

# Taking it to the STREETS: Evaluating Health Effects of Safe Routes to School Infrastructure Changes in Austin, Texas

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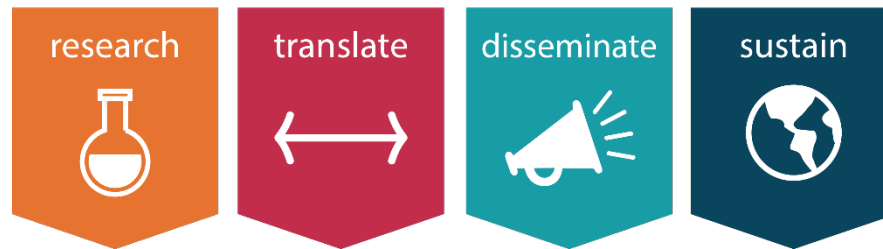


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**STRATEGIC PLAN GOALS**



# Today's Webinar



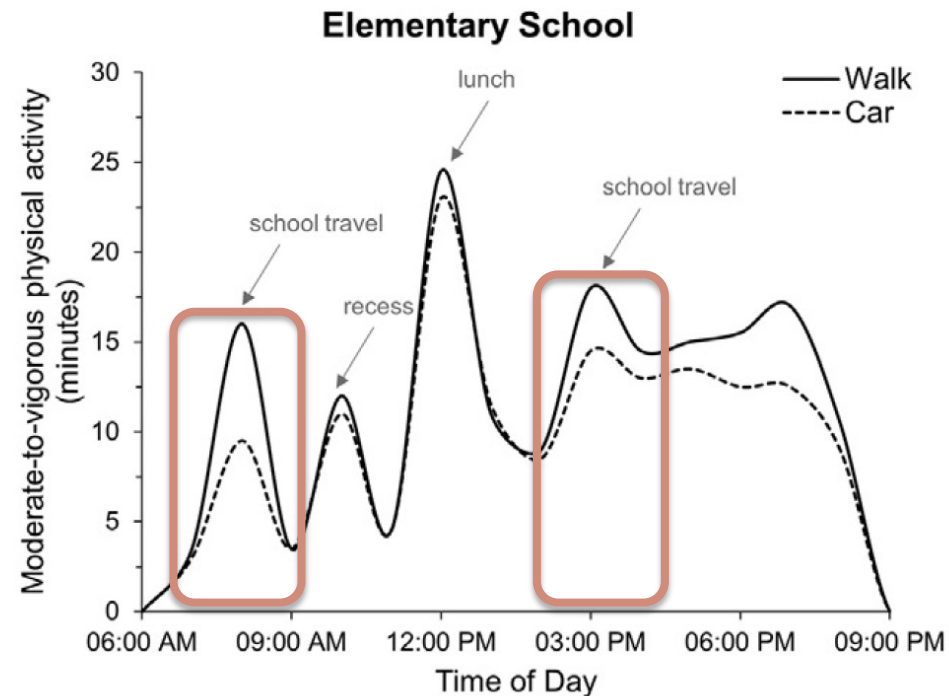
- Importance of Active Commuting
- City of Austin Safe Routes to School Initiative
- STREETS Study Overview

# Background



## Public Health Benefits of Active Commuting to School

- ↑ Physical activity
- ↑ Cardiorespiratory fitness (cycling)
- ↑ Cardiometabolic health
- ↑ Muscular fitness
- ↑ Psychosocial health



Martin et al (2016); Cooper et al (2003); Cooper et al (2012)



# Background



## Economic Benefits of Active Commuting to School

- ↓ Use of private automobiles and other motorized transport, including busing to school
- ↓ Congestion
- ↓ Traffic-related injuries and fatalities
- ↓ Healthcare costs

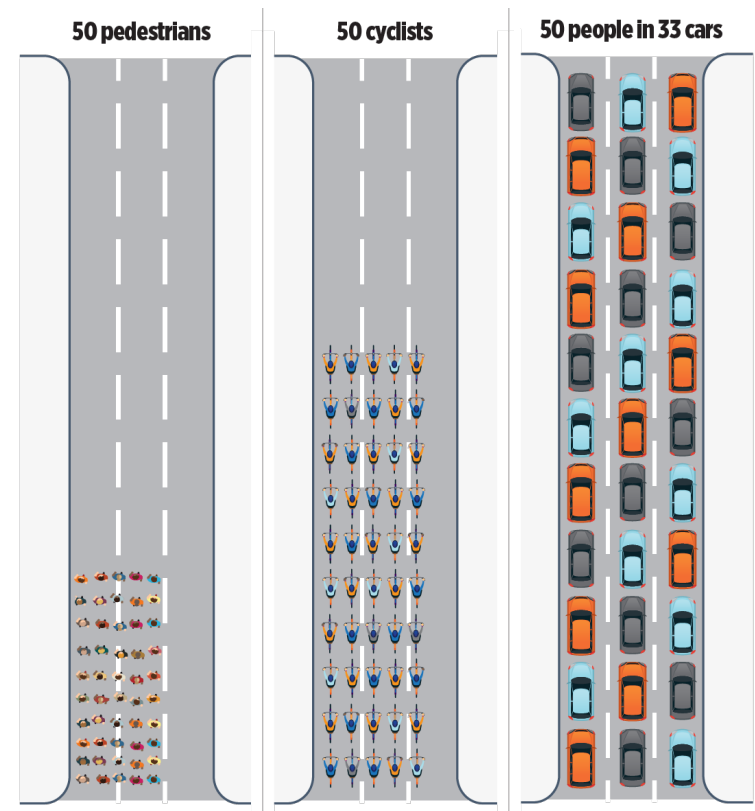


McDonald et al (2016); Community Preventative Services Task Force (2018)

