



RT-HIS
**Regional Travel -
Household Interview Survey**

**EXECUTIVE SUMMARY
GENERAL FINAL REPORT**

*Prepared for the New York Metropolitan Transportation Council (NYMTC)
and the North Jersey Transportation Planning Authority (NJTPA)*



*prepared by:
Parsons Brinckerhoff Quade & Douglas, Inc.
in association with
Cambridge Systematics, Inc.
NuStats International*

February 2000

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**RT-HIS: REGIONAL TRAVEL -
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NYMTC Transportation Models and Data Initiative: Task 12.6
NJTPA Regional Household Interview Survey: NJTPA Component

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Executive Summary: General Final Report

Regional Travel - Household Interview Survey

RT-HIS: Overview

The 1997/1998 Regional Travel - Household Interview Survey (*RT-HIS*) was conducted in the 28 county New York-New Jersey-Connecticut metropolitan area, including 12 counties in New York, 14 counties in New Jersey, and 2 counties in Connecticut. A complete and detailed discussion of the planning, implementation and findings of the New York / New Jersey / Connecticut metro area Regional Travel - Household Interview Survey (*RT-HIS*) is found in the *RT-HIS: General Final Report (February 2000)*. This separately bound *Executive Summary* provides a basic description of the design and implementation of the *RT-HIS*, highlights the principal findings of the detailed travel data obtained, and offers a profile of typical weekday travel in the region as measured by the *RT-HIS*.

The *RT-HIS* was conducted for the New York Metropolitan Transportation Council (NYMTC) and the North Jersey Transportation Planning Authority (NJTPA), the area's major Metropolitan Planning Organizations (MPO's), to develop transportation data and travel forecasting models for their respective regions. A major component of the Transportation Models and Data Initiative, the *RT-HIS* is supporting the Best Practice Models (BPM) being developed for NYMTC. It will also support the improvement of the North Jersey Regional Transportation Model (NJRTM) used for major capital planning decisions and air quality analyses at the NJTPA, and provide significant information about travel at the county level.

New Jersey Transit also participated in the *RT-HIS*, sponsoring the inclusion of Mercer County, New Jersey. In addition, the core area surveyed was supplemented to include New Haven county, Connecticut, at the request of the Metropolitan Transportation Authority (MTA).

The prime consultant for the project was Parsons Brinckerhoff, New York, also the leader of the consultant team for the NYMTC Best Practice Model development project. The survey task leader was NuStats International, Austin, Texas. Data collection began in February of 1997 and continued through May of 1998.

The *RT-HIS* was a diary type travel survey, in which detailed travel information for each member of participating households was collected during an entire travel day. This includes the specific time, location, and mode of travel for all household members during the travel day, as well as their activities at each place to which they traveled. In addition, basic demographic, employment and other data about each household and each person in the household was collected in the *RT-HIS*.

The selection, recruiting and collecting the *RT-HIS* data from each household was an eight staged process, involving a series of mailings and telephone interviews and follow-up contacts.

The *RT-HIS* data set consists of complete and usable travel information collected from a sample of 11,264 households. The sample for analysis of resident-based weekday travel is 10,971 for the entire 28 county Metro Area. The weekend sample, comprised of 275 households, is restricted to the NJTPA counties of northern New Jersey and compliments the results of the 1995 Nationwide Personal Transportation Survey for the entire Area.

Contents and Organization of the *RT-HIS* General Final Report

A complete and detailed discussion of the planning, implementation and findings of the New York / New Jersey / Connecticut metro area Regional Travel - Household Interview Survey is found in the *RT-HIS: General Final Report (February 2000)*. That report is organized as follows:

Section 1: The objectives of the *RT-HIS* are reviewed in the context of other similar travel surveys used in transportation planning and forecast model development.

Section 2: follows the development of the sampling plan and interview process, and also explains the methods of data processing.

Section 3: Implementation of the survey is addressed, including the characteristics of the achieved sample and the necessary adjustments made throughout the sampling process.

Section 4: The principal results of the *RT-HIS* are reported in a series of tables and graphics developed from tabulations of the weekday survey data. Basic descriptive tabulations of the results are presented, focused on the following general topics of interest for regional transportation and travel behavior.

- ❑ General Analysis of Travel and Trip Rates
- ❑ Mode of Travel Shares
- ❑ Purpose of Travel
- ❑ Time of Day / Day of Week
- ❑ Household Structure and Travel
- ❑ Vehicle Ownership
- ❑ Trip Distance, Times and Speeds
- ❑ Auto Trips and Vehicle Occupancy
- ❑ Transit Trips
- ❑ Taxi and Other Shared Ride
- ❑ Walk and Other Non-Motorized

The key *RT-HIS* survey materials are located in the Appendices, including a facsimile of the Diary Form used by respondents to keep track of the travel they reported in the survey.

Objectives of Survey

The purpose of the *RT-HIS* is to provide information suitable for gaining an in-depth understanding of the travel behavior of households and individuals and the activities and demographics and other factors that affect these.

The *RT-HIS* was designed to collect regional travel behavior that would serve two objectives:

- ❑ *To Support Development of Travel Demand Forecasting:* The content of the data to be collected in the *RT-HIS* was primarily determined by identification of the data needed to develop the NYTMC Best Practice Model (BPM). The principal application of the *RT-HIS* data was for the estimation “disaggregate” or individual-based estimation of travel behavior choice models that comprise the BPM travel forecasting system. The data will also be applied to validating and enhancing the NJRTM.
- ❑ *For General Reporting of Travel Estimates:* It was also essential that the *RT-HIS* adequately provide current estimates for a range of travel measures that are of interest to regional transportation planners. It needed to produce reliable estimates of travel by residents of the overall region, and for each of its member counties (in other words “aggregate” reporting).

It is anticipated that the *RT-HIS* data will be a valuable resource for many years to support in-depth study of travel issues important to NYMTC, NJTPA and other agencies responsible for transportation planning in the metropolitan area.

The *RT-HIS* and Other Travel Surveys

The *RT-HIS* is similar to and complements several other surveys or databases available to transportation analysts and planners in the region regarding detailed travel by the resident population. It was designed to both overcome the limitations of these other travel databases, while at the same time provide as much comparability as practical for cross-analysis and validation.

- ❑ *Census Transportation Planning Package (CTPP):* This is the “journey-to-work” data obtained in the decennial census of population.
- ❑ *Nationwide Personal Transportation Survey (NPTS):* Unlike the CTPP data, but like the *RT-HIS*, the NPTS includes data for all travel by households, not just work travel. The most recent NPTS was conducted in 1995, with NYTMC participating in the “over sample” program, yielding a larger sample of households from the New York

counties of the metro region than would have been found in the national sample. Connecticut and New Jersey counties in the region, however, were not augmented.

- *NJDOT: North Jersey Household Travel Survey.* Similar in many respects to the *RT-HIS*, this was a travel diary survey collected in 1986 for northern New Jersey counties. It has been used by NJTPA and NJDOT to develop the current set of NJTRM travel forecasting models.
- *MTA: Comprehensive Total Travel Survey (CTTS):* This was a household travel survey conducted by the MTA in 1989 for use in transit ridership analysis and forecasting in the MTA service area.

RT-HIS Reports and Data Products

Final reporting of the *RT-HIS* methods and results are available in six separate, but modular components intended to address the interests and needs of three main audiences:

In addition to this General Final Report, two other reports prepared as part of the *RT-HIS* supplement this report on the findings of the survey, and may be of interest to the general reader:

Compendium of Results: A comprehensive set of “banner” or simple frequency tabulations of most of the data items collected in the *RT-HIS* – by households, person, places, and vehicles.

