

Walking Associated With Public Transit: Moving Toward Increased Physical Activity in the United States

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The health benefits of physical activity have been well documented;¹⁻⁴ still, only 64.5% of Americans are physically active, and 25.4% do not participate in leisure time physical activity at all.⁵ Inadequate physical activity contributes to numerous health problems, causing an estimated 200 000 annual deaths in the United States and significantly increasing medical costs.⁶ In contrast, average annual medical expenditures are 32% lower among physically able adults who get regular exercise than the expenditures of those who lead a sedentary lifestyle.⁷

The US Department of Health and Human Services created guidelines to describe the amount and type of physical activity most likely to provide health benefits. The 2008 *Physical Activity Guidelines for Americans* recommended that adults get at least 150 minutes of aerobic physical activity per week.⁸ The guidelines also recommended that physical activity be moderate in intensity, such as brisk walking, and last at least 10 consecutive minutes. Morabia and Costanza⁹ demonstrated the health value of brisk walking for as little as 15 minutes per day or slow walking 30 minutes per day in preventing weight gain on the basis of caloric expenditures. Because most public transit trips begin or end with walking,¹⁰⁻¹³ public transit use can be an important opportunity to add physical activity into one's day. Additional research has shown that walking to or from public transit, "transit walking," may help people meet physical activity recommendations.^{10,14-17}

The community environment can affect whether and how community members engage in physical activity.¹⁸ The way communities are built has an impact on the viability of public transit and the safety of its users and influences whether healthy choices, such as walking, are easy or difficult.^{17,19,20} Socioeconomic factors, such as household income levels²¹ and employment status,²² also strongly influence the viability of public transit for community members.

Objectives. We assessed changes in transit-associated walking in the United States from 2001 to 2009 and documented their importance to public health.

Methods. We examined transit walk times using the National Household Travel Survey, a telephone survey administered by the US Department of Transportation to examine travel behavior in the United States.

Results. People are more likely to transit walk if they are from lower income households, are non-White, and live in large urban areas with access to rail systems. Transit walkers in large urban areas with a rail system were 72% more likely to transit walk 30 minutes or more per day than were those without a rail system. From 2001 to 2009, the estimated number of transit walkers rose from 7.5 million to 9.6 million (a 28% increase); those whose transit-associated walking time was 30 minutes or more increased from approximately 2.6 million to 3.4 million (a 31% increase).

Conclusions. Transit walking contributes to meeting physical activity recommendations. Study results may contribute to transportation-related health impact assessment studies evaluating the impact of proposed transit systems on physical activity, potentially influencing transportation planning decisions. (*Am J Public Health.* 2013;103:536-542. doi:10.2105/AJPH.2012.300912)

Whatever the forces driving people to use public transit, a growing body of evidence has suggested that its use benefits community public health and directly benefits the personal health of transit users. Previous research has found links between the use of public transit and physical activity,¹⁰ lower body mass index (defined as weight in kilograms divided by the square of height in meters),^{12,23,24} and travel safety.²⁵

The Centers for Disease Control and Prevention and the National Center for Environmental Health have formally recognized the health impact of transportation systems. Consequently, they developed transportation recommendations that promote travel choices to improve health, such as those that include opportunities for physical activity.²⁶ Current demographic and economic trends (i.e., aging population, rising fuel prices, increasing health and environmental concerns, rising medical care costs) are increasing the value of public transportation-related health benefits²⁷; however, little is known about how these current trends influence physical activity. Examining the

influence of current demographic and economic trends on transportation patterns is vital for informing community design and transportation decisions.

The purposes of this study were to estimate the daily level of physical activity attained by Americans solely through transit walking, to describe the demographic and socioeconomic characteristics of transit walkers, to determine transit-walker and environmental factors that influence transit walking, to help predict those who will achieve 30 minutes or more of physical activity solely by walking to or from public transit, and to assess changes in transit walking over time.

