STREETS
SAFE TRAVEL ENVIRONMENT EVALUATION IN TEXAS SCHOOLS

Hitting the STREETS: Evaluating the Health Effects of the City of Austin's Safe Routes to School Program

Healthier Texas Summit

October 17, 2019

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The University of Texas Health Science Center at Houston
School of Public Health

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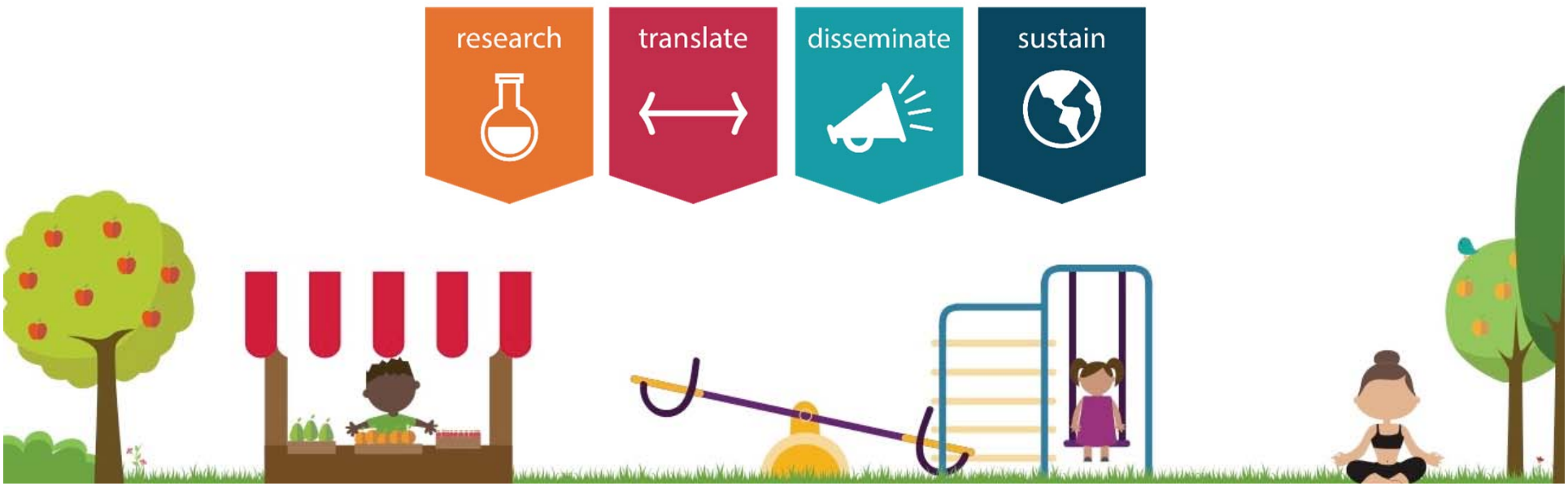
Healthy children in a healthy world.

We advance health and healthy living for children and families
through cutting-edge research, innovative community-based programs,
and dissemination of evidence-based practices.

STRATEGIC PLAN GOALS



Acknowledgements

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- 5 year project (2018-2023)
- University of Texas Health Science Center at Houston (UTHealth) School of Public Health
- City of Austin Public Works Department
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Our Panel Discussion

- Why Natural Experiments?
- City of Austin Safe Routes to School Initiative
- STREETS Study
  - Study Design
  - Measures
  - Timeline
- Panel Discussion

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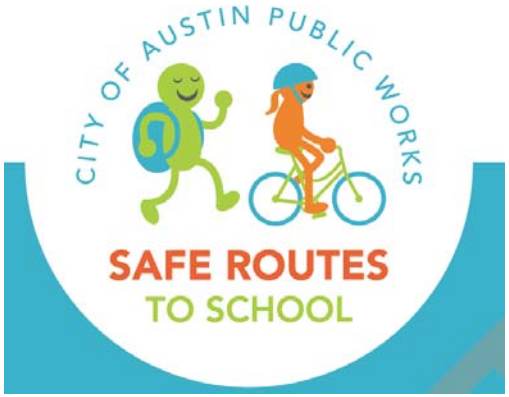
Partnership with City of Austin

- Met in January 2017 through introduction from Bike Austin
- First round of grant submission to National Institutes of Health (May 2017)
  - Time-Sensitive Obesity Policy and Program Evaluation
- Second grant submission (October 2017)
- Third grant submission (May 2018)
- Notice of award in August 2018
- Funded in September 2018



Active Commuting to School

- Physical and mental health benefits to active commuting
- Economic benefits exceed the cost for active travel to school interventions.
  - Reductions in:
    - Use of private automobiles and other motorized transport, including busing to school
    - Congestion
    - Traffic-related injuries and fatalities
    - Healthcare cost