# Background

## Environmental Benefits of Active Commuting to School

- ♻️ Small form factor
- ♻️ Clean transportation
- ♻️ Fewer wastes and resources

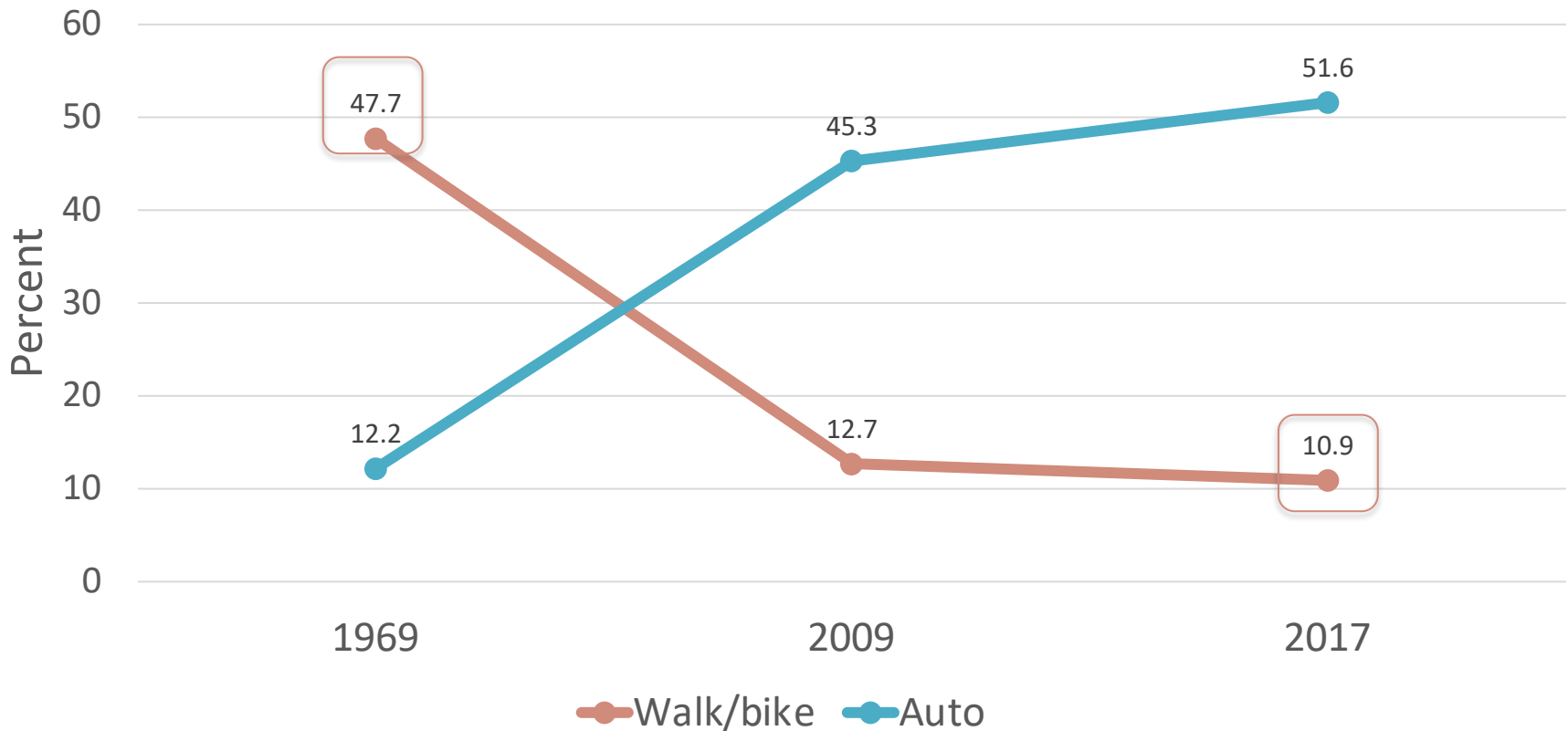


Hong et al (2018)

# Trends in Active Commuting



## Travel Mode to/from School in Elementary Schools in the US



Data from NHTS Survey, McDonald et al (2011) & Kontou et al (2020)



# Correlates of Active Commuting

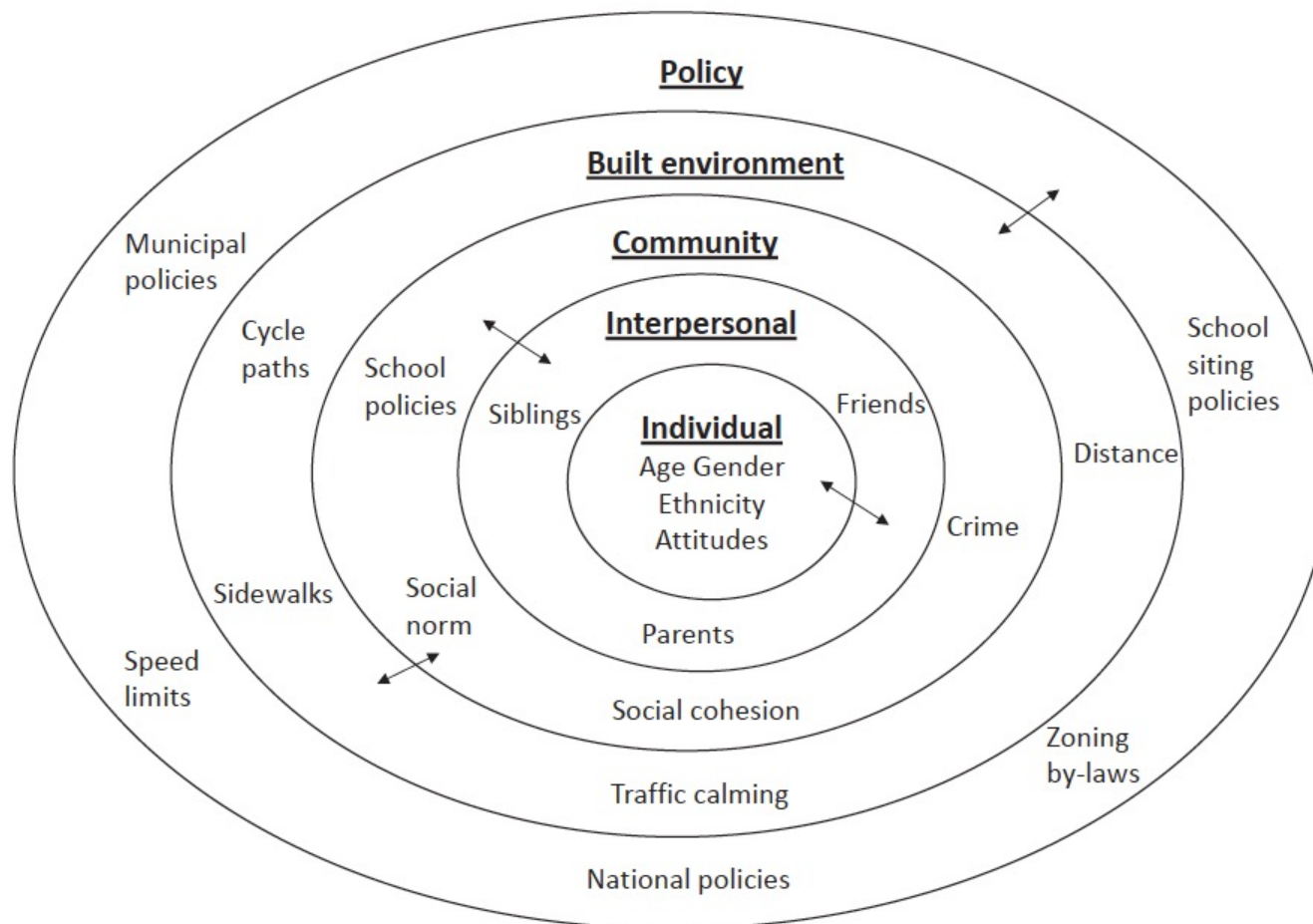


Figure from Larouche & Ghekiere (2018)





# ACS and COVID-19



- Physical activity opportunities like recess, PE and after-school sports will be more limited than in the past.
- ACS is an opportunity to rebuild community and social connection that has been lost in recent months.



(SRTS National Center Report, 2020)



# Safe Routes to School



## The 6 Es of Safe Routes to School Initiatives

- Education
- Engineering
- Evaluation
- Encouragement
- Engagement
- Equity



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# SRTS Program Overview

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# Mission

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To increase the number of students walking and biking to school by creating a safer, healthier and more equitable environment that fosters human-powered transportation

