



FHWA NHTS REPORT

About the NHTS

Conducted periodically since 1969 by the Federal Highway Administration, the NHTS collects travel data from a sample of U.S. households. The information is used to understand trends in the Nation's trip-making and miles of travel by mode, purpose, and time-of-day for use in policy, planning, and safety.

Data are collected for household members for each day of the year, yielding a rich demographic profile linked to daily travel and vehicle characteristics.

For more information:

<http://nhts.ornl.gov>



U.S. Department of Transportation
Federal Highway Administration

TRANSIT TREND ANALYSIS

2017 National Household Travel Survey

February 2019

Introduction

Transit services play a vital role in the ability of Americans to access work, school, shopping, and other daily activities. The National Household Travel Survey (NHTS) provides insights into when, where, and how transit is used and by whom. Other national statistics on transit ridership include the National Transit Database (NTD) and the American Public Transit Association (APTA).^(1,2) The trends vary based on the data source being analyzed. In particular, the 2017 NHTS shows an increase in transit usages, while the NTD and APTA databases show a decline for the same time period. This report seeks to first explain ridership and transit usage differences across the three main sources of data on transit ridership. In the second part of this report, behavioral trends associated with transit usage as documented in the 2001, 2009, and 2017 NHTS data sets are presented.^(4,5,3) The results provide a general understanding of why and how the three main sources of transit ridership data differ as well as factors that influence transit usage among NHTS survey participants.

This report aims to (1) provide a framework for understanding differences across the NTD, APTA, and NHTS data; (2) review trends in transit usage over the past three iterations of the NHTS; and (3) summarize findings from these analyses. The following section explores differences in transit ridership reports within the framework of key NHTS design changes that influenced how transit trips were captured. Next, transit usage as reported in the NHTS is explored more in depth using gender, age, income, and geographical differences to illustrate trends. The final report section summarizes key findings and takeaways.

Differences in Transit Ridership Reporting

Public transit ridership is usually categorized into three types of transit service (referred to in this report as “transit modes”): public or commuter bus (BUS), Amtrak/commuter rail (CRL), and subway/elevated/light rail/streetcar (SUB).

According to figure 1, 2017 NTD and APTA data showed a major decrease in BUS trips while also experiencing minor increases in CRL and SUB trips compared to 2009. However, the 2017 NHTS reported higher ridership numbers for all three transit modes. The total number of SUB trips in the 2017 NHTS was more consistent with 2017 NTD and 2017 APTA SUB trip totals even though this number more than doubled when compared to 2009 NHTS data. The 2017 NHTS reported higher trip totals for CRL and BUS modes when compared with NTD and APTA.

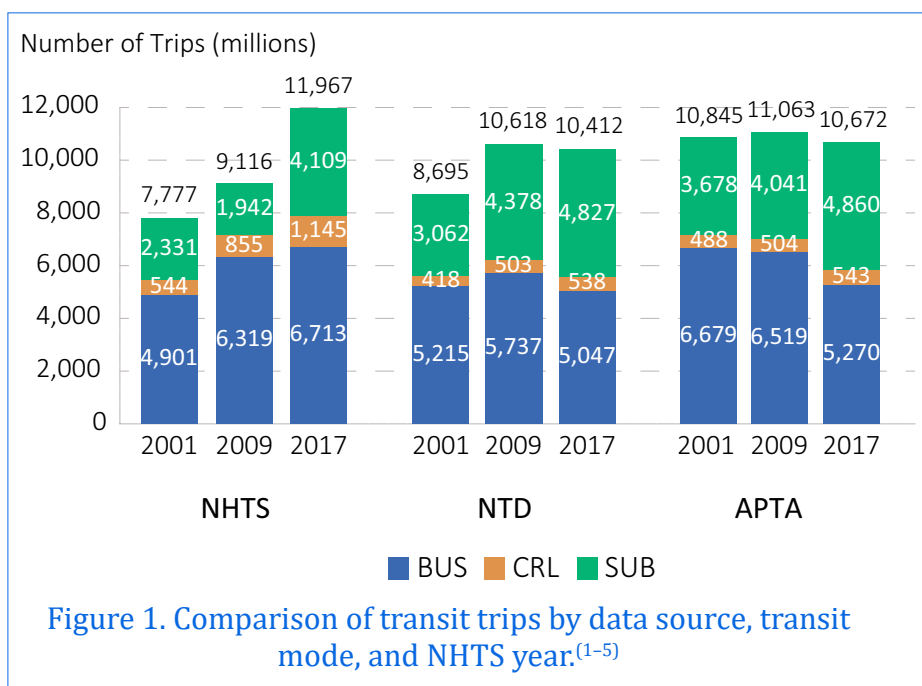


Figure 1. Comparison of transit trips by data source, transit mode, and NHTS year.⁽¹⁻⁵⁾