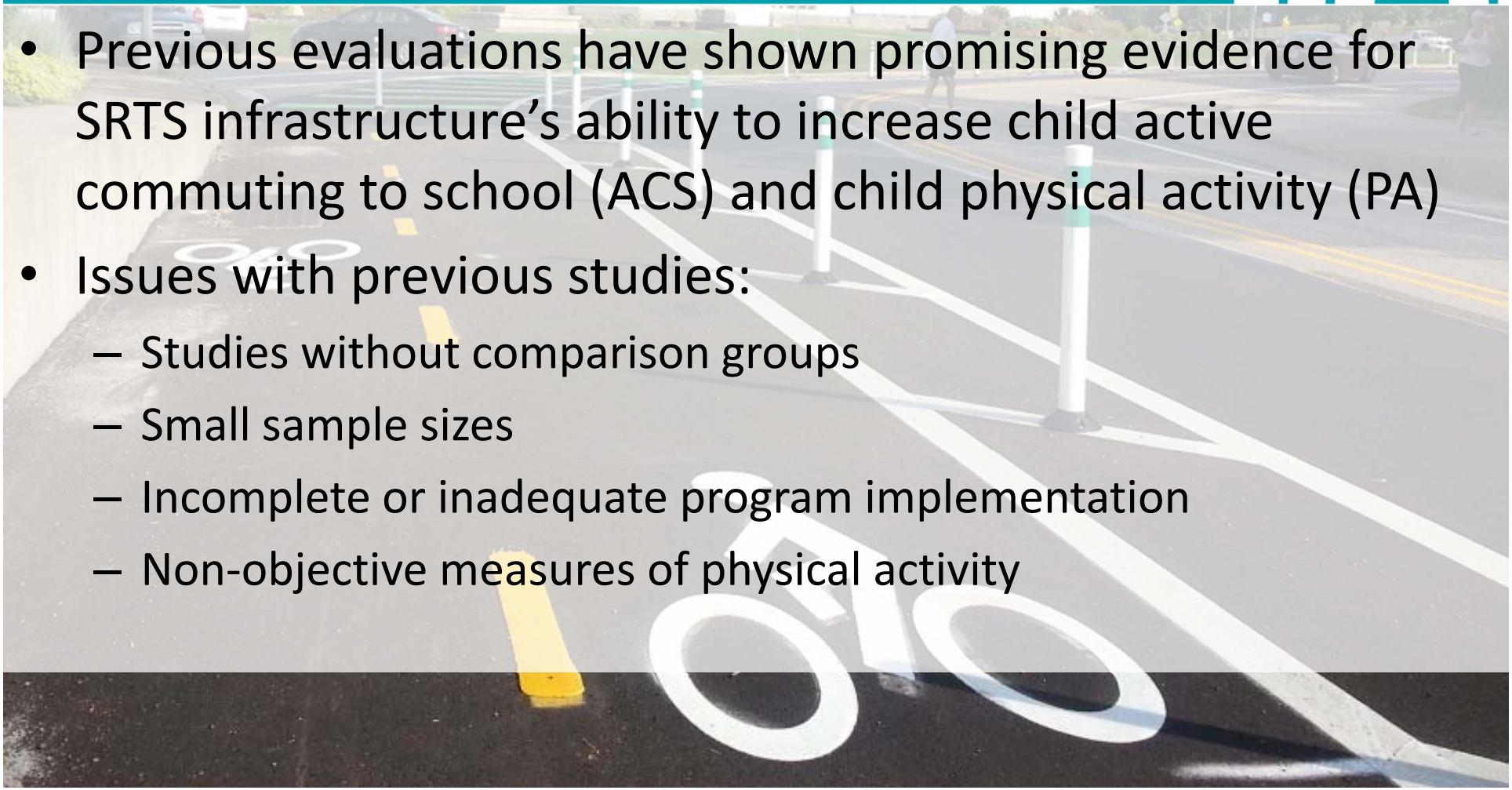
U.S. Department of Health and Human Services (2012); Martin et al (2016); Community Preventative Services Task Force (2018)

What is a natural experiment?

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

Craig et al (2012)

Background – Study Rationale



- Previous evaluations have shown promising evidence for SRTS infrastructure's ability to increase child active commuting to school (ACS) and child physical activity (PA)
- 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)

Background – 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.

