Active Transportation Surveillance — United States, 1999–2012

MMWR in Brief summarizes key points from Active Transportation Surveillance — United States, 1999–2012. MMWR 2015; Vol 64 (No. SS-7). Available at http://www.cdc.gov/mmwr/pdf/ss/ss6407.pdf. Certain text might not have appeared in the original publication.

New information

This is the first report to compare the prevalence of six distinct active transportation (AT) measurements from five national surveillance systems across multiple years (1999–2012).

Analysis

Assessments of AT were grouped by type: commute modes to work, single-day behavior or trips, and recent (past month or week) AT behaviors. The prevalence of AT calculated from each system was presented by year and stratified by sex, age, race/ethnicity, educational attainment, and, when possible, urbanicity and/or population density. For measurements that provide estimates of minutes per week of AT, the proportion meeting the aerobic component of the 2008 Physical Activity Guidelines (1) through AT alone is presented.

Summary findings

Results varied widely across assessment types. The prevalence of primarily walking or bicycling to work in the past week ranged from 2.6% to 3.4%; the prevalence of any AT assessed by single-day measures ranged from 10.5% to 18.5%; and the prevalence of any recent, habitual AT ranged from 23.9% to 31.4%. Regardless of assessment type, AT was usually more common among men, younger respondents, minority racial/ethnic groups, and those at either end of the education spectrum (i.e., less than high school and college graduate). AT also tended to be more prevalent in densely populated urban areas. No trends over time were evident.

Data source and methods

The American Community Survey (ACS) and the National Household Travel Survey (NHTS) both assess the primary mode of transportation to work in the past week. From these systems, the proportion of respondents who reported walking or bicycling to work was calculated. NHTS and the American Time Use Survey (ATUS) include 1-day assessments of trips or activities, from which the proportion of respondents who reported any walking or bicycling for transportation was calculated. The National Health and Nutrition Examination Survey (NHANES) and the National Health Interview Survey (NHIS) both assess recent (i.e., in the past week or past month) habitual physical activity behaviors performed for transportation. From these systems, the proportion of respondents who reported any recent habitual AT was calculated. All publicly available data for the period 1999-2012 were analyzed according to each system's analytic guidelines (Table).

Main results

The prevalence of AT varied by a factor of 10 across all assessment types, with the lowest prevalence found for primary past-week commute mode to work and the highest prevalence found in assessments of recent, habitual AT. Results from similar types of assessments (i.e. commute mode to work, single day, or recent habitual AT) were comparable. The prevalence of AT as the primary past-week commute mode to work ranged from a low of 2.6% in the 2001 NHTS to highs of 3.4% in several years of ACS. The prevalence of any AT from a single-day assessment ranged from a low of 10.5% in the 2012 ATUS to 18.5% in the 2009 NHTS. The prevalence of any habitual AT ranged from 23.9% in the 2001–2002 NHANES to 31.4% in the 2011–2012 NHANES (Figure)

Although no trends over time were detected, certain patterns emerged in analyses stratified by covariates hypothesized to be related to AT. Across systems, men often reported more AT than women, younger respondents tended to report more AT than older respondents, and non-Hispanic whites tended to report less AT than other racial/ethnic groups. Among education groups, the highest prevalence of AT was usually in the least or most educated groups. Also, AT was more prevalent in densely populated urban areas versus sparsely-populated rural or suburban areas.

Corresponding author: Geoffrey P Whitfield, PhD, Division of Emergency and Environmental Health Services, National Center for Environmental Health, CDC. Telephone: 770.488.3976. E-mail: xdh5@cdc.gov.

AT is only one of several types of activity that could be used to meet the aerobic component of the 2008 Physical Activity Guidelines for Americans (*1*). Only two systems collect the data needed to determine which respondents perform sufficient AT to meet the guideline. Based on estimates from NHANES and NHIS, this prevalence ranges from 4.7% (NHIS 2010) to 18.0% (NHANES 2011–2012), and interpretation of findings is complicated by an assessment change in NHANES in 2007.

Limitations

The findings in this report are subject to at least three limitations. First, all are self-reported measures and subject to recall and social desirability biases. Second, survey questions and methods are subject to changes from year to year, limiting comparability across time. Finally, inclusion and exclusion of questions about AT measures in periodic surveys vary. The comparability of results over time is contingent on repeated cycles of data collection, analysis, and dissemination.

Public Health Implications.

