Changes in the Percentage of Students Who Walk or Bike to School—United States, 1969 and 2001

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**Background:** This report describes changes in the percentage of US students (age 5 to 18 years) who walked or bicycled to school and in the distance that they lived from or traveled to their school in 1969 and 2001 and travel patterns in 2001. **Methods:** Data were from the 1969 National Personal Transportation Survey report on school travel and the 2001 National Household Transportation Survey. **Results:** A smaller percentage of students lived within 1 mile of school in 2001 than in 1969. The percentage of students who walked or biked any distance decreased from 42.0% to 16.2%. Nearly half of students used more than 1 travel mode or went to an additional destination en route between home and school in 2001. **Conclusion:** Multidisciplinary efforts are needed to increase the percentage of students who walk or bike to school, as well as decrease the distances that students travel.

**Keywords:** active travel, safe routes to school, trends, travel survey, risk behaviors

Encouraging students to walk or bicycle to school, and making it safe to do so, is a strategy to increase their level of physical activity and an opportunity for collaboration among the disciplines of transportation, public health, urban planning, public safety, and education. Safe Routes to School and Kids Walk to School programs are collaborative efforts among education, transportation, planning, and public health disciplines to promote active transportation, reduce childhood obesity, and improve the health of elementary and secondary school students.

Children and adolescents should accumulate at least an hour of physical activity every day. Physical activity improves muscular strength, cardiorespiratory fitness, bone mass, blood pressure in hypertensive youth, anxiety and stress, self-esteem, and weight control. Walking or bicycling to school can contribute physically active time toward that recommendation. In the United Kingdom, walking school buses (organized groups of students walking to school led by adults) accumulated an average of 22 minutes of walking during trips to and from school. Walking and biking to school is associated with increased minutes of moderate-to-vigorous intensity physical activity during travel and at other times of day.

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The percentage of transportation trips made by children and adolescents that were made by walking and biking declined from 1977 to 1995. A nationally representative survey of parents in 2004 found that 17% of children and adolescents walked at least once per week during a usual week. In 2002, more than 70% of parents reported walking or biking to school as children.

Long-term trends in walking and biking to school over the past few decades are difficult to ascertain. Walking and biking to school was assessed on the 1969 Nationwide Personal Transportation Survey (NPTS) and has been subsequently measured in national transportation surveys using different methods. Differing methods in the surveys lead to difficulties in analyzing recent data for trends in walking and biking to school from 1969 to the present. Trends in these travel behaviors are, however, of interest to transportation, public health, and other disciplines that work toward increasing walking to school to benefit the health of children and adolescents.

The primary objective of this study is to describe changes in the percentage of US students (age 5 to 18 years) who walk or bicycle to school and in the distance that they live from their school using travel survey data from 1969 and 2001. A second objective of this paper is to describe the patterns of student travel in 2001 by the number of travel modes used and by the number of indirect trips to and from school on 1 day.

**Methods**

The first source of data for this report was a previously published report based on data from the 1969 NPTS. The 1969 NPTS was a cross-sectional survey of daily travel among civilian, noninstitutionalized US residents living in 15,000 households representing all 50 states and the District of Columbia (N = 49,883 students age 5 to 18 years). The sampling frame was former respondents in the Census Quarterly Housing Surveys. Household adults completed proxy interviews for youth age ≤ 16 years. Institutional Review Board approval and informed consent were not required for this survey. The response rate was not reported.

