

TRAVEL PATTERNS AND CHARACTERISTICS OF THE ELDERLY SUBPOPULATION IN NEW YORK STATE



Ho-Ling Hwang, Ph.D.
Daniel Wilson
Tim Reuscher
Jian-Jiang Yang
Rob Taylor
Shih-Miao Chin, Ph.D.

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Engineering and Transportation Science Division | Center for Transportation Analysis

Final Technical Memorandum for Task 14

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ELDERLY SUBPOPULATION IN NEW YORK STATE**

Prepared by
Ho-Ling Hwang, Ph.D.
Daniel Wilson
Tim Reuscher
Jian-Jiang Yang
Rob Taylor
Shih-Miao Chin
Oak Ridge National Laboratory

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ACRONYMS

ACS	American Community Survey
AOA	Administration on Aging
FARS	Fatality Analysis Reporting System
JTW	Journey to Work
NHTS	National Household Travel Survey
NHTSA	National Highway Traffic Safety Administration
NYC	New York City
NYS	New York State
PMT	Person Mile Traveled
POV	Privately Owned Vehicle
USDOT	U.S. Department of Transportation
VMT	Vehicle Miles Traveled

ABSTRACT

With the increasing demographic shift towards a larger population of elderly (individuals 65 years and older), it is essential for policy makers and planners to have an understanding of transportation issues that affect the elderly. These issues include livability of the community, factors impacting travel behavior and mobility, transportation safety, etc.

In this study, Oak Ridge National Laboratory was tasked by the New York State (NYS) Department of Transportation to conduct a detailed examination of travel behaviors, and identify patterns and trends of the elderly within NYS. The National Household Travel Survey (NHTS) was used as the primary data source to analyze subjects and address questions such as: Are there differences in traveler demographics between the elderly population and those of younger age groups who live in various NYS regions; e.g., New York City, other urban areas of NYS, or other parts of the country? How do they compare with the population at large? Are there any regional differences (e.g., urban versus rural)? Gender differences? Do any unique travel characteristics or patterns exist within the elderly group?

In addition to analysis of NHTS data, roadway travel safety concerns associated with elderly travelers were also investigated in this study. Specifically, data on accidents involving the elderly (including drivers, passengers, and others) as captured in the Fatal Analysis Reporting System (FARS) database was analyzed to examine elderly driver and elderly pedestrian travel safety issues in NYS. The analyses of these data sets provide a greater understanding of the elderly within NYS and their associated transportation issues. Through this study, various key findings on elderly population size, household characteristics, and travel patterns were produced and are report herein this report.

1. INTRODUCTION

1.1 BACKGROUND

As baby boomers¹ age, the American society continues to undergo a major demographic cultural transformation, which has resulted in an increasingly larger proportion of elderly population – defined as persons 65 years or older. As reported in the latest release of *A Profile of Older Americans* (HHS 2013) published by the Administration on Aging (AoA), the population of this elderly age group increased 21% from 2002 to 2012—numbering 43.1 million in 2012 for the nation. Based on Census population projections, AOA stated that the elderly population will reach about 79.7 million by 2040 and reach 92 million in 2060. Because of this significant growth, understanding and addressing issues associated with all aspects of the elderly population, including livability of the community, factors impacting travel behavior and mobility, transportation safety, etc., have become higher priorities for public policy makers and planners throughout the nation.

For instance, research on mobility needs of older Americans have been conducted by many organizations, especially since the oldest boomers reached their “senior” status before the turn of the century. In a July 2003 brief aiming at the reauthorization of the Transportation Equity Act for the 21st Century (TEA-21), the Brookings Institution (Rosenbloom 2003) issued a challenge that “Congress should consider special approaches to meet the mobility and access needs of the elderly.” The author pointed out that “older people are substantially more mobile today than ever before” and argued that “... the largest group of people facing substantial mobility losses is those who drove well into their senior years.”

Recent travel surveys such as the 2009 National Household Travel Survey (NHTS) showed an increasing number of elderly drivers in the nation; the data also indicated that elderly persons are driving more than their same age cohorts did a decade ago. With the 2009 NHTS data, Lynott and Figueiredo (2011) analyzed travel patterns of elderly adults and found, among many other conclusions, that (1) predominant means of transportation continued to be personal vehicles for elderly adults, (2) a significant increase in the use of public transportation for people aged 65 years old and older, and (3) a lower level of driving especially among elderly women.

Combining information from 2009 NHTS with the 2011 National Health and Aging Trend Study, recent research conducted by Rosenbloom and Santos (2014), which was funded by the AAA Foundation for Traffic Safety, examined travel behavior among elderly drivers. This work focused more on elderly travel behavior associated with a medical condition or taking certain medications. Rosenbloom and Santos found that elderly drivers were much more likely to report

¹ Baby boomers are individuals born during the Post-World War II demographic baby boom era between the years 1946 and 1964.

having a medical condition or a disability than younger drivers. They also indicated that there were gender differences among elderly drivers in all aspects of medication use, travel behavior, and driving.

In this study, ORNL was tasked by New York State (NYS) to conduct a detailed examination of travel behaviors, and identify patterns and trends, on several NYS subpopulations, including the elderly (65 years old or older). Unlike the abovementioned studies that concentrated on national level statistics, this research focused on examining issues associated with elderly travelers among NYS residents only.

1.2 OBJECTIVE

The NHTS data was used as the primary data source to analyze subjects and address questions such as: Are there differences in traveler demographics between the elderly population and those of younger age groups who lived in various NYS regions; e.g., New York City (NYC), other urban areas of NYS, or other parts of the country? How do they compare with the population at large? Are there any regional differences (e.g., urban versus rural)? Gender differences? Do any unique travel characteristics or patterns exist in the elderly group?

In addition to analysis of NHTS data, roadway travel safety concerns associated with elderly travelers were also investigated in this study. Specifically, data on accidents involving elderly persons (including drivers, passengers, and others) as captured in the Fatal Analysis Reporting System (FARS) database was analyzed to examine elderly driver and elderly pedestrian travel safety issues in NYS.

1.3 A BRIEF DESCRIPTION ON DATA SOURCES

1.3.1 NHTS

Overall, statistics reported in this report were produced using data from the 2009 NHTS. The NHTS is a Federal Highway Administration-sponsored national travel survey of U.S. households; it surveyed over 150,000 households in 2009.² According to the NHTS website (NHTS 2014) “*the NHTS is the authoritative source of national data on the travel behavior of the American public.*” The NHTS includes questions about trip frequency, distance, and travel time, and modes of transportation, including walking and bicycling.

Survey data from previous years (i.e., 1995 and 2001) were also considered in this study, specifically when trends or changes over time were concerned. Note that NHTS collected information from populations that were age 5 years old and older at the survey time only.

² U.S. Territories are not included in the NHTS sampling frame.

1.3.2 Census Data

Additional information and data sources were also utilized, along with the NHTS data, in order to further examine travel behavior and patterns associated with the NYS elderly population. Specific subjects include investigations on mobility of the elderly population and their roadway travel safety issues. Data from the Census (i.e., American Community Survey (2014), or ACS) was also used when necessary, especially in examining the size of the elderly population.

The ACS is a survey conducted by the U.S. Census Bureau of about 3 million households each year (250 thousand per month), and are subject to the constraint that households should not be surveyed more than one time in any five-year period. Thus the ACS is very intensive—about 20 times as big as the NHTS (3 million versus 150 thousand)—and it is repeated every year. The ACS is also geographically more uniform than the NHTS. Each year’s ACS sample includes, on average, almost 50 households per Census Tract and almost 15 households per Block Group. Data on demographic, social, and economic characteristics on all ages of populations living in the U.S. is collected in the ACS. The ACS also collects data on commuting, i.e., the Journey to Work (JTW), including mode of transportation and travel time to work.

1.3.3 Fatality Analysis Reporting System (FARS)

Some limited research on elderly travel safety in NYS using mainly the FARS database was also conducted in this study. The FARS data contain information collected from a nationwide census of fatal motor vehicle crashes in the U.S. To qualify as a FARS case, the crash has to involve “*a motor vehicle traveling on a traffic-way customarily open to the public and must have resulted in the death of a motorist or a non-motorist within 30 days (720 hours) of the crash*” (NHTSA, 2014). The FARS database is published and maintained by the National Highway Traffic Safety Administration (NHTSA) of the US Department of Transportation (USDOT) on an annual basis. It covers all qualifying fatalities that occurred within the fifty States, the District of Columbia, and Puerto Rico since 1975.

The latest available FARS data is for the calendar year of 2012, which was released by NHTSA in November 2014. For discussions associated with general trends and patterns in this study, only FARS data from 2001 to 2012 were examined. To be consistent with NHTS data years, when necessary, discussions presented in this section were limited to analyses using the 2001 and 2009 (NHTS data years) FARS databases only.

1.4 ORGANIZATION OF REPORT

This report presents results generated from data analyses performed for travel made by NYS elderly residents. Specifically, statistics on traveler demographics, mode-specific summary statistics such as frequency (i.e., trip rate), mode choice, distance (trip length), time of trip, and

trip purpose of the NYS elderly subpopulation were examined. Section 2 of this report describes characteristics of the elderly population in NYS, including the size of this population, their demographic profiles, elderly household living arrangements, their vehicle ownership and vehicle age. Travel patterns for the elderly population are discussed in Section 3 followed by the discussion of travel safety for the elderly in NYS in Section 4. This technical memorandum is concluded with a summary of key findings in Section 5. A glossary listing definitions of general terms used in this report is provided in Appendix A.

2. CHARACTERISTICS OF THE ELDERLY POPULATION IN NYS

2.1 SIZE OF ELDERLY POPULATION

Based on ACS 2006-2010 data set obtained from the U. S. Census Bureau, the population density of elderly, which is defined as the “number of persons age 65 years and older per square mile,” for the NYS region is displayed in Figure 2-1. Clearly, higher elderly population densities are located in areas with a higher population in general, such as major urban areas of NYC, Albany, Buffalo, and so forth. A very different view is presented when using population shares of elderly (age 65+), as shown in Figure 2-2. Here, the population share is computed by dividing the number of elderly persons by its corresponding total number of population of all ages within the given region. Both maps used data from the ACS at the Census block group level.

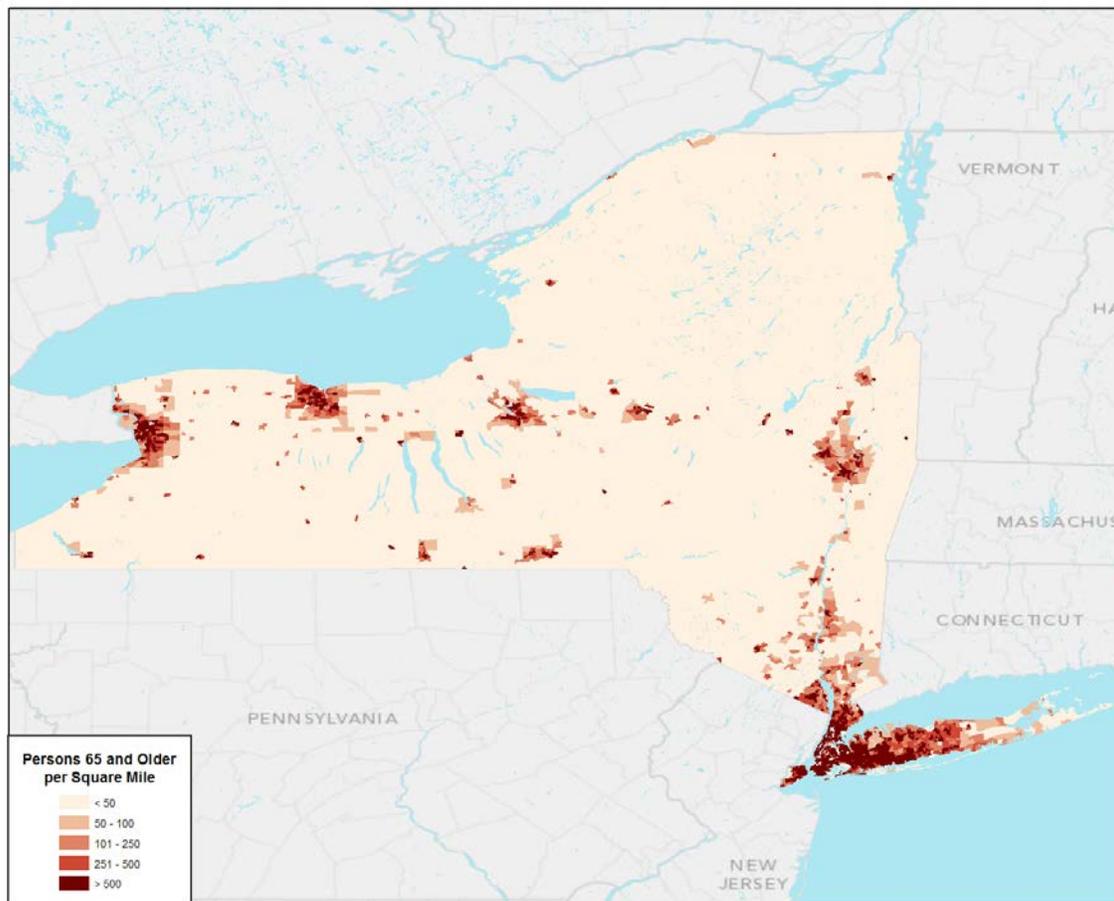


Figure 2-1. Elderly population density in NYS, based on ACS 2006-2010 data.

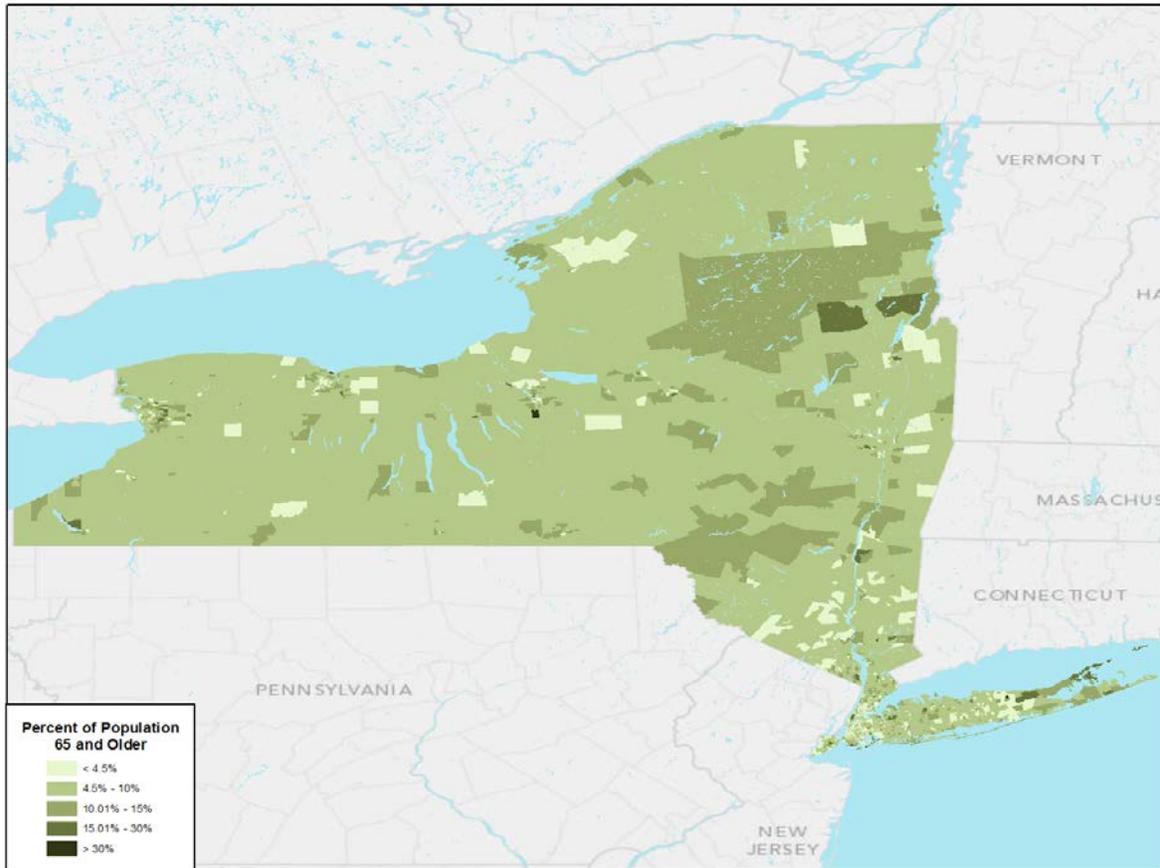


Figure 2-2. Percent of population aged 65 years old or older in NYS, based on ACS 2006-2010 data.

Using NHTS data, as a whole the NYS population (age 5 years and older only) increased from 17 million in 1995 to over 18 million in 2009—a 9% increase from the 1995 level. As seen in Table 2-1, the elderly population (age 65+ years old) in NYS increased over 25% during this 14-year period of time—from nearly 2.1 million in 1995 to over 2.6 million in 2009. On the other hand, the youngest group of NYS residents in the NHTS datasets (ages 5-15 years old) show a declining trend since 1995—dropping from 3 million in 1995 to 2.8 million in 2001, and dropping further to a little over 2.6 million in 2009. Overall, the NYS elderly population accounted for about 14.3% of its total population of age 5 years old and older in 2009—an increase from the elderly population share of 13.6% in 2001 and 12.3% in 1995.

By the age group of NYS residents, Table 2-1 shows that the largest increases are in the two oldest age groups, 80-84 years old and 85+ years old. There are nearly twice as many 80-84 year-old NYS residents in 2009 as in 1995; and over twice in number for the 85+ years old NYS residents in 2009 compared to 1995. With the oldest baby boomers (those born in 1946) reaching age 65 years old in 2011, as well as longer life expectancies in general, significant increases in the elderly population (NYS included) are to be expected to continue in to future years.

Table 2-1. NYS residents by age category using data from 1995, 2001, and 2009 NHTS

Age Category	1995	2001	2009
5-15 years old	3,001,540	2,805,630	2,620,244
16-64 years old	11,734,525	11,880,408	13,053,887
65-69 old years	684,257	681,733	718,959
70-74 old years	617,796	623,144	597,783
75-79 old years		493,001	507,319
80-84 old years		318,207	447,812
85+ years old	146,007	189,113	335,797
All	16,806,988	16,991,235	18,281,802
Elderly (>= 65 years)	2,070,923	2,305,198	2,607,670
Share of elderly	12.3%	13.6%	14.3%

Percent changes in the NYS population by age category, over NHTS years, are presented in Figure 2-3. Similar percent changes in populations for the rest of the U.S. are also included in the same chart for comparisons. The drop of 5-15 year old age populations during both periods (1995 to 2001 and 2001 to 2009) in NYS can be clearly observed. This 5-15 year old population group had a 5% growth from 1995 to 2001 for residents living in the rest of the U.S., however. As a whole, the elderly population (those 65+ years old and older) increased by significant percentages for both NYS and the rest of U.S. during the periods from 1995 to 2001 and from 2001 to 2009. Changes between 2001 and 2009 are clearly more visible than those in the previous period (1995 to 2001)—true in both NYS and the rest of U.S.

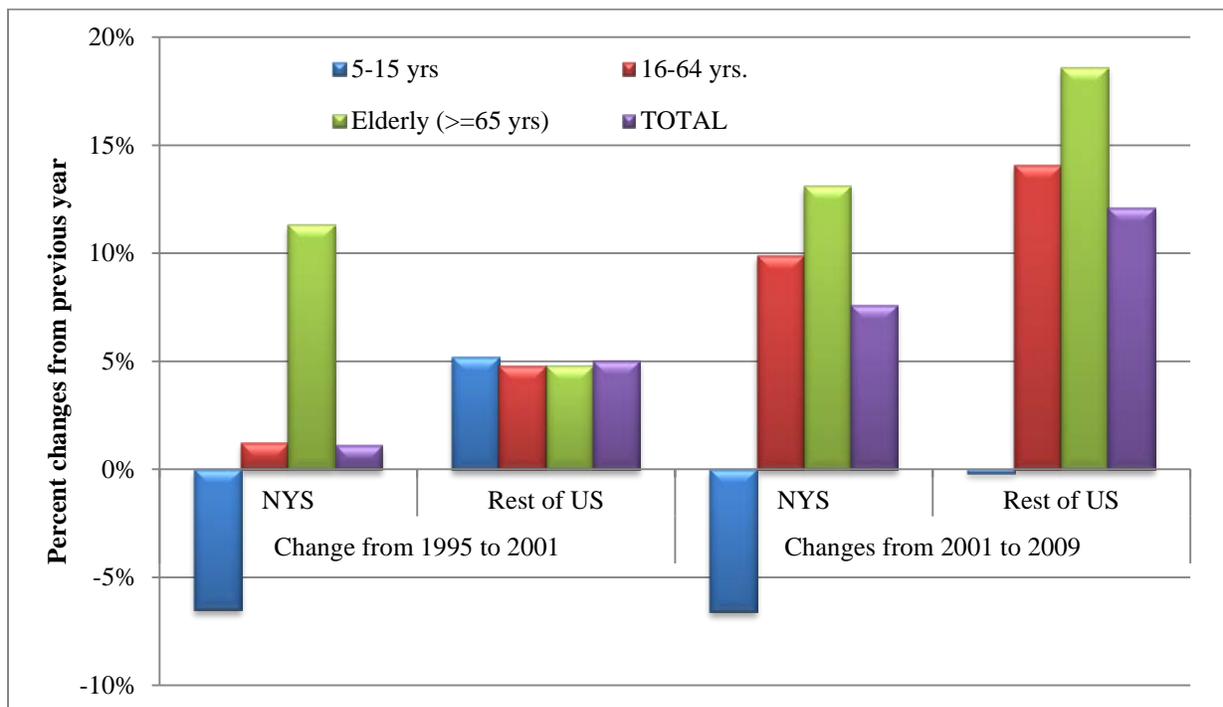


Figure 2-3. Percent change in population by age category in NYS and the rest of U.S. (Using NHTS data).

Further disaggregated elderly age categories reemphasized the significant changes over time for 80-84 years old and 85+ year old population groups seen in Table 2-1. As displayed in Figure 2-4, this increasing trend is also shown in the populations that lived in the rest of the U.S.

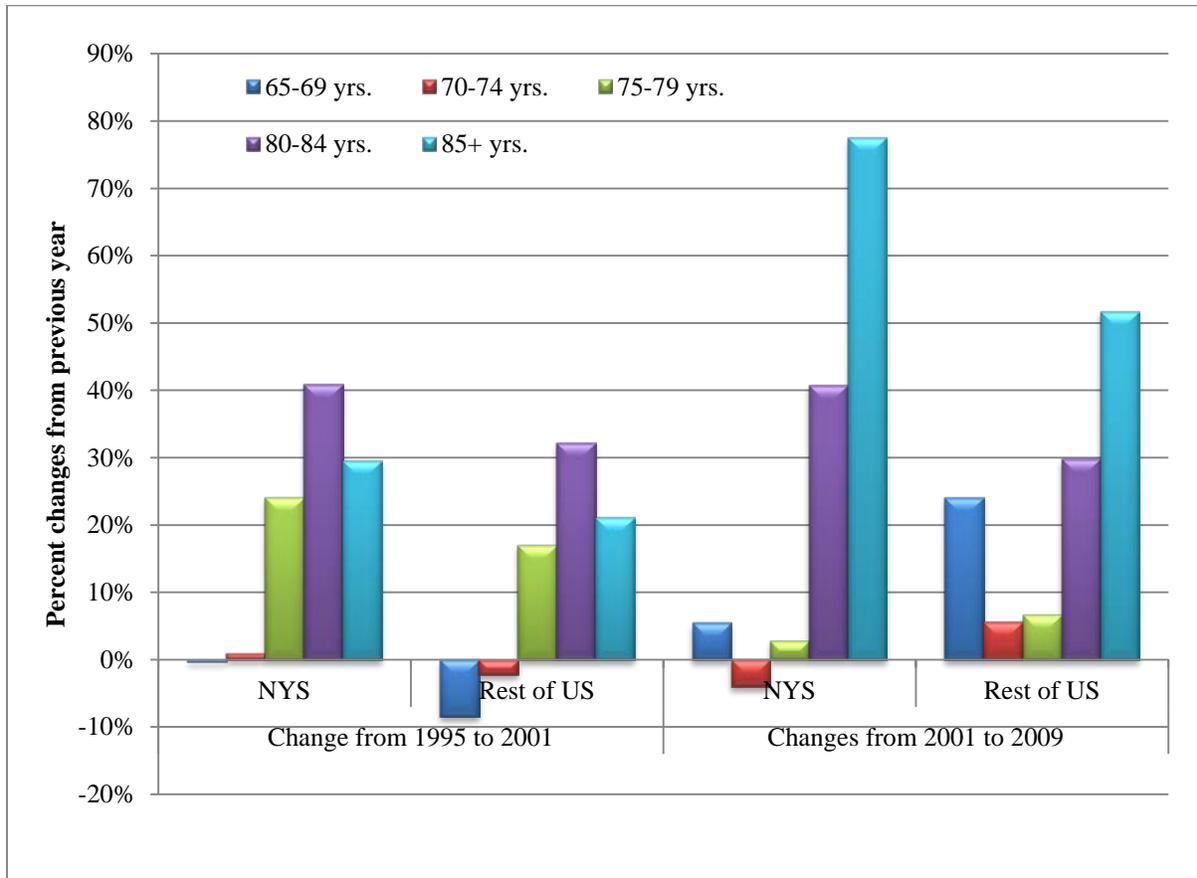


Figure 2-4. Percent change in elderly population age categories in NYS and the rest of U.S. (NHTS data).

2.2 DEMOGRAPHIC PROFILE OF NYS ELDERLY POPULATION

2.2.1 Age and Gender

2.2.1.1 Statistics Based on U.S. Census data

Using the ACS data, NYS population distributions by age group and gender for 1995, 2001, and 2009 are presented in Figures 2-5, 2-6, and 2-7, respectively. The upward shift seen in the shape of these pyramids, from 1995 to 2009, clearly shows that the population in NYS is aging. Such an increasing trend is seen in the elderly female populations; and more so for the elderly male population in NYS who are living longer as well. Among the elderly age groups, the female population is undoubtedly higher than their male counterparts.

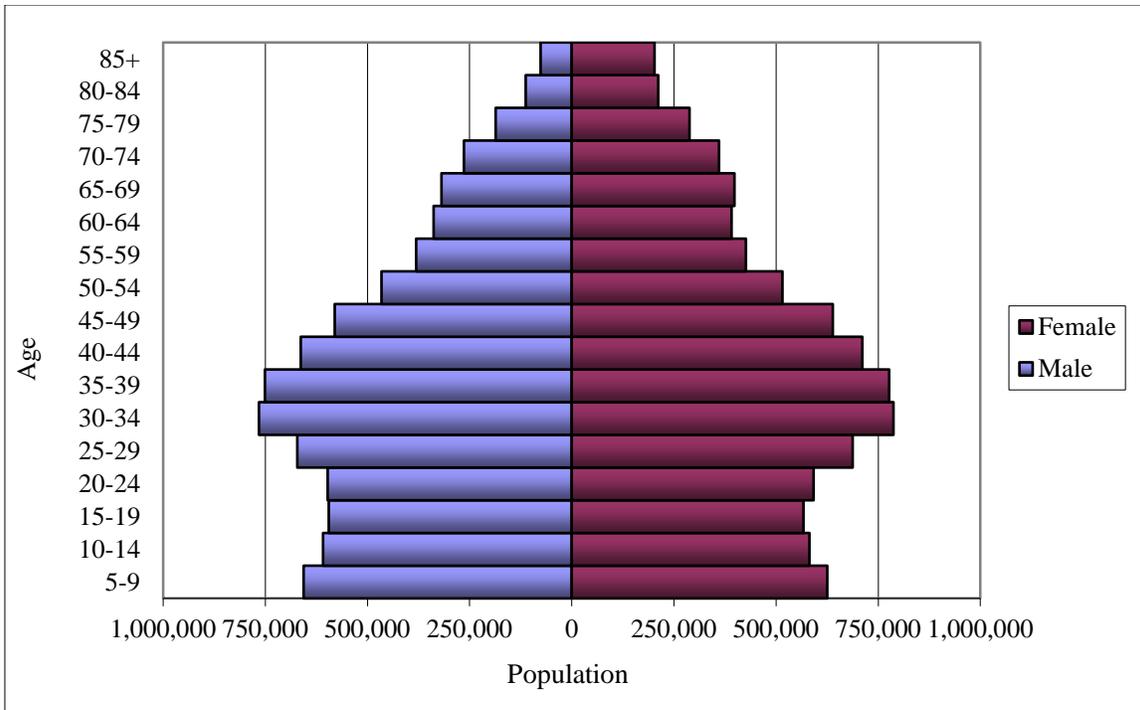


Figure 2-5. NYS population pyramid, by age and gender (1995 Census estimates).

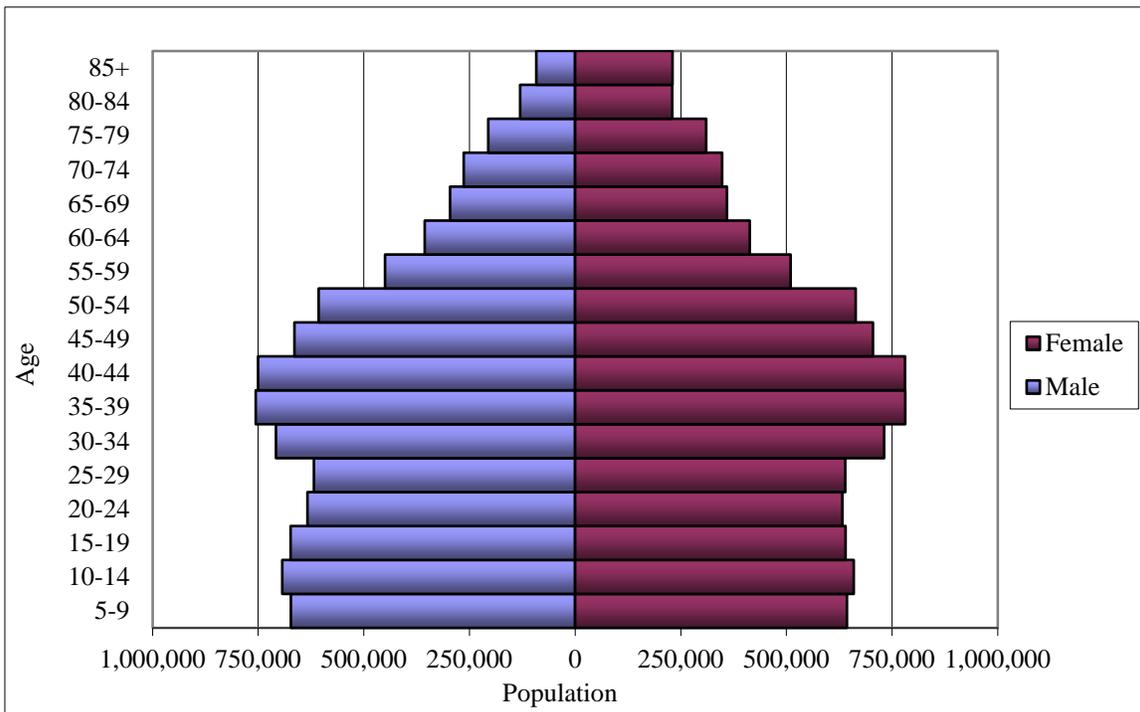


Figure 2-6. NYS population pyramid, by age and gender (2001 Census estimates).

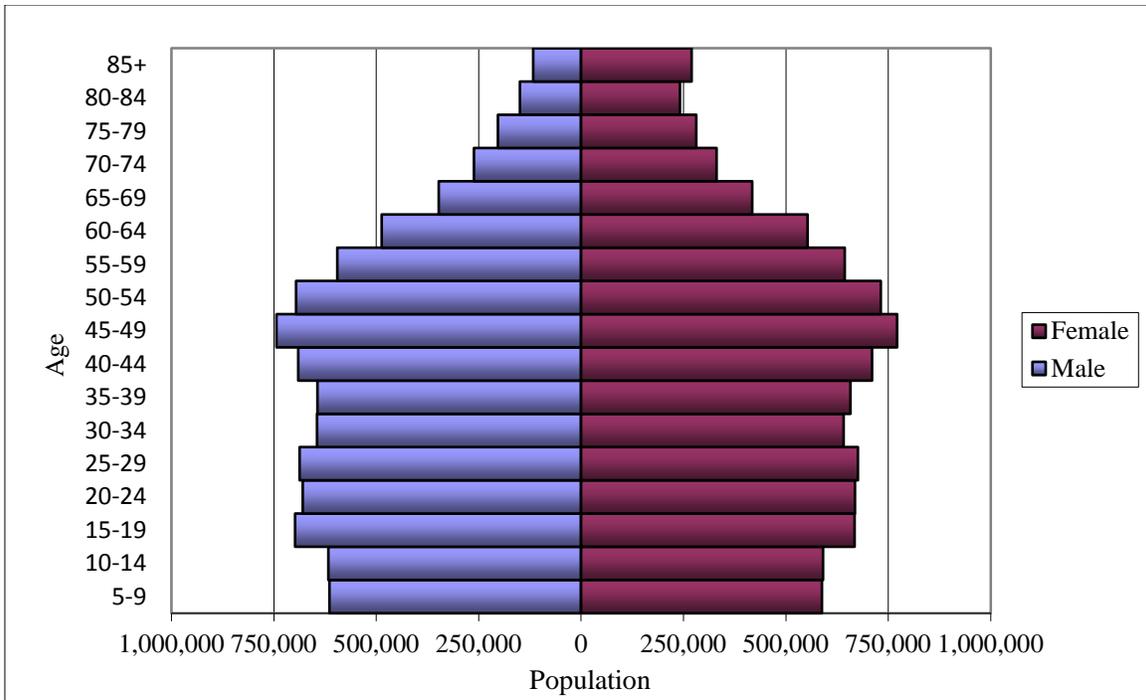


Figure 2-7. NYS population pyramid, by age and gender (2009 Census estimates).

The increase of the elderly population (65+ years old and older) over time is not a unique phenomenon for NYS. According to the latest *Profile of Older Americans: 2013* (HHS, 2013), the elderly population “has increased from 35.5 million in 2002 to 43.1 million in 2012...,” an over 21% increase over the 10-year period. Furthermore, Figure 2-8 presents statistics obtained from the most current Census population projections (U.S. Census Bureau, 2014), which estimated that the U.S. elderly population share would reach 20% by 2030; and among females, the elderly population share would be over 20% by 2025. Note that 2009 and 2012 totals were obtained from Census population estimates.

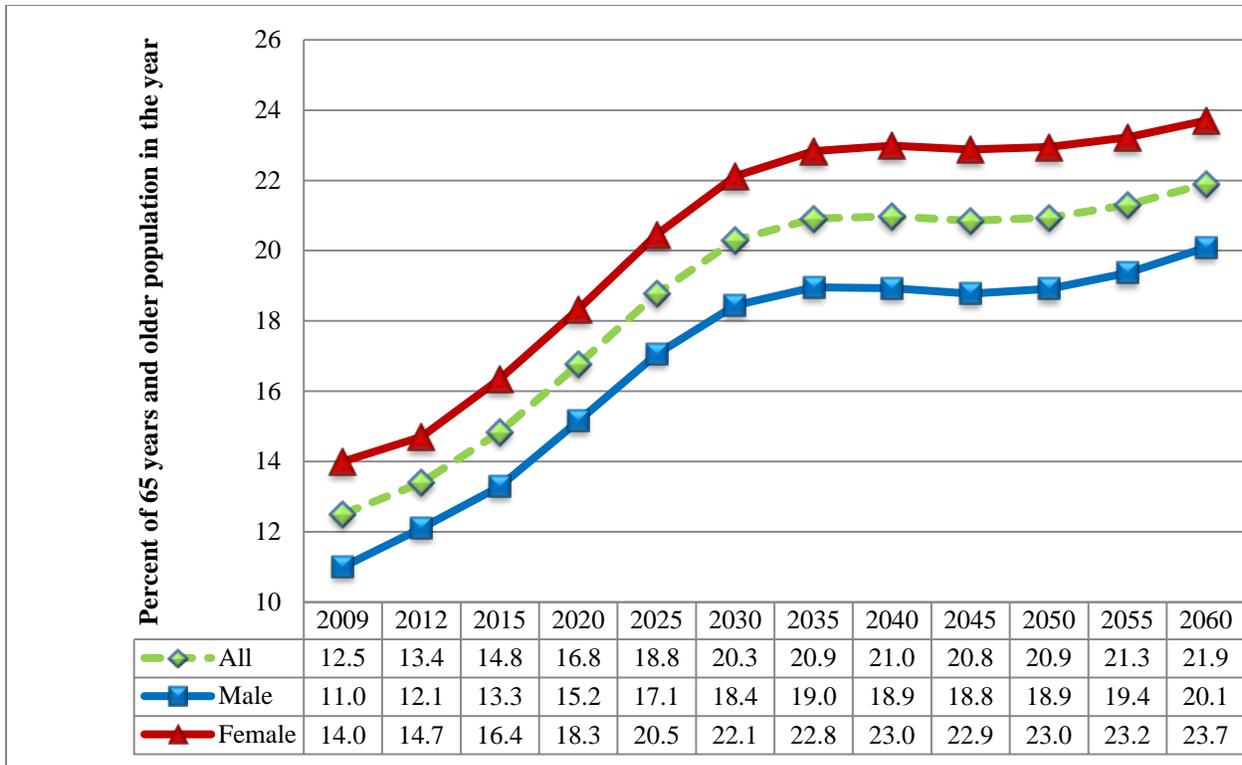


Figure 2-8. Annual share of the estimated and projected 65 years old and older population in the U.S. (Source: U.S. Census Bureau, Population Division).

