Active Routes to School Evaluation Update from the UNC Highway Safety Research Center (HSRC)

December 2017

Main Evaluation Goals

- Measure changes in the percentage of K-8 students in North Carolina who walk and bicycle to school in settings where those activities are feasible.
- Measure changes in participating schools' readiness to support safe walking and bicycling.
- Measure changes in participating families' walking and bicycling activity.

Main Data Sources and Collection Schedule

Instrument	Who / how reported	Timing
Student Travel Tallies and Parent Surveys	Coordinators are asked to recruit schools and work with them to collect data	• **fall 2014 & spring 2015** (as baseline) • **fall 2015** (first mid-intervention period) • **2016** (second mid-intervention period) • **2017** (third mid-intervention period)
Active Travel Readiness Scale	Coordinators report on the level of readiness to promote walking and bicycling for three to five schools with which they work	Quarterly beginning **fall 2014**
Active Routes to School Progress Reporting System (Formstack)	Monthly process measures submitted by Coordinators to North Carolina Division of Public Health (NCDPH)	Monthly

Key updates from prior evaluation reports

- In 2017, 20 schools collected Travel Tallies for the first time and six schools collected Parent Surveys for the first time.
- Among all 126 Travel Tally-collecting schools, walking to school increased significantly in 2017 relative to baseline (fall 2014 and spring 2015)—from 1.4 to 2.2% to school in the morning, and from 2.2 to 3% home from school in the afternoon.
- Among 86 Parent Survey-collecting schools, the proportion of students being driven between home and school dropped dramatically in 2017 compared to baseline—from 56.9 to 34.6% to school in the morning, and from 43.8 to 21% home from school in the afternoon.

Highlights and Implications for Practice

Key findings

While among schools that collected Travel Tallies or Parent Surveys more than once, walking and biking between home and school did not change significantly, there were indicators of promising shifts in behavior:

- **The impact of in-school champions:** Students who attended schools with in-school champions for safe walking and biking were 60 percent more likely to walk to school and twice as likely to walk home from school as students whose schools lacked a champion. According to model results, many of the students attending schools with champions would have otherwise been driven to school, as champions were associated with a 35 percent lower probability of riding to and from school in cars.
- **The impact of Walk to School Day:** Students whose schools participated in Walk to School Day were between six and eight times more likely than students whose schools did not participate in Walk to School Day to start walking between home and school.
- **Synergies between in-school champions and Walk to School Day:** Students whose schools had a champion AND held a Walk to School Day event were nine times more likely as students whose schools harbored neither champions nor Walk to School Day events.
- **The impact of pedestrian and bicycle safety skills trainings:** Students who attended schools that conducted pedestrian or bicycle safety skills trainings were four times more likely to walk to school than students whose schools did not carry out safety skills trainings. Such trainings did not seem to impact how students got home from school.
- **The impact of parents' positive perceptions and walking to school:** Walking and biking to school most commonly occurred among students whose parents perceived walking and biking to school as fun and healthy for their child.

Results-based implications for practice that derive from all evaluations

- Continue to identify and work with schools where it is theoretically feasible to walk or bike to school to collect school travel mode information.
- Continue to identify, work with, and support in-school champions. These are people who enthusiastically support safe walking and biking to school and use their influence to get other key stakeholders involved.
- Continue supporting schools' Walk to School Day events and allow the schools—especially the schools' champions—to lead the events' organization, promotion, and structure to help develop their sense of ownership.
- Focus on "training the trainers" at schools. This allows trainers to take ownership of pedestrian and bicycle skills training and greatly advances the sustainability of pedestrian and bicyclist safety programming, especially once the Active Routes to School Project is no longer able support the schools' safety training efforts.
- Support walking- and bicycling-focused events that highlight the fun of walking and bicycling between home and school.
- Continue encouraging parents to get involved in schools' programs.

Introduction to Findings from the 2017 Data Collection Effort

This report contains five main sections, including a description of the study sample, followed by Travel Tally Results, Parent Survey and Active Travel Readiness results, and ends with a findings-based discussion, as well as practical implications for Active Routes to School Regional Coordinators' work.

Sample

Considerations for comparing results over time

Given the limited sample size from the originally scheduled baseline in fall 2014, data collected in spring 2015 became part of an "extended baseline," comprised of the two time periods. Data collected in fall 2015 became the "first mid-intervention data"; data collected in the spring and fall of 2016 became the "second mid-intervention data"; and data from the spring and fall of 2017 became the "third mid-intervention data." Findings from 2017 relative to earlier time periods are summarized in this report.

Schools' data collection activity and results

Coordinators helped 126 schools collect Travel Tallies and 86 schools collect Parent Surveys during "baseline" (i.e., fall 2014 and spring 2015), fall 2015, 2016, and 2017 time periods.

Sample representativeness

To assess whether the evaluation team could make generalizable statements about school travel in North Carolina, we compared the counties in which schools that were involved in the evaluation were located with all 100 counties in the state. We found that on average, adults living in the 71 counties represented in the 2017 data collection period were slightly more physically active and more likely to walk or bike to work than the average adult in North Carolina. The study's adult population matched North Carolina's adult population in rates of unemployment—a factor that often predicts more walking in general. Suburban schools were over-represented and city and rural schools were significantly underrepresented in the study. Further, as seen in Table 1, Travel Tally-collecting schools were proportionally over-represented in region 2, whereas Parent Survey-collecting schools were overrepresented in region 2 and to a lesser—though significant—extent in regions 3, 4, and 5. Therefore, the school travel and family walking and biking activity patterns presented here are not representative of all schools or communities in North Carolina.

