Hampton Roads
2030 Regional Transportation Plan
Elderly & Handicapped Transportation in 2030
Part I
Improving Elderly Transportation Using the NHTS

HAMPTON ROADS
PLANNING DISTRICT COMMISSION

JUNE 2005

T05-02

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HAMPTON ROADS 2030 REGIONAL TRANSPORTATION PLAN

ELDERLY & HANDICAPPED TRANSPORTATION IN 2030

PART I - IMPROVING ELDERLY TRANSPORTATION USING THE NHTS

This report was included in the Work Program for Fiscal Year 2004-2005, which was approved by the Commission and the Metropolitan Planning Organization at their meetings of March 17, 2004.

PREPARED BY
HAMPTON ROADS PLANNING DISTRICT COMMISSION

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Elderly & Handicapped Transportation in 2030
Part I- Improving Elderly Transportation Using the NHTS

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ABSTRACT

In light of the aging of the Baby Boom generation, a study of elderly and handicapped transportation in the year 2030 is being conducted as part of the Hampton Roads 2030 Regional Transportation Plan. In this first part of the study, the National Household Travel Survey (NHTS) is used to determine ways to improve the mobility of the elderly.

ACKNOWLEDGEMENTS

This report was prepared by the Hampton Roads Planning District Commission (HRPDC) in cooperation with the Federal Highway Administration (FHWA) and the Virginia Department of Transportation (VDOT) and with assistance from Dr. Laurie Garrow of the Georgia Institute of Technology (Ga. Tech). The MPO staff is responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the FHWA, VDOT, Ga. Tech, or the HRPDC. This report does not constitute a standard, specification, or regulation.

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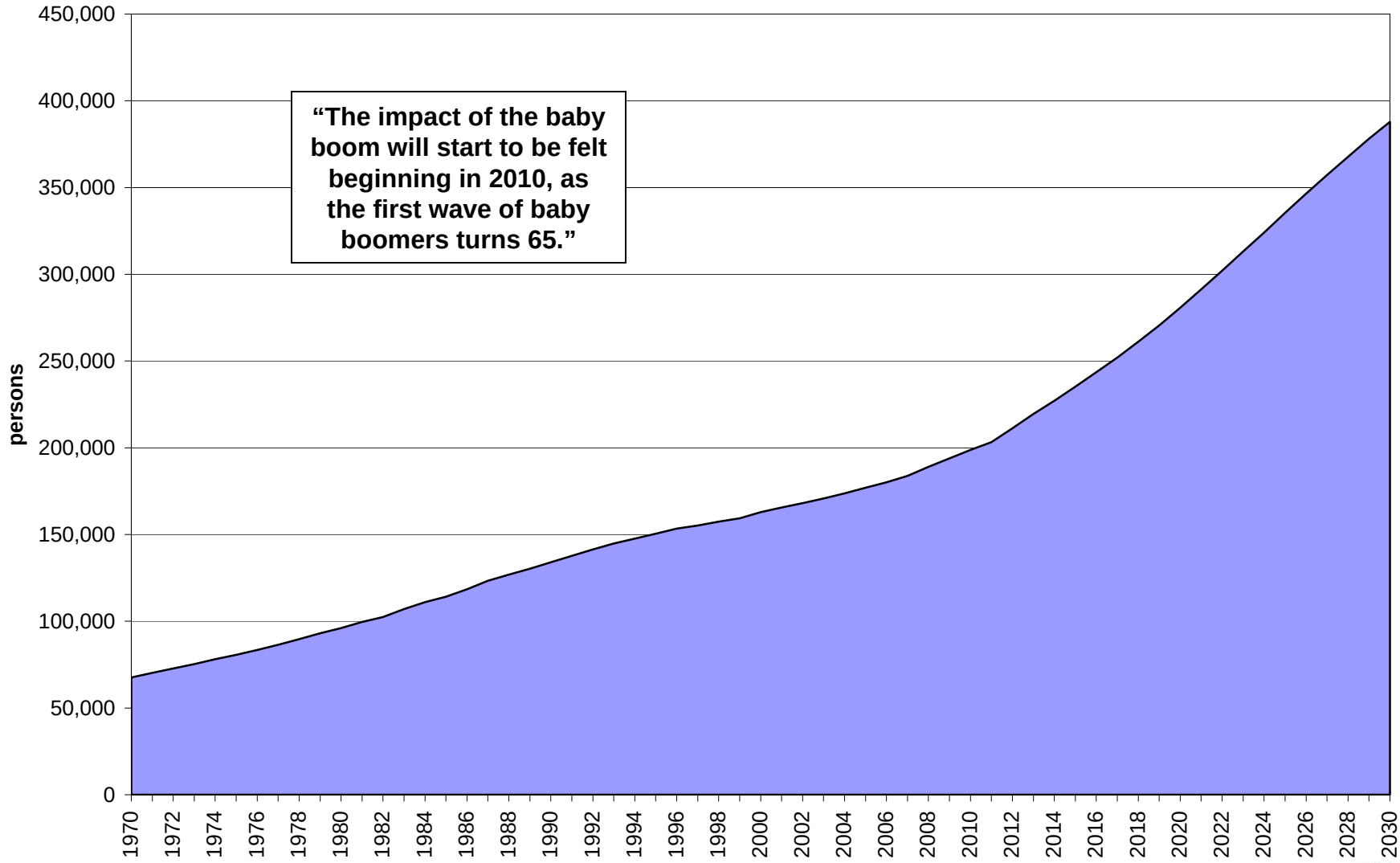
Purpose of Part I

- To determine ways to improve the mobility of Hampton Roads' elderly population in the year 2030, using the National Household Travel Survey (NHTS).
  - Is there a problem in elderly transportation?
  - If so, what can be done?

Investigation of Need

– Is there a problem in elderly transportation?

Age 65+, Hampton Roads



Source of quote: "San Francisco Bay Area Older Adults Transportation Study", Metropolitan Transportation Commission, Dec. 2002

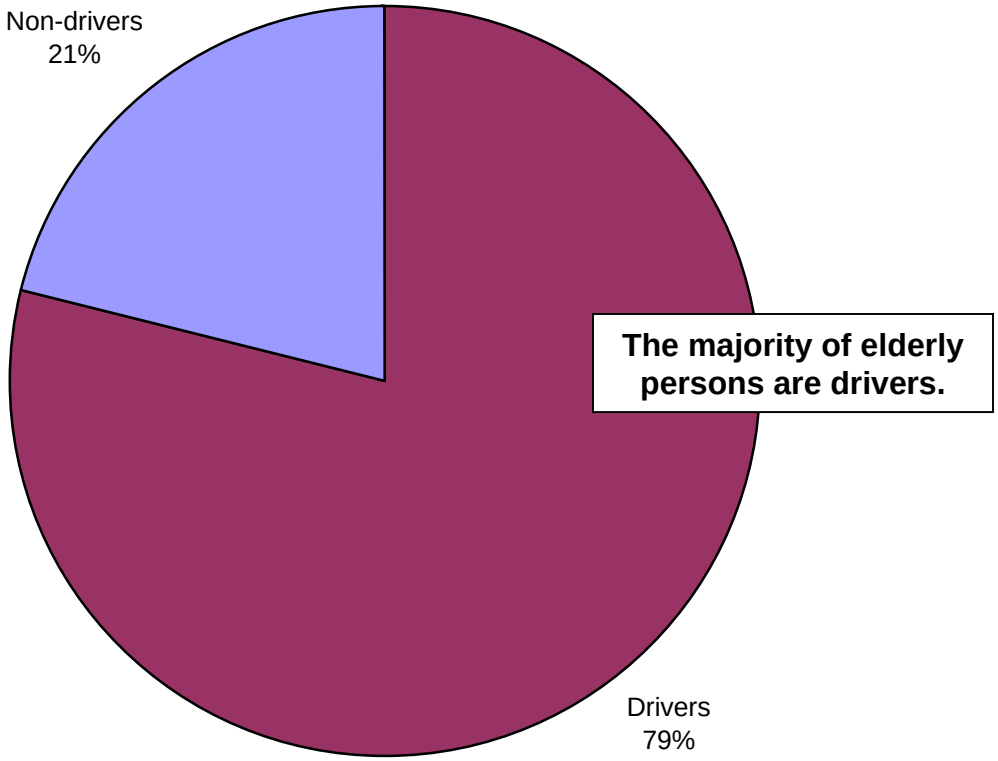
Expected Increase in Elderly

- In 2000, 10% of Hampton Roads' population was 65 and older.
- In 2030, 19% of Hampton Roads' population will be 65 and older, *resembling Tampa today demographically, the second most elderly metro area in the nation (2000).*