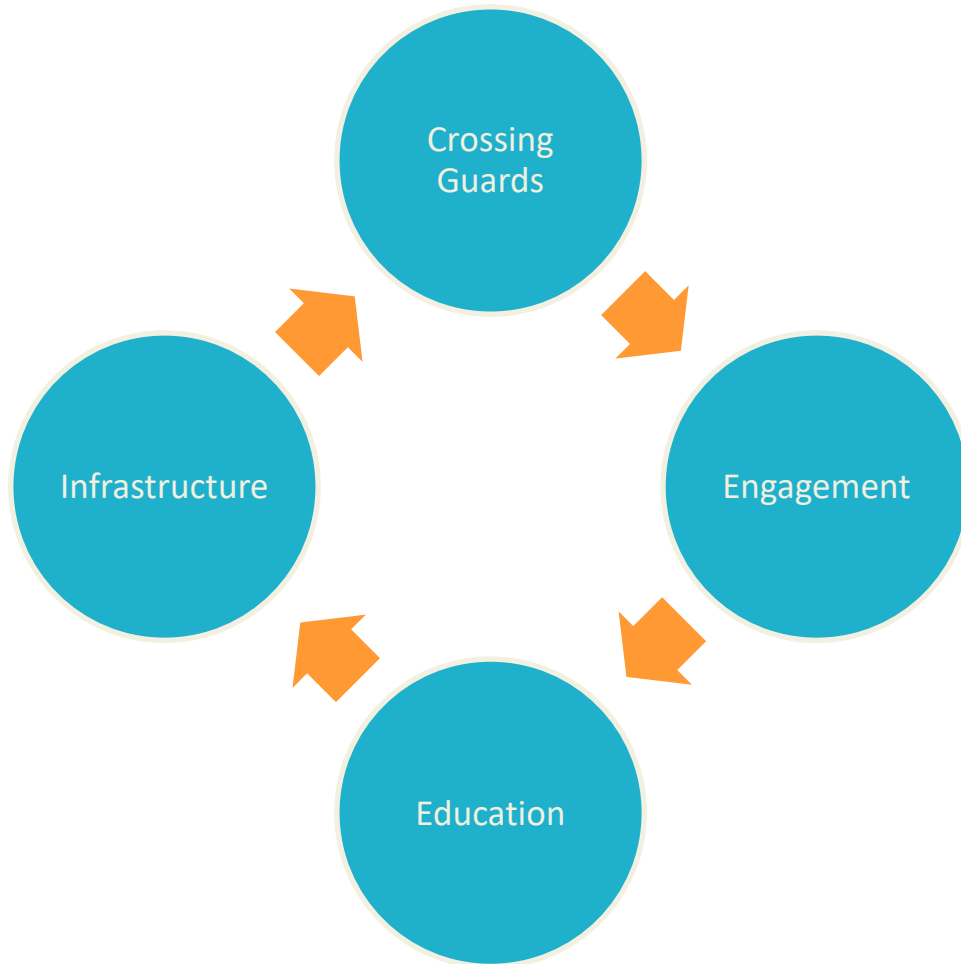
# Vision

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Engage with the community to create a safer, healthier and more equitable environment that fosters human powered transportation as the first choice for City of Austin students.



# Programming



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# Crossing Guard Program

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# Program Breakdown

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## Service 7 school districts

- Austin ISD
  - Leander ISD
  - Round Rock ISD
  - Del Valle ISD
  - Eanes ISD
  - Pflugerville ISD
  - Manor ISD
- 7 Crossing Guard Supervisors
  - 21 Supervisor Assistants
  - 205 Crossing Guards
  - 205 Crossing Locations

# Trainings and Special Events

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- Fall training
- Spring training
- Team building
- New employee orientation
- Partner Trainings
- Crossing Guards Rewards and Recognition Celebration
- Deferred Disposition Program





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# Education Program

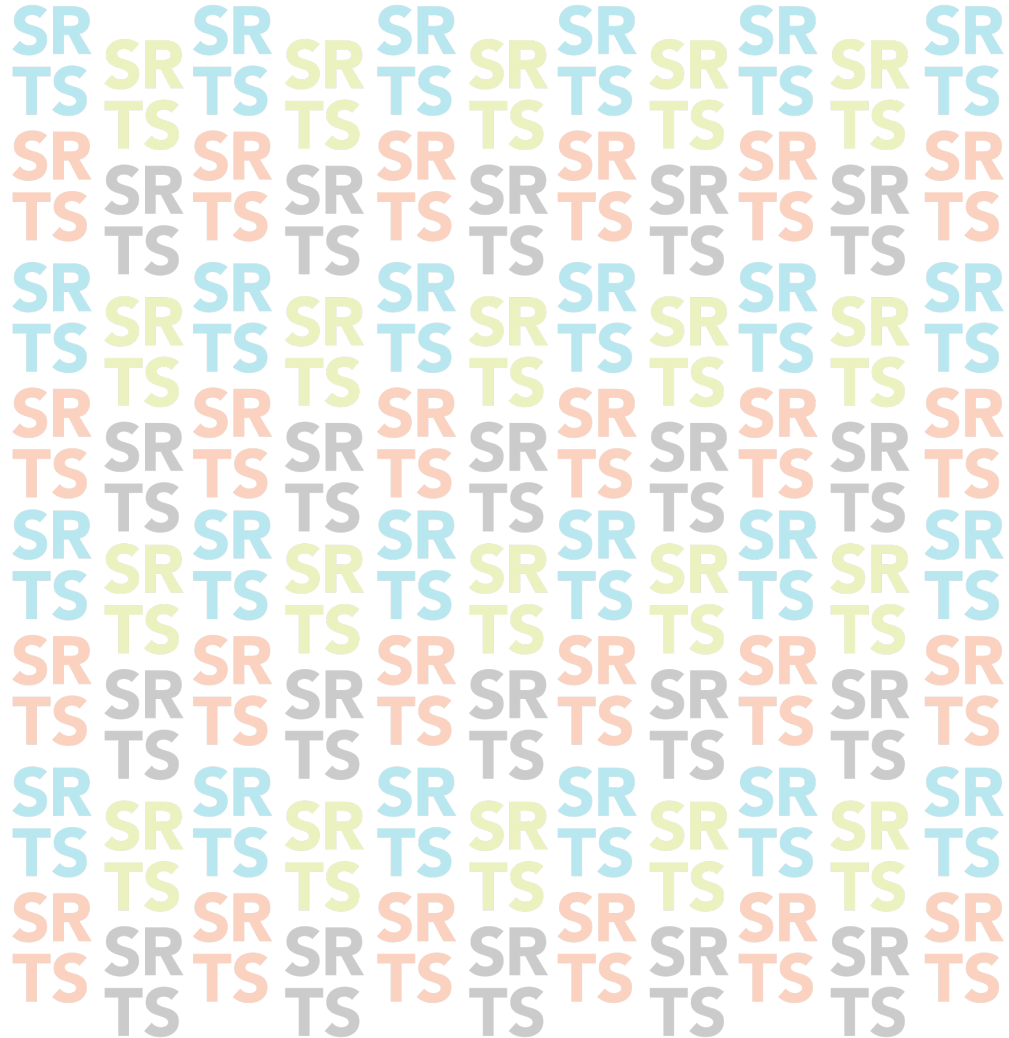
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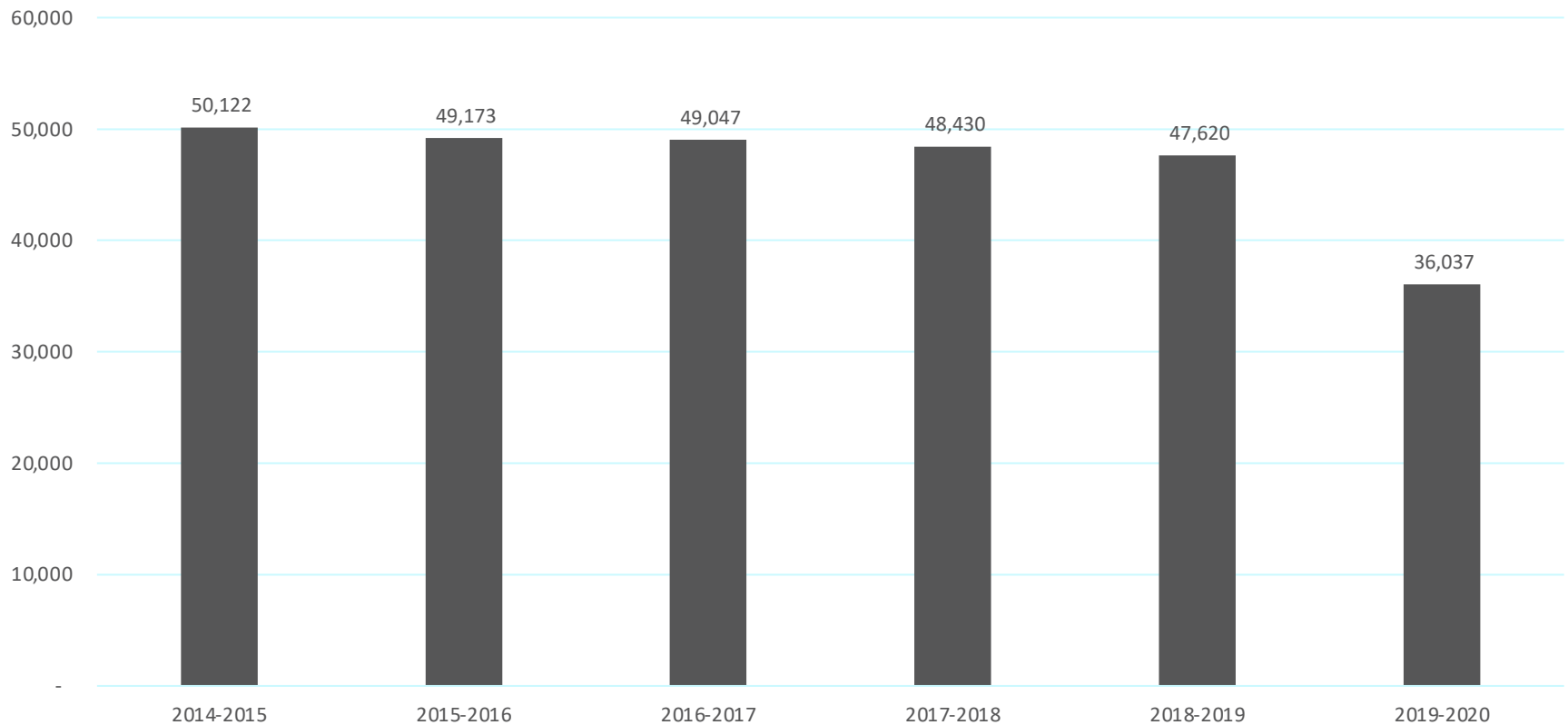


