NextGen NHTS
NEWSLETTER

Spring 2021

Issue Highlights

NHTS Program Updates

Recent FHWA NHTS program activities throughout the past few months have included continued development of the NextGen NHTS core and passive O-D data products. In addition, program staff have made several presentations in recent webinars and workshops. Continue reading to learn about highlights from each.

NextGen NHTS Development

The FHWA NHTS program has made great progress in furthering the development of the NextGen NHTS core and passive O-D data products. In particular, work continues on schedule by the University of Maryland (UMD) team in developing the 2020 national truck and passenger O-D data products. Both national products and associated documentation and algorithms will be made available to the public later this year. Pooled fund add-on purchase opportunities are still available for both 2019 or 2020 passenger O-D data products.

Recent Presentations

Over the past few months, details about the NHTS program and the NextGen NHTS data opportunities have been discussed as part of several webinars and workshops. Check out the following to learn more.

Panel on the Intersection of Survey and Passive Data Webinar | September 28, 2020

Host: Zephyr Foundation
Link: https://zephyrtransport.org/events/2020-09-28-sept-survey-passive-data/
Purpose: This webinar focused on how to leverage a combination of both modern technology-based data products (e.g., GPS and location-based service (LBS)) and more traditional data sources (e.g., surveys and traffic counts) to strengthen transportation outcomes. The NextGen NHTS was presented as an example of how survey and passive data can work side-by-side to address transportation data needs. The three-part webinar included presenters from the Maricopa Association of Governments; Stantec; the University of Kentucky; MacroSys, LLC; and Colorado DOT, with moderators from NC State University and StreetLight Data.

Improving Surveillance of Youth Active Travel to School: A Virtual Workshop | October 14–15, 2020

Host: National Collaborative on Childhood Obesity Research
Links: Part 1: https://www.youtube.com/watch?v=zvV-YLpinew
Part 2: https://www.youtube.com/watch?v=tplqhsFr8hU
B/O Intro: https://www.youtube.com/watch?v=TJo1fl1nb50
B/O 1: https://www.youtube.com/watch?v=Upm1e3Y8gUU
B/O 2: https://www.youtube.com/watch?v=KO1yvwMJi98
Purpose: The purpose of this workshop was to address key challenges related to measurement and surveillance of youth active travel to school and related environmental, policy, and program support. Participants first discussed select topic areas to identify gaps in existing surveillance systems as well as needs of relevant stakeholders. Participants then proposed solutions to address those needs and developed practical recommendations to strengthen surveillance. The 2017 NHTS was identified as one of the main supporting data sources.

Council of Professional Associations on Federal Statistics (COPAFS) Quarterly Meeting—NextGen NHTS: Redesigning the Largest Household Travel Survey in the US | December 4, 2020

Host: COPAFS
Link: https://copafs.org/wp-content/uploads/2020/12/4.-COPAFS-NextGen-NHTS-12-2020-webinar-slides-final.pdf
Purpose: During this regularly scheduled quarterly meeting of COPAFS, presenters Danny Jenkins and Stacey Bricka provided an introduction to the NHTS program, followed by details on the program's evolution over time, motivations behind redesigning the survey, insights into the NextGen NHTS survey design, and future survey plans. The focus was on the factors that went into designing the NextGen NHTS, particularly maintaining the ability to trend the NHTS data while at the same time reducing respondent burden.

Talking Traffic Webinar on FHWA's Travel Behavior Data Program | May 11, 2021

Host: FHWA
Link: For more information, contact Steven Jessberger at steven.jessberger@dot.gov.
Purpose: FHWA hosted a special Talking Traffic Webinar to discuss the Travel Behavior Data Program. Topics included a briefing on NextGen NHTS presented by Danny Jenkins and Patrick Zhang and an exploration of O-D data visualizations presented by Vidya Mysore.

Want to Join the Pooled Fund?