Table 1. The number and percentage of Travel Tally- and Parent Survey-collecting schools by region.

Region	# Travel Tally Schools	% of All Travel Tally Schools	# Parent Survey Schools	% of All Parent Survey Schools
1	8	6.2%	4	4.1%
2	51	40.2%	29	33.8%
3	16	12.4%	10	12.2%
4	17	13.4%	13	14.9%
5	16	12.4%	10	12.2%
6	0	0.0%	0	0.0%
7	1	1.0%	1	1.4%
8	0	0.0%	0	0.0%
9	7	5.2%	8	9.5%
10	12	9.3%	10	12.2%
Total	**126**	**100%**	**86**	**100%**

Travel Tally Results

The results presented in this section include Travel Tally data collected by schools at baseline, in fall 2015, spring and fall 2016, and spring and fall 2017. The Travel Tally is a show-of-hands accounting of students' travel modes to and from school and is collected at the classroom level.

The outcome and predictor variables used in the negative binomial regression models are presented in Table 2 below. Negative binomial regression models are commonly used to estimate the impact of predictor variables (e.g., students' grade in school) on countable outcomes of interest (e.g., the number of students who walked or biked to school).

Table 2. Outcome and predictor variables used in the statistical models of students' school travel patterns.

Variables	Variable Descriptions
Outcome variables	**# of trips to and from school**: walk bike bus (school bus or transit car (family vehicle or car)
Predictor variables	**Classroom grade** (K - 8th grade)
	School's Census-defined locale: city suburb town rural
	School-level income, i.e., the percentage of students eligible to receive free or reduced-priced lunch: < %40 = high income 40-75% = medium income 75% = low income
	Month (Jan - Dec)
	Time period: baseline (fall 2014 & spring 2015) fall 2015 spring & fall 2016 spring & fall 2017

Table 3. Results from 126 Travel Tally-collecting schools derived from negative binomial regression models which clustered responses by school.

Time		# of Trips	Walk	Bike	Bus	Car	Other
Baseline, fall 2014 & spring 2015	Morning	48,061	1.4%	0.2%	43.6%	54.6%	0.1%
	Afternoon	46,413	2.2%	0.3%	58.4%	38.4%	0.7%
Mid-intervention, fall 2015	Morning	42,346	2.9%	0.1%	43.8%	53.1%	0.1%
	Afternoon	41,645	3.6%	0.2%	56.6%	38.7%	0.9%
Mid-intervention, spring & fall 2016	Morning	54,920	2.0%	0.1%	44.4%	53.3%	0.2%
	Afternoon	53,619	2.7%	0.1%	57.7%	38.2%	1.4%
Mid-intervention, spring & fall 2017	Morning	8,038	2.2%	0.1%	43.7%	53.6%	0.3%
	Afternoon	7,722	3.0%	0.1%	55.5%	40.0%	1.3%

Predictors of travel mode choice between home and school from 126 Travel Tally-collecting schools.

- **Walk:** Compared with baseline travel patterns, students were twice as likely to walk to school in fall 2015 and 81 percent more likely to walk to school in 2017 (Table 3). This increase in walking to and from school derived mostly from schools that collected Travel Tallies more recently and enrolled higher-than-average proportions of students who walked between home and school. Across all time periods, middle school students who attended city schools were more likely than other students to walk to school.
- **Bike:** Students attending high income schools in cities and town were most likely to bike between home and school. Biking home from school started to drop 2016 compared to baseline and, but started leveling off at 0.1 percent in 2017. Given the low participation in biking and from school across time periods, it is difficult to determine why biking declined relative to baseline.
- **Bus:** The proportion of students who rode a bus or in a car to and from school did not shift significantly from baseline through 2017. Middle school students attending schools in rural areas were more likely than other students to ride a bus between home and school.
- **Car:** The proportion of students who rode in a car to and from school also did not shift significantly from baseline through 2017. Middle school students attending high income schools were most commonly driven to and from school.

Travel Tally results that compare the same group of schools over time

Table 4. Results from 38 schools that collected Travel Tallies at baseline, fall 2015, 2016, and 2017. Results are derived from negative binomial regression models which clustered responses by school.

Time		# of Trips	Walk	Bike	Bus	Car	Other
Baseline, fall 2014 & spring 2015	Morning	17,304	0.8%	0.0%	42.1%	57.0%	0.0%
	Afternoon	16,803	1.8%	0.1%	61.2%	36.4%	0.6%
Mid-intervention, fall 2015	Morning	15,263	0.4%	0.1%	42.5%	57.0%	0.0%
	Afternoon	14,963	1.1%	0.0%	59.9%	37.6%	1.4%
Mid-intervention, spring & fall 2016	Morning	18,564	1.0%	0.1%	38.9%	60.0%	0.1%
	Afternoon	18,431	1.5%	0.1%	54.8%	42.4%	1.2%
Mid-intervention, spring & fall 2017	Morning	8,038	1.2%	0.1%	42.7%	55.7%	0.3%
	Afternoon	7,722	1.8%	0.1%	56.5%	40.3%	1.3%

Given that 38 schools collected Travel Tallies across all four time periods—i.e., baseline, fall 2015, 2016, and 2017—we had an opportunity to explore trends in these school travel patterns.

