EFFECTS OF FUNDING ALLOCATION FOR SAFE ROUTES TO SCHOOL PROGRAMS ON ACTIVE COMMUTING TO SCHOOL, SELF-REPORTED PHYSICAL ACTIVITY, AND ENVIRONMENTAL FACTORS

Deanna Hoelscher, PhD RD LD CNS, Diane Dowdy, PhD, Chanam Lee, PhD, Jingang Miao, PhD, Suojin Wang, PhD, Donna Nichols, MSEd, CHES, Heather Atteberry, MPH, Alexandra Evans, PhD, MPH, Tiffni Menendez, MPH, Marcia G. Ory, PhD, MPH

MICHAEL & SUSAN DELL CENTER *for* HEALTHY LIVING

THE UNIVERSITY *of* TEXAS SCHOOL OF PUBLIC HEALTH AUSTIN REGIONAL CAMPUS

Robert Wood Johnson Foundation

PUBLIC HEALTH TEXAS A&M HEALTH SCIENCE CENTER

Texas SRTS Policy

Barriers to SRTS:

Distance

Safety

Weather

Traffic

School policies

- SRTS include education, enforcement, encouragement, evaluation and engineering plans
- For Texas, **two types** of grants were awarded in 2007:
  - Infrastructure grants, which include 'brick and mortar' type projects, such as construction of crosswalks, sidewalks, etc. (n = 56)
    - Schools need to have a SRTS plan in place first
  - Non-infrastructure grants, which include a SRTS plan, which may or may not include potential infrastructure changes (n = 194)

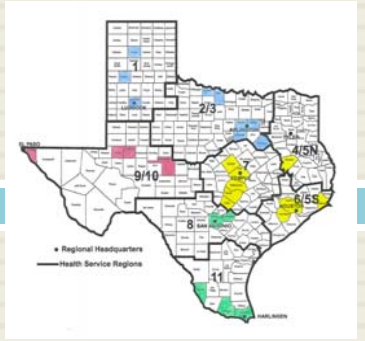
Study Objectives

Comparison of 3 groups

- **Infrastructure (I)**
- **Non-Infrastructure (NI)**
- **Comparison (C)**

- Purpose
  - To determine the effects of differing funding allocation methods on ACS 3 years after implementation (2009-2012)
- Natural experiment
  - Quasi-experimental
- Study hypotheses
  - For ACS, infrastructure funding schools > non-infrastructure funding schools > comparison schools

Methods



Timeline:

Baseline data in 2009

Interim data in 2010 & 2011

Follow up data in 2012

- Funded schools were selected for measurement based on funding type, location (urban/rural), race/ethnicity, and socioeconomic status (SES); comparison schools had similar characteristics but received no funding.
- Timeline for implementation varied by funding allocation.

Methods

ACS Counts:

-4th grade children

-2 days of data collection

-Validity

- Morning & afternoon ACS counts obtained by child self-report at 4 time points
- At baseline and follow up:
  - Serial cross-sectional survey data were collected from parents and 4th grade children using validated questionnaire items
  - Built environment characteristics were measured using GIS and an audit instrument (Lee et al., 2013)
  - School-level questionnaire used for determination of implementation of SRTS policies

Data Analysis

- Data were analyzed using **mixed linear regression** and controlled for random and fixed effects, and other independent variables.
- **Growth curve models** were fit to represent the repeated measures of ACS percentages as a function of time and school type, controlling for weather.

Measurement Periods and Sample Size

	Baseline (T1)	Interim (T2)	Interim (T3)	Follow Up (T4)
Time Range	Mar-Dec, 2009	May-June, 2010	May-June, 2011	April-May, 2012
TOTAL Schools	*78*	*52*	*61*	*73*
Comparison	34	24	23	30
Infrastructure	23	14	19	23
Non-infrastructure	21	14	19	20
ACS to School	12154	9755	10709	11635
ACS from School	12134	9707	10649	11579

