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

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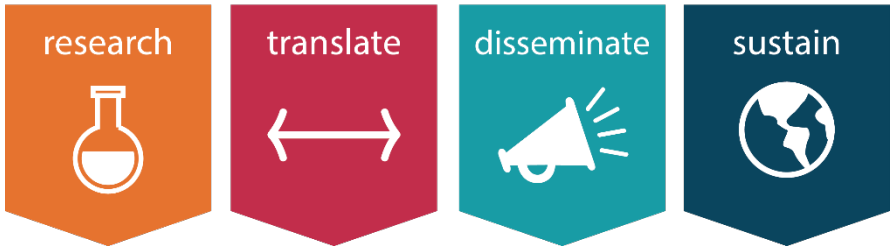
STRATEGIC PLAN GOALS



Today's Webinar

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

STREETS
SAFE TRAVEL ENVIRONMENT EVALUATION IN TEXAS SCHOOLS

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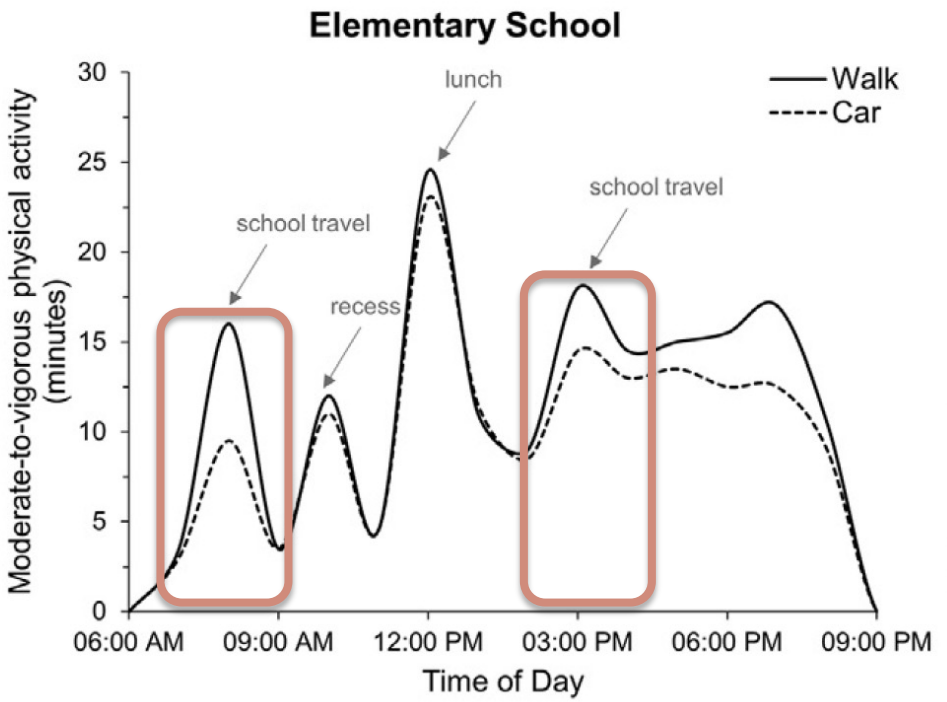
Background

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

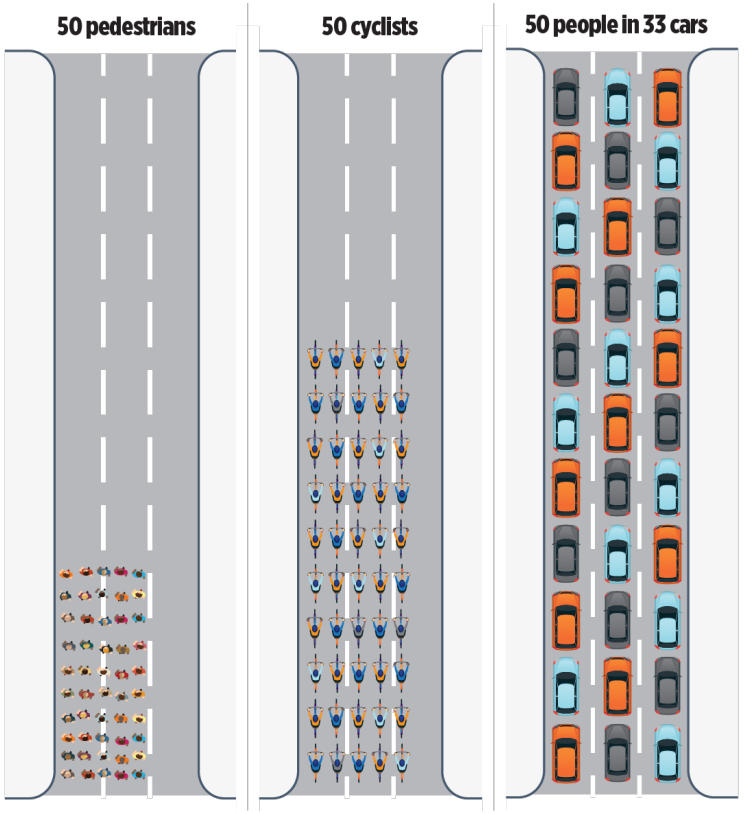
- ↓ Use of private automobiles and other motorized transport, including busing to school
- ↓ Congestion
- ↓ Traffic-related injuries and fatalities
- ↓ Healthcare costs