# Services Offered

- Elementary school education
- Daycare education
- School fitness nights
- Community fairs
- Adult Education
- Safety Patrol training
- Bike rodeos
- Bike trains
- Walking school buses
- Walk to School Day
- Bike to School Day
- BOW WOW



# of Overall Students Trained (school year)  
(AISD, DVISD, EISD, LISD, MISD, RRISD, PISD)



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# Engagement Program

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# Goal

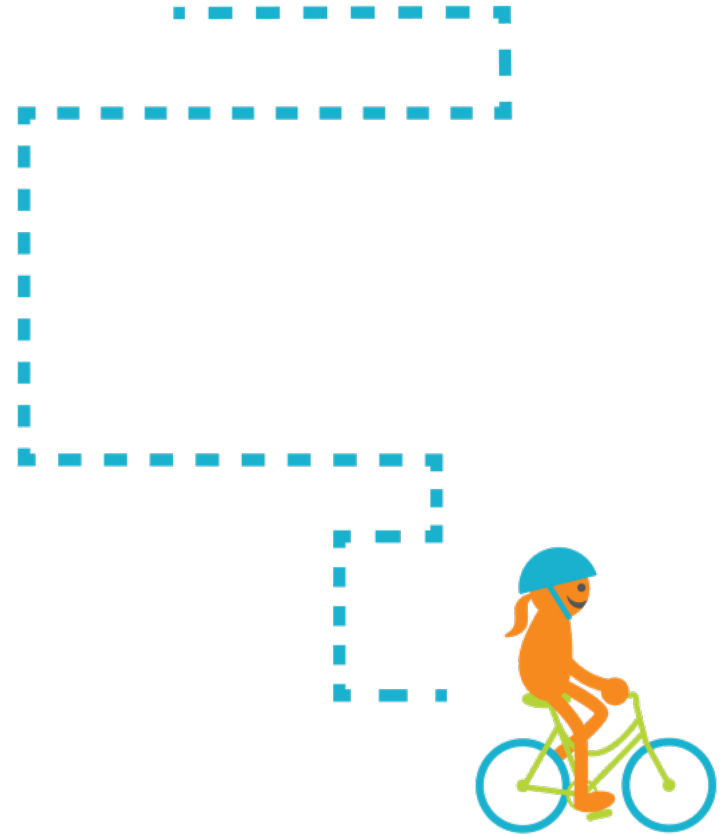
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Create sustainable behavioral change that results in an increase of the number of students walking and biking to school

# Approach

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- Involve the greater community
- Activate new Infrastructure
- Coordinate with other City Programs and Departments
- Recognition Program
- Parent Focus/Health Benefits
- Data Driven



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# Infrastructure Program

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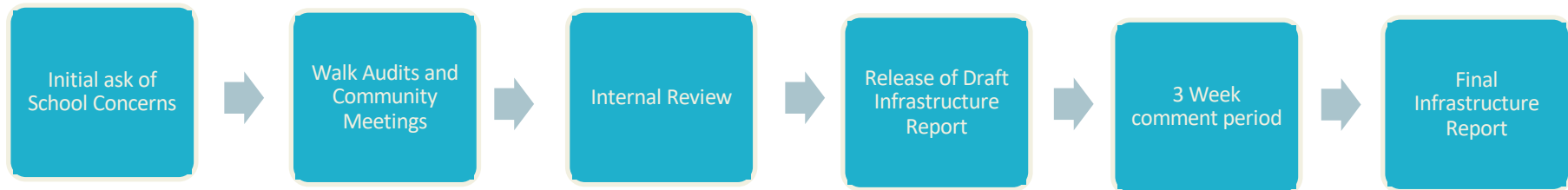


# 2016 Bond

## Language voted on by Austin Voters: \$27,500,000 divided evenly among the ten City Council

**Districts** to allow the City to address Safe Routes to School. The Safe Routes to School Program is a partnership with local school districts to address safety concerns of routes to school and encourage children and families to bike or walk to school. Improvements may include infrastructure options that create a safer environment such as sidewalks, traffic calming devices, protected bicycle facilities, and urban trails.

