

## **Emerging Issues Workshop report**

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### **1. Introduction**

This report provides a summary of the deliberations of, and conclusions from, the “Emerging Issues” workshop held as part of the National Household Travel Survey Conference “Understanding Our Nation’s Travel”. The workshop focused on identifying demographic, technological, and lifestyle changes that can potentially affect transportation policy decisions in the near future. A resource paper by Ram Pendyala and Chandra Bhat served as the starting framework for discussions at the workshop.

An important note is in order here. The workshop did not focus on detailed analytic issues related to how the NHTS data may be combined with other data sources to address relevant emerging issues, nor did the workshop dwell on survey design-related considerations. These aspects were discussed in other workshops held as part of the NHTS Conference.

The rest of this report is structured in two broad sections. The first section identifies the emerging issues potentially affecting the path of transportation policy making. The second section discusses broad strategies to obtain relevant data to study, understand, and accommodate the emerging issues for transportation decision-making.

### **2. Emerging Issues**

#### 2.1. Safety

Safety considerations will continue to be a priority area for the transportation community. While safety is not an emerging issue, the impact of 9/11 and a changing world we live in has led to an alteration in the way individuals view safety in the context of travel choices. Specifically, 9/11 has expanded our concept of safety in travel choices to include not only safety from crime and safety from accidents, but also safety from terrorist acts. Understanding safety perceptions in the context of the latter dimension is important to, among other things, identify the most effective travel-related information dissemination strategies in the immediate aftermath of extreme events.

The current NHTS survey includes several questions related to safety perceptions in the context of accidents. For example, the NHTS asks attitudinal questions on topics such as aggressive driving, drunk driving, and accidents. It also collects information on the number and duration of trips, which can be used to formulate time-based exposure measures to study safety from accidents. However, there is little data collected regarding safety perceptions in the context of crime and terrorism.

## 2.2. Diversity in Vehicle Type Holdings and Vehicle Technology

Recent studies suggest an increasing diversity of motorized vehicle type holdings by households. The 2001 NHTS data shows that only about 57% of the personal-use vehicles are cars or station wagons, while 21% are vans or Sports Utility Vehicles (SUV) and 19% are pickup trucks. The increased holdings of vans, SUVs, and pickup trucks, in turn, has led to a surge in the vehicle miles traveled using these vehicles. This shift from small passenger car vehicle miles of travel to large non-passenger car vehicle miles of travel has implications for roadway capacity, since larger vehicles take up more room on roadways than smaller vehicles. The resulting reduced capacity exacerbates the problem of traffic congestion caused by increasing motorized personal vehicle use and also has safety implications. Further, Environmental Protection Agency (EPA) statistics show that an average van, SUV, or pickup truck produces twice the amount of pollutants emitted by an average passenger car. Clearly, understanding vehicle type trends, as well as vehicle technology trends (availability of in-vehicle navigation systems, engine type, fuel type, etc.), will enable informed transportation design and policy decisions.

The NHTS data collects information on vehicle type and make. However, this data can be supplemented by collecting (or appending) additional information relevant to each vehicle in the sample, perhaps by coordinating with car manufacturers and vehicle licensing agencies. The idea of collecting the VIN# of vehicles was discussed, since the VIN # is a unique identifier of many vehicle type characteristics. However, this may be perceived as being too intrusive by respondents.

## 2.3. Demographic Shifts

The demographic composition of the U.S. population is changing rapidly in such characteristics as racial and ethnic distribution (more non-caucasians, primarily due to immigration), household structure (fewer and fewer nuclear family households), and age distribution (older individuals). These changes have potentially very significant implications for travel behavior. For example, non-caucasians tend to have fewer vehicles and make fewer recreational trips, but appear to make more social and visiting trips, compared to caucasians. The residential choice determinants can also be quite different between different racial/ethnic groups. Similar differences have also been observed based on household structure and age. With regard to age, the travel behavior of the new elderly cohort is likely to be quite different from the earlier elderly cohorts, because the new elderly cohort is accustomed to an active and mobile lifestyle. This may be particularly the case for elderly women, who are likely to be “hyper-mobile” compared to the elderly women of yesteryears.