Participants were asked 7 questions about student characteristics and transportation to school in an in-person interview about travel made by all household members. After ascertaining each student’s enrollment status and grade in school, participants were asked about distance lived from school, travel time, and travel mode. Interviewers asked an open-ended question, “About how many miles was it from home to [student’s name]’s school?” followed by a question about the duration of travel. The next question, “How did [student’s name] usually get to school?” had 9 response categories (school bus, no charge; public transportation, no charge; school bus, charge; public transportation, charge; walk or bicycle; automobile, driver; automobile, passenger; motorcycle; other). These questions about travel to school were not repeated in subsequent NPTS surveys. Distance that students lived from school was classified as <1.0 mile, 1.0 to 1.9 miles, 2.0 to 2.9 miles, or ≥3.0 miles, and mode of transportation was classified as walk or bike, school bus, public transportation, automobile, and other. Confidence intervals were computed from standard errors that were given in the report.
The second source of data for this report was the 2001 National Household Travel Survey (NHTS), a cross-sectional random-digit-dialed travel survey that was fifth in a series of follow-up surveys to the 1969 NPTS. Civilian, noninstitutionalized persons age infant through 88 years (N = 160,798 including 29,836 age 5 to 18 years) residing in 69,817 households were selected from a list-assisted telephone number sample. Adult proxies were used for youth less than 16 years of age. Institutional Review Board approval was obtained by the survey contractors, Westat (Rockville, MD) and MORPACE International, Inc. (Farmington Hills, MI), and survey respondents or proxies provided informed consent. The overall response rate was 29.4%; 91.4% of persons in households for which data were reported completed all interviews.

The NHTS asked participants to keep 24-hour travel diaries in the form of a table. Trips were defined as travel from one address to another. For each trip, participants were asked open-ended questions about the destination, start and end times, purpose of their trip, mode of transportation, and trip distance. Interviewers coded trip purposes into 36 categories including “go to school as a student” and modes of transportation into 17 categories including “walk” and “bicycle.” Each trip was coded with an origin and destination. All household members (or adult proxies) were asked in an initial household telephone interview to complete travel diaries for a randomly assigned day and to report back in a follow-up telephone interview during the following 6 days. Data were analyzed for students age 5 to 18 years who reported ≥1 direct trip from home to school or school to home on the travel day (N = 11,774; 39% of youth). Youth who did not attend school on the travel day or who reported multiple distances in different distance categories were excluded from this report. Distance was classified as <1.0 mile, 1.0 to 1.9 miles, 2.0 to 2.9 miles, or ≥3.0 miles, and mode of transportation was classified as walk or bike, school bus, public transportation, automobile, and other. If students reported having used more than 1 mode of travel to or from school, they were categorized as having used the most physically active mode (eg, walk or bike > public transportation > school bus > automobile). Students were classified as having 1 or multiple modes of transportation during the round trip to school. Direct trips were those for which home and school were the only origins and destinations, and indirect trips were those for which 1 or more additional destinations were reported en route between home and school. Students were classified as having only direct trips or at least 1 indirect trip during the survey day.

Data Analysis

Percentages of students who lived or traveled selected distances to school were reported for 1969 and 2001. Prevalence of walking or biking, taking a school bus, or taking an automobile was reported by distance and age group for 1969 and 2001. Absolute change in prevalence between 1969 and 2001 was reported for walking or biking, taking a school bus, and taking an automobile modes of travel. Percentages of students were reported for 2001 by numbers of travel modes and indirect trips to and from school. Statistical significance was determined by nonoverlapping confidence intervals. Microsoft Office Excel 2003 (Microsoft Corporation, Redlands, WA) was
used to interpolate confidence intervals from a table of standard errors that was given in the 1969 report, and SUDAAN version 9.0 (RTI International, Research Triangle Park, NC) was used for analyses of data from the 2001 survey.

## Results

In 1969, 34.7% of students lived <1.0 mile from school (Table 1). In 2001, this percentage was 19.4% of students. The proportion of students who lived or traveled ≥3.0 miles from school increased from 32.6% in 1969 to 52.0% in 2001; in 2001, over 30% of students traveled ≥5 miles to get to school (not shown).

### Table 1 Percentage of US Students Age 5 to 18 Who Lived or Traveled Selected Distances to School

<table>
<thead>
<tr>
<th>Distance</th>
<th>1969 %</th>
<th>95% CI</th>
<th>2001 %</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1 mi</td>
<td>34.7</td>
<td>(32.0–37.4)</td>
<td>19.4</td>
<td>(18.0–20.9)</td>
</tr>
<tr>
<td>1.0–1.9 mi</td>
<td>17.5</td>
<td>(15.3–19.7)</td>
<td>13.9</td>
<td>(12.8–15.1)</td>
</tr>
<tr>
<td>2.0–2.9 mi</td>
<td>15.2</td>
<td>(13.1–17.3)</td>
<td>14.7</td>
<td>(13.3–16.3)</td>
</tr>
<tr>
<td>≥3.0 mi</td>
<td>32.6</td>
<td>(29.9–35.3)</td>
<td>52.0</td>
<td>(50.1–53.8)</td>
</tr>
</tbody>
</table>

* In 1969, distances lived from school were reported, whereas in 2001, distances traveled from home to school were reported.