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

Background

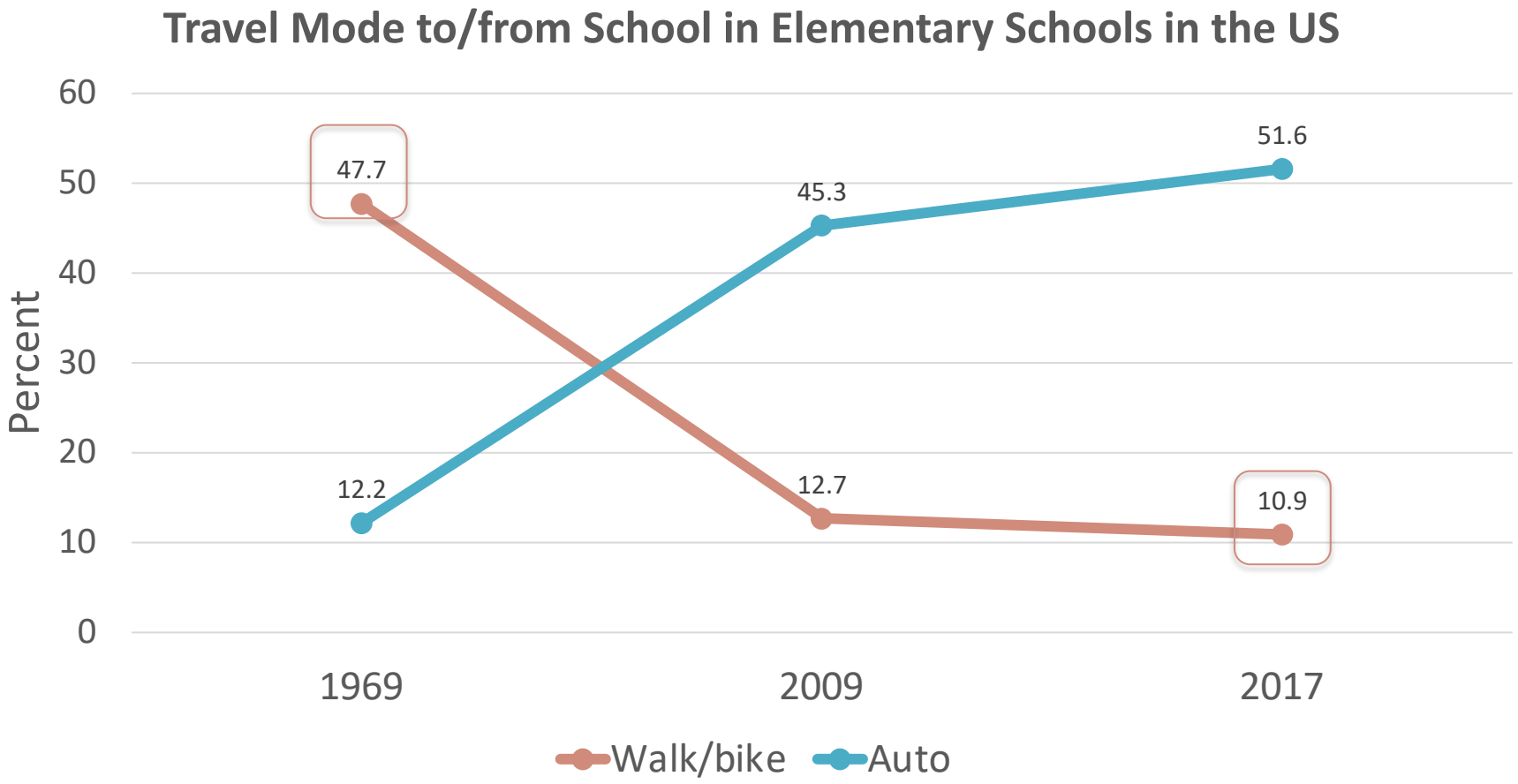
Environmental Benefits of Active Commuting to School

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



Hong et al (2018)

