

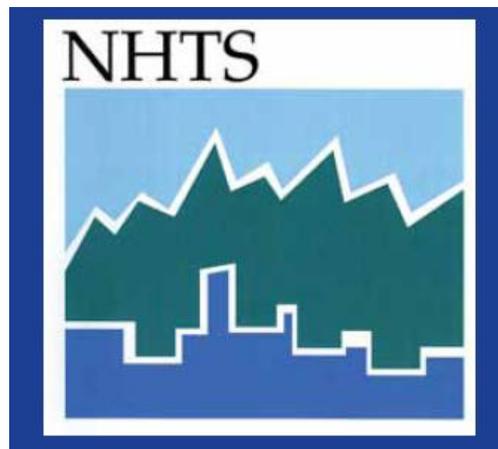
# Uses of National Household Travel Survey Data in Transportation

(April 2006 – May 2011)

Prepared for

Using National Household Travel Survey Data  
for Transportation Decision Making  
*A Workshop*

June 6–7, 2011



## **Introduction**

This document summarizes the use and applications of the National Household Travel Survey (NHTS) data in transportation planning and related activities from April 2006 to May 2011. Published papers, presentations, and monographs that cited the use of the data from the NHTS were searched using the Transport Research International Documentation (TRID). TRID is a newly integrated database that combines the records from TRB's Transportation Research Information Services (TRIS) Database and the OECD's Joint Transport Research Centre's International Transport Research Documentation (ITRD) Database. <http://trid.trb.org/>

The search terms used were “National Household Travel Survey”, OR “NHTS” OR “Nationwide Personal Travel Survey”, “NPTS” OR “National Personal Travel Survey.” The resulting abstracts were examined to select papers/presentations that are most relevant to the conference. Each paper was grouped under the following 11 categories, in line with the sessions planned for the conference.

1. Bike and Pedestrian Studies
2. Demographic Trends
3. Energy Consumption
4. Environment
5. Policy and Mobility
6. Special Population Groups
7. Survey, Data Synthesis, and Other Applications
8. Traffic Safety
9. Transit Planning
10. Travel Behavior
11. Trend Analysis and Market Segmentation

A one-page description of each citation, including the title, authors, publication date, abstract, search and index terms, and availability are shown.

## **Acknowledgements**

Search and documentation support was provided by Jessica Fomalont and Lisa Loyo (TRB). Nanda Srinivasan (TRB) and Adella Santos (FHWA) categorized and formatted the paper abstracts.

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## **Bike and Pedestrian Studies**

### **Extent and correlates of walking in the USA**

#### **Authors:**

Agrawal, Asha Weinstein; Schimek, Paul  
Transportation Research Part D: Transport and Environment Issue: 8  
12/1/2007

#### **Abstract:**

This paper examines data about walking trips in the US Department of Transportation's 2001 National Household Travel Survey. The paper describes and critiques the methods used in the survey to collect data on walking. Using these data, we summarize the extent of walking, the duration and distance of walk trips, and variations in walking behavior according to geographic and socio-demographic factors. The results show that most Americans do not walk at all, but those who do average close to thirty minutes of walking a day. Walk trips averaged about a half-mile, but the median trip distance was a quarter of a mile. A significant percentage of the time Americans' walk was spent traveling to and from transit trips. Binary logit models are used for examining utility and recreational walk trips and show a positive relationship between walking and population density for both. For recreational trips, this effect shows up at the extreme low and high ends of density. For utility trips, the odds of reporting a walk trip increase with each density category, but the effect is most pronounced at the highest density categories. At the highest densities, a large portion of the effect of density occurs via the intermediary of car ownership. Educational attainment has a strong effect on propensity to take walk trips, for both for utility and recreation. Higher income was associated with fewer utility walk trips but more recreational trips. Asians, Latinos, and blacks were less likely to take utility walk trips than whites, after controlling for income, education, density, and car ownership. The ethnic differences in walking are even larger for recreational trips.

#### **Subject areas and Index Terms**

Economics; Geotechnology; Highways; Pedestrians and Bicyclists; Planning and Forecasting; Society; I72: Traffic and Transport Planning  
Data collection; Demographics; Geography; Logits; Pedestrians; Population density; Socioeconomic factors; Travel surveys; Trip purpose; Walking; United States

**Availability:** Find a library where document is available Order URL: <http://worldcat.org/issn/13619209>

## **Bike and Pedestrian Studies**

### **Estimating Nonmotorized Travel Demand**

#### **Authors:**

An, Meiwu; Chen, Mei

Pedestrians 2007

Transportation Research Record: Journal of the Transportation Research Board Issue: 2002  
2007

#### **Abstract:**

The modeling of nonmotorized travel demand has mostly been conducted at the large spatial level (e.g., city, county, or census tract level) by using data from the Bureau of the Census and the National Household Travel Survey. This paper introduces a modeling approach for estimating the mode share of nonmotorized trips by using data from multiple sources at a finer spatial scale. The correlations between a number of socioeconomic, environmental, and infrastructural factors and the nonmotorized share of the daily commute are analyzed at the level of the census block group. A neighborhood analysis concept is developed to take the length of nonmotorized trips into consideration. Multiple regression analysis shows that employment density, the percentage of the student population, median household income, and average sidewalk length together provide the strongest power for prediction of the nonmotorized mode share. The potential applications of the methodology and the implications for data collection are also discussed.

#### **Subject areas and Index Terms**

Economics; Education and Training; Highways; Pedestrians and Bicyclists; Planning and Forecasting; Society; I72: Traffic and Transport Planning

Data collection; Employment; Income; Modal split; Mode choice; Multiple regression analysis; Neighborhoods; Nonmotorized transportation; Socioeconomic factors; Students; Travel demand; Travel surveys; Trip length

**Availability:** Transportation Research Board Business Office Order URL:

[http://www.trb.org/news/blurb\\_detail.asp?id=8488](http://www.trb.org/news/blurb_detail.asp?id=8488); Find a library where document is available Order

URL: <http://worldcat.org/isbn/9780309104289>

## **Bike and Pedestrian Studies**

### **Modeling the Influence of Family, Social Context, and Spatial Proximity on Non-motorized Transport Mode Use**

#### **Authors:**

Ferdous, Nazneen; Pendyala, Ram M; Bhat, Chandra R; Konduri, Karthik Charan  
Transportation Research Board - 500 Fifth Street, NW Washington, DC 20001  
TRB 90th Annual Meeting Compendium of Papers DVD  
Transportation Research Board 90th Annual Meeting  
2011

#### **Abstract:**

This paper presents a joint model of walking and bicycling activity duration using a hazard based specification that recognizes the interval nature of time reporting in activity-travel surveys. The model structure takes the form of a multilevel model system that accounts for the range of interactions and spatial effects that might affect walking and bicycling mode use. Not only are there individual-specific factors that contribute to heterogeneity in non-motorized transport mode use behavior, but there may be family (household-specific) interactions, social group (peer) influences, and spatial clustering effects that contribute to the heterogeneity. The multilevel hazard-based model system capable of accommodating grouped duration responses is formulated and presented in the paper. A composite marginal likelihood estimation approach is adopted to estimate parameters in a computationally tractable manner. The model system is applied to a survey sample drawn from the recent 2009 National Household Travel Survey in the United States. Model results show that there are significant unobserved family-level, social group, and spatial proximity effects that contribute to heterogeneity in walking and bicycling activity duration. These effects were found to be significant even after controlling for socio-economic characteristics and attitudinal factors that captured individual attitudes and values towards non-motorized modes. The unobserved effects were also found to have a differential impact on bicycling activity duration, thus suggesting the need to treat and model walking and bicycling separately in transportation modeling systems.

#### **Subject areas and Index Terms**

Pedestrians and Bicyclists; Planning and Forecasting; I72: Traffic and Transport Planning  
Activity choices; Bicycle travel; Heterogeneity; Nonmotorized transportation; Peer groups; Spatial analysis; Time duration; Transportation modes; Travel surveys; Walking; United States; National Household Travel Survey; Activity duration; Influences

**Availability:** Transportation Research Board Business Office

## **Bike and Pedestrian Studies**

### **Neighborhood Design and Walking Trips in Ten U.S. Metropolitan Areas**

#### **Authors:**

Boer, Rob; Zheng, Yuhui; Overton, Adrian; Ridgeway, Gregory K; Cohen, Deborah A  
American Journal of Preventive Medicine Issue: 4  
4/1/2007

#### **Abstract:**

Despite substantial evidence for neighborhood characteristics correlating with walking, there has been to date only limited attention paid to possible practical implications for neighborhood design. This study investigates to what extent design guidelines are likely to stimulate walking. Four of the New Urbanism Smart Scorecard criteria and 2 other measures were tested for their influence on walking. Data was obtained from the 1995 National Personal Transportation Survey, U.S. Census 2000, and InfoUSA. Propensity-score methodology was used to control for potential confounders. Higher levels of business diversity and higher percentages of 4-way intersections were associated with more walking. For example, the odds ratio (OR) for walking in a neighborhood with 4 business types present compared to 3 business types was 1.24 (confidence interval [CI] 1.07 & 1.44) and neighborhoods with 50 & 74%, 4-way intersections had an OR for walking of 1.4 (CI 1.09 & 1.78) relative to those with 25 & 49%, 4-way intersections. The effects of housing density on walking are mixed. Higher parking pressure and older median housing age did not significantly affect walking after covariate adjustment. Block length did not appear to be associated with walking. When considering the New Urbanism Smart Scorecard from the perspective of walking, some, but not all, of its criteria that appear to have a correlation with walking are likely to be useful for designing walkable communities.

#### **Subject areas and Index Terms**

Energy; Environment; Highways; Pedestrians and Bicyclists; Planning and Forecasting; I15: Environment; I21: Planning of Transport Infrastructure  
Metropolitan areas; Mode choice; Sustainable development; Sustainable transportation; Travel behavior; Travel by mode; Urban design; Walking

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## **Demographic Trends**

### **Demographics Matter: Travel Demand, Options, and Characteristics Among Minority Populations**

#### **Authors:**

Contrino, Heather; McGuckin, Nancy  
Public Works Management & Policy Issue: 4  
4/1/2009

#### **Abstract:**

Race and ethnicity are important in terms of travel choices, needs, and options. Many factors contribute to the differences in patterns of travel within population segments. This paper uses data from the US Census Bureau and the National Household Travel Survey Program to examine the demographic characteristics of minority populations and the resulting differences in their travel behavior. As the U.S. society becomes more diverse over the next few decades, a significant portion of growth in travel demand will come from minority populations. Minorities on average are more transit dependent, have higher automobile occupancies, and have lower levels of vehicle ownership. Factors such as these should be considered when forecasting travel demand and developing policy and planning initiatives.

#### **Subject areas and Index Terms**

Highways; Planning and Forecasting; Public Transportation; Society; I72: Traffic and Transport Planning Demographics; Ethnic groups; Forecasting; Minorities; Race; Transportation planning; Transportation policy; Travel behavior; Travel demand

**Availability:** Find a library where document is available Order URL: <http://worldcat.org/oclc/34383369>

## **Energy Consumption**

### **Evaluation of Incorporating Hybrid Vehicle Use of HOV Lanes**

#### **Authors:**

Brownstone, David; Chu, Lianyu; Golob, Thomas F; Nesamani, K S; Recker, Wilfred W  
University of California, Berkeley - Institute of Transportation Studies Berkeley, CA 94720-1720 ;  
California Department of Transportation - 1120 N Street Sacramento, CA 95814 ; University of  
California, Berkeley - California PATH Program, Institute of Transportation Studies Richmond Field  
Station, 1357 South 46th Street Richmond, CA 94804-4648

Monograph

10/1/2008

#### **Abstract:**

In this report, the authors present a method for examining the operational and environmental effects of the policy of allowing qualified single-occupancy hybrid vehicles access to dedicated High Occupancy Vehicle (HOV)/carpool lanes in California. The study uses a microscopic traffic simulation model that is able to evaluate the HOV/hybrid system and provide detailed outputs that are not available in conventional static models. The study also includes detailed emissions modeling for estimating accurate emissions by integrating emission models into microscopic simulation models. The authors present updated future hybrid vehicle demand models that are based on consumers' automobile choice behavior analysis. These models are applied to data from the recent California Department of Transportation (Caltrans) 2000-2001 Statewide Household Travel Survey and the 2001 National Household Travel Survey (NHTS). The authors also present a supply-side model to estimate availability and prices of hybrid vehicles by body type and manufacturer and price. The objective here is to forecast penetration of hybrid vehicles. Four different scenarios are then constructed and evaluated in terms of operational performance measures and air quality measures.

#### **Subject areas and Index Terms**

Environment; Highways; Planning and Forecasting; I72: Traffic and Transport Planning  
Electric vehicles; Environmental impacts; High occupancy vehicle lanes; Hybrid vehicles; Microscopic traffic flow; Traffic models; Traffic simulation; Travel demand; California

**Availability:** Available from UC Berkeley Transportation Library through interlibrary loan or document delivery Order URL: <http://library.its.berkeley.edu>; University of California, Berkeley; Find a library where document is available Order URL: <http://worldcat.org/oclc/302001742>

## **Energy Consumption**

### **Estimating Transportation Costs by Characteristics of Neighborhood and Household**

#### **Authors:**

Haas, Peter M; Makarewicz, Carrie; Benedict, Albert; Bernstein, Scott

Crosscutting Techniques for Planning and Analysis 2008

Transportation Research Record: Journal of the Transportation Research Board Issue: 2077  
2008

#### **Abstract:**

Since information on U.S. household expenditures was first collected, transport expenditures have risen from the sixth-highest share of household budgets, less than 2%, in 1917 to the second-highest share since the 1970s. This rise is linked to increased automobile purchase and automobile use and a relative decline in other costs, particularly food. Studies have also linked variations in the built environment to transport expenditures, but this influence cannot be tested by the federal Consumer Expenditure Survey since it is reported at the metropolitan level. Regional travel demand models recognize the dual influence of land use and household characteristics but do not include sufficient detail on the built environment of neighborhoods. Additionally, these models report travel time, distance, and frequency but not out-of-pocket household transportation expenditures. A study was launched to create a statistical model to predict household total annual transportation expenditures for each neighborhood in the largest metropolitan regions in the United States, controlling for the built environment and household size and income. The model specifies five independent variables - density, jobs access, neighborhood services, walkability, and transit connectivity. Model parameters were calibrated to measured vehicle ownership and transit use in the pilot region, Minneapolis & St. Paul, Minnesota, and to vehicle miles traveled by households at the block group level in the National Household Travel Survey. Statistically significant results confirm the influence of the built environment and regional accessibility on transport expenditures. Intended users are households, policy makers, and planners making location, design, and investment decisions.

#### **Subject areas and Index Terms**

Highways; Planning and Forecasting; Public Transportation; I72: Traffic and Transport Planning  
Accessibility; Automobile ownership; Estimating; Expenditures; Households; Mathematical models;  
Metropolitan areas; Neighborhoods; Vehicle miles of travel; Twin Cities Metropolitan Area (Minnesota);  
United States; Built environment; Transit use; Transportation costs

**Availability:** Transportation Research Board Business Office Order URL:

[http://www.trb.org/news/blurb\\_detail.asp?id=9915](http://www.trb.org/news/blurb_detail.asp?id=9915); Find a library where document is available Order

URL: <http://worldcat.org/isbn/9780309125895>

## **Energy Consumption**

### **Using National Travel Data in State Energy Master Planning: Gaps and Opportunities in National Transportation Data**

#### **Authors:**

Buehler, Ralph; Lovrien, Nora

Transportation Research Board - 500 Fifth Street, NW Washington, DC 20001

TRB 87th Annual Meeting Compendium of Papers DVD

Transportation Research Board 87th Annual Meeting

2008

#### **Abstract:**

Since the oil crises of the 1970s states, cities, and other local governments around the United States have participated in energy planning exercises with the purpose of reducing vulnerability to future crises. In the last decade as climate change has emerged as a major challenge of the 21st Century, state governments are also setting greenhouse gas reduction goals. The transportation sector makes up as much as 29% of total energy consumption in the United States. Individual level travel is arguably the most amorphous sub-set of the transportation sector that is nonetheless responsible for a substantial portion of the sector's energy use and carbon dioxide emissions. This paper reviews some of the challenges faced by state energy planners to truly understanding the nature of energy use in individual, on-road daily travel behavior. It is imperative for practitioners to have a greater understanding of individuals' travel choices and behavior, from the levers that guide mode choice, to the type of vehicle chosen, the style of driving practiced, and the rigor of the vehicle's maintenance. The paper uses the case study of the New Jersey Energy Master Plan to illustrate some of the challenges of designing effective policies aimed at reducing energy consumption in the individual, on-road transportation sector. The paper then suggests that by extending existing national travel surveys, more helpful energy use data may emerge. This may help to focus efforts of avoiding or abating transportation sector emissions, by explicitly linking individual travel behavior and energy use. We demonstrate this approach using the 2001 NHTS.

#### **Subject areas and Index Terms**

Energy; Environment; Highways; Planning and Forecasting; Public Transportation; Society; I72: Traffic and Transport Planning

Climate change; Energy consumption; Greenhouse gases; Land use planning; Master plans; Mode choice; Transportation planning; New Jersey; Travel data

**Availability:** Transportation Research Board Business Office

## **Energy Consumption**

### **Vehicle Capacity and Fuel Consumption in Household Fleets: Constraint-Based Microsimulation Model**

#### **Authors:**

Bolon, Kevin; Keoleian, Greg; Kostyniuk, Lidia P

Energy and Global Climate Change 2009

Transportation Research Record: Journal of the Transportation Research Board Issue: 2139

2009

#### **Abstract:**

Vehicle capability is one of the factors that constrain the set of transportation options available for personal transportation. The capacity for carrying passengers and cargo is of particular interest when energy consumption is considered, because the use of more efficient vehicles may be limited for trips with higher load requirements. This paper presents a method for considering trip capacity requirements when the available vehicles are assigned to the trips on a household activity schedule. A constraint-based vehicle assignment model that uses the trip data from the 2001 National Household Travel Survey as an example is introduced. Initial results from the analysis of these data show that by optimally assigning existing vehicles to trips, the average value of potential fuel savings ranges from 5% to 23%, depending on the size and vehicle type composition of the household fleet. Households with more vehicles in the fleet and a more diverse range of vehicles to choose from are able to achieve greater fuel savings than those with more homogeneous fleets. Considering the extent to which household vehicle assignment decisions were already consistent with the minimization of fuel consumption, in 2001 actual household vehicle assignment was, on average, only slightly better than random.

#### **Subject areas and Index Terms**

Energy; Highways; Vehicles and Equipment; I96: Vehicle Operating Costs

Fuel consumption; Households; Microsimulation; Vehicle capacity; 2001 National Household Travel Survey; Activity schedules; Vehicle assignment

**Availability:** Transportation Research Board Business Office Order URL:

[http://www.trb.org/Main/Blurbs/Energy\\_and\\_Global\\_Climate\\_Change\\_2009\\_163018.aspx](http://www.trb.org/Main/Blurbs/Energy_and_Global_Climate_Change_2009_163018.aspx); Find a library where document is available Order URL: <http://worldcat.org/isbn/9780309142694>

## **Energy Consumption**

### **Potential of Plug-In Hybrid Electric Vehicles to Reduce Petroleum Use: Issues Involved in Developing Reliable Estimates**

#### **Authors:**

Vyas, Anant D; Santini, Danilo J; Johnson, Larry R

Energy and Global Climate Change 2009

Transportation Research Record: Journal of the Transportation Research Board Issue: 2139

2009

#### **Abstract:**

This paper delineates the various issues involved in developing reliable estimates of the petroleum use reduction that would result from the widespread introduction of plug-in hybrid electric vehicles (PHEVs). Travel day data from the 2001 National Household Travel Survey (NHTS) were analyzed to identify the share of vehicle miles of travel (VMT) that could be transferred to grid electricity. Various PHEV charge-depleting (CD) ranges were evaluated, and 100% CD mode and potential blended modes were analyzed. The NHTS data were also examined to evaluate the potential for PHEV battery charging multiple times a day. Data from the 2005 American Housing Survey (AHS) were analyzed to evaluate the availability of garages and carports for at-home charging of the PHEV battery. The AHS data were also reviewed by census region and household location within or outside metropolitan statistical areas. To illustrate the lag times involved, the historical new vehicle market share increases for the diesel power train in France (a highly successful case) and the emerging hybrid electric vehicles in the United States were examined. A new vehicle technology substitution model is applied to illustrate a historically plausible successful new PHEV market share expansion. The trends in U.S. light-duty vehicle sales and light-duty vehicle stock were evaluated to estimate the time required for hypothetical successful new PHEVs to achieve the ultimately attainable share of the existing vehicle stock. Only when such steps have been accomplished will the full oil savings potential for the nation be achieved.

#### **Subject areas and Index Terms**

Energy; Highways; Vehicles and Equipment; I96: Vehicle Operating Costs

Electric vehicles; Fuel consumption; Hybrid automobiles; Hybrid vehicles; Market share; Plug-in hybrid vehicles; Vehicle miles of travel; United States; 2001 National Household Travel Survey; American Housing Survey; Battery charging

**Availability:** Transportation Research Board Business Office Order URL:

[http://www.trb.org/Main/Blurbs/Energy\\_and\\_Global\\_Climate\\_Change\\_2009\\_163018.aspx](http://www.trb.org/Main/Blurbs/Energy_and_Global_Climate_Change_2009_163018.aspx); Find a library where document is available Order URL: <http://worldcat.org/isbn/9780309142694>

## **Energy Consumption**

### **Promoting the Market for Plug-in Hybrid and Battery Electric Vehicles: The Role of Recharge Availability**

#### **Authors:**

Lin, Zhenhong; Greene, David L  
Transportation Research Board - 500 Fifth Street, NW Washington, DC 20001  
TRB 90th Annual Meeting Compendium of Papers DVD  
Transportation Research Board 90th Annual Meeting  
2011

#### **Abstract:**

Much recent attention is drawn to the provision of adequate recharge availability as one means to promote the battery electric vehicle (BEV) and plug-in hybrid electric vehicle (PHEV) market. What requires better understanding is the possible role of improved recharge availability in the development of the BEV/PHEV market and the priorities the different charging options should receive from the government. This study reviews the current recharge infrastructure and available technologies and conceptualizes the charging issue into three interactions between the charge network and the travel network. Based on travel data of 3375 drivers from the National Household Travel Survey (NHTS), we estimate the distribution among the U.S. consumers of 1) PHEV fuel saving benefits by different recharge availability improvements; 2) range anxiety by different BEV ranges; and 3) willingness-to-pay for workplace and public charging as added to home recharging. Using the ORNL MA3T model, the impact of three recharge improvements is quantified by the resulting increase in the BEV/PHEV sales. Overall, compared to workplace or public recharging improvement, home recharging improvement appears to have a greater impact on the BEV/PHEV sales. The impact of recharge availability improvement is shown to be amplified by faster reduction in battery cost.