### Table 2 Travel Mode by Distance to School Among US Students Age 5 to 18

<table>
<thead>
<tr>
<th>Distance</th>
<th>Walk/Bike</th>
<th>School Bus</th>
<th>Automobile</th>
</tr>
</thead>
<tbody>
<tr>
<td>All distances</td>
<td>42.0 (39.2–44.8)</td>
<td>38.1 (35.3–40.9)</td>
<td>16.3 (14.2–18.4)</td>
</tr>
<tr>
<td>&lt;1 mi</td>
<td>87.0 (83.6–90.4)</td>
<td>4.6 (2.5–6.7)</td>
<td>7.8 (5.1–10.5)</td>
</tr>
<tr>
<td>1.0–1.9 mi</td>
<td>49.3 (42.2–56.4)</td>
<td>28.4 (22.1–34.7)</td>
<td>20.0 (14.3–25.7)</td>
</tr>
<tr>
<td>2.0–2.9 mi</td>
<td>17.3 (11.6–23.0)</td>
<td>49.5 (41.9–57.1)</td>
<td>26.0 (19.3–32.7)</td>
</tr>
<tr>
<td>≥3.0 mi</td>
<td>1.7 (0.4–3.0)</td>
<td>73.8 (69.2–78.4)</td>
<td>18.9 (14.8–23.0)</td>
</tr>
</tbody>
</table>

* In 1969, distances lived from school were reported, whereas in 2001, distances traveled from home to school were reported.

b Percentages do not sum to 100 because public transportation and other modes are not shown.

c Based on data from the Nationwide Personal Transportation Study (1969).17
d Based on data from the National Household Travel Survey (2001).
The percentage of US students who walked or biked to or from school declined from 42.0% in 1969 to 16.2% in 2001 (Table 2). In 1969, 87.0% of students who lived <1.0 mile from school walked or bicycled to school, whereas in 2001, 62.5% of students walked or bicycled <1.0 mile to school. The percentage of students who traveled by automobile increased from 16.3% in 1969 to nearly half (46.2%) in 2001. Students who lived or traveled 1.0 to 1.9 miles to school were more likely to walk or bike in 1969 (49.3%) than in 2001 (17.6%). The percentage of students who walked or biked to school was lower in 2001 than in 1969 for all school distance categories; the percentage who rode a school bus increased among those who live <1.0 mile from school; and the percentage who traveled to or from school by automobile increased for all distance categories (Figure 1).

In 1969, the percentage of students in elementary school who usually walked or biked (49.3%) was significantly higher than the percentage of intermediate and secondary school students (32.0%) who used these modes of transportation to get to and from school (Table 3). A significantly higher percentage of students age 5 to 11 years (18.4%) walked or biked to or from school compared with older students (13.9%) in 2001. Approximately equal percentages (~85%) of younger and older students who lived within a mile of school in 1969 walked or biked to school. In contrast, a significantly smaller percentage of younger (57.4%) compared with older (73.3%) students who traveled <1 mile walked or biked to or from school in 2001.

In 2001, 57.2% of students made only direct trips between home and school and used 1 travel mode for all trips (Table 4). An additional 21.6% of students used only 1 travel mode; however, these students made at least 1 indirect trip to or from school on the travel day. Twenty-one percent of students used more than 1 travel mode to get to and from school; approximately half of these students made only direct trips, and the remainder made at least 1 indirect trip.

