for adults while the proportion of trips for shopping and errands increases with age.

Table R4-4: Travel-Related Activities by Age Group

Age	Activity						Total
	Work/Related	School/Related	Social/Recreation	Personal Errands	Take Others to Activities	Shopping	
0-17	1%	29%	26%	17%	13%	14%	100%
18-34	27%	4%	27%	13%	16%	13%	100%
35-54	31%	1%	18%	17%	14%	18%	100%
55-64	28%	0%	21%	21%	5%	25%	100%
65-74	14%	0%	28%	26%	4%	28%	100%
75+	7%	0%	27%	30%	6%	31%	100%
All Ages	20%	8%	23%	19%	12%	19%	100%

Regardless of the reason for the travel, the majority of reported trips were made by auto. Of the 770,000 trips made on a typical weekday in ODOT Region 4, 90% are auto trips. Of the remaining 10% of trips, 6% are walk trips, 1% are bike trips, and 3% school bus trips. Those ages 18-34 who do not travel by auto walk (5%), bike (1%) or take the school bus (1%, for those still in high school).

Table R4-5: Travel Mode by Age

| Age	Travel Mode					
	Auto	Walk	Bike	Transit	School Bus	Total
0-17	75%	14%	1%	0%	11%	100%
18-34	93%	5%	1%	0%	1%	100%
35-54	95%	3%	1%	0%	0%	100%
55-64	97%	2%	0%	0%	0%	100%
65-74	95%	4%	0%	0%	0%	100%
All Ages	90%	6%	1%	0%	3%	100%

Work and work-related travel is largely by auto (93%). Children's travel to school shows the highest levels of walk trips.

Table R4-6: Travel Modes by Activities

Activity	Auto	Walk	Bike	Transit	School Bus	Total
Work/Work Related	93%	5%	1%	0%	0%	100%
School/ Related (age <18)	55%	15%	2%	0%	28%	100%
School/ Related (age 18+)	83%	7%	3%	0%	6%	100%
Social/Recreation	92%	6%	1%	0%	1%	100%
Personal Errands	93%	5%	0%	0%	1%	100%
Take Others to their Activities	92%	8%	0%	0%	1%	100%
Shopping	97%	2%	0%	0%	0%	100%
All activities	91%	6%	1%	0%	3%	100%

Mode usage varies across typical weekday. Each of the chart components in Figure R4-5 display the distribution of all trips by walk and auto (there was not enough data to analyze bike or transit trips made by Region 4 residents). Walk trips peak in the morning and afternoon, while auto trips are more equally distributed across the day.

Figure R4-5: Mode Usage by Time of Day
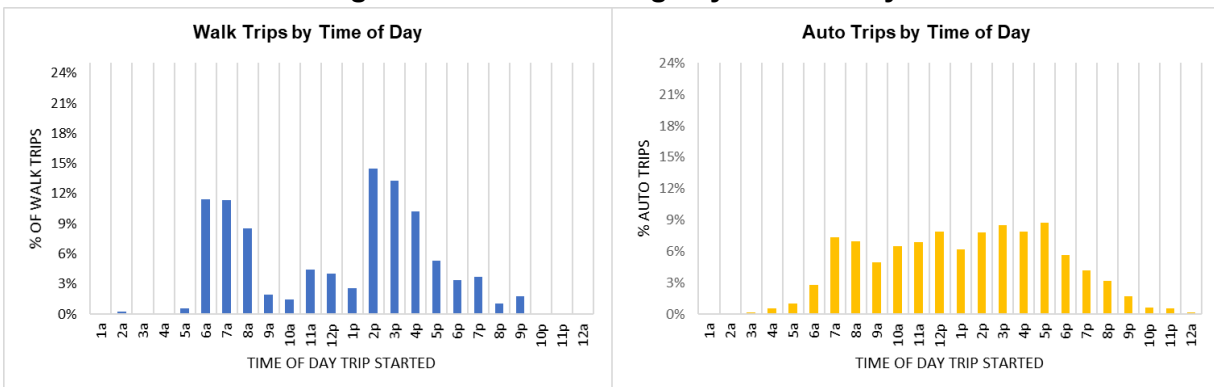
Travel patterns by time of day are fairly consistent by household size, income, and vehicle availability. What accounts for more variation in travel is the age of the traveler. While children report the most pronounced morning and afternoon peaks, the elderly report the most pronounced mid-day peaks, particularly those travelers age 75 and older, as indicated in Figure R4-6.

Figure R4-6: Time of Day Travel by Age Group
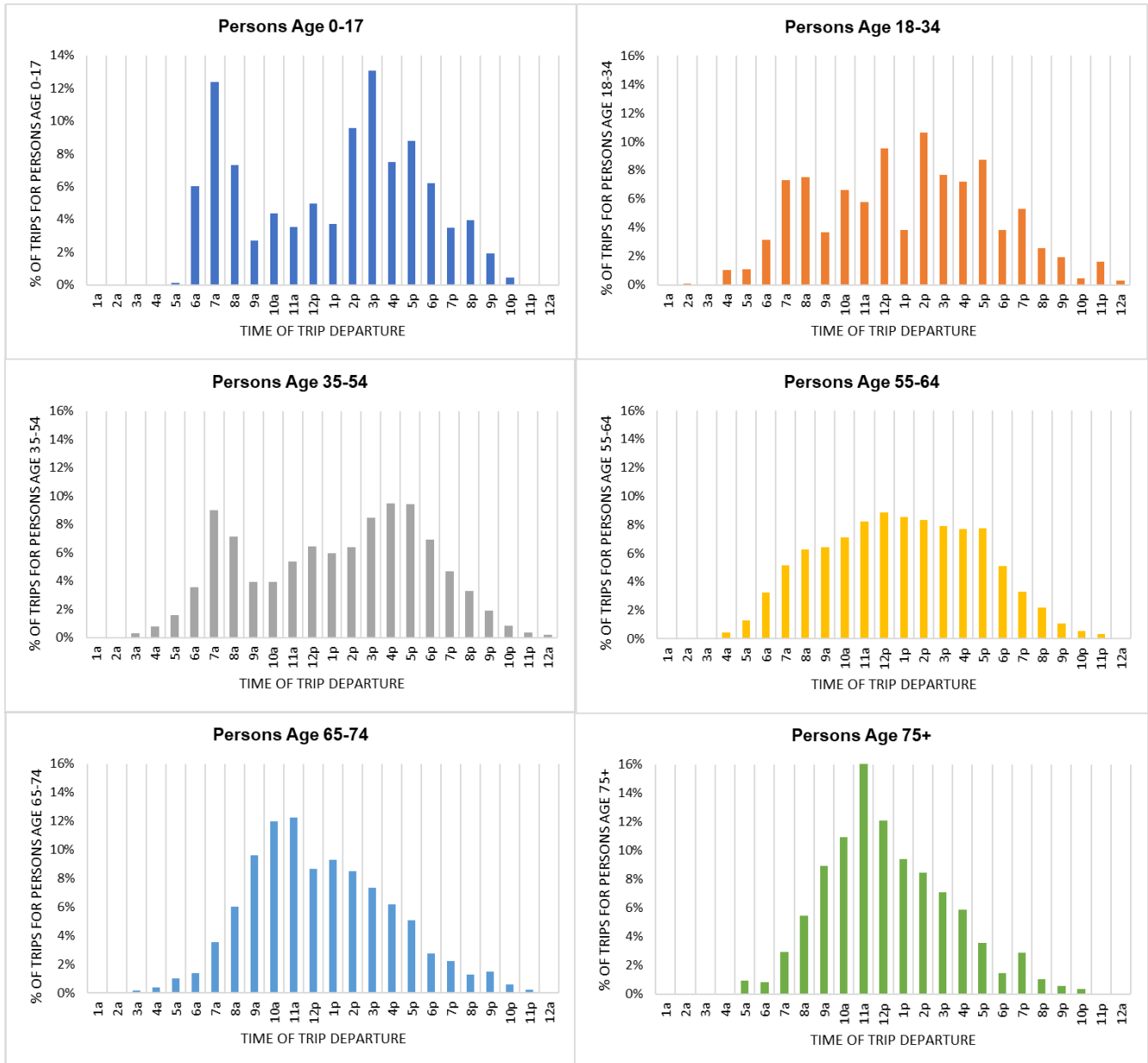
ODOT REGION 5 TRAVEL PROFILE

Across ODOT Region 5, the 1,220 households that participated in the OHAS survey report an average of 2.7 household members and own 2.2 vehicles and 1.2 bicycles, on average. These same households report an average of 9.2 daily weekday trips, traversing 62 miles per day and spending 151 minutes per day traveling. Per capita, this equates to 3.3 trips, 24 miles, and 60 minutes respectively. Household income and size are key explanatory variables in understanding travel patterns.

As shown in Table R5-1, people with household incomes under $25,000 report the lowest level of trip-making. Those in households with incomes over $75,000 report the most trips as well as the longest trips (in distance and duration).

Table R5-1: Person Travel Metrics by Household Income

Household Income	Person Trips	Daily Trip Miles	Daily Travel Time (minutes)
Less than $25k	2.4	11	41
Between $25K and $50k	3.7	26	63
Between $50k and $75k	3.8	27	69
More than $75k	3.9	35	73
All Persons	3.3	24	60
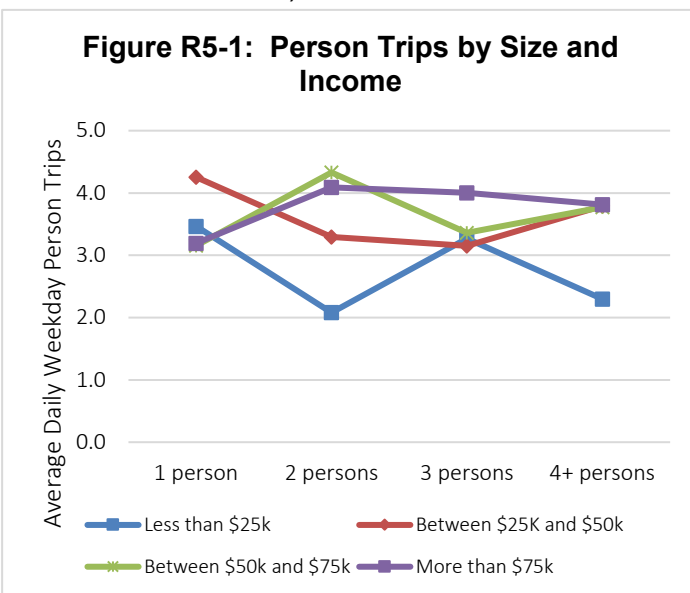
Figure R5-1: Person Trips by Size and Income

The average daily weekday person trip rate shows variations in per capita trip rates when considering both household income and size. As shown in Figure R5-1, the greatest variation in trip rates across size is for those living in 2-person households. Person travel is most consistent across the $75,000 income group regardless of household size.

Children (ages 0-17) report the lowest average weekday trip rates, while those ages 35 to 54 report the highest rates, as indicated in Table R5-2. Respondents ages 18-34 report an average of 3.4 daily weekday person trips traveling 19 miles and 50 minutes.

Table R5-2: Travel Metrics by Age Cohort

Age Group	Person Trips	Daily Trip Miles	Daily Travel Time (minutes)
0-17	2.7	16	56
18-34	3.4	19	50
35-54	4.2	32	67
55-64	3.8	36	77
65+	2.9	27	65
All Persons	3.3	24	60

Forty-one percent of household members age 16+ report that they work full-time (35 hours or more), while 23% report they work part-time or volunteer on a regular basis. The remaining respondents age 16+ are not employed. Within each age cohort, the proportion of full-time workers varies: more than half of all adults ages 35-54 are employed full-time (61%), as compared to 40% of those ages 18-34, 47% of those ages 55-64, and 14% of those ages 65-74.
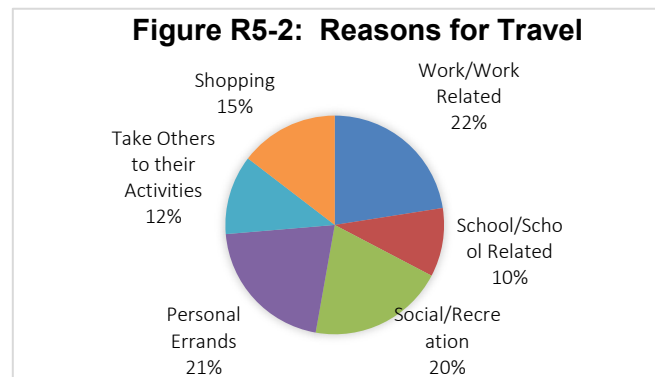
Table R5-3: Worker Status by Age Cohort

Worker Status	Age Groups						Total Ages 16+
	16-17	18-34	35-54	55-64	65-74	75+	
Employed FT	1%	40%	61%	47%	14%	3%	41%
Employed PT or Volunteer	11%	27%	19%	25%	25%	19%	23%
Not Employed	88%	33%	20%	28%	61%	78%	36%
Total	100%	100%	100%	100%	100%	100%	100%

Work is a cornerstone of daily activity, and many aspects of our jobs influence when and how we travel during our non-work hours. The OHAS survey captured the following work-related details:

- Full-time workers report working an average of 45 hours over a 5-day work-week while part-time/volunteer workers spend an average of 20 hours working over a 3-day work-week.
- Most workers who participated in the survey work in the service industry (45% of those employed full-time and 72% of those working part-time or in volunteer positions).
- Most workers report having full (25%) or some (38%) flexibility in their work schedule. However, one-third of respondents (37%) report having no flexibility in the work schedule.
- Thirty-three percent of all workers indicate that their job requires them to have a personal vehicle available while at work.
- Most workers report that their employers provide free parking (90%) but none indicated their employers provide free transit passes. *It is important to note that this is what the employee reported and may not reflect actual workplace programs*.
- Nine percent of workers report their employers permit teleworking, where teleworking is defined as working from home in lieu of a commute (not working from home then going into the office on the same day). Of those workers eligible to telework, 28% report working from home daily, 38% do so at least once a week, 21% do so at least once a month, and the remaining report only teleworking a few times a year at most.

To link why we travel with how and when we travel, OHAS survey respondents recorded all activities and related travel for a 24-hour weekday period, including:
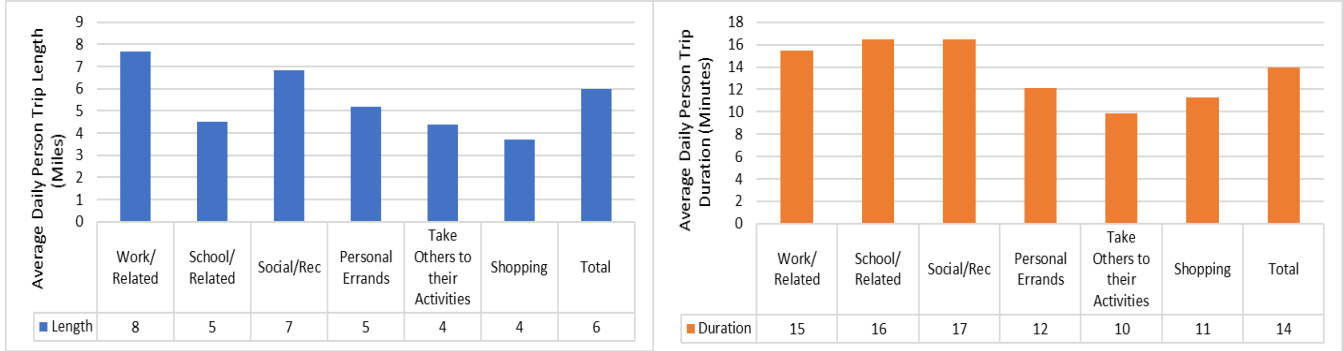
1. Work/Work-related
2. School/School-related
3. Social and Recreational
4. Personal Errands
5. Taking others to their activities
6. Shopping

Figure R5-2: Reasons for Travel

- Work/Work Related 22%
- Shopping 15%
- Take Others to their Activities 12%
- Personal Errands 21%
- Social/Recreation 20%
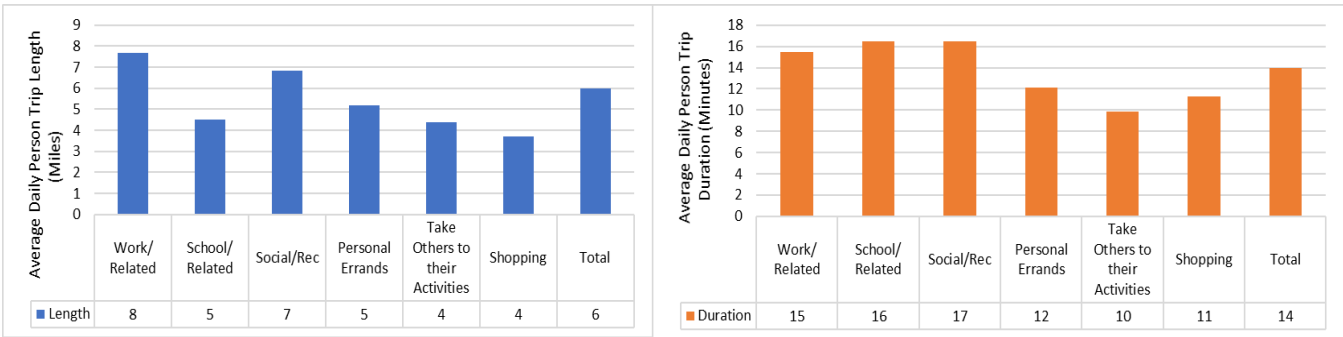- School/School Related 10%

Average trip distance and duration for each activity are shown in Figure R5-3. Trips for work tend to be the longest at an average of 8 miles. In terms of average trip duration, trips for social/recreation take the longest at 17 minutes.

