

# Summary of 1990 Census Data Uses and National Experience

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Elaine Murakami, *Federal Highway Administration*

There were two important outcomes from the 1994 conference. The first is the *Census Mapbook for Transportation Planning* (1). This document began to be developed at the 1994 conference. The Census Mapbook is a collection of examples from state, regional, and transit operators of how census data are used in geographic information systems (GIS); it has been used in GIS-T training sessions by FHWA, the National Transit Institute, and some universities. It is also intended to provide ideas for presenting information during the public involvement process in transportation planning. This document is very rapidly becoming out of date.

The other direct outcome from the last conference was the Bureau of Transportation Statistics study on the continuous measurement alternative to the long form. Copies of that study were handed out to participants; Phil Fulton will discuss the project later in this conference.

Journey-to-work travel still represents the largest segment of daily long-distance trips, excluding vacation trips. In 1990, the Nationwide Personal Transportation Survey (NPTS) estimated that the average work trip was 9.5 miles and accounted for 36 percent of the vehicle miles of travel in urbanized areas. Thus, understanding the journey to work is still very important in transportation planning, even if the census questionnaire does not include all daily travel.

In terms of uses of census data at the national level, three come to mind: national consistency, household travel surveys, and transit markets.

## NATIONAL CONSISTENCY

National consistency has really benefitted from having a consistent method and a consistent question on journey-to-work travel across the country. First and foremost in using this information from the census is Alan Pisarski's *Commuting in America II* (2). The first *Commuting in America* was completed after the 1980 census and provided the ability to look at commuting trends and flows at the national level. Table 1 shows the commuting flow by metropolitan areas in the United States. It documents the importance of suburban-to-suburban flow, which is now the largest, with 35.4 million commuters.

TABLE 1 Commuting Flow (in millions)

		To	
		Central City	Suburbs
From	Central City	24.3	5.9
	Suburbs	15.2	35.4

Another project that benefitted from the consistency of the census is the *Handbook on Conversion Factors for the Use of Census Data* (3) that COMSIS is currently completing for FHWA, basically as a training activity. This handbook shows how areas that have limited or outdated regional household survey data can use census data as the seed for estimating their home-based work trips and for their travel demand models. Since some models use home-based work trips to estimate non-home-based trips, this makes estimation of home-based work trips even more important.

Some other projects have also benefitted from the ability to compare information over time. Texas Transportation Institute (TTI) completed a project for FHWA on travel speeds (4). For metropolitan areas in which traffic analysis zones could be made comparable between 1980 and 1990, TTI looked at the reported trip times and calculated speeds in terms of three geographic patterns: suburbs to central cities, which are radial flows; central cities to suburbs, which are reverse flows; and suburb-to-suburb flows, which are circumferential. Their report showed that there was an overall improvement in travel speed and indicated that it was a reflection of suburban employment growth. As Pisarski has discussed in some of his work, this improvement also reflects the shift from transit and carpooling to driving alone.

Finally, another FHWA project, with Norfolk State University, considered commuting patterns by race, ethnicity, and gender using the 1980 and 1990 Public Use Microdata Sample (PUMS) to look at the question of spatial mismatch. More than 25 years ago, Kain hypothesized that the growing suburbanization of jobs and continued racial segregation in the inner cities would limit African-Americans from access to employment in suburban locations. The census data support the spatial mismatch hypothesis for three metropolitan areas and particularly for women. African-Americans and Hispanic-Americans, particularly women, use transit much more frequently than do white Americans, but even after controlling for travel mode and considering only those who were using private vehicles for their travel, African-American women are traveling longer than poor white women. Those in the service industry and those with low incomes are traveling longer than both white men and white women, which contradicts some of the generalities about men traveling longer than women. The data need to be disaggregated to ensure that the transportation needs of diverse groups are being met.

## HOUSEHOLD TRAVEL SURVEYS

The next use of census data at the national level is for household travel surveys. FHWA has sponsored a research project through Battelle with Penn State University to work with the Puget Sound Transportation Panel (PSTP) data. The PSTP is important at the national level because it represents the first test of a general-purpose longitudinal transportation panel, and it can assist in the evaluation of alternatives to traditional transportation survey methods.