Child Participant Demographics

Variable	Infrastructure		Non-Infrastructure		Comparison	
	Baseline	Follow up	Baseline	Follow up	Baseline	Follow up
Male, %[1]	48.7	51.3	46.9	53.1	50.5	50.7
African Amer, %[2]	6.6	7.6	6.8	7.2	7.2	6.8
Hispanic/ Latino, %	70.0	70.6	62.0	65.1	61.4	62.6
White, %	19.8	17.7	28.2	23.2	24.8	26.9
Other, %	3.6	4.1	3.0	4.5	2.5	2.1

[1]Self-reported by student; [2]Reported by parent

Student Self-Reported Data in 2009 and 2012 (n = 3315 and 3977)

Variable	Infrastructure		Non-Infrastructure		Comparison	
	Baseline	Follow up	Baseline	Follow up	Baseline	Follow up
Neighborhood Safety	3.7 ± 2.0	3.8 ± 2.0	3.8 ± 1.9	3.6 ± 2.1	3.7 ± 2.0	3.7 ± 2.1
Parent Support for PA	7.9 ± 3.3	8.2 ± 3.5*	8.0 ± 3.3	8.1 ± 3.6	7.8 ± 3.4	8.2 ± 3.6*
Friends ACS	1.6 ± 1.8	1.5 ± 1.8	1.6 ± 1.8	1.6 ± 1.8	1.3 ± 1.7	1.4 ± 1.8*
Self-efficacy	27.5 ± 9.7	27.6 ± 9.6	27.7 ± 9.3	26.6 ± 9.5*	25.2 ± 8.8	26.1 ± 9.3*
Days of PA	4.3 ± 2.2	4.2 ± 2.1	4.4 ± 2.1	4.4 ± 2.1	4.2 ± 2.2	4.2 ± 2.1
Days of exercise 30 m	4.2 ± 2.4	4.4 ± 2.3	4.1 ± 2.4	4.5 ± 2.2*	4.2 ± 2.5	4.5 ± 2.2*

*p<0.05

Parent Self-Reported Data in 2009 and 2012 (n = 2053 and 2080)

Variable	Infrastructure		Non-Infrastructure		Comparison	
	Baseline	Follow up	Baseline	Follow up	Baseline	Follow up
Neighborhood Walkability	6.3 ± 2.9	5.5 ± 2.8	6.8 ± 3.2	6.4 ± 3.2	6.4 ± 3.2	5.8 ± 3.2+
Rules for child walking	1.1 ± 1.3	1.2 ± 1.3	1.2 ± 1.3	1.2 ± 1.4	1.0 ± 1.3	1.2 ± 1.4+
School walkability	7.2 ± 3.5	6.2 ± 3.0	7.5 ± 3.8	5.9 ± 3.4	7.2 ± 4.0	5.6 ± 3.6+
Self-efficacy	19.6 ± 6.0	19.8 ± 6.6	20.8 ± 7.2	20.1± 7.0	19.1 ± 6.4	19.5 ± 6.7
Outcome expectations	13.5 ± 4.3	13.9 ± 4.4	14.2 ±4.5	13.7 ± 4.3*	13.3 ± 4.4	13.5 ± 4.5
PA Knowledge	6.5 ± 2.9	7.5 ± 2.1	6.5 ± 2.9	7.5 ± 2.1	6.5 ± 2.9	7.6 ± 2.1+

Summary of Trend Analysis

- Morning ACS:
  - I and NI schools had higher ACS than C ($p = 0.024$, $p = 0.013$)
  - Adverse weather decreased morning ACS ($p = 0.043$)
  - No significant overall linear trend for morning ACS ($p = 0.746$)
  - Group x Time interaction for morning ACS between NI and C ($p = 0.014$)
- Afternoon ACS:
  - NI schools had marginally higher afternoon ACS than C ($p = 0.084$)
  - Overall increasing trend for afternoon ACS ($p = 0.015$)
  - Group x Time interaction for afternoon ACS between NI and C ($p = 0.009$)