2.2.1.2 Elderly Population Statistics Based on the NHTS data

As shown in Figure 2-9, population shares of elderly residents, over the three NHTS survey years, were fairly similar between those living in NYS and those in the rest of the U.S. The increasing trend is slightly more noticeable among the NYS populations than the rest of the U.S. during this period of time, however. Overall, shares of the elderly population in NYS rose from about 12.3% in 1995 to 13.6% in 2001, and again to 14.3% in 2009. Outside NYS, the shares of elderly population remained about the same level (~13%) for 1995 and 2001, and increased to 13.7% in 2009.

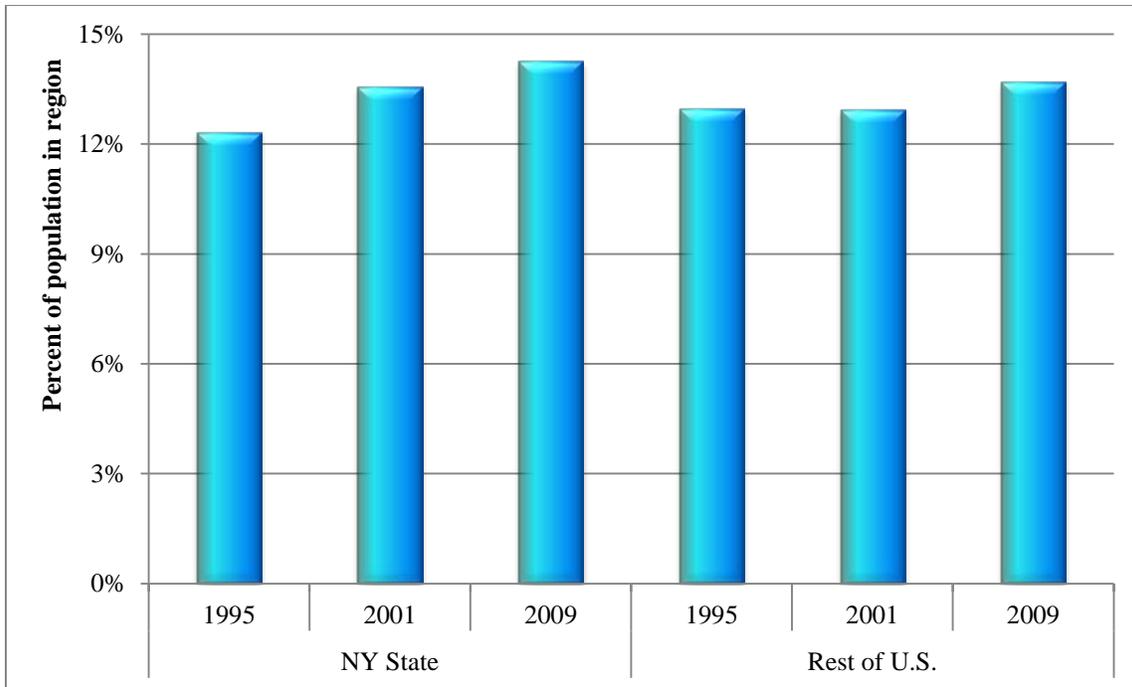


Figure 2-9. Percent population age 65 years old and over in NYS and the rest of the U.S. (1995, 2002, and 2009 NHTS data).

By gender (as seen in Table 2-2), there were virtually no changes in NYS’s male population between 1995 and 2001, although the population of elderly men grew about 13% in 2001 from its 1995 level. Overall, the male population in NYS rose about 9% from 2001 to 2009, while elderly men increased over 11% during the same period of time. The most striking growth in the NYS elderly male population over the last 14 years (from 1995 to 2009) was in the “age 80 years old or older” group which increased about 270% from about 103,000 persons in 1995 to over 275,000 persons in 2009.

For the NYS elderly females, their population changes between 2001 and 2009 were generally higher than those between 1995 and 2001. As seen in Table 2-2, females under the 75 years old age groups all had a relatively small growth between 1995 and 2001. However, the youngest age group (5 to 15 years old) and those in the “70-74 years old” group both experienced a significant reduction (over 10%) in the female population during the period from 2001 to 2009. In addition, there was a 30% change between 1995 and 2001 in the female populations for the “75-79” year old age group, while the change between 2001 and 2009 for the same population was only about 9%. Similar to their counterpart elderly males, although not as significant, the “age 80 years old or older” female group population also showed significant growth in NYS in the 14 years between 1995 and 2009—increasing nearly 90% from about 269,000 persons in 1995 to nearly 509,000 persons in 2009.

Table 2-2. NYS population by age category, by gender, and changes over time (based on NHTS 1995, 2001, and 2009 data)

NYS men					
Age group	1995	2001	2009	% change in (1995-2001)	% change in (2001-2009)
5-15 yrs.	1,578,167	1,380,105	1,339,993	-12.6%	-2.9%
16-64 yrs.	5,703,165	5,791,748	6,435,106	1.6%	11.1%
65-69 yrs.	313,273	300,476	324,234	-4.1%	7.9%
70-74 yrs.	258,885	260,255	272,836	0.5%	4.8%
75-79 yrs.	179,001	210,360	198,210	17.5%	-5.8%
80-84 yrs.	69,867	130,416	161,866	86.7%	24.1%
85+ yrs.	32,785	59,818	112,843	82.5%	88.6%
All	8,135,143	8,133,178	8,845,089	0.0%	8.8%
Elderly (65+)	853,811	961,325	1,069,990	12.6%	11.3%
NYS women					
5-15 yrs.	1,423,373	1,425,525	1,280,251	0.2%	-10.2%
16-64 yrs.	6,031,360	6,088,659	6,618,781	1.0%	8.7%
65-69 yrs.	370,985	381,257	394,724	2.8%	3.5%
70-74 yrs.	358,911	362,889	324,947	1.1%	-10.5%
75-79 yrs.	218,096	282,641	309,110	29.6%	9.4%
80-84 yrs.	155,899	187,792	285,946	20.5%	52.3%
85+ yrs.	113,222	129,295	222,954	14.2%	72.4%
All	8,671,845	8,858,057	9,436,713	2.1%	6.5%
Elderly (65+)	1,217,113	1,343,874	1,537,681	10.4%	14.4%

A visual display of the elderly population by age category and gender is given in Figure 2-10. Gender difference is evident in this figure, and is especially significant among the two oldest age groups. Nearly twice as many 80+ years old women lived in NYS than their counterpart men as captured by the NHTS data.

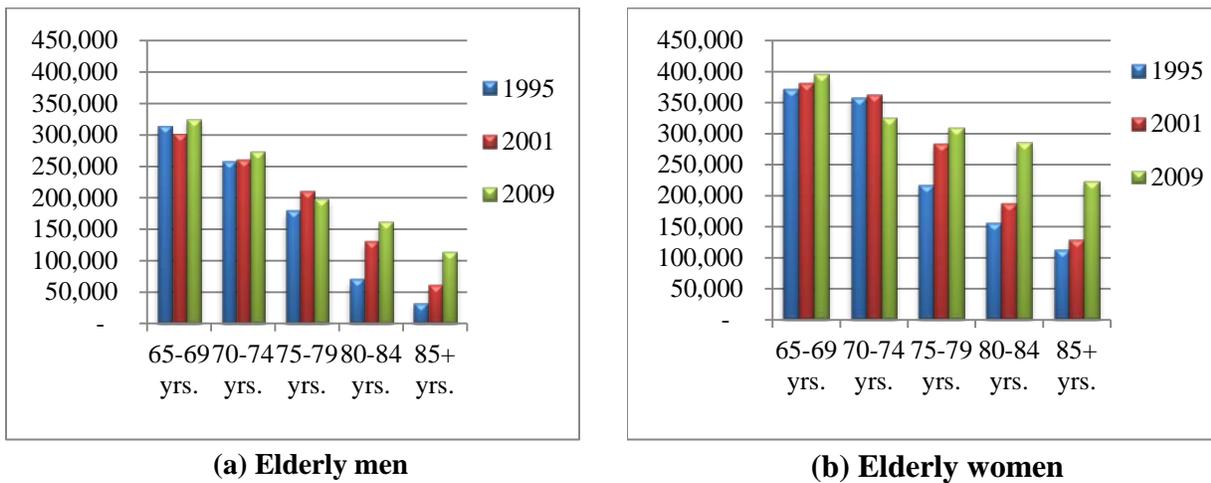


Figure 2-10. NYS elderly population by age and gender (1995, 2001, & 2009 NHTS): (a) elderly men and (b) elderly women.

2.2.2 Elderly Household Income

Considering households with one or more persons age 65 years or older referred to as “elderly households” in this study, residents of NYC and other urban NYS areas had greater shares of higher income elderly households in their regions than those who lived in non-urban areas of NYS in 2009. As shown in Figure 2-11, elderly households with income of more than \$75,000 accounted for about 18% in NYC or other urban NYS areas, versus only 6% in the non-urban areas of NYS. For comparison, the share of higher income elderly households accounted for about 15% of total elderly households that lived outside NYS in 2009.

On the other hand, as illustrated in Figure 2-11 over half of the elderly households that lived in non-urban NYS regions were in the lowest income category; while about 41% of elderly households that lived outside NYS were in the same income level. Also, NYC had a significant portion of its elderly households in the lowest income group—42% versus the 34% of the elderly households that lived in other NYS urban areas. A similar pattern was observed in the Hu and Reuscher (2010) report using the 2001 NHTS data.

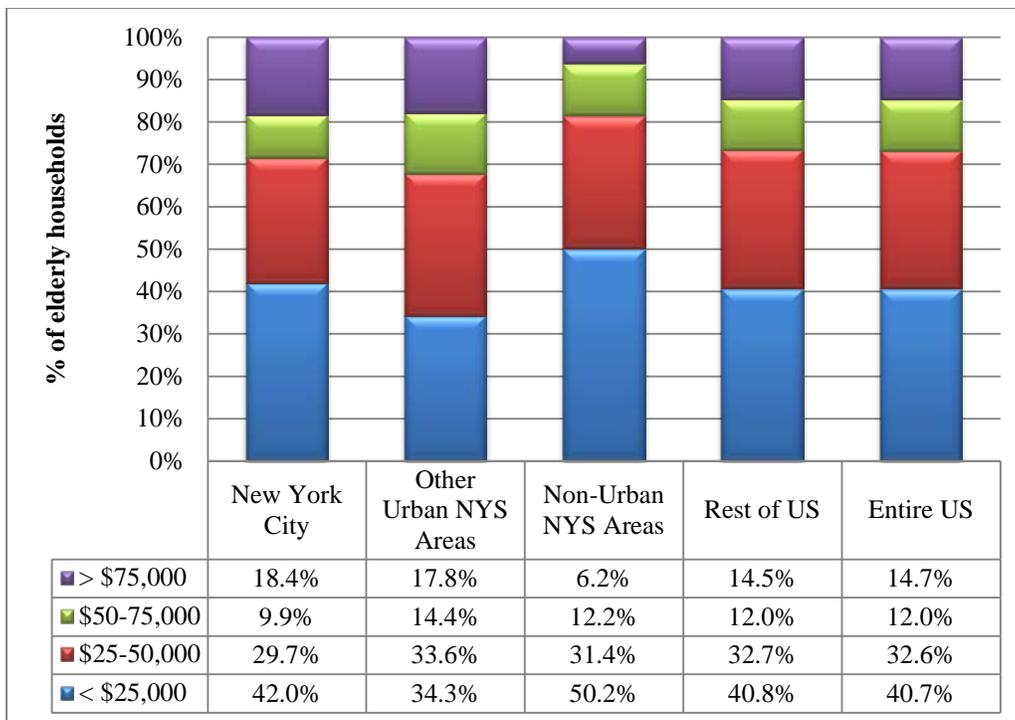


Figure 2-11. Distributions of elderly households by income and region (2009 NHTS).

When compared to non-elderly households as seen in Figure 2-12, elderly households have a significantly higher likelihood of being in the lower two income groups (i.e., annual income under \$50,000) regardless of where they lived. Furthermore, nearly 40% of non-elderly households in NYS were in the “\$75,000 or more” income category, while less than 17% of

elderly households in NYS were in the same income group. This pattern is also exhibited in elderly households located outside NYS (i.e., in the rest of U.S.).

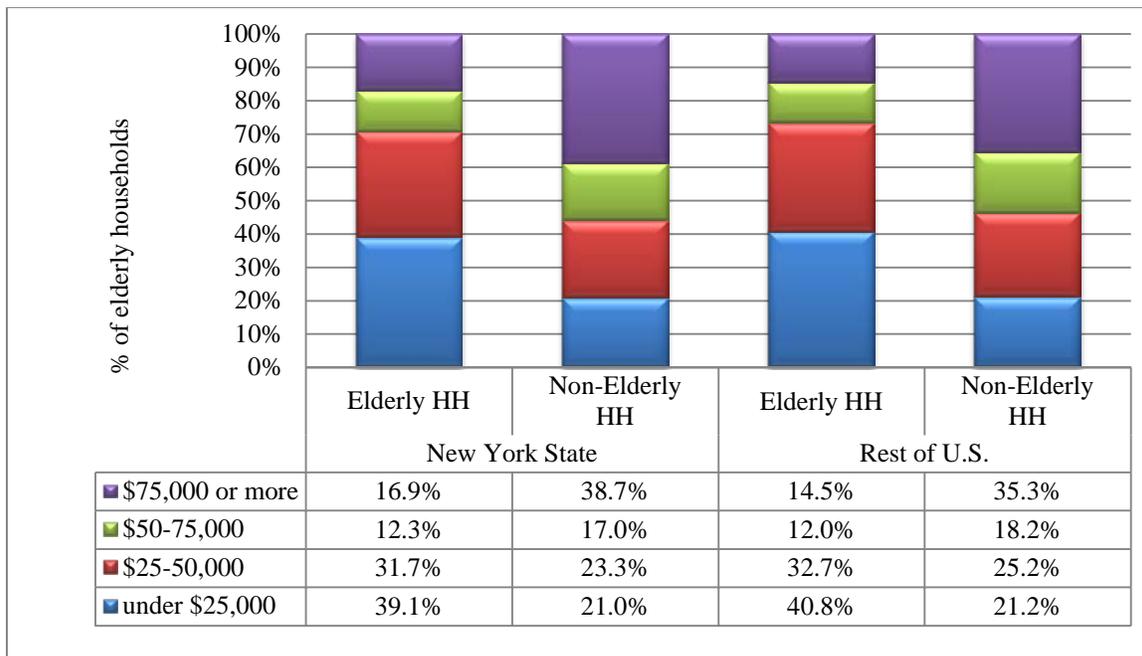


Figure 2-12. Percent of households by income and household status (2009 NHTS).

Interestingly, according to 2009 NHTS data, 91% of the elderly households from NYS lived in urban areas—including 43% in NYC and 48% in other urban areas within NYS. Similarly, as summarized in Table 2-3, over 86% of the NYS elderly households lived in urban areas during each of the prior survey years. Among them, a portion of elderly households that lived in NYC accounted for 39% in 2001 and 35% in 1995. This increasing trend clearly demonstrated that more NYS elderly households were staying in urbanized areas over the last 14 years.

Table 2-3. Number and share of elderly households by geographic location of residence

Data Year	Number of elderly households in NYS				Share of elderly households in NYS		
	New York City	Other Urban NYS Areas	Non-Urban NYS Areas	All NYS	New York City	Other Urban NYS Areas	Non-Urban NYS Areas
2009	952,175	1,071,666	209,117	2,232,958	42.6%	48.0%	9.4%
2001	680,750	844,404	235,009	1,760,164	38.7%	48.0%	13.4%
1995	475,778	704,381	186,276	1,366,435	34.8%	51.5%	13.6%

2.2.3 Driver Status

It is not surprising that aging tends to decrease one’s likelihood of being a driver, thus reducing the number of driving elderly population. The decreasing rates among aging women were higher than those in men, according to 2009 NHTS. The majority of men, especially those living

outside NYC, continued to consider themselves as a driver well into their 80s. As charted in Figure 2-13, a significant portion of the oldest men population group (age 85+ years old) reported themselves as a driver in 2009, particularly among those living in rural areas of NYS where about 80% of men continued to hold on to their driving status.

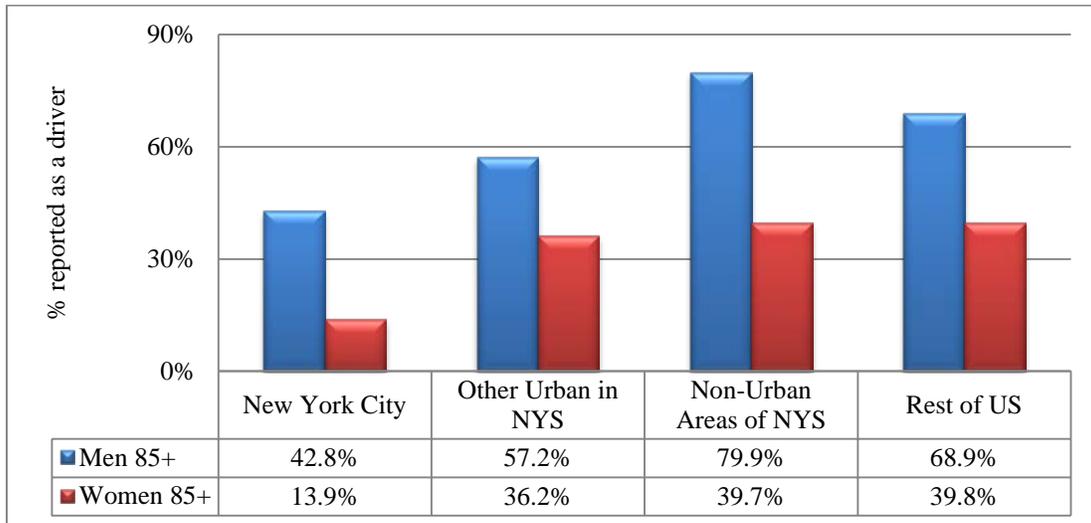


Figure 2-13. Percent of age 85+ years old population reported as being a driver (2009 NHTS).

For their women counterparts, age 85+ years old female residents of NYC were much less likely to report themselves as drivers when compared with those same age women groups that lived in other regions of NYS. Specifically, only about 14% of 85+ years old women in NYC identified themselves as a driver versus nearly 40% of 85+ years old women in all other regions in the 2009 NHTS.

Table 2-4 summarizes the percent of the population that identified themselves as a driver, by age group and by region of residence across the three NHTS years (1995, 2001, and 2009). Clearly visible in Table 2-4 is a decreasing pattern among elderly populations shown in a declining share of drivers as they age regardless of where they lived.

Table 2-4. Percentage of age groups that identified themselves as a driver (1995, 2001 and 2009 NHTS)

Age of driver	1995					2001					2009				
	New York City	NYS Other Urban	NYS Non-Urban	Rest of U.S.	Entire U.S.	New York City	NYS Other Urban	NYS Non-Urban	Rest of U.S.	Entire U.S.	New York City	NYS Other Urban	NYS Non-Urban	Rest of U.S.	Entire U.S.
Men															
16-64 yrs.	71.4%	92.5%	93.2%	93.6%	93.0%	73.0%	92.3%	94.5%	93.8%	93.1%	81.3%	92.7%	90.0%	92.0%	91.7%
65-69 yrs.	68.1%	97.6%	93.8%	93.1%	92.9%	71.3%	97.0%	99.6%	95.3%	94.8%	72.8%	99.1%	94.7%	93.8%	93.5%
70-74 yrs.	82.5%	92.8%	92.3%	92.7%	92.5%	75.7%	94.6%	96.1%	92.7%	92.4%	62.0%	92.6%	91.6%	93.0%	92.1%
75-79 yrs.	78.0%	86.1%	88.7%	89.4%	88.9%	44.9%	91.2%	90.8%	88.9%	87.8%	67.3%	81.5%	95.9%	89.9%	89.2%
80-84 yrs.	47.7%	86.3%	75.9%	82.2%	81.6%	47.5%	79.9%	82.3%	86.3%	85.0%	60.7%	89.3%	88.0%	85.0%	84.4%
85+ yrs.	9.2%	66.5%		70.3%	69.4%	34.8%	68.1%	76.8%	68.4%	67.7%	42.8%	57.2%	79.9%	68.9%	67.7%
Women															
16-64 yrs.	48.3%	89.0%	91.2%	90.2%	88.9%	53.5%	90.3%	94.1%	90.9%	89.8%	69.4%	90.2%	88.8%	89.7%	89.1%
65-69 yrs.	30.1%	80.3%	86.1%	81.8%	80.8%	34.8%	87.9%	94.0%	86.9%	85.5%	62.1%	87.4%	85.4%	87.7%	87.1%
70-74 yrs.	25.8%	75.2%	78.9%	76.6%	75.3%	37.4%	84.7%	80.0%	80.0%	79.0%	64.6%	82.4%	83.2%	80.8%	80.5%
75-79 yrs.	18.7%	66.3%	77.5%	70.8%	69.6%	27.9%	73.5%	82.1%	72.3%	71.3%	45.2%	75.8%	77.6%	73.5%	72.7%
80-84 yrs.	8.1%	61.8%	57.5%	52.9%	52.0%	20.4%	56.9%	57.2%	62.0%	60.4%	28.3%	57.0%	74.3%	64.8%	63.4%
85+ yrs.	7.5%	30.9%	25.0%	28.5%	28.0%	15.9%	24.2%	18.6%	32.8%	32.0%	13.9%	36.2%	39.7%	39.8%	38.7%

Note: Shaded cells indicate small or no samples.

2.3 HOUSEHOLD CHARACTERISTICS

2.3.1 Household Size

Generally speaking, elderly households were more likely to be one-person or two-person households than households without any elderly persons. Clearly visible in Figure 2-14, approximately 40% of elderly households were 1-person households, while only around 20% of non-elderly households were single occupancy. Two-person households were also more common among elderly households than in non-elderly households, accounting for another 40% or so of the elderly households. Only about half of the non-elderly households were one-or two-person households compared to 80% or more of elderly households living alone or with two persons during the same period of time. This pattern stayed fairly consistent over the three NHTS years and across all regions, (i.e., for households of NYS as well as those from rest of the U.S.).

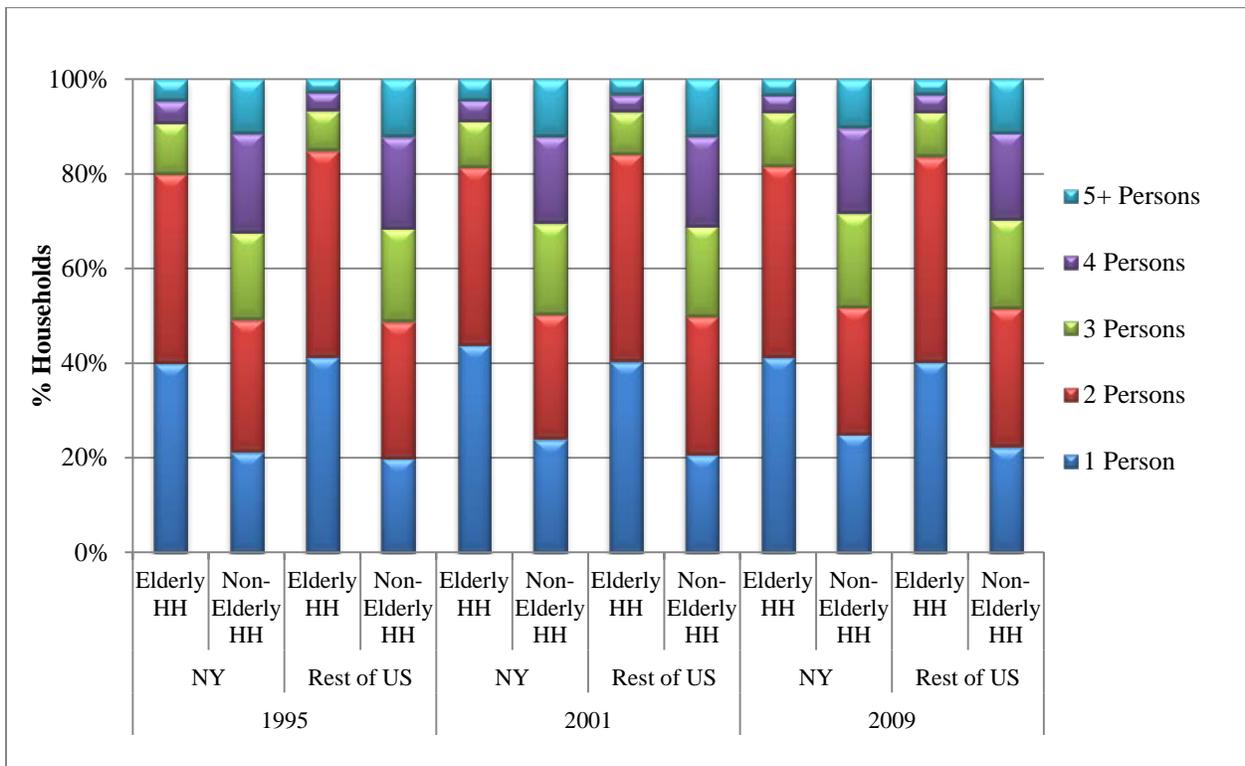


Figure 2-14. Household distributions by household size and household status (NHTS data)

The significant share of live-alone elderly households calls for a closer examination of their specific travel behaviors and characteristics—particularly on issues such as How they traveled (e.g., mode choice)? How their mobility needs were met? Did gender and age make any differences?

2.3.2 Elderly Who Live Alone

2.3.2.1 Driving Status

Based on NHTS data, elderly that lived alone in NYC had a significantly higher likelihood of not being a driver than those who lived in other parts of NYS (Figure 2-15). The shares of non-driving elderly who lived alone outside NYS were roughly comparable to their counterpart New Yorkers that lived outside NYC. The only exception was in 1995, where about 14% of elderly who lived-alone and outside NYS declared themselves as a non-driver. Moreover, as shown in Figure 2-15, there is a noticeable jump on the share of drivers who lived alone in NYC, from about 35% in previous NHTS years to nearly 53% in 2009. This is a pattern not seen among elderly who lived alone elsewhere in NYS or in the rest of the country.

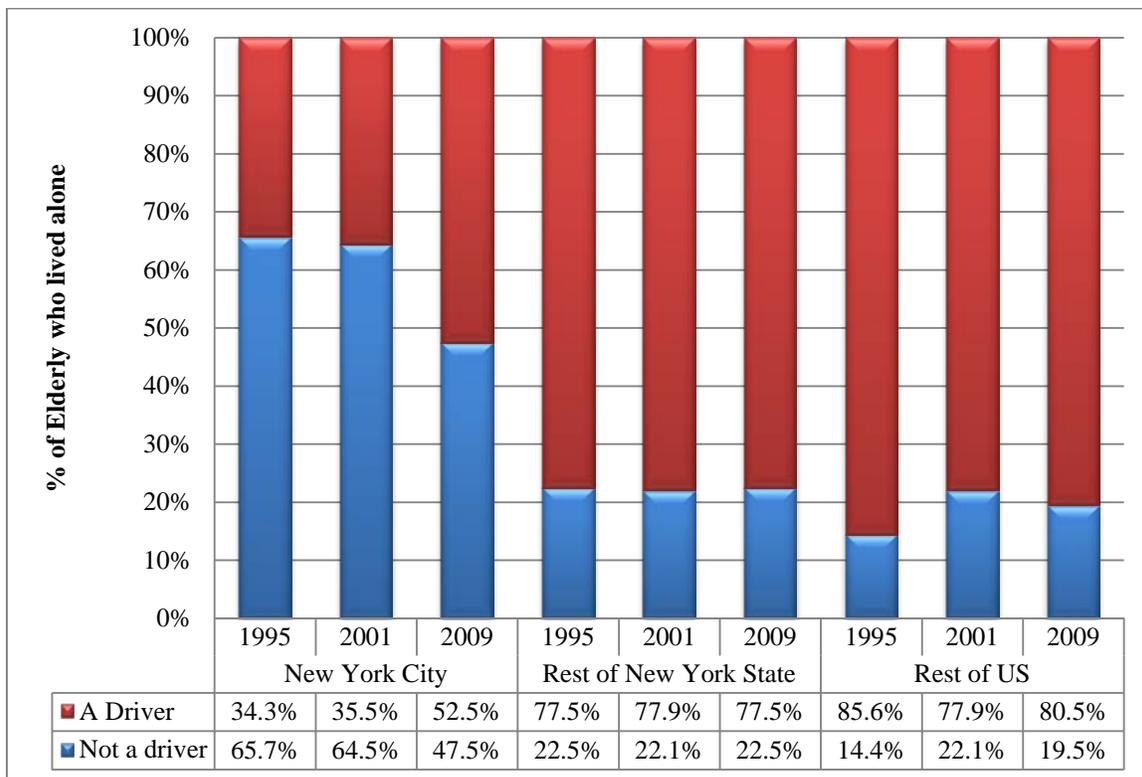


Figure 2-15. A comparison of the share of elderly who lived alone by driver status in New York City, rest of New York State and rest of the U.S.

Figure 2-16 shows that elderly who lived alone and reported themselves as “a non-driver” traveled significantly less—measured by person-mile traveled (PMT)—than those who identified themselves as “a driver” regardless of where they lived. Although it might be argued that the lack of a driver status could severely impact one’s mobility, it might also be possible that the need for driving was diminished when one significantly reduced his/her travel activities (e.g., no longer commuting due to health or other reasons).

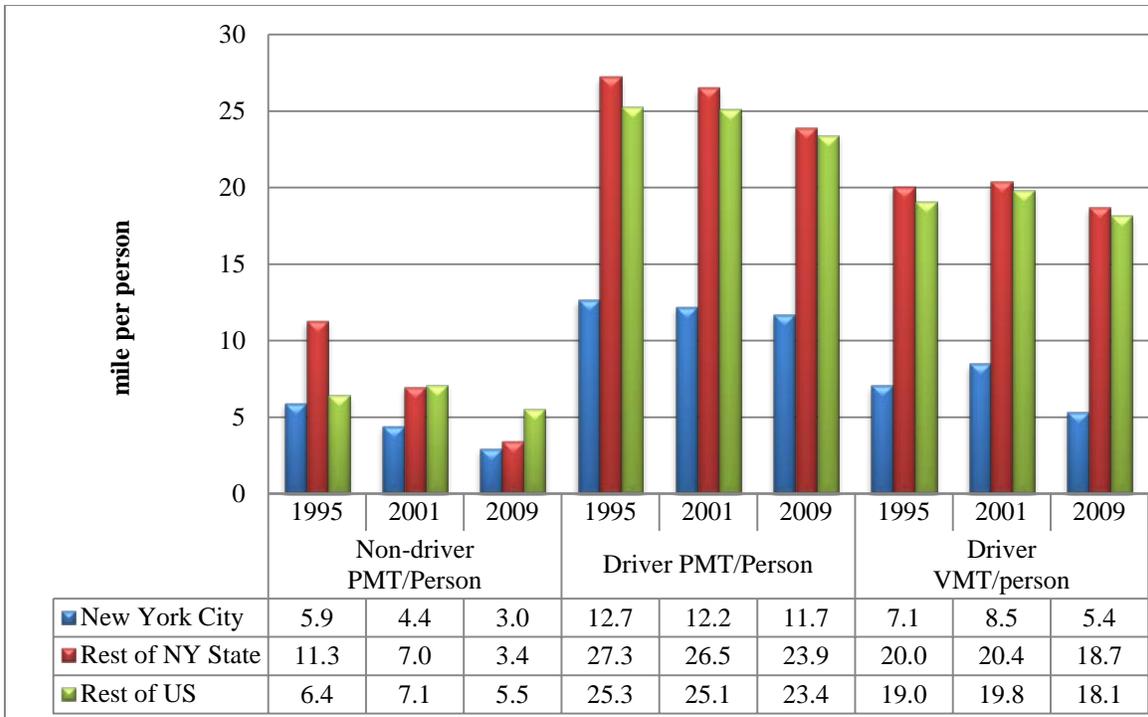


Figure 2-16. Average daily travel by driver status for elderly who lived alone in 1995, 2001, & 2009.

Statistics presented at the bottom of Figure 2-16 illustrate that elderly drivers who lived alone in NYC also had significantly less daily PMT and vehicle-miles traveled (VMT), on average, than their counterparts that lived elsewhere. In fact, this is true for all elderly who lived alone in NYC, no matter what their driver status was. This could reflect that NYC elderly who lived alone made shorter trips, traveled less frequently, or both, than elderly that lived-alone in other regions.

When comparing results across all NHTS years, all daily travel averages for 2009 fell below their corresponding 2001 and 1995 levels. This might suggest that elderly who lived alone also behave consistently as the general traveling public, in which they were “traveling less and making shorter trips” in more recent years, regardless of where they lived.

2.3.2.2 Gender Difference

As discussed in section 2.2.1, women accounted for the majority of the elderly population in the U.S. for all age categories (see Figure 2-10). The longevity of women’s lifespan was also reflected in their high percentages of living alone as presented in Figure 2-17. Regardless of geographic regions of residence, females consistently accounted for 70% or higher one-person households in nearly all age groups.

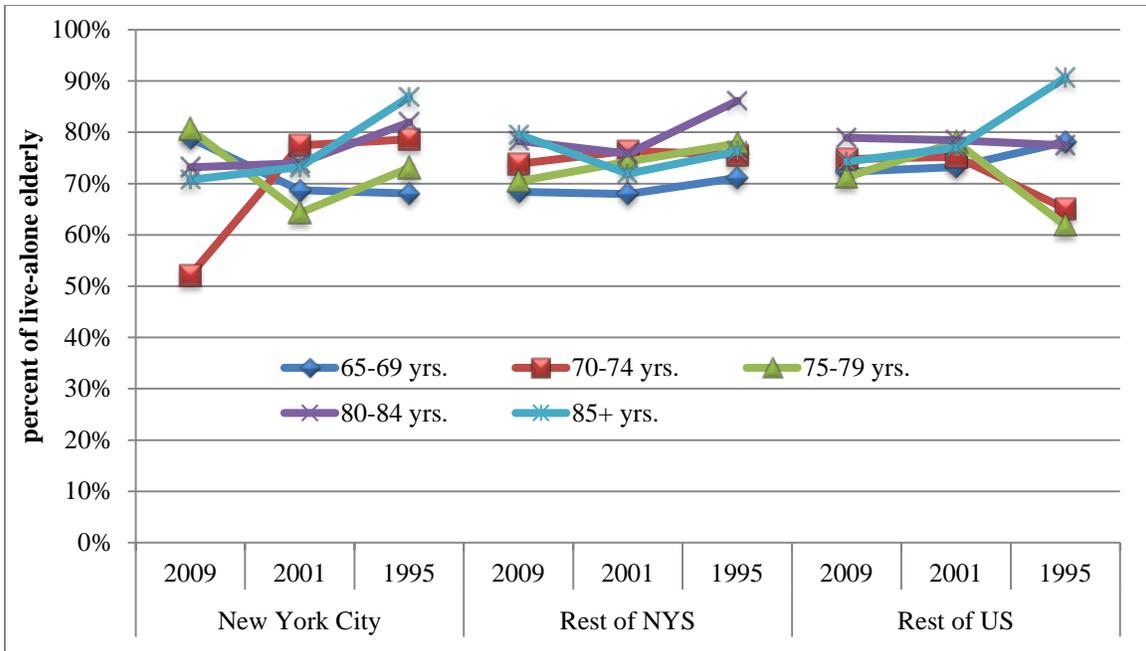


Figure 2-17. Female share of one-person elderly households by region in 1995, 2001, & 2009.

2.3.2.3 Medical Conditions

To examine whether medical conditions have any impact on the driving status of elderly who lived alone, responses from the 2009 NHTS survey question of “Do you have any medical conditions making travel difficult?” were analyzed. Results in Figure 2-18 show that one-person elderly non-driver households were more likely to report medical conditions that made travel difficult than those who lived-alone but reported as a driver, regardless of where they lived. In addition, non-driver elderly who lived alone in NYC had a lower share (52%) of reporting “medical condition present” than those who lived elsewhere in NYS (57%) and the rest of the U.S. (66%) in 2009. Furthermore, about a third of those one-person elderly households in NYC who reported medical conditions indicated that they were drivers, while nearly 60% of the same population from the rest of NYS reported being drivers. Again, this echoed the uniqueness of living without a vehicle by choice for many of the residents in NYC.

