

CHAPTER 1

Personal Mobility

Introduction

By most measures, the United States is the most mobile nation, accommodating over 4 trillion miles of passenger travel and 3.7 trillion ton-miles of freight annually in the late 1990s. A vast system of transportation infrastructure makes this possible: 4 million miles of road, 200,000 miles of rail track, 580,000 bridges, 350 commercial ports, 5,500 airports. Every day, the U.S. maintains, patrols, and moves goods the length of enough commercially navigable waterways to span the globe—25,000 miles if stretched end-to-end.

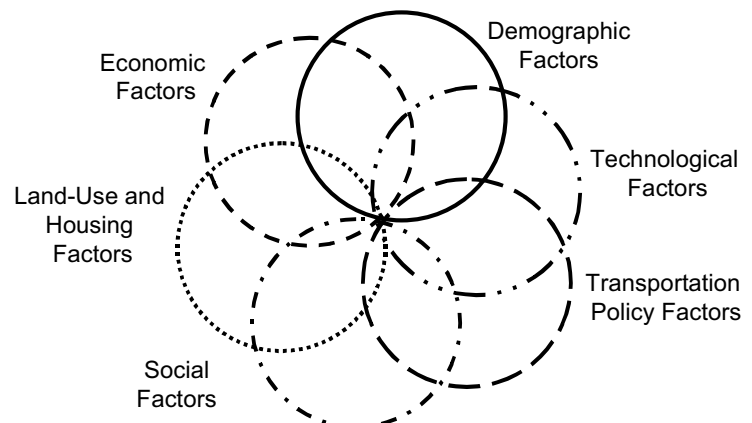
A mobile society is an open society, where seamless access to diverse economic, social, and cultural marketplaces fosters the opportunities, competition, and choices that fuel the economy and enrich the daily lives of millions. Transportation investment choices contribute to such an open society by increasing access to new activity centers, reducing bottlenecks in existing facilities, and extending mobility to the least advantaged members of society.

Our transportation system is constantly in flux, adapting to the changing frontiers of the U.S. economy and its people. Once principally geographic and geological, the frontiers of transportation have become increasingly technological, economic, demographic, and geopolitical. Exhibit 1-1 illustrates the combined forces that interact in determining the way that people travel.

A comprehensive treatment of all issues related to mobility is beyond the scope of this chapter. However, evidence has accumulated that not all segments of U.S. society share in the high quality mobility that most Americans have come to expect. Significant barriers to mobility persist for people with disabilities, elderly people, low-income households, recent immigrants and people of color. The system for distributing goods and services fails to reach into some places where

Exhibit 1-1

Factors Affecting U.S. Travel Patterns: Economic, Social, Technological, Land Use and Housing, Demographic, Transportation Policy



millions of Americans live and work. Without a concentrated effort to address the mobility problems of these groups, and their access to goods and services, the participation and success of these groups in the larger economy will continue to be limited.

Today’s transportation decisions will create the infrastructure for decades to come. In response to new challenges, the Transportation Efficiency Act for the 21st Century (TEA-21) calls for new approaches to shaping the U.S. transportation infrastructure to the economy. There is increased emphasis on market principles.