The NHTS survey collects data on ethnicity/race, household structure, and individual age. However, the sample size is not adequate to pursue an in-depth analysis of the travel effects of changing trends along these dimensions. An approach to address this problem is to over-sample specific population groups, though this may be difficult in a phone survey and may have other survey cost and sample size implications. In addition to working toward larger sample sizes for specific population groups, more detailed information on such issues as length of immigration, and year when an individual stops

driving or becomes relatively immobile, could provide valuable information for transportation planning and policy analysis.

#### 2.4. Transit Service Delivery Measurement

The provision of adequate public transportation service is important to the social and economic fabric, and environmental sustainability, of any metropolitan area. This is because public transportation not only represents a means by which people can efficiently move in a region with the least amount of impact on the environment, but also plays a critical role in providing access to activities for those without personal motor vehicles. Over the years, however, there has been an increasing reliance on the private car, and a corresponding decline in the use of public transit systems for personal travel in metropolitan areas in the U.S. An important issue, then, is to acquire transit service data and examine the data relative to the needs of individuals. Transit service data may include spatial characteristics (stop locations and transit routes), temporal characteristics (time span of operation, the frequency of service, on-time performance or reliability of service, and the load-carrying capacity by time of day), and the comfort, safety, and security (CSS) characteristics associated with transit stops and on-board vehicles (presence of seating at stops, weather control at stops and on-board vehicles, lighting at stops, *etc*). Useful information from potential users of the transit system include desired activity participation locations, desired times-of-day of travel, acceptable thresholds of access times to transit stations and wait times, and demographic and socio-economic attributes.

The transit agencies in metropolitan areas may have some of the transit service data identified above, which can be appended appropriately to households in the NHTS dataset based on residential location. The NHTS survey also collects data on the demographics and revealed activity-travel patterns of individuals, but does not collect data on customer desires or preferences regarding transit service. A set of attitudinal/preference questions regarding transit service would fill this void and contribute to informed transit policy decision-making.

#### 2.5. Overall lifestyle changes

The rapid innovations and advances in information and communication technologies (ICTs) since the early 1990s have had a profound impact on the behavior of businesses and individuals in today's society. Businesses are increasingly harnessing the potential of ICTs to facilitate and consummate business-to-business transactions and business-to-consumer transactions. In particular, it is fairly routine today for businesses to manage the production and distribution activities of their services and products (supply-chain management), as well as promote the purchase of their services and products (electronic enabled commerce), through the use of the internet. Individuals and households are also substantially more likely today than ten years ago to use computers at home with web access and/or to use mobile telephony services, due in large part to the increasing affordability and functionality of these technologies. Projections suggest that technology improvements will further fuel the adoption and use of internet computing and mobile communication devices by individuals and households in the future. The impacts of ICT

adoption and use are likely to be far-reaching, with the potential to fundamentally alter the life styles of businesses and individuals. For example, travel may not be perceived as much of a “time-sink” if a person is able to pursue a business or social conversation when traveling. Thus, drivers’ tolerance to congestion may increase. Similarly, the advent of 24-7 services in many employment sectors, as well as employees’ desires to balance work and family, is leading to an increasing prevalence of work arrangements that involve teleworking, flexible schedules, and alternate work shifts. This diversification of work arrangements can also have a substantial impact on travel patterns.

The NHTS survey collects very basic ICT-use data, but not at a level that will enable a good understanding of ICT-travel interactions. While it would perhaps be asking too much of the NHTS to collect detailed ICT-use data, some additional ICT use questions that characterize the use and frequency of specific forms of ICT over a specified span of time may be helpful. Other ways to potentially collect ICT-use data are discussed in Section 3. As with ICT-use data, detailed information on work arrangements is not available from the NHTS. This is an area for consideration in future surveys.