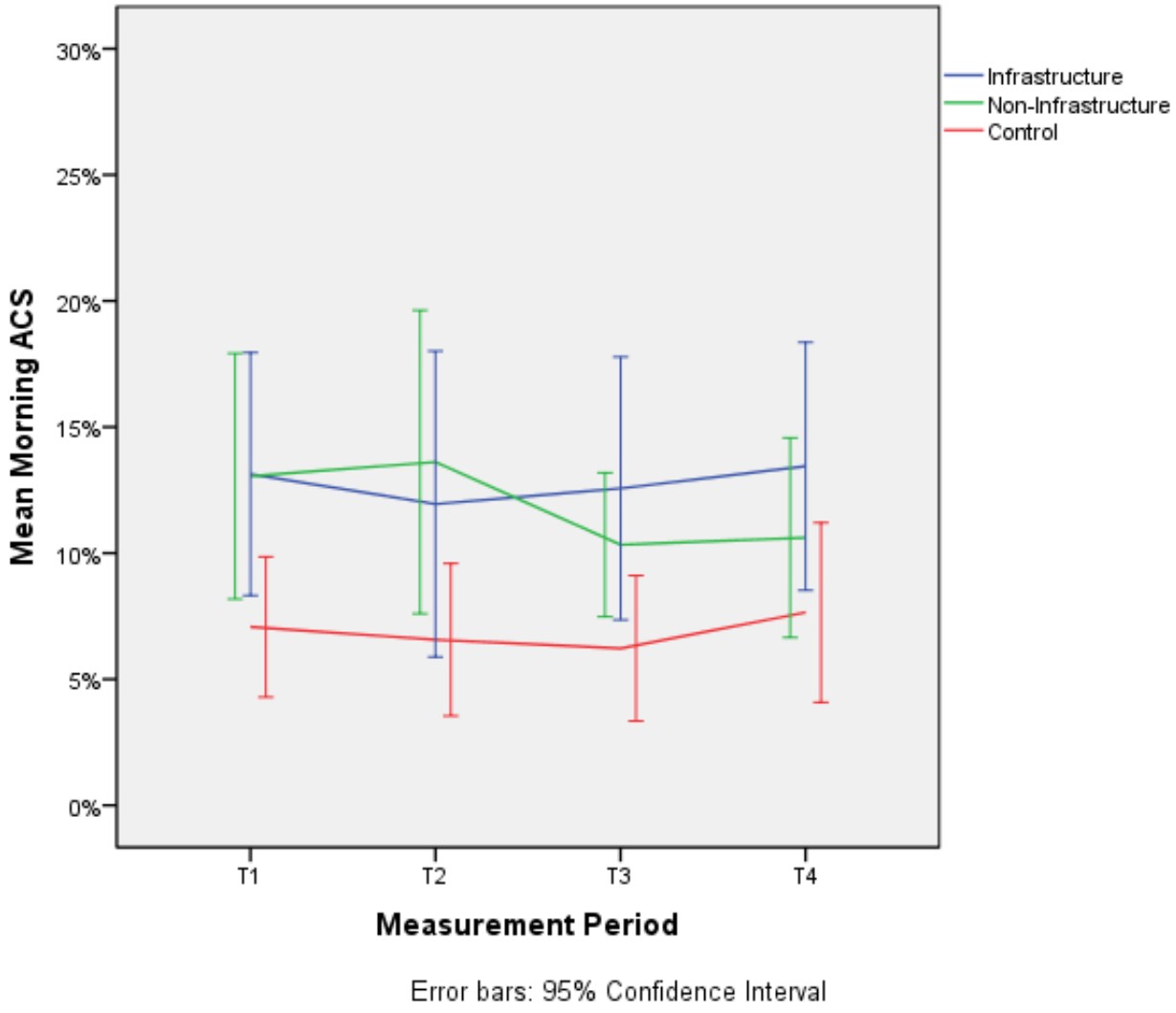
Summary of Trend Analysis (cont)

- Total Mean ACS
  - I schools had marginally higher and NI schools had higher mean ACS than C schools ($p = 0.078$, $p = 0.036$)
  - Adverse weather decreased day ACS ($p = 0.017$)
  - Group x Time interaction between NI and C schools ($p = 0.002$)