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CITY OF AUSTIN
PUBLIC WORKS DEPARTMENT
SAFE ROUTES TO SCHOOL

Safe Routes to School

SUPPORTING THE HUMAN POWER IN YOU

Safe Routes to School

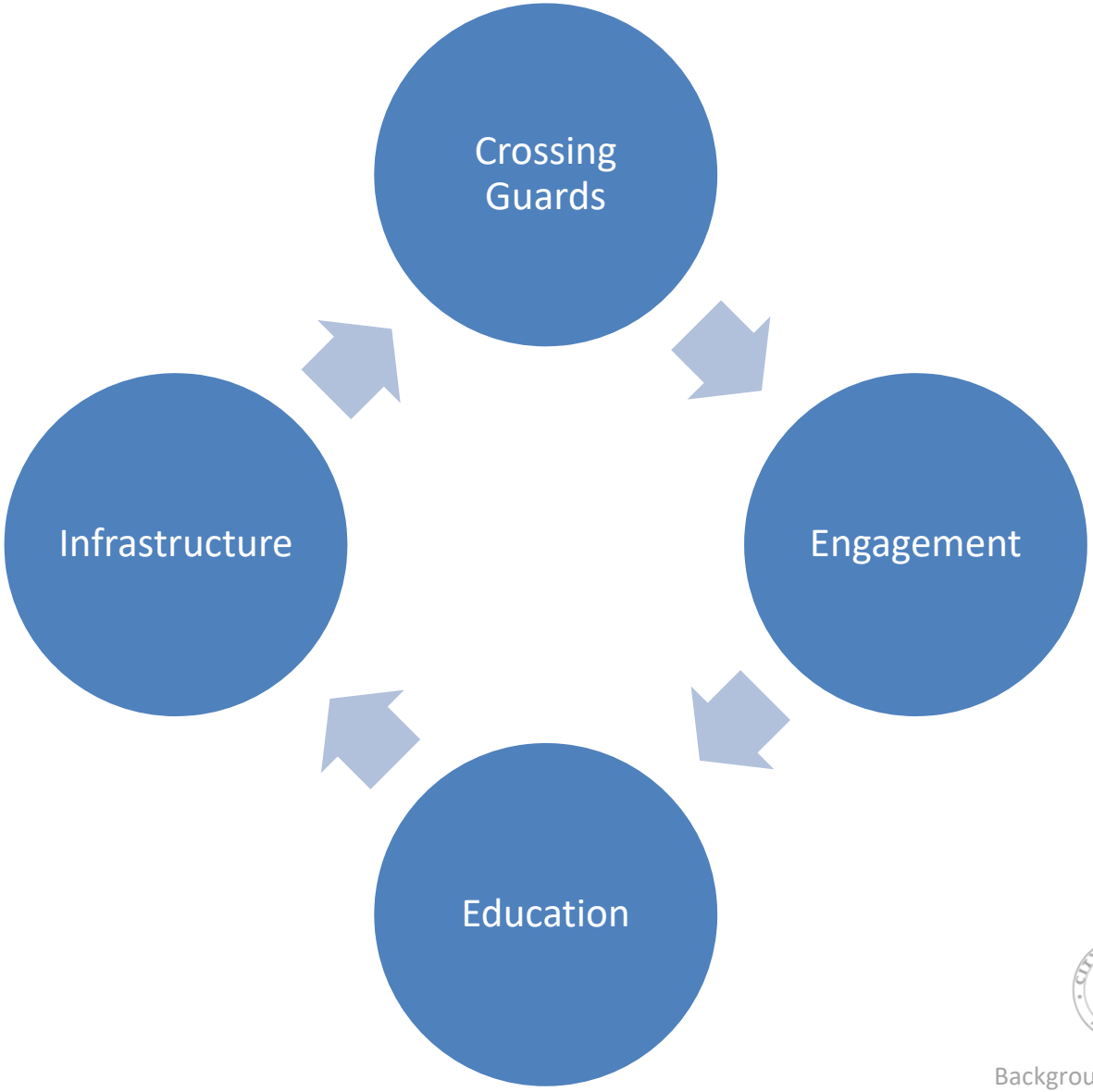
Mission:

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:

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.

Program Initiatives



Bond Language voted on by Austin residents:

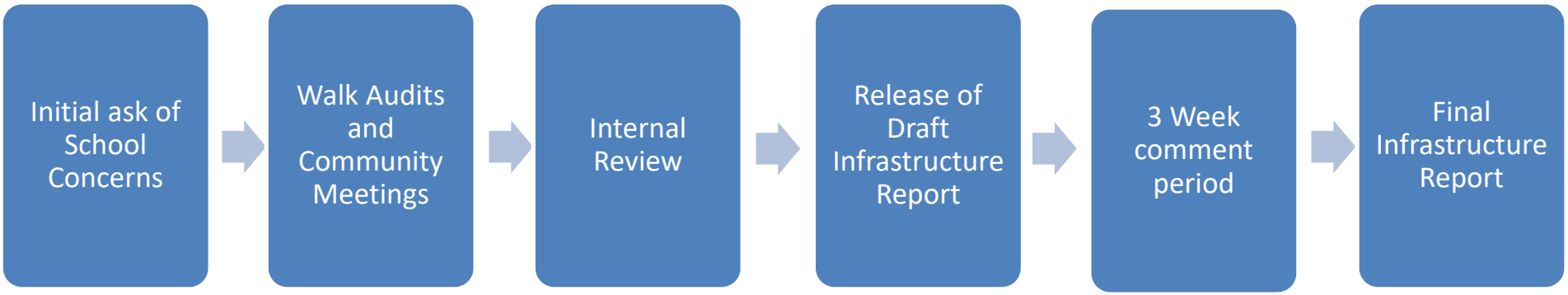
- **$27,500,000 divided evenly among the ten City Council Districts** to allow the City to address Safe Routes to School. The Safe Routes to School Program is a partnership with local school districts to address safety concerns of routes to school and encourage children and families to bike or walk to school. Improvements may include infrastructure options that create a safer environment such as sidewalks, traffic calming devices, protected bicycle facilities, and urban trails.

