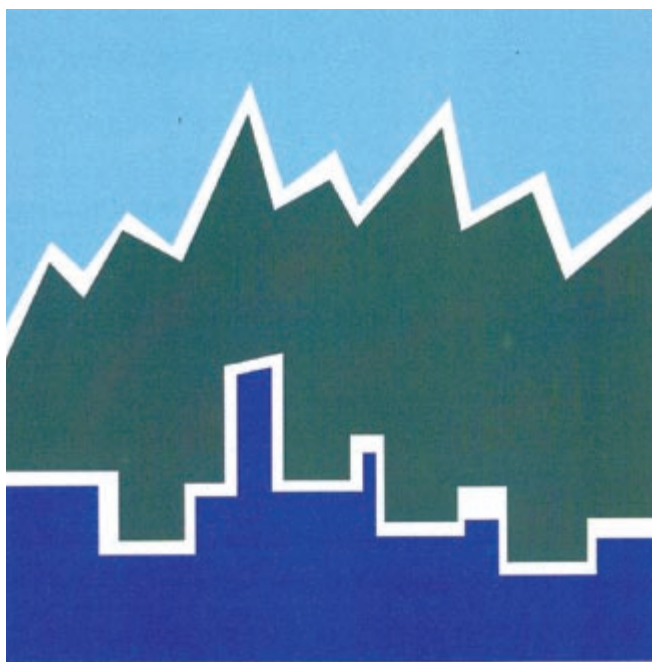




U.S. Department of Transportation
Federal Highway Administration

Our Nation's Travel: Current Issues



2001 National Household
Travel Survey (NHTS)

Notice

The Federal Highway Administration provides high-quality information to serve government, industry, and the public in a manner that promotes public understanding. Standards and policies are used to ensure and maximize the quality, objectivity, utility, and integrity of its information. FHWA periodically reviews quality issues and adjusts its programs and processes to ensure continuous quality improvement.

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This report was prepared by the Office of Highway Policy Information, Federal Highway Administration

Source and Accuracy: All of the data presented in this report is from the 2001 National Household Travel Survey (NHTS), and earlier surveys in the National Personal Travel Survey series, unless otherwise indicated. Since 1990, the data from this survey were collected using random digit dial telephone survey of households in the United States. The survey's estimation procedure uses weights to inflate the sample results to independent estimates of the total population of the United States. Since the NHTS estimates are produced from a sample survey, they are subject to two possible types of errors: sampling and non-sampling errors.

Sampling errors occurs because the results are based on a sample survey, rather than the entire population. Non-sampling errors are those errors resulting from survey processes and can be attributed to several sources: the inability to obtain information about all the cases in the sample (unit and item non-response); the inability to obtain accurate information from respondents; errors made in the data collection, such as recording and coding errors; and errors made in data processing.

The accuracy of the survey estimates depends on both types of error. Although the survey procedures are designed to minimize the impact of non-sampling errors the amount is still unknown. The amount of error due to sampling can be estimated, and when analyses are done the estimates should always be viewed in conjunction with the associated sampling errors. Users should be particularly careful when interpreting results based on a relatively small number of cases or when there are small differences between estimates.

Our Nation's Travel: Current Issues



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The 2001 NHTS dataset was collected and produced by Westat (Rockville, Maryland) and Morpace (Farmington Hills, Michigan)

This booklet highlights transportation issues as they relate to the daily travel of the American public. The 2001 National Household Travel Survey (NHTS) is the primary source of statistical data for this exploration, although other sources are used and cited. The NHTS contains data on all trips: (1) of all lengths; (2) by all modes, and (3) for all purposes.

More on the conduct of the NHTS can be found in the Source and Accuracy Statement and at the resources listed below.

The intent of this booklet is to briefly touch on current issues and facets of the transportation system that influence our daily travel behavior. The reader is encouraged to explore these topics further using:

- The NHTS Web <http://nhts.ornl.gov> - particularly the reports and the on-line analysis capability; and
- The NHTS CD-ROM available from the Bureau of Transportation Statistics, 202-366-DATA, which includes the survey data from the long trip section.

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Overview

NOTES ON NHTS/NPTS/ATS SERIES

The 2001 NHTS, and its predecessor surveys, the 1969, 1977, 1983, 1990 and 1995 National Personal Transportation Survey (NPTS), and the 1995 American Travel Survey (ATS) are the nation's authoritative source of statistical data on the travel of the American public. The ATS collected data on long-distance trips while the NPTS collected mainly daily trips, with limited long-distance travel information. The 2001 NHTS represents a combining of the NPTS and the ATS.

Attempts were made to insure that the data across the daily-trip series was comparable, however certain changes were required in these surveys over time. The reader of this publication should note:

- The 1969, 1977, and 1983 NPTS were conducted for DOT by the Census Bureau as face- to-face surveys; respondents reported their travel by recall.
- The 1990 NPTS was a telephone survey that used recall for collection of travel by household members aged 5 and over.
- The 1995 NPTS also was a telephone survey, but used a travel diary to collect trip reports from every household member aged 5 and over.
- The 2001 NHTS was a telephone survey with a travel diary used to collect data from every person in the household, regardless of age. All together, 69,817 households and 160,758 interviewed people are weighted to represent the travel in the U.S.

The changes in survey methodology, for instance the switch to a trip diary, impacts trend analysis. Trip correction factors were developed to raise the 1990 trip and travel estimates to compare with 1995. However, no comparable factors were developed for the pre-1990 NPTS surveys. Details are available in the 1995 Summary of Travel Trends Report (on the 1995 website <http://www-cta.ornl.gov/npts>).

When person-and trip-level data are analyzed, such as total person miles of travel, it is important to compare the same populations. In 2001, the inclusion of children under the age of 5 increases the base population. For trend analysis on persons or travel, the children under 5 in 2001 NHTS should be excluded.

TRENDS IN TRAVEL BEHAVIOR

Vehicle Ownership Continues to Rise. There is a continued increase in the number of household-based vehicles, and in households with more vehicles than drivers. In 2001, more than one out of five U.S. households had more vehicles than drivers. (see page 6)

Time Spent Driving is also on the Rise. Since 1990, the amount of time Americans spend driving in an average day is up 24 percent--from 49 minutes a day to 61 minutes. (see page 19)

Very Young and Very Old Drivers Have Highest Fatalities. Using the vehicle miles of travel as estimated from the survey shows who is at-risk of a fatal accident based on the amount of travel by different age groups, with teens and the elderly having the most fatal crashes per 100 million vehicle miles of travel. (see page 8)

Other Drivers are Seen as the Biggest Threat to Safety on the Road. The American public has concerns about safety on the roads, especially aggressive, distracted and speeding drivers. Both women and men are concerned about other drivers, but women are more concerned about other safety issues than men. (see page 13)

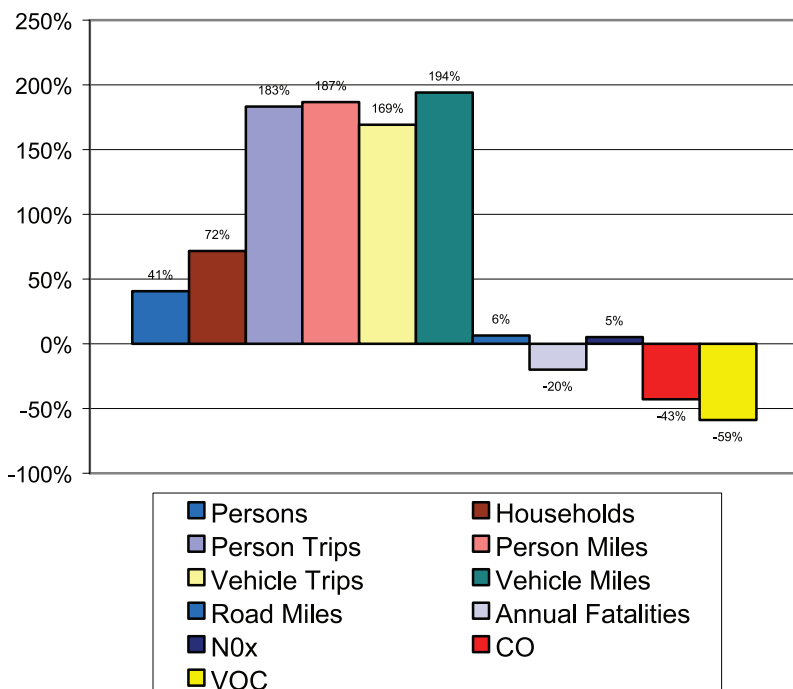
Weekend Traffic May be Greater Than Peak Period. Congestion used to be associated with the work trip, but as Americans keep adding travel for shopping and leisure, weekend travel has grown. (see page 14)

Trip Chaining is an Important Consideration. Over a quarter of workers make short stops (30 minutes or less) on their way to and from work for a variety of reasons, such as dropping off children, getting coffee, or running errands. This growing phenomenon impacts travel mode, route choice and often dictates departure time. (see page 29)

GROWTH IN TRAVEL, 1969—2001

From 1969 to 2001, there were modest increases in the population and the number of households, but much more dramatic increases in all four measures of travel: person trips, person miles of travel (PMT), vehicle trips and vehicle miles of travel (VMT). It is significant to note that during that time period VMT increased by 194 percent while road miles only grew by seven percent. The annual number of fatalities on our nation's highways decreased by 20 percent—from 50,000 to 40,000 traffic fatalities per year. In terms of air quality, the air we breathe is actually cleaner than it was in 1969. There was a 43 percent decrease in carbon monoxide, a 59 percent decrease in volatile organic compounds (VOC), and a 5 percent increase in nitrous oxide (NOx).