Change in

Mean **Morning ACS** by Group over Time

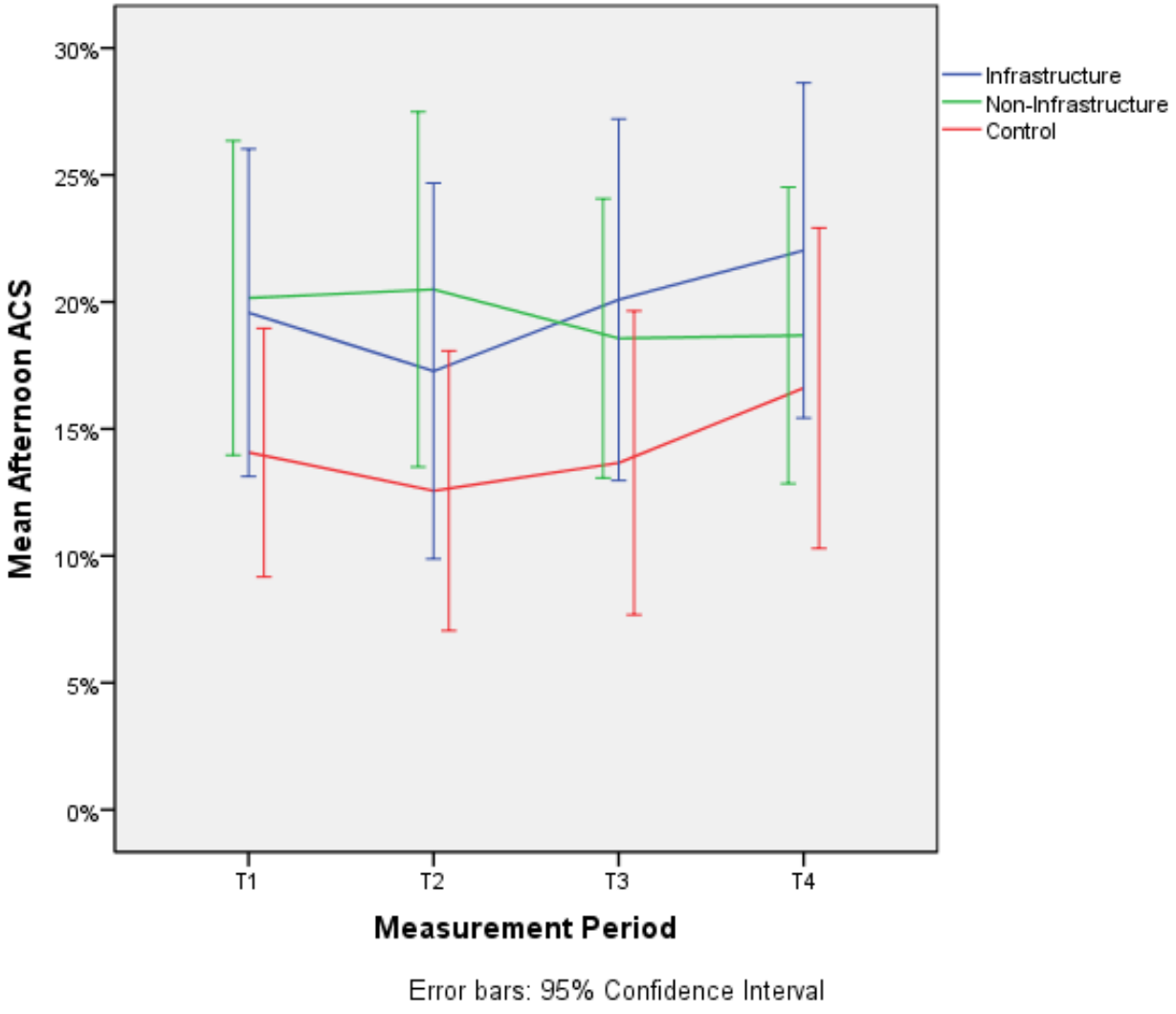
Infrastructure
Non-Infrastructure
Control