Elementary and Middle Schools Per Council Districts

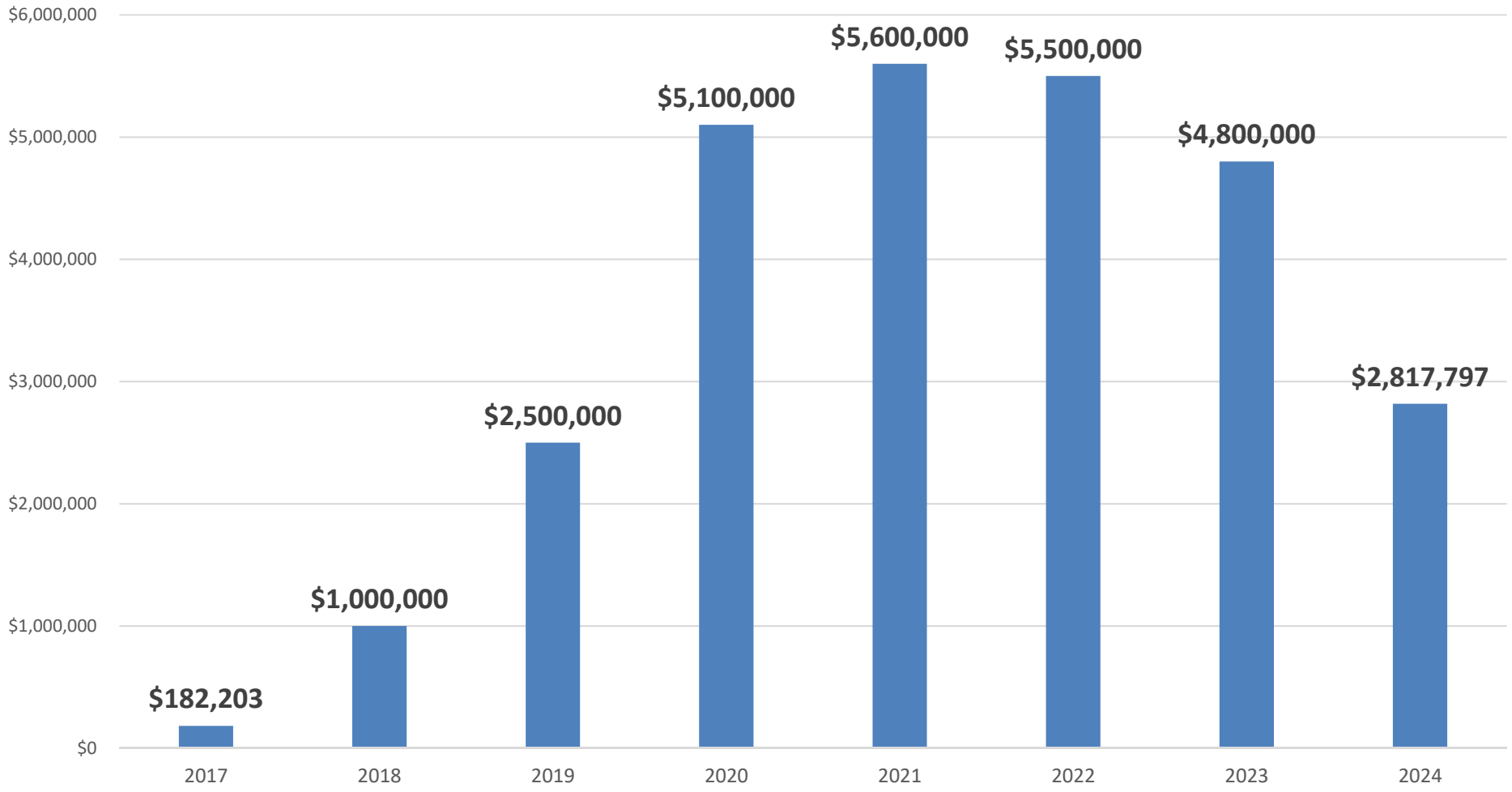
Council District 1	18
Council District 2	17
Council District 3	14
Council District 4	15
Council District 5	8

Council District 6	15
Council District 7	13
Council District 8	12
Council District 9	8
Council District 10	11

Infrastructure Report Process



Yearly Spend Plan



Benefit Breakdown

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 Meetings

Infrastructure Report Breakdown

- Background
- Process
- Overall Benefit and Estimated Cost:Benefit Chart
- Recommendations by School
- Caveat Language
  - Ideas presented in this document are planning-level concepts: many projects will require further feasibility study and engineering evaluation before they can be implemented. In some locations, alternate approaches to address the issue may prove more feasible or more cost effective.