The range of AT prevalence estimates is attributable to the different way each surveillance system assesses AT. There is no single best assessment type; each has limitations and strengths and might be useful in different situations. For example, assessments of past-week mode of travel to work likely underestimate total AT by not including AT to work that is performed infrequently or AT for nonwork travel. As a result, these estimates likely have low sensitivity for identifying persons who participate in any AT, but high specificity by discouraging those who truly participate in no AT from selecting active modes in their response. Such results might provide an estimate of regular, committed AT participants, which could inform infrastructure decisions regarding active commuters.

Single-day assessments also have limitations and strengths. First, because only 1 day is assessed per person, calculating weekly statistics of activity volume is impossible, limiting the ability to assess compliance with activity guidelines. Conversely, 1-day assessments are amenable to recall aids like logs (as in NHTS) or guided interviewing (as in ATUS), which might improve validity and provide information on destination or purpose. Such details about places that attract AT trips could be important to urban and transportation planners.

Assessments of typical AT behaviors (NHANES and NHIS) also have unique limiting factors and strengths. These assessments can be cognitively challenging for respondents when asked to recall frequency and duration of a routine behavior over multiple days and limit responses only to instances where the activity was performed for transportation purposes (*2*). However, using a recall period longer than a single day might increase the likelihood that infrequent AT is captured, which could yield higher sensitivity than other assessments. Further, the additional frequency and duration data allow estimation of activity volume attributable to AT and classification relative to physical activity guidelines.

Continued monitoring of AT can help identify any national changes in AT prevalence. Such changes might reflect demographic shifts such as increased urban living (*3*) or AT initiatives including Safe Routes to Schools (*4*) or Complete Streets (*5*). At the local level, AT surveillance data might be used to evaluate new AT programs or infrastructure and thereby identify best practices for others to implement. Data that characterize who is performing AT in various contexts and locations might also help local officials plan AT infrastructure projects (e.g. sidewalks, pedestrian signals, and bicycle lanes) to meet the population needs. However, of the existing national systems, only ACS provides estimates at geographic scales smaller than metropolitan areas. To obtain local data, states or municipalities might need to supplement national surveillance with additional data collection efforts. Similarly, novel sources of AT data, such as user-generated data from mobile applications, might supplement the established surveillance techniques (*6,7*).

References

1. US Department of Health and Human Services. Physical activity guidelines for Americans. Washington, DC: US Department of Health and Human Services; 2008. Available at http://www.health.gov/PAGuidelines/guidelines/.
2. Pettee Gabriel KK, Morrow JR Jr, Woolsey AL. Framework for physical activity as a complex and multidimensional behavior. J Phys Act Health 2012;9(Suppl 1):S11–8.
3. US Census Bureau. Growth in urban population outpaces rest of nation. Release CB12-50. Washington, DC: US Census Bureau; 2012. Available at http://www.census.gov/2010census/news/releases/operations/cb12-50.html.
4. Safe Routes to School National Partnership. Safe Routes to School: Helping Communities Save Lives and Dollars. 2012. Available at http://saferoutespartnership.org/sites/default/files/pdf/SRTS-policy-report-fact-sheet.pdf.
5. Smart Growth America. National Complete Streets Coalition. 2015. Available at http://www.smartgrowthamerica.org/complete-streets.
6. Albergotti R. Strava, Popular With Cyclists and Runners, Wants to Sell Its Data to Urban Planners. The Wall Street Journal Blog. Ney York, NY; 2014. Available at: http://blogs.wsj.com/digits/2014/05/07/strava-popular-with-cyclists-and-runners-wants-to-sell-its-data-to-urban-planners/
7. US Centers for Disease Control and Prevention. Mobile Applications, Health, and Built Environment: Considerations for developers. Washington, DC: US Department of Health and Human Services; 2014. Available at: http://www.cdc.gov/healthyplaces/mobile.htm.

TABLE. Sampling methods, data collected, and descriptions of surveillance systems that include active transportation assessments — United States, 1999–2012