Figure R5-3: Travel Metrics by Activity

Length	Work/Related	School/Related	Social/Rec	Personal Errands	Take Others to their Activities	Shopping	Total
Length	8	5	7	5	4	4	6

Duration	Work/Related	School/Related	Social/Rec	Personal Errands	Take Others to their Activities	Shopping	Total
Duration	15	16	17	12	10	11	14

Households with children report more school-related trips and more trips to take others to their activities as compared to households with no children. The households with children also report fewer trips for work and shopping.

Figure R5-4: Travel-Related Activities by Presence of Children

Length	Work/Related	School/Related	Social/Rec	Personal Errands	Take Others to their Activities	Shopping	Total
Length	8	5	7	5	4	4	6

Duration	Work/Related	School/Related	Social/Rec	Personal Errands	Take Others to their Activities	Shopping	Total
Duration	15	16	17	12	10	11	14

When considering weekday travel by age groups, travel for those ages 0-17 center about school and social/recreation activities (see Table R5-4). School related activities decline sharply for adults while the proportion of trips for shopping and errands increases with age.

Table R5-4: Travel-Related Activities by Age Group

Age	Activity						Total
	Work/Related	School/Related	Social/Recreation	Personal Errands	Take Others to Activities	Shopping	
0-17	0%	36%	27%	16%	10%	11%	100%
18-34	25%	5%	16%	25%	10%	19%	100%
35-54	37%	1%	14%	17%	20%	11%	100%
55-64	34%	0%	21%	23%	4%	17%	100%
65-74	18%	0%	26%	30%	5%	20%	100%
75+	11%	0%	29%	33%	6%	22%	100%
All Ages	22%	10%	20%	21%	12%	15%	100%

Regardless of the reason for the travel, the majority of reported trips are made by auto. Of the 580,000 trips made on a typical weekday in ODOT Region 5, 86% are auto trips. Of the remaining 14% of trips, 9% are walk trips, 1% are bike trips, and 4% school bus trips. Those ages 18-34 who did not travel by auto walk (13%) or bike (1%).

Table R5-5: Travel Mode by Age

| Age	Travel Mode					
	Auto	Walk	Bike	Transit	School Bus	Total
0-17	72%	11%	0%	0%	17%	100%
18-34	86%	13%	1%	0%	0%	100%
35-54	93%	6%	1%	0%	0%	100%
55-64	94%	6%	1%	0%	0%	100%
65-74	95%	5%	0%	0%	0%	100%
All Ages	86%	9%	1%	0%	4%	100%

Work and work-related travel is largely by auto (90%). School trips show the highest levels of walk trips.

Table R5-6: Travel Modes by Activities

Activity	Auto	Walk	Bike	Transit	School Bus	Total
Work/Work Related	90%	9%	1%	0%	0%	100%
School/ Related (age <18)	54%	12%	0%	0%	34%	100%
School/ Related (age 18+)	49%	42%	4%	0%	4%	100%
Social/Recreation	90%	7%	1%	0%	2%	100%
Personal Errands	93%	6%	0%	0%	0%	100%
Take Others to their Activities	96%	3%	0%	0%	1%	100%
Shopping	94%	6%	0%	0%	0%	100%
All activities	88%	8%	1%	0%	4%	100%

Mode usage varies across typical weekday. Each of the chart components in Figure R5-5 display the distribution of all trips by walk and auto (there was not enough data to analyze bike or transit trips made by Region 5 residents). Walk trips are mainly in the daylight hours, while auto trips are more equally distributed across the day.

Figure R5-5: Mode Usage by Time of Day
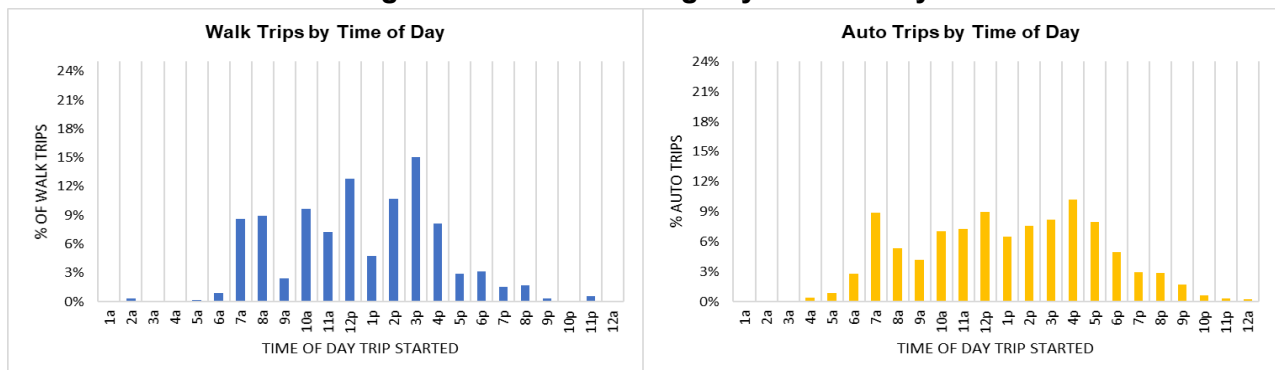
Travel patterns by time of day are fairly consistent by household size, income, and vehicle availability. What accounted for more variation in travel is the age of the traveler. While children report the most pronounced morning and afternoon peaks, the elderly report the most pronounced mid-day peaks, particularly those travelers age 75 and older, as indicated in Figure R5-6.

Figure R5-6: Time of Day Travel by Age Group
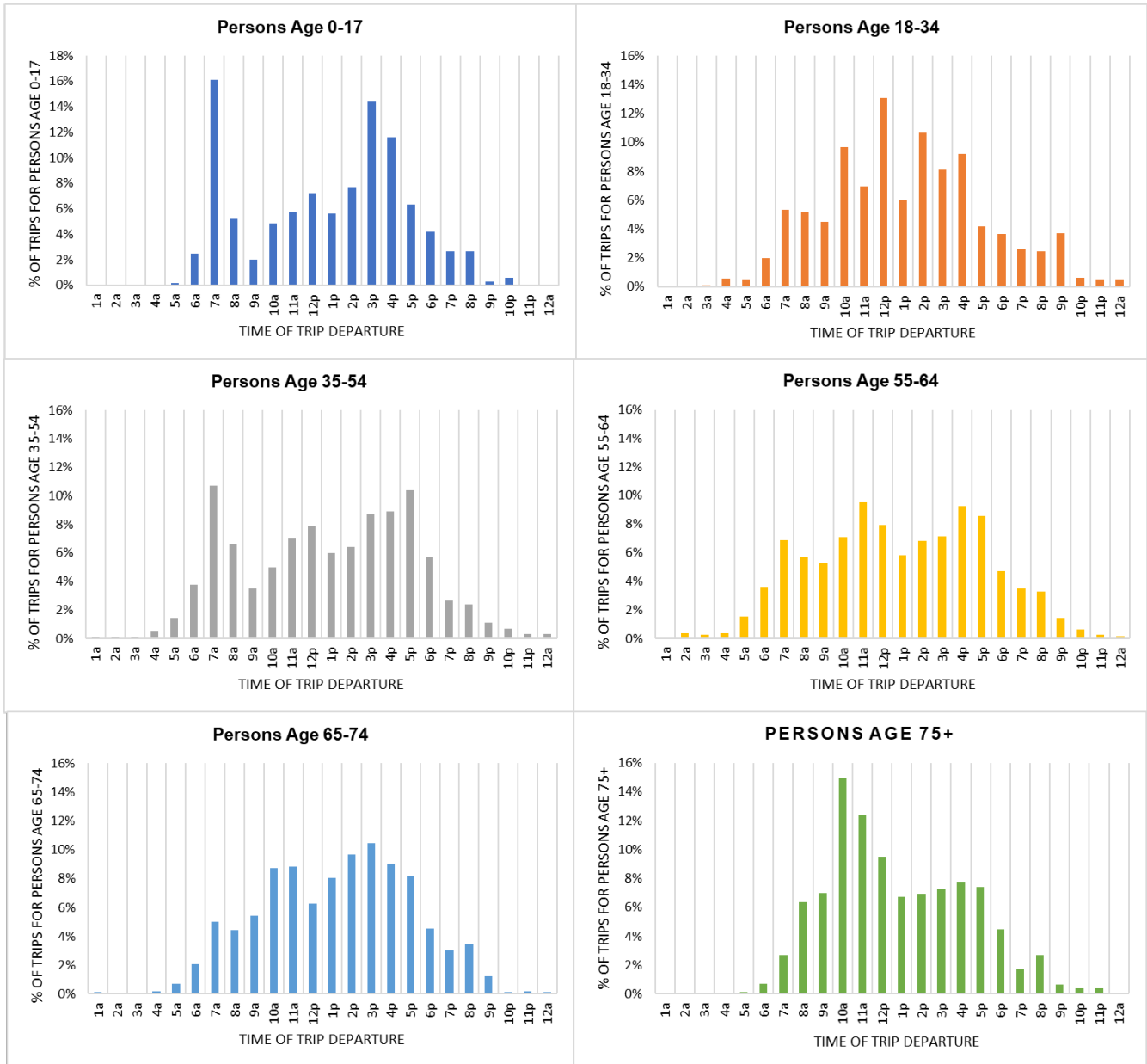
ODOT REGION 1/METRO TRAVEL PROFILE

Across the ODOT Region 1 / Portland Metro Region, the 4,516 households that participated in the OHAS survey report an average of 2.4 household members and own 1.6 vehicles and 1.7 bicycles, on average. These same households report an average of 8.8 daily weekday trips, traversing 56 miles per day and spending 175 minutes per day traveling. Per capita, this equates to 3.7 trips, 25 miles, and 79 minutes respectively. Household income and size are key explanatory variables in understanding travel patterns.

As shown in Table M-1, people with household incomes over $75,000 report the highest level of trip-making. Those in households with incomes under $25,000 report fewer and shorter trips, but also the longest trip durations.

Table M-1: Person Travel Metrics by Household Income

Household Income	Person Trips	Daily Trip Miles	Daily Travel Time (minutes)
Less than $25k	3.3	19	87
Between $25K and $50k	3.5	20	74
Between $50k and $75k	3.8	23	74
More than $75k	3.9	30	79
All Persons	3.7	25	79

Figure M-1: Person Trips by Size and Income
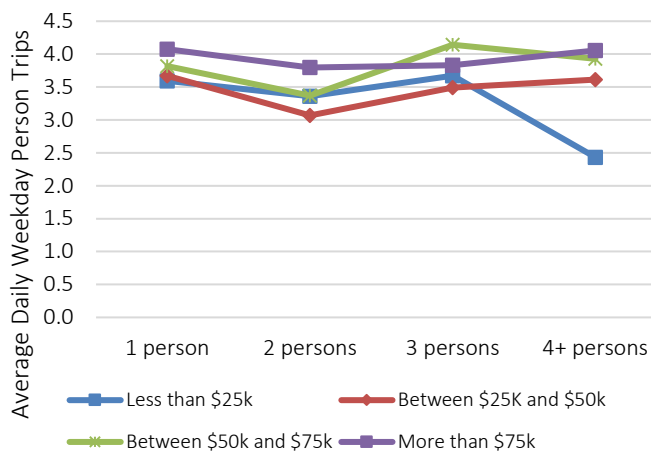
The average daily weekday person trip rates show variations in per capita trip rates when considering both household income and size. As shown in Figure M-1, the greatest variation in trip rates across size is for those living in 4+-person households. Person travel is most consistent across the $75,000+ income group regardless of household size.

Children (ages 0-17) and Seniors (ages 65+) report the lowest average weekday trip rates, while those ages 35 to 54 report the highest rates, as indicated in Table M-2. Respondents ages 18-34 report an average of 3.7 daily weekday person trips traveling 25 miles and 85 minutes.

Table M-2: Travel Metrics by Age Cohort

Age Group	Person Trips	Daily Trip Miles	Daily Travel Time (minutes)
0-17	3.2	13	55
18-34	3.7	25	85
35-54	4.3	31	91
55-64	3.7	30	83
65+	3.2	26	82
All Ages	3.7	25	79

Forty-one percent of household members age 16+ report that they work full-time (35 hours or more), while 22% report they work part-time or volunteer on a regular basis. The remaining respondents age 16+ are not employed. Within each age cohort, the proportion of full-time workers varies: more than half of all adults ages 35-54 are employed full-time (58%), as compared to 49% of those ages 55-64, 46% of those ages 18-34, and 11% of those ages 65-74.

Table M-3: Worker Status by Age Cohort

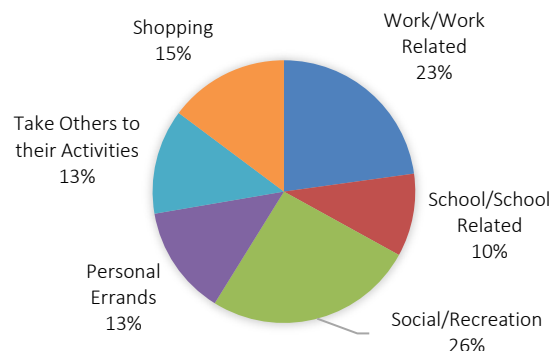| Worker Status	Age Groups						Total Ages 16+
	16-17	18-34	35-54	55-64	65-74	75+	
Employed FT	0%	46%	58%	49%	11%	2%	44%
Employed PT or Volunteer	21%	26%	24%	24%	35%	28%	26%
Not Employed	79%	28%	17%	27%	54%	70%	30%
Total	100%	100%	100%	100%	100%	100%	100%

Work is a cornerstone of daily activity, and many aspects of our jobs influence when and how we travel during our non-work hours. The OHAS survey captured the following work-related details:

- Full-time workers report working an average of 44 hours over a 5-day work-week while part-time/volunteer workers spend an average of 20 hours working over a 3-day work-week.
- Most workers who participated in the survey work in the service industry (49% of those employed full-time and 66% of those working part-time or in volunteer positions).
- Most workers report having full (24%) or some (46%) flexibility in their work schedule. However, one-third of respondents (30%) report having no flexibility in the work schedule.
- Twenty-two percent of all workers indicate that their job requires them to have a personal vehicle available while at work.
- Most workers report that their employers provide free parking (77%) and 9% indicate their employers provide free transit passes. *It is important to note that this is what the employee reported and may not reflect actual workplace programs*.
- Sixteen percent of workers report their employers permit teleworking, where teleworking was defined as working from home in lieu of a commute (not working from home then going into the office on the same day). Of those workers eligible to telework, 15% report working from home daily, 40% do so at least once a week, 29% do so at least once a month, and the remaining report only teleworking a few times a year at most.

To link why we travel with how and when we travel, OHAS survey respondents recorded all activities and related travel for a 24-hour weekday period, including:

1. Work/Work-related
2. School/School-related
3. Social and Recreational
4. Personal Errands
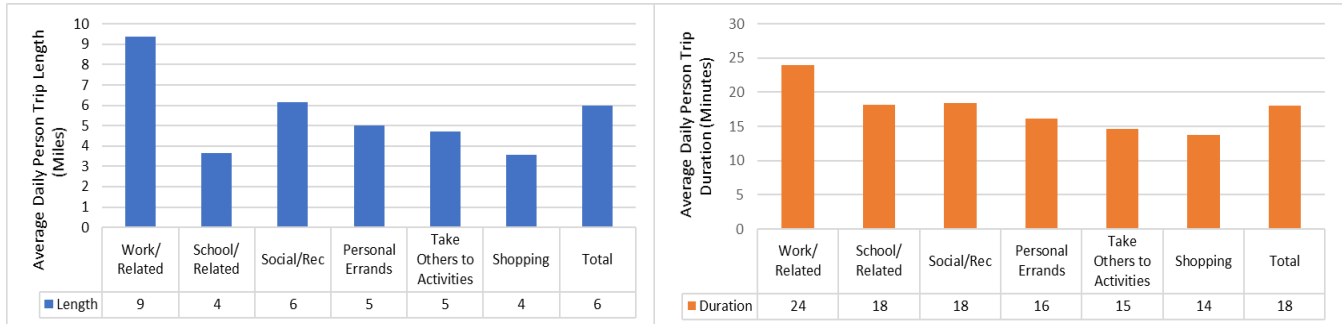5. Taking others to their activities
6. Shopping

Figure M-2: Reasons for Travel

- Shopping 15%
- Work/Work Related 23%
- Take Others to their Activities 13%
- School/School Related 10%
- Personal Errands 13%
- Social/Recreation 26%

Average trip distance and duration for each activity are shown in Figure M-3. Trips for work tend to be the longest at an average of 9 miles while shopping and school trips are shortest at 4 miles. In terms of average trip duration, trips for work take the longest at 24 minutes while trips for shopping average 14 minutes.

Figure M-3: Travel Metrics by Activity

	Work/ Related	School/ Related	Social/Rec	Personal Errands	Take Others to Activities	Shopping	Total
Length	9	4	6	5	5	4	6

	Work/ Related	School/ Related	Social/Rec	Personal Errands	Take Others to Activities	Shopping	Total
Duration	24	18	18	16	15	14	18

Households with children report more school-related trips and more trips to take others to their activities as compared to households with no children. The households with children also report fewer trips for work, social/recreation, errands, or shopping.

