MI Travel Counts III

Travel Characteristics

Technical Report

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Executive Summary

Understanding the amount and type of travel by the residents of Michigan is important for planners and policymakers. The foundation of this report is the data collected in the MI Travel Counts III (MTC III) household travel survey conducted in 2015. The objective of the survey was to obtain household- and person-based travel information for input into the Michigan Department of Transportation (MDOT) Statewide and Metropolitan Planning Organization (MPO) travel demand models. But data from the survey provide much more than model inputs—the descriptions 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 MTC III survey links these household and person characteristics together with the choices people made in their weekday and long-distance travel, including how they went to work, how their children went to school, and how often and how far they travel to shop or visit friends.

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 occurring 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 it is not clear 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 Michigan, 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.

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 Michigan delay obtaining a driver's license (one-quarter of young people aged 15-24 do not have a license); however, there is still a high licensure rate across the state: over 90 percent of all Michigan residents 15 years and older are licensed to drive.

In addition, large shifts are occurring demographically: the rural areas 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, they are younger than the native born.[1] 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 Michigan.

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 details about the type and amount of travel by residents of the state of Michigan and its various regions and cities in 2015. The data presented, including trip rates, control totals, and confidence limits, are useful to planners, policymakers, travel demand modelers, and others interested in analyzing the ways Michigan's residents 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.

Results

Analysis of the MTC III survey answers four simple questions: (1) who travels in Michigan, (2) how people travel in Michigan, (3) why people travel in Michigan, and (4) when people travel in Michigan. In addition, there is special interest in commute characteristics and long-distance travel. This report also compares the data collected in Michigan to survey data from other sources.

[1] http://logon.thechicagocouncil.org/UserFiles/File/Immigration/Fact-Sheets/michigan.pdf

Who Travels in Michigan

- 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; this was also found in the MI Travel Counts I (MTC I) survey conducted in 2005.
- Women aged 24-65 are more likely than their male counterparts to be licensed to drive.
- People—including children and retirees—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 (15-24) have the lowest vehicle and person trip rates. Trend analysis with the 2005 MTC I shows that younger women are traveling less than a decade ago.
- Trend analysis also indicates that people in one- and two-person households are traveling less than a decade ago, while larger households have the same or slightly more travel.
- Older non-drivers rely on obtaining rides to access activities, and they also walk more than older drivers.

How People Travel in Michigan

- The predominant mode, by far, is use of the private automobile (88.2 percent of all trips). Walking accounts for 6.1 percent of all trips, transit 1.5 percent, and bike and other means the remainder.
- 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.
- Just over 5 percent of households in Michigan do not have a vehicle. For people in Michigan living without a private vehicle in their household, a car is still used for much of their daily travel—almost one-third of all trips are made in a vehicle (7 percent as a driver and 25.8 percent as a passenger).

Why People Travel in Michigan

- Work trips account for about 12 percent of weekday trips for all people, but work trips account for over a quarter of weekday trips by workers.
- Shopping and personal business account for the largest share of weekday travel.
- People who work spend a large amount of their weekdays traveling to and from work in addition to shopping, errands, and social/recreational activities. Workers spend more time traveling than non-workers.
- People in the rural areas of the state travel farther to access health care than those in more urbanized areas.

Commuting

- Telecommuting is offered to 12.8 percent of Michigan's workers, and when it is offered the average worker telecommutes 1.3 days per week.
- About 82 percent of workers in Michigan commute to a regular workplace on weekdays, but the remainder either work at home (6 percent) or have no fixed workplace (12 percent).
- The average trip duration for work trips increased 2.7 minutes in the last decade, from 21 minutes statewide in 2005 to 23.7 in 2015—an increase of almost 13 percent.

When People Travel in Michigan

- Peak periods include people traveling for multiple purposes besides commuting: 60 percent of morning peak travel and 44 percent of evening peak travel is work related—the remaining trips are for shopping, errands, social and recreational purposes.
- The highest proportion of trips for all purposes occurs around noontime: most travel in the state occurs between 11 am and 3 pm.
- Residents of Michigan spend a little more than the national average of one hour a day in vehicles—either driving or as a passenger (all ages).
- Workers spend nearly 80 minutes per weekday in a vehicle while adult non-workers spend just under an hour. Children less than 15 years of age spend over 34 minutes on an average weekday in a vehicle.

- Overall, workers in Michigan who drive to work commute 23.7 minutes one-way (compared to an average of 23.9 minutes nationwide). Students driving to school (for example, college students) have an average one-way trip duration of 20 minutes.

Long-Distance Travel in Michigan

- Somewhat surprisingly, quite a large percentage of the population did not engage in long-distance travel during the period covered by the study. About 43.5 percent of households in the state reported no trips of 100 miles or more in the prior 3 months.
- Even with such close proximity to Canada, only 1.6 percent of long-distance trips are reported to Canada. The vast majority of the trips—96.9 percent—are reported within the United States and of those over half (53.3 percent) are within the state.
- Couples without children (not including retired) and families with children are the most likely to travel long distance.

Personal and household patterns of activities as seen through the survey results offer insight into who is using Michigan's transportation system, where, and to what extent. Descriptive analysis of traveler groups such as workers, students and young people, retirees, households with children, non-driving populations, and recreational and long-distance travelers provides a clearer understanding of travel behavior in the state. Understanding how the transportation system is used and how it serves the people of Michigan 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 Trip Generation

Table 1-1 shows the summary of the number of households, number of people, and weekday trips by region from the MTC III 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 only count as a commute trip if the driver was going to work. These and other definitions are included in Appendix A.

The data show that, overall, residents of the state averaged about 4 trips per person on weekdays, and together people in households generated about 10 trips by all means of travel and for all purposes. About 60 percent of these weekday trips were vehicle 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 state: on average, household and person trip rates vary across geographic areas. For example, the Holland area has the highest trip rate per household (10.8), which is 20 percent higher than the Northern Michigan Rural area, with the lowest rate of 8.8 trips per household.

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 statewide, while the data for each region is shown in Appendix B, "Detailed Tables."

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

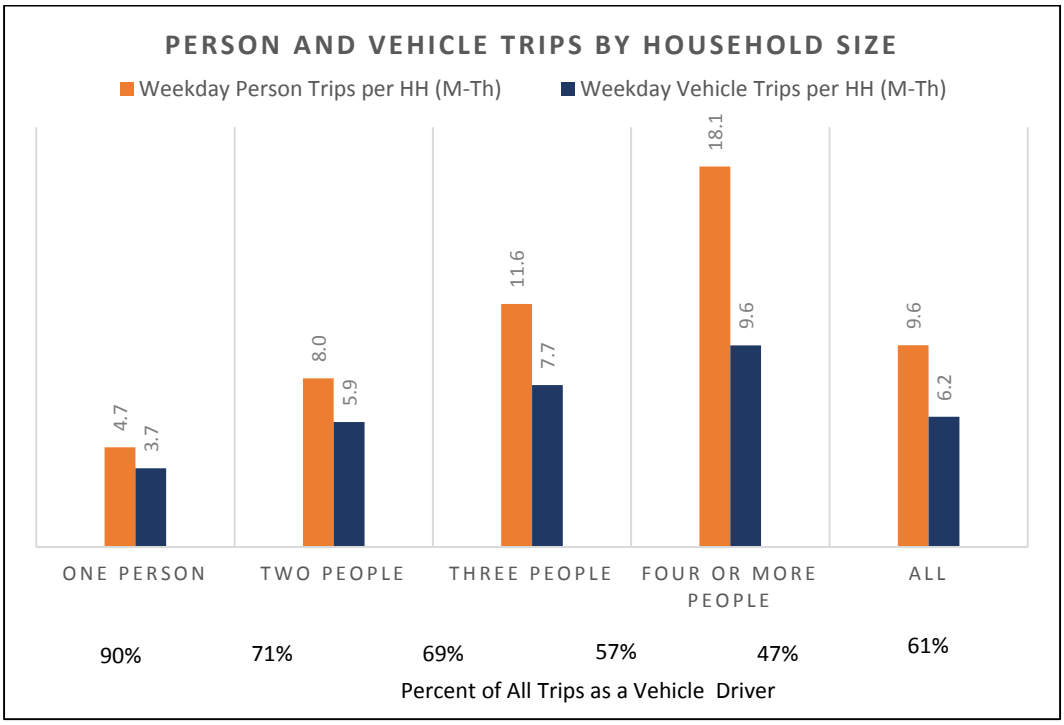
Region	Households	Person counts	Trips per person (Wtd)	Vehicle Trips per person (Wtd)	Person trips per household (Wtd)	Vehicle trips per household (Wtd)
Metro Detroit Area	1,707,565	4,359,950	3.8	2.4	9.6	6.1
Southern Michigan Rural	386,208	1,018,702	3.6	2.4	9.4	6.2
Northern Michigan Rural	306,995	735,146	3.7	2.4	8.8	5.9
Small Cities	130,357	329,776	4.0	2.5	10.2	6.4
Grand Rapids Area	263,361	708,941	3.8	2.5	10.1	6.6
Greater Lansing Area	183,589	464,037	3.8	2.4	9.6	6.1
Flint Area	169,202	425,793	3.7	2.4	9.4	6.0
Midland–Bay City–Saginaw	157,051	391,570	3.9	2.6	9.7	6.6
Ann Arbor Area	137,193	344,793	4.0	2.3	10.0	5.9
Kalamazoo Area	110,760	277,101	3.7	2.5	9.4	6.3
Muskegon Area	86,600	225,015	3.7	2.5	9.6	6.4
Jackson Area	60,771	160,249	3.7	2.5	9.7	6.5
Benton Harbor–St. Joseph–Niles	57,322	144,073	3.9	2.5	9.9	6.4
Holland Area	43,752	122,842	3.9	2.6	10.8	7.2
Battle Creek Area	37,849	93,998	3.8	2.4	9.4	6.0
Traverse City Area	33,933	81,664	3.8	2.5	9.2	6.1
Total	3,872,508	9,883,650	3.8	2.4	9.6	6.2

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

Household size	Person trips	Vehicle trips
One person	4.7	3.7
Two people	8.0	5.9
Three people	11.6	7.7
Four or more people	18.1	9.6
All	9.6	6.2

Figure 1-1 is a graphic of the trip rates shown in Table 1-2. Single-person households made 9 out of 10 of their trips as a vehicle driver, while vehicle-driver trips accounted for less than half of all trips in households with four or more people. 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 a 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 of the MTC III 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 "Comparison with Other Data Sources" section in this report.

Figure 1-2. Weekday mean vehicle trip rates by number of vehicles in the household, with 95% confidence limits

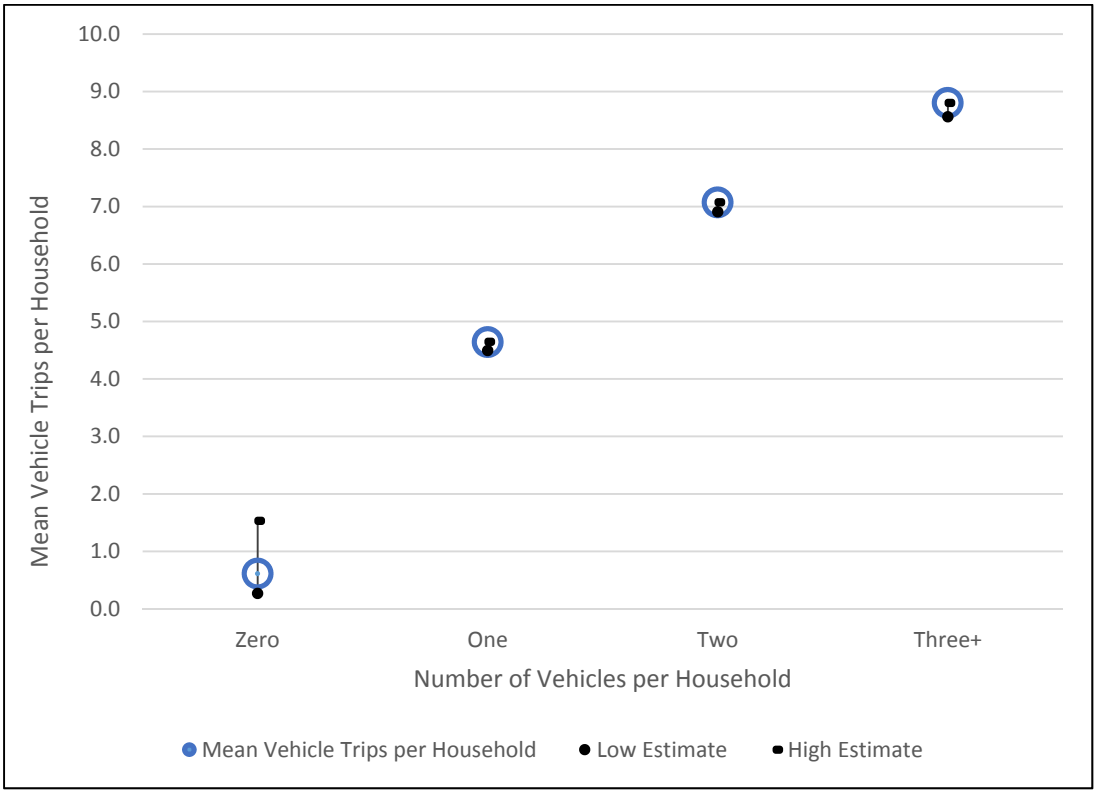
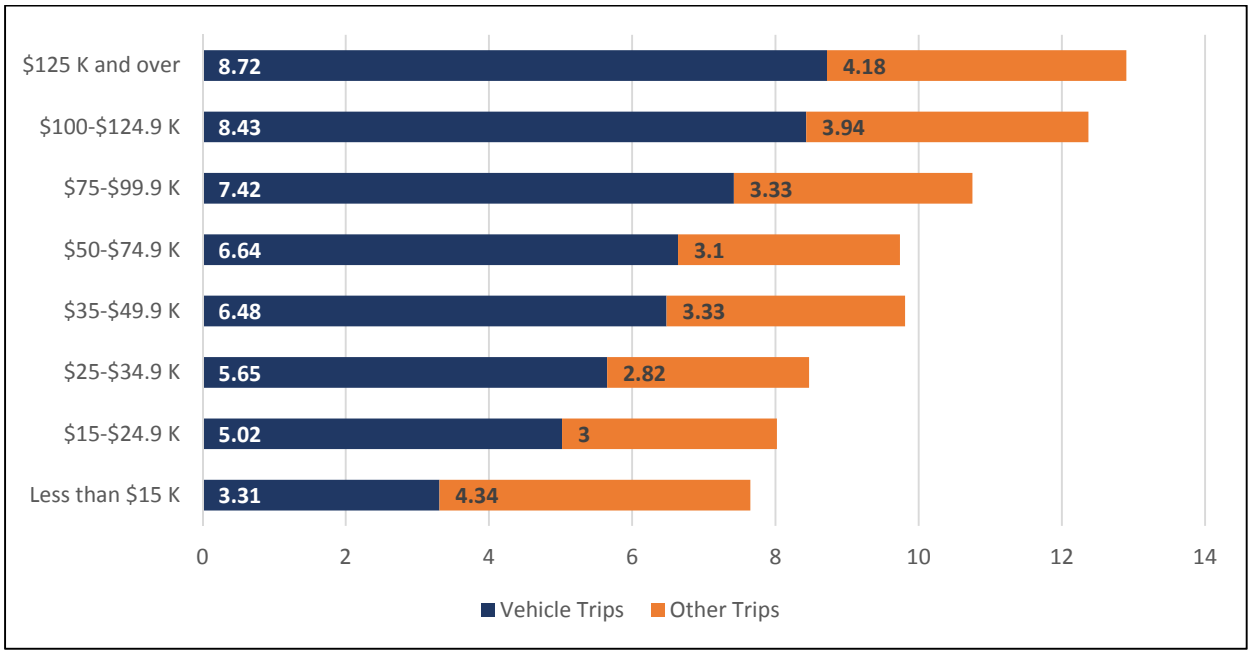


Figure 1-3 shows the relationship between household income and the amount of travel generated by that household. Higher-income households generally produce more travel—these households generally have more vehicles and more workers. Appendix B shows these estimates for each region, with income groups combined to help create robust sample sizes in each group. Higher-income households are also more likely to make more trips for leisure and social activities, and workers in higher-income households travel farther 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. The lowest-income households are more likely to be small, and less than half have a household member employed. Conversely, the highest-income households in Michigan average more than 1.5 workers and 2.5 vehicles.