#### **Subject areas and Index Terms**

Energy; Highways; Vehicles and Equipment; I15: Environment; I90: Vehicles  
Choice models; Electric vehicles; Hybrid vehicles; Market development; Marketing; Plug-in hybrid vehicles; Promotion; Rechargeable batteries

**Availability:** Transportation Research Board Business Office

## **Energy Consumption**

### **The Impact of Residential Density on Vehicle Usage and Fuel Consumption**

#### **Authors:**

Kim, JinWon; Brownstone, David

University of California, Irvine - Department of Economics, 3151 Social Science Plaza Irvine, CA 92697  
; University of California Transportation Center - 2614 Dwight Way, Mail Code 1782 Berkeley, CA  
94720-1782 ; University Transportation Centers Program - 1200 New Jersey Avenue, SE Washington,  
DC 20590

Monograph

3/1/2010

#### **Abstract:**

This paper investigates the impact of residential density on vehicle usage and fuel consumption. The empirical model accounts for both residential self-selection effects and non-random missing data problems. While most previous studies focus on a specific region, this paper analyzes national level data from the 2001 National Household Travel Survey. Comparing two households that are equal in all respects except residential density, the household residing in an area that is 1000 housing units per square mile denser (roughly 50% of the sample average) will drive 1500 (7.8%) fewer miles per year and will consume 70 (7.5%) fewer gallons of fuel than the household in the less dense area. The effect of the contextual density measure (density in the context of its surrounding area) is quantitatively larger than the sole effect of residential density. A simulation moving a household from suburban to urban area reduces household annual mileage by 15%.

#### **Subject areas and Index Terms**

Energy; Highways; Operations and Traffic Management

Automobile ownership; Density; Econometric models; Fuel consumption; Land use models;  
Socioeconomic factors; Urban sprawl; Vehicle miles of travel; California; National Household Travel  
Survey

**Availability:** Available from UC Berkeley Transportation Library through interlibrary loan or document delivery Order URL: <http://library.its.berkeley.edu>; Find a library where document is available Order URL: <http://worldcat.org/oclc/589077900>

## **Energy Consumption**

### **National Household Travel Survey: Energy Use and Fuel Efficiency**

#### **Authors:**

Federal Highway Administration - 1200 New Jersey Avenue, SE Washington, DC 20590

Monograph

4/1/2008

#### **Abstract:**

Transportation uses a majority of the petroleum consumed in the U.S. According to the Energy Information Agency (EIA), currently transportation accounts for 60 percent of U.S. oil demand. A number of factors affect fuel consumption in the U.S., such as total driving population and annual vehicle miles of travel per driver. According the National Household Travel Survey (NHTS) data series, both of these have nearly doubled since 1969. Other factors, such as the fleet mix (varying proportion of cars, vans, and SUVs), the fuel efficiency of vehicles, and the level of use of these vehicles, affect total fuel consumption. Overall fuel economy for both cars and light trucks in the U.S. market reached its highest level in 1987, when manufacturers averaged 26.2 mpg. The fleet mix is changing, though. Hybrid, hybrid electric, sweet diesel vehicles, and other alternative fuel vehicles are becoming a growing part of the fleet mix. How fast these changes influence fuel consumption in the U.S. is dependent upon the timeliness of adoption by the American public.

#### **Subject areas and Index Terms**

Energy; Highways; I15: Environment

Alternate fuels; Energy consumption; Fuel consumption; Travel surveys; Vehicle fleets; Vehicle miles of travel; Average fuel economy; Fuel efficient cars

## **Energy Consumption**

### **National Household Travel Survey: Rising Fuel Cost - A Big Impact**

#### **Authors:**

Federal Highway Administration - 1200 New Jersey Avenue, SE Washington, DC 20590

Monograph

6/1/2006

#### **Abstract:**

Transportation accounts for almost 70 percent of all petroleum used in the U.S., and private (passenger) vehicle travel accounts for 82 percent of all vehicle miles of travel. Recent increases in the cost of motor fuel are raising questions about the impact of higher fuel prices on the economy and the daily travel of Americans. If U.S. households continue to drive at the same rates, they will pay more than double in annual motor fuel expenditures this year compared to five years ago. The type of vehicle driven has a significant impact on the amount of money paid at the pump. Fuel expenditures for the average passenger car are approximately 24 percent less than the average sports utility vehicle (SUV) or pick-up truck. Pick-ups and SUVs are less fuel-efficient and are driven more miles on average. People living in rural areas are impacted more than people living in urban areas. Rural drivers tend to drive more, and often own less fuel efficient vehicles than urban drivers.

#### **Subject areas and Index Terms**

Economics; Energy; Highways; I10: Economics and Administration; I15: Environment  
Economic impacts; Expenditures; Fuel consumption; Gasoline; Highway travel; Prices; Rural areas;  
Travel behavior; Travel surveys; Urban areas; Vehicle size; Vehicles by weight

## **Environment**

### **Statistical Evidence of the Impact of Air Quality Control on Vehicle Miles Traveled and Vehicle Ownership from 2001 and 2009 NHTS Data**

#### **Authors:**

Zhang, Lei; Lu, Yijing; He, Xiang; Ferrari, Nicholas; Krause, Cory; Shen, Qing  
Transportation Research Board - 500 Fifth Street, NW Washington, DC 20001  
TRB 90th Annual Meeting Compendium of Papers DVD  
Transportation Research Board 90th Annual Meeting  
2011

#### **Abstract:**

The air quality conformity rule in the transportation planning process, as well as many other federal, state, and local efforts and funding programs, aim to reduce pollution emissions and attain air quality control goals by reducing vehicle miles traveled (VMT), congestion, and fuel consumption in air quality nonattainment/maintenance areas. In this paper, the authors develop multiple regression and discrete choice models to analyze the relationship between air quality nonattainment designation and VMT and vehicle ownership based on data from the 2001 and 2009 National Household Travel Surveys. Results show the VMT reduction effect of air quality nonattainment designation and the associated planning efforts and funding preference ranges from 1.2% to 4.5% at the county level, and the average effect is about 1.6%. In addition, air quality nonattainment designation encourages households to own fewer vehicles and to choose fuel efficient vehicles (e.g. small cars). Additional research is in order to both assess past actions and justify/improve future efforts in reducing VMT and pollution emissions in air quality nonattainment areas.

#### **Subject areas and Index Terms**

Environment; Highways; Planning and Forecasting; I72: Traffic and Transport Planning  
Air quality management; Automobile ownership; Data collection; Environmental impacts; Fuel consumption; Nonattainment areas; Statistical analysis; Traffic congestion; Transportation planning; Travel surveys; Vehicle miles of travel; National Household Travel Survey; Discrete choice models

**Availability:** Transportation Research Board Business Office

## **Policy and Mobility**

### **An Economic Evaluation of Health-Promotive Built Environment Changes**

#### **Authors:**

Guo, Jessica Y; Gandavarapu, Sasanka  
Preventive Medicine Issue: Supplement 1  
1/1/2010

#### **Abstract:**

This study aimed to help public investment decisionmakers see the greatest return on their built environment investments by developing an analysis framework for identifying the most promising improvement strategies and assessing the attainable return on investment. The 2001 National Household Travel Survey sample (N = 4974) from Dane County, Wisconsin, was used to develop a Spatial Seemingly Unrelated Regression model of daily vehicle miles traveled and miles walked or biked. The empirical model was used to analyze the travel impacts of hypothetical built environment changes. These travel impacts were translated into health impacts and monetary values using cost-benefit analysis. Two win-win built environment strategies were found: increased regional retail accessibility and increased prevalence of sidewalks. Based on the present analyses, an investment of \$450 million to make sidewalks available to all Dane County residents was estimated to yield a cost-benefit ratio of 1.87 over a 10-year life cycle. Certain built environment measures could be predicted to be effective strategies for exerting a positive influence on people's travel behavior and the health of the community. Quantifiable public health benefits gained by better air quality and increased physical activity were shown to outweigh the cost of implementing the built environment measure of adding sidewalks to all roads.

#### **Subject areas and Index Terms**

Highways; Planning and Forecasting; I72: Traffic and Transport Planning  
Activity choices; Automobile travel; Benefit cost analysis; Bicycling; Capital investments; Mode choice; Public health; Sidewalks; Strategic planning; Travel behavior; Travel surveys; Walking; Dane County (Wisconsin); Transportation infrastructure

**Availability:** Find a library where document is available Order URL: <http://worldcat.org/issn/00917435>

## **Policy and Mobility**

### **Peak Travel in America**

#### **Authors:**

McGuckin, Nancy; Contrino, Heather; Nakamoto, Hikari  
Transportation Research Board - 500 Fifth Street, NW Washington, DC 20001  
TRB 89th Annual Meeting Compendium of Papers DVD  
Transportation Research Board 89th Annual Meeting  
2010

#### **Abstract:**

Understanding peak period travel is vital for transportation finance initiatives, congestion mitigation, and air quality policies among other important policy and planning programs. Historically, the peak period was considered the domain of work travel. Commuting is still predominantly a weekday activity, tied to the morning and evening hours, and has traditionally defined peak travel demand. Over the last four decades the number of work trips grew as the population of workers grew. But by the early 80's the National Household Travel Survey (NHTS) showed that the number of non-work trips were growing faster than work trips. By the early 90's the concept of trip chaining during a work tour was commonly used to allow more complex commutes to be recognized as work travel by including stops for incidental purposes during the commute. Even beyond the growth in trip chaining, non-work travel continues to grow faster than work travel, and it is growing during the peak periods. As the authors look forward to initiatives that aspire to smooth travel demand across time periods, one question that is difficult to answer is 'How much of peak period travel is really mandatory?' This research utilizes the NHTS data chained trip files (2001 are the most recent available, but this analysis can be updated in late fall with the 2008 NHTS) to categorize peak weekday vehicle travel into Mandatory travel; including work and school trips with typically more rigid schedules and fixed destinations; and Flexible travel; such as getting a meal and going to the gym that may be less rigid in time or destination choice. The concept of a work tour is used to include incidental non-work stops into the commute and therefore the 'Mandatory' category. The trips classified as 'Flexible' are trips wholly separate from the commute tour. This research concludes that using very stringent definitions of Mandatory travel (for instance, not including trips for medical purposes) nearly 75 percent of am peak vehicle trips are for 'Mandatory' purposes. In contrast, only 34 percent of PM peak vehicle trips are 'Mandatory'. Importantly, we find that the mean income of peak travelers is slightly lower than the average for all travelers. Workers with the least flexible schedules, such as people in sales and service occupations, are more likely to be commuting during the peak. Part-time workers and workers in households with children are more likely to make 'Flexible' trips during the peak, and many (38 percent) of the workers making Flexible trips during peak go to work at another time, indicating schedule constraints on their Flexible travel.

#### **Subject areas and Index Terms**

Highways; Planning and Forecasting; Public Transportation; I72: Traffic and Transport Planning  
Congestion management systems; Flexibility; Peak periods; Systems analysis; Travel surveys; Travel time; Vacations; Work trips; United States; Destinations; Household travel surveys

**Availability:** Transportation Research Board Business Office

## **Policy and Mobility**

### **Quantitative Analysis of Impacts of Moving Toward a Vehicle Mileage-Based User Fee**

#### **Authors:**

Sana, Bhargava; Konduri, Karthik C; Pendyala, Ram M

Economics, Demand Management, and Parking Policy

Transportation Research Record: Journal of the Transportation Research Board Issue: 2187  
2010

#### **Abstract:**

This paper offers a broad examination of the revenue generation and social equity implications of a national mileage-based user fee that could be substituted for all or part of the current gas tax. Data from the 2001 National Household Travel Survey are combined with documented elasticity values that can be used to calculate changes in vehicle fleet composition and miles of travel by time of day in response to price signals. These data provide the basis for calculating the impacts of a mileage-based user fee system. It is found that modest mileage-based fees of just 0.5 cent per mile to 1.3 cents per mile can offer revenue streams that replace current gas tax revenue. In addition, the mileage-based user fee system appears to have minimal, if any, differential impacts across income classes and thus eliminates any potential equity concerns that may arise from the implementation of such a user fee system. Impediments to a mileage-based user fee system appear likely to be technological and personal privacy issues as opposed to transportation or social equity issues.

#### **Subject areas and Index Terms**

Finance; Highways; I10: Economics and Administration

Equity (Justice); Financing; Fuel taxes; Highways; Impacts; Privacy; Revenues; Mileage-based user fees

**Availability:** Transportation Research Board Business Office Order URL:

[http://www.trb.org/Main/Blurbs/Economics\\_Demand\\_Management\\_and\\_Parking\\_Policy\\_164863.aspx](http://www.trb.org/Main/Blurbs/Economics_Demand_Management_and_Parking_Policy_164863.aspx);

Find a library where document is available Order URL: <http://worldcat.org/isbn/9780309160605>

## **Policy and Mobility**

### **Similarities and Differences in Determinants of Mode Choice in the USA and Germany**

#### **Authors:**

Buehler, Ralph

Transportation Research Board - 500 Fifth Street, NW Washington, DC 20001

TRB 89th Annual Meeting Compendium of Papers DVD

Transportation Research Board 89th Annual Meeting

2010

#### **Abstract:**

The automobile is at the center of many costly trends like environmental pollution, oil dependence, and traffic congestion. Short trips have the greatest potential to be made by non-motorized modes of transportation and thus mitigate the negative impacts of car travel. Germany and the U.S. have among the highest motorization rates in the world. Yet Americans make a 40% higher share of their trips by car and annually drive twice as many kilometers per capita as Germans. Arguably, differences in socio-economic and demographic factors together with denser, more compact spatial development patterns with better accessibility, and more automobile restrictive transport policies in Germany can help explain less car use there. Using two comparable individual level national travel surveys (NHTS 2001 for the U.S. and MiD 2002 for Germany) this paper empirically investigates the role of socio-economic and demographic factors, spatial development patterns and accessibility in explaining differences in automobile use in Germany and the U.S. We find that in both countries higher population density, a greater mix of land uses, household proximity to a transit stop, and fewer cars per household are associated with a lower share of trips by automobile. However, considerable differences remain: Americans use their car for almost 70 percent of all trips shorter than 1 mile (1.6km) and 90 percent of trips shorter than 2 miles (3.2km) compared to only 30 percent (<1.6km) and 60 percent (<3.2km) for Germans. Similarly, Americans living at population densities of over 5,000 inhabitants per km<sup>2</sup> make a similar share of trips by car as Germans living at 5 times lower population densities. We conclude that transport policies that make car travel slower, more expensive, less convenient and non-motorized modes more attractive help account for the remaining differences.

#### **Subject areas and Index Terms**

Environment; Highways; Planning and Forecasting; I72: Traffic and Transport Planning  
Demographics; Land use planning; Mixed use development; Mode choice; Nonmotorized transportation;  
Traffic congestion; Travel surveys; Germany; United States; National Household Travel Survey

**Availability:** Transportation Research Board Business Office

## **Policy and Mobility**

### **The Impact on Non-driver Mobility of Destinations and Bus Routes within Walking Distance of Residence**

#### **Authors:**

Case, Robert

Transportation Research Board - 500 Fifth Street, NW Washington, DC 20001

TRB 89th Annual Meeting Compendium of Papers DVD

Transportation Research Board 89th Annual Meeting

2010

#### **Abstract:**

The National Household Travel Survey (NHTS) reveals that non-drivers - assumed to be persons without drivers licenses - largely rely on being driven by others, resulting in mobility that is significantly lower than that of persons who can drive themselves. Interest arises, therefore, in the impact that living within walking distance of destinations and living near transit has on non-driver mobility, but the structure of the NHTS prevents that data from being used to measure these impacts. In this paper, data from a survey conducted in the Hampton Roads region of Virginia - augmented with a new geographic information systems (GIS) technique for directly measuring proximity to destinations - are analyzed using logistic models to measure the impact on non-driver mobility of living within walking distance of destinations and bus transit. Findings include the significant impact of these proximities, the quantifications of which can be used to promote the land use and bus infrastructure policy recommendations developed from the findings to improve the mobility of non-drivers.

#### **Subject areas and Index Terms**

Planning and Forecasting; Public Transportation; I72: Traffic and Transport Planning

Bus routes; Bus transit; Mobility; Origin and destination; Public transit; Residential location; Travel surveys; Walking distance; Household travel surveys; Nondrivers

**Availability:** Transportation Research Board Business Office

## **Policy and Mobility**

### **To What Extent Can High-Occupancy Vehicle Lanes Reduce Vehicle Trips and Congestion? Exploratory Analysis Using National Statistics**

#### **Authors:**

Plotz, Joseph; Konduri, Karthik C; Pendyala, Ram M  
Freeway Operations; Regional Systems Management and Operations; Managed Lanes 2010  
Transportation Research Record: Journal of the Transportation Research Board Issue: 2178  
2010

#### **Abstract:**

Despite the increasing interest in and deployment of managed lanes on highways that involve pricing and tolling schemes, a considerable number of highway facilities still use high-occupancy vehicle (HOV) lanes with no other features to manage or price their use. These HOV lanes are often restricted to vehicles transporting two or more, or three or more, occupants and are viewed as mechanisms to reduce vehicular travel demand, motivate ridesharing among individuals, and curb greenhouse gas emissions. In this paper, an analysis of the 2001 National Household Travel Survey data set was conducted to determine the potential share of HOV trips that might be induced by the presence of an HOV lane. It was found that a vast majority of HOV trips were trips undertaken with family for discretionary activity purposes. Given that virtually all these HOV trips would have been undertaken regardless of the presence of an HOV lane, one could question the potential efficacy of implementing a pure HOV lane. This paper addresses this question by considering two extreme scenarios that provide a range of potential impacts of HOV lanes on vehicle trip reduction. In the specific hypothetical scenario considered in this paper, the range was found to lie between 1% and 37%, with a clear indication that true impacts in the real world were more likely to be closer to the lower bound than the upper bound. On the basis of these findings, it appears that pure HOV lanes provide modest benefits from the perspectives of vehicular trip reduction and congestion relief. The paper concludes that HOV lanes with additional managed use and pricing features are likely to yield substantially greater impacts from the perspectives of both vehicular trip reduction and revenue generation.

#### **Subject areas and Index Terms**

Highways; Operations and Traffic Management; I73: Traffic Control  
Congestion pricing; High occupancy vehicle lanes; Traffic congestion; Travel demand management; 2001 National Household Travel Survey

**Availability:** Transportation Research Board Business Office; Find a library where document is available Order URL: <http://worldcat.org/isbn/9780309160490>

## **Policy and Mobility**

### **Equity Implications of Replacing Federal Fuel Taxes with Per-Mile User Charges**

#### **Authors:**

Weatherford, Brian Anthony  
Transportation Research Board - 500 Fifth Street, NW Washington, DC 20001  
TRB 90th Annual Meeting Compendium of Papers DVD  
Transportation Research Board 90th Annual Meeting  
2011

#### **Abstract:**

Policy makers have begun to consider replacing state and Federal fuel taxes with per-mile user charges, also referred to as “VMT fees.” VMT fees would be more financially sustainable and more closely link actual use of the transportation system to the costs of maintaining and expanding it. This paper uses data from the 2001 National Household Travel Survey (NHTS) and a simple OLS regression methodology to examine the potential social equity implication that such a change in the tax structure might cause. At the national level, a VMT fee would be less regressive than fuel taxes are, suggesting that a VMT fee would be a more socially equitable way to increase funding of the transportation system. However, replacing fuel taxes with a VMT fee designed to be completely revenue neutral resulted in a net social welfare loss of \$1.9 billion. Other vertical equity implications were modest but there were disproportionate horizontal equity impacts among low income households. Low income retired households were made relatively better off than other low income households while low income single parent households were made significantly worse off.

#### **Subject areas and Index Terms**

Finance; Highways; Policy; I10: Economics and Administration  
Demographics; Equity (Justice); Finance; Fuel taxes; Mathematical models; Socioeconomic factors;  
Transportation policy; User charges; Vehicle miles of travel; Mileage-based user fees

**Availability:** Transportation Research Board Business Office

## **Policy and Mobility**

### **Impact of State and Local Incentives on Household Ownership of Hybrid Electric Vehicles: Results from 2009 National Household Travel Survey**

#### **Authors:**

Ayala, Roberto; Saphores, Jean-Daniel Maurice  
Transportation Research Board - 500 Fifth Street, NW Washington, DC 20001  
TRB 90th Annual Meeting Compendium of Papers DVD  
Transportation Research Board 90th Annual Meeting  
2011

#### **Abstract:**

We analyze the impact of state and local incentives on household ownership of hybrid electric vehicles (HEVs) while accounting for their socio-economic characteristics. Our large dataset combines household data from the 2009 National Household Travel Survey (NHTS) with zip code-level retail gas prices and congestion data from the Texas Transportation Institute, as well as information about state and city incentives. These incentives include unrestricted HOV access, income tax credit, sales tax rebates, and city parking privileges. By contrast, studies published so far focused on just one or two incentives and/or they analyzed only their local impact. We find that unrestricted access to HOV lanes paired with a parking incentive or sales tax rebates/exemptions can effectively promote household ownership of HEVs; by contrast, state income tax credits do not appear to have a statistically significant impact. Moreover, our results indicate that households are more likely to purchase HEVs in areas where gasoline prices are higher, which suggests that increasing gasoline tax could effectively promote HEVs. Understanding the effectiveness of various government policies is important at a time when there is renewed interest in promoting HEVs to address our dependence on foreign oil, air pollution and global warming.

#### **Subject areas and Index Terms**

Energy; Environment; Highways; I15: Environment  
Access; Environmental policy; Hybrid vehicles; Incentives; Ownership; Policy; Revealed preferences;  
Socioeconomic factors; Tax credits

**Availability:** Transportation Research Board Business Office

## **Policy and Mobility**

### **Propensity to Telecommute--Exploring the National Household Travel Survey**

#### **Authors:**

Jin, Xia; Wu, Jingcheng

Transportation Research Board - 500 Fifth Street, NW Washington, DC 20001

TRB 90th Annual Meeting Compendium of Papers DVD

Transportation Research Board 90th Annual Meeting

2011

#### **Abstract:**

Telecommuting refers to the substitution for work at the workplace with work at home or other locations close to home. The interest in telecommuting stems from its potential benefits in trip reduction, congestion mitigation, cost saving for office space, increased productivity, and better home-work balance, etc. This paper presents a study in exploring the factors that influence people's telecommuting behavior using the 1995 National Personal Transportation Survey (NPTS), 2001 and 2009 National Household Travel Survey (NHTS) data. This paper contributes to the field by providing a comprehensive analysis using national survey data as well as examining the trend over the years. More importantly, the analysis advances the understanding in the characteristics of those who telecommute by detailed category of telecommuting frequency. The findings of this study are essential as a first step toward the capability of estimating and incorporating telecommuting in the travel demand forecasting process.