METHODS

The US Department of Transportation administers the National Household Travel Survey (NHTS) every 6 to 8 years to gather information about the way Americans travel.²⁷ For this study, we used 2001 and 2009 NHTS data. During phone interviews, respondents provided demographic information and then

agreed to complete a travel diary, from which data were collected in a subsequent phone interview. In the travel diary, respondents provided detailed information about all trips taken on an assigned day and the characteristics of those trips. The NHTS uses list-assisted random-digit dialing to ensure an equal probability of sampling among households with land-line telephones. The sampling frame included all telephone numbers in 100 banks of numbers (same first 8 digits) that had at least 1 residential number listed. New sampling frames were constructed periodically to ensure inclusion of new area codes and phone numbers. A systematic sample was selected for use after sorting by a number of geographic variables until a new sample was drawn approximately every 3 months.

Households that could be associated with an address were first contacted with an introductory letter and cash incentive. Approximately 1 week after the mailing, interviewers contacted households by phone for a “recruitment interview,” in which interviewers obtained household-level demographics and requested the completion of a travel diary. Households were assigned a 24-hour travel day in which members were asked to record travel-related information such as trip times, purposes, and modes. Within days of the travel day, households were again contacted by phone and asked information about all trips, including trips to school or work, to attend social events, to visit friends or family, to transport someone, to visit the doctor or dentist, and to and from public transportation.²⁷

We included households in its final data set if 50% or more of the household adults completed an extended interview (“usable” household). For the full sample data set (including NHTS’s 9 add-on areas in 2001 and 20 add-on areas in 2009), 38.9% of households in 2001 ($n = 69\,817$) and 19.8% of households in 2009 ($n = 150\,147$) were considered usable. In these households, 160 758 (2001) and 308 901 (2009) individuals completed an extended interview, which resulted in data for 105 942 (2001) and 267 417 (2009) adults and 54 816 (2001) and 41 484 (2009) children. We used the full NHTS data set for our study, which included replicate weights used to ensure generalizability, reduce non-response and selection bias, and adjust for

multiple household telephone lines and travel differences by season and day of week.

Using the most recent NHTS sample (2009), we calculated the weighted proportion of the total population and of transit walkers among the total population on the basis of certain demographic characteristics (age, income, education, race, gender, urban size, and car ownership). We defined a transit walker as a person who traveled to or from public transit by walking. A walk segment is a segment between a place, such as home or work, and a transit entry or exit point from which a person walked. Daily transit walk time is the total daily walking time to and from transit, calculated by adding walk segment times. Using 2009 data, we calculated the weighted mean and the median for total walking time to or from transit and then stratified them by household income, age, education, race/ethnicity, gender, urban size, household car ownership, and employment status at both the person and the trip level. We compared 2009 weighted median walk time and weighted proportion of transit walking 30 minutes or more per day with 2001 NHTS data and assessed differences between the 2 years using the *t* test. We assessed the influence of each independent variable on walk time of 30 minutes or more per day in 2009 with the Crosstab (SUDAAN; Research Triangle Institute, Research Triangle Park, NC) procedure using the χ^2 test. We performed multivariate analysis using the Rlogist (SUDAAN) procedure to find the influence of each independent variable in the presence of others and determine the predictors for attaining walk time of 30 minutes or more per day. As recommended by NHTS,²⁷ we used jackknife replicate weights in SAS-Callable SUDAAN^{28,29} to perform all analyses.

RESULTS

In 2009, the transit-walker population differed from the general population in several demographic and socioeconomic categories. Transit walkers’ median household income was \$25 000 per year, compared with the general population’s median income of \$45 800 per year. The largest proportion of transit walkers were from low-income households (<\$35 000/year; 50.8% vs 31.7% of the general population),

were non-White (54.8% vs 26.4%), and lived in a city with a rail system and a population of 1 million or more people (64.6% vs 21.6%). Approximately 42.0% of transit walkers lived in households that did not own a vehicle; only 6.0% of the general population lived in households without a vehicle. The median age of transit walkers was 39.8 years, similar to the median age of the general population, 39.4 years. Transit walkers were also similar to the general population in that comparable proportions had no more than a high school education (41.9% vs 38.9%), were female (52.9% vs 50.8), and were employed (67.9% vs 63.6%; Table 1). Transit-walkers’ trips were primarily for commuting to work (43.7%), shopping or errands (15.2%), social or recreational activities (13.4%), and school, daycare, or religious activities (5.5%). The proportion of trips for commuting to work increased from 2001 to 2009 for those aged 30 to 39 years (50.3%), with undergraduate degrees (56.2%), and from households making more than \$100 000 per year (58.2%).

