SEMCOG

Travel Characteristics

Technical Report

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Executive Summary

Understanding the amount and type of travel by the residents of the SEMCOG planning region is important for transportation planners and policymakers. Household and personal characteristics influence average trip rates, trip purpose, and trip durations. Households with more people, income, workers, and autos produce more trips, while individual trip patterns and purposes differ according to age and gender.

Importantly, there are large shifts in some of the basic determinants of travel behavior. On the one hand the baby boomers—who depend heavily on the automobile—are moving into retirement. While in previous generations growing older meant traveling less, looking forward we are not sure what kind of mobility baby boomers will maintain as they get older. For instance, in previous generations women were less likely licensed to drive, and traveled fewer miles than men, but in the baby-boom generation those relationships changed and women were nearly as mobile as men. In the SEMCOG region, women aged 25-64 are *more* likely to be licensed than men in the same age group, and women workers are the highest traveling group studied.

At the other end of the age spectrum, younger people also travel differently than younger people in previous generations. Across the country, younger travelers are responsible for the growth in several new methods of travel, from the resurgence of inter-city bus to Uber/Lyft, Zipcar, and bike share. Like other areas, young people in the SEMCOG region delay obtaining a driver's license (over 30 percent of young people aged 16-24 do not have a license); however, there is still a high licensure rate across the region: over 86 percent of all residents 16 years and older are licensed to drive.

In addition, large shifts are occurring demographically: some neighborhoods are aging, there are fewer families with children, and immigrants represent a larger share of family households. Immigrants also represent a greater share of the workforce than previously, and overall are younger than the native born. Finally, new technologies and behaviors—like online shopping and gaming—may be changing the amount and type of travel people make. A few factors that may be important to future travel demand are shown in Table 1, which is a short list of the many influences on travel behavior to keep in mind while assessing the current snapshot of travel in the SEMCOG region.

Table 1. Factors that may influence travel demand

Congestion	Household formation/child-rearing
Goods and services delivery	Development density
Labor force participation	Mobility of older population
Licensing regulations	Immigration and migration
Economic activity	Internet shopping/social networking
Non-auto mode options	Telecommuting
Car-sharing	Vehicle ownership

This technical report provides detailed information about the type and amount of travel by residents of the region and its various components and cities in 2015. The data presented include trip rates, control totals, and descriptive data that are useful to planners, policymakers, travel demand modelers, and others interested in analyzing the ways people use the transportation system. More basic information about travel behavior that may be of interest to a wider audience can be found in the companion "Highlights" report.

Key results answer four simple questions: (1) who travels, (2) how people travel, (3) why people travel (including detail on the journey-to-work), and (4) when people travel. Summary findings include the following:

Who Travels in SEMCOG

- Households with more persons, workers, income, and vehicles generate more trips.
- Overall, women travel more than men—especially working women. The highest travel rates (both vehicle and person) are for women aged 35-49.
- Women aged 24-65 are more likely than their male counterparts to be licensed to drive.
- People—including children and retired—who are not in the workforce account for about half of the travel on weekdays, while people who are employed account for the other half.
- However, workers make more trips per person, and more vehicle trips, than people not in the workforce.
- Younger people (16-20) have the lowest vehicle trip rates, and less than half (48 percent) of their daily travel is driving alone while over a third is shared ride trips.
- Older non-drivers rely on obtaining rides to access activities, and they also walk more than older drivers.

- People in households without vehicles walk and take transit for the majority of their daily activities, but also drive a vehicle (rented or borrowed) for more than one out of ten trips (12.3 percent).

Why People Travel in SEMCOG

- Shopping and personal business account for the largest share of weekday travel. Women have a larger share of travel for dropping off and picking up passengers, shopping, and errands than do men.
- Work trips account for less than 10 percent of all weekday trips by all people—including children and retired people as well as non-working adults. However, work trips account for over one out of five weekday trips by workers (20.3 percent).
- People who commute on weekdays traveling to and from work in addition to shopping, errands, and social/recreational activities. Workers spend more time traveling than non-workers.
- Telecommuting is offered to 16.3 percent of workers in the SEMCOG region, and when it is offered the average worker telecommutes 1.3 days per week.
- About 82 percent of workers in the SEMCOG region commute to a regular workplace on weekdays, but the remainder either work at home (6 percent) or have no fixed workplace (12 percent).

How People Travel in SEMCOG

- The predominant mode, by far, is use of the private automobile (62 percent of all trips). Shared ride (carpool) accounts for another 23 percent, walking is 8 percent, and transit is 3 percent of all weekday trips.
- Just over 9 percent of households in the region do not have a vehicle. People in zero-vehicle households walked for 33 percent of their daily trips and took transit for 25 percent.
- Walking can be a means of travel and also an activity in itself. About 20 percent of walks (and over a quarter of bike trips) are for exercise and recreation.
- About one out of five walk trips are to access transit (change mode). For bicycle trips, over 36 percent are for travel to work or school.
- The auto occupancy for work trips is 1.1 persons—the lowest of all purposes.

When People Travel in SEMCOG

- Residents of the region spend about 20 minutes a day in vehicles—either driving or as a passenger (all ages). Children less than 15 years of age spend about 15 minutes on an average weekday in a vehicle.
- Drive-alone trips average just over 20 minutes in duration, and the average transit trip is over 30 minutes long.
- Overall, workers in the region who drive to work commute 24.9 minutes one-way (compared to an average of 23.9 minutes nationwide)..
- The share of vehicle trips in the morning peak period consisted of 60 percent commute trips and another nearly 20 percent pick-up/drop-off. The share of vehicle trips in the evening peak period is 42 percent commute trips and 37.2 percent shopping, errands, and social travel.

Personal and household patterns of activities as seen through the survey results offer insight into who is using the region's transportation system, where, and to what extent. Descriptive analysis of traveler groups such as workers, students and young people, retirees, households with children, and special populations provides a clearer understanding of travel behavior in the region. Understanding how the transportation system is used and how it serves the people of the region is a critical component of developing policies, plans, and programs that optimize system performance, provide for the mobility needs of travelers, and maintain economic vitality.

Findings of the Travel Behavior Survey 1

1.1 Weekday Trips and Trip Generation

Table 1-1 shows the summary of the number of households, number of people, and weekday trips by region from the survey (other tables presenting data by region are available in Appendix B). A trip is movement from one location to another, a person trip is when a person travels, and a vehicle trip is when a vehicle travels. For example, if someone walked to the store and then back home, that would be two person trips—one from home to the store and one from the store back home. Vehicle trips count the number of times a vehicle makes a movement from one location to another regardless of how many people are in the car: two people sharing a ride to work is counted as one vehicle trip. A vehicle trip is also sometimes called a vehicle-driver trip because the driver characteristics are used to describe it—a vehicle trip would count as a commute trip only if the driver was going to work. These and other definitions are included in Appendix A.

The data show that, overall, residents of the region averaged 3.8 trips per person on weekdays, and together people in households generated 10.9 trips by all means of travel and for all purposes. About 60 percent of the weekday trips were vehicle trips (6.5 of 10.9 household trips), while the rest were people riding as passengers in vehicles or people traveling by transit, walking, or other means of travel.

Table 1-1 shows another important aspect of travel in the region: on average, household and person-trip rates vary across geographic areas in the greater Detroit planning area. For example, Eastern Wayne has the highest trip rate per household (10.1) while households in Oakland average 9.4 trips, or about ten percent fewer (maps of the areas are shown in Chapter 2).

Table 1-1. Number of households, people, and weekday trips by region (weighted)

Region	Households (wtd)	Persons (wtd)	Trips per person	Vehicle trips per person	Trips per household	Vehicle trips per household
Washtenaw Area (WATS)	136,471	332,614	4.0	2.3	9.6	5.4
Eastern Wayne	287,299	774,076	3.8	1.7	10.1	4.6
Western Wayne	380,256	994,861	3.6	2.4	9.5	6.3
Oakland	489,635	1,208,898	3.8	2.5	9.4	6.2
Macomb	334,509	841,088	3.7	2.4	9.5	6.2
Monroe	58,328	149,499	3.7	2.4	9.9	6.6
St. Clair	64,182	159,325	3.8	2.5	9.7	6.2
Livingston	68,439	182,607	3.7	2.5	9.5	6.5
Total	1,819,119	4,642,968	3.8	2.3	9.6	5.9

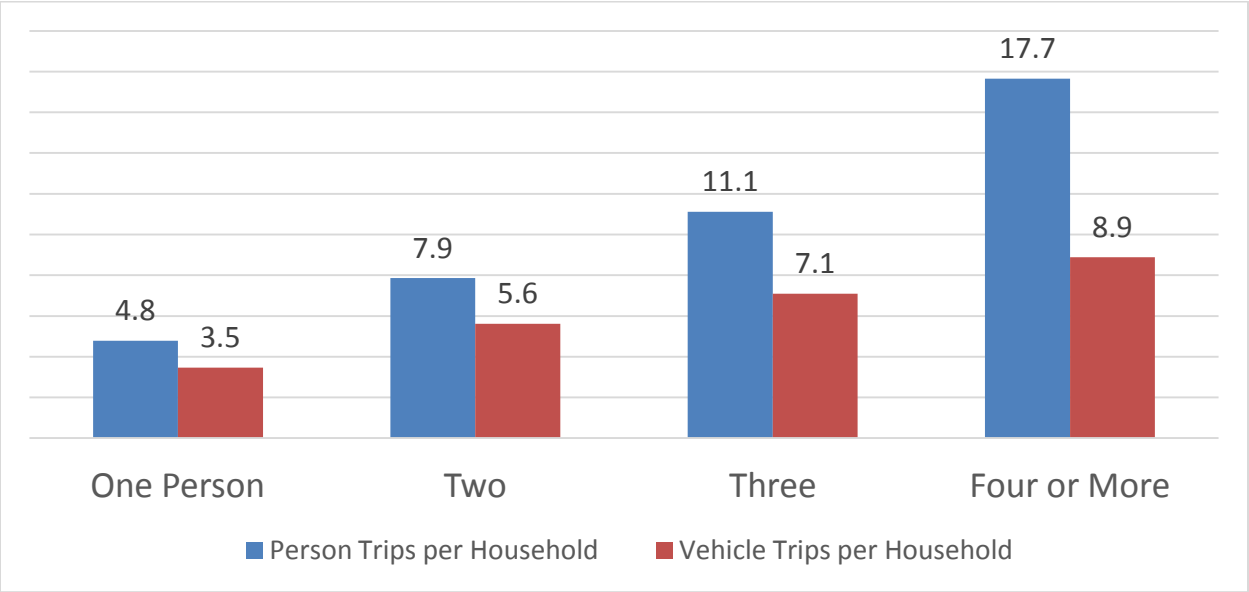
Table 1-2 shows the relationship between household size and number of trips. Households with more people—and especially more workers or households with children—generate more travel than smaller households. This table shows the data region-wide, while the data for each region is shown in Appendix B, "Detailed Tables."

Table 1-2. Estimate of weekday person and vehicle trips per household by household size

Household size	Person trips per household	Vehicle trips per household
One person	4.8	3.5
Two	7.9	5.6
Three	11.1	7.1
Four or more	17.7	8.9

Figure 1-1 is a graphic of the trip rates shown in Table 1-2. People in single-person households were more likely to drive on their daily trips than people in larger households, which include more children. People in single-person households made most trips as a driver (3.5 of 4.8 person trips) while in households with four or more people vehicle-driver trips accounted for less than half of all trips (8.9 of 17.7 total). That is, households with more people make more overall trips but more of those trips are as vehicle passengers, walking, or biking; people in the same household often travel together, especially households with children.

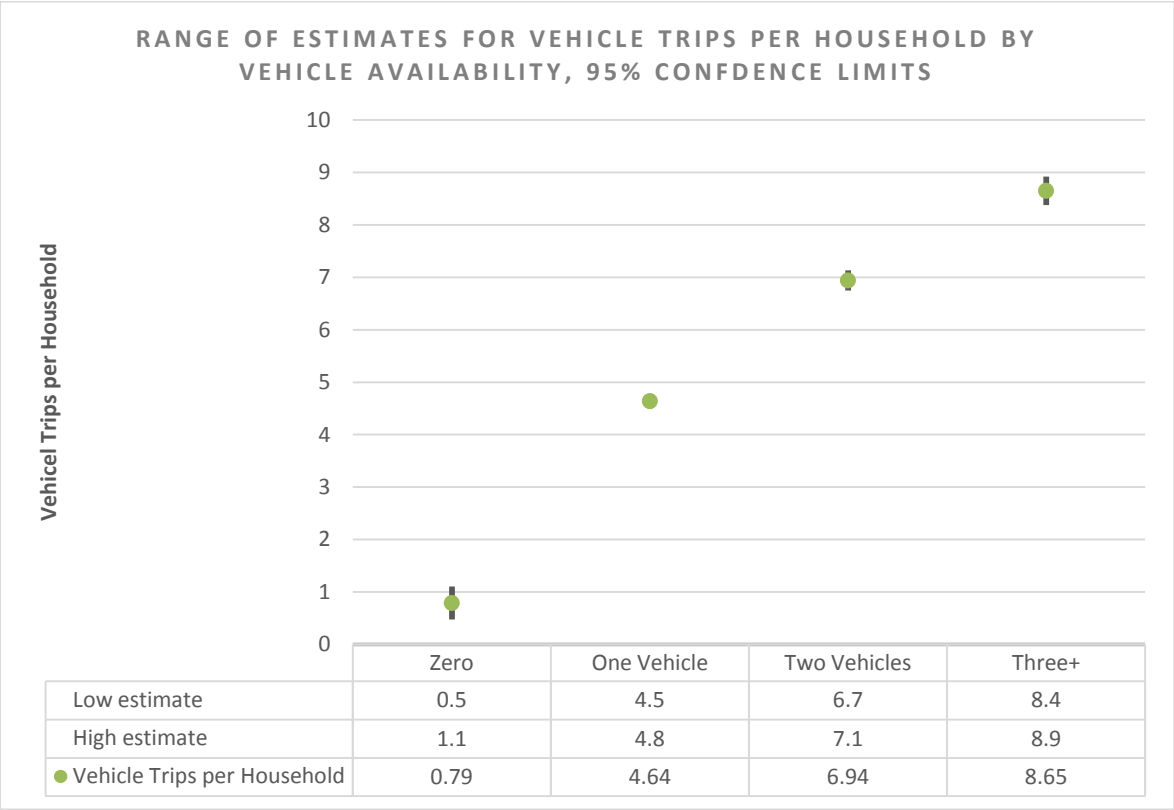
Figure 1-1. Weekday person and vehicle trip rates by household size



The number of vehicles that the household owns, leases, or has available for use is also a key component in estimating how many trips the household will generate. Figure 1-2 shows the number of vehicle trips by the number of vehicles in the household. People in households with no vehicles available still make vehicle trips by renting cars or borrowing cars, including car-sharing. But their vehicle trip rate is much lower than that of households with one or more private vehicles available.

Figure 1-2 shows another important attribute to the travel survey data: the statistical accuracy or significance of the survey data. The graphic shows that vehicle trip rates are statistically very different between households with different levels of auto availability. The largest difference is shown between households with no vehicle and households with one. More information about the accuracy of the data is found in the "Data Methodology" section in this report.