Trends in Active Commuting



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

Correlates of Active Commuting

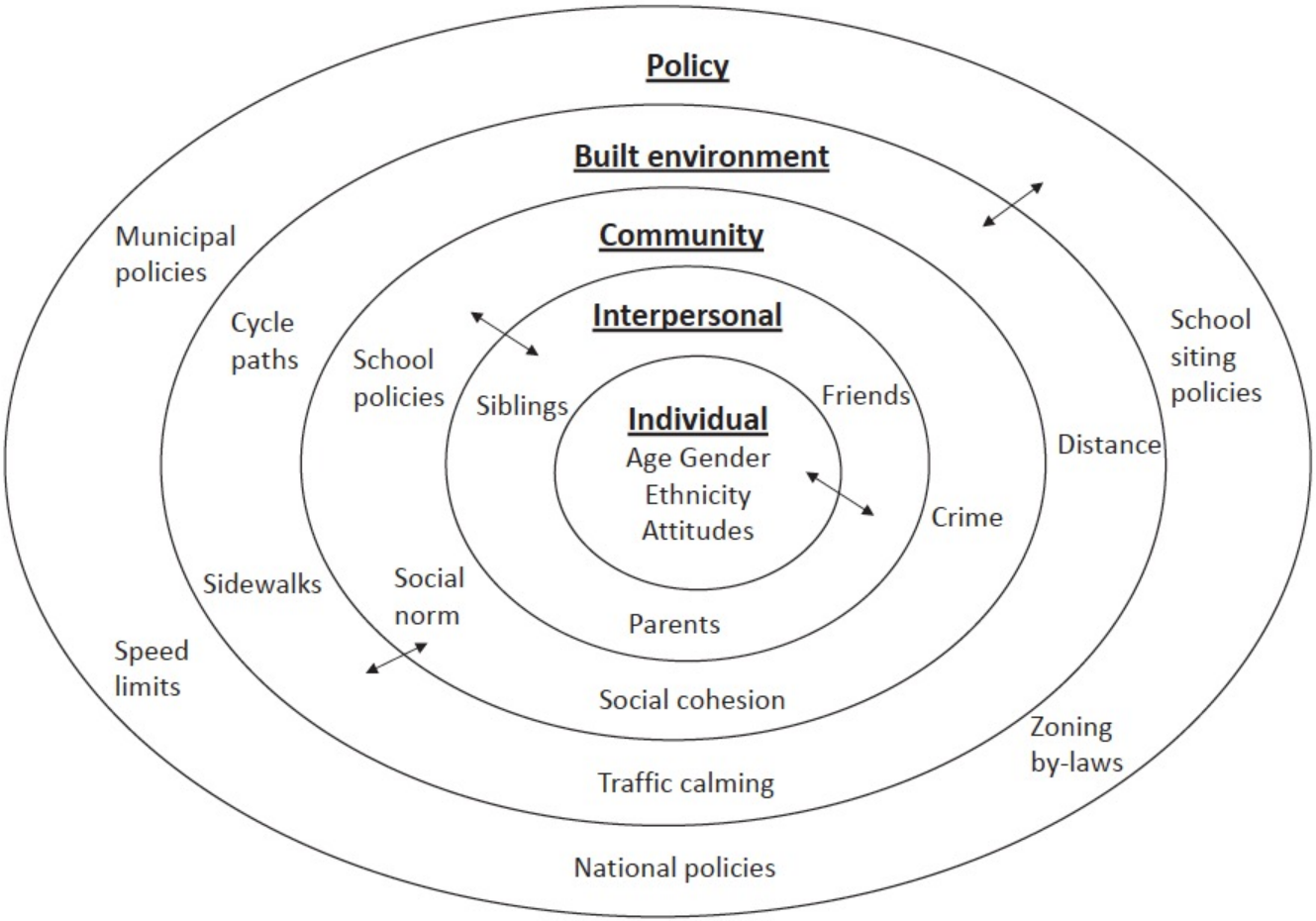


Figure from Larouche & Ghekiere (2018)

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

Safe Route Partnership (2020)

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SRTS Program Overview

SUPPORTING THE HUMAN POWER IN YOU

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.

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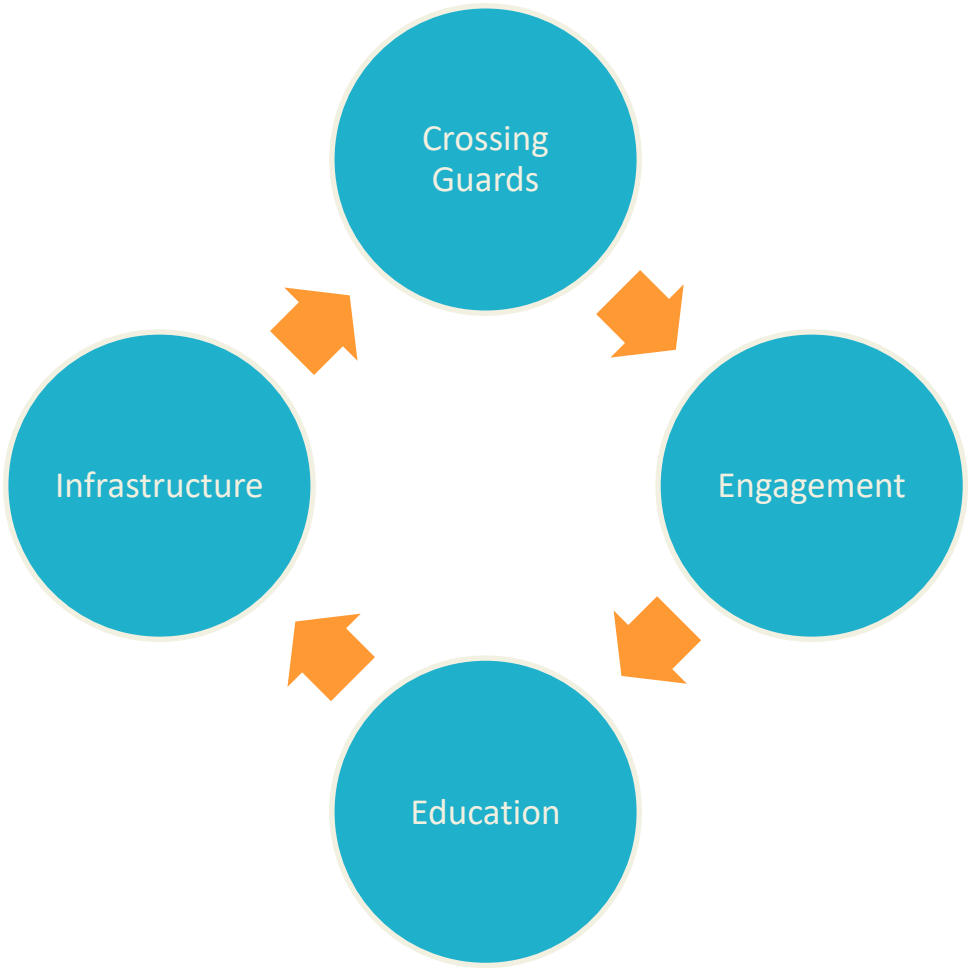
Programming