Total daily walking time ranged from less than 1 to 120 minutes, with 35.3% walking 30 minutes or more to and from public transit. With walk times broken down into increments of 5 minutes, the largest proportion of transit users walked a total of 10 to 14 minutes (15.2%), followed by 15 to 19 minutes (13.5%), and 20 to 24 minutes (11.4%; Figure 1).

The distribution of walk time was highly right skewed (Figure 1); therefore, the median was the appropriate measure of its central tendency and was used for all comparisons. Transit walkers with the highest median walk times were as follows:

- those in households making less than \$15 000 per year (24.6 minutes),
- those with less than a high school education (23.2 minutes),
- Asian/Pacific Islanders (23.1 minutes), and
- those living in households without access to a vehicle (22.4 minutes).

The proportion of transit walkers attaining 30 or more minutes per day of physical activity solely by walking to transit was highest for individuals who

- made less than \$15 000 per year (43.1%),
- had less than a high school education (41.3%),

TABLE 1—Demographic Comparison of Full Sample and People Who Walk to and From Transit: United States, 2009 National Household Travel Survey

Variable	Transit Walkers (n = 4195)		Total Population (n = 308 901)	
	Unweighted No.	Weighted % (95% CI)	Unweighted No.	Weighted % (95% CI)
Household income, \$				
< 15 000	838	24.2 (20.7, 28.1)	23 787	11.6 (11.1, 12.2)
15 000–34 999	827	26.6 (23.2, 30.4)	53 401	20.1 (19.4, 20.7)
35 000–69 999	801	22 (19.1, 25.2)	91 340	30.6 (29.9, 31.5)
70 000–99 999	522	9.7 (8.1, 11.7)	51 855	16.9 (16.3, 17.6)
≥ 100 000	934	17.5 (15.1, 20.0)	67 960	20.8 (20.2, 21.3)
Age, y				
18–29	641	25.3 (22.0, 28.9)	20 078	18.7 (18.4, 19.0)
30–39	552	21.9 (18.5, 25.8)	25 954	18.6 (18.2, 18.9)
40–49	837	19.5 (16.8, 22.5)	43 160	20.1 (19.6, 20.5)
≥ 50	2165	33.3 (30.4, 36.2)	174 380	42.7 (42.4, 42.9)
Education				
< high school degree	518	15.1 (12.7, 17.8)	20 309	10.1 (9.7, 10.5)
High school degree	925	26.8 (23.7, 30.2)	72 198	28.8 (28.4, 29.3)
Some college	974	24.2 (21.4, 27.2)	73 687	28.7 (28.2, 29.3)
Undergraduate ^a	867	18.3 (16.3, 20.5)	54 761	19.2 (18.7, 19.7)
Graduate ^a	848	15.6 (13.6, 17.8)	40 060	13.2 (12.8, 13.6)
Race/ethnicity				
White	2593	45.2 (42.1, 48.4)	263 466	73.6 (73.2, 74.0)
African American	687	29.9 (26.7, 33.4)	17 500	12.5 (12.4, 12.6)
Asian/Pacific Islander	232	6.3 (5.0, 7.8)	7925	3.5 (3.3, 3.8)
Hispanic	560	17.2 (14.9, 19.8)	14 104	8.9 (8.6, 9.3)
Other ^b	69	1.4 (0.9, 2.1)	3857	1.4 (1.3, 1.6)
Gender				
Male	1912	47.1 (44.1, 50.2)	143 137	49.2 (49.2, 49.2)
Female	2283	52.9 (49.8, 56.0)	165 764	50.8 (50.8, 50.8)
Urban size				
Not in urbanized area	506	4.7 (3.8, 5.9)	120 990	33.7 (33.2, 34.3)
MSA and < 500 000	552	8 (6.0, 10.6)	70 765	18.1 (17.6, 18.5)
500 000–999 999	317	6.5 (4.9, 8.5)	24 912	8.2 (7.9, 8.4)
≥ 1 million without rail	825	16.3 (13.8, 19.1)	57 287	18.5 (18.1, 18.8)
≥ 1 million with rail	1995	64.6 (61.0, 68.0)	34 945	21.6 (21.4, 21.9)
Household-owned car				
No car	1439	42 (38.3, 45.7)	9752	6 (5.8, 6.3)
≥ 1 car	2756	58 (54.3, 61.7)	299 149	94 (93.7, 94.2)
Worker				
Yes	2617	67.9 (64.8, 70.8)	139 068	63.6 (63.2, 63.9)
No	1576	32.1 (29.2, 35.2)	131 489	36.5 (36.1, 36.8)