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

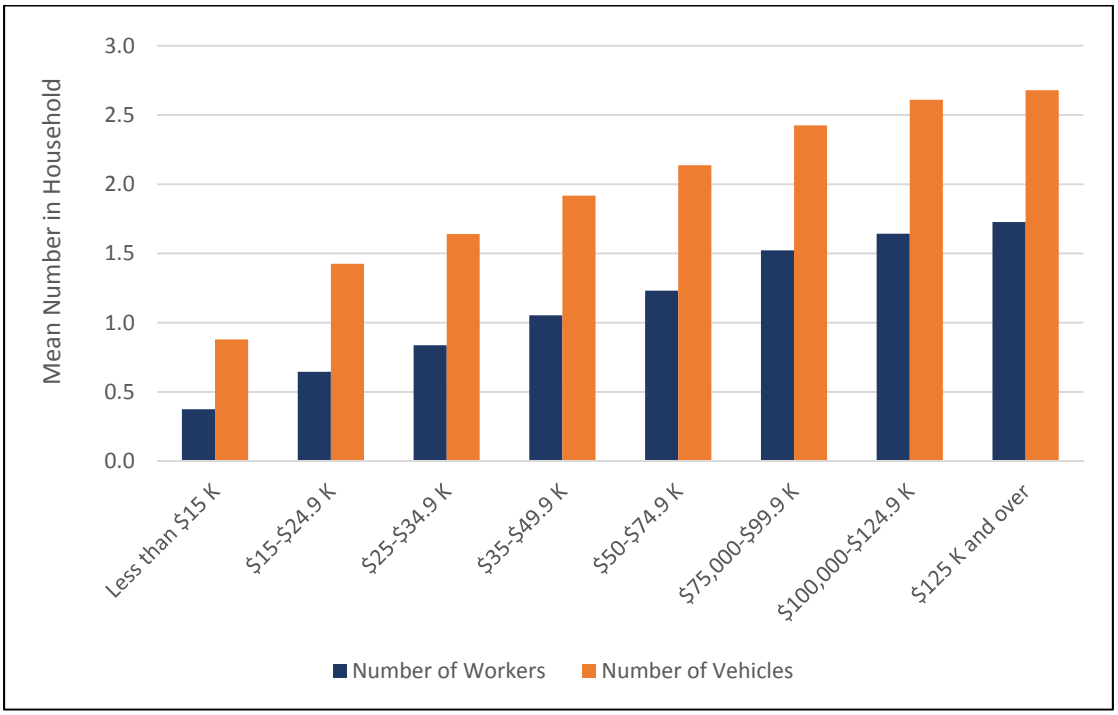
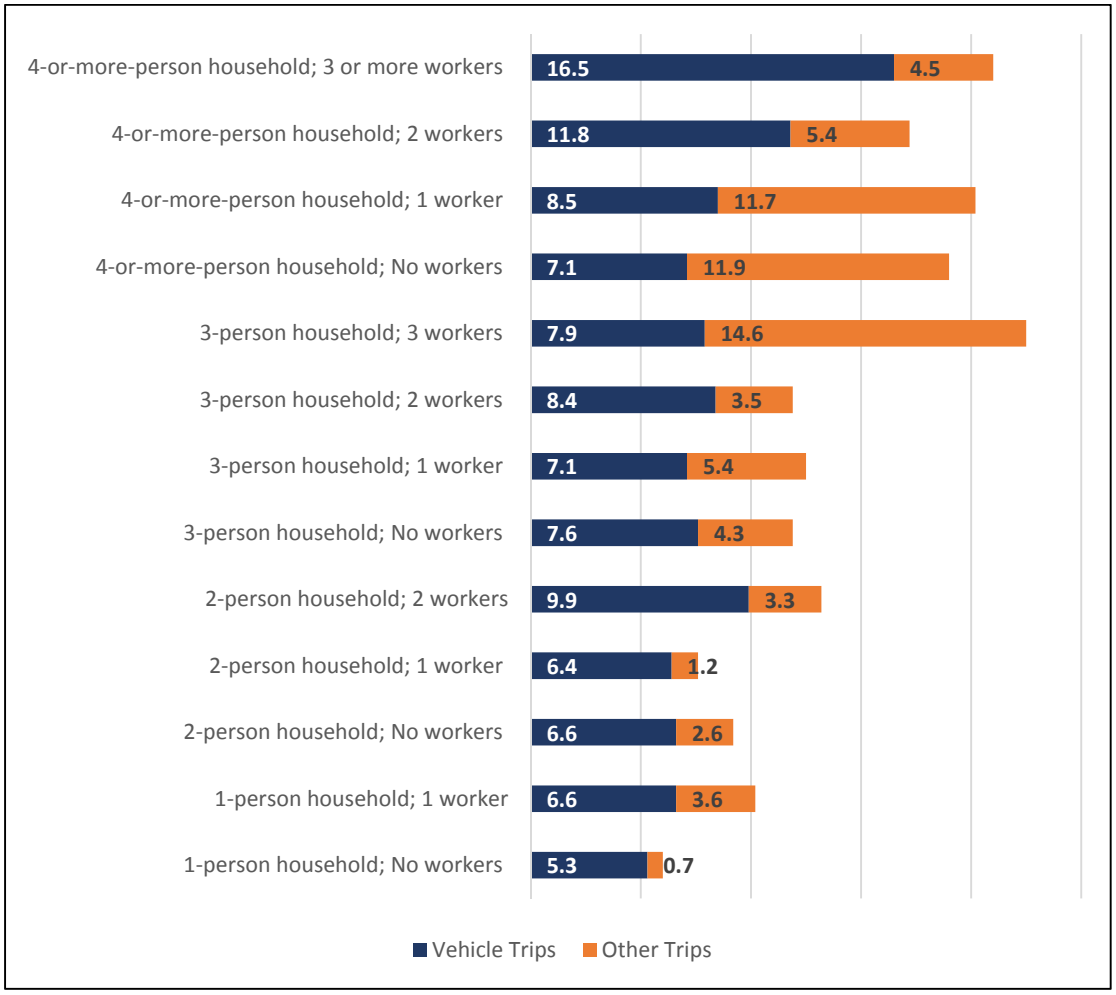


Figure 1-5 shows the person and vehicle trip rates for households in Michigan by the number of workers in the household (including households with no workers). With some exceptions, households with workers make more person trips by all means (driver, passenger, walk, transit) and more vehicle-driver trips. This table is reproduced for households with and without children in Appendix B.

Figure 1-5. Person and vehicle trips per household by household size and number of workers in the household



The characteristics of households—like how many people, workers, vehicles, and income—determine the amount of travel that the household produces. These factors are critical to understanding and forecasting travel demand in the state, and the data provided in this section can be used in conjunction with census estimates of households by type to calculate the amount of travel at various levels of geography.

1.2 Who Travels in Michigan: Travel Behavior of Different Groups of People

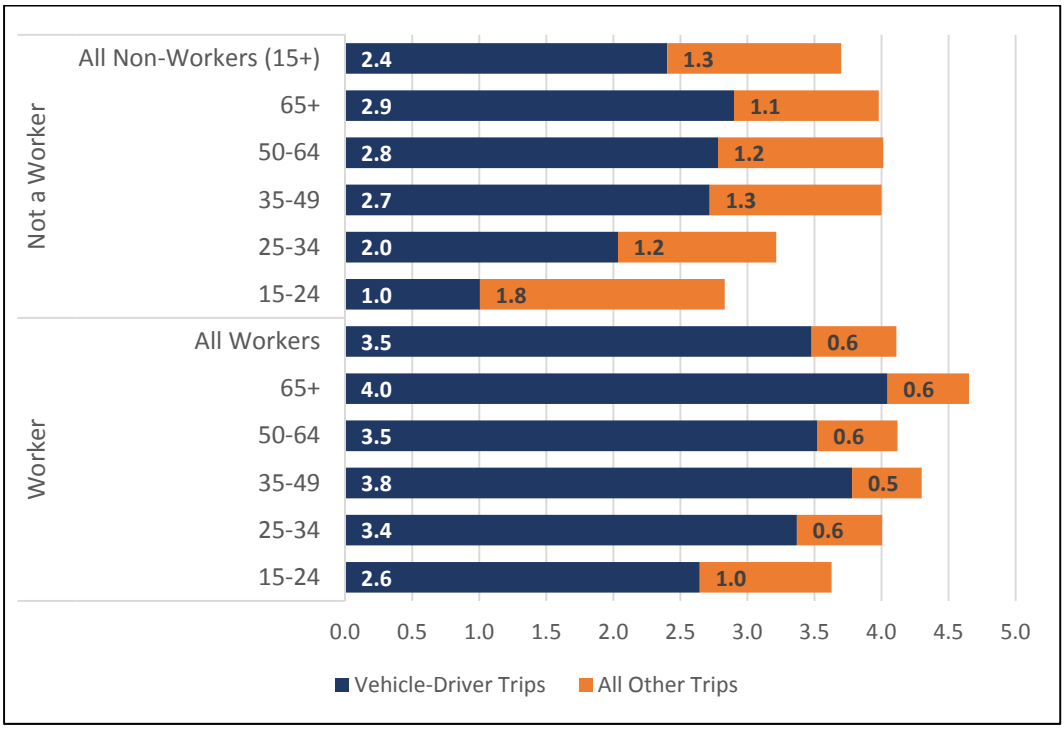
Understanding the demographics of who is using the transportation system is important for understanding the opportunities, constraints, and general level of mobility different travelers

experience. This is critical in forecasting because changing demographics can change the requirements and demands for the system over time. For example, the aging of the population creates challenges for safety and for providing continued mobility for people as they age. The oldest driver in the MTC III survey is 100 years old, but 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

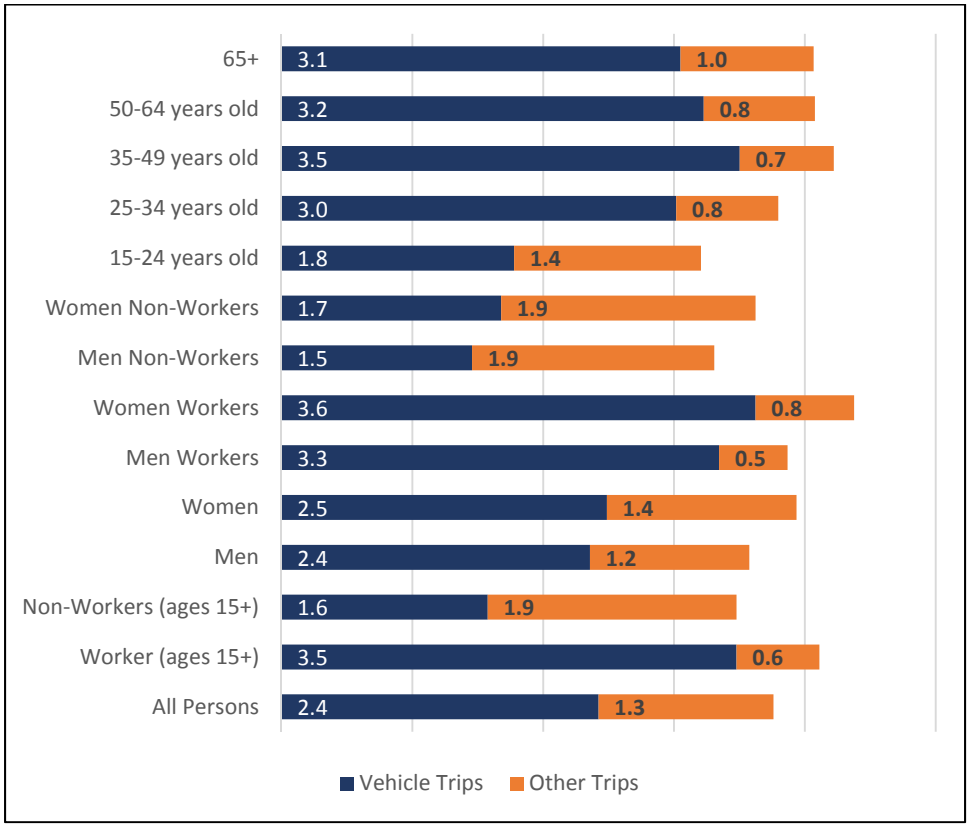
Worker status has long been linked with greater travel; workers commute on workdays and the commute is generally the longest trip for most daily travelers. Figure 1-6 shows the trip rates for workers and non-workers (15 years of age and older). Workers in every age group make more total trips and more vehicle-driver trips than non-workers. For example, non-workers age 15 and older make a total of 3.7 person trips per day (2.4 vehicle-driver trips plus 1.3 other trips). In comparison, workers make an average of 4.1 trips (3.5 vehicle-driver trips plus 0.6 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 errands—linked to their household responsibilities. In Michigan, women commute less than 11 miles to their jobs, on average, compared to 14.5 miles for men. However, in terms of the number of trips, as seen in Figure 1-7, women workers travel the most, with 3.6 vehicle-driver trips and 0.8 trips by all other means. Conversely, young people aged 15-24 have the lowest overall trip rates, with 1.8 vehicle-driver trips and 1.4 trips by all other means on an average weekday.

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



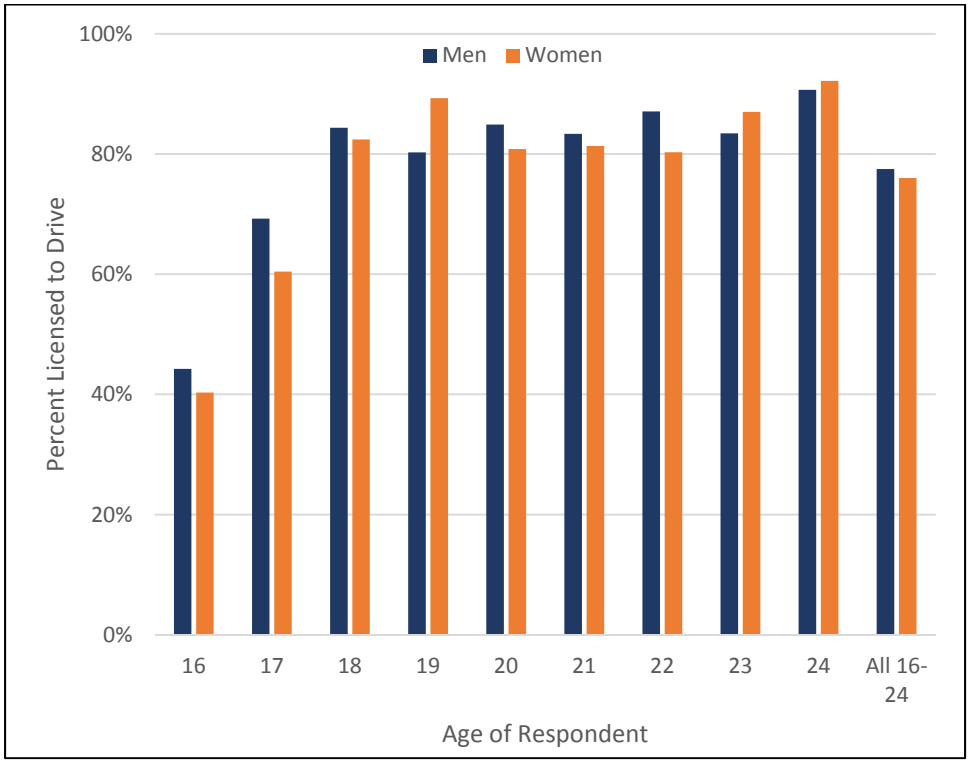
1.2.2 Licensed Drivers

Many states, including Michigan, have enacted graduated driver license programs, which have, in effect, delayed 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 that has delayed licensing in young people. 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.

Overall, almost a quarter of young people in Michigan (ages 16-24) are not licensed to drive. However, for both young men and women, the licensure rate climbs swiftly year by year and equalizes to the state average (over 90 percent licensed to drive) by age 24 (see Figure 1-8).

Figure 1-8. Comparison of men's and women's licensure status by age for people 16 to 24



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. When 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—significantly different compared to people aged 35-49, and nominally different than the other groups. In addition to delayed licensing, a smaller portion of young people are in the workforce—less than half of residents aged 16-24 are employed, compared to almost 75 percent of those aged 35-49. Interestingly, 15 percent of people 65 and older are still working.

Figure 1-9. Weekday trip rates by age

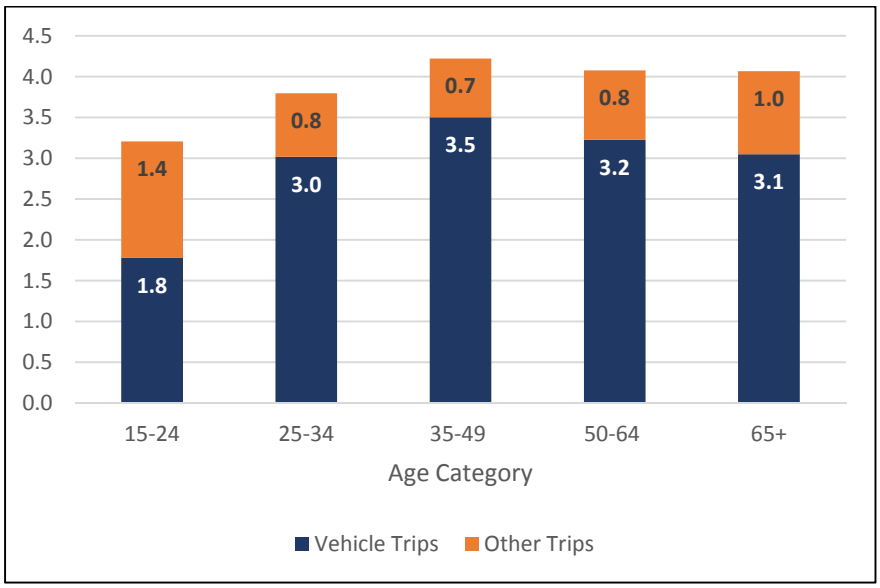
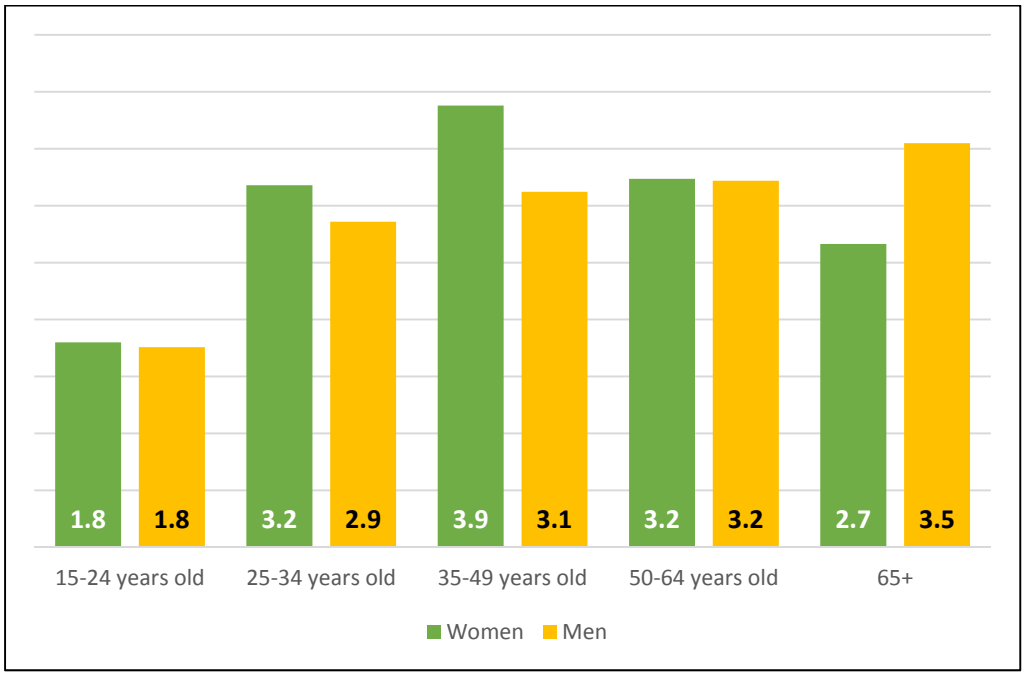


Figure 1-10 shows the differences in weekday **vehicle-driver** trips by age and gender. Women aged 35-49 years old have the highest rates—24 percent higher than men in the same age group. On the other hand, older women (aged 65+) drive 25 percent less than men in the same age group. For the youngest drivers (ages 15-24), men and women have exactly the same rate of vehicle-driver trips on an average weekday, although both are much less than the rate for 25- to 34-year-olds.

Figure 1-10. Weekday vehicle-driver 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).[2] It is difficult to develop trends for the youngest age group, but one can compare people who were 16-20 in 2015 with people who were 16-20 in 2005, which is shown in Figure 1-11.

The overall trip rates from the 2015 survey were higher than those obtained in 2005—3.8 per person compared to 3.45 in 2005. However, the 2015 survey indicates a slightly lower trip rate for young men and women aged 16-20, and also for young women aged 21-34 (the age groups are as reported in the 2005 documentation).

[2] 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. Person trip rate per weekday for younger age groups, 2005 and 2015

Lower travel rates by younger people are linked, in academic literature, to lower labor force participation, delays in licensing (mentioned earlier), and 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 MTC III 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: over 15 percent of the people aged 65 and older reported no travel of any kind on the assigned travel day in the MTC III survey. For older people who no longer drive, mobility can be so constrained that they have a difficult time shopping and socializing.

About 93 percent of people aged 65 and older are licensed to drive, and that share generally drops with age. 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 1-12. However, the majority of older people in Michigan are licensed to drive even after the age of 85.