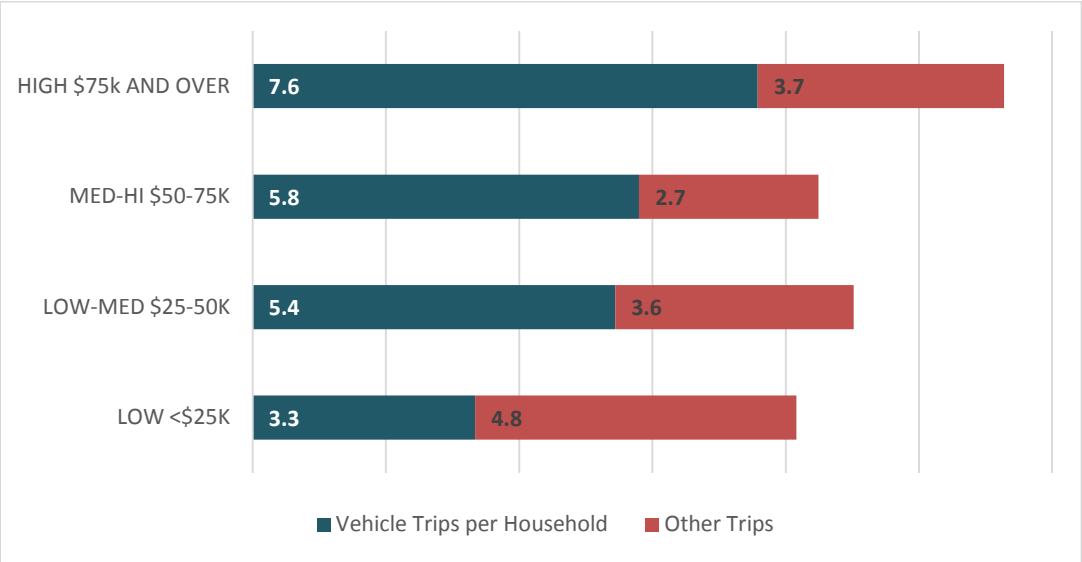
Figure 1-2. Weekday vehicle trip rates by number of vehicles in the household



	Zero	One Vehicle	Two Vehicles	Three+
Low estimate	0.5	4.5	6.7	8.4
High estimate	1.1	4.8	7.1	8.9
Vehicle Trips per Household	0.79	4.64	6.94	8.65

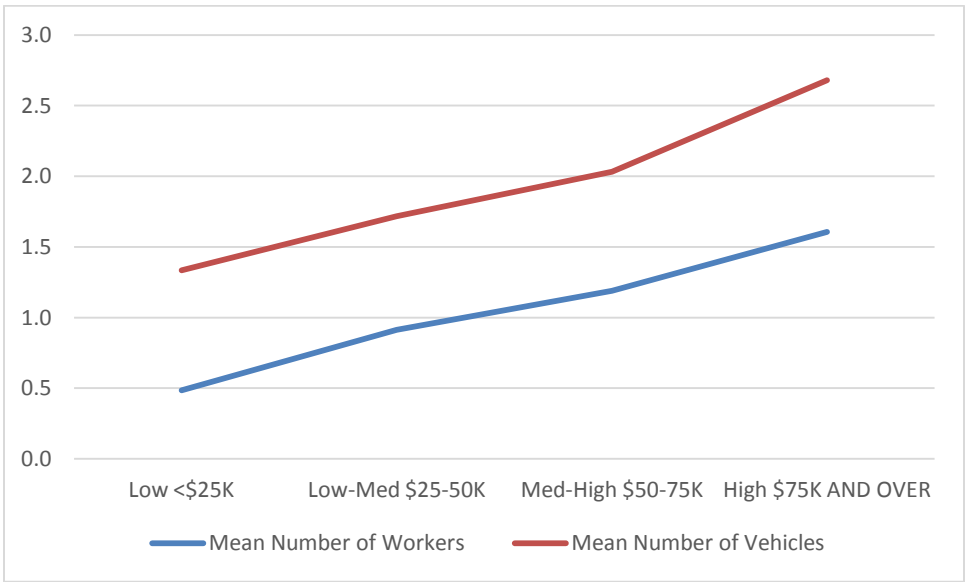
Figure 1-3 shows the relationship between household income and the amount of travel generated by that household. Appendix B shows these estimates for each region. Higher-income households generally produce more travel—these households are more likely to include more workers and more vehicles. Higher-income households are also more likely to make more trips for leisure and social activities, and workers in higher-income households travel further for work on average (see the section on Journey-to-Work).

Figure 1-3. Weekday household trip rate by household income



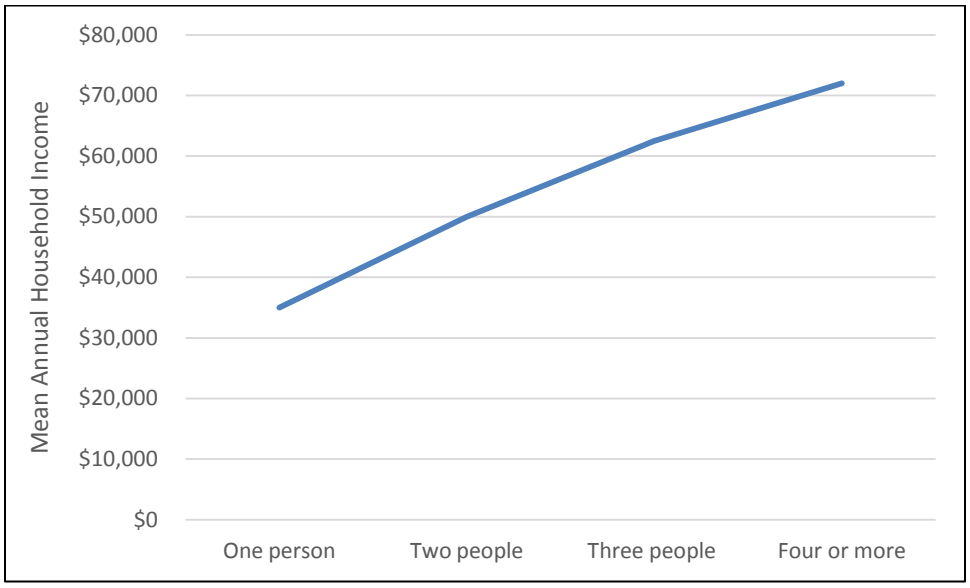
Higher income households have more workers and more vehicles, as shown in Figure 1-4. Households on the low end of the income scale are smaller with fewer workers in the household—only about half have a household member employed. On the other end of the spectrum, the highest income households in the region average more than 1.5 workers and 2.5 vehicles.

Figure 1-4. Mean number of workers and vehicles in households by household income



Larger households also report higher incomes, as shown in Figure 1-5. The income reported by households with four or more people ($72,000) is twice as much as the income reported by households with only one person ($35,000).

Figure 1-5. Estimated annual income by household size



The characteristics of households—like how many people, workers, vehicles, and income—determine the amount of travel that the household produces. These key factors are critical to understanding and forecasting travel demand in the region.

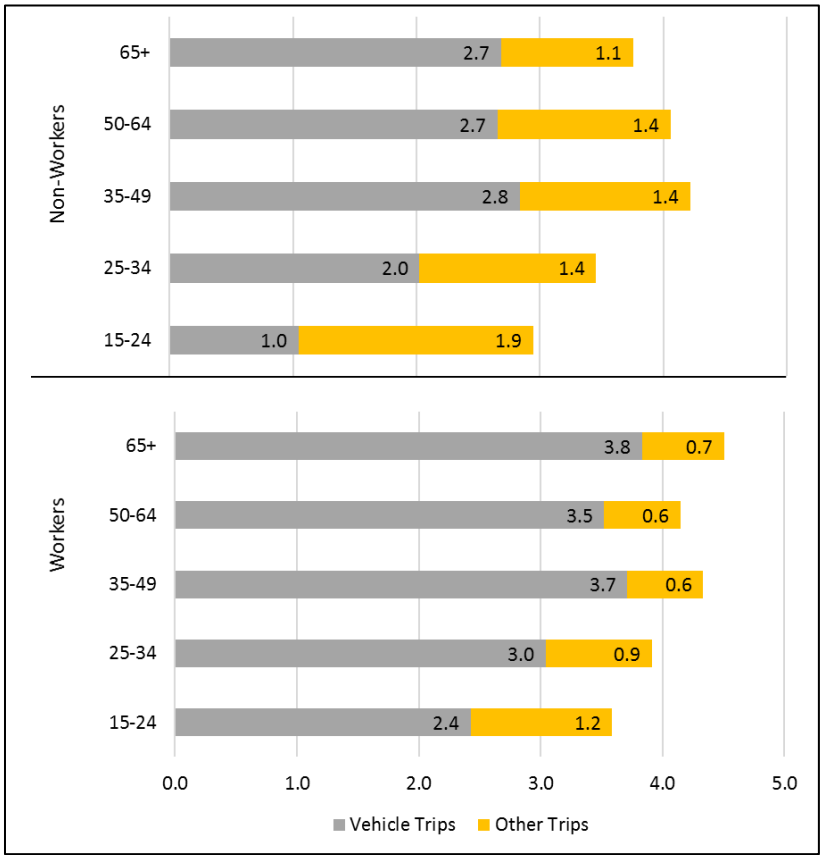
1.2 Who Travels: Travel Behavior of Different Groups of People

Understanding the demographics of who is using the transportation system is important for understanding the opportunities, constraints, and general level of mobility that different travelers experience. This is critical in forecasting because changing demographics can change the requirements and demands for the system over time. The aging of the population creates challenges for safety and for providing continued mobility for people as they age. There is a significant portion of older people who do not drive and report no travel out of the home on the travel day. While travel patterns may vary for any individual or within any one community, this section provides a deeper look at specific population groups that might be of special interest to planners and policymakers.

1.2.1 Workers

Worker status has long been linked with greater travel; workers commute on workdays and the commute is generally the longest trip for most daily travelers. Figure 1-6 shows the trip rates for workers and non-workers (15 years of age and older). Workers in every age group make more total trips and more vehicle-driver trips than non-workers. For example, non-workers age 25-34 make a total of 3.4 person trips per day (2.0 vehicle-driver trips plus 1.4 other trips). In comparison, workers aged 25-34 make an average of 3.9 trips (3.0 vehicle-driver trips plus 0.9 other trips).

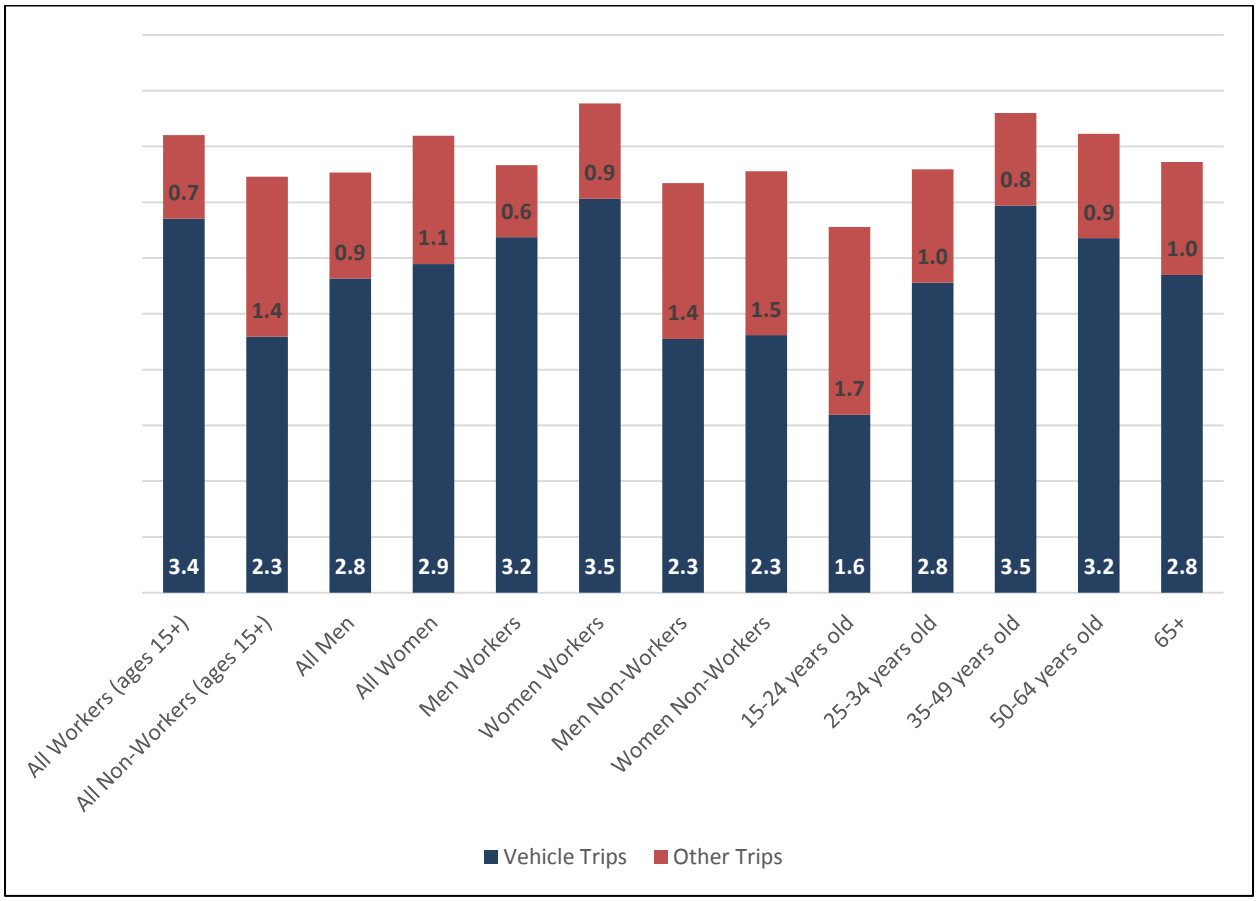
Figure 1-6. Weekday person and vehicle trip rates by age and worker status



Since the 1990s, women in the United States have made more trips than men—especially employed women with children in the home. While women typically work closer to home, they make more short trips—like ferrying children, shopping, and running errands—linked to their household responsibilities. In the SEMCOG region, women commute less than 11 miles to their jobs (10.96), on average, compared to over 15 miles for men (15.16). However, in terms of the number of trips, as seen in Figure 1-7, women workers travel the most, with 3.5 vehicle-driver trips and 0.9 trips by

all other means. At the other end of the spectrum, men not in the labor force have the lowest overall trip rates, with 1.6 vehicle-driver trips and 1.7 trips by all other means on an average weekday.

Figure 1-7. Weekday trips by worker status and gender



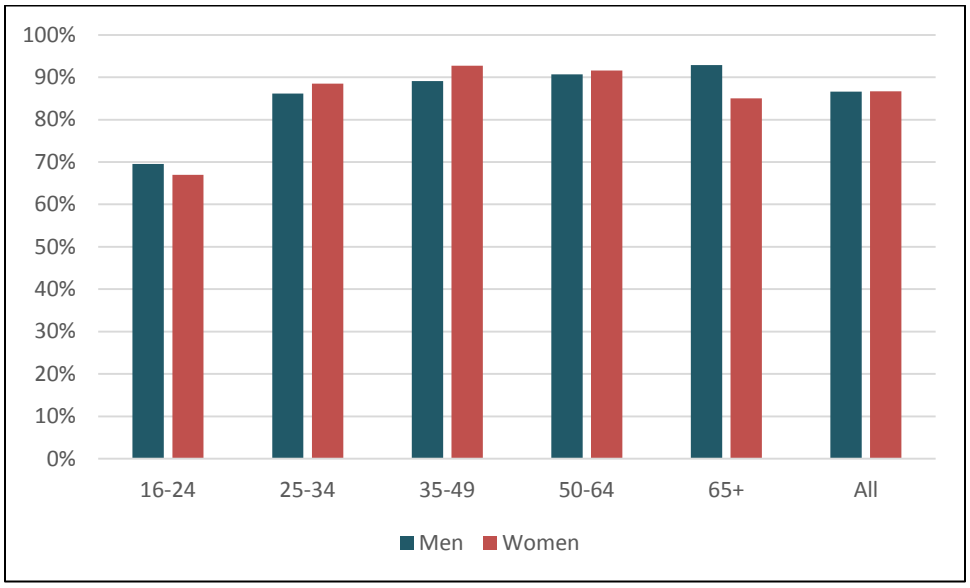
1.2.2 Licensed Drivers

Almost 90 percent (87.7%) of the residents of the SEMCOG region who are 16 and older are licensed to drive and, in a break with tradition, women are slightly more likely to be licensed in every age group but the youngest and oldest (see Figure 1-8). Older non-drivers are discussed in a separate section on special populations.

Many states, including Michigan, have enacted programs which in effect delay licensing in younger people. In Michigan, a teen driver must be at least 17 years of age or older and have 12 consecutive months without an accident to obtain an unrestricted driver's license.

This contributes to safety, since younger drivers are more likely to be in crashes, but placing more requirements on the licensing procedures has also had a ripple effect in that some young people do not get licensed until their 20s. This is of interest to planners and policymakers because younger people overall have exhibited changes in travel behavior compared to older generations: not just delayed licensing, but greater transit use, and as mentioned before, a particular affinity for new means of travel, such as car-share and bike-share.

Figure 1-8. Comparison of men's and women's licensure status by age group



1.2.3 Age and Gender

Figure 1-9 shows the average weekday trip rates by age category. Not surprisingly, people with the highest vehicle and person-trip rates are aged 35-49 years old, which coincides with peak workforce participation, and with home-building and child-rearing for many. Remember, vehicle trips are coded to the driver, so "other" trips include trips made as a passenger in the vehicle and trips by walking, transit, and other means. Combined, these are the estimates of weekday person trips.