Note. CI = confidence interval; MSA = metropolitan statistical area.

^aCompleted courses or obtained degree in specified level of education.

^bNative Americans, Alaskan natives, and mixed race/ethnicity (White and African American, White and Asian).

- were Asian/Pacific Islanders (44.6%),
- lived in large cities with a rail system (38.9%), and
- had no household vehicle (38.8%; Table 2).

Transit-walker time varied by mode of travel, with median total walk time for bus-only trips at 18.2 minutes per travel day (95% confidence interval [CI] = 14.2, 22.1), train-only

trips at 19.3 minutes (95% CI = 18.6, 20.2), and mixed-mode trips at 31.7 minutes (95% CI = 26.4, 36.9).

The effect of individual variables on transit walking 30 minutes or more per day varied. Transit walkers' age, gender, education level, household vehicle ownership, and employment status did not statistically significantly influence walk duration. However, household income ($P = .03$) and race ($P = .01$) were influential, and urban size was slightly influential ($P = .07$). Household income was strongly correlated with household vehicle ownership ($r = .57$) and educational level ($r = .51$), so we included only household income in the logistic regression model along with other relevant variables to find the influence of each variable in the presence of others using SUDAAN.

A model with acceptable goodness of fit ($P = .95$ [Hosmer-Lemeshow Wald]) resulted in 3 independent variables with significant influence on transit walkers' walking 30 minutes or more per day: household income, race/ethnicity, and city size. People living in households making less than \$15 000 per year were nearly twice as likely to attain 30 minutes of physical activity per day solely through walking to transit, compared with those from households making more than \$100 000 per year (adjusted odds ratio [AOR] = 1.94; 95% CI = 1.31, 2.88). Asian/Pacific Islanders were nearly twice as likely as Whites to walk 30 minutes or more through transit walking (AOR = 1.98; 95% CI = 1.27, 3.09). People living in cities with a population of 1 million or more with a rail system were 85% more likely to walk 30 minutes or more per day, compared with those living in metropolitan statistical areas of less than 500 000 people (AOR = 1.85; 95% CI = 1.00, 3.43; Table 3). Closer examination of urban size revealed that transit walkers living in urban areas with 1 million people or more and a rail system were 72% more likely to attain walking 30 minutes or more per day through transit walking (AOR = 1.72, $P = .05$) than were those living in areas without a rail system.

Transit walking increased 28% from 2001 to 2009, with an estimated increase of approximately 2.1 million people walking to or from public transit (9.6 million transit walkers in 2009, compared with 7.5 million in 2001).

