

Safe Routes to School and Health

Understanding the Physical
Activity Benefits of Walking
and Bicycling to School



SafeRoutes

National Center for Safe Routes to School



September 2010

Prepared by the National Center for Safe Routes to School

Introduction

Walking and bicycling are two of the easiest ways to be active. One of the main goals of most Safe Routes to School (SRTS) programs—along with increasing safety—is to increase the numbers of children who walk and bicycle to school. Some local SRTS programs are expanding that goal to include encouraging healthy, active lifestyles from an early age. However, little is known as to whether walking or bicycling to school leads to an overall increase in physical activity. The question explored in this research-based report is: does walking and bicycling to school actually increase physical activity? And, if so, how can local SRTS programs measure this increase?

Safe Routes to School and Health: Understanding the Physical Activity Benefits of Walking and Bicycling to School looks specifically at the potential physical activity benefits of SRTS and describes strategies for measuring those benefits. The report is divided into four sections:

- A summary of current research findings on the relationship between walking and bicycling to school and physical activity
- A description of what communities are already doing to measure physical activity and other health impacts of SRTS
- A table of potential techniques local SRTS programs could use to measure physical activity
- A summary of potential approaches for evaluating the health benefits of SRTS programs at the national level

National trends indicate that children are leading increasingly sedentary lives. Local communities, states and even several national health organizations are looking to SRTS programs as a way to potentially increase physical activity and to improve overall health. The U.S. Department of Health and Human Services,¹ the American Academy of Pediatrics,² and the Institute of Medicine³ have all suggested walking and bicycling to school as ways children can be more active. First Lady Michelle Obama's Let's Move campaign also recommends thinking about the trip to school as an opportunity to be active.

This report also reflects input on measurement strategies from an expert panel convened by the National Center for Safe Routes to School, including representatives from the Centers for Disease Control and Prevention, the U.S. Department of Education, and the University of North Carolina at Chapel Hill, and interviews with local program organizers from across the country about how measurements are currently taken.

This report, particularly the table of measurement strategies, can be useful for local SRTS programs interested in evaluating the potential physical activity benefits of their program.

What's Known About Walking and Bicycling to School and Physical Activity?

The U.S. Department of Health and Human Services and other health experts recommend at least 60 minutes of age-appropriate physical activity for children every day of the week.^{4,5} For children and adolescents, this regular physical activity helps build and maintain healthy bones and muscles, reduces the risk of developing obesity and chronic diseases, reduces feelings of depression and anxiety, and promotes psychological well-being.⁶

Within the last decade researchers have become increasingly interested in understanding the relationship between walking and bicycling to school and student health. However, few studies use the same design and measurement techniques, making it difficult to compare the results. While many studies have similar findings, there are some studies that have conflicting results. These discrepancies make it challenging to infer any definitive statements about the relationship between walking and bicycling to school and physical activity levels. However, trends among findings do indicate a positive relationship between active travel to school and higher levels of physical activity.

Highlights of what has been observed about walking and bicycling to school and physical activity levels in elementary and middle school age children include:

- Overall, children who actively commute to school seem to obtain more daily physical activity than those who ride in a car or bus.^{7,8,9,10,11,12,13}
- There are a couple of ways that walking and bicycling to school may be related to higher levels of physical activity. Children may obtain physical activity during the commute to and from school while obtaining similar amounts as non-active commuters throughout the rest of the day.^{7,8} Or, active travel to school may make children more inclined to be physically active at other times of the day.^{7,8,10}
- However, sometimes active commuters and students who are driven to school obtain similar amounts of physical activity throughout the day, despite the active commuters' additional opportunity for activity.^{14,15,16,17}
- The length of the school trip may play a role in physical activity levels of active commuters, with distances greater than half a mile being more likely to result in significantly higher levels of daily physical activity.^{15,13}
- Children who walk or bicycle to school are more likely to walk or bicycle to other destinations in their neighborhood than children who are driven to school.¹⁸

Local Programs: Reports from the Field

Based on interviews with local Safe Routes to School practitioners who have been attempting to measure health benefits of SRTS programs the National Center learned three things:[†]

1. Which health outcomes SRTS programs are measuring or are considering measuring
2. What methods they are using to do so
3. Opportunities and challenges they have encountered along the way

Safe Routes to School practitioners were interested in learning whether SRTS programs could impact a variety of health indicators, including:

- Physical activity levels
- Daily caloric expenditure
- Physical fitness
- Body mass index (BMI)
- Walking amounts
- Asthma rates

The methods used to collect information about these impacts varied depending on the health measure sought. Notably, every program reported measuring the number of students walking and bicycling to school in order to track any changes in walking and bicycling rates. For examples of methods local programs are using, see the table on pages eight and nine.