Younger people have the lowest overall trip rates and the lowest vehicle-driver trip rates of all—even compared to people aged 65 years and older (3.3 person trips for young people compared to 3.8 for people 65 and older). In addition to delayed licensing, a smaller portion of young people are in the workforce—less than half of the residents of the SEMCOG region aged 15-24 are employed

(46.5 percent), compared to 73 percent of those aged 35-49. Interestingly, just over 14 percent of people 65 and older are still working—slightly higher than the 12 percent national average.

Figure 1-9. Weekday trip rates by age

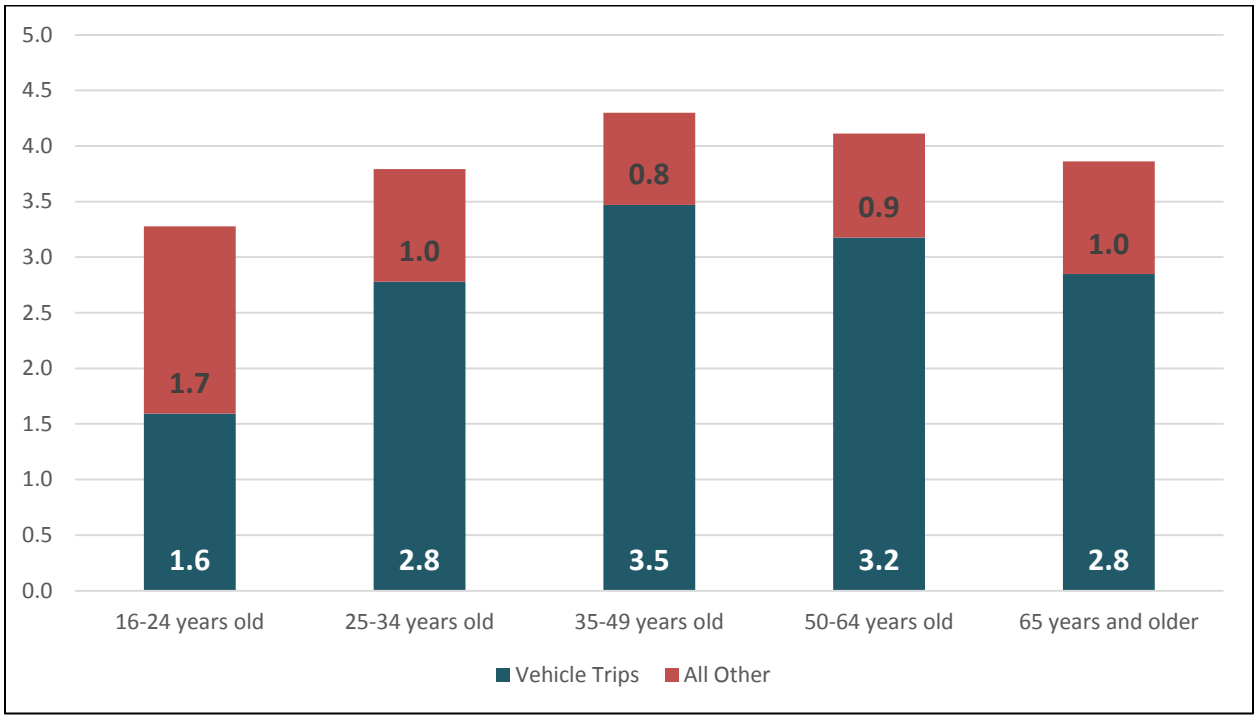
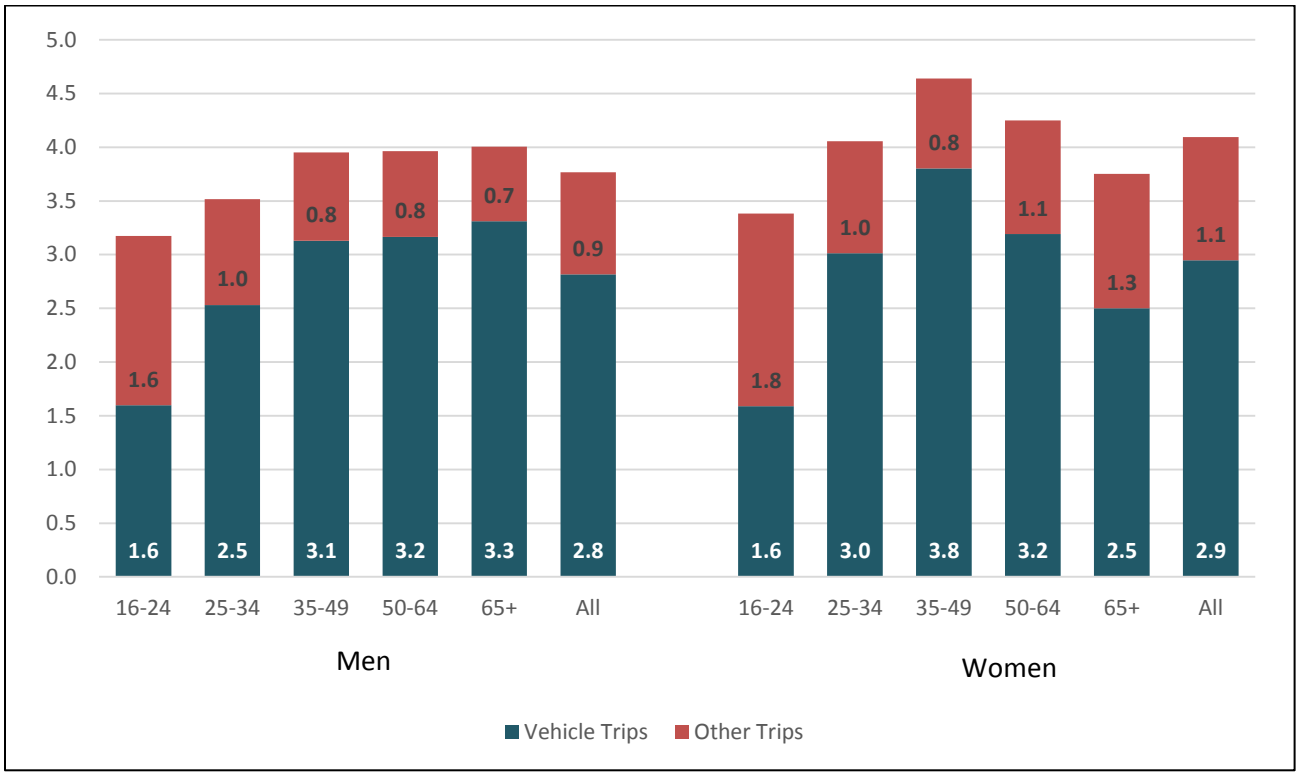


Figure 1-10 shows the differences in weekday vehicle-driver trips by age and gender. Women aged 35-49 years old have the highest rates—24 percent higher than men in the same age group. On the other hand, older women (aged 65+) drive 25 percent less than men in the same age group. For the youngest drivers (ages 16-24), men and women have exactly the same rate of vehicle-driver trips on an average weekday while women have slightly higher travel by other means. Notably, both young men's and young women's rates are lower than any other age group.

Figure 1-10. Weekday vehicle trip rates by age and gender



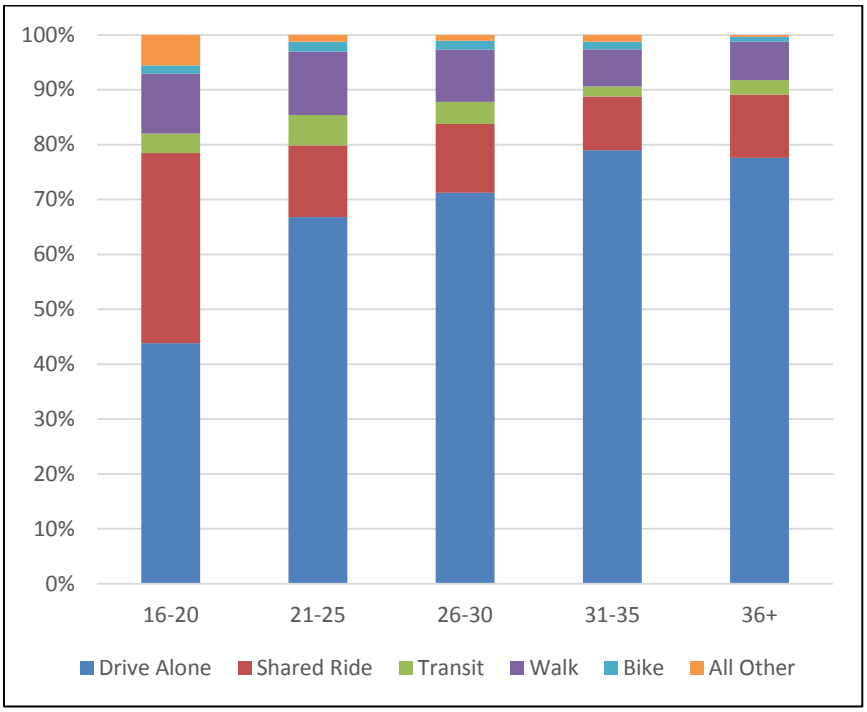
1.2.4 Travel by Younger People

Many travel behavior indicators—like obtaining a driver's license, entering the workforce, even marriage and child-rearing—seem to be delayed in the current generation of young people. Around the country planners are reporting lower trip rates for younger people (millennials are aged between 16-34 years)[1], lower auto ownership, and higher transit use.

The means of travel for weekdays is shown in Figure 1-11 for younger age groups. People in the SEMCOG region who are younger than 30 tend to share rides and take transit more often than people in older age groups, and are markedly less likely to drive alone.

[1] Definitions of generations vary somewhat; this report uses those developed by Pew Research at: http://www.pewsocialtrends.org/2014/03/07/millennials-in-adulthood/sdt-next-america-03-07-2014-0-06/

Figure 1-11. Mean trip rates per weekday for younger age groups

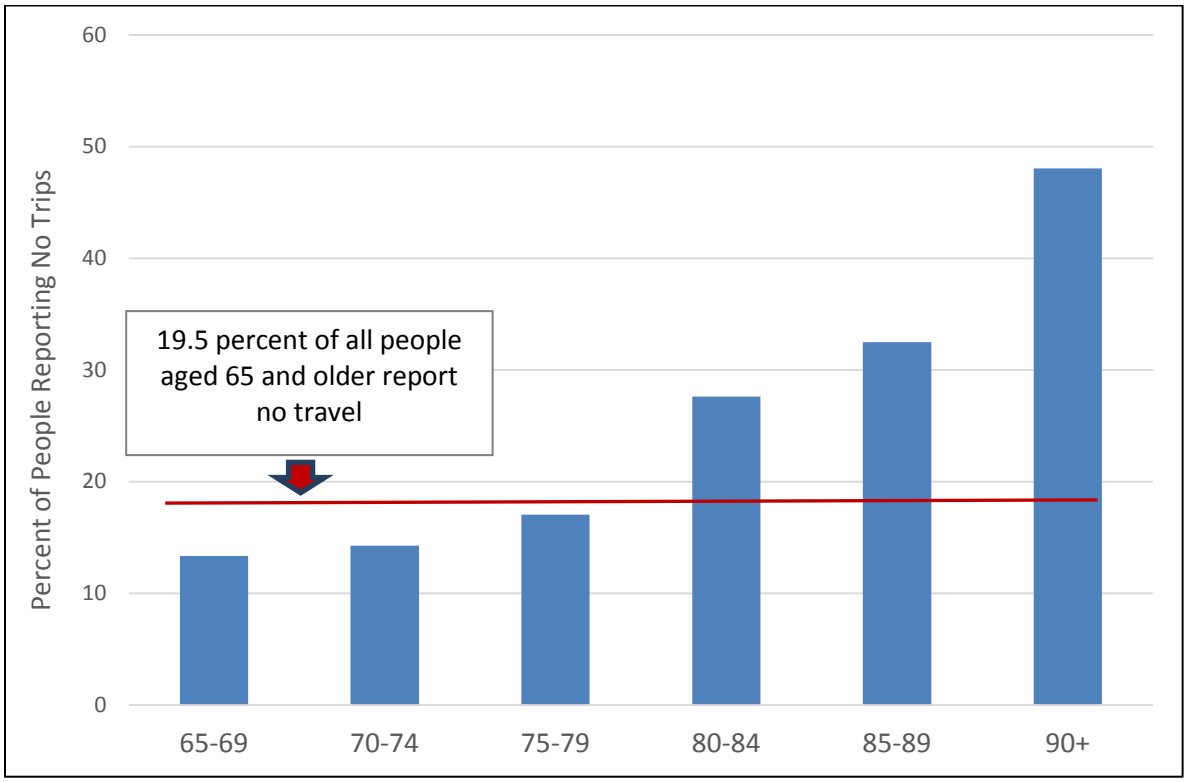


Lower travel rates and lower auto use by younger people are linked in academic literature to lower labor force participation, delays in licensing (mentioned earlier), and even greater online activity. However, the interaction between online activities—like shopping, gaming, and social networking—and travel behavior is complex, and beyond the scope of the SEMCOG travel survey design.

1.2.5 Mobility of Older Non-Drivers

Older non-drivers are of particular interest to planners and policymakers because their travel behavior is important for safety analysis, equity, livability, and other cross-cutting issues. Many older people do not travel at all: almost one out of five people (19.5 percent) aged 65 and older reported no travel of any kind on the assigned travel day. The proportion of people reporting no travel on an average weekday rises with age, as shown in Figure 1-12.

Figure 1-12. Percent of people reporting no travel by age for people 65 and older



For older people who no longer drive, mobility can be so constrained that they have a difficult time shopping and socializing, and may become shut-ins. About 93 percent of men and 85 percent of women aged 65 and older are licensed to drive (shown previously in Figure 1-7). But as people get older they age past driving. Men and women have traditionally had different licensure rates (in previous generations, women were less likely to drive than men), and that effect is shown in Figure 1-13. However, the majority of older people in the SEMCOG region are licensed to drive, even after the age of 85.

Figure 1-13. Comparison of older men and women by licensure status

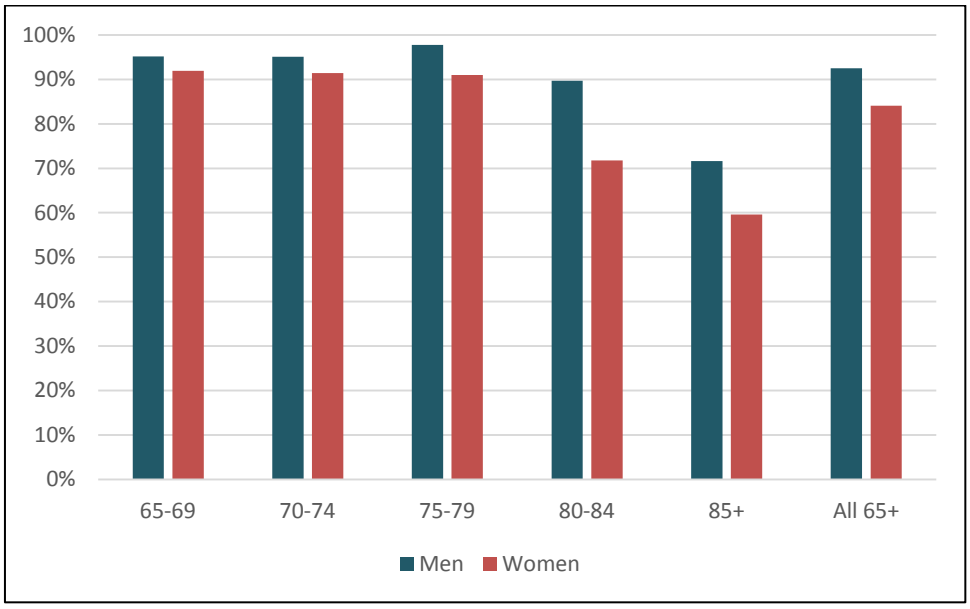
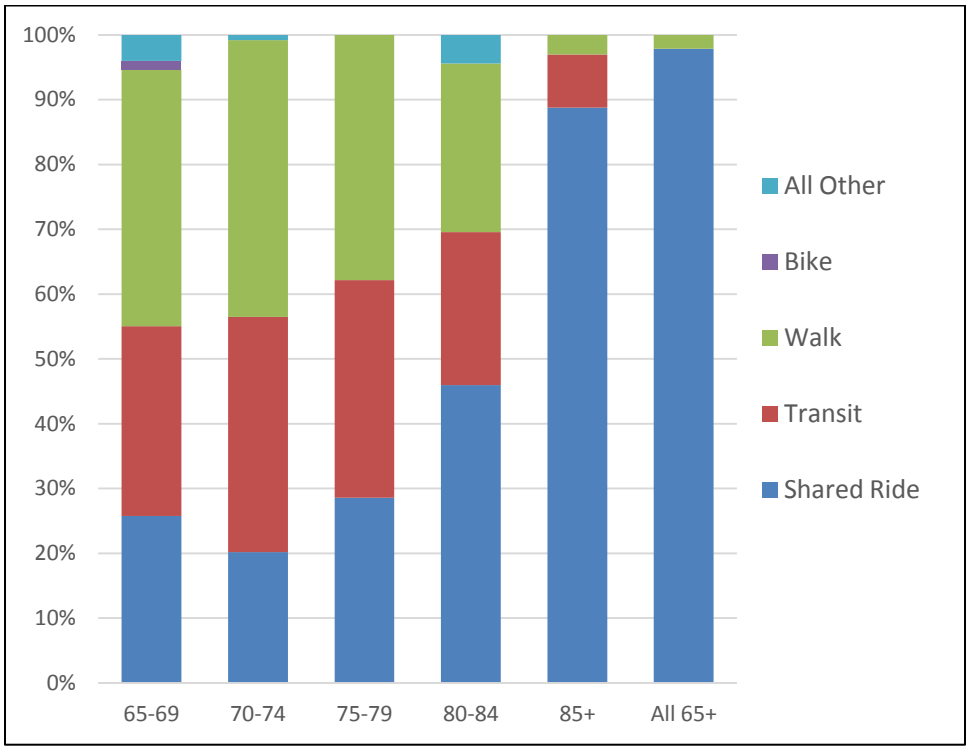


Figure 1-14 shows the means of transportation reported by older non-drivers in the SEMCOG region who traveled on the sampled weekday. It is clear that many older non-drivers are heavily dependent on friends and family to give them rides, for they report being passengers in a vehicle for the majority of their trips. But older non-drivers also walk quite a bit and take transit for their daily travel. Only after age 80 does walking markedly decline.