### Approach:

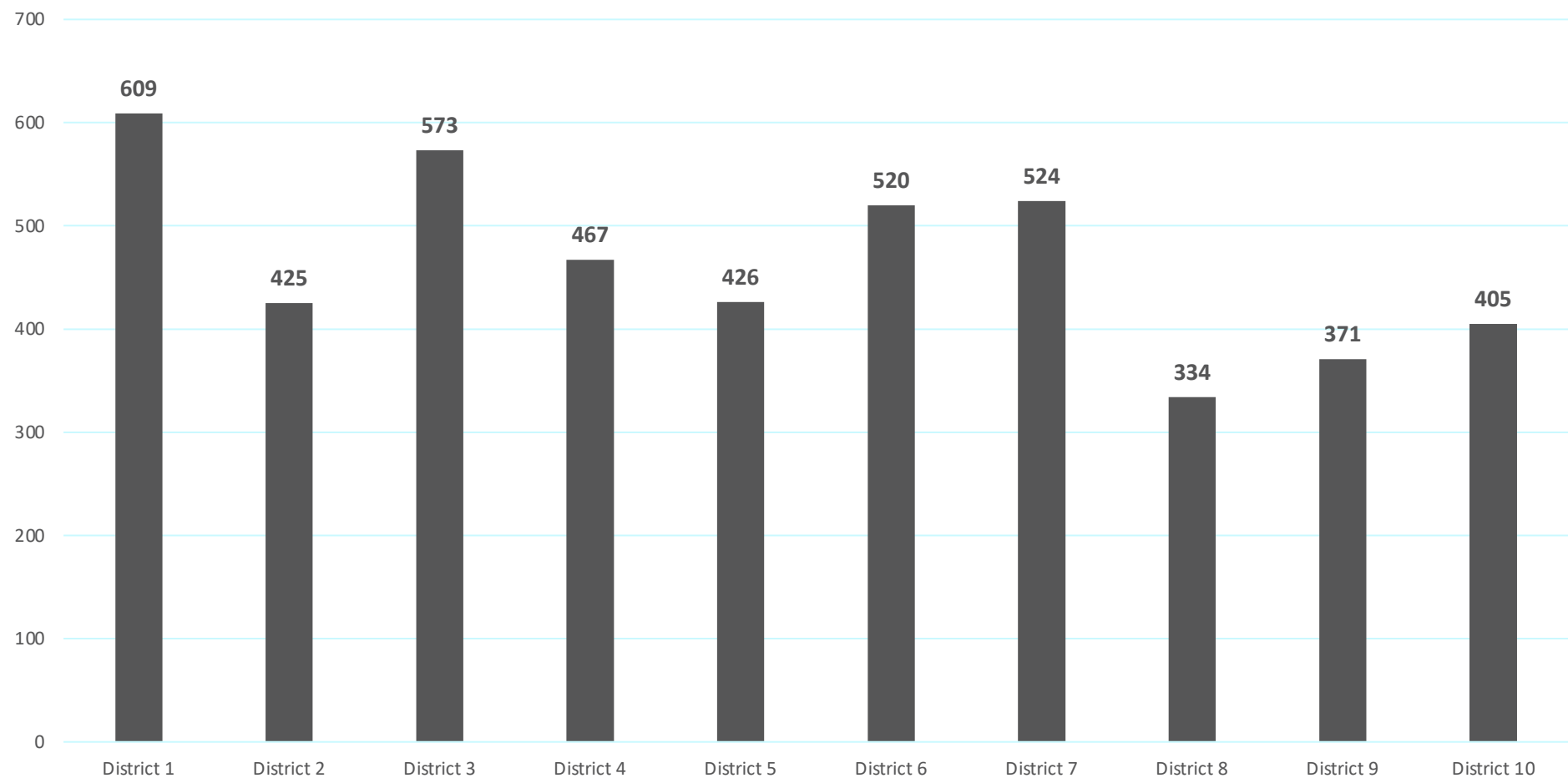


# Walk Audits Per Council District

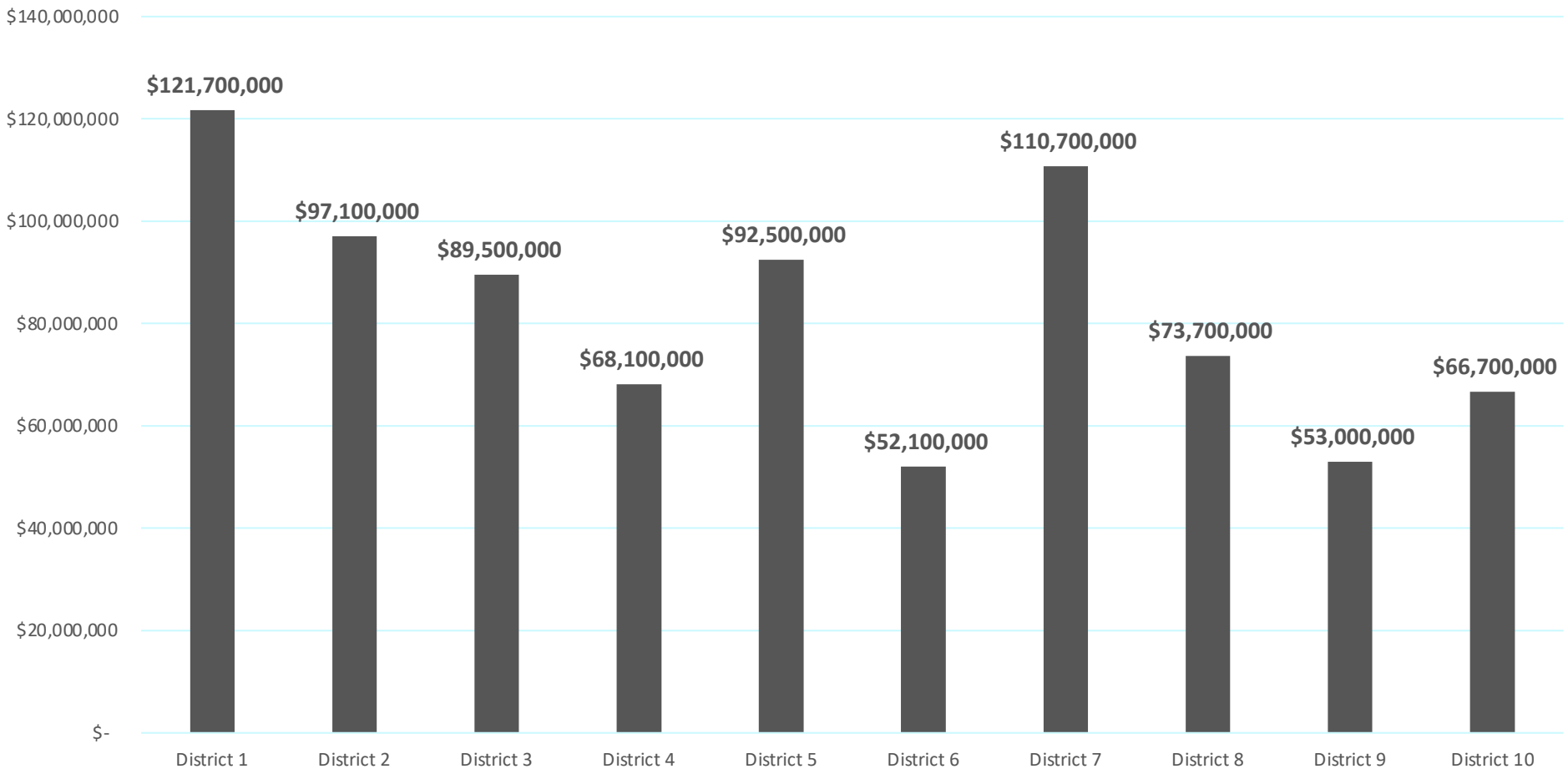
|                    |    |  |                     |    |
|--------------------|----|--|---------------------|----|
| Council District 1 | 18 |  | Council District 6  | 18 |
| Council District 2 | 18 |  | Council District 7  | 13 |
| Council District 3 | 14 |  | Council District 8  | 14 |
| Council District 4 | 15 |  | Council District 9  | 8  |
| Council District 5 | 9  |  | Council District 10 | 11 |



# Identified # of Barriers Per Council District



# Estimated Cost of Barriers Per Council District



# Benefit Analysis

## Demand (35%):

- Schools within .5 miles
- Students Served (Network Analysis)

## Safety (30%):

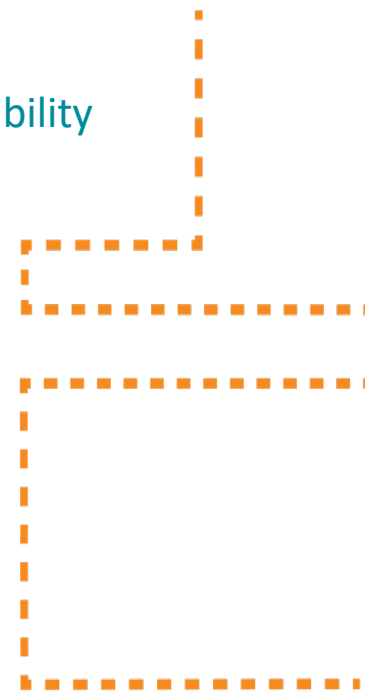
- Bike/Ped Crashes
- Functional Class Score
- Engineering Judgement