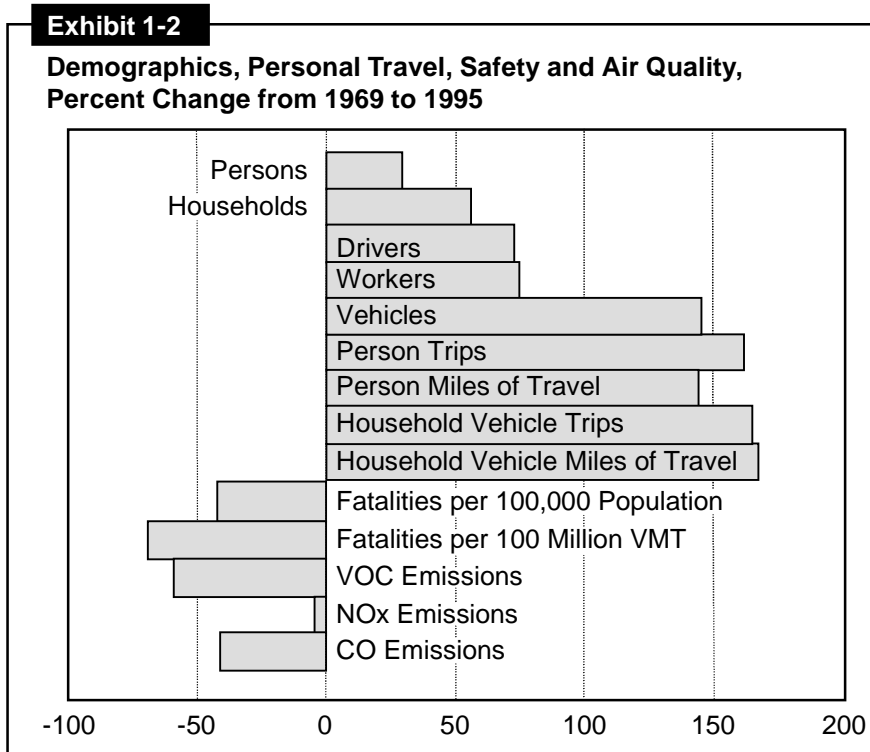
The purpose of this chapter is to place in context the profile of unmet transportation needs in the midst of transportation “plenty.” The qualities of the U.S. surface transportation systems are reported throughout the succeeding chapters.

The data from the Nationwide Personal Transportation Survey (NPTS) is the source of the figures and analysis in this chapter. The periodic survey provides a snapshot of travel by Americans and allows us to view differences in transportation patterns by income, age, gender and race, and to understand how travel changes over time. The reports and data analyses of the following people were used as source material: Sandra Rosenbloom of University of Arizona, Patricia S. Hu and Jennifer Young of Oak Ridge National Laboratory, Daphne Spain of University of Virginia, William Mallett of the Bureau of Transportation Statistics, U.S. Department of Transportation, John Pucher, Tim Evans, and Jeff Wenger of Rutgers University, Steven Polzin of University of South Florida, and Nancy McGuckin, Travel Behavior Consultant. Patricia Hendren of University of California at Davis and Nancy McGuckin provided considerable support in reviewing, restructuring and editing the material.

Measuring Mobility

Technological advances, government policies, and public acceptance of safety initiatives have accomplished much over the 1969 to 1995 period. Exhibit 1-2 shows key 1995 demographic, travel, safety and air quality indicators indexed to 1969. There were substantial increases in personal travel over this time, yet there were significant decreases in highway fatalities and the most crucial emissions indicators.