Comparative Analysis: Weekday and Weekend Travel Analysis: A report which describes the *weekend* travel for the small sample of households in New Jersey for whom weekend travel data were collected in the *RT-HIS*, supplemented by the weekend travel data found in the 1995 NPTS. The report compares and contrast weekend travel with weekday travel, using both *RT-HIS* and NPTS survey data for the Metro Area.

In addition to these, three *RT-HIS* reports were specifically developed to serve the transportation analyst or technical user of the *RT-HIS* data, at either NYMTC or NJTPA, or other organizations and individuals interested in transportation and travel behavior.

RT-HIS Methods and Implementation. This component documents *RT-HIS* survey methods, interviewing outcomes, response rates and notable events. It also provides an assessment of survey data item reliability and applicability for model development. The creation of the sample weights and balancing factors are also addressed here. All survey instruments and materials are included in this report.

RT-HIS Users Manual. This component is focused towards current and future users of the data set and addresses methodology, data strengths and weaknesses, instructions for proper application of data weights as well as control totals to confirm the data are used properly, and other detailed information that would facilitate proper use of the data. It provides guidance for data distribution policies that would conform to confidentiality requirements. Contents also include SPSS and SAS programs to produce key tables and as well as instructions for comparing the results to other data sets such as the NPTS and Census.

Special Topics and Analysis Issues: Identification and discussion of the approach to further travel analysis and research that the *RT-HIS* data can support beyond that which has been conducted and reported on in this general report.

The *RT-HIS* resides in six basic relational database data files:

- ❑ Household – basic data about each household in sample: 11,264 households total (10,971 weekday)
- ❑ Person – basic data about each person in sample: 27,369 persons (26,650 weekday)
- ❑ Place - all places visited (traveled to), including place at 3:00 am (usually Home) and the last place of day: 118,134 places (115,238 weekday)
- ❑ Vehicle – all vehicles owned or available to households in sample: 17, 517 vehicles
- ❑ Location – file of all unique locations (Longitude/Latitude geocoded) associated with the places reported: 55,349 locations.
- ❑ Audit File - one record for each trip record with information (“data quality / processing flags”) documenting data edits, cleaning and any imputation done to the data record.

In addition to these basic data files, the consultant team has developed automated procedures that have been used to:

- ❑ Combine these files for analysis, e.g. construct a “trip” file from the “place” file , with origins and destinations on each trip record;
- ❑ Develop general travel measures from the specific respondent provided data, e.g. “trip purpose” or “general mode of travel”;
- ❑ Re-code the data to standard consistent groupings, e.g. age ranges / cohorts;
- ❑ Calculate and apply *RT-HIS* weights; and,
- ❑ Produce a standard set of tabulations of the *RT-HIS* data, such as cross-tabulations and mean average estimates for tabular and graphic presentation of the results.

Sampling Plan

All households within the 28 counties comprising the New York/New Jersey/Connecticut metropolitan area (see Figure 1) were eligible for inclusion in the study through a random sampling process. These counties included:

New York: Bronx, Dutchess, Kings, Nassau, New York, Orange, Putnam, Queens, Richmond, Rockland, Suffolk, Westchester

New Jersey: Bergen, Essex, Hudson, Hunterdon, Mercer, Middlesex, Monmouth, Morris, Ocean, Passaic, Somerset, Sussex, Union, Warren

Connecticut: Fairfield, New Haven

The *RT-HIS* sample was designed to collect data from a sufficient number of households to ensure that accurate data were obtained. Sample design and selection were accomplished according to a plan which included the following characteristics:

- ❑ Complete and accurate travel and activity information needed from approximately 11,000 households;
- ❑ Travel data collected for weekday travel (small weekend sample included);
- ❑ A minimum number of households per county, sufficient to estimate values for several important socioeconomic and travel variables, and;
- ❑ Differential rates of sampling within counties employed, according to the concept of Density / Mode Leadership Districts (DMLD's) developed to sufficiently sample users of the myriad travel models available in the Metro Area.

Schedule of Survey Implementation

Households were recruited and interviewed in three large groups beginning in February 1997 and ending in May 1998, more specifically Spring 1997, Fall 1997, and Spring 1998. Generally, when schools were in session, the survey was underway.

Participating households were assigned specific "travel days" to record their travel, which typically occurred 10 days after recruitment and during which household members were asked to record travel information in their diaries for a specified 24 hour period. In total, 14,441 households were recruited to participate in the study. Of these, 11,264 households completed travel diaries, and the information was retrieved from all household members regardless of age.

The survey process included these steps:

1. Household selected for sample
2. Letter of Introduction mailed from NYMTC or NJTPA
3. Recruitment interview conducted (by telephone)
4. Travel Diaries mailed out, one for each person in recruited households
5. Assigned Travel Day is recorded by participating households
6. Retrieval Interview(s) conducted by telephone to obtain the data
7. Data checking and quality control
8. Geocoding to precise locations all places where respondents traveled

Final Sample Achieved

The final data set is comprised of 11,264 households that provided complete activity and travel information for a 24-hour period for each member. Of these 293 reflect weekend travel, 275 of which comprise the planned sample of weekend travel households in the 13 counties of the NJTPA planning region. The remaining 10,971 reflect weekday travel.

Recruitment Levels: The recruitment rate for the *RT-HIS* was 33.6 percent. That is, about one-third (14,441) of the eligible households (42, 064) contacted in stage 1 of the *RT-HIS* agreed to complete the demographic and person data collected in the “recruitment interview.”

Retrieval Levels: Of the recruited households, 11,264 actually completed the retrieval of all the travel data for the Assigned Travel day yielding a retrieval rate of 78.2 percent.

Overall Response Rate: The combined response rate is the product of the recruitment and retrieval rates, or 26 percent.

Validation and Weighting

Weighting and validation of the data occurred in two stages:

Stage 1 Weighting

The Stage 1 weight is comprised of five elements that aim to adjust the weekday data to correct for the differential rates of sampling that occurred due to the sampling plan and because of telephone ownership patterns:

- ❑ Factor 1: Probability of Selection in Sampling Plan
- ❑ Factor 2: Multiple Phone Numbers for One Household
- ❑ Factor 3: Multiple Households Sharing One Phone Number
- ❑ Factor 4: Episodic Telephone Ownership
- ❑ Factor 5: Normalization of Weights

Stage 2 Weighting

Three characteristics of the sample were investigated and adjusted for possible non-response bias as indicated by a possible lower or higher representation in the 1997/98 *RT-HIS* sample than in the earlier 1990 Census:

- ❑ Household Income
- ❑ Household Size
- ❑ Number of Vehicles Owned

Two final weights have been developed that are applied to the *RT-HIS* data for analysis and reporting:

Final Weight – Normalized: the product of the Stage 1 and Stage 2 weights, with a final re-factoring at the county level to achieve an exact match with respect to the distribution of households by counties.

Final Weight – Expanded: this is simply the product of the normalized final weight and the average expansion factor of 655.

Travel Analysis and Reporting - Highlights of *RT-HIS* Findings and Profile of Weekday Travel in the Metro Area

In the General Final Report, basic descriptive tabulations of the weekday results of the *RT-HIS* are presented in considerable detail. Detailed tables and graphics are presented which focus on the following general topics of interest for regional transportation and travel behavior.