Figure M-4: Travel-Related Activities by Presence of Children
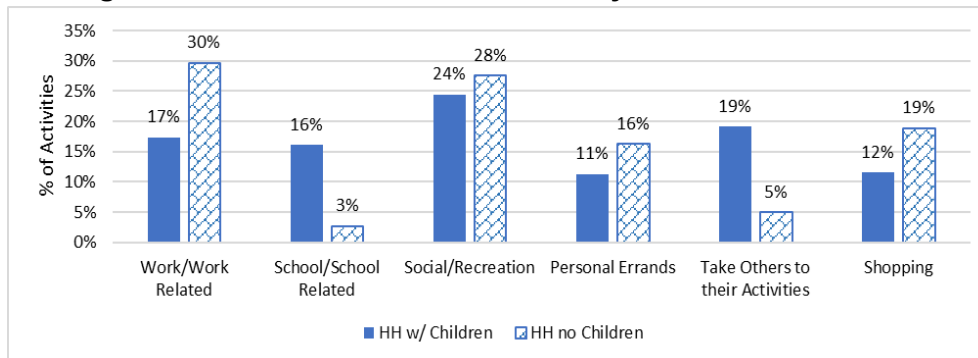
When considering weekday travel by age groups, travel for those ages 0-17 center about school and social/recreation activities (see Table M-4). School related activities decline sharply for adults while the proportion of trips for shopping and errands increases with age.

Table M-4: Travel-Related Activities by Age Group

Age	Activity						Total
	Work/ Related	School/ Related	Social/ Recreation	Personal Errands	Take Others to Activities	Shopping	
0-17	0%	40%	30%	8%	13%	9%	100%
18-34	28%	8%	26%	12%	13%	14%	100%
35-54	33%	1%	22%	13%	17%	14%	100%
55-64	31%	0%	26%	16%	7%	20%	100%
65-74	15%	0%	32%	21%	6%	26%	100%
75+	10%	0%	31%	28%	6%	25%	100%
All Ages	23%	10%	26%	13%	13%	15%	100%

CHAPTER 7 – ODOT REGION 1/METRO PROFILE

Regardless of the reason for the travel, the majority of reported trips are made by auto. Of the 5.8 million trips made on a typical weekday in the Portland Metro region, 78% are auto trips. Of the remaining 22% of trips, 11% are walk trips, 3% bike trips, 4% transit trips, and 3% school bus trips. Those ages 18-34 who do not travel by auto either walk (13%), ride their bikes (4%) or take transit (7%) as indicated in Table M-5.

Table M-5: Travel Mode by Age

Age	Auto	Walk	Bike	Transit	School Bus	Total
0-17	67%	14%	2%	2%	15%	100%
18-34	76%	13%	4%	7%	0%	100%
35-54	81%	10%	4%	5%	0%	100%
55-64	86%	7%	2%	4%	0%	100%
65-74	85%	9%	1%	5%	0%	100%
All Ages	78%	11%	3%	4%	3%	100%

Work and work-related travel is largely by auto (80%). Children's travel to school and social/recreation travel show the highest levels of walk trips, while adult school trips have the highest reported levels of transit usage (17%).
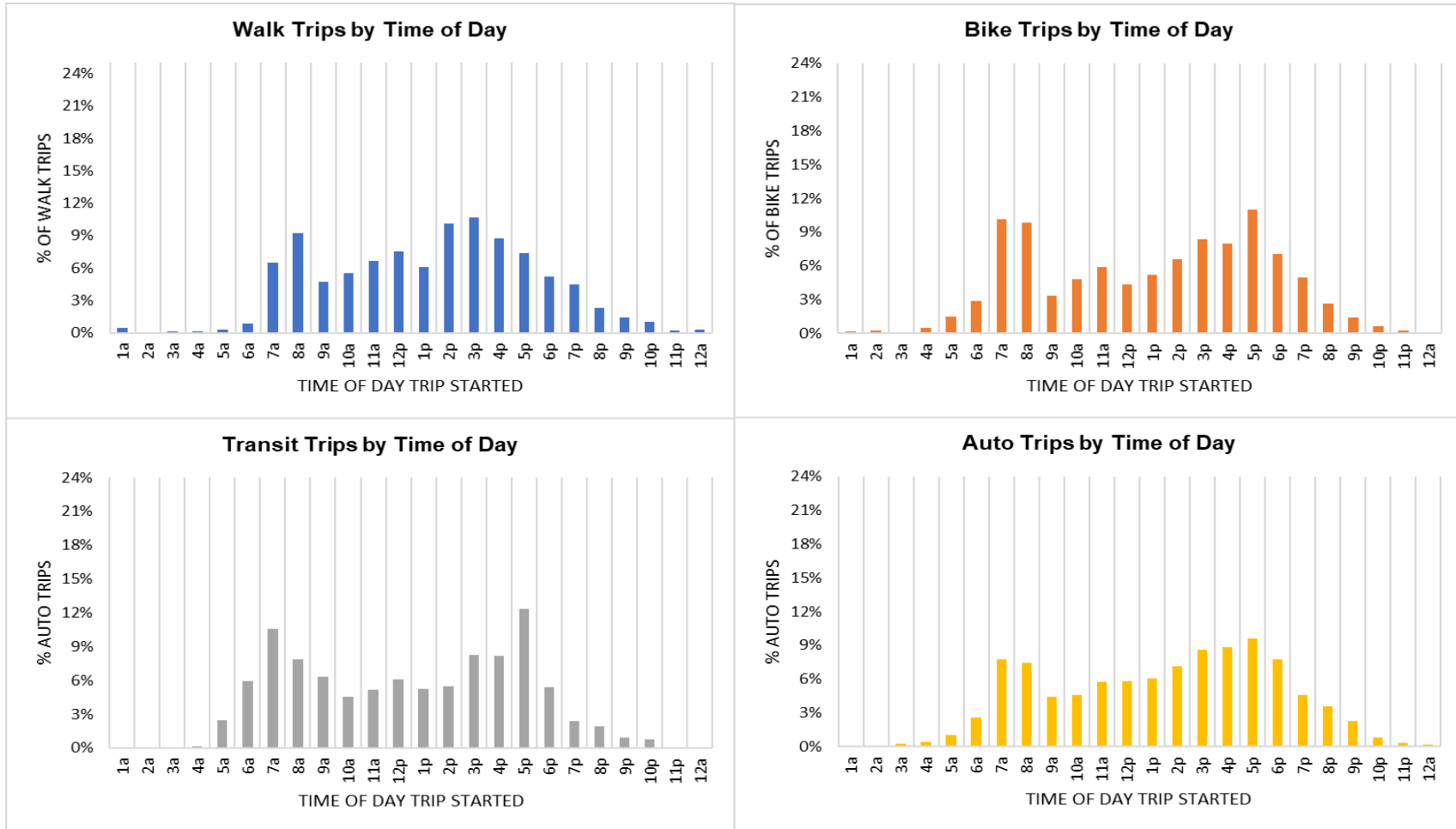
Table M-6: Travel Modes by Activities

Activity	Auto	Walk	Bike	Transit	School Bus	Total
Work/Work Related	80%	8%	4%	7%	0%	100%
School/ Related (age <18)	51%	16%	2%	2%	29%	100%
School/ Related (age 18+)	69%	9%	3%	17%	3%	100%
Social/Recreation	78%	16%	2%	3%	1%	100%
Personal Errands	86%	8%	2%	4%	0%	100%
Take Others to Activities	92%	7%	1%	0%	0%	100%
Shopping	82%	11%	3%	4%	0%	100%
All activities	80%	11%	3%	4%	3%	100%

Mode usage varies across typical weekday. Each of the chart components in Figure M-5 display the distribution of all trips by each of the four main modes of walk, bike, transit and auto regardless of the reasons for those trips.

Figure M-5: Mode Usage by Time of Day

Travel patterns by time of day are fairly consistent by household size, income, and vehicle availability. What accounted for more variation in travel is the age of the traveler. While children report the most pronounced morning and afternoon peaks, the elderly report the most pronounced mid-day peaks, particularly those travelers age 75 and older, as indicated in Figure M-6.

## Figure M-6: Time of Day Travel by Age Group
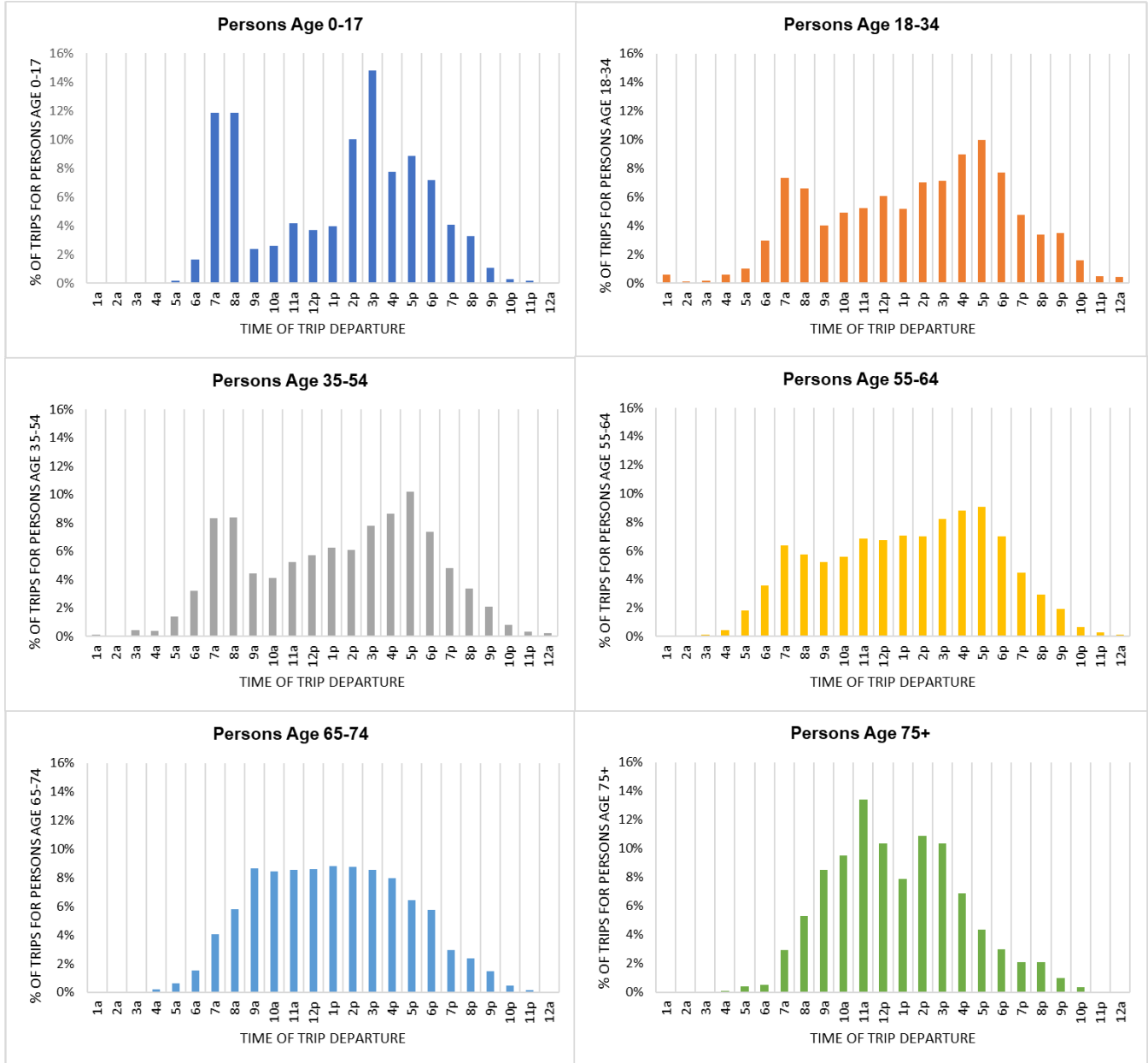
CENTRAL LANE TRAVEL PROFILE

Across the Central Lane Region, the 1,786 households that participated in the OHAS survey report an average of 2.2 household members and own 1.6 vehicles and 1.7 bicycles, on average. These same households report an average of 8.6 daily weekday trips, traversing 44 miles per day and spending 143 minutes per day traveling. Per capita, this equates to 3.8 trips, 20 miles, and 68 minutes respectively. Household income and size are key explanatory variables in understanding travel patterns.

As shown in Table CL-1, people with household incomes over $75,000 report the highest level of trip-making. Those in households with incomes under $25,000 report fewer and shorter trips, but also the longest trip durations.

Table CL-1: Person Travel Metrics by Household Income

Household Income	Person Trips	Daily Trip Miles	Daily Travel Time (minutes)
Less than $25k	3.7	16	71
Between $25K and $50k	4.0	22	68
Between $50k and $75k	3.8	22	68
More than $75k	4.1	22	66
All Persons	3.8	20	68
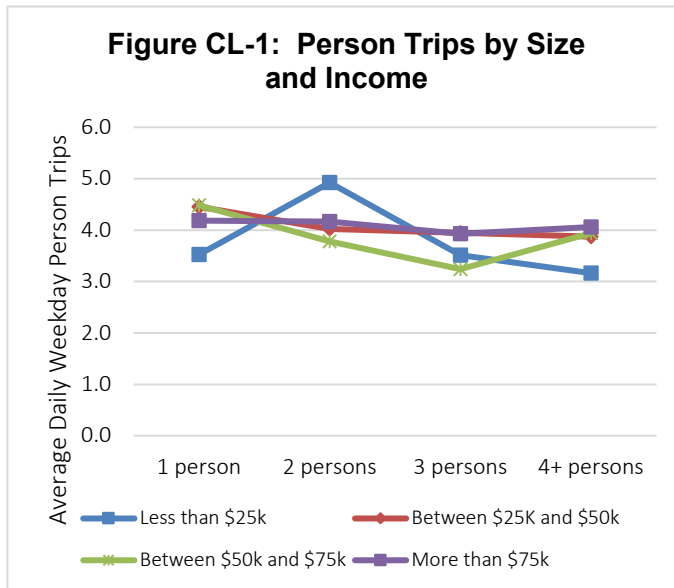
Figure CL-1: Person Trips by Size and Income

The average daily weekday person trip rates show variations in per capita trip rates when considering both household income and size. As shown in Figure CL -1, the greatest variation in trip rates across size is for those living in 2-person households. Person travel is most consistent across the -$75,000+ income group regardless of household size.

Children (ages 0-17) report the lowest average weekday trip rates, while those ages 35 to 54 report the highest rates, as indicated in Table CL -2. Respondents ages 18-34 report an average of 4.0 daily weekday person trips traveling 23 miles and 73 minutes.

Table CL -2: Travel Metrics by Age Cohort

Age Group	Person Trips	Daily Trip Miles	Daily Travel Time (minutes)
0-17	3.0	11	54
18-34	4.0	23	73
35-54	4.4	22	74
55-64	4.0	29	70
65+	3.8	20	71
All Persons	3.8	20	68

Thirty-five percent of household members age 16+ report that they work full-time (35 hours or more), while 35% report they work part-time or volunteer on a regular basis. The remaining respondents age 16+ are not employed. Within each age cohort, the proportion of full-time workers varies: more than half of all adults ages 35-54 are employed full-time (52%), as compared to 39% of those ages 55-64, 30% of those ages 18-34, and 13% of those ages 65-74.
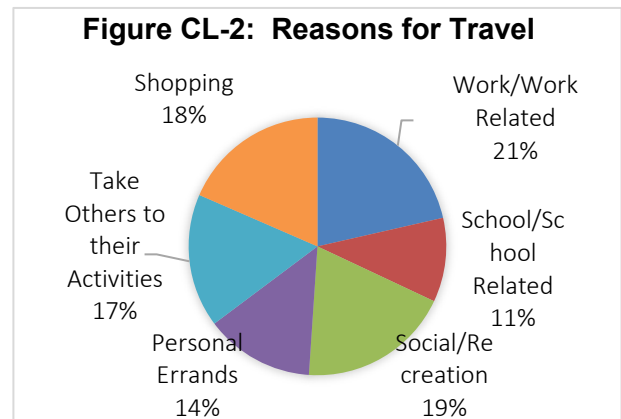
Table CL -3: Worker Status by Age Cohort

Worker Status	Age Groups						Total Ages 16+
	16-17	18-34	35-54	55-64	65-74	75+	
Employed FT	0%	30%	52%	39%	13%	1%	35%
Employed PT or Volunteer	47%	45%	29%	29%	36%	26%	35%
Not Employed	53%	25%	19%	32%	51%	74%	30%
Total	100%	100%	100%	100%	100%	100%	100%

Work is a cornerstone of daily activity, and many aspects of our jobs influence when and how we travel during our non-work hours. The OHAS survey captured the following work-related details:

- Full-time workers report working an average of 43 hours over a 5-day work-week while part-time/volunteer workers spend an average of 22 hours working over a 4-day work-week.
- Most workers who participated in the survey work in the service industry (59% of those employed full-time and 63% of those working part-time or in volunteer positions).
- Most workers report having full (35%) or some (43%) flexibility in their work schedule. However, one-fourth of respondents (22%) report having no flexibility in the work schedule.
- Twenty-four percent of all workers indicate that their job requires them to have a personal vehicle available while at work.
- Most workers report that their employers provide free parking (72%) and 21% indicated their employers provide free transit passes. *It is important to note that this is what the employee reported and may not reflect actual workplace programs*.
- Thirteen percent of workers report their employers permit teleworking, where teleworking was defined as working from home in lieu of a commute (not working from home then going into the office on the same day). Of those workers eligible to telework, 27% report working from home daily, 37% do so at least once a week, 18% do so at least once a month, and the remaining report only teleworking a few times a year at most.