One of the first steps in this project was to develop weights for the first four waves (1989 to 1993), accounting for sample stratification, pre-wave self-selection, missing data, and panel attrition.

Other components of this project include analysis of mode transitions over time and analysis of travel and activity over time. The PSTP suffered from sample bias similar to problems experienced in other regional household travel surveys. Households with low incomes, large

household size, and fewer than two cars were the most likely not to participate. Using the PUMS was a critical component in calculating the weights to adjust for these problems. When metropolitan case studies are discussed, the topic of sample bias will come up again.

The next concern is households without phones. Using the PUMS data, the University of Michigan Population Studies Lab conducted a project to see what the impact of doing a telephone survey would be for conducting the 1995 NPTS. Although this project was completed before the 1994 conference, I wanted to discuss it again because FHWA has become very concerned about nonresponse to these travel surveys, and a whole series of work related to non-response has begun in the last few months. In the 1995 NPTS, people were asked if they had been without a telephone in the last 12 months because those who have been recently without a telephone are likely to be more similar to those who currently do not have a telephone, particularly in urban areas. Table 2 and Figure 1 show that by not interviewing households without telephones, the samples are biased by not well representing those without vehicles. Nationwide, 5 percent of households are without telephones. When measuring travel behavior for a regional area and trying to improve transportation services, researchers can add some bias into the information by not accounting for households without telephones.

TABLE 2 Households Without Phones: 1990 Census 1 Percent PUMS

Characteristic	Total Hhlds	No Phone	% No Phone
All households	910,770	48,445	5.3
<u>Region</u>			
Northeast	186,902(20.8)	6,035(14.1)	3.6
Midwest	216,109(24.2)	9,647(20.1)	4.4
South	308,741(34.2)	24,160(49.5)	7.6
West	183,415(20.8)	7,799(16.3)	4.1
<u>County of residence</u>			
Central city	149,019(19.6)	8,629(23.3)	6.3
Suburbs	410,493(47.3)	12,584(28.6)	3.2
MSA - entire	77,986 (8.7)	4,299 (9.3)	5.7
Mixed area	27,382 (2.9)	1,485 (2.9)	5.2
Outside MSA/PMSA	245,890(21.5)	21,448(36.0)	8.8
<u>Poverty Tenure</u>			
Below poverty	115,789(12.9)	21,977(45.4)	18.6
At or above poverty	794,981(87.1)	26,468(56.6)	3.3
<u># Vehicles Available</u>			
None	94,980(11.6)	16,392(37.1)	16.8
One	297,775(33.7)	20,991(42.2)	6.6
Two or more	518,015(54.7)	11,062(20.7)	2.0
<u>Race of Householder</u>			
White	778,182(83.8)	31,540(62.3)	3.9
Black	84,172(10.7)	11,462(26.4)	13.0
Asian	18,356 (2.1)	402 (1.0)	2.4
Native American	6,841 (0.7)	1,681 (3.0)	23.6
Other	23,219 (2.7)	3,360 (7.4)	14.6
<u>Head Hispanic Origin</u>			
Non-Hispanic	856,190(93.7)	41,851(85.3)	4.8
Mexican	31,812 (3.6)	4,332 (9.1)	13.4
Puerto Rican	6,575 (0.9)	1,010 (2.6)	16.3
Cuban	3,681 (0.4)	140 (0.3)	4.0
Dominican	1,173 (0.2)	230 (0.6)	20.3
Other Hispanic	11,339 (1.3)	882 (2.0)	7.9

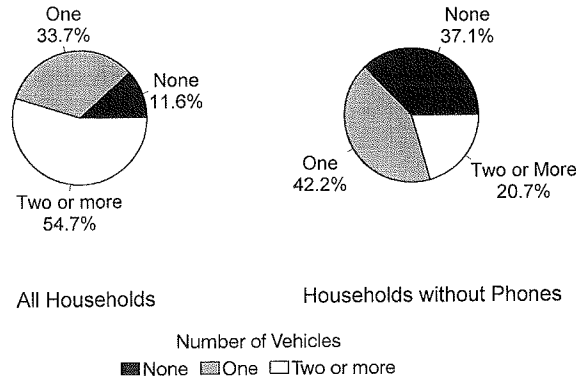


FIGURE 1 Vehicle availability by telephone availability: 1990 census 1 percent PUMS.