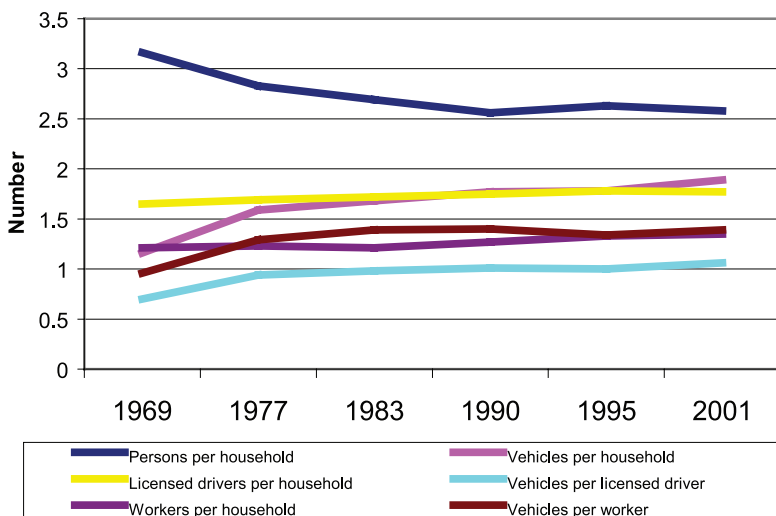
Change in Travel-Related Characteristics, 1969 - 2001



THE CHANGING AMERICAN HOUSEHOLD

Between 1969 and 2001, there have been many changes in the American household—household size declined, vehicle ownership increased and workers and drivers per household increased. The most dramatic change has been the increase in vehicle ownership. Vehicles per household, per licensed driver, and per worker all grew dramatically (63 percent, 51 percent, and 45 percent respectively).

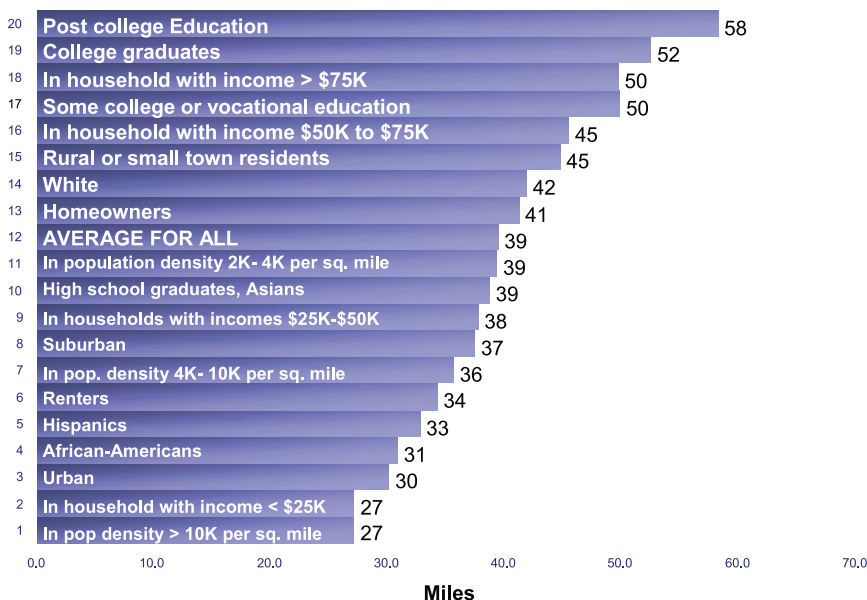
Trends in the Factors that Affect Travel



WHO TRAVELS AND HOW MUCH?

The average amount of travel miles of U.S. residents varies considerably between people in different types of situations. A person in a household with income of less than \$25,000 a year averages just under 27 miles per day (9,855 annual miles), or about half of the miles of a person in a household at the opposite end of the travel spectrum, people who travel over 58 miles a day (18,104 annual miles) and have education beyond a bachelor's degree.

Average Daily Person Miles by Selected Characteristics



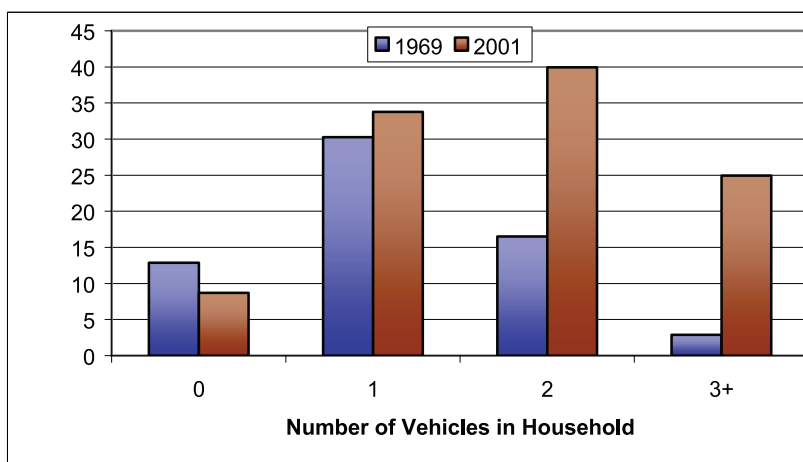
MORE AND MORE HOUSEHOLD VEHICLES

Since 1969, the number of households without vehicles has declined (to about eight percent of all households), while the majority of households now have two or three vehicles. In 2001 the number of household-based vehicles, 202 million, exceeded the number of drivers by 12 million. In fact, in 22.7 million or 21.2 percent of all U.S. households, there are more vehicles than drivers.

Some of the extra are specialty vehicles, like a motorcycle, pick-up truck, or the old car that the family uses when they take the dog along. The average age of the household vehicle fleet has been steadily increasing over time (from 5.6 to 8.9 years on average), with many observers concluding that households are keeping their older vehicles, rather than trading them in, when they acquire newer vehicles. Although personal miles of travel in vehicles continues to grow, household vehicles are used less intensively in those households where there are more vehicles than drivers.

Households by Number of Vehicles

(Number of households in millions)

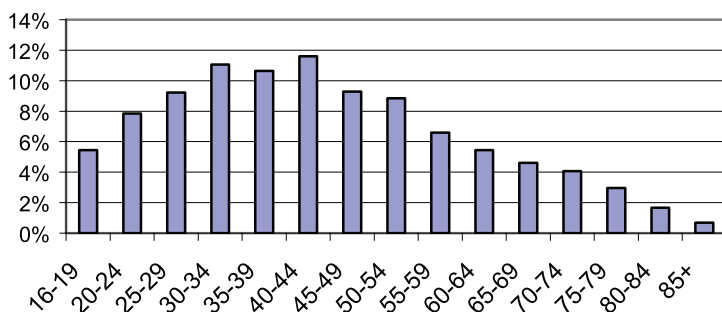


WHAT IS A CRASH RATE AND WHY IS IT IMPORTANT?

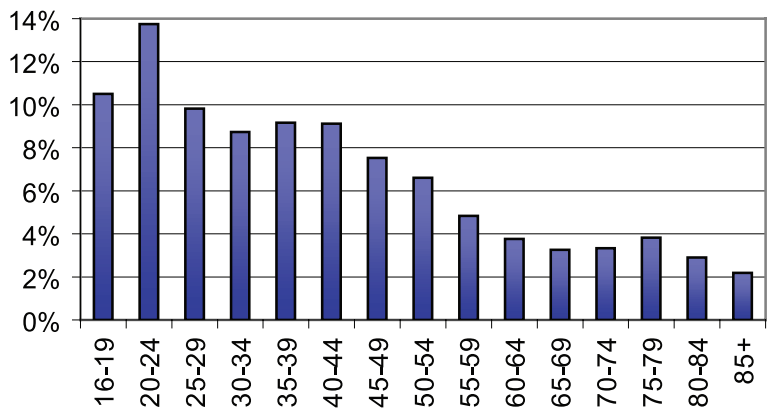
Crash rates are an important tool in targeting safety measures, programs and campaigns. Of course, calculating a crash rate by age requires a survey that collects vehicle miles for all purposes by age group, like the NHTS.

A crash rate is computed to show highway accidents or fatalities per 100 million vehicle miles of travel (VMT). Crash rates are often computed by age of the driver, and based on the number of crashes per 100 million VMT. The importance of calculating the crash rate this way is that it puts accidents and fatalities into the context of the amount of driving done. Thus it shows a very different picture from the distribution of licensed drivers or of fatal accidents. Once the crash rate is calculated, it is obvious that the two groups at greatest risk are teens and the elderly.

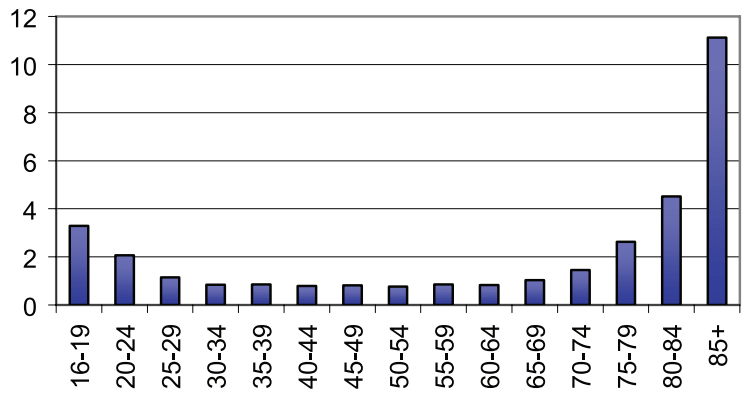
**Percent of Vehicle Miles of Travel by Age Group
(Exposure Rate)**



Percent of Fatalities by Age Group

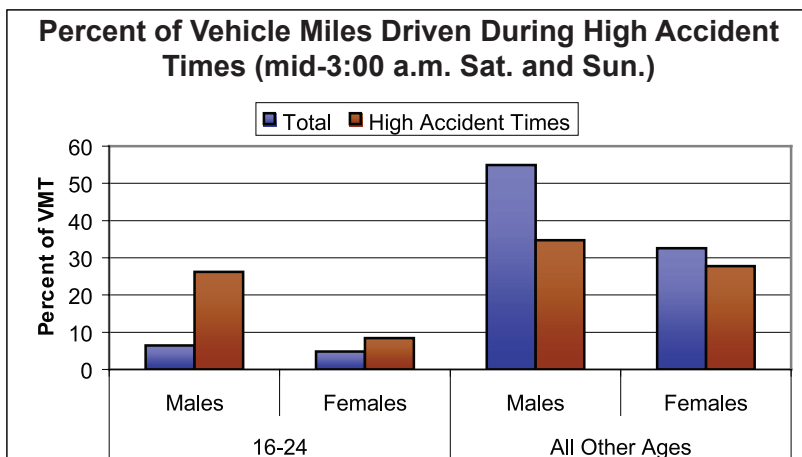


Fatal Crash Rate: Fatalities per 100 million Vehicles Miles of Travel



WHO IS DRIVING DURING THE HIGHEST ACCIDENT TIMEFRAMES?