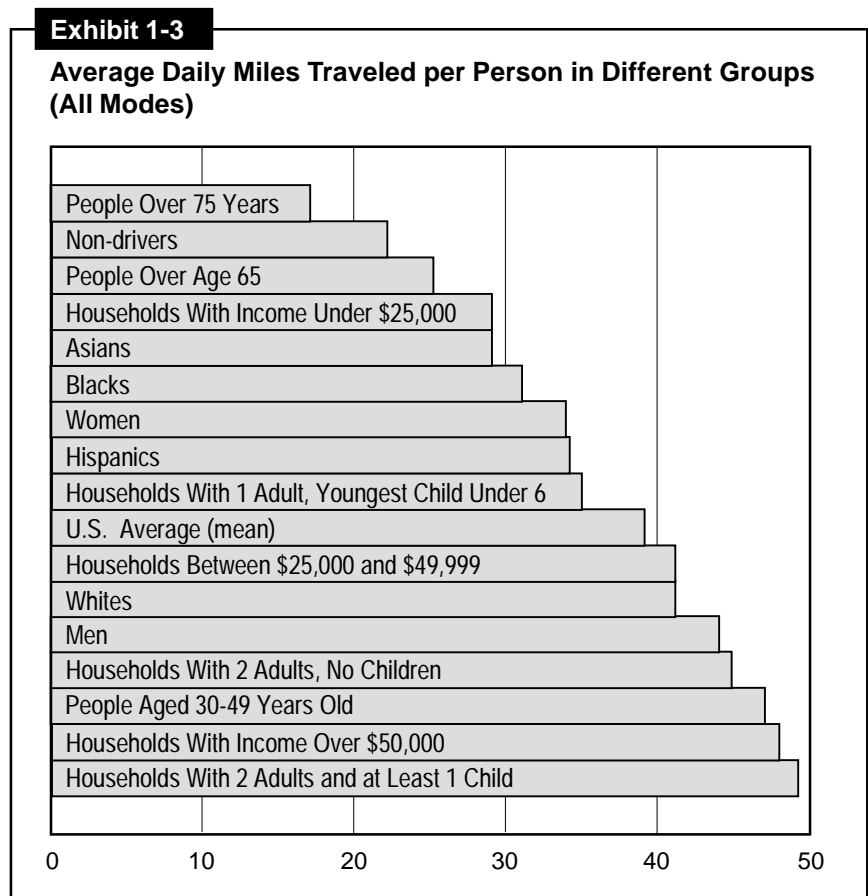
The most commonly discussed inequity is the failure of transportation systems to connect under-employed workers who reside in central cities to growing entry level suburban jobs. Also, as a matter of civil rights, transportation is the key for people with disabilities who are denied the same access to opportunities as is available to the majority of Americans. Another current issue



involves single-parent households who have unique logistical challenges and need flexible and sensible transportation options.

Mobility appears to decrease sharply with retirement. In 1995, annual average vehicle miles for drivers of all ages was 13,476, while for drivers 65 to 69 the average was 9,054. This trend is reflected in the average trip length, which drops by about one quarter after 65 years of age. Most of this change represents the elimination of commute trips by retired workers. However, since 1969 the average annual miles driven by people 65 to 69 has increased by 50 percent, reflecting the aging of cohorts with a higher ratio of drivers to non-drivers. As the baby boom begins to retire around the year 2010, the total ratio of seniors to working age people on the road is likely to increase rather sharply. Is the infrastructure in place to maintain safety standards when older drivers become the rule rather than the exception?

Converting these aggregate trends into specific impacts on individuals and households reflects much about our changing society. Exhibit 1-3 shows the very different levels of travel within various sub-groups, and raises the issue of the dimensions of geography and personal choice. Real-world complexities make untangling this issue difficult: for example, densely developed neighborhoods may have shopping and employment opportunities within short distances of residential areas lowering a person's daily travel miles. On the other hand, families in city neighborhoods may pay higher costs at neighborhood shops compared to suburban super-stores.