Data source and website	Sampling method and analytic notes	Data collection	Year	Active transportation assessment questions and calculation
American Community Survey (ACS) http://census.gov/acs/www	ACS uses an address-based, stratified, multistage random sample of households and, starting in 2006, group quarters (>10 inhabitants). ACS includes all eligible household members and a subsample of group quarters. Sample size ranged from 1.9 to 2.5 million persons per year. Commuting assessed in employed respondents aged ≥16 years. Interview response rate is >97.3% in all years. Data missing and imputed for ≤5.9% of eligible respondents each year. Variance estimates were calculated using jackknife replication, using census-supplied weights.	Three-stage follow-up during data collection: mailed questionnaires, computer-assisted telephone interview, and computer-assisted in-person interview (in that order); mandatory participation	2006–2012	"How did this person usually get to work *last week*?" "If this person usually used more than one method of transportation during the trip, mark (X) in the box of the one used for most of the distance." The proportion reporting bicycle or walked was calculated.
National Household Travel Survey (NHTS) http://nhts.ornl.gov	NHTS uses list-assisted, stratified, random-digit dialing of households with landline telephones. Analyses are restricted to respondents aged ≥16 years Trip log: n = 109,714 (2001), n = 229,594 (2009); transportation to work: n = 83,817 (2001), n = 139,068 (2009). Individual response rates range from 36.2% (2001) to 19.8% (2009). Trip data was missing for 11.9% (2001) and 15.2% (2009). Variance estimates were calculated using jackknife replication, using NHTS-supplied weights.	Telephone recruitment, paper trip log, telephone data retrieval interview	2001 and 2009	Participants logged all trips on 1 day, including mode of travel and purpose. Any trip with a mode of bicycle or walk and any purpose other than "go to gym/exercise/play sports" was considered an active transportation trip. The proportion reporting any active transportation was calculated. "How did you usually get to work last week? (the one [mode] used for most of the distance)" The proportion reporting bicycle or walked was calculated.
American Time Use Survey (ATUS) http://bls.gov/tus	ATUS uses a stratified random sample of persons aged ≥15 years from households having completed Current Population Survey interviews. Sample size ranged from 12,248 (2007) to 20,720 (2003). Response rate ranged from 52.5% to 57.8%. Variance was estimated by balanced repeated replication, using weights provided by the U.S. Bureau of Labor Statistics.	Computer-assisted telephone conversational interview, recalling activities from 4 a.m. the previous day to 4 a.m. the day of the interview	2003–2012	For a given time on the day of recall, participants could report a primary activity of travel (code 18). If the location was walking or bicycling, the travel was considered active transportation. The proportion reporting any active transportation was calculated.
National Health and Nutrition Examination Survey (NHANES) http://cdc.gov/nchs/nhanes.htm	NHANES uses a stratified multistage probability sample of U.S. residents aged ≥12 years. Number (aged ≥16 years) ranged from 6,035 to 6,888, weighted to represent 207–235 million U.S. residents per 2-year cycle. Adult response rate ranged from 78% to 84%. Data were missing for ≤0.2% of eligible respondents in each 2-year cycle. Variance estimates were calculated using Taylor series linearization.	In-home interview	1999–2006	"Over the past 30 days, have you walked or bicycled as part of getting to and from work, or school, or to do errands?" "How often did you do this [times per day/week/month]?" "On those days when you walked or bicycled, about how long did you spend altogether doing this [in minutes]?" The proportion reporting any transportation walking or bicycling was computed, as was the time spent in participation (in minutes per week).
		Computer-assisted in-home interview	2007–2012	"Do you walk or use a bicycle for at least 10 minutes continuously to get to and from places?" "In a typical week, on how many days do you walk or bicycle for at least 10 minutes continuously to get to and from places?" "How much time do you spend walking or bicycling for travel on a typical day [in minutes]?" The proportion reporting any transportation walking or bicycling was computed, as was the time spent in participation (in minutes per week).

TABLE. (*Continued*) **Sampling methods, data collected, and descriptions of surveillance systems that include active transportation assessments — United States, 1999–2012**

Data source and website	Sampling method and analytic notes	Data collection	Year	Active transportation assessment questions and calculation
National Health Interview Survey (NHIS) http://cdc.gov/nchs/nhis.htm	NHIS uses multistage area probability sampling, representative of households and noninstitutional group quarters. Individual respondents were weighted to represent the U.S. general population. Cancer control module was answered by one adult (aged ≥18 years) per household. Final adult response rate ranged from 69.0% (2005) to 60.8% (2010). Data was complete for 94.5% (2005, n = 29,689) and 93.7% (2010, n = 25,438). Variance estimates were calculated using Taylor series linearization.	Personal household interview	2005	"First I will ask about walking for transportation that is, walking to get some place. Please include all walks that involved an errand or to get some place. During the past 7 days, did you walk to get to some place that took you at least 10 minutes?" "During the past 7 days, on how many days did you walk for at least 10 minutes at a time to get some place such as work, school, a store, or restaurant?" "How much time did you usually spend on one of those days walking to get from place to place?" The proportion reporting any transportation walking was computed, as was the time spent in participation (in minutes per week).
			2010	"The next questions are about walking for transportation: During the past 7 days, did you walk to get some place that took you at least 10 minutes? In the past 7 days, how many times did you do that? On average, how long did those walks take?" The proportion reporting any transportation walking was computed, as was the time spent in participation (in minutes per week).