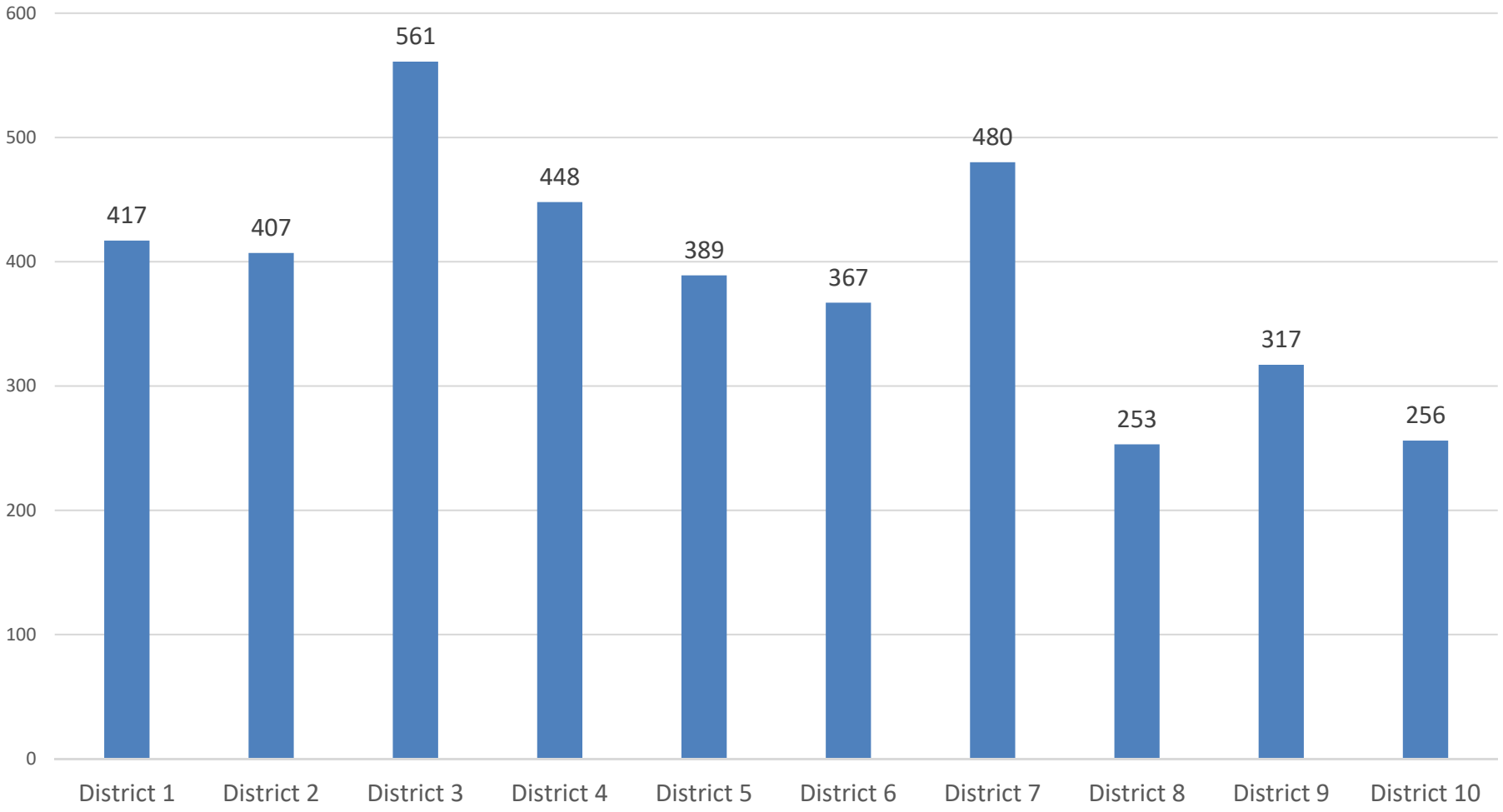
  - Estimated Cost:Benefit Rankings are preliminary, planning level-estimates to identify cost-effective options for addressing safety concerns. Estimated Cost:Benefit Rankings are developed using planning level costs for projects of this nature. Individual project cost estimates will change as projects advance.

Overall Benefit and Estimated Cost:Benefit Chart

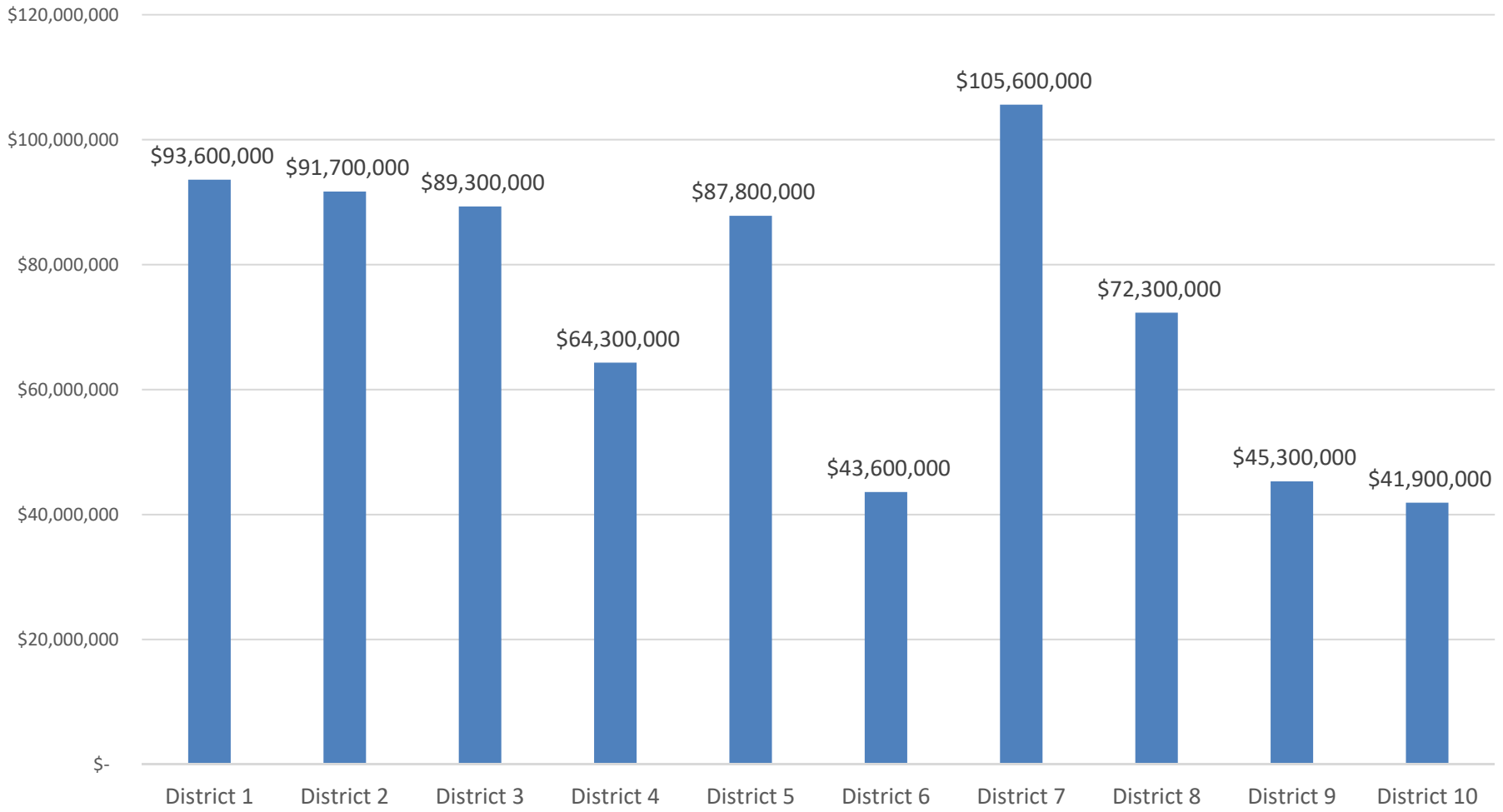
Project ID	Schools within 1/2 mile * = no schools w/in 1/2 mile; closest school noted	Location	Issue	Recommendation + = parking removal required * = curb changes required ~ = private property acquisition required	Overall Benefit Category	Estimated Cost:Benefit Category*
1C - 613	GRAHAM	CLAYWOOD DR / WANDERING 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 / WANDERING 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