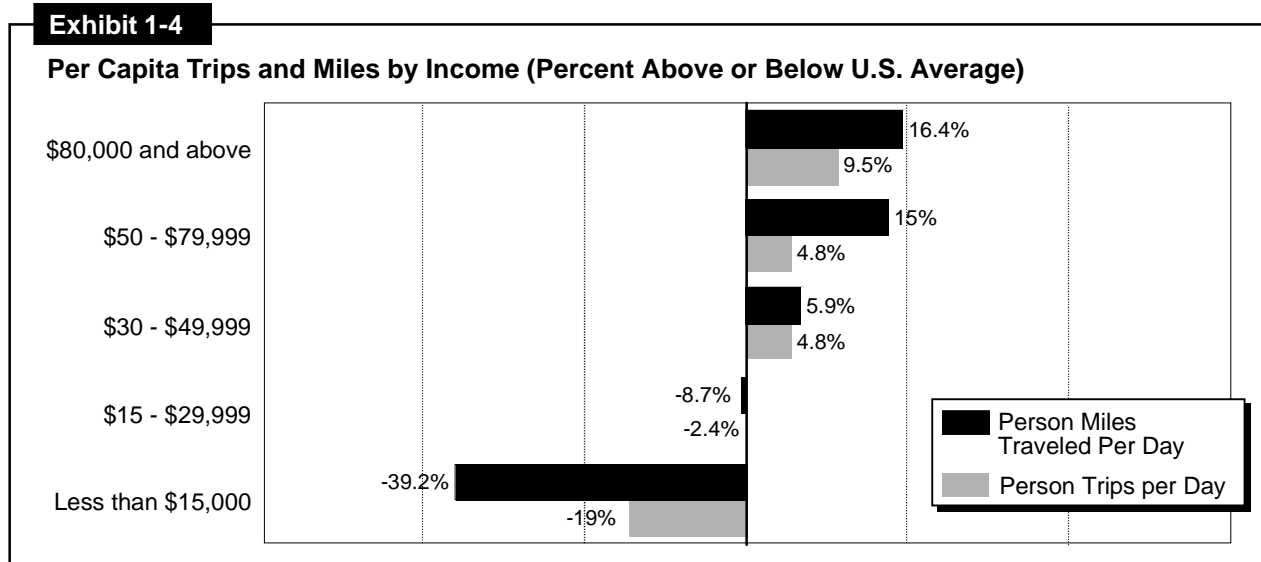


The remainder of this chapter attempts to filter through some of today's complexities relative to their influence on travel patterns.

The Role of Income

Household income is the most important influence on mobility. African-Americans, Hispanic-Americans, newly arrived immigrants, the elderly, and people with disabilities all travel fewer miles and take fewer trips than the U.S. average. Part of the explanation for these differences in travel is related to income class. Residential location and auto ownership influence travel patterns, but household income heavily influences housing choices and auto purchases. Similarly, the logistical hardships on a single parent are severe, but these hardships are ameliorated with disposable income.

According to 1995 data, individuals in low-income households, earning less than \$15,000 per year, make 19 percent fewer trips annually and travel nearly 40 percent fewer miles annually (9,060 compared to 14,924) than the average American household (see Exhibit 1-4). Income differences are even more dramatic on the household level. VMT per household in low-income households is approximately half that in other households (11,594 miles compared to 23,427).



When compared with the highest earning households (those making \$80,000 a year), households with less than \$15,000 income make 1.2 fewer trips per day. The difference in person miles traveled is even more striking—low-income households travel 15.9 fewer miles (almost 50 percent less) than high-income households. One reason for these differences, especially the disparity of person miles traveled, is the lower vehicle ownership rates in low-income households.

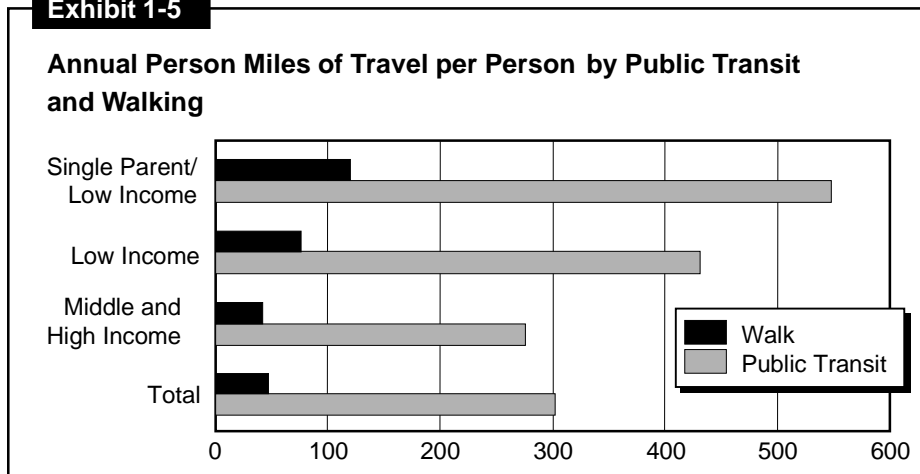
A personal vehicle enables a driver to choose departure time and route. However, the high cost of acquiring, registering, insuring and maintaining a vehicle places vehicle ownership out of range for many low-income households. Twenty-six percent of low-income households do not have a car, compared to 4 percent of other households.