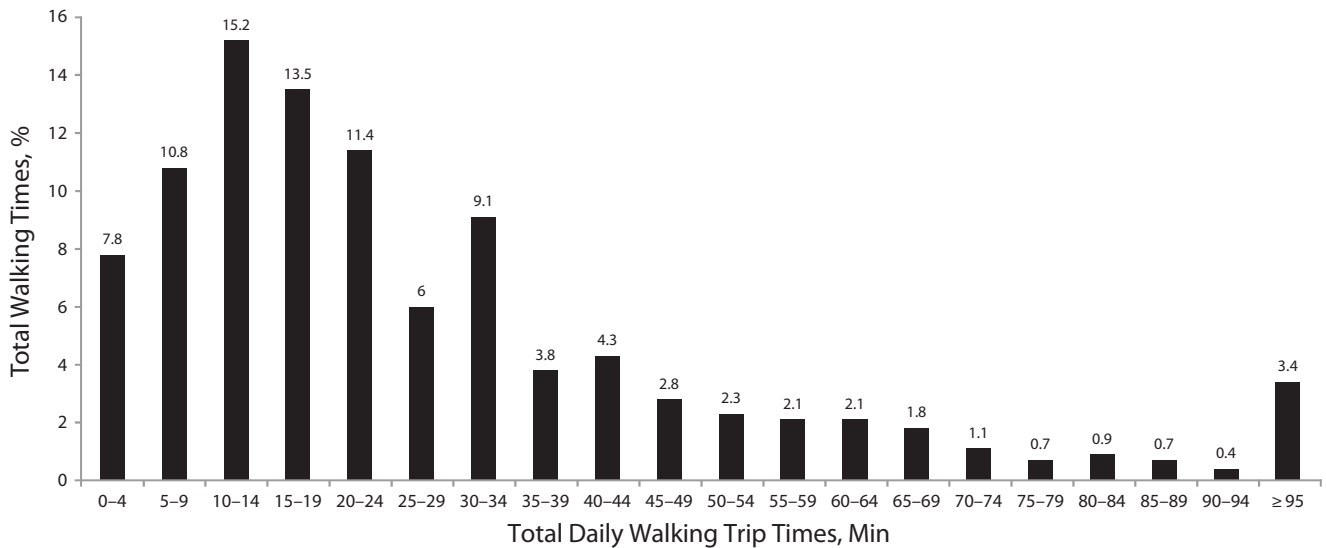


FIGURE 1—Total daily walking trip times to and from transit: United States, 2009 National Household Travel Survey.

About 830 000 more people walked 30 minutes or more per day in conjunction with a transit trip in 2009 (3.4 million) than in 2001 (2.6 million).

When comparing changes in median walk time between years, we found a slight increase in walk time for middle-income transit walkers (\$35 000–\$69 999; from 17.6 minutes to 19.4 minutes; $P=.05$) and a decrease for households making more than \$100 000 per year (from 19.2 minutes to 15.9 minutes; $P=.05$). Examining the proportional changes between years for transit walkers who attained 30 minutes or more per day, we found the largest increase was for Whites (from 22.2% to 30.4%; $P=.004$). Households making \$35 000 to \$69 000 per year showed slightly smaller increases in transit walking (from 27.1% to 35.4%; $P=.08$), as did those with undergraduate college degrees (from 27.7% to 35.1%; $P=.09$) and those in households owning at least 1 vehicle (from 27.8% to 32.6%; $P=.08$; Table 2).

DISCUSSION

Generally, public transit is a safer form of transportation²⁵ (i.e., avoidance of motor vehicle crash injuries) and produces fewer emissions than multiple single-occupancy vehicles moving the same number of people.³⁰ Public transit use also encourages physical activity

because most trips begin or end with active transportation.^{10–14} Transit walking, which increased from 2001 to 2009, provides the opportunity to engage in moderate-intensity aerobic physical activity that can help individuals meet the 2008 *Physical Activity Guidelines for Americans*. We found that transit walkers added a median of 21 minutes daily while walking to and from transit, and approximately 830 000 more people (an increase from 2 565 352 in 2001 to 3 353 051 in 2009) achieved 30 minutes of physical activity or more solely through transit walking. Research by Morabia and Constanza⁹ has shown that walking expends 3.1, 3.9, or 4.7 kilocalories per minute, depending on intensity; therefore, 21 minutes of walking associated with public transit use can burn between 65.1 and 98.7 calories per day. According to Hill et al.,³¹ expending 100 kilocalories per day could save \$12 500 per person in obesity-related medical costs (2012 dollars).