- ❑ General Travel and Trip Rates
- ❑ Mode Shares
- ❑ Purpose of Travel
- ❑ Time of Day / Day of Week
- ❑ Household Structure
- ❑ Vehicle Ownership
- ❑ Trip Distance, Times and Speeds
- ❑ Auto Trips: VMT Shares, Vehicle Occupancy
- ❑ Transit: Mode of Access, Distribution Mode
- ❑ Taxi and Shared Ride: Trip Characteristics
- ❑ Walk and other non-Motorized: Trip Characteristics

The companion Weekend Travel Analysis Report offers comparable information at the regional level for Saturday and Sunday travel, using data from both the *RT-HIS* and the NPTS.

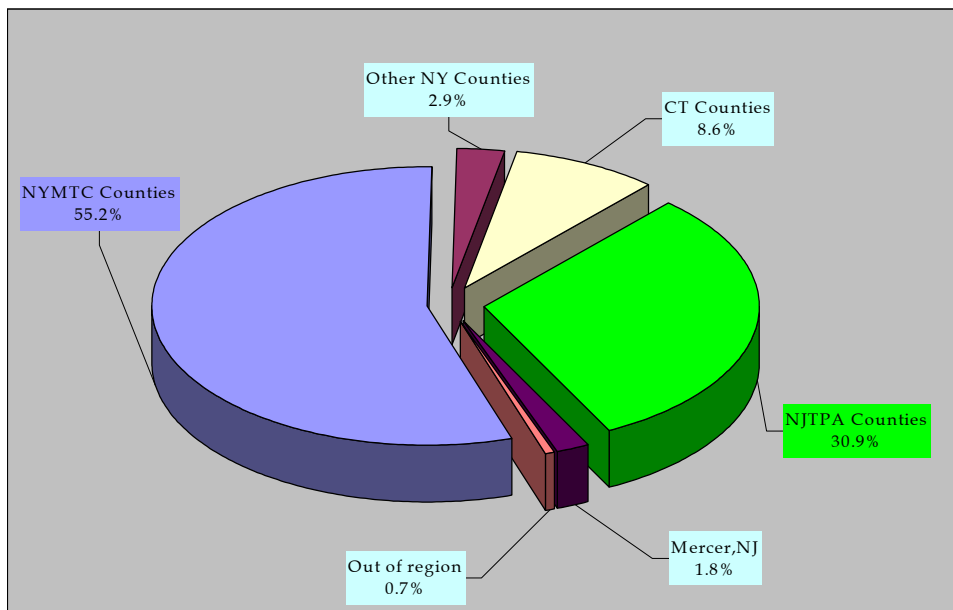
The following sections of this Executive Summary highlight first findings from *the RT-HIS* weekday data.

General Travel and Trip Rates

The travel activity that occurs between one place (origin) and another place (destination) is defined as a “trip” in the reporting of the RT-HIS. For example, a trip to work that is made by commuter rail, with a subway connection, is considered one trip. The return trip home from work is counted as a separate trip.

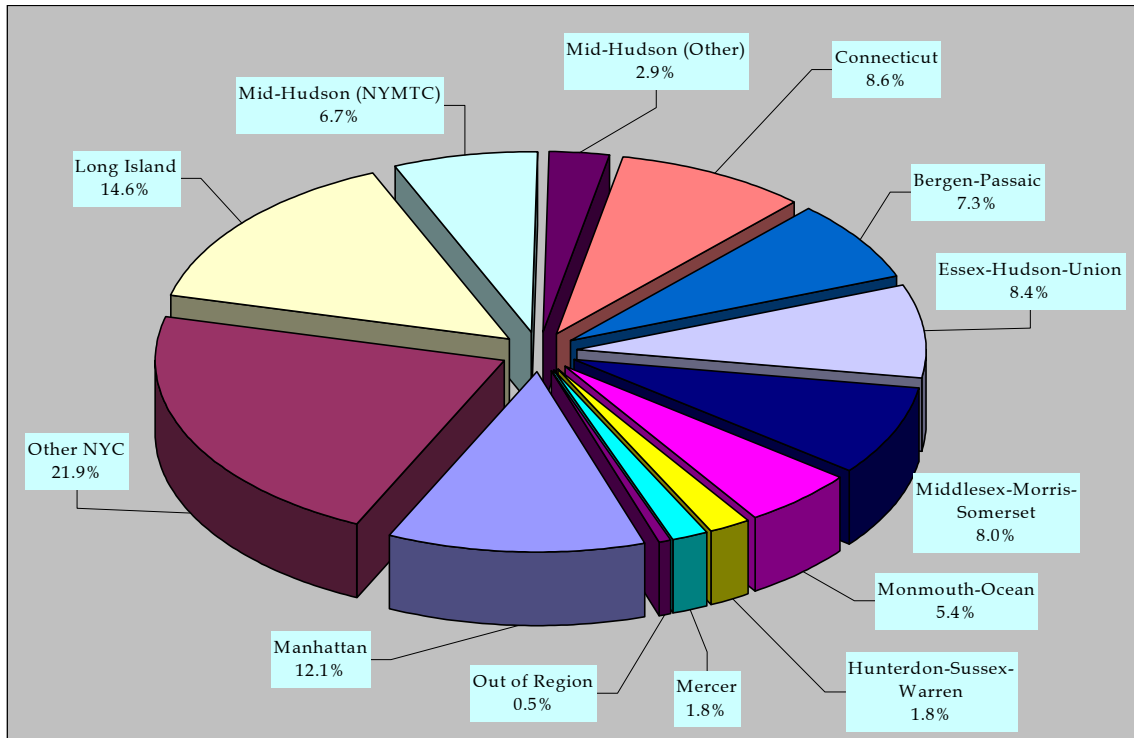
- The RT-HIS weekday sample provides a profile of the estimated 59 million weekday trips made by residents of the Metro Area by where they live. The geographic distribution of these trips is shown in the figure below.

All Weekday Trips: Percent by Destination Area Planning Region



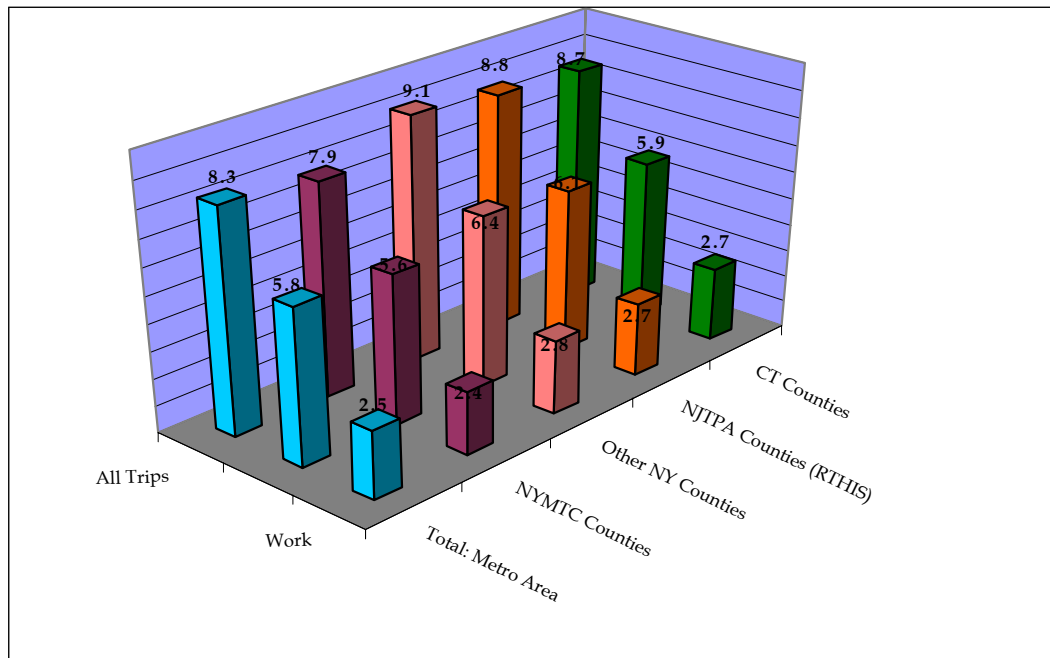
- The 12 counties that comprise the NYMTC area account for about 55% of weekday travel by residents of the region.
- Nearly one-third or 31% of weekday travel in the Metro Area occurs in the 13 NJTPA counties in northern New Jersey.
- Almost one-third (31%) of the estimated 59 million resident-based weekday trips in the region are trips within New York City and about 15% on Long Island.
- Brooklyn residents account for the highest percentage (9.2%) of all trips among counties in the region, while Manhattan is the origin or destination of 1 in 8 trips (12.1%) made by residents of the region.
- Over one-third of all travel is to or from New York City (34.0%), with Long Island accounting for almost 1 in 6 trips (14.6%).

