

# The 1984 Home Interview Survey in the Dallas-Fort Worth Area: Changes in Travel Patterns, 1964–1984

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A recent travel survey in the Dallas-Fort Worth metropolitan area identified some important changes in trip generation rates. Due to the demographic and labor force changes in the Dallas-Fort Worth area during the 1970s and 1980s, the number and share of home-based nonwork person-trips per household declined. The shares and numbers of home-based work and non-home-based trips have increased during this period. The reduction in home-based trip rates has important implications for urban development and transportation planning. According to the 1984 Dallas-Fort Worth travel survey, the average household-trip rate was 8.68 trips/day, which was fairly stable since 1964. Person-trips per person and vehicle-trips per person, however, increased since 1964, reflecting the smaller household size and automobile occupancy rates of recent periods. The results of the 1984 travel survey also indicated that average trip length in the metropolitan area was about seven mi, average trip duration was 17–19 min, automobile occupancy rate was 1.13 for work trips and 1.5 for nonwork trips, transit mode share was 1.7 percent, and peak-hour travel times were 7–8 a.m. and 5–6 p.m.

Some schools of transportation planning and travel forecasting contend that travel behavior is stable over time and that travel forecasting parameters can be held constant without need for repeated surveys (1). Though this assumption may prove true in stable areas, the assumption must be validated in a region experiencing major change. A new travel survey was conducted in the Dallas-Fort Worth area in 1984 because of anticipated major demographic changes involving household size and work habits. It is the premise of this paper that even though overall person-trip rates may be reasonably stable over time, changes in the composition of person-trips in the last two decades have been significant enough to warrant updating the existing travel forecasting models.

The purposes of this paper are, first, to shed light on the recent changes in trip patterns due to a relative increase in home-based work (HBW) trips and an absolute decline in the average number of home-based nonwork (HNW) trips per household; second, to provide summary information on the findings of the 1984 Dallas/Fort Worth travel survey; third, to discuss some methodologically relevant issues that could be helpful for future surveys; and fourth, to discuss the implication of the changes in household travel patterns for the model refinement efforts of a transportation planning agency.

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In the next section an overview of the changes in the frequency and composition of person-trips due to the shift away from HNW trips is offered. The Dallas-Fort Worth area travel survey results are compared with recent survey results from San Francisco, Denver, Houston, and Atlanta.

In the following section, the salient features of the North Central Texas Council of Governments (NCTCOG) survey are reviewed and 20-year longitudinal comparisons for such travel characteristics as peak-hour travel time, travel duration, trip length, automobile occupancy rates, and travel mode are provided. When available, comparable data for other metropolitan areas are also provided.

In the next section, certain methodological issues that have implications for trip frequencies and composition are discussed, for example, the implications of the choice of the survey time period for frequency of school trips and the impact of trip linking on the share of each trip purpose.

In the final section, the survey results are applied to model validation and calibration.

## THE 1984 NCTCOG HOME INTERVIEW SURVEY: WHAT TRENDS CAN BE DETECTED ABOUT CHANGING TRAVEL PATTERNS IN THE POST-1980 PERIOD?

A frame of reference for the 1984 travel survey is created by looking at the changes in the Dallas-Fort Worth area travel patterns since 1964 and finding commonalities with other metropolitan areas. Implications of the changes for model refinement efforts are then examined.

### The Survey

Between April 23 and July 13, 1984, interviews of 2,471 households were conducted at their places of residence, and demographic and travel information for the household members 5 years old and over were recorded. Some 20,200 person-trip records were created for all the vehicular trips made by 6,403 persons in the sample households. The only exceptions to vehicular trips were walk-to-work trips. Weighted by the total number of households in the NCTCOG transportation study area, the sample households represent over 1 million households and approximately 10 million trips in 1984 (Table 1).

TABLE 1 PERSON-TRIPS BY PURPOSE—1964 AND 1984 TRAVEL SURVEYS (2, 3)

WEIGHTED SAMPLES			
	1984	1964	
	Person Trips	Person Trips	Percent Change
HBW Column %	2,600,433 26.99	1,026,338 20.90	153.37
HNW Column %	4,601,088 47.75	2,915,587 59.40	57.81
NHB Column %	2,433,963 25.26	964,735 19.70	152.29
Total	9,837,655	4,906,660	100.5

\* Person trips include all in-vehicle trips (driver, auto and carpool passenger) and transit trips. They exclude taxi, school bus, walk, bicycle, and "other" modes. This information does not reflect "external" related travel.