Young men 16 to 24 average six percent of all VMT, but account for just over 26 percent of VMT in the high accident timeframes (defined as midnight to 3 a.m. on Saturday and Sunday morning for purposes of this chart). Young women ages 16 to 24 also have a disproportionately high VMT during these high-risk periods.



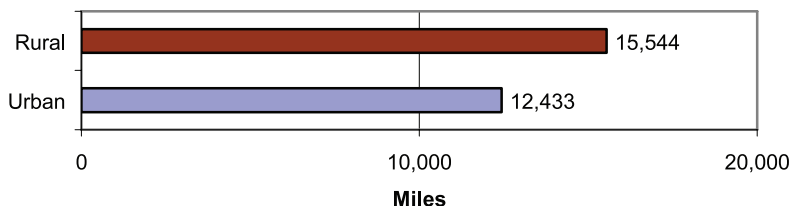
DOES WHERE YOU LIVE MAKE A DIFFERENCE IN YOUR SAFETY ON THE HIGHWAY?

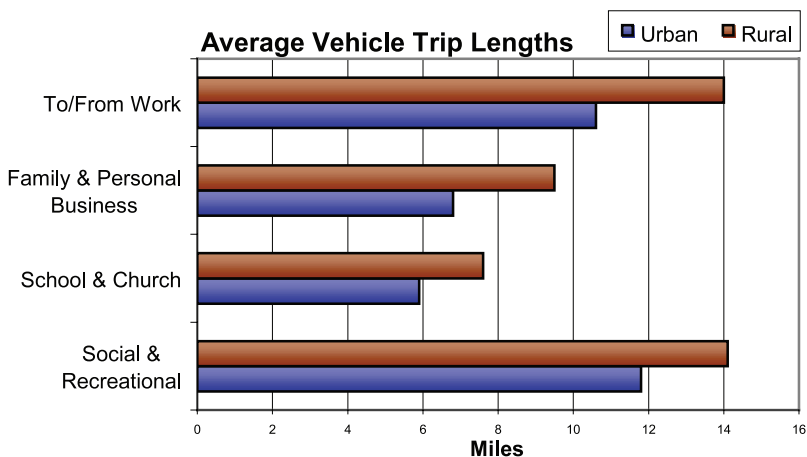
Most fatal crashes happen on rural roads, which account for three-quarters of the nation's lane miles, just under 40 percent (39.5) of all VMT, but 55 percent of all fatal crashes. Research conducted by the National Highway Traffic Safety Administration, NHTSA, shows that residents of rural areas have a much greater propensity for involvement in fatal highway accidents than their urban counterparts.

(see: <http://www.nhtsa.dot.gov/people/injury/research/ruralz.htm>)

Seventeen percent of drivers are from rural areas, yet they account for 40 percent of all fatal crashes. Given this pattern, it is useful to understand the differences in the profile of urban and rural drivers and their travel.

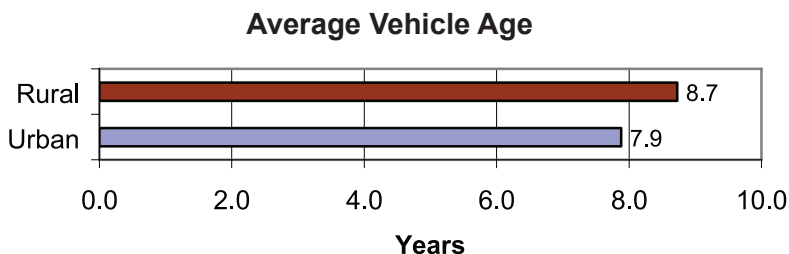
Average Annual Miles per Driver





This summary points to several reasons that rural residents are at greater risk for involvement in fatal accidents. They tend to drive 3,100 more miles each year, or 25 percent more than their urban counterparts. Generally, rural residents must travel longer distances for all purposes of trips.

Perhaps the most significant factor that is typically not highlighted is that rural residents have older vehicles—on average, a year older than those owned by urban households.



The age of a vehicle not only affects its functioning, but may also indicate fewer safety features, such as air bags.

WHAT DOES THE PUBLIC THINK ABOUT SAFETY ISSUES?

The NHTS asked the American public their level of concern for the following:

- aggressive drivers
- distracted drivers
- drunk drivers
- speeding drivers
- number of large trucks on the road, and
- worry about traffic accidents.

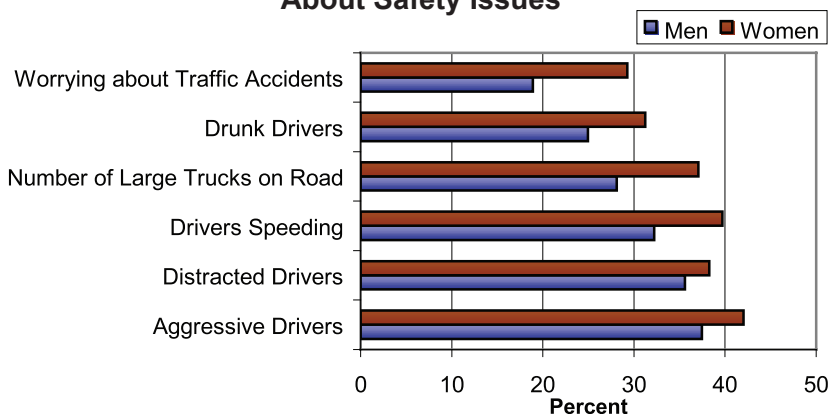
Aggressive and distracted drivers are perceived as the greater threats to safety, followed closely by speeding drivers.

		How Much of a Problem is?...	
	None	Somewhat	Very much or severe
Aggressive Driving	16.4	43.6	40.1
Distracted Drivers	16.1	46.9	37.1
Speeding Drivers	20.4	43.2	36.4
Number of Large Trucks on Roads	22.2	44.8	33.1
Drunk Drivers	40.5	31	28.5
Worry About Accidents	31.9	43.4	24.8

ARE THERE GENDER DIFFERENCES IN CONCERN ABOUT SAFETY ISSUES?

In each safety issue under consideration, women consistently showed more concern than men. Gender was one of the few attributes that showed consistent differences. Concern about safety issues did not follow any clear pattern by household income, population size or population density of the area of residence, or race of the household respondent.

Percent of Men and Women Very Concerned About Safety Issues

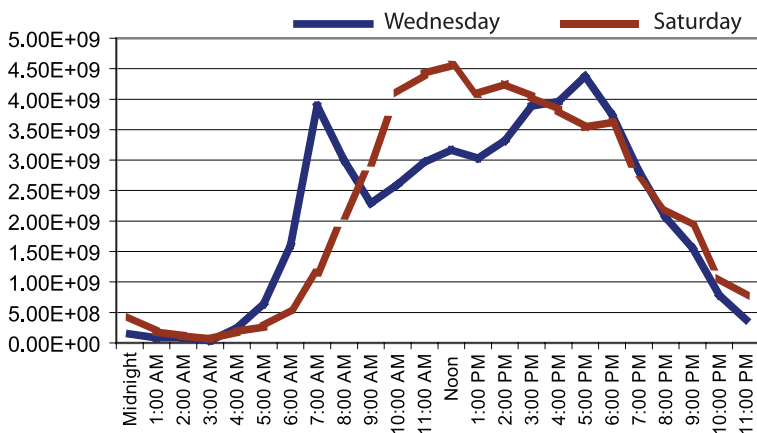


Congestion

ARE WE SEEING MORE CONGESTION AT OFF-PEAK PERIODS?

Congestion used to be associated with just work trips, but most roadways are carrying more shopping, errands, and social/recreational travel, especially those serving regional malls or recreational areas. Weekend traffic may be as bad as any weekday. Overall, Saturday at 1:00 p.m. has a higher number of vehicle trips than either the morning or afternoon peak periods on a typical weekday (Wednesday).

Number of Vehicle Trips by Time of Day



Note: Includes all trips made on a Wednesday or Saturday throughout the year.

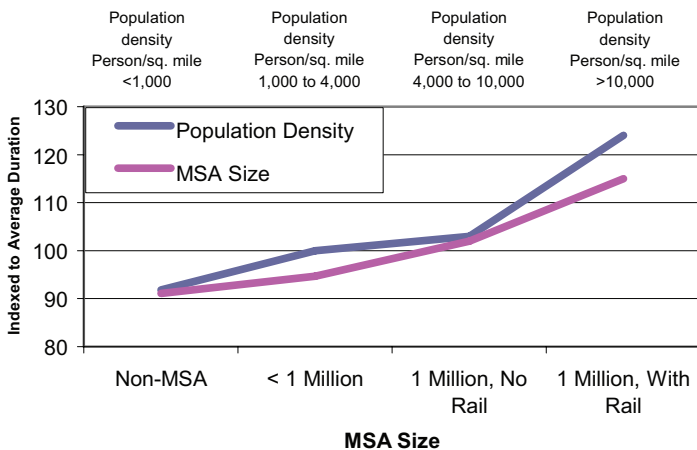
IS CONGESTION ONLY A PROBLEM IN BIG CITIES?

Most research shows that congestion is worse in the largest metro areas, but it is certainly not exclusive to big cities. To equalize differences in trip lengths among areas, the following table shows trip duration in minutes for private vehicle trips of 10 miles only. Travel time for a 10-mile trip does increase as area size increases, but a larger determinant seems to be the density of population.