Predictors of travel mode choice between home and school from 38 Travel Tally-collecting schools.

- **Walk:** The proportion of students who walked to and from school did not change significantly from baseline through 2017. Instead, walking percentages hovered around one percent in the morning and between 1.5 and two percent in the afternoon (Table 4). Walking most commonly involved middle school students who attended high income schools located in cities and suburbs.
- **Bike:** Biking increased significantly from baseline through 2017, however, participation did not exceed 0.1 percent. Biking to and from school most commonly occurred at medium and high-income schools in cities.
- **Bus:** The percentage of students who rode a bus to and from school did not shift significantly from baseline through 2017. Riding on a bus between home and school tended to involve middle school students.
- **Car:** The proportion of students who traveled between home and school in a car also did not shift significantly during this time. Middle school students were more likely than younger students to ride in a car to school, especially when they attended high and medium-income schools.

Students who attended those schools that collected Travel Tallies at baseline, in fall 2015, 2016, and in 2017 (n = 38 schools) were less likely than students who attended all 126 Travel Tally-collecting schools to walk or bike to and from school, and were more likely to be driven between home and school. This suggests that schools' agreement to collect Travel Tallies did not reflect whether it was feasible to walk or bike to school. As seen in the "sample representativeness" section and Table 1 above, Travel Tally-collecting schools in this sample were over-represented in Active Routes to School region 2 and located predominantly in mountainous, suburban locations, which may have skewed results toward schools at which it was simply not feasible to walk or bike.

Analysis of school-level interventions and travel mode outcomes

The following analysis involves 39 schools that collected Travel Tallies between 2015 and 2017 and conducted walking and biking activities in the time between those years. This analysis describes associations between school-based activities (i.e., Walk to School Day event participation, implementation of school- or district-level active transportation policies, the presence of an in-school champion for safe walking and bicycling to school, and pedestrian and bicycle safety skills trainings) and students' use of different school travel modes.

HSRC gathered information on intervention strategies from Formstack documentation, which DPH provided HSRC starting in March 2016. The documentation shared included interventions that occurred in 2015 and 2017. HSRC linked these school-level interventions with schools' Travel Tally results and included intervention and Travel Tally variables in the analysis. The research team then estimated statistical models that associated the presence of in-school champions, policies, trainings, and Walk to School Day participation with students' use of different school travel modes (i.e., walk, bicycle, school bus, car, and other modes).

The next section describes travel mode results from 39 schools that collected Travel Tallies between fall 2015 and 2017 and carried out intervention activities in between these data collection times. Estimates come from negative binomial regression models which clustered responses by school. This modeling approach is commonly used to estimate associations between predictors (e.g., pedestrian safety training) and outcomes that involve counts of events (e.g., the number of walking and biking trips to school).

Figure 1. Traveling to (left) and from (right) school by Walk to School Day participation (2015-2017).