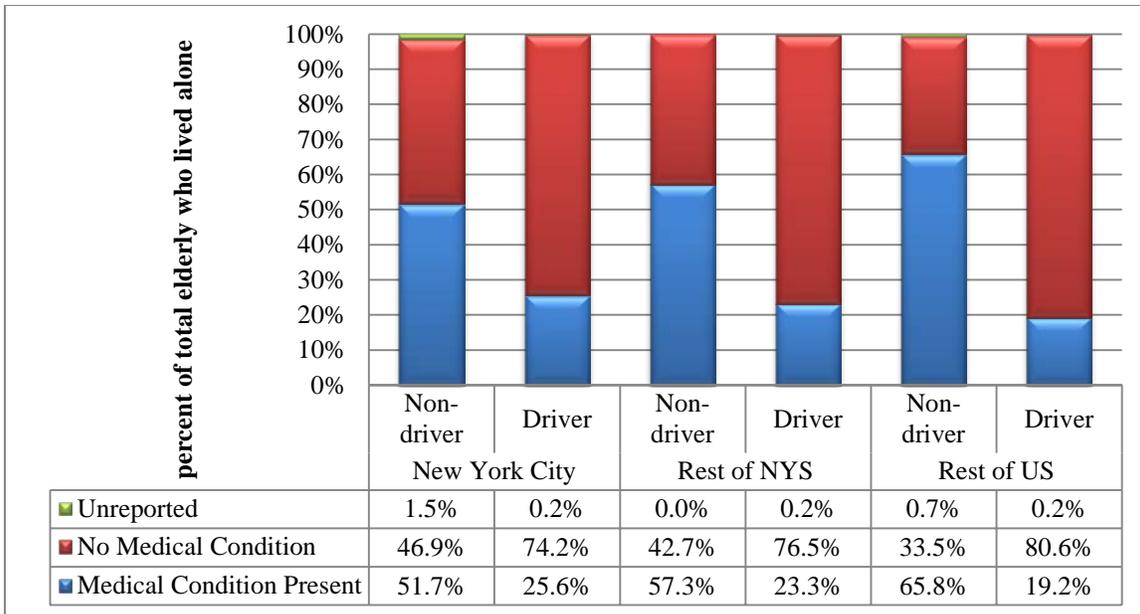


Figure 2-18. Percent of one-person household elderly who reported the presence of a medical condition by driver status (2009 NHTS).

2.3.3 Two-person Elderly Households

Based on statistics presented in Figure 2-19, NYC clearly has a much higher share of two-person elderly households without drivers than their counterpart households residing in other areas of NYS. This holds true for all three NHTS years where “no driver” two-person households accounted for 17-32% in NYC versus only 3% in the rest of NYS over the three NHTS years. In 2009, nearly half of the two-person elderly households that lived in NYC reported having one driver in the household, while only about 20% of those who lived elsewhere in NYS reported the same. Outside NYC, the majority of two-person elderly households in NYS were comprised of two drivers which accounted for 77% in both 2001 and 2009, and 74% in 1995.

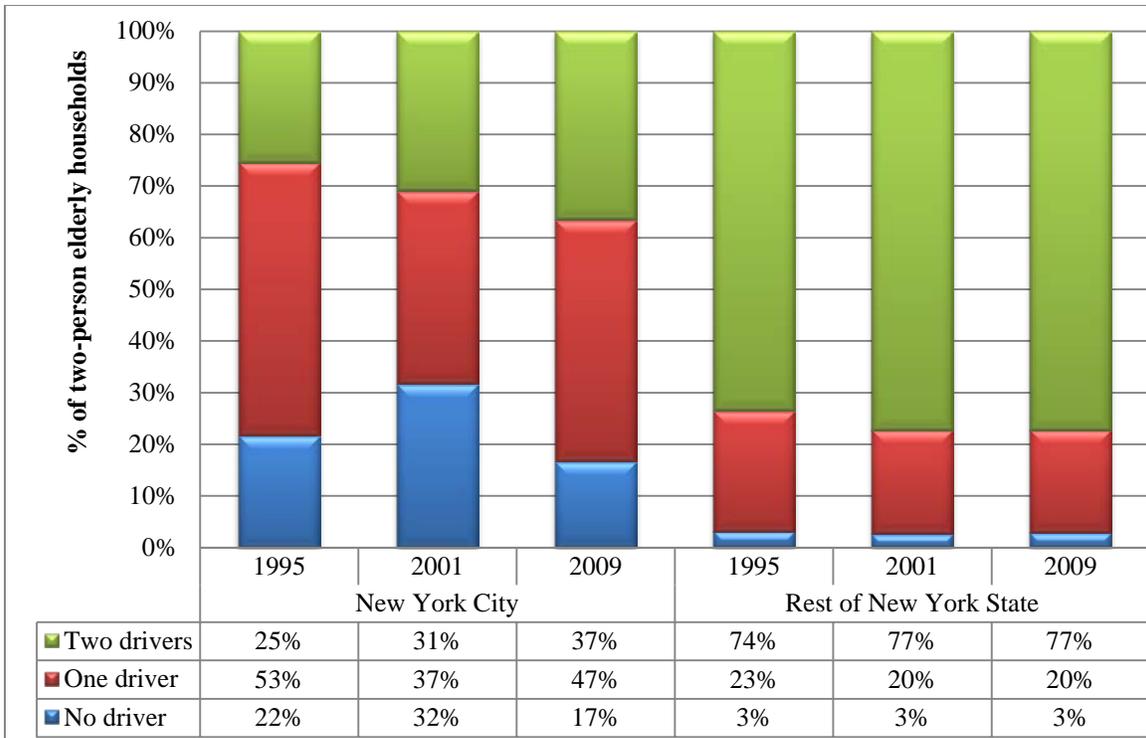


Figure 2-19. Distribution of two-person elderly households by number of drivers over time (1995, 2001, and 2009 NHTS).

2.4 VEHICLE OWNERSHIP

Using the 2006-2010 5-year ACS data, the NYS population density for zero-vehicle elderly households at the Census Tract level was calculated and displayed in Figure 2-20. A more detailed map of NYC was also included as a part of Figure 2-20. Clearly visible from the state-level map, the highest density of zero-vehicle elderly households is concentrated around the NYC area. Clusters of zero-vehicle elderly households outside NYC were mainly located in other major urban areas such as Albany, Syracuse, Rochester, and Buffalo.

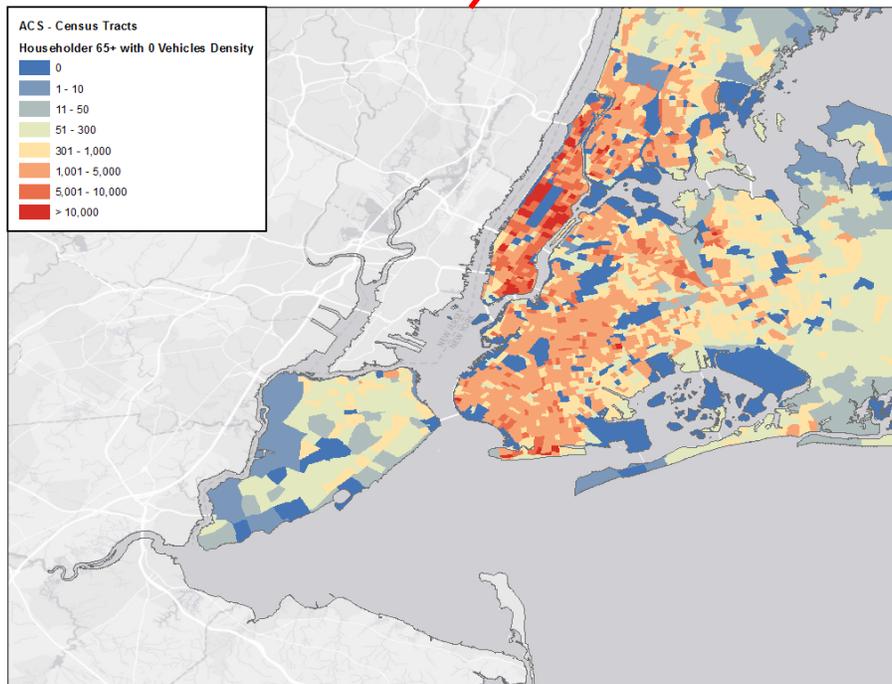
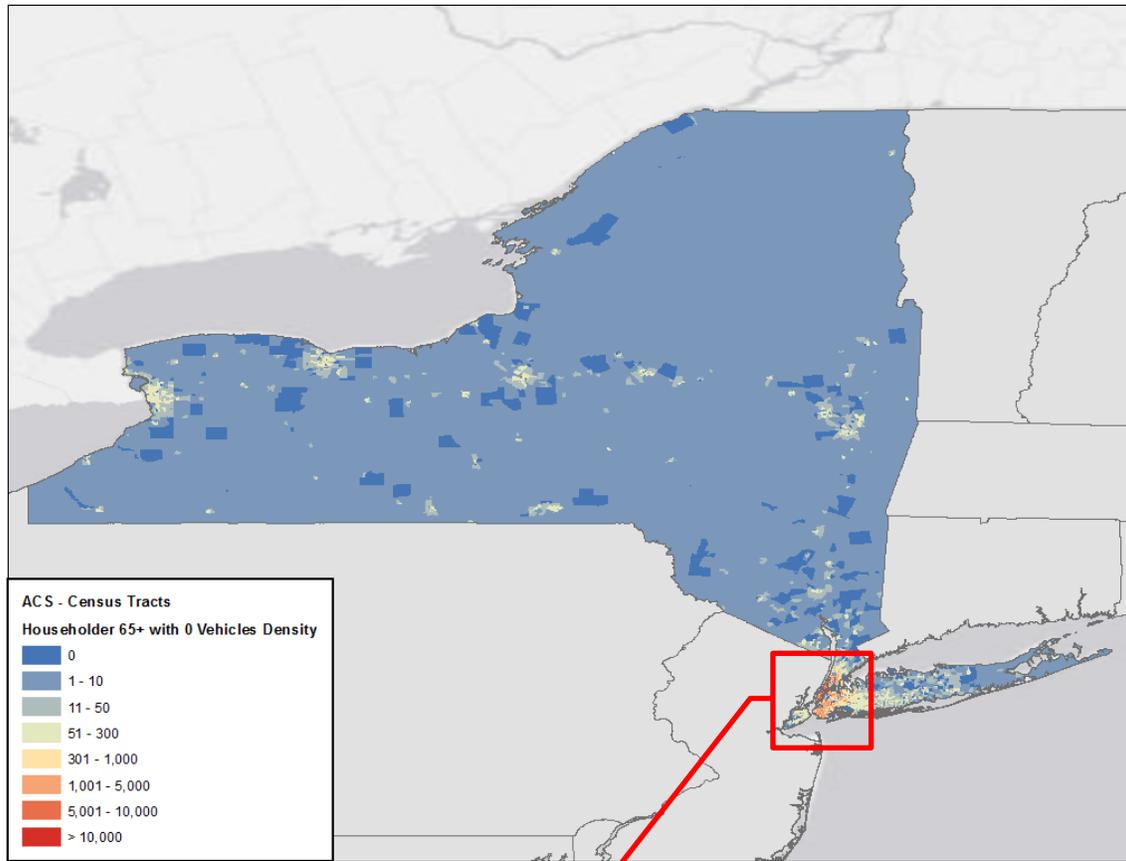


Figure 2-20. Density of elderly households with zero vehicles based on ACS 2006-2010 data (density measured as per square-mile in Census tract). Top: NYS, bottom: zoom-in of NYC region.

Clearly visible in Figure 2-21 (with numeric values shown in Table 2-5) is the remarkable difference in percentages of zero-vehicle households (shown in blue) between NYC and all other regions. For instance, in 2009, nearly 62% of elderly households in NYC did not own any vehicles while only 10% to 18% of elderly households in other regions were without any vehicles. Expectedly, elderly households living in more sparsely populated areas were more likely to own a vehicle than their counterparts from more populated regions.

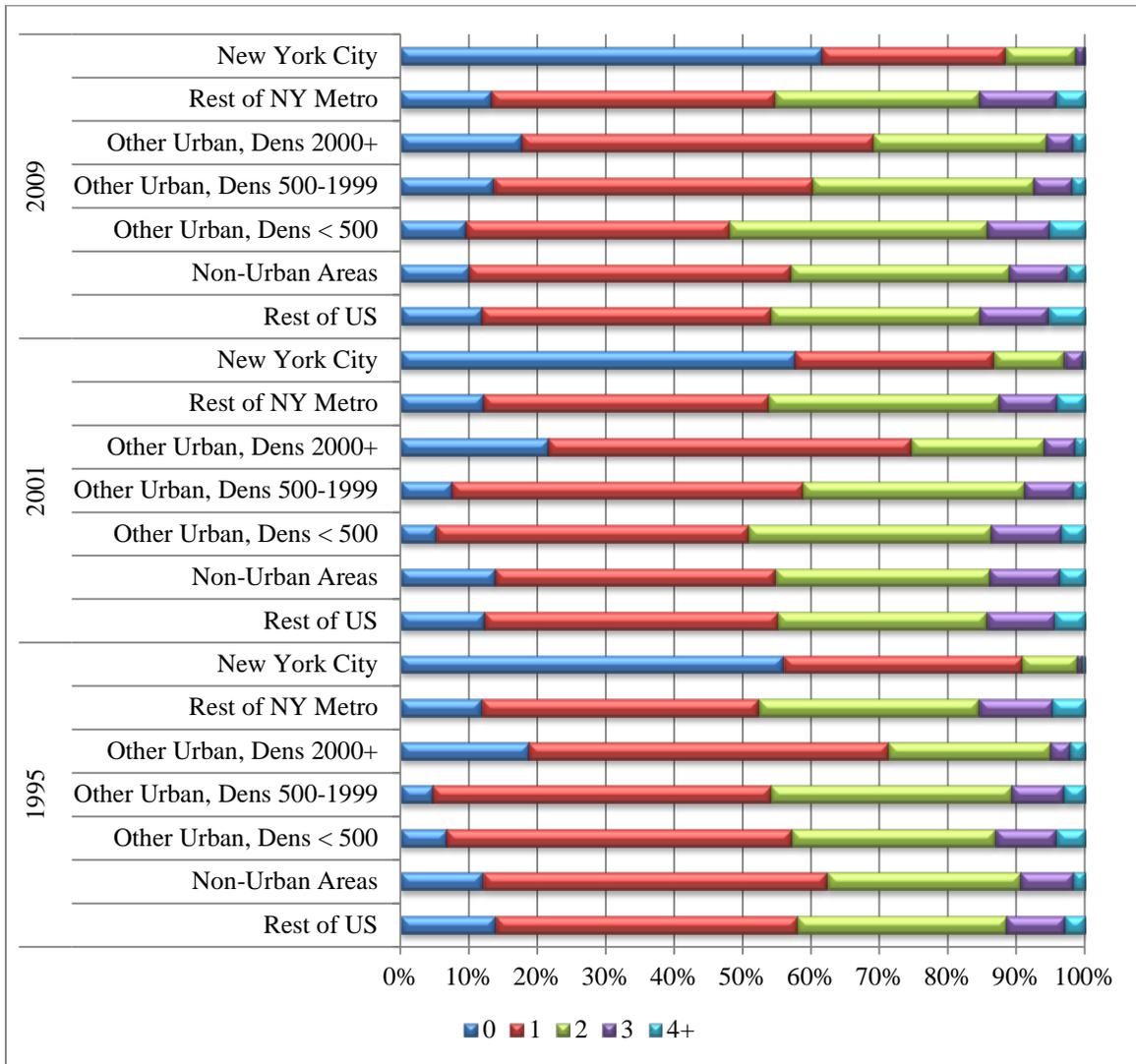


Figure 2-21. Distribution of elderly households by vehicle ownership and type of region.

Table 2-5. Distribution of elderly households by vehicle ownership and geographic regions (1995, 2001, and 2009 NHTS)

Number of vehicles owned	Entire US	New York City	Rest of NY Metro	Other Urban, Dens < 500	Other Urban, Dens 500-1999	Other		Rest of U.S.
						Urban, Dens 2000+	Non-Urban Areas	
2009								
0	13.28%	61.56%	13.22%	9.51%	13.58%	17.66%	10.09%	11.87%
1	41.94%	26.78%	41.48%	38.57%	46.68%	51.41%	46.94%	42.26%
2	30.02%	10.30%	29.90%	37.65%	32.36%	25.36%	32.01%	30.58%
3	9.64%	1.22%	11.18%	9.18%	5.56%	3.81%	8.35%	9.95%
4	3.32%	0.07%	2.62%	3.72%	1.33%	0.45%	2.13%	3.47%
5+	1.80%	0.07%	1.60%	1.37%	0.48%	1.31%	0.49%	1.87%
All	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
2001								
0	13.50%	57.65%	12.15%	5.15%	7.49%	21.61%	13.83%	12.30%
1	42.55%	29.02%	41.64%	45.62%	51.32%	53.01%	40.93%	42.79%
2	30.04%	10.31%	33.66%	35.54%	32.36%	19.38%	31.36%	30.58%
3	9.63%	2.71%	8.47%	10.25%	7.12%	4.55%	10.22%	9.89%
4	3.00%	0.28%	3.49%	1.87%	1.07%	1.40%	1.91%	3.11%
5+	1.27%	0.03%	0.59%	1.57%	0.65%	0.05%	1.75%	1.33%
All	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
1995								
0	14.63%	55.88%	11.80%	6.76%	4.73%	18.73%	11.96%	13.83%
1	44.06%	35.00%	40.49%	50.43%	49.37%	52.50%	50.40%	44.12%
2	30.12%	8.01%	32.21%	29.75%	35.16%	23.80%	28.18%	30.63%
3	8.33%	0.74%	10.80%	8.81%	7.69%	2.84%	7.77%	8.52%
4	2.25%	0.37%	3.76%	3.39%	1.93%	1.83%	1.46%	2.27%
5+	0.61%		0.94%	0.85%	1.12%	0.30%	0.24%	0.63%
All	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Notes: highlighted cells are estimated based on a small sample; “Dens” are population density per square mile; and “elderly households” are households with one or more persons aged 65 years or order.

This high proportion of zero-vehicle households was not unique for only elderly households in NYC. Based on NHTS data, about 55% of all NYC households did not own any vehicles in 2009; this zero-vehicle household share was about 52% in 2001 and 53% in 1995. Note that comparisons of vehicle ownership and many other statistics on all residents of NYC and the rest of NYS were summarized in a separate study report (Southworth, et. al., 2012).

In addition to regional differences, Figure 2-22 shows that elderly households also have a significantly higher percentage of zero-vehicles than those non-elderly households living in the same areas in 2009. Specifically, 34% of elderly households versus 26% for non-elderly households that lived in NYS owned zero vehicles, while 12% of elderly households versus 5% of non-elderly households that lived in the rest of the U.S. were zero-vehicle households. Patterns of these shares have not changed in any significant way since 2001.

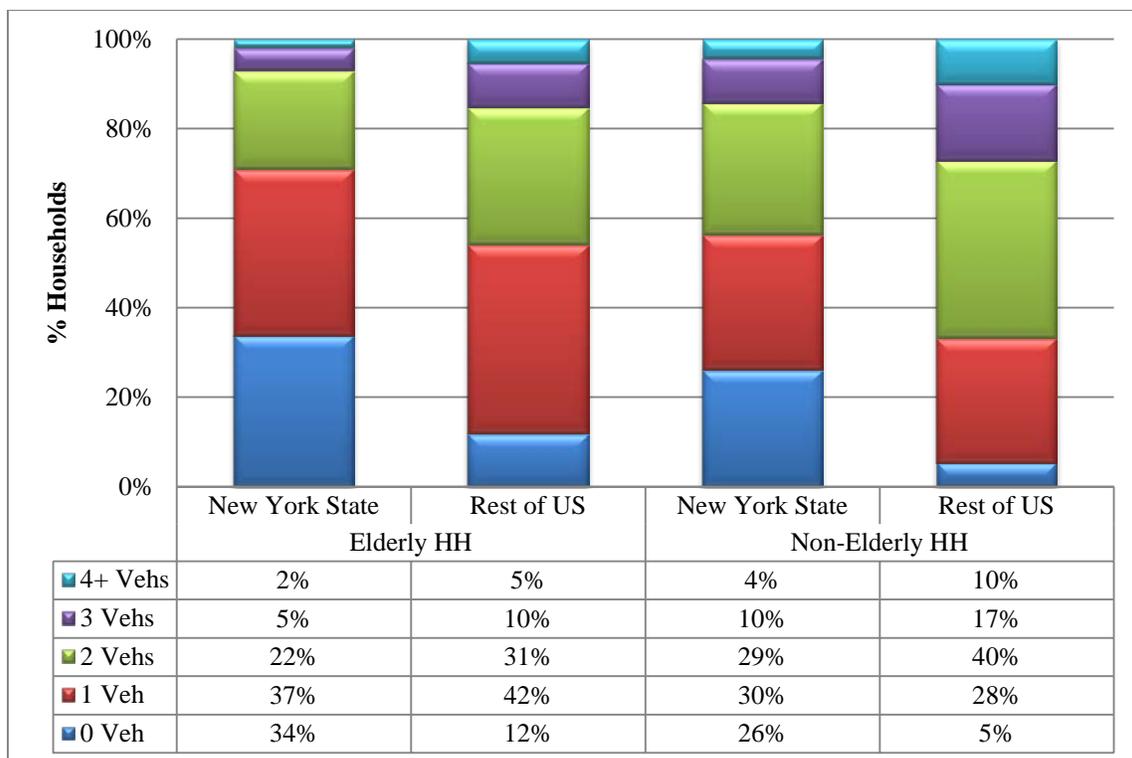


Figure 2-22. Distributions of elderly and non-elderly households by vehicle ownership (2009 NHTS).

2.5 VEHICLE AGE

The NHTS also collected information on household vehicle age although a small percent of the survey participants did not report this data—about 3-5% of them were missing (unreported) over the last three NHTS surveys. Using the available vehicle age data, Figure 2-23 shows the vehicle-age distributions by household status (elderly vs. non-elderly), and by geographic region, over the three survey years. In 2009, about 27% of vehicles owned by NYS elderly households

were eleven years or older; while over 37% of their counterparts from the rest of the U.S. were the same. Among non-elderly households, the shares of “11 years or older” vehicles accounted for about 24% and 33% for NYS households and households that lived in the rest of the U.S., respectively.

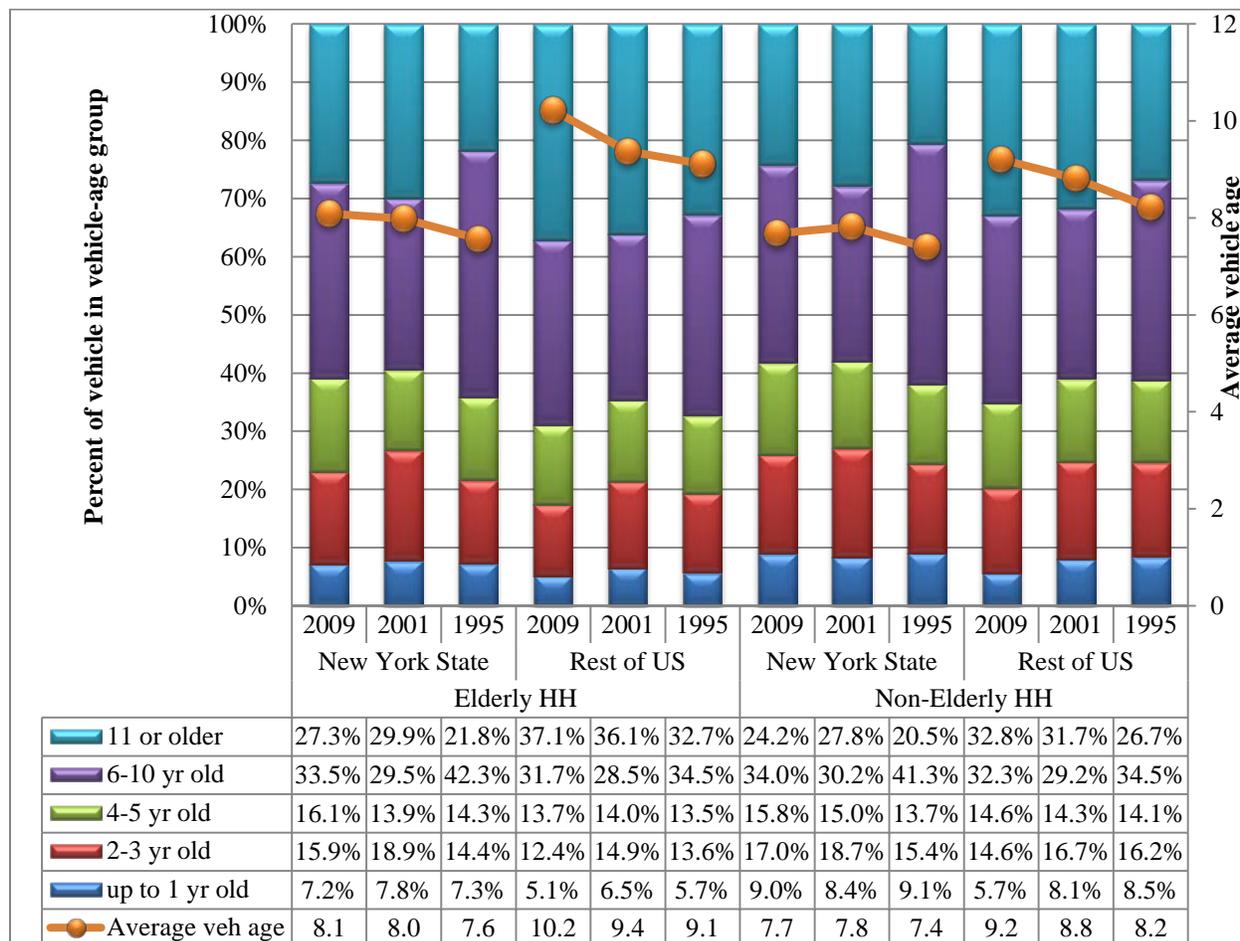


Figure 2-23. Distribution of vehicle age by household elderly status and by region (1995, 2001, and 2009 NHTS).

For reference, the average age of vehicles owned by households within each group was also plotted in Figure 2-23. Vehicles owned by NYS households were about one or two years “younger” on average than those owned by households outside NYS. As seen in Figure 2-23, vehicles owned by elderly households were slightly older than those owned by their non-elderly counterparts. The differences are slightly more visible among households living in the rest of NYS. Furthermore, an increase in average vehicle age over the last 14-year period can also be observed in all regions, based on data presented in Figure 2-23.

2.6 WORKER STATUS

The percent of population age 16 years and older that worked during the three NHTS years was examined. As shown in Figure 2-24, overall shares of workers were slightly lower among residents of NYC than those that lived in other parts of the country. Also observed in Figure 2-24 is the lower worker shares among the female groups across all regions, when compared with their male counterparts that lived in the same region. These workforce levels were roughly stable within each gender as a whole.

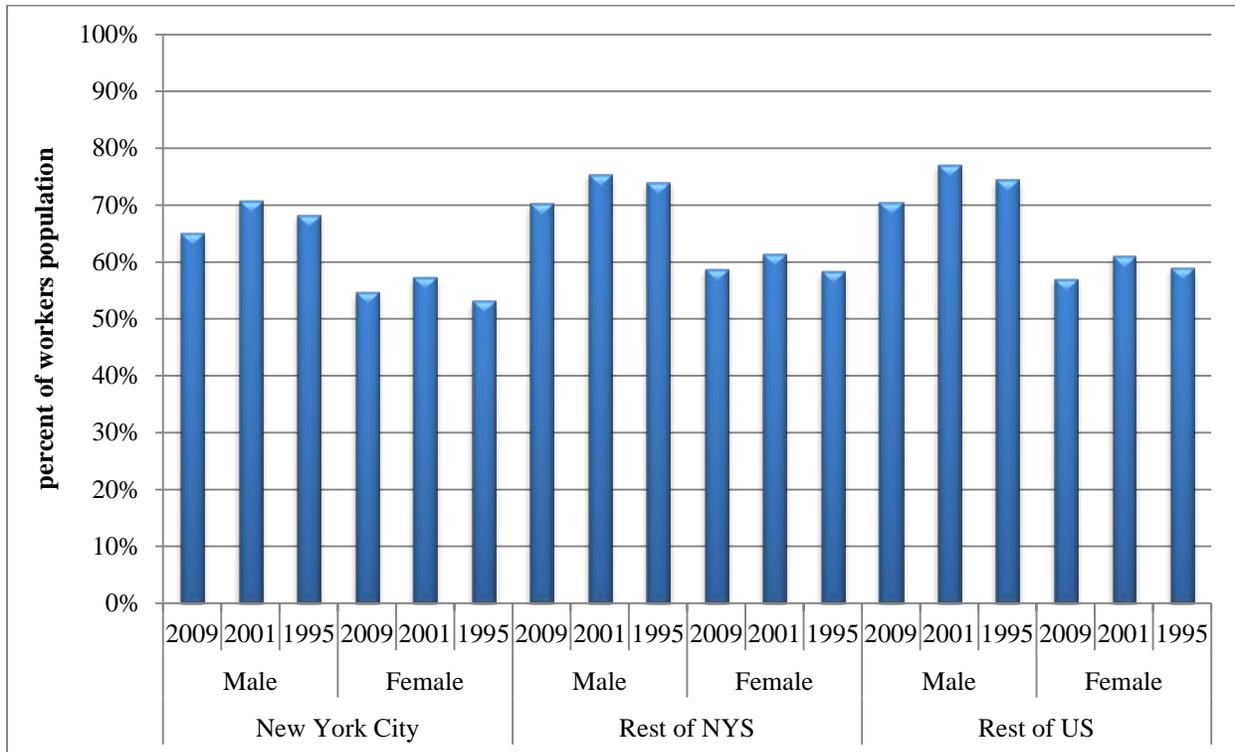


Figure 2-24. Percent of 16+ year old workers population over time by gender and region (1995, 2001, and 2009 NHTS).

When focused on the elderly, as illustrated in Figure 2-25, there were clearly increasing trends in the worker shares over the last 14 years for all female groups in all regions, and for male groups that lived outside NYC. The 1995 statistics for the older males (70-74 years old and 75+ years old) that lived in NYC seemed to be the only one that was out of sync. Interestingly, a significant portion of the 75+ year old population in NYS (including NYC) continued to work, especially visible in the 2009 data.

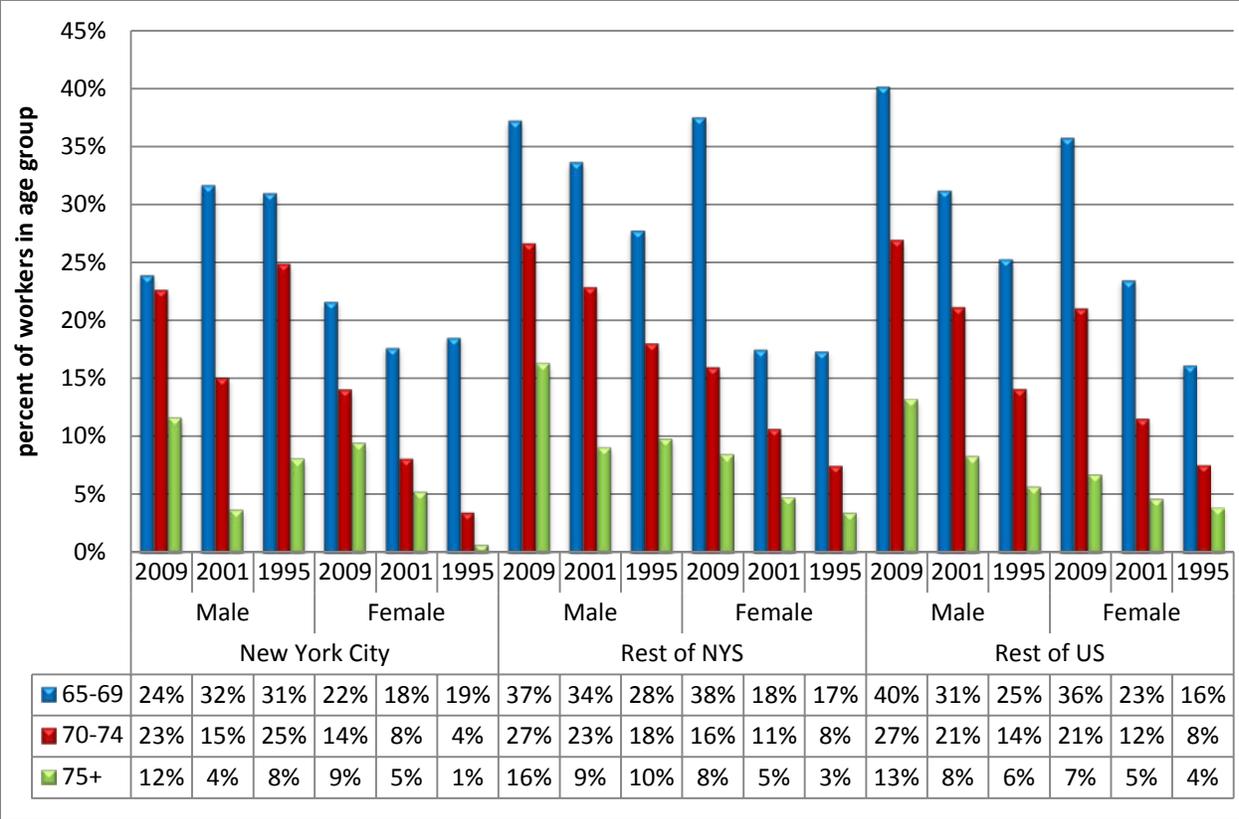


Figure 2-25. Share of workers for elderly groups by gender and region in 1995, 2001, and 2009 NHTS.

3. TRAVEL PATTERNS OF ELDERLY POPULATION

As pointed out previously, national level studies using NHTS data have found that Americans are traveling less over the last decade, making fewer and shorter trips in 2009 as compared to 2001. Elderly households were no exception. According to AARP (Lynott and Figueiredo, 2011), on average an elderly person took about 6% fewer trips and traveled 10% shorter distance in 2009 than in 2001. This section examines travel behaviors of NYS elderly residents which include estimating the level of elderly travel, assessing any gender and regional differences, determining their travel patterns and trends, as well as identifying issues associated with NYS elderly travelers.

3.1 TRAVEL STATISTICS BY PERSON TRIPS

3.1.1 Average Daily Person-Trip Rate

Statistics presented in Figure 3-1 reveal that Americans traveled less in 2009 than in previous years, except for NYC. The degree of change for this trend varied slightly among the regions. Overall, those that lived in NYC took fewer daily trips per person than people from other regions. On average, a typical 5 to 64 year old person took more trips in a day than one who were 65 years and older from the same region.

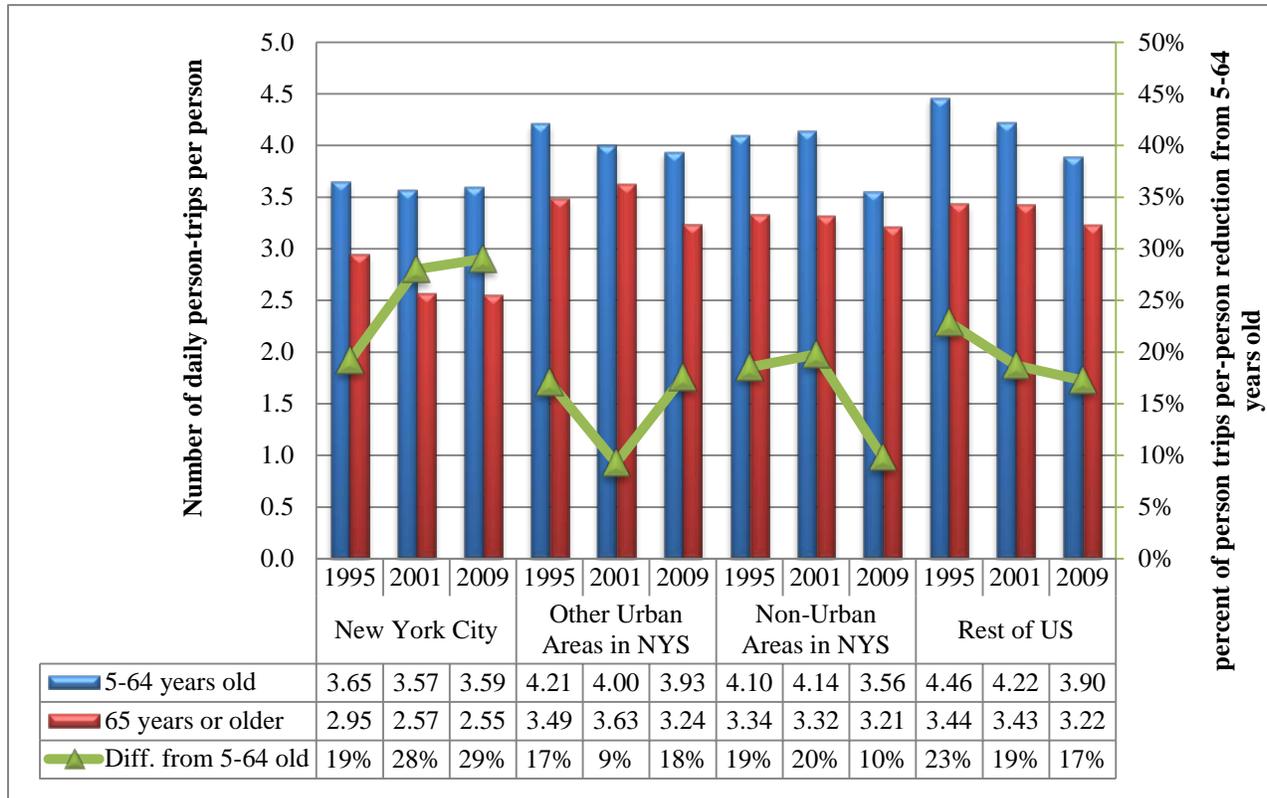


Figure 3-1. Daily person-trips per person by age and region over time (1995, 2001 and 2009 NHTS data).