Figure 1-12. Comparison of older men and women by licensure status

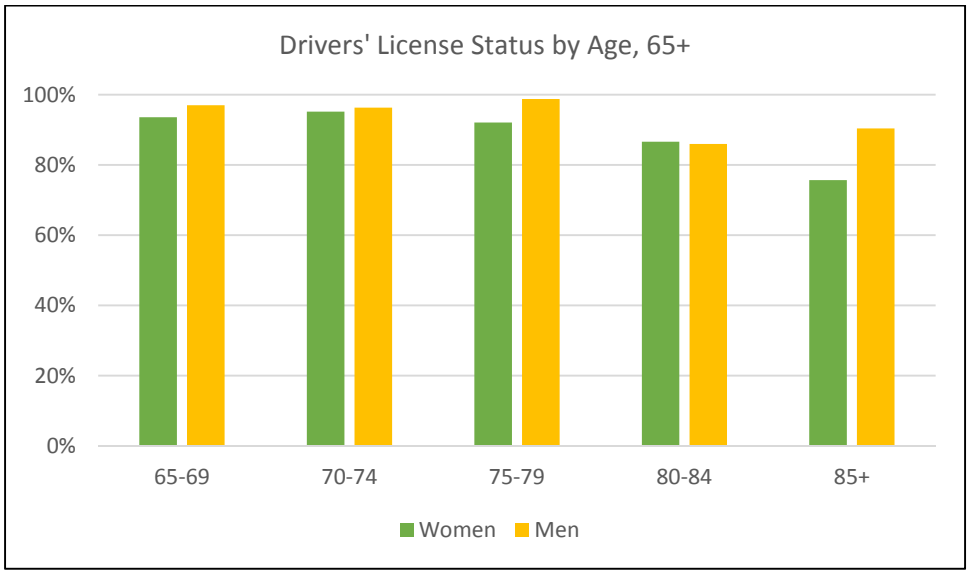
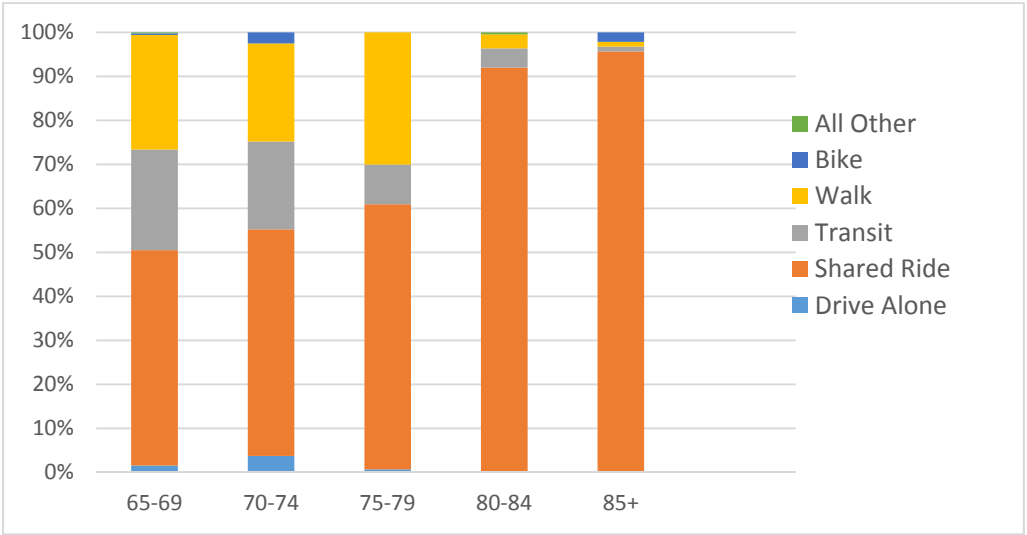


Figure 1-13 shows the means of transportation reported by older non-licensed travelers in Michigan. Many older non-drivers are heavily dependent on transit, walk, and rides from friends and family to get around. Up until age 80 older non-drivers report walking for about a quarter of their daily travel. After age 80 the clear majority of trips are made as a vehicle passenger.

Figure 1-13. Means of travel for older non-licensed travelers

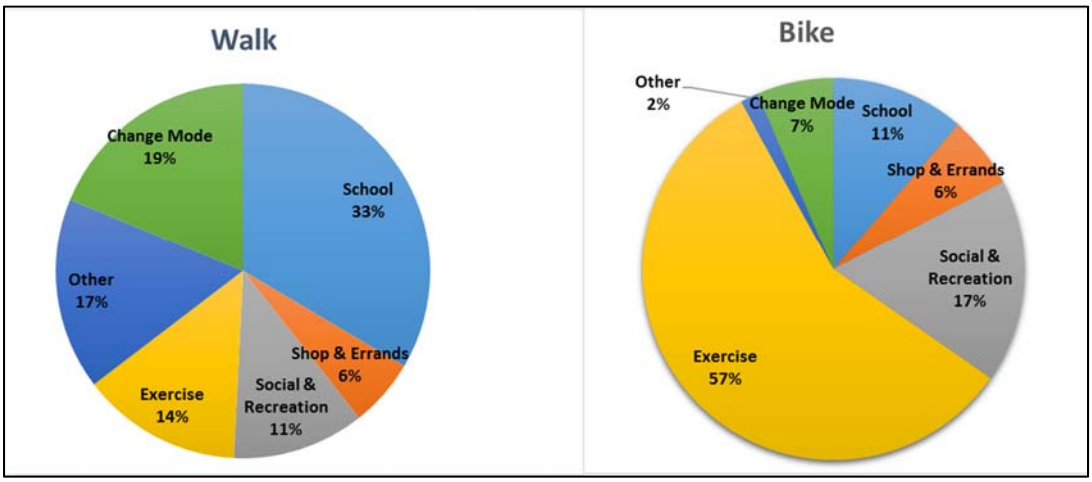


1.2.6 Travel by Children

Children are a special group because their travel is very different from adults'. Children are more likely to walk and bike, and planners and policymakers are concerned for their safety. Figure 1-14 shows the purpose of trips by walking and biking on weekdays for children in Michigan.

One-third of walk trips by children are walks to school, 19 percent to change mode (access public transit), and 14 percent are for exercise or recreation. Children who bike on a weekday do so for exercise or recreation 57 percent of the time, they bike to social or recreational activities 17 percent, and they bike to school for 11 percent of their trips.

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



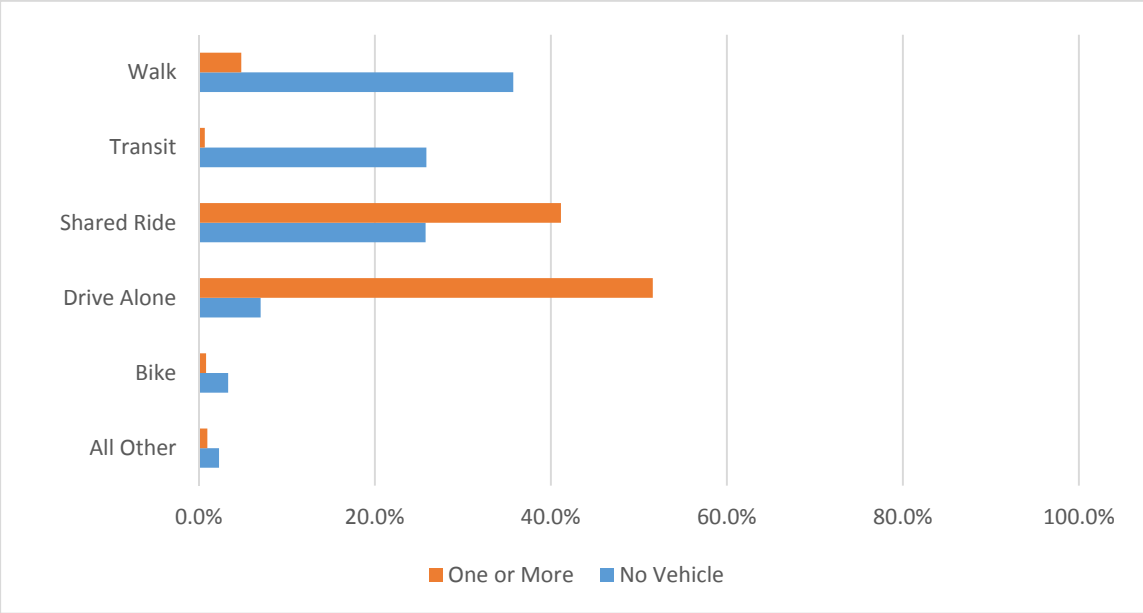
1.2.7 People with No Vehicles Available

Traditionally, people who live in households without a private vehicle available do make vehicle trips, but fewer vehicle trips than those in households with one or more vehicles available. This section details how people (aged 15 and older) living in households without a vehicle conduct their daily travel. This is an important issue looking forward with the growing availability of car travel via non-household vehicles, such as 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 Michigan living without a private vehicle in their household, walking and transit are the primary methods of getting around (35.7 percent of trips are by walk and 25.9 percent by transit, as shown in Figure 1-15). People in zero-vehicle households also drive (7 percent of daily trips) and bike (3.3 percent of daily trips) more than people in car-owning households.

People in households with one or more vehicles available significantly prefer using their own private vehicle to travel—more than 90 percent of all trips are made in a vehicle (51.6 percent as a driver and 41.1 percent as a passenger). 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 less than 5 percent of their trips, while less than one percent of all daily trips are made by transit.

Figure 1-15. Comparison of means of travel by people in households by whether a vehicle is available (ages 15 and older)



1.2.8 Conclusion: Who Travels

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 Michigan 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 Michigan are less likely to be drivers, with nearly a quarter of people aged 16-24 not licensed to drive. However, by the age of 24, young men and women have as high a licensure rate as the general population. At the other end of the age spectrum, older non-drivers in Michigan are very dependent on others for rides, but continue to walk and take transit to meet their daily mobility needs. People in households without a car available walk and use transit for most of their trips, but also travel in a vehicle for about a third of their weekday travel (7 percent drive alone and 25.8 percent share a ride).

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.

1.3 Why People Travel in Michigan

1.3.1 Overall Weekday Travel

People in Michigan travel on weekdays for a wide range of purposes—work, dropping off children at school, shopping, going out to eat. Figure 1-16 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-quarter 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 1-16. Distribution of weekday trip by purpose for three groups

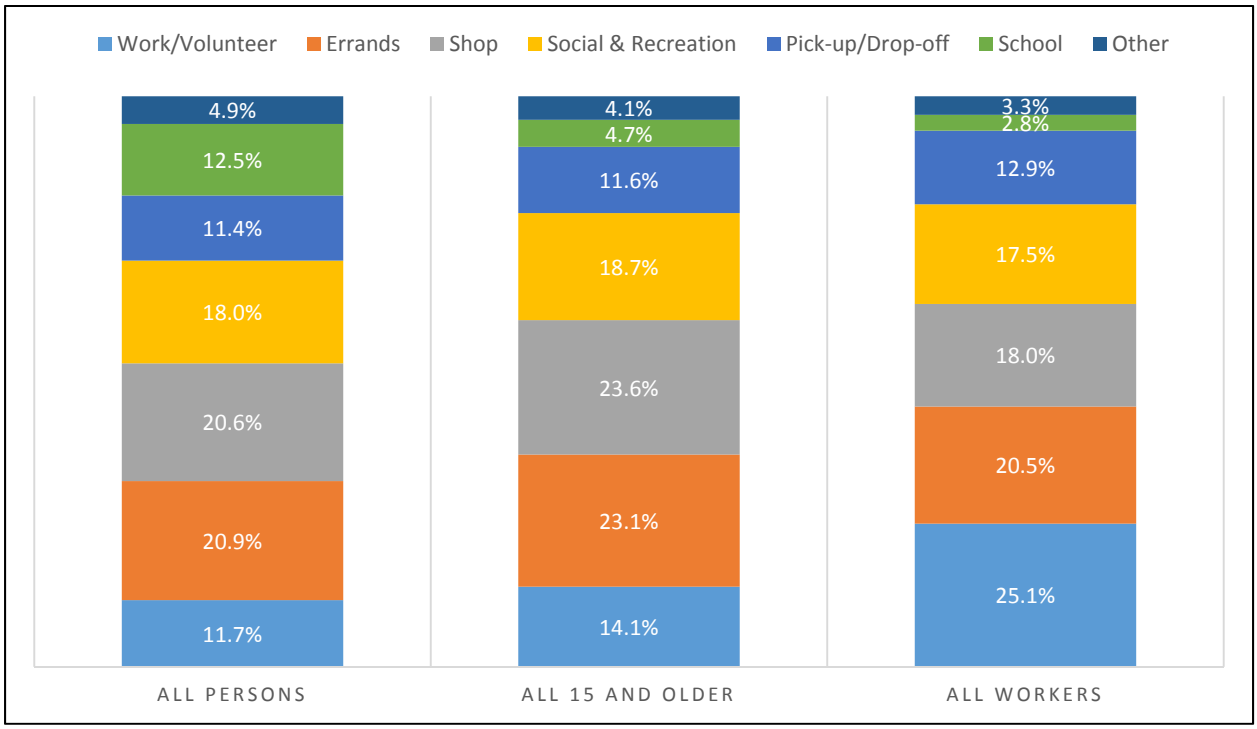
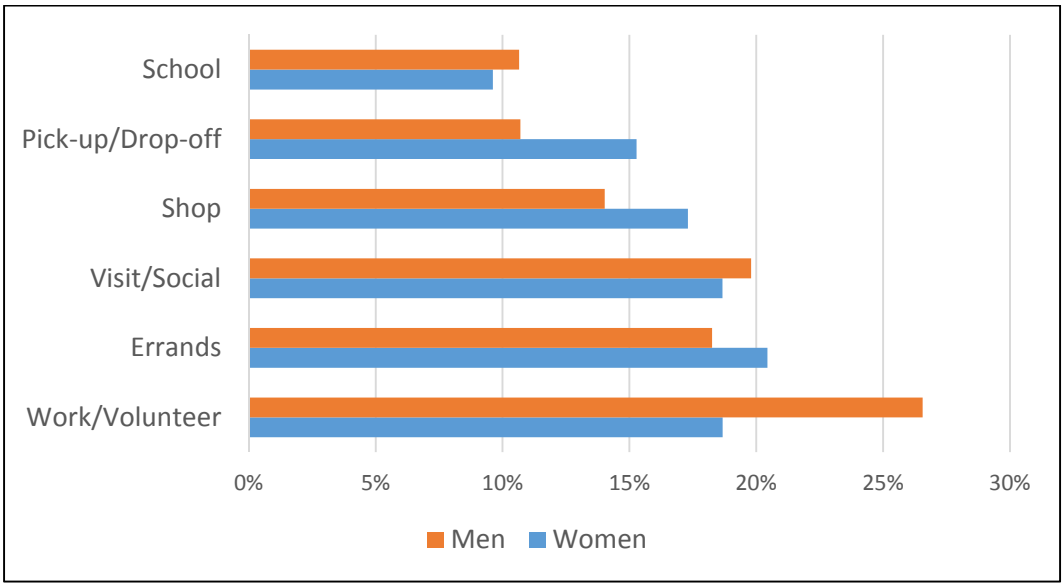


Figure 1-17 shows the percent of weekday travel by purpose by gender. While men have a statistically significant larger share of travel for work, women have a nominally larger share for pick-up/drop-off, shopping, and errands (not statistically significant at 95%). These differences reflect the gendered 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 1-17. Percent of weekday travel by purpose by gender



1.3.2 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 also 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 Michigan 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. The Census journey-to-work data are collected in a special tabulation called Census Transportation Planning Package (CTPP).

This rich source of data over 40 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 JTW data from MTC III, statewide and for the regional planning areas in Michigan (in Appendix B). In Table 1-3, the data on commuting by workers is compared to the most recent Census JTW data for Michigan. Understandably—because of the different time frames and methods—there are differences in the estimates. MTC III shows a slightly higher share for drive alone, and slightly lower for carpool and transit, which could be caused by day-to-day variation. MTC III estimates many more workers walking and biking to work, which may be because the MTC III survey was fielded during temperate months of the year.

Table 1-3. Comparison of means of travel to work, CTPP and MTC III

Means of travel to work	CTPP 2006-2010		MTC III 2015	
	Total	Percent	Total	Percent
Car, truck, or van – drove alone	3,527,070	85.9%	4,113,505	87.5%
Carpool	380,840	9.3%	306,429	6.5%
Walk and bike	113,945	2.8%	217,098	4.6%
Transit (including railroad and ferry)	53,245	1.3%	40,960	0.9%
All other methods	31,770	0.8%	23,152	0.5%

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

Figure 1-18 compares resident workers' usual commute to the actual travel day commute. As shown, if the worker indicated that he or she usually drove a car to work (row labeled "usual commute"), 94.8 percent of the time those workers drove a car to work on their assigned travel day (column labeled "on travel day commuted by"). However, if the worker indicated that he or she usually took transit, almost 15 percent of the time these workers drove a car, 15 percent of the time they got a ride, 27.3 percent of the time they walked, and 4.7 percent of the time they rode a bicycle. These

findings show less day-to-day variation—some call this greater "mode loyalty"—in vehicle commuting compared to other means of travel.

Also noteworthy are the workers who said they usually walk or bike to work. On the assigned travel day, a third or more of the workers who usually used non-motorized means either drove a car or rode as a passenger in a vehicle to work. Understandably, the behavior could vary because 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 provides 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.

Figure 1-18. Usual versus actual means of travel for commuting

Usual Commute:	*On Travel Day Commuted by:*				
	Vehicle Driver	Vehicle Passenger	Public Transit	Walk	Bike
Vehicle Driver	94.8%	2.7%	0.2%	1.9%	0.1%
Vehicle Passenger (Carpool)	38.0%	56.4%	0.3%	5.0%	0.1%
Public transit	14.9%	15.0%	37.5%	27.3%	4.7%
Walk	28.0%	7.0%	0.8%	60.2%	3.8%
Bike	24.9%	13.8%	0.5%	9.4%	51.1%

That being said, Figure 1-19 shows the mode share for commuting for each of the regions (also shown in Table B-6 in Appendix B). Notable differences in the means of travel to work are apparent for Ann Arbor, with larger shares of walk and transit compared to other areas.

