Commuting in America 2013
The National Report on Commuting Patterns and Trends

Brief 14. Bicycling and Walk Commuting

January 2015
About the AASHTO Census Transportation Planning Products Program

Established by the American Association of State Highway and Transportation Officials (AASHTO) and the U.S. Department of Transportation (U.S. DOT), the AASHTO Census Transportation Planning Products Program (CTPP) compiles census data on demographic characteristics, home and work locations, and journey-to-work travel flows to assist with a variety of state, regional, and local transportation policy and planning efforts. CTPP also supports corridor and project studies, environmental analyses, and emergency operations management.

In 1990, 2000, and again in 2006, AASHTO partnered with all of the states on pooled-fund projects to support the development of special census products and data tabulations for transportation. These census transportation data packages have proved invaluable in understanding characteristics about where people live and work, their journey-to-work commuting patterns, and the modes they use for getting to work. In 2012, the CTPP was established as an ongoing technical service program of AASHTO.

CTPP provides a number of primary services:

- **Special Data Tabulation from the U.S. Census Bureau**—CTPP oversees the specification, purchase, and delivery of this special tabulation designed by and for transportation planners.

- **Outreach and Training**—The CTPP team provides training on data and data issues in many formats, from live briefings and presentations to hands-on, full-day courses. The team has also created a number of electronic sources of training, from e-learning to recorded webinars to downloadable presentations.

- **Technical Support**—CTPP provides limited direct technical support for solving data issues; the program also maintains a robust listserv where many issues are discussed, dissected, and resolved by the CTPP community.

- **Research**—CTPP staff and board members routinely generate problem statements to solicit research on data issues; additionally, CTPP has funded its own research efforts. Total research generated or funded by the current CTPP since 2006 is in excess of $1 million.

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Commuting in America 2013: The National Report on Commuting Patterns and Trends

Brief 14. Bicycling and Walk Commuting

This brief is the 14th in a series describing commuting in America. This body of work, sponsored by American Association of State Highway and Transportation Officials (AASHTO) and carried out in conjunction with a National Cooperative Highway Research Program (NCHRP) project that provided supporting data, builds on three prior Commuting in America documents that were issued over the past three decades. Unlike the prior reports that were single volumes, this effort consists of a series of briefs, each of which addresses a critical aspect of commuting in America. These briefs, taken together, comprise a comprehensive summary of American commuting. The briefs are disseminated through the AASHTO website (traveltrends.transportation.org). Accompanying data tables and an Executive Summary complete the body of information known as Commuting in America 2013 (CIA 2013).

As noted in Brief 12, the auto boom appears to have completed its rapid growth cycle and has stabilized at very high levels, remaining the dominant mode. However, in the past decade or so, there are modest signs of auto commuting retrenchment and evidence that other travel options are showing renewed use. This brief presents data describing bicycling and walking commuting trends and relationships. It should be noted that these modes, which hover around a three percent share for commuting, are more challenging to comprehensively analyze with statistically significant data due to their modest share and the constraints of sample size in both American Community Survey (ACS) and National Household Travel Survey (NHTS) data sources. Thus, some of the geographic and social demographic richness available for private vehicle commuting, particularly for smaller geographies, is more limited in the case of bike and pedestrian commuting. Note the terms bicycling and bike and walk and pedestrian are used interchangeably in discussing these modes of commuting. One should also note that this analysis speaks to walking as a primary mode of commuting where in fact walking is virtually always an element of every commute as commuters walk to and from the other primary modes to their residence and place of employment. This brief also contains some information on motorcycle commuting.
### Bicycling and Walk Commuting—Geographic Patterns and Trends

Table 14-1 shows the trend in bicycle, walk, and motorcycle commuting over the past three decades.