Over time, the average number of person trips taken by a non-elderly person in NYC stayed relatively stable at around 3.6 trips per day, while the counterpart elderly person reduced his/her daily travel from 3.0 trips per day in 1995 to about 2.6 trips in 2009. More precisely, elderly persons living in NYC took an average of 29% less daily trips than their younger neighbors (calculated as $[3.59-2.55]/3.59$) in 2009. Outside NYC, the difference was only 18% among those who lived in other urban areas of NYS and 10% for those that lived in non-urban areas of NYS. In rest of the country, this reduction of daily trips for an elderly person is about 17%.

Furthermore, as illustrated in Figure 3-2, there is a gender difference between the two age groups when comparing their average daily person-trips. Age differences within the male group were much less than their female counterparts in all regions over all NHTS years. In fact, elderly males traveled nearly at the same rate as their younger neighbors, with the exceptions of those that lived in NYC in 2001 and 2009, per NHTS data. The reduction in trip rates for elderly females, compared to those 5-64 years old female group, ranged from around 20% to nearly 35%. Regardless of age or gender, in most cases, a resident of NYC made fewer daily trips on average than the typical person from other regions.

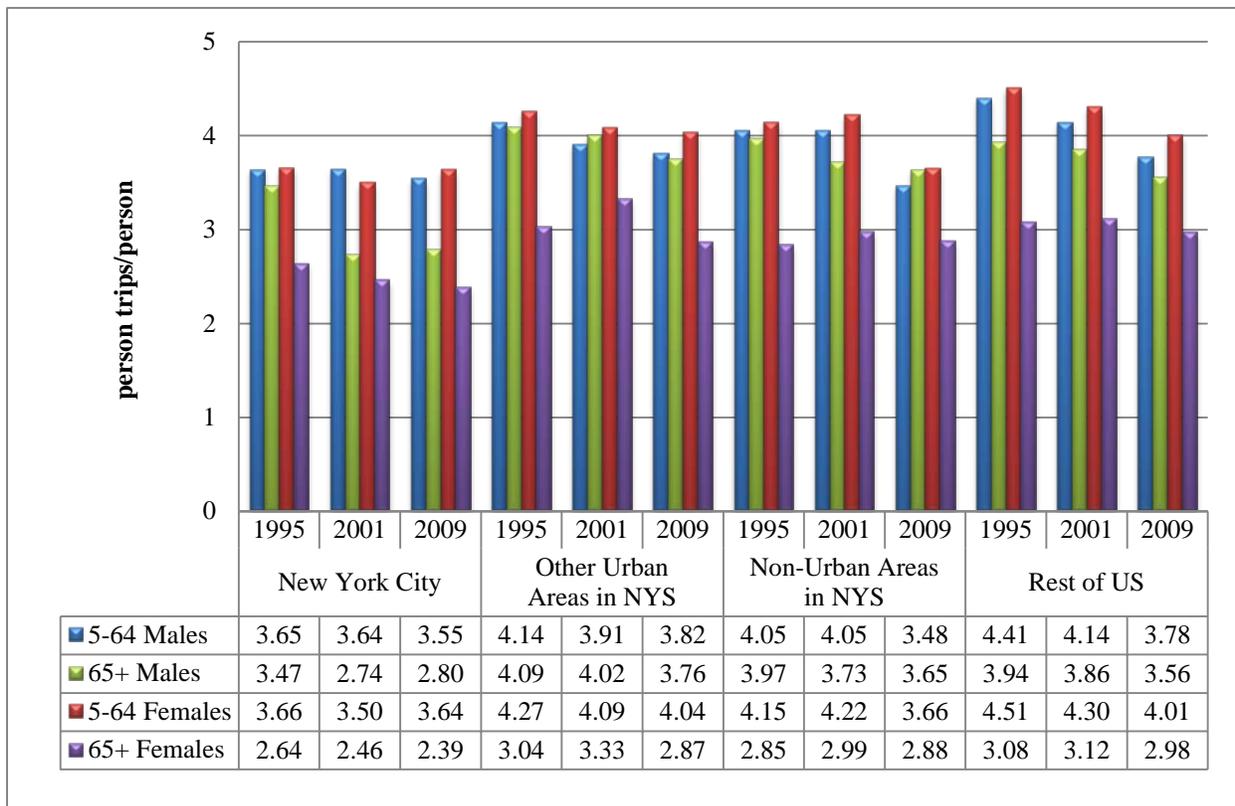


Figure 3-2. Daily average person trips by age and gender over time (1995, 2001, and 2009 NHTS).

3.1.2 Average Person-Trip Length

Although the 2001 average trip lengths in all regions and age groups increased from their corresponding 1995 level (as observed in Figure 3-3), this trend did not continue in 2009 for those age 5-64 years old, regardless of where they lived. Average person-trip length dropped from 7.11 miles in 2001 to 5.34 miles in 2009 among the younger residents of NYC, and from 10.36 miles in 2001 to 10.13 miles in 2009 for the same age group that lived outside NYS.

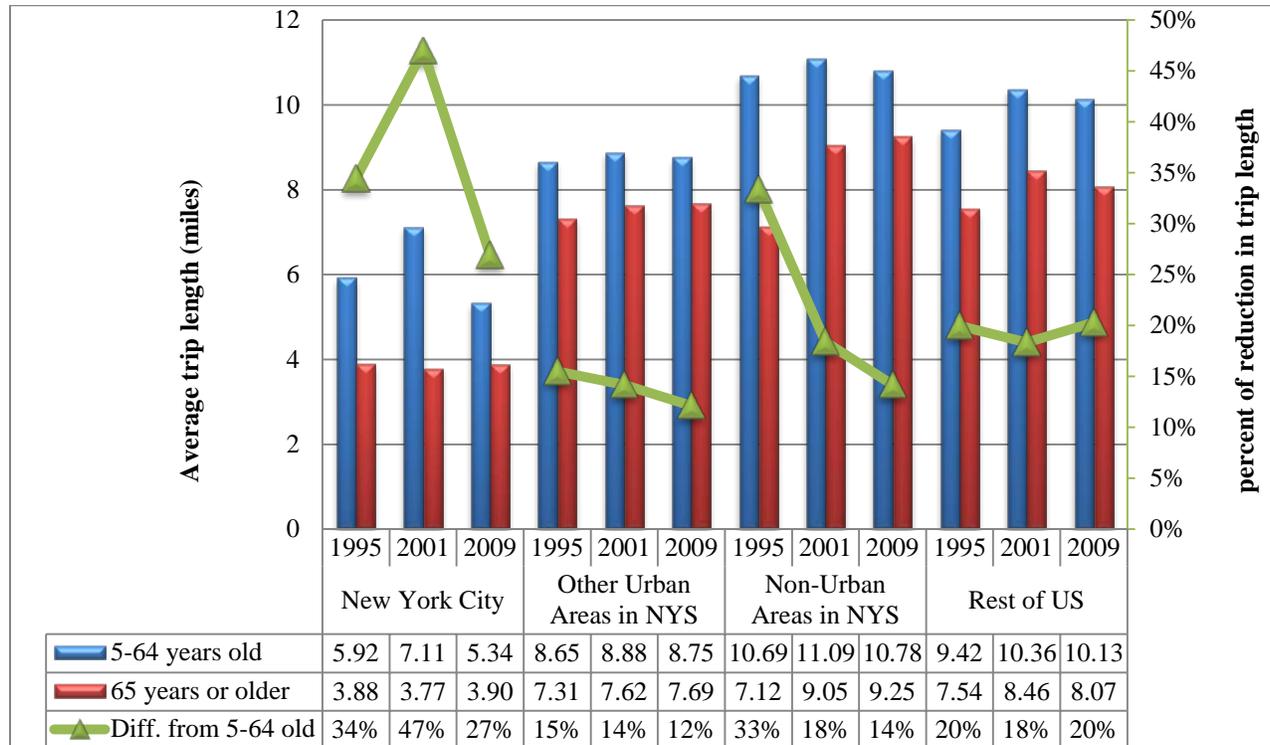


Figure 3-3. Average person-trip length by age and region over time (1995, 2001, and 2009 NHTS).

On the other hand, the upward trend on average person-trip length did not stop for the elderly population living in NYS, as the elderly that lived outside NYS saw a decrease in person-trip distance from its 2001 level. Figure 3-3 also shows that elderly took shorter trips than their younger counterparts, in all regions and across all NHTS years. The NYC elderly residents took significantly shorter trips, on average, than their counterparts living in all other regions. For example, an average NYC resident traveled about 3.90 miles per-trip in 2009; compared to an average of 8 miles or more for those who lived elsewhere.

Compared to the non-elderly population, elderly persons on average took significantly shorter trips regardless of where they lived. This difference is most striking for residents living in NYC where the elderly traveled an average of nearly 30% shorter distance than a typical non-elderly person in 2009. This difference was only 12% for people that lived in other urban areas of NYS and 14% for those in non-urban regions of NYS. Outside NYS, the elderly traveled on average

about 20% fewer miles when compared to the younger population living in the same region—8.1 miles versus 10.1 miles, respectively.

3.1.3 Mode Shares by Person Trips

3.1.3.1 Age and Geographic Region Difference

With the exception of people living in NYC, Americans depend on privately-owned vehicles (POV) for a considerably large portion of their daily travels (measured in person trips)— ranging from about 80% to over 90% depending on where they live. On the contrary, as seen in Figure 3-4, NYC residents used POV in only about one-third of their daily trips in 2009. Instead of POV, residents of NYC walked and used public transit to fulfill most of their daily travel needs which accounted for over 60% of their total daily trips. Walking and public transit were not as commonly used means of transportation by those that lived outside NYC, however.

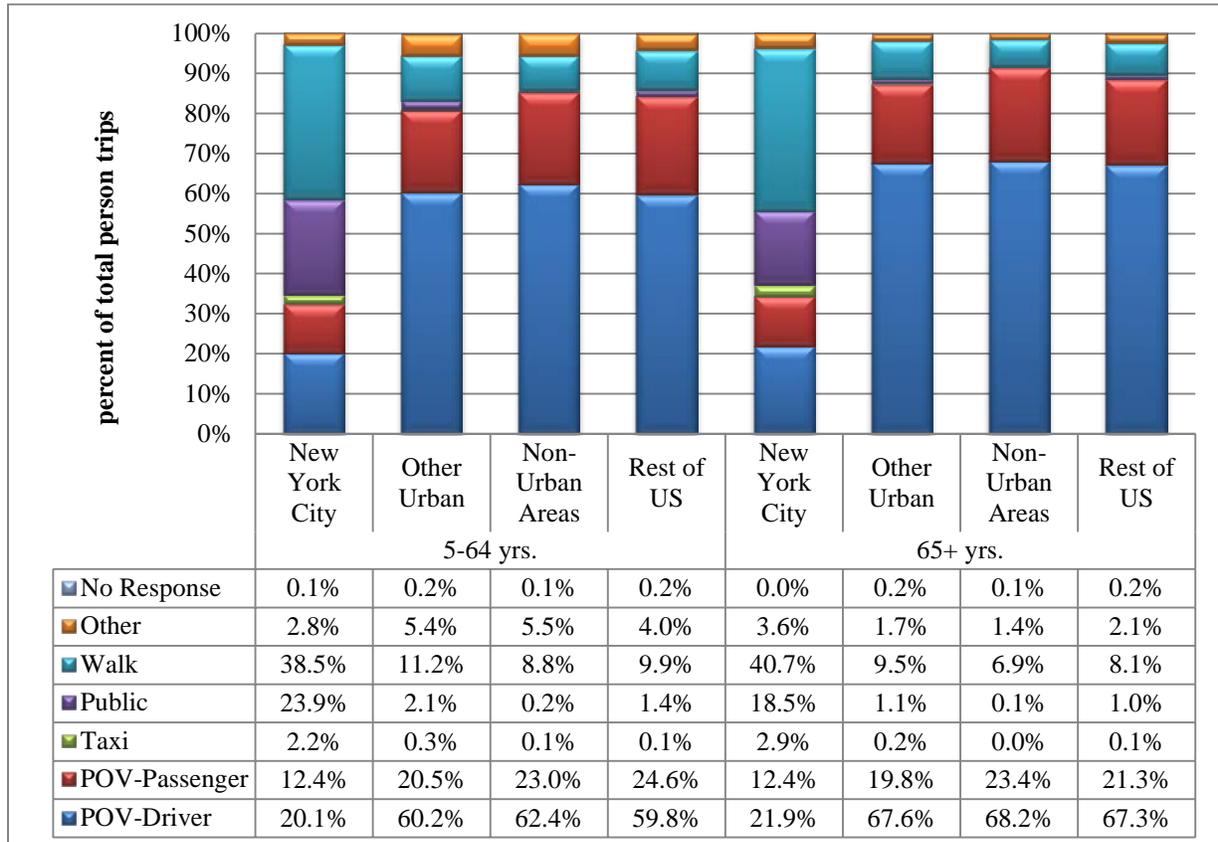


Figure 3-4. Mode share distributions by age and region, based on 2009 NHTS.

Although not as significant as the regional impacts (i.e., NYC versus other areas), age also played a role in mode choice. Interestingly, in 2009, shares of POV (combined driver and passenger) for the 65+ year old group in all geographic regions were higher than their younger

counterparts. In fact, “POV-driver” shares among the elderly groups were all higher than their corresponding younger age groups (see darker color blue bars in Figure 3-4).

Elderly NYC residents utilized slightly more POV and walked a little more frequently in 2009 (Figure 3-5), when compared to the under-65 years old population who lived in NYC. Vehicle use among NYC residents decreased from their respective 2001 levels for both age groups, and more significantly for the elderly population that lived in NYC. Furthermore, elderly residents of NYC were more likely to take walking trips (41%) than their younger counterparts (39%) in 2009. This was a different pattern from those in 2001 where walking accounted for 37% of person trips in the younger group versus a slightly lower 35% for the 65+ group (Hu and Reuscher, 2010).

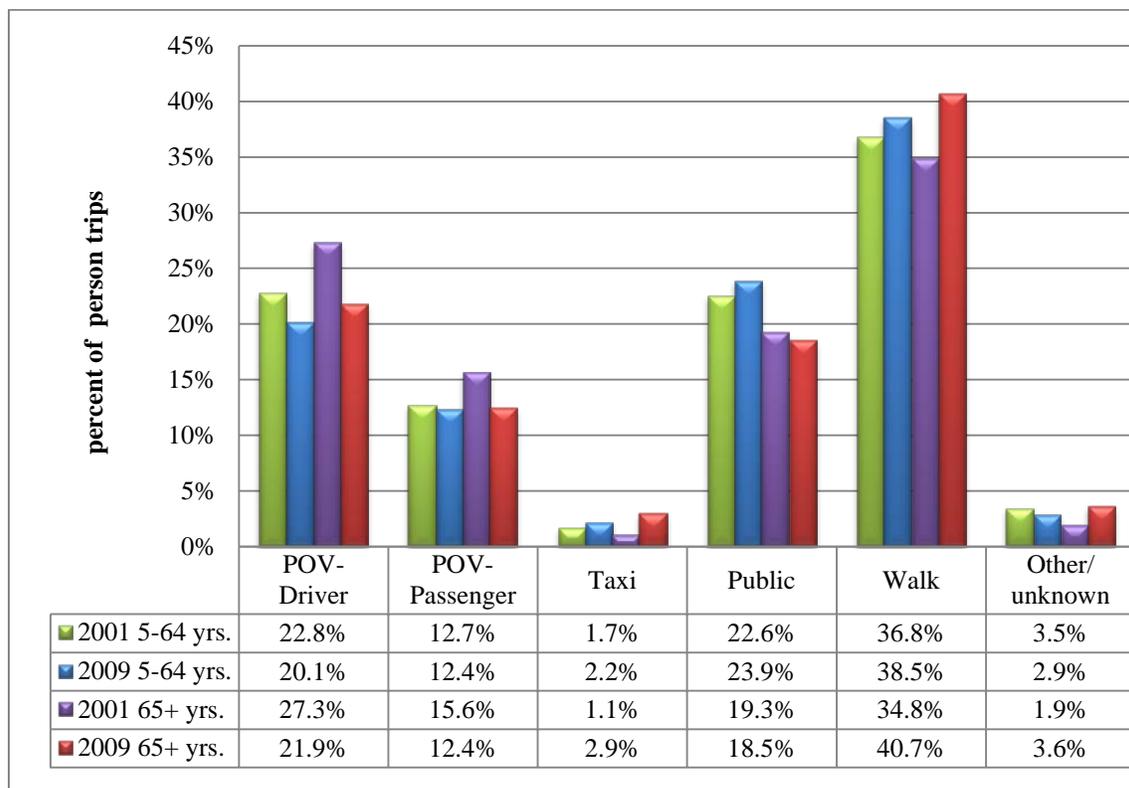


Figure 3-5. NYC mode shares by age group measured in person trips, 2001 and 2009 NHTS.

On the other hand, elderly who lived in NYC were less likely to use public transit than younger NYC residents—true in both 2001 and 2009. Specifically in 2009, transit mode share was used for about 19% of total person trips made by NYC’s elderly residents in 2009, while this was at 24% for the younger group. Within age groups, shares of transit use did not change significantly over time, between 2001 and 2009.

3.1.3.2 Gender and Age Impacts on Driving

In the case of POV trips made by the elderly, women were less likely than men to be the driver, more so among those who lived in NYC than other regions in the country. Figure 3-6 clearly displays the previous statement. Among the elderly groups, age difference also impacted their driving decisions. Less than 46% of total POV person-trips taken by NYC women age 75 years or older were made by drivers, while age 65-74 year old women drove on nearly 60% of their POV person-trips. Outside NYS (i.e., rest of U.S.) the age difference among women drivers was also noticeable, although they are slightly closer than those from NYC—about 63% for women age 75+ years versus 72% among the under-75 year old group. For men, the majority of their POV person-trips were reported as self-driving, regardless of where they lived or their age group.

Moreover, as seen in Figure 3-6, a significant portion of POV person-trips taken by females were driven by their spouses or people outside their households, regardless of their age or where they resided. Travel for trips driven by their children was more significant in NYC, especially for females 75+ years old than those that lived in rest of U.S.

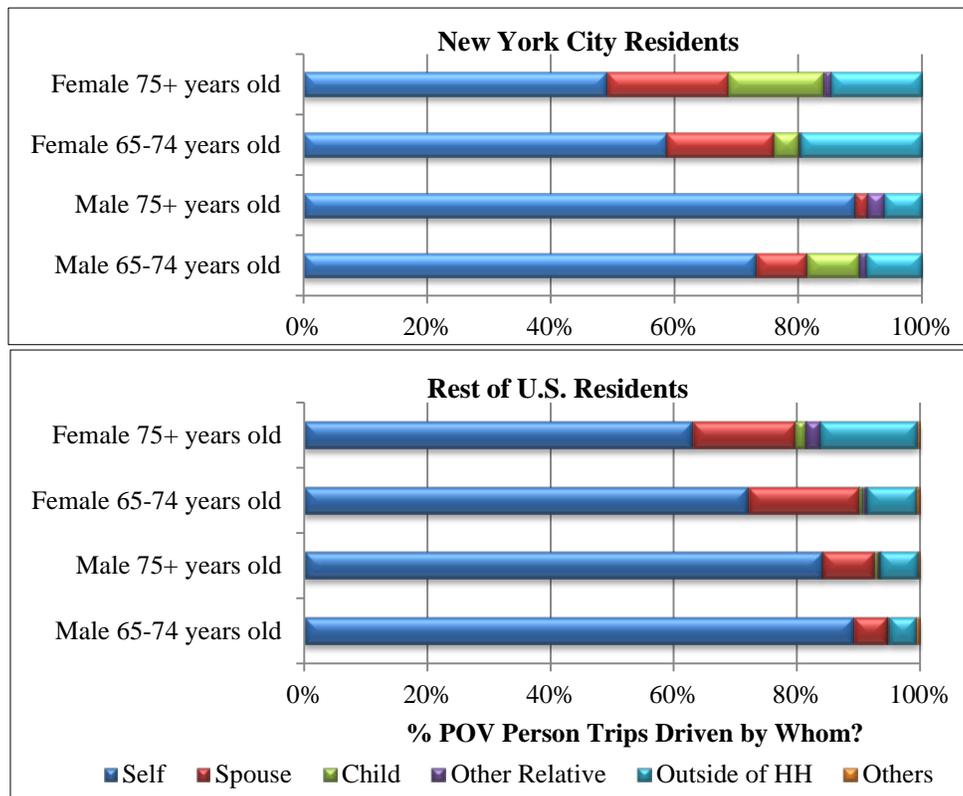


Figure 3-6. Percent person trips taken in a privately-own vehicle by driver type, age, and gender (2009 NHTS).

Within NYS but outside NYC, the percent of person trips taken in POV showed a pattern that was fairly similar to that in the rest of U.S. Figure 3-7 shows that the percent of POV person-trips driven by spouse was much higher among residents in non-urban area of NYS than those that lived in all other regions— especially among females. Urban or rural, the majority of men continued to drive themselves beyond age 75 resulting in only small reductions from shares of POV person-trips taken by the 65-74 years old age group that lived in the same region.

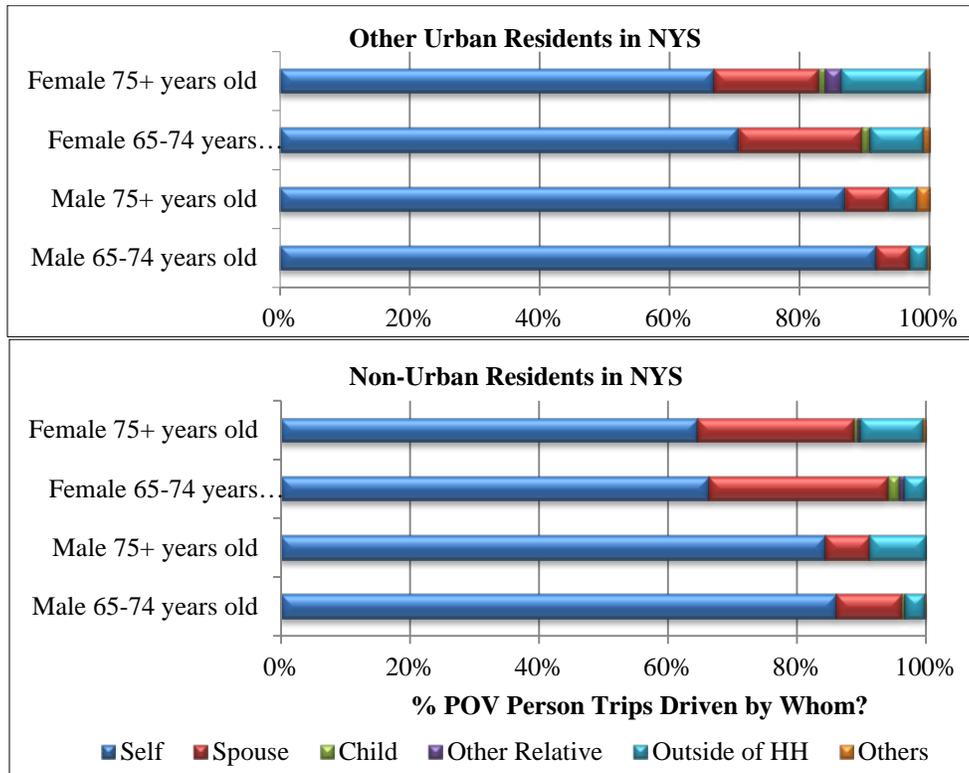


Figure 3-7. Percent person trips taken in POV by driver type, by age, and gender for other urban and non-urban regions in NYS (NHTS 2009).

3.1.3.3 Lived-Alone Elderly Households

Person trips taken in POV by the elderly that lived alone, expectedly, mostly relied on their own driving. Clearly seen in Figure 3-8, the elderly that lived alone in NYC were more likely to get outside help for transport than those that lived outside NYC. There was a gender difference particularly for the lived-alone elderly that lived outside NYC.

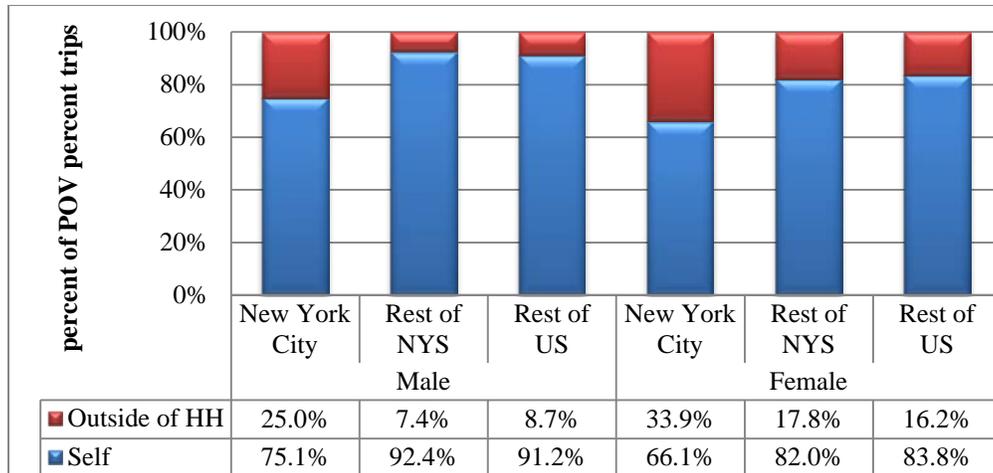


Figure 3-8. Percent of person trips taken in POV by lived-alone elderly household by driver type, gender, and region (2009 NHTS).

3.1.4 Daily Person-Trips by Trip Purpose

Geographic regional differences did not result in any significant impacts on the shares of daily person-trips by trip purpose among the age groups (i.e., elderly or non-elderly). Regardless of age or region of residency, “family and personal business” was the most commonly cited reason for making a daily trip, followed by traveling for a “social and recreational” purpose. As summarized in Table 3-1, “family and personal business” trips accounted for over 40% of daily person-trips made by people in the younger age group for all regions; while about 55% or more of daily person-trips taken by age 65+ years old were for the exact same reason.

Not surprising, the share of trips made for “earn a living” was another major reason for the younger than 65 years old group, ranging from about 18% to 23% over the three NHTS years. “Travel for work” reduced significantly among the elderly groups in all regions—accounting for 8% or less in daily person-trip shares by region over the three NHTS years. On the other hand, an age impact on the shares of person-trips made for “social & recreational” reasons can be observed from Table 3-1. The increased shares of “family and personal business” and “social and recreational” trips among elderly groups in all regions could reflect a part of the life style changes for elderly Americans, e.g., a shift away from traveling for work and more time for leisure activities.

Table 3-1. Distribution of daily average person-trips by trip purpose and region; based on 1995, 2001, and 2009 NHTS

Person Trips	New York City			Other Urban			Non-Urban Areas			Rest of U.S.		
	1995	2001	2009	1995	2001	2009	1995	2001	2009	1995	2001	2009
5-64 Years old												
Daily Trips/Person	3.65	3.57	3.59	4.21	4.00	3.93	4.10	4.14	3.56	4.46	4.22	3.90
Earn a Living	20.6%	21.7%	17.8%	21.8%	21.0%	21.1%	21.8%	20.3%	22.5%	21.8%	20.5%	20.1%
Family & Personal Business	44.4%	40.9%	42.9%	44.2%	41.5%	40.5%	42.8%	42.8%	41.6%	44.2%	42.4%	40.8%
Civic, Educational & Religious	10.8%	11.6%	10.1%	9.0%	9.4%	10.3%	9.6%	8.9%	8.5%	9.1%	10.2%	10.2%
Social & Recreational	24.1%	24.2%	26.8%	24.8%	26.6%	26.2%	25.7%	26.9%	25.6%	24.7%	25.9%	27.1%
Other	0.1%	1.4%	1.4%	0.2%	1.2%	1.0%	0.1%	0.7%	0.8%	0.2%	0.8%	0.8%
Unreported	0.0%	0.3%	1.0%	0.0%	0.3%	0.9%	0.0%	0.5%	1.1%	0.0%	0.1%	1.0%
65+ Years old												
Daily Trips/Person	2.95	2.57	2.55	3.49	3.63	3.24	3.34	3.32	3.21	3.44	3.43	3.22
Earn a Living	7.3%	4.4%	5.5%	6.5%	4.4%	6.9%	6.3%	6.5%	7.3%	6.8%	4.8%	8.2%
Family & Personal Business	61.3%	58.8%	54.9%	60.2%	57.2%	57.0%	64.5%	56.0%	53.9%	60.4%	56.4%	54.9%
Civic, Educational & Religious	7.9%	7.7%	5.2%	4.6%	5.8%	4.2%	3.5%	5.7%	6.2%	5.7%	6.2%	5.3%
Social & Recreational	23.4%	28.5%	32.3%	28.6%	31.6%	30.3%	25.7%	31.1%	32.1%	26.9%	31.7%	30.4%
Other	0.1%	0.4%	0.9%	0.1%	0.9%	1.1%		0.6%	0.0%	0.1%	0.9%	0.5%
Unreported		0.3%	1.2%	0.0%	0.3%	0.6%		0.1%	0.5%	0.0%	0.1%	0.8%

Note: highlighted cells are estimated on a small sample.

3.1.5 Daily Person-Trips by Time of Travel

Illustrated in Figure 3-9 is a strong relationship between the age of the traveler and the time travel started. A significantly smaller percent of the trips taken by the elderly started during 6-9 am, when compared with trips made by the younger travelers in all regions. Over three quarters of the elderly trips occurred during 9 am to 6 pm, with over 55% made in the time period from 9 am to 3 pm. There was no major regional difference in either age group, although NYC seemed to have slightly more travel activity during the evening and night hours than other regions within the same age group. Rural areas of NYS, on the other hand, showed a slightly fewer share of trips during the late hours when comparing with other regions within the same age category.

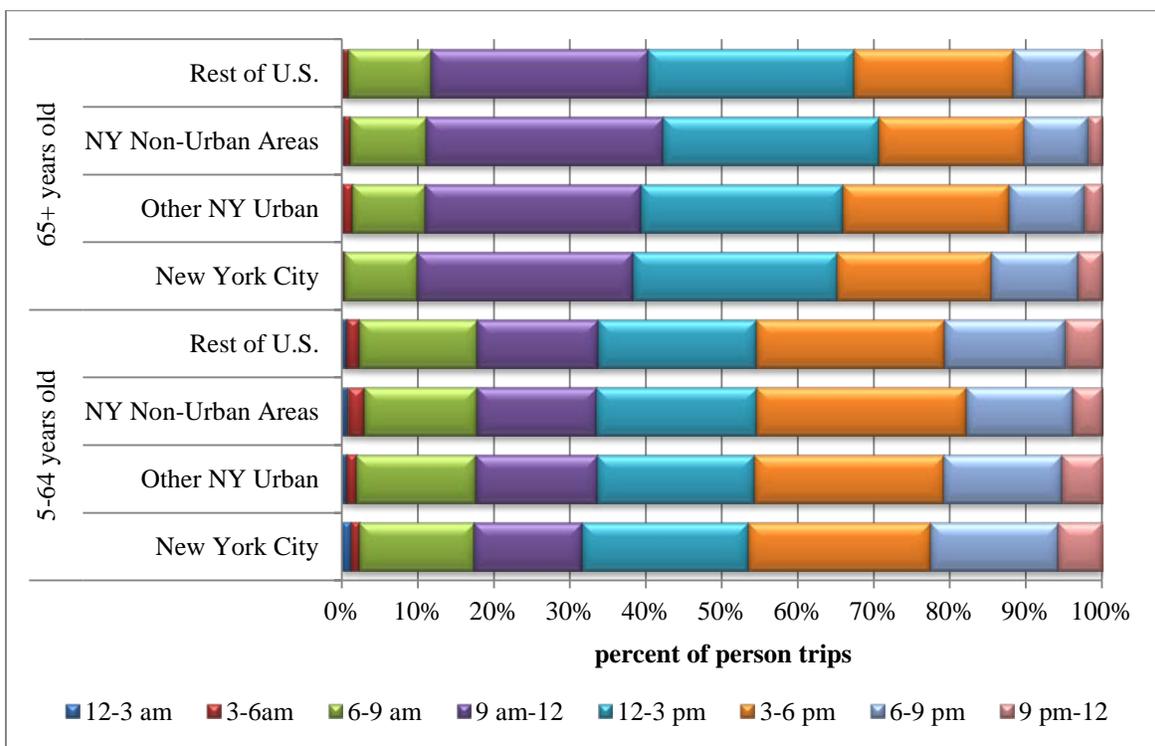


Figure 3-9. Temporal distribution of person-trips by time of travel, age group, and region (2009 NHTS).

Regarding time of travel by trip purpose in 2009, traveler's age also played a role. This is evident in Figure 3-10 (NYC on the top and rest of NYS at the bottom). In NYC, most of the work trips taken by elderly travelers (i.e., trip made to earn a living) concentrated in two periods, 6-9 am and 3-6 pm, and accounted for about 63% of all commute trips made by the elderly in 2009. Although slightly less at about 50%, most commute trips made by the younger workers also occurred within the same two time periods. This seemed to be consistent with a typical working schedule for many working Americans. A similar pattern can also be observed from the bottom portion of the figure which displays distributions for the rest of NYS. Elderly commuters that lived in the rest of the NYS, however, made a noticeable percent of work trips during the

midday period from 9 am to 3 pm in 2009, and accounted for about 36% of their total commute trips versus 25% for the non-elderly group that lived in the same region. This might suggest elderly workers that lived in the rest of NYS had a more flexible working schedule than their younger counterparts from the same region.

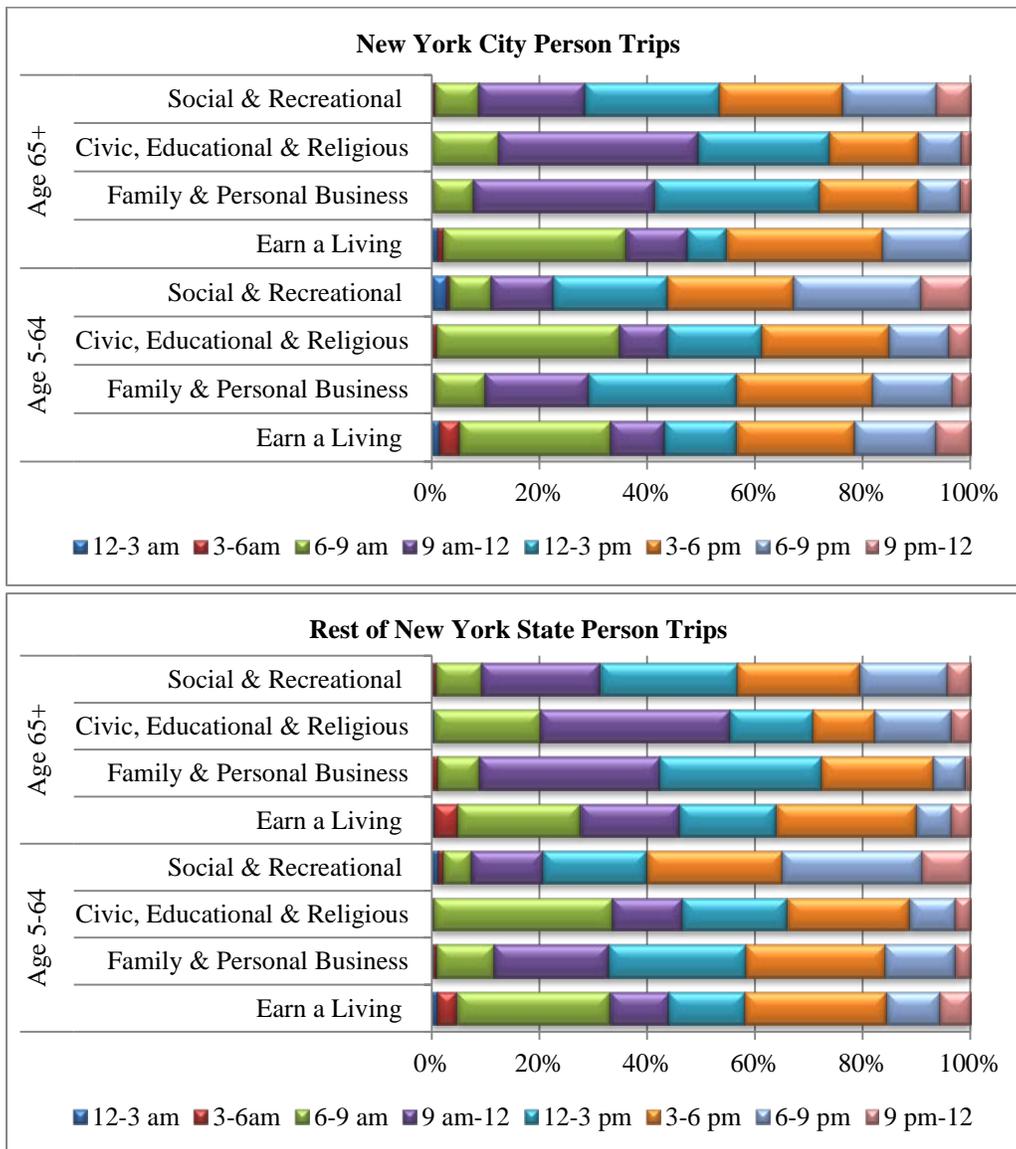


Figure 3-10. Temporal distribution of person-trips by trip purpose and traveler's age. (Source: 2009 NHTS)

Furthermore for both NYC and the rest of NYS regions (seen in Figure 3-10), elderly travelers tended to begin their trips during the 9 am to 3 pm period when conducting “family and personal business” trips. About 64% of these “family and personal business” trips were taken in this same time period by the elderly travelers, while only about 47% of the non-elderly trips were made for the same reason during this time period.

