

Prevalence of Active Commuting at Urban and Suburban Elementary Schools in Columbia, SC

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We directly observed the prevalence of walking and bicycling (active commuting) to 8 randomly selected urban and suburban elementary schools. When school was used as the unit of analysis, only 5.0% of the students actively commuted to or from school across all observed trips. Active commuting was not affected ($P \geq .18$) by school urbanization level, school socioeconomic status, time of day, day of week, weather conditions, or temperature. These results indicate a need for school- and community-based interventions. (*Am J Public Health*. 2005;95:236–237. doi: 10.2105/AJPH.2003.034355)

The recent decline in the percentage of walking or bicycling trips performed by children¹ has reduced their potential to accumulate recommended levels of physical activity.² Previous estimates of walking to school have been based on parent reports.^{3–5} The purpose of this study was to determine objectively, through direct observation, the prevalence of active commuting (i.e., walking and bicycling) to and from elementary schools in urban and suburban communities in a city in the southeastern United States.

METHODS

Study Design

School was the unit of analysis in a cross-sectional study that was designed to observe the prevalence of active commuting of entire school populations. Four schools from each level of urbanization (urban, suburban)⁶ were recruited from the 13 urban (9 low socioeconomic status [SES]) and 18 suburban (8 low SES) public elementary schools in Columbia, SC. If a selected school refused to participate, a randomly selected replacement school from the same urbanization stratum was recruited.

Schools

Total enrollment across all 8 schools was 3911 (range=229–723 students; mean $\pm$ SD=489 $\pm$ 166). Suburban schools were greater than urban schools (545 $\pm$ 111 vs 433 $\pm$ 12), had 13.3% more minority students, and had 11.9% more students receiving free or reduced school lunch. Schools with fewer than 67% of their students receiving free or reduced school lunch were considered moderate to high SES; other schools were categorized as low SES.⁶

School Observation

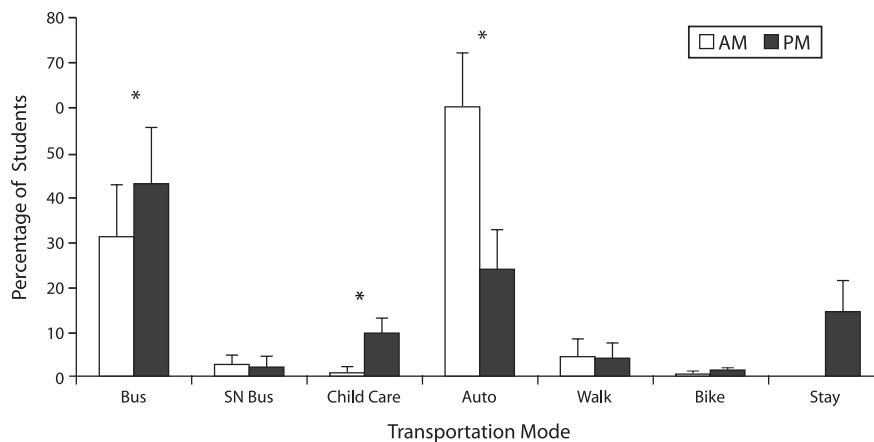
The prevalence of active commuting to school was assessed by direct observation of the number of children arriving at and leaving school via bus, special needs bus, child care center transportation for before- and after-school care, automobile, walking, or bicycling. Depending on the size, procedures, and layout of each school, 2 to 3 observers identified students' travel behaviors

at each school for 60 minutes before and after school and recorded data on a 1-page form designed for the study. Interrater reliability of observers' counts and validity of the instrument were not determined. To our knowledge, no children were at these schools prior to our arrival in the morning. The number of students involved in on-site after-school programs was determined from attendance rosters or by counting the students.