To link why we travel with how and when we travel, OHAS survey respondents recorded all activities and related travel for a 24-hour weekday period, including:
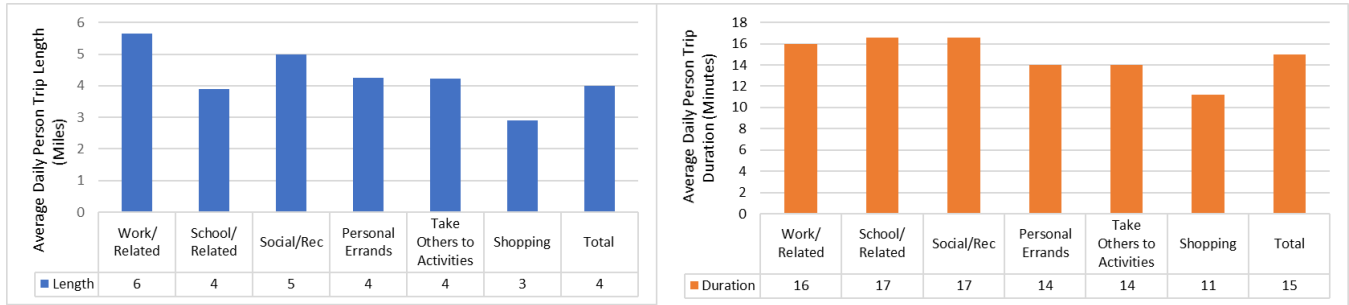
1. Work/Work-related
2. School/School-related
3. Social and Recreational
4. Personal Errands
5. Taking others to their activities
6. Shopping

Figure CL-2: Reasons for Travel

- Shopping 18%
- Work/Work Related 21%
- School/School Related 11%
- Social/Recreation 19%
- Personal Errands 14%
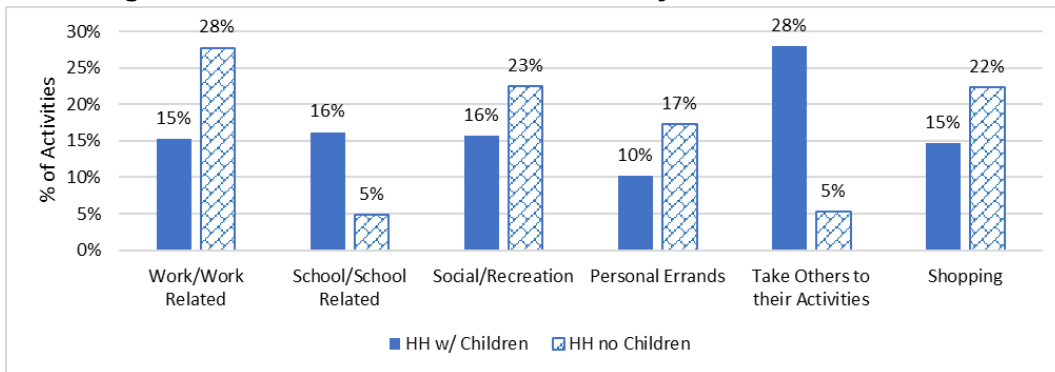- Take Others to their Activities 17%

Average trip distance and duration for each activity are shown in Figure CL -3. Trips for work tend to be the longest at an average of 6 miles while shopping trips are shortest at 3 miles. In terms of average trip duration, trips for school and social/recreation take the longest at 17 minutes while trips for shopping average 11 minutes.

Figure CL -3: Travel Metrics by Activity

	Work/ Related	School/ Related	Social/Rec	Personal Errands	Take Others to Activities	Shopping	Total
Length	6	4	5	4	4	3	4

	Work/ Related	School/ Related	Social/Rec	Personal Errands	Take Others to Activities	Shopping	Total
Duration	16	17	17	14	14	11	15

Households with children report more school-related trips and more trips to take others to their activities as compared to households with no children. The households with children also report fewer trips for work, social/recreation, errands, or shopping.

Figure CL -4: Travel-Related Activities by Presence of Children

	Work/Work Related	School/School Related	Social/Recreation	Personal Errands	Take Others to their Activities	Shopping
HH w/ Children	15%	16%	16%	10%	28%	15%
HH no Children	28%	5%	23%	17%	5%	22%

When considering weekday travel by age groups, travel for those ages 0-17 center about school and accompanying other household members to their activities (see Table CL -4). School related activities decline sharply for adults while the proportion of other non-work trips increases with age.

Table CL -4: Travel-Related Activities by Age Group

Age	Activity						Total
	Work/ Related	School/ Related	Social/ Recreation	Personal Errands	Take Others to Activities	Shopping	
0-17	0%	37%	18%	8%	23%	14%	100%
18-34	23%	11%	17%	12%	21%	16%	100%
35-54	31%	2%	18%	13%	18%	18%	100%
55-64	28%	1%	22%	18%	6%	25%	100%
65-74	21%	0%	25%	22%	6%	26%	100%
75+	22%	0%	24%	24%	4%	25%	100%
All Ages	21%	11%	19%	14%	17%	18%	100%

Regardless of the reason for the travel, the majority of reported trips are made by auto. Of the 931,000 trips made on a typical weekday in the Central Lane region, 81% are auto trips. Of the remaining 19% of trips, 10% are walk trips, 5% bike trips, 4% transit trips, and 1% school bus trips. Those ages 18-34 who did not travel by auto either walk (11%), ride their bikes (8%) or take transit (6%) as indicated in Table CL -5.

Table CL -5: Travel Mode by Age

Age	Travel Mode					
	Auto	Walk	Bike	Transit	School Bus	Total
0-17	80%	10%	3%	3%	4%	100%
18-34	75%	11%	8%	6%	0%	100%
35-54	84%	9%	5%	3%	0%	100%
55-64	83%	8%	6%	3%	0%	100%
65-74	90%	7%	1%	3%	0%	100%
All Ages	81%	10%	5%	4%	1%	100%

Work and work-related travel is largely by auto (81%). Personal errands, children's travel to school and social/recreation travel show the highest levels of walk trips, while adult school trips have the highest reported levels of transit usage (17%) and bike travel (14%).

Table CL-6: Travel Modes by Activities

Activity	Auto	Walk	Bike	Transit	School Bus	Total
Work/Work Related	81%	9%	6%	3%	0%	100%
School/ Related (age <18)	67%	14%	4%	6%	9%	100%
School/ Related (age 18+)	62%	6%	14%	17%	1%	100%
Social/Recreation	78%	13%	6%	3%	0%	100%
Personal Errands	75%	15%	5%	5%	0%	100%
Take Others to Activities	96%	3%	1%	0%	0%	100%
Shopping	83%	10%	2%	4%	0%	100%
All activities	81%	10%	4%	4%	1%	100%

Mode usage varies across a typical weekday. Each of the chart components in Figure CL -5 display the distribution of all trips by each of the four main modes of walk, bike, transit and auto regardless of the reasons for those trips.

Figure CL -5: Mode Usage by Time of Day
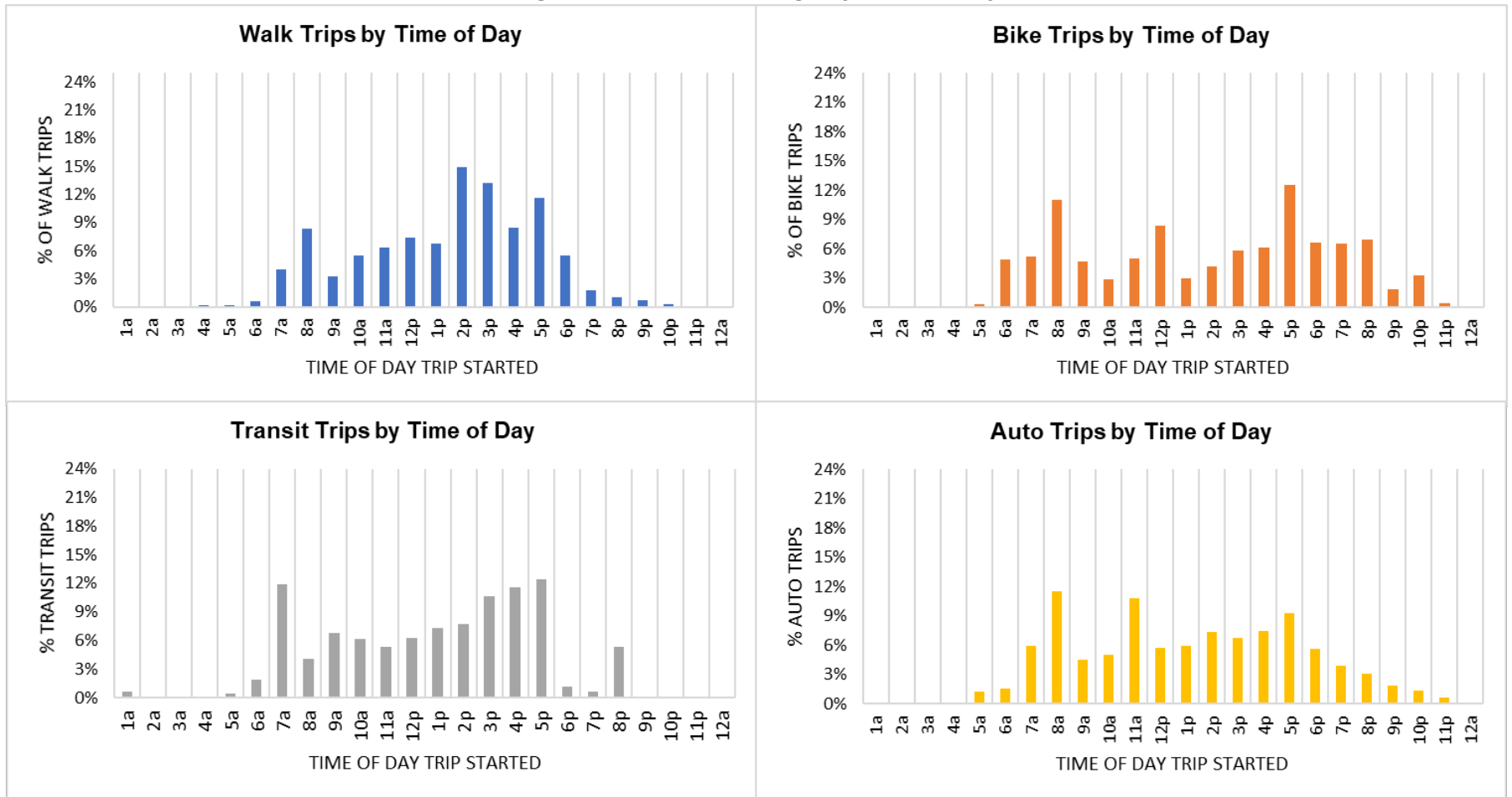
Travel patterns by time of day were fairly consistent by household size, income, and vehicle availability. What accounted for more variation in travel is the age of the traveler. While children report the most pronounced morning peaks, the elderly report the most pronounced mid-day peaks, particularly those travelers age 75 and older, as indicated in Figure CL -6.

Figure CL -6: Time of Day Travel by Age Group
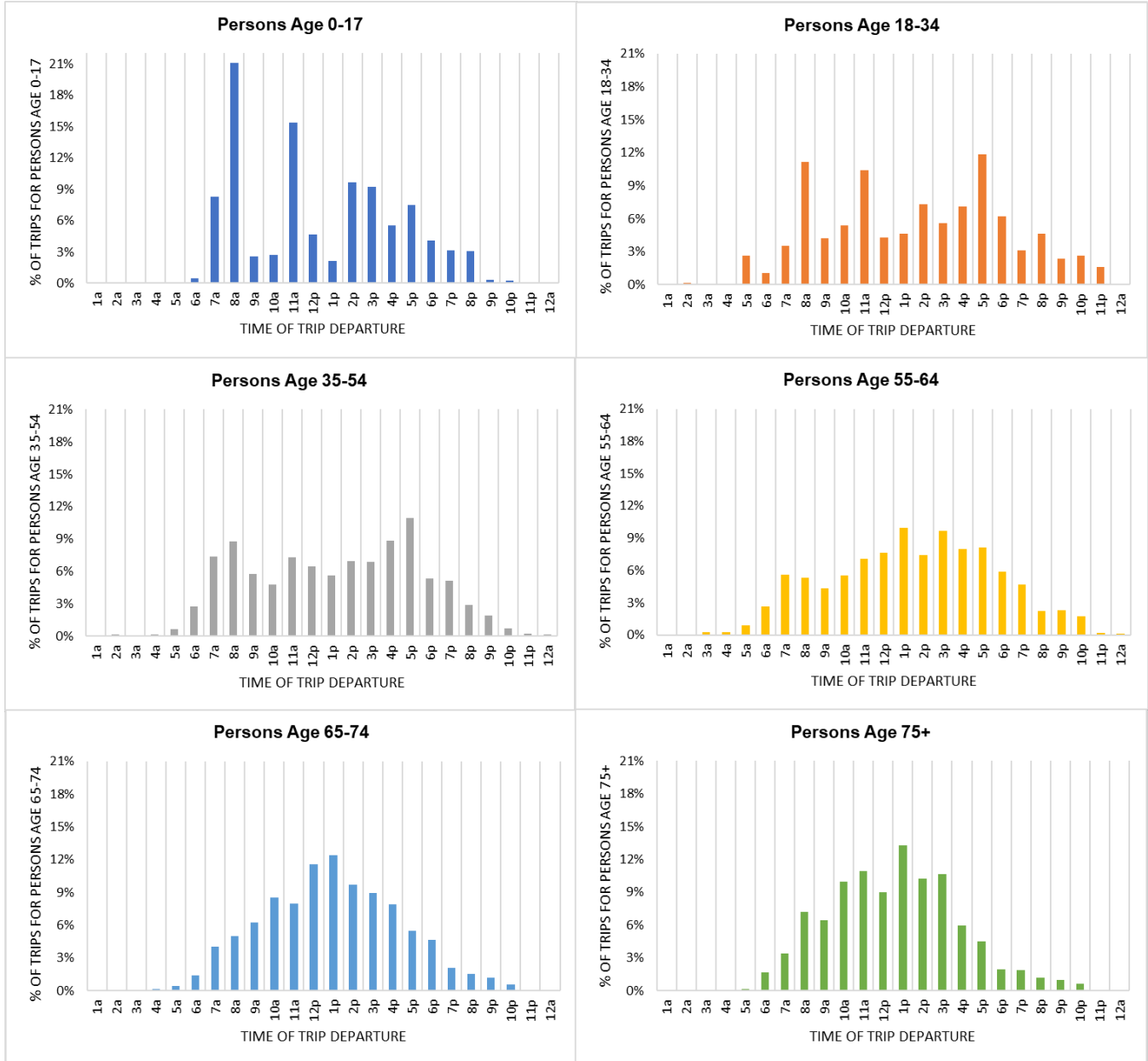
SALEM/KEIZER (SKATS) TRAVEL PROFILE

Across the SKATS Region, the 1,821 households that participated in the OHAS survey report an average of 2.6 household members, 1.7 vehicles, and 1.1 bicycles. These same households report an average of 9.5 daily weekday trips, traversing 58 miles per day and spending 178 minutes per day traveling. Per capita, this equates to 3.5 trips, 24 miles, and 73 minutes respectively. Household income and size are key explanatory variables in understanding travel patterns.

As shown in Table SK-1, people with household incomes over $50,000 report the highest level of trip-making. Those in households with incomes under $25,000 report fewer and shorter trips.

Table SK-1: Person Travel Metrics by Household Income

Household Income	Person Trips	Daily Trip Miles	Daily Travel Time (minutes)
Less than $25k	2.8	14	67
Between $25K and $50k	3.1	28	79
Between $50k and $75k	4.2	22	71
More than $75k	4.2	30	75
All Persons	3.5	24	73

Figure SK-1: Person Trips by Size and Income
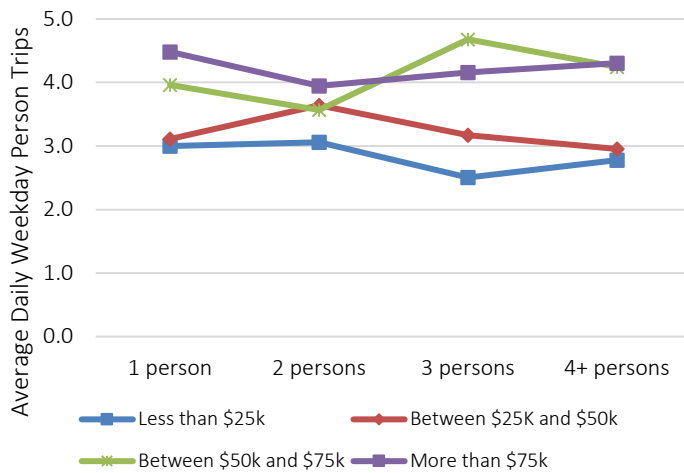
The average daily weekday person trip rate show variations in per capita trip rates when considering both household income and size. As shown in Figure SK-1, the greatest variation in trip rates across size is for those living in 3-person households. Person travel is most consistent across the -$75,000+ income group regardless of household size.

Table SK-2: Travel Metrics by Age Cohort

Age Group	Person Trips	Daily Trip Miles	Daily Travel Time (minutes)
0-17	2.9	15	62
18-34	4.1	28	82
35-54	4.1	33	81
55-64	3.8	25	76
65+	3.0	21	72
All Ages	3.5	24	73

Children (ages 0-17) report the lowest average weekday trip rates, while those ages 18 to 54 report the highest rates, as indicated in Table SK-2. Respondents ages 18-34 report an average of 4.1 daily weekday person trips traveling 28 miles and 82 minutes.