## Equity (20%):

- Free and reduced eligibility rate
- Poverty Rate

## Stakeholder Input (15%):

- WikiMap Comments
- Public Comment



# Infrastructure Report Breakdown

- Background
- Process
- Overall Benefit and Estimated Cost:Benefit Chart
- Recommendations by School

| Project ID | Schools within 1/2 mile<br>* = no schools w/in 1/2 mile; closest school noted | Location                         | Issue  | Recommendation<br>+ = parking removal required<br>* = curb changes required<br>~ = private property acquisition required | Overall Benefit Category | Estimated Cost:Benefit Category* |
|------------|---|----------------------------------|--|--|--------------------------|----------------------------------|
| 1C - 613   | GRAHAM  | CLAYWOOD DR / WANDERIN G WAY     | Missing/non-compliant curb ramps, Long crossing distance                     | Add curb extensions, Add median refuge island on Wandering Way, Install 1 curb ramp                                      | 2 - High                 | 2 - High                         |
| 1C - 614   | GRAHAM  | CLAYWOOD DR / COLLINWOOD WEST DR | No marked crossing, Long crossing distance                                   | Add curb extensions, Add median refuge island on Collinwood Dr, Install high visibility crosswalk *                      | 2 - High                 | 2 - High                         |
| 1C - 615   | GRAHAM  | AMBLEWOOD WAY / WANDERIN G WAY   | Missing/non-compliant curb ramps   | Install 2 curb ramps   | 3 - Medium               | 1 - Very High                    |
| 1C - 616   | COPPERFIELD   | BRANSTON DR / SHROPSHIRE BLVD    | Missing/non-compliant curb ramps, No marked crossing, Long crossing distance | Add curb extensions, Install high visibility crosswalk   | 4 - Low                  | 3 - Medium                       |

# Guiding Principles

- 1) Implement projects that have a High or Very-High Overall Benefit or a High or Very-High Estimated Cost:Benefit
- 2) Make meaningful walking and bicycling improvements near as many schools as possible
- 3) For 2016 Mobility Bond funding, balance funding equally per district, as voted on by the public
- 4) Leverage other available sources of funding to implement additional projects





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# STREETS Study



# What is a natural experiment?



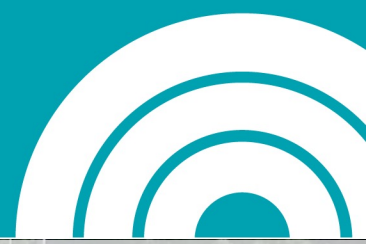
- Intervention of interest has not been manipulated by the researcher
- Used to evaluate population-level environmental and non-health sector interventions and their impact on health
  - Advocacy for policy making
- Difficult to do a controlled experiment
  - For example: national legislation to improve air quality, or major changes in transport infrastructure

Craig et al (2012)





# Study Rationale



- Previous evaluations have shown promising evidence for SRTS infrastructure's ability to increase child active commuting to school and child physical activity
- Issues with previous studies:
  - Studies without comparison groups
  - Small sample sizes
  - Incomplete or inadequate program implementation
  - Non-objective measures of physical activity

Katzmarzyk et al (2016); Kohl & Cook (2013); Hoelscher et al (2016); MacDonald et al (2014)



# Study Rationale



- STREETS is a unique and time sensitive opportunity to conduct a rigorous, one-time only, evaluation of citywide SRTS improvements.
  - ✓ Using other Central Texas schools as comparison
  - ✓ Objective measures of physical activity
  - ✓ Rigorous evaluation at both individual and school level

*If this natural experiment is shown to result in changes in physical activity at both the individual and population level in a cost-effective manner, this city-driven initiative could be an effective and scalable model for other municipalities.*



# STREETS Study Aims



## Aim 1

Determine three-year **individual level effects** of SRTS infrastructure changes on child physical activity

## Aim 2

Determine **population-level effects** of SRTS infrastructure changes on active commuting to school.

## Aim 3

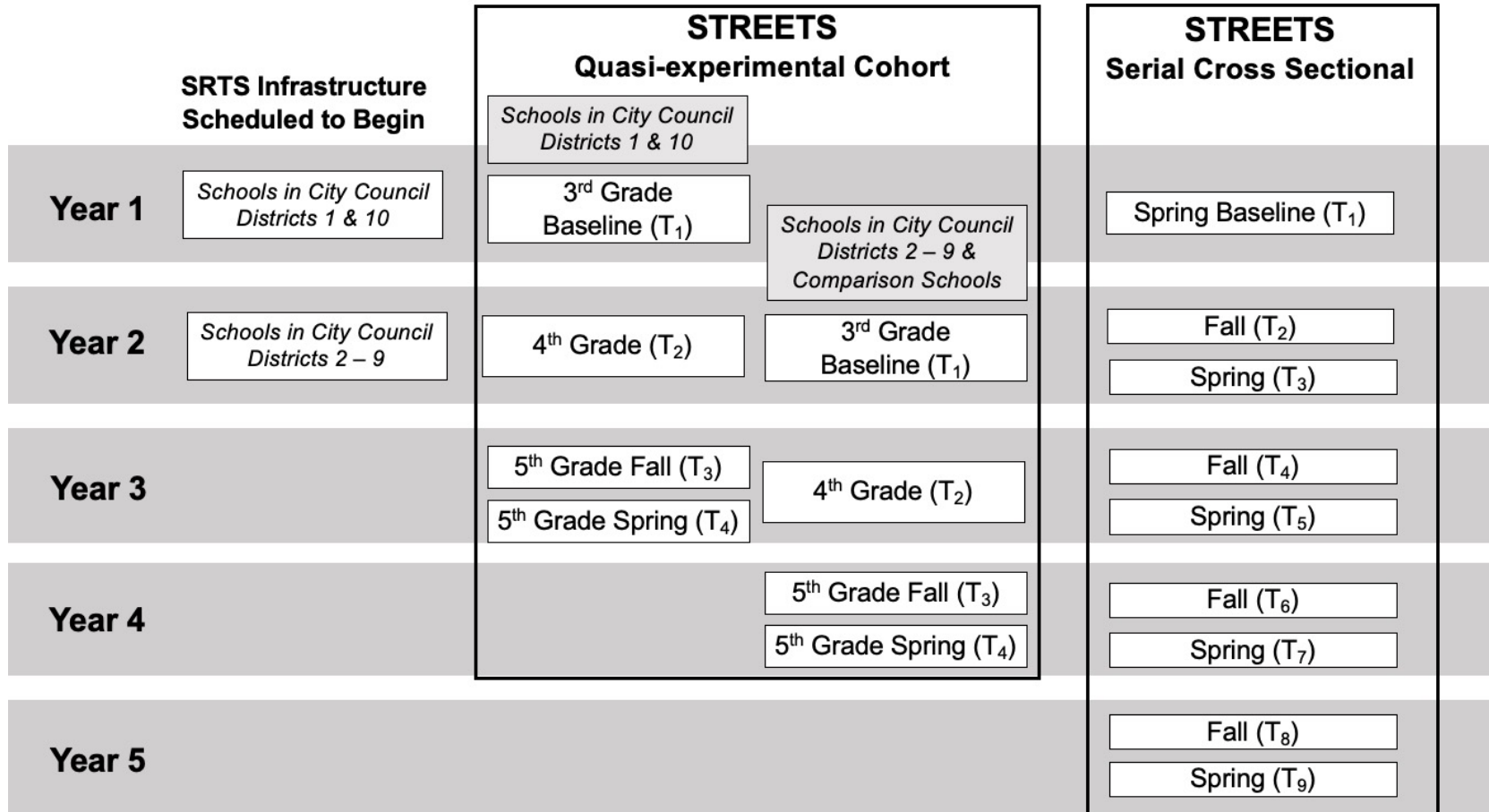
Examine the **cost effectiveness of SRTS** infrastructure changes on child physical activity levels.