**Table 14-1. Summary of Long-Term Trends in Walk, Bicycling, and Motorcycle Commuting in the U.S.**

<table>
<thead>
<tr>
<th></th>
<th>1980 (000)</th>
<th>1990 (000)</th>
<th>2000 (000)</th>
<th>2010 (000)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Total Workers</td>
<td>96,617</td>
<td>115,070</td>
<td>128,279</td>
<td>136,941</td>
</tr>
<tr>
<td>Walk Commuters</td>
<td>5,413</td>
<td>4,489</td>
<td>3,759</td>
<td>3,797</td>
</tr>
<tr>
<td>Bicycling Commuters</td>
<td>468</td>
<td>467</td>
<td>488</td>
<td>731</td>
</tr>
<tr>
<td>Motorcycle</td>
<td>419</td>
<td>237</td>
<td>142</td>
<td>267</td>
</tr>
</tbody>
</table>

*Source: Census, ACS 2010*

From 1980 to 2010, walk commuting declined continuously, with its share of commuting dropping approximately in half over the 30-year period. In the past decade, the number of walkers ticked up slightly. Bicycling’s share and the absolute number of bicyclists remain relatively steady through 2000 but showed a substantial increase by 2010. Motorcycle commuting also showed an increase between 2000 and 2010; however, its level of use and share remain well below the levels in 1980. Collectively, these modes of commuting total approximately 3.5 percent of commuting trips in 2010, with over 80 percent of that being pedestrians. This sum is well below the share of workers that work at home in 2010, 4.3 percent.

Figure 14-1 is the long-term trend in walk commute mode share. This figure reports both census/ACS and National Household Travel Survey (NHTS) measures of walking to and from work. Both data sources confirm that the historical decline appears to have ended and walk commuting levels have stabilized.
Figure 14-1. Long-Term Trend in Walk Commute Mode Share

Note: Data from NHTS 2009 are plotted for 2008 since the majority of data collection occurred in 2008.
Source: Census, ACS, NHTS series

Figure 14-2 presents bicycle and walk commuting mode share by region and gender. Commuting by bicycle and walk ranges from approximately 900,000 to 1.3 million across the regions. The regions’ total workforce (shown in parentheses on the vertical axis) provides context for the regional counts. The Northeast region, with the smallest total workforce of 25 million, has the highest number of walk commuters of any region and the lowest number of bicycle commuters of any region. The other regions are relatively similar, with the exception of the West where strong male bike commuting is evident. In general, commuting by bike is approximately 2.5 times greater for males than females.

The National Household Travel Survey (NHTS) explores what analysts call mode loyalty by comparing the actual mode of travel on the survey travel day with the reported usual mode of commuting for the prior week. Walking has a relatively high mode loyalty, 80.2 percent, indicating that persons who report walking to work usually actually walk to work 80.2 percent of the time. Bicyclists are loyal to their usual mode 73 percent of the time. As one would expect, some travelers whose usual mode is another mode also bike and walk occasionally. For example, for those who drove alone 0.5 percent walked and 0.1 percent rode a bike. Usual transit users were the most frequent occasional walkers at 6.6 percent.

Both Census/ACS and National Household Travel Survey (NHTS) measures of walking to and from work confirm that the historical decline appears to have ended and walk commuting levels have stabilized.
Figures 14-3 through 14-5 compare the changes in commuting by walk, bike, and motorcycle by state over the past 20 years.

The states are ranked by 2010 commute share. In general, walking commute share declined since 1990. Most of that decline occurred between 1990 and 2000. High walk commute shares occur in highly urbanized areas such as District of Columbia, New York, and Massachusetts, but perhaps more surprisingly, are also evident in Alaska, Vermont, and Montana.

Figure 14-4 presents the same information for bicycle commuting. Unlike walking, bike commuting is virtually always larger in 2010 than prior decades across the 50 states and the District of Columbia. The District of Columbia and Oregon are the only two locations where bicycle commuting is above 2 percent.

Figure 14-5 shows the trend across states for motorcycle commuting. Interestingly, motorcycle commuting declined from 1990 to 2000 but then rebounded to 2010. There is a strong West Coast influence in motorcycle commuting levels.
Figure 14-3. Twenty-Year Trend in Walk Share of Commuting by State

Source: Census, ACS 2010
Figure 14-4. Twenty-Year Trend in Bicycling Share of Commuting by State

Source: Census, ACS 2010
Figure 14-5. Twenty-Year Trend in Motorcycle Share of Commuting by State
Source: Census, ACS 2010
Table 14-2 shows the top 10 metropolitan areas with respect to walking mode share. Not surprisingly, university communities and small- to moderate-sized areas dominate with the exception of New York.