Figure 1-19. Means of travel to work by region

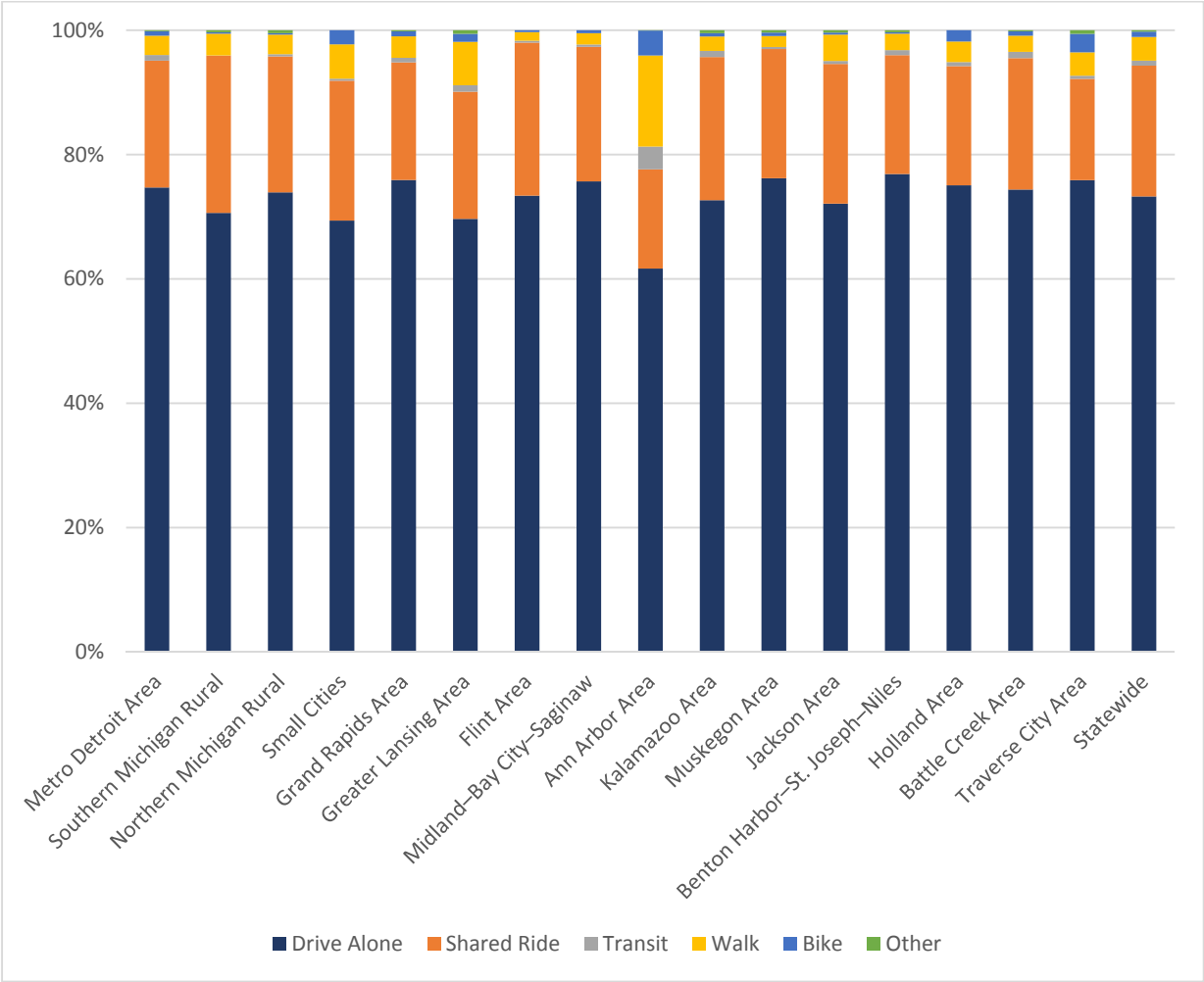
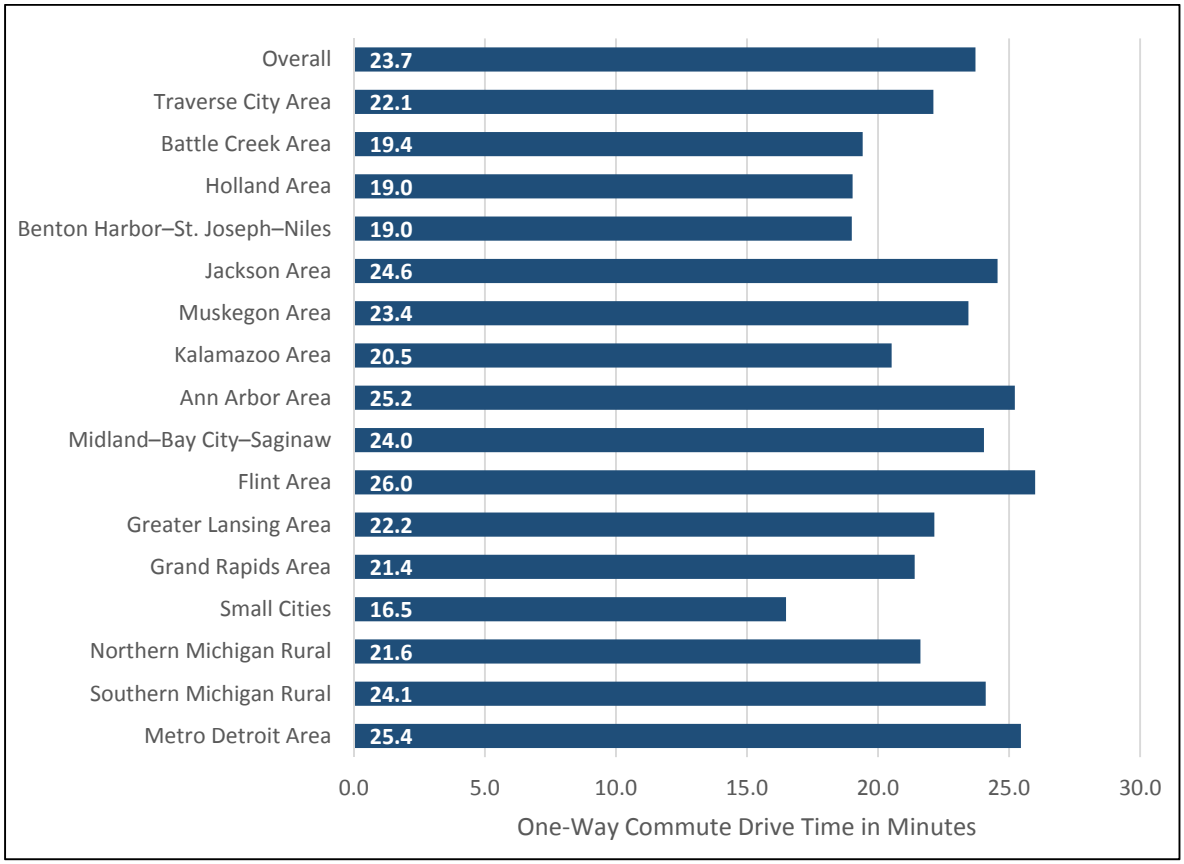


Figure 1-20 shows the average commute-trip duration (vehicle-driver trips) by region. Overall, workers in Michigan who drive to work average 23.7 minutes one-way (compared to an average of 23.9 minutes nationwide). Small cities have the shortest relative commutes—only 16 minutes (exactly the same as in the 2005 survey)—while the Metro Detroit Area and Flint Area have the longest commutes.

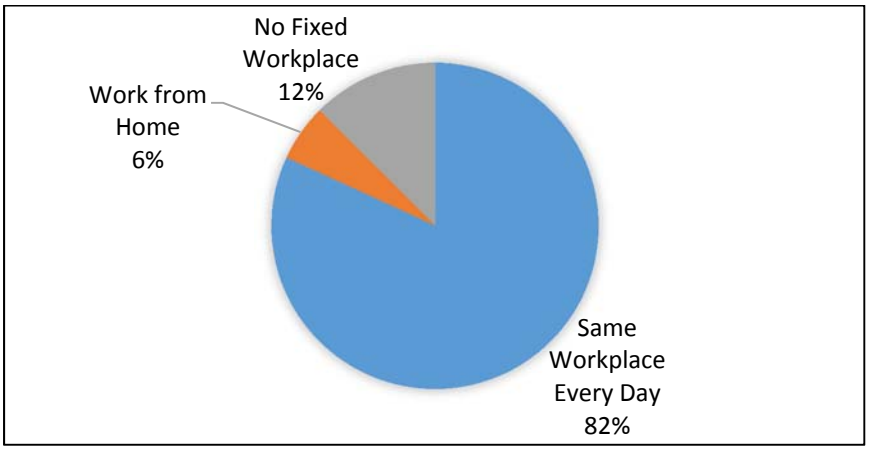
Figure 1-20. Average one-way commute duration (minutes) by region: vehicle trips by workers 15 and older



As the workforce changes, many more workers are working at home, working two jobs, and doing service jobs that have no fixed workplace. MTC III asked workers about these characteristics. Some of the day-to-day variation in travel mode may be a product of these changes in the workforce. For example, telecommuting is offered to almost 13 percent of Michigan's workers (12.8 percent), and when it is offered the average worker telecommutes 1.3 days per week.

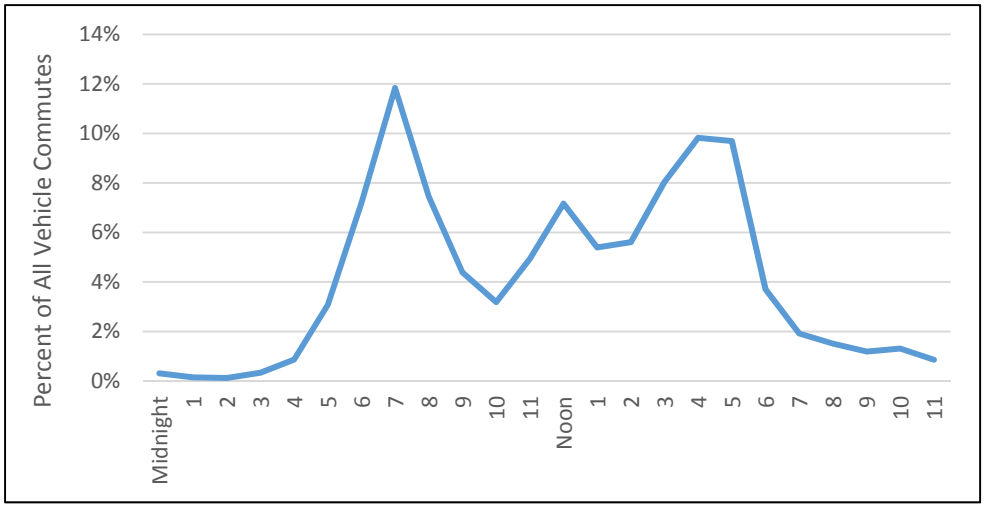
Figure 1-21 shows the distribution of workers by their workplace location. The majority of workers (82 percent) have a regular work location, 12 percent have no fixed workplace, and 6 percent said they worked only at home.

Figure 1-21. Workplace location



The average weekday distribution of vehicle commutes by hour of the day is shown in Figure 1-22. 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 1-22. Time of day of vehicle commute trips (survey period Monday-Thursday)

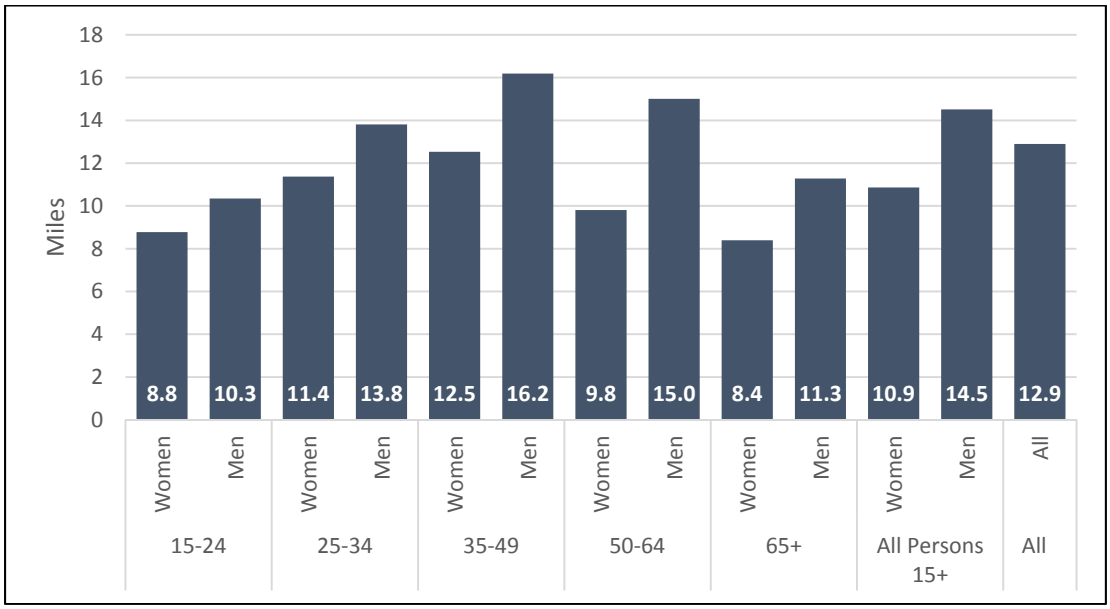


An average commuter in Michigan travels 12.9 miles to his or her job—almost one mile longer than the national average of 11.8 miles. The longest commutes are by people aged 35-49, while younger and older workers travel to jobs closer to home, as shown in Figure 1-23.

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

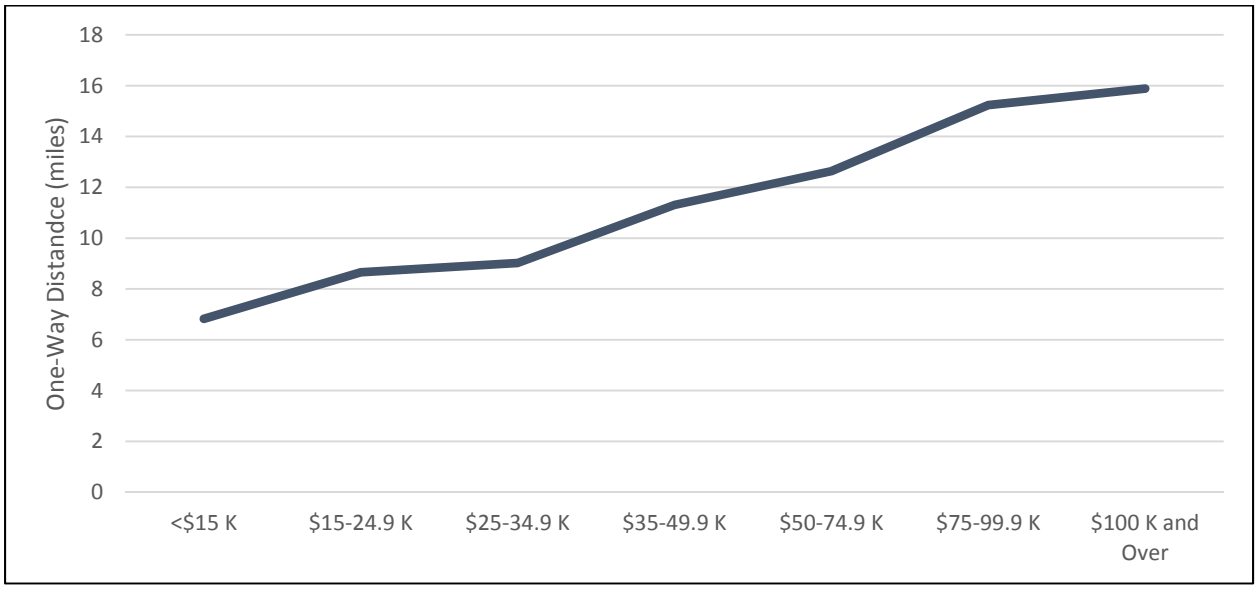
part-time, more often work in service and retail, and choose workplaces closer to home to balance childcare and household responsibilities, all of which correlates with shorter commutes.

Figure 1-23. Average commute distance by age and gender



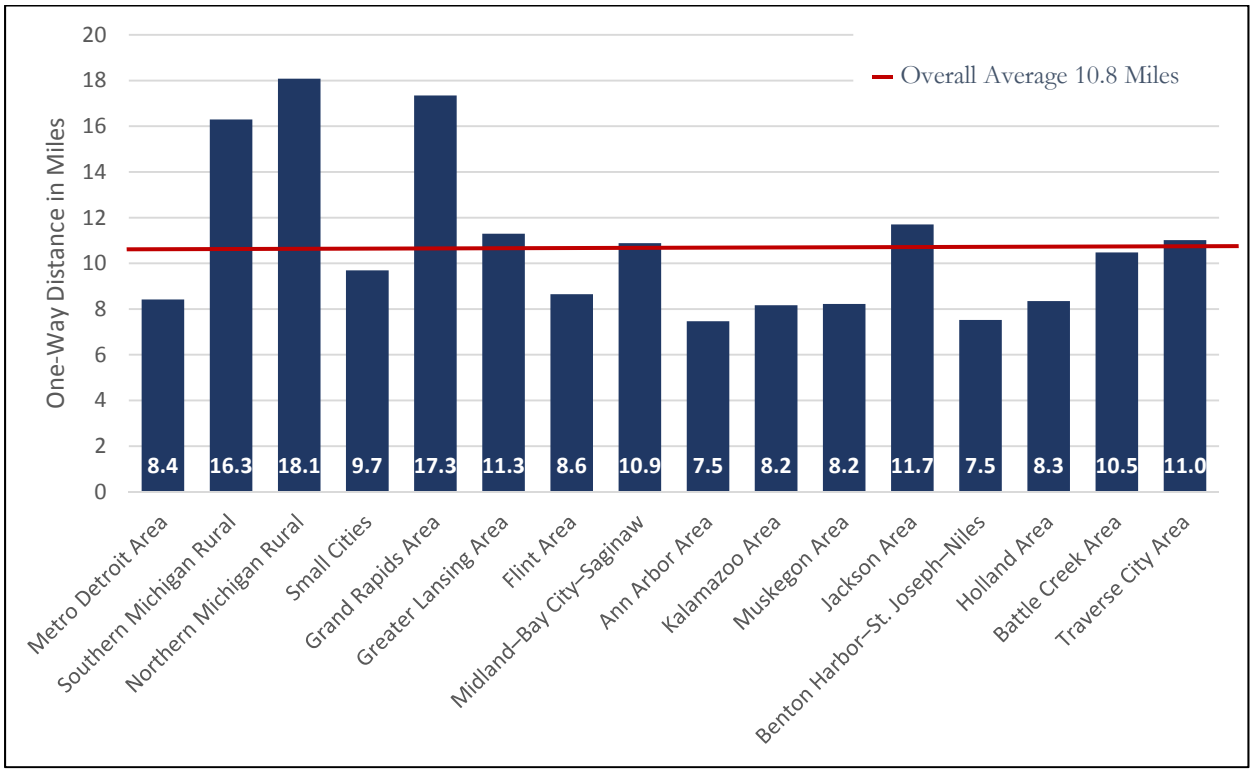
Commute distance is also highly correlated with household income, as shown in Figure 1-24. Workers in the highest-income households commute over twice as far as workers from households in the lowest income category. These data are reproduced for each region (with income categories combined) in Appendix B.

Figure 1-24. Average commute distance by household income



Distance is also a factor in other kinds of trips; for instance, travel to access health care. People in the rural areas of the state travel farther for medical services than others, as shown in Figure 1-25. While the overall state average for access to health care is 10.8 miles, people in the more rural areas of the state travel up to 50 percent farther.

Figure 1-25. Average trip distance to access health care by region



1.3.3 Conclusion: Why People Travel

The residents of Michigan travel for diverse reasons—social activities, shopping, errands, and work, and the distribution of those purposes is significantly influenced by gender, age, and working status.

The most common reasons for daily travel are shopping and social—travel for work is just 12 percent of trips by all people (including travel by children, older people, and non-workers), and 25 percent of trips by 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).

There is a gender difference in the distribution of trip purposes; for example, 26.6 percent of men's trips are for work as compared to 18.7 percent of women's. Pick-up/drop-off/accompany trips take

up the largest percentage of women's trips, accounting for 20.4 percent of women's trips and 18.3 percent of men's.

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. Overall, workers in Michigan who drive to work average about the same amount of time as the national average commute time, but they travel almost one mile farther. Men commute farther in every age group compared to women of the same age, and workers in higher income households commute farther than those in lower income categories. Small cities have the shortest relative commutes—only 16 minutes (exactly the same as in the 2005 survey)—while the Detroit area and Genesee County have the longest commutes.