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Crossing Guard Program

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Program Breakdown

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

- 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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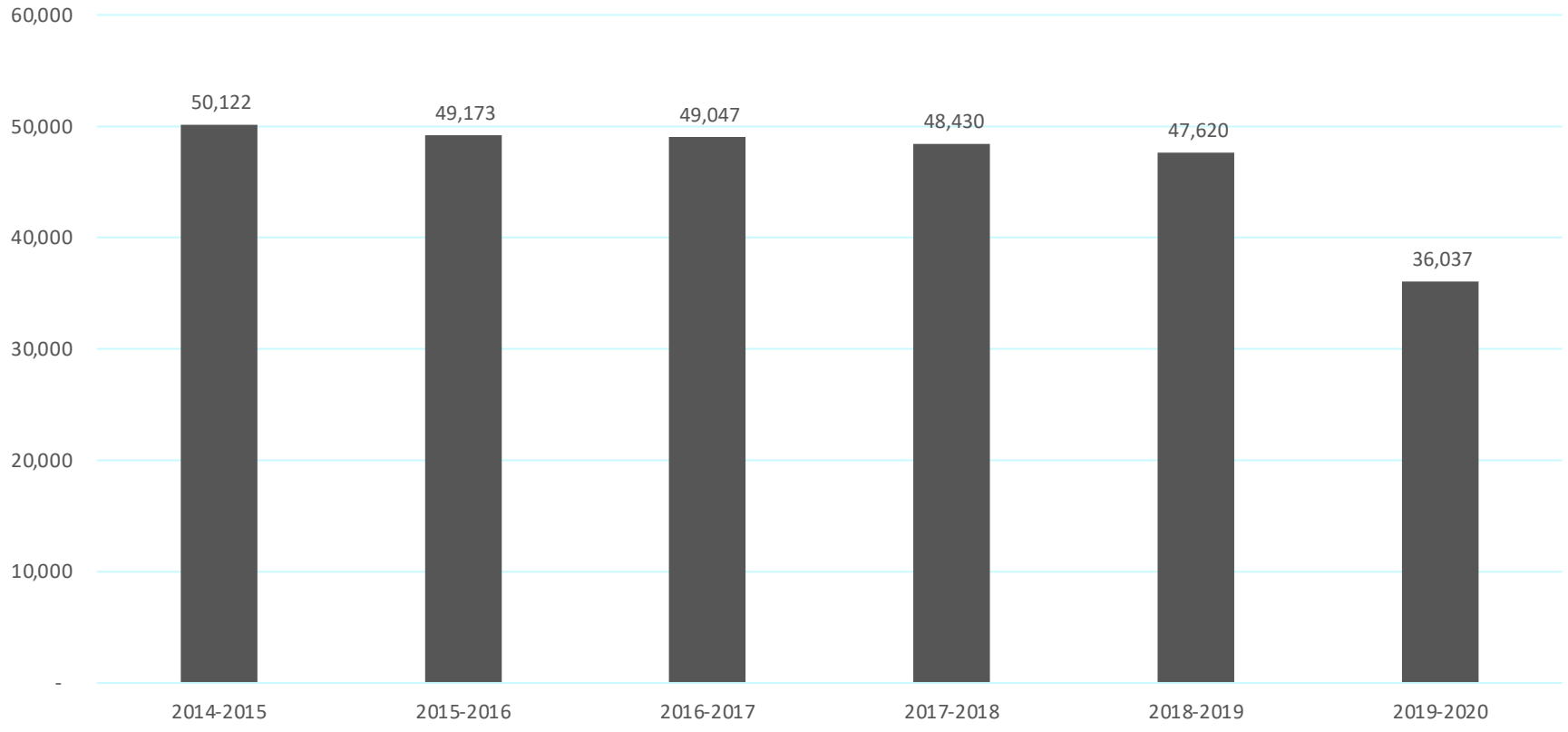
Services Offered

- 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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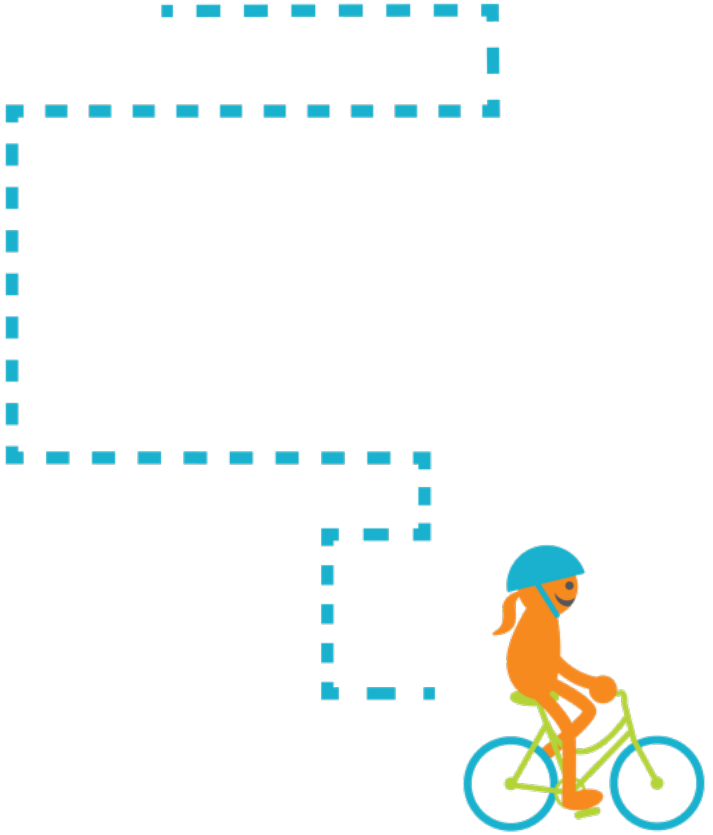
Goal