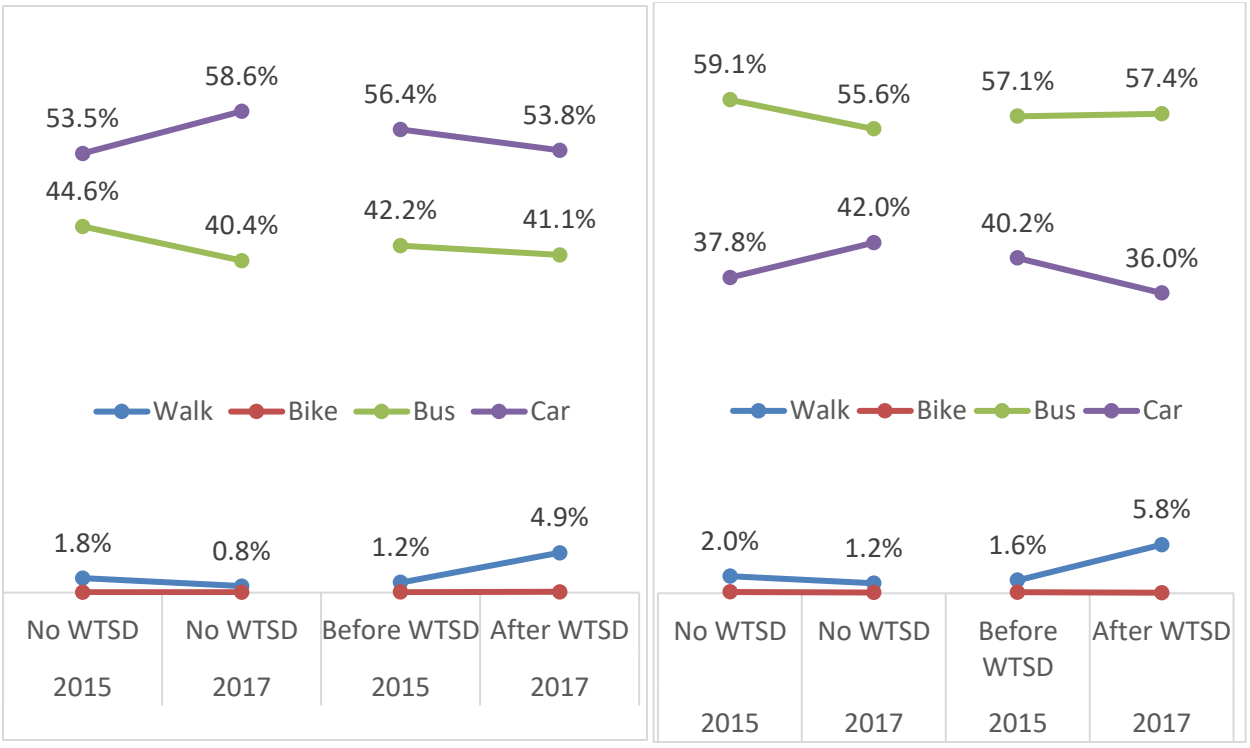
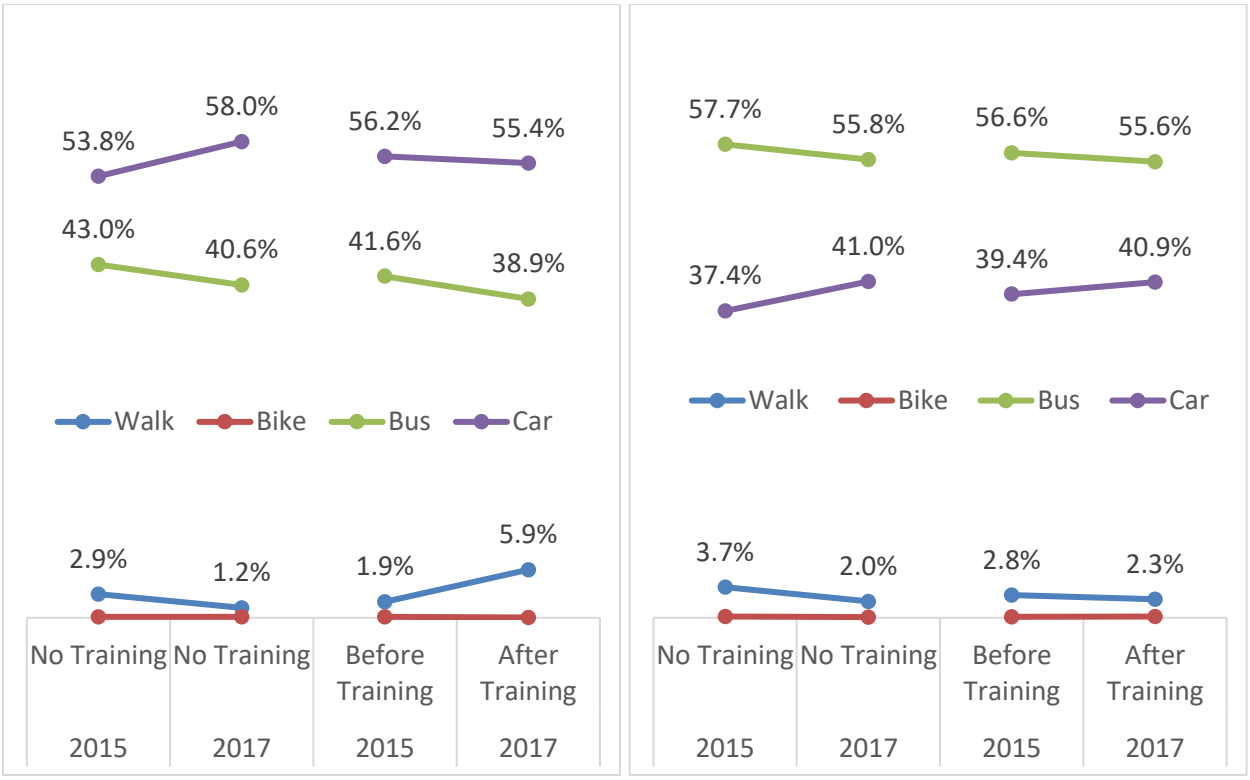


Figure 2. Traveling to (left) and from (right) school by safety training participation (2015-2017).



Walk to School Day-related results: Students were eight and six times more likely to walk to and from school, respectively, when their school participated in Walk to School Day in 2015 or 2016 compared with students whose schools did not participate in Walk to School Day in 2015 or 2016. Schools' participation in Walk to School Day was not significantly associated with bicycling or riding on a bus or in a car between home and school (Figure 1).

Training-related results: Those students who engaged in safety skills training—i.e., one or more pedestrian or bicycle skills training sessions taught either by a teacher or an Active Routes to School Regional Coordinator— were five times more likely to walk to school than those students who did not participate in safety training. However, the same training-walking association was not significant when it came to walking home from school (Figure 2). This could be because parents were more likely to accompany their children on the way to school—perhaps because of work schedules—and less likely to accompany them home. That is, pedestrian safety skills training may have inspired children to practice safe walking with their parents, something which may have been less feasible on their trip home from school.

The presence of an in-school champion: Students attending schools with in-school champions were 60 percent more likely to walk to school and twice as likely to walk home from school as students whose school lacked a champion. According to model results, many of the students attending schools with champions would have otherwise been driven to school, as champions were associated with a 35 percent lower probability of riding to and from school in cars, though not associated with busing between home and school.

The presence of an in-school champion interacted with schools' participation in Walk to School Day to produce positive synergistic effects. Students whose schools had a champion AND held a Walk to School

Day event were nine times more likely to walk to school as students whose schools had neither champions nor a Walk to School Day event. In contrast, the presence of an in-school champion and schools' participation in pedestrian and bicycle safety skills training were not significantly associated. It could be that school staff and involved parents tend to help organize and promote Walk to School Day events, whereas they may assume a less active role in schools' engagement with safety trainings.