Without a vehicle many low-income households obtain a level of mobility through trips in vehicles owned by others, walking and mass transit. Approximately 8 percent of trips in low-income households are made in vehicles owned by others compared to 1 percent in other income groups. People in low-income households are more than twice as likely to make a walk trip as those in other income groups. Regarding transit use, households with income less than \$15,000 represent 11.7 percent of the population, yet make 27 percent of all transit trips. The 8 percent of households without a vehicle account for 47 percent of all transit trips.

Exhibit 1-5 helps illustrate the link between income and travel-mode choice. The difference in the use of walk and transit is especially clear between single parent/low-income households compared to middle and high-income households.

In addition to the significant effects of racial and ethnic preferences in housing and jobs, the concentration of many low-income households is also influenced by the opportunity to pay lower housing costs. Due to the fact that a larger share of trips made in cars owned by others, walking, and public

Exhibit 1-5



transit, the area in which low-income people travel is geographically confined. For all other households, about 50 percent of their trips are within three miles of home. For low-income, this rises to 60 percent, and for low-income single-parent households, it reaches 66 percent.

The difference in the travel radius, or area that one can

access, expands geometrically. A 3-mile radius gives you access to 28 square miles, while a 10-mile radius allows access to 300 square miles. Traveling over a larger radius opens opportunities for employment, shopping, and services. For example, when a supermarket closes in a lower-income neighborhood, residents are left with fewer options for basic needs.

Transportation limitations are especially critical for work trips. The growth in employment opportunities in the past two decades has largely been in the suburbs of major metropolitan areas. This points to the “spatial mismatch” of having large groups of low-skilled workers in the inner city or close-in suburbs, while the growth in jobs is occurring in the suburbs or exurbs.

With high residential density and low auto ownership, areas with low housing costs create natural markets for public transit, taxi and jitney services, and neighborhood retail and commercial services. If these services are effective, the concentration of the poor and their relative “immobility” need not worsen their condition or constrain their life activities. The public sector can play a key role in enhancing these opportunities by providing resources for transportation investments and encouraging private sector involvement in these areas.

Role of Age

Mobility can help cure isolation. All the disadvantaged groups experience a multifaceted isolation from American life. But this isolation is most severe, debilitating, and progressive for senior citizens. As the proportion of Americans who are elderly begins to increase, and as expected medical advances improve longevity and continue capabilities, the senior population is expected to make new demands on the transportation infrastructure. They will prolong their involvement in the mainstream of society and, what is more, they will have the economic power and votes to enforce accommodation in the infrastructure.

The American society is aging rapidly. The median age of America’s population rose from 28 to 34 between 1970 and 1995. One reason for this increase is the proportion of those age 75 and older is increasing. By 2030 the proportion of the population over the age of 75 is projected to rise from 6 percent to 9 percent. The fastest growing segment of the elderly, the population aged 85 and over is expected to double (to 7 million) by 2020.

Different mobility issues face the elderly because they typically drive less, have lower incomes, have health problems and may require special services and facilities. The majority of older people age in

the places they lived while working. Increasingly these are suburban or rural communities where it is difficult to access services or facilities without a car, and where it has generally been difficult to provide transit services.

Exhibit 1-6 shows how annual miles driven decreases as age increases. It also shows annual miles driven by the elderly has steadily increased since 1969, which correlates with the growing number of elderly with driver’s licenses.

According to 1995 NPTS data, 55 percent of women and 84 percent of men aged 75 and over have licenses. More importantly, almost 100 percent of men and 90 percent of women who will be over the age of 70 in 2012 are currently licensed drivers. As a result we can expect the elderly will be driving more in the future than at present.