DRAFT

Draft Report Identified # of Barriers



Draft Report Estimated Cost of Barriers



STREETS Study Specific Aims

Aim 1	• Determine three-year **individual level effects** on child physical activity of Austin SRTS infrastructure projects compared to similar schools without SRTS infrastructure projects
Aim 2	• Determine **population-level effects** of Austin SRTS projects on active commuting to school (ACS).
Aim 3	• Examine the **cost effectiveness of SRTS** infrastructure changes on child physical activity levels.
Exploratory Aims	• SRTS educational programmatic elements/curricula • Distance from home to school • School characteristics (e.g., SES, racial/ethnic composition, etc.) • Previous SRTS environmental changes • Individual determinants on child physical activity and ACS

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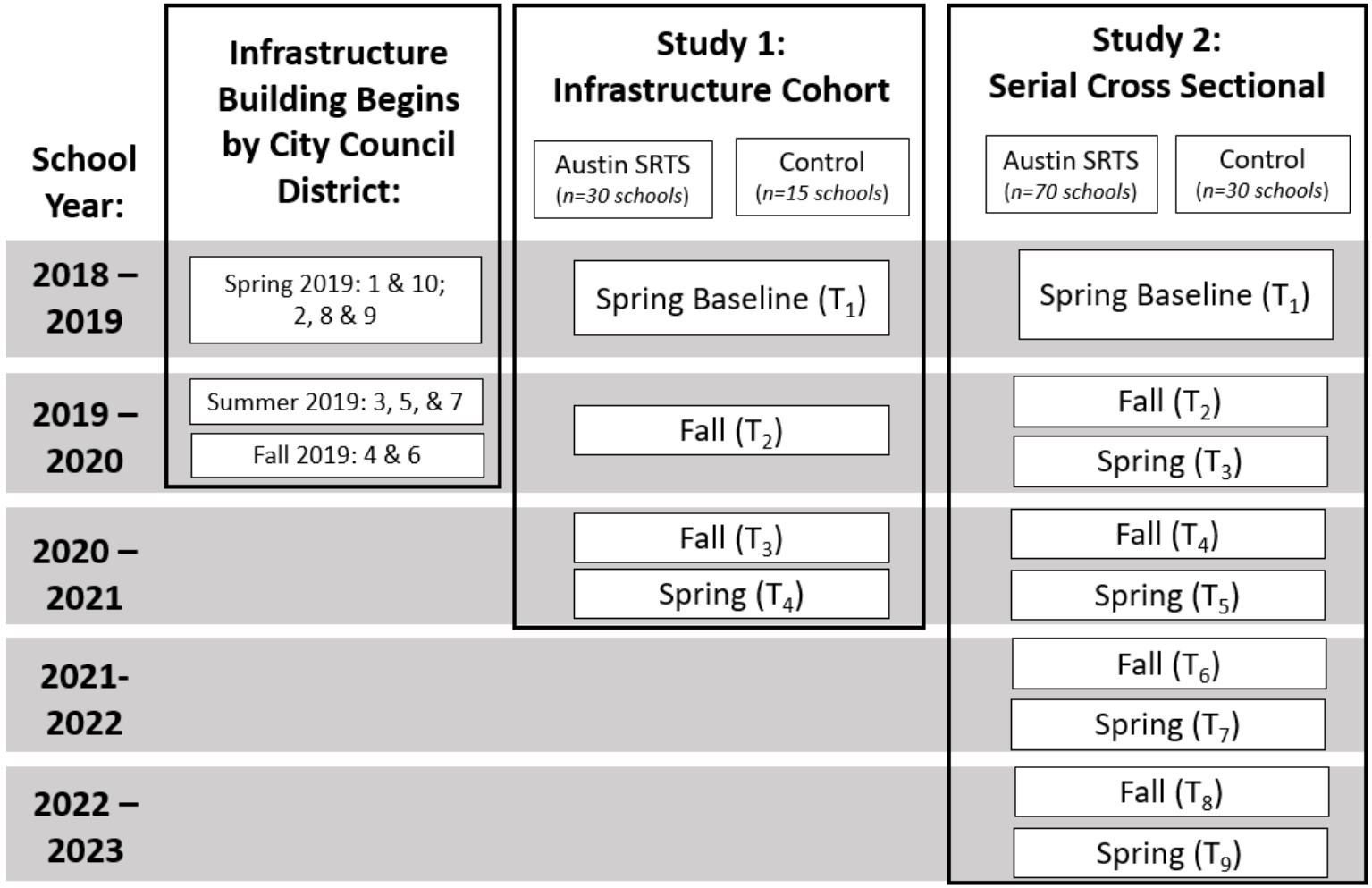
Study Design