Demographically, transit walkers are similar to populations who typically experience health disparities.³² Transit walkers tend to make less money than the general population, are more often non-White, and tend to live in households that do not have access to a private vehicle. Transit walkers also tend to live in large urban areas with access to rail systems. Median walk times by socioeconomic and

demographic characteristics revealed that people who were non-White, lived in low-income households, or lived in households without access to a private vehicle accumulated the most walk time. Similar patterns were found for people attaining 30 minutes or more per day solely through transit walking.

Our analyses revealed that household income, race, and city size are strong predictors of walking 30 minutes or more per day to and from transit. In fact, these results indicate that living in a large urban area with both bus and rail systems increases the likelihood of walking 30 minutes or more per day through transit walking by 72%, compared with living in a city of similar size with only a bus system. Income level and race combined with city size have a multiplicative effect, resulting in even higher odds of walking 30 or more minutes per day to and from transit for certain income and racial groups. These findings echo previous research that found strong links between having a low income, being non-White, and transit walking¹⁰ and the willingness of community members to walk for faster modes of transit (i.e., subway or rail systems) that often require more walking because of greater distances between stops.²²

Because transit use and transit walking can be influenced by both necessity and personal preference, determining the reasons for

TABLE 2—Comparison of Weighted Median Walk Times and Weighted Percentage of People Who Walked 30 Minutes or More to and From Transit per Day: United States, 2001 and 2009 National Household Travel Survey