Exhibit 1-6					
Average Annual Miles by Driver Age, 1969-1995					
	1969	1977	1983	1990	1995
All Ages	8,685	10,006	10,588	13,181	13,476
60-64	8,112	8,002	8,568	10,314	11,354
65-69	5,850	6,277	6,804	8,347	9,054
70+	4,644	4,828	4,348	6,138	6,779

The expected increases in driving by the elderly pose some serious highway safety issues. Currently, the elderly are second only to teens in their crash involvement rate and have the highest fatality rate of any group on the road. An increasingly mobile elderly population will be sharing the road with non-elderly drivers who may be more aggressive in their driving. Intelligent transportation systems technology may offer some solutions to making this mix of drivers work.

Finally, the cultural composition of the elderly is changing. In 1995, approximately 87 percent of the elderly were White. By the middle of the next century, the Census Bureau predicts that 20 percent of older Americans will be African-American and 19 percent will be of races other than African-American or White. Over 15 percent will be of Hispanic origin. Currently, African-Americans and Hispanics travel less than Whites. As the older population becomes more diverse, will the trend toward increased travel by the elderly continue to hold?

Meeting the mobility needs of the elderly is especially complicated because many may not be able to drive. A 1990 study found that almost one in five men and one in three women older than age 75 required assistance to conduct some of their daily activities, such as bathing, dressing or eating. Between 80 and 90 percent of this kind of personal care, as well as help with household tasks—including transportation—are provided to the elderly by family members, often daughters and daughters-in-law. With the high levels of women working, there is a growing need for elderly service providers, including special transportation services designed to meet their unique needs. How our multimodal transportation system will meet the mobility needs of our expanding elderly population is a question of growing importance.

Role of Gender

Women’s roles have and are continuing to change in all aspects of their lives—at home, at work, and in society at large. Changing gender roles represent the most significant influence on changes in travel behavior over the past quarter century.

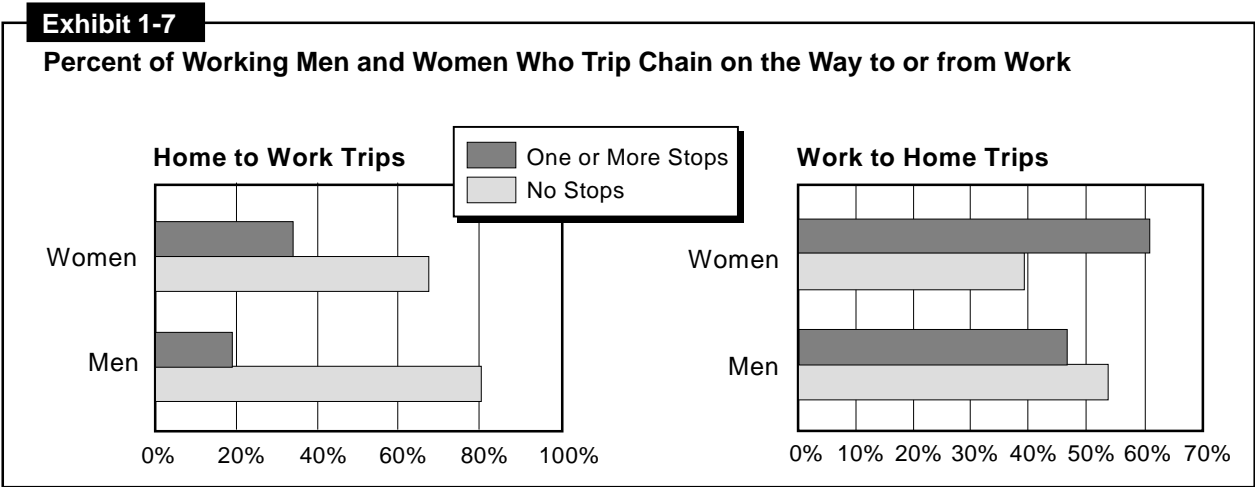
Both men’s and women’s lives are becoming more complex as we try to balance work and family responsibilities. Women have made great strides and accomplishments in the last 20 years, but remain

primarily responsible for family and shopping trips. These responsibilities stem from our attitudes toward how family needs are met. As Martin Wachs stated “travel patterns are among the most clearly ‘gendered’ aspects of American life.”