Average Duration of a 10-Mile Vehicle Trip (In Minutes)

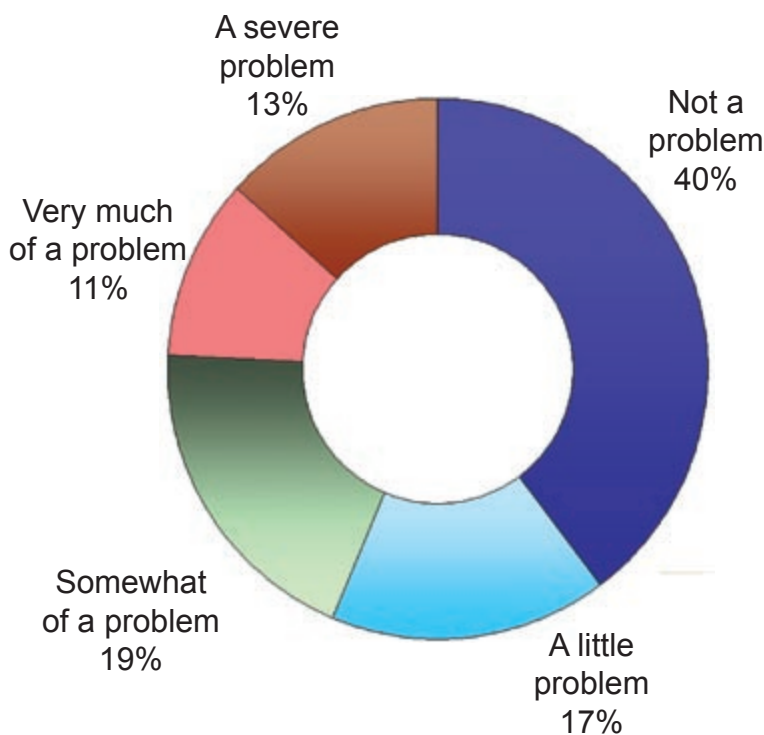
	Metropolitan Area Size				
Population per Square Mile	1 Million or More with Rail	1 Million or More Without Rail	Less Than 1 Million	Not in a Metro Area	All
Over 10,000	25.9	26.8	20.2	--	25.8
4000 to 10,000	23.2	21.4	19.5	--	21.4
1000 to 4000	21.3	21.3	20.4	--	20.8
< 1000	20.4	18.9	19.1	19.0	19.1

Population Density



HOW MUCH OF A PROBLEM IS CONGESTION?

The NHTS asked respondents how much of a problem congestion was in their life. Almost half (49.3 percent) of the survey respondents reported that congestion was not a problem or a little problem. Those that gave this response are largely older (65+) or younger (16 to 19), not working, and living in rural or small towns. Only 28 percent overall said congestion was very much or a severe problem.

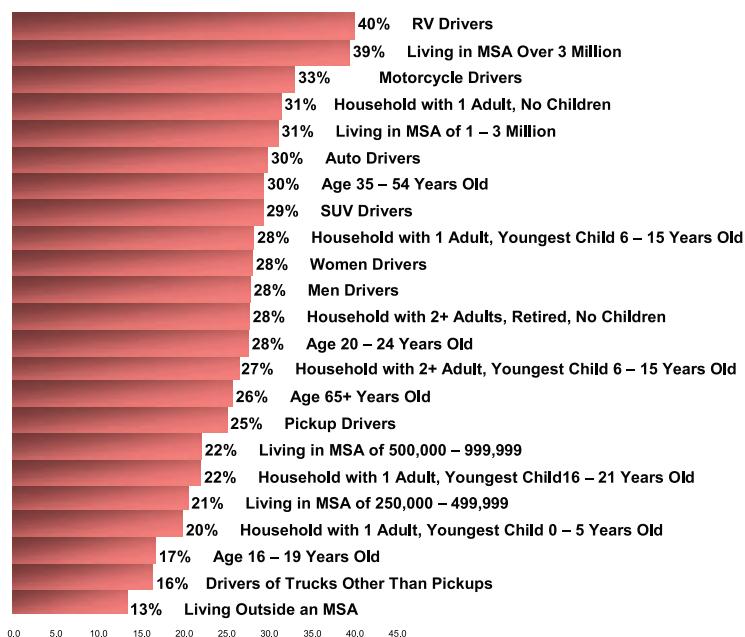


However, for those people living in the largest metro areas (three million or more in population) only 37.2 percent said congestion was not a problem or a little problem, with just slightly more (39.5 percent) saying it was very much or a severe problem.

WHO CONSIDERS CONGESTION TO BE “VERY MUCH OR A SEVERE” PROBLEM?

Only 28 percent of the respondents asked this question said that congestion was very much of a problem or a severe problem. This average did not vary consistently by demographic factors or geographic location. Those who consider congestion to be very much of a problem or a severe problem follow certain expected patterns, such as living in the largest metro areas, but also include the unexpected, like motorcycle drivers and RV drivers. At the opposite end of the spectrum, who is least bothered by congestion, there are a few surprises, including 16 to 19 year-olds, a group never known for their patience.

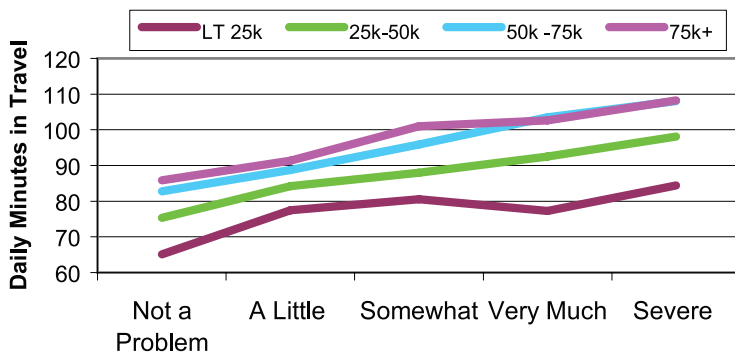
Percent Responding that Congestion was a Major or Severe Problem



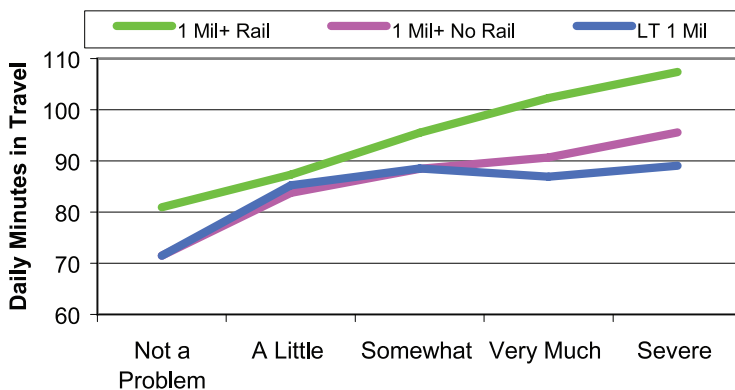
IS THERE A CONNECTION BETWEEN ATTITUDES ABOUT CONGESTION AND THE AMOUNT OF TIME SPENT IN TRAVEL?

People who view congestion as a major or severe problem spend more time in travel than those less bothered by congestion.

Attitude About Congestion by Income



Attitude About Congestion by MSA Size

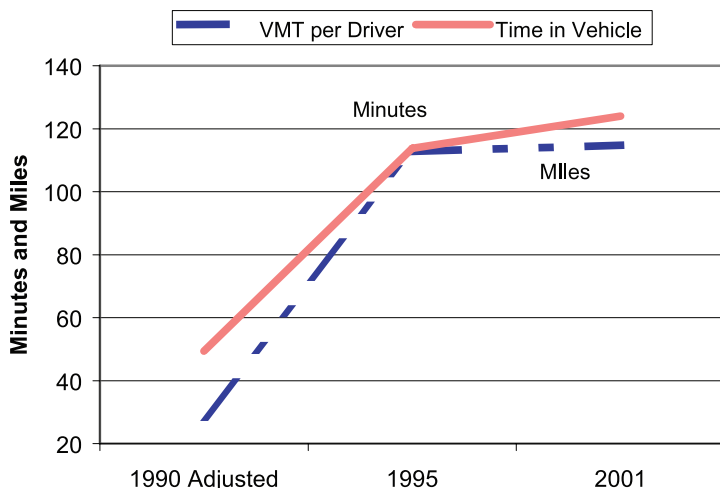


HOW MUCH OF THE EXTRA TIME SPENT IN VEHICLES IS TO GO MORE MILES?

Between 1990 and 2001, the average driver increased their daily distance by 4.2 miles, and increased their driving time by almost 12 minutes.

	1990 Adjusted	1995	2001
VMT/Driver (Miles)	28.5	32.1	32.7
Time in Vehicle (Minutes)	49.4	56.2	61.2

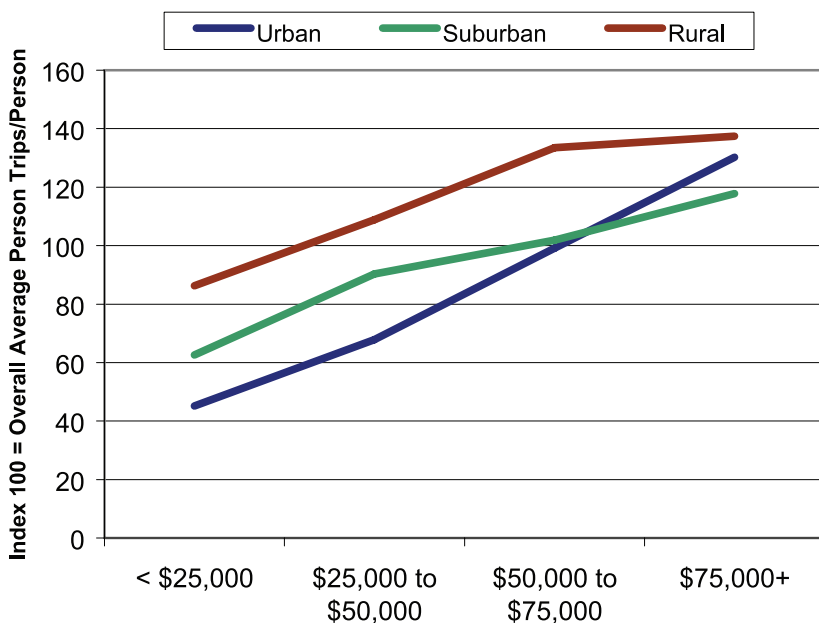
Since 1995, it appears as if travel time is growing faster than travel miles. While miles per driver increased 15 percent between 1990 and 2001, the amount of time the average driver spends in the vehicle increased by 24 percent.



WHAT ARE THE MOST IMPORTANT FACTORS INFLUENCING THE AMOUNT OF TRAVEL?

It has long been recognized that two of the most important factors in the amount of travel are household income and location. As expected, travel increases as household income increases and travel increases as we move from urban to suburban to rural settings. It appears that the spread within income groups in the same area type is greater than the spread between area types within the same income group. Perhaps income is the stronger influence on the amount traveled.