The last project related to travel surveys is the Travel Model Improvement Program (TMIP). Track C of TMIP is the TRANSIMS project at Los Alamos, where a combination of STF3 for small geographic units and the individual records from PUMS is being used to develop a microsimulation of households, and the individual records from a PUMS are applied back to the smaller geographic units, in this case, census tracts. Microsimulation at the household level holds promise for improvements in current travel forecasting procedures.

**TRANSIT MARKETS**

I was quite surprised at all the work that has been done on the transit side with census data. Right now the census data are the best data available on characteristics of current and potential transit users.

Another reason that the census data are best for transit analysis is that the census provides information on households without vehicles. It is commonly thought that there aren't that many households without vehicles anymore, and nationwide it is something like 11 percent. However, if the data are compared by race, 30 percent of African-American households have no vehicle compared with 8.7 percent of white households. Further, if one looks at households in which the head of the household is under age 25 or at African-American households, the proportion without a vehicle is 46 percent (Figure 2).

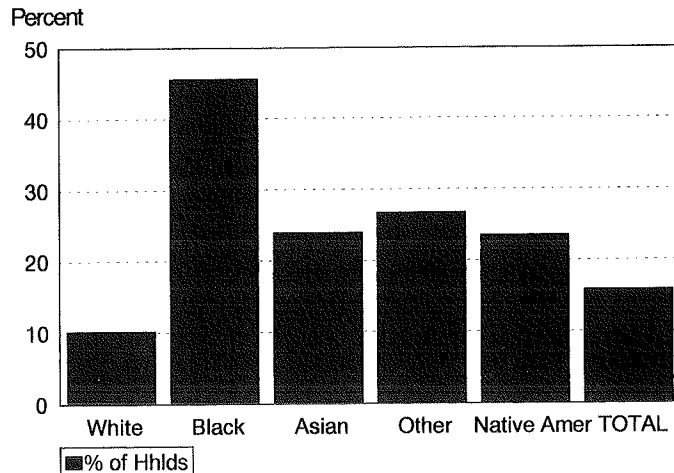


FIGURE 2 Households without vehicles where head of household is under age 25: 1990 census 1 percent PUMS.

To me, this was an astounding number. At the other end of the age range, the proportion of African-American households with a householder age over 65 was 43 percent in 1990. Between 1980 and 1990, those proportions have not shifted very much (Table 3).

Many reports have used the census data to describe those who currently use transit for their journey to work. The Joint Center for Political and Economic Studies just completed a report for FTA (5), Sandra Rosenbloom is working on a Transit Cooperative Research Program project (6), and Betty Deakin and Chris Porter at the University of California, Berkeley, are also working on a project for FTA related to land use development and rail (7). The census provides a large enough sample to distinguish those riding the bus from those riding commuter rail; these populations are very different. To no one's surprise, bus riders are most likely to be women; many are African-American and Hispanic, and many do not have a car available. Those who ride commuter rail are more likely to be men with higher incomes who travel very far.

Finally, another transit market is immigrant households. Figure 3 is a graph from the Drachman Institute showing transit use for the journey to work and the number of years since immigration. For those who immigrated between 1985 and 1990, 20 percent of trips for journey-to-work travel are by transit, and for those who immigrated between 1975 and 1984, the transit share was 14 percent. Several papers have been done for FTA and TCRP that are really looking at the impact of immigrant populations and transit use.

In summary, all the projects mentioned that used census data have occurred in the last 2 years, reflecting a growing use of census information in the transportation field. These projects show how census data are used for evaluating transportation investments and understanding employment access and vehicle availability. Many states are currently changing their welfare requirements and limitations on obtaining welfare benefits. An understanding of who is currently driving alone and who is using transit is particularly relevant for a look at the limitations the states have on their assets and at the development of alternatives to driving alone.