- Natural experiment with two rigorous approaches:
  - A quasi-experimental cohort (Study 1)
  - A serial cross-sectional study design (Study 2)
- Qualitative data will be collected to provide context and confirm findings for the infrastructure changes.
- A cost effectiveness study (Study 3) will provide information on the relative return on investment

STREETS Study Design



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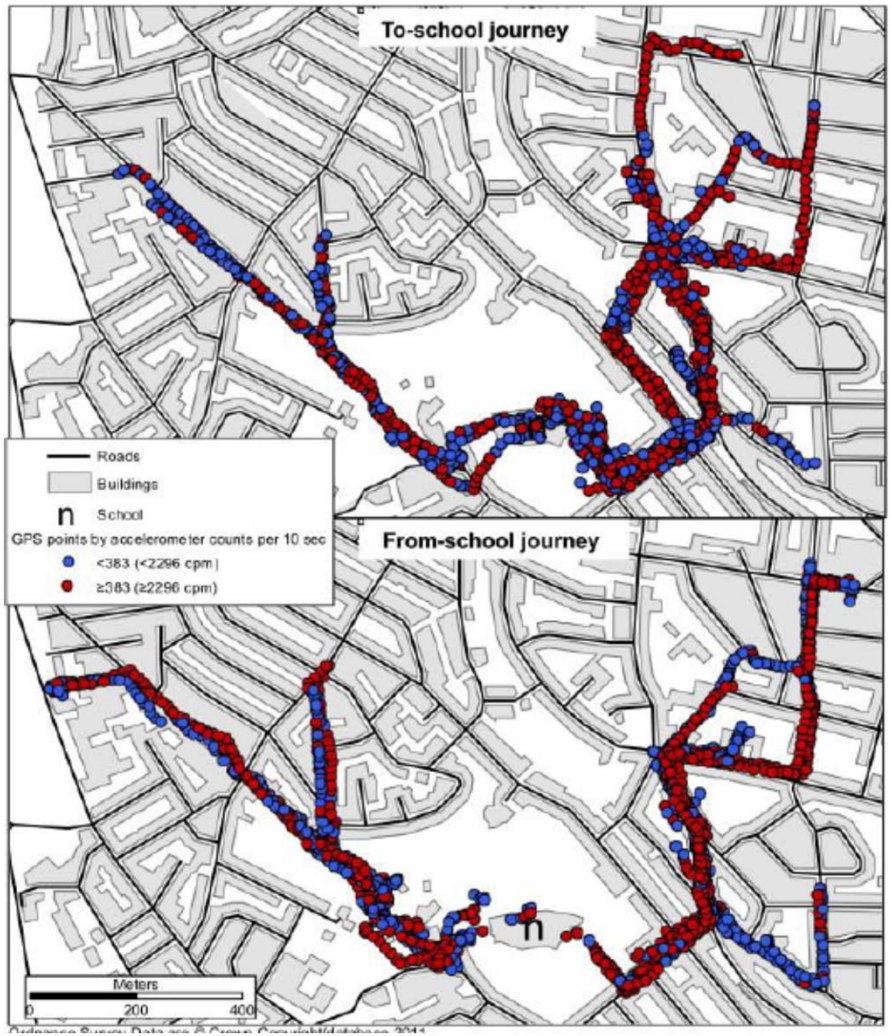
Cohort Study Overview

- **Currently have 25 schools recruited**
- **Measures**
  - Child physical activity measured with accelerometer and GPS
    - 7 days
  - Child survey
    - Self report PA, self-report ACS, self efficacy, demographics
  - 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

What is an accelerometer?

- An instrument or device that measures acceleration
- It contains a sensor that converts acceleration into an electric signal
- Objective measure of total PA, and by intensity-level
- Detailed description of patterns and changes in PA

Example: Combined accelerometer and GPS data points comparing nine pupils' journeys to and from one secondary school



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.

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

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Cross-sectional Study – Measures

- **Currently have 90 schools recruited**
- SRTS Student Tally
  - Teacher administered tally of proportion of students engaged in ACS
  - All 3rd, 4th, and 5th grade classrooms in participating schools
- School health policy survey
  - School SRTS programs
  - PA policies
  - Other health related policies and programs
- Campus Improvement Plans