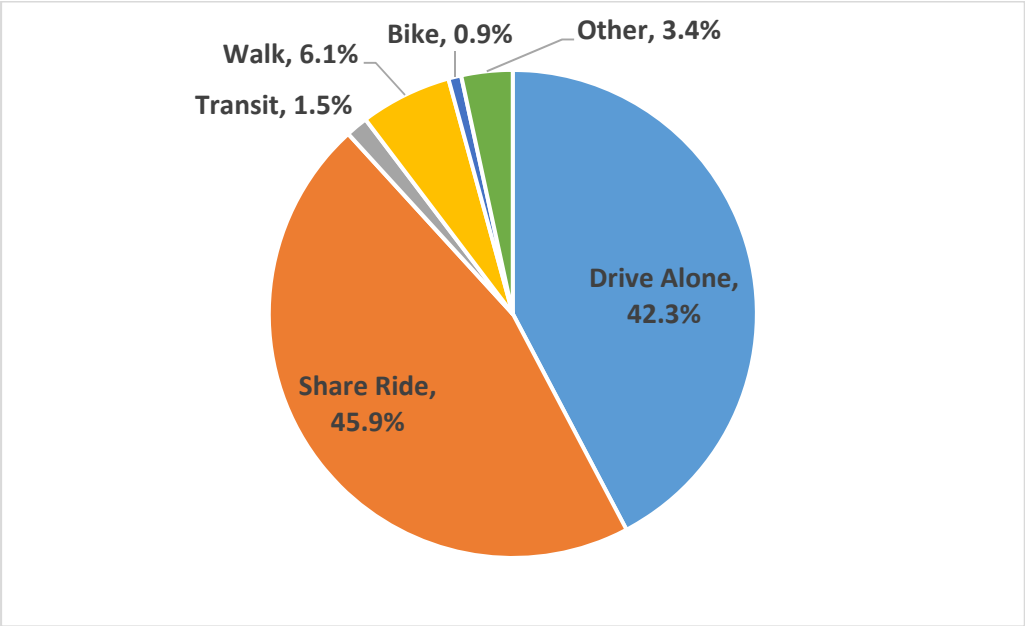
1.4 How People Travel in Michigan

It is critical to obtain information on how people travel in order to understand the use of the infrastructure in the state, as well as to assess safety, livability, air quality, and other important policy areas. The MTC III survey collected information about the means of travel for every trip and for every person in the household. This section analyzes the information on means of travel.

1.4.1 Overall Weekday Travel

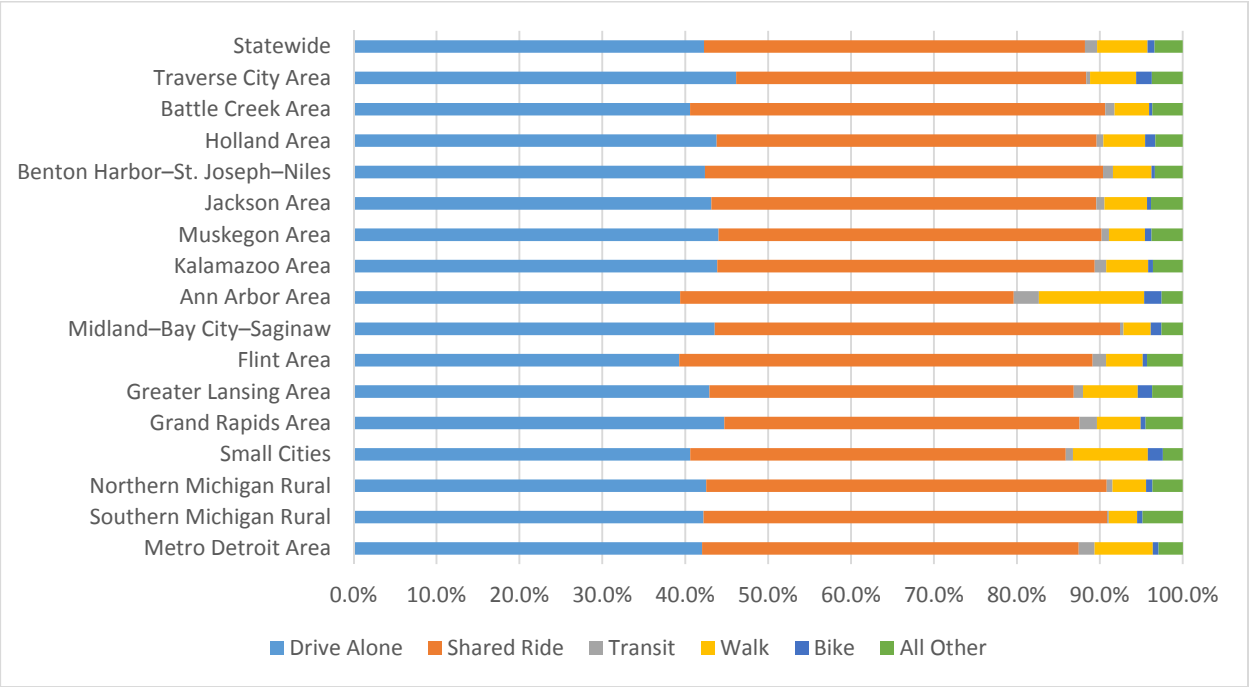
Overall, 42.3 percent of weekday trips are by people who drive alone, with another 45.9 percent made by people riding as passengers in a vehicle. Walking is used for 6.1 percent of weekday trips, followed by transit (1.5 percent), bike (0.9 percent), and all other means (3.4 percent), as shown in Figure 1-26.

Figure 1-26. Means of travel by all people for all trip purposes, weekday



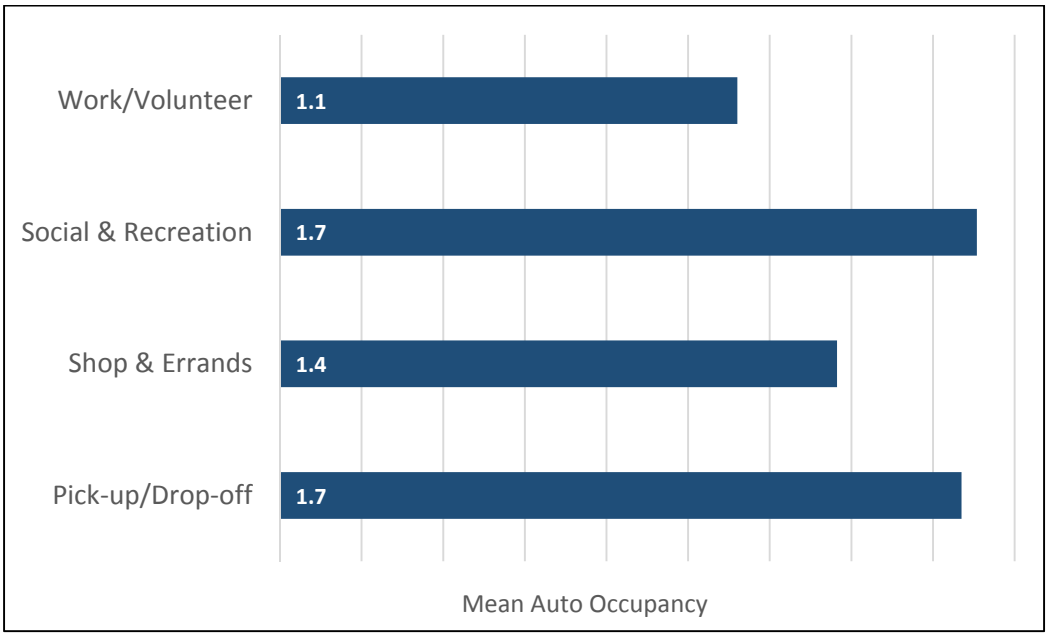
Location is important for understanding differences in how people travel across the region: in areas where densities and infrastructure support other means of travel—places with sidewalks and crosswalks, bike paths, and good local transit—the amount of walking, biking, and transit is higher compared to other areas. The proportion of weekday trips by different means of travel for each region is shown in Figure 1-27. Similar to the means of travel to work, notable differences are shown between Ann Arbor and other areas in the proportion of walk, bike, and transit trips for daily travel.

Figure 1-27. Proportion of weekday trips by means of travel by region



Auto occupancy rates also vary by trip purpose (as shown in Figure 1-28). The lowest occupancy rate is for the work since driving alone is by far the dominant mode of choice for work trips in Michigan. People tend to share rides more for travel not related to work. Social & recreation trips have the highest occupancy rate, followed by shopping and errands.

Figure 1-28. Mean auto occupancy by trip purpose

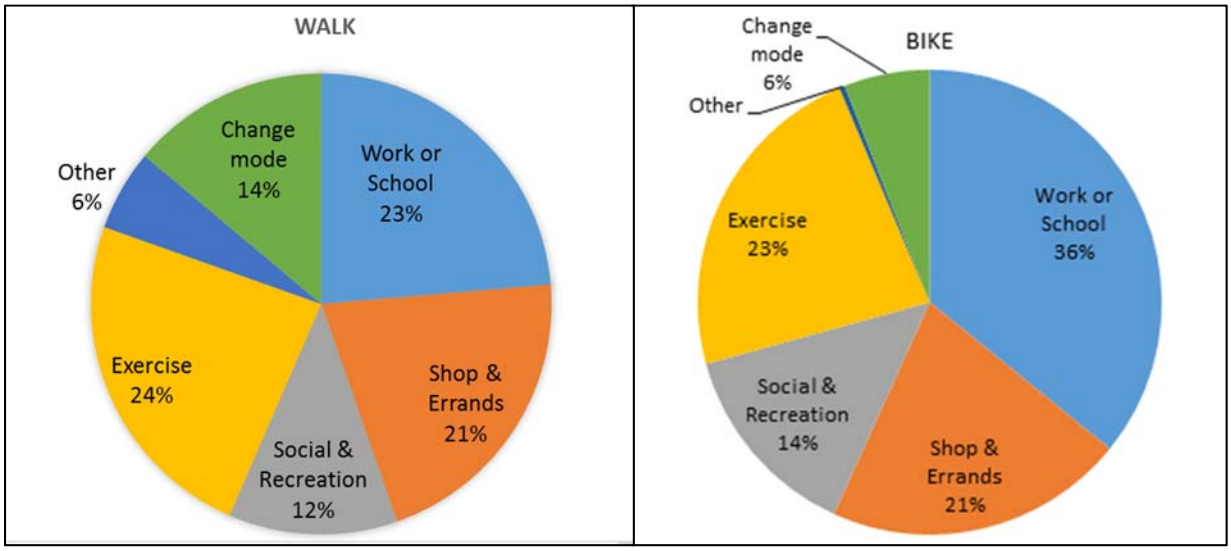


1.4.2 Active Travel

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 1-29 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 1-29. Walk and bike trips by people aged 15 and older by purpose, weekdays



1.4.3 Conclusion: How People Travel

Travel in Michigan relies heavily on the private vehicle as the primary mode of transportation. People traveling together are the highest proportion of trips (45.9 percent) because people in households travel together. Drive alone trips (42.3 percent of all) are the next most common, led by commuting which has the highest rate of drive alone when compared to other trip purposes.

Transit and walking represent a small share of total daily travel in the state. The small mode share for transit is partly explained by the differences in transit availability and frequency in different areas around the state. 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: people travel together for social and recreational reasons, families travel together to shop, and people drive alone to work—travel to work has the lowest occupancy rate of all the trip purposes.

While travel in Michigan is predominantly by private vehicle for all segments of the population, there are some discernable differences in mode choices, which are mostly determined by household income, vehicle availability, and having a driver's license. As a result, these household and personal

characteristics will help identify the groups that are most likely to utilize or be in need of transportation alternatives.

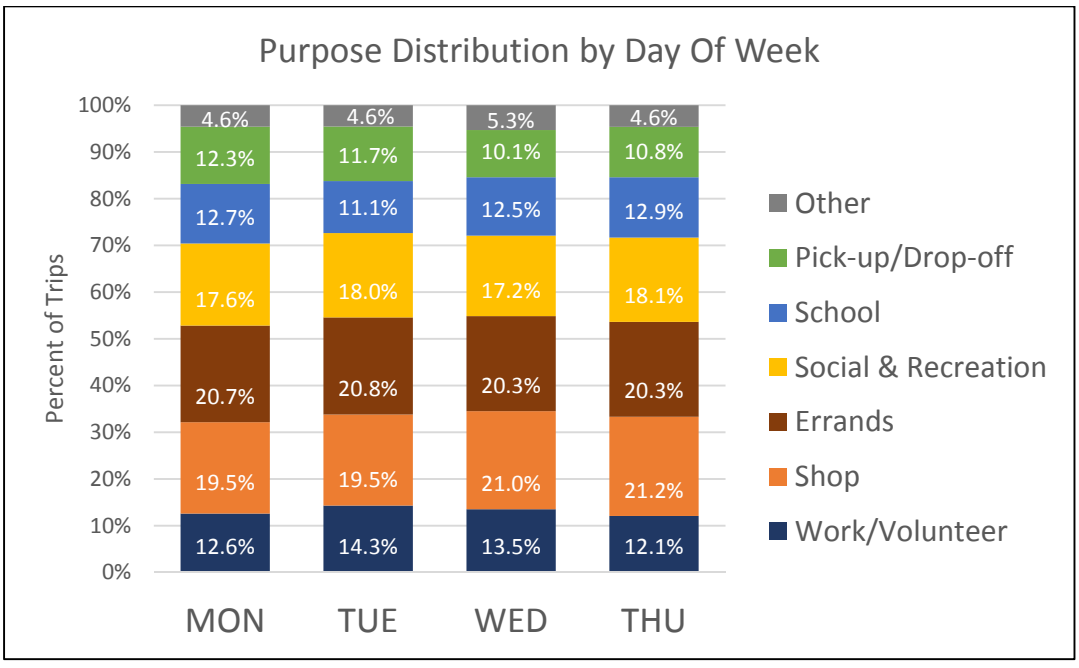
1.5 When People Travel in Michigan

The survey obtained information on travel throughout the day for respondents, and the amount of travel in time (duration) as well as the time of day of each trip was recorded. This section looks at some of the patterns in the time of day of travel, and summarizes differences in total time spent traveling by different groups of people.

1.5.1 Travel Distribution by Day of Week

Trip distribution by purpose for each of the four sampled weekdays is shown in Figure 1-30. As expected, weekday travel is very consistent from one day to the next. There is little variation across weekdays in the purpose of travel.

Figure 1-30. Person trip distribution by purpose for each travel day of the week

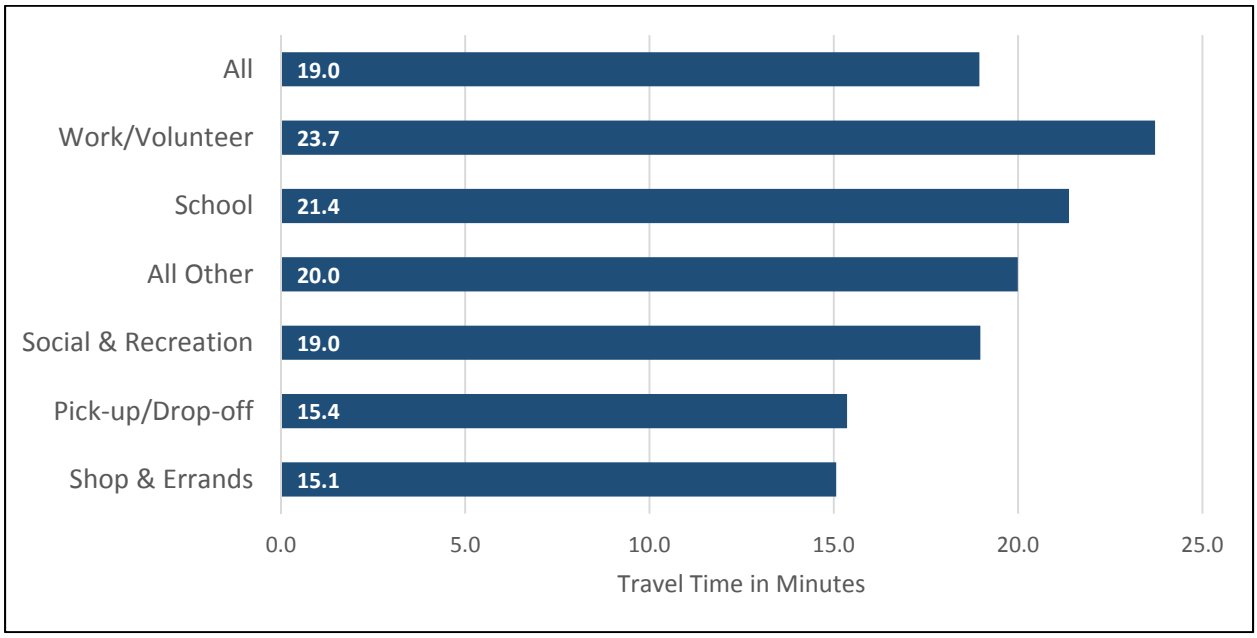


1.5.2 Average Trip Length and Duration

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, an average commute is often measured in minutes per trip, but also sometimes in a 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 where people were "stuck" in their houses, but had to find jobs farther from home. This resulted in a measurable increase in the "average" distance between home and work (nationwide).

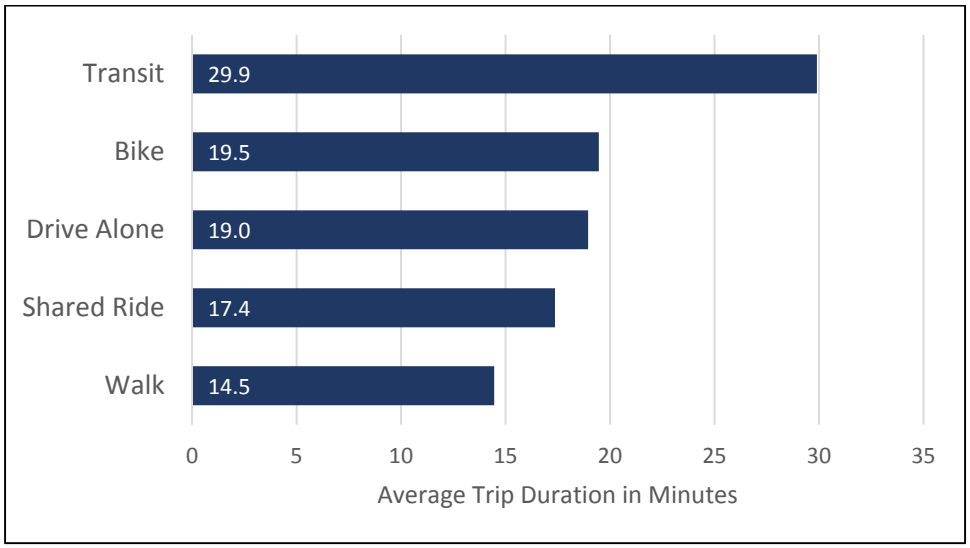
Figure 1-31 shows the average trip duration in minutes for vehicle-driver trips for different purposes. As expected, work trips (including volunteer activities) have the longest travel time, while trips for errands and pick-up/drop-off of passengers (for example, dropping off children at school) are the shortest. The trip duration for people who drive to school (for example, college students) is second only to work commutes.

Figure 1-31. Average weekday trip duration (minutes) by purpose: vehicle driver trips by people aged 15 and older



The means of travel is also related to trip duration. Figure 1-32 shows the average trip duration by means of travel for the state for all purposes. Overall, walking trips are of the shortest average duration, while transit trips (often used for JTW) have the longest duration.

Figure 1-32. Average trip duration (minutes) by means of travel, all purposes



Average trip duration by the income of the household is shown in Table 1-4. There is not a clear relationship between household income and trip duration, as was shown for household income and commute distance in Figure 1-24.