Daily Person Trips per Person Indexed to Average



EVERYBODY TRAVELS MORE – GENDER AND EMPLOYMENT STATUS

At a time when average annual miles increased for all drivers by 34 percent, employed women's driving increased by 54 percent and driving by women not employed increased by 49 percent. There were some gains in the female driver rate between 1983 and 2001, particularly in women not employed. In 1983, 64.2 percent of that group were drivers, and by 2001 that rose to 75.5 percent.

Mobility by Gender and Employment Status

Employment Status	1983		2001	
	Percent Adults	Percent Drivers	Percent Adults	Percent Drivers
Employed				
Male	34	96	37	96
Female	26	91	32	94
All	60	94	69	95
Not Employed				
Male	13	76	11	82
Female	26	64	20	76
All	40	68	31	78
Total	100	84	100	90
Number of Adults (16 and Over)	175,725	147,015	208,155	186,284

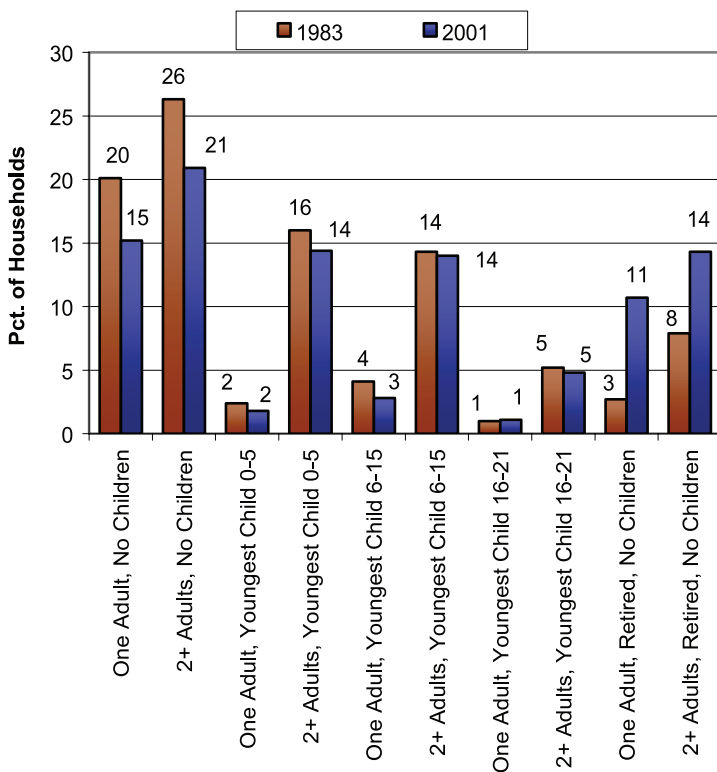
Average Annual Miles Driven by Gender and Employment Status

Employment Status	1983	2001	Percent Change
Employed			
Male	15,882	18,786	18%
Female	7,738	11,912	54%
All	12,480	15,826	27%
Not Employed			
Male	7,654	9,760	28%
Female	4,473	6,666	49%
All	5,663	7,973	41%
Total	10,288	13,785	34%

HOUSEHOLD LIFECYCLE CHANGES OVER TIME

The stages of a person's life, from young and single to married with children to retired, is referred to as "lifecycle", and has been effectively used to explain and understand travel behavior. The lifecycle categories used with the NHTS data differentiate by number of household adults, presence or absence of children, age of the youngest child and whether the adults consider themselves retired. When comparing the 1983 and 2001 households by life-cycle, the most striking change is the increase in retired households, which reflects the aging of the American population.

Percent of Households by Lifecycle



HOW MANY PEOPLE HAVE TRANSPORTATION DISABILITIES AND WHAT IS THE IMPACT ON THEM?

The NHTS defines “transportation disability” as a medical condition that makes it difficult to travel outside the home. To avoid temporary conditions, like a cast on a broken leg, a threshold is established that the condition must have existed for at least 6 months.

Overall 16.5 million people or 6 percent of the NHTS sample has a transportation disability—but that is highly linked to age. Only 3.7 percent of people under the age of 65 (nine million people) have a disability, whereas 22.5 percent of people 65 and older do (7.5 million).

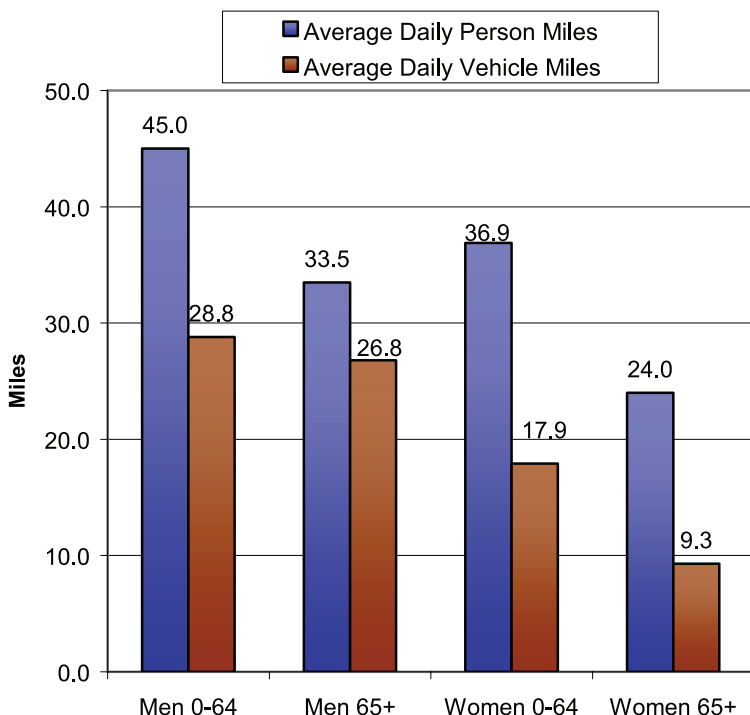
Overall, a transportation disability means that people reduce their travel, ask others for rides, or limit driving to daytime. There is a reluctance to give up driving altogether, although nearly eight percent of older people with a transportation disability have given up driving.

	Under 65	65+	All
All Transport Disabled	3.7%	22.5%	6.0%
Reduced day-to-day travel	3.5%	20.1%	5.5%
Asked others for rides	2.5%	12.7%	3.7%
Limited driving to daytime	1.5%	10.5%	2.6%
Given up driving altogether	0.6%	7.8%	1.5%
Used bus and subway less frequently	0.8%	3.9%	1.2%
Used special transport services, like dial-a-ride	0.5%	2.9%	0.8%

*** Note that the same person can select several impacts**

WHAT ARE THE SPECIAL MOBILITY ISSUES OF OLDER AMERICANS?

As we age, our vision, cognitive function, reaction time and psychomotor abilities tend to decline. All of these issues may lead to a loss of mobility, which can subject an older person to a loss of social interactions. One of the most difficult transitions for older drivers is the decline or cessation of travel at night or in bad weather. Typically this leads to giving up driving all together, and many of the factors that cause an older person to give up driving also inhibit or prohibit their use of other travel modes, such as transit or walking.



DO OLDER WOMEN HAVE SPECIAL TRAVEL PROBLEMS?

Older women (65+) experience greater mobility issues because:

- Women of all ages tend to travel less than their male counterparts
- Many older women today did not grow up driving
- Women outlive men and are often widowed and living alone for many years
- Older women often have greater concerns than older men about their personal safety and security.

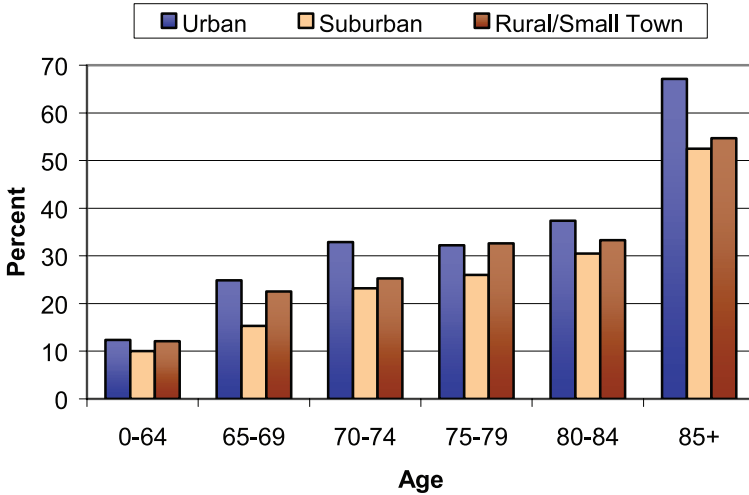
To take a different look at the mobility issues of older women, the chart below shows the percent of women who did not make a trip on their assigned survey Travel Day. While the assigned Travel Day may or may not have been a typical day for any given survey respondent, on average, it provides a representative look at daily travel in the United States.

Twelve percent of all persons, men and women, did not report a trip on the travel day, but 77 percent of those who did not travel were 75 years of age or older. The average zero-trip rate for all women is 13.7 percent. The chart confirms a few expected outcomes:

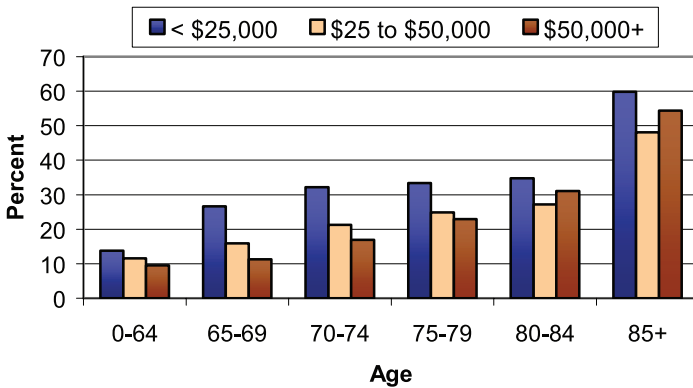
- Women 65 and older are more likely to not make a trip than women under 65.
- The prevalence of zero-trip making increases with age, and shoots up dramatically for those 85 and older.
- The differences in zero-trip days between urban, suburban and rural/small town women may be due to differences in household income.

Accordingly, the next graph shows the impact of income on the percent of zero-trip women. Within each age grouping, there is a very strong correlation between income and zero-trip making. As income rises, the incidence of zero-trip making decreases.