Each school was to be observed during the morning and afternoon on 5 consecutive school days during September to November 2002. Of 80 scheduled observations, 38 morning and 33 afternoon observations were conducted because of 5 half-days and no school on 2 days. The percentage of students observed at each commute was calculated as the number of observed students divided by the school enrollment multiplied by the school's mean yearly attendance rate (0.94–0.97; daily attendance rates were unavailable). Observed students accounted for 92% (87%–99%) of the total available school population. The number of observed students was similar between morning (436 $\pm$ 132.9) and afternoon (437 $\pm$ 145.3) commutes.

RESULTS

One-way Wilcoxon rank sum tests were calculated to determine group differences in transportation modes. Only 5% of the observed students arrived at or departed from school via walking or bicycling, which was consistent within days (morning vs afternoon commutes; Figure 1) and among days (Monday–Friday) ($P \geq .71$). Bus and automobile riders accounted for 39% and 44% of the students, respectively. Compared with the mornings, 59% less automobile transportation, 36% more bus transportation, and 90% more child care transportation occurred in the afternoons ($P < .05$; Figure 1). The percentage of students bicycling from school was slightly greater than observed in the morning. One child and his bicycle were driven to school, and in another case, the child was met on several afternoons by a parent with the child's bicycle. The prevalence of walking



Note. SN bus = special needs bus; stay = stay at school.

*Significant difference between morning and afternoon observations ($P < .05$).

FIGURE 1—Observed modes of transportation for the morning (AM) and afternoon (PM) commutes.

and bicycling was not associated with school SES level ($P \geq .49$), school urbanization level ($P \geq .48$), weather conditions ($P \geq .18$), or temperature ($r = -0.04$ – 0.08).

DISCUSSION

The prevalence of active commuting was consistently low (5.0%) across all observations and schools. The rate of active commuting observed in this study was approximately one third of the national average (13%) reported by the US Department of Transportation.³ Other survey results report prevalence rates of active commuting from 4.2% in Georgia⁴ to 25.0% in a national sample of households.⁵ The different methodologies (observation, mail,⁴ telephone^{3,5}), time frames (observation vs 1-week or 1-month recall), and classification procedures (1 trip per week or month for surveys) may account for some of the differences in the prevalence rates between this study and other studies. Also, the surveys represent a wide age range (5–15 years), whereas this study observed only elementary-school students. These differences suggest that comparisons should be made cautiously. However, the previous survey findings and our observational results support a low prevalence of active commuting to school.

No differences in active commuting were observed between urban and suburban schools or between SES categories. Schools in larger cities might show higher walking and bicycling rates because of greater population densities near schools. The small sample and limited geographic diversity attenuated our ability to detect such group differences. Although not significant in this study, the effect of temperature and weather conditions would likely play a critical role in the commuting behavior of children in colder climates. Factors not considered in this study, such as crime, traffic congestion, and other aspects of the physical environment, should be considered in future investigations of the influence of environmental factors on active commuting to school.

The observation system used for this study may provide more accurate prevalence estimates compared with previous survey-based estimates. To avoid low survey response rates, selection bias, and recall errors or to enable program planners to understand specifics about student commuting behavior, direct observation may be warranted.

In conclusion, only 5% of the elementary-school students were observed walking or bicycling to or from school on a daily basis. Future research is needed in larger samples to identify differences in school commuting

activity in diverse geographic locations and demographic groups. ■

About the Authors

At the time of the study, John R. Sirard, Kerri L. McIver, and Russell R. Pate were with the Department of Exercise Science, and Barbara E. Ainsworth was with the Departments of Exercise Science and Epidemiology and Biostatistics, Arnold School of Public Health, University of South Carolina, Columbia.

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Contributors

J. R. Sirard, B. E. Ainsworth, and R. R. Pate originated the study. J. R. Sirard supervised all aspects of the study's implementation and conducted all data analyses. K. L. McIver assisted in implementation of the project. All authors assisted with the interpretation of the findings and writing the brief.

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Human Participant Protection

This study was approved by the University of South Carolina's institutional review board, the school districts, and the principals at each participating school.

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