All Weekday Trips: Percent by Destination Area



- Person trip rates (total weekday trips made per person) are relatively uniform for most places outside the four non-Manhattan boroughs of New York City, and Hudson -Essex-Union in New Jersey, where they are a low of 2.7 and 3.1 respectively. Elsewhere they vary from 3.3 to 3.6.
- The average number of reported weekday trips per household in the region was 8.3, per person 3.2. Trip rates vary depending on the residence location.
- Household trip rates (total weekday trips made per household) reflect both person trip rates and household size or number of persons in each household. Consequently, there is greater variation in household rates among the county groups, with the lowest (6.5) found in Manhattan (smaller households than the areawide average), and the highest in Long Island (10.2), Mid-Hudson NYMTC (9.5), and the more suburban counties of the NJTPA region (9.3).

Household Trips Rates - Total, Work and Other (non-Work) - Metro Area

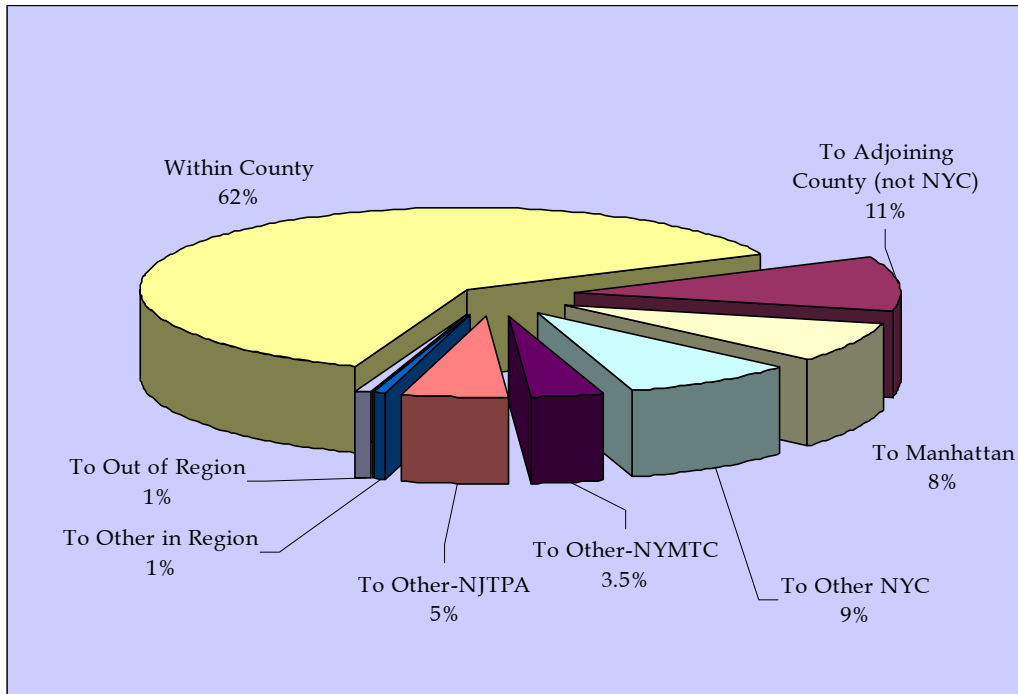


General Origin-Destination Patterns of Weekday Travel

- More than three quarters (77.8%) of weekday travel by residents of the region consists of trips made entirely within a single county. This ranges from a low of about 70% of trips in Manhattan to a high of 90% in the two *RT-HIS* counties in Connecticut.
- Similar to the patterns found in the Census journey-to-work data, almost two-thirds (62.8%) of all work travel in the region is within the county.
- The next largest share of weekday travel is made between adjoining counties (not counting NYC). The incidence of such county-to-county trips ranges from 5.4% (Long Island) to 19.2% (Middlesex-Morris-Somerset area).
- For New York City residents, trips between outer boroughs (exclusive of trips to Manhattan) account for almost one in five trips (19.2%).
- Overall, 3.7% of areawide weekday trips are to Manhattan, with Manhattan the destination for 10.5% of trips from other New York City boroughs, and ranging from a low of less than 1% of southern and western NJTPA counties, to about 3.4% for Essex-Hudson and Union county trips.
- The importance of Manhattan as an employment center for the region is revealed with a total share of 8.1% of work travel destinations (exclusive of Manhattan “within county” trips).
- Other New York City boroughs attract 8.6% of work travel.

- Work travel to adjoining counties in NJTPA counties is fairly high – ranging from about 19% from Bergen and Passaic, to 28% from Middlesex, Morris, and Somerset counties.

General Origin-Destination Markets: All Weekday Trips - Metro Area - Work Trips



- In contrast, about 84% of non-Work travel takes place within the same county.
- Only 2% of non-Work trips made by non-Manhattan residents are to Manhattan.

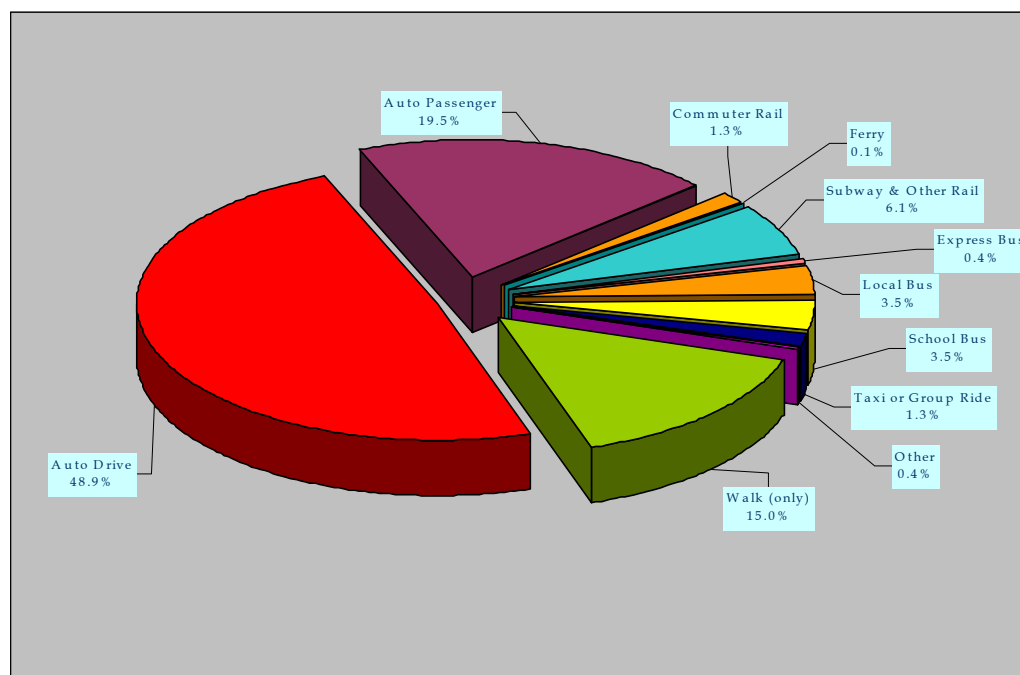
Modes of Travel

For trips involving more than one mode of travel, a hierarchy is used in the *RT-HIS* reporting to define the “main mode” for each trip. A trip by subway and local bus is classified as a subway trip. A trip using commuter rail and the subway is counted as a commuter rail trip. A trip involving an auto and a transit mode (commuter rail, subway, bus, ferry, etc.), is classified according to the transit mode. Trips involving walking and some other mode are classified by the non-walking mode. Consequently, “walk” trips, are those that are made only by walking.