### Changes Since 1964

The last time a comprehensive travel survey was conducted in the region was 1964. The data in Table 1 show that in the 20-year period the total number of trips doubled from 4.9 to 9.8 million, an annual increase of 5 percent. The greatest change occurred in HBW and NHB trips—each showing an increase of over 150 percent in the 20-year period. Home nonwork trips, which include trips that originated in homes for shopping, school, and personal business purposes, showed a relative decline, as indicated by a reduction in their share of total trips from 59 to 48 percent of all person-trips. Home-based work and non-home-based (NHB) trips increased their combined share from 41 to over 52 percent of all person-trips (Table 1).

Paralleling the shift in the composition of trips is a change in the frequency of person-trips. On the one hand, there has been a slight decline in the average number of person-trips per household from 9.12 in 1964 to 8.68 in 1984 (Table 2), and on the other hand, an increase in the number of person-trips per person from 2.73 in 1964 to 3.40 in 1984 (Table 3). Similar shifts occurred in other metropolitan areas.

The shift in the relative frequency of the three trip purposes in the past two decades is partially explained by the changes in the demographic profile of the region. Increased labor force participation by 1980 of women from about 40 percent to over 58 percent of the population aged 16 years and over is one of the reasons for the increased share of HBW trips. The 1980 census of the Dallas-Fort Worth SMSA shows that an average of 1.44 persons per household were employed in 1980, compared to 0.92 persons in 1960. This increase in the number of working people per household has resulted in more than a

twofold increase in the work force in the 20-year period at an average growth rate of 6.1 percent annually, whereas the population aged 16 years and over has less than doubled at 4.45 percent annually.

Another demographic transformation in the region that has contributed to shifts in trip patterns is the reduced household size. In 1964, the average household size in the region was 3.22, whereas in 1984 it declined by 21 percent to an average of 2.55 persons. The combined effects of a higher labor force participation rate and smaller household size produced fewer HNW trips as household members reduced the frequency of departures from home by consolidating their trips. The extent of this shift in the frequency of HNW trips is reflected in the travel surveys of other metropolitan areas.

### Commonalities with Other Metropolitan Areas

The trend shown in the 1984 NCTCOG survey towards a reduced share of HNW trips is supported by other travel surveys in the 1980s. The San Francisco Bay Area Travel Survey of 1981, the Denver Regional Council of Governments 1985 Travel Survey, and the Atlanta Area Survey of 1980 all show declining absolute numbers of HNW trips per household (Table 2). In all these surveys, the decline in the frequency of HNW trips has contributed to a slight decline in the overall number of trips per household. Furthermore, the parallel decline in the relative importance of HNW trips in these areas is shown by the declining share of HNW trips as a percentage of all trips, from a high of 59 percent in 1964—in the case of the Dallas-Fort Worth area—to a low of 47 percent in 1984 (Table 4).

TABLE 2 PERSON-TRIPS PER HOUSEHOLD—COMPARISON OF THE 1984 NCTCOG SURVEY WITH OTHER SOURCES (2-7)

	HBW	HNW	NHB	ALL TRIPS
Dallas/Fort Worth - NCTCOG Survey,* 1984 (2)	2.29	4.32	2.07	8.68
SDHPT Survey, 1964 (3)	1.91	5.42	1.79	9.12
% Annual Change, 1964-1984	0.99%	-1.01%	0.78%	-0.25%
San Francisco Bay Area Survey,* 1981 (4)	1.89	4.49	2.35	8.71
1965	1.86	5.01	1.91	8.78
% Annual Change, 1965-1981	0.001%	-0.63%	1.41%	-0.001%
Denver Regional COG Survey,* 1985 (5)	1.96	3.40	1.97	7.33
1971	2.03	4.31	1.75	8.09
% Annual Change, 1971-1985	-0.25%	-1.51%	0.90%	-0.67%
Houston-Galveston Area Survey, 1984 (6)	2.11	3.89	2.92	8.92
Atlanta Area Survey, 1980 (7)	1.95	4.45	1.87	8.27
1972	2.03	4.80	1.65	8.48
% Annual Change, 1972-1980	-0.33%	-0.61%	1.11%	-0.21%

\* Based on Linked Trips

TABLE 3 DISTRIBUTION OF TRIP PURPOSES—COMPARISON OF THE 1984 NCTCOG SURVEY WITH OTHER SOURCES (2-7)