Parent Survey Results

The results presented in this section reflect Parent Survey data collected by schools at baseline, in fall 2015, in 2016, and in 2017. The Parent Survey captures the school travel modes students use "on most days" as well as parents' perceptions about walking and bicycling between home and school.

Parent Survey data analysis involved estimating mixed-effects logistic regression models, which captured school-level random effects. These models are commonly used to estimate the probability of outcomes that involve choice (e.g., school travel mode decisions) and that account for the fact that observations gathered from the same "group—such as a school—are probably more strongly correlated with one another than observations gathered from different groups—or schools in this case. As with the Travel Tally analyses, the "month" predictor variable was used as a control in this Parent Survey analysis to account for the potential influence that regularly occurring events or seasons (e.g., Walk to School day, which occurs each October; winter months' influence) may have had on children's school travel patterns.

Table 5. Outcome and predictor variables used in the statistical models of students' school travel patterns.

Variables	Variable Descriptions
Outcome variables	**# of trips to and from school**: walk/bike bus (school bus or transit car (family vehicle or car)
Predictor variables	**Student's grade** (K - 8th grade)
	Student's sex
	School's Census-defined locale: city suburb town rural
	School-level income, i.e., the percentage of students eligible to receive free or reduced-priced lunch: < %40 = high income 40-75% = medium income 75% = low income
	Month (Jan - Dec)
	Time period: baseline (fall 2014 & spring 2015) fall 2015 spring & fall 2016 spring & fall 2017

Variables	Variable Descriptions
	Distance from school within 1 mile between 1 and 2 miles more than 2 miles
	Whether child asked for permission to walk or bike to school
	Whether or not parent was comfortable allowing their child to walk or bike to school
	Whether or not parent thought their child's school encouraged walking or biking to school
	Whether or not parent thought walking or biking to school were fun for their child
	Whether or not parent thought walking or biking to school were healthy for their child

Table 6. Results from 86 Parent Survey-collecting schools derived from mixed-effects logistic regression results, which captured school-level random effects.

Time		# of Surveys	Walk/Bike	Bus/Transit	Car	Other
Baseline, fall 2014 & spring 2015	Morning	6,399	3.5%	37.3%	56.9%	2.3%
	Afternoon	6,208	4.0%	49.1%	43.8%	3.1%
Mid-intervention, fall 2015	Morning	3,140	2.7%	42.1%	55.1%	0.1%
	Afternoon	3,084	4.5%	54.4%	40.9%	0.2%
Mid-intervention, spring & fall 2016	Morning	1,132	3.4%	40.9%	54.3%	1.4%
	Afternoon	1,109	3.7%	45.3%	48.1%	2.9%
Mid-intervention, spring & fall 2017	Morning	369	2.5%	63.4%	34.6%	0.9%
	Afternoon	366	4.9%	73.8%	21.0%	0.7%

Results from all 86 Parent Survey-collecting schools suggest that traveling between home and school in a car dropped significantly in 2017 compared with earlier years. At the same time, a significantly higher proportion of students rode on a bus to and from school. However, it is worth noting that the number of Parent Surveys included in the analyses has been decreasing each year (Table 6).

Predictors of travel mode choice between home and school from 86 Parent Survey-collecting schools.

- **Walk/Bike:** After distance from school, parents' perceptions of how much fun and healthy walking and biking to school is for their child predicted whether their child walked or biked between home and school. Further, children asking parents to walk or bike to school were strongly associated with walking or biking to school.
- **Bus:** Children who asked permission to walk or bike to school—and whose parents thought walking and biking to school was healthy for their child—were significantly less likely to ride a

bus to and from school. Students who rode a bus between home and school were most commonly older and lived beyond two miles from school.

- **Car:** Children whose parents who thought walking and biking to school was fun were less likely to be driven to school. Those who rode in a car between home and school were most commonly younger students who lived more than two miles from school.

Though we do not know why the Parent Survey results differ from the Travel Tally results, three potential reasons could likely explain the differences: (1) in most cases, different schools collected either Travel Tallies or Parent Surveys, only a handful of schools collected both, so the data collection instruments capture responses from different groups of people; (2) Parent Surveys capture how children travel between home and school "on most days", whereas Travel Tallies capture how children get to and from school during two or three days in a given week; and (3) Parent Surveys solicit information on children's estimated distances from school, as well as parents' perceptions of walking and bicycling to school, which is information the Travel Tallies do not solicit.

Predictors of parents' and students' walking or biking activity from 86 Parent Survey-collecting schools.

***Note:** none of the 5 schools most recently added to the list of Parent Survey-collecting schools gathered information on parents' walking and biking activity. Therefore, the results reported here pertain to data from 2016 and before.

- **Parent walked/biked to school with child:** The amount of time parents spent accompanying their children on the walk or bike to school did not shift significantly from baseline through 2016 ($p = 0.115$).
- **Child walked/biked after school or on the weekend:** Parents reported that their children walked and biked an average of 30 percent longer in 2016 than at baseline (baseline: $M = 106.83$ min, $SD = 7.82$ min; 2016: $M = 136.54$ min, $SD = 7.44$ min). Parent-perceived fun and health of walking and biking to school, as well as schools' encouragement of walking and biking to school was strongly associated with students' walking and biking activity after school and on the weekend. This was especially true among younger students who attended town-based and rural schools.
- **Parent walked/biked:** Parents reported walking or biking 40 percent longer over the past week in 2016 than at baseline (baseline: $M = 125.10$ min, $SD = 4.90$ min; 2016: $M = 183.80$ min, $SD = 23.34$ min). Parent-perceived fun of walking and biking to school was associated with parents' general walking and biking activity. And parents with students enrolled in higher income suburban, town-based, and rural schools that encouraged walking and biking to school walked and biked the most. Moreover, parents whose children walked or biked to school walked or biked 25 percent longer over the past week than parents whose children did not walk or bike. This child-parent walk/bike relationship held independently of whether parents accompanied their child on the walk or bike trip to school.