Variable	Walk Time, ^a Minutes			Walked ≥ 30 Minutes/Day ^a		
	2001 (n = 4419), Median (95% CI)	2009 (n = 4195), Median (95% CI)	P	2001 (n = 4419), % (95% CI)	2009 (n = 4195), % (95% CI)	P
Household income, \$						
< 15 000	23.1 (17.9, 28.3)	24.6 (21.9, 27.3)	.61	40.2 (35.2, 45.4)	43.1 (36.3, 50.2)	.12
15 000–34 999	20.0 (18.3, 21.6)	18.4 (15.6, 27.3)	.27	35.5 (30.4, 41.1)	34.5 (25.9, 44.2)	.85
35 000–69 999	17.6 (15.9, 19.2)	19.6 (18.4, 20.8)	.05	27.1 (21.8, 33.0)	35.4 (28.3, 43.3)	.08
70 000–99 999	18.0 (12.9, 23.1)	19.4 (18.1, 20.6)	.6	28.7 (21.3, 37.3)	33.9 (24.8, 44.5)	.42
≥ 100 000	19.2 (18.7, 19.8)	15.9 (12.7, 19.1)	.05	28.8 (22.6, 35.8)	28.2 (23.3, 33.7)	.89
Age, y						
18–29	19.3 (18.7, 20.0)	19.5 (18.8, 20.2)	.85	32.2 (27.8, 36.8)	36.0 (29.4, 43.1)	.36
30–39	19.7 (19.0, 20.4)	19.4 (18.1, 21.2)	.68	30.2 (25.2, 35.8)	32.2 (26.2, 38.8)	.63
40–49	19.7 (18.8, 20.6)	20.4 (17.9, 22.9)	.6	34.6 (29.4, 40.1)	39.6 (33.7, 45.9)	.22
≥ 50	21.0 (17.7, 24.3)	19.3 (18.3, 20.2)	.32	35.2 (30.4, 40.3)	34.0 (29.5, 38.7)	.72
Education						
< high school degree	23.1 (12.5, 35.4)	23.2 (15.5, 20.2)	.99	40.4 (33.6, 47.7)	41.3 (33.6, 49.4)	.87
High school degree	19.9 (19.1, 20.7)	19.8 (18.0, 21.6)	.92	34.1 (28.8, 39.7)	37.5 (30.7, 44.8)	.45
Some college	19.5 (18.7, 20.2)	17.6 (7.6, 27.7)	.71	31.6 (26.6, 37.1)	30.6 (24.6, 37.3)	.81
Undergraduate ^b	18.2 (11.7, 24.6)	19.4 (18.2, 20.5)	.72	27.7 (22.5, 33.6)	35.1 (28.9, 41.9)	.09
Graduate ^b	16.2 (9.5, 23.0)	19.3 (16.6, 22.1)	.4	29.3 (24.0, 35.2)	33.1 (22.8, 45.4)	.56
Race/ethnicity						
White	15.8 (14.7, 16.9)	17.7 (11.9, 23.6)	.53	22.2 (19.1, 25.8)	30.4 (26.1, 35.1)	.004
African American	21.4 (19.5, 23.4)	19.9 (16.7, 23.1)	.43	37.6 (33.0, 42.3)	40.0 (33.4, 47.0)	.57
Asian/Pacific Islander	24.4 (21.5, 27.4)	23.1 (3.7, 42.5)	.9	42.8 (32.9, 53.3)	44.6 (35.3, 54.2)	.8
Hispanic	23.2 (16.6, 29.8)	21.5 (18.9, 24.0)	.63	40.7 (34.5, 47.3)	36.3 (30.4, 42.7)	.33
Other ^c	28.9 (21.9, 36.0)	16.2 (3.3, 29.0)	.09	48.5 (29.0, 68.5)	35.8 (18.2, 58.3)	.4
Gender						
Male	19.6 (19.1, 20.0)	19.0 (16.5, 21.5)	.63	30.6 (27.5, 33.8)	34.8 (29.9, 40.0)	.17
Female	19.7 (19.1, 20.4)	19.8 (19.0, 20.6)	.85	34.6 (31.3, 38.1)	35.6 (31.4, 39.9)	.72
Household-owned car						
No car	22.9 (19.2, 26.6)	22.4 (18.6, 26.3)	.85	39.5 (35.4, 43.8)	38.8 (32.6, 45.3)	.86
≥ 1 car	18.4 (16.0, 20.7)	17.5 (14.9, 20.1)	.61	27.8 (24.5, 31.4)	32.6 (28.6, 36.9)	.08
Worker						
Yes	19.8 (19.3, 20.2)	19.3 (18.7, 20.0)	.23	33.3 (30.5, 36.2)	34.0 (30.4, 37.9)	.77
No	19.1 (17.7, 20.5)	19.9 (16.6, 23.3)	.66	31.5 (26.9, 36.5)	37.7 (31.7, 44.1)	.12

Note. CI = confidence interval.

^aTesting significant difference between 2001 and 2009 values for each category of the variables using *T* test.

^bCompleted courses or obtained degree in specified level of education.

^cNative Americans, Alaskan natives, and mixed races/ethnicities (White and African American, White and Asian).

transit-walking increases in this study was difficult. Although we can make inferences about the affordability of owning and using a private vehicle on the basis of household income, for example, respondents were not asked directly about their reasons for choosing to walk to transit, so we were not able to consider personal preference in this dataset. Similarly, the perceived convenience, safety, and accessibility

of public transit were not queried; thus, we could not address them directly in this study. A recent report from the American Public Transportation Association indicated that 1 reason people are choosing to use public transit is rising gas prices and claimed that \$5 per gallon gas could stimulate as many as 1.5 billion additional public transit passenger trips in the United States.³³ Ridership could also have

increased because the number of public transit agencies had increased from 5251 in 2003³⁴ to 7700 in 2009.³⁵ This increase may translate to more transit options.