#### **Subject areas and Index Terms**

Planning and Forecasting; I72: Traffic and Transport Planning

Telecommuting; Traffic forecasting; Travel behavior; Travel demand; Travel demand management;

Travel surveys; Congestion mitigation; Household travel surveys; Trip reduction programs

**Availability:** Transportation Research Board Business Office

## **Special Population Groups**

### **National Household Travel Survey: Travel to School: The Distance Factor**

#### **Authors:**

Federal Highway Administration - 1200 New Jersey Avenue, SE Washington, DC 20590

Monograph

1/1/2008

#### **Abstract:**

Like all trip-making, travel to school has changed dramatically over the last 40 years. The change that is most apparent is the increase in children being driven to school. One factor underlying this change is the increased distance children travel to school. In 1969, just over half (54.8 percent) of students lived a mile or more from their schools. By 2001, three-quarters of children traveled a mile or more to school. Some of the change in distance may be due to suburbanization and larger school districts. Policies and programs that encourage walking and biking to school, especially for grade school children, need to account for the number of eligible walkers and bikers (living within a mile of school) along with the barriers to walking and biking such as security concerns of parents.

#### **Subject areas and Index Terms**

Highways; Pedestrians and Bicyclists; Planning and Forecasting; I72: Traffic and Transport Planning  
Automobile travel; Bicycling; Distance; Mode choice; Residential location; School children; School trips;  
Travel surveys; Trip length; Walking

## **Special Population Groups**

### **Children's Mode Choice for the School Trip: The Role of Distance and School Location in Walking to School**

#### **Authors:**

McDonald, Noreen C

Transportation: Planning, Policy, Research, Practice Issue: 1  
1/1/2008

#### **Abstract:**

Using data from the 2001 National Household Travel Survey, this study analyzes the factors affecting mode choice for elementary and middle school children. The findings show that walk travel time is the most policy-relevant factor affecting the decision to walk to school. Dense places encourage walking to school, while factors such as gender and race do not have large effects on mode choice. These findings suggest that current policies, such as Safe Routes to School, which do not affect the spatial distribution of schools and residences will not be enough to change travel behavior. The mode choice model is used to investigate how the land use strategy of building community schools might affect walking to school. The results show that including children's distance from school as a planning criterion could be an effective way to change community design and encourage walking.

#### **Subject areas and Index Terms**

Education and Training; Highways; Pedestrians and Bicyclists; Planning and Forecasting; Policy; Society; I72: Traffic and Transport Planning

Choice models; Gender; Land use planning; Location; Mode choice; Population density; Race; School children; School trips; Schools; Transportation policy; Travel behavior; Travel surveys; Travel time; Trip length; Walking; Walking distance

**Availability:** Find a library where document is available Order URL: <http://worldcat.org/issn/00494488>

## **Special Population Groups**

### **Trip Chaining Behavior of Older People in the US and London: Effects of Medical Conditions and Urban Form**

#### **Authors:**

Noland, Robert B; Schmocker, Jan-Dirk; Su, Fengming; Bell, Michael G H  
World Conference on Transport Research Society - Secretariat, 14 Avenue Berthelot 69363 Lyon cedex  
07,  
11th World Conference on Transport Research  
2007

#### **Abstract:**

This paper examines the relationship between the trip complexity of older people (60 years and older) measured by the number of stops they make in a tour. The data used for this analysis is the trip-chaining dataset of the 2001 National Household Travel Survey, which is a comprehensive survey of travel behavior in the United States, and the London Area Travel Survey (LATS) which is a similar survey of travel behavior in London, England. The analysis focuses on understanding the difference in the behavior of older people compared to earlier work done on this same data for the entire NHTS sample (Noland and Thomas, in press). The focus is both on examining the effect of urban form, as proxied by population density, and the effect of medical conditions of older people on their travel. The authors break down the age cohorts into sub-groups that span the range of our population of those older than 60. This helps in understanding distinctions between the travel of the “old-old” and the “young-old”. A similar analysis is done for the LATS data, but with different definitions used for some of the disability variables and with a different context of urban form, given the population density in London. An ordered probit model is used to conduct a multivariate analysis of these effects on trip complexity. The results yield some interesting findings and both similarities and differences in the travel behavior of older people compared to the entire sample, as well as (not surprisingly) differences between behavior in London versus the United States (US) as a whole.

#### **Subject areas and Index Terms**

Highways; Planning and Forecasting; Public Transportation; Society; I72: Traffic and Transport Planning Aged; Diseases and medical conditions; Health care; Public transit; Transit operating agencies; Travel behavior; Travel surveys; Trip chaining; Urban transit; London (England); United States

**Availability:** World Conference on Transport Research Society

## **Special Population Groups**

### **Trip-Chaining Behavior of Older People: Effects of Medical Conditions and Urban Form**

#### **Authors:**

Noland, Robert B; Schmocker, Jan-Dirk; Bell, Michael G H  
Transportation Research Board - 500 Fifth Street, NW Washington, DC 20001  
TRB 87th Annual Meeting Compendium of Papers DVD  
Transportation Research Board 87th Annual Meeting  
2008

#### **Abstract:**

This paper examines the relationship between the trip complexity of older people of (60 years and older), as measured by the number of stops they make in a tour. The data used for this analysis is the trip-chaining dataset of the 2001 National Household Travel Survey, which is a comprehensive survey of travel behavior in the United States. Our analysis focuses on understanding the difference in the behavior of older people compared to earlier work done on this same data for the entire sample (Noland and Thomas, in press). Our focus is both on examining the effect of urban form, as proxied by population density, and the effect of medical conditions of older people on their travel. We break down the age cohorts into sub-groups that span the range of our population of those older than 60. This helps in understanding distinctions between the travel of the “old-old” and the “young-old”. An ordered probit model is used to conduct a multivariate analysis of these effects on trip complexity. Our results yield some interesting findings and both similarities and differences in the travel behavior of older people compared to the entire sample.

#### **Subject areas and Index Terms**

Highways; Planning and Forecasting; Safety and Human Factors; Society; I72: Traffic and Transport Planning  
Age groups; Aged; Diseases and medical conditions; Health; Health care; Population density; Travel behavior; Trip chaining; National Household Travel Survey

**Availability:** Transportation Research Board Business Office

## **Special Population Groups**

### **Older Drivers' "High Per-Mile Crash Involvement": The Implications for Licensing Authorities**

#### **Authors:**

Eberhard, John

Traffic Injury Prevention Issue: 4  
2008

#### **Abstract:**

The study objective is to determine what role motor vehicle administrators have in dealing with older drivers based on their crash risk and mobility needs. This article reviews both the recent crash, injury, and exposure trends from the National Household Travel Survey and other sources to help motor vehicle administrators set priorities in meeting the safety and mobility needs of older persons. Older drivers have a higher crash risk per mile driven. The "risk" of dying in a crash is more likely attributable to the frailty of older drivers than the risks associated with the functional limitations that accompany aging. The research literature indicates that older drivers are not a risk to other road user age groups but primarily to themselves. Furthermore, recent fatality data indicate that the death rates for older persons, particularly those over 80 years of age, have been declining over the last 10 years. These results differ from recent fatality trend projections that predicted a significant increase in traffic fatalities associated with an aging driver population. Drivers over 80 are more likely to have a crash on a per licensed driver basis. There is new evidence, however, that only older drivers who drive infrequently are at increased risk. These drivers drive relatively short distances on local streets with complex traffic situations. Most of these drivers are also likely to be experiencing multiple functional limitations. Since those who stop driving reduce their mobility by over one half, motor vehicle administrators need to work more closely with the state departments of aging and transportation providers to help ensure mobility options for those who can no longer drive. The author concludes that older driver motor vehicle crashes are not a significant threat to other road users in vehicles or as pedestrians. It is the older drivers and his vehicle occupants who are at higher risk of dying when in a crash. Current evidence is that the drivers who pose the greatest risks are the teenage grandchildren of this older generation. Therefore, motor vehicle administrators can support their stand against increasing the licensing requirements of older drivers. When dealing with the older driver population they need to weigh the consequences of having someone stop driving and assist other responsible agencies in fostering sustained mobility for those who stop driving.

#### **Subject areas and Index Terms**

Administration and Management; Highways; Policy; Safety and Human Factors; I10: Economics and Administration; I83: Accidents and the Human Factor  
Administration; Aged drivers; Collisions; Driver licensing; High risk drivers; Mobility; Policy; Safety

**Availability:** Find a library where document is available Order URL: <http://worldcat.org/oclc/49192340>

## **Special Population Groups**

### **Changes in the Percentage of Students Who Walk or Bike to School - United States, 1969 and 2001**

#### **Authors:**

Ham, Sandra A; Martin, Sarah L; Kohl, Harold W  
Journal of Physical Activity and Health Issue: 2  
2008

#### **Abstract:**

This article reports on a study that compared the changes in the percentage of US students (age 5 to 18 years) who walked or bicycled to school and in the distance that they lived from or traveled to their school in 1969 and 2001. The authors also provide detailed information about school childrens' travel patterns in 2001. Data were used from the 1969 National Personal Transportation Survey report on school travel and the 2001 National Household Transportation Survey. The results showed that, in 2001, a smaller percentage of students (19.4%) lived within 1 mile of school than in 1969 (when 34.7% of students lived less than one mile from their school). The percentage of students who walked or biked any distance decreased from 42.0% to 16.2% in the study's two time periods. Nearly half of students used more than 1 travel mode or went to an additional destination en route between home and school in 2001. The authors discuss the role of commuting to school as part of a child's everyday physical activity. Other topics discussed include concerns for safety from traffic accidents, distance from school, the impact of school choice programs such as magnet schools and desegregation, Safe Routes to School legislation, student access to vehicles, and complex travel patterns of modern American children. The authors conclude by describing the multidisciplinary efforts that will be needed as part of any programs to increase the percentage of students who walk or bike to school.

#### **Subject areas and Index Terms**

Highways; Passenger Transportation; Pedestrians and Bicyclists; Planning and Forecasting; Safety and Human Factors; Society; I72: Traffic and Transport Planning  
Adolescents; Bicycling; Children; Commuting; Households; Residential areas; School bus passengers; School buses; School children; Traffic safety; Trip length; Walking; Walking distance; Safe Routes to School (Program)

**Availability:** Find a library where document is available Order URL: <http://worldcat.org/issn/15433080>

## **Special Population Groups**

### **Travel Behavior of Largest Minority Cohorts in Texas**

#### **Authors:**

Jimenez, Gustavo A; Mattingly, Stephen P

Travel Behavior 2009, Volume 2

Transportation Research Record: Journal of the Transportation Research Board Issue: 2135  
2009

#### **Abstract:**

Texas is changing dramatically; minority cohorts are expected to grow and become more than 65% of the Texas population before 2035. When considering issues of environmental justice, transportation professionals in Texas must seek to identify how these demographic changes will affect the transportation system. Gaining an understanding of this problem requires that the prevalent travel behavior and attitudes of minority populations be considered. The research presented in this paper investigates the prevailing travel behavior of the three largest minority cohorts in Texas: U.S.-born Hispanics, Hispanic immigrants, and African Americans. Considering environmental justice, this paper focuses on a study performed to identify the travel behaviors of the minority cohorts of Texas. The researchers used the National Household Travel Survey Add-On for Texas, because it allowed them to examine respondents by race & ethnicity and immigrant status. On the basis of the study's results, it was found that U.S.-born Hispanics emulate Caucasian travel behavior most closely; however, U.S.-born Hispanics have higher nonwork-trip generation rates. Moreover, multivariate analysis indicated that Hispanic immigrants drive less than U.S.-born Hispanics, even after accounting for sociodemographics. The study also revealed that African Americans, Hispanic immigrants, and single adults with children produce most transit trips in urban Texas. This study further indicated that Hispanic immigrants - given their high household sizes, low income, and low vehicle availability - may be incurring mobility problems. The findings in this study indicate that Texas may be facing a transportation & cultural change because of the different travel characteristics of rapidly growing minority cohorts.

#### **Subject areas and Index Terms**

Highways; Planning and Forecasting; Public Transportation; Society; I72: Traffic and Transport Planning African Americans; Demographics; Environmental justice; Ethnic groups; Hispanics; Households; Minorities; Mobility; Socioeconomic factors; Travel behavior; Urban areas; Texas; Immigrants; National Household Travel Survey; Transit use

**Availability:** Transportation Research Board Business Office Order URL:

[http://www.trb.org/Main/Blurbs/Travel\\_Behavior\\_2009\\_Volume\\_2\\_162993.aspx](http://www.trb.org/Main/Blurbs/Travel_Behavior_2009_Volume_2_162993.aspx); Find a library where document is available Order URL: <http://worldcat.org/isbn/9780309142724>

## **Special Population Groups**

### **Urban Sprawl and Miles Driven Daily by Teenagers in the United States**

#### **Authors:**

Trowbridge, Matthew John; McDonald, Noreen C  
American Journal of Preventive Medicine Issue: 3  
3/1/2008

#### **Abstract:**

The association of urban sprawl with increased automobile reliance and daily mileage is well established among adults. However, sprawl's specific impact on teen driving exposure is unknown. Teen driver fatality rates per mile driven are significantly higher than adults, making the identification of environmental influences on travel behavior particularly important in this age group. Driving and demographic data for 4528 teens (weighted=10.5 million) aged 16-19 years were obtained from the 2001 National Household Transportation Survey (NHTS). County-level sprawl was measured using an index developed by Ewing et al. The association between daily miles driven by teens and sprawl, controlling for demographic characteristics, was modeled using ordinal logistic regression. The predicted probability of driving >20 miles in counties with varying degrees of sprawl also was calculated. Of the surveyed teens, 48% did not drive, 27% drove <20 miles/day, and 25% drove >20 miles/day. Of the 52% of teens who reported driving, the average distance driven was 15.6 miles/day. More-pronounced sprawl was associated with increased daily mileage ( $p<0.001$ ). Overall, teens in sprawling counties were more than twice as likely to drive >20 miles/day than teens in compact counties. This trend was most prominent among the youngest drivers. For example, the predicted probability of boys aged 16-17 years driving >20 miles per day varied from 9% to 24% in compact versus sprawling counties. Sprawl is associated with increased daily mileage by teen drivers. Given the stark relationship between driving exposure and fatality risk among teens, increased efforts to understand and modify the effects of sprawl on adolescent driving behavior are necessary.

#### **Subject areas and Index Terms**

Economics; Highways; Planning and Forecasting; Safety and Human Factors; Society; Vehicles and Equipment; I10: Economics and Administration; I72: Traffic and Transport Planning; I96: Vehicle Operating Costs  
Adolescents; Automobile driving; Demographics; Travel patterns; Trip length; Urban development; Urban sprawl

**Availability:** Find a library where document is available Order URL: <http://worldcat.org/issn/07493797>

## **Special Population Groups**

### **New York State NHTS, 2001: Travel Patterns of Special Populations**

#### **Authors:**

Hu, Pat; Reuscher, Tim

Oak Ridge National Laboratory - Center for Transportation Analysis, P.O. Box 2008 Oak Ridge, TN 37831 ; New York State Department of Transportation - Office of Transportation Policy Albany, NY 12232 ; Department of Energy - 1000 Independence Avenue, SW Washington, DC 20585

Monograph

3/1/2010

#### **Abstract:**

The primary objective of the survey was to collect trip-based data on the nature and characteristics of personal travel so that the relationships between the characteristics of personal travel and the demographics of the traveler can be established. Commercial and institutional travel was not part of the survey. New York State participated in the 2001 National Household Travel Survey (NHTS) by procuring additional 12,000 sample households. These additional sample households allowed New York State to address transportation planning issues pertinent to geographic areas that are significantly smaller than what the national NHTS data allowed. The final sample size for New York State was 13,423 usable households. In this report, Oak Ridge National Laboratory (ORNL) identifies and analyzes differences, if any, in travel patterns that are attributable to demographic characteristics (e.g., gender, age, race and ethnicity), household characteristics (e.g., low income households, zero and one car households), modal characteristics and geographic location. Travel patterns of those who work at home are examined and compared to those of conventional workers, as well as those who do not work. Focus is given to trip frequency, travel by time of day, trip purpose, and mode choice. For example, included in this analysis is the mobility of the elderly population in New York State. The American society is undergoing a major demographic transformation that is resulting in a greater percentage of older individuals in the population. In addition to demographic changes, recent travel surveys show that an increasing number of older individuals are licensed to drive and that they drive more than their same age cohort did a decade ago. Cohort differences in driving are particularly apparent - not only are more of today's elderly population licensed to drive than their age cohort two decades ago, they also drive more. Equally important are the increase in immigration and in racial and cultural diversity. This report also discusses vehicle availability, socioeconomic characteristics, travel trends (e.g., miles traveled, distance driven, commute patterns), and the transportation accessibility of these populations. Specifically, this report addresses in detail the travel behavior of the following special populations: (1) the elderly, defined as those who were 65 years old or older, (2) low-income households, (3) ethnic groups and immigrants, and (4) those who worked at home.

#### **Subject areas and Index Terms**

Highways; Planning and Forecasting; I72: Traffic and Transport Planning  
Aged; Demographics; Energy conservation; Energy consumption; Low income groups; Mode choice; Telecommuting; Transportation planning; Travel behavior; Travel patterns; Travel surveys; Trip purpose; New York (State); National Household Travel Survey; Oak Ridge National Laboratory; Personal travel

**Availability:** National Technical Information Service

## **Special Population Groups**

### **Travel behavior of immigrants: An analysis of the 2001 National Household Transportation Survey**

#### **Authors:**

Tal, Gil; Handy, Susan

Transport Policy Issue: 2

3/1/2010

#### **Abstract:**

The purpose of this paper is to examine the relationships between travel behavior and immigrant status. The National Household Travel Survey (NHTS) allows us to explore the relationships between travel behavior and characteristics that are usually hard to discern in surveys with smaller samples. The correlation between travel behavior and immigrant characteristics such as place of birth and year of immigration in the US was tested while controlling for spatial and socio-demographic variables. The effects of place of birth and year of arriving to the US were found to be significant for some places of birth and for immigrants who entered the US in recent years. Understanding the differences in travel behavior and the possible explanations for these differences can help in modeling travel demand, finding policies best suited to meeting the travel needs of foreign-born communities, and addressing environmental justice concerns.

#### **Subject areas and Index Terms**

Planning and Forecasting; Society

Countries; Environmental justice; Mode choice; Travel behavior; Travel demand; Immigrants

**Availability:** Find a library where document is available Order URL: <http://worldcat.org/oclc/29485010>

## **Special Population Groups**

### **Active Adult (55) Community Trip Generation Rates**

#### **Authors:**

Racca, David P

University of Delaware, Newark - Delaware Center for Transportation Newark, DE 19716 ; Delaware  
Department of Transportation - 800 Bay Road Dover, DE 19903

Monograph

4/1/2006

#### **Abstract:**

In response to the growing number of applications for the development of age restricted communities (55 years old and older) the Delaware Department of Transportation (DelDOT) through the Delaware Center for Transportation sponsored this study to examine trip generation characteristics and traffic impacts. Goals of the study include: Identify for the general Delaware population what the household structure and travel characteristics are for people 55 and older, and examine how household structure changes with age; Acquire available data to describe the household structures in age-restricted communities and compare households in age-restricted communities with similar households outside of such communities; Research current literature and data on travel characteristics of those in age-restricted communities across the country; Identify any Delaware specific information that would be available to describe travel characteristics of age-restricted communities; and Describe the number of age-restricted communities in Delaware and features that make them different from traditional housing developments, and examine the types of facilities offered to residents and how that might affect trip generation. National trip generation estimates, as available through the Institute of Transportation Engineers, and local traffic studies were reviewed. Current and proposed 55 communities as compared with the general population. National travel data as provided by the National Personal Travel Survey was used to provide further information. This study produced a flexible model to assist planners in judging the impacts of age restricted communities.

#### **Subject areas and Index Terms**

**Availability:** Highways; Planning and Forecasting; Public Transportation; Society; I72: Traffic and Transport Planning

## **Special Population Groups**

### **Critical Factors for Active Transportation to School among Low-Income and Minority Students: Evidence from the 2001 National Household Travel Survey**

#### **Authors:**

McDonald, Noreen C

American Journal of Preventive Medicine Issue: 4

4/1/2008

#### **Abstract:**

This article reports on a cross-sectional study that used data from the 2001 National Household Travel Survey to document rates of walking and biking to school among low-income and minority youth in the U.S. (n = 14,553). The authors developed binary models of the decision to use active transport to school that can simultaneously adjust for trip, individual, household, and neighborhood correlates. All analyses were conducted in 2007. The results showed that low-income and minority groups, particularly blacks and Hispanics, use active travel modes to get to school at much higher rates than whites or higher-income students. However, racial variation in travel patterns is removed by controlling for household income, vehicle access, distance between home and school, and residential density. The authors conclude that active transportation to school may be an important strategy to increase and maintain physical activity levels for low-income and minority youth. Current policy interventions such as Safe Routes to School have the opportunity to provide benefits for low-income and minority students who are the most likely to walk to school.

#### **Subject areas and Index Terms**

Highways; Safety and Human Factors; I10: Economics and Administration

Blacks; Commuting; Hispanics; Households; Income; Low income groups; Minorities; Private passenger vehicles; Race; Residential areas; School trips; Schools; Socioeconomic factors; Transportation modes; Walking distance; National Household Travel Survey; Safe Routes to School (Program)

**Availability:** Find a library where document is available Order URL: <http://worldcat.org/issn/07493797>

## **Special Population Groups**

### **National Household Travel Survey: Older Drivers: Safety Implications**

#### **Authors:**

Federal Highway Administration - 1200 New Jersey Avenue, SE Washington, DC 20590

Monograph

5/1/2006

#### **Abstract:**

The aging of our population has profound implications for our transportation system. The National Household Transportation Survey (NHTS) is the unique source of data on travel by different population groups. The survey shows that the percent of older people who continue to drive is growing, and the growth in older drivers is especially marked among older women. Even if baby boom men and women drive at the same (modest) rates as the current older population, their sheer numbers means that total miles driven by those 65 and older will increase by 50 percent by 2020 and more than double by 2040. Per mile driven, elderly drivers (those over 80 years old) are more likely to die in a crash than any other age group.

#### **Subject areas and Index Terms**

Highways; Safety and Human Factors; Society; I83: Accidents and the Human Factor

Aged drivers; Fatalities; Gender; Highway safety; Highway travel; Traffic accidents; Traffic safety;

Travel behavior; Travel surveys

## **Special Population Groups**

### **Getting By with a Little Help from my Friends' and Family: Immigrants and Carpooling**

#### **Authors:**

Blumenberg, Evelyn; Smart, Michael

Transportation: Planning, Policy, Research, Practice Issue: 3

5/1/2010

#### **Abstract:**

Immigrants make many more trips by carpool than by transit in the United States. This study uses data from the 2001 National Household Travel Survey and multinomial logit mode choice models to examine the determinants of carpooling among immigrants, both within and across households. Results show that, while immigrants are far more likely than native-born Americans to use public transit, immigrants appear to have a stronger preference for carpools over transit than the native born. After controlling for relevant determinants of carpooling, results also indicate that immigrants are far more likely to form household carpools than native-born adults and also are more likely than the native-born to form carpools outside the household. In general, the association between carpooling and immigrants weakens over time, as immigrants progress toward the travel patterns of native-born Americans.