Figure 1-14. Means of travel for older non-drivers

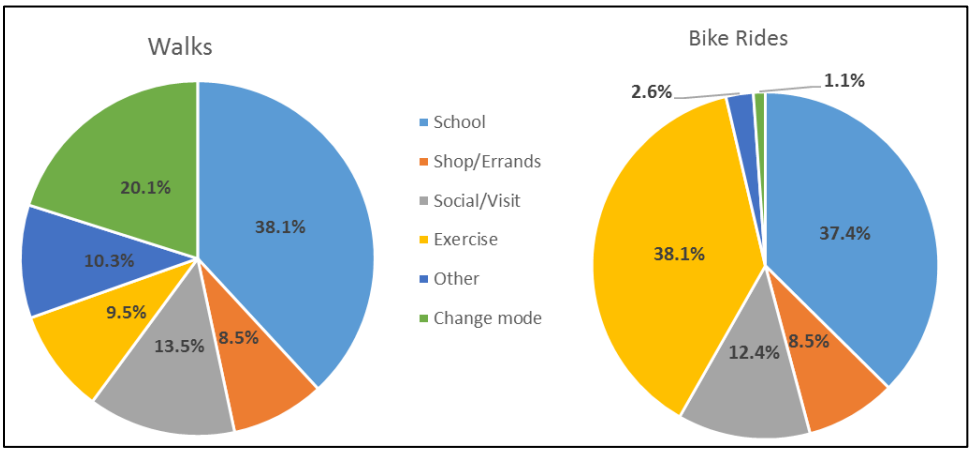


1.2.6 Travel by Children

Children are a special group because their travel is so very different from adults'. Children are more likely to walk and bike, and planners and policymakers are concerned for their safety. Figure 1-15 shows the purpose of trips by walking and biking on weekdays for children in the SEMCOG region.

One-third of walk trips by children are walks to school, 19 percent to change transportation mode (e.g., to access public transit), and 14 percent are for exercise or recreation. Children who bike on a weekday bike for exercise or recreation 57 percent of the time, bike to visit or socialize 17 percent, and bike to school for 11 percent of their trips.

Figure 1-15. Purpose of weekday walking and biking trips by children aged 14 and younger



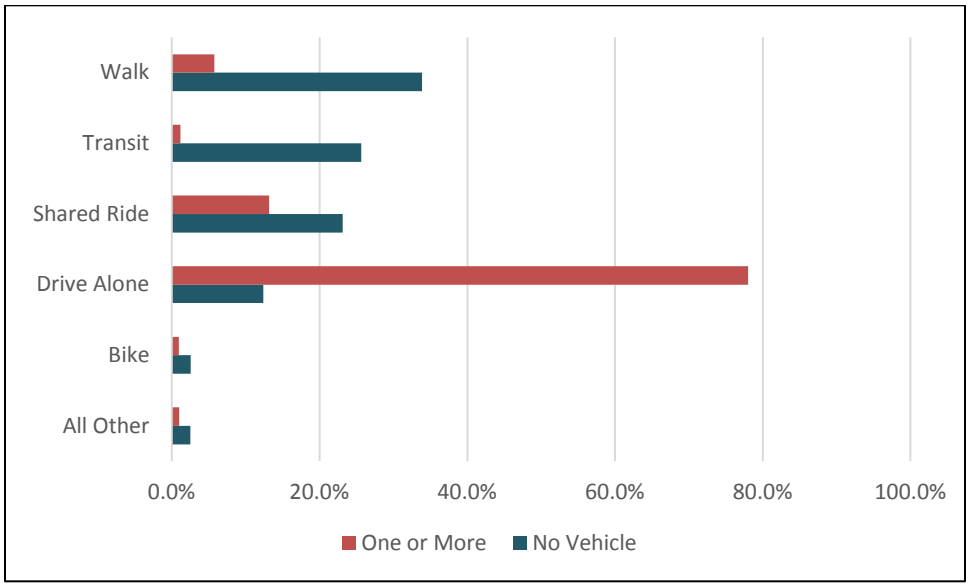
1.2.7 People with No Vehicles Available

Over 9 percent of the sampled residents of the SEMCOG region did not have a vehicle available in their household. This section details how people (aged 15 and older) living in households without a vehicle conduct their daily travel. This is an important issue for equity, emergency preparedness, and—looking forward—to assess the impact of the growing availability of travel via short-term car rentals (like Zipcar) or Uber/Lyft. Being able to use a car when needed—even if not owning a vehicle—may affect one's decision to buy a car. In many urban areas there has been a (slight) rise in zero-vehicle households, and how this trend will affect future travel patterns is still unknown.

For people in the SEMCOG region living without a private vehicle in their household, the most common forms of daily travel are walking (34 percent), transit (24 percent), and being a passenger in a car (23 percent). However, even people who live in households without vehicles travel a significant portion of their day as a car driver—12 percent of all trips (shown in Figure 1-16). These trips may be in rented cars, borrowed cars, or other vehicles not part of the surveyed household.

In comparison, people in households with one or more vehicles available significantly prefer using their own private vehicle to travel—they drive for 78 percent of daily trips, and share a ride for another 13.2 percent. When a private vehicle is available in the household, walking and transit are used to a significantly lesser degree. For example, people in car-owning households walk for 5.7 percent of trips and just 1.2 percent of their daily trips are made by transit. Because having access to alternatives may make owning a car—or additional car—less likely, people in areas with good transit service are more likely to be in households with fewer vehicles, or even none at all.

Figure 1-16. Comparison of means of travel by people in households by vehicle availability (ages 15 and older)



1.3 Conclusion: Who is Traveling

Trip rates are found to be greatly influenced by household size; larger households have more trips overall, which is related not just to the number of people, but to the fact that larger households also are likely to include more workers, have higher household incomes, and own and use more vehicles than smaller households.

Average trips per household is related to auto availability: the greatest increase in trip-making occurs between households with no vehicles and households with one or more. Findings also show that low-income households (under $15,000) had the lowest average trip rates, and the lowest vehicle utilization.

Trip rates also vary significantly in relation to personal characteristics such as gender, age, and working status. Overall, employed women are the highest trip-makers of all. Trip rates increase with age for both genders, peaking for the age group of 36-64, then decreasing significantly. Currently, women over the age of 64 have much lower trip rates, and lower licensure rates, than men in the same age group, but looking forward, the mobility of older women in 20 years may reflect the high mobility patterns and licensure rates of today's 45-year-old women.

Working status also affects person trip rates. Workers make more trips per day than non-workers. But as the population ages, people in the SEMCOG region are working longer. The percent of people over the age of 65 who are still working is higher than the national average, and is reflected in the high mobility and licensure rates of older residents.

Travel by younger people is different from historical patterns—young people in the SEMCOG region are less likely to be drivers or workers, and less likely to drive than their counterparts a generation ago. At the other end of the age spectrum, older non-drivers in the SEMCOG region are very dependent on others for rides, but continue to walk and even take transit to meet their daily mobility needs. People in households without a car available walk and use transit for many of their trips, but are a vehicle driver sometimes (either borrowing or renting a vehicle).

While not every household or person conforms to the average travel characteristics for their particular grouping, the figures presented here give an overall view that travel is very different based on household size, income, gender, age, and working status.

1.4 Why People Travel

1.4.1 Overall Weekday Travel

People in the SEMCOG region travel for a wide range of purposes on an average weekday—to and from work, to drop children at school, to shop, visit friends and relative, etc. Figure 1-17 shows the distribution of weekday travel by purpose for three groups: all people, people aged 15 and older, and workers. For workers, travel to and from work is about one-fifth of their daily trips, a higher proportion than any other single purpose. Whereas for all people, including children and retired, errands and shopping are the most common weekday purposes of travel.

Figure 1-17. Distribution of weekday trip by purpose for three groups

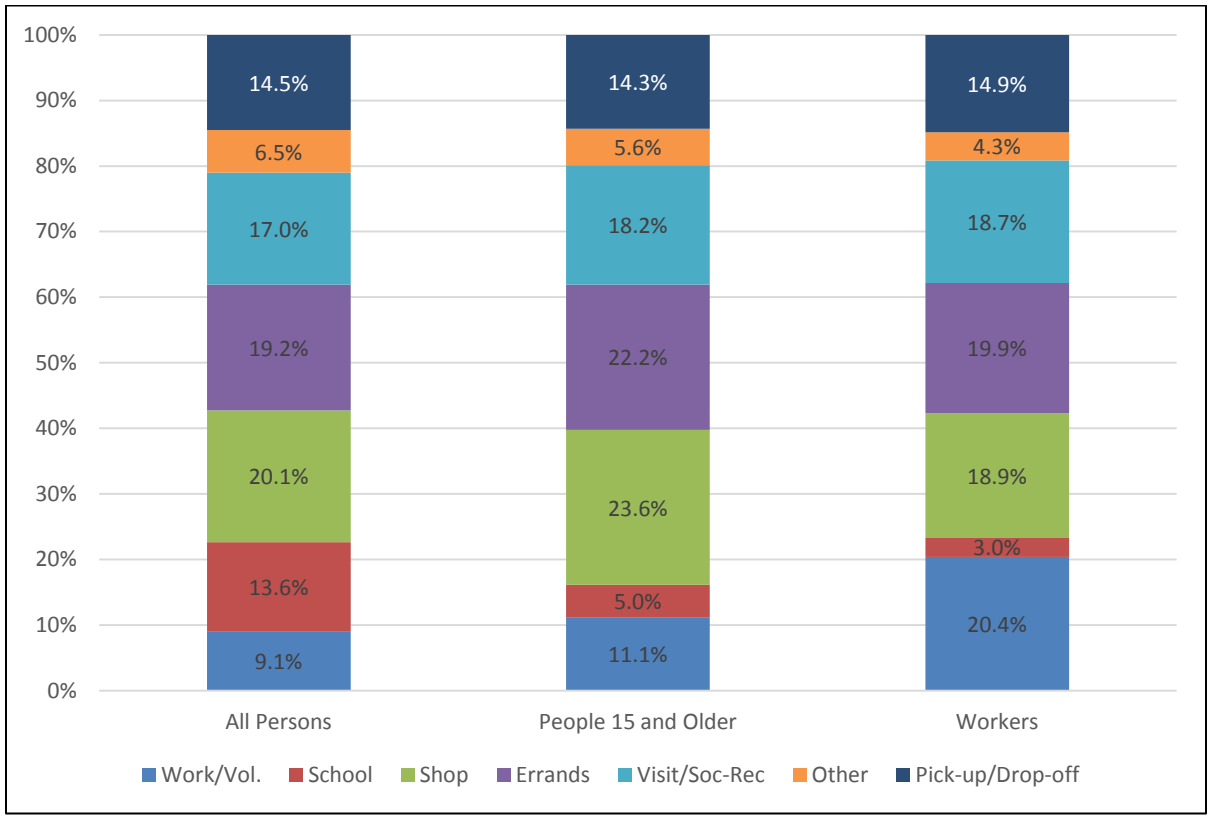
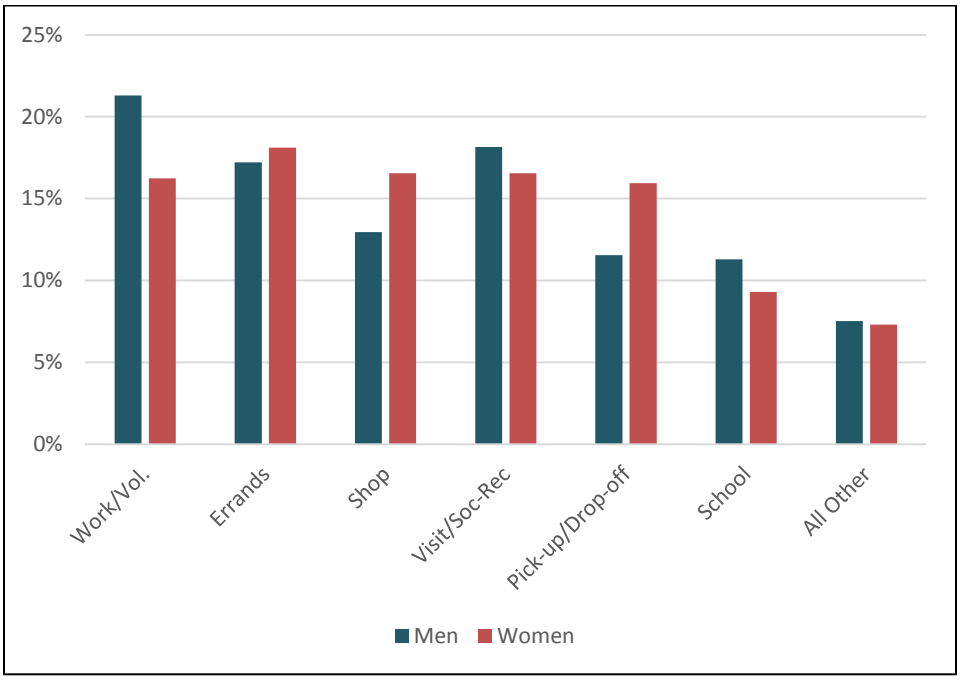


Figure 1-18 shows the percent of weekday travel by purpose for men and women. While men have a larger share of travel for work, women have a larger share for pick up/drop off, shopping, and errands. This reflects the gendered nature of travel, where women still conduct more travel that serves the household (dropping off children at school and activities and grocery shopping, for example).

Figure 1-18. Percent of weekday travel by purpose by gender



1.4.2 The Journey-to-Work (JTW) Trip

The journey-to-work (JTW) trip bears an importance to transportation planning far beyond simply its share of total travel. Commuting is regular in its frequency, time of departure and destination—and, for most communities, it is highly concentrated in time and space, which can lead to road and transit congestion. Commuting is still predominantly a weekday activity, tied to the morning and evening, and has historically defined peak travel demand, and in turn influenced the design of the transportation infrastructure. Work trips are critical to transit planning—historically, commuters are about half of all transit riders—and commuters' characteristics help determine the corridors served and the levels of transit service available during the peak period.

Commuting in the SEMCOG region is linked to the demographic characteristics of the worker; the supply and location of jobs and housing; and the availability, cost, and convenience of various means of travel. The work trip is often the longest trip of the day, and the nationwide average commute trip has increased in length almost 30 percent since the 1970s.

The commute trip is so important in understanding people's daily travel that information about the commute has been included in the U.S. decennial Census since 1960. This rich source of data from over 50 years has been invaluable in understanding trends that influence commuting, such as:

- Growth of the single-person household and the advent of working women;
- Sprawl of residences and workplaces into lower-density and suburban areas;
- Explosion of vehicle ownership combined with a dramatic increase in private vehicle use; and
- Significant increases in the average time spent traveling to work in all large metro areas.