	HBW	HNW	NHB	ALL TRIPS
Dallas/Fort Worth - NCTCOG Survey, 1984 (2)	0.90	1.69	0.81	3.40
- SDHPT Survey, 1964 (3)	0.57	1.62	0.54	2.73
% Annual Change, 1964-1984	2.90%	0.20%	2.50%	1.23%
San Francisco Bay Area, 1981 (4)	0.74	1.75	0.91	3.40
- Survey, 1965	0.60	1.61	0.61	2.82
% Annual Change, 1965-1981	1.46%	0.56%	3.06%	1.31%
Denver Regional COG Survey, 1985 (5)	0.77	1.33	0.77	2.87
- Survey, 1971	0.70	1.60	0.60	2.90
% Annual Change, 1971-1985	0.71%	-1.21%	2.02%	-0.07%

### Implications of the Survey Results for Model Refinement

There are modeling implications in the shift in the composition of person-trips away from HNW trips. The pronounced downward shift in the share of HNW trips has been large enough that the compensating gains in HBW and NHB trips have not succeeded in offsetting the HNW loss. The fact that this pattern has been displayed in all four metropolitan areas for which comparable data are available suggests that the trip generation implications of the shift should not be ignored. It is also important to note that an income variable in trip generation cannot totally capture this change in travel over time, due to the

counterintuitive decline in HNW travel with increases in real income.

A convincing case, therefore, can be made for the need for new travel data in the 1980s for planning agencies that calibrated their travel models with the 1960s survey results. The consistency of the trend among the metropolitan areas examined suggests that (a) overall trip rates are more stable than the disaggregated rates by purpose, (b) for a given survey year, rates are more consistent across regions than over time, (c) the slight decline in the aggregate trips per household is the result of the shrinking household size rather than reduced travel, and (d) due to declining household size and automobile occupancy rates, person-trips per person and vehicle-trips per person have increased considerably since the 1960s.

TABLE 4 PERSON-TRIPS PER PERSON—COMPARISON OF THE 1984 NCTCOG SURVEY WITH OTHER SOURCES (2-5)

	HBW	HNW	NHB
Dallas/Fort Worth - NCTCOG Survey, 1984 (2)	26.99	47.75	25.26
- SDHPT Survey, 1964 (3)	20.90	59.40	19.70
% Annual Change, 1964-1984	1.46%	-0.98%	1.41%
San Francisco Bay Area Survey, 1981 (4)	23.64	49.68	26.67
1965	24.25	54.00	21.75
% Annual Change, 1965-1981	-0.16%	-0.50%	1.41%
Denver Regional COG Survey, 1985 (5)	26.0	47.0	27.0
1971	23.0	57.0	20.0
% Annual Change, 1971-1985	0.93%	-1.25%	2.50%
Atlanta Area Survey, 1980 (7)	23.58	53.84	22.58
1972	23.99	56.56	19.45
% Annual Change, 1972-1980	-0.21%	-0.60%	2.01%

TABLE 5 AVERAGE AUTOMOBILE OCCUPANCY RATES BY PURPOSE—WEIGHTED 1984 SAMPLE (2, 3)

Purpose**	Average Auto Occupancy		Percent
	1984	1964	Average 1964-84
HBW1	1.07	1.36	-21.32
HBW2	1.15	1.24	- 7.26
HBW3	1.14	1.16	- 1.72
HBW4	1.13	1.12	+ 0.01
HNW	1.53	1.70	-10.00
NHB	1.36	1.46	- 6.85
TOTAL	1.36	1.52	-10.53

\* Weighted average of vehicle occupancies for self-driven auto trips.

For occupancy rates of 9 plus, the average is assumed to be 10.

\*\* HBW1, HBW2, HBW3, and HBW4 refer to HBW trips made by individuals with annual household incomes falling in the first quartile (less than \$15,000), second quartile (between \$15,000 and \$29,999), third quartile (between \$30,000 and \$39,999), and fourth quartile (over \$40,000), respectively.

## CHANGES IN THE TRAVEL PATTERNS IN THE DALLAS-FORT WORTH AREA: 1964-1984

In this section a profile of travel behavior in the NCTCOG region is created that shows how frequently, at what time of the day and how far people travel, what the automobile occupancy rates and mode choices are, and how all these characteristics have changed since 1974.