#### **Subject areas and Index Terms**

Highways; Planning and Forecasting; Society

Carpools; Households; Mode choice; Travel surveys; Immigrants

**Availability:** Find a library where document is available Order URL: <http://worldcat.org/issn/00494488>

## **Special Population Groups**

### **National Household Travel Survey: Travel Characteristics of New Immigrants**

#### **Authors:**

Federal Highway Administration - 1200 New Jersey Avenue, SE Washington, DC 20590

Monograph

8/1/2006

#### **Abstract:**

Predicting future growth in travel has traditionally depended on key characteristics: household income, family size, autos owned, driving ability, and employment. With the aging population (baby boomers) and a sizeable influx of new immigrants in the U.S., the normal distribution of key population characteristics used to forecast travel demand is changing. Although the data shown in this brief are for the nation, immigration is concentrated both regionally and in major metropolitan areas. The travel differences of new immigrants go beyond higher average workers per household, longer distances to work, and lower rates of vehicle ownership. While total household trip rates are higher for new immigrants due to higher household size, individually, new immigrants make fewer trips - about 5 trips a week less than U.S. born. In addition, a higher proportion of their travel is work and work-related. As compared to the U.S. born population, new immigrants are also more dependent on transit and walking for all their daily travel and much less likely to drive alone. Another important insight about differences in commute patterns is the high use of carpools by Hispanic commuters, especially men. Especially for travel demand forecasting, growing immigration has both policy and planning implications as states and local areas develop travel forecasts and plan new transportation programs. Since immigrants are more transit dependent and have higher auto occupancies, transportation initiatives focused on HOV lanes and transit development can also benefit from understanding the travel behavior of this growing portion of the U.S. population.

#### **Subject areas and Index Terms**

Highways; Planning and Forecasting; Public Transportation; Society; I72: Traffic and Transport Planning  
Automobile ownership; Carpools; Forecasting; Highway travel; Public transit; Travel behavior; Travel demand; Travel surveys; Travel time; Trip length; Vehicle occupancy; Work trips; Immigrants

## **Survey, Data Synthesis, and Other Applications**

### **Model-Based Approach to Synthesize Household Travel Characteristics across Neighborhood Types and Geographic Areas**

#### **Authors:**

Lin, Jie; Long, Liang

Journal of Transportation Engineering Issue: 12

12/1/2008

#### **Abstract:**

Household travel survey data are crucial in regional travel demand analysis. However, good quality data are not always available owing to financial constraints, privacy concerns, poorly designed sampling schemes, and/or low response rates. Thus, various data synthesis techniques have been proposed in the past. In this paper, we identify the limitations of the existing data updating/synthesis methods and propose a two-level random coefficient model to synthesis household travel characteristics across geographic areas. Then the two-level structure was applied to the sampled households in the 2001 National Household Travel Survey across (consolidated) metropolitan statistical areas of various population sizes. One particular travel characteristic, journey to work vehicle trip rate, is investigated. The study findings confirm the effect of neighborhood (defined at the census tract level) attributes (e.g., intersection density, average auto mobile work trip travel time) on household number of journey to work vehicle trips. This effect is significant on the urban households of study, whereas the suburban counterparts across the country do not seem to be affected by their living environments after controlling for neighborhood type. In general, the two-level structure is shown statistically superior to the one level.

#### **Subject areas and Index Terms**

Highways; Planning and Forecasting; I72: Traffic and Transport Planning  
Coefficients; Data processing; Data quality; Geography; Mathematical models; Neighborhoods; Travel patterns; Travel surveys; Work trips

**Availability:** Find a library where document is available Order URL: <http://worldcat.org/oclc/8674831>

## **Survey, Data Synthesis, and Other Applications**

### **Data, Survey Methods, Traffic Monitoring, and Asset Management**

#### **Authors:**

Monograph

2007

#### **Abstract:**

This collection of 22 papers is concerned with traffic monitoring, asset management, and survey methods. Specific topics discussed include the following: revenue risk mitigation in transportation project financing; traffic sign asset management; estimating highway investment requirements; estimating design hourly volumes; traffic prediction; digital dashboards; random count site selection; wireless location technology-based traffic monitoring; traffic flow impact on travel time variability; transferability of National Household Travel Survey data; impact of nonresponse and weighting in a travel survey; data integration impact on travel behavior indicators; iterative proportional fitting algorithm for combining traffic count data with missing dimensions; an electronic freight theft management system using Internet-based mapping; regional routing model for strategic waterway analysis; Highway Capacity Manual adjustment factor for annual weekday to annual average daily traffic; automated consensus-based data verification; enhancing truck data accuracy using dual-loop event data; video-based vehicle detection and classification system; gross vehicle weight distributions from weigh-in-motion data; detection and tracking of vehicle base fronts for traffic counts and speeds; and customizing quality assessment techniques for traffic data archives.

#### **Subject areas and Index Terms**

Administration and Management; Finance; Highways; Marine Transportation; Planning and Forecasting; I10: Economics and Administration; I72: Traffic and Transport Planning  
Adjustment factors; Algorithms; Asset management; Automatic vehicle detection and identification systems; Data banks; Data quality; Design hourly volume; Estimating; Financing; Gross vehicle weight; Instrument panels; Investments; Location; Risk management; Routing; Theft; Traffic counting; Traffic counts; Traffic flow; Traffic forecasting; Traffic signs; Traffic surveillance; Travel behavior; Travel surveys; Travel time; Video cameras; Waterway facility operations; Weigh in motion; Weighting; Highway Capacity Manual; National Household Travel Survey; Data accuracy; Data integration; Data verification; Nonresponse (Surveys); Transferability; Transportation projects; Wireless location technology

**Availability:** Transportation Research Board Business Office Order URL:

[http://www.trb.org/news/blurbs\\_detail.asp?id=8271](http://www.trb.org/news/blurbs_detail.asp?id=8271); Find a library where document is available Order URL: <http://worldcat.org/isbn/9780309104197>

## **Survey, Data Synthesis, and Other Applications**

### **Pseudo Panel Study Derived from 3 Consecutive 5-Year Interval Household Travel Surveys: Behavior Shifts' Findings**

#### **Authors:**

Chapleau, Robert; Morency, Catherine

World Conference on Transport Research Society - Secretariat, 14 Avenue Berthelot 69363 Lyon cedex  
07,

11th World Conference on Transport Research

2007

#### **Abstract:**

This research project is based on a recent opportunity to track down identical phone numbers from the three most recent household travel survey samples in order to construct a pseudo panel of households. Because no nominative information is available in the databases, specific procedures, initialized with phone numbers, had to be developed to measure coincidental indices: same household? same place? same people? same trip patterns? same modal choice? etc. As a result, true medium term evolution in demographic or household restructuring, car ownership, trip rates, or public transport abandon time, can be assessed.

#### **Subject areas and Index Terms**

Highways; Planning and Forecasting; Public Transportation; I72: Traffic and Transport Planning  
Automobile ownership; Households; Mode choice; Tracking systems; Travel behavior; Travel patterns;  
Travel surveys; National Household Travel Survey; Telephone numbers

**Availability:** World Conference on Transport Research Society

## **Survey, Data Synthesis, and Other Applications**

### **Investigating Transferability of National Household Travel Survey Data**

#### **Authors:**

Mohammadian, Abolfazl; Zhang, Yongping

Data, Survey Methods, Traffic Monitoring, and Asset Management

Transportation Research Record: Journal of the Transportation Research Board Issue: 1993  
2007

#### **Abstract:**

Traditionally, metropolitan planning organizations are required to have their models calibrated on a continuing basis using new data. However, new survey data required to support these models do not exist in most urban areas. That makes it difficult to calibrate existing models or develop new travel demand models using emerging modeling techniques. As a result, the need to assess potential approaches and develop knowledge on how to transfer information collected in one context and use it in another context is becoming critical. This paper presents the process of developing a model that can facilitate household travel data transferability, which can reduce or eliminate the need for large data collection in the application context. Household records from the 2001 National Household Travel Survey are clustered into several homogeneous groups representing various types of households and their lifestyles. The clustering model is based on several variables that are easily obtainable from available sources. In addition to household characteristics, the variables of land use, built environment, and transportation system characteristics are included in the analysis. Various statistical measures of travel behavior are estimated for each cluster. By using an artificial neural network model, cluster membership rules and travel statistics are transferred to other geographic areas for the purpose of comparison and validation of the transferability method.

#### **Subject areas and Index Terms**

Highways; Planning and Forecasting; Society; I72: Traffic and Transport Planning

Cluster analysis; Data collection; Households; Life styles; Neural networks; Simulation; Travel behavior; Travel surveys; 2001 National Household Travel Survey; Transferability

**Availability:** Transportation Research Board Business Office Order URL:

[http://www.trb.org/news/blurbs\\_detail.asp?id=8271](http://www.trb.org/news/blurbs_detail.asp?id=8271); Find a library where document is available Order

URL: <http://worldcat.org/isbn/9780309104197>

## **Survey, Data Synthesis, and Other Applications**

### **Household Travel Data Simulation**

#### **Authors:**

Zhang, Yongping; Mohammadian, Abolfazl

World Conference on Transport Research Society - Secretariat, 14 Avenue Berthelot 69363 Lyon cedex 07,

11th World Conference on Transport Research  
2007

#### **Abstract:**

This paper presents the process of developing models that can facilitate disaggregate household travel data transferability. Household records from the 2001 National Household Travel Survey (NHTS) are clustered into several homogeneous groups representing various household lifestyles. Using an artificial neural network model, households from add-on areas of the NHTS were assigned to the same cluster schema developed for the national dataset. Travel estimates from national data are transferred to the add-on areas based on household cluster membership. Using a small local sample, transferred travel data are updated considering the observed distributions and utilizing Bayesian updating. Furthermore, the household level travel data transferability model is combined with a population synthesizing model to create synthetic household travel data that can reduce or eliminate the need for a large data collection in the application context.

#### **Subject areas and Index Terms**

Data and Information Technology; Highways; Planning and Forecasting; Public Transportation; I72: Traffic and Transport Planning

Data collection; Households; Public transit; Simulation; Transportation planning; Travel surveys; National Household Travel Survey; Bayesian analysis; Transferability; Travel data

**Availability:** World Conference on Transport Research Society

## **Survey, Data Synthesis, and Other Applications**

### **Household Travel Surveys: Who within the Household Do You Survey and Does it Matter?**

#### **Authors:**

Bricka, Stacey; Knudson, Becky; Weston, Lisa Marie

Transportation Research Board - 500 Fifth Street, NW Washington, DC 20001

Tools of the Trade: 11th National Conference on Transportation Planning for Small and Medium-Sized Communities

11th National Conference on Transportation Planning for Small and Medium-Sized Communities  
2008

#### **Abstract:**

Household travel surveys inform the transportation planning process and are typically conducted about once every 10 years, based on the region's long-range planning horizon and the availability of funding. Smaller urban areas may conduct these surveys even less frequently, due mainly to funding constraints. While all surveys collect the basic trip details of origin, destination, travel times, trip purpose, and mode, the surveys vary greatly in terms of who provides travel details. Some regions focus only on travel by those ages 16 and older in the households; others collect travel from those ages 5 and older, but increasingly, regions are collecting travel from all household members regardless of age. This trend towards complete snapshots of household travel patterns is driven by modeling advances that call for intra-household details. One approach to balance the need for new data against limited funding is to survey only a portion of the household members. While the larger regions surveyed all household members regardless of age, smaller regions coped through conducting surveys that obtained travel details only from members age 5 and older or those ages 16 and older. Most models built using this partial data are "3-step" models that focus only on vehicle trips. Thus trips for children are of secondary importance and dropped when prioritizing budgets (Gresham 2008, Bricka and Tinkler 2004). However, as these regions grow, they will either need to conduct new surveys or to impute trips for children using the survey data itself or other available data (such as the national household travel survey). The purpose of this paper is threefold: to review the literature regarding children's travel in order to understand the extent to which it influences household travel patterns, to document the state of modeling practice to understand why this data is needed, and finally, to present design considerations to help minimize the cost of conducting a travel survey of all household members, or, if a partial survey is conducted now, identify the "pegs" to help with imputing children's travel in future years.

#### **Subject areas and Index Terms**

Highways; Passenger Transportation; Planning and Forecasting; Public Transportation; I72: Traffic and Transport Planning

Households; Long range planning; Mode choice; Origin and destination; Planning and design; Public transit; Transportation planning; Travel surveys; Travel time; Trip purpose

**Availability:** Transportation Research Board

## **Survey, Data Synthesis, and Other Applications**

### **Microsimulation of Household Travel Survey Data**

#### **Authors:**

Mohammadian, Abolfazl; Zhang, Yongping  
Transportation Research Board - 500 Fifth Street, NW Washington, DC 20001  
TRB 87th Annual Meeting Compendium of Papers DVD  
Transportation Research Board 87th Annual Meeting  
2008

#### **Abstract:**

Due to the high cost, high non-response rate, and time-consuming data processing, only few Metropolitan Planning Organizations (MPOs) can afford collecting household travel survey data as frequently as needed. Therefore, planning agencies and transportation planners are interested in exploring techniques that can facilitate transferability or simulation of household travel survey data. This paper presents the process of developing a data simulation tool that can reduce the need for large data collection in the application context. The study attempts to develop a methodology that can facilitate the application of transferring and simulating disaggregate household travel data for local areas. A synthetic population for the New York Metropolitan Statistical Area is developed by a two-stage population synthesis procedure. Then, a standard Monte-Carlo simulation is used to generate values of the travel attributes from the updated distributions of travel statistics for various household lifestyles transferred from the 2001 National Household Travel Survey (NHTS) data. By linking the generated travel estimates to the synthetic population, simulated household travel data is created for the application context. Finally, using travel data from the add-on sample of NHTS in the application area as the validation dataset, comparisons against the simulated data are made to examine the effectiveness of the data transferability model. The results of the comparisons are very promising.

#### **Subject areas and Index Terms**

Data and Information Technology; Economics; Finance; Highways; Operations and Traffic Management; Society; I71: Traffic Theory  
Costs; Information management; Metropolitan planning organizations; Microsimulation; Monte Carlo method; Socioeconomic factors; Travel behavior; Travel demand; Travel surveys; Trip length; New York Metropolitan Area; National Household Travel Survey

**Availability:** Transportation Research Board Business Office

## **Survey, Data Synthesis, and Other Applications**

### **Travel Data Simulation Tool**

#### **Authors:**

Mohammadian, Abolfazl

Transportation Research Board - 500 Fifth Street, NW Washington, DC 20001

Tools of the Trade: 11th National Conference on Transportation Planning for Small and Medium-Sized Communities

11th National Conference on Transportation Planning for Small and Medium-Sized Communities  
2008

#### **Abstract:**

Due to the high cost, low response rate and time-consuming data processing, few Metropolitan Planning Organizations can afford collecting household travel survey data as frequently as needed. This paper tested the feasibility of the spatial transferability of the National Household Travel Survey (NHTS) data by transferring the distributions from national level to a local area after updating. Based on the cluster/transferability models and Bayesian updating module developed in earlier work, this study aims to facilitate the application of transferring and simulating disaggregate household travel data for local areas. A synthetic population for the New York Metropolitan Statistical Area is created by a two-stage population synthesis procedure. Then, a standard Monte-Carlo simulation is used to generate values of the travel attributes from the updated distributions. By linking the generated travel estimates to the synthetic population, simulated household travel data are created for the application context. Finally, using the add-on samples in the application area as the validation data, comparisons against the simulated data are made to examine the effectiveness of the whole transferability process. Traditionally, transportation planners believed trip rates are easier to be transferred than any other travel statistics. However, this study showed that transferability of other statistics including trip length is also very promising.

#### **Subject areas and Index Terms**

Data and Information Technology; Highways; Planning and Forecasting; Public Transportation; I72: Traffic and Transport Planning

Data collection; Metropolitan planning organizations; Monte Carlo method; Simulation; Traffic data; Transportation planning; Travel surveys; New York (New York); National Household Travel Survey; Bayesian analysis

**Availability:** Transportation Research Board

## **Survey, Data Synthesis, and Other Applications**

### **Improving the Usability of a Complex Household Travel Survey: An Evaluation of User Requirements**

#### **Authors:**

Schulz, Angelika; Nobis, Claudia; Follmer, Robert; Jesske, Birgit; Gruschwitz, Dana  
Information Systems, Geographic Information Systems, and Advanced Computing 2009  
Transportation Research Record: Journal of the Transportation Research Board Issue: 2105  
2009

#### **Abstract:**

Data quality refers not only to statistical characteristics of a respective data set but also includes further dimensions that are closely related to user requirements in regard to content, convenience of access, comprehensibility, and usability. Especially with respect to data sets designated for multiple secondary analyses by heterogeneous users, particular attention must be given to data processing, data documentation, and supplementary information. Within the context of a large-scale national household travel survey, a two-stage evaluation approach was developed to get a better understanding of a data set's usability for various parties. The evaluation process consisted of two parts: first, a retrospective online user survey was completed to get a general overview of the user community, the respective context of data usage, and the users' overall satisfaction. Subsequently, a one-day user workshop was held. While the survey was designed mainly as an exploratory instrument for effectively revealing the majority of relevant issues, the workshop was intended to discuss complex or controversial matters with highly qualified and committed stakeholders. Both the survey and the workshop revealed the crucial role of a user-centered approach when a survey is conducted. In fact, quite a few survey adjustments can be accomplished with reasonable effort while ensuring comparability and keeping within a given budget. Mostly, these adjustments are related to data processing, documentation, and information. On the basis of the findings, general recommendations were made, with special emphasis on the essential consideration of different user requirements.

#### **Subject areas and Index Terms**

Data and Information Technology; Highways; Planning and Forecasting; I72: Traffic and Transport Planning

Data files; Data processing; Data quality; Households; Information management; Travel surveys; Data documentation; User requirements

**Availability:** Transportation Research Board Business Office Order URL:

[http://trb.org/Main/Blurbs/Information\\_Systems\\_Geographic\\_Information\\_Systems\\_162392.aspx](http://trb.org/Main/Blurbs/Information_Systems_Geographic_Information_Systems_162392.aspx); Find a library where document is available Order URL: <http://worldcat.org/isbn/9780309126205>

## **Survey, Data Synthesis, and Other Applications**

### **Model-Based Synthesis of Household Travel Survey Data in Small and Midsize Metropolitan Areas**

#### **Authors:**

Long, Liang; Lin, Jie; Pu, Wenjing

Information Systems, Geographic Information Systems, and Advanced Computing 2009

Transportation Research Record: Journal of the Transportation Research Board Issue: 2105  
2009

#### **Abstract:**

Household travel data synthesis & simulation has become a promising alternative or supplement to survey data from both small urban areas and large metropolitan regions in which data are expensive to collect or the data required to support the planning process have become outdated. This paper proposes and applies model-based approaches [i.e., small area estimation (SAE) methods] to synthesize household travel characteristics. The proposed methods address the sampling-bias concerns in the existing methods. Specifically, three SAE methods - the generalized regression estimators method, the empirical best linear unbiased predictor (EBLUP) method, and the synthetic method (an EBLUP without random area effects) - are applied to synthesize household travel characteristics at both census tract and individual levels. The SAE framework of synthesizing household travel characteristics is demonstrated with the National Household Travel Survey data and the Census Transportation Planning Package data in the Des Moines metropolitan area in central Iowa. Results indicate that SAE methods are promising approaches to synthesize unbiased aggregate and disaggregate household travel characteristics by incorporating population auxiliary information and local, small-household travel survey data. The proposed data synthesis methods and analysis findings will provide a useful tool for practitioners, planners, and policy makers in transportation analyses. The paper also points out that by linking population synthesis with the travel data simulation framework described here, this method could be of broad application in transportation planning.

#### **Subject areas and Index Terms**

Data and Information Technology; Highways; Planning and Forecasting; I72: Traffic and Transport Planning

Data quality; Households; Mathematical models; Metropolitan areas; Representative samples (Statistics); Transportation planning; Travel demand; Travel surveys; Des Moines (Iowa); Data synthesis; Synthesized travel characteristics

**Availability:** Transportation Research Board Business Office Order URL:

[http://trb.org/Main/Blurbs/Information\\_Systems\\_Geographic\\_Information\\_Systems\\_162392.aspx](http://trb.org/Main/Blurbs/Information_Systems_Geographic_Information_Systems_162392.aspx); Find a library where document is available Order URL: <http://worldcat.org/isbn/9780309126205>

## **Survey, Data Synthesis, and Other Applications**

### **Transferability: Creating Representative Activity Schedules Using 2001 NHTS**

#### **Authors:**

Henson, Kriste; Cuellar, Leticia; Kubicek, Deborah; Tallman, Charles David  
Transportation Research Board - 500 Fifth Street, NW Washington, DC 20001  
TRB 88th Annual Meeting Compendium of Papers DVD  
Transportation Research Board 88th Annual Meeting  
2009

#### **Abstract:**

To generate representative travel patterns quickly for a city's or a region's population for use in homeland security modeling, Los Alamos National Laboratory (LANL) has developed a methodology for generating representative activity schedules that uses a nationwide travel survey, the 2001 National Household Travel Survey (NHTS). Previously, in order to reasonably model cities, activity-based transportation models required as input an activity/travel survey representing travel in the local area of interest. The validity of this approach was evaluated using by using both the NHTS and the 2000 Twin Cities Metropolitan Area Travel Behavior Inventory (TBI) to separately model the activities of a synthetic population for the Minneapolis-St. Paul, MN (Twin Cities) metropolitan area and comparing the results. Prior to assessing the new approach of generating local activities using a national data set, a basic validation was completed to determine how successful LANL's TRANSPORTATION ANALYSIS and SIMULATION SYSTEM (TRANSIMS-LANL) was at producing activities for a synthetic population based on a local travel survey. For this purpose, the TBI was utilized to generate activity schedules for a synthetic population. These schedules were compared directly to the TBI itself. An analysis showed that TRANSIMS-LANL was able to produce activities that closely reflect the original survey. In general, the generated total trip and activity counts varied from the survey by approximately one percent. Using the national survey to generate activities, TRANSIMS-LANL underestimated the total number of trips and activities by only eight percent and six percent, respectively.