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

Approach

- 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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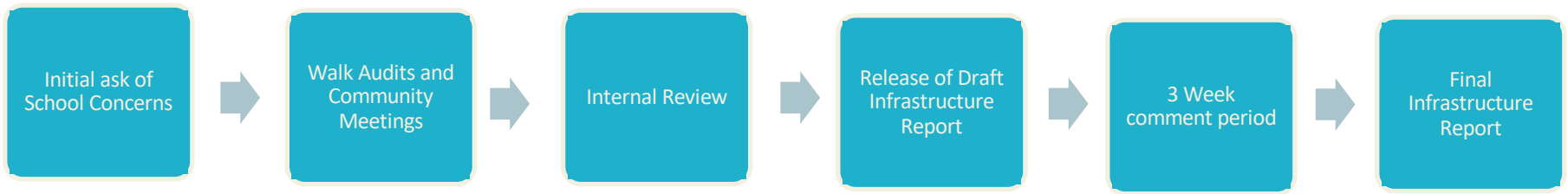
2016 Bond

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.

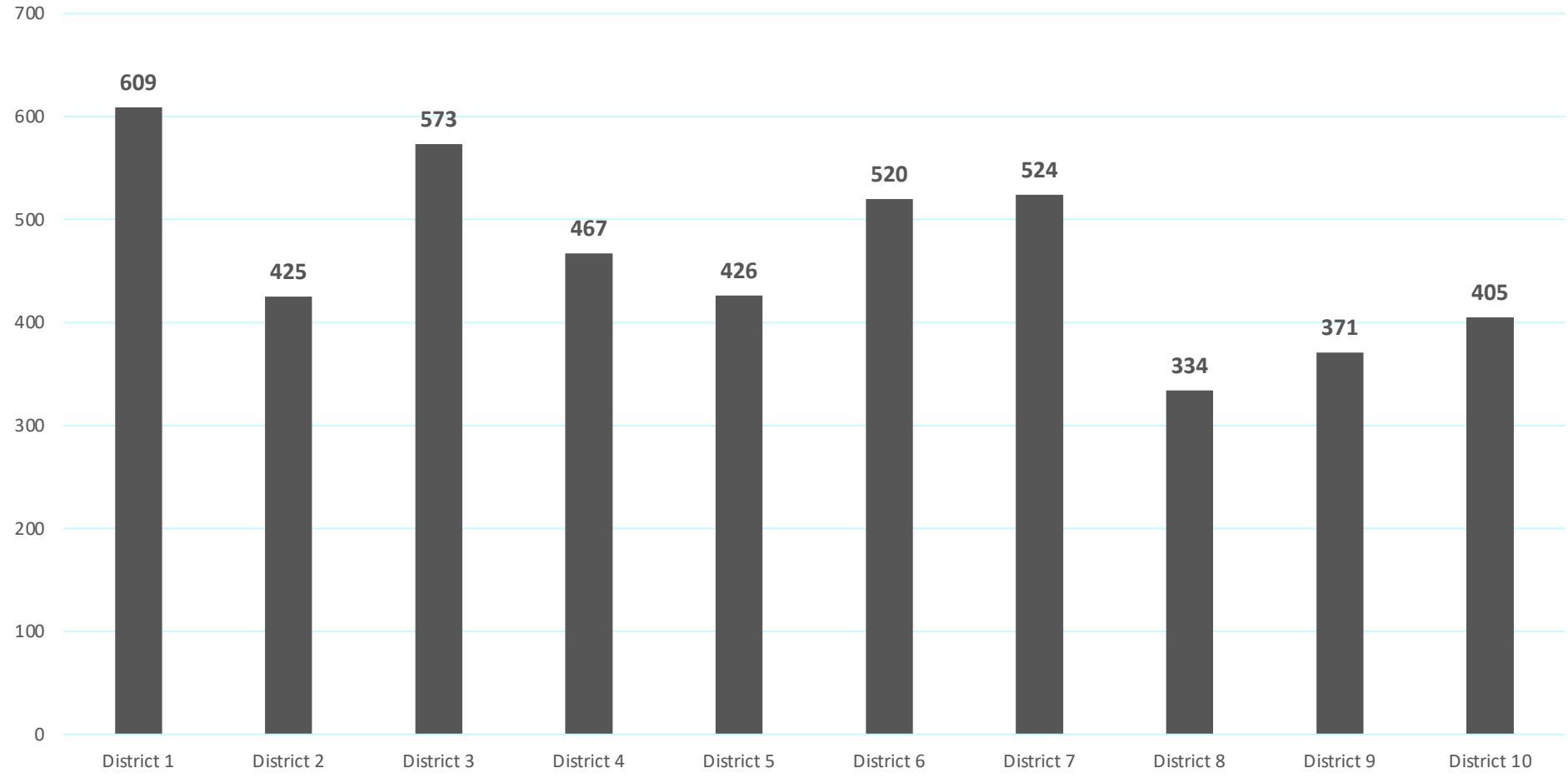
Approach:



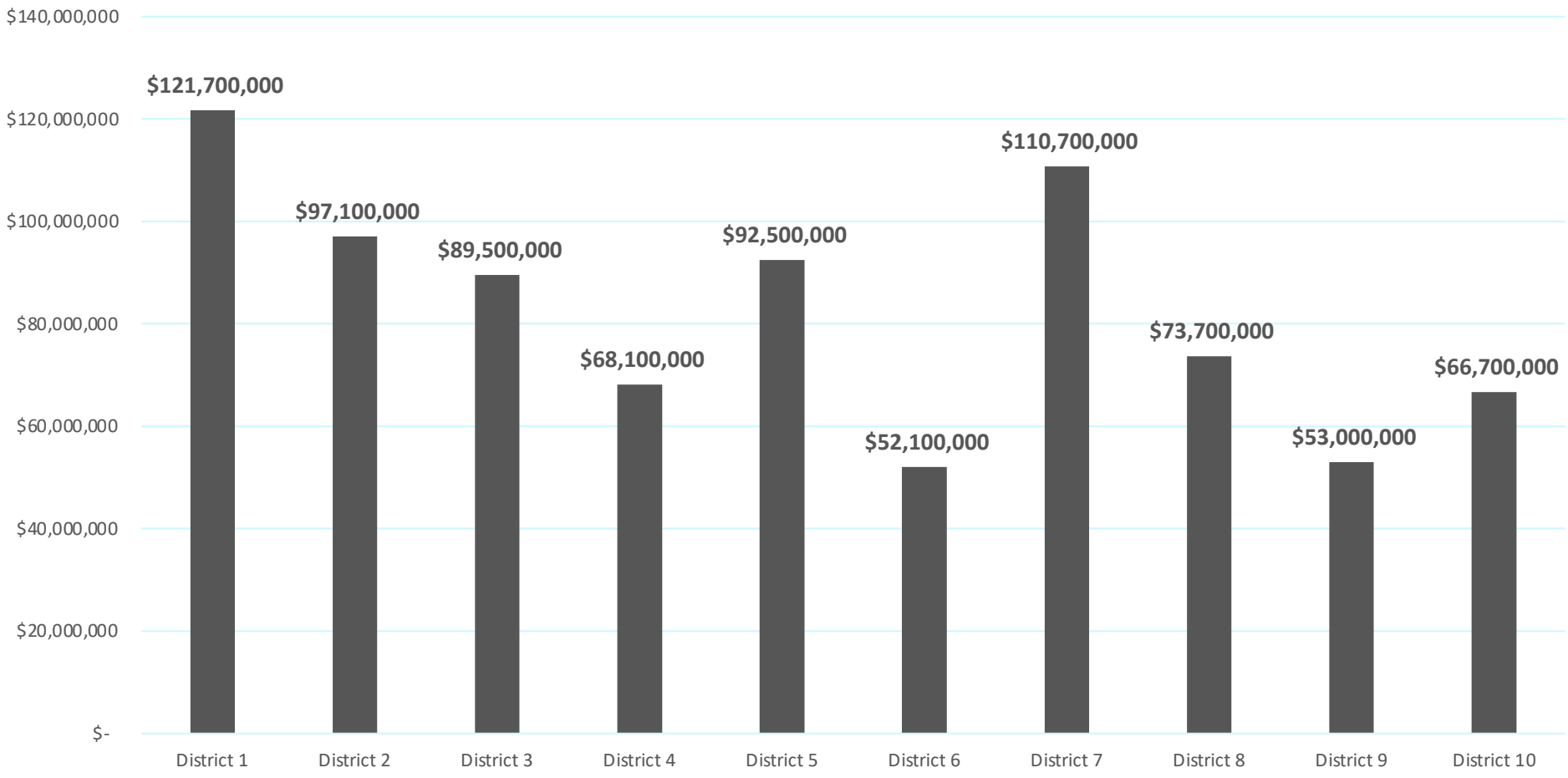
Walk Audits Per Council District

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%):

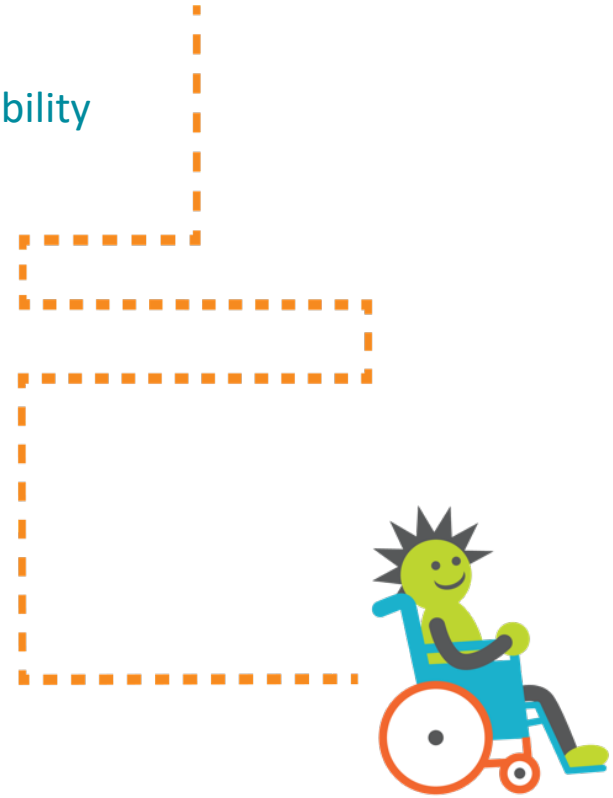
- Bike/Ped Crashes
- Functional Class Score
- Engineering Judgement

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 * = 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

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.