This study had several limitations. First, NHTS collected data for only 1 travel day, and we were not able to determine whether the travel day reported represented the respondent's typical daily travel routine. The NHTS sample

TABLE 3—Predictors of Walking 30 Minutes or More per Day by Walking to or From Transit: United States, 2009 National Household Travel Survey

Variable	Multivariate Analyses ^a		
	b (SE)	AOR (95% CI)	P
Household income, \$.02
< 15 000	0.67 (0.20)	1.94 (1.31, 2.88)	
15 000–34 999	0.19 (0.28)	1.21 (0.70, 2.09)	
35 000–69 999	0.29 (0.21)	1.34 (0.88, 2.04)	
70 000–99 999	0.27 (0.25)	1.32 (0.79, 2.18)	
≥ 100 000 (Ref)		1.00	
Race/ethnicity			.03
White (Ref)		1.00	
African American	0.31 (0.18)	1.37 (0.95, 1.97)	
Asian/Pacific Islander	0.69 (0.22)	1.98 (1.27, 3.09)	
Hispanic	0.12 (0.21)	1.13 (0.74, 1.73)	
Other ^b	0.13 (0.50)	1.14 (0.43, 3.05)	
Urban size			.07
MSA ^c and < 500 000 (Ref)		1.00	
500 000–999 999	0.07 (0.46)	1.08 (0.43, 2.67)	
≥ 1 million without rail	0.07 (0.37)	1.07 (0.52, 2.21)	
≥ 1 million with rail	0.62 (0.31)	1.85 (1.00, 3.43)	
Not in urbanized area	0.31 (0.42)	1.37 (0.59, 3.17)	

Note. AOR = adjusted odds ratio; CI = confidence interval.

^aAdjusted association between a variable and total daily walk time of ≥ 30 min to and from transit, controlling for all other variables.

^bNative Americans, Alaskan natives, and mixed races/ethnicities (White and African American, White and Asian).

^cMSA, Metropolitan Statistical Area as defined by the US Census Bureau.

included only households with a land-line phone; we are unsure of the extent to which the growing trend of cell phone–only households affected the study's results. Although the NHTS statisticians provided weights to account for nonresponse and selection bias, the low response rates may possibly have affected the results of our study. We were unable to assess exertion level during transit walking, so we were not able to discuss transit-walking intensity. Additionally, we were not able to account fully for other changes that may have influenced travel behavior during the study periods, such as improvements in community transit service or pedestrian infrastructure, increased unemployment rates or travel-related costs, or improved public health messaging about environmental health or the importance of physical activity.

Increased levels of physical activity are an important co-benefit of using public transportation, along with improvements in air

quality and increased transportation safety. Departments of transportation and public health officials have a unique opportunity for multidisciplinary work to solve the complex problems that often hinder community health and safety. Public health officials should continue to encourage physical activity in their communities and remind citizens that physical activity can be incorporated throughout the day, such as time spent walking when taking public transportation.

Previous studies quantifying the amount of physical activity that can be achieved by walking to and from public transit have been useful in assessing the health impacts of transportation policies and development projects.^{35–39} Health impact assessment is a tool used to examine the community health impact of non-health-related projects or policies (e.g., transportation, built environment, energy, housing, agriculture) and is a way to assess health impacts and provide decision makers with

crucial community health impact information before a policy or project is implemented.^{40,41} The US Department of Health and Human Services recommends using health impact assessment as a planning resource to put Healthy People 2020 goals into practice.⁴²

Obesity, physical inactivity, and their associated morbidity and mortality continue to gain attention and intervention momentum. Built-environment interventions can provide opportunities for physical activity, reducing obesity rates and improving overall health.⁵ In this study, we confirmed previous research findings that transit walking contributes to meeting physical activity recommendations, especially for people of lower socioeconomic status or minority groups. Continued improvements to public transit systems can lead to lasting improvements to opportunities for physical activity. ■

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Contributors

A. L. Freeland acquired the data, assisted in analysis and interpretation, and drafted the article. S. N. Banerjee conducted data analysis and served as the statistician for the project. A. L. Dannenberg formulated the study design, assisted in interpretation of the data, and provided substantial editing of the article. A. M. Wendel served as a subject matter expert on transportation and healthy community design and provided critical editing of the article.

Human Participant Protection

The CDC's institutional review board approved this project under exempt status; the researchers used secondary data from a public source.

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