Change in

Mean **Afternoon ACS** by Group over Time

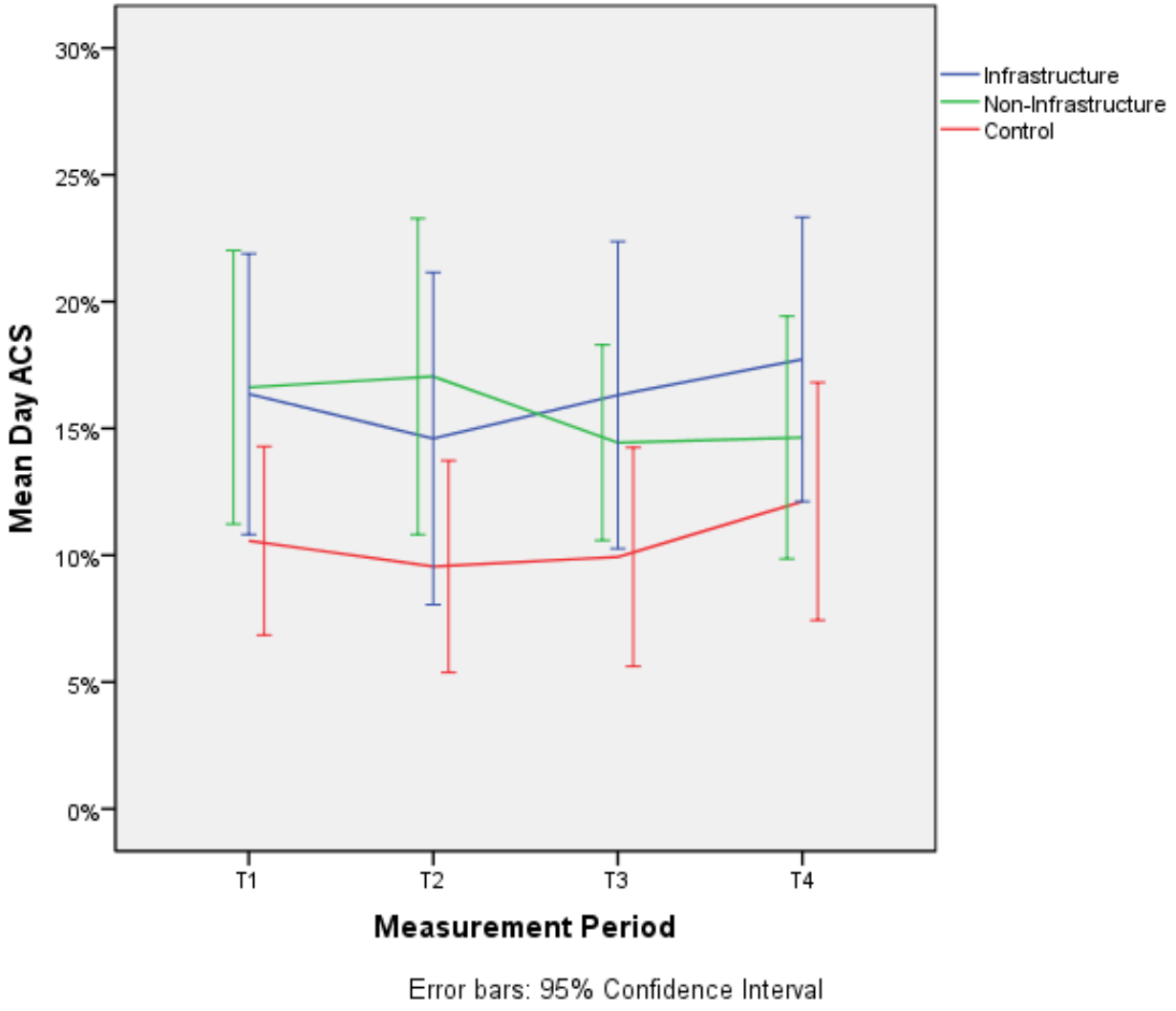
Infrastructure
Non-Infrastructure
Control



