Associations of Reported Crime and Children’s Active Commuting to School: The Safe TRavel Environments Evaluation in Texas Schools Study (STREETS).

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Active Commuting to School

• Active commuting to school (ACS) represents one opportunity for children to be meet physical activity guidelines.

• ACS prevalence is declining

• The proportion of K-8 students who ACS fell from 47.7% in 1969 to 12.7% in 2009 (McDonald, 2011).
Factors Associated with ACS

- **Individual**: parent and child perceptions, SES, race/ethnicity

- **Environment**: distance, weather, transportation infrastructure, traffic safety, and **crime safety**

- **Policy**: school policy
Crime

• Crime is measured:
  1. Subjectively as parental and child perceptions of crime
  2. Objectively as reported crime rates

• Perception of crime is a commonly reported barrier to children’s ACS (Davidson, 2008; Lee, 2013).

• There are inconsistent and limited findings describing the associations of police-reported crime rates and ACS, proximal to elementary schools.

• No evidence describing differences in type of crime (e.g., serious, less serious, violent, property) and associations with ACS.
Primary Aim: To determine the associations between police-reported crime rates and active commuting to school, after controlling for neighborhood-level confounders (e.g., household income, multifamily dwellings, neighborhood connectivity).

Secondary Aim: To determine the associations between household income and police-reported crime rates proximal to schools.
**Primary Exposure: Police-Reported Crime Rates**

**Five Variables for Police-Reported Crime Rates:** operationalized using FBI Uniform Reporting Definitions:

1) **Total crime rate per year (2018)**
2) **Less serious crime rate:** drugs, simple assaults, public intoxication etc.
3) **Serious crime rate:** sum of violent and property crime
4) **Violent crime rate:** murder, rape, aggravated assault, robbery
5) **Property crime rate:** burglary, theft, auto theft

- All **one-year crime rates** defined as the number of reported crimes per 1000 population per year within a 1-mile Euclidean buffer of each school (%).

**Data Sources:**

- 2018 City of Austin open data
- 2018 census block group population 5-year estimates - weighted by the percent of area that fell within the school buffer
Confounding Variables

1) **Household Income**: median household income within 1-mile Euclidean buffer of each school ($)

2) **Multifamily dwelling**: percentage of households that are multifamily dwellings within a 1-mile Euclidean buffer of each school (%)

3) **Neighborhood Connectivity**: count of 3- and 4-way intersections within 1-mile Euclidean buffer of each school using road network (n)

**Data Sources:**

2018 census block group 5-year estimates - weighted by the percent of area that fell within the school buffer.
Primary Outcome: ACS

- **STREETS baseline data (2018-2019)**
- **Active commuting to school**: percentage of students using active transport modes (walking or biking) averaged across three consecutive school weekdays.
- Collected using standard teacher-administered classroom tally among 3rd, 4th, and 5th grade classrooms

<table>
<thead>
<tr>
<th>Key</th>
<th>Weather</th>
<th>Student Tally</th>
<th>Walk</th>
<th>Bike</th>
<th>School Bus</th>
<th>Family Vehicle</th>
<th>Carpool</th>
<th>Transit</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>S = sunny</td>
<td>R = rainy</td>
<td>O = overcast</td>
<td>SN = snow</td>
<td>Number in class when count made</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Only with children from your family</td>
</tr>
<tr>
<td>Sample AM</td>
<td>S</td>
<td>N</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>8</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Sample PM</td>
<td>R</td>
<td>1</td>
<td>9</td>
<td>3</td>
<td>3</td>
<td>8</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>
Statistical Analysis

- **Descriptive statistics** frequencies with proportions, means with standard deviations (± SD), and medians with interquartile range (IQR).

- **5 linear mixed effects models** analyzed the associations of crimes rates (e.g., total, serious, less serious, property, violent) and ACS adjusted for neighborhood-level confounders using clustering within schools.
  - Standardized all variables

- **5 simple linear regression models** predicted the associations of household income and crime rates around schools.
  - Standardized all variables
## Descriptives

<table>
<thead>
<tr>
<th>School-Level Characteristics</th>
<th>Total Sample (N=63)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minority (Hispanic or African American)</td>
<td>70%</td>
</tr>
<tr>
<td>Low-income (free/reduced lunch)</td>
<td>57%</td>
</tr>
<tr>
<td>ACS</td>
<td>14%</td>
</tr>
</tbody>
</table>
## Primary AIM Results

### Results from Linear Mixed Effect Analyses

<table>
<thead>
<tr>
<th>Primary Exposures</th>
<th>ACS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Crime Rate</td>
<td>0.30*</td>
</tr>
<tr>
<td>Less Serious Crime Rate</td>
<td>0.30*</td>
</tr>
<tr>
<td>Serious Crime Rate</td>
<td>0.25</td>
</tr>
<tr>
<td>Property Crime Rate</td>
<td>0.23</td>
</tr>
<tr>
<td>Violent Crime Rate</td>
<td>0.28*</td>
</tr>
</tbody>
</table>

*p<0.05, standardized B
## Secondary AIM Results

### Results from Simple Linear Regression Analysis

<table>
<thead>
<tr>
<th>Household Income</th>
<th>Total Crime Rate</th>
<th>Less Serious Crime Rate</th>
<th>Serious Crime Rate</th>
<th>Property Crime Rate</th>
<th>Violent Crime Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-0.53***</td>
<td>-0.48***</td>
<td>-0.54***</td>
<td>-0.46***</td>
<td>-0.55***</td>
</tr>
</tbody>
</table>

***p<0.001, standardized B
Conclusions

• Total reported crime rate is significant and directly associated with ACS.

• Less serious and violent crime rates are also significant and directly associated with ACS.

• Household income was significantly and inversely associated with all types of reported crime rates.
Implications & Next Steps

• Include more neighborhood contextual factors (e.g. perception of crime)

• Consider distance of buffer (e.g. 1 mile, ½ mile, ¼ mile)

• Need for more objective measures of ACS and police-reported crime rates
  – Crime is underreported to police
Thank You! Questions? For more information please contact:
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PSA: Come find out more about STREETS at UTHealth’s Webinar on April 27th!
Strengths and Limitations

**Strengths**

- Large number of diverse schools and neighborhoods
- Inclusion of types of crime rates

**Limitations**

- Cross-sectional design
- Need to include other confounding variables (e.g., perception of crime)
- Need for better measures of reported crime rates and/or ACS
  - Reported crime rates are underreported to police