**Table 14-2. Metro Areas With Highest Walk Shares, 2010**

<table>
<thead>
<tr>
<th>Top Walk Commute Metro Areas in 2010</th>
<th>Mode Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>State College, PA Metro Area</td>
<td>9.24%</td>
</tr>
<tr>
<td>Iowa City, IA Metro Area</td>
<td>8.34%</td>
</tr>
<tr>
<td>Champaign-Urbana, IL Metro Area</td>
<td>7.84%</td>
</tr>
<tr>
<td>Flagstaff, AZ Metro Area</td>
<td>7.63%</td>
</tr>
<tr>
<td>Bloomington, IN Metro Area</td>
<td>7.14%</td>
</tr>
<tr>
<td>Ann Arbor, MI Metro Area</td>
<td>6.68%</td>
</tr>
<tr>
<td>Bremerton-Silverdale, WA Metro Area</td>
<td>6.57%</td>
</tr>
<tr>
<td>Burlington-South Burlington, VT Metro Area</td>
<td>6.19%</td>
</tr>
<tr>
<td>New York-Northern New Jersey-Long Island, NY-NJ-PA Metro Area</td>
<td>5.94%</td>
</tr>
<tr>
<td>Bloomington-Normal, IL Metro Area</td>
<td>5.63%</td>
</tr>
</tbody>
</table>

Source: ACS 2010

Table 14-3 shows the top 10 highest bike share metropolitan areas. These are generally smaller metropolitan areas, often with a large university in the metropolitan area and with a culture of strong bicycle use. Champaign-Urbana, Illinois and Iowa City, Iowa show up on both the walk and bike lists.

**Table 14-3. Metro Areas With Highest Bike Shares, 2010**

<table>
<thead>
<tr>
<th>Top Bike Commute Metro Areas in 2010</th>
<th>Mode Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eugene-Springfield, OR Metro Area</td>
<td>4.50%</td>
</tr>
<tr>
<td>Boulder, CO Metro Area</td>
<td>4.20%</td>
</tr>
<tr>
<td>Santa Barbara-Santa Maria-Goleta, CA Metro Area</td>
<td>4.13%</td>
</tr>
<tr>
<td>Gainesville, FL Metro Area</td>
<td>3.17%</td>
</tr>
<tr>
<td>Flagstaff, AZ Metro Area</td>
<td>3.15%</td>
</tr>
<tr>
<td>Madison, WI Metro Area</td>
<td>3.03%</td>
</tr>
<tr>
<td>Fort Collins-Loveland, CO Metro Area</td>
<td>2.77%</td>
</tr>
<tr>
<td>Chico, CA Metro Area</td>
<td>2.74%</td>
</tr>
<tr>
<td>Iowa City, IA Metro Area</td>
<td>2.71%</td>
</tr>
<tr>
<td>Champaign-Urbana, IL Metro Area</td>
<td>2.70%</td>
</tr>
</tbody>
</table>

Source: ACS 2010
Table 14-4 shows the metropolitan areas with the highest motorcycle shares. These are also generally modest-sized areas often removed from larger metropolitan areas—many in the South and West. Iowa City, Iowa is unique in being in the top 10 list for walk, bike, and motorcycle commuting.