Change in

Mean **Day ACS** by Group over Time

Infrastructure
Non-Infrastructure
Control



Implementation Scores[1] for SRTS

	Baseline Mean (SD)*	Follow up Mean (SD)
Infrastructure	0.25 ± 0.78	1.60 ± 4.14
Non-Infrastructure	0.38 ± 0.81	2.13 ± 2.57
Comparison	0.38 ± 1.58	1.40 ± 3.58
TOTAL	0.34 ± 1.19	1.68 ± 3.99*

[1]Implementation score was calculated based on responses to 18 questions on the school survey (n = 58 at baseline and 52 at follow-up)

* $p<0.05$

Limitations and Strengths

- Self-report survey data
- Study timeline not always consistent with project implementation
- Implementation data are difficult to collect

- Large and diverse sample size
- Quasi-experimental design
- Longitudinal data at school level

Conclusions

- Implementation of policies that fund SRTS infrastructure and non-infrastructure projects have minimal significant effects on ACS in the short term, e.g., 3 years.
  - More differences seen with NI schools compared to I schools
- Non-infrastructure funding appears to have slightly negative effects on ACS over time.
- Comparison schools implemented more SRTS activities over time – secular trends?
- More long term follow up may be necessary to determine outcomes of infrastructure projects.

Implications for Practice and Policy

- Policies that provide cost-reimbursement funding for SRTS infrastructure initiatives appear to be difficult to implement at a high level.
  - May not achieve desired outcomes in the short term
- Non-infrastructure activities need mechanisms for continued support or maintenance over time.
- Policies that address SRTS need to focus on adequate implementation to achieve desired effects.

Acknowledgements

This work was partially supported by three Robert Wood Johnson Foundation grants (64634, 63755, 65539).

To request a copy of any instrument or project information, please contact **Diane Dowdy**, PhD, TCOPPE Project Director: **Dowdy@srph.tamhsc.edu**

It takes more than a 'Village' to do this Texas-sized project…

It takes a TEXAS-sized team…

- *Roy Allen*
- *Heather Atteberry*
- *Arthur Castro*
- *Yichen Cheng*
- *Diane Dowdy*
- *Sandra Evans*
- *Kyna Farmer*
- *Selina G…*
- *…*
- *…*
- *Leah Kolar*
- *Shanah Lee*
- *Joel Lyons*
- *Klaus Madsen*
- *Jay Mendoza*
- *Ann Mesaros*
- *Lisako McKyer*
- *Hyung Jin Kim*
- *Deb Kellstedt*
- *Tiffni Menendez*
- *Marcia Ory*
- *Michael Pomeroy*
- *Donna Nichols*
- *John Reilly*
- *Tina Simms*
- *Carolyn Smith*
- *Christine Tisone*
- *Suojin Wang*
- *Jerri Ward*
- *Nalini Ranjit*