Since the 2017 NHTS reflected a higher ridership level as compared to the 2017 NTD and APTA data, additional analyses were conducted to understand those differences. A closer examination of the 2017 NHTS yielded the following three potential areas in which the 2017 NHTS methods may have influenced the higher reports of transit ridership as compared to NTD and APTA ridership reports:

- Increased reports of same-mode transfers;
- The inclusion of cellphone only (CPO) households in the sample; and
- A decrease in representation of rural/non-metropolitan statistical area (MSA) geographies and corresponding increase in representation of urban/MSA geographies.

The influence of each of these is briefly discussed in the following subsections, with a focus on changes within the NHTS data series and, more specifically, changes in 2017 that were most likely influencing the divergent trend as compared to NTD and APTA.

Same-Mode Transfers

Compared to the 2001 and 2009 NHTS, respondents of the 2017 NHTS reported significantly more same-mode transit transfer trips. These higher reports resulted in a sharp increase of transit trip totals (especially for CRL and SUB modes). In other words, 2017 NHTS subjects reported more SUB-SUB and CRL-CRL transfer trips than the two previous NHTS surveys.

Changes in the survey questionnaire design and data collection procedures for the 2017 NHTS are likely reasons behind these differences. More specifically, the 2017 NHTS employed a place-based approach to trip recording (i.e., asking about places visited), while prior surveys asked respondents to report about the trips they made. For transit trips in the 2017 data set, this meant recording the destination (or place) visited, filling in the travel mode (transit), and then reporting on access and egress modes as well as transfers as compared to 2009 respondents who reported “I took a transit trip.”⁽⁶⁾

Inclusion of CPO Households in the Sample

CPO households were included in 2017 NHTS for the first time ever but were not included as a variable in the weighting scheme. As a result, CPO were over-represented in the 2017 NHTS as compared to the National Health Interview Survey (NHIS) CPO household percentages, as shown in figure 2.^(3,7) Specifically, the NHTS weighted results represented 57% CPO households overall and 64% CPO transit-using households as compared to the NHIS range of 53% to 55% nationally.

The level of representation of CPO households is important because the weighted 2017 NHTS results indicate that the average transit mode share reported by CPO households was 3% as compared to a 2% mode share for landline households. Thus, the inclusion of CPO households appears to have contributed to the increase in public transit trip estimates from the 2009 to 2017 NHTS.