Parent survey results from the May 2016 evaluation report—which pertained to baseline and fall 2015 results—featured Parent Survey results from 20 schools where it was "theoretically feasible" to walk or bike between home and school. Unfortunately, no such schools administered Parent Surveys in 2016 or 2017. Further, no schools involved in Parent Survey data collection prior to 2017 were involved in the 2017 data collection effort. Thus, we are unable to report on Parent Survey-derived trends in school travel. Nonetheless, it is worth noting that in the previous evaluation report, HSRC identified the

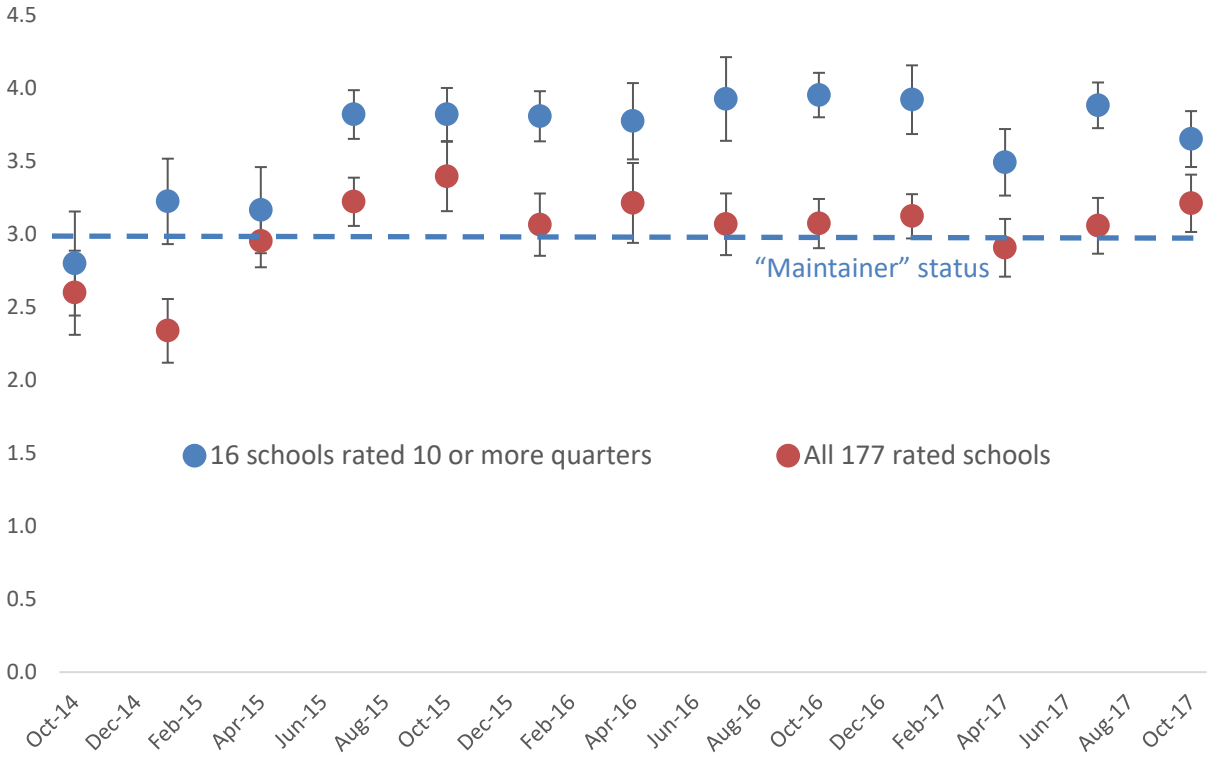
importance of parent-perceived health for predicting walking or biking to schools where it is theoretically feasible to walk or bike.

Active Travel Readiness Ratings

The Active Travel Readiness Scale is a measure of Active Routes to School Coordinators' perceptions of schools' interest in and engagement with walking and bicycling to and at school. Each quarter, Coordinators assign a score of 0 ("No Interest, No Activity") to 5 ("Lots of interest, Many activities, Seeking more to do") for up to 10 schools with which they work intensely (for more information on the scale, see the Appendix).

Ordinary least squares regression models controlling for schools' locale and school-level income revealed that between September 2014 and October 2017, Coordinators' ratings of schools' Active Travel Readiness increased significantly, though they were generally higher in the fall months (Figure 3).

Figure 3. Estimated Active Travel Readiness ratings over time (with 95% confidence bands).



Across all 177 schools Coordinators rated: Looking across the 177 schools that Coordinators rated any time from October 2014 and October 2017 (in red in Figure 3), most of these schools enhanced their readiness starting in the summer of 2015. They maintained higher ratings through the early part of 2017, when their ratings dipped slightly in the spring 2017, then rebounded in the summer and fall months of 2017. On average, Coordinators tended to rate schools somewhere between a "Maintainer 1" and "Maintainer 2" archetype (Figure 3). That is, in general, the schools Coordinators have worked with most intensely have tended to show a good deal of interest in promoting safe walking or biking to school and have carried out a few to several activities each year (see the Appendix for more information on the Active Travel Readiness Scale).