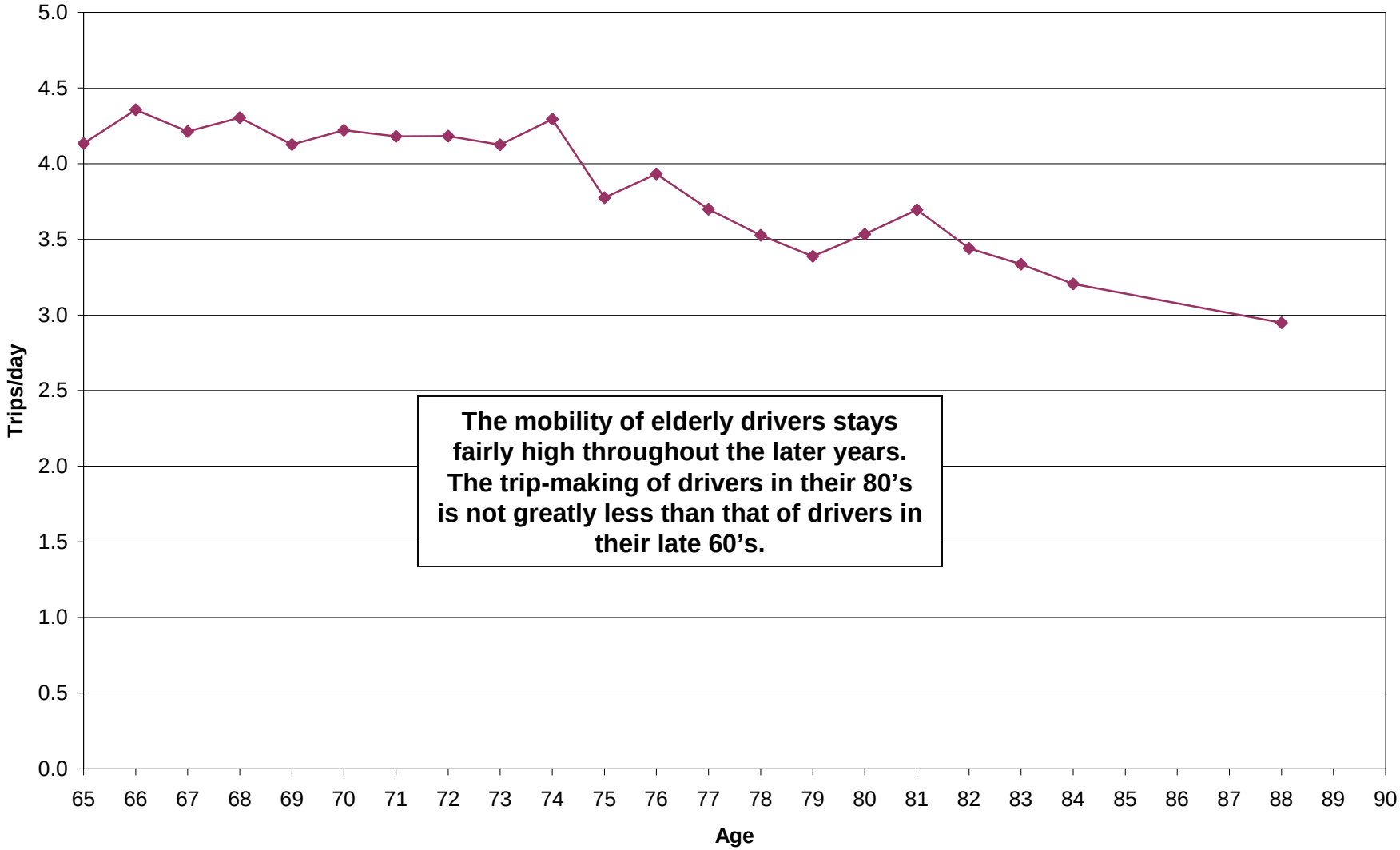
Source of HR data: Census and HRPDC 2030 forecast.

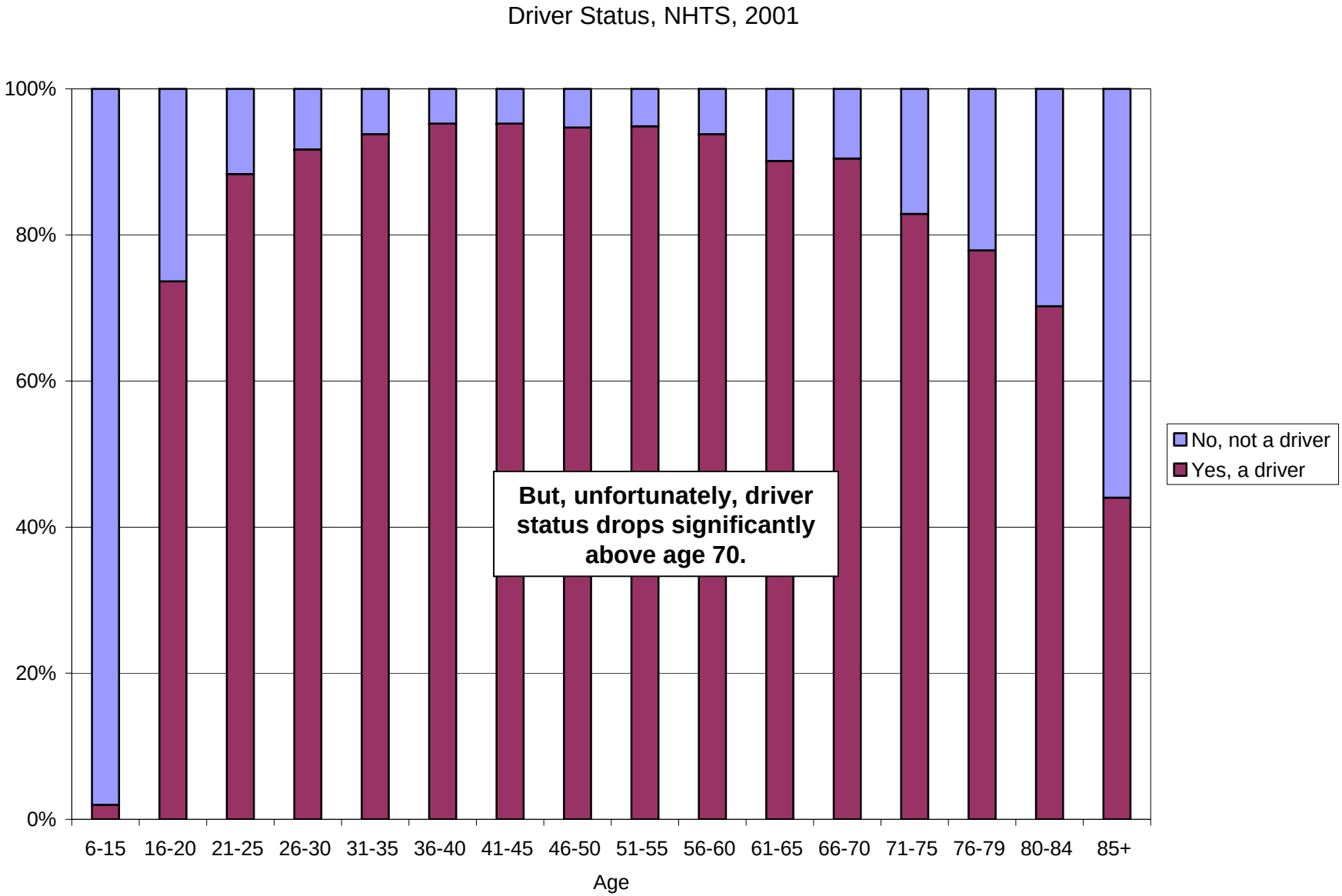
Source of national data: "Seniors in Suburbia", William Frey, Milken Institute, Nov. 2001