Forty-one percent of household members age 16+ report that they work full-time (35 hours or more), while 23% report they work part-time or volunteer on a regular basis. The remaining respondents age 16+ are not employed. Within each age cohort, the proportion of full-time workers varies: more than half of all adults ages 35-54 are employed full-time (57%), as compared to 47% of those ages 18-34, 44% of those ages 55-64, and 9% of those ages 65-74.
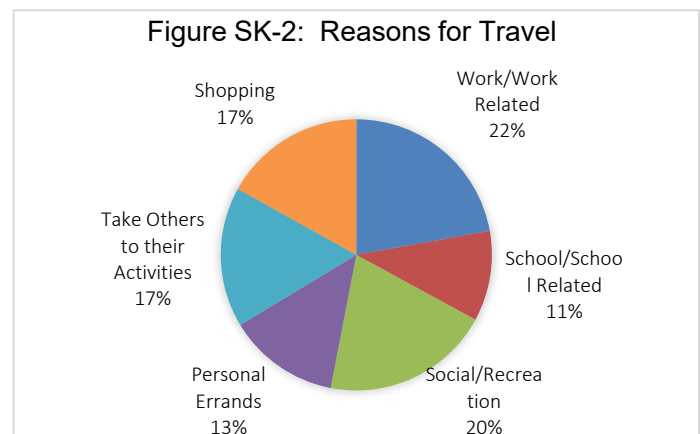
Table SK-3: Worker Status by Age Cohort

Worker Status	Age Groups						Total Ages 16+
	16-17	18-34	35-54	55-64	65-74	75+	
Employed FT	0%	47%	57%	44%	9%	0%	41%
Employed PT or Volunteer	13%	21%	20%	25%	35%	21%	23%
Not Employed	87%	32%	23%	32%	55%	78%	37%
Total	100%	100%	100%	100%	100%	100%	100%

Work is a cornerstone of daily activity, and many aspects of our jobs influence when and how we travel during our non-work hours. The OHAS survey captured the following work-related details:

- Full-time workers report working an average of 43 hours over a 5-day work-week while part-time/volunteer workers spend an average of 19 hours working over a 3-day work-week.
- Most workers who participated in the survey work in the service industry (43% of those employed full-time and 70% of those working part-time or in volunteer positions).
- Most workers report having full (22%) or some (43%) flexibility in their work schedule. However, one-third of respondents (35%) report having no flexibility in the work schedule.
- Twenty-nine percent of all workers indicate that their job requires them to have a personal vehicle available while at work.
- Most workers report that their employers provide free parking (79%) and 6% indicate their employers provide free transit passes. *It is important to note that this is what the employee reported and may not reflect actual workplace programs*.
- Twelve percent of workers report their employers permit teleworking, where teleworking was defined as working from home in lieu of a commute (not working from home then going into the office on the same day). Of those workers eligible to telework, 37% do so at least once a week, 27% do so at least once a month, 22% report teleworking almost every day and the remaining report only teleworking a few times a year at most.

To link why we travel with how and when we travel, OHAS survey respondents recorded all activities and related travel for a 24-hour weekday period, including:
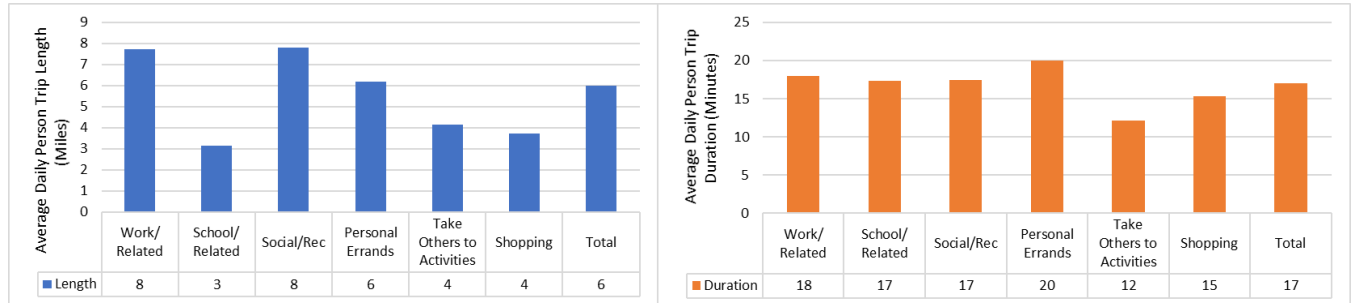
1. Work/Work-related
2. School/School-related
3. Social and Recreational
4. Personal Errands
5. Taking others to their activities
6. Shopping

Figure SK-2: Reasons for Travel

Shopping 17%
Work/Work Related 22%
Take Others to their Activities 17%
School/School Related 11%
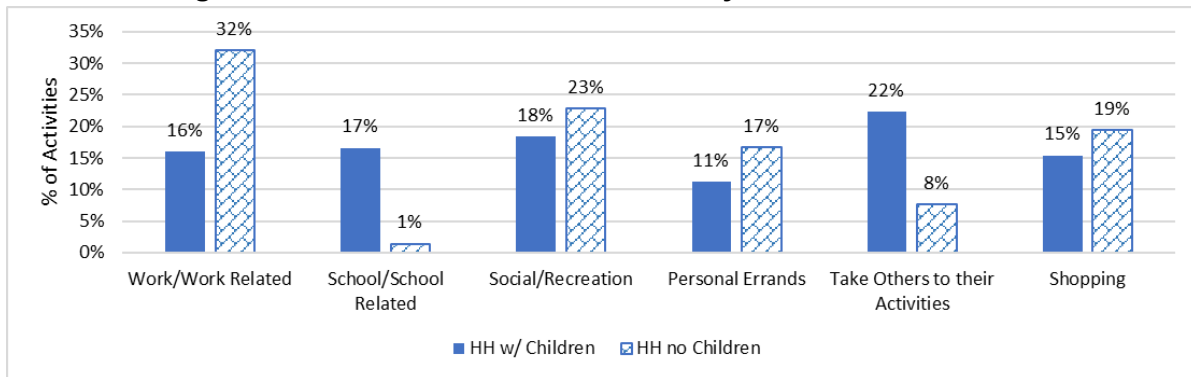Personal Errands 13%
Social/Recreation 20%

Average trip distance and duration for each activity are shown in Figure SK-3. Trips for work and social/recreation tend to be the longest at an average of 8 miles while school trips are shortest at 3 miles. In terms of average trip duration, trips for personal errands take the longest at 20 minutes while trips to take others to their activities average 12 minutes.

Figure SK-3: Travel Metrics by Activity

	Work/ Related	School/ Related	Social/Rec	Personal Errands	Take Others to Activities	Shopping	Total
Length	8	3	8	6	4	4	6

	Work/ Related	School/ Related	Social/Rec	Personal Errands	Take Others to Activities	Shopping	Total
Duration	18	17	17	20	12	15	17

Households with children report more school-related trips and more trips to take others to their activities as compared to households with no children. The households with children also report fewer trips for work, errands, or shopping.

Figure SK-4: Travel-Related Activities by Presence of Children

When considering weekday travel by age groups, travel for those ages 0-17 center about school and social/recreation activities (see Table SK-4). School related activities decline sharply for adults while the proportion for personal errands and shopping increases with age.

Table SK-4: Travel-Related Activities by Age Group

Age	Activity						Total
	Work/ Related	School/ Related	Social/ Recreation	Personal Errands	Take Others to Activities	Shopping	
0-17	0%	40%	21%	10%	16%	13%	100%
18-34	31%	4%	20%	12%	17%	17%	100%
35-54	33%	1%	17%	12%	22%	15%	100%
55-64	34%	0%	21%	16%	9%	20%	100%
65-74	16%	0%	26%	23%	10%	24%	100%
75+	8%	0%	28%	28%	9%	27%	100%
All Ages	22%	11%	20%	13%	16%	17%	100%

Regardless of the reason for the travel, the majority of reported trips are made by auto. Of the 828,000 trips made on a typical weekday in the SKATS MPO region, 83% are auto trips. Of the remaining 17% of trips, 9% are walk trips, 1% bike trips, 2% transit trips, and 3% school bus trips. Those ages 18-34 who do not travel by auto either walk (15%) or take transit (2%) as indicated in Table SK-5.

Table SK-5: Travel Mode by Age

Age	Travel Mode					
	Auto	Walk	Bike	Transit	School Bus	Total
0-17	67%	12%	1%	3%	17%	100%
18-34	82%	15%	1%	2%	0%	100%
35-54	90%	7%	1%	2%	0%	100%
55-64	91%	5%	1%	2%	0%	100%
65-74	93%	4%	0%	2%	0%	100%
All Ages	83%	9%	1%	2%	4%	100%

Work and work-related travel is largely by auto (87%). Children's travel to school and social/recreation travel show the highest levels of walk trips, while adult school trips have the highest reported levels of transit usage (9%).

Table SK-6: Travel Modes by Activities

Activity	Auto	Walk	Bike	Transit	School Bus	Total
Work/Work Related	87%	10%	2%	1%	0%	100%
School/ Related (age <18)	51%	14%	1%	1%	32%	100%
School/ Related (age 18+)	85%	2%	0%	9%	4%	100%
Social/Recreation	84%	13%	1%	1%	1%	100%
Personal Errands	88%	7%	1%	3%	1%	100%
Take Others to their Activities	92%	6%	0%	0%	2%	100%
Shopping	89%	6%	1%	4%	0%	100%
All activities	84%	9%	1%	2%	4%	100%

Mode usage varies across typical weekday. Each of the chart components in Figure SK-5 display the distribution of all trips by each of the four main modes of walk, bike, transit and auto regardless of the reasons for those trips. Of note are the high morning and afternoon peaks for bike trips, while travel by all other modes occurs throughout the day.

Figure SK-5: Mode Usage by Time of Day
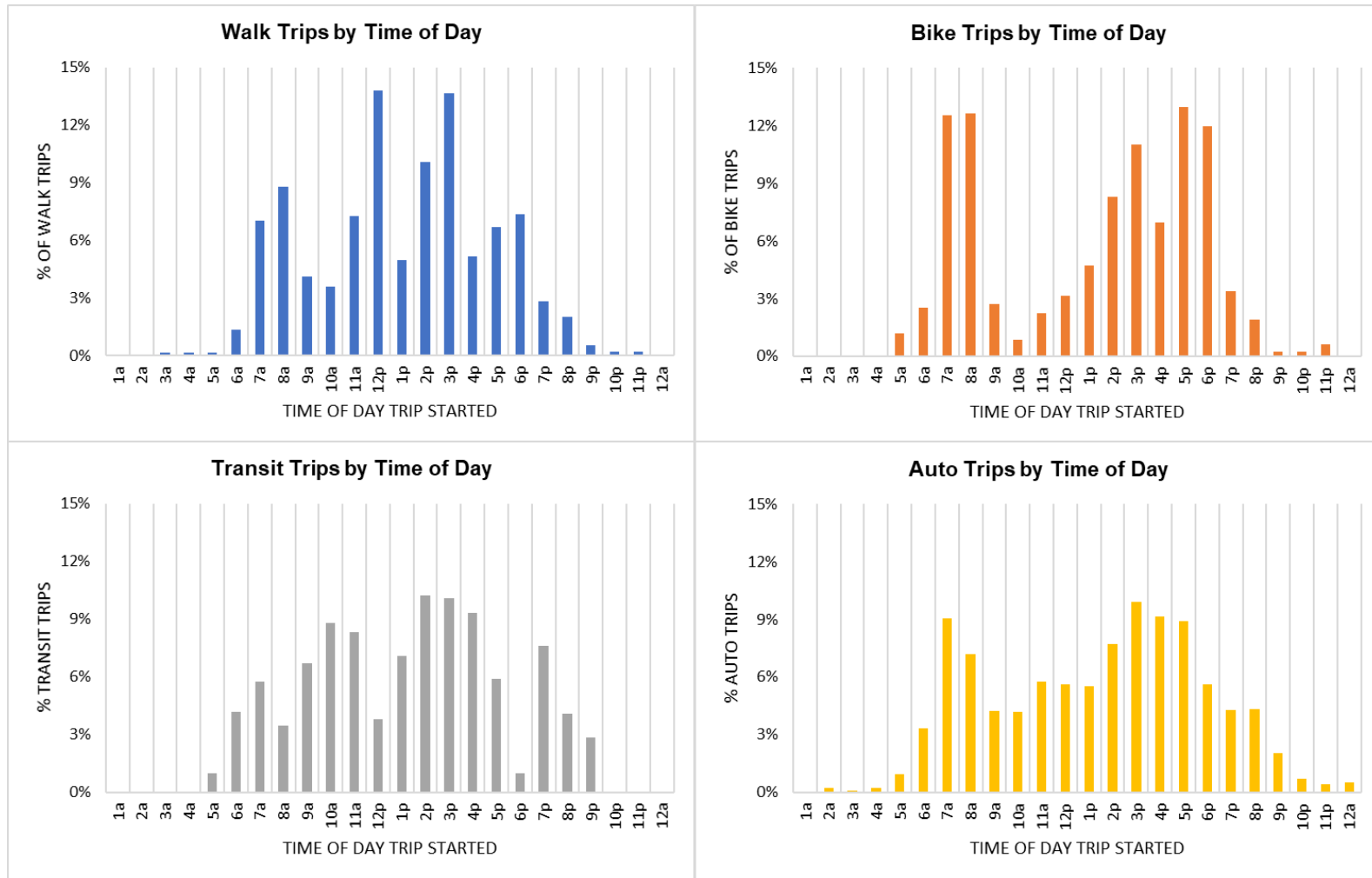
CHAPTER 7 – SALEM/KEIZER TRAVEL PROFILE

Travel patterns by time of day are fairly consistent by household size, income, and vehicle availability. What accounts for more variation in travel is the age of the traveler. While children report the most pronounced morning and afternoon peaks, the elderly report the most pronounced mid-day peaks, particularly those travelers age 75 and older, as indicated in Figure SK-6.

## Figure SK-6: Time of Day Travel by Age Group
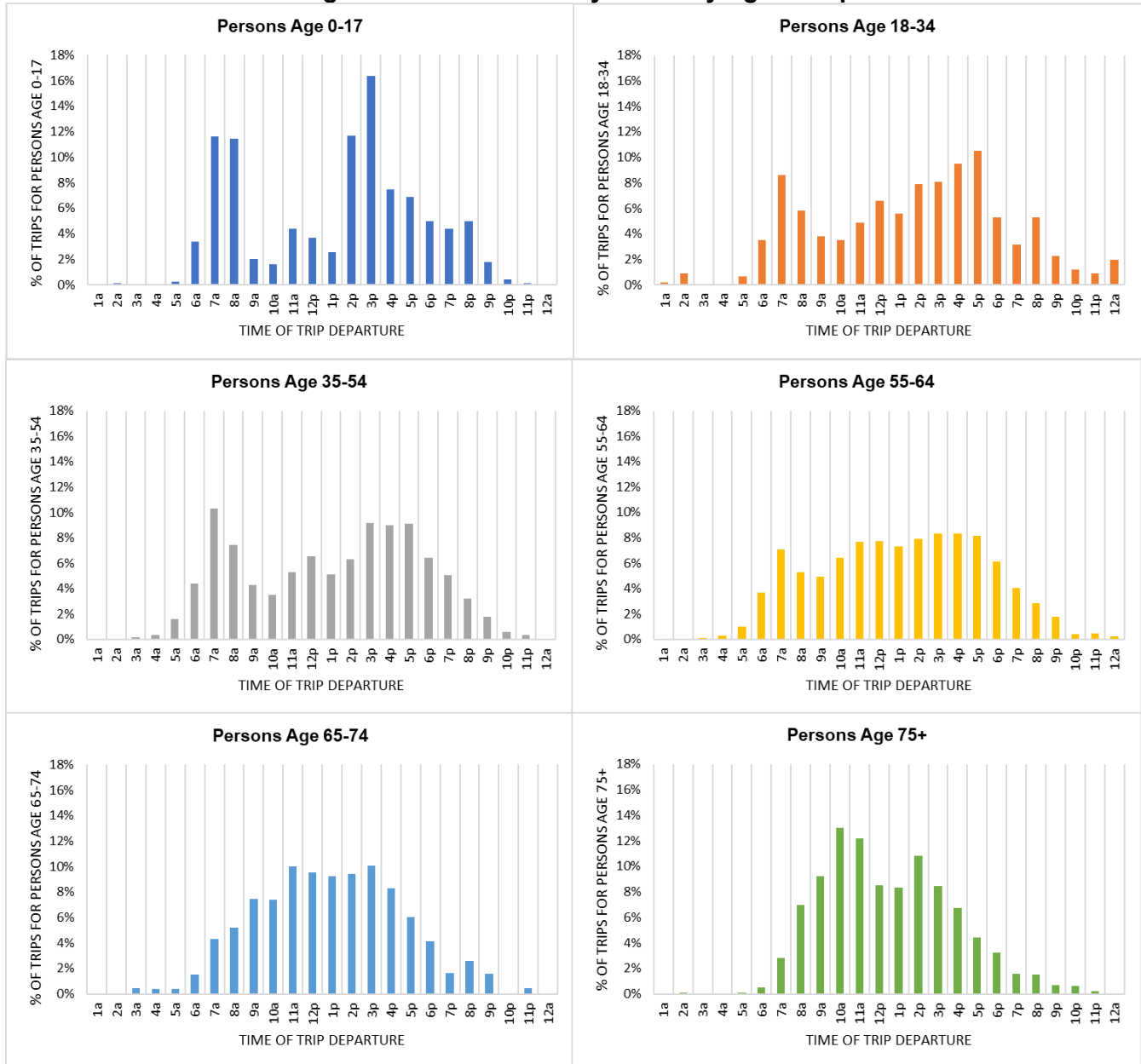
MEDFORD/ROGUE VALLEY TRAVEL PROFILE

Across Rogue Valley, the 1,061 households that participated in the OHAS survey report an average of 2.4 household members, 1.8 vehicles, and 1.6 bicycles. These same households report an average of 9.1 daily weekday trips, traversing 41 miles per day and spending 128 minutes per day traveling. Per capita, this equates to 3.9 trips, 19 miles, and 59 minutes respectively. Household income and size are key explanatory variables in understanding travel patterns.