On the other hand, nearly 60% of “social and recreational” trips made by younger travelers that lived in the rest of NYS were conducted after 3 pm, while the same only accounted for about 43% of the trips taken by the elderly living in the same region. This pattern was relatively consistent with statistics from “social and recreational” trips taken by residents of NYC. Generally speaking, elderly took “social and recreational” related trips throughout the day, spreading over all hours from 9 am to 9 pm.

3.1.6 Average Length of Person-Trips

Results shown in Figure 3-11 revealed noticeable age and gender influences on average daily person-trip distance. On average, younger travelers in all regions made longer trips (in distance) than their elderly counterparts. Men also made longer trips on average than women within the same age group in most areas. In most cases, the difference in trip lengths between the two age groups was more visible in men than in women. Furthermore, average trip lengths were generally shorter for those that lived in NYC when compared with trips made by those that lived elsewhere. Based on NHTS data, NYC elderly females traveled on average only about half of the distance traveled by their younger counterparts in 1995 and 2001. This pattern was not present in the 2009 data, however. One note of caution is that due to survey limitations, sample variation in the statistics produced might be relatively large. Consequently, a seemingly large change seen in averages presented here might not necessarily warrant a statistically significant difference.

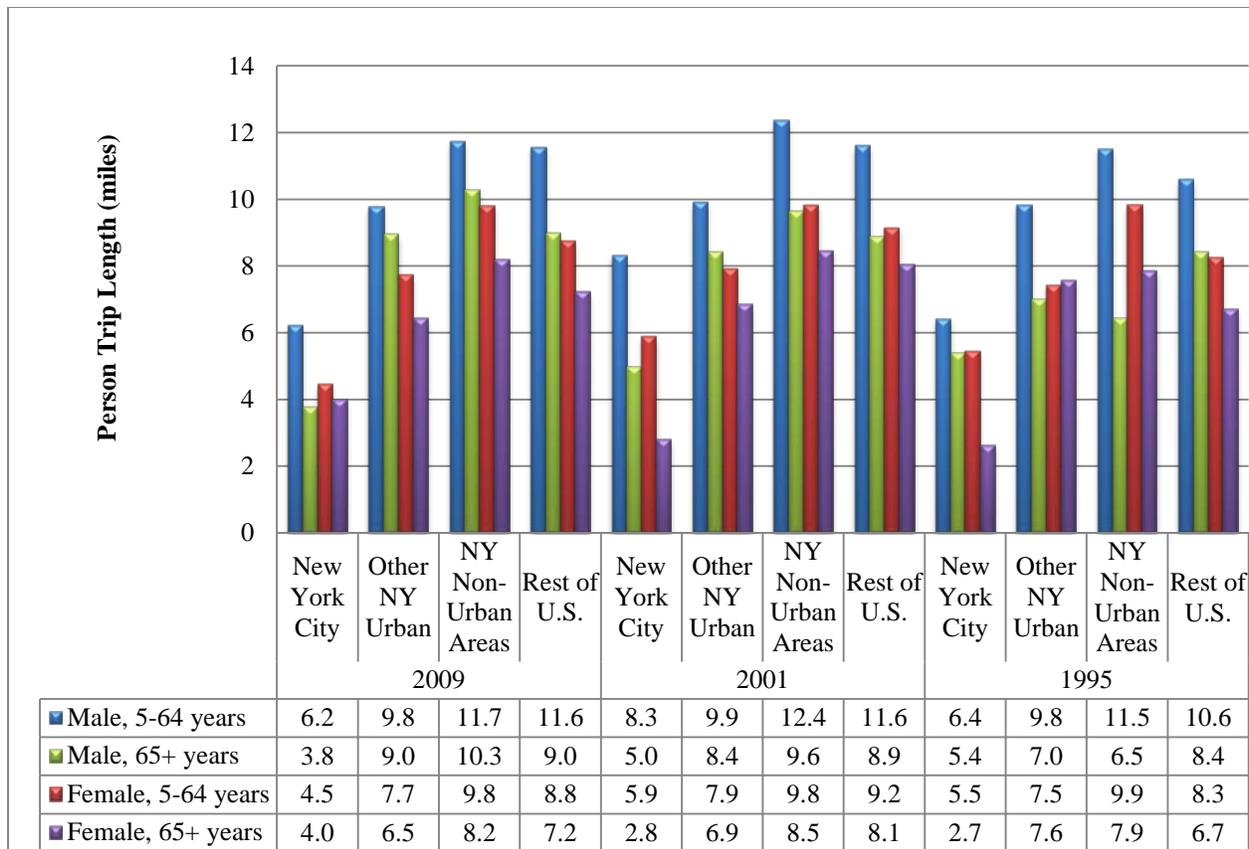


Figure 3-11. Average person-trip length by gender, age category, and region (1995, 2001, and 2009 NHTS).

3.1.7 Availability of Drivers

Considering availability of other drivers in the household, no significant influences could be identified among those that have and those without other drivers in their household, when measured by average daily person trips (Figure 3-12). The only exception was for the 65-69 year old females that lived in NYC where those with other drivers in the household made a statistically higher number of trips than those without (3.9 trips versus 2.4 trips, respectively).

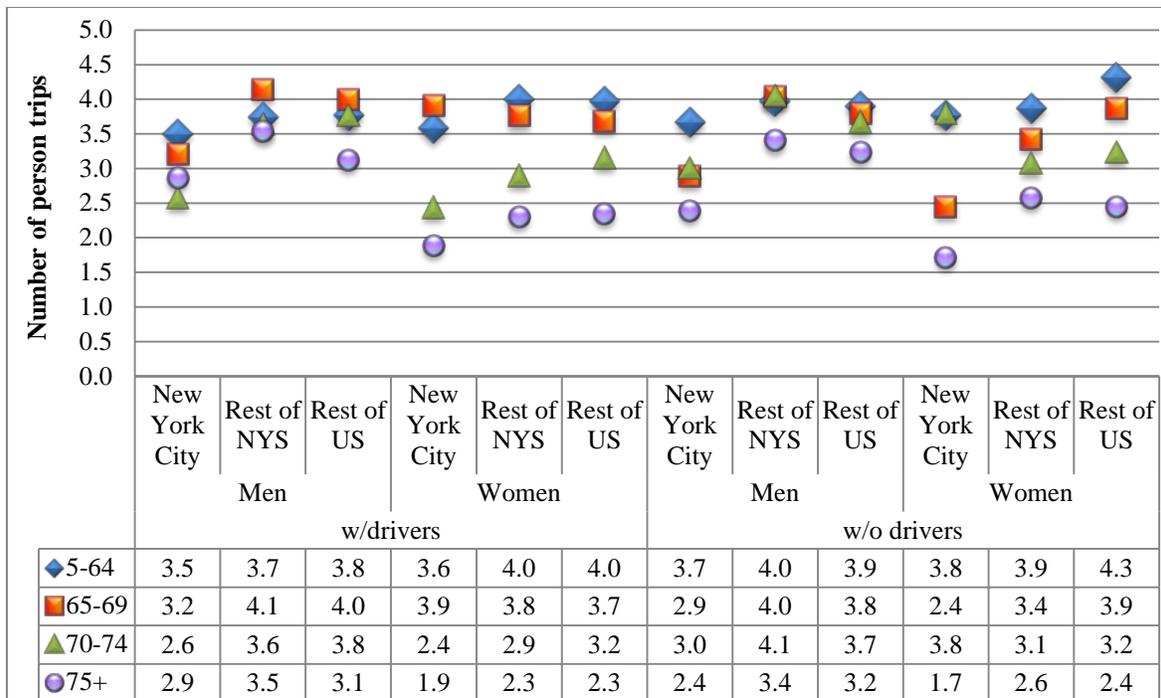


Figure 3-12. Average daily person trips per person by age, gender, and availability of other drivers in the household (2009 NHTS).

When measured by average vehicle trips per driver, as shown in Figure 3-13, those that lived in NYC clearly had a lower rate of vehicle travel than those that lived outside NYC, signifying a regional influence. Considering the sample variations (i.e., standard errors for the averages), influence from the availability of other drivers in the household was evident in the two oldest groups of elderly females (ages 70-74 years and 75+ years old) that lived in the rest of NYS; as well as in the groups of 65-69 years old and 75+ years old females that lived in the rest of the U.S. Younger males (ages 5-64 years) who lived in NYC also show an impact due to availability of other drivers in their households. Other than that, no significant effects from the availability of other drivers in the household were observed.

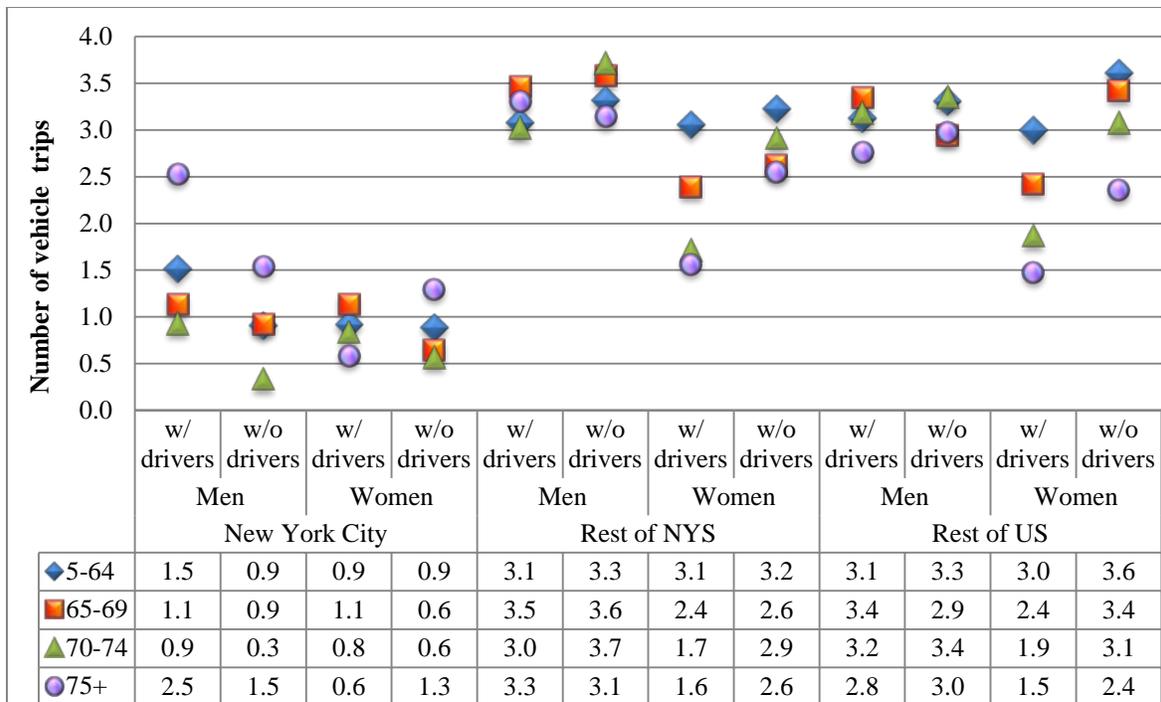


Figure 3-13. Average daily vehicle trips by age, gender, and availability of other drivers in the household (2009 NHTS).

3.1.8 Zero-Vehicle Household Effect on Travel

Generally speaking, elderly households with zero-vehicles were more likely to fall into the low income category. This is clearly demonstrated using reported 2009 NHTS data as shown in Figure 3-14. Roughly 80% or more zero-vehicle elderly households from regions outside NYC had an annual income of less than \$25,000. Although the shares of low-income and zero-vehicle elderly households that lived in NYC were still fairly large (about 56% to 71%), many of the NYC elderly households did not own vehicles regardless of their income levels. Based on 2009 NHTS data, nearly one in ten zero-vehicle elderly households in NYC were in the over \$75,000 income group, while the same income level only accounted for about 2% in 2001 and 1995.

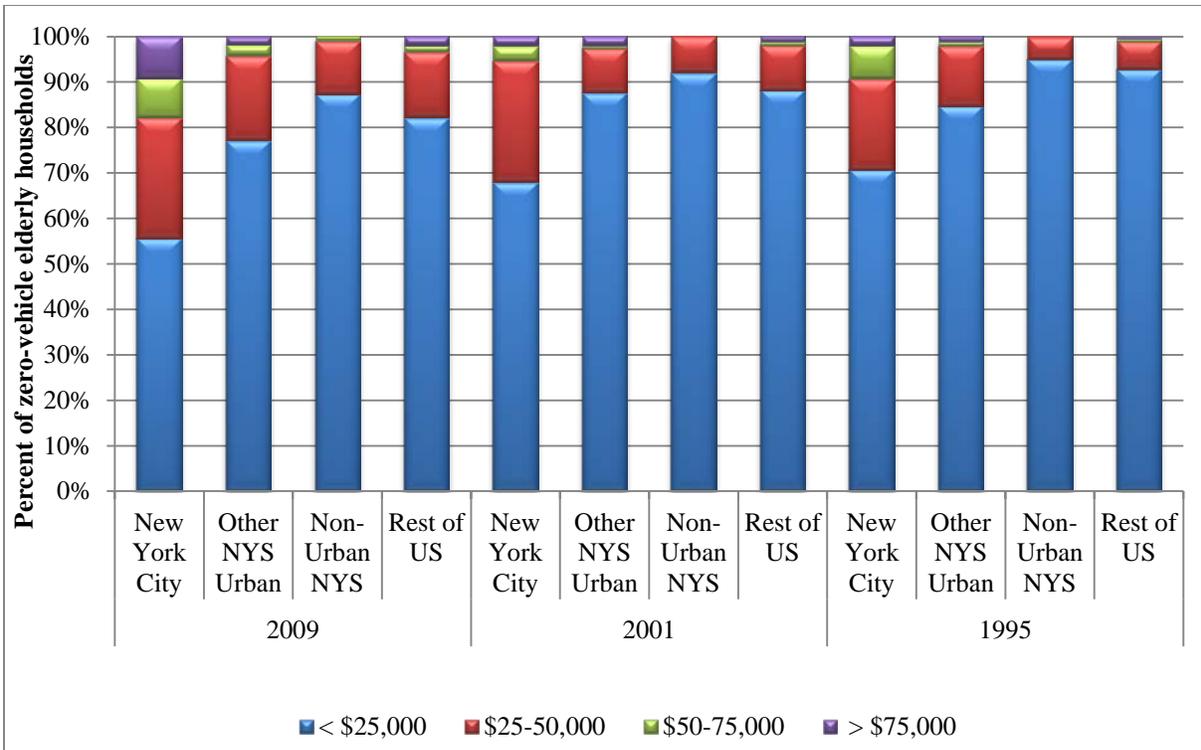


Figure 3-14. Distribution of zero-vehicle elderly households by income level and region (1995, 2001, & 2009 NHTS).

Figure 3-15 shows that when compared to non-elderly, zero-vehicle households, generally there would be a higher share of zero-vehicle elderly households in the lowest income group. This is more so for zero-vehicle households that reside in NYC. Regardless of region or age groups, shares of zero-vehicle households that were in the lowest income groups have seen a declining trend over the last three NHTS surveys. Moreover, there were smaller shares of zero-vehicle households in NYC than other regions that belonged to the lowest income group, a pattern similar to those observed previously. In the 2009 NHTS, for example, about 56% of NYC zero-vehicle elderly households that reported their household incomes were in the less than \$25,000 group, while only about 37% of their non-elderly counterparts were in the same category.

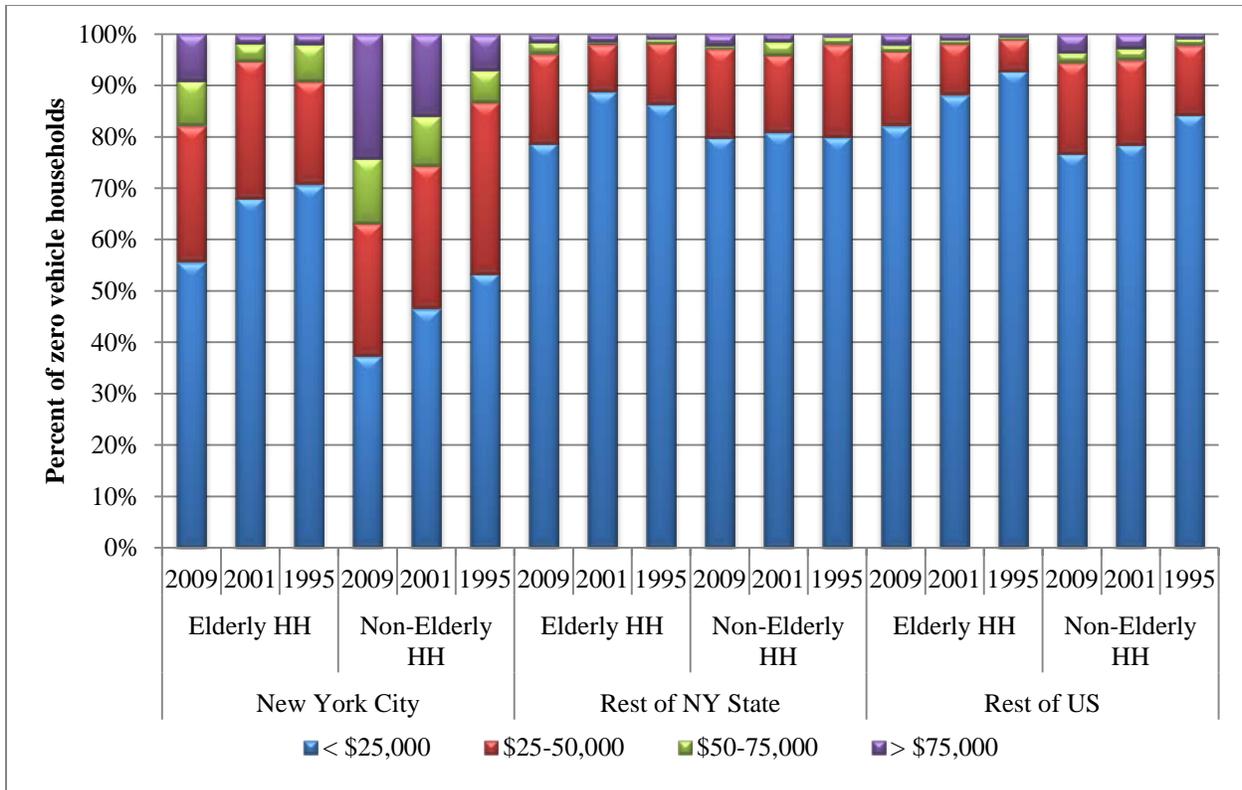


Figure 3-15. Distribution of household income for zero-vehicle households by age group and region.

Caution should be exercised due to the relatively high degree of missing data because of unreported responses to the household income survey questions. As summarized in Table 3-2, though still not as good as one would hope for, the data quality trend has been improving over the last three surveys. The statistics in Figure 3-15 were based on readjusted shares, assuming equally distributed unreported cases (i.e., respondents in all income levels have an equal chance of not reporting this data). However, this assumption might not necessarily be realistic. Users of this income data should bear this limitation in mind when interpreting associated statistics.

Table 3-2. Percent of unreported income for zero-vehicle households by region and year

Year	New York City	Other NYS Urban Areas	Non-Urban Areas of NYS	Rest of U.S.
2009	12.9%	13.1%	4.5%	16.7%
2001	22.8%	25.2%	12.3%	18.4%
1995	29.9%	23.9%	41.7%	28.1%

In terms of person-trip rates, zero-vehicle elderly households made fewer trips than those who owned a vehicle regardless of where they lived. The difference between owning a vehicle and not owning one for elderly households was less substantial among those who lived in NYC. As summarized in Figure 3-16, of those that owned a vehicle, elderly households in NYC made slightly fewer numbers of trips on average than those that lived in other regions. In 2009, for

instance, NYC elderly households that owned a vehicle took an average of 3.1 person-trips while those that lived in other regions made an average 3.5 person-trips in a day. On the contrary, zero-vehicle elderly households in NYC made more daily person-trips than those that lived outside the NYC—at an average of 2.1 person-trips per day for NYC in 2009 compared to about 1.4-1.7 trips per day for those that lived elsewhere during the same year.

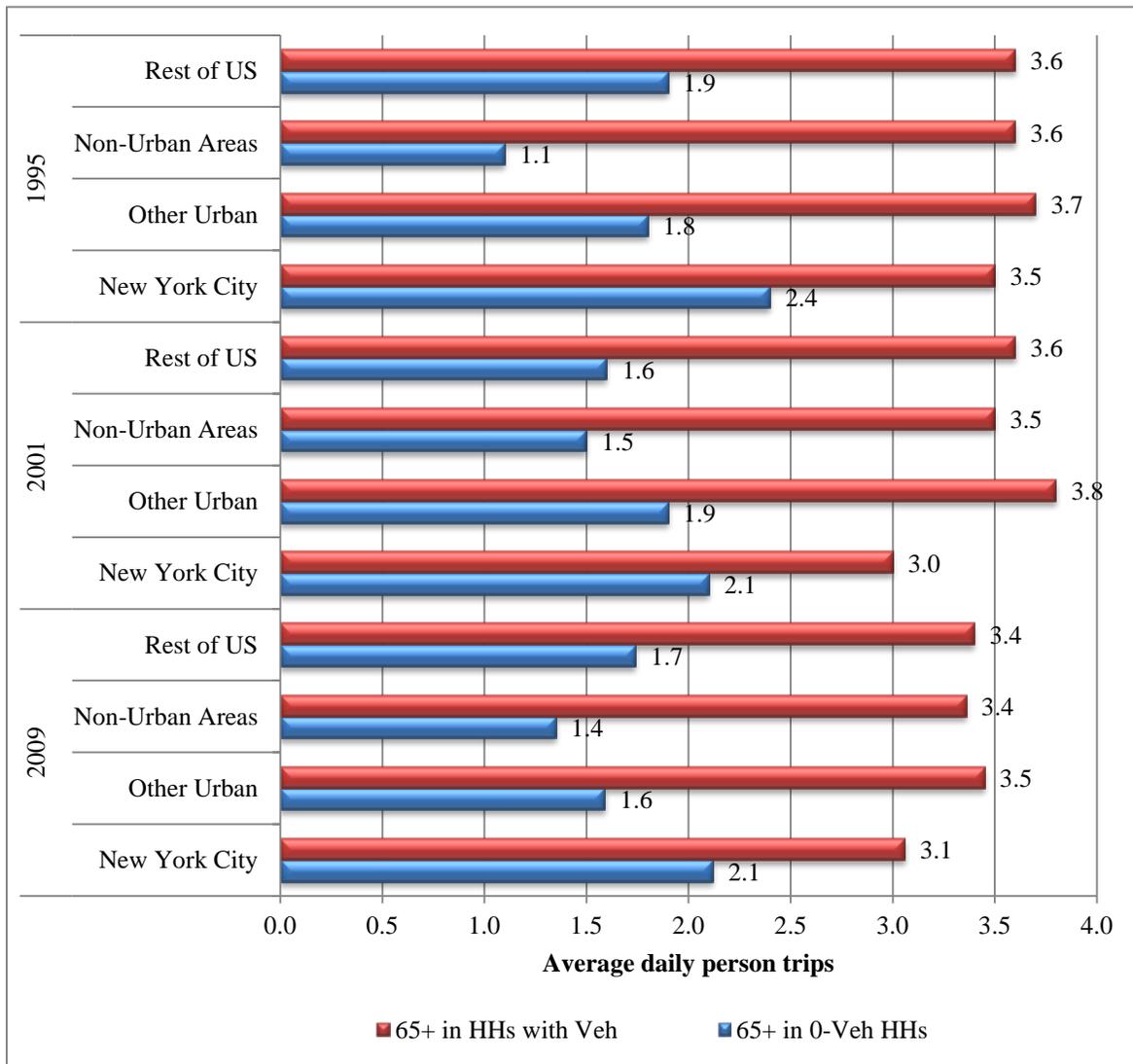


Figure 3-16. Impact of owning a vehicle on the average trip rates of elderly households, by region and over time (1995, 2001, and 2009 NHTS).

3.2 VEHICLE TRAVEL

3.2.1 Average Daily Vehicle-Trip Rate

When limited to vehicle travel only (i.e., trips made by POV), again, NYC residents made significantly fewer trips than those that lived elsewhere. Figure 3-17 shows that on average a

NYC elderly person made a little over one daily vehicle-trip in 2009, while elderly residents elsewhere made almost 3 vehicle-trips per day in the same year. In most cases, elderly persons made fewer vehicle trips than their younger counterparts living in the same region, particularly during 2009. The NYC elderly took a slightly higher number of vehicle trips per day than the 5-64 year old group from NYC did in earlier NHTS years, however. Regardless of the region or age group, a declining trend in the average number of daily vehicle-trips over the three NHTS years can also be observed in Figure 3-17.

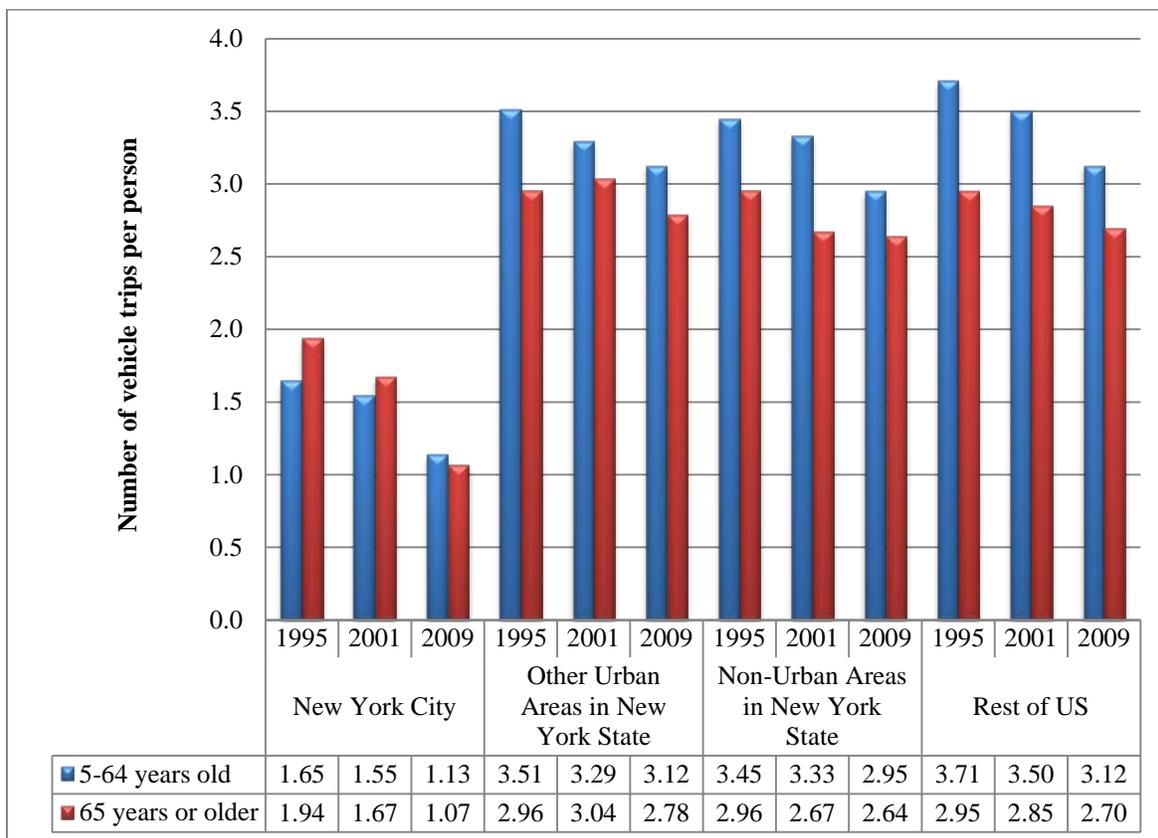


Figure 3-17. Average daily vehicle trips by age group and region (1995, 2001, 2009 NHTS data).

3.2.2 Average Vehicle-Trip Length

Similarly, when examining average daily travel distances for trips made in POV (in terms of vehicle trips), Figure 3-18 revealed that elderly in all regions typically made shorter vehicle trips than their younger counterparts. Average daily travel distances in a vehicle were longer for residents that lived in rural regions of NYS, particularly on trips taken by the younger population. Given a generally wider spread of activity centers (e.g., shopping locations, schools, or churches) for residents in non-urban areas (i.e., rural), driving farther distance to conduct their daily business was expected. The percent reduction in trip length due to age difference was also included in Figure 3-18. Elderly generally traveled shorter distances, by vehicles, than their younger neighbors which ranged from about 20% to 26% per vehicle trip in 2009.

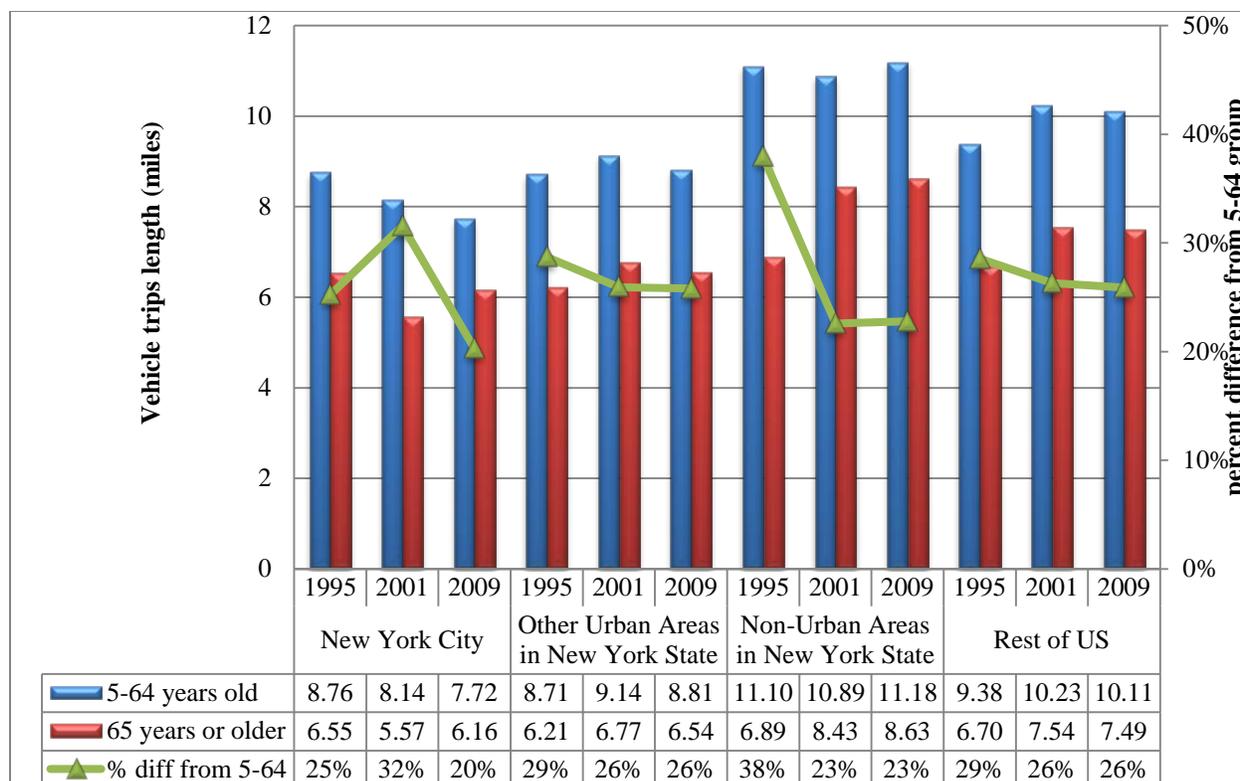


Figure 3-18. Average daily vehicle trip lengths by age and region (1995, 2001 and 2009 NHTS).

3.2.3 Vehicle-Trips by Time of Travel

As in the temporal analysis on patterns of person-trips discussed under section 3.1.5, distributions of vehicle trips by time of the day for elderly drivers in NYS was compared to those of their corresponding younger driver group. Figure 3-19 shows that, no matter where they lived, elderly drivers were more likely to make vehicle trips during the time period from 9 am to 6 pm. Vehicle travel by the younger drivers, on the other hand, is spread more evenly across the day from 6 am to 9 pm. In terms of regional difference, elderly NYC residents had a slightly higher percent of driving activities during the evening hours (6-9 pm) and were less likely to make vehicle trips in early morning than elderly who lived elsewhere. There was no noticeable difference in the temporal patterns presented in Figure 3-19 over the three NHTS years.

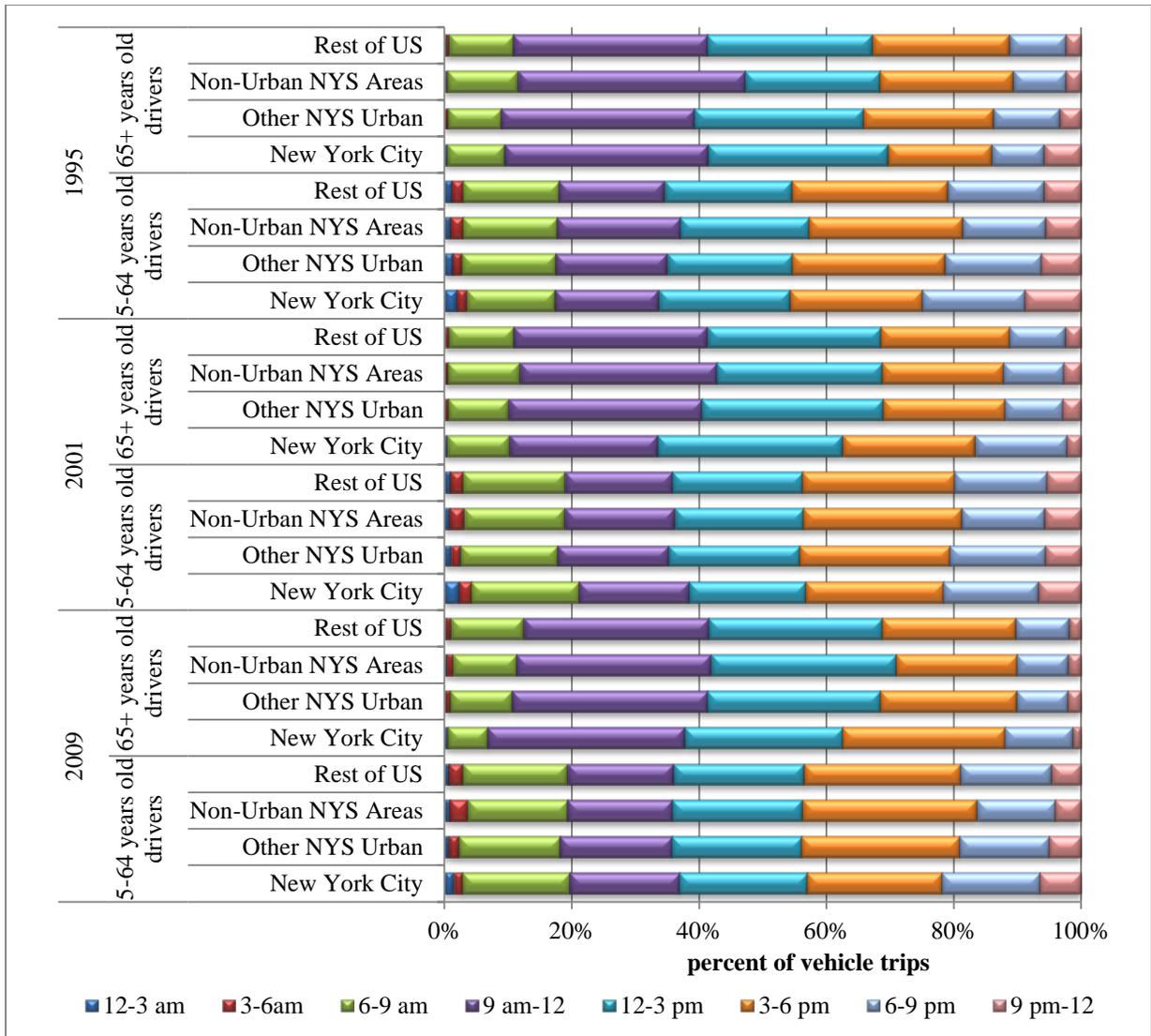


Figure 3-19. Temporal distribution of vehicle trips by driver age and region (1995, 2001, & 2009 NHTS).