Elderly (65+) Driver Status, US, NHTS, 2001

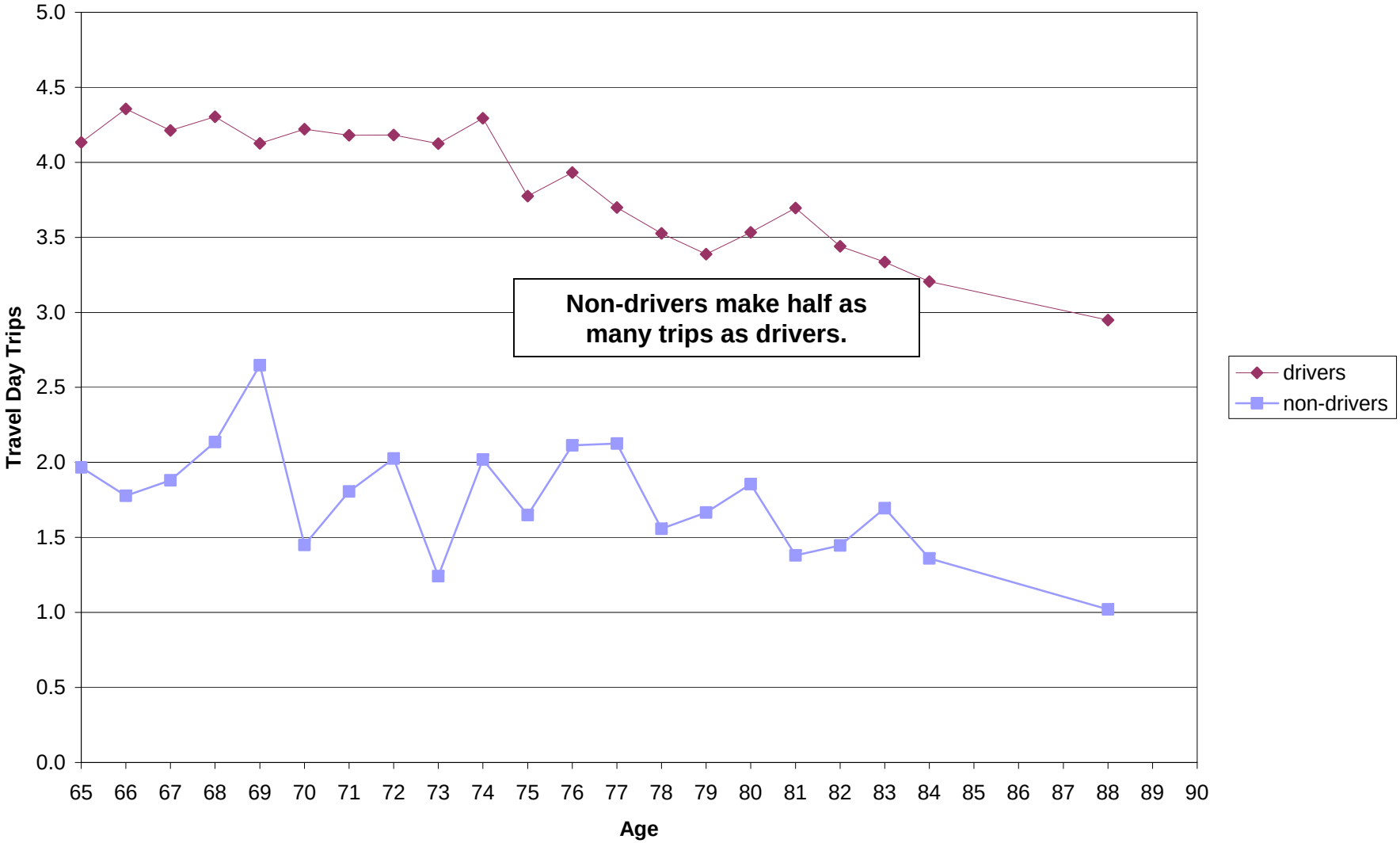


Trips per Day, 65+, Drivers, NHTS, National Sample, 2001

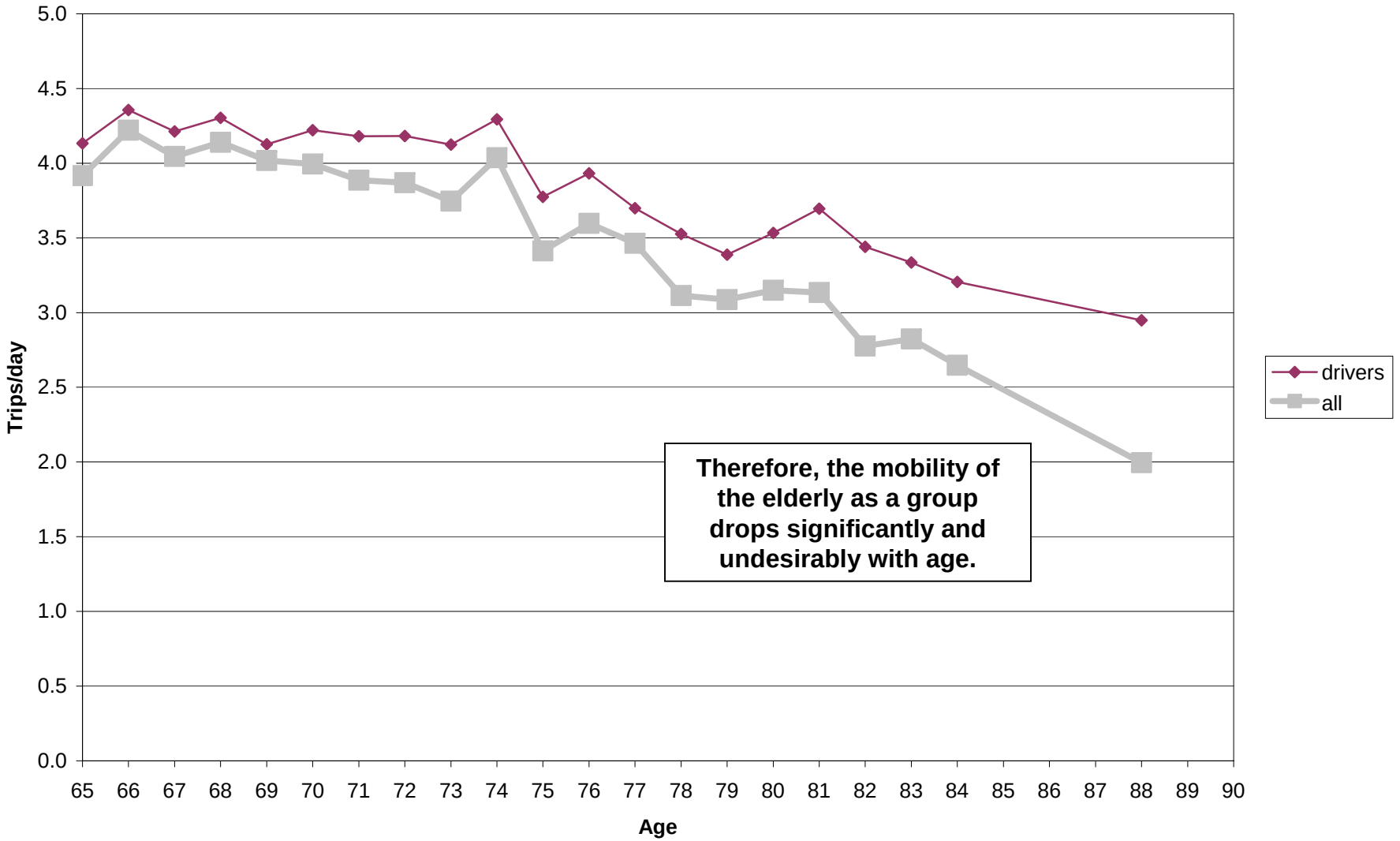



Driver Status, NHTS, 2001
100%
80%
60%
40%
20%
0%
6-15
16-20
21-25
26-30
31-35
36-40
41-45
46-50
51-55
56-60
61-65
66-70
71-75
76-79
80-84
85+
Age
No, not a driver
Yes, a driver
But, unfortunately, driver status drops significantly above age 70.

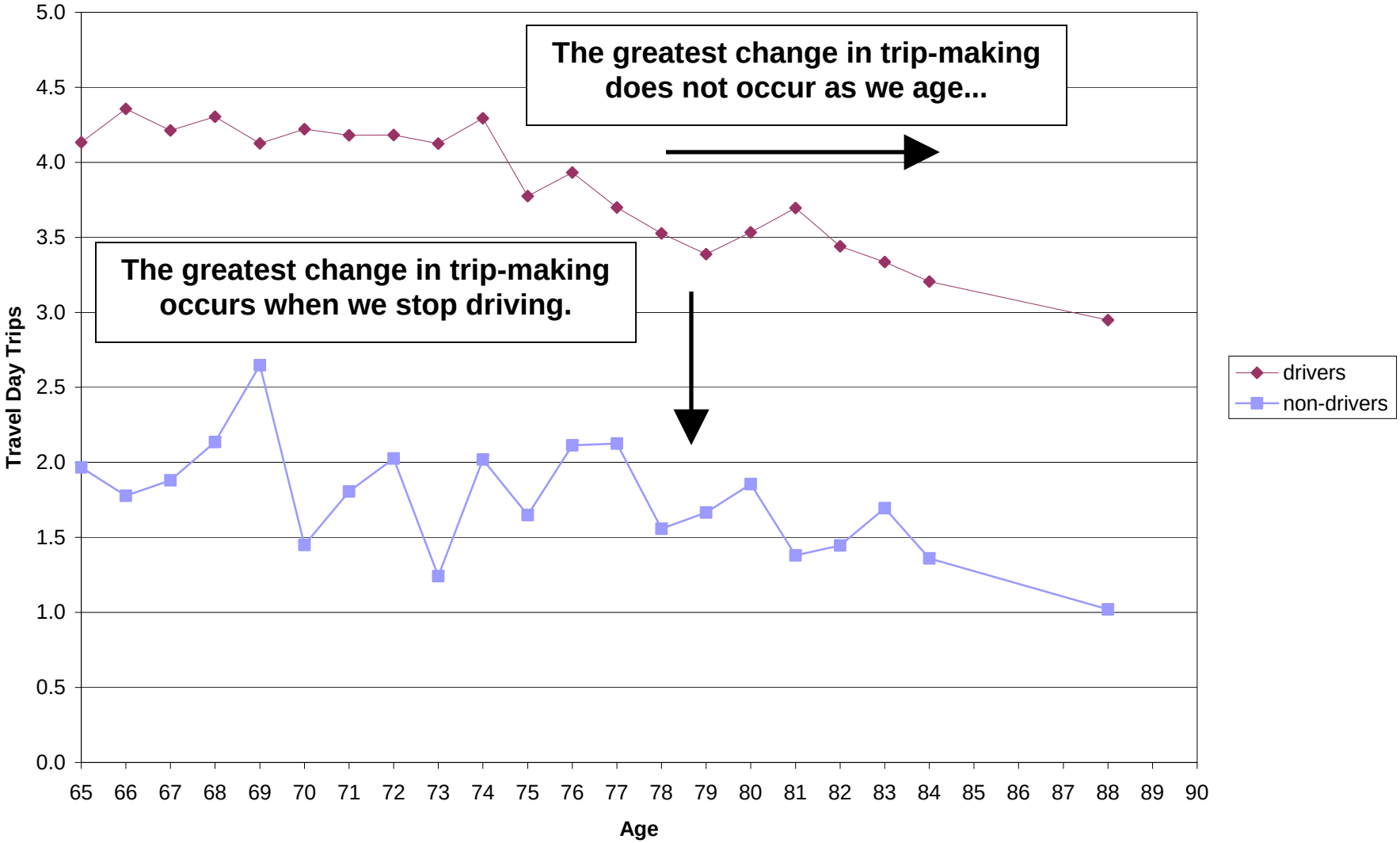
Trips per Day, 65+, NHTS, National Sample, 2001