![Figure 1](image-url) — Absolute differences between the percentage of US students who traveled to school by selected means and by distance to school in 1969 and 2001.
The findings in this study suggest the magnitude of changes in school travel patterns over 3 decades in the United States. We showed behavioral outcomes of numerous social and environmental changes since 1969 that affected travel patterns to school and indicated that, for many children and youth in the early 21st century, school travel patterns are complex. The results show that the percentage of students (both elementary and secondary) who walked or bicycled to school was significantly lower...
in 2001 than in 1969. In 1969, approximately the same percentages of younger and older students who lived <2 miles from school usually walked or biked to school. In 2001, younger students who traveled <1 mile to or from school were less likely to walk than their older counterparts. Furthermore, the percentage of students who rode in automobiles was higher, with the largest increase in automobile use among those who live 1.0 to 1.9 miles from school. Moreover, in 2001, approximately 4 in 10 students had complex travel patterns on 1 day, having used multiple travel modes or made indirect trips to or from school.

Recent studies of walking and biking to school reported prevalences that were similar to the findings from the NHTS that 16% of students in 2001 walked or biked to school. An annual household survey of knowledge, attitudes, and behaviors about health issues included questions about travel to school and barriers to walking and biking in 1999 and 2004 surveys. In 2004, adults in 17% of households with children reported that their youngest child walked to or from school at least once a week during the preceding month. Similar proportions of primary and secondary school-age children walked and biked to or from school. Sixteen percent of parents in 1999 and 2004 surveys said that it was easy for their child to walk to school. In another national study, 14% of children and adolescents usually walked or biked to school. Prevalence was highest in children in grades 4 to 6 (21%) and declined in grades 7 to 9 (12%) and grades 10 to 12 (8%). The NHTS shows similar age-related differences overall; however, we found that among students who traveled <1 mile to school, older students were more likely to walk than younger students.

Between 1969 and 2001, nearly half of the decline in walking to school can be explained by the increased distances that students must travel. This has implications for physical activity levels in that traveling longer distances decreases the likelihood of using active transportation. Accordingly, the barrier most frequently cited by parents to walking and biking to school was living too far away (55% in 1999 and 62% in 2004). However, trends in education policy might lead to increased distances to school. For example, the No Child Left Behind legislation, charter and magnet schools, and desegregation programs allow students to attend schools based on choice rather than geography.

Perceived traffic danger was the second most frequently cited barrier to walking and biking to school (40% in 1999 and 30% in 2004). Traffic safety statistics show that the highest percentages of student deaths (51%) and nonfatal injuries (55%) were among students in vehicles driven by teen drivers. Nevertheless, 11% of nonfatal injuries related to school travel and the highest risk of nonfatal injuries and deaths per mile traveled were among students who biked and walked. A study of factors affecting mode choice found that students traveling through neighborhoods with sidewalks on main roads were more likely to walk to school. To improve travel safety for students, the 2005 Safe Routes to School (SRTS) legislation provided funding for infrastructure improvements. The federal legislation established a National Center for SRTS to assist communities in developing effective programs (http://www.saferoutesinfo.org/). Moreover, every state department of transportation has funding for SRTS programs. For example, California’s SRTS programs include transportation improvements such as installing sidewalks on main roads and have demonstrated increases in walking and biking to school as observed on-site and as reported by parents.
Our findings provide new information about the challenges of reversing the
trend away from active travel that should prove useful to those involved in SRTS
programs. We found that on a given day, approximately one-third of students travel
to other destinations between home and school. SRTS programs have potential to
improve public health by increasing physical activity through active travel while
working to decrease injury by providing safer routes.\(^5\) Thus, SRTS programs should
consider the safety of routes between schools and nearby destinations that students
often travel to before and after school in addition to routes between schools and
residential neighborhoods.

It is interesting to note that the largest relative decline in active travel was among
children living or traveling 1.0 to 1.9 miles to school. This may represent a change
in societal norms between 1969 and 2001. Healthy People 2010, the national public
health objectives in the United States, defines a reasonable distance for walking
to school as 1 mile or less and for bicycling to school as 2 miles or less.\(^25\) In 1969,
nearly half (49\%) of the students who lived 1.0 to 1.9 miles from school either
walked or biked to school, whereas in 2001 only 18\% of such students did so.

Indications of complex travel patterns to and from school were found in several
previous studies. A 2002 survey showed that the frequency of walking and biking
trips to and from school ranged from zero to >10 times per week (multiple trips
to school in 1 day) with a mean frequency of 7 one-way trips per week among
those with 1 or more trips.\(^20\) Another study found that travel modes varied within
a day.\(^13\) Walking was used more often for trips from school than for trips to school,
and automobiles were reported more often for trips to school.\(^13\) The current study
provides additional description of students’ travel patterns to and from school in
2001 showing that nearly half of the children and youth had either indirect trips or
multiple travel modes on 1 day.