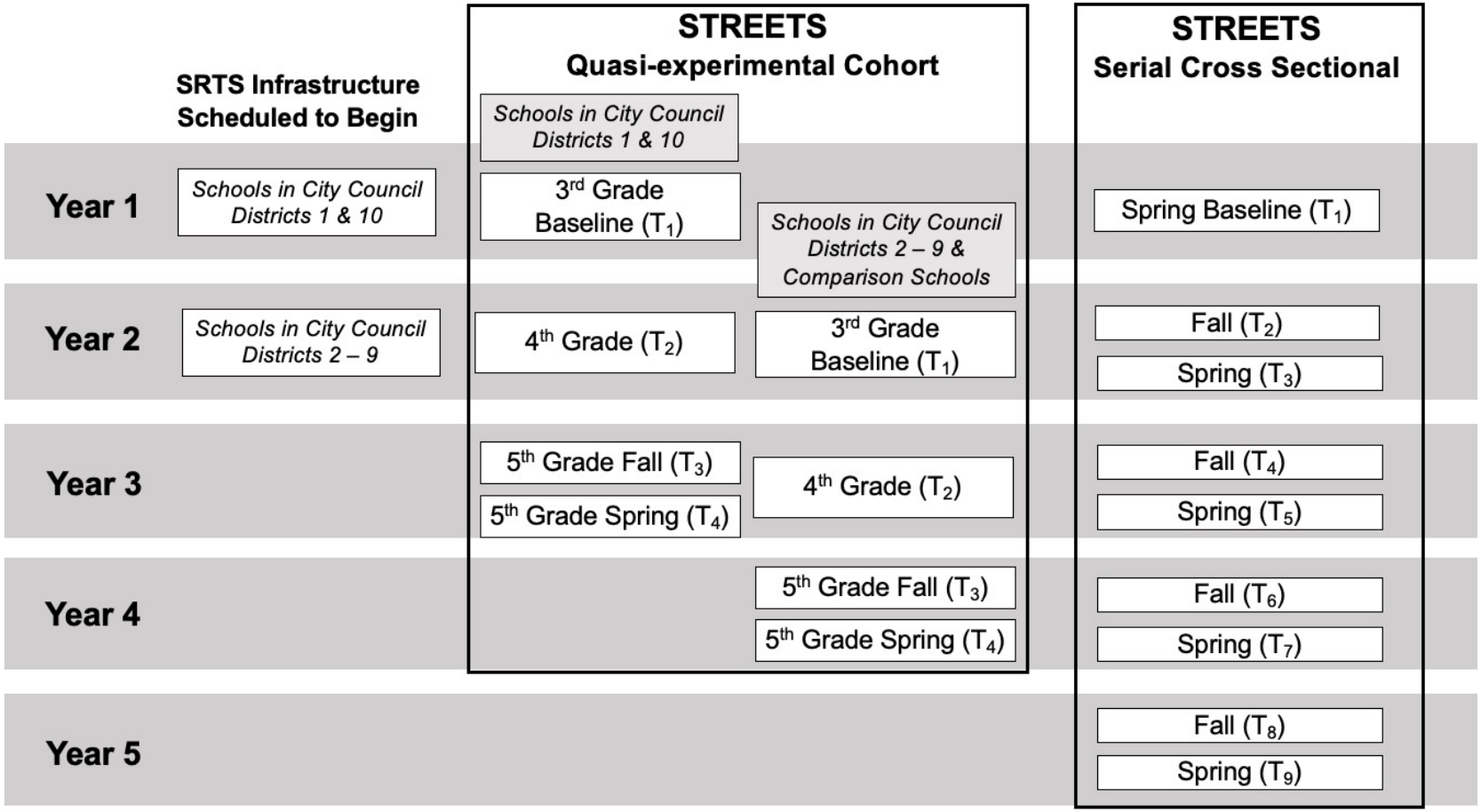
Aim 3

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 3rd grade students and follow through 5th grade
  - Measure students 4 times
- **Aim 2: Population level effects on active commuting**
  - Serial cross-sectional study design
  - Measure every 3rd, 4th, and 5th 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