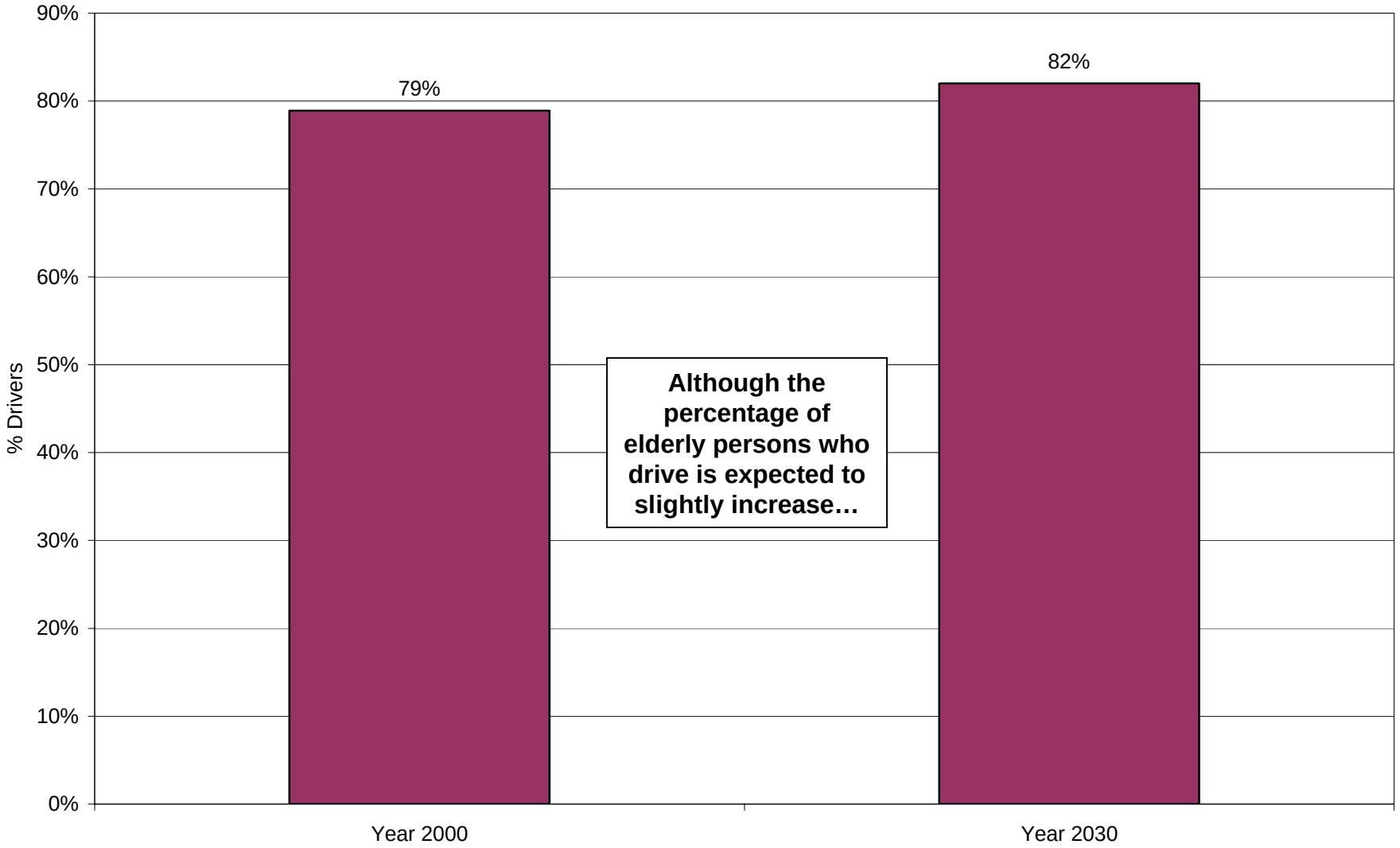
Trips per Day, 65+, NHTS, National Sample, 2001

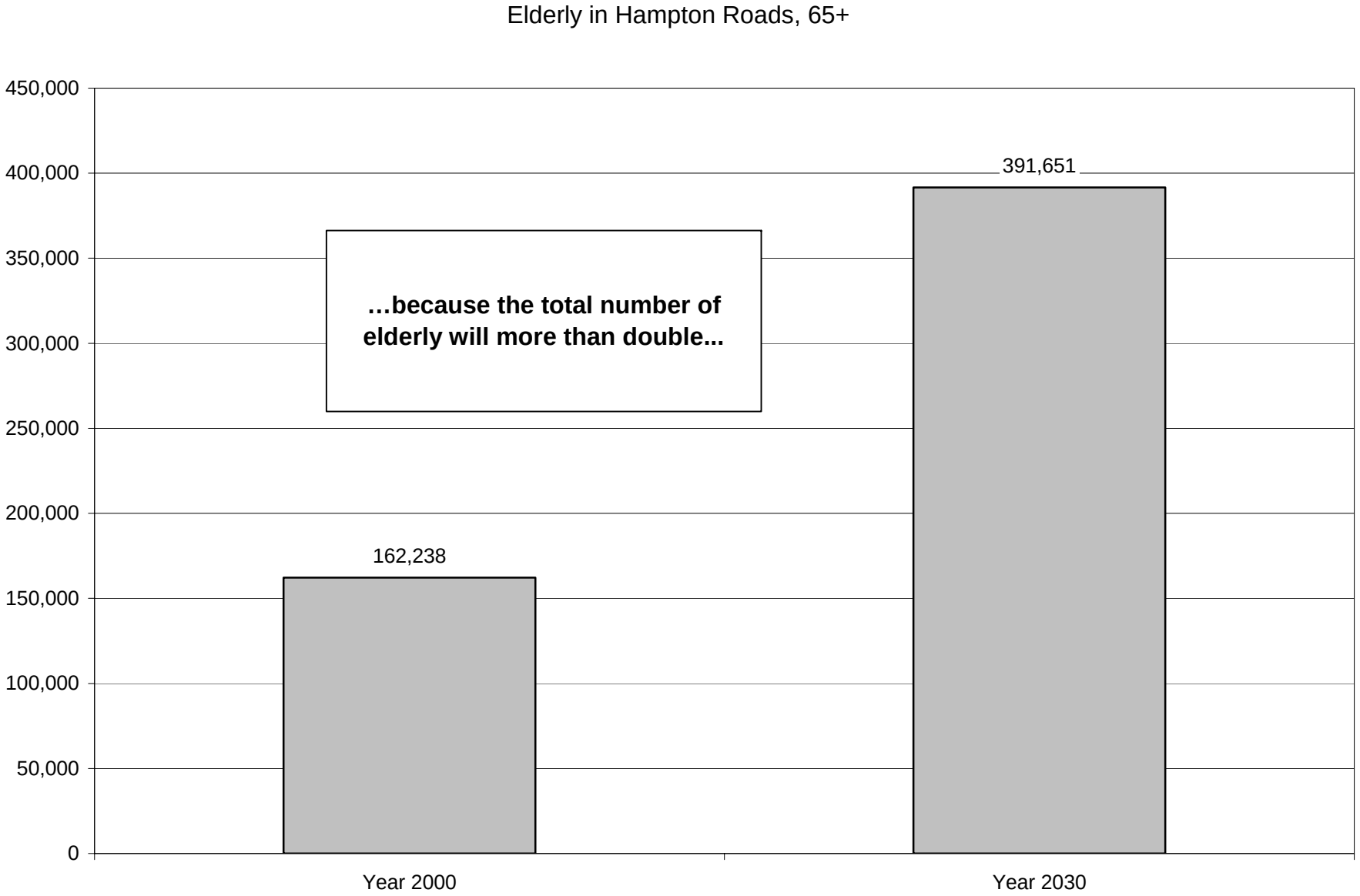


Trips per Day, 65+, NHTS, National Sample, 2001

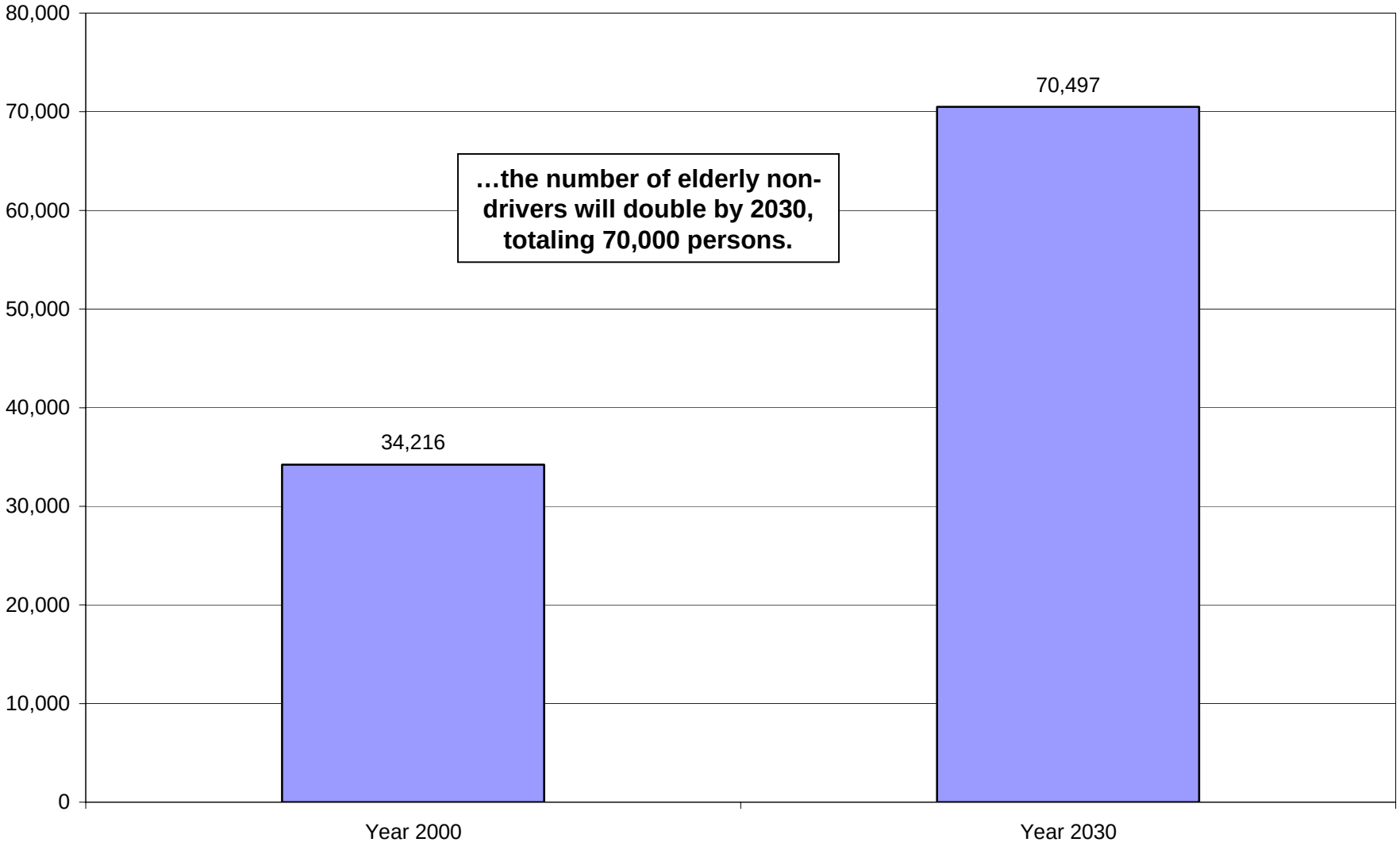


Driver Status, Elderly 65+, US




Elderly in Hampton Roads, 65+
450,000
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
391,651
…because the total number of elderly will more than double...
162,238
Year 2000
Year 2030

Non-drivers 65+, Hampton Roads



Significance of Mobility

- "…many older people see mobility as inextricably linked to personal image, dignity, and well-being."
- "Other research has suggested that the ability to stay connected to friends and community is an important element to physical and mental health."
- "Most adults equate mobility with the ability to drive; the loss of driving is seen as a handicap, which results in, at best, a change in lifestyle and, at worst, the end of life as they know it."