This section summarizes the worker and commute information from the SEMCOG travel survey. Table 1-3 shows the percent of workers by usual means of travel to work from the SEMCOG travel survey--these data are similar to the Census journey-to-work data used for small-area estimation. Drove alone accounts for almost 9 out of 10 trips; carpool, walk/bike, and transit add up to the remainder.

Table 1-3. Usual means of travel to work

Usual means of transportation to work	Percent of workers
Car, truck, or van – drove alone	89.2%
Carpool	4.3%
Walk and bike	3.4%
Transit (including RR and ferry)	3.1%

Day-to-day variation is an under-studied occurrence in travel behavior, and it is especially important to understand in commuting. The Census Journey-to-Work (JTW) asks about the "usual means of commute last week" while a travel survey obtains the actual behavior on a random day. The SEMCOG travel survey asked both questions of respondents and comparing the answers is quite illuminating.

Figure 1-19 compares resident workers' usual commute to the actual travel day commute (both were obtained in the survey). As shown, if the worker indicated that he or she usually drove a car to work (row labeled "usual mode"), 94.5 percent of the time those workers drove a car to work on the travel day (column labeled "travel day commuted mode:"). However, if the worker indicated that he or she usually took transit, 10.8 percent of the time these workers drove a car, 25.5 percent of the time they got a ride, 24.5 percent of the time they walked, and 1.9 percent of the time they rode a

bicycle. These findings show less day-to-day variation—some call this greater "mode loyalty"—in people who drive to work compared to other means of travel.

Figure 1-19. Usual versus actual means of travel for commuting

	Travel Day Commute Mode:						
Usual Means of Travel to Work "Last Week"	Vehicle Driver	Vehicle Passenger	Public Transit	Walk	Bike	Other	Overall Percent Commute Mode 'Last Week"
Private Vehicle Driver (inc. Motorcycle)	94.5%	3.0%	0.4%	1.9%	0.1%	0.2%	89.2%
Private Vehicle Passenger (inc. carpool)*	35.2%	57.8%	3.1%	2.4%	1.5%	0.0%	4.3%
Public transit	10.8%	25.5%	35.6%	24.5%	1.9%	1.6%	3.1%
Walk	18.5%	12.5%	0.4%	62.5%	5.7%	0.4%	1.9%
Bike	22.5%	7.8%	5.8%	10.1%	53.8%	0.0%	1.5%
Overall Percent Commute Mode on Travel Day:	86.9%	6.2%	1.7%	3.9%	1.1%	0.2%	100.0%

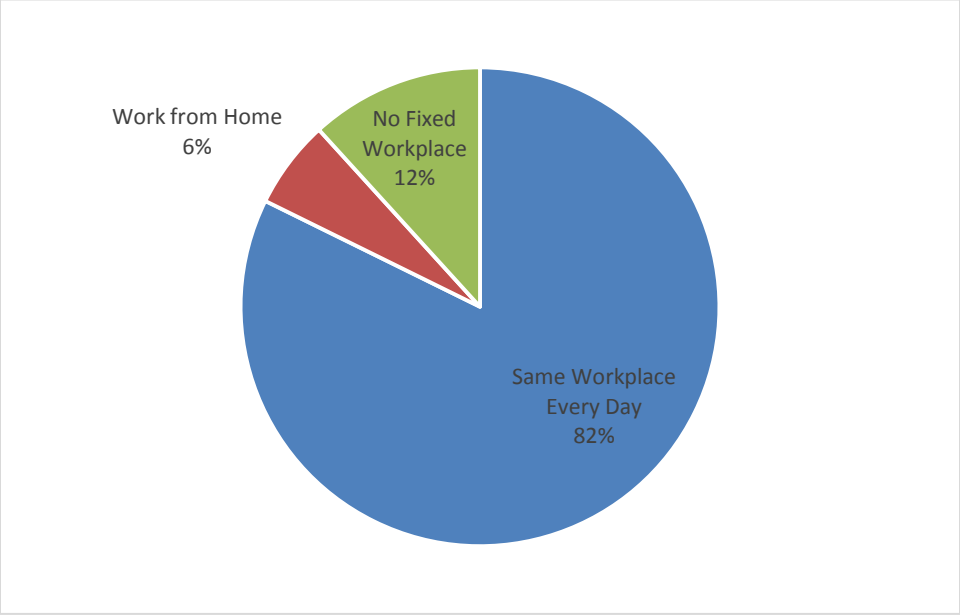
Also noteworthy are the workers who said they usually walk or bike to work. On the travel day 31 percent of the commuters who said they usually walked either drove alone or were a passenger in a vehicle (18.5 and 12.5 percent, respectively). Of the commuters who said they usually rode a bike, on the travel day 30.3 percent either drove alone or were a passenger in a vehicle (22.5 and 7.8 percent, respectively). This understandable variation can be a factor of poor weather or special circumstances (an event at work, for instance), or stops the commuter wanted to make on the way to or from work. Since the Census JTW data provide detailed data on the usual means of commuting, it is important to take into consideration the day-to-day variation in commute means of travel.

As the workforce changes, many more workers are working at home, working two jobs, and doing service jobs that have no fixed workplace. The SEMCOG travel survey asked workers about these characteristics.

Some of the day-to-day variation may be a product of changes in the workforce. For example, telecommuting is offered to over 16 percent of the region's workers (16.3 percent), and when it is offered, the average worker telecommutes 1.3 days per week.

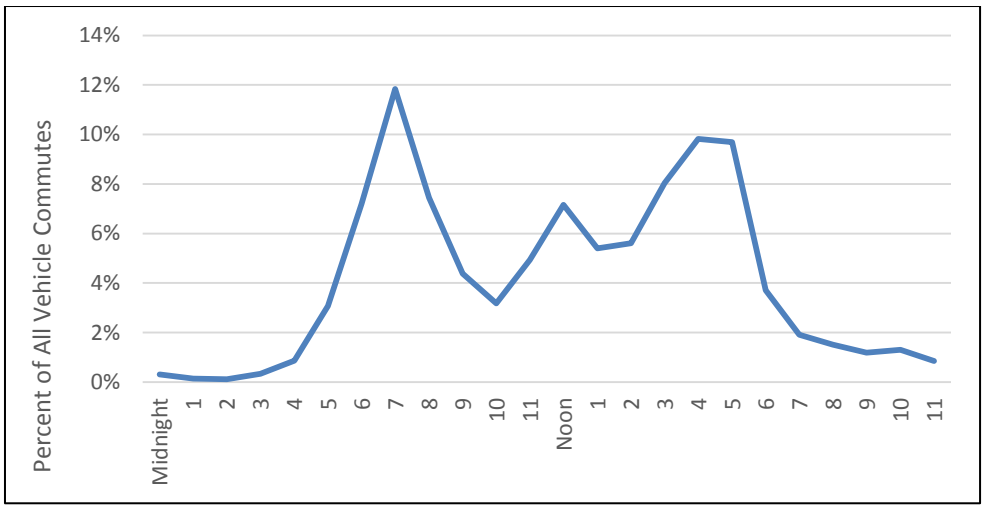
Figure 1-20 shows the distribution of workers by their workplace location. The majority of workers (82 percent) have a regular work location, 12 percent have no fixed workplace, and 6 percent said they worked only at home.

Figure 1-20. Workplace location



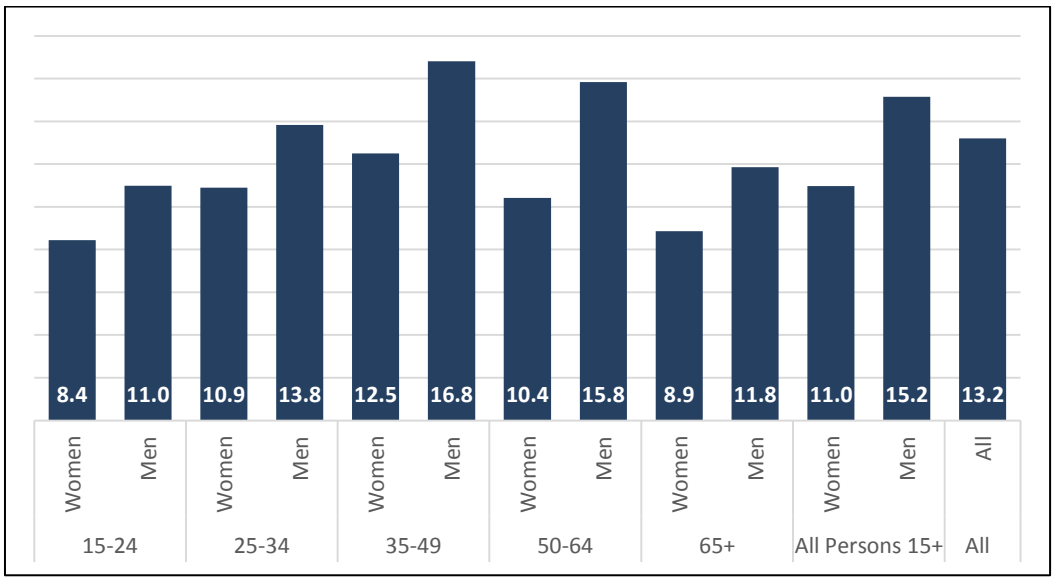
The average weekday distribution of vehicle commutes by hour of the day is shown in Figure 1-21 (these are from travel survey data reported for Monday through Thursday). Almost 12 percent of commuters who drive to work leave between 7 and 8 am on an average weekday, but the distribution in the afternoon/evening is more widely spread.

Figure 1-21. Time of day of vehicle commute trips (survey period Monday-Thursday)



An average commuter in the SEMCOG region travels 13.2 miles to their jobs—almost one and a half miles longer than the national average of 11.8 miles. The longest commutes are by men aged 35-49, while women and younger and older workers travel to jobs closer to home, as shown in Figure 1-22.

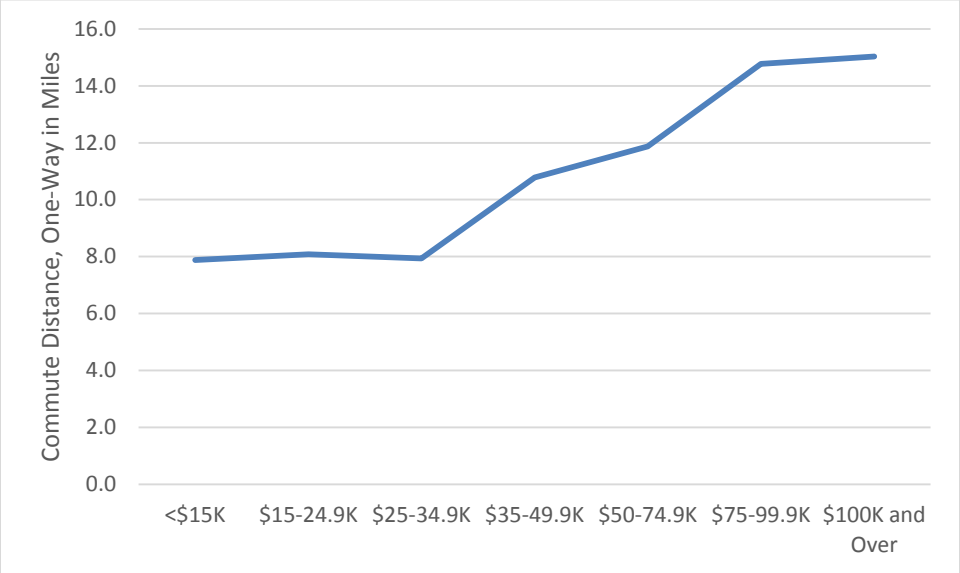
Figure 1-22. Average commute distance by age and gender



Men travel over one-third longer distances to work than women overall, and have longer commute distances in every age group compared to women. Traditionally, women are more likely to work part-time, more often work in service and retail, and choose workplaces closer to home to balance childcare and household responsibilities, all of which correlates with shorter commutes.

Commute distance is also highly correlated with household income, as shown in Figure 1-23. Workers in the highest-income households commute almost twice as far as workers from households in the lowest income category. These data are reproduced for each region (with income categories combined) in Appendix B.

Figure 1-23. Average commute distance by household income



1.5 Conclusion: Why People Travel

The most common reasons for daily travel are shopping and social—travel for work is a small percentage of overall travel (including travel by children, older people, and non-workers). However, the work trip bears an importance to transportation planning far beyond simply its share of total travel. The commute trip is often the longest and most time-sensitive trip of the day; it is regular in its frequency; and because so many workers travel at the same time, commuting can lead to road and transit congestion. However, as the workforce changes, there is more day-to-day variation in commuting. People can work at home or telecommute, and many workers have no fixed workplace (like plumbers and other service providers).

The day-to-day variation affects the means of travel to work. People who usually drive are very consistent in their commute patterns, but people who take transit, walk, or bike have greater variability—on a rainy day walkers may get a ride; on a sunny day transit riders may walk. These variations are not well-understood, but they are important to keep in mind when analyzing commute data.

There is a gender difference in the distribution of trip purposes—for example, 21.3 percent of men's trips are for work as compared to 16.2 percent of women's. Errands take a larger share of women's daily travel, as does pick-up/drop-off/accompany trips, when compared to men's daily travel.

In terms of the journey-to-work, there is notable variation in day-to-day commuting—especially for people who don't usually drive to work. An average commuter in the SEMCOG region travels 13.2 miles to their jobs—almost one and a half miles longer than the national average of 11.8 miles. Overall, men travel over one-third longer distances to work than women overall, and have longer commute distances in every age group compared to women. The longest commutes are by men aged 35-49, while women and younger and older workers travel to jobs closer to home.

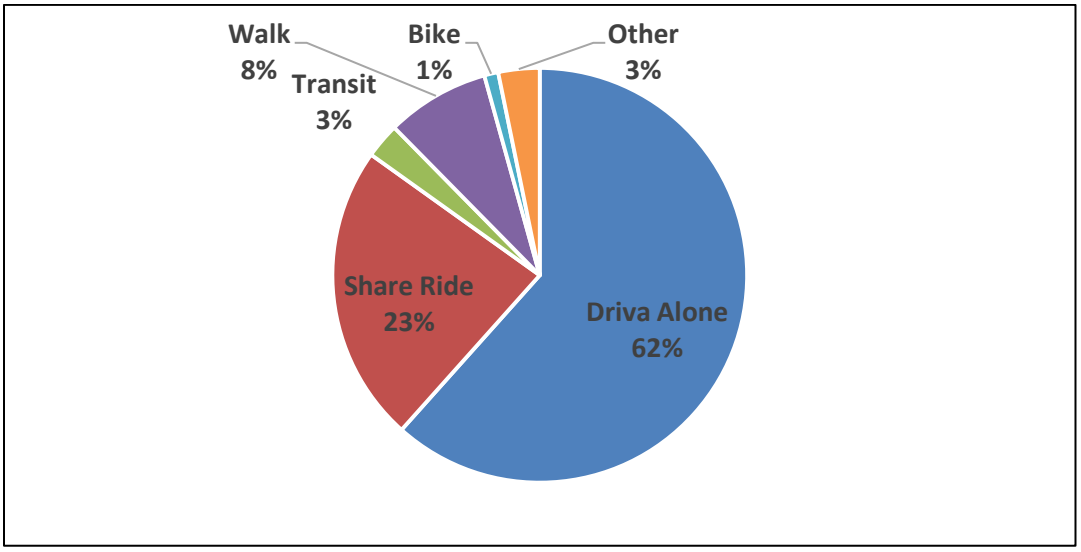
The residents of the SEMCOG region travel for diverse reasons—social activities, shopping, errands, and work. While all people make trips for all purposes, the distribution of those purposes is significantly influenced by gender, age, and working status.

1.6 How People Travel

1.6.1 Overall Weekday Travel

Overall, 62 percent of weekday trips are by people who drive alone, with another 23 percent made by people riding as passengers in a vehicle. Walking is used for 8 percent of weekday trips, followed by transit (3 percent), bike (1 percent), and all other means (3 percent), as shown in Figure 1-24.