Percent of Zero-Trip Women Within Each Age Group by Urban, Suburban, and Rural



Percent of Zero-Trip Women Within Each Age Group by Income



Unfortunately, almost half (47 percent) of the women 65 and older were in households with incomes of less than \$25,000, another 35 percent were in households with incomes of \$25,000 to \$49,999, and only 18 percent were in households with incomes of \$50,000 or more.

WHAT ABOUT HOUSEHOLDS WITHOUT VEHICLES—WHO ARE THEY AND HOW DO THEY GET AROUND?

Zero-vehicle households account for 8.1 percent of all U.S. households—down from 15.3 percent in 1977. These households are primarily urban—7.8 million urban households and 850,000 rural households have no vehicles available.

Over half of zero-vehicle households are located in large metro areas (three million or more in population). Of the zero-vehicle households in areas of three million or more, 67 percent had annual income of \$25,000 or less, and only seven percent had an income of \$75,000 or more.

Well over half (58.3 percent) of zero-vehicle households are one-person households, compared with the average of 25.8 percent of all households.

People in zero-vehicle households travel differently than those who have vehicles—while zero-vehicle households comprise 8.1 percent of all households, they make almost half (46.8 percent) of all transit trips. Their high level of transit use is also related to their location in the largest metro areas.

Percent of Person Trips by Mode

	Household Vehicles:	
	None	Some
POV	35.7%	88.2%
Transit	20.7%	0.9%
Walk	36.2%	7.7%
Other	7.4%	3.2%
Total	100.0%	100.0%

Average Person Miles of Travel Per Day

	Households Vehicles:		
	None	Some	All
Worker (16+)	30.5	50.5	49.6
Non-worker (16+)	9.8	32.9	30.2
All	17.9	40.4	39.3

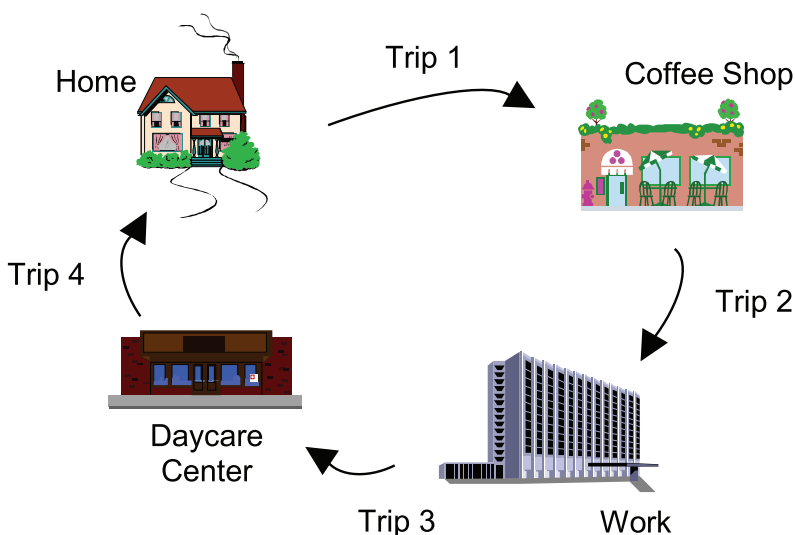
WHAT IS TRIP CHAINING?

The phenomenon of trip-chaining—linking a series of short trips (stops of 30 minutes or less, such as to stop at a store or to drop kids at school or day care)—into the commute to or from work complicates our understanding of the typical journey to work.

The Census does not ask about regular stops during travel to work, which can impact departure time, travel time, and route choice.

For at least the past 25 years transportation planners have focused on the commute as one of the major organizing elements of household travel. Commute trips are often thought to be highly repetitious, and therefore highly predictable. In actuality, commute trips vary in length and time by day and direction, and trip chaining impacts commuters' departure time, route choice behavior, and miles traveled to work.

Example of Trip-Chaining



WHO IS TRIP-CHAINING?

In 2001, nearly 19 million weekday workers (27 percent of all weekday workers) chained trips as part of their commute compared to 17.3 million in 1995 (25 percent of weekday workers). Over 1.5 million more weekday workers made short stops during their commutes in 2001 than in 1995—almost all of them added stops in the home-to-work direction of the trip which had a 21 percent increase, while the people who chained trips in both directions increased by over 12 percent.

Number of Weekday Workers by Chain Type

	1995	2001	Numeric Change 1995-2001	Percent Change 1995 - 2001
Number of Weekday Workers	68,760,000	68,990,000	230,000	0.3%
Made Direct Trips	31,290,000	31,660,000	370,000	1.2%
Stopped for more than 30 minutes	20,193,955	18,487,330	-1,706,625	-9.2%
Chained Work Trips	17,276,045	18,842,670	1,566,625	9.1%
Chain Home-Work Only	5,929,237	7,158,844	1,229,607	20.7%
Chain Work-Home Only	7,762,956	7,659,436	-103,520	-1.3%
Chain Both	3,583,852	4,024,390	440,538	12.3%

Source: McGuckin, Zmud and Nakamoto

DO WORKERS WHO TRIP-CHAIN HAVE LONGER COMMUTES?

Workers who chain trips into the commute live farther from work, and travel more miles and minutes than those who do not trip chain. Comparison of the commute distance can be measured by the sum of miles traveled to work on a weekday, the reported distance to work, and the geocoded great circle distance (as the crow flies).

The VMT for those who trip chain was much higher than the reported usual distance to work, whereas for workers who made a direct trip the actual and reported miles are virtually the same. Workers who chained during their commutes spent 15 to 20 minutes longer in travel than workers who did not.

Mean Distance in Miles Between Home and Work— Workers who Trip Chain and Workers Who Don't

Measure of Distance/Duration	Workers who Trip Chain	Workers who Make a Direct Trip
Person Miles of Travel (PMT)	18.4	12.0
Vehicle Miles of Travel (VMT)	16.0	10.6
Minutes	35.6	23.7
Reported Usual Distance to Work	13.6	10.6
Great Circle Distance Home-Work	8.4	7.0

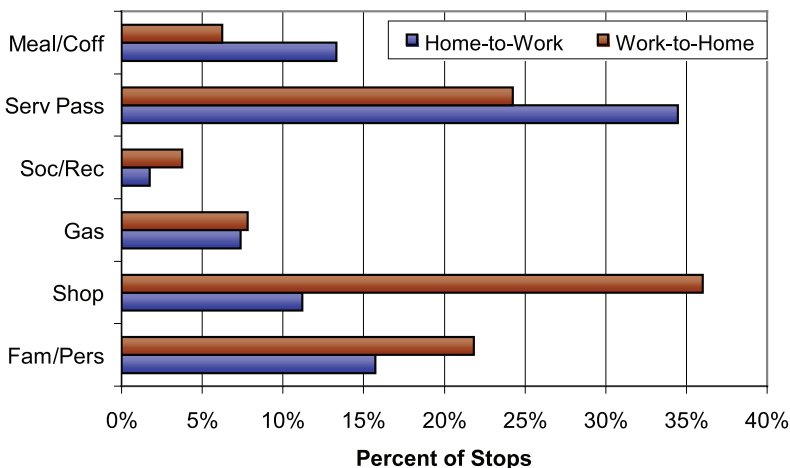
Source: McGuckin, Zmud and Nakamoto

WHY DO WORKERS STOP?

By far the most common purpose for stops, within trip chains on the way home from work, was to shop—such trips include both discretionary and household-sustaining activities. The detailed purposes collected in 2001 NHTS include a separate coding for buying gasoline and meals/coffee, which are shown separate from other shopping in the graph.

For workers who made stops in either direction, the most common type of trip embedded in the home-to-work chain was a serve passenger trip (35 percent), followed by family or personal business (16 percent) and stop for a meal or coffee (14 percent). For the work-to-home chain, the most common type of embedded trip was a shopping trip (36 percent), followed by serve passenger (24 percent) and family or personal business (22 percent).

Percent of Stops During Commute by Purpose



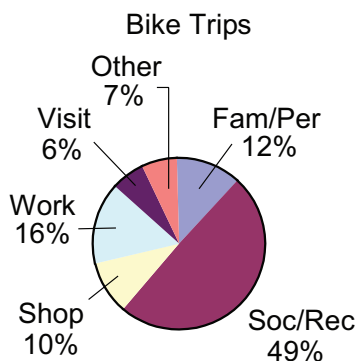
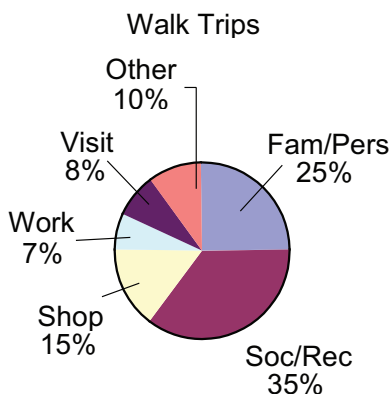
Walk and Bike

WHAT ARE THE PURPOSES OF WALK AND BIKE TRIPS?

Social and recreational purposes, primarily exercise, dominate walk and bike trips for older teenagers and adults (these data are for respondents 16 and older). Over a third (35 percent) of all walk trips are for social and recreation, while a quarter are for family and personal business.

Nearly half of all bike trips are for social and/or recreational purposes, and one out of six (16 percent) are for commuting to work. The average bike trip to work is 2.9 miles one-way, compared to 12.1 miles by all modes.

The survey also asked for the number of walk and bike trips made during the previous week for people 16 and older. This was asked to get a better sense of typical walk and bike patterns, since such a trip may not show up on the specific travel day assigned to the respondent. The data on the next page provides a profile of frequency of walking.