Source: Transportation in an Aging Society, TRB, 2004, p. 275

Investigation of Need- Findings

- Is there a problem in elderly transportation?
  - Do the elderly desire to travel more?
    - Yes- the elderly are more likely to be non-drivers, and non-drivers travel half as much as drivers.
  - How many of them will not be driving?
    - In 2030 in Hampton Roads there will be 70,000 elderly non-drivers, twice as many as today.

Improving Elderly Mobility

- What can be done to increase the mobility of elderly non-drivers?

National Experts

- Sandra Rosenbloom, Ph. D.
  - Director, Drachman Institute and Professor of Planning, University of Arizona
  - Four Strategies should be considered for elderly mobility:
    1. "promoting the centralization of a metropolitan area"
    2. "target public transit services…directly for the elderly"
    3. "support alternative transportation options, for example by encouraging ride-sharing, introducing voucher programs, and strengthening the role of for-profit transportation providers"
    4. promote safety by "improving the highway and street infrastructure" especially for pedestrians

Source: "Regional Report", Sacramento Area Council of Governments, Nov. 2003, p. 5

Research Methodology

- Quantification of improvements to elderly non-driver mobility was not found in existing research.
- Therefore, original research was conducted for this HRPDC study using data from the National Household Travel Survey (NHTS).
  - The 2001 NHTS covered 66,000 households across the U.S., including 4,230 non-drivers age 65+.

Statistically Significant in Elderly Non-Driver Mobility

Using regression techniques, 12 variables were found to be significantly related to the trip-making[2] of the 4,000+ elderly non-drivers surveyed:

1.	Diary Completion	(diarycmp1)[1]
2.	Medical Condition that Limits Travel	(con_tr1)
3.	Travel Issues Considered a Problem	(dtsum)
4.	Years Past Age 75	(over_75)
5.	Surveying Firm	(smplfirm1)
6.	Residential Density	(hthresdn1)
7.	Workers in Household (other than self)	(wrk_oth1)
8.	Before/After Sept. 11, 2001	(tdboa9111)
9.	Education Level	(educ1)
10.	One Adult with Child/children in Household	(lif_cyc5)
11.	Day of the Week	(travday7)
12.	Gender	(r_sex)

[1]Variable names used on following page are shown in parentheses.

[2]Trip-making ("tripswitch" on following page): value = 1 if made a trip; value = 0 if made no trip on subject day.

Calculation of Statistical Significance

Dependent Variable: **tripswitch**

Regression Statistics	
Multiple R	0.38803731
R Square	0.15057295
Adjusted R Square	**0.15**
Standard Error	0.46141271
Observations	4230

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	12	159.1488827	13.2624	62.2936	1.0016E-139
Residual	4217	897.8064365	0.2129		
Total	4229	1056.955319			

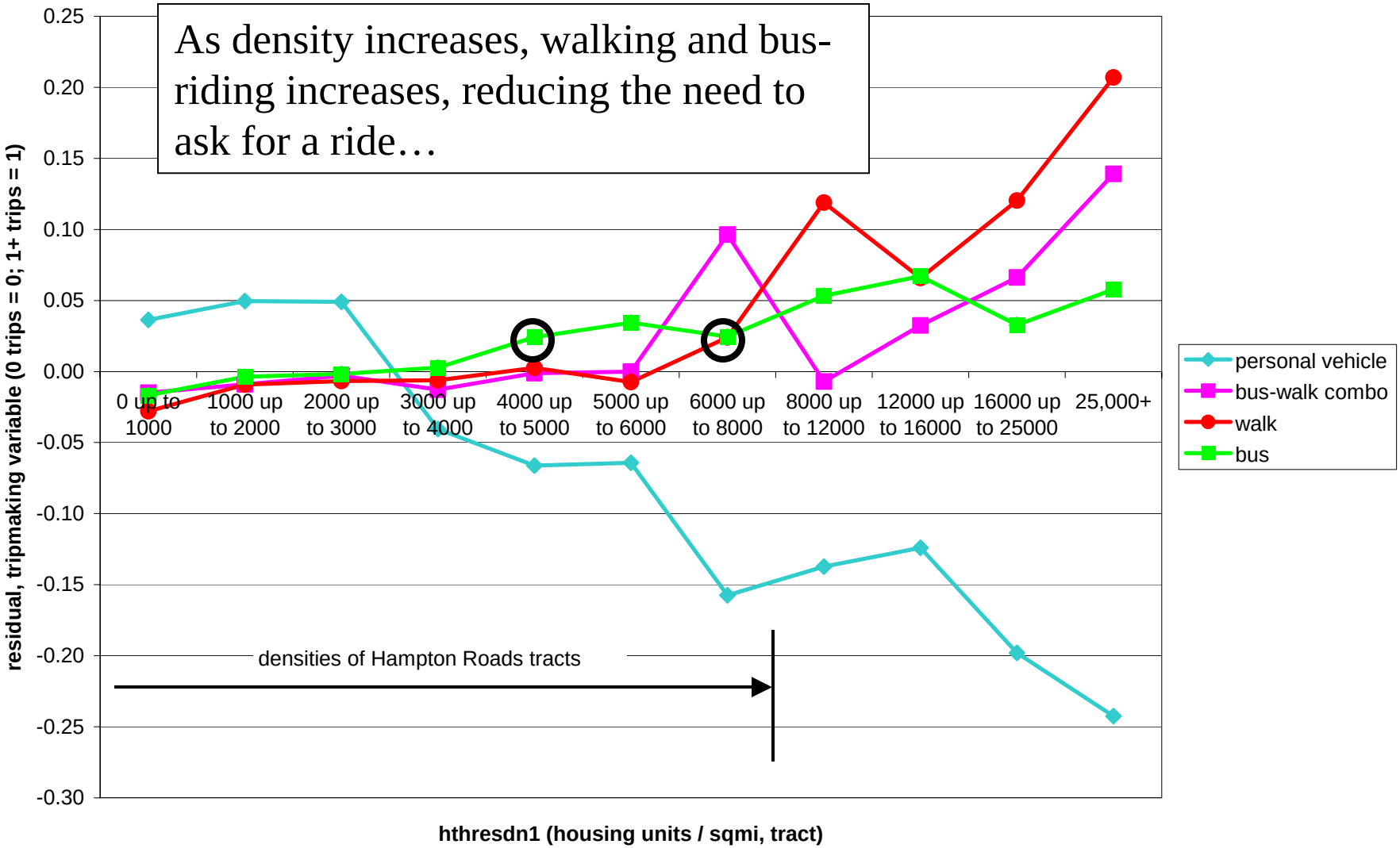
VARIABLES IN THE MODEL:						*Adjustable* 95% *Confidence Interval*	
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Tolerance*	*Lower*	*Upper*
Intercept	0.34	0.02	**13.96**	2.5E-43		0.29	0.38
r_sex	0.038	0.018	**2.12**	0.03423	0.94	0.003	0.073
travday7	-0.045	0.021	**-2.12**	0.034	1.00	-0.086	-0.003
lif_cyc5	-0.44	0.16	**-2.71**	0.00678	1.00	-0.76	-0.12
educ1	0.011	0.004	**2.67**	0.00758	0.96	0.003	0.019
tdboa9111	0.055	0.015	**3.58**	0.00035	0.96	0.025	0.086
wrk_oth1	-0.037	0.009	**-4.03**	5.6E-05	0.94	-0.055	-0.019
hthresdn1	4.0E-06	7.4E-07	**5.43**	5.9E-08	0.97	2.6E-06	5.5E-06
smplfirm1	0.11	0.02	**6.29**	3.5E-10	0.85	0.08	0.15
over_75	-0.010	0.001	**-6.98**	3.3E-12	0.92	-0.013	-0.007
dtsum	0.008	0.001	**5.51**	3.8E-08	0.88	0.005	0.011
con_tr1	-0.18	0.01	**-12.03**	8.8E-33	0.95	-0.20	-0.15
diarycmp1	0.26	0.02	**16.87**	8.1E-62	0.86	0.23	0.29

Note: See previous page for variable descriptions.