- Analysis of the shares of total weekday travel by principal mode of travel shows that while auto travel accounts for two-thirds of weekday trips (48.9% auto driver, plus 19.5% auto passenger), walk and transit trips are significant travel modes in the *RT-HIS* metro area.
- Walk trips represent 15.0% of all weekday trips in the Metro Area.

- Transit serves more than one in ten, or 11.4% of weekday trips made by area residents.
- In New York City, the automobile serves only about one-third (36.6%) of weekday trips, while nearly one-third (31.0%) are accommodated by walking, and almost another one-third (29.4%) by public transit or taxi / car service (3.0%).
- Commuter Rail travel accounts for about 1% of all travel made by NJTPA area, Mercer, and Connecticut residents; 2.5% for Mid-Hudson, and about 3% for Long Island residents.
- Walk trip rates (weekday trips per person by walking) are the highest in these more urban parts of the region as well - 1.2 in Essex, Hudson and Union, 1.8 in other New York City, and 3.2 for Manhattan residents.
- Out of 30.3% of all weekday trips to Manhattan (from elsewhere) are made by auto, nearly half (42.4%) by subway, almost one in eight (13.6%) by commuter rail, and about 4.8% by Express Bus. Nearly one in five (18.8%) within-county trips is a walk trip. Virtually all, 94.8% of trips made outside the county to the adjoining county are by automobile.
- Half (49.5%) of weekday trips made by Manhattan residents are walk trips.
- Rail or Ferry serves about one in five work trips in the region (19.8% to work; 19.1% from work), and Bus and Taxi-Shared ride about 8%.
- Subway and commuter rail shares are at their highest during the peak periods; while walk trips accommodate their highest share during the mid-day period.
- School bus trips account for 6.6 % of all person trips during the four hour morning peak period.

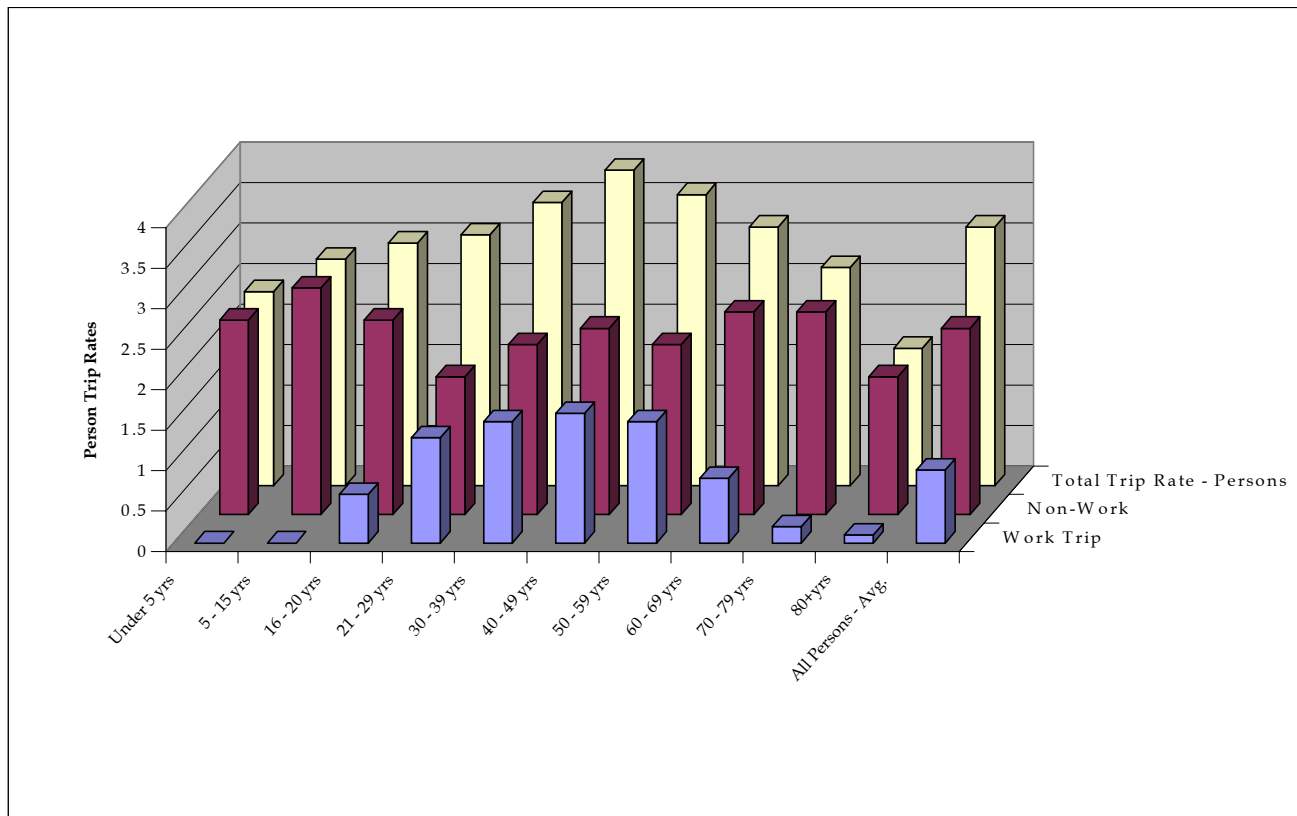
Percentage Weekday Travel by General Mode - Metro Area



Reasons for Travel - Trip Purpose

- Only 9.5% of all weekday trips are from home to work (no stop in between), and 8.6% returning from work to home (again no stop). About 18% of all weekday trips are between places other than home and work. The next most prevalent trip purpose is Social Recreational -- 6.5% from home, 7.6% to home.
- Home to work travel dominates travel to Manhattan (46.8%) and is a large share of trips to adjoining counties (16.9 % from home; 15.3% to home).
- While the regional (all person) average weekday work trips per person is 0.92, rates are the highest in the 40-49 year old cohort (1.61 work trips per weekday). Non-Work person trip rates are much more uniform across age groups, with lower than average (2.29) rates indicated for 20-39 year olds, and for the 80 years and older group.