#### **Subject areas and Index Terms**

Highways; Planning and Forecasting; I72: Traffic and Transport Planning  
National security; Traffic simulation; Travel behavior; Travel patterns; Travel surveys; Twin Cities  
Metropolitan Area (Minnesota); TRANSIMS (Computer model); Activity schedules

**Availability:** Transportation Research Board Business Office

## **Survey, Data Synthesis, and Other Applications**

### **Examining Common Distributional Assumptions of Travel Characteristics for Data Simulation**

#### **Authors:**

Zhang, Yongping; Mohammadian, Abolfazl

Data Systems and Travel Survey Methods 2009

Transportation Research Record: Journal of the Transportation Research Board Issue: 2121  
2009

#### **Abstract:**

Issues about travel data limitation have been a growing concern for many urban areas. To address this problem, new research areas regarding the transferability of household travel survey data are emerging. It has been shown that local updating can significantly improve the quality of the transferred data. As part of a comprehensive research effort on the transferability of National Household Travel Survey (NHTS) data, this study attempts to fit 13 continuous distributions and 6 discrete distributions to various travel characteristics derived from the NHTS 2001 data sets. The best-fitted distributions are selected according to multiple criteria, including Anderson & Darling, chi-square, and Kolmogorov & Smirnov tests. The results of the analysis suggest that the assumption of normality does not hold for any of the travel characteristics in the sample. Instead, distributions such as gamma, Weibull, and exponential prove to dominate the best-fitted distributions for their respective applications. Despite the complexity of the best-fitted distributions, certain stable distributional patterns are shown to exist. This paper also summarizes the best distributional assumptions for various travel characteristics, followed by a brief introduction to their applications.

#### **Subject areas and Index Terms**

Data and Information Technology; Highways; Planning and Forecasting; I72: Traffic and Transport Planning

Data quality; Distributions (Statistics); Exponential distributions; Gamma distributions; Goodness of fit; Simulation; Travel surveys; Trip length; Vehicle miles of travel; Weibull distributions; National Household Travel Survey; Transferability; Travel data

**Availability:** Transportation Research Board Business Office Order URL:

[http://trb.org/Main/Blurbs/Data\\_Systems\\_and\\_Travel\\_Survey\\_Methods\\_2009\\_162816.asp](http://trb.org/Main/Blurbs/Data_Systems_and_Travel_Survey_Methods_2009_162816.asp); Find a library where document is available Order URL: <http://worldcat.org/isbn/9780309126380>

## **Survey, Data Synthesis, and Other Applications**

### **Household Travel Data Simulation Tool: Software and Its Applications for Impact Analysis**

#### **Authors:**

Javanmardi, Mahmoud; Rashidi, Taha H; Mohammadian, Abolfazl (Kouros)  
Information Systems, Geographic Information Systems, and Advanced Computing 2010  
Transportation Research Record: Journal of the Transportation Research Board Issue: 2183  
2010

#### **Abstract:**

Data transferability is seen as an alternative solution to costly travel surveys for urban areas where regular travel data are difficult to collect, especially in small and mid-sized communities. A comprehensive travel data transferability model and a software tool that can facilitate travel data transferability and simulate synthetic household-level disaggregate travel data have been developed. The model is built on earlier transferability studies by a significant enhancement of the approach and resolution of many limitations of previous studies. The software tool has been tested on two case studies in Des Moines, Iowa, and New York State. Nine household-level travel attributes are simulated for the synthetic population of these regions. A comparison of the simulated travel data with the actual observed data, obtained from the National Household Travel Survey add-on samples, proves the accuracy of the model. It is also shown that updating the parameters of the distributions of travel attributes can further improve the results. The model is then used for some basic policy evaluations and a sensitivity analysis that includes scenarios such as changes to the demographics, aging population, and investments in the education system. The result of the sensitivity analysis also confirmed the wide capabilities of the model.

#### **Subject areas and Index Terms**

Data and Information Technology; Highways; Planning and Forecasting; I72: Traffic and Transport Planning

Case studies; Policy analysis; Sensitivity analysis; Simulation; Software; Transportation planning; Travel demand; Des Moines (Iowa); New York (State); National Household Travel Survey; Synthetic data; Transferability; Travel data

**Availability:** Transportation Research Board Business Office Order URL:

[http://www.trb.org/Main/Blurbs/Information\\_Systems\\_Geographic\\_Information\\_Systems\\_164773.aspx](http://www.trb.org/Main/Blurbs/Information_Systems_Geographic_Information_Systems_164773.aspx);

Find a library where document is available Order URL: <http://worldcat.org/isbn/9780309160544>

## **Survey, Data Synthesis, and Other Applications**

### **Evaluating Transportation Impacts of Forecast Demographic Scenarios Using Population Synthesis and Data Transferability**

#### **Authors:**

Auld, Joshua; Rashidi, Taha H; Mohammadian, Abolfazl; Weis, Kermit  
Transportation Research Board - 500 Fifth Street, NW Washington, DC 20001  
TRB 89th Annual Meeting Compendium of Papers DVD  
Transportation Research Board 89th Annual Meeting  
2010

#### **Abstract:**

A population synthesis tool has been developed which allows an analyst to input future demographic scenarios for a modeled region to generate forecast year synthetic populations. The utility allows both direct manipulation of base-year marginal distributions for the forecast scenario and incorporates new models to estimate changes in the marginal distribution for some significant control variables. The models allow for an improved estimation of forecast year marginal totals. To demonstrate the application of the new utility, a travel data simulation model has been estimated and validated which enables the transference of a collection of travel demand indicators from a source, the National Household Travel Survey, to the forecast year synthetic population. The combination of the synthetic population with the simulated travel demand indicators will allow for an analysis of potential transportation impacts of estimated demographic changes without running a complete travel demand model when investigating multiple scenarios.

#### **Subject areas and Index Terms**

Planning and Forecasting; Transportation (General); I72: Traffic and Transport Planning  
Demographics; Population; Traffic data; Traffic forecasting; Traffic simulation; Travel demand; Travel surveys; National Household Travel Survey

**Availability:** Transportation Research Board Business Office

## **Survey, Data Synthesis, and Other Applications**

### **Travel Determinants and Multi-scale Transferability of National Activity Patterns to Local Populations**

#### **Authors:**

Henson, Kriste; Goulias, Konstadinos G  
Transportation Research Board - 500 Fifth Street, NW Washington, DC 20001  
TRB 90th Annual Meeting Compendium of Papers DVD  
Transportation Research Board 90th Annual Meeting  
2011

#### **Abstract:**

The ability to transfer national travel patterns to a local population is of interest when attempting to model megaregions or areas that exceed metropolitan planning organization (MPO) boundaries. At the core of this research are questions about the connection between travel behavior and land use, urban form, and accessibility. As a part of this process, a group of land use variables have been identified that are essential to define activity and travel patterns for individuals and households. The 2001 National Household Travel Survey (NHTS) participants are divided into categories comprised of a set of latent cluster models representing persons, travel, and land use. These are compared to two sets of cluster models constructed for two local travel surveys. Paired t-tests are used to compare the mean population travel and land use distributions for each person cluster. The results show that the NHTS and the local surveys share mean population distributions. However, when applying a series of log-linear models to test the actual population distributions, it is discovered that the actual national and local distributions are different. Therefore, a national household travel survey cannot be used to model actual local population travel characteristics if the goal to model the actual distributions and not mean travel behavior characteristics.

#### **Subject areas and Index Terms**

Planning and Forecasting; I72: Traffic and Transport Planning  
Accessibility; Activity choices; Cluster analysis; Land use planning; Local transportation; Metropolitan planning organizations; Travel behavior; Travel patterns; Travel surveys; National Household Travel Survey

**Availability:** Transportation Research Board Business Office

## **Survey, Data Synthesis, and Other Applications**

### **Synthetic household travel survey data simulation**

#### **Authors:**

ZHANG, Y; MOHAMMADIAN, A

3rd International Symposium on Transport Simulation (IST08): symposium proceedings  
INTERNATIONAL SYMPOSIUM ON TRANSPORT SIMULATION, 8TH, 2008, SURFERS  
PARADISE, QUEENSLAND, AUSTRALIA  
8/1/2008

#### **Abstract:**

Due to the high cost, low response rate and time-consuming data processing, few United States Metropolitan Planning Organizations can afford collecting household travel survey data as frequently as needed. This paper tested the feasibility of the spatial transferability of the National Household Travel Survey (NHTS) data by transferring the distributions from national level to a local area after updating. Based on the cluster/transferability models and Bayesian updating module developed in earlier work, this study aims to facilitate the application of transferring and simulating disaggregate household travel data for local areas. A synthetic population for the New York Metropolitan Statistical Area is created by a two-stage population synthesis procedure. Then, a standard Monte-Carlo simulation is used to generate values of the travel attributes from the updated distributions. By linking the generated travel estimates to the synthetic population, simulated household travel data are created for the application context. Finally, using the add-on samples in the application area as the validation data, comparisons against the simulated data are made to examine the effectiveness of the whole transferability process. Traditionally, transportation planners believed trip rates are easier to be transferred than any other travel statistics. However, this study showed that transferability of other statistics including trip length is also very promising. (a) For the covering entry of this conference, please see ITRD abstract no. E217226.

#### **Subject areas and Index Terms**

Society; I71: Traffic Theory; I72: Traffic and Transport Planning  
Behavior; Conferences; Households; Mathematical models; Travel; Behaviour; Conference; Household;  
Journey; Mathematical model

**Availability:** Find a library where document is available Order URL:

<http://worldcat.org/isbn/9780980319989>

## **Survey, Data Synthesis, and Other Applications**

### **Developing a method for simulating trip tours in urban areas**

#### **Authors:**

STOPHER, P; BERTOIA, T

Is road pricing viable in a small urban area? A Wellington case study

AUSTRALASIAN TRANSPORT RESEARCH FORUM (ATRF), 29TH, 2006, GOLD COAST, QUEENSLAND, AUSTRALIA, VOL 29

9/1/2006

#### **Abstract:**

The purpose of this study was to determine whether analyses based on tours rather than trips could be used to characterise household travel patterns successfully for use in synthetic travel data simulation. This study used the 2001 US National Household Travel Survey (NHTS) Day Trip file to analyse household travel and to determine whether tours could be derived intelligently from the available data. The 2001 NHTS data is the most recent national travel survey dataset from the U.S. and is a very large data set (containing 642,292 trips). The size of the data set provides a unique challenge and opportunity to examine and refine trip-to-tour conversion procedures on a large scale. This paper outlines the operational and procedural steps involved in cleaning the data set and formulating strategies for categorising the trips into tours. Some basic statistical analyses of the tour data are presented, and a summary of important considerations when dealing with tour-based data are suggested. (a) For the covering entry of this conference, please see ITRD abstract no. E214666.

#### **Subject areas and Index Terms**

Data and Information Technology; Planning and Forecasting; Society; I72: Traffic and Transport Planning

Behavior; Conferences; Households; Mathematical analysis; Methodology; Statistics; Travel; Urban areas; Analysis (math); Behaviour; Conference; Household; Journey; Method; Statistics; Urban area

**Availability:** Find a library where document is available Order URL:

<http://worldcat.org/isbn/1877040568>

## Traffic Safety

### Passenger Age and Gender Effects on Adult Driver Fatal Crash Rate

#### Authors:

Lerner, Neil; Freedman, Mark; Zador, Paul; Ouimet, Marie Claude; Simons-Morton, Bruce G; Duncan, Douglas

University of Iowa, Iowa City - Public Policy Center, 227 South Quadrangle Iowa City, IA 52242-1192

Proceedings of the 4th International Driving Symposium on Human Factors in Driver Assessment, Training, and Vehicle Design, Stevenson, Washington, July 9-12, 2007

Driving Assessment 2007: 4th International Driving Symposium on Human Factors in Driver Assessment, Training, and Vehicle Design  
2007

#### Abstract:

Driver behavior and crash rates vary with the presence of passengers but the details of this relationship are not well understood. The literature generally does not take into account the characteristics of passengers, yet effects on crashes may vary dramatically with passenger age and gender. This study estimated the amount of exposure (driving miles) done by various driver age/gender categories with various combinations of passengers. Statistical imputation techniques were used to derive travel estimates for various pairings using data from the 2001 National Household Travel Survey. Crash frequencies for every pairing were obtained from the Fatality Analysis Reporting System and were used to compute fatal crash rates (per 10 million trip miles). The findings reported here focus on adult (21 and older) drivers. The results show that drivers of a given type (age/gender group) show dramatically different crash rates as a function of passenger type. Some passenger types are associated with fatal crash rates higher than that with no passenger, while other passenger types are associated with lower crash rates. The details of this relationship depend to some degree on driver characteristics. Crash rates for different driver age/gender groups overlap substantially based on the passenger, so that the “best” and “worst” driver groups are passenger-specific. For adult male drivers, female passengers are generally associated with lower crash rates. For male drivers, there is a higher crash rate with a male passenger of a given age than with a female passenger of the same age, even for child passengers.

#### Subject areas and Index Terms

Highways; Passenger Transportation; Safety and Human Factors; Society; I83: Accidents and the Human Factor

Accident data; Accident rates; Adults; Age; Children; Drivers; Fatalities; Females; Gender; Highway safety; Males; Passengers; Traffic accidents; Traffic safety; Vehicle occupants; Fatality Analysis Reporting System; National Household Travel Survey

**Availability:** University of Iowa, Iowa City; Find a library where document is available Order URL:

<http://worldcat.org/isbn/9780874141580>

## **Traffic Safety**

### **Interactive Tool to Compare and Communicate Traffic Safety Risks: Traffic STATS**

#### **Authors:**

Gerard, David; Fischbeck, Paul S; Gengler, Barbara; Weinberg, Randy S  
Transportation Research Board - 500 Fifth Street, NW Washington, DC 20001  
TRB 86th Annual Meeting Compendium of Papers CD-ROM  
Transportation Research Board 86th Annual Meeting  
2007

#### **Abstract:**

Traffic STATS is an interactive, web-based query tool that provides estimates of passenger vehicle and other traffic safety risks in real time. Using “cube” database technology, the tool houses publicly-available government data on traffic fatalities from the Fatality Analysis Reporting System (FARS) and personal travel behavior from the National Household Travel Survey (NHTS) and “on the fly” calculates risk statistics for user-specified queries. A query defines a set of parameters for variables that are common to these two databases (i.e., age, day of week, gender, hour of day, month of year, region of country, person type, and transportation mode), and the tool generates three risk metrics (deaths per mile, deaths per trip, deaths per minute traveled), as well as associated confidence intervals. The tool provides a level of detail and responsiveness that is currently not available from other sources, and allows users to explore the relative risks across transportation modes, demographic variables, and vehicle types. In this paper, we describe the motivation for developing the tool, provide an explanation of the technology developed to store the data and facilitate the queries, and walk through a series of examples of the types of comparisons that can be made quickly and efficiently. As an added feature, the tool also facilitates extremely fast queries of the underlying FARS and NHTS data.

#### **Subject areas and Index Terms**

Data and Information Technology; Education and Training; Highways; Safety and Human Factors; I82: Accidents and Transport Infrastructure  
Databases; Fatalities; Interactive computer systems; Risk analysis; Risk assessment; Statistical analysis; Traffic safety; Traffic safety education; TrafficSTATS (Software)

**Availability:** Transportation Research Board Business Office Order URL:

[http://gulliver.trb.org/news/blurbs\\_detail.asp?id=7286](http://gulliver.trb.org/news/blurbs_detail.asp?id=7286)

## **Traffic Safety**

### **An Interactive Tool to Compare and Communicate Traffic Safety Risks: TrafficSTATS**

#### **Authors:**

Fishbeck, Paul S; Gengler, Barbara; Gerard, David; Weinberg, Randy S  
Journal of the Transportation Research Forum Issue: 3  
2007

#### **Abstract:**

This paper describes a new tool that allows for comparisons of passenger travel risks and risk tradeoffs. This tool, TrafficSTATS, is a publicly-available, interactive, web-based query tool that provides estimates of passenger vehicle and other traffic safety risks. Using "cube" database technology, TrafficSTATS houses publicly-available government data on traffic fatalities from the Fatality Analysis Reporting System and personal travel behavior from the National Household Travel Survey. TrafficSTATS can calculate risk statistics in real time for user-specified queries. Examples of the types of comparisons that can be made are highlighted.

#### **Subject areas and Index Terms**

Data and Information Technology; Highways; Safety and Human Factors; I81: Accident Statistics  
Accident risk forecasting; Alternatives analysis; Databases; Fatalities; Internet; Real time information;  
Risk analysis; Statistical analysis; Statistics; Traffic safety; Travel behavior; TrafficSTATS (Software)

**Availability:** Find a library where document is available Order URL: <http://worldcat.org/issn/10461469>

## Traffic Safety

### Progress in teenage crash risk during the last decade

#### Authors:

Ferguson, Susan A; Teoh, Eric R; McCartt, Anne T  
Journal of Safety Research Issue: 2  
2007

#### Abstract:

The purpose of the present study was to examine the most recent data on teenagers' fatal and nonfatal crashes in the United States to determine current crash rates as well as changes in crash rates during the past decade. Data for calendar years 1996 and 2005 were extracted for fatal crashes from the Fatality Analysis Reporting System and for police-reported crashes from the National Automotive Sampling System/General Estimates System. To calculate crash rates, population data were obtained from the Census Bureau, and mileage data were obtained from the 2001 National Household Travel Survey. Results showed that during 2001-02, the latest year for which mileage data are available, 16 year-old drivers had higher fatal and nonfatal crash rates per mile traveled than all but the very oldest drivers. However, fewer 16 year-olds typically are licensed to drive and they drive fewer miles per year than all but the oldest drivers. Thus, their fatal and nonfatal crash rates per population in 2005 were lower than among other teenagers and among drivers 20-29. During the past decade the most progress has been made in reducing crashes among the youngest drivers. Between 1996 and 2005 both fatal and police-reported crashes per population declined about 40% for 16 year-old drivers, compared with about 25% for 17 year-old drivers and 15-19% for 18 year-old drivers. The greatest reductions for 16 year-olds occurred in nighttime crashes, alcohol-related fatal crashes, and fatal crashes involving multiple teenage passengers. Substantial progress has been made in reducing fatal and nonfatal crashes per population among 16 year-old drivers. Although this study was not designed to examine the role of graduated licensing, the results are consistent with the increased presence of such laws, many of which restrict nighttime driving and driving with teenage passengers. Restrictions on nighttime driving and driving with teenage passengers should be made a part of all states' graduated licensing systems. Historically, 16 year-olds have had the highest crash risk per licensed driver and per mile traveled. Given the dramatic reductions in per population crash rates among 16 year-olds, it is possible that their per mile and per licensed driver rates also have declined and may no longer be as elevated relative to other ages. However, shortcomings in the licensed driver data and a lack of recent mileage data hamper our ability to examine these issues. If we are to continue to provide a yardstick against which we can measure progress among the youngest drivers, immediate steps need to be taken to restore the availability of reliable exposure data.

#### Subject areas and Index Terms

Data and Information Technology; Highways; Safety and Human Factors; I81: Accident Statistics; I83: Accidents and the Human Factor  
Accident data; Accident rates; Accident types; Graduated licensing; Human factors in accidents; Statistical analysis; Teenage drivers; Traffic accidents; Traffic safety

**Availability:** Find a library where document is available Order URL: <http://worldcat.org/oclc/1800052>

## **Traffic Safety**

### **Measuring Injury Risks from Motor Vehicle Crashes with an Integrated Approach**

#### **Authors:**

Chu, Xuehao

Journal of Transportation Safety & Security Issue: 3  
2009

#### **Abstract:**

This article applies an integrated approach to an empirical measurement of injury risks to roadway users. This approach estimates exposure with time traveled and integrates injuries of different severity on the KABCO scale using corresponding unit costs. This approach is applied to the United States in 2001 for walking and motoring, using fatal-injury data from the Fatal Analysis Reporting System (FARS), nonfatal injury data from the General Estimate System (GES), and exposure data from the 2001 National Household Travel Survey (NHTS). The results for the most probable case indicate that the average risk is about \$2.00 of expected injury costs per hour of exposure for motoring, and \$1.69 per hour for walking.

#### **Subject areas and Index Terms**

Highways; Planning and Forecasting; Safety and Human Factors  
Collisions; Crash injuries; Crash injury research; Drivers; Injuries; Measurement; Pedestrian accidents;  
Risk analysis; United States; Injury costs; Integrated models

**Availability:** Find a library where document is available Order URL: <http://worldcat.org/issn/19439962>

## **Traffic Safety**

### **Fatality Risk of Older Drivers under Different Conditions Based on Vehicle Miles Traveled**

#### **Authors:**

Rallabandi, Abhiteja; Dissanayake, Sunanda

Iowa State University, Ames - Institute for Transportation 2711 South Loop Drive, Suite 4700 Ames, IA 50010-8664

Proceedings of the 2009 Mid-Continent Transportation Research Symposium

2009 Mid-Continent Transportation Research Symposium

2009

#### **Abstract:**

The rapid increase in older driving population calls for more safety in their driving requirements. Fatal crash involvement of older drivers based on per mile driven basis is high, even when the total number of fatal crashes is relatively small, indicating the importance of exposure. Therefore, this paper focused on some of the critical characteristics associated with fatality risk of older drivers. This was done by analyzing the crash rates in crashes per vehicle miles traveled under different conditions and situations. Crash data are obtained from the Fatality Analysis Reporting System (FARS) and number of miles traveled is from the National Household Travel Survey (NHTS). Time period considered for the crash data is 1997 to 2006, where the midpoint corresponds with the NHTS data. The average annual fatality rates calculated indicate that the risk for older drivers increases with increased age under different light conditions, vehicle type, road conditions, race, and gender of the driver. Thus, the driving conditions of elderly people have to be enhanced for the betterment of their safety.

#### **Subject areas and Index Terms**

Highways; Safety and Human Factors; I83: Accidents and the Human Factor

Aged drivers; Fatalities; Highway safety; Travel surveys; Vehicle miles of travel; Fatality Analysis Reporting System; National Household Travel Survey

**Availability:** Iowa State University, Ames

## **Traffic Safety**

### **Evaluation of Fatality Risk of Older Drivers Based on Per Vehicle Miles of Travel**

#### **Authors:**

Rallabandi, Abhiteja; Dissanayake, Sunanda  
Transportation Research Board - 500 Fifth Street, NW Washington, DC 20001  
TRB 89th Annual Meeting Compendium of Papers DVD  
Transportation Research Board 89th Annual Meeting  
2010

#### **Abstract:**

The population of older drivers has been rapidly increasing resulting in the increased demand of safety in their driving requirements. Overall, total number of fatal crashes by older drivers is small even though their fatal crash involvement based on per mile driven basis is the highest, indicating the importance of accounting for true exposure. This study is therefore focused on identifying some of the critical characteristics of older drivers' fatal crash involvement while considering the actual amount of travel by elderly drivers. This is done by calculating the fatality rates in average annual fatalities per billion vehicle miles driven. Crash data are obtained from the Fatality Analysis Reporting System (FARS) and number of miles traveled or exposure data is from the National Household Travel Survey (NHTS). Time period considered in this study is 1997 - 2006, where the midpoint corresponds with the 2001 NHTS data. The average annual fatality rates evaluated indicate that the risk for older drivers increases with increased age under different light conditions, vehicle type, road conditions, race, and gender of the driver. Comparative evaluation of critical factors could be made using the estimated fatality rates, which could be helpful in enhancing older driver safety.