3.2.4 Average Vehicle-Trips per Driver by Purpose

Table 3-3 shows the distributions of daily average vehicle-trips per driver by trip purpose and by age groups. Similar to the person trips (Table 3-1), the most commonly cited reason for drivers making a daily vehicle trip was for the purpose of conducting “family and personal business.” This is true regardless of the age group or where they lived. Expectedly, “earn a living” among younger drivers accounted for higher shares of vehicle-trips than those of the elderly drivers in the same regions. In fact, work related vehicle-trips accounted for about 30% of daily vehicle-trips made by drivers younger than 65 years old in nearly all regions. On the other hand, elderly drivers in most regions made around 25% of their daily vehicle-trips for “social and recreational” activities. Despite taking fewer vehicle trips than drivers in other regions as discussed (Figure 3-17), the trip purposes for NYC drivers were fairly similar to those who lived elsewhere.

Table 3-3. Distribution of daily average vehicle-trips by trip purpose and region (1995, 2001, and 2009 NHTS)

	New York City			Other Urban			Non-Urban Areas			Rest of U.S.		
	1995	2001	2009	1995	2001	2009	1995	2001	2009	1995	2001	2009
5-64 Year-olds												
Daily VT/Driver	1.65	1.55	1.13	3.51	3.29	3.12	3.45	3.33	2.95	3.71	3.50	3.12
Earn a Living	26.8%	27.6%	19.6%	29.5%	28.7%	28.7%	31.4%	29.5%	31.0%	29.7%	28.8%	28.3%
Family & Personal Business	51.9%	48.9%	55.0%	49.2%	46.5%	45.7%	47.3%	47.3%	44.9%	48.2%	46.4%	45.1%
Civic, Educational & Religious	4.0%	3.8%	3.3%	3.5%	4.1%	4.9%	3.4%	3.2%	3.8%	4.2%	4.8%	4.9%
Social & Recreational	17.3%	18.4%	20.3%	17.7%	20.1%	19.6%	17.8%	19.4%	19.3%	17.8%	19.5%	20.5%
Other/ unreported	0.0%	1.3%	1.8%	0.1%	0.7%	1.1%	0.1%	0.6%	1.1%	0.1%	0.6%	1.2%
65+ Year-olds												
Daily VT/Driver	1.94	1.67	1.07	2.96	3.04	2.78	2.96	2.67	2.64	2.95	2.85	2.70
Earn a Living	14.8%	5.4%	6.2%	6.9%	5.5%	7.8%	7.5%	9.0%	10.0%	8.4%	6.2%	10.7%
Family & Personal Business	58.6%	66.6%	59.0%	63.3%	61.4%	59.8%	67.6%	58.6%	56.3%	63.6%	60.5%	57.8%
Civic, Educational & Religious	8.2%	4.2%	4.5%	4.5%	5.6%	4.4%	2.4%	6.1%	5.8%	5.0%	6.1%	5.1%
Social & Recreational	18.5%	23.8%	29.1%	25.2%	26.7%	27.2%	22.6%	25.9%	27.6%	22.9%	26.6%	25.6%
Other/ unreported			1.2%	0.0%	0.8%	0.8%		0.5%	0.2%	0.1%	0.6%	0.8%

3.2.5 Effects on Average Vehicle-Trip Length

Similar to average person-trip length, NYC residents on average traveled fewer miles by vehicle than those from other regions. Not surprisingly, those who lived in more rural areas typically drove a little farther than others. As shown in Figure 3-20, there were also gender and age influences on the average vehicle-trip length. Males age 65 years and older drove slightly shorter distance than their counterpart younger male drivers—typically about 2 to 3 less miles per trip on average. By comparison, with the exception of NYC elderly females for the 2009 NHTS, elderly women drove the least miles on average in all regions over the 14-year period.

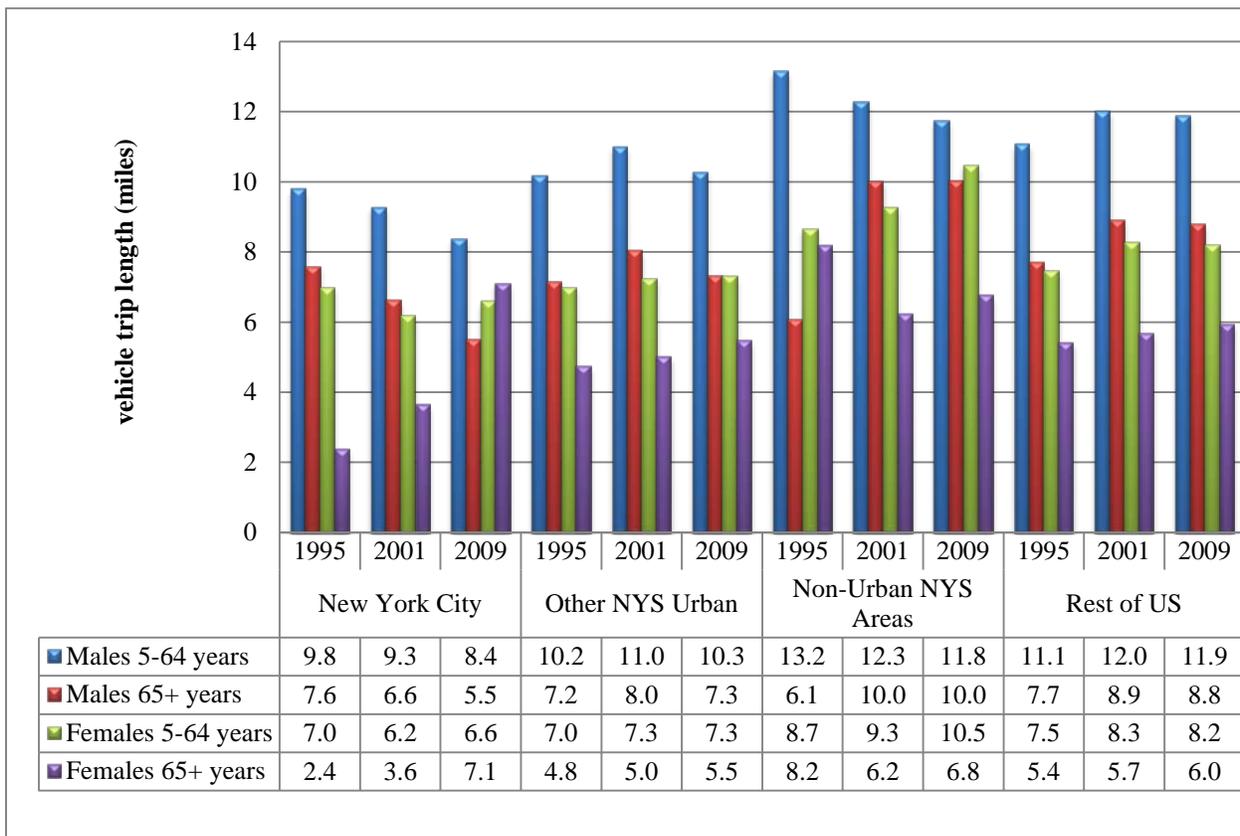


Figure 3-20. Average length of vehicle trips by age, gender, and region (1995, 2001 & 2009 NHTS).

3.3 SIZE OF TRAVEL PARTY ON TRIPS INVOLVING ELDERLY

To address the question of whether elderly traveled alone, in pairs, or in larger groups when they made trips in 2009, information associated with travel party size (i.e., the number of people traveling on the same trip) collected in the NHTS was analyzed. No significant gender differences on percent of person-trips made by elderly were observed in Figure 3-21, regardless of where they resided. Furthermore, elderly single-travelers accounted for the majority of person-trips in all regions during 2009. About three in four person-trips made by elderly from

NYC were made while traveling alone, and roughly one in five were made when traveling with another partner.

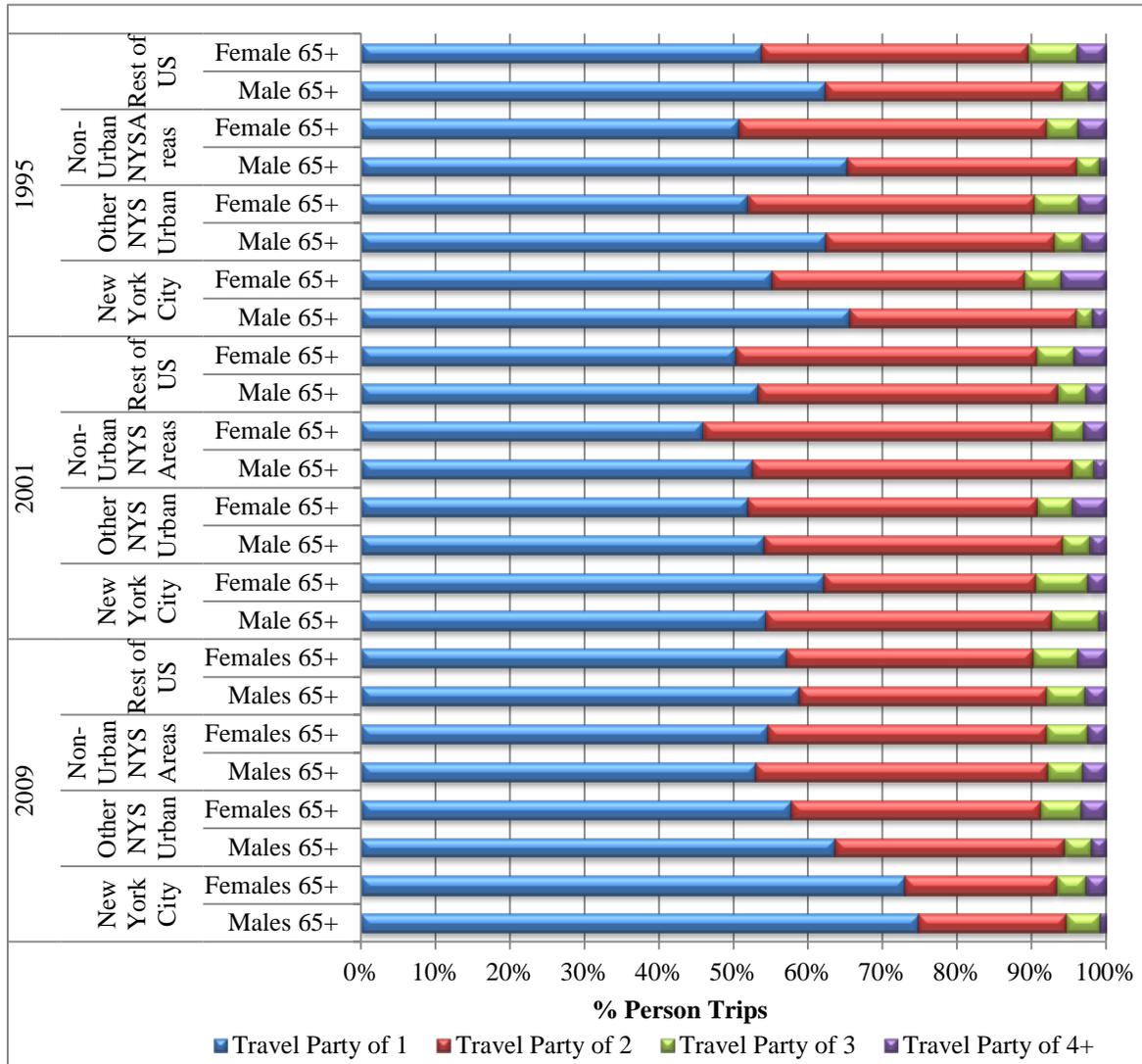


Figure 3-21. Percent of elderly person trips by gender and travel party size (1995, 2001, 2009 NHTS).

Outside NYC, the shares of person-trips by travel party size in the 2009 NHTS were relatively similar among all regions, with about 55%-65% of person-trips made by elderly traveling alone and roughly 35% were accompanied by another person. The statistics based on 2001 NHTS showed slightly higher shares of person-trips in the “travel party of 2” category than their 2009 level within each corresponding region. A gender difference was present in the 1995 data, showing elderly males were about 10% more likely to travel alone than elderly females in all regions. This pattern did not continue in the 2001 and 2009 NHTS, however.

In terms of PMT shown in Figure 3-22, elderly women had a smaller share for travel party of one than their elderly male counterparts in 2009. Combining with person-trip statistics, this reflected

that elderly females have taken shorter trips when they traveled alone. The rather large difference by gender in shares of PMT by travel party of one for residents from non-urban area of NYS in 2001 (46% for elderly male vs. 20% in female) was not repeated in the more recent NHTS where the shares were 38% for males who traveled alone and 29% for females who traveled alone during 2009. Again, as seen in Figure 3-22 gender differences in shares of PMT for elderly traveling alone were more apparent for urban areas of NYS (including NYC) during 1995.

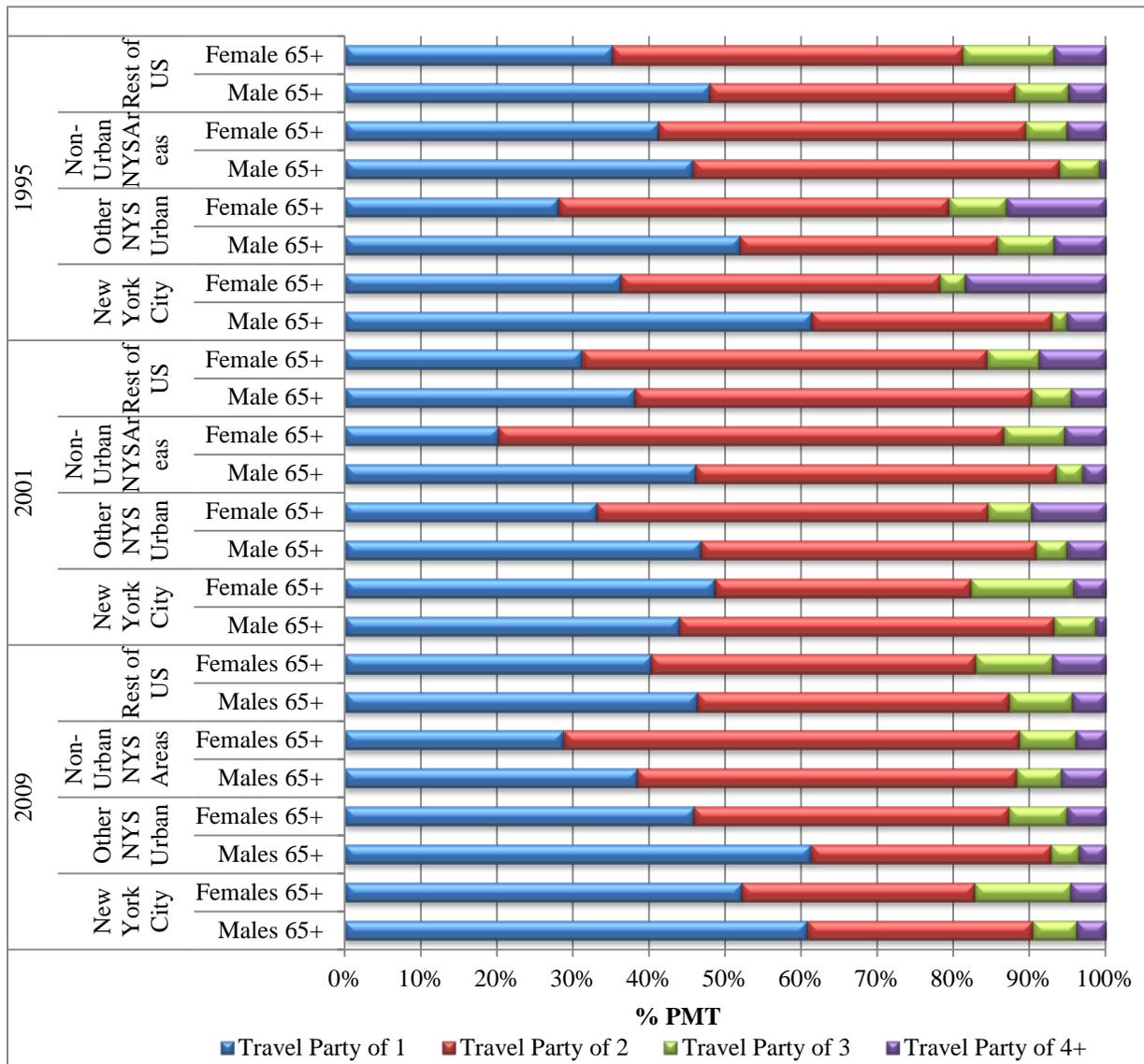


Figure 3-22. Percent of elderly person-mile traveled by gender and travel party size (1995, 2001, 2009 NHTS).

Interestingly, when looking at shares of vehicle trips, elderly females were more likely to travel alone than elderly males (Figure 3-23), regardless of region, over the three NHTS years. Accordingly, elderly males were more likely to travel in parties of two, as measured by vehicle

trips, than elderly females. The NYC elderly males, specifically, were noticeably less likely to make vehicle trips on their own than those that lived elsewhere.

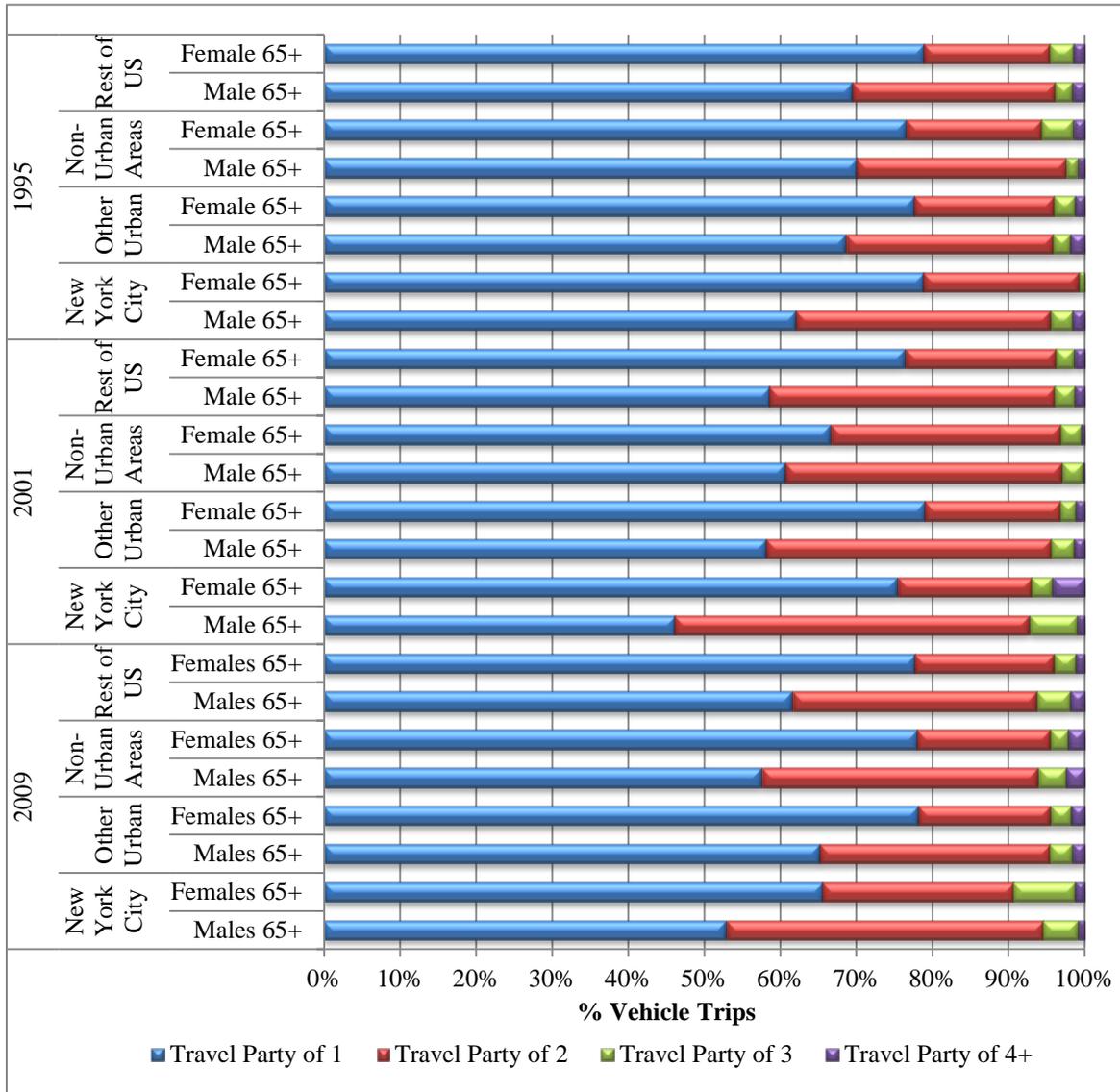


Figure 3-23. Percent of elderly vehicle trips by gender and travel party size (1995, 2001, & 2009 NHTS).

In most cases, the VMT share pattern was more similar to the vehicle trips than those observed between the PMT and person trips discussed above. Figure 3-24 shows that, except for those that lived in NYC during 2009, elderly females were more likely to have higher VMT shares of traveling alone than their counterpart males did in all other regions over time. Results displayed in Figure 3-24 indicate that traveling alone or with another person among elderly populations accounted for 90% or more of their respective total VMT in nearly all regions.

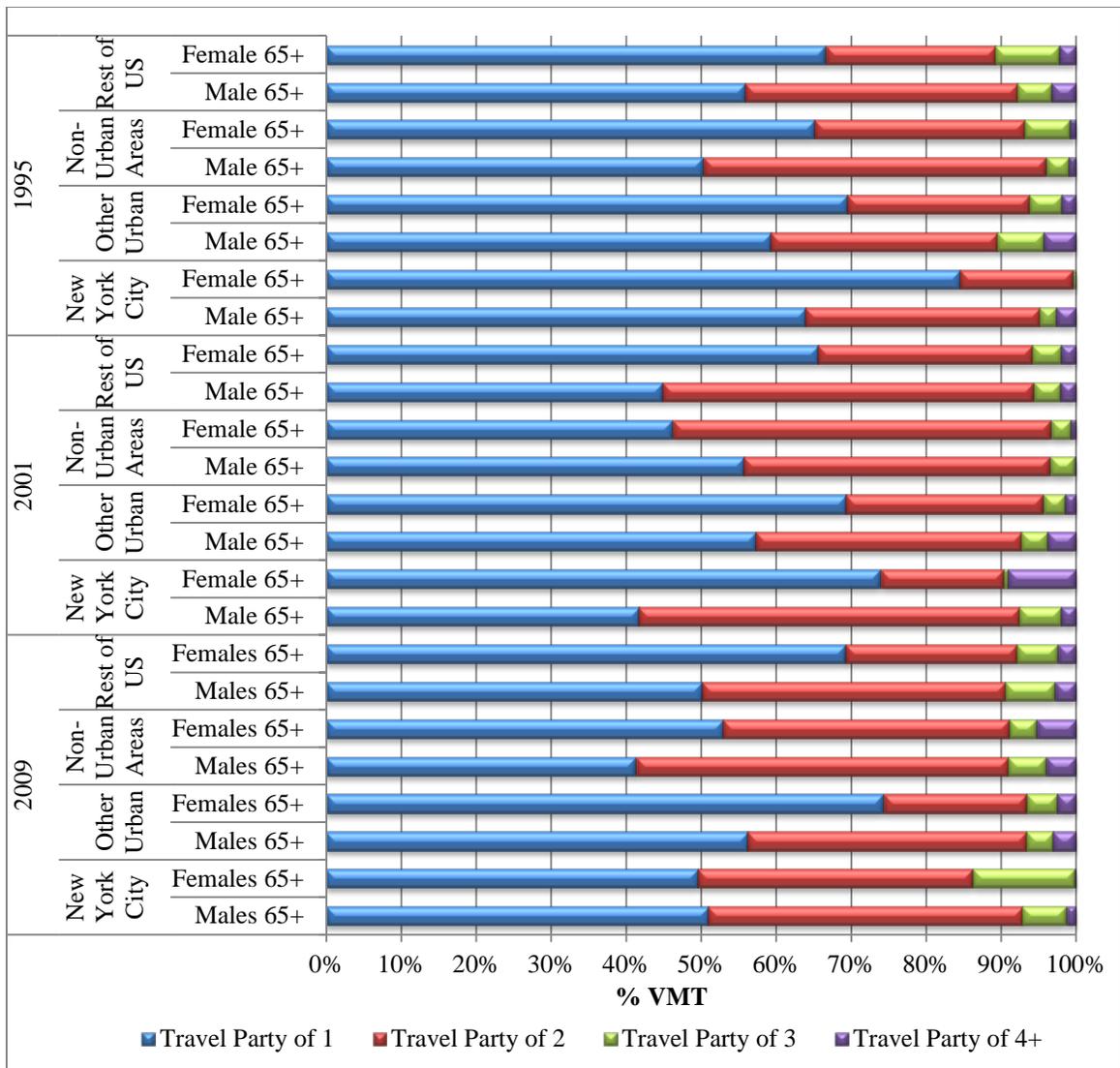


Figure 3-24. Percent of elderly VMT by gender and travel party size (1995, 2001, & 2009 NHTS).

3.4 VIEWS OF TRANSPORTATION SERVICES BY ELDERLY

During the 2009 NHTS, survey participants were asked to select the most important (one item) travel-related issue: highway congestion, access to or availability of public transit, lack of walkways or sidewalks, price of travel (including transit fee, tools, and cost of gasoline), aggressive or distracted drivers, or safety concerns (including traffic accidents). For the reported issue, the respondent was asked to rate it as a little issue, a moderate issue, or a big issue. Similar questions were asked in the 1995 and 2001 surveys, however, their choices and rating scales were somewhat varied. To avoid potential complications in comparing slightly varied questions from different years, only 2009 NHTS data were summarized and reported here. Readers interested in previous results are directed to the 2001 subpopulation report (Hu and Reuscher, 2010) for more information.

As summarized in Figure 3-25, over 62% of elderly in NYC considered “access/availability to public transit” being their most important issue, followed by 53% of respondents for safety issues (worrying about accidents, aggressive/distracted drivers) and the lack of walkways or sidewalks. The least concerned issue for elderly NYC residents was highway congestion; only 38% of elderly NYC respondents reported that congestion was their most important issue. Interestingly, nearly equal shares of non-elderly NYC residents rated issues on bad drivers, congestion, cost of travel, and transit access/availability as important (over 62% on each). Even though the issue of “lack of walkways/sidewalks” was the least concerned issue among this younger NYC population, it still was viewed by over 42% of this group as their most important transportation issue.

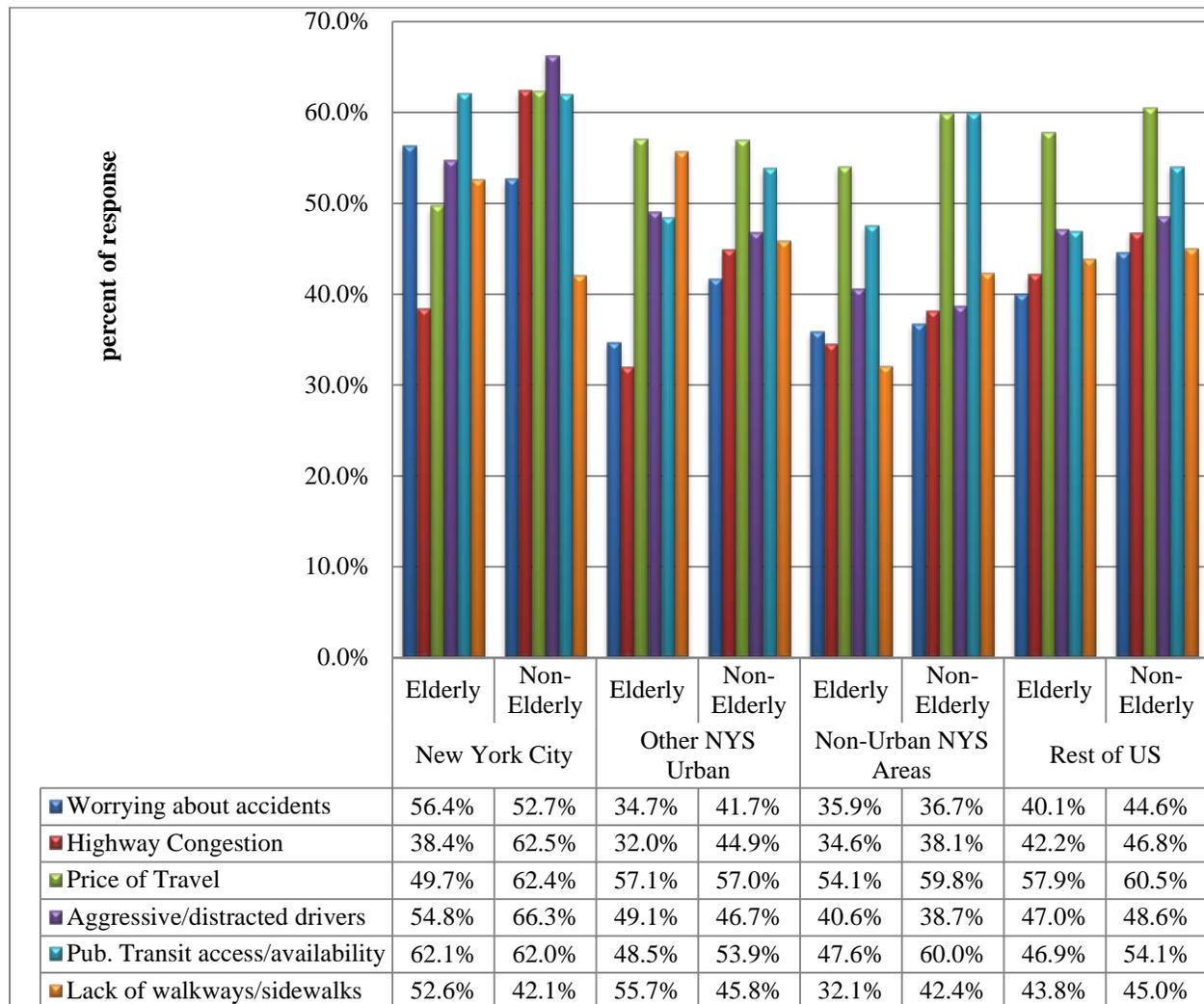


Figure 3-25. Views of the most important transportation issues as reported by respondent age category and region, 2009 NHTS.

The concern for travel costs (price of travel) was cited as the most important issue by the majority of those who lived outside NYC, ranging from around 55% to over 60% by region, with

a slightly lower percent among elderly that lived in rural areas of NYS or outside NYS (i.e., rest of U.S.). Lack of walkways or sidewalks was viewed as the most important issue by 56% of elderly that lived in other urban areas of NYS while only 46% of their younger counterpart felt the same. The lack of walkway or sidewalks was a lesser concern in rural regions, especially among the elderly. With the exception of the non-elderly population that lived in NYC, highway congestion was one of the lowest ranking issues among the six suggestions considered by respondents that lived outside NYC. Nonetheless, congestion was considered as the most important issue by about 32- 47% of those that lived outside NYC, regardless of age.

4. TRAVEL SAFETY OF ELDERLY IN NYS

4.1 FARS OVERVIEWS

Data elements contained in FARS databases are organized and provided in four data file levels, including *Crash*, *Vehicle*, *Person*, and *Event*; except for the Crash-level which contains only the *Accident* file, and other data levels contain multiple files (see Figure 4-1). This research project utilized information (data elements) obtained specifically from the *Accident* and *Person* files. The *Accident* file contains data elements associated with crash characteristics and environmental conditions at the time of the crash, which has one record per fatal crash. Crash locations contained in the *Accident* file were used to identify cases that occurred within NYC and elsewhere in NYS. The *Person* file contains information on all persons involved in the FARS-qualifying crash, which includes motorist (drivers and passengers of the involved vehicles) as well as non-motorist (pedestrians and pedal-cyclists). Specifically, information on age, gender, person type (e.g., driver, pedestrian etc.) was used for analyses reported in this report.

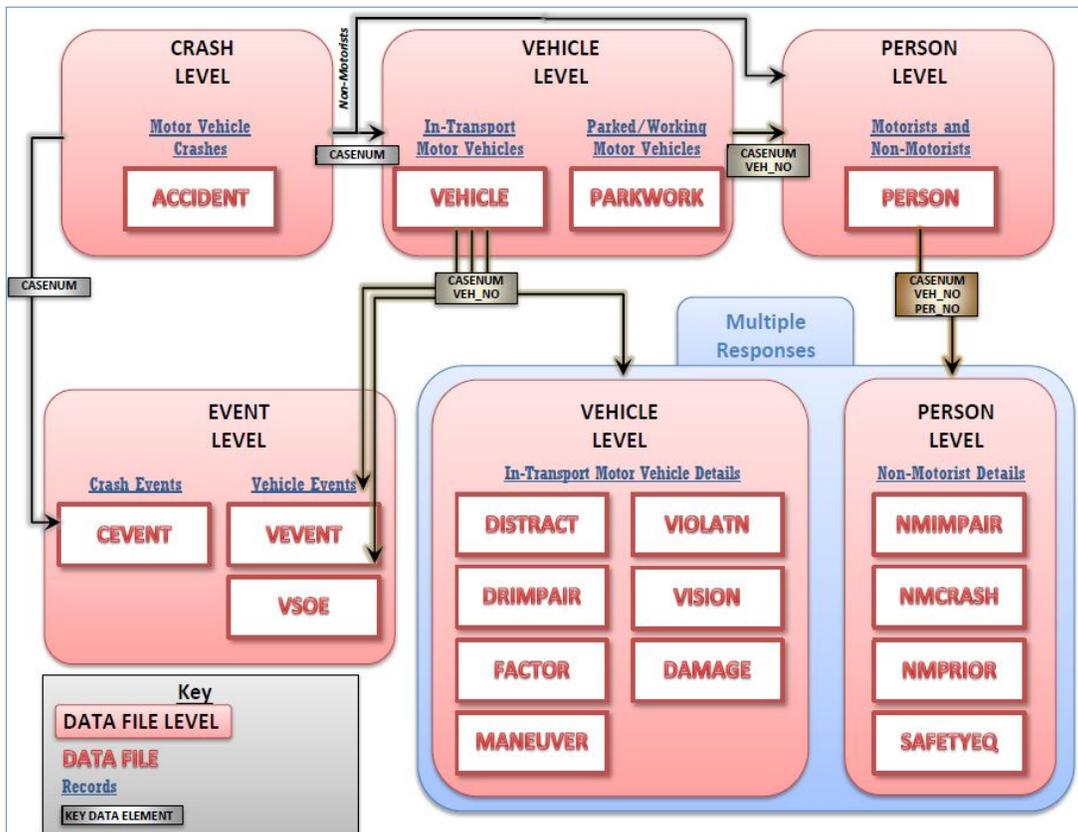


Figure 4-1. FARS data levels and files (Source: FARS Analytical User's Manual).

Generally speaking, the number of fatal accidents in NYS had an overall declining trend during the period from 2001 to 2012 (see Figure 4-2). Clearly, the majority of NYS fatal accidents that

involved a single-fatality accounted for nearly 94% of all accidents that involved any fatalities in NYS during this twelve-year period, while only less than 1% of fatal accidents in NYS had 3 or more fatalities.