### Who is Most Likely to Travel: The Influence of Household Size, Automobile Availability, and Income on Trip Rates

Larger households and those with a higher income or more cars are more likely to make trips. Households of six or more

members make an average of 15 trips/day, whereas single-member households make an average of 3.25 trips/day. Trips per person, however, decline as household size increases, reflecting the economies of scale in trip making that accrue to larger households. This trend is illustrated by the decline from 3.25 trips/person for single-member households to less than 2.4 trips/person for households of six or more members. The decline in the average household size since 1964—from 3.22 to 2.55 persons in 1984—has consequently led to an increase in person-trips per person. Table 4 shows the changes in person-trips per person in the Dallas-Fort Worth area, San Francisco, and Denver. Person-trips per person increased for all trip purposes in the Dallas-Fort Worth region and the San Francisco area, but decreased for HNW trips in Denver.

The increased availability of automobiles to households has also led to the increased number of person trips. The average

TABLE 6 VEHICLE-TRIPS PER HOUSEHOLD AND PER PERSON—1964 AND 1984  
NCTCOG HOME INTERVIEW SURVEYS (2, 3)

	HBW	HNW	NHB	ALL TRIPS
Vehicle Trips Per Household, 1984	2.03	2.82	1.52	6.37
1964	1.62	3.19	1.23	6.04
% Change, 1964-1984	25.30	-11.60	23.58	5.46
Vehicle Trips Per Person, 1984	0.80	1.10	0.60	2.50
1964	0.48	0.95	0.37	1.80
% Change, 1964-1984	66.67	15.80	62.16	38.89

TABLE 7 PERCENTAGE DISTRIBUTION OF TRIP START TIMES—1984 HOME INTERVIEW SURVEY (2)

A.M. TRIPS												
TIME	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
HBW	0.58	0.22	0.21	0.28	0.59	2.40	10.66	19.27	9.64	2.70	1.49	1.67
HNW	0.46	0.21	0.09	0.00	0.03	0.28	0.93	5.70	7.29	3.71	4.99	4.94
NHB	0.15	0.15	0.10	0.02	0.02	0.15	0.42	1.48	3.04	5.16	7.31	10.50
TOTAL	0.41	0.20	0.13	0.08	0.17	0.81	3.38	8.22	6.83	3.81	4.66	5.49
P.M. TRIPS												
TIME	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
HBW	2.45	2.04	2.80	6.08	11.94	12.94	4.94	2.00	1.33	1.69	1.24	0.82
HNW	4.06	4.36	5.30	8.10	7.59	8.36	10.17	8.62	5.77	5.82	2.28	0.97
NHB	14.68	9.88	9.10	8.98	7.43	7.56	3.88	4.47	2.55	1.45	1.29	0.20
TOTAL	6.35	5.15	5.61	7.79	8.70	9.37	7.18	5.80	3.77	3.61	1.75	0.73

number of automobiles per household in 1984 was 1.84 compared to 1.33 in 1964, an increase of 3.8 percent in the 20-year period. The number of automobiles per person had a steeper increase of 76 percent from 0.41 automobile/person in 1964 to 0.72 automobile/person in 1984. The greater availability of automobiles has boosted trip rates, both directly by reducing the number of zero-car households, and indirectly by reducing automobile occupancy rates. Table 5 shows that since 1964 the average automobile occupancy rate has declined by 10.53 percent from 1.52 to 1.36 persons/automobile trip. The growth in vehicle-trip rates per household and per person shown in Table 6 reflects the combined effects of lower household size and automobile occupancy rates.

Higher-income people are also more likely to make trips. Households in income Quartiles 3 and 4 are at least twice as likely to travel as those in Quartile 1, a relationship that is true regardless of the fact that households in higher-income quartiles are larger on the average.

### How Far, How Long, and at What Time Are People Most Likely to Travel?

An important product of the survey was identifying the time and duration of traffic peaks. The morning peak hour was 7–8 a.m. and the afternoon peak hour was 5–6 p.m. (Table 7). The peak hour in the region varied widely by purpose. The peak hour for HBW coincided with the peaks for total trips (7–8 a.m. and 5–6 p.m.) and the peaks for HNW trips occurred later (8–9 a.m. and 6–7 p.m.). NHB trips, on the other hand, peaked between 12 noon and 1 p.m.