Table 1-4. Average trip duration by household income, all purposes and all means of travel

Household income category	Average trip duration
Not ascertained	19.4
<$15 K	18.7
$15 K-24.9 K	18.4
$25 K-34.9 K	18.2
$35 K-49.9 K	17.4
$50 K-74.9 K	19.0
$75 K-99.9 K	19.7
$100 K-124.9 K	18.6
$125 K and over	19.7

1.5.3 Weekday Time Spent in Vehicle Travel

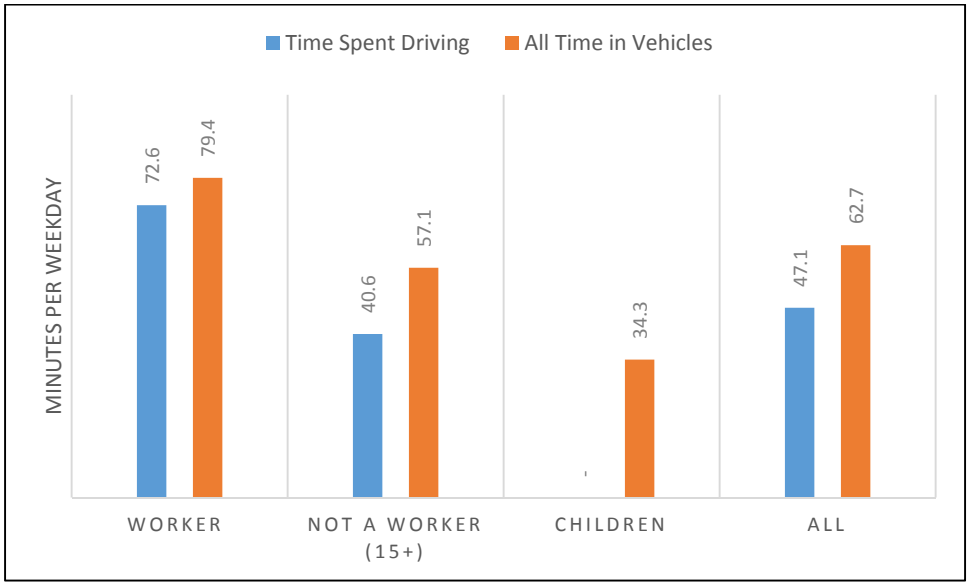
Examination of overall daily time spent in travel lends greater insight into how trip-making patterns affect people's daily lives in terms of time use. Time spent in travel is generally considered a "dis-

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 "utility" to the traveler, such as trips that are specifically taken for pleasure or exercise.

In this section only time spent in a vehicle is measured—this includes time spent as a driver or as a passenger. This metric does not include long-distance travel, which might include road trips taken for pleasure. The value of a metric like "time spent in vehicle 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 Michigan's travelers. The range of miles traveled in a vehicle is a measure of the distance covered by people's usual activities in a travel day (excluding longer-distance trips and leisure trips such as an evening walk).

Nationwide, the time spent in a vehicle—as driver or passenger—is about an hour on a typical day. However, children and retired people spend much less time in a vehicle than workers. The same is true for people in Michigan. The time spent traveling in vehicles on a weekday—as drivers or passengers—is just over an hour per day (62.7 minutes). However, workers spend almost 80 minutes per weekday in a vehicle, and 91 percent of that time they are driving. Non-workers, on the other hand, spend less than an hour per weekday in vehicles (57.1 minutes) and are driving only 70 percent of the time (shown in Figure 1-33).

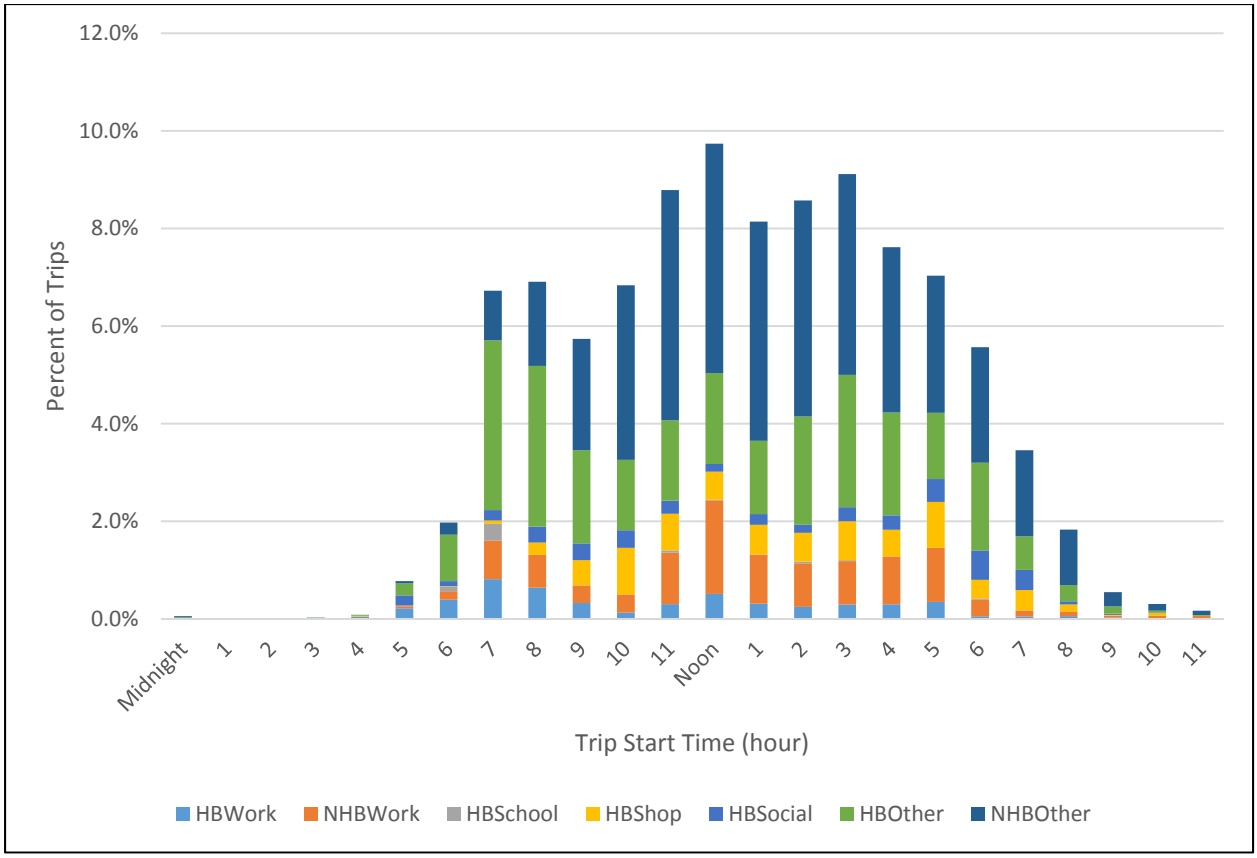
Figure 1-33. Minutes per weekday spent in vehicles by worker status



1.5.4 Time of Day of Travel

The percent of person trips by start time is shown in Figure 1-34. The trips to and from work (Home-Based Work and Non-Home-Based Work trips, shown in the bottom two categories of the bars in the chart, show the typical peak period distribution. On the other hand, shopping, social, and non-home-based "other" trips build throughout the day and evening periods. The largest proportion of trips start around noon, and overall trip-making is highest between 11 am and 3 pm. This could be a result of people going out—or home—for lunch, running errands at lunchtime, or shiftwork.

Figure 1-34. Person trips by start time (hour) and general purpose[3]



[3] General Purposes assign the trips by purpose for both the origin and destination. "HBWork" indicates a trip directly from home to work or work to home, "HBShop" is a trip directly from home to shop and shop to home, etc. "NHBWork" is a trip with one end at work but the other not at home, for instance a trip from "drop-passenger" to work or from work to lunch. "NHBOther" is the largest share, and indicates trips in chains, such as a trip from one shop to another.

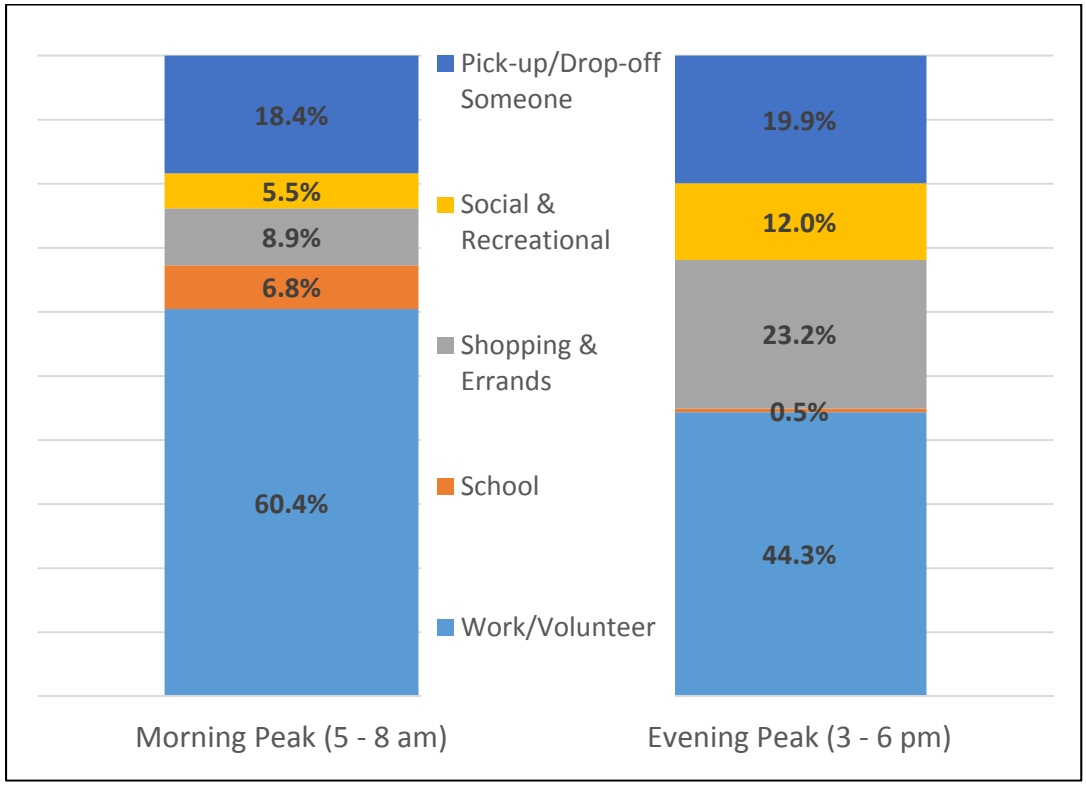
Figure 1-35 shows the distribution of weekday vehicle trips by purpose during the morning and afternoon peak periods (in this analysis, 5 to 8 am and 3 to 6 pm). As shown, the peak period includes travel for a wide range of purposes, including commuting.

More non-work travel occurs in the afternoon and evening peak period, compared to the morning. Weekday trips for social, recreational, and shopping constitute more than a third of evening peak travel.

In the morning peak, 60.4 percent of the vehicle trips are commutes and another 18.4 percent are trips to drop off someone (these are often at work or school).

In the afternoon peak period, less than half (44.3 percent) of the vehicle trips are commutes, with an equally large share of pick-up/drop-off (19.9 percent) in the afternoon compared to the morning peak. The afternoon peak period also has a large share of vehicle trips for shopping/errands (23.2 percent) and social and recreation (12.0 percent).

Figure 1-35. Percent of vehicle trips by purpose, weekday peak periods



1.5.5 Conclusion: When People Travel

The average resident of Michigan spends over an hour in a vehicle on an average weekday. The longest vehicle trips are for commuting and traveling to a school or university, while the shortest are for shopping and errands. There is not much variation across the weekdays in daily travel by purpose.

However, the diurnal patterns are interesting. In the morning peak 60.4 percent of the vehicle trips are commutes and another 18.4 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 (44.3 percent), with an equally large share of pick-up/drop-off in the afternoon (19.9 percent). The afternoon peak period also has a large share of vehicle trips for shopping/errands and social/recreation. These trips build in volume throughout the day and evening.

1.6 Long-Distance Travel

The underlying premise of daily travel is that people fulfill their need for employment, goods, and services by accessing those opportunities through travel outside of the home. In contrast, there is no similar underlying premise for long-distance travel—those trips to a destination 100 miles or more from home. Beyond travel required as part of one's job (in Michigan only 12.8 percent of long-distance trip-making is business travel), it is complicated to account for all the factors that combine to motivate people to embark on a long trip.

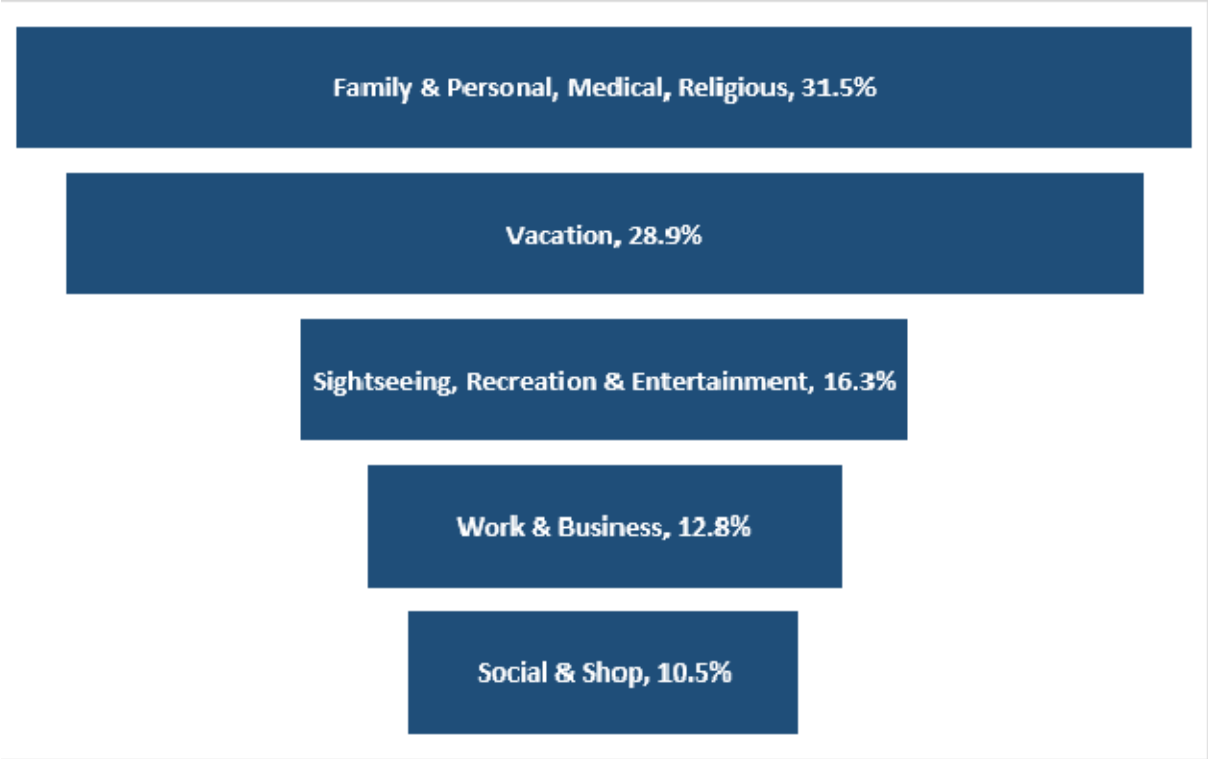
Quite a large percentage of the population had not engaged in long-distance travel in the last three months. About 43.5 percent of households in the state report no trips of 100 miles or more in the last 3 months. This ranges from a high of 47.5 percent (in the Metro Detroit Area) of households with no long-distance travel to a low of 28.9 percent in the Traverse City area. The variation across the regions in the state is shown in Table 1-5.

Table 1-5. Percent of households with zero long-distance trips by region

Region	Percent of households with zero long-distance trips
Metro Detroit Area	47.5%
Southern Michigan Rural	43.8%
Northern Michigan Rural	35.6%
Small Cities	40.3%
Grand Rapids Area	39.4%
Greater Lansing Area	38.0%
Flint Area	47.7%
Midland–Bay City–Saginaw	42.5%
Ann Arbor Area	33.9%
Kalamazoo Area	38.5%
Muskegon Area	43.2%
Jackson Area	43.8%
Benton Harbor–St. Joseph–Niles	43.0%
Holland Area	36.0%
Battle Creek Area	48.5%
Traverse City Area	28.9%
Overall	43.5%

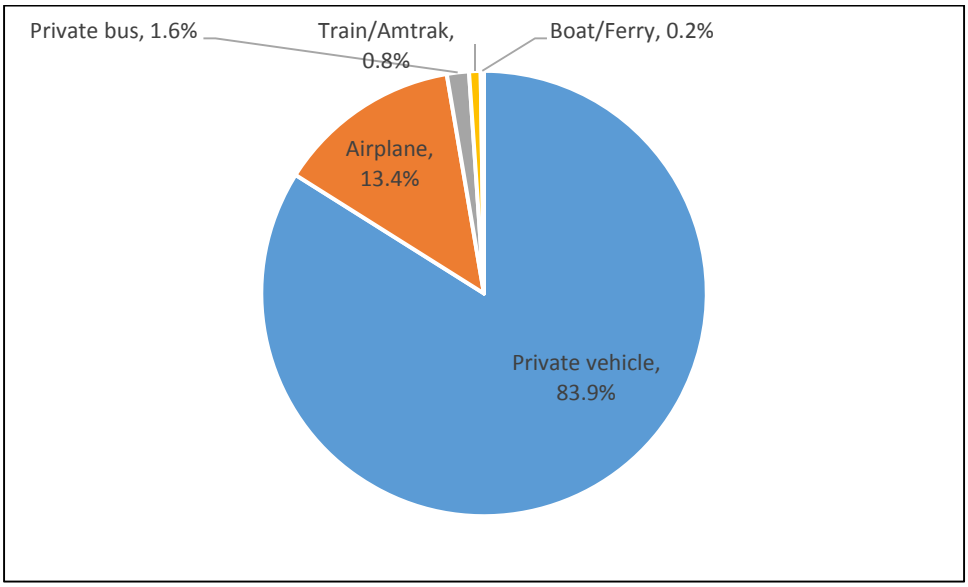
The purpose of the long-distance travel reported in MTC III is shown in Figure 1-36. Family and personal reasons—including weddings, funerals, and reunions—combined with medical and religious travel is the reason for 31.5 percent of long-distance trips. Vacation accounts for 28.5 percent with sightseeing, entertainment, and recreation another 16.3 percent. Work-related long-distance travel accounts for 12.8 percent, and shopping and social activities are the remaining 10.5 percent of trips.