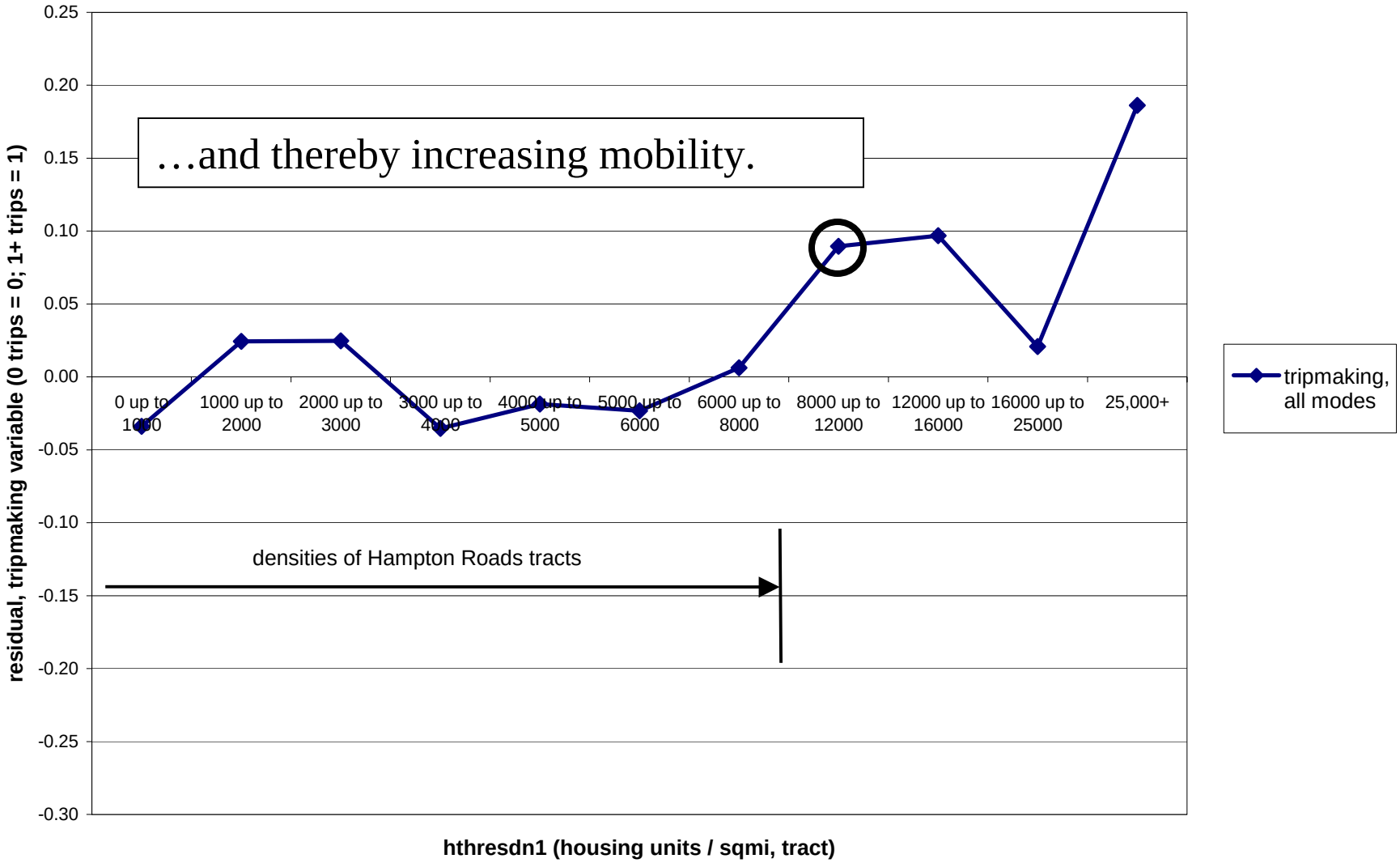
Residential Density

- Of these 12 variables, the one over which local government has some control is "Residential Density".
  - Therefore, *after accounting for the other 11 variables*, the impact of "residential density" was examined.

Impact of Residential Density on Tripmaking of Elderly Non-drivers, by mode



Impact of Residential Density on Tripmaking of Elderly Non-drivers



Residential Density and Trip-making

- Probable reasons for higher walk/transit trips in dense areas:
  - Sidewalks are more likely to be available
  - Destinations tend to be closer
  - Public transit is more likely to be available and more likely to be attractive (e.g. higher frequency of arrivals)

Residential Density and Trip-making

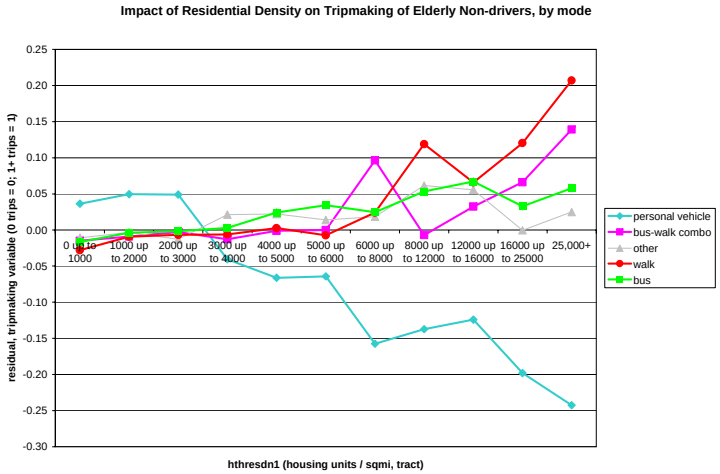
- Existing research corroborates this density impact
  - "Seniors make a higher percentage of their trips by walking than do other people…"
  - "One in three older non-drivers walks on a given day in denser areas, as compared to 1 in 14 in more spread-out areas."
  - "More than half of older non-drivers use public transportation occasionally in denser areas, as compared to 1 in 20 in more spread-out areas;"

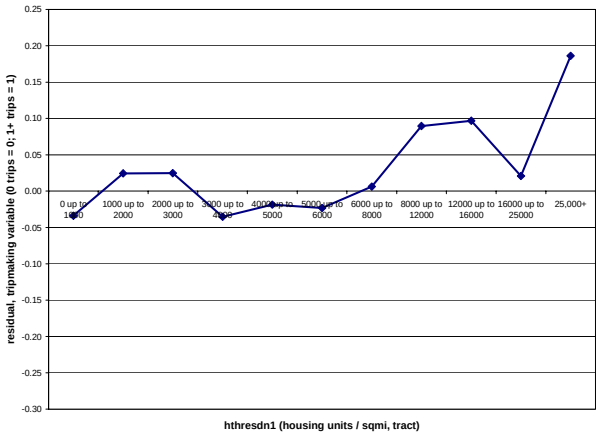
Source of first quote: "San Francisco Bay Area Older Adults Transportation Study", Metro. Transp. Comm., Dec. 2002, p. 2-11

Source of second and third quotes: Aging Americans: Stranded Without Options, Linda Bailey, Surface Transportation Policy Project, April 2004, p. 2

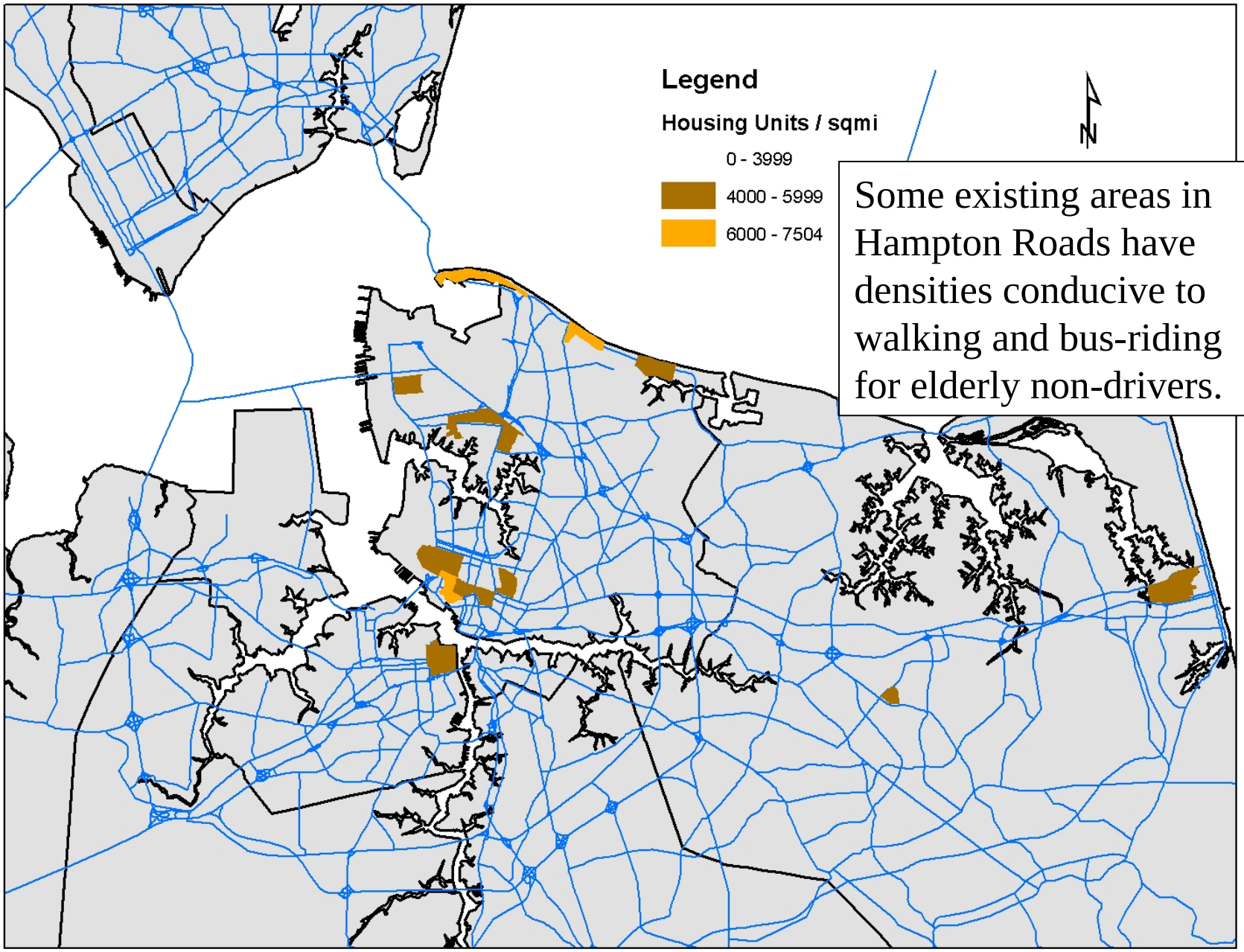
At What Densities do These Effects Appear?