Among the 16 schools that Coordinators rated at least 10 quarters: Starting in July 2015, Coordinators consistently rated these schools' readiness as higher than average. assessed these schools as accelerating their readiness as faster-than-average. Since July 2015, these 16 schools' ratings hovered at or above a "Maintainer 2" level of readiness (Figure 3). This suggests that the 16 schools Coordinators rated 10 or more quarters conducted promotional activities frequently and often sought to incorporate safe, walking or biking to into the schools' cultures.

Across all 177 rated schools—and to a lesser extent, the 16 schools that were most frequently rated—their Active Travel Readiness rating were lowest in the summer and winter months and highest closest to national events such as Walk and Bike to School Days. This suggests that schools' participation in walking and biking activities may be associated seasonal weather patterns. It is also possible that times surrounding promotional events were when Coordinators more frequently interacted with schools. Thus, during these times, Coordinators may have perceived a relatively high degree of school-level activity compared with other times of year—i.e., when Coordinators may have been less certain of schools' activity and therefore more likely to assign them a slightly lower readiness score. However, it is heartening to see that on average, those schools Coordinators have worked with most intensely have sustained "Maintainer" status, indicating that they have consistently carried at a few promotional activities year after year (Figure 3).

Discussion and Implications for Active Routes to School Regional Coordinators' Work

This evaluation report marks the fourth produced for the Active Routes to School Project. Considering 2017 results with prior evaluation findings, a few trends have emerged. First, schools have continued to choose to collect Travel Tallies rather than Parent Surveys. Only five schools new to collecting data administered Parent Surveys, whereas 20 new data-collecting schools administered Travel Tallies.

Further, as reflected in the 126 Travel Tally-collecting schools' results, it appears that schools newer to collecting tallies may represent places where on average it is more feasible to walk to school. This could be in response to conversations about where to collect school travel information, Coordinators have more recently engaged "feasibly walkable" schools in gathering data. Moreover, we know that over time, schools have expressed greater interest in Active Routes to School. Whereas earlier in the Project, Coordinators initiated contact with schools, many schools have more recently reached out to the Coordinators to set up safe walking and biking programs. Coordinators seem to have developed a knack for nudging school communities toward considering walking and biking as viable means of transportation and recreation. They are planting the seeds of culture change.

As discussed in the last evaluation report, schools' participation in Walk to School Day events and safety skills trainings, and the presence of in-school champions were strongly and positively associated with walking to school. Moreover, it seems that champions may have boosted the impact of WTSD to promote more walking. The following discussion highlights implications for practice that derive from past evaluation, yet reinforces previously shared implications that might inform the nature of Active Routes to School Regional Coordinators' work.

Implications and recommendations that derive from all evaluations

Results from all 126 Travel Tally-collecting schools. Compared with baseline travel patterns, students were twice as likely to walk to school in fall 2015 and 81 percent more likely to walk to school in 2017. It is encouraging to see that Coordinators appear to be working with schools to and from which it may be more feasible to walk or bike. ***Practical implications:*** *Continue to identify and work with schools where it is theoretically feasible to walk or bike to school to collect school travel mode information. This way, we will all get clearer sense of whether and to what extent the Active Routes to School Project is meeting its overarching goal to increase the number of elementary and middle school students in North Carolina who safely walk and bike to school.*

The strong influence of in-school champions. Once again, 2017 evaluation findings highlight the influential role of in-school champions. Students whose schools had an in-school champion were 2.5 times more likely to walk to school and 35 percent less likely to travel between home and school in a car than students whose schools lacked a champion. Not only that, the presence of champions interacted with WTSD events to produce synergistic effects. Students in schools with both champions and WTSD events were nine times more likely to walk to school than students with neither champions nor WTSD. ***Practical implications:*** *Continue to identify, work with, and support in-school champions. These are people who enthusiastically support safe walking and biking to school and use their influence to get other key stakeholders involved. Work with these champions to spread the word about the benefits of safe walking and biking and uncover ways of removing real and perceived barriers to participating in these activities. It stands to reason that nurturing in-school champions also serves as a key sustainability strategy.*

The potential influence of Walk to School Day and safety trainings. Students whose schools hosted WTSD events were between six and eight times more likely to walk to and from school than students whose schools did not organize WTSD events. Additionally, students attending schools that conducted pedestrian or bicycle safety trainings were four times more likely to walk to school—though not more likely to walk home from school—than students attending schools that had not conducted trainings.