#### **Subject areas and Index Terms**

Highways; Safety and Human Factors; I83: Accidents and the Human Factor  
Age groups; Aged drivers; Automobile drivers; Demographics; Driver errors; Fatalities; Highway safety;  
Lighting; Person miles of travel; Risk assessment; Statistics; Road conditions

**Availability:** Transportation Research Board Business Office

## **Traffic Safety**

### **Using U.S. National Household Travel Survey to Validate Exposure Estimates by Quasi-Induced Exposure Technique**

#### **Authors:**

Jiang, Xinguo; Lyles, Richard W  
Transportation Research Board - 500 Fifth Street, NW Washington, DC 20001  
TRB 90th Annual Meeting Compendium of Papers DVD  
Transportation Research Board 90th Annual Meeting  
2011

#### **Abstract:**

As opposed to exogenous estimates of exposure to risk such as vehicle miles of travel, number of registered vehicles, or number of licensed drivers, quasi-induced exposure has not received adequate vetting. A criticism of quasi-induced exposure is that its underlying assumptions are not convincingly validated or verified, partially because the risk estimates of quasi-induced exposure have not been sufficiently compared to the more conventional techniques. In this paper, the 2009 national household travel survey data are utilized to derive annual vehicle miles traveled, disaggregated by characteristics of interest (namely age and gender). Comparisons are developed at different disaggregation levels between the vehicle miles traveled and the relative exposure calculated by quasi-induced exposure. The main findings of the exercises include: (1) statistical results suggest that the exposure estimates for 15 age groups and driver gender are in good agreement with the corresponding annual vehicle miles traveled and thus the induced exposure estimates are deemed to be reasonably representative of the driving population and (2) the validation study reveals that data disaggregation improves the homogeneity of age and gender distributions. Based on the comparisons here, quasi-induced exposure is confirmed as a promising and powerful tool in estimating exposure in the safety analysis.

#### **Subject areas and Index Terms**

Highways; Safety and Human Factors; I81: Accident Statistics  
Accident analysis; Accident data; Age groups; Estimating; Gender; Mathematical models; Risk assessment; Safety; Traffic incidents; Vehicle miles of travel; National Household Travel Survey

**Availability:** Transportation Research Board Business Office

## Traffic Safety

### Using the U.S. National Household Travel Survey to estimate the impact of passenger characteristics on young drivers' relative risk of fatal crash involvement

#### Authors:

Ouimet, Marie Claude; Simons-Morton, Bruce G; Zador, Paul L; Lerner, Neil D; Freedman, Mark; Duncan, Glen D; Wang, Jing  
Accident Analysis & Prevention Issue: 2  
3/1/2010

#### Abstract:

Motor vehicle crashes are the main cause of morbidity and mortality in teenagers and young adults in the United States. Driving exposure and passenger presence, which can both vary by driver and passenger characteristics, are known to influence crash risk. Some studies have accounted for driving exposure in calculating young driver fatal crash risk in the presence of passengers, but none have estimated crash risk by driver sex and passenger age and sex. One possible reason for this gap is that data collection on driving exposure often precludes appropriate analyses. The purpose of this study was to examine, per 10 million vehicle trips (VT) and vehicle-miles traveled (VMT), the relative risk of fatal crash involvement in 15-20-year-old male and female drivers as a function of their passenger's age and sex, using solo driving as the referent. The Fatality Analysis Reporting System provided fatal motor vehicle crash data from 1999 to 2003 and the 2001 National Household Travel Survey (NHTS) provided VT and VMT. The NHTS collects driving exposure for both household and non-household members (e.g., friends, colleagues), but demographic characteristics only on household members. Missing age and sex of non-household passengers were imputed with hot deck using information from household passengers' trips with non-household drivers, thereby enabling the calculation of crash rate and relative risk estimates based upon driver and passenger characteristics. Using this approach, the highest risk was found for young male drivers with 16-20-year-old passengers (relative risk [RR] per 10 million VT  $\hat{=}$  7.99; 95% confidence interval [CI], 7.34-8.69; RR per 10 million VMT  $\hat{=}$  9.94; 95% CI, 9.13-10.81). Relative risk was also high for 21-34-year-old passengers, again particularly when both drivers and passengers were male. These effects warrant further investigation and underscore the importance of considering driving exposure by passenger characteristics in understanding crash risk. Additionally, as all imputation techniques are imperfect, a more accurate estimation of U.S. fatal crash risk per distance driven would require national surveys to collect data on non-household passenger characteristics.

#### Subject areas and Index Terms

Highways; Safety and Human Factors  
Accident risk forecasting; Age; Fatalities; Gender; Human factors in accidents; Passengers; Teenage drivers; Travel surveys; National Household Travel Survey

**Availability:** Find a library where document is available Order URL: <http://worldcat.org/issn/00014575>

## **Traffic Safety**

### **Motor Vehicle Crash Injury Rates by Mode of Travel, United States: Using Exposure-Based Methods to Quantify Differences**

#### **Authors:**

Beck, Laurie F; Dellinger, Ann M; O'Neil, Mary E  
American Journal of Epidemiology Issue: 2  
7/1/2007

#### **Abstract:**

In this paper, the authors use traffic exposure data to calculate exposure-based fatal and nonfatal traffic injury rates in the United States. Nationally representative data was used to identify fatal and nonfatal traffic injuries that occurred from 1999 to 2003, and the 2001 National Household Travel Survey was used to estimate traffic exposure (i.e., person-trips). Fatal and nonfatal traffic injury rates per 100 million person-trips were calculated by mode of travel, sex, and age group. The overall fatal traffic injury rate was 10.4/100 million person-trips. Fatal injury rates were highest for motorcyclists, pedestrians, and bicyclists. The nonfatal traffic injury rate was 754.6/100 million person-trips. Nonfatal injury rates were highest for motorcyclists and bicyclists. Exposure-based traffic injury rates varied by mode of travel, sex, and age group. Motorcyclists, pedestrians, and bicyclists faced increased injury risks. Males, adolescents, and the elderly were also at increased risk. Effective interventions are available and should be implemented to protect these vulnerable road users.

#### **Subject areas and Index Terms**

Highways; Pedestrians and Bicyclists; Research; Safety and Human Factors; Society; I83: Accidents and the Human Factor  
Accident risk forecasting; Crash injuries; Crash injury research; Cyclists; Demographics; Fatalities; Injury rates; Mode choice; Motorcyclists; Pedestrians; Risk assessment; Travel by mode; United States

**Availability:** Find a library where document is available Order URL: <http://worldcat.org/issn/00029262>

## **Traffic Safety**

### **Crash Types: Markers of Increased Risk of Alcohol-Involved Crashes Among Teen Drivers**

#### **Authors:**

Bingham, C Raymond; Shope, Jean T; Parow, Julie E; Raghunathan, Trivellore E  
Journal of Studies on Alcohol and Drugs Issue: 4  
7/1/2009

#### **Abstract:**

Teens drink/drive less often than adults but are more likely to crash when they do drink/drive. This study identified alcohol-related crash types for which teen drivers were at greater risk compared with adults. Michigan State Police crash records for drivers ages 16-19 (teens) and 45-65 years (adults) who experienced at least one crash from 1989 to 1996 were used to create alcohol crash types consisting of alcohol-related crashes that included specific combinations of other crash characteristics, such as drinking and driving at night (i.e., alcohol/nighttime). This data was combined with data from the 1990 and 1995 National Personal Travel Surveys and the 2001 National Household Travel Survey to estimate rates and rate ratios of alcohol-related crash types based on person-miles driven. Teens were relatively less likely than adults to be involved in alcohol-related crashes but were significantly more likely to be in alcohol-related crashes that included other crash characteristics. Teen males' crash risk was highest when drinking and driving with a passenger, at night, at night with a passenger, and at night on the weekend, and casualties were more likely to result from alcohol-related nighttime crashes. All the highest risk alcohol-related crash types for teen female drinking drivers involved casualties and were most likely to include speeding, passenger presence, and nighttime driving. The frequency with which passengers, nighttime or weekend driving, and speeding occurred in the highest risk alcohol-related crash types for teens suggests that these characteristics should be targeted by policies, programs, and enforcement to reduce teen alcohol-related crash rates.

#### **Subject areas and Index Terms**

Highways; Safety and Human Factors; I83: Accidents and the Human Factor  
Accident causes; Accident proneness; Accident risk forecasting; Adolescents; Collisions; Drunk drivers;  
Drunk driving; Highway safety; Teenage drivers; Traffic accidents

**Availability:** Find a library where document is available Order URL: <http://worldcat.org/issn/19371888>

## **Transit Planning**

### **Exploration of a Shift in Household Transportation Spending from Vehicles to Public Transportation**

#### **Authors:**

Polzin, Steven E; Chu, Xuehao; Raman, Vishaka Shiva  
University of South Florida, Tampa - Center for Urban Transportation Research, 4202 East Fowler  
Avenue Tampa, FL 33620-5375 ; Florida Department of Transportation - 605 Suwannee Street  
Tallahassee, FL 32399-0450

Monograph

1/1/2008

#### **Abstract:**

Despite continued and growing public support of public transit, traffic congestion continues to get worse and transit ridership and service levels have grown but not sufficiently to play a more meaningful role in addressing growing travel demands. As a result, interest continues in exploring how significant service increases might provide adequate transit capacity and sufficiently attractive service levels to attract enough ridership to offset the need of households for the current number of vehicles. Similarly, policy analysts speculate that the resources saved by households with fewer autos may represent a sufficient consumer benefit to justify or offset the higher subsidy costs necessary to provide the enhanced services. While speculation on this topic is common amongst transit planners and advocates, the literature currently offers little insight into this issue. This report estimates the average costs of private car ownership in the country based on the household income and expenditures using the Bureau of Labor Statistics (BLS) data. Travel behavior as a function of vehicle ownership is explored with the National Household Travel Survey (NHTS). Analysis of the datasets is used to develop a better understanding of the economic and travel implications potentially arising as a result of households reducing their automobile ownership. As part of the study, a scenario analysis was developed using an Excel spreadsheet tool. This tool can be used by analysts to evaluate probable consequences of reduced vehicle ownership. The analysis is driven by utilizing relationships between travel behavior, transportation spending and household vehicle availability. The research offers several observations regarding the magnitude of the behavior changes that might be expected with lower vehicle ownership as well as the capacity and cost of transit expansion required to accommodate the demands.

#### **Subject areas and Index Terms**

Finance; Planning and Forecasting; Public Transportation; Society  
Automobile ownership; Costs; Expenditures; Forecasting; Households; Income; Public transit; Ridership;  
Spreadsheets; Travel behavior; Travel demand; National Household Travel Survey; Transit capacity

**Availability:** National Technical Information Service

## **Transit Planning**

### **Public Transit in America: Analysis of Access Using the 2001 National Household Travel Survey**

#### **Authors:**

Polzin, Steven E; Maggio, Edward; Chu, Xuehao

University of South Florida, Tampa - Center for Urban Transportation Research, 4202 East Fowler Avenue Tampa, FL 33620-5375 ; Florida Department of Transportation - 605 Suwannee Street Tallahassee, FL 32399-0450

Monograph

2/1/2007

#### **Abstract:**

Understanding transit ridership has become a critical research interest and policy goal. This paper presents the results of an analysis of the National Household Travel Survey (NHTS) data specifically focusing on the appended variables that measure access or distances to public transportation. Statistically significant distance intervals were chosen for analysis respective of a chosen variable. This document augments the report titled "Public Transit in America: Results from the 2001 National Household Travel Survey." The analysis reveals strong differences in household and workplace access to transit as a function of race, income, auto ownership, and urban area size. Additionally, a very high sensitivity to access exists suggesting that the share of transit accessible trips is smaller than previously acknowledged. Approximately 53% of national households are within a mile of bus service and 40% within a quarter-mile. Approximately 10% of the population lives within one mile of rail. Over 50% of nationwide workplaces are within a quarter mile walk radius of a bus line. Not surprisingly, work is more closely concentrated near transit than are residences. Furthermore, mode share for transit declines approximately two thirds beyond the first interval (up to 0.15 mi) from a bus route. These observations imply a high value to services in close proximity to residential areas. The analysis suggests that access is even more critical than might have previously been acknowledged by the transit planning profession.

#### **Subject areas and Index Terms**

Planning and Forecasting; Public Transportation; Society

Access; Automobile ownership; Bus routes; Demographics; Households; Income; Public transit; Race; Residential areas; Ridership; Transportation planning; Urban areas; National Household Travel Survey

**Availability:** National Technical Information Service Order URL:

<http://www.ntis.gov/search/product.aspx?ABBR=PB2007105396>

## **Transit Planning**

### **On the Relationship between Transit's Usual and Actual Mode Shares**

#### **Authors:**

Chu, Xuehao; Polzin, Steven E

Transportation Research Board - 500 Fifth Street, NW Washington, DC 20001

TRB 86th Annual Meeting Compendium of Papers CD-ROM

Transportation Research Board 86th Annual Meeting

2007

#### **Abstract:**

This paper builds a simple aggregate model of workers who commute to work by transit or by non-transit means, and applies this model to the 2001 National Household Travel Survey (NHTS) for 34 transit market segments defined by 14 personal, household, and geographical characteristics. Theoretically the paper uses this model to establish a mathematical relationship between transit's "usual" mode share as measured from journey-to-work data and its "actual" mode share as measured from daily travel surveys. The key parameters in this relationship are the mode disloyalty rate among workers who usually use transit and the mode disloyalty rate among workers who usually use non-transit means. The theoretical analysis further establishes a necessary condition under which transit's usual mode share will be greater than its actual mode share. Empirically the application to the 2001 NHTS shows that the necessary condition for transit's usual mode share to be greater than its actual share is met, and transit's usual mode share is greater than its actual mode share for all 34 transit market segments. Furthermore, the degree to which transit's usual mode share is greater than its actual share is significant, ranging from 14.6 percent to 86.9 percent. Differences of such magnitude are too large to be ignored.

#### **Subject areas and Index Terms**

Passenger Transportation; Planning and Forecasting; Public Transportation Commuters; Empirical methods; Market share; Modal split; Public transit; Theoretical studies; Transit operating agencies; Travel surveys; National Household Travel Survey

**Availability:** Transportation Research Board Business Office Order URL:

[http://gulliver.trb.org/news/blurb\\_detail.asp?id=7286](http://gulliver.trb.org/news/blurb_detail.asp?id=7286)

## **Transit Planning**

### **Relationship Between Transit's Usual and Actual Mode Shares**

#### **Authors:**

Chu, Xuehao; Polzin, Steven E

Data Systems and Travel Survey Methods

Transportation Research Record: Journal of the Transportation Research Board Issue: 2049  
2008

#### **Abstract:**

One major source of transit mode share at the national level is the journey-to-work data from the U.S. Census Bureau's Decennial Census surveys conducted since 1960. These data can be used to determine transit's usual mode share, that is, the share of workers who state that they usually use transit for commuting. The relation of transit's usual mode share to its actual mode share, that is, the share of work trips made by transit as revealed by respondents to daily travel surveys, was studied. Theoretically, a simple aggregate model of workers who commute to work by transit or by nontransit means is built to establish a theoretical relationship between transit's usual and actual mode shares. This model establishes a necessary and sufficient condition for transit's usual share to be greater than its actual share. Empirically, the FHWA's 2001 National Household Travel Survey is used to measure transit's usual and actual mode shares for 34 transit market segments defined by 14 personal, household, and geographical characteristics. For each of the 34 transit market segments, the empirical results show that the necessary and sufficient condition is met and that transit's usual mode share is greater than its actual mode share. Furthermore, the degree to which transit's usual mode share is greater than its actual share is significant, ranging from 14.7% to 87.3%. Differences of such magnitude are too large to be ignored.

#### **Subject areas and Index Terms**

Data and Information Technology; Highways; Planning and Forecasting; Public Transportation Census; Market segmented groups; Modal split; Public transit; Travel surveys; Work trips; 2001 National Household Travel Survey

**Availability:** Transportation Research Board Business Office Order URL:

[http://www.trb.org/news/blurb\\_detail.asp?id=9551](http://www.trb.org/news/blurb_detail.asp?id=9551); Find a library where document is available Order

URL: <http://worldcat.org/isbn/9780309113229>

## **Transit Planning**

### **Income Effects and Other New Findings on the Complexity of Transit Tours**

#### **Authors:**

Bernardin Jr., Ph.D., Vincent L; Swenson, Andrew; Jiang, Zhuojun; Grovak, Michael  
Transportation Research Board - 500 Fifth Street, NW Washington, DC 20001  
TRB 90th Annual Meeting Compendium of Papers DVD  
Transportation Research Board 90th Annual Meeting  
2011

#### **Abstract:**

It has long been held that tours involving the use of public transit are less complex, including fewer stops and types of activities within a tour, compared with tours made by automobile or other modes. However, this traditional hypothesis was developed and supported by household travel surveys which include a relatively small subsample of transit users. This paper reports on recent on-board transit ridership surveys in Indianapolis, Indiana, and Columbus, Ohio, that collected information on the complexity of transit riders' tours. The results suggest that, contrary to common belief, transit tours are at least as complex as tours by other modes, based on household surveys of the same regions. The new surveys also reveal that income and vehicle ownership have a significant and opposite effect on the complexity of transit tours as they have on tours by other modes. Thus, the traditional hypothesis of simpler transit tours does hold for more affluent transit users but not for a typical, less affluent transit user. Comparisons of the on-board and household surveys further suggests that the traditional hypothesis of simple transit tours may have arisen from a bias toward more affluent riders in the subsample of household travel surveys that contain transit. The overall finding that transit tours may actually be more complex and involve more types of activities than previously thought has important implications for transit planning.

#### **Subject areas and Index Terms**

Planning and Forecasting; Public Transportation; I72: Traffic and Transport Planning  
Automobile ownership; Income; Mode choice; Planning; Public transit; Ridership; Travel surveys;  
Columbus (Ohio); Indianapolis (Indiana); National Household Travel Survey; On-board surveys

**Availability:** Transportation Research Board Business Office

## **Transit Planning**

### **Examining the Role of Trip Length in Commuter Decisions to Use Public Transportation**

#### **Authors:**

Yu, Yao; Machemehl, Randy B

University of Texas, Austin - Center for Transportation Research, 1616 Guadalupe Street Austin, TX 78701-1255 ; Southwest Region University Transportation Center - Texas Transportation Institute, Texas A&M University College Station, TX 77843-3135

Monograph

6/1/2010

#### **Abstract:**

Traveler trip length has for years been used as a fundamental indicator of the best mix of transit modes and user perceptions of travel cost for transit versus auto. This study examines traveler trip lengths across transit modes, work trip duration frequency distributions and mode share distributions in 7 major cities, 8 Combined Statistical Areas and one Metropolitan Statistical Area and found the effect of increasing population and transit mode variety on work trip travel time and travel distance. A traditional hierarchy of transit modes arranged by traveler trip length might include local bus, light rail, rapid rail (heavy rail) and commuter rail (regional rail). Based on NTD data, the average trip length for these four modes are: local bus (4.6 miles), light rail (3.9 miles), heavy rail (6.3 miles), and commuter rail (30.1). Trip Time Frequency Distributions for home-based work trips in all major cities selected in this study followed the same pattern except in New York, NY. In virtually all cities from 1990 to 2005, frequencies decreased in all categories less than 30 minutes and increased in categories greater than 30 minutes. Meanwhile, Trip Time Frequency Distributions for home-based work trips in all selected MSAs also followed the same pattern. These results contradicted our assumption that cities or MSAs with different urban forms or transit history might have different Trip Length Frequency Distributions (TLFDs) and showed that at an aggregated level, there is no statistically significant difference among TLFDs for work trips in the selected areas. Average work trip length for all the 50 MSAs in National Household Travel Survey data also showed that travel time and travel distance for home-based work trips in all selected MSAs are very similar. Also, from the linear regression functions with trip length as dependent variable, it can be seen that work trip time and distance tend to increase with increasing population, work trip time and distance tend to increase also as the number of transit modes increase. u1020

#### **Subject areas and Index Terms**

Planning and Forecasting; Public Transportation; I72: Traffic and Transport Planning  
Commuters; Decision making; Metropolitan areas; Mode choice; Public transit; Travel time; Trip length

**Availability:** National Technical Information Service Order URL:

<http://www.ntis.gov/search/product.aspx?ABBR=PB2010112709>

## **Travel Behavior**

### **National Household Travel Survey: Commuting for Life**

#### **Authors:**

Federal Highway Administration - 1200 New Jersey Avenue, SE Washington, DC 20590

Monograph

11/1/2006

#### **Abstract:**

All across the U.S. more and more workers, in large metro areas and in small towns, are spending an hour or more each way in their daily commute. The number of hour-long commutes has skyrocketed, not because workers are taking jobs further from home, but because the same commutes are taking longer. Commutes of all distances are taking significantly longer, but the number of workers in large cities who spend an hour or more for their commute is increasing at a faster rate than non-urban areas. Sixty percent of the commutes of less than 20 miles that take an hour or more are on transit, (total door-to-door time including walk, wait, and transfer times) but for trips over 20 miles the commutes are by far more likely to be in a private vehicle. How much time are workers losing to family and community life, let alone productive work time, due to increased travel times? One out of twelve commuters spends an average of 2 hours and 48 minutes a day traveling to and from work, in addition to the eight or more hours on the job.

#### **Subject areas and Index Terms**

Highways; Planning and Forecasting; Public Transportation; Society; I73: Traffic Control  
Commuting; Highway travel; Public transit; Rural areas; Travel surveys; Travel time; Urban areas; Work trips

## **Travel Behavior**

### **Multivariate analysis of trip chaining behaviour**

#### **Authors:**

NOLAND, R B; THOMAS, J V

Environment and Planning B: Planning and Design Issue: 6

11/1/2007

#### **Abstract:**

The relationship between patterns of trip chaining and urban form was investigated in order to examine whether lower density environments are related to more frequent reliance upon trip chaining and more complex tours. The analysis uses the USA 2001 National Household Travel Survey to evaluate household individual travel and trip characteristics alongside a basic measure of residential density. Two estimation techniques, the ordered probit and the negative binomial model, are used to evaluate the factors associated with the tendency to combine trips into more complex tours, measured as number of stops. The results indicate that, accounting for key household and traveller characteristics, lower density environments lead both to a greater reliance upon trip chaining and to tours that involve more stops along the way. This is followed by a household level analysis of tour generation. There was no evidence that more accessible areas tended to generate more tours.