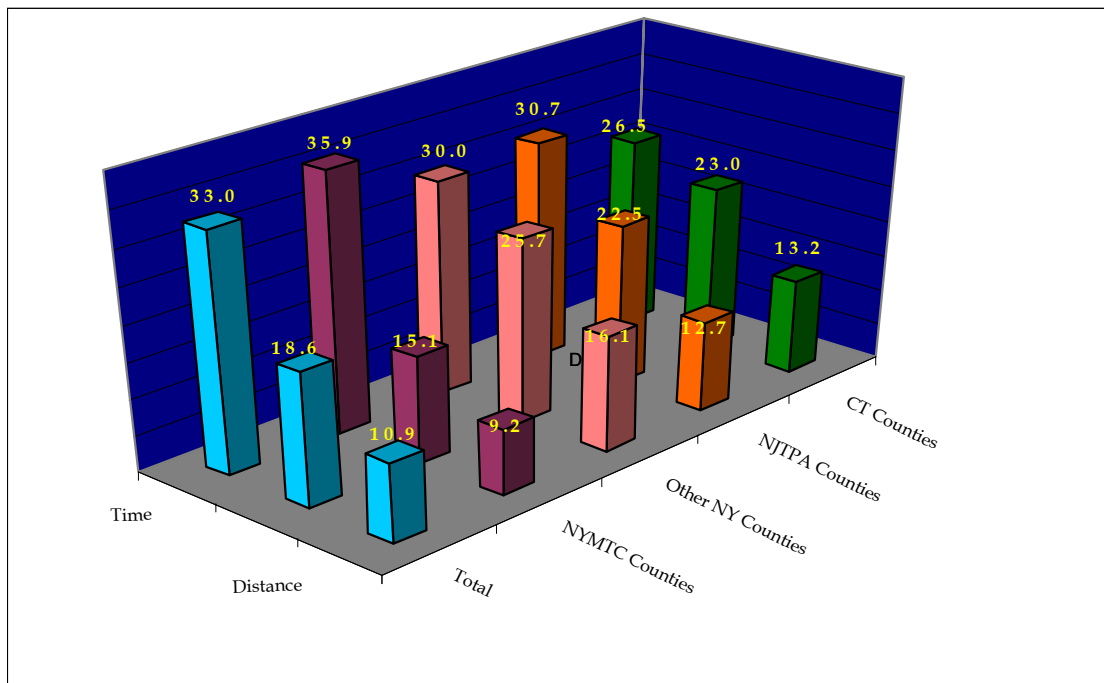
Person Trip Rates by Age Group



Travel Distances and Travel Times

- The average weekday trip takes about 24 minutes, is about 7 miles long and is made at an average speed of about 17 miles per hour (mph).
- The distance traveled for the average work trip is about twice as long as for the average non-work trip - 10.9 miles vs. 5.6 miles.
- Work trips are more often vehicle trips, and consequently faster and farther, with an average travel time of 33 minutes, compared to 20 minutes for the average non-work trip.

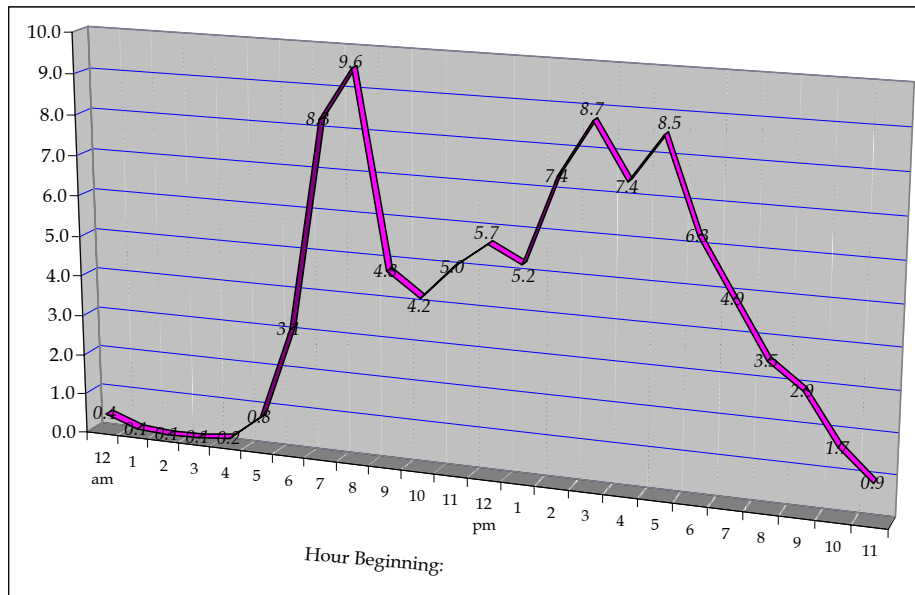
Trip Distance, Average Speed and Travel Time - Work Trips



Time of Day of Travel

- Over half of weekday travel occurs in either of the two peak periods -- 25.7% in the AM peak four hours, and a slightly higher 27.1 % in the PM peak period. The shares of trips by time of day are fairly uniform across the region.

Diurnal Distribution - Hour of Departing - Metro Area



Travel Variations by Different Types of Households

- The average household size (mean number of persons) in the RT-HIS is 2.61 persons.
- Somewhat more than one half (55.2%) of the households are 1 or 2 person units, with about one-third (34.5%) of households either 3 or 4 person.
- Only about 1 in 10 of the region's households are 5 persons or larger.
- The average household in New York City is smaller than in other parts of the metro area, with over half of Manhattan households single person units.
- Total weekday trips rates do vary substantially by household income, with rates of travel generally increasing with higher income levels.
- The highest rate of trip-making is found for households with incomes in the \$100,000 - \$150,000 range, making 12.5 trips per weekday, a rate which is more than double that of the 5.3 average trips made by the lowest income group.

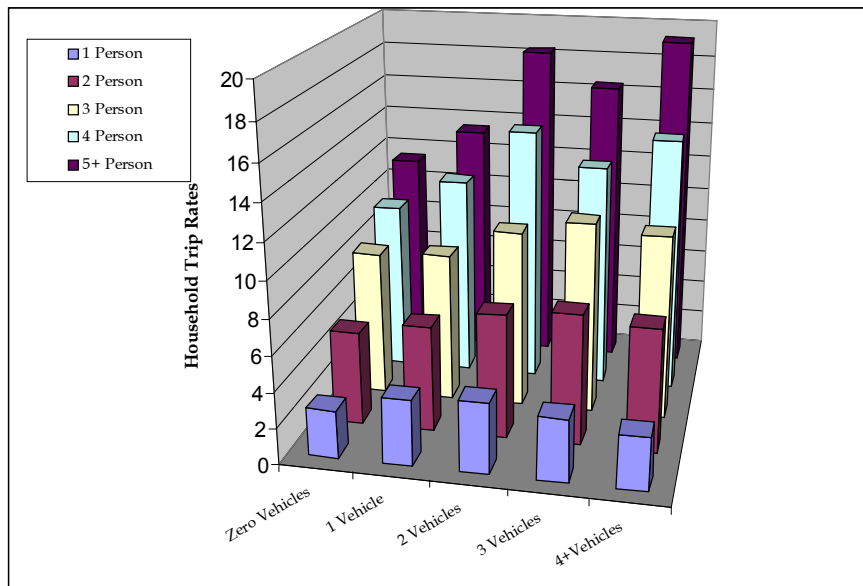
Travel Variations by Different Types of Persons