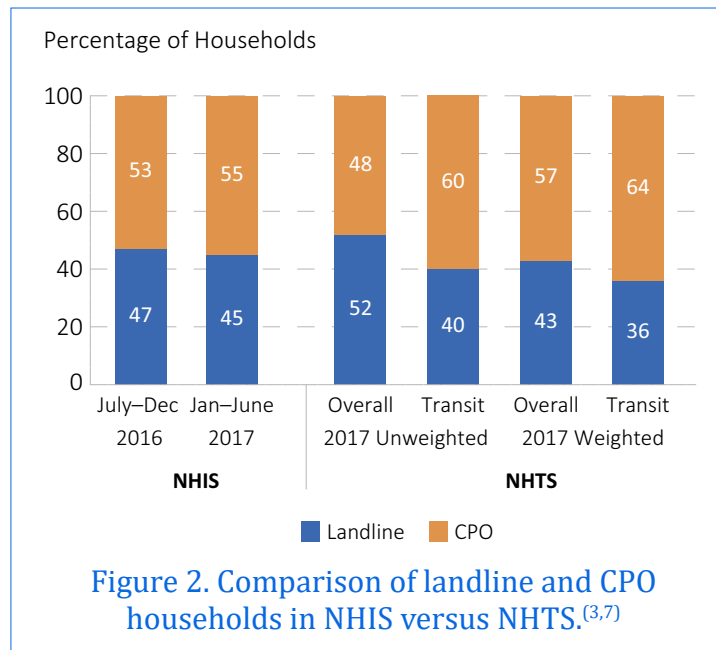


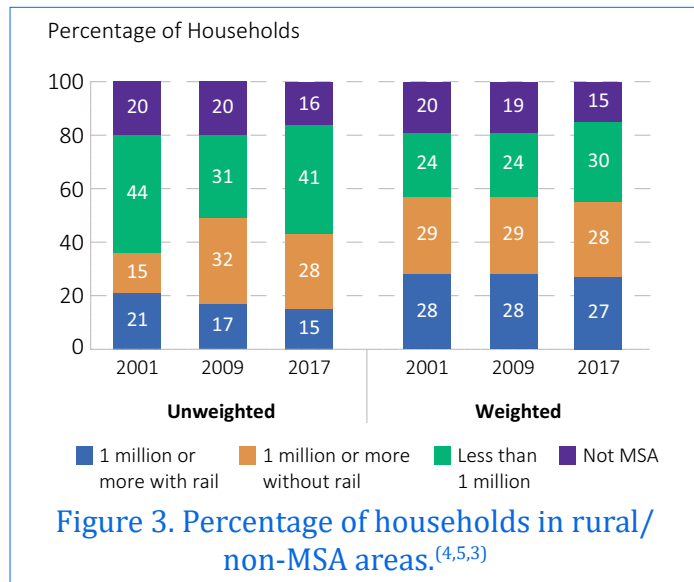
Figure 2. Comparison of landline and CPO households in NHIS versus NHTS.^(3,7)

Decreased Representation of Rural/Non-MSA Areas

From 2009 to 2017, changes in NHTS weighting methods led to increased representation of small- and medium-sized MSAs (i.e., population less than 1 million people) and reduced representation of rural/non-MSA areas. This contributed to higher transit trip totals, as

transit service was much more limited in rural/non-MSA geographies.

Figure 3 illustrates the shift in the percentage of households from unweighted to weighted representation. In particular, the influence of households in the “1 million or more with rail” category almost doubled from unweighted to weighted proportions in 2017. In addition, looking at the weighted proportions, each MSA category had similar shares of households represented in the 2001 and 2009 NHTS. However, the weighted share of households in the “Not MSA” category decreased from 19% in 2009 to 15% in 2017 in the weighted sample, while the share of households from MSAs in the “Less than 1 million” category increased from 24% to 30%. These proportional shifts in MSA categories contributed to the increasing trend in transit ridership from 2009 to 2017.



Interpretation of Reporting Differences

Changes in NHTS survey methods have led to the 2017 NHTS reporting higher ridership levels as compared to NTD and APTA sources. In prior years, the NHTS was more in line or below the ridership reports from these two other sources. This increase in 2017 NHTS transit trips appears to be linked to changes in how transit data were collected, the inclusion of CPO and their higher reported transit usage as compared to landline households, and how the weights influenced a higher representation of urban/MSA geographies.

NHTS Transit Travel by Social Demographic Groups

This section of the report focuses on the NHTS data itself and considers the demographic and geographic characteristics of transit users as reported in the 2001, 2009, and 2017 NHTS.^(4,5,3) The characteristics considered include gender and age group, income, Census region, Census division, MSA category, and MSA population size. They are each explored in further detail in the following subsections.

Gender and Age

According to table 1, the annual number of transit trips per person varied based on the age and gender of the traveler. While the 2009 NHTS (compared with 2001 NHTS) showed an increase in annual transit trips across age and gender combined, the 2017 NHTS (compared with 2009 NHTS) reported that respondents younger than 20 years old took fewer transit

Table 1. Number of annual transit trips per person by age and NHTS year.^(4,5,3)

Age	NHTS Year			Percent Difference	
	2001	2009	2017	2001-2009	2009-2017
Male					
<16	11.77	13.91	11.12	18%	-20%
16-20	36.5	34.31	32.27	-6%	-6%
21-35	35.09	34.72	45.61	-1%	31%
36-64	20.63	25.71	33.42	25%	30%
65+	10.35	18.3	23.41	77%	28%
All ages male	22.05	25.29	31.09	15%	23%
Female					
<16	11.71	12.9	7.91	10%	-39%
16-20	36.91	43.63	33.16	18%	-24%
21-35	42.25	44.91	48.47	6%	8%
36-64	24.69	29.34	35.16	19%	20%
65+	17.21	14.42	22.15	-16%	54%
All ages female	25.52	28.46	31.57	12%	11%
Combined (Male and Female)					
<16	11.74	13.41	9.53	14%	-29%
16-20	36.69	38.69	32.65	5%	-16%
21-35	38.69	39.95	47.05	3%	18%
36-64	22.72	27.52	34.28	21%	25%
65+	14.31	16.06	22.69	12%	41%
All ages combined	23.83	26.90	31.34	13%	17%

trips, while respondents who were 65 years old or older took more. This transit ridership trend is more obvious for females. Male respondents ages 21 to 64 years old reported higher transit ridership growth rates but still slightly lower total transit person trips than females.