Participation in the NextGen NHTS pooled fund effort is on a rolling basis. Pooled fund partners can purchase additional core survey data and O-D data in their regions or join at the technical advisory level to share in the NextGen NHTS underlying research. For more information about joining at any time, contact the FHWA National Travel Behavior Data Program Manager Danny Jenkins at daniel.jenkins@dot.gov.

NHTS DATA SPOTLIGHT:

Walk, Bicycle, and Motorcycle Travel

Changes in seasons from winter to spring bring about changes in weather—and with warmer weather comes more travelers choosing to use outdoor travel modes like walking, bicycling, and riding motorcycles. Survey data from the 2017 NHTS[1] and motorcycle crash data from the National Highway Traffic Safety Administration's Fatality Analysis Reporting System (FARS)[2] provide insight into these travelers' demographics and behaviors as well as trip characteristics. This issue's NHTS Data Spotlight reveals details about pedestrians, bicyclists, and motorcyclists.
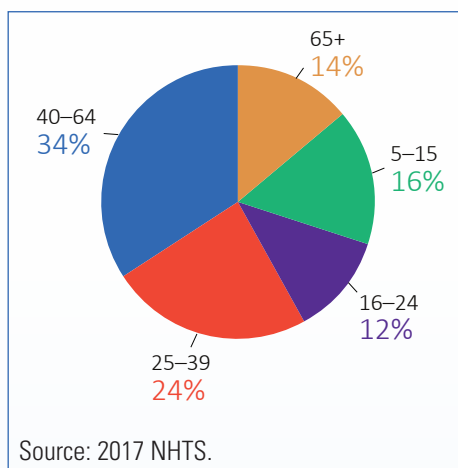
Walk and Bicycle Travel

According to the 2017 NHTS, walking and bicycling accounted for 42.5 billion trips—nearly 12% of all trips made annually in the United States. These trips averaged 1 mile in length and about 16 minutes in duration. The following explores characteristics about these travelers and the trips they took, painting a clear picture of their travel behaviors.

Traveler Demographics

On a typical day, one in six Americans (or nearly 17%) reported walking or bicycling. The majority of these walkers and bicyclists were ages 40–64 (34%), followed by ages 25–39 (24%) and were proportionally equal between males and females across all age groups. The 2017 NHTS also collected data on self-reported health statuses and levels of physical activity. Respondents who reported being in good health reported more walking and bicycling than those who reported being in poorer health, and, likewise, those who reported higher levels of physical activity also reported more walk and bicycle trips than those who reported lower levels.

Percentage of Walkers and Bicyclists by Age Group.

Source: 2017 NHTS.

Trip Characteristics

Unsurprisingly, most walkers and bicyclists tended to live in higher-density locations, such as urban and secondary cities. When looking at travel time of day, walk and bicycle trips primarily took place during daylight hours, peaking around 8 a.m., 12 p.m., 3 p.m., and 6 p.m., which was relatively comparable to both auto (peaking at 7 a.m., 12 p.m., and 5 p.m.) and transit (peaking at 7 a.m. and 5 p.m.) travel. An overwhelming majority of walk and bicycle trips (75%) took place during the weekdays (i.e., Monday through Thursday).

Trip Purpose

The 2017 NHTS trip purpose data illustrate the reasons behind non-motorized travel. During weekdays, these reasons primarily included social/recreation (37%); family/personal business, including parents taking kids to school or daycare (16%), shopping (12%); and school/church (12%). On weekends, the primary trip purposes were social/recreational (49%), shopping (19%), and visiting with friends/relatives (10%).

Percentage of Walk and Bicycle Trips by Purpose and Day of Week.

Trip Purpose	Weekday	Weekend
To/from work	9%	4%
Work-related business	2%	0%
Shopping	12%	19%
Family/personal business	16%	8%
School/church	12%	7%
Medical/dental	1%	0%
Visit with friends/relatives	6%	10%
Social/recreational	37%	49%
Other	5%	3%
Total	**100%**	**100%**

Source: 2017 NHTS.

