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

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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.
<table>
<thead>
<tr>
<th></th>
<th>Baseline (T1)</th>
<th>Interim (T2)</th>
<th>Interim (T3)</th>
<th>Follow Up (T4)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TOTAL Schools</strong></td>
<td>78</td>
<td>52</td>
<td>61</td>
<td>73</td>
</tr>
<tr>
<td><strong>Comparison</strong></td>
<td>34</td>
<td>24</td>
<td>23</td>
<td>30</td>
</tr>
<tr>
<td><strong>Infrastructure</strong></td>
<td>23</td>
<td>14</td>
<td>19</td>
<td>23</td>
</tr>
<tr>
<td><strong>Non-infrastructure</strong></td>
<td>21</td>
<td>14</td>
<td>19</td>
<td>20</td>
</tr>
<tr>
<td><strong>ACS to School</strong></td>
<td>12154</td>
<td>9755</td>
<td>10709</td>
<td>11635</td>
</tr>
<tr>
<td><strong>ACS from School</strong></td>
<td>12134</td>
<td>9707</td>
<td>10649</td>
<td>11579</td>
</tr>
</tbody>
</table>
# Child Participant Demographics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Infrastructure</th>
<th>Non-Infrastructure</th>
<th>Comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline</td>
<td>Follow up</td>
<td></td>
</tr>
<tr>
<td>Male, %(^1)</td>
<td>48.7</td>
<td>51.3</td>
<td>50.5</td>
</tr>
<tr>
<td>African Amer, %(^2)</td>
<td>6.6</td>
<td>7.6</td>
<td>7.2</td>
</tr>
<tr>
<td>Hispanic/Latino, %</td>
<td>70.0</td>
<td>70.6</td>
<td>61.4</td>
</tr>
<tr>
<td>White, %</td>
<td>19.8</td>
<td>17.7</td>
<td>24.8</td>
</tr>
<tr>
<td>Other, %</td>
<td>3.6</td>
<td>4.1</td>
<td>2.5</td>
</tr>
</tbody>
</table>

\(^1\)Self-reported by student; \(^2\)Reported by parent
Student Self-Reported Data in 2009 and 2012 (n = 3315 and 3977)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Infrastructure</th>
<th>Non-Infrastructure</th>
<th>Comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline</td>
<td>Follow up</td>
<td>Baseline</td>
</tr>
<tr>
<td>Neighborhood Safety</td>
<td>3.7 ± 2.0</td>
<td>3.8 ± 2.0</td>
<td>3.8 ± 1.9</td>
</tr>
<tr>
<td>Parent Support for PA</td>
<td>7.9 ± 3.3</td>
<td>8.2 ± 3.5*</td>
<td>8.0 ± 3.3</td>
</tr>
<tr>
<td>Friends ACS</td>
<td>1.6 ± 1.8</td>
<td>1.5 ± 1.8</td>
<td>1.6 ± 1.8</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>27.5 ± 9.7</td>
<td>27.6 ± 9.6</td>
<td>27.7 ± 9.3</td>
</tr>
<tr>
<td>Days of PA</td>
<td>4.3 ± 2.2</td>
<td>4.2 ± 2.1</td>
<td>4.4 ± 2.1</td>
</tr>
<tr>
<td>Days of exercise 30 m</td>
<td>4.2 ± 2.4</td>
<td>4.4 ± 2.3</td>
<td>4.1 ± 2.4</td>
</tr>
</tbody>
</table>

*p<0.05
## Parent Self-Reported Data in 2009 and 2012 (n = 2053 and 2080)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Infrastructure</th>
<th>Non-Infrastructure</th>
<th>Comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline</td>
<td>Follow up</td>
<td>Baseline</td>
</tr>
<tr>
<td>Neighborhood Walkability</td>
<td>6.3 ± 2.9</td>
<td>5.5 ± 2.8</td>
<td>6.8 ± 3.2</td>
</tr>
<tr>
<td>Rules for child walking</td>
<td>1.1 ± 1.3</td>
<td>1.2 ± 1.3</td>
<td>1.2 ± 1.3</td>
</tr>
<tr>
<td>School walkability</td>
<td>7.2 ± 3.5</td>
<td>6.2 ± 3.0</td>
<td>7.5 ± 3.8</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>19.6 ± 6.0</td>
<td>19.8 ± 6.6</td>
<td>20.8 ± 7.2</td>
</tr>
<tr>
<td>Outcome expectations</td>
<td>13.5 ± 4.3</td>
<td>13.9 ± 4.4</td>
<td>14.2 ± 4.5</td>
</tr>
<tr>
<td>PA Knowledge</td>
<td>6.5 ± 2.9</td>
<td>7.5 ± 2.1</td>
<td>6.5 ± 2.9</td>
</tr>
</tbody>
</table>
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 (blue)
- Non-Infrastructure (green)
- Control (red)

Error bars: 95% Confidence Interval
Change in Mean Day ACS by Group over Time

- Infrastructure
- Non-Infrastructure
- Control

Error bars: 95% Confidence Interval
## Implementation Scores\(^1\) for SRTS

<table>
<thead>
<tr>
<th></th>
<th>Baseline Mean (SD)*</th>
<th>Follow up Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infrastructure</td>
<td>0.25 ± 0.78</td>
<td>1.60 ± 4.14</td>
</tr>
<tr>
<td>Non-Infrastructure</td>
<td>0.38 ± 0.81</td>
<td>2.13 ± 2.57</td>
</tr>
<tr>
<td>Comparison</td>
<td>0.38 ± 1.58</td>
<td>1.40 ± 3.58</td>
</tr>
<tr>
<td>TOTAL</td>
<td>0.34 ± 1.19</td>
<td>1.68 ± 3.99*</td>
</tr>
</tbody>
</table>

\(^1\)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 Guang
- Leah Kolar
- 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
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## Survey Data Collection

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Student survey</td>
<td>3315</td>
<td>3977</td>
</tr>
<tr>
<td>Parent survey</td>
<td>2053</td>
<td>2080</td>
</tr>
<tr>
<td>Student-Parent Dyads</td>
<td>1653</td>
<td>1700</td>
</tr>
</tbody>
</table>
Change in ACS¹ by Group, Time, and ACS Period²

¹Active 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. ²No overall rising or declining trends were seen: Although the mean values change, the confidence intervals across time overlap.