Although complex travel patterns appear to be the norm in the United States
in the early 21st century, we cannot conclude from these data that travel patterns
have become more complex over time because comparable historical data about
multiple modes and destinations during school travel are not available. In 1969,
respondents were asked about distance that students lived from school and usual
mode of travel.\(^17\) However, the wording of the historic survey questions suggests
the possibility that a single travel mode for trips to and from school was the norm
in 1969.

Our society has changed in additional ways since 1969 that could affect the
rates of walking and biking to school. For example, car ownership increased such
that many households have more than 1 vehicle per driver.\(^26\) Thus, high school
students have greater access to vehicles than they did in 1969. Further, a larger
percentage of women are in the workforce, and the percentage of US residents
who live in urbanized areas has increased. Finally, although trends in school policy
are changing to permit more students to live farther from schools, the data do not
suggest a significant increase in bussing.

Statistics about complex travel patterns to and from school have implications
for survey methodologists in transportation, public health, and other disciplines who
are interested in measuring participation in walking and biking to and from school.
Standard survey questions are needed for use in the evaluation of interventions
including SRTS programs, research, and surveillance. In past studies, researchers used 1 question about usual travel mode\textsuperscript{10,21} or 2 questions about mode and frequency of walking and biking\textsuperscript{16,20} to ascertain whether children walked or biked. This study suggests that travel patterns for students might be too complex to be accurately ascertained using a single question about usual mode of transportation to and from school, thus reducing the researcher’s ability to detect changes in travel patterns over time. Multiple questions about mode and frequency of walking and biking that capture the complexity in travel patterns may be more reliable and valid than survey questions that assume school travel is a simple behavior. However, measurement issues related to the assessment of patterns in travel to school have not been studied. Research is needed to investigate the cognitive issues that are involved in recalling (eg, autobiographical memory) and reporting (eg, working memory, language comprehension, literacy) travel patterns to and from school, particularly for adults with low socioeconomic status, education level, and literacy level. This research is needed to identify best practices for survey question design.

There are several limitations to this study. First, data are based on self-reports of students or their parents or guardians and thus subject to recall bias. Second, the response rate in 2001 was only 29.4\%, indicating nonresponse bias that could have substantially affected the results; however, survey data were weighted to adjust for this.\textsuperscript{18} The response rate in 1969 was not reported; however, a national survey that used a similar in-person interview method conducted in 1969 had a 95\% response rate.\textsuperscript{27} Third, the survey methods used in 1969 and 2001 differed in several ways. Participants in the 1969 survey were all youth who attended school, whereas students for whom data were analyzed from the 2001 survey were the subset of respondents who attended school on the particular day in question. The NPTS assessed students’ usual travel mode and distance to school directly through in-person survey interviews, whereas the NHTS used 24-hour travel diaries with telephone follow-up. In 2001, we estimated the travel mode when travel to and from school used different modes. In 1969, participants were asked how far students lived from school, whereas participants in 2001 reported the distance traveled between home and school in the diaries. The NPTS categorized students by grade, whereas the NHTS categorized them by age. Finally, caution should be used when assessing the statistical significance of changes from 1969 to 2001 because the computations of confidence intervals did not account for differences in survey methods and analytical methods. Comparisons between groups within a survey are not subject to this limitation.

In conclusion, given the methodological limitations, the results suggest that the percentage of students age 5 to 18 years who walked or biked to or from school declined substantially from 1969 to 2001. In addition, the percentage of students who lived within a mile or two of school decreased and school travel patterns frequently included multiple travel modes and indirect trips between home and school in 2001. Multidisciplinary strategies, such as Safe Routes to School programs, are needed to increase the level of physical activity among US students by enabling and promoting walking and bicycling to and from school. These programs need to overcome the barriers of long distances to school and perceived and actual traffic safety risks.
Disclaimer

The findings and conclusions in this report are those of the authors and do not necessarily represent the views of the CDC.

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