**TABLE 3 Households with Zero Vehicles by Age of Householder**

1980 Census PUMS (1% sample)

	<25 Yrs	25-34	35-44	45-64	65+
White	11.6	7.2	5.5	7.8	29.0
Black	43.9	29.5	25.3	29.1	51.5
Asian	21.8	14.5	9.9	13.7	40.1
Other	29.4	23.5	23.3	28.1	51.2
Native Am	24.6	19.7	16.5	22.4	39.4
TOTAL	16.0	10.5	8.3	10.4	31.2

1990 Census (PUMS 1% sample)

	<25 Yrs	25-34	35-44	45-64	65+
White	10.2	5.4	4.0	5.2	20.0
Black	45.6	30.7	23.9	26.0	42.6
Asian	24.0	13.1	9.8	10.6	33.8
Other	26.8	18.6	16.6	21.2	42.1
Native Am	23.6	16.0	9.5	14.1	29.9
TOTAL	15.9	9.2	6.9	8.0	22.4

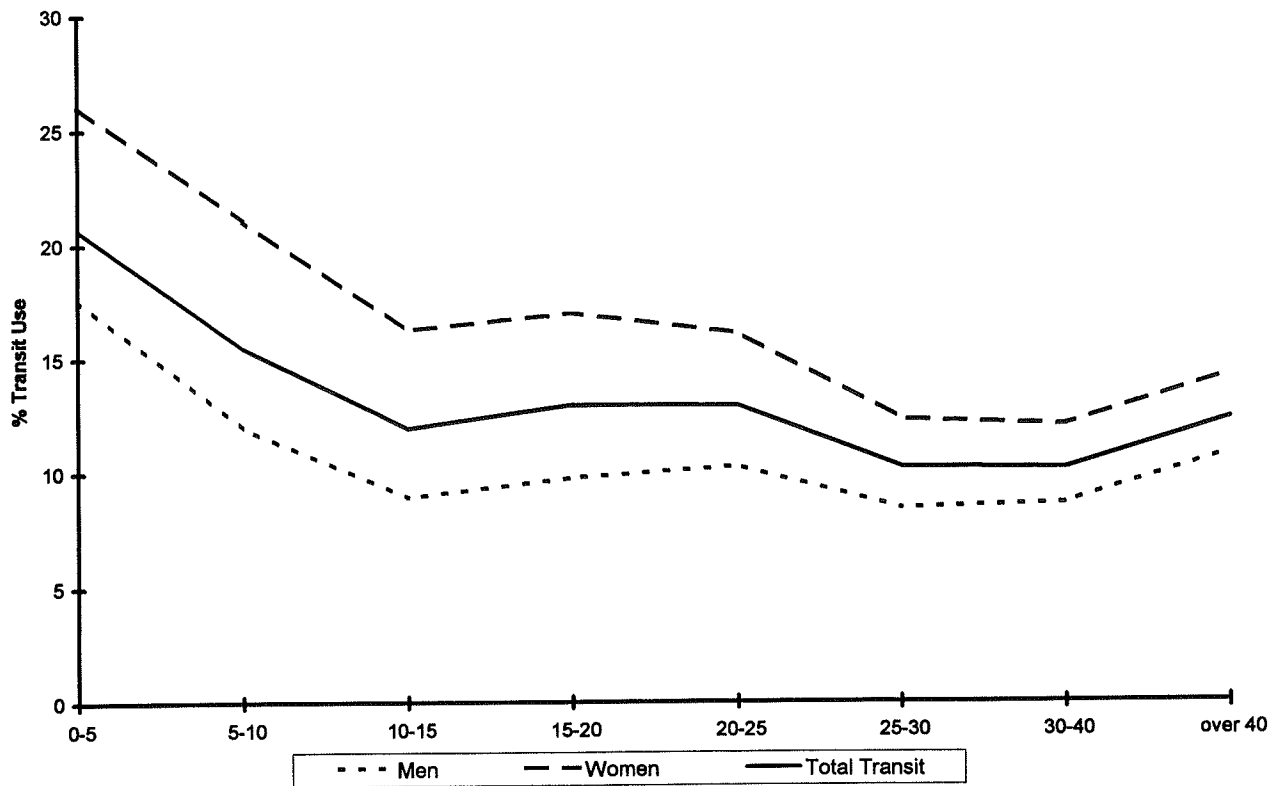


FIGURE 3 Transit use to work by immigrants by sex and number of years in the United States (Drachman Institute from unpublished tape-readable data, 1990 U.S. census).

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