Figure 1-24. Means of travel by all people for all trip purposes, weekday



Location is important for understanding differences in how people travel across the region: in areas where densities and infrastructure support other means of travel—places with sidewalks and

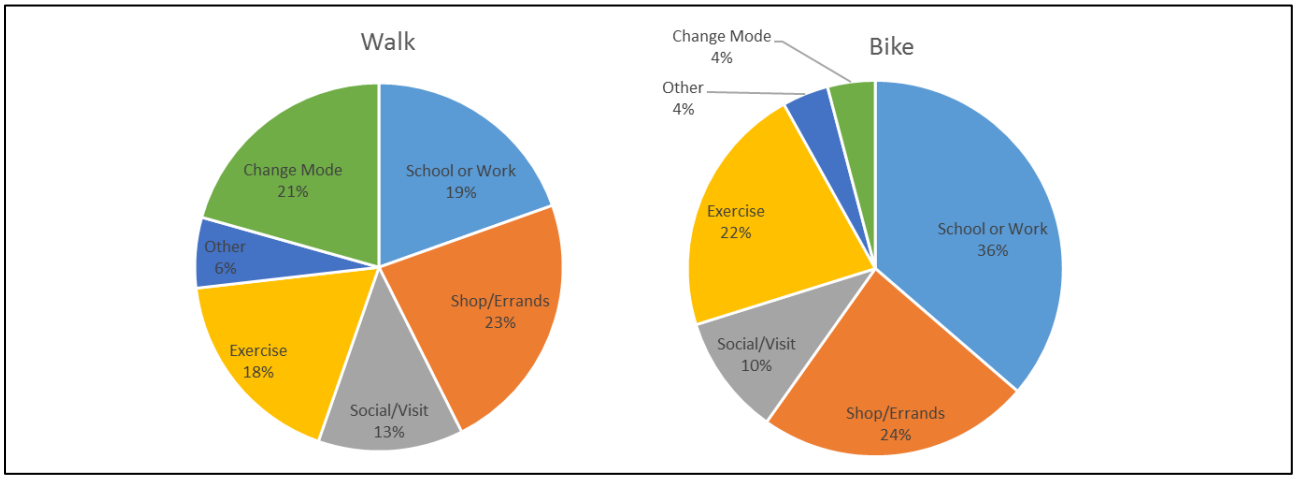
crosswalks, bike paths, and good local transit—the amount of walking, biking, and transit is higher compared to other areas. The proportion of weekday trips by different means of travel for each sample region is shown in Appendix B.

1.6.2 Active Travel

An important construct for understanding travel characteristics is the link between travel and activities. Travel is often considered to be "derived" or secondary in nature; that is, travel is not an end to itself (except for some long-distance travel, like road trips). Daily travel is primarily undertaken to conduct activities at the trip destination, such as work, shopping, or meeting friends. However, walk and bike trips are sometimes activities in themselves; about a quarter of walks and bike rides by adults are for exercise and recreation.

Figure 1-25 shows the distribution of weekday walk and bike trips for people aged 15 and older by purpose of travel. The largest share for each category is walking and biking to school or work (including volunteer activities), followed by active travel for exercise, shopping and errands, and other daily activities. About 14 percent of walks and 6 percent of bike trips are to access another form of transportation, like walking to the bus or train ("Change Mode").

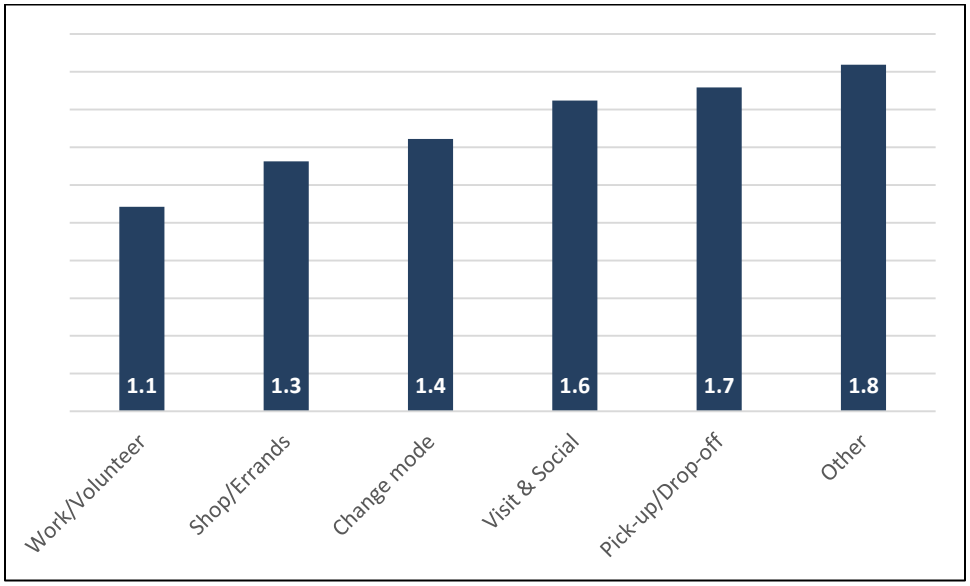
Figure 1-25. Walk and bike trips by people aged 15 and older by purpose, weekdays



1.6.3 Vehicle Occupancy

Vehicle occupancy is highly related to the purpose of travel, as shown in Figure 1-26. Travel to work—which has a higher share of drive-alone trips—has the lowest vehicle occupancy. At the other end of the spectrum, trips to drop someone off or pick someone up—including those at transit stations ("change mode")—have the highest average vehicle occupancy.

Figure 1-26. Weekday vehicle occupancy by trip purpose



1.7 Conclusion: How People Travel

Travel in the SEMCOG region relies heavily on the private vehicle as the primary mode of transportation. Driver trips dominate, but shared-ride vehicle trips are a close second, partly because the pick-up/drop-off/accompany purpose represents a high proportion of trips.

Transit and walking represent a small share of total daily travel in the region. The small mode share for transit is partly explained by the comparatively long average duration for transit trips compared to driver trips—the average is at least twice that of using a private vehicle. Walking has the shortest average trip duration; however, the feasibility of walking and the distances involved in reaching far-flung destinations, particularly in rural areas, can be prohibitive.

Auto occupancy rates also vary by trip purpose. The lowest occupancy rate is for work since driving alone is by far the dominant mode of choice for work trips in the SEMCOG region. People tend to share rides more for travel not related to work. Not surprisingly, drop-off and pick-up trips, including trips to access another means of travel ("change mode"), have the highest occupancy rate, followed by shopping trips.

1.8 When People Travel

1.8.1 Average Trip Length and Duration

The amount of travel per person or household is measured by the number of trips and by the length of the trip in either distance or time. For instance, we often hear of how long an average commute is (trip duration), measured in minutes per day, but also sometimes in total of hours per typical week or even weeks per year. Another important benchmark is how far people have to travel to work: in 2008-2009, the combination of the housing crisis and the economic downturn led to a situation whereby people were "stuck" in their houses (i.e., they couldn't afford to move) but had to find jobs farther from home. This resulted in a measurable increase in the "average" distance between home and work (nationwide).

Figure 1-27 shows the average trip duration in minutes for trips for different purposes.

As expected, travel to work is the longest trip—the average regional commute is 24.9 minutes one-way. Social and recreational trips are next longest at 19.5 minutes in travel on average one-way. The shortest trips are for daily shopping and errands and picking up and dropping off a passenger, at 15.8 and 15.7 minutes in travel time one-way, respectively.

Figure 1-27. Average weekday trip duration (minutes) by purpose: trips by all means by people aged 15 and older

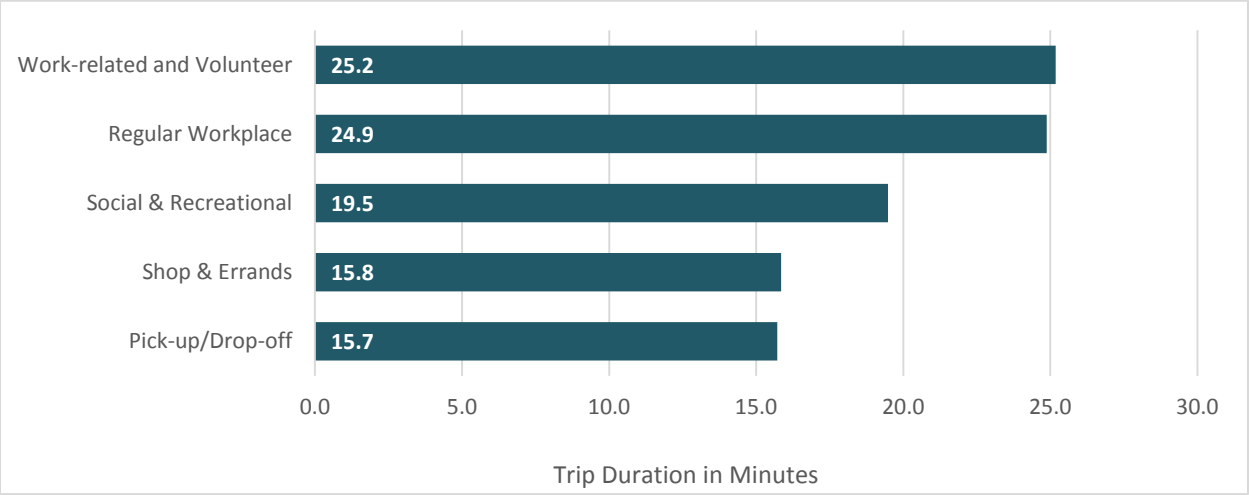


Figure 1-28 shows the trip duration by means of travel. Average drive-alone trips (for all purposes) are just under 20 minutes in duration and shared ride average about 17 minutes. Transit trips average over 30 minutes in duration per trip—over 50 percent longer than the average one-way, drive-alone trip. The longer travel times on transit can be correlated to a greater share of work travel—which are often longer distance trips—and/or slower travel times by urban buses.

Figure 1-28. Average weekday trip duration by means of travel

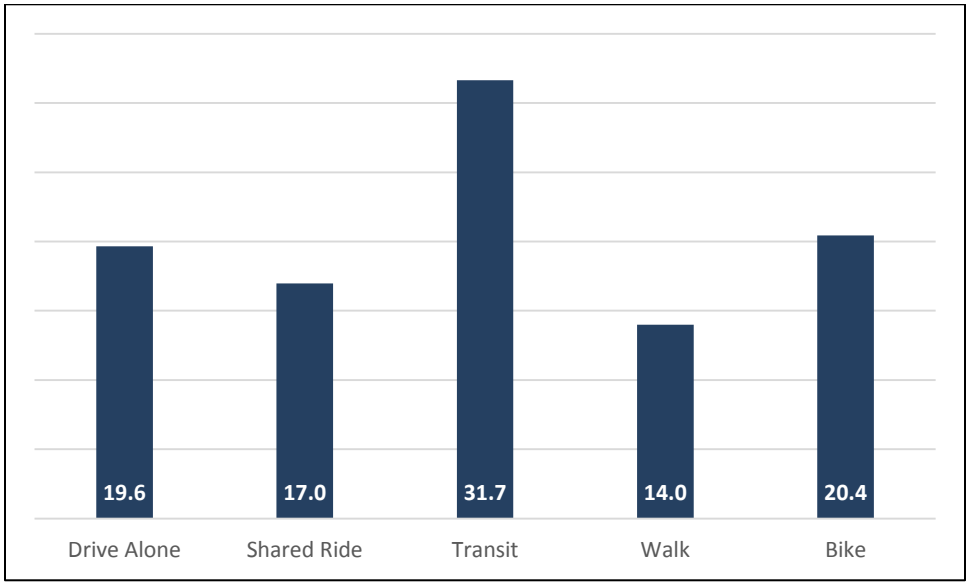
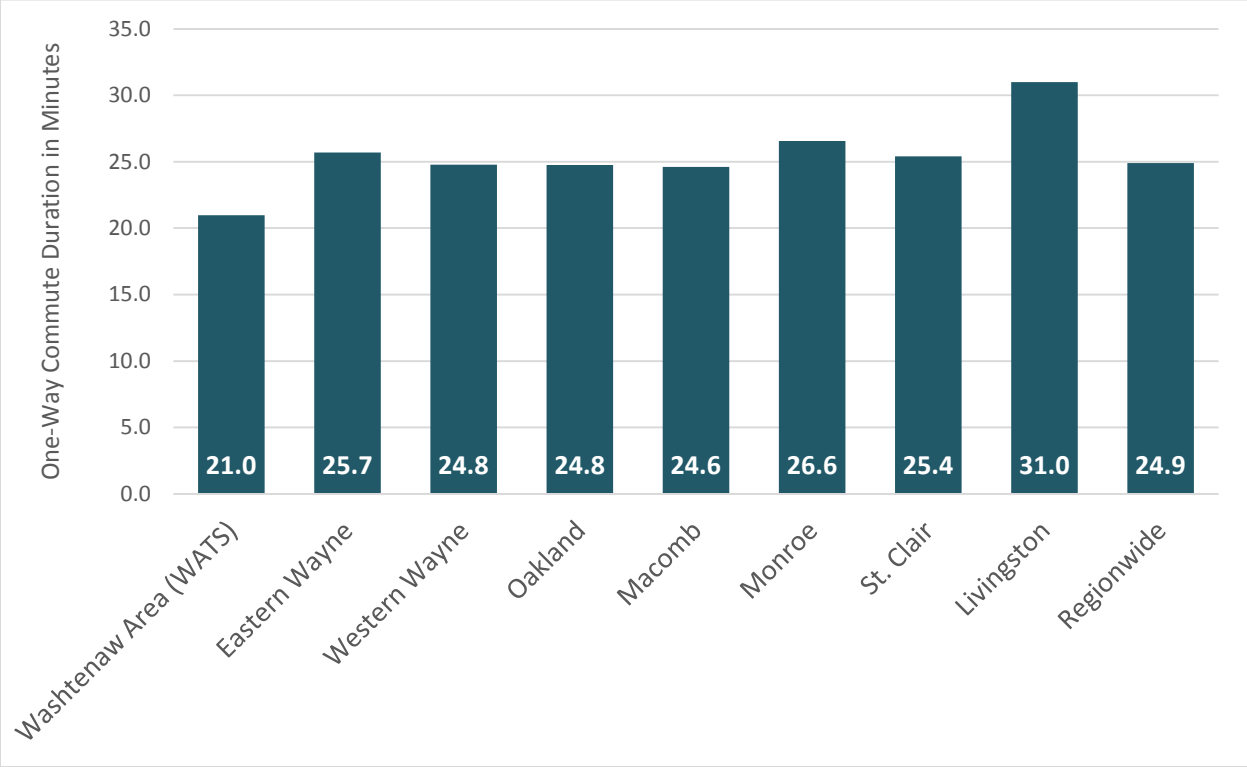


Figure 1-29 shows the average commute-trip duration by all workers and all means of travel by region. Overall, workers in the SEMCOG region travel 24.9 minutes one way in their commutes. Workers commuting from Livingston have the longest travel times—31 minutes one way. The

shortest commutes are by workers in the WATS (Washtenaw) area, who travel just 21.3 minutes, almost 10 minutes less one way compared to Livingston workers.

Figure 1-29. Average one-way commute duration (minutes) by region



1.8.2 Weekday Time Spent in Travel

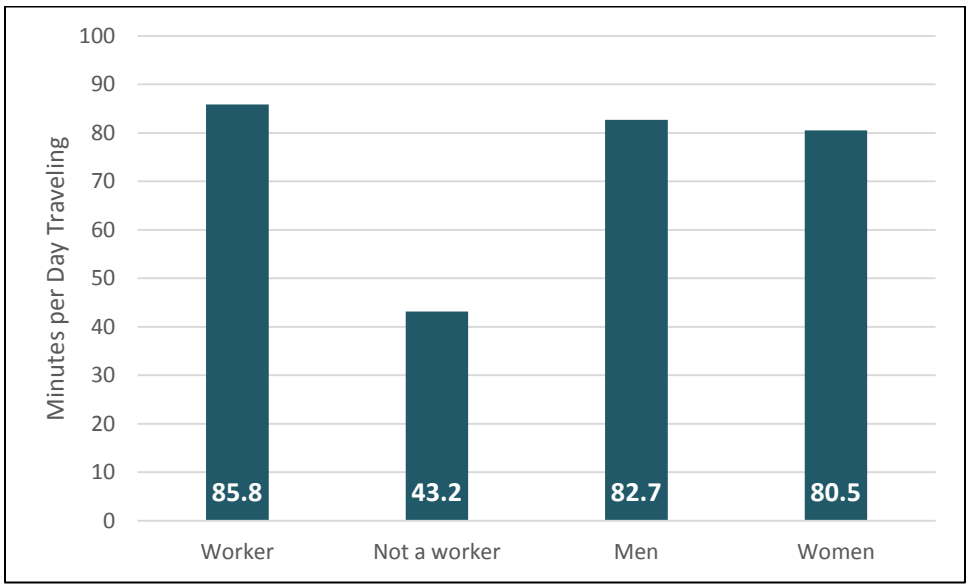
Examination of overall daily time spent in travel lends greater insight into how trip-making patterns affect people's daily lives in terms of time use. Time spent in travel is generally considered a "dis-utility" in that it could be time otherwise spent in productive work or in quality-of-life activities, such as leisure pursuits. But as travel surveys collect more information about trips made by walking and biking, for instance, some travel must be regarded as having "to the traveler, such as trips that are specifically taken for pleasure or exercise.