FIGURE. Prevalence of active transportation (walking or bicycling) — five surveillance systems, United States, 1999–2012
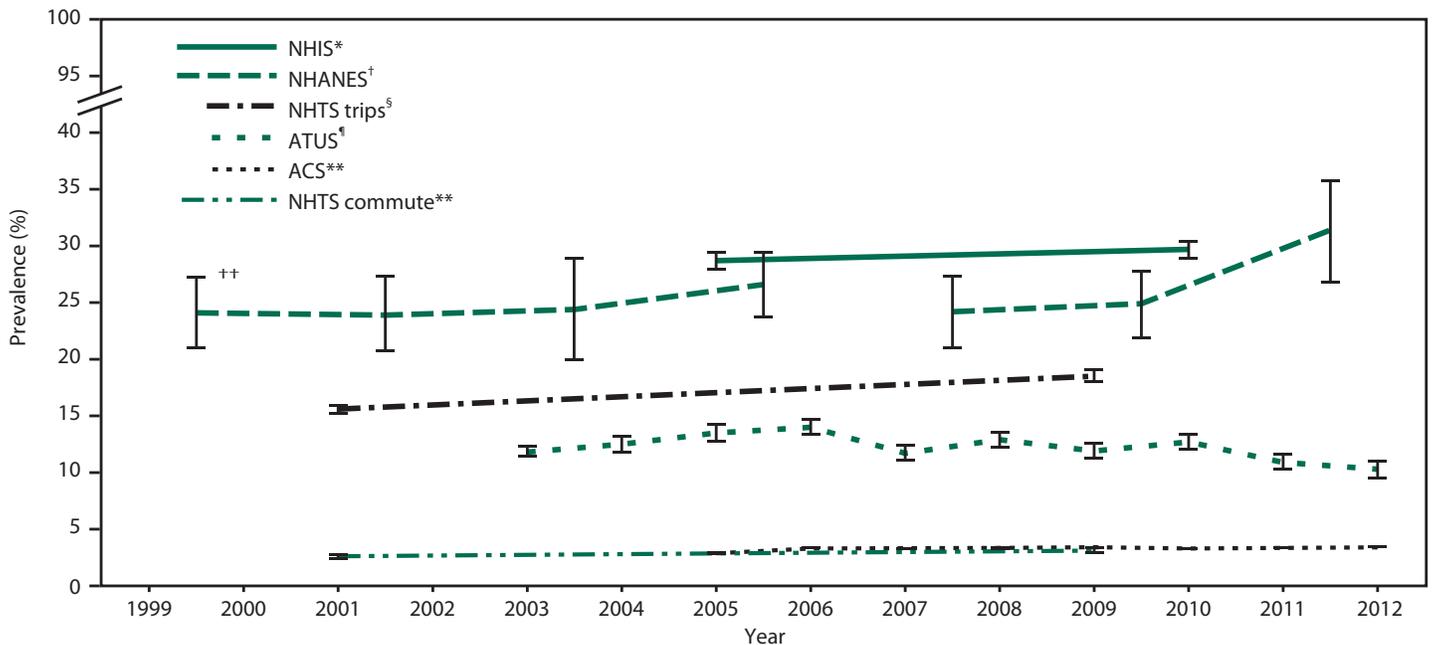
Abbreviations: ACS = American Community Survey; ATUS = American Time Use Survey; NHANES = National Health and Nutrition Examination Survey; NHIS = National Health Interview Survey; NHTS = National Household Travel Survey.
* NHIS: any walking for transportation in the past week.
[†] NHANES 1999–2006: any walking or bicycling for transportation in the past month; 2007–2012: any recent walking or bicycling for transportation.
[§] NHTS trips: any trips with a mode of walking or bicycling on a given day.
[¶] ATUS: any activity reported as transportation while walking or bicycling on a given day.
** ACS and NHTS commute: walking or bicycling reported as primary commute mode to work in the past week.
[††] 95% confidence interval.

Readers who have difficulty accessing this PDF file may access the HTML file at http://www.cdc.gov/mmwr/preview/mmwrhtml/ss6407_brief. Address all inquiries about the *MMWR* Series, including material to be considered for publication, to Editor, *MMWR* Series, Mailstop E-90, CDC, 1600 Clifton Rd., N.E., Atlanta, GA 30329-4027 or to mmwrq@cdc.gov.