#### **Subject areas and Index Terms**

Data and Information Technology; Planning and Forecasting; Terminals and Facilities; I72: Traffic and Transport Planning

Behavior; Dwellings; Mathematical models; Planning; Statistics; Suburbs; Travel; Trip chaining; Urban areas; United States; Behaviour; Dwelling; Journey; Mathematical model; Planning; Statistics; Suburbs; Trip chain; Urban area; Usa

**Availability:** Find a library where document is available Order URL: <http://worldcat.org/issn/02658135>

## **Travel Behavior**

### **What Neighborhood Are You In? Empirical Findings of Relationships Between Household Travel and Neighborhood Characteristics**

#### **Authors:**

Lin, Jie; Long, Liang

Transportation: Planning, Policy, Research, Practice Issue: 6

11/1/2008

#### **Abstract:**

Although there have been several studies regarding the influence of neighborhood characteristics on residential location choice and household travel behavior, to date there has been no uniform, concrete definition of neighborhood in the literature. This paper seeks to fill this gap in the literature by using public data sources to present an alternative way of defining neighborhood and neighborhood type. The paper also investigates the interaction between neighborhood environment and household travel in the United States. A neighborhood here is spatially identical to a census tract. A neighborhood type identifies a group of neighborhoods with similar neighborhood socioeconomic, demographic, and land use characteristics. This is accomplished by performing log-likelihood clustering on the Census Transportation Planning Package 2000 data. Five household travel measures (number of trips per household, mode share, average travel distance and time per trip, and vehicle miles of travel), are then compared across the resulting 10 neighborhood types, using the 2001 National Household Travel Survey household and trip files. Results show that household life cycle status and residential location are positively interdependent. Transit availability at place of residence tends to increase the transit mode share regardless of household automobile ownership and income level. Job/housing trade-offs are evident when mobility is not of concern. The study also reveals racial preference in residential location and contrasting travel characteristics among ethnic groups. There is evidence of significant effects of living environment on household travel and vehicle use. Urban households have comparable vehicle ownership to their suburban and rural counterparts, but higher vehicle miles of travel takes place in rural and suburban areas.

#### **Subject areas and Index Terms**

Highways; Planning and Forecasting; Public Transportation; Society; I72: Traffic and Transport Planning Census; Cluster analysis; Definitions; Empirical methods; Households; Mode choice; Neighborhoods; Travel behavior; Travel surveys

**Availability:** Find a library where document is available Order URL: <http://worldcat.org/issn/00494488>

## **Travel Behavior**

### **A discrete-continuous model of households' vehicle choice and usage, with an application to the effects of residential density**

#### **Authors:**

Fang, Hao Audrey

Transportation Research Part B: Methodological Issue: 9

11/1/2008

#### **Abstract:**

This paper develops a new method to solve multivariate discrete-continuous problems and applies the model to measure the influence of residential density on households' vehicle fuel efficiency and usage choices. Traditional discrete-continuous modelling of vehicle holding choice and vehicle usage becomes unwieldy with large numbers of vehicles and vehicle categories. The author proposes a more flexible method of modelling vehicle holdings in terms of number of vehicles in each category, using a Bayesian multivariate ordinal response system. The author also combines the multivariate ordered equations with Tobit equations to jointly estimate vehicle type/usage demand in a reduced form, offering a simpler alternative to the traditional discrete/continuous analysis. Using the 2001 National Household Travel Survey data, the author finds that increasing residential density reduces households' truck holdings and utilization in a statistically significant but economically insignificant way. The results are broadly consistent with those from a model derived from random utility maximization. The method developed above can be applied to other discrete-continuous problems.

#### **Subject areas and Index Terms**

Data and Information Technology; Economics; Highways; Planning and Forecasting; Safety and Human Factors; Society; I72: Traffic and Transport Planning

Automobile travel; Choice models; Economics; Households; Mode choice; Population density; Statistics

**Availability:** Find a library where document is available Order URL: <http://worldcat.org/issn/01912615>

## **Travel Behavior**

### **Short and Sweet: Analysis of Shorter Trips Using National Personal Travel Survey Data**

#### **Authors:**

Litman, Todd

Victoria Transport Policy Institute - 1250 Rudlin Street Victoria, British Columbia V8V 3R7

Monograph

12/14/2010

#### **Abstract:**

This paper summarizes information on shorter trips, based on 2009 National Household Travel Survey data. This analysis indicates that a significant portion of total personal travel consists of shorter trips. About 10% of reported trips are a half-mile or less, about 19% are a mile or less, and 41% are three miles or less. Since shorter trips tend to be undercounted, the actual share of short trips is probably higher than these figures indicate.

#### **Subject areas and Index Terms**

Passenger Transportation; Planning and Forecasting

Statistics; Travel behavior; Travel surveys; Trip length; National Household Travel Survey

**Availability:** Victoria Transport Policy Institute

## **Travel Behavior**

### **National Household Travel Survey: The Other Side of Congestion**

#### **Authors:**

Federal Highway Administration - 1200 New Jersey Avenue, SE Washington, DC 20590

Monograph

2/1/2007

#### **Abstract:**

Travel to work has historically defined peak travel demand, and in turn influenced the design of the transportation infrastructure. Commuting is a major factor in metropolitan congestion--85 million workers (two-thirds of all commuters) usually leave for work between 6:00 and 9:00 am, and over 88 percent are in private vehicles. However, a significant number of non-work vehicle trips are made during peak periods, which complicates the issue of congestion management. Importantly for understanding trends in congestion, the amount of travel for non-work purposes, including shopping, errands, and social and recreational activities, is growing faster than work travel. Growth in these kinds of trips is expected to outpace growth in commuting in the coming decades. The overlap of work and non-work travel during the peak travel periods is a significant factor in understanding the causes and cures of congestion. Primarily these non-work trips are to drop or pick-up a passenger, shop or run errands.

#### **Subject areas and Index Terms**

Highways; Operations and Traffic Management; I73: Traffic Control

Peak hour traffic; Traffic congestion; Travel behavior; Travel surveys; Trip purpose; Work trips;

Nonwork trips

## **Travel Behavior**

### **An Investigation in Household Mode Choice Variability across Metropolitan Statistical Areas for Urban Young Professionals**

#### **Authors:**

Long, Liang; Lin, Jie

World Conference on Transport Research Society - Secretariat, 14 Avenue Berthelot 69363 Lyon cedex 07,

11th World Conference on Transport Research

11th World Conference on Transport Research

2007

#### **Abstract:**

Contextual effects, especially associated with geographical variability, on travel behavior must be considered in spatial transferability of household travel survey data and demand model coefficients. In this paper a hierarchical modeling approach is applied to quantify geographical variability of household shopping trip mode choice by neighborhood type (defined by census tract) across eight metropolitan statistical areas. Residents of the neighborhoods studied are primarily urban young professionals. The individual level variables come from the 2001 National Household Travel Survey (NHTS) and the neighborhood level variables are derived from the Census Transportation Planning Package (CTPP) 2000. The model results confirm mode choice is dependent on where the household lives after controlling for household characteristics. With the similar household and census tract features the variability of household mode choice across geographic areas can be ignored. Lastly, the model limitations and future research are discussed.

#### **Subject areas and Index Terms**

Highways; Planning and Forecasting; Public Transportation; I72: Traffic and Transport Planning Households; Mode choice; Public transit; Travel behavior; Travel surveys; Trip purpose; Urban transportation; Young adults

**Availability:** World Conference on Transport Research Society

## **Travel Behavior**

### **Commute Travel: How Does Proximity Influence Mode Choice? GIS Analysis of a Large Urban University**

#### **Authors:**

Gould, Jane; Zhou, Jiangping; O'Flaherty, Sandra  
Transportation Research Board - 500 Fifth Street, NW Washington, DC 20001  
TRB 86th Annual Meeting Compendium of Papers CD-ROM  
Transportation Research Board 86th Annual Meeting  
2007

#### **Abstract:**

This paper explores the relationship between residential patterns and modal choices for the employees of a larger employment center in Los Angeles. The research employs several databases of employee residences and commute data. Geographic information systems and statistical models are used to identify patterns and to quantify the relationships. It is found that the majority of employees live relatively close, within a 10 to 20 mile distance from the employment center. Second, there are notable relationships between residential distance from employment and choice of commute mode. Also, proximity to multiple transit lines significantly increases the percentage of employees electing transit as a commute mode. The choice of commute mode occurs within discrete distances, or cut-off points, with the exception of carpooling and driving, which show no relationship with commute distance from the employment center. The final section of this paper compares commute distance for the university sample to commuters in a Los Angeles regional travel model and the 2001 NHTS. Staff data resembles the regional trends while faculty have shorter commutes than the national average.

#### **Subject areas and Index Terms**

Planning and Forecasting; Public Transportation  
Campus transportation; Commuting; Geographic information systems; Mode choice; Public transit;  
Urban transportation policy; Vanpools; Work trips; University of California, Los Angeles

**Availability:** Transportation Research Board Business Office Order URL:

[http://gulliver.trb.org/news/blurbs\\_detail.asp?id=7286](http://gulliver.trb.org/news/blurbs_detail.asp?id=7286)

## **Travel Behavior**

### **Wisconsin Passenger and Freight Statewide Model: Case Study in Statewide Model Validation**

#### **Authors:**

Proussaloglou, Kimon; Popuri, Yavasvi; Tempesta, Daniel; Kasturirangan, Krishnan; Cipra, David  
Travel Demand 2007  
Transportation Research Record: Journal of the Transportation Research Board Issue: 2003  
2007

#### **Abstract:**

This paper reports the model validation process for a passenger and a freight statewide model developed for the Wisconsin Department of Transportation. These policy-sensitive planning models are used to understand and quantify passenger and freight flows in Wisconsin and to support system-planning analyses at a statewide level. Examples of policies being tested include the impact of different land use scenarios and transportation projects on highway traffic, the diversion of traffic along key corridors, and the ridership potential of enhanced intercity bus service. The passenger model was estimated by using the Wisconsin add-on for the 2001 National Household Travel Survey (NHTS), and the freight model was estimated by using Transearch commodity flow data. Model validation relied on the NHTS data, statewide automobile and truck traffic counts, intercity transit ridership estimates, and 2000 U.S. Census data including the Census Transportation Planning Package, FHWA's validation manual, and NCHRP Report 365. The Wisconsin statewide models are presented as case studies to highlight the data sources, model estimation and validation methodologies, and results obtained at a statewide level. The passenger and freight validation results support the robustness of the models at a statewide and a corridor level. The methodology and standards discussed for the Wisconsin statewide models provide another data point to help establish guidelines for statewide model validation.

#### **Subject areas and Index Terms**

Highways; Planning and Forecasting; I72: Traffic and Transport Planning  
Case studies; Commodity flow; Freight and passenger traffic; Intercity travel; Travel demand; Validation; Wisconsin; Census Transportation Planning Package; National Household Travel Survey; Statewide travel models

**Availability:** Transportation Research Board Business Office Order URL:

[http://www.trb.org/news/blurbs\\_detail.asp?id=8489](http://www.trb.org/news/blurbs_detail.asp?id=8489); Find a library where document is available Order URL: <http://worldcat.org/isbn/9780309104296>

## **Travel Behavior**

### **National Transport Surveys: What Can We Learn from International Comparisons?**

#### **Authors:**

Patrick, Bonnel; Jean-Loup, Madre; Armoogum, Jimmy  
Transportation Research Board - 500 Fifth Street, NW Washington, DC 20001  
TRB 86th Annual Meeting Compendium of Papers CD-ROM  
Transportation Research Board 86th Annual Meeting  
2007

#### **Abstract:**

Many countries, are conducting National Personal Transportation Surveys, but the methodologies implemented are quite different and the results difficult to compare. INRETS-DEST and LET-ENTPE, with FUNDP' help (Namur, Belgium), have gathered descriptions of the surveys conducted in 16 countries. This overview focuses mainly on the following points: (1) survey objectives and partners involved; (2) survey design, protocol and survey methodology; (3) coding and especially geocoding of data; (4) scope and target populations (for individuals and trips); (5) sampling techniques; and (6) nonresponse analysis and weighting procedures. Wide methodological differences are observed between countries. In addition of daily travel, most countries collect long distance trips as well, which are defined in a variety of ways. In some countries data collection is continuous, while in others it is periodic. CATI or CAPI systems were mainly used in the most recent surveys. Address geocoding is performed only in some countries. Up to now, no country has ever used GPS for the follow-up of mobility, even if France and U.S. plan to do so. Most countries have developed weighting and imputation procedures to correct for nonresponse, but only a few have developed strategies to survey nonrespondents. This paper presents the results of comparisons and the lessons which can be learnt for the next French NPTS. In particular, this analysis deals with the potential of new technologies to improve data quality while maintaining data comparability with previous surveys. Following the example of long distance travel (DATELINE survey in 2001-2002), the necessity of harmonizing the surveys on daily mobility at the European level appears.

#### **Subject areas and Index Terms**

Data and Information Technology; Highways; Planning and Forecasting; Public Transportation; Society; I72: Traffic and Transport Planning  
Global Positioning System; Information management; Methodology; Mobility; Public transit; Surveying methods and processes; Surveys; Transit operating agencies; Travel surveys; National Personal Transportation Survey; Survey methods

**Availability:** Transportation Research Board Business Office Order URL:

[http://gulliver.trb.org/news/blurb\\_detail.asp?id=7286](http://gulliver.trb.org/news/blurb_detail.asp?id=7286)

## **Travel Behavior**

### **Housing Choices and Travel of Older Adults: Using AHS and NPTS-NHTS Data to Plan for the Future**

#### **Authors:**

Dill, Jennifer; Kanai, Tomoko  
Transportation Research Board - 500 Fifth Street, NW Washington, DC 20001  
TRB 86th Annual Meeting Compendium of Papers CD-ROM  
Transportation Research Board 86th Annual Meeting  
2007

#### **Abstract:**

As urban areas throughout the U.S. plan their future transportation systems, one important trend to consider is the aging of the population. Many regions, including Portland, Oregon, are adopting smart growth policies that attempt to integrate land use and transportation planning to reduce dependence on single-occupant vehicles. Questions arise regarding the effect the aging of the population will have on these strategies. Will they be supportive or make things more difficult? This paper uses data from national sources, the American Housing Survey (AHS) and the Nationwide Personal Transportation Survey (NPTS) and the National Household Travel Survey (NHTS), to answer the following questions for the Portland region, looking at recent trends: (1) What type of housing do older adults live in? (2) How likely are adults to move at different ages? (3) What are the travel patterns of older adults? (4) How does urban form relate to the travel patterns of older adults? In addition to looking at adults aged 65 and older, the analysis pays particular attention to people aged 45-54 and 55-64, which includes most Baby Boomers. The analysis provides an example of using nationally-developed data sources to inform regional planning processes.

#### **Subject areas and Index Terms**

Economics; Planning and Forecasting; Public Transportation; Society  
Aged; City planning; Housing; Land use planning; Population; Single occupant vehicles; Portland (Oregon); American Housing Survey; National Household Travel Survey; Nationwide Personal Transportation Survey; Choices

**Availability:** Transportation Research Board Business Office Order URL:

[http://gulliver.trb.org/news/blurbs\\_detail.asp?id=7286](http://gulliver.trb.org/news/blurbs_detail.asp?id=7286)

## **Travel Behavior**

### **Time-of-Day Choice Modeling for Long-Distance Trips**

#### **Authors:**

Jin, Xia; Horowitz, Alan J

Travel Demand 2008

Transportation Research Record: Journal of the Transportation Research Board Issue: 2076  
2008

#### **Abstract:**

During the past two decades, increasing attention has been given to incorporating the temporal nature of trip making into the travel demand modeling process. The vast majority of prior studies focused on daily urban trips. This study explores the timing & scheduling decision-making behavior for long, occasional, and exceptional travel, rather than habitual, repetitive trips. A long-distance trip is defined for this study as 50 mi or longer and 60 min or longer one way. An intensive preference survey was conducted to help expose those salient factors that affect time-of-day choice and help understand the prioritization among the variables and constraints. A multinomial logit model was then developed from the 2001 National Household Travel Survey daily-trip survey data. Various trip activity, personal, and household characteristics were examined. The time-of-day choice process for long-distance trips was found to be more complicated than that for daily short trips. Trip duration, activity duration, travel day type, whether traveling with other persons, and the presence of young children all had strong implications for the departure time choice for long-distance trips.

#### **Subject areas and Index Terms**

Highways; Planning and Forecasting; I72: Traffic and Transport Planning  
Choice models; Decision making; Departure time; Multinomial logits; Periods of the day; Travel demand;  
2001 National Household Travel Survey; Long distance travel

**Availability:** Transportation Research Board Business Office Order URL:

[http://trb.org/news/blurbs\\_detail.asp?id=9890](http://trb.org/news/blurbs_detail.asp?id=9890); Find a library where document is available Order URL:

<http://worldcat.org/isbn/9780309125918>

## **Travel Behavior**

### **Relationship Between Urban Sprawl and Daily Miles Driven by Teenagers in the United States**

#### **Authors:**

Trowbridge, Matthew John; McDonald, Noreen C  
Transportation Research Board - 500 Fifth Street, NW Washington, DC 20001  
TRB 87th Annual Meeting Compendium of Papers DVD  
Transportation Research Board 87th Annual Meeting  
2008

#### **Abstract:**

Graduated drivers licensing (GDL) decreases teen driver fatalities by minimizing driving exposure during nighttime and other high-risk circumstances. However, the long-term success of GDL may be compromised by environmental factors such as sprawl that generally increase automobile reliance. Sprawl's association with increased mileage is well established among adults. However, its specific impact on teen driving exposure is unknown. Driving and demographic data for 4,528 teens (weighted=10.5 million) were obtained from the 2001 National Household Transportation Survey (NHTS). County-level sprawl was measured using an index developed by Ewing et al. The association between daily miles driven by teens and sprawl controlling for demographic characteristics was modeled using ordinal logistic regression. The predicted probability of driving >20 miles in counties with varying degrees of sprawl was also calculated. Teens drove an average of 15.6 miles daily. 48% did not drive, 27% drove <20 miles, and 25% drove >20 miles. More severe sprawl was associated with higher daily mileage ( $p < 0.001$ ). Overall, teens in sprawling counties were more than twice as likely to drive >20 miles daily than teens in compact counties. This trend was particularly prominent among the youngest drivers. For example, the predicted probability of 16-17 year old males driving >20 miles per day varied from 9% to 24% in compact vs. sprawling counties. Sprawl is associated with increased daily mileage by teen drivers. Given the stark relationship between driving exposure and fatality risk among teens, increased efforts to understand and modify the effects of sprawl on adolescent driving behavior are necessary.

#### **Subject areas and Index Terms**

Highways; Research; Safety and Human Factors; Society; I83: Accidents and the Human Factor  
Average daily traffic; City planning; Demographics; Driver licenses; Graduated licensing; Research;  
Teenage drivers; Urban development; Urban sprawl

**Availability:** Transportation Research Board Business Office

## **Travel Behavior**

### **Comparison of Vehicle-Ownership Models**

#### **Authors:**

Potoglou, Dimitris; Susilo, Yusak Octavius

Travel Demand 2008

Transportation Research Record: Journal of the Transportation Research Board Issue: 2076  
2008

#### **Abstract:**

Empirical studies on household car ownership have used two types of discrete choice modeling structures: ordered and unordered. In ordered response structures, such as the ordered logit and ordered probit models, the choice of the number of household vehicles arises from a unidimensional latent variable that reflects the propensity of a household to own vehicles. Unordered response structures are based on the random utility maximization principle, which assumes a household associates a utility value across different car ownership levels and chooses the one with the maximum utility. The most common unordered response models are the multinomial logit and probit models, but only the multinomial logit has been used in practical applications because of its simple structure and low computational requirements. Consensus among researchers on unordered or ordered structures is still lacking. Empirical studies have reported various models, including the multinomial logit, ordered logit, and ordered probit. An open question remains: Which model would better reflect households' car ownership choices? This paper compares multinomial logit, ordered logit, and ordered probit car ownership models through a number of formal evaluation measures and empirical analysis of three data sets: the 2001 National Household Travel Survey for the Baltimore [Maryland] Metropolitan Area, the 2005 Dutch National Travel Survey, and the 2000 Osaka [Japan] Metropolitan Person Trip Data. Results show the multinomial logit model should be selected for modeling the level of household car ownership.

#### **Subject areas and Index Terms**

Highways; Planning and Forecasting; I72: Traffic and Transport Planning  
Automobile ownership; Choice models; Empirical methods; Multinomial logits; Transportation planning;  
Baltimore Metropolitan Area; 2001 National Household Travel Survey; Dutch National Travel Survey,  
2005; Osaka Metropolitan Person Trip Data, 2000; Ordered logits; Ordered probit models

**Availability:** Transportation Research Board Business Office Order URL:

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<http://worldcat.org/isbn/9780309125918>

## **Travel Behavior**

### **Comparison of Pedestrian Trip Generation Models**

#### **Authors:**

Kim, Nam Seok; Susilo, Yusak Octavius  
Transportation Research Board - 500 Fifth Street, NW Washington, DC 20001  
TRB 87th Annual Meeting Compendium of Papers DVD  
Transportation Research Board 87th Annual Meeting  
2008

#### **Abstract:**

This paper explores pedestrian demand models at regional level and the development of trip generation models for walking to work using Poisson regression and Negative Binomial regression. Non-motorized transportation including walking has so far received relatively little attention in the transportation-planning field, and as a result the best technique for estimating pedestrian demand is still being explored by transportation planners, engineers, non-government research organizations, and local and regional government. This paper presents an empirical comparison of four different regression models for the estimation of pedestrian demand at the regional level and tries to find the most appropriate model, with reference to National Household Travel Survey 2001 data for the Baltimore region. The results show that Poisson regression seems to be more appropriate for pedestrian trip generation modeling in terms of Chi-square ratio test, Pseudo R<sup>2</sup> and Akaike Information Criterion (AIC). However, R<sup>2</sup> based on Deviance residuals and unrestricted Log-likelihood value at convergence confirmed the empirical studies that negative binomial regression is more appropriate for the over-dispersed dependent variable than Poisson regression.

#### **Subject areas and Index Terms**

Data and Information Technology; Pedestrians and Bicyclists; Planning and Forecasting; Public Transportation  
Demand; Nonmotorized transportation; Pedestrian traffic; Pedestrians; Poisson distributions; Regression analysis; Trip generation; 2001 National Household Travel Survey; Akaike information criterion

**Availability:** Transportation Research Board Business Office

## **Travel Behavior**

### **Multinomial Modeling of Purpose Driven Trip**

#### **Authors:**

Penn, M; Vargas, F; Chimba, D

American Society of Civil Engineers - 1801 Alexander Bell Drive Reston, VA 20191-4400

Transportation Land Use, Planning, and Air Quality. Proceedings of the 2007 Conference, Orlando, Florida, July 9-11, 2007

Transportation Land Use, Planning, and Air Quality  
2008

#### **Abstract:**

Activity and purpose based trip making studies are gaining popularity in current transportation research industry. The purpose is determined by activity one is to engage in at the destination of the trip. The trip purpose can be influenced by many socioeconomic factors. Based on the importance of determining the effect of trip purpose, this study applies a multinomial modeling approach to evaluate various factors which determine purpose based trips. The study utilizes trip data from the 2001 National Household Travel Survey (NHTS). Home based and non-home based work, school, shopping, family, social and religious driven trips are modeled by using different socioeconomic variables. Multinomial logit (MNL) and multinomial probit (MNP) models are used in this study in determining the effect of the variables.