Working mothers make more trips, more often in a car, and cover more miles than at any time in the past 25 years. Dual career households buy services, such as day care, that were formerly conducted in the home. Mothers still serve as the primary “taxi” service for their children, and as they increase the number of hours worked, women link more and more stops on to the trip to and from work. This phenomenon is called “trip chaining.” It is important to consider the impact of this complex travel pattern because trip chaining may increase congestion at the peak periods, and people who must link trips together have a limited ability to shift commute trips to transit or car pools.

Whereas travel by single adults of both sexes, and by men and women in households without children is rather similar, travel by men and women in households with smaller children is starkly different. Women have always made trips for sustaining the household such as shopping trips and family errands—the increase in women’s participation in the labor force has pushed these trips into the non-work time periods. In addition, many employed women with children drop children at school or day-care on the way to work. Therefore, non-work related trips are being chained together between home and work. This trip-chaining behavior is especially prevalent by women in households with children under 5 years of age.

When we look at the 1995 NPTS, working adult women traveling on weekdays are more likely than men to make stops on the way to or from work, as shown in Exhibit 1-7. The majority of women (61.2 percent) make at least one stop after work, and almost thirty percent (28.3 percent) make two stops or more. Just under half (46.4 percent) of men stop on the way home from work, and only about one out of six (17.7 percent) make two stops or more. The job of running errands to support a home is exacerbated for low-income single mothers who are least likely to own or have access to an automobile.



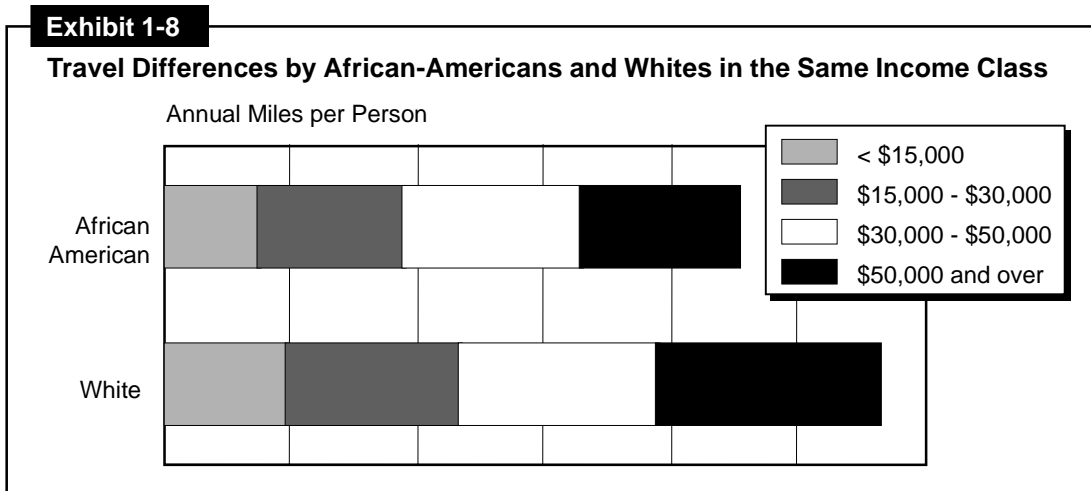
The effect of women’s employment on their travel is clear. Between 1983 and 1995, the population of women 16 and older grew by 12 percent, the incidence of women in the workforce grew by 36 percent, and the average woman increased her daily person miles of travel by 49 percent. Perhaps in future years, with more women completing college, and entering more varied occupations, differences in jobs and salaries between men and women will translate into child care patterns and family responsibilities which are more evenly divided and the gap between men’s and women’s travel will close somewhat.