The value of a metric like 'time spent in travel' is that it can help measure the efficiency of the transportation system, but it is also an indicator of convenience, accessibility, and quality of life for the region's residents. The range of miles traveled (Person Miles of Travel, or PMT) calculates the

distance or range covered by people's usual activities in a travel day (excluding longer-distance trips and leisure trips such as an evening walk).

The time spent traveling in the SEMCOG region (by all people using all means of travel) is shown in Figure 1-30. The overall average is 69.3 minutes a day about 15 percent more than the national average of an hour. Workers spend almost twice as much time in travel on weekdays as non-workers, while men and women spend very similar amounts of time traveling (as shown in Figure 1-30). Children (people under 16 years of age, not shown in the chart) spend on average 50 minutes per day in travel.

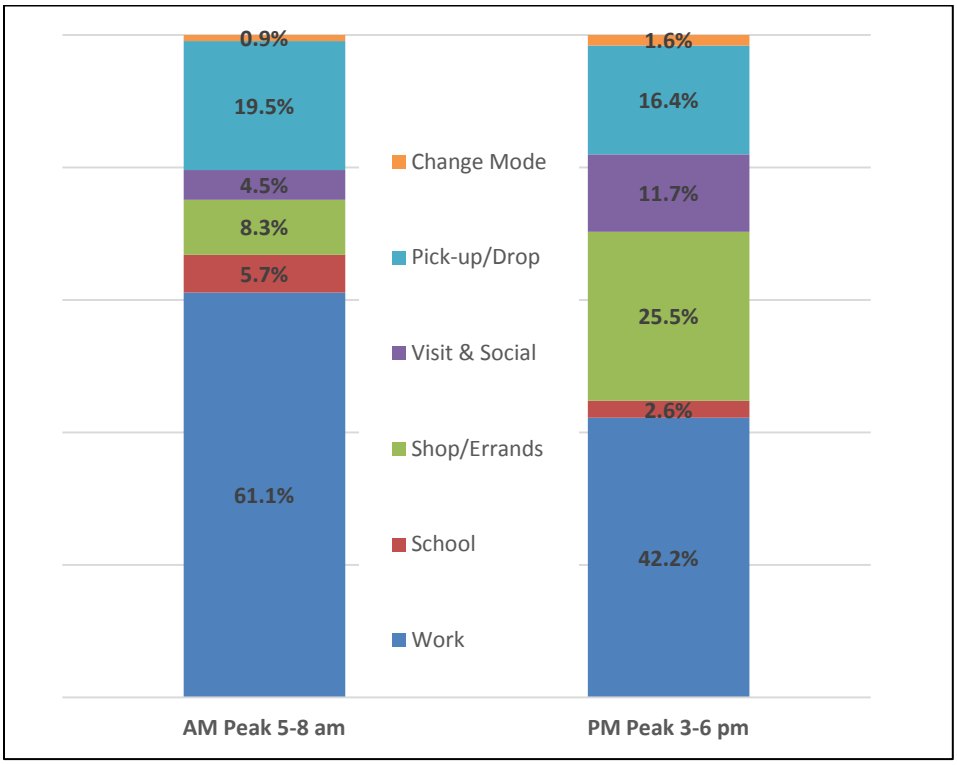
Figure 1-30. Minutes per weekday spent in travel, by worker status and sex



1.8.3 Travel During Peak Periods

Figure 1-31 shows the distribution of weekday vehicle trips by purpose during the morning and afternoon peak periods (in this analysis, 5 to 8 am and 3 to 6 pm). As shown, the peak period includes travel for a wide range of purposes, including commuting.

Figure 1-31. Percent of vehicle trips by purpose, weekday peak periods



In the early morning peak, over 60 percent of the vehicle trips are commutes (61.1 percent), another 19.5 percent are trips to drop off someone (these are often at work or school), and 5.7 percent are students driving to school.

In the afternoon peak period, 42.2 percent of the vehicle trips are commutes, another 16.5 percent are pick up/drop off, and 2.6 percent are related to school. The afternoon peak period also has a large share of vehicle trips for shopping/errands (25.5 percent) and visit/social (11.7 percent).

1.9 Conclusion: When People Travel

The average resident of the SEMCOG region spends just over 20 minutes a day in a vehicle on an average weekday. The longest vehicle trips are to school/university, to access transit, and for social outings, while the shortest are for shopping and errands.

Driving trips average only 60 percent of the duration of transit trips—19.6 minutes for an average driving trip compared to 31.7 for an average transit trip. The overall average commute duration is

12.1 minutes for the region, ranging from a low of 7.8 minutes in Livingston to 16.0 minutes in East Wayne.

The purpose of travel during the peak periods is also interesting. In the early morning peak, more than 60 percent of the vehicle trips are commutes and another 19.5 percent are trips to drop off someone (these are often at work or school). But in the afternoon peak, less than half of the vehicle trips are commutes, with the majority of weekday afternoon peak travel (61 percent) consisting of trips for shopping, errands, and social purposes.

Data and Methodology 2

The objective of the SEMCOG regional travel survey was to obtain household- and person-based travel information for travel demand estimation. But the data from the survey provide much more than model inputs: the description of how the travel behavior of Michigan residents is linked to their demographics, their economic situation, and the type of places they live and work in are also interesting and important. Data from the SEMCOG regional survey link these household and person characteristics together with the choices people made in their weekday travel, for instance: how they went to work, how their children went to school, and how often and how far they travel to shop or visit friends.

To create these summaries, similar activities are grouped into the same trip purpose, similar methods of transport are grouped into common means of travel (for instance, combining public bus and rail into "'transit"), households are grouped by income, and individuals are grouped by age and gender. This does not mean that any individual person will travel the way described here, but these summaries help us understand the average type of people who drive a lot or drive a little, who commute during the peak period, or who drop children off at school in the morning, or pick up groceries in the afternoon.

A note about delivery drivers: there is a special type of traveler that makes trips as part of their daily work, such as pizza delivery drivers, UPS drivers, taxi drivers, or florists. To accurately estimate the average travel of residents, these commercial trips are generally not included—because of how many deliveries a driver will make in a day (one driver made 55 trips on the survey day), and because the destination, purpose, and time of day are out of the norm for non-commercial travel. For the summaries presented here, the trips reported by delivery drivers for commercial purposes are not included.

A second note: the data were collected Monday through Thursday to represent "typical" weekday travel. That means the amount and type of travel summarized here may have greater emphasis on commuting and school travel and less information on leisure and shopping. In the tables and charts, trip estimates are described as "Weekday Trips" so that the reader keeps this in mind.

2.1 Survey Design

The residents of the SEMCOG region were invited to participate in the travel survey based on a random sample of households from all residential addresses in eight sample areas. Households were stratified by size and income because income can be used as an indicator for vehicle ownership and households with higher incomes may make more discretionary trips than less-wealthy households with the same number of vehicles.

Participants completed a web- or phone-based recruitment survey, were assigned a travel date, and were then asked to report the details of their travel in the web-based retrieval survey or report their travel by phone. Some households were offered the opportunity to participate in a global positioning system (GPS) technology component of the study. In the GPS subsample, all household members aged 16–75 were asked to carry a wearable GPS device for 3 days.

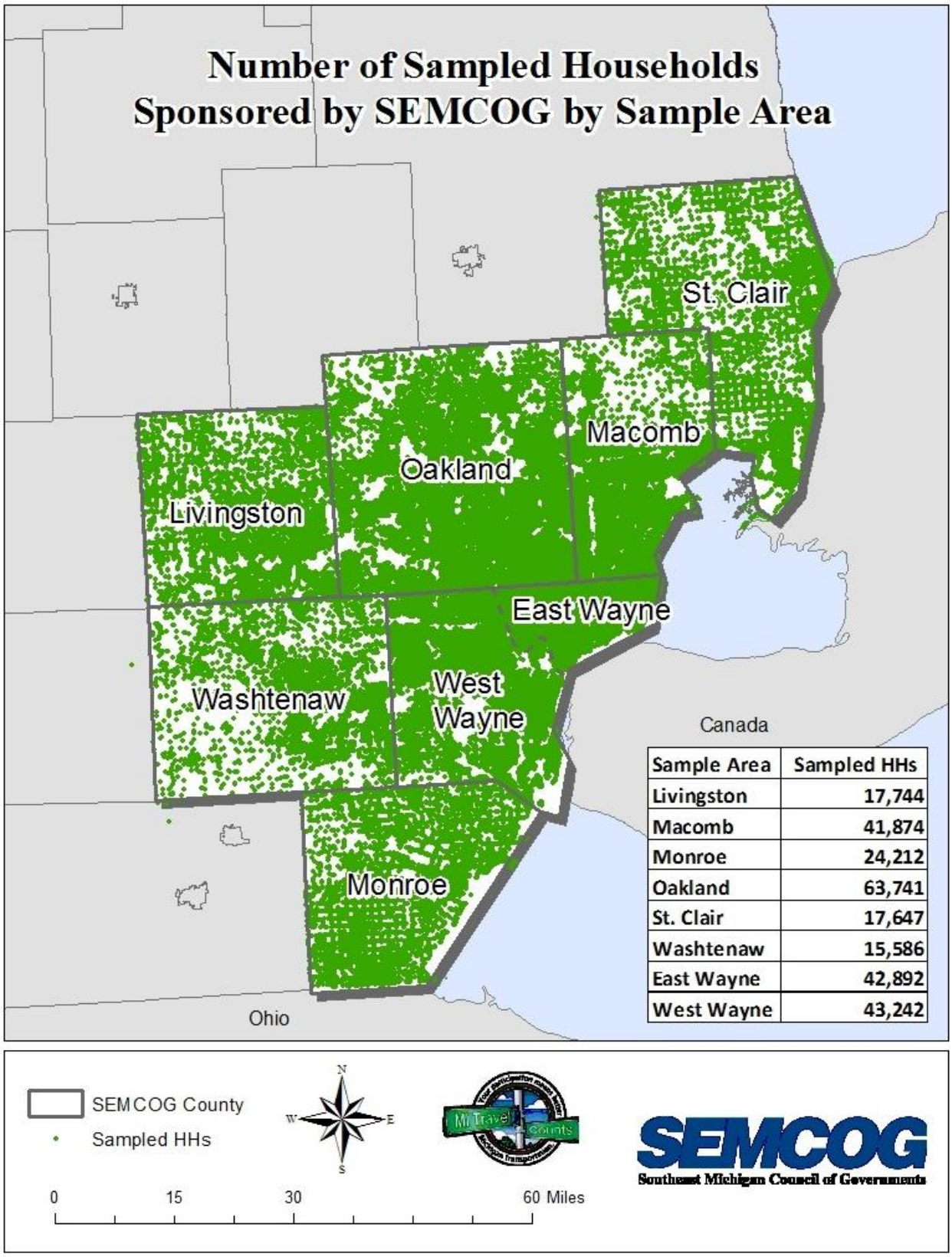
A pilot study was conducted from January to March of 2015. The main data collection was conducted in two phases. There was a spring data collection beginning in April 2015, followed after a break in the summer by a fall data collection beginning in September 2015.

2.2 Sampling

Westat used address-based sampling (ABS) to obtain a representative sample of households for each of the eight SEMCOG sample areas. The sampling frame was a database of addresses created by Marketing Systems Group (MSG) from the U.S. Postal Service's (USPS's) Computerized Delivery Sequence (CDS) file. Westat used MSG's geocoding for the initial frame selection, but re-geocoded all addresses in the frame to confirm location before final sample selection. In addition to containing non-vacant addresses, the sampling frame included vacant residential addresses in each region except in areas where the vacancy rate was found to be higher than generally found in other areas across the region. P.O. Box addresses were excluded from the sampling frame. The sampling frame also included throwback addresses (i.e., street addresses for which mail is redirected by USPS to a specified P.O. Box) and seasonal addresses.

A map with the number of the sampled households by area can be seen in Figure 2-1.

Figure 2-1. Number and location of sampled households, SEMCOG regional travel survey



2.3 Recruitment

Each sampled address was sent up to three pieces of mail requesting the household's participation in the study. The first contact was a letter on letterhead providing a brief description of the study, an overview of the requirements for participation, information about the incentive, the URL for the public website, the toll-free study phone number, and a personal identification number (PIN) providing access to the survey. If needed, the second and third contacts were reminder postcards. These contained a bit less information, but still provided the URL and PIN that allowed access to the survey website. The first reminder postcard was sent 7 days after the initial invitation letter and was mailed to all sampled addresses. The second reminder postcard was sent 7 days after the first and was sent only to non-responding addresses.

Sampled households were directed to the secure project website, where they completed the recruitment survey. This component of the survey process was where respondents indicated willingness to participate and provided key demographic and contact data for the household. Although the primary mode of participation at this stage was via web, a telephone recruitment option was provided for those participants who requested to complete their enrollment by phone. As part of the sample selection, Westat attempted to match each sampled address to a telephone number. This process typically resulted in approximately 40 to 50 percent of the sampled addresses having an associated telephone number. These telephone numbers were used to augment the contact information collected from each household in the recruitment survey (telephone number and email address), and to attempt to recruit households by telephone.

Each responding household was assigned a travel date at the end of the recruitment survey. Before the assignment of the travel date, survey participants were offered a choice of whether they wanted to have personalized travel logs (diaries) mailed to them or to print the logs themselves from the website. Households that chose to have the travel logs mailed were assigned a travel date at least 10 days in the future so the logs could be prepared and mailed to arrive a few days before the travel date. Those who opted to print their own materials were assigned the next available travel date.

The travel log packets for the log-only households were sent using first-class postage in 6 x 9 envelopes and included a cover letter, individualized travel logs for all household members, and a $1 bill (as a "primer" incentive to further encourage completion of the travel day survey). The letter also reminded participants about the final $20 household incentive.

2.4 Retrieval with GPS

During the recruitment survey, 40 percent of the entire sample was flagged as GPS eligible, and those respondents were asked if they would be willing to participate in a GPS technology component of the study. Depending on the assigned travel day, the number of GPS households was capped to achieve an overall 10 percent GPS subsample.

For selected households that agreed to participate in this component of the study, GPS devices were sent to all household members between the ages of 16 and 75. The GPS participants were asked to carry these wearable devices for three consecutive days and then to report their travel details for the first of the three days in a GPS-based Prompted Recall (GPS+PR) survey. The travel date assignment was consistent with the non-GPS households, with the first of the three GPS travel days starting Monday through Thursday, and continuing for two additional consecutive days.

GPS households were offered an incentive check for $25 per GPS-instrumented person upon completion of the GPS+PR interview and travel reporting for non-GPS eligible household members. This amount was consistent with amounts offered in Westat's other wearable GPS studies. This approach provided an incentive that was commensurate with the level of burden required to participate in the study and that was enough to motivate households to return the GPS devices. GPS households received only the GPS person-based incentive and not the household-level completion incentive offered to non-GPS households.