As shown in Table RV-1, people with household incomes over $75,000 report the highest level of trip-making and longest distances traveled. Those in households with incomes under $25,000 report fewer shorter trips but which took longer.

Table RV-1: Person Travel Metrics by Household Income

Household Income	Person Trips	Daily Trip Miles	Daily Travel Time (minutes)
Less than $25k	3.8	15	60
Between $25K and $50k	3.6	19	57
Between $50k and $75k	4.0	20	58
More than $75k	3.8	23	59
All Persons	3.9	19	59
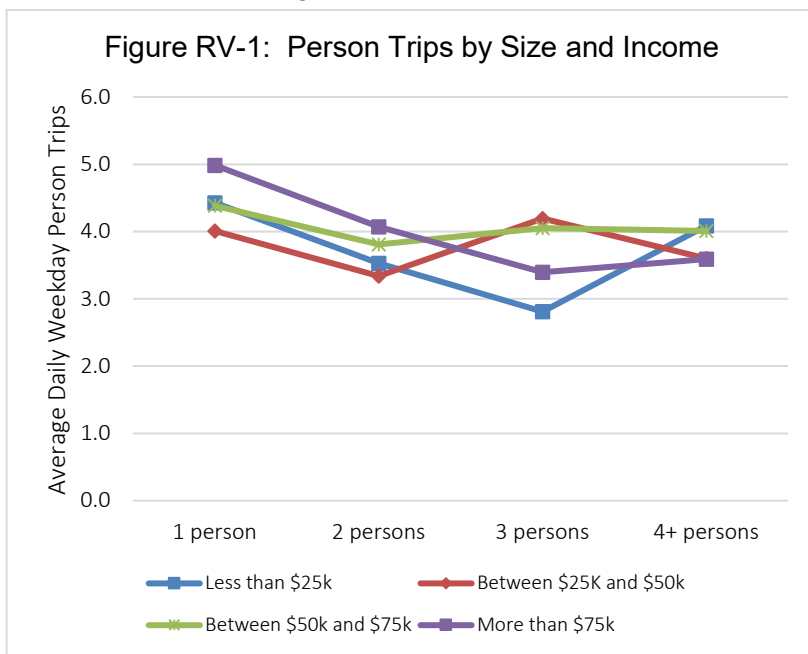
Figure RV-1: Person Trips by Size and Income

The average daily weekday person trip rate remains fairly steady for persons when considering both household income and size. As shown in Figure RV-1, the greatest variation in trip rates across size is for those living in 3-person households with incomes under $25,000. Person travel is most consistent across the $50,000-$75,000 income group regardless of household size.

Children (ages 0-17) report the lowest levels of average weekday travel, while those ages 35 to 64 report the highest, as indicated in Table RV-2. Respondents ages 18-34 report an average of 4.2 daily weekday person trips traveling 17 miles and 55 minutes.

Table RV-2: Travel Metrics by Age Cohort

Age Group	Person Trips	Daily Trip Miles	Daily Travel Time (minutes)
0-17	3.2	11	47
18-34	4.2	17	55
35-54	4.4	25	69
55-64	4.5	27	68
65+	3.5	19	60
All Ages	3.9	26	75

Thirty-five percent of household members age 16+ report that they work full-time (35 hours or more), while 28% report they work part-time or volunteer on a regular basis. The remaining respondents age 16+ are not employed. Within each age cohort, the proportion of full-time workers varies: more than half of all adults ages 35-54 are employed full-time (58%), as compared to 43% of those ages 18-34, 31% of those ages 55-64, and 8% of those ages 65-74.

Table RV-3: Worker Status by Age Cohort

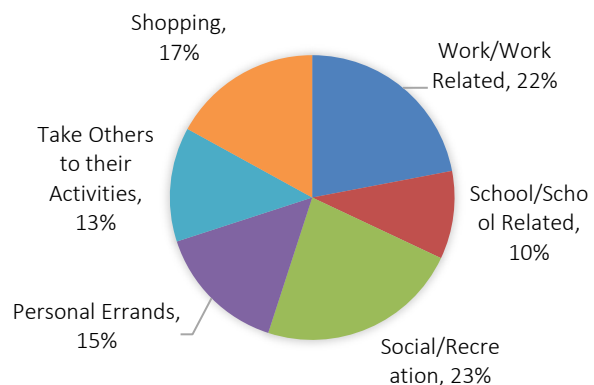| Worker Status	Age Groups						Total Ages 16+
	16-17	18-34	35-54	55-64	65-74	75+	
Employed FT	0%	43%	58%	31%	8%	0%	35%
Employed PT or Volunteer	23%	31%	23%	34%	36%	23%	28%
Not Employed	77%	26%	19%	35%	56%	77%	36%
Total	100%	100%	100%	100%	100%	100%	100%

Work is a cornerstone of daily activity, and many aspects of our jobs influence when and how we travel during our non-work hours. The OHAS survey captured the following work-related details:

- Full-time workers report working an average of 43 hours over a 5-day work-week while part-time/volunteer workers spend an average of 20 hours working over a 3-day work-week.
- Most workers who participated in the survey work in the service industry (52% of those employed full-time and 68% of those working part-time or in volunteer positions).
- Most workers report having full (27%) or some (44%) flexibility in their work schedule. Only 30% of respondents report having no flexibility in the work schedule.
- One in four (27%) of all workers indicate that their job requires them to have a personal vehicle available while at work.
- Most workers report that their employers provide free parking (87%) and 3% indicate their employers provide free transit passes. *It is important to note that this is what the employee reported and may not reflect actual workplace programs*.
- Eleven percent of workers report their employers permit teleworking, where teleworking was defined as working from home in lieu of a commute (not working from home then going into the office on the same day). Of those workers eligible to telework, 57% do so at least once a week, 18% do so at least once a month, 16% report teleworking almost every day and the remaining 10% report only teleworking a few times a year at most.

To link why we travel with how and when we travel, OHAS survey respondents recorded all activities and related travel for a 24-hour weekday period, including:

1. Work/Work-related
2. School/School-related
3. Social and Recreational
4. Personal Errands
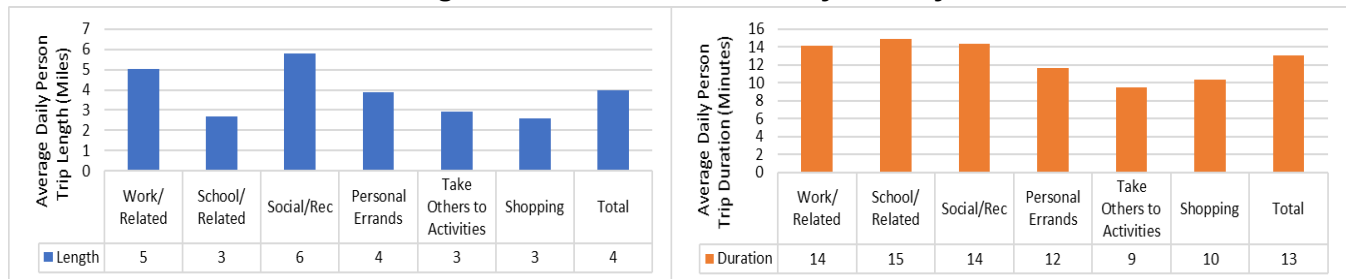5. Taking others to their activities
6. Shopping

Figure RV-2: Reasons for Travel

- Work/Work Related, 22%
- School/School Related, 10%
- Social/Recreation, 23%
- Personal Errands, 15%
- Take Others to their Activities, 13%
- Shopping, 17%

Average trip distance and duration for each activity are shown in Figure RV-3. Trips for social/recreation tend to be the longest at an average of 6 miles while school trips are shortest at 3 miles. In terms of average trip duration, school trips take the longest at 15 minutes while trips to take others to their activities average 9 minutes.

Figure RV-3: Travel Metrics by Activity

	Work/Related	School/Related	Social/Rec	Personal Errands	Take Others to Activities	Shopping	Total
Length	5	3	6	4	3	3	4
Duration	14	15	14	12	9	10	13

Households with children report more school-related trips and fewer work trips than households with no children. The households with children also report more trips for taking others to their activities and fewer trips for social/recreational, errands, or shopping.

Figure RV-4: Travel-Related Activities by Presence of Children
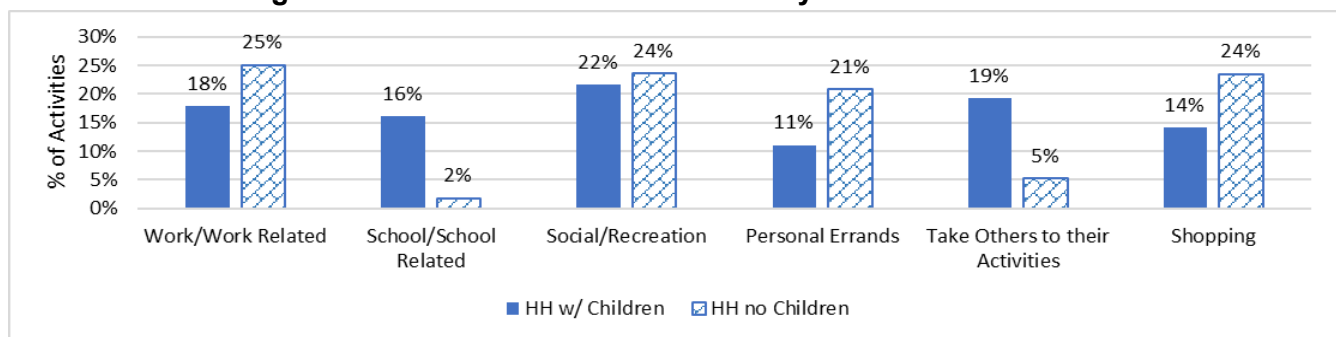
When considering weekday travel by age groups, travel for those ages 0-17 center about school and social/recreation activities (see Table RV-4). School related activities decline sharply for adults while the proportion of personal errands increases with age.

Table RV-4: Travel-Related Activities by Age Group

Age	Activity						Total
	Work/Related	School/Related	Social/Recreation	Personal Errands	Take Others to Activities	Shopping	
0-17	1%	36%	28%	10%	13%	12%	100%
18-34	34%	8%	17%	8%	20%	13%	100%
35-54	33%	1%	19%	14%	14%	18%	100%
55-64	24%	0%	23%	22%	6%	25%	100%
65-74	13%	0%	26%	26%	6%	29%	100%
75+	7%	1%	31%	35%	4%	23%	100%
All Ages	22%	9%	23%	16%	12%	18%	100%

Regardless of the reason for the travel, the majority of reported trips are made by auto. Of the 617,000 trips made on a typical weekday in the Rogue Valley region, 88% are auto trips. Of the remaining 13% of trips, 7% are walk trips, 2% bike trips, 1% transit trips, and 3% school bus trips. Those ages 18-34 who do not travel by auto either walk (5%) or bike (3%) as indicated in Table RV-5.

Table RV-5: Travel Mode by Age

Age	Travel Mode					
	Auto	Walk	Bike	Transit	School Bus	Total
0-17	76%	9%	3%	1%	12%	100%
18-34	90%	5%	3%	1%	0%	100%
35-54	88%	7%	3%	1%	0%	100%
55-64	94%	4%	1%	1%	0%	100%
65-74	92%	6%	0%	1%	0%	100%
All Ages	88%	7%	2%	1%	3%	100%

Work and work-related travel is largely by auto (91%). School and social/recreation travel show the highest levels of walk trips, while adult school trips have the highest reported levels of transit usage (7%).

Table RV-6: Travel Modes by Activities

Activity	Auto	Walk	Bike	Transit	School Bus	Total
Work/Work Related	91%	5%	3%	1%	0%	100%
School/ Related (age <18)	55%	14%	4%	2%	25%	100%
School/ Related (age 18+)	75%	12%	1%	7%	5%	100%
Social/Recreation	89%	9%	1%	0%	1%	100%
Personal Errands	94%	4%	1%	1%	0%	100%
Take Others to Activities	93%	3%	3%	0%	1%	100%
Shopping	92%	6%	2%	1%	0%	100%
All activities	88%	6%	2%	1%	2%	100%

Mode usage varies across typical weekday. Each of the charts in Figure RV-5 display the distribution of all trips by each of the four main modes of walk, bike, transit, and auto. As to be expected, walk trips are concentrated mostly in the daytime hours, with a peak around 2 pm. Bike trips peak in the morning (9 am). Transit trips are highest in the morning as well, while auto trips are distributed throughout the day.

Figure RV-5: Mode Usage by Time of Day
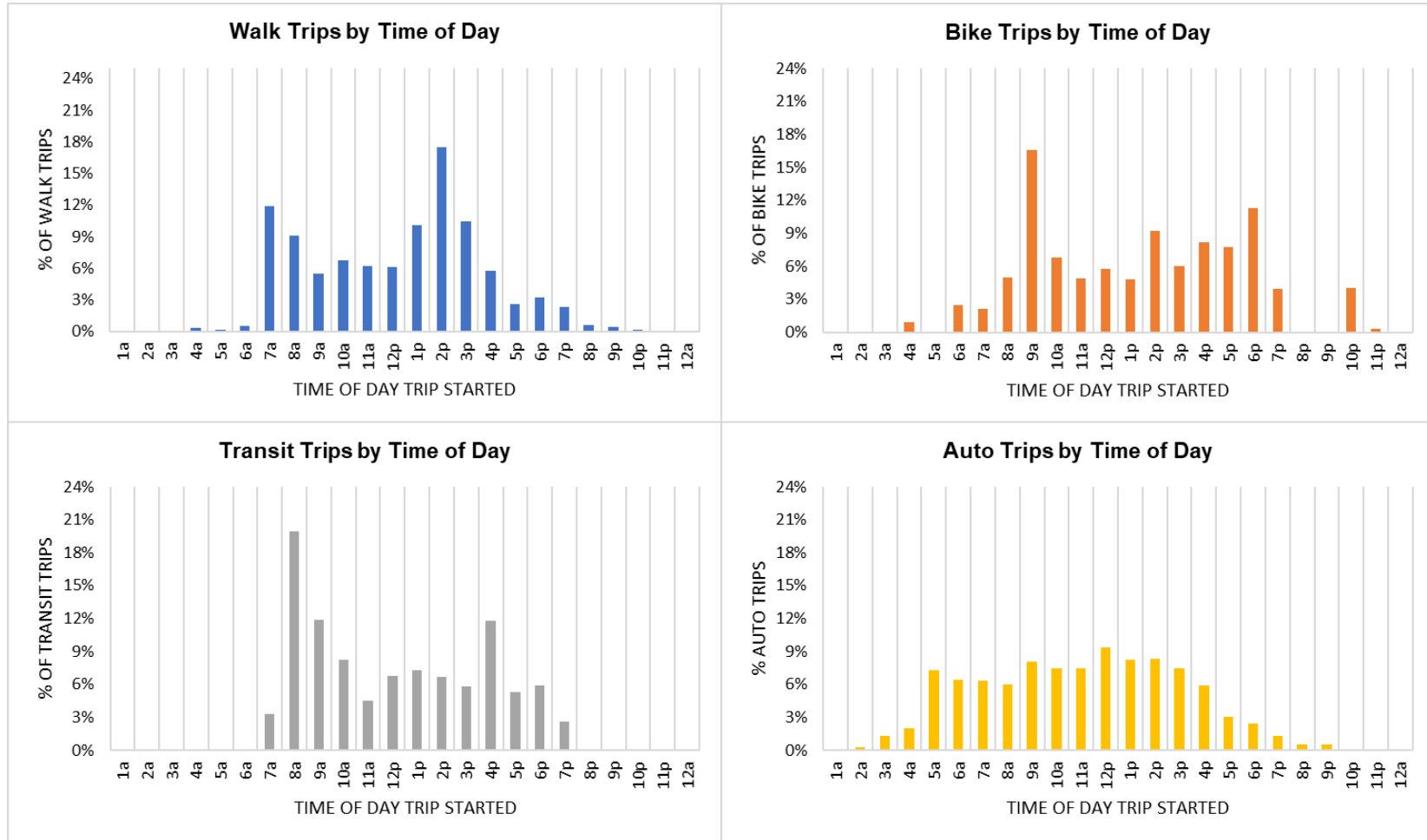
Travel patterns by time of day are fairly consistent by household size, income, and vehicle availability. What accounted for more variation in travel is the age of the traveler. While children report the most pronounced morning and afternoon peaks, the elderly report the most pronounced mid-day peaks, particularly those travelers age 75 and older, as indicated in Figure RV-6.