[†] In fall 2009, the National Center for Safe Routes to School conducted 19 interviews with local SRTS programs. The National Center identified programs that had been attempting to measure the health benefits of SRTS by surveying SRTS state coordinators, Walk to School Day organizers, SRTS National Conference attendees, and other professional contacts.

Measuring Walking and Perceptions About Outdoor Activity

(Springfield, Mass.)

The SRTS program at Alice B. Beal Elementary School in Springfield, Massachusetts has been underway for more than two years. In addition to various encouragement strategies, this program includes an outdoor classroom curriculum in which students are encouraged to walk and play outdoors in an effort to foster appreciation for physical activity and nature.

The program evaluates changes in perception and attitude, as well as walking and bicycling rates. In order to measure any shifts in parent perception and travel behavior, the school administers the National Center's parent survey annually and the in-class travel tally forms two times per year. Older students kept a journal about their walking and recorded their daily number of steps, as measured by the pedometers, on a chart posted in the health classroom.

Reading the journals, the teacher was able to assess perceptions of nature and outdoor physical activity. She noted that students changed their thoughts on being outdoors. For example, they enjoyed the element of discovery involved when they visited a nearby park as part of their class. At the same time, logging their steps seemed to inspire students to keep their step count up.

Partnering with a Local University

(Washington, D.C.)

In Washington D.C., several SRTS programs are working with researchers at George Washington University to document current physical activity levels and assess any changes that may have occurred as SRTS program activities are implemented. These SRTS programs have a multi-faceted approach, including a variety of education and encouragement techniques to increase physical activity levels in the classroom, during recess, at home and while walking and bicycling to and from school.

Measurements included use of a physical activity questionnaire and accelerometers. The questionnaire asked how often the students engage in particular activities, what they do for sport and play, and if they sweat when doing chores or playing. It also asked how sure students felt that they could walk or bicycle to school every day and how safe they felt doing so. Accelerometers were used to collect data on physical activity and energy expenditure.

Baseline data indicated that students were falling far short of achieving the recommended 60 minutes of physical activity a day.

Evaluating a Comprehensive Walking Program

(Chicago, Ill.)

Active Transportation Alliance (Active Trans) is Chicagoland's voice for better biking, walking and transit. A key component in their programming is the Walk Across Illinois School Fitness Program. This 26-week curriculum aims to increase students' physical activity. The program uses a variety of education and encouragement techniques to increase physical activity levels in the classroom, during recess, at home and while walking and bicycling to and from school. Many participating schools also have ongoing SRTS programs.

The evaluation component of this project includes a three-year longitudinal study in one school district. Active Trans has matched schools participating in the program with control schools. The organization collected baseline data in 2008-2009 and will continue to collect information before and after the schools complete the Walk Across Illinois program. To measure physical activity outcomes, Active Trans is gathering walking and

bicycling rates using the National Center's student travel tally forms, estimating physical activity levels at schools using an observational technique and collecting information about physical fitness by using common fitness tests. Active Trans chose these methods because they are easy to use, do not detract from instructional time, have been validated, if possible, and produce results that can be easily compared across groups.



Expert Opinions on Evaluating Safe Routes to School and Health

In December 2009, the National Center invited a group of health experts to discuss local and national measures of SRTS impacts on child health. Panel members represented the Centers for Disease Control and Prevention's Division of Adolescent and School Health and Division of Nutrition, Physical Activity and Obesity; the U.S. Department of Education's Office of Safe and Drug Free Schools; and the School of Public Health and Department of City and Regional Planning at the University of North Carolina at Chapel Hill.

Using information from the interviews with local SRTS programs as background, the expert panel considered potential health outcome measures and appropriate methods for collecting this information. The panel discussed challenges and opportunities related to evaluating the health impacts of SRTS programs at both the national and local levels.

Expert panel members agreed that "the most practical and useful measures for understanding the health benefits of SRTS programs begins with collecting information about the prevalence and frequency of active travel to school" i.e. how many students are walking and bicycling to school and how often they are doing so.

Once this is known, walking and bicycling numbers, along with information like distance to school, can be used to estimate potential changes in student physical activity levels. While impacts on other health indicators such as body mass index (BMI) are compelling to consider, these measures are not suitable for an evaluation of most SRTS programs at this point. The amount of change that must occur to impact these types of secondary health benefits would have to be significant, and this amount of change is unlikely to be seen in SRTS programs at this time, especially given the relatively short duration most programs have been in place. In addition, these measures often require extensive data collection and analysis that make them impractical at the local level.