Figure 1-36. Purpose of long-distance travel by Michigan residents



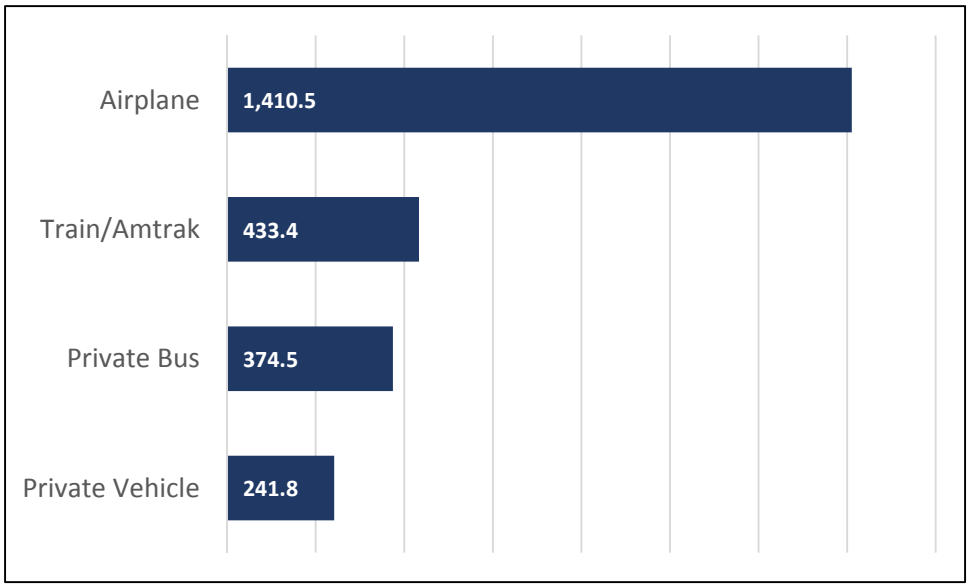
The distribution of long-distance travel by how people traveled is shown in Figure 1-37. Private vehicle is used for over four out of five trips of 100 miles or more (83.9 percent) while air is used for 13.4 percent. Private bus, Amtrak, and boats each account for a very small share of the long-distance travel market in Michigan.

Figure 1-37. Means of travel for long-distance trips by Michigan residents



People use different means of travel for trips of different lengths, as shown in Figure 1-38. Airplane is used for much longer trips than private vehicles, for example.

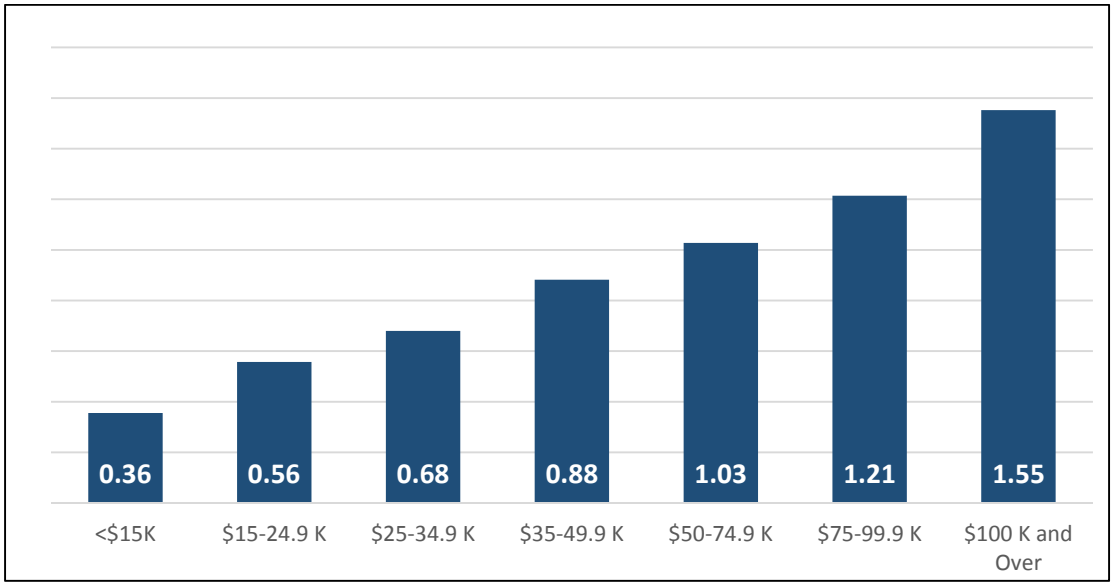
Figure 1-38. Average distance in miles by means of travel for long-distance trips



The characteristics of households that reported no long distance trips are quite different from those reporting travel. The zero-long-distance trip households average less than one worker (0.9) compared to 1.3 workers in households reporting long-distance travel. The average income of households reporting no long-distance travel is about $35,000 compared to the $80,000 income of

households reporting one or more trips, and the amount of long-distance travel—like daily travel—is directly related to the income of the household. Figure 1-39 shows the average long-distance trip rate for households by income.

Figure 1-39. Average long-distance trips in the last 3 months by household income, Michigan residents



After couples without children (not including retired), families with children are the most likely to travel long distance, as shown in Figure 1-40. At the other end of the spectrum, single-parent households are the least likely to travel long distance, followed by single-person households.

Even with such close proximity to Canada, only 1.6 percent of long-distance trips are reported to Canada (Table 1-6). The vast majority of the trips—96.9 percent—are reported within the United States and of those over half (53.3 percent) are within the state (Table 1-7).

Figure 1-40. Percent of households who traveled for long distance in last 3 months by lifecycle

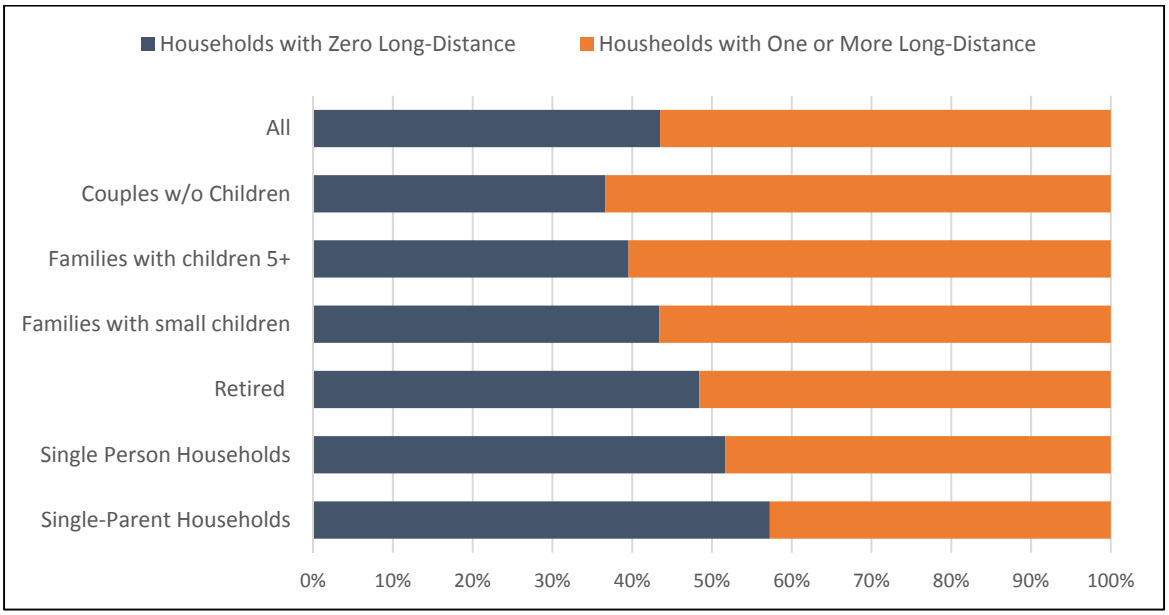


Table 1-6. Percent of long-distance trips by country of destination

Destination country	Percent of long-distance trips
United States	96.9%
Canada	1.6%
Mexico	0.2%
All other	1.4%

Table 1-7. Percent of long-distance trips by state of destination (U.S. trips only)

Destination state	Percent of long-distance trips
Michigan	53.3%
Illinois	6.4%
Florida	6.0%
Ohio	5.8%
Indiana	4.0%
Wisconsin	2.2%
Tennessee	1.7%
California	1.3%
Pennsylvania	1.2%
Texas	1.1%
Kentucky	1.1%
New York	1.0%
All other	15.0%

1.6.1 Conclusion: Long-Distance Travel

The most common purpose for long-distance travel is family and personal reasons at 31.9 percent, followed by vacation (28.9 percent) and sightseeing, entertainment, and recreation (16.3 percent). Business trips constitute just 12.8 percent of travel over 100 miles from home by Michigan residents.

The private automobile remains the primary mode of travel for all long-distance trips, at 83.9 percent, with air travel a robust 13.5 percent of trips. Air also accounts for a larger share of the Metro Detroit Area's long-distance trips than the other regions, due to the presence of a major airport. However, people in the Metro Detroit Area are the least likely of any region to travel long distance. The variation in the percent of households that travel long distance and the ones that report no long-distance travel in the past 3 months is quite high across the regions. While households in the Metro Detroit Area are the least likely to report long-distance travel (47.5 percent report no long-distance travel), households in other regions—like Traverse City and Ann Arbor—are much more likely to engage in long-distance travel.

The households that generate long-distance travel are more likely higher income with more workers. Couples with and without children are more likely than single-person or single-parent households to travel long distance.

Long-distance travelers are an important segment of Michigan's transportation system users. The state's economic vitality relies on people traveling in Michigan to enjoy the recreational and other amenities the state has to offer. The data in the MTC III survey is a valuable tool for understanding long-distance travel behavior in the state.

2 Data and Methodology

The objective of the MTC III project was to obtain household- and person-based travel information for input into the MDOT Statewide and MPO travel demand models. But 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 MTC III survey link these household and person characteristics together with the choices people made in their weekday and long-distance travel including 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 who makes trips as part of their daily work, such as plumbers, 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 will keep this in mind.

2.1 Survey Design

Michigan residents were invited to participate in MTC III based on a random sample of households from all residential addresses in 16 sample areas statewide.

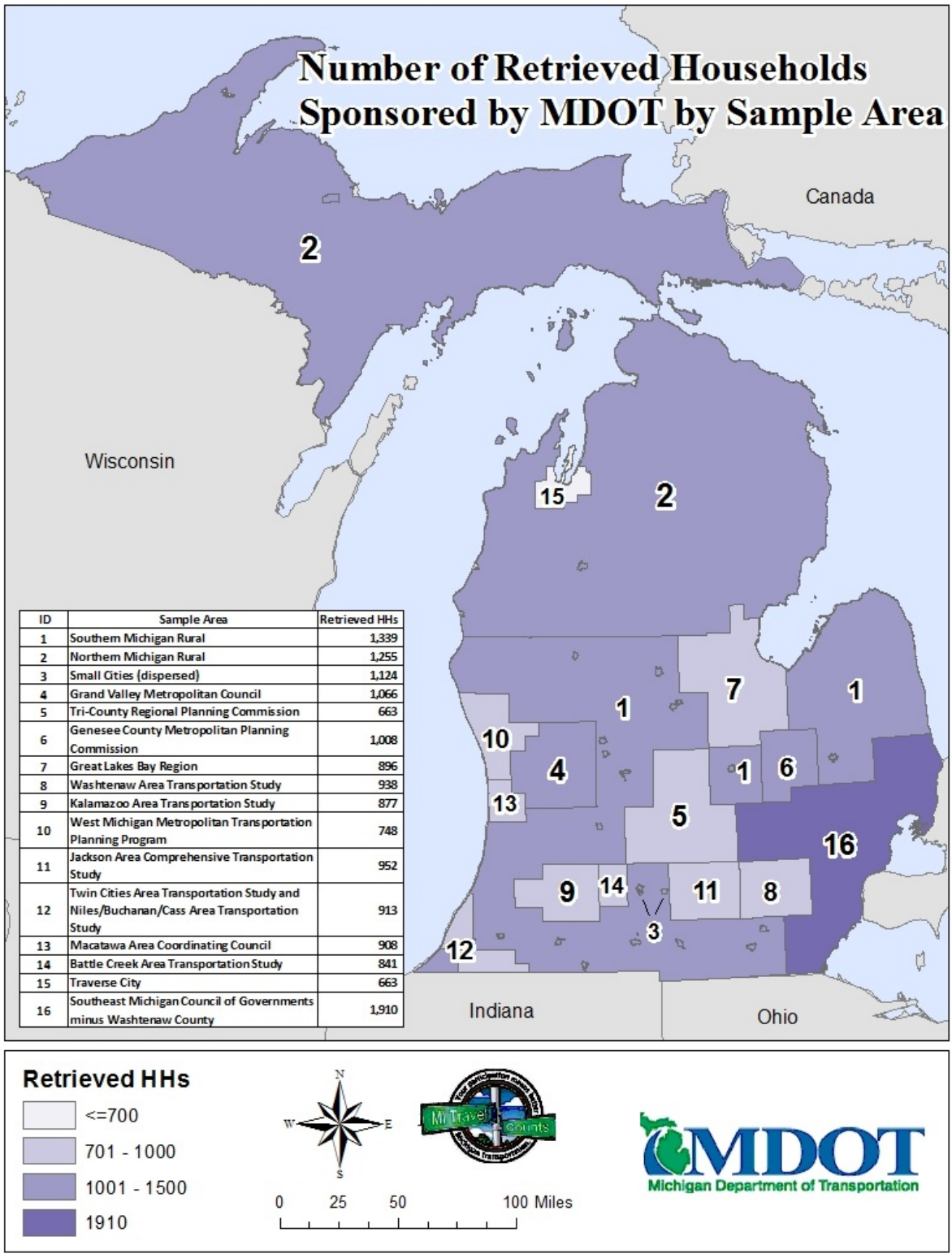
The randomly selected households received an invitation letter in the mail asking their household to participate in the survey. Participants completed a web- or phone-based recruitment survey where they provided basic demographic information about their household and each household member, were assigned 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. Participants reported each place they went, the mode of travel, time of departure and arrival, purpose of each trip, and information on long-distance trips taken in the past 3 months. 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 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

An address-based sampling (ABS) was used to obtain a representative sample of households for each of the 16 MDOT sample areas. A map with the number and location of retrieved and completed households is shown in Figure 2-1.

Figure 2-1. Number of retrieved households by sample area

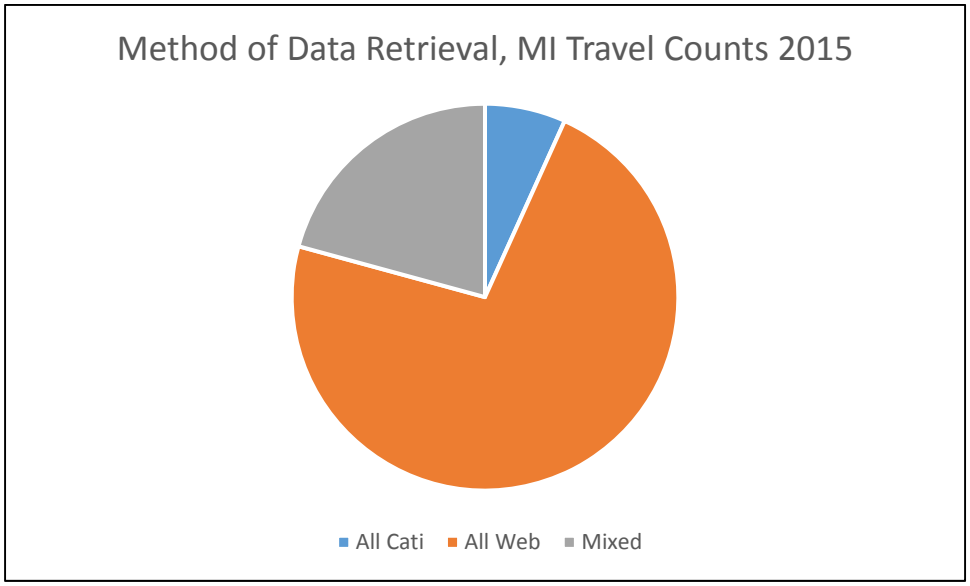


ID	Sample Area	Retrieved HHs
1	Southern Michigan Rural	1,339
2	Northern Michigan Rural	1,255
3	Small Cities (dispersed)	1,124
4	Grand Valley Metropolitan Council	1,066
5	Tri-County Regional Planning Commission	663
6	Genesee County Metropolitan Planning Commission	1,008
7	Great Lakes Bay Region	896
8	Washtenaw Area Transportation Study	938
9	Kalamazoo Area Transportation Study	877
10	West Michigan Metropolitan Transportation Planning Program	748
11	Jackson Area Comprehensive Transportation Study	952
12	Twin Cities Area Transportation Study and Niles/Buchanan/Cass Area Transportation Study	913
13	Macatawa Area Coordinating Council	908
14	Battle Creek Area Transportation Study	841
15	Traverse City	663
16	Southeast Michigan Council of Governments minus Washtenaw County	1,910

Comparison of Survey Data to Other Sources 3

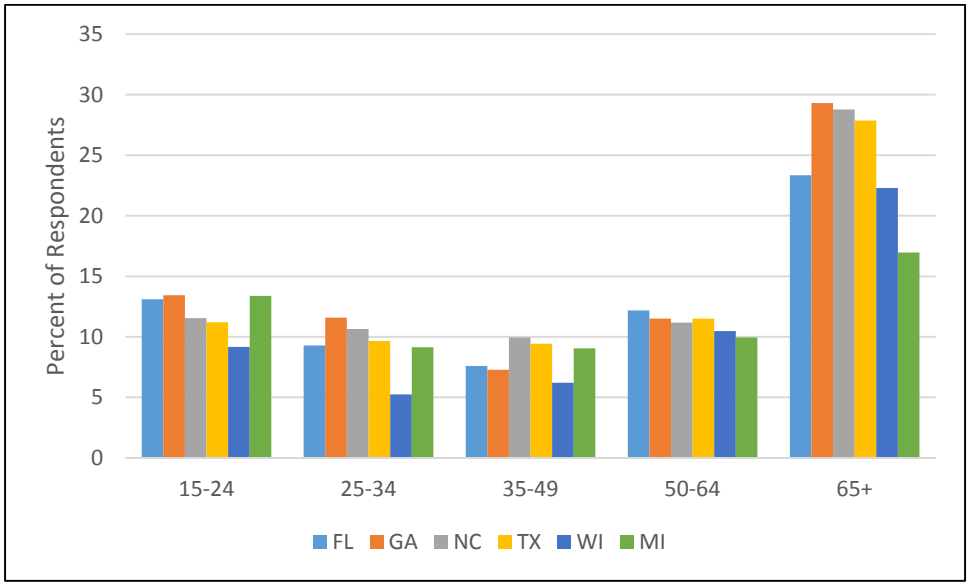
In this section comparisons are made between the data obtained in the MTC III and other data sources, such as the census and the 2009 National Household Travel Survey (NHTS)—the most recent of the national data series. Although the 2016 NHTS—which is underway at the time of this writing—is being conducted via a similar method to the MTC III, the 2009 NHTS used a land-line telephone sample (with the corresponding coverage issue of not including cell-phone-only households) and Computer-Aided Telephone Interviews (CATI). In comparison, the MTC III survey was truly multi-method, and was completed via the web for the majority of respondents (Figure 3-1).

Figure 3-1. Percentage of respondents by method of data retrieval, MI Travel Counts 2015



With those caveats on the different methods used to collect the data in mind, several comparisons are shown here. First is the percentage of respondents reporting no travel. This is a commonly used quality test in travel surveys since reporting no travel could be a passive way of refusing to participate. Figure 3-2 shows the percentage of people by age groups who reported no travel on the assigned travel day in Michigan compared to selected states in the 2009 NHTS. As shown, the percentage of people aged 65 and older who report no travel in Michigan is much lower than NHTS.