# STREETS Study Design



- **Aim 1: Individual level effects on child physical activity**
  - Quasi-experimental cohort
  - Recruit 3<sup>rd</sup> grade students and follow through 5<sup>th</sup> grade
  - Measure students 4 times
- **Aim 2: Population level effects on active commuting**
  - Serial cross-sectional study design
  - Measure every 3<sup>rd</sup>, 4<sup>th</sup>, and 5<sup>th</sup> grade classroom once per semester
- **Aim 3: Cost-effectiveness**
  - Use physical activity data from Aim 1 and final cost data to be collected from City of Austin

# STREETS Study Timeline

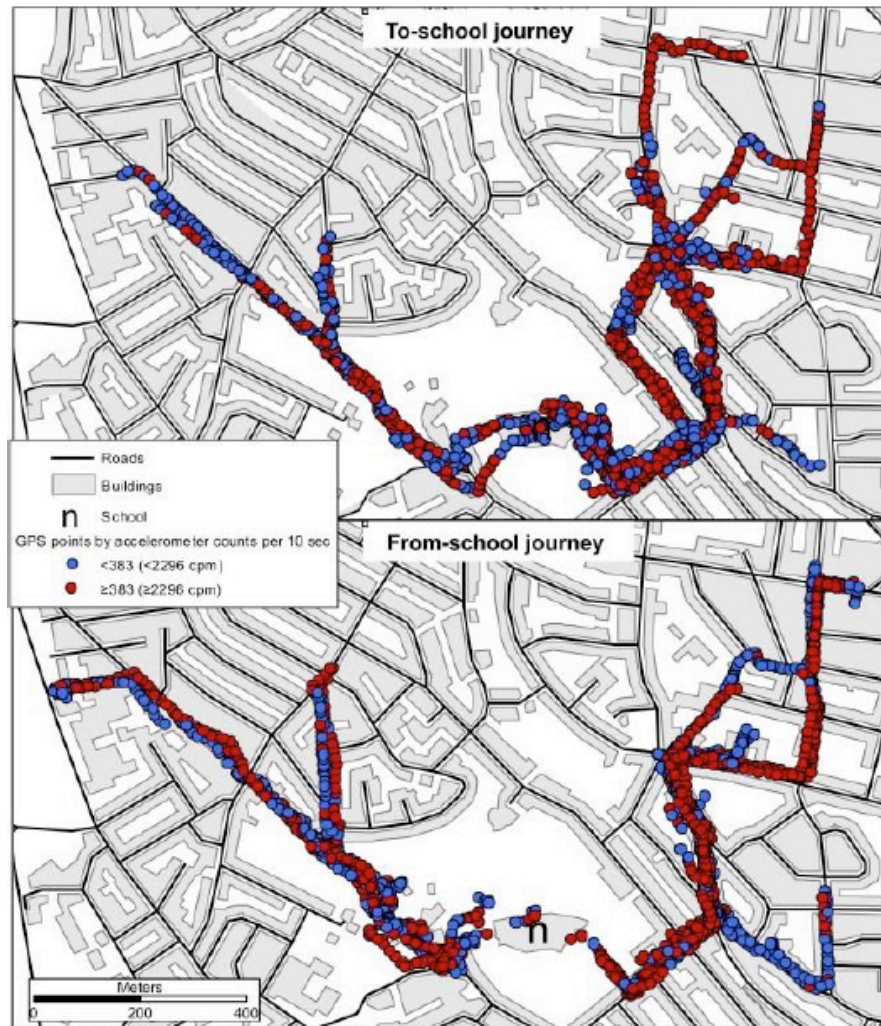


# Cohort Study Overview

- **44 elementary schools recruited**
- **Measures**
  - Child physical activity measured with accelerometer and GPS
  - Child survey
    - Self report PA, self-report ACS, attitudes, neighborhood perceptions, self efficacy
  - Parent survey
    - Perceptions of neighborhood, self-efficacy, attitudes towards ACS and PA, demographics
  - School neighborhood environment audits
    - MAPS-SRTS instrument
    - GIS based social and built neighborhood environment measures



# Example: Accelerometer and GPS to Measure Active Commuting

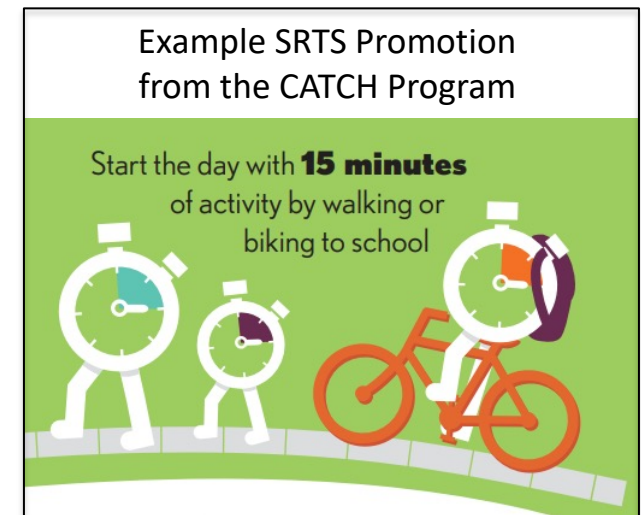


- **Time-matched accelerometer + GPS**
  - Red dots: moderate to vigorous physical activity
  - Blue dots: very light activity or sedentary travel (by car)
- **Provides aggregate view of travel behavior**
  - Combine kids from each school to find patterns of route segments where active travel is maximized
  - No way to know which belong to individual study participants

Source: Southward, E. F., Page, A. S., Wheeler, B. W., & Cooper, A. R. (2012). Contribution of the school journey to daily physical activity in children aged 11–12 years. *American journal of preventive medicine*, 43(2), 201-204.

# Cross-sectional Study – Measures

- **94 schools recruited**
- SRTS Student Tally
  - Teacher administered tally of proportion of students engaged in ACS
  - All 3<sup>rd</sup>, 4<sup>th</sup>, and 5<sup>th</sup> grade classrooms in participating schools
- School health policy survey
  - School SRTS programs
  - PA policies
  - Other health related policies and programs
- Campus Improvement Plans