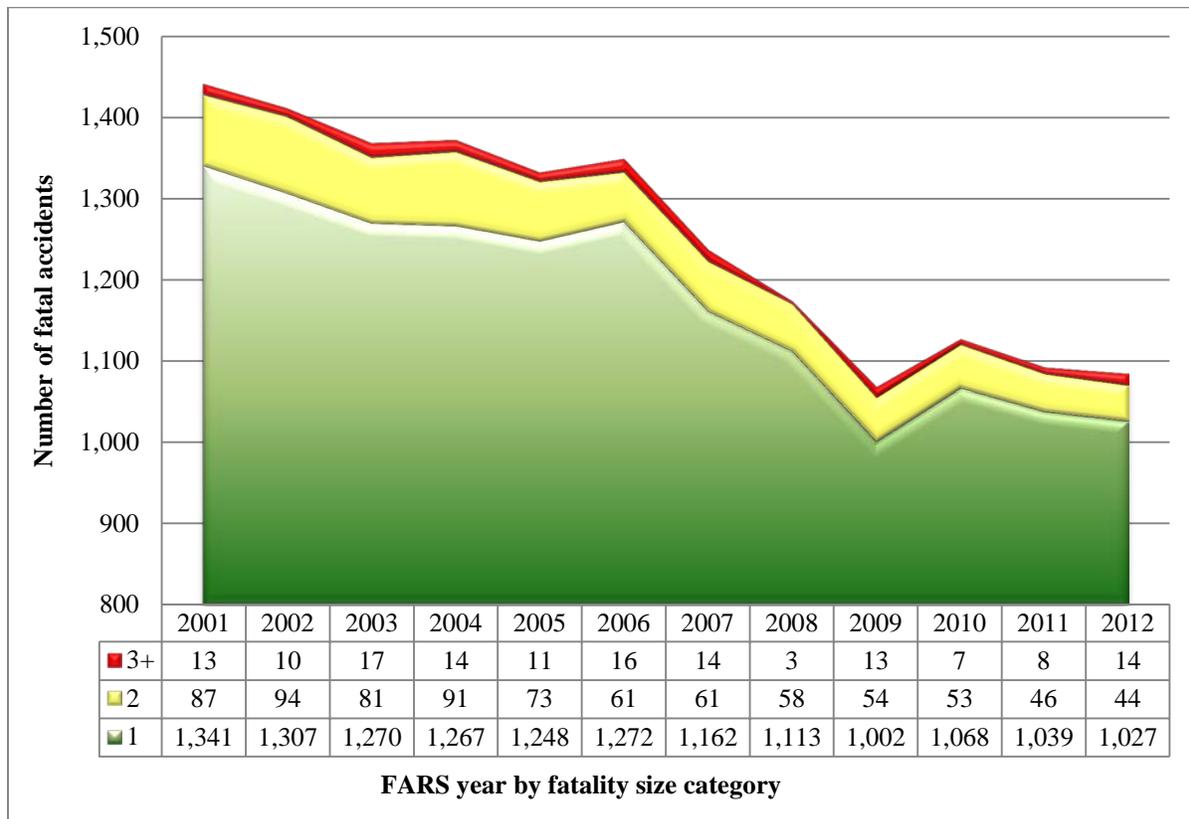


Figure 4-2. Total number of fatal accidents by number of fatalities (per accident), 2001-2012 in NYS.

About 31% of all fatal accidents (a total of 15,059 accidents) that occurred in NYS during the period of 2001-2012 involved at least one elderly person (age 65 years or older), and accounted for a total of 4,668 fatal accidents during the twelve-year period in NYS. Note that the elderly fatality could be an occupant of the vehicle (driver or passenger), pedestrian, or other. Slightly over 94% of these elderly-involved fatal accidents were single-fatality accidents. No significant differences in the fatal accident count patterns could be seen between fatal accidents of the general population and those involving elderly persons.

A total of 16,238 fatalities were a result of roughly 15,000 fatal accidents that occurred on NYS roadways during 2001-2012. Figure 4-3 shows a summary of fatalities, taking in to account the age and gender of those killed in accidents over this 12-year time period. Consistently over time, the number of male fatalities was more than twice as many as female fatalities. In other words, males have a significantly higher risk, than their counterpart, of being killed in fatal accidents in NYS. This is true for all age groups, except the oldest age group of 65 years or older.

Considering the annual distribution of fatalities by age and gender, close to a third of females

who were killed in NYS accidents were from the oldest age group (65+ years), while less than 20% of their male counterparts were from that same age group. Nevertheless, there is a general reduction in the number of fatalities over time in both male and female groups. As a reminder, FARS data presented here captured all people involved in accidents on NYS roadways, but may not necessarily be residents of NYS.

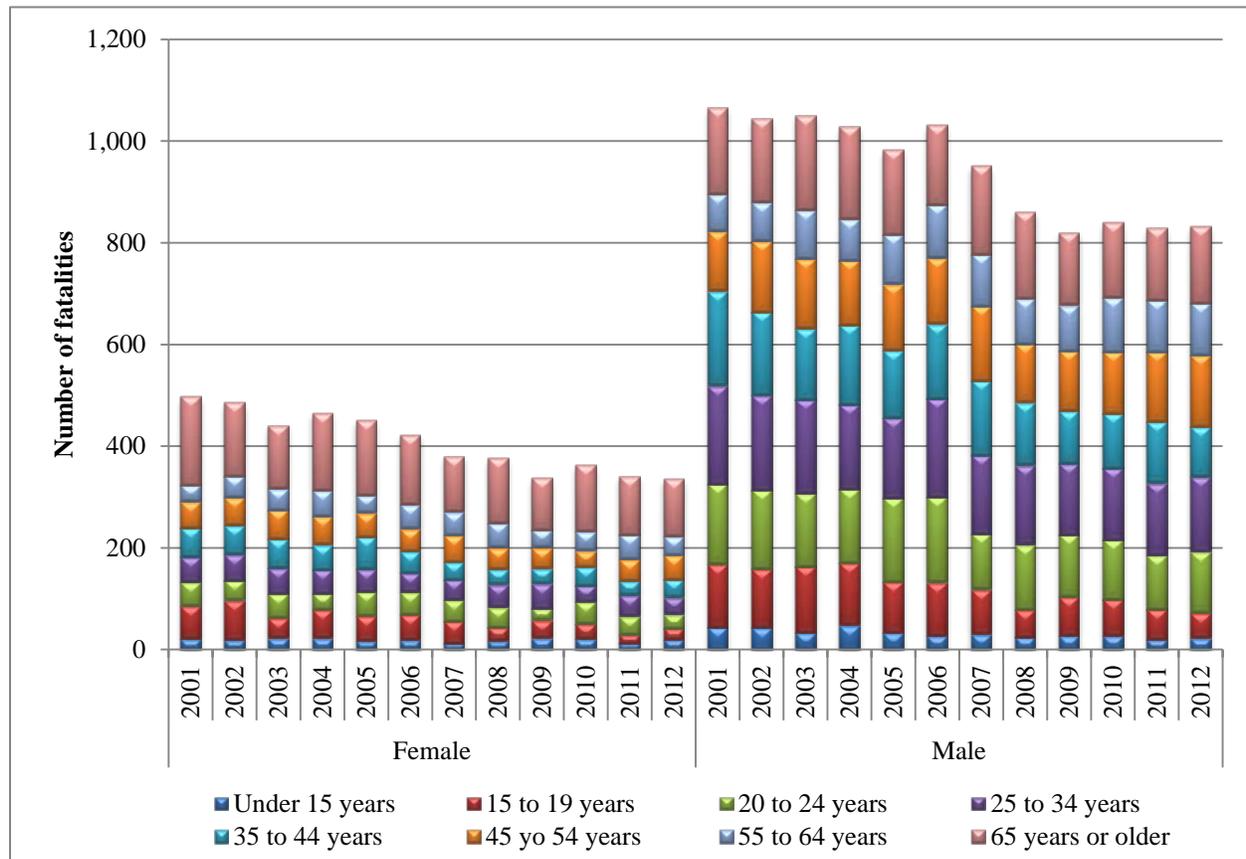


Figure 4-3. Number of NYS fatalities by gender and age of person involved, FARS data 2001-2012.

The approximate 15,000 fatal accidents that occurred on NYS roadways involved over 38,000 people who experienced varying degrees of injury severity. On average, over 24% of the involved persons did not suffer any injuries in these accidents. As shown in Figure 4-4, the share of “No Injury” persons (colored in orange) increased over time from about 22% in 2001 to over 27% in 2012, while the percent of persons killed (colored in cyan) stayed around the same level (at about 40%) for the same period of time.

With the geocoded accident location information provided in the FARS database, a heat map of all fatal accidents from 2001 to 2012 (combined) is displayed in Figure 4-5. This heat map follows a “stop light” theme where locations with the most accidents were shown in red and the least are in green. Not surprisingly, highly populated urban areas with more people and more traffic are more likely to have accidents to occur in those regions.

Utilizing FARS geocoded accident locations and age information of persons involved in these accidents, a summary of fatalities by region and age groups (elderly versus non-elderly) can be obtained. Table 4-1 presents these results for the NHTS years 2001 and 2009. All groups displayed a decrease in fatalities from 2001 to 2009.

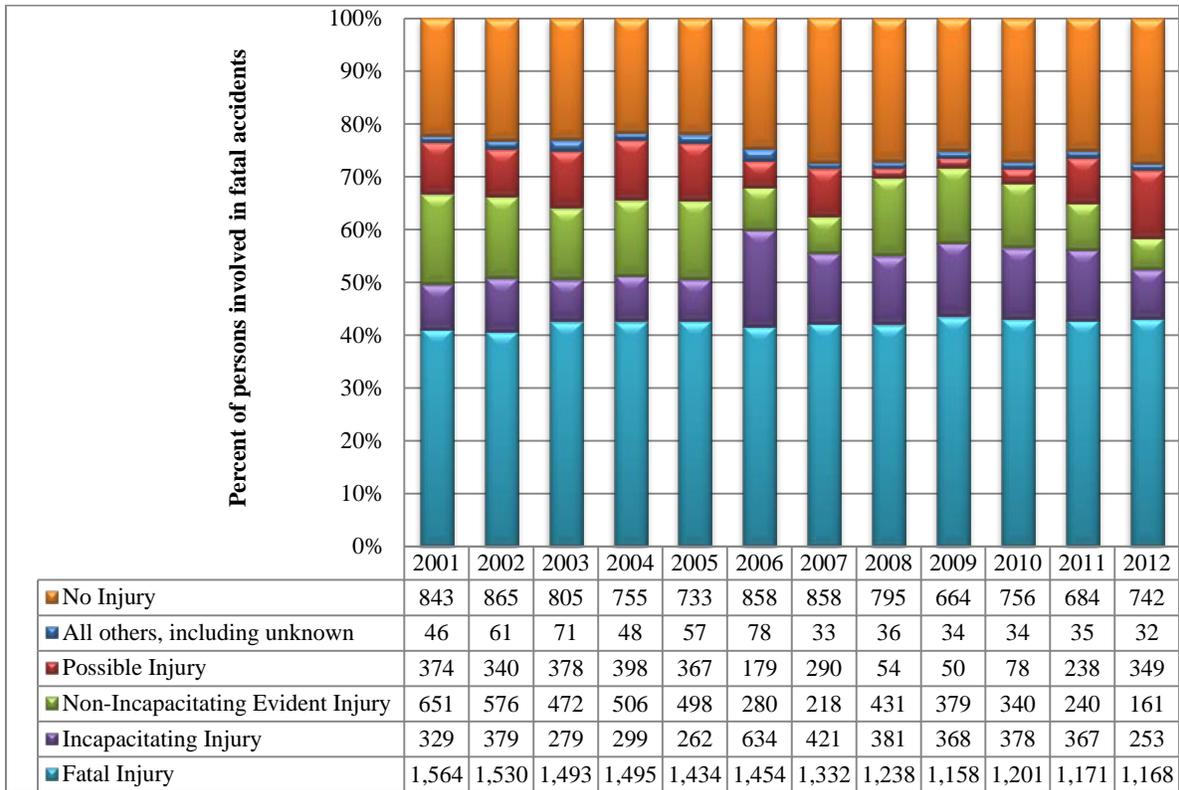


Figure 4-4. Distribution of injury severity on persons involved in FARS crashes in NYS 2001-2012.

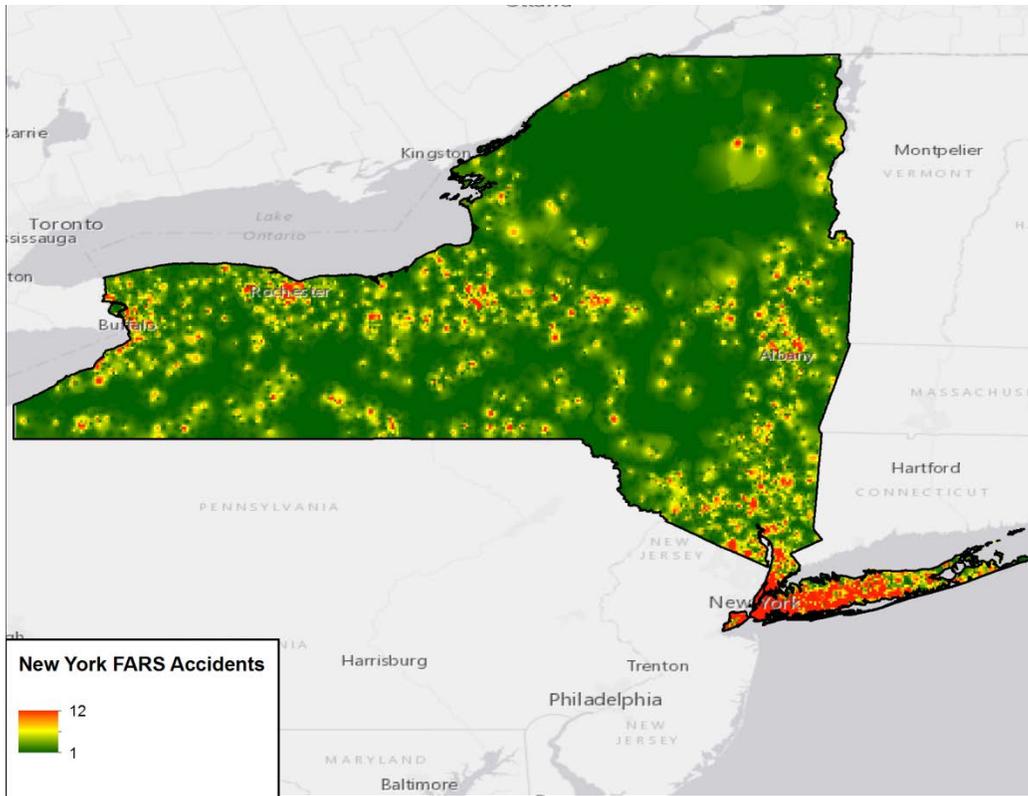


Figure 4-5. Heat map of all FARS accidents in 2001-2012.

Table 4-1. Fatalities by NYS region by elderly status of impacted person, 2001 versus 2009

Region	Age Group	2001	2009
NYC	Non-elderly	274	207
	Elderly	102	64
Other NYS	Non-elderly	945	706
	Elderly	243	181
NYS	All	1,564	1,158

4.2 MEASURE OF EXPOSURES

The number of traffic fatalities would likely be influenced by many factors, including the size of the population, the amount of travel that occurred, and the volume of vehicles using the roadways in any given time (month, year, etc.). Because of this, assessments based on the sheer numbers of fatal crash counts, across regions or over time, might not necessarily provide an accurate measure of travel safety on the roadways when comparing between different time periods or among various geographic regions. Commonly used measures of exposure applied in this study that provide normalized accident/crash numbers for comparison purposes include (1) population-based measures, such as rate per person (over all impacted population) or rate per driver (targeted population), and (2) vehicle-based measures such as rate per vehicle or rate per VMT.

As shown in Table 4-2, based on Census ACS data, overall the NYS population has seen a generally increasing trend over the twelve years from 2001 to 2012. Those ages 55 years and older clearly showed the highest increase among all NYS residents. Age 65+ years old populations were also on a steady rise over this time period in NYS. On the other hand, population sizes for those ages 35 to 44 years and the youngest group of under 15-year olds clearly showed a declining trend over the same 12-year period. These trends (e.g., the growing shares of 55+ year olds and falling share for the 35-44 year old groups) are clearly visible from Figure 4-6; which displays changes in NYS population distributions by age during the time period from 2001 to 2012.

Table 4-2. .NYS 2001-2012 populations by age group (thousands)

Age group	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
<15	3,897	3,867	3,825	3,769	3,688	3,623	3,578	3,555	3,541	3,526	3,522	3,509
15-19	1,297	1,311	1,324	1,342	1,365	1,379	1,388	1,391	1,381	1,361	1,330	1,308
20-24	1,281	1,292	1,307	1,311	1,317	1,325	1,344	1,363	1,389	1,418	1,439	1,444
25-34	2,706	2,679	2,657	2,625	2,584	2,561	2,565	2,598	2,636	2,667	2,717	2,757
35-44	3,070	3,040	3,003	2,959	2,909	2,857	2,792	2,726	2,654	2,604	2,564	2,540
45-54	2,638	2,655	2,690	2,724	2,758	2,788	2,814	2,841	2,870	2,876	2,868	2,840
55-64	1,732	1,821	1,889	1,954	2,017	2,080	2,134	2,178	2,244	2,321	2,391	2,415
65 or older	2,463	2,472	2,481	2,488	2,494	2,492	2,518	2,559	2,592	2,626	2,671	2,758
Total	19,083	19,138	19,176	19,172	19,133	19,105	19,132	19,212	19,307	19,399	19,502	19,570

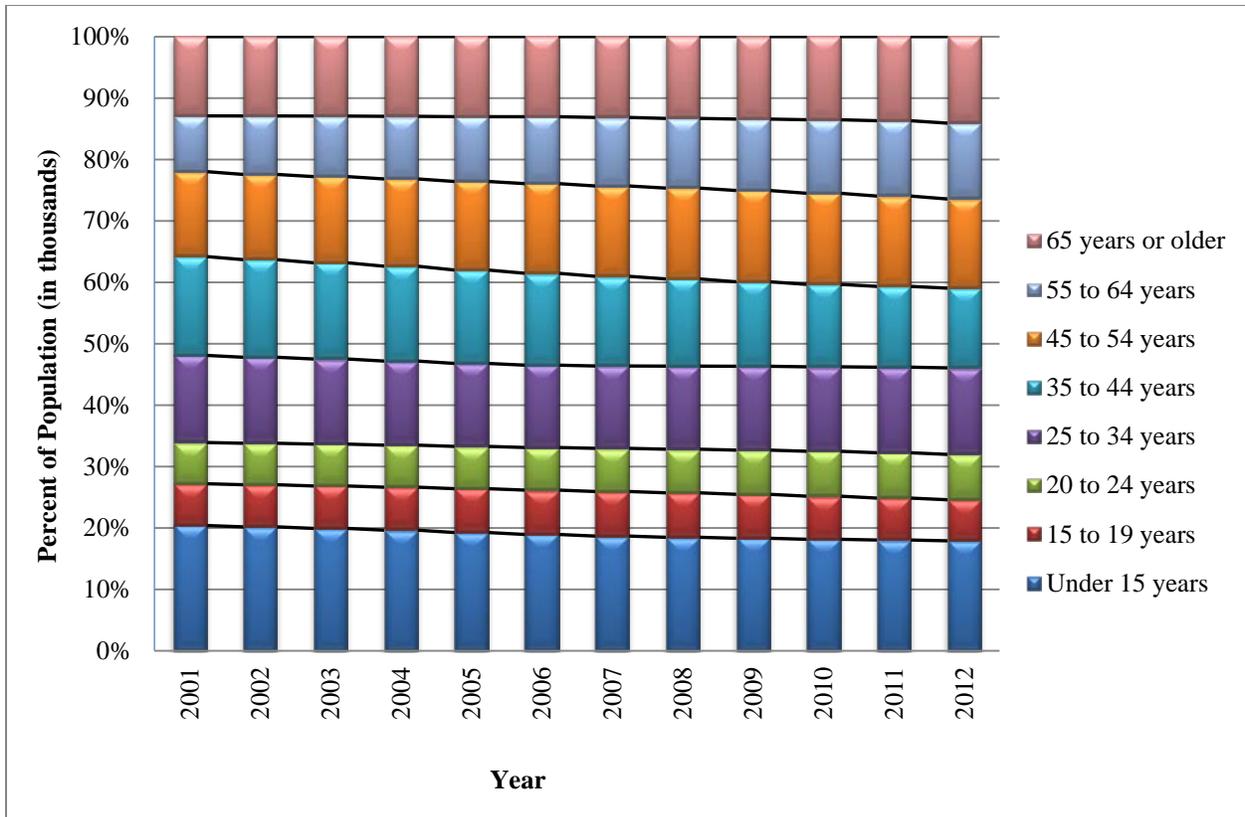


Figure 4-6. Distribution of NYS resident population by age group, 2001-2012.

Using information obtained from the *Highway Statistics Series* (USDOT 2015) published by the FHWA, annual VMT and its corresponding number of registered number of vehicles in NYS for the period of 2001 to 2012 are summarized and presented in Figure 4-7. Specifically, state-level VMT was taken from *Table VM-2* and vehicle registration information was found in *Table MV-1*. As seen in Figure 4-7, with a few slight exceptions, trends in VMT and registered number of vehicles were generally consistent. The growing pattern as seen in NYS populations over this 12-year period (Table 4-1) was not echoed in the VMT nor registered number of vehicles for NYS, however.

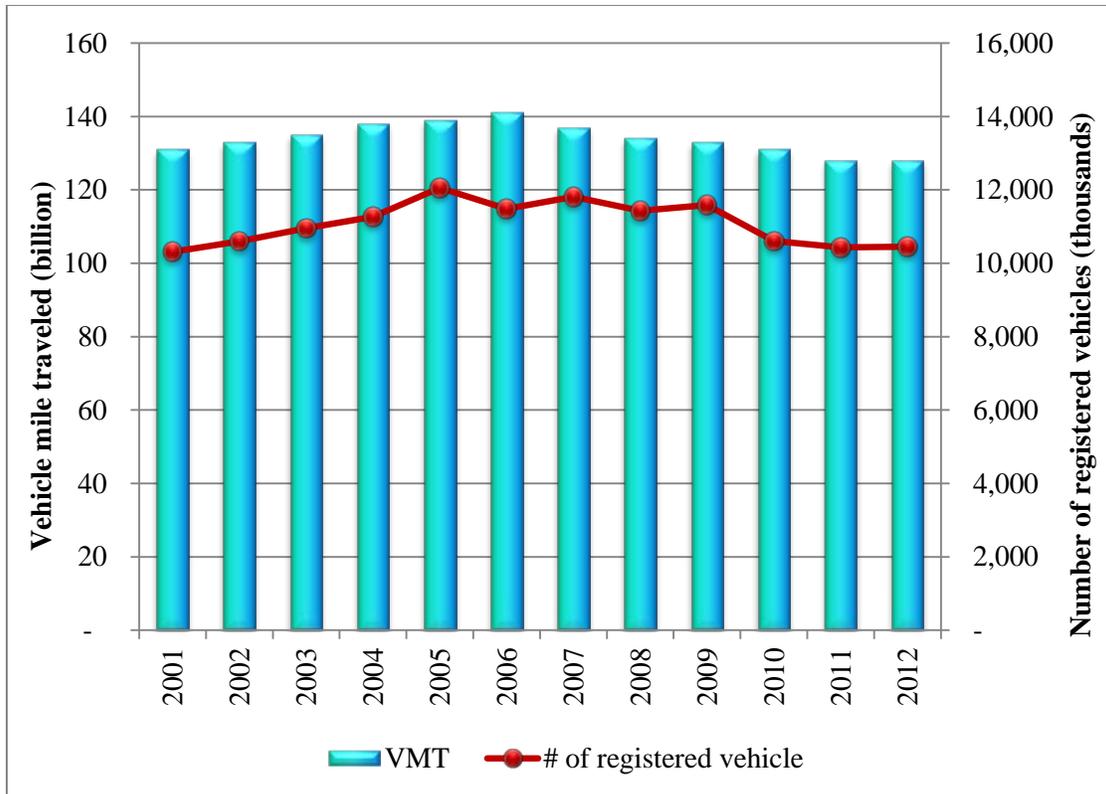


Figure 4-7. Annual VMT and number of registered vehicles for NYS, from 2001 to 2012.

The *Highway Statistics* information is only available as totals for national and state-levels; i.e., no further geographic or demographic breakdowns are given. Thus, to examine whether travelers’ age or geographic region (where they lived) influences the degree of fatality (based on FARS data), NHTS data had to be used. To maintain consistency, when NHTS demographic information was used, VMT estimated from NHTS data was also used as the measure of exposure for this specific discussion instead of the state-level VMT from *Highway Statistics*. As in previous sections of this report, NYS residents aged 65 years or older were classified in the elderly group, while all others were included under the “non-elderly” group. The main geographic concern was focused on the uniqueness of NYC versus those that lived elsewhere in NYS.

Table 4-3 presents a summary of the VMT totals (in million miles) by elderly and non-elderly residents that lived in NYC and elsewhere in NYS based on the 2001 and 2009 NHTS data sets. With the exception of NYC elderly, all groups showed a declining VMT value (in million miles) between 2001 and 2009. As discussed in Section 3 of this report, generally speaking, based on NHTS data NYC elderly persons traveled less frequently and made shorter trips, when compared to their counterparts that lived elsewhere in NYS. Expectedly as shown in Figure 4-8, elderly NYC residents contributed to less than 9% of total VMT in their region, while elderly residents elsewhere in NYS accounted for 11% of their regional total VMT during the two NHTS years.

Table 4-3. VMT by elderly status for NYS residents, 2001 and 2009 NHTS

Region	Group	2001 (in millions)	2009 (in millions)
Total New York State	Non-Elderly	85,240	82,358
	Elderly	9,969	9,813
	Total	95,209	92,171
New York City	Non-Elderly	15,156	13,085
	Elderly	1,210	1,272
	Total	16,366	14,357
Rest of New York State	Non-Elderly	70,084	69,272
	Elderly	8,759	8,542
	Total	78,843	77,814

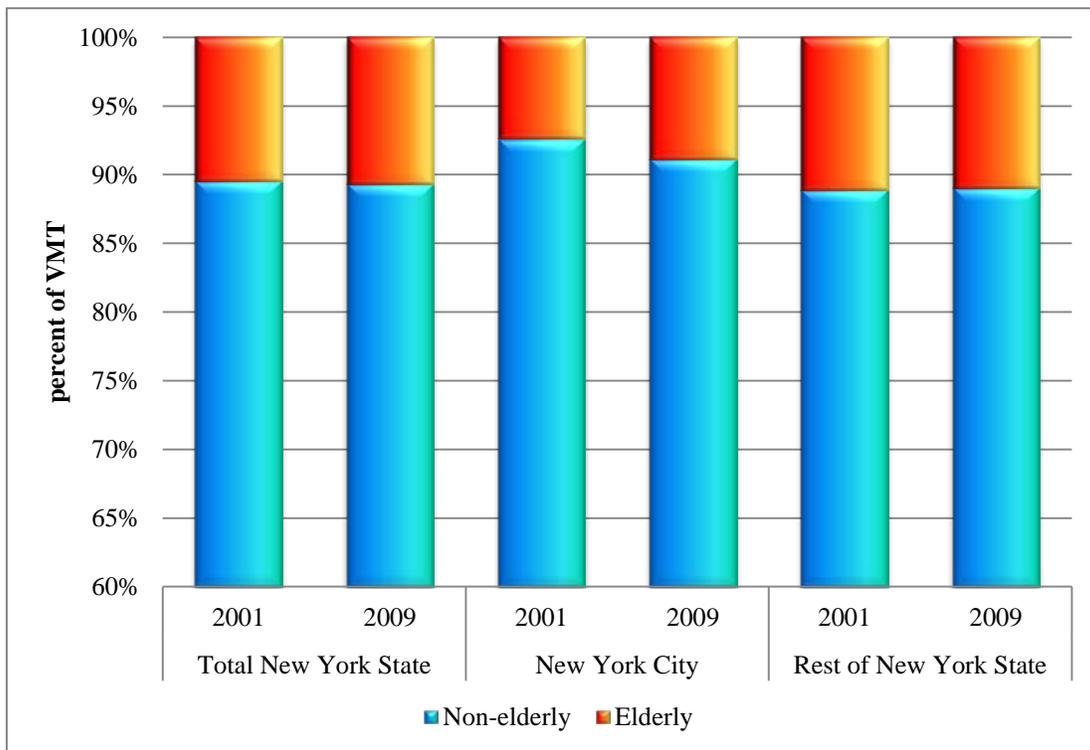


Figure 4-8. Distributions of VMT by age group and location in NYS, 2001 and 2009 NHTS data.

4.3 FATALITY RATES

Annual fatality rates based on accidents that occurred in NYS during 2001-2012 were estimated by different measures and are presented in Figure 4-9. The FARS fatality counts (totals) in these years are also presented in the same figure for reference. Basically, all fatality rates agreed with the declining trend as shown in the measures of fatality numbers over the 12-year period. The population-based measure of fatality rate (i.e., the fatality rate per 100,000 persons) was flatter (a smaller slope meaning less changes over time) than those of other more “targeted group” measures (i.e., per driver, per vehicle, or per VMT). These “targeted” measures have direct and indirect associations with vehicle, so it seems reasonable to have a slightly higher association

with fatalities—mainly because FARS captures accidents that occur on public roadways and the majority of these accidents are associated with vehicles. All measures showed a slight jump between 2009 and 2010, again consistent with the fatality counts in those two years.

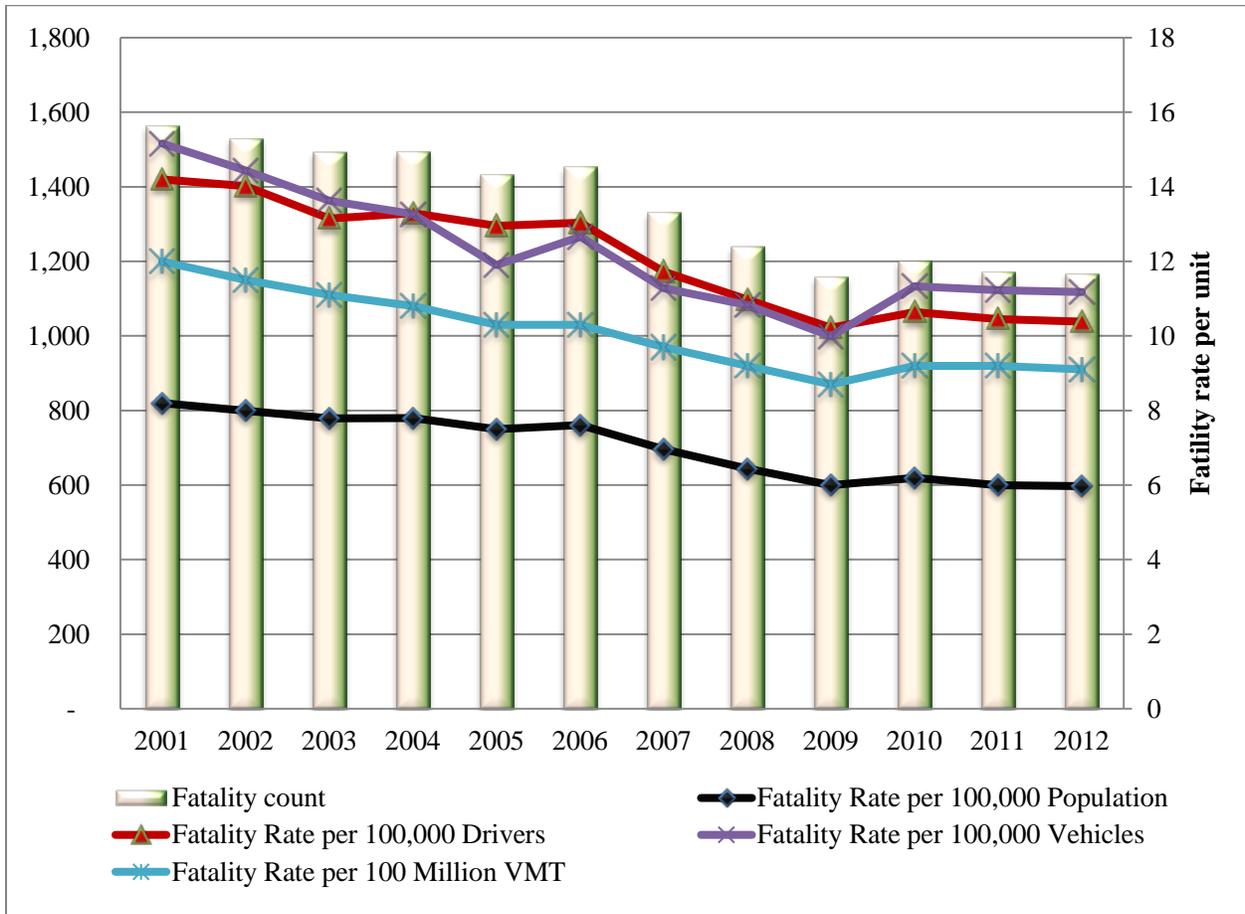


Figure 4-9. Fatality counts and measures of fatality rates for FARS crashes in NYS, 2001-2012.

Fatality rates by age of those being killed, measured in fatalities per 100,000 populations within the age group, were also examined and the results are summarized in Table 4-4. Higher fatality rates associated with the younger driver age groups (15-24 years old) could clearly be seen in Table 4-4, especially in the early 2000s. Furthermore, fatality rates for the elderly (age 65+ years old) were nearly as bad as those for ages 20-24 year olds. Overall, fatality rates were in decreasing trends for all age groups over the 12-year course (except for the 45-54 year old group).

Table 4-4. Fatality rates by age group in NYS during 2001-2012
(Unit of measure: person per 100,000 population)

Year Age Group	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
< 15 years	1.7	1.6	1.5	1.9	1.4	1.3	1.2	1.2	1.4	1.4	0.9	1.2
15 to 19 years	14.6	14.8	12.8	13.3	11.0	11.3	9.5	5.9	8.0	7.4	5.8	5.4
20 to 24 years	15.9	14.9	14.8	13.3	16.1	15.9	11.2	12.4	10.4	11.3	9.9	10.3
25 to 34 years	9.1	8.9	8.8	8.2	7.9	9.1	7.6	7.7	7.2	6.5	6.8	6.5
35 to 44 years	7.9	7.3	6.5	7.0	6.7	6.7	6.5	5.6	5.0	5.6	5.8	5.2
45 to 54 years	6.4	7.3	7.2	6.7	6.5	6.3	7.1	5.6	5.5	5.3	6.2	6.7
55 to 64 years	6.1	6.5	7.3	6.8	6.5	7.3	6.9	6.3	5.6	6.2	6.3	5.8
65+ years	14.0	12.5	12.6	13.5	12.6	11.8	11.3	11.6	9.5	10.5	9.7	9.6
All ages	8.2	8.0	7.8	7.8	7.5	7.6	7.0	6.4	6.0	6.2	6.0	6.0

Unfortunately, statistics on the number of drivers or VMT by age group for the 12-year time period were not readily available, thus other fatality rate measures (as seen in Figure 4-9) could not be examined. Nonetheless, the statistics shown in Tables 4-1 and 4-3 were utilized to compare VMT-based fatality rates for the two NHTS years (2001 and 2009) by elderly status of the persons that were killed and by regions where such accidents occurred (NYC versus elsewhere in NYS). These fatality rates are shown in Table 4-5 below.

Table 4-5. Fatality rate by elderly status of the person killed in NYS accidents, for NHTS years 2001 and 2009
(Unit of measure: person per 100-million VMT)

Region	Age Group	2001	2009
NYC	Non-elderly	1.8	1.6
	Elderly	8.4	5.0
Other NYS	Non-elderly	1.3	1.0
	Elderly	2.8	2.1
NYS	All ages	1.6	1.3

As observed in Table 4-5, the per-VMT based fatality rate also indicated that the elderly were subjected to a much higher risk than their younger counterparts. Fatality rates in NYC were higher than for their counterparts elsewhere in the NYS—likely due to fewer vehicles traveling in NYC versus regions located elsewhere in NYS. Clearly, from the point of view of VMT, 2009 was a safer year for all when compared with 2001 fatality rates. Overall, regardless of age, the average fatality rate dropped from 1.6 “person per 100-million VMT” in 2001 to 1.3 “person per 100-million VMT” in 2009.

4.4 ADDITIONAL REMARKS REGARDING FARS

Of all NYS fatalities accidents during the 12-year period of 2001-2012, the majority was occupants of vehicles involved (either as a driver or a passenger), accounting for 55-66% of NYS fatalities annually (see Figure 4-10). Most of the remaining fatalities were non-motorized bystanders (e.g., people that were walking, biking, etc.), accounting for about 24-30% of the total annual fatalities. As seen in Figure 4-10, there is an increasing trend in share of fatalities involving persons with non-motorized transportation modes—growing from about 25% in the earlier years to about 30% in the latter years. An increased share in fatalities involving motorcyclists in recent years could also be observed. Nevertheless, as shown in the data table in Figure 4-10, the number of vehicle-occupant fatalities in NYS has seen a significant reduction over the 12-year period dropping from 1,016 in 2001 to 648 in 2012 (a nearly 40% reduction in fatalities).