Income

Table 2 summarizes the total number of annual transit trips by income across NHTS years.^(4,5,3) There are some significant changes in transit ridership trends across different income groups. The highest transit ridership increase observed between 2001 and 2009 was within the \$10,000-<\$25,000 and \$25,000-<\$50,000 income groups. However, these are the only income groups that reported a decline in transit use from 2009 to 2017. The

Table 2. Number of annual transit trips (in millions) by income and NHTS year.^(4,5,3)

Income	NHTS Year			Percent Difference	
	2001	2009	2017	2001-2009	2009-2017
<\$10,000	145	142	193	-2%	35%
\$10,000-<\$25,000	77	106	90	38%	-15%
\$25,000-<\$50,000	45	57	56	27%	-1%
\$50,000-<\$75,000	36	45	57	25%	26%
\$75,000-<\$100,000	48	42	63	-11%	50%
\$100,000+	68	56	87	-18%	56%
All incomes	62	67	80	8%	19%

higher income groups (\$75,000-<\$100,000 and \$100,000+) exhibited decreasing transit ridership between 2001 and 2009 but a significant increase in transit use from 2009 to 2017. The lowest income group (<\$10,000) also showed an increase in transit use between 2009 and 2017. Further research is required to understand the underlying causes of such major changes in transit travel trends by income.

Census Region^(8,9)

Recognizing that transit service availability varies greatly across the United States, table 3 shows the annual number of transit trips per person by Census region across NHTS years. The Midwest and South regions exhibited the largest increases in transit trip totals from 2001 to 2009 and 2009 to 2017. In comparison, the significant transit ridership growth in the West region from 2001 to 2009 did not keep its momentum from 2009 to 2017.

Table 3. Number of annual transit trips (in millions) by Census region and NHTS year.^(4,5,3,8,9)

Census Region	NHTS Year			Percent Difference	
	2001	2009	2017	2001-2009	2009-2017
Northeast	3,375	3,462	4,076	3%	18%
Midwest	757	1,006	1,516	33%	51%
South	1,105	1,310	1,837	19%	40%
West	1,368	1,836	2,015	34%	10%

Census Division^(8,9)

Exploring further the differences in transit usage at a more detailed geography, table 4 shows the annual number of transit trips per person by the nine Census divisions across NHTS years. These results suggest that transit ridership increased in regions where total transit ridership was formerly relatively low but decreased in regions that formerly had high transit ridership totals.

The New England, West North Central, East South Central, and Mountain divisions experienced the most transit ridership growth from 2009 to 2017. From 2001 to 2009, the largest increase was a doubling of trips in the West South Central region. From 2009 to 2017, the West North Central and East South Central regions showed the greatest increases (despite the West North Central showing the greatest decline between 2001 and 2009). From 2009 to 2017, transit use in the Middle Atlantic and Pacific divisions were stagnate. Aging infrastructure and more frequent service disruptions are often cited by transit agencies as the leading causes of decreased ridership.⁽¹⁰⁾

Table 4. Number of annual transit trips (in millions) by Census division and NHTS year.^(4,5,3,8,9)

Census Division	NHTS Year			Percent Difference	
	2001	2009	2017	2001-2009	2009-2017
New England	326	328	594	1%	81%
Middle Atlantic	3,050	3,134	3,482	3%	11%
East North Central	617	909	1,284	47%	41%
West North Central	140	98	232	-30%	137%
South Atlantic	933	907	1,278	-3%	41%
East South Central	36	57	117	57%	105%
West South Central	136	346	442	156%	28%
Mountain	193	221	375	14%	70%
Pacific	1,175	1,615	1,640	37%	2%

Table 5 shows the annual number of transit trips per person by MSA category across NHTS years. All three NHTS datasets show a consistent trend—rapid transit ridership growth in smaller MSA areas with less than 1 million people. As noted earlier, the weighted 2017 NHTS results increased the representation of the smaller MSA areas and decreased the proportion of rural/non-MSA households, which may have influenced these results. Thus, the 111% increase from 2009 to 2017 for the “Less than 1 million” category should be interpreted with caution. Transit ridership in larger MSAs without rail transit increased moderately from 2001 to 2017.