Example SRTS Promotion from the CATCH Program

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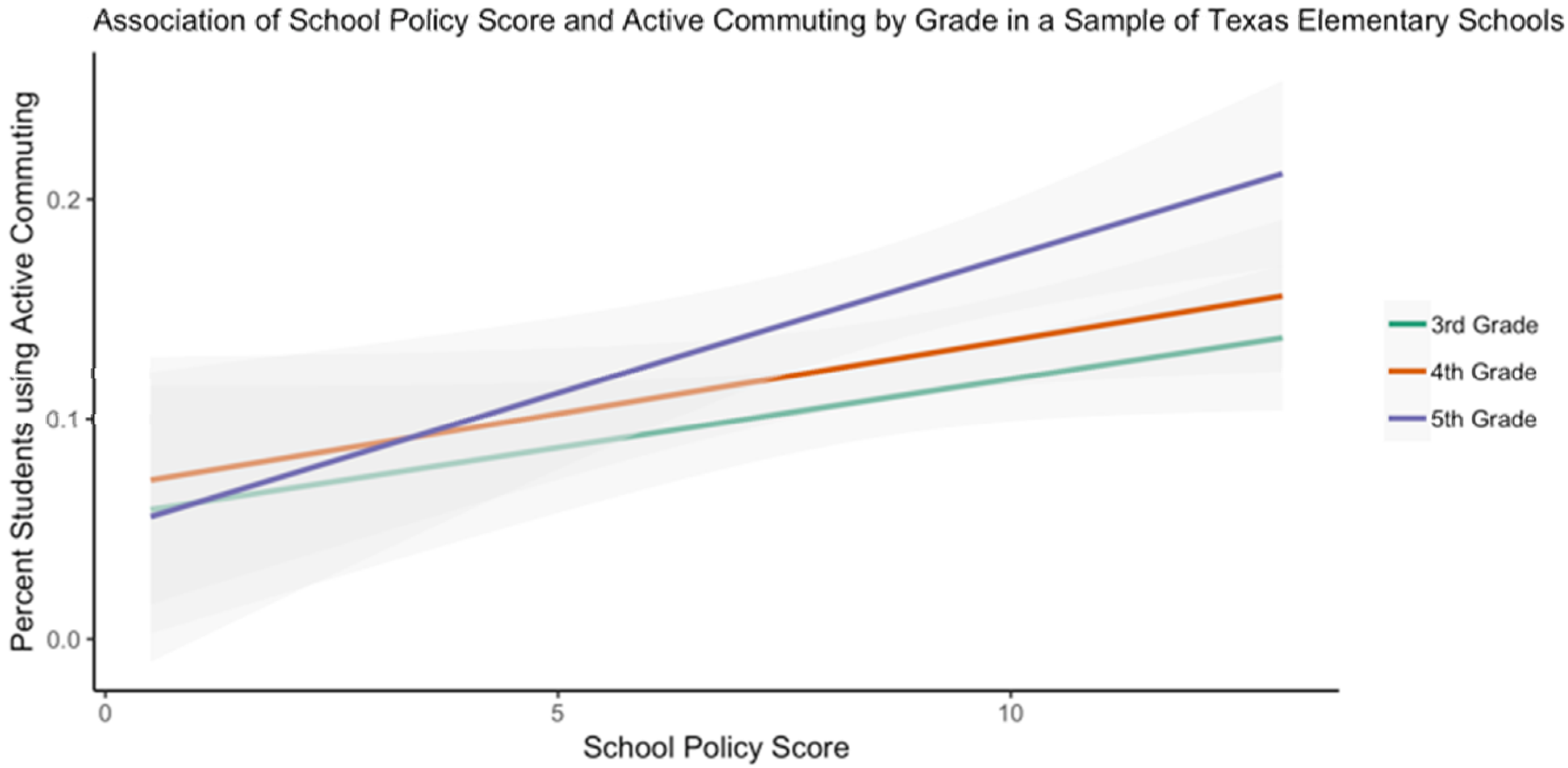
Example use of STREETS Data



Gressett et al (2019)

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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

Thank You!

STREETS Study

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References

- Community Preventive Services Task Force. Physical Activity: Interventions to Increase Active Travel to School. Centers for Disease Control and Prevention. 2018; Atlanta, GA.
- Craig P, Cooper C, Gunnell D, et al. Using natural experiments to evaluate population health interventions: new Medical Research Council guidance. J Epidemiol Community Health. 2012;66(12):1182–1186. doi:10.1136/jech-2011-200375
- Gressett A, Ganzar LA, Kohl H, Hoelscher DM. Active commuting to school and elementary school policy. In progress. 2019
- Hoelscher D, Ory M, Dowdy D, Miao J, Atteberry H, Nichols D, et al. Effects of Funding Allocation for Safe Routes to School Programs on Active Commuting to School and Related Behavioral, Knowledge, and Psychosocial Outcomes: Results From the Texas Childhood Obesity Prevention Policy Evaluation (T-COPPE) Study. Environment and Behavior. 2016;48(1):210-29.
- Katzmarzyk PT, Denstel KD, Beals K, Bolling C, Wright C, Crouter SE, et al. Results From the United States of America's 2016 Report Card on Physical Activity for Children and Youth. J Phys Act Health. 2016;13(11 Suppl 2):S307-S13.
- Kohl III HW, Cook HD. Educating the student body: Taking physical activity and physical education to school: National Academies Press; 2013.
- Martin A, Boyle J, Corlett F, Kelly P, Reilly JJ. Contribution of Walking to School to Individual and Population Moderate-Vigorous Intensity Physical Activity: Systematic Review and Meta-Analysis. Pediatr Exerc Sci. 2016;28(3):353-63.
- McDonald NC, Steiner RL, Lee C, Rhoulac Smith T, Zhu X, Yang Y. Impact of the safe routes to school program on walking and bicycling. Journal of the American Planning Association. 2014;80(2):153-67.

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