## 2.6. Land use-Travel Interactions

Understanding the interactions between land-use and travel is critical to designing balanced land use-transportation systems. For instance, the neo-urbanist view is that urban design can affect travel choices by impacting safety/security perceptions, and providing non-motorized-friendly and transit-friendly environments. Similarly, the idea of using land-use strategies to control the growing obesity epidemic in the US is based on the notion that physical activity can be promoted through appropriate urban form design. Of course, it is possible that land-use and urban form designs are not causing changes in travel patterns of individuals as much as individuals are selecting land-use/urban forms based on their travel or physical activity desires. This self-selection issue is important to understand if we are to disentangle the true and spurious causal effects of urban form on travel choices.

The NHTS collects the street addresses of participating households, though obtaining this information requires a separate confidentiality agreement. Thus, researchers can append land-use data to the NHTS household sample if they have access to such data. However, a centralized effort to append land-use data for each NHTS household would be valuable to researchers focusing on an understanding of land-use and travel interactions. This would require close coordination with local and metropolitan planning organizations around the country.

## 2.7. Rural issues

There continues to be a poor understanding of rural commutes and rural transportation needs in general. For example, how do individuals make the tradeoff between a long commute and living in a rural area? And what kinds of transportation services are available to the elderly?

The NHTS collects information from households all over the country, but the representation of rural households is relatively small because of the concentration of the population in urban areas.

### **3. Strategies to address emerging issues**

The current NHTS survey is a rich source of travel data and already provides a wealth of information to understand national and regional travel trends. In this section, we identify potential strategies to augment and leverage the existing richness of the NHTS survey to address the emerging issues identified above. The strategies proposed here are generic and are not tied to specific emerging issues.

#### 3.1. Identify Multidisciplinary Partnerships at the front end

Many agencies collect data that can be beneficially used along with the NHTS survey to address several of the emerging issues identified in the previous section (for example, the Center for Disease Control and the National Institute of Health collect rich data on physical activity). However, different agencies collect their data in different formats and in different ways. This makes appending relevant data at the back-end of the NHTS data collection process rather tedious. On the other hand, a concerted partnership among agencies at the front end has the potential to make the process of fusing data efficient. Specifically, the “hooks and dangles” for connection could be identified in advance, so that fusion becomes relatively straightforward rather than a nightmarish puzzle. In addition to making the fusion process efficient, a multidisciplinary partnership at the front end has the benefit of using the expertise of each agency to ask the right kinds of questions.

#### 3.2. Adopt a Time-Use Survey Approach

Time-use data on in-home and out-of-home activities (including travel and ICT use) can provide important information to address lifestyle issues, such as ICT-travel interactions and physical activity participation levels. While converting the entire NHTS to a time-use format may be unnecessarily burdensome, and would lead to problems in examining travel trends across time, one possibility is to use a time-use data collection approach for a small set of NHTS sample households.

#### 3.3. Collect Core Data, and Use Rotation/Augmentation

Expanding the NHTS survey to include questions to address all the emerging issues is infeasible because of survey burden issues. However, it should be possible to retain a core set of questions for all respondents, and then ask different sets of questions to different sub-samples of respondents. For example, a small sample of respondents could be asked additional questions regarding physical activity levels, another small sample could be asked questions regarding ICT-use, and a third small sample could be asked questions regarding transit service preferences. Such a rotation scheme keeps the survey length reasonable for each individual, and still provides information to address several emerging issues identified earlier. Another approach would be to supplement the core questions in the NHTS with a set of indicative questions, the answers to which act as

identifiers for targeting individuals/households for a follow-up survey (by NHTS or some other agency). For instance, one of the core questions in the NHTS could be “Do you have a cell-phone”. A positive answer to this would make the individual a candidate for a follow-up survey with an in-depth focus on the effect of cell-phone use on activity-travel characteristics.

#### 3.4. Include a GPS component

Using GPS technology to collect travel data has been proven now to be an efficient way to obtain detailed travel (and route choice) information. The GPS data collection approach can be supplemented by a short diary to record the activity purpose at each stop location, as well as additional details of the activity pursued at that location (such as whether an activity was a joint activity or a solo activity, the people involved in the activity, etc.) . Alternatively, it may be possible to impute the activity purpose for each stop by overlaying the stop location coordinates on a high-resolution land-use GIS layer.