Role of Race and Hispanic Status

The influence of race, income and geography adds another dimension to the discussion of mobility. As Steven Polzin (University of South Florida) notes, African-Americans and Hispanics have historically spent more time at lower levels of comfort, reliability, security and safety to achieve the same level of mobility as Whites. Among Whites, 88 percent of travel is via automobile. The comparable share for Hispanics in 1995 was 83 percent and for African-Americans 76 percent. We've looked at these differences in terms of the ability to access a wide range of goods and services, and to be able to take advantage of job opportunities in a wider radius from home. How much of these differences are due to race and how much are due to the lower average household income of the African-American population?

When controlling for income, the differences are still very apparent by race as shown in Exhibit 1-8. African-Americans travel less and in a smaller area around their homes than Whites in the same income group—overall taking 15 percent fewer trips and traveling almost a quarter fewer miles per person per day.

African-Americans average 1,421 annual trips per person, or 3.9 trips a day, compared to 1,602 annual and 4.4 daily trips for Whites. As compared to Whites, African-Americans make six times the number of annual transit trips (95 vs.15) and almost twice the number of annual walk trips (131 vs. 72).



Similar patterns are shown in the comparison of travel by Hispanics and non-Hispanics. Hispanics are twice as likely to use transit as non-Hispanics (48 annual trips vs. 25), and Hispanics make 50 percent more walking trips than non-Hispanics (126 vs. 80). The differences in private vehicle use are slight, with Hispanics making 83 percent of their trips by private vehicle, versus 88 percent for non-Hispanics.

The incidence of households without a vehicle is lower for Hispanics than non-Hispanics, and much lower for African-Americans than the general population (see Exhibit 1-9). While 14.9 percent of all low-income households (below \$15,000) do not own a vehicle, this increases to 30.4 percent of low-income Hispanic households and 46.5 percent of low-income African-American households.

In terms of travel mode, 44 percent of transit trips are made by African-Americans, although they represent only 12.4 percent of the population. Clearly, race, income, and household location are

intertwined to form a pattern of travel and mode use. Further research and data analysis may yield information that would allow for more effectively addressing the mobility needs of low-income and minority populations.

Exhibit 1-9	
Percent of Households Without a Vehicle	
All U.S. households without a vehicle	8.1%
Households with income below \$15,000	14.9%
Hispanic households without a vehicle	12.2%
Hispanic households with income below \$15,000	30.4%
African-American households without a vehicle	24.1%
African-American households with income below \$15,000	46.5%

Summary

Although all elements of the population have increased their mobility over time, many challenges still exist. A transportation system that provides accessibility, efficiency and flexibility must meet mobility challenges through traditional as well as innovative means.

There is clearly a larger market for transit that has not yet been tapped. Currently, 84 percent of transit riders are frequent users, i.e., people who use transit two or more times a week. Demand-responsive programs to transport people to subways, trolleys and bus transfer points may increase the scope of people who consider transit as an option. Given the projected growth in the elderly population, customer oriented para-transit designed to meet the needs of older Americans may play a significant role in allowing this group to maintain their mobility.

There are a number of initiatives to promote the development of neo-traditional neighborhoods, which includes a return to higher density and mixed land use neighborhoods in which transit and walking would be viable options. The benefits of such development are found in improved air quality, residents having a full range of viable mode choices, improved health of those who walk and bike, and a greater sense of community.

Older Americans need responses that may come from new technology to insure their continued mobility and resolve some of the serious safety issues they present to themselves and others. Highway and vehicle technology can play an integral role in decreasing travel times and mitigating the impact of highway congestion.

Some researchers suggest that greater use of telecommunications and telecommuting may decrease work travel, while other researchers claim that Internet use will expand the need for geographic mobility. It is fairly certain that technology has and will continue to change travel patterns, and may result in more home-based trips and more deliveries to the home. More research is needed to help identify the major trends and assess their impact in the changing world of transportation, telecommunications and personal travel.

Having a private vehicle increases the range of goods and services available to the traveler by simply expanding the area accessible. In some areas where transit is not available, programs that provide autos may help make work viable for women on welfare. For some urban dwellers, however, an auto may be more of a liability than an asset. Innovative approaches to providing transportation services can help increase all of our ability to participate fully in our society.