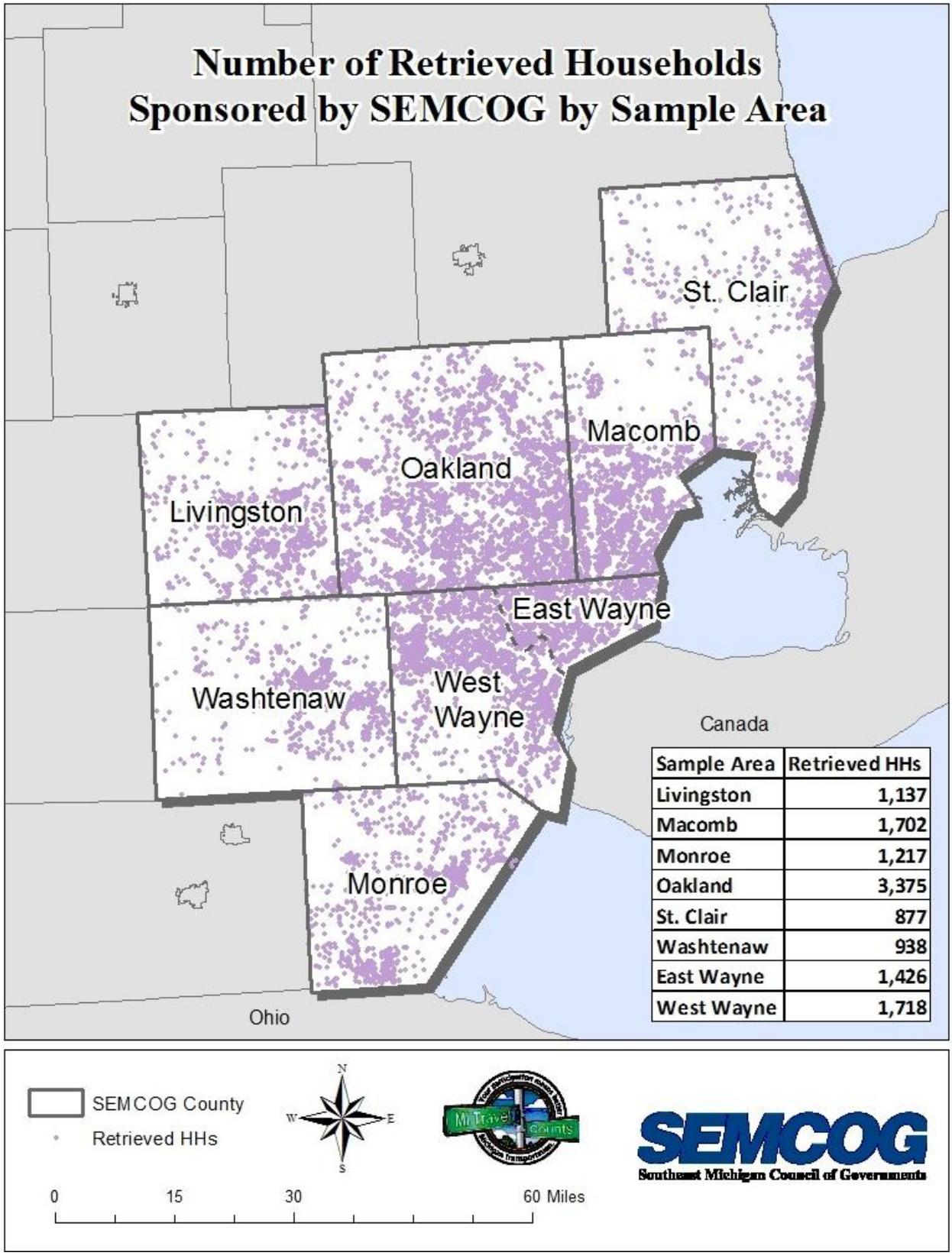
2.5 Prompted Recall

Once participants returned the GPS devices to Westat, the GPS data were downloaded from the devices, and the data files were uploaded to a secure project website and processed into place sequences, the chronologically enumerated list of destinations identified from the GPS logger data on the travel date. After the data had been processed, the household was notified by text, email, and/or phone that their retrieval survey was ready to be completed. Respondents were encouraged to complete the survey online, but could also complete the survey by speaking with an interviewer.

Instead of reporting all the places visited on the travel day, as was done by non-GPS households, GPS-eligible respondents were presented with a survey interface that showed the travel traces from their GPS device and were asked to confirm the list of places visited and to provide details about

each place. They were also asked to use their completed travel log as a reference. Travel details for non-GPS-eligible household members were entered based on their travel log information. A map of the location of the final completed households is shown in Figure 2-2.

Figure 2-2. Number and location of retrieved households, SEMCOG travel survey



Sample Area	Retrieved HHs
Livingston	1,137
Macomb	1,702
Monroe	1,217
Oakland	3,375
St. Clair	877
Washtenaw	938
East Wayne	1,426
West Wayne	1,718

Conclusion 3

People in the SEMCOG region are highly mobile and very likely licensed to drive. The average resident makes about four daily trips on average by all means for all purposes. But there is a lot of variation depending on age, vehicle ownership, worker status, and income.

As they do in other areas of the country, younger people in the SEMCOG region have delayed licensing and report fewer vehicle trips than people in the same age group a decade ago. Older people, on the other hand, are very active and retain their licenses well into their golden years.

Women overall travel more than men, and female workers make more trips on a weekday than male workers. However, men commute further than women and spend more time in a vehicle on an average weekday. An average commuter in the SEMCOG region travels 13.2 miles to their jobs—almost one and a half miles longer than the national average of 11.8 miles. Overall, men travel over one-third longer distances to work than women do overall, and they have longer commute distances in every age group compared to women. The longest commutes are by men aged 35-49, while women and younger and older workers travel to jobs closer to home.

In terms of the journey-to-work, there is also notable variation in day-to-day commuting—especially for people who don't usually drive to work. This is critical to keep in mind when using census data for small area estimation. And there are important differences between the sampled areas in the region; for example, the average commute time in Livingston is twice that of commute times in the WATS area.

However, less than half of the travel on weekday evening peak periods is commuting. The majority of trips in the evening peak of trips for shopping, errands, and social reasons. The people in the SEMCOG region travel far for university trips, and for socializing, and conduct a lot of trips to pick-up and drop-off passengers.

The data collected in the SEMCOG travel survey are robust and a valuable source of information—both descriptive and as inputs into travel demand forecasts—for the planners and policy makers of the SEMCOG region.

Appendix A
Definitions

The following list provides definitions for technical terms used in this report:

Auto Occupancy. The number of persons in a vehicle, including the driver.

Daily Trip. A trip going from one location to another on an average weekday (Monday-Thursday). A single trip may use more than one mode of transportation.

Household Characteristics. The household characteristics related to travel that were analyzed include household income, household size, the number of autos available, and the number of workers in the household.

Journey-to-Work. A commute trip (home to work) made by a worker.

Long Distance Trip. A trip of more than 100 miles away from home taken during the three months prior to the survey.

Means of Travel. The types of transportation used to make a trip including school bus, walk, bike, public transit, and private vehicle.

Person Characteristics. The person characteristics related to travel that were analyzed include age, gender, licensed or non-licensed driver, and working status.

Person Miles of Travel (PMT). The total amount of miles (sum of all miles traveled) for a person for a period of time, such as year or day.

Person Trip. A trip made by one person by any means of travel for any purpose.

Shared-Ride vehicle trip. A trip made by a privately operated vehicle with more than one occupant.

Time Spent Traveling. The total amount of time a person or a household spent traveling during a 24-hour period. The sum of the trip duration for all trips.

Travel Characteristics. Any properties, measurements, or factors that describe and influence travel patterns for a group of people or in a particular area. Travel characteristics examine trip characteristics, trip makers' personal and household characteristics, and the relationship between the trip maker and the trip and utilization of the system.

Travel Time Period. The hour of the day when a trip starts.

Trip Characteristics. The trip characteristics related to travel that were analyzed include purpose, mode, duration, time period, and amount.

Trip Duration. The time (in minutes) between the departure and arrival times of a trip.

Trip Purpose. The reason for travel, or the main activity at the trip destination.

Vehicle Miles of Travel. The total amount of miles (sum of all miles traveled) for a vehicle for a time period, such as day or year.

Vehicle Trip. A trip made by a privately operated vehicle regardless of the number of persons in the vehicle.

Zero-vehicle Household. A household that has no automobiles available for use.

Appendix B
Detailed Tables

Table B-1. Person and vehicle trip rates per household in each region by household size

Region	Number of people per household	Person trips per household	Vehicle trips per household
Washtenaw Area (WATS)	One person	4.9	3.0
	Two	8.1	5.1
	Three	13.1	7.1
	Four or more	19.1	9.4
Eastern Wayne	One person	4.8	2.6
	Two	8.0	4.4
	Three	11.5	5.2
	Four or more	21.3	7.9
Western Wayne	One person	4.8	3.8
	Two	7.9	5.7
	Three	10.9	7.7
	Four or more	16.9	9.2
Oakland	One person	5.0	3.9
	Two	7.6	5.9
	Three	11.1	7.4
	Four or more	17.1	9.2
Macomb	One person	4.4	3.4
	Two	8.1	6.1
	Three	10.8	7.6
	Four or more	16.7	8.7
Monroe	One person	5.1	4.3
	Two	7.8	5.9
	Three	10.5	7.6
	Four or more	15.7	8.0
St. Clair	One person	4.8	3.6
	Two	7.5	5.7
	Three	10.8	7.4
	Four or more	17.7	9.0
Livingston	One person	4.5	3.8
	Two	7.5	6.0
	Three	9.5	7.1
	Four or more	16.8	9.3
Total	One person	4.8	3.5
	Two	7.9	5.6
	Three	11.1	7.1
	Four or more	17.7	8.9

Table B-2. Person and vehicle trip rates per household in each region by number of vehicles per household

Region	Number of vehicles per household	Person trips per household	Vehicle trips per household
Washtenaw Area (WATS)	Zero	6.4	0.4
	One	7.4	4.1
	Two	11.5	6.5
	Three+	13.3	9.3
Eastern Wayne	Zero	8.7	0.7
	One	9.3	4.5
	Two	11.5	6.9
	Three+	14.9	9.6
Western Wayne	Zero	5.6	0.8
	One	7.0	4.8
	Two	11.5	7.3
	Three+	11.9	8.8
Oakland	Zero	6.3	1.1
	One	7.1	4.7
	Two	10.6	6.9
	Three+	11.7	8.7
Macomb	Zero	7.7	0.7
	One	6.9	4.7
	Two	10.9	7.1
	Three+	11.0	8.5
Monroe	Zero*	4.3	0.3
	One	7.9	4.9
	Two	10.2	6.5
	Three+	10.7	8.0
St. Clair	Zero*	5.6	1.2
	One	8.2	4.9
	Two	9.6	6.3
	Three+ or more	11.4	8.2
Livingston	Zero*	7.2	2.7
	One	6.1	4.7
	Two	10.7	6.6
	Three or more	11.2	8.0
Total	Zero	7.4	0.8
	One	7.6	4.6
	Two	11.0	6.9
	Three or more	11.8	8.7

- Small sample size

Table B-3. Person and vehicle trips rates per household in each region by number of workers in the household

Region	Number of workers per household	Person trips per household	Vehicle trips per household
Washtenaw Area (WATS)	Zero	8.3	6.1
	One	9.6	5.3
	Two	13.2	6.8
	Three or more	18.9	11.8
Eastern Wayne	Zero	9.7	6.1
	One	12.4	5.5
	Two	14.3	7.2
	Three or more	13.7	6.4
Western Wayne	Zero	7.8	5.9
	One	9.9	5.7
	Two	14.0	7.5
	Three or more	14.7	10.4
Oakland	Zero	8.2	6.0
	One	9.3	5.6
	Two	13.3	7.3
	Three or more	16.6	11.3
Macomb	Zero	8.0	5.5
	One	10.3	6.2
	Two	12.4	7.5
	Three or more	15.8	11.8
Monroe	Zero	8.3	6.5
	One	9.6	6.6
	Two	14.5	6.9
	Three or more	15.9	12.3
St. Clair	Zero	10.0	6.2
	One	9.6	5.7
	Two	13.3	7.7
	Three or more	17.8	10.3
Livingston	Zero	8.6	6.6
	One	10.1	4.7
	Two	14.0	7.5
	Three or more	15.5	11.3
Total	Zero	8.5	6.0
	One	10.2	5.7
	Two	13.4	7.3
	Three or more	16.0	11.1

Table B-4. Person and vehicle trip rates per household in each region by household income category

Region	Annual Household Income Category	Person Trips per Household	Vehicle Trips per Household
Washtenaw Area (WATS)	Not Reported	10.7	5.8
	LOW <$25K	7.0	2.9
	LOW-MED $25-50K	8.3	4.4
	MED-HI $50-75K	9.0	5.3
	HIGH $75K AND OVER	11.8	7.1
Eastern Wayne	Not Reported	10.9	5.3
	LOW <$25K	9.3	2.6
	LOW-MED $25-50K	10.9	5.5
	MED-HI $50-75K	8.2	5.2
	HIGH $75K AND OVER	12.4	8.0
Western Wayne	Not Reported	9.9	6.6
	LOW <$25K	7.8	3.8
	LOW-MED $25-50K	8.0	5.3
	MED-HI $50-75K	8.2	5.8
	HIGH $75K AND OVER	12.0	8.2
Oakland	Not Reported	9.2	6.5
	LOW <$25K	7.5	3.8
	LOW-MED $25-50K	8.1	5.4
	MED-HI $50-75K	8.4	5.7
	HIGH $75K AND OVER	10.9	7.4
Macomb	Not Reported	9.2	6.1
	LOW <$25K	7.3	3.9
	LOW-MED $25-50K	10.1	5.6
	MED-HI $50-75K	8.4	6.3
	HIGH $75K AND OVER	10.5	7.4
Monroe	Not Reported	8.8	6.2
	LOW <$25K	7.1	3.8
	LOW-MED $25-50K	8.5	5.9
	MED-HI $50-75K	10.1	6.5
	HIGH $75K AND OVER	11.0	7.4
St. Clair	Not Reported	9.1	5.9
	LOW <$25K	8.4	4.0
	LOW-MED $25-50K	8.9	6.2
	MED-HI $50-75K	9.3	6.3
	HIGH $75K AND OVER	11.3	7.9
Livingston	Not Reported	8.3	6.2
	LOW <$25K	7.1	4.7

	LOW-MED $25-50K	7.1	5.3
	MED-HI $50-75K	8.1	5.8
	HIGH $75K AND OVER	11.9	7.7
Total	Not Reported	9.6	6.2
	LOW <$25K	8.2	3.3
	LOW-MED $25-50K	9.0	5.4
	MED-HI $50-75K	8.5	5.8
	HIGH $75K AND OVER	11.3	7.6

Table B-5. Percent of person trips by means of travel (all purposes) for each region (weekdays)

Region	Drive alone	Shared ride	Transit	Walk	Bike	All other
Washtenaw Area (WATS)	56.2%	21.4%	3.4%	14.0%	2.3%	2.8%
Eastern Wayne	45.2%	28.2%	8.1%	15.2%	1.7%	1.5%
Western Wayne	65.5%	22.9%	1.3%	5.8%	0.9%	3.6%
Oakland	66.2%	21.2%	1.3%	6.7%	1.0%	3.6%
Macomb	65.3%	23.1%	2.3%	5.4%	0.8%	3.2%
Monroe	66.1%	21.1%	1.6%	5.9%	0.5%	4.8%
St. Clair	64.3%	24.5%	1.2%	5.0%	1.0%	4.0%
Livingston	68.0%	23.0%	0.2%	3.9%	0.2%	4.7%
Region-wide	61.6%	23.3%	2.7%	8.1%	1.1%	3.2%

Table B-6. Percent of person trips by means of travel to work (mode share for work trips) by region

Sample area	Drive alone	Shared ride	Transit	Walk	Bike	Other
Washtenaw Area (WATS)	69.0%	6.6%	4.0%	14.9%	5.2%	0.2%
Eastern Wayne	72.2%	9.0%	7.5%	7.0%	3.7%	0.7%
Western Wayne	88.6%	6.1%	0.7%	2.9%	0.5%	1.2%
Oakland	90.8%	5.6%	0.7%	2.4%	0.2%	0.3%
Macomb	89.5%	7.1%	0.8%	1.9%	0.1%	0.6%
Monroe	93.3%	3.3%	1.6%	1.4%	0.1%	0.3%
St. Clair	88.7%	8.7%	0.3%	1.6%	0.7%	0.1%
Livingston	91.5%	6.3%	0.5%	1.7%	0.0%	0.0%
Region-wide	86.1%	6.5%	1.8%	3.9%	1.1%	0.6%

Table B-7. Average (mean) commute distance (miles) by household income for each region

Region	Annual Household Income Category	Mean Commute Distance
Washtenaw Area (WATS)	LOW <$25K	8.3
	LOW-MED $25-50K	5.9
	MED-HI $50-75K	8.6
	HIGH $75K AND OVER	12.3
Eastern Wayne	LOW <$25K	8.8
	LOW-MED $25-50K	7.6
	MED-HI $50-75K	8.5
	HIGH $75K AND OVER	12.0
Western Wayne	LOW <$25K	7.7
	LOW-MED $25-50K	11.9
	MED-HI $50-75K	13.0
	HIGH $75K AND OVER	13.5
Oakland	LOW <$25K	7.0
	LOW-MED $25-50K	9.4
	MED-HI $50-75K	13.2
	HIGH $75K AND OVER	17.0
Macomb	LOW <$25K	6.9
	LOW-MED $25-50K	9.1
	MED-HI $50-75K	11.2
	HIGH $75K AND OVER	15.7
Monroe	LOW <$25K	6.5
	LOW-MED $25-50K	13.8
	MED-HI $50-75K	13.1
	HIGH $75K AND OVER	16.8
St. Clair	LOW <$25K	12.9
	LOW-MED $25-50K	11.8
	MED-HI $50-75K	15.7

	HIGH $75K AND OVER	18.6
Livingston	LOW <$25K	8.6
	LOW-MED $25-50K	9.5
	MED-HI $50-75K	15.1
	HIGH $75K AND OVER	23.0