<table>
<thead>
<tr>
<th>Top Motorcycle Commute Metro Areas in 2010</th>
<th>Mode Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logan, UT-ID Metro Area</td>
<td>1.09%</td>
</tr>
<tr>
<td>Medford, OR Metro Area</td>
<td>0.84%</td>
</tr>
<tr>
<td>Yuba City, CA Metro Area</td>
<td>0.82%</td>
</tr>
<tr>
<td>Athens-Clarke County, GA Metro Area</td>
<td>0.79%</td>
</tr>
<tr>
<td>Bloomington-Normal, IL Metro Area</td>
<td>0.74%</td>
</tr>
<tr>
<td>Grand Forks, ND-MN Metro Area</td>
<td>0.74%</td>
</tr>
<tr>
<td>Lawton, OK Metro Area</td>
<td>0.74%</td>
</tr>
<tr>
<td>Iowa City, IA Metro Area</td>
<td>0.73%</td>
</tr>
<tr>
<td>Elkhart-Goshen, IN Metro Area</td>
<td>0.67%</td>
</tr>
<tr>
<td>Honolulu, HI Metro Area</td>
<td>0.65%</td>
</tr>
</tbody>
</table>

Source: ACS 2010

Demographic Factors

The propensity to use bike, walk, and motorcycle commuting is related to a host of socio-demographic factors such as income, gender, race/ethnicity, age, country of birth, vehicle availability, and household characteristics. Several of these factors were discussed in Brief 10.

- Table 10-4, Modal Shares by Gender, shows that bike commuting has the largest difference in use by gender of any of the commuting categories with males two and a half times more likely to bike to work. Motorcycle use, aggregated with taxi and other means of commuting, also has strong gender differences with greater use by males.
- Table 10-5, Mode Shares by Age Group, documents the greater tendency for both bicycle and walk commuting use among younger workers. Those ages 16–34 have a 0.8 percent bicycle commute mode share versus 0.4 percent for ages 35–54 and 0.3 percent for ages 55 and above.

Metropolitan areas with substantial bike, walk, and motorcycle mode share are not high-density large metropolitan areas with the exception of New York, which has a relatively high walk commuting mode share.
• Table 10-6, Mode Shares and Changes by Mode for Young Workers, 2000 and 2010, indicates an increase in walk mode share for those ages 16–34, from 4.1 percent in 2000 to 4.2 percent in 2010, but when factored in against the decline in working population in that age group, net impact was a decrease of 5,000 walking commuters. During that same time period, bike commuting increased 99,000 commuters and motorcycle commuting increased 24,000 commuters for that same age group.

• Table 10-7, Mode Shares by Race and Ethnicity, indicates 2.6 percent walk commuting mode shares for White respondents, 3.2 percent for Hispanic, 4.0 percent for Asian, 2.6 percent for Black, and 3.7 percent for American Indian. Bicycling mode shares were 0.5 percent for White respondents, 0.7 percent for Hispanic, 0.5 percent for Asian, 0.2 percent for Black, and 0.3 percent for American Indian.

Figure 14-6 shows the comparison between commuting mode shares by the year of entry into the U.S. for immigrants. It is difficult to assess to what extent the shifts in mode are a product of assimilation or attributable to aging-based changes in travel behavior of the immigrant population. What is clear is that use of bike and walk decline significantly based on the year of entry into the country.

Figure 14-6. Trend in Mode Use with Time in America

Source: ACS 2010
Figure 14-7 indicates the income distribution for motorcycle, bicycle, and walk commuters. In interpreting the chart, it is important to recognize that the income categories used in the ACS data reporting are larger in higher income categories; thus, the higher number of commuters in some of the higher income categories reflects the fact that these income brackets are larger.

Figure 14-7. Motorcycle, Bike, and Walk Commuters by Household Income Category
Source: ACS 2010

Figure 14-8 presents the mode share data for motorcycle, bicycle, and walk by household income group. The downward sloping curve for walk commuting indicates a significant income effect on walk commuting. That is also the case for bicycle commuting but less so for motorcycle commuting.

Figure 14-8. Motorcycle, Bike, and Walk Commuter Mode Shares by Household Income Category
Source: ACS 2010
Auto availability is closely related to income and influences mode choice. Figure 14-9 shows motorcycle, bike, and walk commuting shares by household car availability. Not surprisingly, walk commute share is higher in households with limited auto availability. Similarly, bike commuting is more prevalent as a mode in households with vehicle shortages. Interestingly, motorcycling is modest but has a higher mode share in high vehicle ownership households. In fact, nearly 84% of motorcycle commuters come from households with high car availability, suggesting that for the most part motorcycles are discretionary vehicles added to the fleet after personal vehicles are fully available to working adults in the household.