- For the elderly non-driver
  - bus-riding increases above 4,000 housing units per sqmi.
  - walking increases above 6,000 housing units per sqmi.
  - total mobility greatly increases above 8,000 housing units per sqmi.



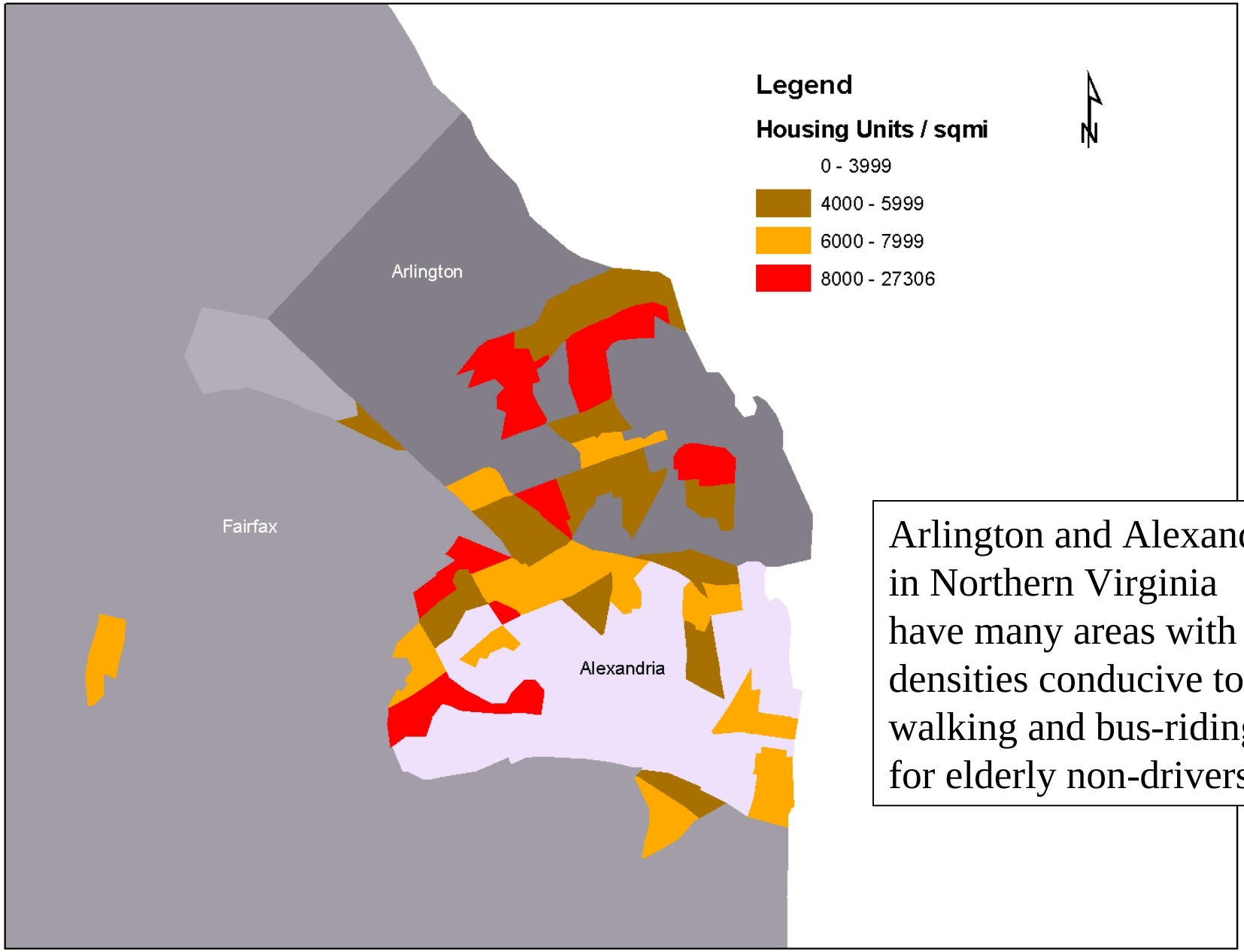


Housing Density, census tract, 2000



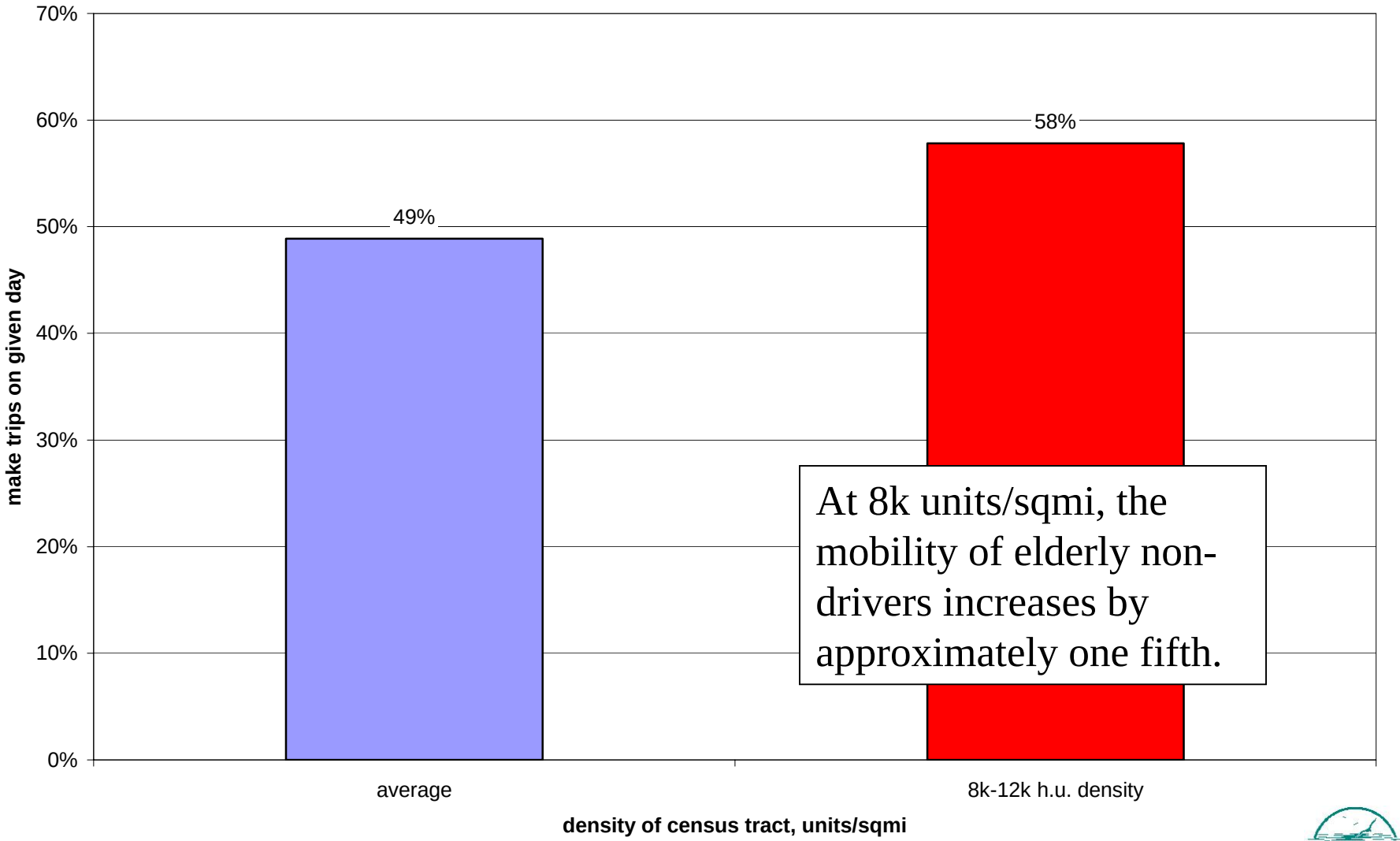
Some existing areas in Hampton Roads have densities conducive to walking and bus-riding for elderly non-drivers.

Housing Density, census tract, 2000



Arlington and Alexandria in Northern Virginia have many areas with densities conducive to walking and bus-riding for elderly non-drivers.

Density and Increased Mobility



At 8k units/sqmi, the mobility of elderly non-drivers increases by approximately one fifth.

Current Policy Examples in Hampton Roads

- Comprehensive Plan, Virginia Beach
  - West Pembroke Area Recommendations
    - "…redevelopment in this area should make special design provisions to accommodate bus transit, pedestrian mobility and possible alternative use of the old rail line for commuter transportation systems."
  - Elderly Housing Policy (e.g. zoning)
    - Policy T-4-6: "Housing opportunities for senior citizens and persons with disabilities should be located in corridors where public transportation operates."