Figure RV-6: Time of Day Travel by Age Group
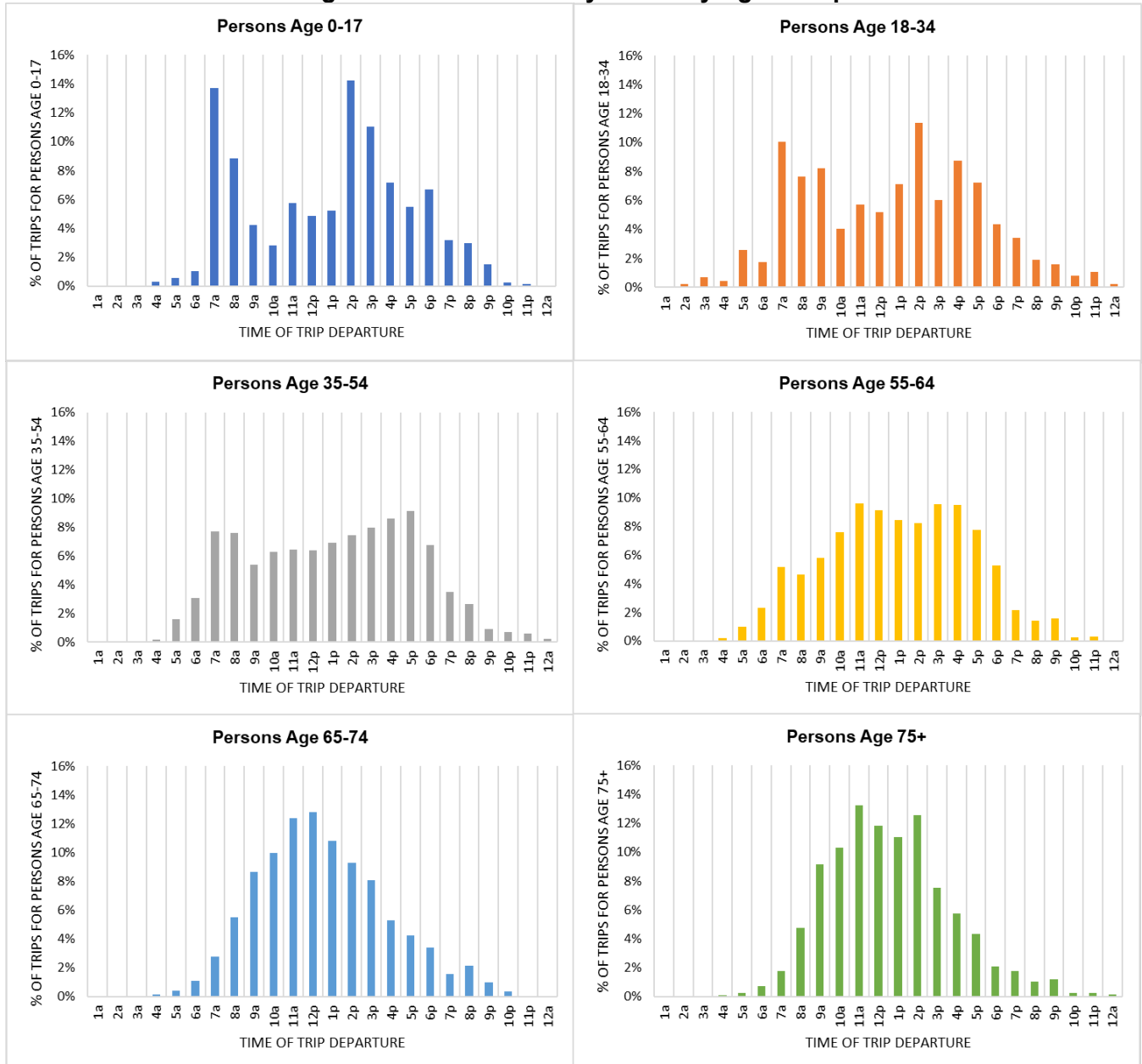
BEND TRAVEL PROFILE

Across the Bend Region, the 799 households that participated in the OHAS survey report an average of 2.5 household members, 2.0 vehicles and 1.9 bicycles. These same households report an average of 9.3 daily weekday trips, traversing 48 miles per day and spending 149 minutes per day traveling. Per capita, this equates to 3.8 trips, 20 miles, and 65 minutes respectively. Household income and size are key explanatory variables in understanding travel patterns.

As shown in Table B-1, people with household incomes over $75,000 report the highest level of trip-making and longest distances traveled. Those in households with incomes under $25,000 report fewer and shorter trips but which took longer.

Table B-1: Person Travel Metrics by Household Income

Household Income	Person Trips	Daily Trip Miles	Daily Travel Time (minutes)
Less than $25k	2.4	10	51
Between $25K and $50k	3.7	19	70
Between $50k and $75k	3.8	22	64
More than $75k	4.3	22	67
All Persons	3.8	20	65

Figure B-1: Person Trips by Size and Income
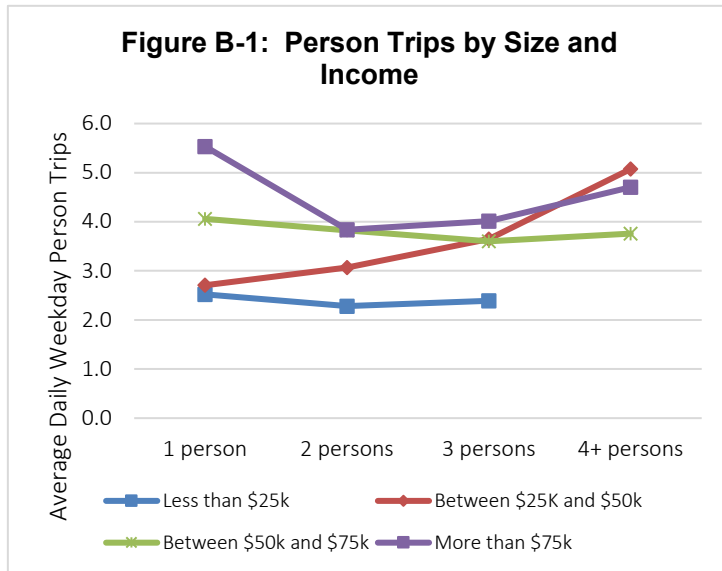
The average daily weekday person trip rate shows variations in per capita trip rates when considering both household income and size. As shown in Figure B-1, the greatest variation in trip rates across size is for those living in 1-person households. Person travel is most consistent across the $50,000-$75,000 income group regardless of household size.

Senior citizens (age 65+) report the lowest average weekday trip rates, while those ages 35 to 64 report the most, as indicated in Table B-2. Respondents ages 18-34 report an average of 3.5 daily weekday person trips traveling 12 miles and 46 minutes.

Table B-2: Travel Metrics by Age Cohort

Age Group	Person Trips	Daily Trip Miles	Daily Travel Time (minutes)
0-17	3.5	16	65
18-34	3.5	12	46
35-54	4.5	24	70
55-64	3.7	26	70
65+	3.0	21	64
All Ages	3.8	20	65

Thirty-nine percent of household members age 16+ report that they work full-time (35 hours or more), while 30% report they work part-time or volunteer on a regular basis. The remaining respondents age 16+ are not employed. Within each age cohort, the proportion of full-time workers varies: more than half of all adults ages 35-54 are employed full-time (54%), as compared to 46% of those ages 18-34, 39% of those ages 55-64, and 5% of those ages 65-74.
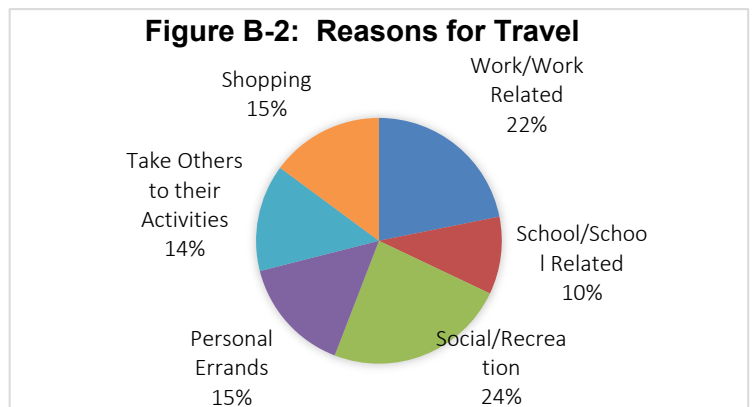
Table B-3: Worker Status by Age Cohort

Worker Status	Age Groups						Total Ages 16+
	16-17	18-34	35-54	55-64	65-74	75+	
Employed FT	0%	46%	54%	39%	5%	0%	39%
Employed PT or Volunteer	18%	31%	32%	30%	34%	13%	30%
Not Employed	82%	23%	14%	31%	61%	87%	31%
Total	100%	100%	100%	100%	100%	100%	100%

Work is a cornerstone of daily activity, and many aspects of our jobs influence when and how we travel during our non-work hours. The OHAS survey captured the following work-related details:

- Full-time workers report working an average of 43 hours over a 5-day work-week while part-time/volunteer workers spend an average of 19 hours working over a 3-day work-week.
- Most workers who participated in the survey work in the service industry (49% of those employed full-time and 75% of those working part-time or in volunteer positions).
- Most workers report having full (33%) or some (43%) flexibility in their work schedule. Only 24% of respondents report having no flexibility in the work schedule.
- One in four (27%) of all workers indicate that their job requires them to have a personal vehicle available while at work.
- Most workers report that their employers provide free parking (93%) and 4% indicate their employers provide free transit passes. *It is important to note that this is what the employee reported and may not reflect actual workplace programs*.
- Thirteen percent of workers report their employers permits teleworking, where teleworking was defined as working from home in lieu of a commute (not working from home then going into the office on the same day). Of those workers eligible to telework, 42% do so at least once a week, 29% do so at least once a month, 20% report teleworking almost every day and the remaining 9% report only teleworking a few times a year at most.

To link why we travel with how and when we travel, OHAS survey respondents recorded all activities and related travel for a 24-hour weekday period, including:
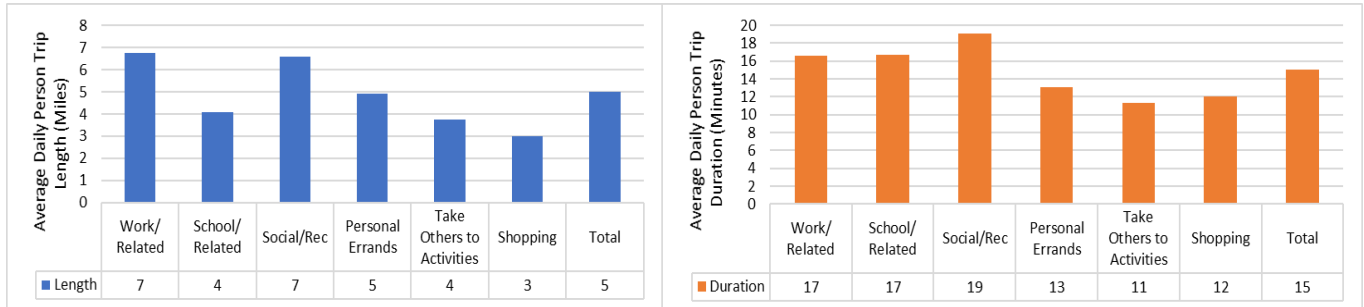
1. Work/Work-related
2. School/School-related
3. Social and Recreational
4. Personal Errands
5. Taking others to their activities
6. Shopping

Figure B-2: Reasons for Travel

- Shopping 15%
- Take Others to their Activities 14%
- Work/Work Related 22%
- School/School Related 10%
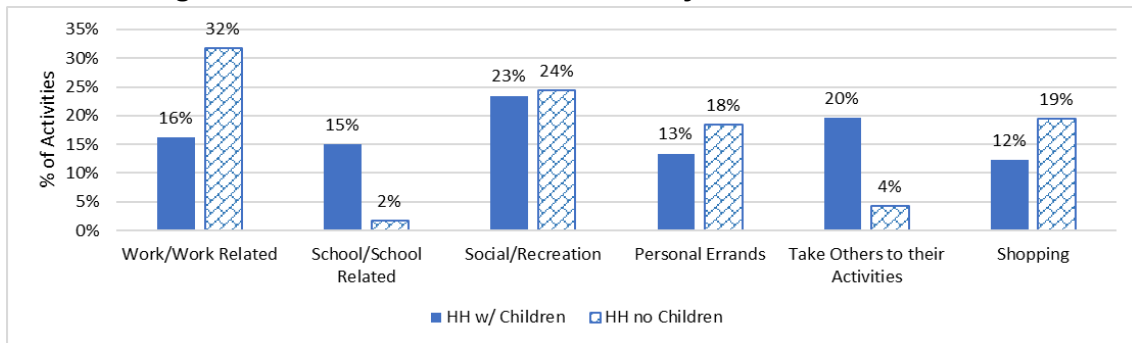- Social/Recreation 24%
- Personal Errands 15%

Average trip distance and duration for each activity are shown in Figure B-3. Trips for social/recreation tend to be the longest at an average of 7 miles while school trips and those to take others to their activities are shortest at 4 miles. In terms of average trip duration, social/recreation trips take the longest at 19 minutes while trips to take others to their activities average 11 minutes.

Figure B-3: Travel Metrics by Activity

	Work/Related	School/Related	Social/Rec	Personal Errands	Take Others to Activities	Shopping	Total
Length	7	4	7	5	4	3	5
Duration	17	17	19	13	11	12	15

Households with children report more school-related trips and more trips to take others to their activities as compared to households with no children. The households with children also report fewer trips for work, errands, or shopping.

Figure B-4: Travel-Related Activities by Presence of Children

When considering weekday travel by age groups, travel for those ages 0-17 centers about school and social/recreation activities (see Table B-4). School related activities decline sharply for adults while the proportion for shopping increases with age.

Table B-4: Travel-Related Activities by Age Group

Age	Activity						
	Work/Work Related	School/School Related	Social/Recreation	Personal Errands	Take Others to Activities	Shopping	Total
0-17	0%	35%	26%	14%	14%	10%	100%
18-34	29%	6%	17%	15%	18%	15%	100%
35-54	33%	1%	23%	11%	19%	13%	100%
55-64	34%	0%	24%	19%	4%	18%	100%
65-74	13%	0%	28%	27%	4%	28%	100%
75+	5%	0%	30%	30%	9%	26%	100%
All Ages	22%	10%	24%	15%	14%	15%	100%

Regardless of the reason for the travel, the majority of reported trips are made by auto. Of the 400,000 trips made on a typical weekday in the Bend MPO region, 85% are auto trips. Of the remaining 16% of trips, 7% are walk trips, 5% bike trips, and 3% school bus trips. Those ages 18-34 who do not travel by auto either walk (12%) or bike (2%) as indicated in Table B-5.

Table B-5: Travel Mode by Age

Age	Travel Mode					
	Auto	Walk	Bike	Transit	School Bus	Total
0-17	74%	8%	7%	0%	12%	100%
18-34	85%	12%	2%	0%	0%	100%
35-54	86%	7%	6%	0%	1%	100%
55-64	94%	4%	1%	0%	0%	100%
65-74	92%	5%	1%	1%	0%	100%
All Ages	85%	7%	5%	0%	3%	100%

Work and work-related travel is largely by auto (87%). School and social/recreation travel show the highest levels of walk trips, while adult school trips have the highest reported levels of auto usage (93%).

Table B-6: Travel Modes by Activities

Activity	Auto	Walk	Bike	Transit	School Bus	Total
Work/Work Related	87%	6%	5%	1%	0%	100%
School/ Related (age <18)	59%	9%	9%	0%	24%	100%
Schoo/ Related (age 18+)	93%	3%	2%	0%	3%	100%
Social/Recreation	81%	12%	4%	0%	2%	100%
Personal Errands	91%	3%	4%	0%	1%	100%
Take Others to their Activities	94%	4%	1%	0%	1%	100%
Shopping	94%	5%	2%	0%	0%	100%
All activities	86%	7%	4%	0%	3%	100%

Mode usage varies across typical weekday. Each of the chart components in Figure B-5 display the distribution of all trips by each of the four main modes of walk, bike, and auto (there were not enough transit trips captured in the survey to evaluate here). Walk trips peak around 3 pm then again around 5 pm. Bike trips peak in the afternoon as well (3 pm). Auto trips are distributed throughout the day.