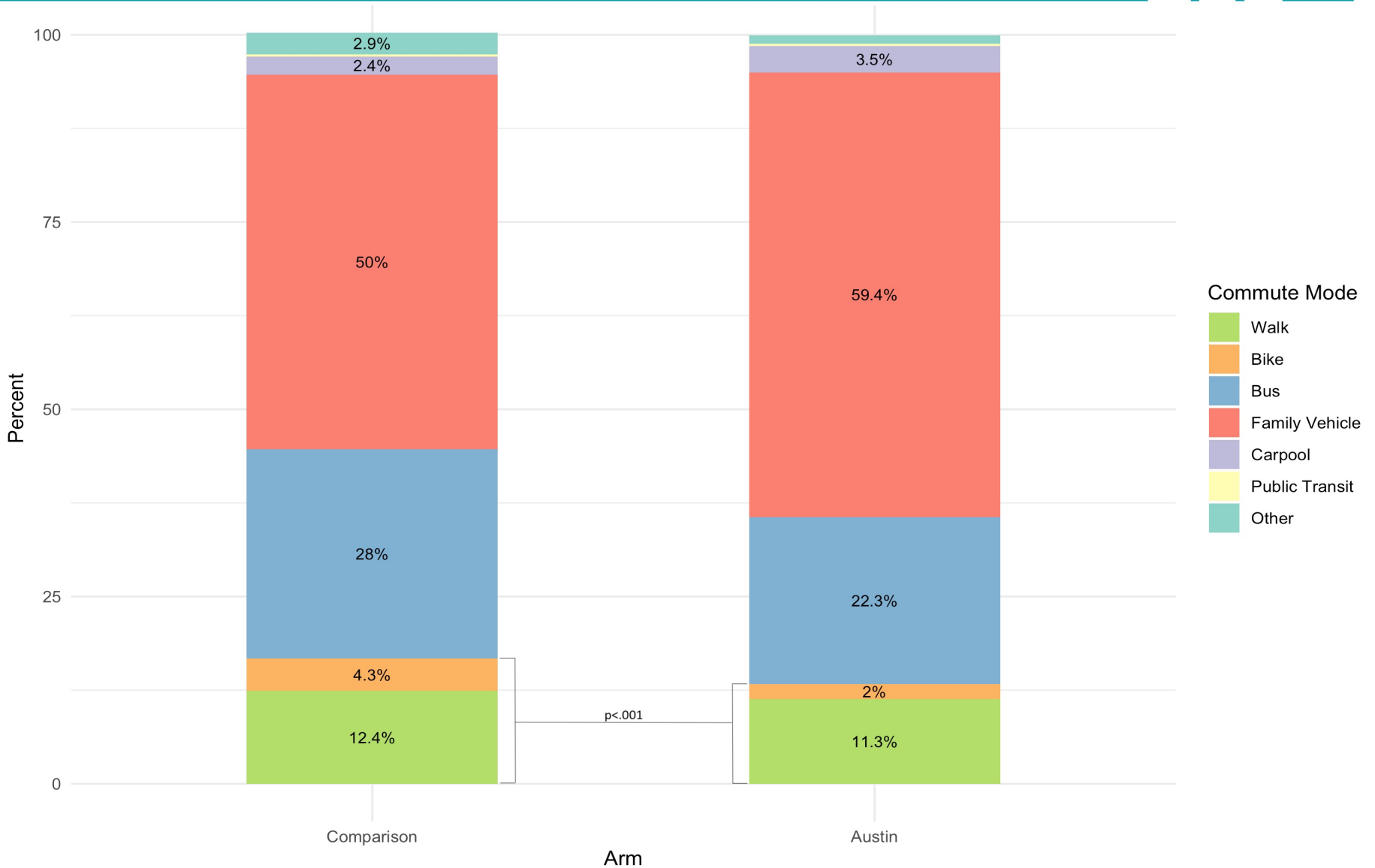
# Other Measures



- Qualitative data will be collected to provide context and confirm findings for the infrastructure changes.
  - Key informant interviews with schools, parents, stakeholders, and children
- A cost effectiveness study (Study 3) will provide information on the relative return on investment
  - Cost of infrastructure at schools and infrastructure changes from City of Austin engineering plans and cost data



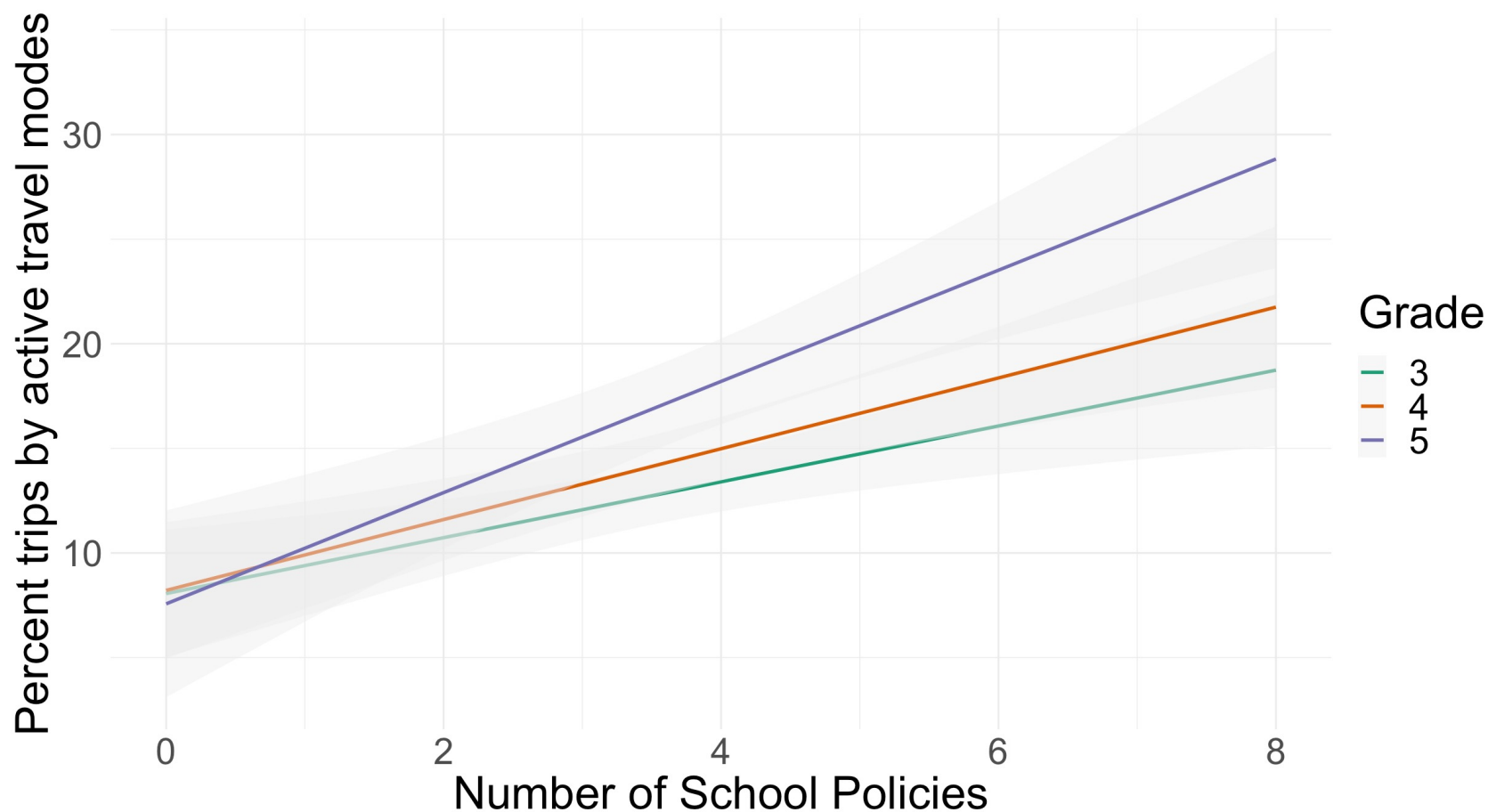
# ACS in Central Texas



# Example use of STREETS Data



## School Policies and Practices and Active Commuting to School among Elementary Students



# STREETS Acknowledgements



- Funded by the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) at the National Institutes of Health (NIH)
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- City of Austin Public Works Department
- Investigators:
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  - Casey Durand, PhD
  - Adriana Perez, PhD
  - Shelton Brown, PhD
  - Deborah Salvo-Dominguez, PhD
- Study Staff
  - Sarah Bentley, MPH, Project Coordinator
  - Leigh Ann Ganzar, DrPH MPH, Measurement Coordinator



**Thank You!**



# STREETS Study



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