In 1984, households in the Dallas-Fort Worth area had an average trip length of 6.9 mi. From Table 8, the average length of HBW trips was greater for higher-income quartiles, and HBW trips tended to be longer than HNW and NHB trips. Since 1964, the average distance traveled increased by 21.05 percent from 5.7 to 6.9 mi.

The average trip duration, as perceived and reported by the respondents in the 1984 travel survey, was 17.4 min for all

TABLE 8 AVERAGE TRIP LENGTH (MI)—1984 HOME INTERVIEW SURVEY (2, 3)

WEIGHTED SAMPLE			
Purpose***	1984* Travel Survey (miles)	1964 Travel Survey (miles)	Percent Change 1964-84
HBW1	8.26	8.50**	---
HBW2	10.09	8.50**	---
HBW3	10.64	8.50**	---
HBW4	11.43	8.50**	---
HNW	5.30	4.80	10.42
NHB	6.50	5.70	14.04
Weighted Average	6.90	5.70	21.05

\* 1984 trip lengths are based on origin/destination tables obtained from the Work Place Survey.

\*\* 1964 HBW average.

\*\*\* HBW1, HBW2, HBW3, and HBW4 refer to HBW trips made by individuals with annual household incomes falling in the first quartile (less than \$15,000), second quartile (between \$15,000 and \$29,999), third quarter (between \$30,000 and \$39,999), and fourth quartile (over \$40,000), respectively.

purposes combined (Table 9). The average duration was longest for work trips, particularly work trips made by higher-income households. There are problems of validity associated with perceived travel time as an index of actual travel duration. The NCTCOG regional travel model simulation of the 1984 travel duration, which is based on origin-destination trip tables, is methodologically more accurate and is slightly longer (by an average of 19 min), but has an intrinsic flaw in that it does not distinguish between peak and off-peak trip duration. Because most HNW and NHB trips are likely to be taken during off-peak hours, the implications of an upward bias in the model's estimate of travel duration for HNW and NHB trips should be taken into account.

#### How Are Trips Most Likely to be Made: Changes in Travel Mode, 1964–1984

The dominant travel mode in the NCTCOG region was self-driven automobile trips. In 1984, 78.2 percent of all person-trips were made by automobile drivers, 20.1 percent by automobile passengers, and 1.7 percent by transit riders. In 1964,

these proportions were 63.8 percent for automobile drivers, 33.0 percent for automobile passengers, and 3.2 percent for transit passengers (Table 10). The increased proportion of automobile driver trips and the declines in automobile passenger and transit trips were consistent for all trip purposes.

#### IMPACT OF SURVEY METHODOLOGIES ON TRIP FREQUENCIES AND COMPOSITION

In this section, a number of methodological issues that have a potential impact on the frequency and composition of trips in a survey are discussed; specifically, the impact of the choice of the survey time period on the frequency of school trips and the impact of trip linking on the composition of trips by purpose are examined.

#### The Choice of the Survey Time Period

The 1984 NCTCOG survey was conducted over a 4-month period extending from April 23 to July 13. The survey lasted

TABLE 9 AVERAGE TRIP DURATION AS PERCEIVED BY THE SURVEY RESPONDENTS—1984 HOME INTERVIEW SURVEY (2)

WEIGHTED SAMPLE*	
Purpose**	Average Duration (Minutes)
HBW1	19.71
HBW2	22.66
HBW3	22.69
HBW4	24.30
HNW	15.23
NHB	12.50
All Trips (Weighted Average)	17.44

\* Includes self-driven and passenger auto trips, carpool and motorcycle trips only. Excludes bus, school bus, taxi and other (truck, air and external trips)

\*\* HBW1, HBW2, HBW3, and HBW4 refer to HBW trips made by individuals with annual household incomes falling in the first quartile (less than \$15,000), second quartile (between \$15,000 and \$29,999), third quartile (between \$30,000 and \$39,999), and fourth quartile (over \$40,000), respectively.

TABLE 10 PERSON-TRIPS BY MODE AND PURPOSE (as percentages of all trips)—1964 AND 1984 HOME INTERVIEW SURVEYS (2, 3)

WEIGHTED SAMPLE				
Mode Purpose	Auto (Self-Driven)	Auto** Passenger	Bus	Total Person Trips
HBW (1984)	88.62	7.94	3.44	100.00
(1964)	78.80	14.40	6.80	100.00
HNW (1984)	68.64	30.07	1.29	100.00
(1964)	57.30	40.10	2.60	100.00
NHB (1984)	85.22	14.02	0.76	100.00
(1964)	67.90	31.10	1.00	100.00
TOTAL (1984)	78.22	20.04	1.74	100.00
(1964)	63.90	33.00	3.20	100.00

\* Person trips include all in-vehicle trips (by the driver or passenger, auto and carpool) and transit trips. They exclude taxi, school bus, walk, bicycle, and "other" modes.