Figure B-5: Mode Usage by Time of Day
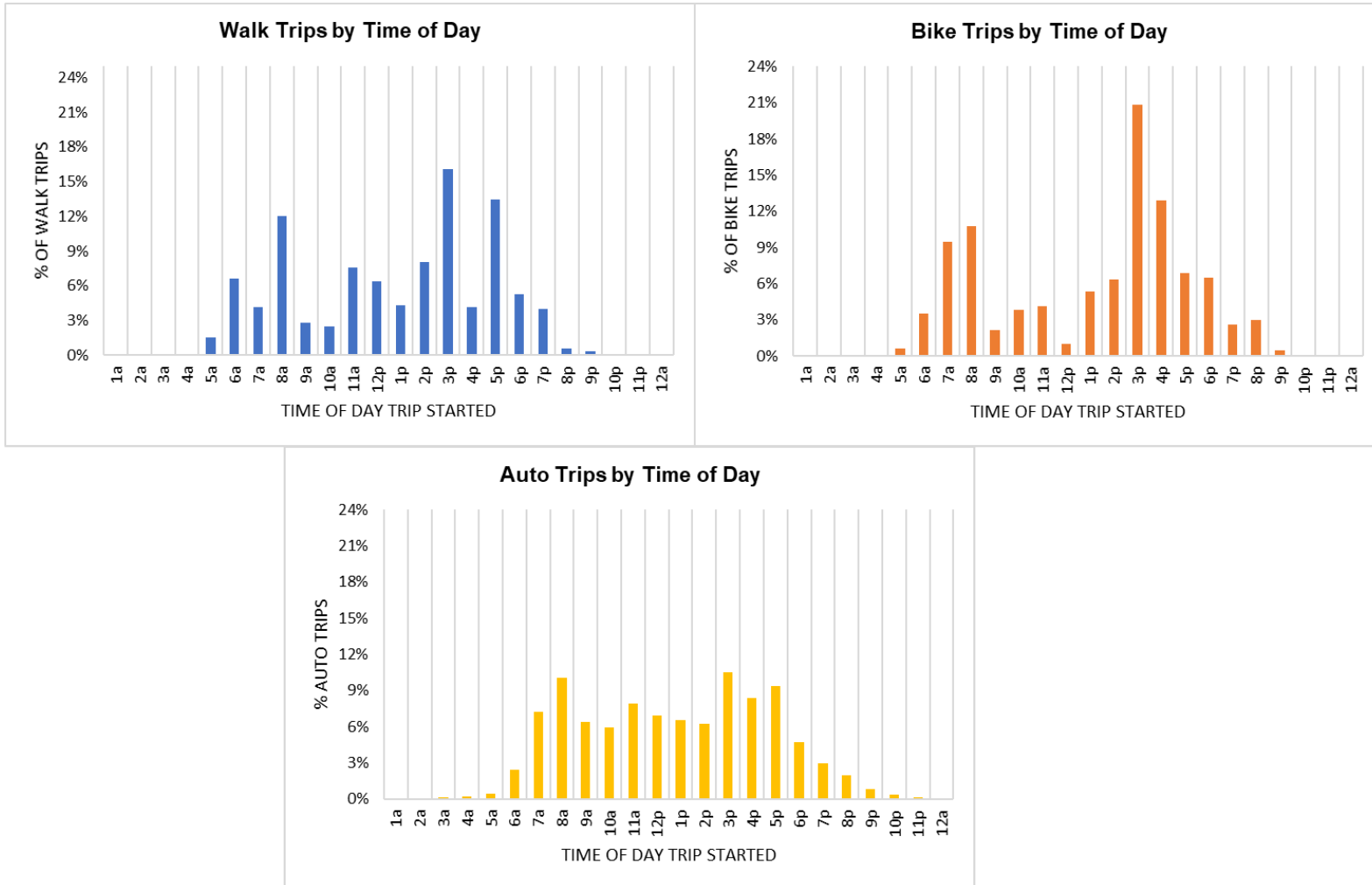
Travel patterns by time of day were fairly consistent by household size, income, and vehicle availability. What accounts for more variation in travel is the age of the traveler. While children report the most pronounced morning and afternoon peaks, the elderly report the most pronounced mid-day peaks, particularly those travelers age 75 and older, as indicated in Figure B-6.

Figure B-6: Time of Day Travel by Age Group
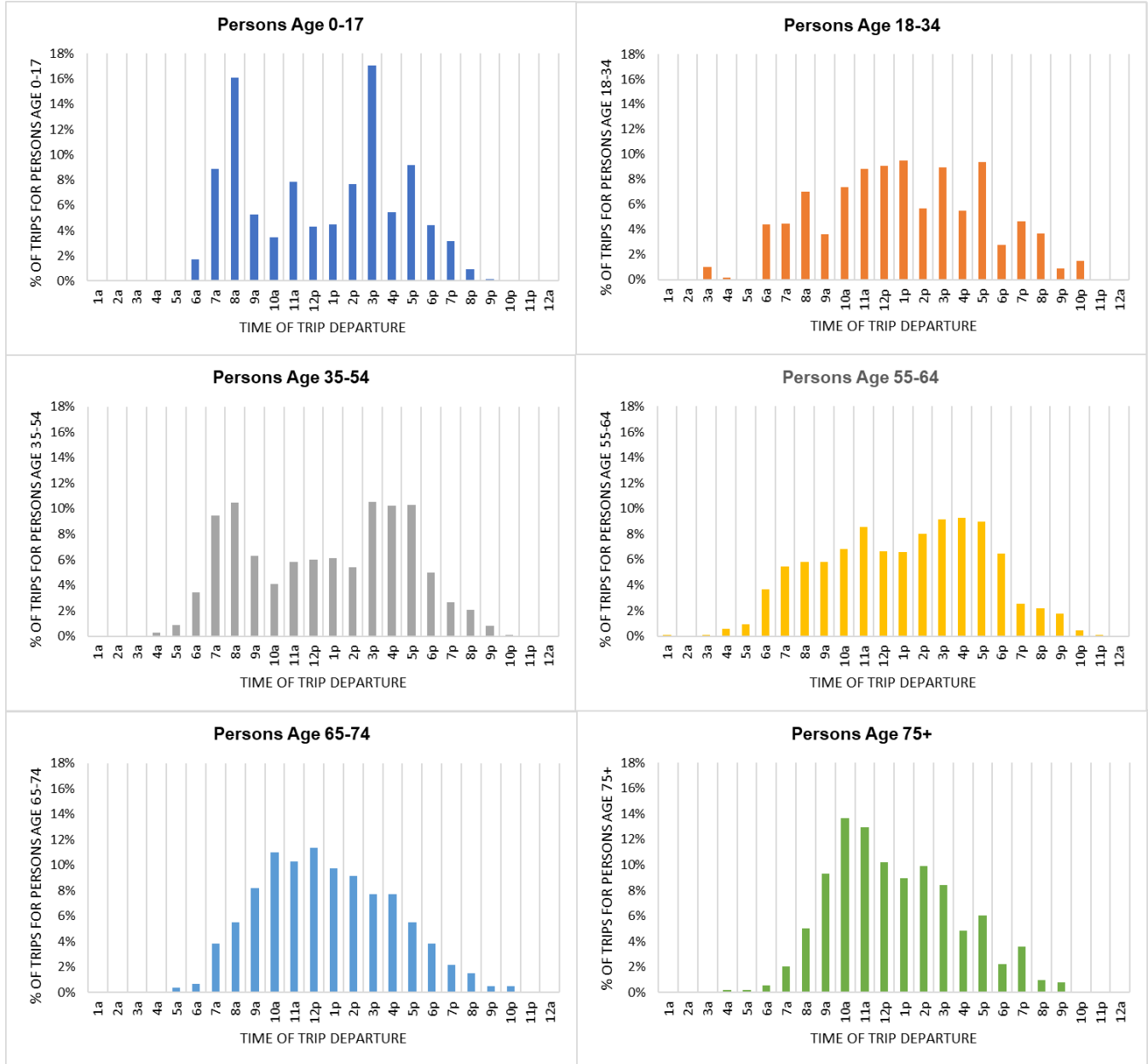
CHAPTER 8

Looking Ahead

Overview

The 2009-2011 OHAS was a comprehensive effort to capture the weekday travel patterns of Oregonians and provide a better understanding of how Oregon's transportation infrastructure is used to carry out typical weekday activities. The survey methods, sampling, and post-processing of the data conformed to industry standards. These included the use of state-of-the-practice methods and technologies as well as stringent quality control checklists. The result is a sizable database that documents the demographic and travel behavior of households across the state.

The data provide specifics about the participating households, including size, number of workers, vehicle ownership, and income. An inventory of each household vehicle reports year, make and model. In addition, household member facts include age, sex, worker and student status. For the travel day, the survey data details the time of day and travel modes used to carry out daily weekday activities, as well as the spatial distribution of trips allowing for a better understanding of typical travel time and distance. These elements combine to provide an accurate portrayal of daily travel.

Planning is now underway to develop and fund a new round of surveys to document current and anticipate future travel behavior trends. The purpose of this chapter is to summarize the limitations of the OHAS effort and provide details regarding household travel survey state of the practice methods and technologies to support opportunities for funding future survey(s) in Oregon.

Limitations

The OHAS effort was designed and fielded using state-of-the-practice design and technologies current as of the 2007-2008 design timeframe. The result is a high quality data set describing the who, what, how, and when of travel, as presented throughout this report. While the agencies involved in the OHAS effort were able to achieve their original goal of supporting the update of travel demand models across the state, there are some limitations associated with data collection that are important to document (particularly with the goal of developing future surveys in mind):

1. Participating households were randomly sampled from a list of known residential addresses. As a result, daily travel by those Oregon residents living in group quarters (such as military personnel living on a base, students living in dormitories, and those in assisted living homes) is not captured in this survey.

2. The sample design focused on achieving specific goals with respect to geography, household size, and the number of household workers. Census data were used to create statistical weights to ensure the data are demographically representative. At the same time, lower participation rates by minorities and young adults limits the extent to which their specific travel can be reported in this report. By focusing the sample design on geography and demographic characteristics, the analysis of travel by non-auto modes was limited in the smaller metropolitan areas of the state. As a result, this report was limited in exploring travel by transit, walk, and bike to the higher density place types (MPO mixed use and TOD). Future sampling designs should consider specific behavioral goals to ensure sufficient trips are captured for travel modes of interest.

3. The sampling geography was based on survey regions, and within the survey regions, county or city boundaries. While this provided sufficient samples to analyze within each survey region, the resulting distribution of households by place type was insufficient for regional place type analysis. Instead, place type analyses are limited to a statewide perspective. A second caveat with respect to the place type analysis is that the statistical weights adjusted the data based on geography and demographic characteristics. As a result, the final weighted distribution of households and persons by place type do not line up with census-based distributions. Future sampling designs should consider stratification by place type to ensure consistency with census-based distributions and to support sub-regional place type analyses. (Place types had not been developed at the time of the sampling design).

4. The sample design did not have specific goals based on the type of worker. This limits the ability to draw conclusions regarding the travel differences between blue- and white-collar workers, or between office workers, shift workers, and those employed in the service industry. The survey data collection took place between 2009 and 2011, meaning teleworking and self-employment trends at that time were captured but newer trends regarding a more fully developed "gig economy" (which includes transportation network company drivers (e.g., Uber, Lyft), independent contractors and freelancers) cannot be discerned.[10]

5. By design, the survey focused on documenting typical weekday travel when school is in session. The converse then means that there are no data regarding weekend or summer travel. In addition, the sequential fielding of surveys in the different regions across the state limits the ability to study seasonal differences in travel.

6. As much as the bulk of the travel patterns in this report remain stable today, smaller pockets of travel have emerged since the survey was conducted in 2009-2011, such as electric car ownership, ride-sharing services, electric bikes and scooters. It is not possible to detect the emergence of these new travel modes within the 2009-2011 data set.

7. Overall, the survey design resulted in a data set that can be used for purposes in addition to travel demand modeling. The application of the data for policy and other planning applications has been limited based on the lack of agency resources and staff time.

These limitations were common to all travel surveys conducted during that time period. Newer survey technologies and methods have been developed to enhance the contents of today's travel survey data sets, providing enhanced opportunities for Oregon agencies seeking to update the OHAS data.

Opportunities

In the decade since the planning and development of the OHAS effort took place, there have been significant advances in the methods and technologies used to conduct household travel surveys. These advancements include a refinement in the use of address-based sampling, design strategies to balance data needs within available budget, technology improvements to reduce respondent burden and

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[10] For more details about this emerging employment sector, see
https://www.bls.gov/careeroutlook/2016/article/what-is-the-gig-economy.htm

increase data quality, and the evaluation of purchased passive data to complement and supplement traditional travel survey data. Each of these areas are discussed further below.

Sampling

From the 1970s to the early 2000s, household travel surveys relied on telephone-based sampling to contact and recruit households to participate in the study. As levels of cellular telephone ownership increased and households dropped landline telephones, the ability to obtain a representative sample via a telephone sampling approach declined significantly. This challenge has been further compounded by the general trend in society to not answer calls from unknown telephone numbers. In response to these challenges, household travel survey sampling practice began to migrate to an address-based sampling approach in the mid-2000s.

By the time of the OHAS design effort in 2007/2008, address-based samples were the state of the practice, but the vendors who aggregated and sold the listings had not yet mastered the sources and techniques to enhance these addresses with names, phone numbers, or email addresses. As a result, the household travel survey practice entailed mailing letters in a 20:1 ratio (or more) of sampled households to survey goals (this compares to a telephone sampling ratio that ranged from 5:1 to 10:1).

Today, address-based sample frames remain the dominant source for generating a random sample to support the household travel survey. However, vendors have mastered the aggregation of data for each address to provide not only name, associated telephone numbers and email addresses but also demographic and consumer data to help describe the household characteristics. As a result, sampling designs today reflect finely-tuned sampling goals of particular geographies, demographic, and socio-economic characteristics. In addition, the inclusion of telephone and email addresses (while not perfect) provide alternative methods to attempt to reach households should they not respond to the recruitment mailing/invitation.

Since the use of an address-based sample frame strengthens the ability to target sample geographically, this provides a mechanism to expand geographic sampling beyond just political boundaries to include both over-sampling within transit service areas and place types. This type of geographic targeted sampling has also been used to identify areas like off-campus student housing, off-base military housing, and similar areas where hard-to-reach populations are known to locate. It can also be used to target place types to support more detailed analyses of travel between survey regions or between MPO and non-MPO place types. Finally, geographically targeted sampling can be used to support before-and-after studies of changes in travel in specific geographic areas where heavy infrastructure investment is planned.

As much as geographic (both place type and political boundaries) and demographic stratification is important for yielding a traditional representative sample, there is a need to also consider targeted behavioral sampling in order to capture travel by low incidence modes and emerging modes associated with the growing shared mobility market in order to achieve a behaviorally representative sample. Capturing sufficient travel by these rarer yet growing travel mode shares for use in planning and modeling by random sampling is costly. Instead, the use of non-probability targeted samples is

becoming more common to ensure survey data is obtained from specific population groups (such as those important for purposes of measuring environmental justice, equity, or use of low-incidence and emerging travel modes).

Methods

Up to now, most agencies conducted their household travel surveys every 8-15 years. As the cost of conducting these surveys increased, the impact of a once-a-decade survey on an agency's budget and staffing resources also increased and some surveys are delayed due to the difficulties in amassing such a large budget item within a 1-2 year period. In an effort to smooth out the budgeting process and strain on an organization, there is a gradual migration taking place to conduct surveys more regularly with sample sizes adjusted to reflect the survey period (for example, instead of conducting a 10,000 household survey once every 10 years, agencies are conducting annual surveys of 1,000 households each year). An additional benefit of conducting the surveys more regularly is the ability to capture emerging travel trends in "real time" and to provide data on a more regular basis that can allow for evaluation of before and after studies as well as measure policy impacts.

From a cost-savings point of view, agencies are also evaluating ways to reduce respondent burden through the development of what is referred to as a "core and satellite" survey design. In this design, the questions are allocated between a core survey administered to all respondents and the use of supplemental surveys (or short question lists asked of a subset of respondents in the main survey) to capture more detailed data about highly specialized topics. Specialized topics include long distance travel, factors that influence residential or mode choice (i.e., parking costs), destination choices, and preferences for travel options that are still in the planning stages (such as autonomous and connected vehicles).

Technology

The greatest advances in household travel survey practice are in the area of technology. Society has embraced the use of real-time mapping software such as Google or Bing and become accustomed to responding to short surveys online. While some still prefer hard copy forms and surveys, most (particularly the young adult population) respond well to online surveys and smartphone-based applications that track travel.

As a result, the use of online surveys results in a streamlined and easier survey process for all respondents, especially larger households with children. Smartphone apps make the survey process simpler and encourage higher participation levels (particularly among young adults) while obtaining more accurate details regarding trip origins and destinations as well as travel times.

Three large-scale travel survey studies in 2015-2017 (Phoenix, San Diego, and Ohio) employed what is being referred to as "smartphone-mostly" designs, where smartphone apps collect the origins and destinations of travel using device-based GPS and a survey is used to validate the travel details in real-time. This technology simplifies the collection of trip details, improves the capture of often-forgotten walk and bike trips (including the routes used), the transitions between walk and transit, and other

travel-related activities such as transferring between bus and light rail. In addition, the low respondent burden translates to the collection of multiple days of data for roughly the same price as a one-day traditional diary design.

Passive Data

Over the past five years, a growing emphasis has been placed on evaluating purchased passive data for use in transportation planning. Passive data is generated from multiple sources, including cellular data that tracks a phone's movement across different cell towers, in-vehicle and device-based GPS, and location-based data captured through smartphone applications. Vendors purchase this data from multiple sources, fuse it with consumer data from credit cards, utilities, etc., and create synthesized data products that, while not actually observed data, can still be used to measure congestion levels and origin-destination flows across various levels of geography.

The cost of the origin-destination flow data depends on the level of geographic-detail and the time period for which data is desired (data for one week of a year is less expensive than data for an entire year). Depending on the parameters of the data purchased, this data can be less expensive than designing and conducting a travel survey. The key challenge is that the passive data provides a rich database of origin-destination flows but relies on products like consumer credit data and uses algorithms and other modeling techniques to ascribe demographic details. Travel surveys, on the other hand, provide a detailed description of observed travelers, but for a limited sample of the population.

The transportation planning community is currently evaluating how and where this data can used to complement and supplement travel survey data. Most accepted uses are to replace external station surveys, capture visitor travel to a region, and use the proportions of origin-destination flows to validate travel demand model results. Research continues in full-force to develop a new paradigm of models (Passive Data Models or PDM) that leverage the passive data with travel survey data to maximize limited agency data budgets.

As part of a recent Travel Model Improvement Panel Peer Exchange on Big Data (see https://tmip.org/content/tmip-peer-review-reports-big-data), several panelists emphasized that, "a household survey remains a critical data item with the current forecasting methods utilized" (page 32). Recommendations regarding the use of passive data (referred to as "big data" in this report) include: a list of questions to ask the data providers, (2) guidelines and key metrics for evaluating the passive data, and (3) recommendations for what the data should and should not be used for. The Federal Highway Administration is evaluating the fusion of passive data with travel survey data as part of its current "NextGen National Household Travel Survey" research program.

An understanding of appropriate use of passive data will continue to develop rapidly over the next few years and has the potential to offer more options for the next round of surveys in Oregon. As the future of surveys in Oregon is discussed and researched, consideration should be given to these new design and technology opportunities in order to find the best approach that balances respondent burden with data needs for modeling and policy analysis within an affordable budget.