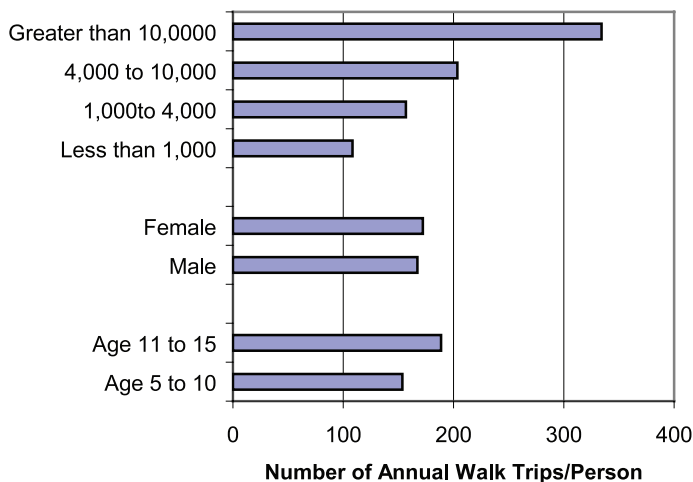


Number of Walk Trips in Previous Week for Persons 16 Years and Older

	Number of Walk Trips Last Week				
	None	1-6	7-14	14 plus	All
Age					
16-24	34.2%	45.2%	15.3%	5.3%	100%
25-64	33.4%	47.1%	15.4%	4.1%	100%
65+	40.6%	38.1%	18.6%	2.6%	100%
Gender					
Male	34.9%	43.5%	16.9%	4.7%	100%
Female	34.5%	47.2%	15.0%	3.4%	100%
Workers	34.6%	46.5%	14.7%	4.2%	100%
Households					
Vehicles < Drivers	31.5%	43.7%	18.7%	6.2%	100%
Vehicles => Drivers	35.3%	45.8%	15.3%	3.6%	100%
Urban	28.8%	44.9%	19.8%	6.4%	100%
Suburban	36.0%	46.6%	14.3%	3.1%	100%
Rural/ Small Town	35.4%	44.5%	16.1%	4.1%	100%

Number of Annual Walk Trips for Persons 5 to 15 Years Old

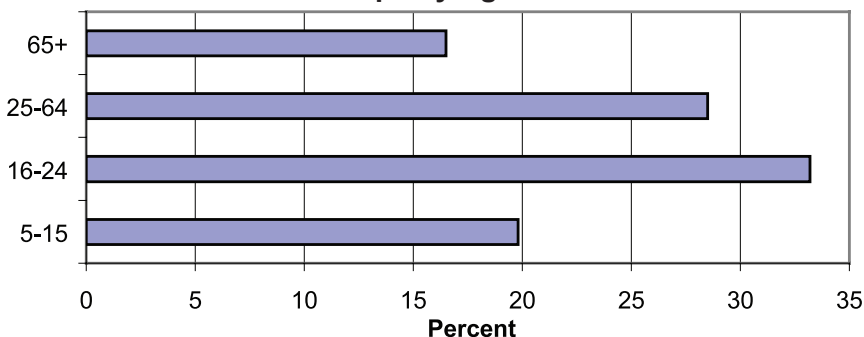
Population Density per Square Mile



WHAT PORTION OF WALK AND BIKE TRIPS ARE TAKEN IN DAYLIGHT AND IN DARK?

Young people ages 16 to 24 make over a third (33 percent) of their walk and bike trips at night, while older people (65+) make the lowest share (17 percent).

Number of Nighttime (6PM to 6 AM) Walk and Bike Trips by Age



Number of Annual Walk and Bike Trips per Person by Age and Daytime—Nighttime

Age	Day	Night	Total
5 – 15	166	41	207
16 – 24	90	45	135
25 – 64	92	37	129
65+	92	19	111

Everyone above the age of 15 seems to average about 90 daytime walk trips per year, or one trip every four days. As expected, children age five to fifteen average most walk and bike trips, since this represents a primary mode of their mobility.

Energy Consumption

HOW MANY HOUSEHOLD-BASED VEHICLES ARE SUVs and PICK-UPS AND HOW MUCH MILEAGE DO THEY ACCOUNT FOR?

Over half of the U.S. fleet is comprised of passenger cars. The average car is a little bit older than the average van or sport utility vehicle, (SUV), and accrues fewer miles per vehicle per year. Pick-ups are, on average, the oldest vehicles in the fleet—almost one year older than the average car and three and one-half years older than the average SUV. SUVs are 12 percent of all vehicles but account for 14.1 percent of all household based VMT, while pick-ups, which are 18.4 percent of the fleet, account for 19.5 percent of the total annual miles for household-based vehicles.

Vehicle Type	Percent of Household Vehicles	Avg. Age	Annual Miles Per Vehicle	Annual Total Miles (All Vehicles)
Car	56.5%	8.0	11,755	1,135,477,169,013
Van	9.0%	6.6	13,541	208,029,190,243
SUV	12.0%	5.6	14,091	286,467,638,147
Pick-Up	18.4%	9.1	12,522	393,999,980,017

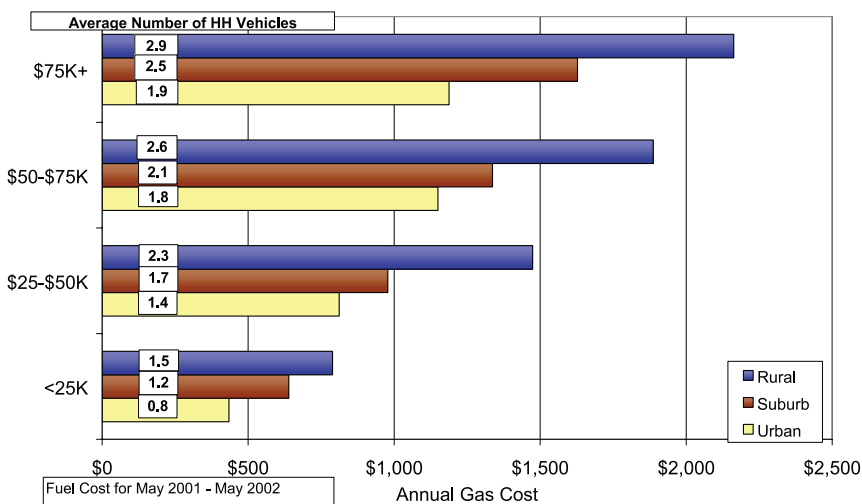
Note: We wish to thank the Energy Information Agency, U.S. Department of Energy, for appending the fuel efficiency data (mpg) and gas cost to the 2001 NHTS dataset. The fuel costs used are based on May 2001-May 2002.

HOW IS ANNUAL FUEL EXPENDITURE RELATED TO INCOME AND LOCATION?

Fuel use and annual fuel cost for a household is a function of how many vehicles the household has, how many miles those vehicles are driven, and how much motor fuel costs in the household's location.

In 2001, wealthier households (\$75,000 a year and more) spent more in motor fuel—more than two and one half times—than poorer households (less than \$25,000) spent; \$1,749 compared to \$662 per year. Wealthier households have more vehicles and accrue more annual miles. But the average varies by the location of the household; the wealthiest rural households spent \$2,163 per year (with an average of 2.9 vehicles) compared to the wealthiest urban households that spent \$1,188 with an average of 1.9 vehicles.

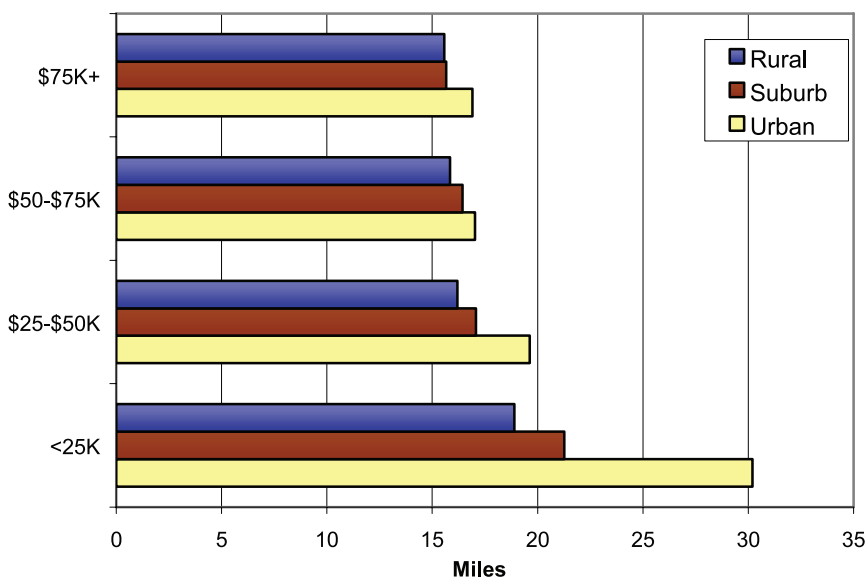
Household Fuel Expenditures per Year



DOES LOCATION AND INCOME AFFECT THE MILES PER DOLLAR OF GAS?

Looked at another way, the person miles per dollar of gas relates the mix of fuel-efficient vehicles in poorer and richer households and in rural and urban areas. Poorer urban households, with fewer and more efficient vehicles, get more miles per dollar of gas than households in other area types. Wealthier households, regardless of location, get fewer miles per dollar spent in fuel cost.

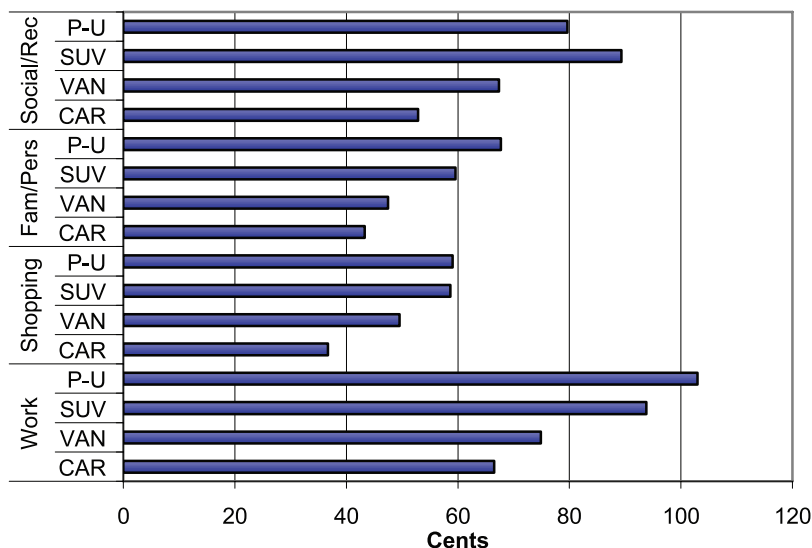
Miles per Dollar of Household Fuel Expenditure



HOW MUCH DO PEOPLE SPEND GOING TO WORK COMPARED TO OTHER TYPES OF TRIPS?