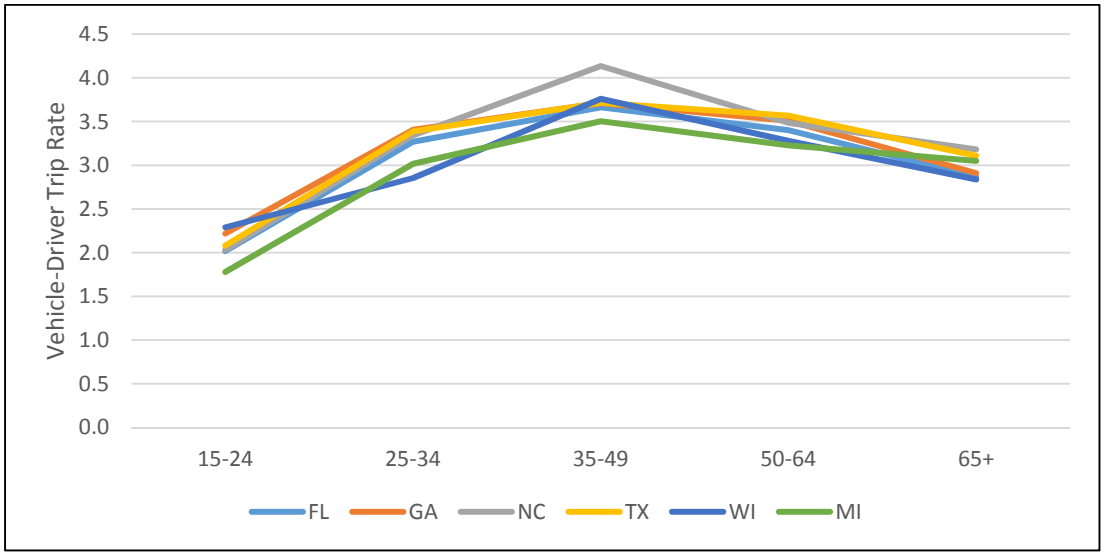
Figure 3-2. Percentage of people reporting no travel, Monday-Thursday, 2009 NHTS selected states and 2015 MDOT



A second comparison is made of the actual trip rates calculated from the sample. Figure 3-3 compares the vehicle trip rates by age for the same selected states from NHTS 2009 and for respondents in Michigan. Vehicle trip rates are used because the definition is consistent; whereas person trip rates can vary based on methods used to prompt the respondents to report walk and bike trips, and the handling of round trips (those that begin and end at home).

The vehicle trip rates peak for people aged 35-49 years in all of the areas—these are the peak traveling years correlated with high workforce participation and home and family responsibilities for many. Overall, people in age groups less than 50 years in Michigan have a slightly lower vehicle trip rate compared to other states (in 2009). However, these comparisons show that the data collected from respondents in Michigan are very comparable with data collected via a different method, another time frame, and in different geographies.

Figure 3-3. Vehicle trip rates by age of respondent, selected states from 2009 NHTS and 2015 MDOT



The MTC III data were collected in 2015. For some demographic comparisons to census data, the 2010-2014 ACS (the American Community Survey, released in December 2015) is the most recent. But specifically for JTW comparisons, the most recent data is the 2006-2010 CTPP (Census Transportation Planning Package). Table 3-1 shows the comparison of estimates of the number of households by number of workers in the households from CTPP and MTC III. Multi-worker households seem to be under-represented, although the time frame difference makes the comparison less clear; this is typical of transportation surveys. Additionally, zero-worker households are not included in CTPP data, but are included in the MTC III dataset and represent over 30 percent of Michigan's households, as shown in Table B-4 in Appendix B.

Table 3-1. Distribution of households by number of workers, CTPP and MTC III (only including households with workers)

Only households with one or more workers	CTPP 2006-2010	2015 MTC III
1-person household; 1 worker	12.0%	20.4%
2-person household; 1 worker	10.9%	15.9%
2-person household; 2 workers	20.3%	16.2%
3-person household; 1 worker	5.3%	3.0%
3-person household; 2 workers	10.8%	7.0%
3-person household; 3 workers	5.0%	9.0%
4-or-more-person household; 1 worker	7.1%	9.4%
4-or-more-person household; 2 workers	17.4%	14.8%
4-or-more-person household; 3 or more workers	11.2%	4.3%

3.1 Data Validity Checks

At the state level, the data are very robust. Most of the estimates presented in this report have a plus or minus 5 percent confidence interval. These confidence limits simply mean that a survey with the same protocols conducted at the same time but with a different sample of households would have an estimate for the same variable within 5 percent more or less than the estimate provided in this report. However, at the regional level, these error ranges may be higher, because of smaller sample sizes, greater variation in the distribution of the variable, or both. For example, data that depend on very sparse population characteristics, such as zero-vehicle households, are subject to larger confidence limits.

All estimates include ranges, and it is important to use the data wisely. As an example, Table B-6 ("Means of Weekday Travel by Region") in Appendix B shows that drive alone consists of 66.6 percent of travel in Southern Rural Michigan, and 67.6 percent of trips in Northern Rural Michigan. While these estimates of drive alone trips are significantly different from the other means of travel in each respective region—carpool, walk, and transit—they are not significantly different between regions. That is, one cannot say that people are more likely to drive alone in Northern Rural Michigan compared to Southern Rural Michigan.

Conclusion 4

This report presents findings about the state's transportation system users, their characteristics, and how and why they are using the system, providing context for how the system's components perform to keep the residents of Michigan mobile.

Descriptive analyses were used to explore relationships between population groups' travel characteristics at an aggregate level (statewide) and for each region in the detailed tables in Appendix B. Quantitative analyses included margin-of-error estimation to ensure that the data presented were sound so that the descriptive findings could be confirmed and used for policy analysis and planning applications.

The objective of these statistical analyses was to provide sound results regarding travel characteristics and to gain a better understanding of the behaviors and decision-making processes at the personal and household level. The general characteristics presented can be used to determine the travel behaviors of Michigan residents and anticipate their future needs to provide a transportation system that benefits all.

Household and personal characteristics influence average trip rates, trip purpose, and trip durations. Households with more people, income, and autos produce more trips, while trip patterns and purposes are different according to age and gender. The segmentation of trip-making into demographic groups including workers, young people, older people, children, non-driving populations, higher and lower income groups, and women and men provides a clearer understanding of the patterns of daily travel by users of the transportation system. This information is important for assessing system performance for economic vitality, mobility, equity, and a host of other system objectives.

Important findings of the study include that trip rates are greatly influenced by household size: larger households have more trips overall, which is related not just to the number of people, but also 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.

The average trip rate 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 Michigan 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 Michigan are less likely to be drivers, with nearly a quarter of people aged 16-24 not licensed to drive. However, by the age of 24, young men and women have as high a licensure rate as the general population. At the other end of the age spectrum, older non-drivers in Michigan 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 also use a vehicle for some of their trips. The effect of new car-sharing services on vehicle availability at the household level will be interesting to track.

There are important differences between the regions in the state in terms of mode of travel and commute duration, for instance, and the data collected in the survey are summarized for the state overall and for each sampled area. Comparing MTC III with census data and data collected in other states shows a lot of similarities and a few differences. For instance, people in Michigan travel farther to work than the national average, but spend less time in commuting, meaning their commutes are faster than many other areas.

The data collected in MTC III are robust and a valuable source of information—both descriptive and as inputs into travel demand forecasts—for the planners and policymakers of Michigan.

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.

Daily Trips. The total number of trips made by a person or household in a 24-hour period.

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 3 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 including age, gender, licensed or non-licensed driver, and working status.

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. Same as Carpool.

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 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	Person trips					Vehicle trips				
	One person	Two	Three	Four or more	All	One person	Two	Three	Four or more	All
Metro Detroit Area	4.8	7.9	11.1	18.3	9.6	3.7	5.8	7.5	9.6	6.1
Southern Michigan Rural	4.1	7.7	12.5	17.1	9.4	3.6	6.0	8.2	9.1	6.2
Northern Michigan Rural	4.6	7.8	11.5	17.7	8.8	3.9	5.8	7.9	9.3	5.9
Small Cities	5.1	9.3	13.2	20.7	10.2	4.0	6.7	7.9	10.4	6.4
Grand Rapids Area	5.0	8.4	11.0	17.6	10.1	4.0	6.4	7.5	9.6	6.6
Greater Lansing Area	5.0	8.1	11.9	18.4	9.6	3.7	5.9	8.2	9.1	6.1
Flint Area	4.7	8.2	12.4	16.7	9.4	3.6	5.9	8.1	8.7	6.0
Midland–Bay City–Saginaw	4.5	8.6	12.6	18.0	9.7	3.7	6.3	8.7	10.3	6.6
Ann Arbor Area	5.1	8.5	12.6	18.9	10.0	3.4	5.5	7.1	10.0	5.9
Kalamazoo Area	4.5	7.9	11.9	18.1	9.4	3.6	6.0	8.0	10.0	6.3
Muskegon Area	4.7	8.2	10.7	17.8	9.6	3.9	6.3	7.2	9.7	6.4
Jackson Area	4.7	8.1	11.8	19.0	9.7	3.9	6.1	7.5	11.0	6.5
Benton Harbor–St. Joseph–Niles	4.7	8.2	11.1	20.2	9.9	3.8	6.1	7.5	10.5	6.4
Holland Area	4.8	8.3	12.5	18.0	10.8	3.9	6.4	8.6	10.4	7.2
Battle Creek Area	4.8	7.7	12.8	17.6	9.4	3.8	5.9	8.3	8.8	6.0
Traverse City Area	4.7	8.0	11.8	18.5	9.2	3.8	6.1	8.3	9.1	6.1
All	4.7	8.0	11.6	18.1	9.6	3.7	5.9	7.7	9.6	6.2

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

Region	Person trips				Vehicle trips			
	Zero vehicles	One vehicle	Two vehicles	Three or more	Zero vehicles*	One vehicle	Two vehicles	Three or more
Metro Detroit Area	6.6	7.2	11.2	12.6	0.6	4.7	7.2	9.2
Southern Michigan Rural	4.3	7.5	9.7	11.4	1.3	4.4	6.6	8.0
Northern Michigan Rural	4.3	6.6	9.5	11.1	0.7	4.4	6.6	7.7
Small Cities	5.2	7.8	12.3	15.1	0.5	5.1	7.9	10.1
Grand Rapids Area	7.3	7.0	11.1	13.5	0.0	4.7	7.1	10.1
Greater Lansing Area	6.5	7.0	11.3	11.4	0.4	4.4	7.0	8.2
Flint Area	6.4	7.9	10.2	12.0	0.6	5.0	6.7	8.5
Midland–Bay City–Saginaw	4.7	7.3	11.2	11.9	1.2	4.9	7.4	8.7
Ann Arbor Area	6.8	7.0	12.0	13.1	0.5	4.1	6.9	9.3
Kalamazoo Area	5.1	6.4	10.8	12.7	0.2	4.4	7.3	9.2
Muskegon Area	4.9	7.3	10.9	11.6	0.9	4.9	7.1	8.4
Jackson Area	6.3	7.3	10.8	12.3	1.1	4.9	7.3	9.0
Benton Harbor–St. Joseph–Niles	4.8	7.2	11.8	12.4	0.8	4.8	7.4	8.9
Holland Area	5.6	6.6	12.8	12.9	0.2	4.4	8.2	9.4
Battle Creek Area	7.5	7.4	10.6	11.7	1.1	4.8	7.0	8.5
Traverse City Area	5.0	6.6	10.0	12.6	0.4	4.3	6.6	8.9
All	6.2	7.2	10.9	12.2	0.6	4.6	7.1	8.8

* Greyed cells indicate small sample size (number of households<30)

Table B-3. Person and vehicle trips rates per household in each region by household income category[4]

Region	Person trips per HH				Vehicle trips per HH			
	Low <$25 K	Low-med $25-50 K	Med-hi $50-75 K	High $75 K and over	Low <$25 K	Low-med $25-50 K	Med-hi $50-75 K	High $75 K and over
Metro Detroit Area	7.7	8.5	12.7	16.2	4.3	5.7	8.0	12.7
Southern Michigan Rural	6.9	8.4	12.5	18.4	4.6	5.5	8.3	13.1
Northern Michigan Rural	7.2	7.6	12.3	16.7	4.9	5.1	8.2	12.1
Small Cities	7.0	9.4	14.0	24.7	4.5	5.8	8.8	16.7
Grand Rapids Area	7.3	9.5	11.8	16.3	4.9	6.1	7.8	11.6
Greater Lansing Area	6.4	9.0	12.2	17.7	4.3	5.1	8.2	12.5
Flint Area	7.7	8.9	13.1	12.2	4.6	5.8	8.4	10.4
Midland–Bay City–Saginaw	7.4	9.3	12.7	16.0	4.9	6.2	8.6	12.1
Ann Arbor Area	6.6	8.5	13.2	17.8	3.8	5.1	7.8	10.4
Kalamazoo Area	6.1	8.8	12.6	16.1	3.9	5.8	8.8	11.3
Muskegon Area	6.8	8.8	13.0	15.3	4.6	5.8	8.6	11.7
Jackson Area	6.5	10.1	12.6	16.9	4.4	6.4	8.8	13.4
Benton Harbor–St. Joseph–Niles	6.3	10.5	12.9	15.1	4.1	6.4	8.5	12.5
Holland Area	6.8	9.6	13.7	17.2	4.7	6.2	9.0	12.7
Battle Creek Area	6.8	8.8	12.6	16.9	4.3	5.5	8.3	13.2
Traverse City Area	6.5	7.8	12.6	17.3	4.4	5.4	8.1	11.4
All	7.3	8.7	12.6	16.7	4.5	5.7	8.2	12.5

[4] The income categories collected in MTC III do not coincide with the income categories collected in MTC I. MTC I used <$30,000, $30-60,000, and $60,000 and over. These categories are based on the mean family income for the State in 2014 of nearly $50,000. See: http://www.mlive.com/news/kalamazoo/index.ssf/2015/09/look_up_median_household_famil.html

Table B-4. Vehicle trips per household matching census household type, households with and without children under 18 years of age

Households by household size and number of workers	Vehicle trips		
	Overall	Households with children	Households without children
1-person household; No workers	3.4	^	3.4
1-person household; 1 worker	4.1	^	4.1
2-person household; No workers	5.5	3.5	5.6
2-person household; 1 worker	5.7	4.9	5.7
2-person household; 2 workers	6.7	10.9	6.7
3-person household; No workers	5.0	5.9	4.4
3-person household; 1 worker	7.1	6.8	7.7
3-person household; 2 workers	8.1	7.9	8.4
3-person household; 3 workers	10.2	11.5	10.1
4-or-more-person household; No workers	6.0	5.8	7.1
4-or-more-person household; 1 worker	8.1	8.2	5.6
4-or-more-person household; 2 workers	9.8	9.8	9.4
4-or-more-person household; 3 or more workers	14.0	15.2	12.7

^ No children

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

Region	Drive alone	Carpool	Transit	Walk	Bike
Metro Detroit Area	42.0%	45.4%	1.9%	7.0%	0.7%
Southern Michigan Rural	42.2%	48.7%	0.2%	3.4%	0.7%
Northern Michigan Rural	42.5%	48.3%	0.7%	4.1%	0.8%
Small Cities	40.6%	45.3%	0.9%	9.0%	1.8%
Grand Rapids Area	44.7%	42.9%	2.1%	5.3%	0.6%
Greater Lansing Area	42.9%	43.9%	1.1%	6.6%	1.7%
Flint Area	39.3%	49.9%	1.6%	4.4%	0.5%
Midland–Bay City–Saginaw	43.6%	48.9%	0.4%	3.3%	1.3%
Ann Arbor Area	39.4%	40.2%	3.0%	12.7%	2.1%
Kalamazoo Area	43.9%	45.5%	1.4%	5.1%	0.6%
Muskegon Area	44.0%	46.2%	0.9%	4.4%	0.8%
Jackson Area	43.2%	46.4%	1.0%	5.1%	0.5%
Benton Harbor–St. Joseph–Niles	42.4%	48.0%	1.2%	4.7%	0.4%
Holland Area	43.8%	45.8%	0.8%	5.0%	1.2%
Battle Creek Area	40.6%	50.1%	1.1%	4.2%	0.4%
Traverse City Area	46.2%	42.2%	0.5%	5.6%	1.9%
Statewide	42.3%	45.9%	1.5%	6.1%	0.9%

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

Region	Drive alone	Carpool	Walk	Transit	Bike	All other
Metro Detroit Area	74.7%	20.4%	0.9%	3.1%	0.7%	0.2%
Southern Michigan Rural	70.6%	25.3%	0.0%	3.5%	0.2%	0.3%
Northern Michigan Rural	73.9%	21.9%	0.4%	3.2%	0.2%	0.5%
Small Cities	69.4%	22.5%	0.3%	5.5%	2.3%	0.0%
Grand Rapids Area	75.9%	18.9%	0.7%	3.5%	0.8%	0.2%
Greater Lansing Area	69.7%	20.5%	1.0%	7.0%	1.3%	0.6%
Flint Area	73.4%	24.6%	0.3%	1.4%	0.3%	0.0%
Midland–Bay City–Saginaw	75.7%	21.7%	0.4%	1.8%	0.5%	0.0%
Ann Arbor Area	61.7%	16.0%	3.7%	14.6%	4.0%	0.0%
Kalamazoo Area	72.7%	23.0%	1.0%	2.3%	0.5%	0.5%
Muskegon Area	76.2%	20.8%	0.3%	1.8%	0.6%	0.4%
Jackson Area	72.1%	22.5%	0.5%	4.2%	0.3%	0.4%
Benton Harbor–St. Joseph–Niles	76.9%	19.1%	0.8%	2.7%	0.2%	0.3%
Holland Area	75.1%	19.2%	0.7%	3.3%	1.8%	0.0%
Battle Creek Area	74.4%	21.1%	1.0%	2.6%	0.7%	0.2%
Traverse City Area	75.9%	16.3%	0.5%	3.7%	3.0%	0.6%
Statewide	73.3%	21.0%	0.8%	3.8%	0.9%	0.2%

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

Region	Low <$25 K	Low-med $25-50 K	Med-high $50-75 K	High $75 K and over	All
Metro Detroit Area	7.7	10.0	12.6	15.5	13.1
Southern Michigan Rural	8.3	10.7	15.9	22.3	16.3
Northern Michigan Rural	9.9	12.0	13.2	13.7	12.6
Small Cities	3.9	9.1	7.6	11.2	8.5
Grand Rapids Area	10.2	10.7	11.1	13.7	11.7
Greater Lansing Area	5.6	10.7	11.8	13.2	11.7
Flint Area	13.6	12.7	17.1	19.2	16.5
Midland–Bay City–Saginaw	7.4	14.8	12.8	14.8	13.3
Ann Arbor Area	7.4	6.7	9.4	13.6	11.3
Kalamazoo Area	7.5	10.5	8.8	11.4	10.2
Muskegon Area	8.4	8.8	13.7	14.6	12.8
Jackson Area	7.1	16.2	12.0	15.1	13.9
Benton Harbor–St. Joseph–Niles	5.8	9.1	11.7	10.5	9.5
Holland Area	5.6	7.0	10.7	10.9	9.8
Battle Creek Area	6.2	7.5	9.9	13.7	10.1
Traverse City Area	11.6	7.3	10.0	15.9	12.3
Statewide	7.9	10.5	12.6	15.3	12.9