- The highest rate of auto driver trips occur with the \$100,000-\$150,000 groups (7.0 auto driver trips), more than 4 times the rate of the lowest income group (1.5).
- Conversely, transit trip rates are the highest for this low-income group (1.7 transit trips per household).
- One-half (49.1%) of trips by school age 5-15 year olds are made as auto passengers, one fifth (20.3%) by school bus, and almost one-quarter (22.2%) as walk trips.
- Subway use peaks for persons in their “twenties” (12.1% of all modes used), about double the average share for persons of any age.
- Auto driving serves about two-thirds of all trips made by persons 30 to 69 years of age. It remains the predominant mode of travel for those over 70 years of age as well.
- Females make slightly more than half of all weekday trips (52.7%). Females represent the large majority of local bus trips (62%), Yellow/Medallion Taxi (58%) and Gypsy Cab (75%), auto passenger (58%).
- Women and girls represent a smaller but still the majority share of walk trips (54%).
- Males dominate the travel in Commuter Rail (66%), PATH (60%), Express Bus (58%) and Car Service (68%).
- Women and men use two major modes, Subway and auto drive, in virtually the same proportions.
- Persons with a license, drive for about 70% of their weekday trips. Walking (11%) and Subway (6%) are the next most used methods for this group.
- For people without a driver’s license, walking is the most used mode (34%) followed by auto passenger (22%), Subway (18%) and Local Bus (16%).
- Overall, about 3.2 percent of the persons represented in the *RT-HIS* report some form of disability; with about quarter of these respondents (or about 1.4% of total population) reporting a specific disability that limits mobility – visual or blind, cane or walker, or wheelchair.

Vehicle Ownership and Effect on Travel

- Almost one-quarter (23.5%) of the region's households are "car-less" or zero car households, more than two-thirds (69.2%) of Manhattan, and two-fifths (40.4%) of other New York City households. About one in ten (9.5%) of households in the NJTPA counties own no car.
- The average number of vehicles available to households in the overall region is 1.43 vehicles per household, with the average closer to 2 vehicles per household in most parts of the region outside New York City, except for Essex, Hudson, and Union counties in New Jersey.

Total Trip Rate by Household Size and Number of Vehicles

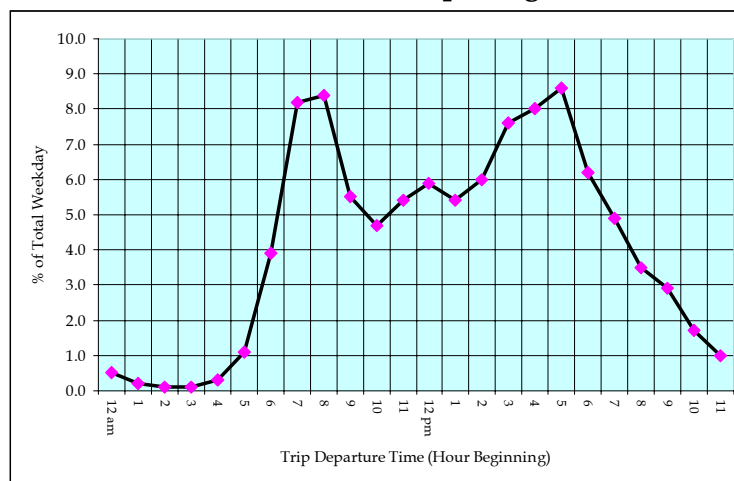


- Consistent with expectations, and also with typical vehicle ownership models for metropolitan areas, rates of car ownership increase with both income and household size.
- Total weekday trip rates also increase with both household size and the number of vehicles owned.
- Total trip rates for households owning 3 vehicles (11.4 trips) is more than twice that of zero car household (5.2 trips).
- The rate of walk trips (2.2) is about 3 times higher for zero-car households than for households with two vehicles (0.8), and 4 times higher than for those with four or more (0.6).
- Total trip rates are somewhat higher for those who have been at the same residence for 5 or more years.
- Auto drive trip rates, however, are substantially higher - 4.2 for the 5 year plus households, compared to 2.4 for the within the past year group of households.

Focus on Auto Trips

- The two peak travel times for auto trips made by area residents peak in the morning between 8 and 9 am, and in the afternoon between 5 and 6 pm.

Diurnal Distribution - Hour of Departing - Auto Weekday Trips

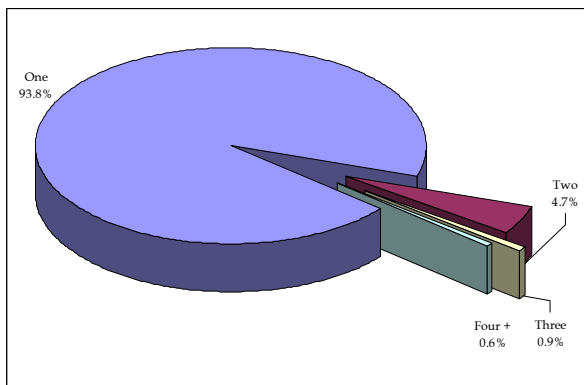


- The average auto vehicle trip is 8.7 miles long, and takes 21.0 minutes to complete at an average travel speed of 23.3 miles per hour.
- Auto trips in New York City are shorter (7.7 miles), but slower (16.4 mph) and take longer in time (27.5 minutes).
- About one-quarter (29.3%) of auto trips in the region are in the 1-3 mile range, about one-fifth (19.0%), in the 5-10 mile range, and one-tenth (9.6%) between 3 and 5 miles in length.
- New York City accounts for about 15% (4.0% Manhattan; 11.1% other NYC) of regional Vehicle Miles of Travel (VMT) by accounted for by area residents' automobiles.
- Trips from Long Island account for about 18% of VMT.
- The three counties of Middlesex, Morris, and Somerset in New Jersey represent about 13% of the total of auto VMT in the region.
- About 21% is associated with relatively long trips – 30 to 60 miles in length.
- Vehicle occupancy rates are reasonably uniform across the region, with most counties fairly close to the regional average of 1.40 persons per car for weekday travel.
- Vehicle occupancy rates are lower than average for trips in the longer trips in the 10 to 60 mile range (1.29 to 1.23). They are highest (1.52) for the very shortest trips under a mile and for the longest trips over 60 miles in length.
- For work travel, vehicle occupancy across the region is close to the average of 1.10.

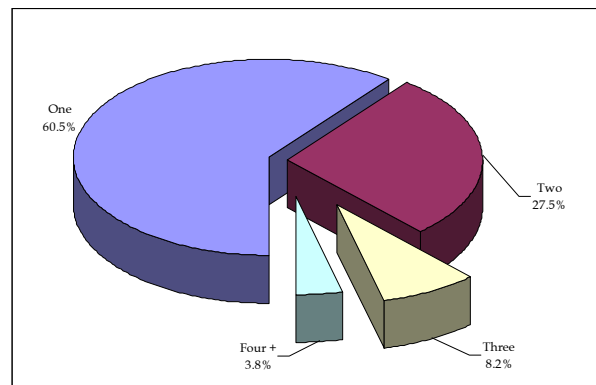
- Similarly, there is not a great deal of variation for non-work travel from the regional average of 1.57 persons per vehicle.
- About three-quarters (72.5%) of weekday auto trips are made as single occupant, or driver only trips; about one in five (19.2%) with a single passenger, and only 8.3% representing "HOV" auto trips with 3 or more occupants.
- Single Occupant Vehicle (SOV) auto trip shares generally increase with trip distance, and are the highest for work travel in the region at 93.7%.