#### **Subject areas and Index Terms**

Economics; Highways; Society; I10: Economics and Administration

Households; Multinomial logits; Multinomial probits; Socioeconomic factors; Travel surveys; Trip purpose

**Availability:** American Society of Civil Engineers; Find a library where document is available Order

URL: <http://worldcat.org/isbn/9780784409602>

## **Travel Behavior**

### **Walking the Walk: The Association Between Community Environmentalism and Green Travel Behavior**

#### **Authors:**

Kahn, Matthew E; Morris, Eric A

Journal of the American Planning Association Issue: 4  
2009

#### **Abstract:**

This study investigates whether green beliefs and values are associated with green travel behavior. The authors examine whether residents of communities with environmentalist attributes drive less, consume less gasoline, and are more likely to commute by private vehicle. Demographic, transportation, and built environment data from the 2000 Census of Population and Housing and the 2001 National Household Travel Survey was used. Indicators of green ideology were developed using voting records, political party membership, and data on hybrid auto ownership. Using both individual households and small areas as units of analysis, ordinary least squares regression and linear probability models were estimated. Findings show that green ideology was associated with green travel behavior. People with green values are more likely than others to be located in communities with attributes conducive to environmentally friendly travel, such as high population densities and proximity to city centers and rail transit stations. Residents of green communities also engage in more sustainable travel than residents of other communities. Green ideology may cause green travel behavior because greens derive utility from conservation or because greens locate in areas with characteristics that promote sustainable travel. If greens conserve because they derive utility from it, then environmental education and persuasion may bring about more sustainable travel. It also is possible that green travel behavior can cause green beliefs. If so, it is possible that attracting more travelers to alternate modes and reducing vehicle miles traveled may increase environmental awareness, which may in turn promote other green behavior.

#### **Subject areas and Index Terms**

Environment; Highways; Pedestrians and Bicyclists; Planning and Forecasting; Public Transportation; I15: Environment; I72: Traffic and Transport Planning

Communities; Environment; Least squares method; Mode choice; Probability; Social values; Travel behavior; Beliefs

**Availability:** Find a library where document is available Order URL: <http://worldcat.org/oclc/4626214>

## **Travel Behavior**

### **Vehicle Ownership and Utilization Choice Model with Endogenous Residential Density**

#### **Authors:**

Brownstone, David; Fang, Hao

Transportation Research Board - 500 Fifth Street, NW Washington, DC 20001

TRB 88th Annual Meeting Compendium of Papers DVD

Transportation Research Board 88th Annual Meeting

2009

#### **Abstract:**

This paper explores the influence of residential density on households' vehicle fuel efficiency and usage choices with a national subsample of the 2001 NHTS survey. A Bayesian approach that corrects for the endogeneity of the residential density is used to mitigate the problem of sample selectivity. The results show that an increase in residential density has a negligible effect on car choice and utilization, but reduces truck choice and utilization with a modest scale marked by statistical significance. The effects are larger than, but qualitatively consistent with, those obtained in a previous study, in which a California sample was used and the endogeneity of the density variable left uncorrected. Out-of-sample forecasting accuracy results are also reported to test the robustness of the model.

#### **Subject areas and Index Terms**

Environment; Highways; Planning and Forecasting; I72: Traffic and Transport Planning

Automobile ownership; Choice models; Fuel consumption; Population density; Residential location;

Travel surveys; California; Choices; Fuel efficient cars; Vehicle choice

**Availability:** Transportation Research Board Business Office

## **Travel Behavior**

### **Travel Behavior and the Effects of Household Demographics and Lifestyles**

#### **Authors:**

Rashidi, Taha H; Mohammadian, Abolfazl; Zhang, Yongping  
Transportation Research Board - 500 Fifth Street, NW Washington, DC 20001  
TRB 88th Annual Meeting Compendium of Papers DVD  
Transportation Research Board 88th Annual Meeting  
2009

#### **Abstract:**

Household and individual demographics, attributes and dynamics have significant effects on their travel behavior and the overall performance of the transportation system. This study attempts to study the effects of demographic changes on the travel attributes of the household members of several homogeneous lifestyle clusters. Using the National Household Travel Survey (NHTS) 2001 data, more than twenty travel attributes including number of auto trips, trips per tour, transit usage and average commute distance are analyzed. To investigate the impact of changing demographics on household and individual level travel attributes, the best fitted distributions for a large set of travel attributes are introduced. Then the study provides a detailed comparison of the resulted distributions across different lifestyles and demographics.

#### **Subject areas and Index Terms**

Highways; Planning and Forecasting; Public Transportation  
Cluster analysis; Data collection; Demographics; Households; Life styles; Travel behavior; Travel surveys; Travel time; Trip purpose; 2001 National Household Travel Survey

**Availability:** Transportation Research Board Business Office

## **Travel Behavior**

### **Transferability of Time-of-Day Choice Modeling for Long-Distance Trips**

#### **Authors:**

Jin, Xia; Wu, Jingcheng; Horowitz, Alan J  
Transportation Research Board - 500 Fifth Street, NW Washington, DC 20001  
TRB 88th Annual Meeting Compendium of Papers DVD  
Transportation Research Board 88th Annual Meeting  
2009

#### **Abstract:**

Time-of-day models deal with the time at which travel occurs throughout the day. This paper presents a study in time-of-day choice modeling for long-distance trips, with special interest in the transferability of the model. Two datasets from the 2001 National Household Travel Survey and the 2001 California Statewide Household Travel Survey were employed to explore the effects of various factors on time-of-day choice making and to test the transferability the behavior findings and model parameters. Although there are remarkable differences in data composition between the two datasets, comparative analysis of the models developed from the two datasets reveals consistent results, suggesting the potential for transferability of the behavior pattern across spatial locations.

#### **Subject areas and Index Terms**

Aviation; Highways; Passenger Transportation; Planning and Forecasting; Transportation (General); I72: Traffic and Transport Planning  
Choice models; Data collection; Households; Periods of the day; Travel behavior; Travel surveys; California; Long distance travel models; Transferability of models

**Availability:** Transportation Research Board Business Office

## **Travel Behavior**

### **Does the built environment affect when American teens become drivers? Evidence from the 2001 National Household Travel Survey**

#### **Authors:**

McDonald, Noreen; Trowbridge, Matthew  
Journal of Safety Research Issue: 3  
2009

#### **Abstract:**

Motor vehicle crashes are the most common cause of death for American adolescents. However, the impact of where teens live on when they begin driving has not been studied. Data from the 2001 National Household Travel Survey were used to estimate the effect of residential density on the driver status of teens aged 16 to 19 years after matching on demographic characteristics. Controlling for demographic characteristics, 16 and 17 year old teens in high density neighborhoods had driver rates 15 percentage points below teens living in less dense areas ( $p < 0.001$ ). The effect for 18 and 19 year olds was a 9 percentage point decrease ( $p < 0.001$ ). These results suggest teens living in less dense and more sprawling communities initiate driving at a younger age than comparable teens in compact areas, placing them at increased risk for crash related injuries. The role of environmental factors, such as neighborhood walkability and provision of transit, should be considered in young driver programs.

#### **Subject areas and Index Terms**

Highways; Safety and Human Factors  
Age; Population density; Residential areas; Teenage drivers; Travel surveys; Built environment

**Availability:** Find a library where document is available Order URL: <http://worldcat.org/oclc/1800052>

## **Travel Behavior**

### **Effect of Variation in Household Sociodemographics, Lifestyles, and Built Environment on Travel Behavior**

#### **Authors:**

Rashidi, Taha H; Mohammadian, Abolfazl; Zhang, Yongping

Travel Behavior 2010, Volume 1

Transportation Research Record: Journal of the Transportation Research Board Issue: 2156  
2010

#### **Abstract:**

Household and individual demographics, attributes, and dynamics have significant effects on travel behavior and the overall performance of the transportation system. This study attempts to examine the effects of household demographic changes on the travel attributes of households grouped into several homogeneous lifestyle clusters. With the use of the National Household Travel Survey 2001 data, more than 20 travel attributes including number of auto trips, trips per tour, transit usage, and average commute distance are analyzed. To investigate the impact of changing demographics on household- and individual-level travel attributes, the best-fit distributions for a large set of travel attributes are introduced. Then a detailed comparison between the resulting distributions across different lifestyles and demographics is presented.

#### **Subject areas and Index Terms**

Highways; Planning and Forecasting; Public Transportation; Society; I72: Traffic and Transport Planning  
Automobile travel; Demographics; Households; Life styles; Public transit; Ridership; Travel behavior;  
Travel surveys; Trip length; 2001 National Household Travel Survey; Built environment;  
Sociodemographics

**Availability:** Transportation Research Board Business Office Order URL:

[http://www.trb.org/Main/Blurbs/Travel\\_Behavior\\_2010\\_Volume\\_1\\_164247.aspx](http://www.trb.org/Main/Blurbs/Travel_Behavior_2010_Volume_1_164247.aspx); Find a library where document is available Order URL: <http://worldcat.org/isbn/9780309142915>

## **Travel Behavior**

### **A Conceptual and Methodological Framework of Daily and Long Distance Leisure Activity-Travel Behavior**

#### **Authors:**

LaMondia, Jeffrey J; Bhat, Chandra R  
Transportation Research Board - 500 Fifth Street, NW Washington, DC 20001  
TRB 90th Annual Meeting Compendium of Papers DVD  
Transportation Research Board 90th Annual Meeting  
2011

#### **Abstract:**

The goal of this paper is to contribute to the understanding of daily and long-distance leisure activity participation of individuals. The paper introduces a unified conceptual framework for daily and long-distance leisure activity-travel behavior. Additionally, the paper uses a unique 2001 National Household Travel Survey (NHTS) dataset comprised of households' daily and long-distance leisure activities to undertake a unique empirical analysis of five distinct leisure activities using the conceptual framework and a copula-based model methodology.

#### **Subject areas and Index Terms**

Planning and Forecasting; I72: Traffic and Transport Planning  
Activity choices; Daily; Empirical methods; Households; Leisure time; Methodology; Travel behavior;  
Travel surveys; National Household Travel Survey; Long distance travel

**Availability:** Transportation Research Board Business Office

## **Travel Behavior**

### **A Comparative Analysis of Alternative Econometric Structures for Trip-Generation Models**

#### **Authors:**

Srinivasan, Sivaramakrishnan; Lim, Kwang-Kyun  
Transportation Research Board - 500 Fifth Street, NW Washington, DC 20001  
TRB 90th Annual Meeting Compendium of Papers DVD  
Transportation Research Board 90th Annual Meeting  
2011

#### **Abstract:**

Trip-generation models have been traditionally estimated using linear-regression structures even though this methodology does not recognize the non-negativity and integer nature of the trips. Although the theoretical superiority of count-data models as an alternative approach is well recognized, the empirical benefits of such models have not been well established. In this context, the intent of this study is to undertake a comparative analysis of three different econometric structures for trip generation models. The structures are compared across three different trip purposes with significantly different distribution patterns. The models are estimated using the 2009 National Household Travel Survey (NHTS) data and are applied to samples from the NHTS 2009 and 2001. Predictive validations indicate that the ordered-probit models are able to replicate the trip generation patterns better than log-linear and negative-binomial models for all three trip purposes. The negative-binomial model performs reasonably good in the case of the non-home-based trips which has a monotonically-decreasing distribution pattern. However, on comparing the predicted expected number of trips, the negative binomial and the ordered-probit models perform equally well.

#### **Subject areas and Index Terms**

Planning and Forecasting; I72: Traffic and Transport Planning  
Alternatives analysis; Econometric models; Linear regression analysis; Probits; Structures; Travel patterns; Travel surveys; Trip generation; Trip purpose; National Household Travel Survey

**Availability:** Transportation Research Board Business Office

## **Travel Behavior**

### **Is the Usual Share of a Commuting Mode always Greater than its Actual Share?**

#### **Authors:**

Sikder, Sujan; Chu, Xuehao

Transportation Research Board - 500 Fifth Street, NW Washington, DC 20001

TRB 90th Annual Meeting Compendium of Papers DVD

Transportation Research Board 90th Annual Meeting

2011

#### **Abstract:**

Using data from the 2001 National Household Travel Survey (NHTS), recent research showed that transit's usual share is greater than its actual share for workers in the U.S. for a variety of commuter markets. A mode's usual share is the percent of workers who state that they usually use that mode for commuting in a week while the actual share of a mode is the percent of work trips by that mode by the same workers on a typical work day. This paper explores if this relative relationship between a mode's usual and actual shares holds true for common modes other than transit for the U.S. Mathematically, the paper determines that this relative relationship cannot hold true for all modes; in other words, the usual share has to be smaller than the actual share for one or more modes other than transit. Empirically, it uses the same 2001 NHTS to test this relative relationship for three common modes (privately operated vehicles [POVs], walk and bike) and for a variety of commuter markets. The empirical results confirm the mathematical conclusion with the relative relationship being true for bike but not true for POVs and walk. In addition, the relationship between usual and actual shares is determined not solely by the mode but also by individual commuter markets. Finally, the deviation between usual and actual shares in percentage terms is large for transit and walk, but small for POVs and bike. One direction of future research would be to determine the reasons of these differences in the usual-actual relationship across modes and commuter markets.

#### **Subject areas and Index Terms**

Pedestrians and Bicyclists; Planning and Forecasting; I72: Traffic and Transport Planning  
Bicycle travel; Commuting; Empirical methods; Modal split; Mode choice; Private passenger vehicles;  
Transit riders; Travel surveys; Walking; Work trips; 2001 National Household Travel Survey

**Availability:** Transportation Research Board Business Office

## **Travel Behavior**

### **National Household Travel Survey: Congestion: Non-Work Trips in Peak Travel Times**

#### **Authors:**

Federal Highway Administration - 1200 New Jersey Avenue, SE Washington, DC 20590

Monograph

4/1/2007

#### **Abstract:**

Importantly for understanding trends in congestion, the amount of travel for non-work purposes, including shopping, errands, and social and recreational activities, is growing faster than work travel. Growth in these kinds of trips is expected to outpace growth in commuting in the coming decades. Currently, more than half of peak period person trips in vehicles are not related to work, and the balance has changed substantially since the 1990's. After trips to work, and giving someone a ride, the next largest single reason for travel during the peak period is to shop, including buying gas and meals.

#### **Subject areas and Index Terms**

Highways; Operations and Traffic Management; I73: Traffic Control

Peak hour traffic; Recreational trips; Shopping trips; Traffic congestion; Travel surveys; Trip purpose;

Nonwork trips

## **Travel Behavior**

### **Long Distance Transportation Patterns: Mode Choice**

#### **Authors:**

Research and Innovative Technology Administration - Bureau of Transportation Statistics, 1200 New Jersey Avenue, SE Washington, DC 20590

Monograph

5/1/2006

#### **Abstract:**

Americans total 1.3 trillion person-miles of long distance travel a year on about 2.6 billion long-distance trips. Long-distance trips are journeys of more than 50 miles from home to the furthest destination. More than half of long-distance trips are taken for pleasure, while fewer than one out of five long-distance trips is for business. While most long-distance trips are made by personal vehicle, the National Household Travel Survey (NHTS), conducted in 2001 and 2002, explored the choices that travelers make for their long-distance travel. Among the key findings are: (1) Long-distance trips originating in urban and metropolitan areas are more likely to use public transportation modes than trips originating in rural and non-metro areas. (2) About 8 percent of long-distance trips that use a public transportation mode use a different mode in each direction of travel. (3) Almost 90 percent of long-distance trips are by personal vehicle. (4) Mode choice varies somewhat by trip purpose and distance. (5) Personal vehicle is the most frequent mode used to initially access long distance public transportation, but on the arrival end a greater mix of modes is used.

#### **Subject areas and Index Terms**

Highways; Planning and Forecasting; Public Transportation; Society; I10: Economics and Administration Metropolitan areas; Modal split; Mode choice; Private passenger vehicles; Public transit; Rural areas; Transportation modes; Travel patterns; Travel surveys; Trip length; Trip purpose; Urban areas; National Household Travel Survey; Long distance travel

**Availability:** Research and Innovative Technology Administration

## **Travel Behavior**

### **National Household Travel Survey: Is Congestion Slowing Us Down?**

#### **Authors:**

Federal Highway Administration - 1200 New Jersey Avenue, SE Washington, DC 20590

Monograph

5/1/2006

#### **Abstract:**

Congestion reduces mobility, increases auto-operating costs, adds to air pollution, and causes stress. Congestion is considered one of the major urban transportation problems. Commuters know about congestion--work trips are particularly concentrated in time and space. Not all of the vehicles on the road during the peak periods are headed for work, however. In fact, less than half of the vehicle trips in the peak periods are direct trips to or from work. One reason for this is that fewer commuters are traveling directly between home and work. There has been a large increase in incidental stops during the commute, such as dropping the children at day care or school, or picking-up dinner on the way home, especially for workers with the longest commutes.

#### **Subject areas and Index Terms**

Highways; Operations and Traffic Management; Planning and Forecasting; I72: Traffic and Transport Planning; I73: Traffic Control

Commuters; Peak hour traffic; Traffic congestion; Travel behavior; Travel surveys; Trip purpose; Urban areas; Work trips; Nonwork trips

## **Travel Behavior**

### **National Household Travel Survey: Working At Home - The Quiet Revolution**

#### **Authors:**

Federal Highway Administration - 1200 New Jersey Avenue, SE Washington, DC 20590

Monograph

7/1/2008

#### **Abstract:**

Many workers dream of working at home, to replace stressful commutes, save time and gas money, and help the environment. Because of electronic communication and increased acceptance in professional occupations, productive and seamless telecommuting is becoming a more feasible option for employers and workers. As a result, the number of workers who work at home is on the rise. The 2001 NHTS shows that 10.4 million workers telecommuted at least occasionally (at minimum, once in the past two months) instead of traveling to their normal workplace. Telecommuters have much longer commutes than average & in 2001 their one-way distance to work was 17.4 miles compared to 12.1 for all workers. The 2001 NHTS data indicate that the most likely candidates for telecommuting are workers in technical, professional and sales/service fields of employment. Interestingly, more than twice as many older workers (65 and over) report that they work from home in 2001 as compared to 1995. Due to the greater average commute distance for telecommuters, the savings in gas consumption for the days that they do not go in to work is nearly 18 million gallons. Working at home benefits workers, who save time and money, and benefits the greater society in reduced congestion, saved fuel, and better air quality.

#### **Subject areas and Index Terms**

Highways; Planning and Forecasting; I72: Traffic and Transport Planning

Air quality; Benefits; Demographics; Fuel conservation; Savings; Telecommuting; Time; Travel surveys; Trip length

## **Travel Behavior**

### **National Household Travel Survey: Congestion: Who is Traveling in the Peak?**

#### **Authors:**

Federal Highway Administration - 1200 New Jersey Avenue, SE Washington, DC 20590

Monograph

8/1/2007

#### **Abstract:**

Continuing the series of briefs on congestion, this brief looks at the trends, amount, and characteristics of non-work vehicle trips during the peak periods. The average American is taking approximately four more trips a week than a decade ago for non-work purposes; travel for eating out, recreational activities, and shopping have all increased. Travelers know that Friday peaks are the worst. Besides commuting to work, people travel during the peak to take their child to school, run out to buy milk before work, go to the gym, arrive at the doctor's office early to avoid a wait, or pick up their dry cleaning.

#### **Subject areas and Index Terms**

Highways; Operations and Traffic Management; I73: Traffic Control

Highway travel; Medical trips; Peak hour traffic; School trips; Shopping trips; Traffic congestion; Travel behavior; Travel surveys; Trip purpose; Weekdays; Work trips; Nonwork trips

## **Travel Behavior**

### **National Household Travel Survey: Vacation Travel**

#### **Authors:**

Federal Highway Administration - 1200 New Jersey Avenue, SE Washington, DC 20590

Monograph

8/1/2008

#### **Abstract:**

This National Household Travel Survey brief paper discusses the vacation travel that took place in the summer of 2008, in the United States. One question addressed concerns the effect of gas prices on summer highway travel. Data indicate that vehicle travel has decreased since 2006, and the price of gas has more than doubled between 2001 and the summer of 2008.

#### **Subject areas and Index Terms**

Highways; Planning and Forecasting; I72: Traffic and Transport Planning

Gasoline; Highway travel; Impacts; Prices; Summer; Travel behavior; Travel surveys; Vacations; United States

## **Travel Behavior**

### **Changes in the U.S. Household Vehicle Fleet**

#### **Authors:**

Federal Highway Administration - 1200 New Jersey Avenue, SE Washington, DC 20590

Monograph

9/1/2009

#### **Abstract:**

The preliminary 2008 National Household Travel Survey (NHTS) shows a number of important changes in the U.S. household-based vehicle fleet. The NHTS collects detailed information on household vehicle ownership, including the type of vehicles, model year, odometer reading, and daily use characteristics. Perhaps reversing a longstanding trend towards the aging of the household vehicle fleet, the preliminary 2008 NHTS shows a leveling off in average vehicle age--in 1977, the average household vehicle was 6.6 years old, by 2001 average age was 8.9 years, but declined slightly to 8.3 years in the 2008 preliminary data. Older vehicles (10 years or older) accounted for 39 percent of the household fleet in 2001, but their share declined slightly to 37 percent in 2008. At the other end of the spectrum, the number of newer vehicles rose, including the addition of nearly 5 million hybrid or alternative fuel vehicles. Maybe more importantly, the mix of household vehicles continues to include fewer passenger cars and more SUVs. SUVs account for over 18 percent of all household vehicles in 2008, an increase from 12 percent in 2001.

#### **Subject areas and Index Terms**

Highways; Vehicles and Equipment; I90: Vehicles

Households; Ownership; Private passenger vehicles; Sport utility vehicles; Travel by vehicle type; Trend (Statistics); Vehicle fleets; United States; National Household Travel Survey

## **Trend Analysis and Market Segmentation**

### **Small Area Estimates of Daily Person-Miles of Travel: 2001 National Household Transportation Survey**

#### **Authors:**

Vaish, A K; Chen, Shijie; Sathe, Neeraja S; Folsom, Ralph E; Chandhok, Promod; Guo, Kuo  
Transportation: Planning, Policy, Research, Practice Issue: 6  
11/1/2010

#### **Abstract:**

Although the 2001 National Household Transportation Survey (NHTS) collected information on many useful travel-related variables, it was designed at the national rather than state level. For most states, it does not have a large enough sample to produce reliable estimates, especially for subdomains within a state. This paper summarizes the methodology and results used to produce small area estimates (SAEs) of the percentage of persons among four age groups having high daily person-miles of travel and associated prediction intervals for all 50 states and the District of Columbia. The survey weighted hierarchical Bayes SAE methodology was used to produce state-level SAEs. This methodology demonstrates that SAE can be an effective technique for producing reliable state-level estimates from large, national surveys. In particular, the prediction interval relative widths for SAEs were, on average, 31 & 48% narrower than the corresponding design-based confidence interval widths. The reduction was around 47 & 63% for small states. Directions for future research are suggested.

#### **Subject areas and Index Terms**

Highways; Planning and Forecasting; I72: Traffic and Transport Planning  
Age groups; Bayes' theorem; Estimating; Methodology; Person miles of travel; States; Travel surveys;  
National Household Travel Survey

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