**Figure 14-9. Motorcycle, Bike, and Walk Commuting Share by Household Car Availability**

*Source: 2009 NHTS*

*Notes: Car availability includes motorcycles. Data were not available for the two cases with 0.0% motorcycle commuting share.*

Motorcycle, bicycle, and walk travel for commuting is inevitably influenced by weather and topography to a certain extent. Unfortunately, data is not available to assess the extent to which weather influences the choice of these modes for commuting over the seasons or across geography.
Further Motorcycle, Bike, Walk Mode Detail

Motorcycle, bike, and walk modes have different characteristics than vehicle trips with respect to travel speed; hence, trip lengths and trip duration differ from those typical for vehicle trips. Motorcycle commuting is very comparable to private vehicle commuting, as might be expected. However, survey respondent data indicate that an average walk trip is approximately 1 mile, taking approximately 15 minutes. The derived walk speed of 3.7 mph is faster than the traditionally used 3 mph walk speed. This calculation is no doubt affected by the rounding that occurs when respondents tend to answer travel duration questions rounded to the nearest five minutes.

Bike travel speeds are similar to transit travel speeds, though the trip length is approximately 1/3 that of transit trips. Mode shares in this brief have been expressed in terms of percent of trips, as is normal practice. However, if one calculates mode share in terms of person miles of travel, the relative significance of bike and walk trips as a share of total commuting person miles of travel would be dramatically diminished.

Table 14-5. Average Duration, Distance, and Speed for Commuting Trips

<table>
<thead>
<tr>
<th>Mode</th>
<th>Duration (minutes)</th>
<th>Distance (miles)</th>
<th>Speed (mph)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motorcycle</td>
<td>24.6</td>
<td>12.1</td>
<td>29.5</td>
</tr>
<tr>
<td>Bike</td>
<td>20.9</td>
<td>3.8</td>
<td>10.8</td>
</tr>
<tr>
<td>Walk</td>
<td>15.6</td>
<td>1.0</td>
<td>3.7</td>
</tr>
<tr>
<td>Private Vehicle</td>
<td>22.9</td>
<td>12.1</td>
<td>28.9</td>
</tr>
<tr>
<td>Public Transit</td>
<td>53.0</td>
<td>10.2</td>
<td>11.4</td>
</tr>
</tbody>
</table>

Source: 2009 NHTS online tool, using variable TRVL_MIN, calculated for trips with both time and distance data. Private vehicle and public transit data from NHTS 2009 summary of travel trends, Table 27.

Figure 14-10 provides the trip duration distribution for walk trips. As shown, 47.4 percent of walk trips are 10 minutes or less and an additional 20 percent are 10 to 14 minutes in duration. Even for trips of less than 10 minutes, walking only constitutes 1.4 percent of commuting trips.

Short commute trip distances for walk and bike modes result in these mode shares being far smaller if expressed in terms of person miles of travel.
Figure 14-10. Trip Duration Distribution, Walk Trips
Source: 2012 ACS

Figure 14-11 provides a longer-term trend for non-private vehicle commuting. This figure provides perspective between transit commuters and motorcycle, bicycle, and walk commuting modes.

Figure 14-11. Multi-Decade Commuting Trend for Non-Private Vehicle Modes
Source: Census, ACS 2010
The use of bike and walk for commuting and other trip purposes is continuing to receive substantial attention from transportation planners as well as others who champion these modes for their environmental and health benefits. Additional resources on these modes include:


More modest levels of use of these modes often result in traditional data collection methodologies not having sufficiently large samples to capture rich descriptive data. Towards that end, mobile applications and crowd sourcing data-collection strategies are being implemented to advance the level of information on bike and walk modes.