____

[1]Federal Highway Administration. (2017). *2017 National Household Travel Survey*, U.S. Department of Transportation, Washington, DC. Available online: http://nhts.ornl.gov, last accessed April 12, 2021.
[2]National Highway Traffic Safety Administration. (2020). "Fatality Analysis Reporting System." (website) U.S. Department of Transportation, Washington, DC. Available online: https://www.nhtsa.gov/crash-data-systems/fatality-analysis-reporting-system, last accessed April 12, 2020.
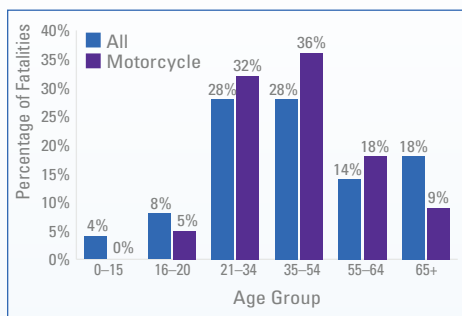
Motorcycle Travel

While motorcycles made up only 3% of all registered motor vehicles in 2016, they accounted for 14% of all traffic fatalities in the United States. With such a high fatality rate, it is important to dissect available data to understand traveler and trip characteristics in an effort to promote awareness and safety among all road users.
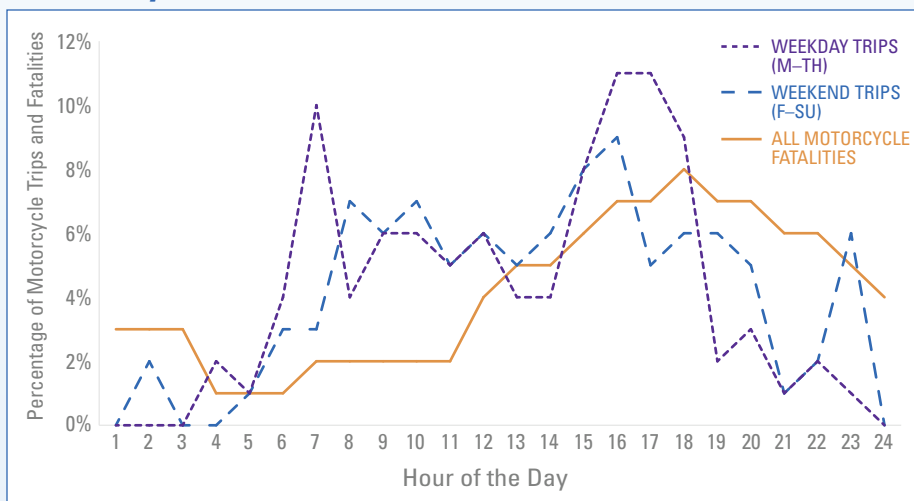
Traveler Age

When reviewing the distribution of motorcycle fatalities across all age groups, motorcycle crash fatalities were more likely to occur among riders ages 21–64 compared to those under 21 or over 65.

Percentage of Motorcycle Fatalities by Age Group.

Source: FARS.

Percentage of Motorcycle Trips and Fatalities by Day of Week and Time of Day.

Source: 2017 NHTS and FARS.

Motorcycle Fatalities by U.S. Census Division.

Trip Purpose	All Fatalities	Motorcycle Fatalities	Percentage of Motorcycle Fatalities
New England	1,193	162	14%
Middle Atlantic	3,033	444	15%
East North Central	5,099	762	15%
West North Central	2,827	390	14%
South Atlantic	9,725	1,468	15%
East South Central	3,948	463	12%
West South Central	6,241	851	14%
Mountain	3,406	544	16%
Pacific	5,474	803	15%
Total	**40,946**	**5,887**	**14%**

Source: FARS.

When reviewing the distribution of motorcycle fatalities across all age groups, motorcycle crash fatalities were more likely to occur among riders ages 21–64 compared to those under 21 or over 65.