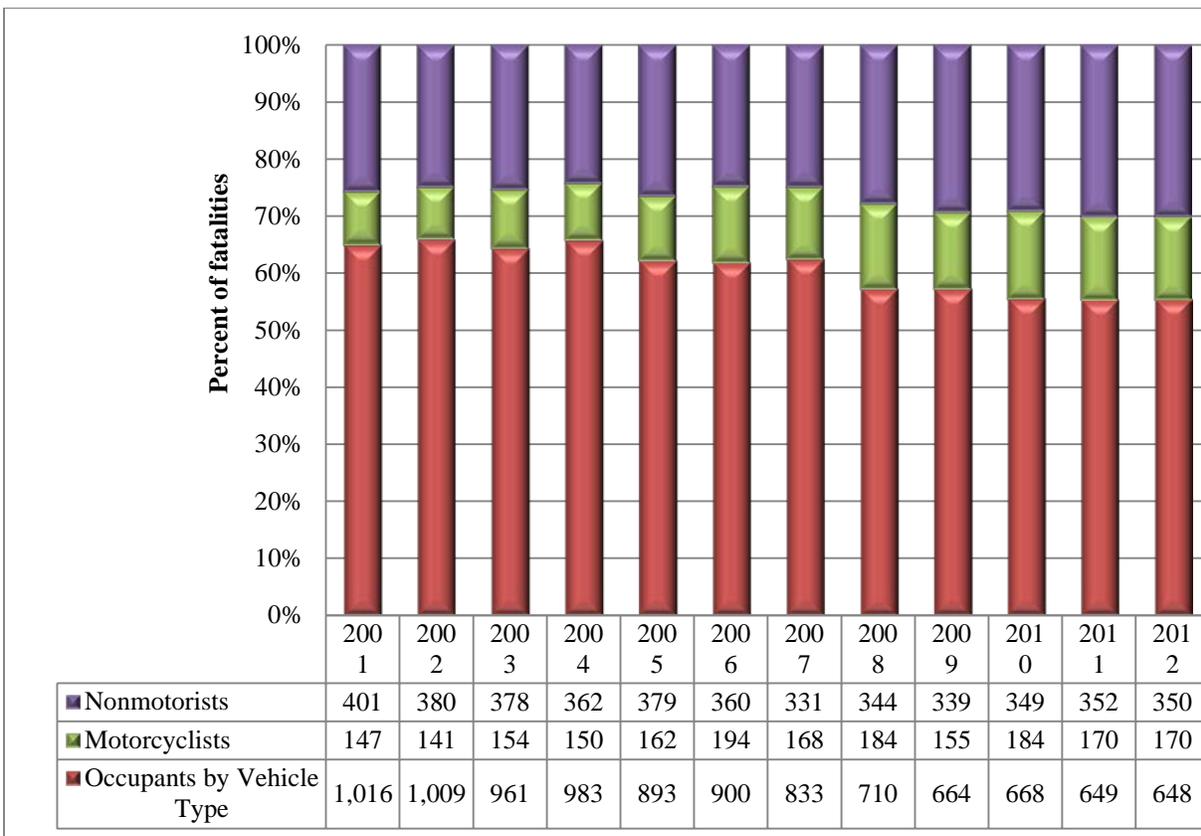


Figure 4-10. Distribution of NYS fatalities by person type, 2001-2012.

The characteristics of fatalities in NYS accidents were further examined, specifically by their elderly status, and are presented in Figure 4-11. Expectedly, occupants of vehicles (i.e., motorist) remain to be the majority of fatalities in both elderly and non-elderly age groups, accounting for 61-65% and 72-79% of the fatalities in the respective age groups over the 12-year period. Among those motorists killed in NYS accidents, nearly 20% were elderly persons, while

elderly accounted for about 30% of the non-motorist (pedestrian, pedal-cyclist, etc.) fatalities in NYS.

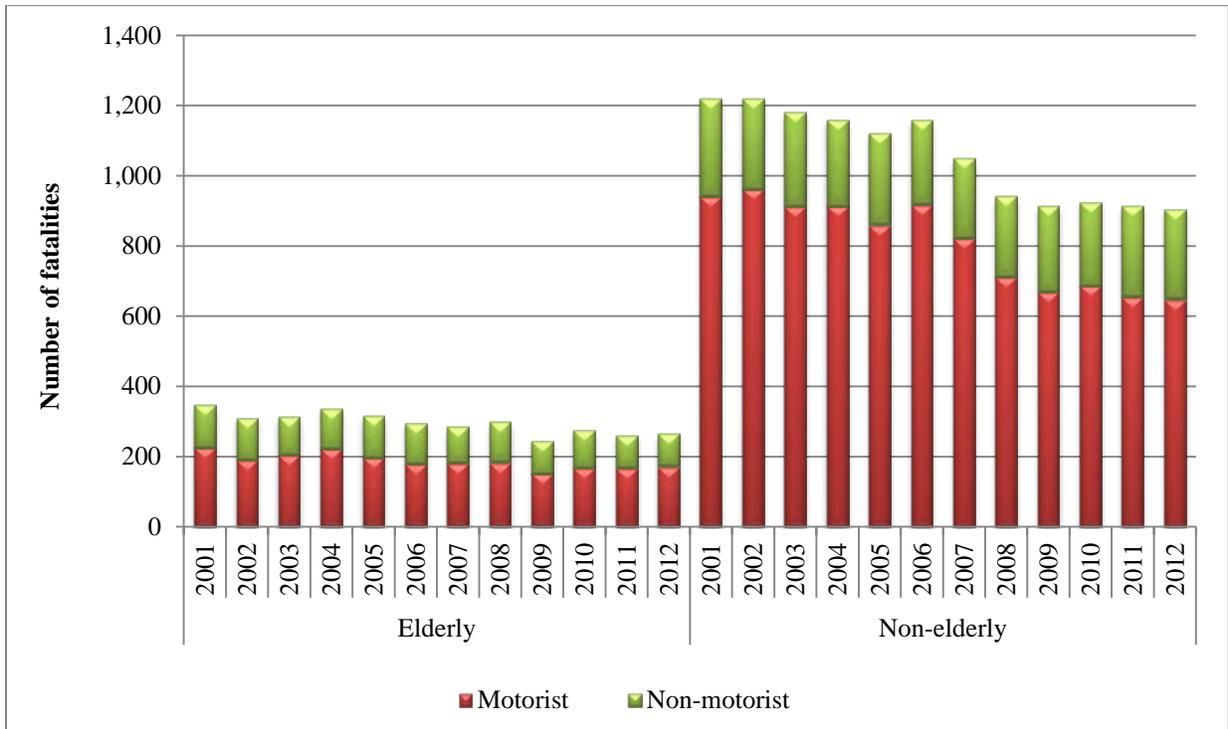


Figure 4-11. Number of fatalities by elderly status in NYS accidents based on 2001-2012 FARS.

Note that in order to examine travel safety issues concerning the elderly, information from the FARS data series was also analyzed to the extent possible for NYS. A major limitation of using FARS in this context was that FARS considered all persons involved in its qualifying accidents regardless of where these people lived. By using data from all FARS accidents that occurred in NYS for the analysis, this study unescapably inherited a somewhat nonrealistic assumption of treating all those involved in fatal accidents in NYS as if they were residents of NYS. Readers of this report are reminded to keep this in mind when interpreting FARS results.

5. SUMMARY

This report details findings from an examination of travel behaviors and patterns (or trends) associated with the elderly population in NYS. The main data source used in this study was the 2009 NHTS for NYS (including national and add-on samples) covering only residents of NYS. Due to the uniqueness of NYC, regional analyses were conducted by comparing statistics from NYC to other regions in NYS in many cases.

Below are key findings from this study:

Population Size of Elderly in NYS

- ❖ Based on the 2009 NHTS, the NYS elderly population accounted for 14.3% of its total population of age 5 years and older—an increase from the 13.6% in 2001 and 12.3% in 1995.
- ❖ The largest increase in specific NYS populations during the last fourteen years was in the group of 80 years old or older, where there were more than twice as many in 2009 as in 1995.
- ❖ Although the male population in NYS as a whole rose nearly 9% from 2001 to 2009, the elderly male population in NYS increased over 11% during the same period of time. Similarly, NYS females as a whole had a population growth of about 7% between 2001 and 2009, while the increase in the elderly female population was over 14% during this time period.

Characteristics of the Elderly Households

- ❖ When compared to non-elderly households, elderly households (a household with at least one person that is 65 or older in age) had a significantly higher likelihood of being in the lower income groups (with annual household income under \$50,000) regardless of where they lived in NYS.
- ❖ In 2009, about 91% of the NYS elderly households lived in urban areas, including 43% in NYC and 48% in other urban areas of NYS.
- ❖ In terms of household size, approximately 40% of elderly households lived alone; while only about 20% of non-elderly households were one-person dwellings. Another 40% or so of the elderly households were two-person households, compared to about 30% in non-elderly households.
- ❖ In 2009, nearly 62% of elderly households in NYC did not own any vehicles, while only 10% to 18% of elderly households had zero-vehicles in all other NYS regions. As a whole, regardless of age, about 55% all NYC households did not own any vehicles in 2009.

Driving Status of Elderly

- ❖ Elderly that lived alone in NYC had a significantly higher likelihood of not being a driver than their counterparts who lived elsewhere in NYS. According to the 2009 NHTS, the shares were 48% in NYC versus 23% in other NYS regions.
- ❖ A “non-driver” lived-alone elderly traveled significantly less PMT than those who identified themselves as “a driver” regardless where they lived. Elderly who lived alone in NYC also had significantly less daily PMT and VMT than their counterparts that lived elsewhere—regardless of their driver status.
- ❖ NYC also had a much higher share of “without any drivers” two-person elderly households than their counterparts that lived in other areas of NYS. Based on 2009 NHTS data, about 17% of the total two-person elderly households in NYC had no drivers in their households, versus only 3% in the rest of the NYS.

Travel Patterns

- ❖ On average, NYC residents took fewer daily trips per person than those from other regions. A typical elderly person took 29% less daily person trips in 2009 than their younger neighbors from the same region. Outside NYC, the difference was only about 18% among those who lived in other urban areas of NYS and 10% for those that lived in non-urban areas of NYS.
- ❖ Elderly on average also took significantly shorter trips regardless of where they lived. For those who lived in NYC, a typical elderly person traveled an average of 30% shorter distance than a typical non-elderly person in 2009; this difference was about 12% for people that lived in other urban areas of NYS and 14% for those from non-urban regions of NYS.
- ❖ Instead of POV, NYC residents walked and used public transit to fulfill most of their daily travel needs. These two modes of transportation accounted for over 60% of NYC residents’ total daily trips.
- ❖ The majority of POV trips taken by elderly men relied on their own driving, regardless of where they lived or how old they were. On the other hand, a significant portion of POV person trips taken by elderly women were driven by their spouses or people outside their households.
- ❖ At least 55% of daily person-trips taken by the elderly were made for the purpose of “family and personal business” while only about 40% of their younger counterparts in all regions traveled for the same reason.
- ❖ In terms of time of travel, based on 2009 NHTS, three out of four elderly person-trips occurred during 9 am to 6 pm and, among them, over half were made during the period from 9 am to 3 pm.
- ❖ Although zero-vehicle elderly households made fewer person trips than those who owned a vehicle, the difference between owning or not owning was less substantial among those who lived in NYC.

- ❖ Considering vehicle travel, NYC residents made significantly fewer trips than those that lived elsewhere. On average, a NYC elderly person made about one daily vehicle-trip in 2009, while an elderly person from outside NYC made nearly 3 vehicle-trips per day in the same year.
- ❖ Similar to person trips, elderly drivers were more likely to make vehicle trips during the time period from 9 am to 6 pm, regardless where they lived. On the other hand, vehicle trips made by younger drivers were spread more evenly across the day from 6 am to 9 pm.
- ❖ Elderly single-travelers accounted for the majority of person-trips in all regions during 2009; about 75% of person-trips taken by the elderly of NYC were made by traveling alone and another 20% were made by traveling with another person (party of two).
- ❖ Except for those that lived in NYC, in 2009, elderly females tended to have a higher VMT share for traveling alone than elderly males from the same region.

Travel Safety

- ❖ FARS captures accidents that occur on public roadways and the majority of them are associated with vehicles. Over 30% of all fatal accidents that occurred in NYS during the period of 2001-2012 involved at least one elderly person. More than 94% of elderly-involved fatal accidents were single-fatality accidents. There were no significant differences in accident count patterns between fatal accidents involving the general population and those involving elderly persons.
- ❖ In terms of fatalities, accidents that occurred in NYC showed a slightly higher percent of elderly fatalities than accidents in other regions of NYS (Figure 5-1).

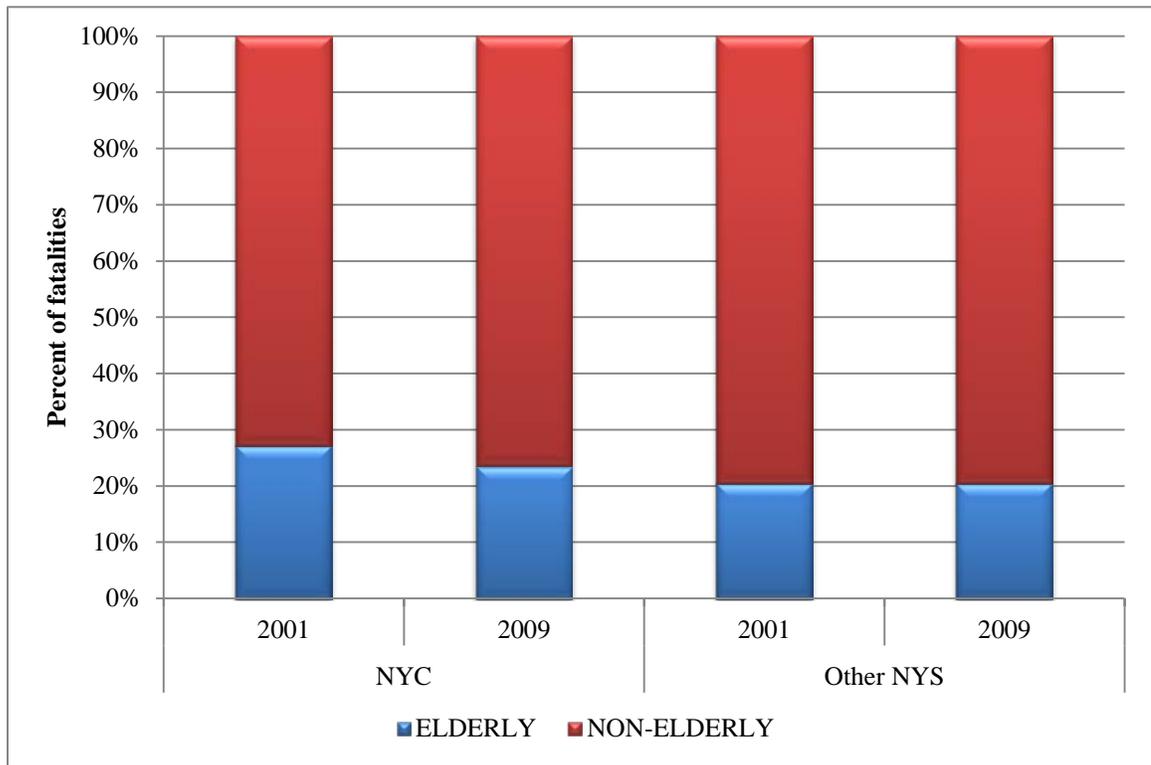


Figure 5-1. Distribution of fatalities by NYS region and elderly status in NHTS years 2001 and 2009.

- ❖ Fatality rates measured in different units (per population, per driver, per VMT, or per vehicle) were generally consistent for NYS FARS cases, over time. Fatality rates measured in fatalities per 100,000 populations by age group for 2001-2012 showed that the annual fatality rate for the elderly group was nearly the same as those age 20-24 years old.
- ❖ When aggregated into two age groups (i.e., elderly versus non-elderly), using fatalities per 10-million VMT as the measure in the two NHTS years, Figure 5-2 clearly shows that elderly persons were subjected to a much higher risk than their non-elderly counterparts in all regions of NYS.

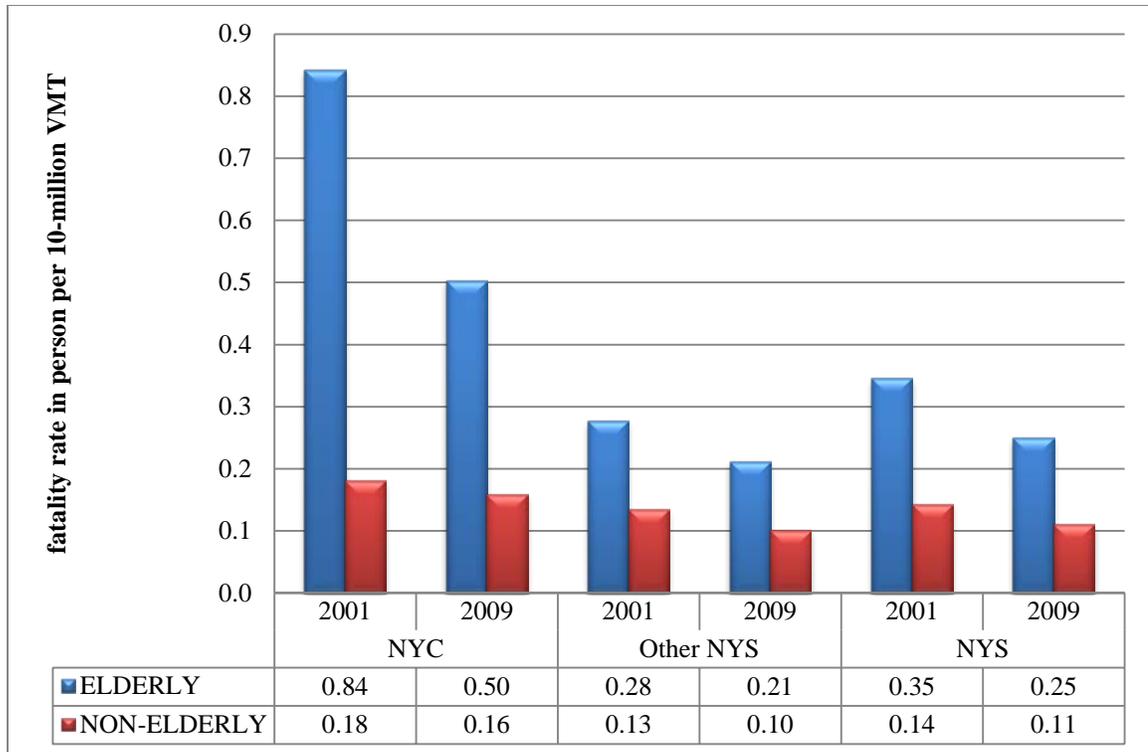


Figure 5-2. Fatality rates by region and elderly status for NHTS years 2001 and 2009, measured in number of persons per 10-million VMT.

It is worth pointing out again, that FARS data were accident-based, thus persons involved in those accidents were not necessarily residents of NYS, while NHTS on the other hand, was a household-based survey which covered travel behaviors of NYS residents. Due to data limitations, the use of FARS data to reflect travel safety for NYS elderly thus assumed certain similarity in behaviors between residents and non-residents. Caution should be exercised when interpreting NHTS and FARS data results collectively.

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APPENDIX A: GLOSSARY OF NHTS TERMS

APPENDIX A. GLOSSARY OF NHTS TERMS

This glossary provides the most commonly used terms in the NHTS and definitions of those terms. These definitions are provided to assist the user in the interpretation of the NHTS data.

Adult	For NHTS, this is defined as a person 18 years or older.
Block Group	A subdivision of a Census tract that averages 1000 to 1100 people, and approximately 400-500 housing units. The source used for the 2009 NHTS was TeleAtlas MatchMaker (derived from Census 2000 definition).
Census Region and Division	<p>The Census Bureau divides the states into four regions and nine divisions. Note that the divisions are wholly contained within a region, i.e., region lines do not split division lines. The regions and their component divisions are:</p> <p>Northeast Region:</p> <ul style="list-style-type: none">• New England Division: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont• Middle Atlantic Division: New Jersey, New York, Pennsylvania <p>North Central Region:</p> <ul style="list-style-type: none">• East North Central Division: Illinois, Indiana, Michigan, Ohio, Wisconsin• West North Central Division: Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota <p>South Region:</p> <ul style="list-style-type: none">• South Atlantic Division: Delaware, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia• East South Central Division: Alabama, Kentucky, Mississippi, Tennessee• West South Central Division: Arkansas, Louisiana, Oklahoma, Texas <p>West Region:</p> <ul style="list-style-type: none">• Mountain Division: Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming• Pacific Division: Alaska, California, Hawaii, Oregon, Washington <p>Puerto Rico.</p>

For the 2009 NHTS the source used for the 2000 Census Region was:

<http://www.census.gov/geo/www/cob/rg2000.html>. The source used for the 2000 Census Division was:

<http://www.census.gov/geo/www/cob/dv2000.html>.

Census Tract

A small subdivision of a county, containing approximately 4,000 persons. Tracts can range in population from 2,500 to 8,000. The geographic size of the tract may vary considerably, depending on population density. Tracts were designed to be homogeneous in regard to population characteristics, economic status and living conditions when they were first delineated. Since the first tracts were delineated for the 1890 Census, today's tracts may be far from homogeneous. The source used for the 2009 NHTS was TeleAtlas MatchMaker (derived from Census 2000 definition).

Child

A child is normally defined as a person under the age of 18. An exception to this is for life cycle, where a child can be anyone through the age of 21 who is listed as a child to the household respondent.

**Consolidated
Metropolitan
Statistical Area
(CMSA)**

A large metropolitan complex of 1 million or more population, containing two or more identifiable component parts designated as primary metropolitan statistical areas (PMSAs). For example, the New York-Northern New Jersey-Long Island CMSA is composed of the following fourteen areas: Bridgeport, Danbury, Dutchess County, Jersey City, Middlesex-Somerset-Hunterdon, Monmouth-Ocean, Nassau-Suffolk, New Haven-Meriden, New York, Newark, Newburgh, Stamford-Norwalk, Trenton, Waterbury.

Destination

For travel day trips, the destination is the point at which there is a break in travel, except if the break is only to change vehicles or means of transport.

Driver

A driver is a person who operates a motorized vehicle. If more than one person drives on a single trip, the person who drives the most miles is classified as the principal driver.

Employed

A person is considered employed if (s)he worked for pay, either full time or part time, during the week before the interview. This includes persons who work at home or persons who have more than one job.

Education Level	The number of years of regular schooling completed in graded public, private, or parochial schools, or in colleges, universities, or professional schools, whether day school or night school. Regular schooling advances a person toward an elementary or high school diploma, or a college, university, or professional school degree.
Household	A group of persons whose usual place of residence is a specific housing unit; these persons may or may not be related to each other. The total of all U.S. households represents the total civilian non-institutionalized population. A household does not include group quarters (i.e., 10 or more persons living together, none of whom are related).
Household Income	Household income is the money earned by all family members in a household, including those temporarily absent. Annual income consisted of the income earned 12 months preceding the interview. Household income includes monies from all sources, such as wages and salary, commissions, tips, cash bonuses, income from a business or farm, pensions, dividends, interest, unemployment or workmen's compensation, social security, veterans' payments, rent received from owned property (minus the operating costs), public assistance payments, regular gifts of money from friends or relatives not living in the household, alimony, child support, and other kinds of periodic money income other than earnings. Household income excludes in-kind income such as room and board, insurance payments, lump-sum inheritances, occasional gifts of money from persons not living in the same household, withdrawal of savings from banks, tax refunds, and the proceeds of the sale of one's house, car, or other personal property.
Household Members	Household members include all people, whether present or temporarily absent, whose usual place of residence is in the sample unit. Household members also include people staying in the sample unit who have no other usual place of residence elsewhere.
Household Vehicle	A household vehicle is a motorized vehicle that is owned, leased, rented or company-owned and available to be used regularly by household members during the two-week travel period. Household vehicles include vehicles used solely for business purposes or business-owned vehicles, so long as they are driven home and can be used for the home to work trip, (e.g., taxicabs, police cars, etc.). Household vehicles include all vehicles that were owned or available for use by members of

the household during the travel period, even though a vehicle may have been sold before the interview. Vehicles excluded from household vehicles are those which were not working and were not expected to be working within 60 days, and vehicles that were purchased or received after the designated travel day.

Journey-to-Work Trips (Commute trips)

Includes travel to and from a place where one reports for work. Does not include any other work-related travel. Does not include any trips for persons who work at home.

Means of Transportation

A mode of travel used for going from one place (origin) to another (destination). A means of transportation includes private and public transit modes, as well as walking.

The following transportation modes, grouped by major mode, are included in the NHTS data.

Private Vehicle – a stipulation for being a private vehicle is that the vehicle is privately owned or operated.

1. Car. Includes cars and station wagons. Leased and rented cars are included if they are privately operated and not used for picking up passengers in return for fare.
2. Van. Includes vans or minivans designed to carry 5 to 13 passengers, or to haul cargo.
3. Sport Utility Vehicle. Includes vehicles that are a hybrid of design elements from a van, a pickup truck and a station wagon. Examples include a Ford Explorer, Jeep Cherokee, or Nissan Pathfinder.
4. Pickup Truck. Includes vehicles with an enclosed cab that usually accommodates 2-3 passengers, and has an open cargo area in the rear. Late model pickups often have a back seat that allows for total seating of 4 -6 passengers. Pickup trucks usually have the same size of wheel-base as a full-size station wagon. This category also includes pickups with campers.
5. Other Truck: This category consists of all trucks other than pickup trucks (i.e., dump trucks, trailer trucks, etc.).
6. RV or Motor Home: An RV or motor home includes a self-powered recreational vehicle that is operated as a unit without being towed by another vehicle (e.g., a Winnebago motor home).
7. Motorcycle: This category includes large, medium, and small

motorcycles and mopeds.

8. Golf Cart: This includes all electric or gas operated vehicles designed for use on a golf course, but whose use has recently extended to use within smaller, often gated, communities.

Public Transportation, as used in FHWA publications and analysis of NHTS data, typically includes the following that are **indicated in bold below**, mass transit bus, commuter bus, commuter train, subway/elevated rail, and streetcar/trolley.

Bus. This category includes:

9. **mass transit systems**, these are local public transit buses that are available to the general public,
10. **commuter buses**, these are buses used for short-distance public transport purposes (e.g., city bus or public bus), school buses, and
12. charter/tour buses, these are private buses operating on a fixed schedule between population centers, and
13. city to city buses, these are buses that run from one urban center to the other (e.g., Greyhound), and
14. shuttle buses, these are buses that shuttle passengers from one fixed place to another (e.g., airport shuttles).

Train: This category includes:

15. Amtrak/Intercity Train that run from one urban center to another,
16. **Commuter** trains and passenger trains
17. **Subway and elevated rail** (also known as rail rapid transit) is a high capacity system operated on a fixed rail or guide way system on a private right of way, and
18. **Trolley/streetcars** are vehicles that run on a fixed rail system powered by electricity obtained from an overhead power distribution system.

Other Modes

11. School Buses.
19. Taxi. Taxis include the use of a taxicab by a passenger for fare, including limousines. The taxi category does not include rental cars if they are privately operated.
20. Ferry. This includes travel by passenger line ferries.
21. Airplane. . Airplanes include commercial airplanes and smaller

planes that are available for use by the general public in exchange for a fare. Private and corporate planes and helicopters are also included.

- 22. Bicycle: This category includes bicycles of all speeds and sizes that do not have a motor.
- 23. Walk: This category includes walking and jogging.
- 24. Special Transit for People with Disabilities. This includes things like “Dial-A-Ride”
- 97. Other. Includes any type of transportation not previously listed, (e.g. skate boards, roller blades, sailboats, cruise ships, etc.).

**Metropolitan
Planning
Organization
(MPO)**

A metropolitan planning organization devises solutions to regional transportation problems concerning land use, air quality, energy, economic development and commerce. Such an organization exists for every urban area with at least 50,000 residents. New York State has thirteen MPOs analyzed in this report: Albany; Binghamton; Buffalo; Elmira; Glens Falls; Ithaca; Kingston; the New York Metropolitan Transportation Council (NYMTC) area; Newburgh; Poughkeepsie; Rochester; Syracuse; and Utica-Rome.

**Metropolitan
Statistical Area
(MSA)**

Except in the New England States, a Metropolitan Statistical Area is a county or group of contiguous counties which contains at least one city of 50,000 inhabitants or more, or “twin cities” with a combined population of at least 50,000. In addition, contiguous counties are included in an MSA if, according to certain criteria, they are socially and economically integrated with the central city. In the New England States, MSA’s consist of towns and cities instead of counties. The source used for the 2009 NHTS was 1999 Metropolitan Areas: Cartographic Boundary Files. File ma99_99.shp from <http://www.census.gov/geo/www/cob/ma1999.html>.

Motorized Vehicle

Motorized vehicles are all vehicles that are licensed for highway driving. Snow mobiles and minibikes are specifically excluded.

**New York City
(NYC)**

New York City is defined in this report as the five county area: Bronx, Kings, Queens, New York (Manhattan), and Richmond.

**New York
Metropolitan
Transportation
Council (NYMTC)**

The New York Metropolitan Transportation Council (NYMTC) encompasses includes the following three areas: (1) Nassau, Suffolk; (2) New York City, (which includes the following counties: Bronx, Kings, Queens, New York, and Richmond); and (3) Putnam, Rockland,

and Westchester.

Occupancy Occupancy Rate	Occupancy is the number of persons, including driver and passenger(s) in a vehicle. NHTS occupancy rates are generally defined as the mileage-weighted averages of the number of persons on a vehicle trip.
Origin	Origin is the starting point of a trip.
Passenger	For a specific trip, a passenger is any occupant of a motorized vehicle, other than the driver.
Person Miles of Travel (PMT)	PMT is a primary measure of person travel. When one person travels one mile, one person mile of travel results. Where 2 or more persons travel together in the same vehicle, each person makes the same number of person miles as the vehicle miles. Therefore, four persons traveling 5 miles in the same vehicle results in 20 person miles ($4 \times 5 = 20$).
Person Trip	A person trip is a trip by one or more persons in any mode of transportation. Each person is considered as making one person trip. For example, four persons traveling together in one auto are counted as four person trips.
Privately Owned Vehicle (POV)	A privately-owned vehicle or privately-operated vehicle. Either way, the intent here is that this is not a vehicle available to the public for a fee, such as a bus, subway, taxi, etc.
Travel Day	A travel day is a 24-hour period from 4:00 a.m. to 3:59 a.m. designated as the reference period for studying trips and travel by members of a sampled household.
Travel Day Trip	A travel day trip is defined as any time the respondent went from one address to another by private motor vehicle, public transportation, bicycle, walking, or other means during the NHTS assigned reporting travel day. However, a separate trip is not counted in two instances: <ol style="list-style-type: none">1. When the sole purpose for the trip is to get to another vehicle or mode of transportation in order to continue to the destination.2. Travel within a shopping center, mall or shopping areas of 4-5 blocks is to be considered as travel to one destination.

Travel Day Trip Purpose

A trip purpose is the main reason that motivates a trip. There are 36 travel day trip purposes used in the 2009 NHTS.

Trip purposes were collected using a From-To approach. For each trip, the origin and destination are on the file in specific terms if reported by the respondent (e.g. from work to Bob's Beef Pit). The 36 trip reasons are defined below. The numbers in parentheses represent the value of WHYTO (trip purpose) in the dataset.

1. To Home (01). Represents a trip to the respondents' primary residence.
2. Go to Work (11). This is the first trip to the work location on travel day.
Return to Work (12). A trip to work that is not the first trip to the workplace on the travel day (e.g., returning to work after lunch).
3. Attend Business Meeting/Trip (13). Represents a work related trip whose purpose is to attend a business meeting.
4. Other Work Related (14). A work related trip whose purpose is not specified.
5. Go to School as a Student (21). Represents a trip whose purpose is to go to school as a student.
6. Go to Religious Activity (22). Represents a trip whose purpose is to go to a place to attend a religious activity.
7. Go to Library, School Related (23). Represents a trip whose purpose is to go to the library as part of a school related activity.
8. Go to Daycare/Before or After School Care (24). Represents a trip whose purpose is to attend day care or a supervised before or after school care program
9. Other School/Religious Activity (20). Represents school and religious activities that are not captured in WHYTO 21-24 above.
10. Medical/Dental Services (30). Represents a trip made to obtain medical, dental, or mental health treatment, or other related professional services.
- 11.

12. Buy Goods: groceries/clothing/hardware store (41). Represents a shopping trip whose purpose is to purchase commodities for use or consumption elsewhere. This purpose also includes all shopping trips even if nothing is purchased.
13. Buy Services: video rentals/dry cleaning/post office/car service/bank (42). This category includes the purchase of services other than medical/dental or other professional services.
14. Buy Gas (43). Represents a trip made specifically to get gas.
15. Shopping/Errands (40). Represents shopping and errand trips that are not captured in WHYTO 41-43 above.
16. Go to the Gym/Exercise/Play Sports (51). Represents a trip made for exercise, to engage in exercise or to participate in a sport.
17. Rest or Relaxation/Vacation (52). Represents a trip made for the purpose of relaxing or taking a vacation, but does not include visiting family.
18. Visit Friends/Relatives (53). Represents the social/recreational trip whose purpose is to visit with family and friends.
19. Go out/Hang out: entertainment/theater/sports event/go to bar (54). Represents trips whose purpose is entertainment related or hanging out with friends. Typically this event takes place in a public venue.
20. Visit Public Place: historical site/museum/park/library (55). Represents a trip purpose that is educational or enlightening.
21. Social/Recreational (50). This category includes social and recreational trips that are not captured in WHYTO 51-55 above.
22. Use Professional Services: attorney/accountant (61). Represents a trip made for to engage professional services other than for medical/dental purposes.
23. Attend Funeral/Wedding (62). Represents a trip whose purpose is to attend a funeral or a wedding.
24. Use Personal Services: grooming/haircut/nails (63). Represents a trip for personal services such as to get a massage or get a haircut.
25. Pet Care: walk the dog/vet visits (64).

26. Attend Meeting: PTA/home owner's association/local government (65). Represents a trip purpose to attend a non-work related meeting, such as a community meeting
27. Family Personal Business/Obligations (60). Represents a trip for 13 personal business but is not captured in WHYTO 61-65 above.
28. Pickup Someone (71). Represents a trip whose purpose was to pick up a passenger.
29. Take and Wait (72). Represents a trip made to take someone to a destination and then wait with or for them at the destination and then depart together.
30. Drop Someone Off (73). Represents a trip whose purpose was to drop off a passenger (but not wait for them).
31. Transport Someone (70). Represents trips with a passenger that are related to picking up or dropping off someone but is not captured in WHYTO 71-73 above.
32. Social Event (81). Represents a trip whose purpose is to attend a social event but eating a meal is not a key component of the event.
33. Get/Eat Meal (82). Represents a trip whose primary purpose is to get and eat a meal.
34. Coffee/Ice Cream/Snacks (83). Represents a trip whose purpose is to get/eat a snack or drink, something less than a meal.
35. Meals (80). Represents a trip whose purpose is to eat or get a meal but is not captured in WHYTO 81-83 above.
36. Other (97). Represents a trip purpose not captured by any of the specific WHYTO categories described above.

Urbanized Area

An urbanized area consists of the built up area surrounding a central core (or central city), with a population density of at least 1,000 persons per square mile. Urbanized areas do not follow jurisdictional boundaries thus it is common for the urbanized area boundary to divide a county. For the 2009 NHTS, Urban Areas were calculated two ways.

- Variable URBAN uses the 2000 Urbanized Areas: Cartographic Boundary Files. File ua00_d00.shp from <http://www.census.gov/geo/www/cob/ua2000.html>. Two codes are used: 0 = Not in Urban Area, 1 = in Urban Area
- Variable URBAN1 uses the 2000 Urbanized Areas: Cartographic Boundary Files. File ua00_d00.shp from <http://www.census.gov/geo/www/cob/ua2000.html>. Four codes are used: 0 = Not in Urban Area, 1 = in Urban Cluster, 2 = in Urban Area, 3 = in area surrounded by urban areas.

Vehicle

In the 2009 NHTS, the term vehicle includes autos, passenger vans, sport utility vehicles, pickups and other light trucks, RV's, motorcycles and mopeds owned or available to the household.

Vehicle Miles of Travel (VMT)

VMT is a unit to measure vehicle travel made by a private vehicle, such as an automobile, van, pickup truck, or motorcycle. Each mile traveled is counted as one vehicle mile regardless of the number of persons in the vehicle.

Vehicle Occupancy

Vehicle occupancy is the number of persons, including driver and passenger(s) in a vehicle; also includes persons who did not complete a whole trip. NHTS occupancy rates are generally calculated as person miles divided by vehicle miles.

Vehicle Trip

A trip by a single privately-operated vehicle regardless of the number of persons in the vehicle.

Vehicle Type	For purposes of the 2009 NHTS, one of the following: <ol style="list-style-type: none"> 1. Automobile (including station wagon) 2. Van 3. Sport Utility Vehicle 4. Pickup Truck (including pickup with camper) 5. Other Truck 6. RV or Motor Home 7. Motorcycle 8. Other
Weekday	Weekday is defined as Monday through Friday. In the previous comparison reports, it was defined as the time between 12:01 a.m. Monday and 6:00 p.m. Friday. This was modified to correctly estimate per person statistics.
Weekend	Weekend is defined as Saturday and Sunday. See “Weekday” for more on the difference between previous reports.
Work-Related Travel (WR)	These are trips related to business activities except travel to the place of work: for example, a plumber drives to a wholesale dealer to purchase supplies for his business or a company executive travels from his office to another firm to attend a business meeting. Business, out-of-town trips, and professional conventions are also included.
Worker	See “Employed.”