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**Perspective on Walking Mode Share**

ACS indicates approximately 90% of walk trips are less than the mean commute time of approximately 25 minutes in 2012. This suggesting a willingness to walk up to approximately 1.5 miles at the nominal walk speed of 3 mph. Approximately 13 percent of all commute trips are less than 1.5 miles based on the NHTS commute trip length distribution. Thus, there are approximately 17 million commuters with destinations within 1.5 miles. Given nearly 4 million usual walk commuters, walking has an approximate 20–25 percent share for trips less than 1.5 miles. The walk mode share is estimated to be nearly 50 percent for trips under one-half mile.
Summary

Motorcycle, bike, and walk are among the minor commute modes. Of these, walk is by far the most significant. Bicycle and walk commuting have received significant attention in the recent past due to their classification as active modes of commuting that may provide health benefits to the commuter, are not dependent on fossil fuels, and do not create emissions. As noted, bicycle commuting is gaining commuters and walking has stabilized from prior decades of decline. These changes are far from robust at the national level and, because of their small shares, recent changes do not meaningfully impact other modes of commuting. Motorcycle commuting remains modest, with a tiny share. It is important to recognize the role that immigrant populations play in both walk and bike modes. Of particular note is a strong role among Hispanics in both walking and bicycling with the highest bicycling shares of any racial or ethnic groups.

Both bike and walk commuting modes have their appeal impacted by context conditions including weather and the physical environment and infrastructure in place to accommodate these modes. Unfortunately, data regarding the attractiveness of the environments for commuting by these modes is not available in aggregate data sets. In addition to built environment characteristics and weather, a review of the list of metropolitan areas with high shares of walk and bike commuting suggests that perhaps cultural effects in combination with some social demographic characteristics appear to be significant considerations as well. Modest-size communities with strong university presence appear to be significant factors in influencing bike and walk commute shares. Geographic variation in the use of these modes is significant across metropolitan areas. It is not uncommon to see the bike and walk shares in some metropolitan areas being several times greater than in other areas.

Bike and walk modes are active modes whose use is being encouraged due to their health benefits and lack of fossil fuel consumption or emissions. Current use levels remain modest nationally; however, use levels in select urban environments can be several times the national average.
Commuting in America 2013 Briefs Series

The CIA 2013 series will include the briefs listed below as well as a CIA 2013 Executive Summary and supporting data files, all available at the CIA 2013 website traveltrends.transportation.org. The website also includes a glossary of terms, documentation of data sources, and additional resources. The series of briefs included in CIA 2013 are:

1. **Overview**—establishes institutional context, objectives, importance, data sources, and products to be produced.

2. **The Role of Commuting in Overall Travel**—presents national trend data on the relative role of commuting in overall person travel; explores commuting as a share of trips, miles of travel, and travel time at the national level.

3. **Population and Worker Trends**—provides very basic and key national demographic data.

4. **Population and Worker Dynamics**—focuses on the dynamics of the population and workforce, including data on migration, immigration, and differential rates of growth.

5. **The Nature and Pattern of Jobs**—defines employment and describes it in terms of its temporal, geographic, and other features.

6. **Job Dynamics**—looks at trends as they relate to jobs, including work at home, full-time versus part-time, job mobility, and changes in the nature and distribution of job types.

7. **Vehicle and Transit Availability**—reports on vehicle ownership and licensure levels and the availability of transit services. It also references factors influencing the availability of bike, walk, and carpool commute options.

8. **Consumer Spending on Transportation**—reports on various trends related to household spending on transportation.

9. **How Commuting Influences Travel**—explores how commuting travel influences overall travel trends temporally and geographically.

10. **Commuting Mode Choice**—provides a summary of mode choice for commuting (including work at home).

11. **Commuting Departure Time and Trip Time**—reports descriptive information on travel time and time left home, including national and selected additional data for metro area sizes.

12. **Auto Commuting**—addresses trends in privately-owned vehicle (POV) and shared-ride commuting.

13. **Transit Commuting**—addresses transit commuting.

14. **Bicycling and Walking Commuting**—addresses bicycling and walking as commuting modes.

15. **Commuting Flow Patterns**—addresses commuting flow patterns for metro area geographic classifications.

16. **The Evolving Role of Commuting**—synthesizes and interprets materials developed in the prior briefs to paint a picture of the current role of commuting in overall travel and evolving trends to watch going forward.

**ES. CIA 2013 Executive Summary**