\*\* Includes carpool/vanpool passengers.

longer than was originally intended due to delays in the completion of some interviews. The closing dates for the public school districts in the region began around May 25, 1984, and ended by the first week of June. Prolonging the survey time over a period when the nature of trips and their purposes changed created problems of estimation bias. These problems had to be addressed when the survey results were analyzed and the trip generation model was calibrated.

The average number of trips per household in the period before schools closed (8.67 trips) was 28 percent higher compared to those made after schools closed (6.77 trips). The difference between the two periods was most pronounced in the HNW trips, which included school trips. By the t-test, trip means of the two periods showed significant differences, particularly for HNW trips. Future survey design should avoid a time period that would overlap with school closing dates and should estimate travel demand based on a period that would uniformly fall within school periods. This practice is particularly justified when, as in the case of the Dallas-Fort Worth area survey, the previous surveys have been conducted during the school year. The Dallas-Fort Worth survey was not intended to last beyond the end of May; future surveys should be planned with up to a 50 percent time buffer to assure no overlap.

#### Trip Linking: Impact on the Composition of Trips by Purpose

The NCTCOG trip rates were based on linked trips, a mechanism that was designed to generate a more accurate distribution of trips by purpose. The impact of linking procedures on the

final distribution of trips was that more trips were allocated to HBW and HNW purposes with the loss of some NHB trips. Therefore, survey results based on linked trips need to be carefully examined when compared with those based on unlinked trips.

Trip linking impacts the distribution of trips by purpose by linking out a small portion of the intermediate trips made on the way to the final destination. Trips that are linked out are those made for the purposes of serving passenger, changing mode, or riding, before the principal trip purpose was realized. Of the original 20,200 trips recorded in the survey, 4.3 percent were trips for the purpose of taking a passenger to a destination on the way to the tripmaker's principal destination. Another 2.5 percent of the trips had mode-change and ride purposes associated with them before the final purpose was realized. On the whole, 6.8 percent of the trips were linked out and as a result the distribution of the final trip purposes changed. For instance, if a person left for work but on the way dropped a child at school (a serve-passenger linkage), the linking procedure would link out the latter trip so that only a home-to-work trip would remain. Similarly, a passenger with a driver dropping off another passenger (a ride linkage) or a person who is dropped off at a bus stop for a ride to the final destination (a mode-change linkage) all made trips that were linked out, and only the originally intended purpose of the trip (e.g., work) was recorded.

The impact of trip linking on the composition of the Home Interview Survey trip purposes was to increase the share of the HBW trips from 23.5 to 27.5 percent of all the trips. For HNW trips, the impact was less pronounced because the linking increased the share of these trips from 47.5 to 48.6 percent of



all trips. For NHB trips, the impact was a sharp decline from 29 to 24 percent of the trips after the linking was completed.

## CONCLUSIONS AND IMPLICATIONS FOR MODEL REFINEMENT

An evaluation of the NCTCOG travel survey results and comparisons with the results from other metropolitan areas indicate that though overall trip rates per household tend to remain constant over time, the changing demographics of the recent decades have altered the composition of trips. Changes in labor force participation rates and in household size in the past two decades have spearheaded a major transformation in the composition of trips, and HNW trips have declined both in absolute terms, from over five trips per household to about four, and in relative terms, from nearly 60 percent of all trips to about 47 percent. Reduced household size and automobile availability have also led to pronounced increases in person-trips per person and vehicle-trips per person.

Cross-sectional comparisons led to the important conclusion that trip rates are more likely to be stable between regions than over time. The practical implication of this consistency is that smaller planning agencies with inadequate survey funds can borrow rates from regions of similar size and transportation characteristics.

The survey results also have implications for model refine-

ment and recalibration. For instance, new trip production rates for the NCTCOG trip generation model will be calculated, and whether the increase in NHB trips warrants disaggregating them into work-based and non-work-based trips will be investigated. Furthermore, changes in average trip length and automobile occupancy rates have implications for the vehicle-miles of travel generated by a given model. These and many more modeling issues will be examined in detail in light of the findings of the travel survey.

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