Trip Geography

When looking at motorcycle fatalities as a proportion of all traffic fatalities per U.S. Census division, the highest proportion of fatalities occurred in the Mountain division (16%), and the lowest occurred in the East South Central division (12%). Additionally, motorcycle fatalities were more likely to occur on urban roadways (60%) than rural roadways (40%).

Trip Characteristics

Motorcycle fatalities were most likely to occur in the afternoon or evening hours, with nearly half of occurring between 2 p.m. and 9 p.m., which coincidentally was when most motorcycle trips were made.

Motorcycle travel during weekdays (i.e., Monday through Thursday) conformed to typical morning and afternoon peak hours, while on weekends (i.e., Friday through Sunday), peak motorcycle travel occurred midday into late evening hours. When comparing the time of occurrence of fatalities to typical motorcycle travel, the peaks in fatalities aligned with the peaks in afternoon weekday and evening weekend motorcycle travel.

Considering both time of day and geographic location, motorcycle fatalities on urban roadways were more likely to occur during overnight hours (8 p.m. to 5 a.m.), while fatalities on rural roadways were more likely to occur during late morning to early evening hours (11 a.m. to 6 p.m.).

Imputing Walk and Bicycle Modes in the 2020 Add-on Passenger O-D Product

The 2020 NextGen NHTS add-on passenger O-D product includes details on imputed modes of travel—— air, rail, car, bus, walk, bicycle, and other. To gain insight as to how travel by those modes will be imputed (especially the walk and bicycle trips), we asked UMD project director Dr. Lei Zhang and UMD's NextGen NHTS project team for a high-level overview of the mode detection process. Here's what they had to say:

The UMD team receives daily raw data files from multiple LBS data providers, with the 2020 data representing more than 270 million active devices from across the country. The data streams are recorded as anonymized individual records that indicate the date, time, and latitude and longitude coordinates of location sightings for each device. The first step is to preprocess the data to remove duplicate records and devices, remove less accurate location information, and filter the data so that only those devices that are observed for at least 7 days in a calendar month remain.

The UMD team then employs algorithms to first identify trip tours and then the linked and unlinked trips of the tour. The algorithms include an additional step for long-distance trips, as they typically include a more complicated interim-stop pattern. These algorithms, based on previous academic research and industry best practice, are further refined by the UMD team given the final goal of estimating a high-quality O-D matrix.

⚠️ **IMPORTANT NOTE:** This is just a high-level preliminary summary. The UMD team will continue its efforts to refine the processes and plans on releasing finalized details and imputation algorithms, including source codes, with the actual data products later this year.

Travel mode imputation algorithms are developed with four types of data: location data features, such as speed, speed distribution, acceleration, and location recording intervals; trip features, including route-based O-D distances, travel time, and trip start time; transportation network features such as road networks and bus routes/rail lines and stations; and training datasets with labeled multimodal sample data streams. Air travel modes are identified first, then ground transportation mode imputation is performed.

Walk and bicycle trips tend to show specific distance, time, and speed profiles as compared to vehicle travel. In addition, the travel path for these travel modes does not always follow road networks and often can start and end at the same location (i.e., loop trips for exercise or walking the dog). We employ additional quality control efforts to ensure the algorithms differentiate between true non-motorized travel profiles and slow-moving vehicles as well as to verify that O-D patterns make sense (e.g., very few long-distance trips are made by walking or bicycling).

The final add-on product documentation and associated algorithm source codes will include the details and specifications for those who would like to really dig into this topic. We appreciate the UMD team's brief introductory overview and look forward to hearing more on this topic as we get closer to the 2020 product release!

U.S. Department of Transportation
Federal Highway Administration

Stay Connected

To learn more about NextGen NHTS, join the pooled fund, or provide suggestions, please visit our website at http://nhts.ornl.gov or contact:

Daniel Jenkins, PE
FHWA National Travel Behavior Data Program Manager
Federal Highway Administration
daniel.jenkins@dot.gov