Source: Comprehensive Plan, Policy Document, City of Virginia Beach, Dec. 2003

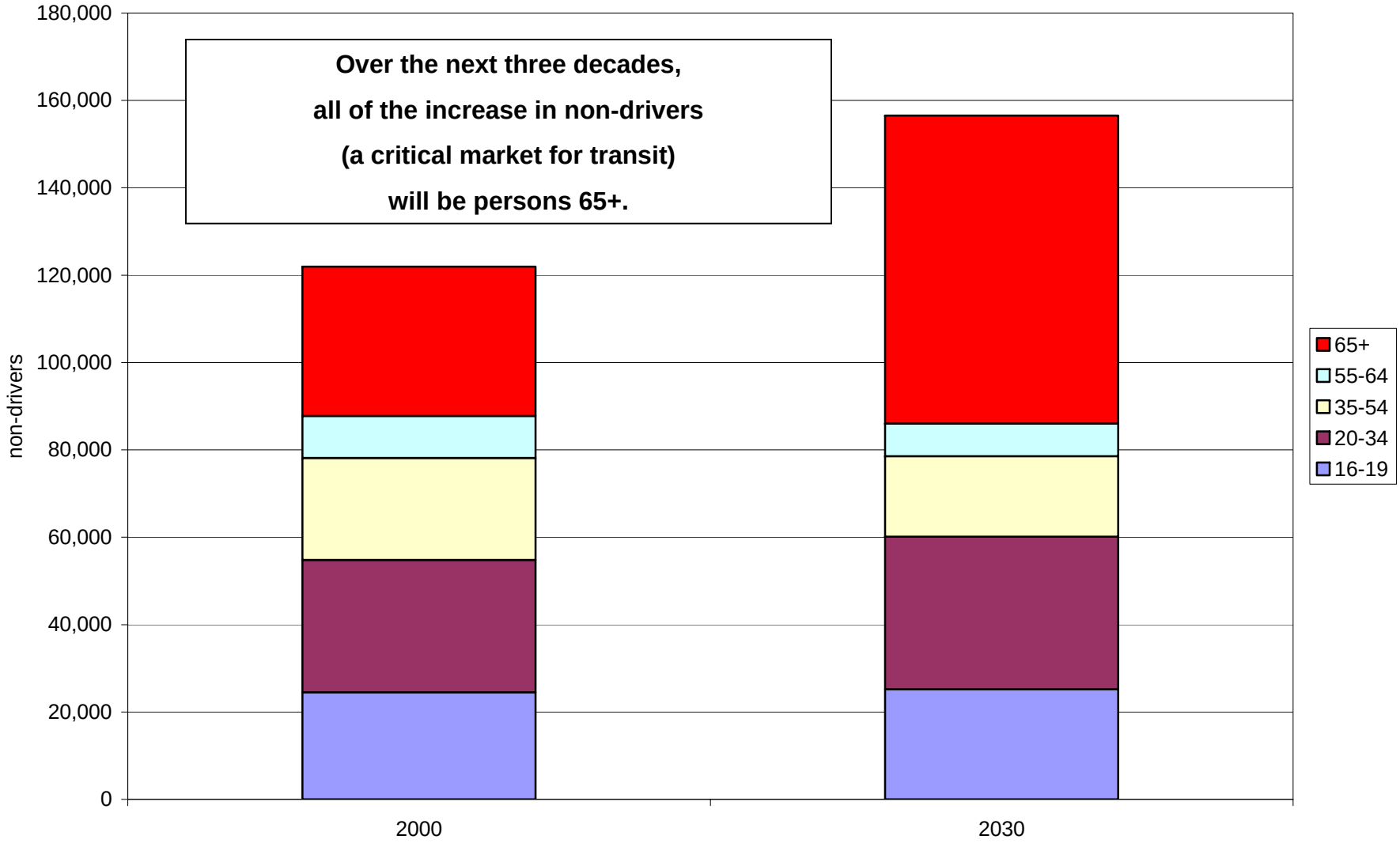
What can be done to increase mobility?

- Individuals can move to denser areas
  - For example, the downtown areas of Norfolk, Newport News, Portsmouth, and Hampton are dense and well-served by transit.
- Local government can align infrastructure and services with land use
  - Local government can improve pedestrian facilities (sidewalks, signal timing) and public transportation (frequency, speed, and options)
    - focusing on dense areas where walking and transit work best.
  - Local government can ensure that adequate portions of their localities are zoned for higher densities
    - particularly areas conducive to walking and having existing or planned high levels of transit service.

Adjusting Transit to Accommodate the Elderly

- Is there a need for transit service adjustment?
- How can transit service be adjusted to accommodate the elderly?

Non-Drivers, Hampton Roads



Public Transit & Elderly- Current Situation

- The challenge:
  - "The elderly are less likely to be regular transit users, even when transit is accessible…and when land use patterns are more favorable to transit."
  - "…transit use by older people fell by almost 50 percent between 1995 and 2001, when only 1.3 percent of all trips were made by transit."

Source, first quote: Transportation in an Aging Society, TRB, 2004, p. 204

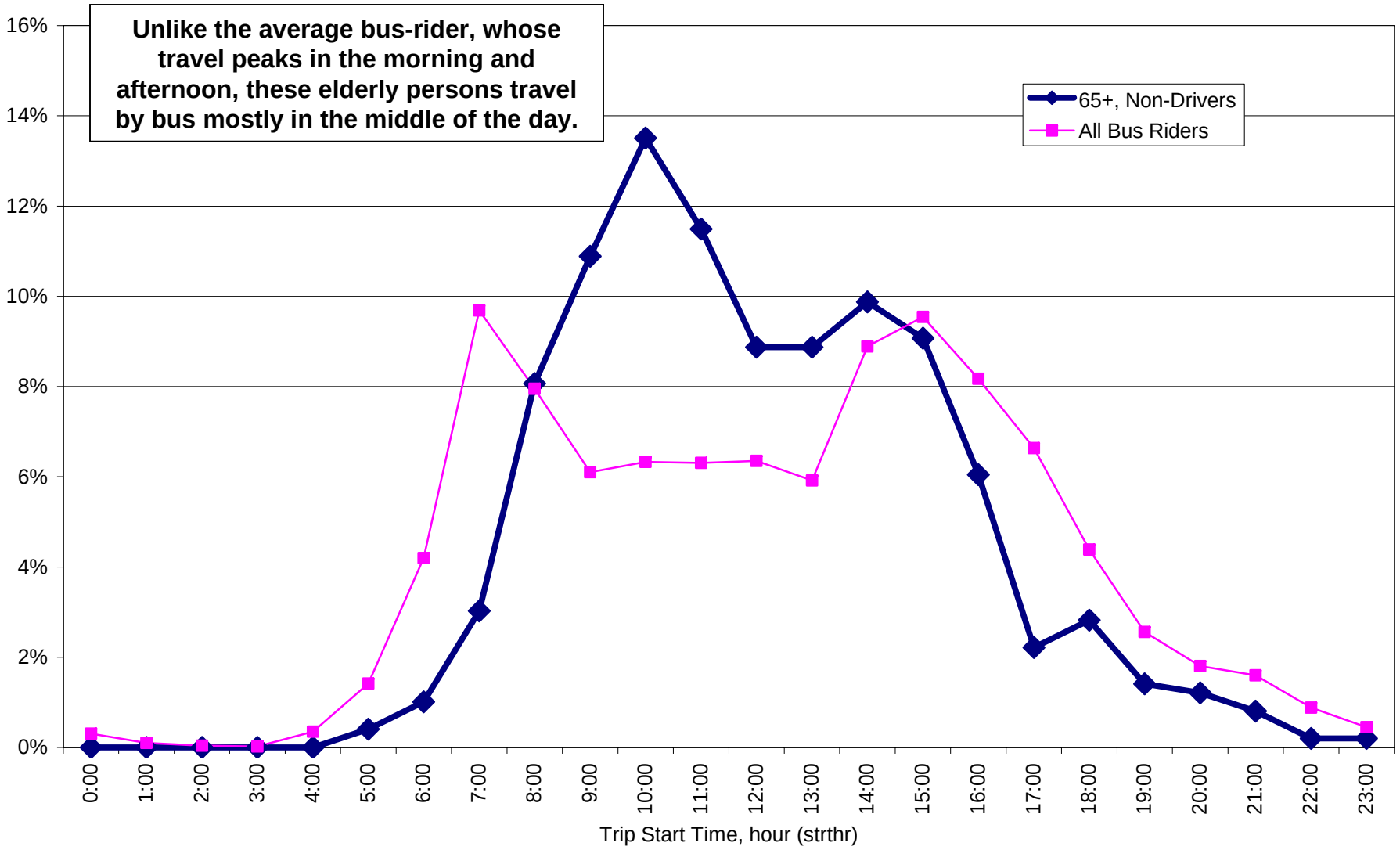
Source, second quote: "The Mobility Needs of Older Americans: Implications for Transportation Reauthorization", Sandra Rosenbloom, The Brookings Institution, Washington, DC, July 2003, p. 4

The Need for Adjusting Transit

- The need exists for adjusting transit service to serve the elderly.
  - A large “market” for transit use will exist in the elderly population in the future.
  - That market has been difficult to reach in the past.
- How can transit better serve the elderly?

Source: “San Francisco Bay Area Older Adults Transportation Study”, Metropolitan Transportation Commission, Dec. 2002

Bus Trips, NHTS, 2001



Community Buses

- "Some communities have been very successful with service routes and **community buses**—small accessible and scheduled buses in which the driver provides substantial assistance…. Community buses are also attractive because they are specifically routed to serve the origins and destinations of most interest to older people."
  - "Many systems have found that those who ride community buses are relatively healthy older people who are new to public transit or who used it only infrequently prior to the new services."

Source: "The Mobility Needs of Older Americans: Implications for Transportation Reauthorization", Sandra Rosenbloom, The Brookings Institution, Washington, DC, July 2003, p. 14

Adjusting Public Transit to Serve Elderly

- Higher frequency in middle of day
- Drivers providing assistance
- Routes designed to serve origins and destinations of elderly
- Vehicles designed for the elderly
- Marketing to the elderly

See also: “Improving Public Transit Options for Older Persons”, Transit Cooperative Research Program, TRB 2002

Window of Opportunity

- "The impact of the baby boom will start to be felt beginning in 2010, as the first wave of baby boomers turns 65."

Source: "San Francisco Bay Area Older Adults Transportation Study", Metropolitan Transportation Commission, Dec. 2002

Summary

- Is there a problem?
  - Yes- the elderly are more likely to be non-drivers, and non-drivers travel half as much as drivers.
- What can be done to increase the mobility of elderly non-drivers?
  - Local governments can improve pedestrian facilities and transit service,
    - focusing on dense areas.
  - Local governments can ensure that adequate portions of their localities are zoned for higher densities,
    - particularly areas conducive to walking and having existing or planned high levels of transit service.
  - Local governments can adjust transit service to accommodate the elderly.
    - time of day, drivers, route design, vehicle design, marketing