Distribution of Auto Trips - by Number of Occupants

Work Trips



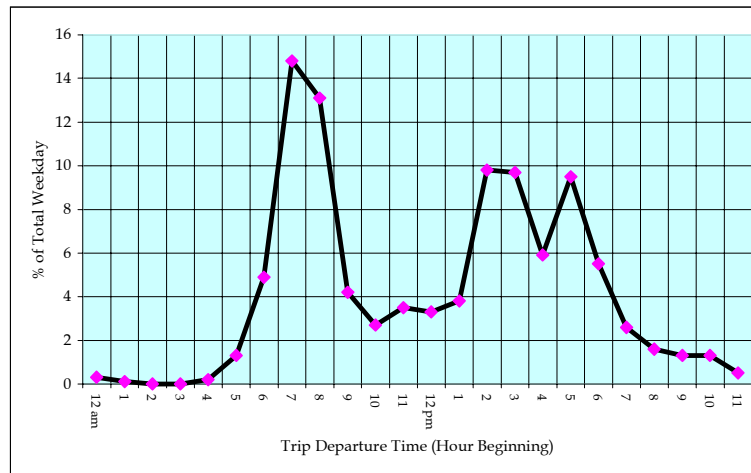
Other (non-Work) Trips



Focus on Public Transit Trips

- Transit travel in the region is particularly peaked, with about 15% of all weekday transit trips occurring in the 7 - 8 am hour. The afternoon peak period is an extended one - from 2 pm to 6 pm.

Diurnal Distribution - Hour of Departing - Transit Weekday Trips



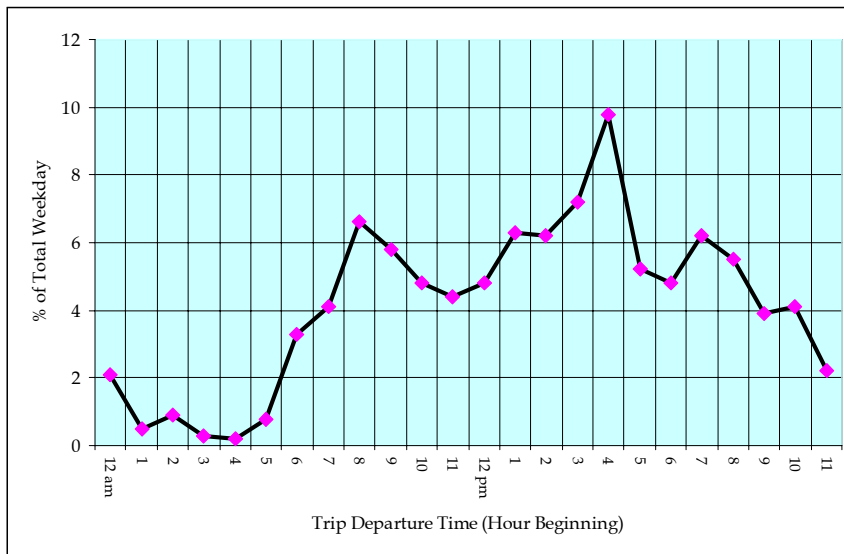
- The average transit trip in the Metro Area is 8.6 miles long, and takes 49 minutes to complete at an average travel speed of 10.2 miles per hour. This speed is for the entire trip - from origin to destination place - including all means of travel used to complete the trip.
- Transit trips in New York City are much shorter than from other parts of the region, and slower, taking longer than the average transit trip from all places except Long Island.
- Commuter Rail trips are the longest of transit trips (28 miles), but the fastest at an average speed of 19 mph. On average, these trips are nearly one and a half hours (88 minutes) from door-to-door.
- Trips using Express Bus trips are also longer (19.8 miles), and require more than an hour to complete (77 minutes).
- Trips that are primarily Subway trips are a little less than twice as long (7.4 miles) as local bus trips (4.2 miles), but are about 30% faster (8.2 mph vs. 5.9 mph).
- Walk is the means of access for half (48.9%) of Commuter Rail, Express Bus and Ferry transit trips. Drive (and Park) is the method of access for one-third (32.2%), and Auto Passenger (drop-off) for about 8%. Connecting local bus is used for about 11%. There is considerable variation among the counties of the region with respect to access.
- Somewhat more than half (55%) of these trips made on “premium” transit are completed by walking. Subway is used as the distribution for about 30% of these

trips; and PATH for 8%. Ferries provide a distribution function for 7% of these trips as well.

Other Vehicle Trips: Group Rides

- The temporal distribution of travel in the region by Taxi and other group show peak use in the 4-5 pm hour, with a “mini” peak between 8 and 9 am.

Diurnal Distribution - Hour of Departing - Taxi and Group Rides

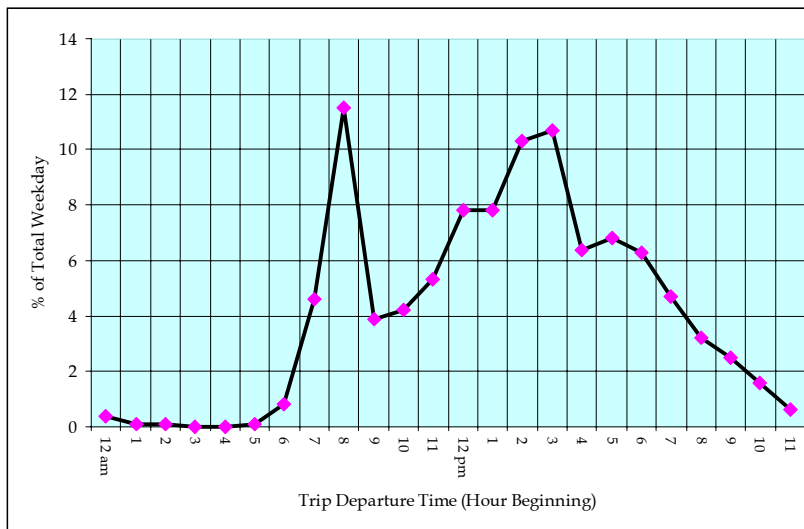


- The average Yellow-Medallion Taxi trip is 4.4 miles long, and takes about 21 minutes, at an average speed of about 12.9 mph.
- “Black Car” services and Gypsy Cab accommodate somewhat longer trips on average – 6.2 miles and 8.0 miles respectively.
- The average Taxi/Group Ride trip by Airport Service is about 27 miles, and takes one hour and six minutes door-to-door.
- Reflecting the importance of taxi trips in New York City, the average group ride trip distance there is similar to that of the regional taxi average – 4.6 miles.

Walk and Other Non-Motorized Trips

- Travel in the region by walking and other non-motorized modes (bicycle, skates, wheelchair) of travel show a peaking pattern that reflects walk to work and school, with peaks between 8 and 9am and between 2 and 3 pm.

Diurnal Distribution - Hour of Departing - Walk & Non-Motorized



- The largest shares of these trips are made as “other non-Home or Work” (20.1%) and “at work-other” purpose trips (13.6%).
- Social recreational travel is served by walking for a substantial share as well – about 8% from home, and about 9% returning home.
- The mean average walk trip is a little more than one mile long (1.2 miles), while the average bicycle trip is about 2 miles long.
- The mean trip length for non-Motorized trips in New York City is 0.8 miles.
- About two-thirds (61.5%) of these walk and other non-Motorized trips are less than one-half mile long, and another one-fifth (20.7%) are still less than one mile.

Conclusion

The 1997/98 *RT-HIS* represents a tremendous data collection effort and valuable analytic resource for the transportation planning community in the New York-New Jersey-Connecticut metropolitan area. The scope of the project, and the complexity of the region, required the development and implementation of groundbreaking uses of computer-aided data flow and editing procedures. Substantial regional cooperation occurred during all phases of the project, the first of its type and magnitude in a third of a century. Careful survey design and execution have yielded a rich database of how, when, where, and why area residents travel. The detailed travel information contained in the *RT-HIS* will be available and should prove useful to planners, policy-makers, researchers, stakeholders, and ultimately the public for years to come.