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Approaches for Measuring Physical Activity

Based on both the local SRTS program interviews and the expert panel discussion, several methods for evaluating potential physical activity benefits have been identified for use by local SRTS programs. These methods range in the amount of information and time they require. All of the measurement approaches described in the following table attempt to balance what is feasible at the local level with the accuracy of the measurements.

When using these approaches, SRTS program practitioners need to remember that the measurements are estimates meant to illustrate physical activity benefits rather than provide an exact number. Local programs may choose to use one or several of these methods, depending on what best fits their SRTS program. In addition, research and discussion from this report and other National Center projects provide the foundation for potential approaches to a national evaluation of the health benefits of SRTS that are described on pages eight and nine.



Local Level Approaches for Measuring Physical Activity in SRTS Programs

Goals	Strategies	Benefits	Considerations	Tips
<p><u>Goal 1:</u> Estimated physical activity benefits (general)</p> <p>To estimate the number of students benefiting from increased physical activity by walking and bicycling to school...</p>	<p>Use the National Center's student travel tally to count the number of students who are walking and bicycling to school and measure any changes to this number as SRTS activities are implemented.</p> <p>Visit www.saferoutesinfo.org/data/ to download the tally form.</p> <p>Observe and count travel modes as children enter the school or count bicycles parked on school grounds.</p>	<ul style="list-style-type: none"> • Low-cost • Downloadable forms are easy to use • Reports that summarize the information are available if data is entered online at www.saferoutesinfo.org/data/ 	<ul style="list-style-type: none"> • Based on existing research, this method assumes that walking and bicycling to school contributes to daily physical activity but does not attempt to calculate how much it contributes • Self reported information • Best administered in classrooms (but requires very small amount of class time) • Standardizing how data is collected in each classroom and school can be challenging 	<ul style="list-style-type: none"> • To track potential impacts of SRTS activities, tallies should be conducted before and after SRTS activities are implemented • If activities or projects are ongoing, tallies should be conducted in the fall and spring or annually at a minimum • Conduct counts only on typical school days, preferably on a Tuesday, Wednesday, or Thursday • For more instructions on using the National Center's travel tallies or to download the forms, visit www.saferoutesinfo.org/data/
		<ul style="list-style-type: none"> • Does not require class time or school personnel • Low-cost • Does not require school personnel 	<ul style="list-style-type: none"> • May not capture all students who walk or bicycle to school • May require volunteers 	<ul style="list-style-type: none"> • If the in-class travel tallies are not a good fit for a school, observational counts are another option. • Like the travel tallies, these counts should be conducted the same way every time to ensure consistency.

Local Level Approaches for Measuring Physical Activity in SRTS Programs

Goals	Strategies	Benefits	Considerations	Tips
<p>Goal 2:</p> <p>Estimated physical activity benefits (minutes)</p> <p>To estimate minutes of physical activity gained from walking and bicycling to school ...</p>	<p>Conduct student travel tallies and convert total number of students walking and bicycling to time spent in physical activity.</p> <p>For walkers, use this equation: number of walkers x .5 miles x 20 minutes[†] x 180 days x 2 trips = total minutes of physical activity in a school year</p> <p>For bicyclists, use this equation: number of bicyclists x 1 mile x 7.5 minutes^{††} x 180 days x 2 trips = total minutes of physical activity in a school year</p>	<ul style="list-style-type: none"> These estimates can help illustrate how active travel to school can help children meet the recommendation of 60 minutes of daily physical activity Quantifies potential physical activity benefit from SRTS Easy to use if walking and bicycling counts are already collected May also be done at the individual level (using time spent walking/bicycling to school) 	<ul style="list-style-type: none"> Estimates are rough and based on a number of assumptions Assumptions may not be accurate for some communities 	<ul style="list-style-type: none"> Use the 60-minutes-a-day benchmark to compare results In order to more accurately calculate time spent in physical activity, survey walkers and bicyclists to determine the average distance to school and use this figure to replace the .5 mile and 1 mile estimates, and talk with school administration to determine the exact number of school days at your school
<p>Goal 3:</p> <p>Daily physical activity increases</p> <p>To measure how walking and bicycling to school contributes towards total daily walking and bicycling amounts...</p>	<p>Use pedometers and cyclometers to calculate time spent walking and bicycling. Compare activity levels of active travel students on days that they walk or bicycle to school against days that they arrive by other modes, or anonymously compare activity levels of active travel students to non-active travel students.</p>	<ul style="list-style-type: none"> Objectively measures distance Can be used as a classroom experiment to engage students and may encourage more walking and bicycling 	<ul style="list-style-type: none"> Higher cost (to purchase tools to track activity) Requires instruction and time to track daily results Subject to user error Could unintentionally single out non-walkers/bicyclists 	<ul style="list-style-type: none"> Report results anonymously so as not to single out non-active travel students

[†] Based on speed (2.9 mph for children)¹⁹

^{††} Based on speed (8.1 mph for children)²⁰

Other Approaches for Understanding Physical Activity and SRTS Programs

The next two strategies will not directly measure the physical activity provided by walking and bicycling to school, however, they can evaluate related indicators and can help identify changes in perceptions if used before activities to promote walking and bicycling begin and then repeated during or after activities have occurred.