Table 5. Number of annual transit trips (in millions) by MSA category and NHTS year.^(4,5,3)

MSA Category	NHTS Year			Percent Difference	
	2001	2009	2017	2001-2009	2009-2017
1 million or more with rail	4,941	5,603	6,333	13%	13%
1 million or more without rail	1,139	1,293	1,695	14%	31%
Less than 1 million	416	624	1,315	50%	111%
Not MSA	109	95	102	-13%	7%

Table 6 shows more detailed growth rates of the number of annual transit trips by MSA population size across NHTS years. In 2009, MSAs with 500,000 to 999,999 people had the biggest gain in transit ridership, while other MSA population sizes saw mixed results. In 2017, the smaller the MSA size, the larger gains in transit ridership growth since 2009, which again could be associated with the earlier discussion of the change in weighted representation of the smaller MSA categories.

Table 6. Number of annual transit trips by MSA population size and NHTS year.^(4,5,3)

MSA Population Size	NHTS Year			Percent Difference	
	2001	2009	2017	2001-2009	2009-2017
Less than 250,000	94	108	362	15%	234%
250,000-499,999	195	150	360	-23%	141%
500,000-999,999	127	366	592	188%	62%
1,000,000-2,999,999	882	957	1,226	9%	28%
3 million or more	5,199	5,939	6,803	14%	15%
Not MSA or CMSA	109	95	102	-13%	7%

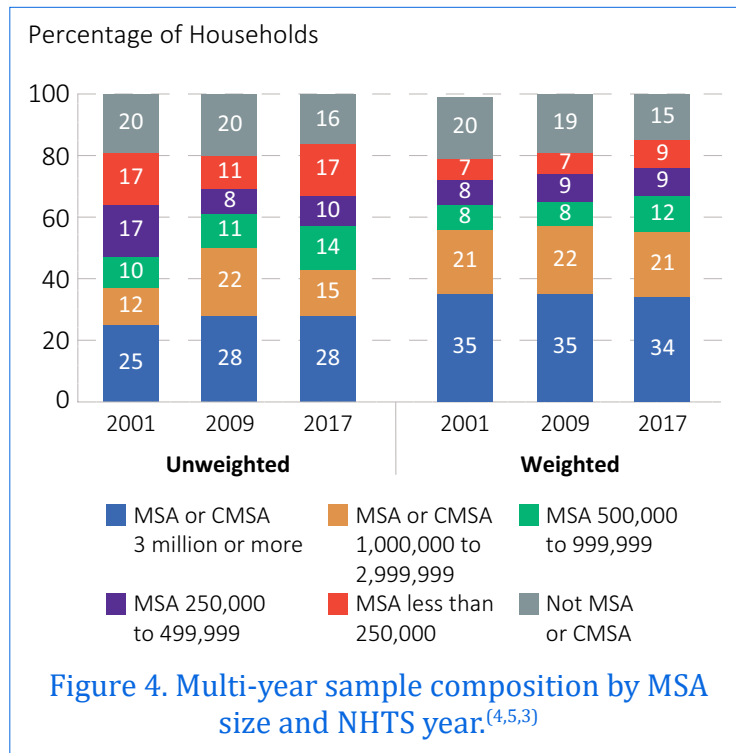
CMSA = consolidated metropolitan statistical area.

To better understand the relationship between MSA size and rail availability, the unweighted and weighted sample composition by MSA size were compared (see figure 4). The 2001 and 2009 NHTS produced similar sample distributions by MSA size after weighting the original sample. For the 2017 NHTS sample, the share of non-MSA households decreased by approximately 5 percentage points (i.e., approximately 25%). Further research is needed to determine the extent to which these trends are reflective of the weighting or actual changes in transit usage.