MICHAEL & SUSAN DELL CENTER for HEALTHY LIVING

MICHAEL & SUSA… CENTER for HEALT…

Contact Information

Deanna M. Hoelscher, PhD, RD, LD

Deanna.M.Hoelscher@uth.tmc.edu

Twitter: @DeannaHoelscher

The University of Texas School of Public Health

Austin Regional Campus

Michael & Susan Dell Center for Healthy Living

1616 Guadalupe | Suite 6.300 | Austin, TX 78701

MICHAEL & SUSAN DELL CENTER *for* HEALTHY LIVING

msdcenter.org

@msdcenter

/msdcenter

/msdcenter

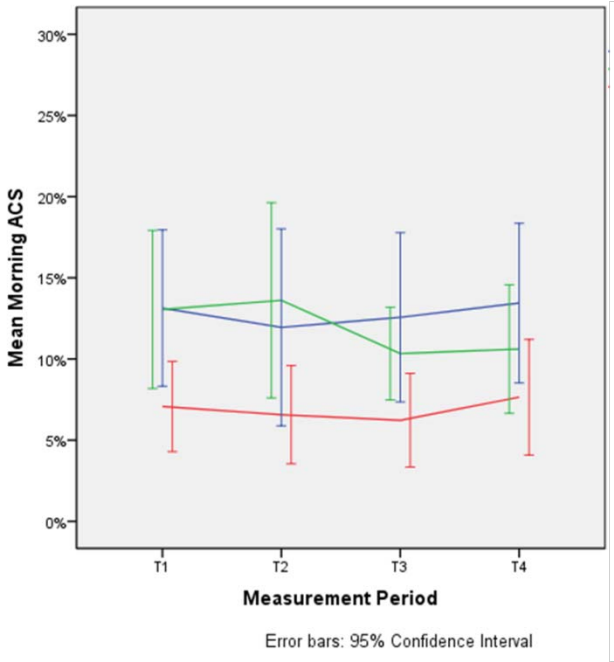
/msdcenter

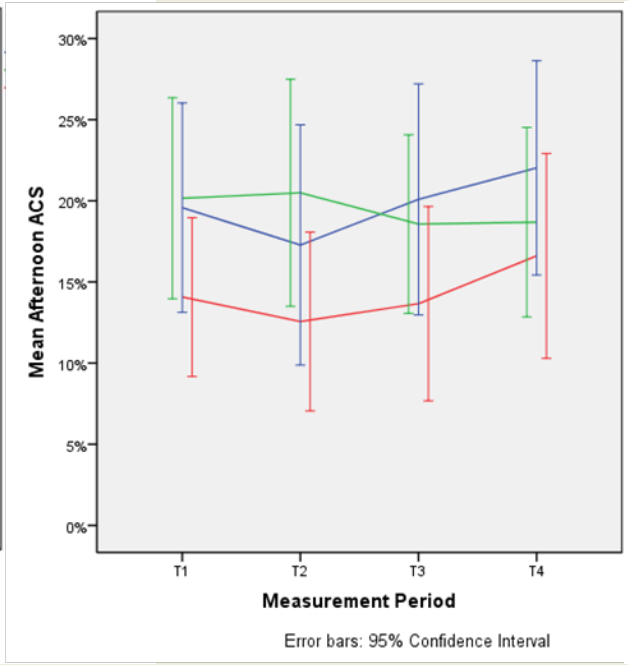
msdcenter

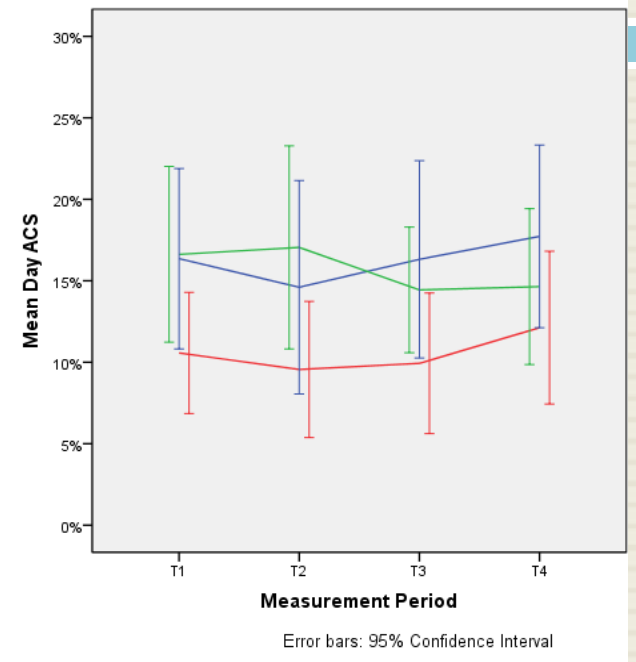
Survey Data Collection

Survey	Baseline (2009)	Follow up (2012)
Student survey	3315	3977
Parent survey	2053	2080
Student-Parent Dyads	1653	1700

Change in ACS[1] by Group, Time, and ACS Period[2]







[1]Active Commuting to School (ACS) is 2-day self-reported walking or biking to or from school. Analyses are controlled for % economically disadvantaged, % white, mean precipitation, mean heat, mean wind speed. [2]No overall rising or declining trends were seen: Although the mean values change, the confidence intervals across time overlap.

Infrastructure

Non-Infrastructure

Control