The first strategy—surveying parent perceptions of student physical activity levels—can help assess perceived changes in overall physical activity that occur alongside SRTS programs. This information can be collected by adding a question to the National Center’s Parent Survey or creating another questionnaire for parents that asks if they perceive that their children’s physical activity has increased, decreased or stayed the same.

Before implementing this approach, it is important to consider three limitations of the method:

- Volunteer time may be required to collect and analyze the surveys
- Perceived, not actual, changes are being assessed
- Any observed changes cannot be entirely attributed to SRTS without a thorough understanding of all the factors that can affect physical activity levels

The second approach—conducting an active travel climate assessment—helps a SRTS program measure the level of support for walking and bicycling to school that students feel that the school staff provide. This tool does not directly measure the physical activity

benefits of SRTS. Rather, it measures students’ views. A secondary benefit of this approach is that it may provide ideas for better enabling walking and bicycling to school. See the survey by going to the National Center’s online library at http://www.saferoutesinfo.org/online_library and using the search term “School Climate for Active Travel Survey.”

Before using either of these strategies, it is important to consider some of their limitations. Limitations include the fact that volunteer time may be required to collect and analyze the information; that perceived, not actual, changes are being assessed and that any observed changes cannot be entirely attributed to SRTS without a thorough understanding of all the factors that can affect physical activity levels.



A National Evaluation of Safe Routes to School and Physical Activity

The Federal Highway Administration, which operates the federal SRTS program for the U.S. Department of Transportation, has asked the National Center to develop a national evaluation plan for understanding the outcomes of the SRTS program.

Local programs are vital to the success of the federal SRTS legislation and to the walking and bicycling movement as a whole. In fact, understanding how local efforts work provides invaluable insight into the federal SRTS program and is an integral part of national evaluation.

Improving the safety for students and increasing the numbers of students who walk or bicycle to school are the main outcomes for which the SRTS program will be evaluated in the national plan. However, since physical activity benefits can also be an outcome of increased walking and bicycling to school, it is important to establish a model that will standardize ways for local programs to identify any changes in physical activity levels so this outcome can be included in evaluation as well.

There is an opportunity for SRTS programs with a focus on increasing physical activity to use the recommended methods in this report to examine and measure physical activity levels and to compare their findings over time and with similar programs. Once an established system of measurement and data collection is established, physical activity outcomes can begin to be understood or explored at the national level.



Recommendations from the Expert Panel

The expert panel recommended that future federal funding for the SRTS program include requiring a standardized approach for quantifying active travel to school and changes in travel mode. Panel members emphasized that the most important indicator for understanding the physical activity benefits of the SRTS program is a reliable way to count the number of students walking or bicycling to school and document any changes in this number that occur alongside SRTS programs. The National Center's travel tallies offer a potential starting point for this evaluation and these forms could be amended to collect other relevant information. Currently, the National Center's travel tallies measure the number of students walking and bicycling to school but do not capture the travel behavior or distance traveled at the individual level. The travel tally could be changed to collect these kinds of data.

The expert panel also recommended comprehensive research studies as the way to determine if more specific health and physical activity benefits exist from the creation of a SRTS program. If SRTS programs are being implemented as part of a larger initiative to promote physical activity or healthy choices, evaluating the intervention with measures of physical fitness, mental health or behavior, or body mass index may add to the body of

research on health benefits of physical activity and active travel to school. Future studies could enhance what is already known about SRTS and physical activity by using a longitudinal design (a study that follows the same individuals over time) and a standardized set of measures. These characteristics would address some of the limitations of current studies: the challenges of comparing results across studies and the inability to understand whether there is cause and effect between walking and bicycling to school and desired outcomes.

Implications for the Future

This discussion and report come at an important time in our country. The SRTS program is being viewed by many organizations and communities nationwide as part of the solution to some of the health issues the country is currently addressing. The role SRTS programs can play in moving youth away from sedentary lifestyles to being more active is promising but not yet clear. Continuing this discussion and conducting future research studies are necessary to obtain a more complete body of knowledge in this area. Understanding what works at the local level and establishing appropriate national evaluations is a good start to help define how SRTS programs can contribute to the larger goal of raising a healthier generation of American youth.



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