Summary of Report Findings

Upon reviewing the NHTS data across the past three administrations, as well as NTD and APTA ridership, the following key findings appeared to be the most significant:^(1-5,8,9)

- While NTD and APTA ridership reports showed unchanged or slightly decreasing transit rider-ship trends from 2009 to 2017, NHTS reported an increasing trend across the same time period. This analysis attributes that divergence to changes and improvements in survey methods in the 2017 NHTS.
- When NHTS transit statistics were compared to NTD and APTA reports for the same year, the proportionate rail transit mode share in the 2017 NHTS was more consistent with that from NTD and APTA. The total number of SUB trips in the 2017 NHTS was more consistent with 2017 NTD and 2017 APTA SUB trip totals even though this number more than doubled when compared to 2009 NHTS data.
- Persons younger than 20 years old became less likely to use transit between 2009 and 2017, but those older than 65 years old took more transit trips. This new transit ridership trend for the below-20 and above-65 age groups was more obvious for females.
- There was a major reversal in transit travel trend by income groups in 2017 compared to 2009. The higher income groups (i.e., >\$75,000) exhibited decreasing transit ridership between 2001 and 2009 but experienced significant increase in transit use between 2009 and 2017. Two low-medium income groups (i.e., \$10,000–<\$25,000 and \$25,000–<\$50,000) showed increased transit use between 2001 and 2009 but significant decrease between 2009 and 2017.
- There was significant variation of transit ridership growth rates across Census regions, Census divisions, MSA categories, and sizes. In general, regions with fewer existing transit trips and smaller MSA areas experienced faster transit growth rates. In contrast, larger MSAs with population sizes larger than 1 million people (especially those with rail transit) registered much more moderated growth.



References

1. Federal Transit Administration. (2017). *National Transit Database: Monthly Module Adjusted Data*, U.S. Department of Transportation, Washington, DC. Available online:

<https://www.transit.dot.gov/ntd/data-product/monthly-module-adjusted-data-release>, last accessed September 16, 2018.

2. American Public Transportation Association. (2017). *Public Transportation Ridership Report*, American Public Transportation Association, Washington, DC. Available online: <https://www.apta.com/resources/statistics/Pages/RidershipArchives.aspx>, last accessed September 16, 2018.
3. Federal Highway Administration. (2017). *2017 National Household Travel Survey*, U.S. Department of Transportation, Washington, DC. Available online: <https://nhts.ornl.gov>, last accessed September 16, 2018.
4. Federal Highway Administration. (2001). *2001 National Household Travel Survey*, U.S. Department of Transportation, Washington, DC. Available online: <https://nhts.ornl.gov>, last accessed September 16, 2018.
5. Federal Highway Administration. (2009). *2009 National Household Travel Survey*, U.S. Department of Transportation, Washington, DC. Available online: <https://nhts.ornl.gov>, last accessed September 16, 2018.
6. Task Force on Understanding New Directions for the National Household Travel Survey. (2016). *Exploring New Directions for the National Household Travel Survey: Phase Two Report of Activities*, Transportation Research Circular E-C217, Transportation Research Board, Washington, DC. Available online: <http://onlinepubs.trb.org/Onlinepubs/circulars/ec217.pdf>, last accessed October 1, 2018.
7. Blumberg, S.J. and Luke, J.V. (2017). *Wireless Substitution: Early Release of Estimates from the National Health Interview Survey, July–December 2016/January–June 2017*, National Center for Health Statistics, Hyattsville, MD. Available online: <https://www.cdc.gov/nchs/nhis/releases.htm#wireless>, last accessed September 16, 2018.
8. U.S. Census Bureau. (undated). *Geographic Terms and Concepts—Census Divisions and Census Regions*, U.S. Department of Commerce, Washington, DC. Available online: https://www.census.gov/geo/reference/gtc/gtc_census_divreg.html, last accessed October 19, 2018.
9. U.S. Census Bureau. (undated). *Census Regions and Divisions of the United States*, U.S. Department of Commerce, Washington, DC. Available online: https://www2.census.gov/geo/pdfs/maps-data/maps/reference/us_regdiv.pdf, last accessed December 3, 2018.
10. Clark, H.M. (2017). *Who Rides Public Transportation*, American Public Transportation Association, Washington, DC. Available online: <https://www.apta.com/resources/reportsandpublications/Documents/APTA-Who-Rides-Public-Transportation-2017.pdf>, last accessed September 15, 2018.

Contact Information

For more information, please visit our website at <http://nhts.ornl.gov> or contact:

Daniel Jenkins
NHTS Program Manager
Federal Highway Administration
daniel.jenkins@dot.gov