How much an average work or shopping trip costs depends on the type of vehicle usually used and the average trip distance. The average work trip, for instance, is nearly 12 miles, whereas an average shopping trip is only seven. Therefore, over all vehicles for all trip lengths, fuel costs 78 cents for the average vehicle trip to work but only 44 cents for the average vehicle trip for shopping.

Fuel Costs for Common Trips by Vehicle Type



P-U = Pickup Truck

SUV = Sports Utility Vehicle

Future Trends

Changes in society, technology, and economic conditions will interact with lifestyle elements of travel behavior to continue to alter daily travel. As the population ages, we don't know what the effect on the purpose and time of day of travel will be. Some of the visions of the future include smart growth and Intelligent Transportation Systems (ITS) to mitigate the impact of the growth in travel. Future transportation improvements will not likely come from large capital investments as much as from carefully crafted programs that include integration of policy goals, creative analysis and innovative solutions.

Societal and Demographic Trends

Demographic changes in the U.S. can affect travel, such as the added longevity and an aging population, migration and immigration, household structure and family definitions.

One example of a demographic shift is the growth of single person households. Over a quarter of all U.S. households are single-person households, but they are the fastest growing segment. Of the 13.5 million added households between 1990 and 2000, 4.7 million were single-person households. The Census 2000 was the first time the proportion of single-person households (25.8 percent) was greater than the proportion of nuclear families (married couples with children account for 24.3 percent).

Household size and composition have a major influence on travel. For example, single-person households are more likely to eat out. The shift from traditional nuclear families (two parents and children) to more diverse and smaller households adds to the number of people separately traveling to work, the grocery store, and for errands and social purposes. For instance, in 1990, three out of four carpools to work consisted of people from the same household, which rose to four out of five in 2001.

The aging of the driving population in the US has raised many safety concerns, particularly focused on elderly driver's declining vision and ability. Thirteen percent of the U.S. population is 65 years and over, and the proportion of older Americans is projected to grow to 20 percent in the next three decades. The coming population bubble of these senior drivers is important to understand for both policy and safety considerations.

Even if older drivers follow historic patterns and reduce their daily travel, the sheer number of added travelers will significantly increase the proportion of national VMT accounted for by older drivers. Just from the impact of the greater population, the miles driven by 60 to 64 year-olds could increase 25 percent in the next decade, while the miles driven by 65 to 69 year-olds could grow 10 percent.

Other societal and lifestyle factors, such as the growing dominance of multiple-service retail stores, where diverse goods and services such as clothing and dry goods, fresh produce, ready-meals, movie rental, and auto parts can be found in the same location, also impact travel. On-line services continue to become more common, and are changing the amount and nature of home deliveries.

Technological Innovations

Throughout history more communication has led to more travel, and we are in an era of communication technology advances. Some researchers believe that people may forgo travel through working at home and internet shopping. But reducing travel for work and shopping may lead people to increase travel for other purposes, such as errands or recreational trips. The NHTS shows that workers who go to work on the travel day make an average of 3.6 trips for all reasons whereas workers who do not go to work on the travel day make 4.8.

The character of working at home has changed dramatically over the last half century. The decline in home-based employment from 1960 to 1970 was presumably a result of vanishing family farms and consolidation of professions (Doctors, Veterinarians, Lawyers) into group practices. But the decline has reversed, according to the U.S. Census, since 1980, “work at home” has increased almost two-fold—from 2.2 million workers to 4.2 in 2000.

The NHTS asks respondents whether they sometimes work at home *instead* of going into their regular work place—about 10 million workers out of 145 million in the country do sometimes work at home (about four percent). More than six out of ten people who answered ‘yes’ were in professional or technical occupations, more often men than women, and slightly older than workers who did not work at home.

Working from home is much more common in the large cities and less so in smaller and non-metro areas, and not surprisingly 90 percent of the workers who occasionally work at home are frequent web users. People who occasionally worked at home instead of going to their regular workplaces had commutes nearly 25 percent longer than those who never worked at home. The growing flexibility of work, coupled with the power of communications technology has potential effects on miles of travel, congestion, and the time-of-day of travel that are still being studied.

Technology innovations affect more than communications and work—they are already present in the infrastructure with intelligent transportation systems (ITS). Electronic toll collection, traffic-enforcement through vehicle tag recognition, Global Positioning System (GPS) tracking of buses and snowplows, and variable message signs are all part of the daily landscape. High-Occupancy or Toll (HOT) lanes are an innovation that allows a solo driver to pay a toll to use the less congested carpool lanes. Fees can be collected electronically and dynamically adjusted based on the volume of traffic in the carpool lane to ensure that

these lanes are free-flowing at all times. This type of facility is being studied around the country, and HOT lanes have found unexpected markets, such as women with children who will pay to reduce travel time and increase reliability.

Land Use

There has been a tremendous growth of population, workplaces, and travel in suburban areas. The continued development of suburban areas changes the geography and time-of-day patterns of congestion, including peak spreading and weekend congestion. Sprawling development increases auto-dependency. Much of today's travel is suburb to suburb, with widely dispersed origins and destinations that make transit less efficient.

The effect of greater distance between where we are and where we want to go significantly affects our daily lives—there has been an explosion of people who drive alone to work, for instance. Moving to a private vehicle may have saved travel time in the early days of suburban growth but travel time to work has increased in the last decade in every large metro area. On an average weekday, workers spend 45 minutes in their commutes out of 100 minutes in all travel. But trips for non-work activities are increasing even faster than work trips—there is more travel for family and personal errands, shopping, and social and recreational purposes. Reversing an historic trend towards faster travel, the estimated speed for all trips is slowing.

Transportation and land-use are linked, but few opportunities exist for them to be integrated in the development process, which can result in a mismatch between transportation goals and developing land-use patterns. Transportation planning is carried out by both local and regional organizations, and coordinated through the local Metropolitan Planning Organization. Independent municipalities and organizations with no single coordinating agency, on the other hand, generally carry out land-use decisions.

With smart integration of land-use and transportation planning many cities are seeing resurgence in urban lifestyles. Cities are working hard to maintain the centrality of employment centers, and offering a mix of social, cultural and recreational activities combined with renewed residential land-use.

Smart Growth advocates see transit-oriented development, higher-density settlement, and discouraging the use of the auto, as integral to the future of our cities. Health advocates are trying to get Americans out of their cars to walk more every day. Mandated air-quality standards and increased energy use in sprawling urban areas create the need to assess the impact of broad-ranging travel demand management (TDM) strategies on American's daily travel.

Summary

The mobility of the majority of the American population is greater than ever. Moving forward, demographic shifts, technology, and good planning practices and strategies, are sure to change the nature of the transportation environment. There are still people who have constrained mobility, for those who are older, poorer, have transportation disabilities or are without access to a vehicle, may feel disenfranchised from the social, political, and economic benefits of this society.

Mobility is part of our culture, the American dream. It is the fabric of our daily lives that weaves the connection between where we are and where we want to be. A secure and efficient transportation system is central to our economic well being. The information presented in this booklet gives a snapshot of personal mobility in America, and the data and publications (<http://nhts.ornl.gov>) allow policy-makers and researchers to use this rich source of information about household travel. To the extent that this snapshot has raised more questions on this topic, it has been a success.

TERMS USED IN THIS PUBLICATION

Means of Transportation – The type of transportation used for the trip, sometimes called “Mode.” For purposes of this report, any means not specifically identified on a chart will be included in “other.”

Privately Owned Vehicle (POV) – Motor vehicles owned by or available to the surveyed household. Includes cars, vans, sport utility vehicles, pickup trucks, other trucks, recreational vehicles, motorcycles and other household-based vehicles.

Public Transportation – Includes bus, subway or elevated rail, commuter train, and streetcar or trolley car.

Other Modes – includes walk, bicycle, school bus, airplane, Amtrak, and taxi.

Person Trip – A movement from one address to another by one person by any mode.

Person Trip by Private Vehicle – A subset of all person trips, to include only those trips by private vehicle. There is still one person trip for each person on the trip, whether they are the driver or a passenger.

Person Miles – The number of miles traveled by each person on the trip. For example, two people making a five-mile trip by car would generate 10 person miles.

Trip Chaining – This refers to making stops of 30 minutes or less, such as to drop a child at school, on the way to or from a major destination, such as home or work.

Trip Purposes – A trip purpose is the reason that motivates the travel. In the NHTS some of the purposes are grouped into a main purpose, as shown below:

Work – Trips to and from your place of work, or where you report to work.

Work-related –Trips made for your job, other than travel to your place of work. This may include going to a meeting, travel to various construction sites, or visiting clients.

Family and Personal Business:

Shop –Includes purchase of goods or window-shopping.

Doctor/Dentist –Trips to doctors’ or dentists’ offices, medical clinics, hospitals, counselors, etc. to obtain medical or dental services.

Pickup/Dropoff –Trips to take someone else somewhere, such as picking up a child at school. This is sometimes called ‘Serve Passenger’.

Other Family and Personal Business –Trips for purchase of services, such as haircuts, banking, car repair, etc. and all other family and personal business activities that do not fall into one of the other subcategories above.

School/Church –Trips to schools, colleges or universities to attend class, or to attend religious activities.

Social and Recreational:

Vacation –Trips the respondents reported as their “vacation.”

Visiting Friends or Relatives–Trips specifically made to visit.

Other Social and Recreational –All other trips for social and recreational activities, including participating in sports, going to movies, plays, and parties, attending sporting events, etc.

Other –Trips that cannot be classified in any of the categories above.

Vehicle Miles of Travel (VMT) – Each mile traveled by a household-based private vehicle. For example, two people making a five-mile car trip would generate five vehicle miles of travel. The estimates do not include transit vehicle miles because the sample is households, people, and household-based vehicles, which we track with the vehicle trips people make throughout the day.

Vehicle Occupancy – For the NHTS data, vehicle occupancy is calculated by weighting the number of vehicle occupants, by the trip length and dividing by the vehicle miles, this produces the rate of person miles over vehicle miles.

Vehicle Trip – Each time a private vehicle goes from one address to another for a purpose, a vehicle trip is counted, regardless of the number of the people in the vehicle.

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