Whereas the presence of an in-school champion seemed to have bolstered the impact of Walk to School Day on students' participation in walking between home and school, the same was not true of the champions' relationships with pedestrian and bicycle safety trainings. It might be that by design, Walk to School Days are locally organized and promoted. The Active Routes to School Coordinators may assist schools with coordinating the event, securing promotional materials, etc., yet it is ultimately up to community and school volunteers to set up and put on these events. Pedestrian and bicycle safety trainings on the other hand, need not be locally organized and promoted. Examining the Coordinators' activity-related text descriptions, it appears that many—if not most—safety trainings are set up by the Coordinators themselves or the schools' physical education teacher. Moreover, the trainings probably do not receive the level of school-based promotion that Walk to School Day events are likely to have received. ***Practical implications:*** *Continue supporting schools' Walk to School Day events and allow the schools—especially the schools' champions—to lead the events' organization, promotion, and structure. Focus on "training the trainers" at schools. This allows trainers to take ownership of pedestrian and bicycle skills training and greatly advances the sustainability of pedestrian and bicyclist safety programming, especially once the Active Routes to School Project is no longer able support the schools' safety training efforts.*

Schools showing greater interest in walking and biking. in general, the schools Coordinators have worked with intensely have tended to show a good deal of interest in promoting safe walking and biking to school and have carried out a few to several activities each year (see the Appendix for more information on the Active Travel Readiness Scale). And though schools' participation in walking and biking activities varied according to seasonal weather patterns, most of Coordinator-rated schools have consistently carried out a few promotional activities year after year (Figure 3).

The "fun factor." Parents' perceptions of the level of fun walking or biking to school was for their children continued to be the strongest predictor—after distance from school—of whether children walked or biked. These students were also less likely to be driven to and from school. Not only that, perceived fun was the strongest predictor of whether and how much parents walked or biked to school with their children, how much children walked or biked after school and on the weekend, and how much parents walked or biked in general. ***Practical implications:*** *Support walking- and bicycling-focused events that highlight the fun of walking and bicycling between home and school. Capturing photos and videos of smiling families and school staff can communicate the community-oriented benefits of active school travel to school administrators and other decision-makers. While fun might sound too "soft" for a serious strategy, it seems to hold promise for supporting impactful change.*

Parents' and students' walking and bicycling activity over time. As of 2016, parents reported they walked or biked 40 percent longer in 2016 than did parents at baseline. Additionally, they reported that their children walked and biked an average of 30 percent longer in 2016 than did children at baseline. Not only that, parents and children's walking and biking activity seemed to influence one another. When children tended to walk or bike to school, their parents walked and bicycled 25 percent longer more in general than parents whose children did not walk or bike (p = 0.013). This child-parent walk/bike relationship held independently of whether parents accompanied their child on the walk or bike trip to school. Further, parents whose children attended schools in rural areas walked or biked an average of 36 percent longer throughout the previous week than parents whose children attended city schools (rural: M = 147.82 min, SD = 11.17 min; city: M =108.95 min, SD = 12.36 min). The "causal direction" this parent-child walk/bike relationship is not yet clear. However, results suggest that their children—and by association, their children's school—may influence parents' walking and biking behavior more than the other way around. For one, in 2016, only five percent of parents' walking and biking activity was attributable to their walking and biking to school with their children. Moreover, schools' perceived encouragement of walking and biking did not predict students' walking and biking to school. It did, however, predict parents' walking and biking activity (p = 0.048). ***Practical implications:*** *Continue encouraging parents to get involved in schools' programs. Recruit them to lead walking school buses from homes or remote drop-off locations; invite parents who walk or bike to school to socialize with other parents and school staff during drop-off and pick-up transition times, thereby creating a sense of community; invite parents as special guests to participate in on-campus walking programs; and improve infrastructure so more adults and children may walk and bike separated from traffic.*

Asking parents' permission to walk or bicycle to school. Students who asked for their parents' permission to walk or bicycle to school were more likely to use these travel modes. Also, asking permission to walk or bike was negatively associated with riding a bus between home and school. ***Practical implications:*** *Consider engaging schools toward encouraging students to discuss transportation options with their families. This could be accomplished through homework assignments or service learning projects.*

Schools' encouragement of walking and bicycling to and from school. Overall, parents' perceptions of schools' encouragement of walking and biking to school was not associated with active school travel among all 81 Parent Survey-collecting schools. However, schools' perceived encouragement of active school travel modes strongly predicted students walking and bicycling activity after school and on the weekend, as well as parents' walking and bicycling activity. This school encouragement-parent walking and biking activity relationship was especially strong in towns and rural areas, suggesting that schools either play a more influential role in family life in such areas or that people who live in small towns and rural locations are more likely than their urban and suburban counterparts to walk or bike for recreation. ***Practical implications:*** *Consider using prominent banners that promote safe walking and bicycling to school and elsewhere; placing bike racks in visible locations at school and around town; developing school policies that include safe walking and bicycling as an objective; and using consistent school-parent communications that feature walking and bicycling as viable transportation options. These strategies can create a welcoming community climate for safe walking and bicycling.*

Appendix

School archetypes using the Active Travel Readiness scale

Coordinators are prompted with: "This school community…"

...is not interested in promoting safe walking/biking and hasn't conducted any activities.	…shows some interest in promoting safe walking/biking, but hasn't gotten involved yet.	…shows some interest in promoting safe walking/biking, and has done a few activities to promote them.	…shows a lot of interest in promoting safe walking/biking and has consistently done one or two activities each year.	…shows a lot of interest in promoting safe walking/biking and has consistently done several activities each year.	…shows a lot of interest in promoting safe walking/biking, has consistently done numerous activities, and wants to do more to make walking/biking to (or at) school an important part of the school's culture.
Keywords for classifying a school					
No interest No activity	Some interest No activity	Some interest A little activity	Lots of interest A few activities	Lots of interest Many activities	Lots of interest Many activities Seeking more to do
Archetype					
Resistor	Beginner-1	Beginner-2	Maintainer-1	Maintainer-2	Maintainer-3
Active Travel Readiness score					
0	1	2	3	4	5