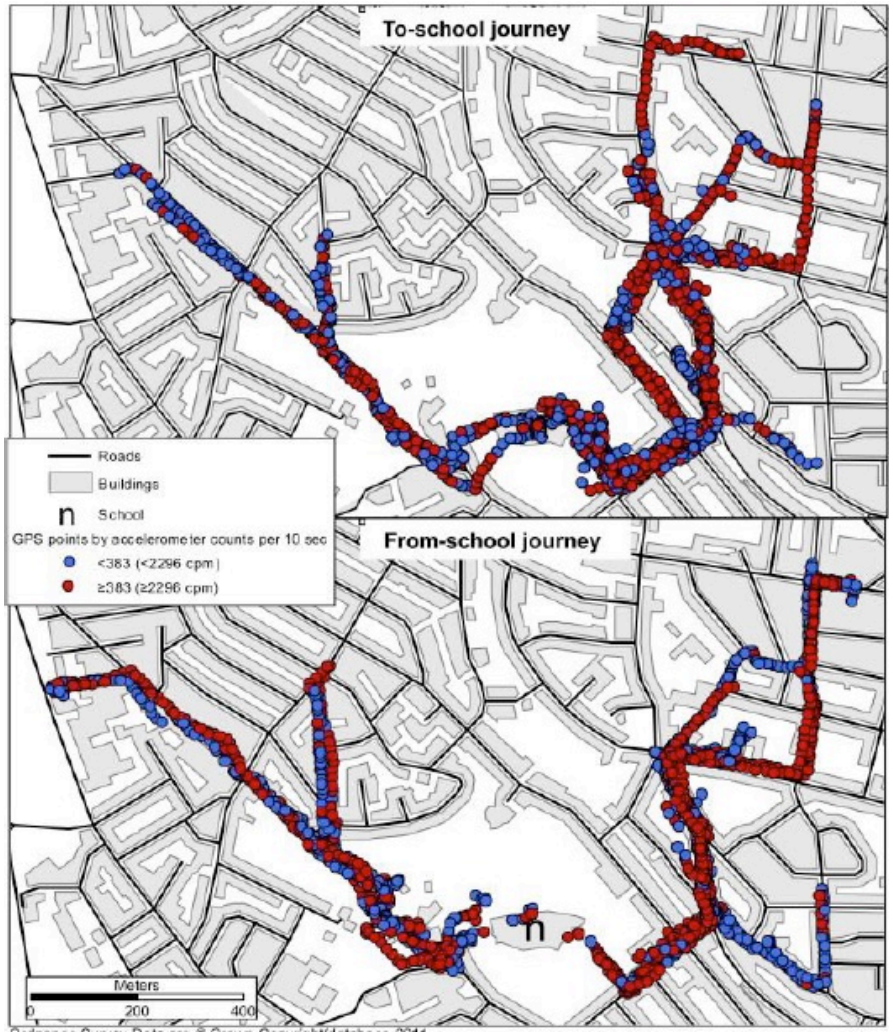
STREETS Study Timeline



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

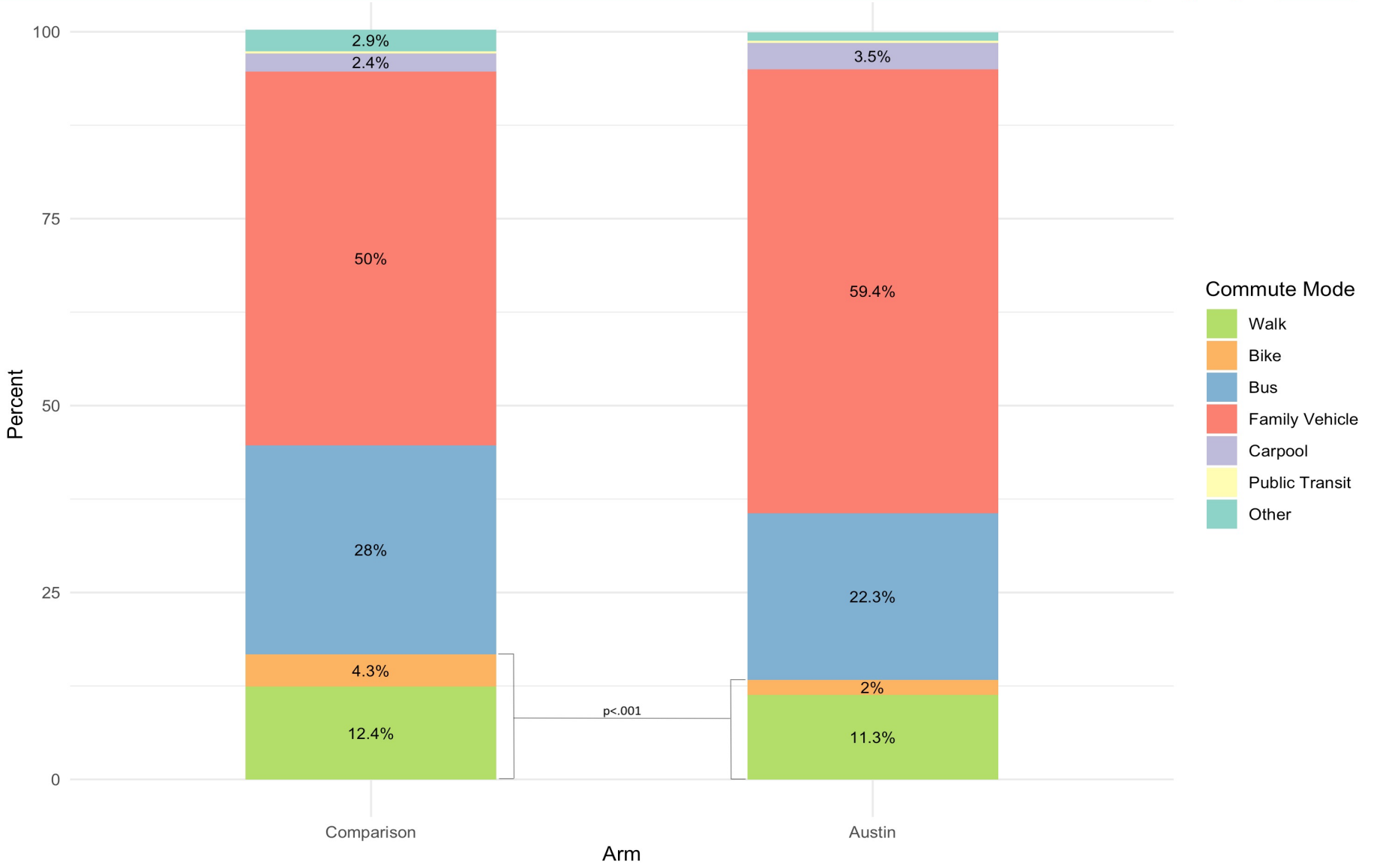
- **94 schools recruited**
- SRTS Student Tally
  - Teacher administered tally of proportion of students engaged in ACS
  - All 3rd, 4th, and 5th grade classrooms in participating schools
- School health policy survey
  - School SRTS programs
  - PA policies
  - Other health related policies and programs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

Example SRTS Promotion from the CATCH Program

Other Measures

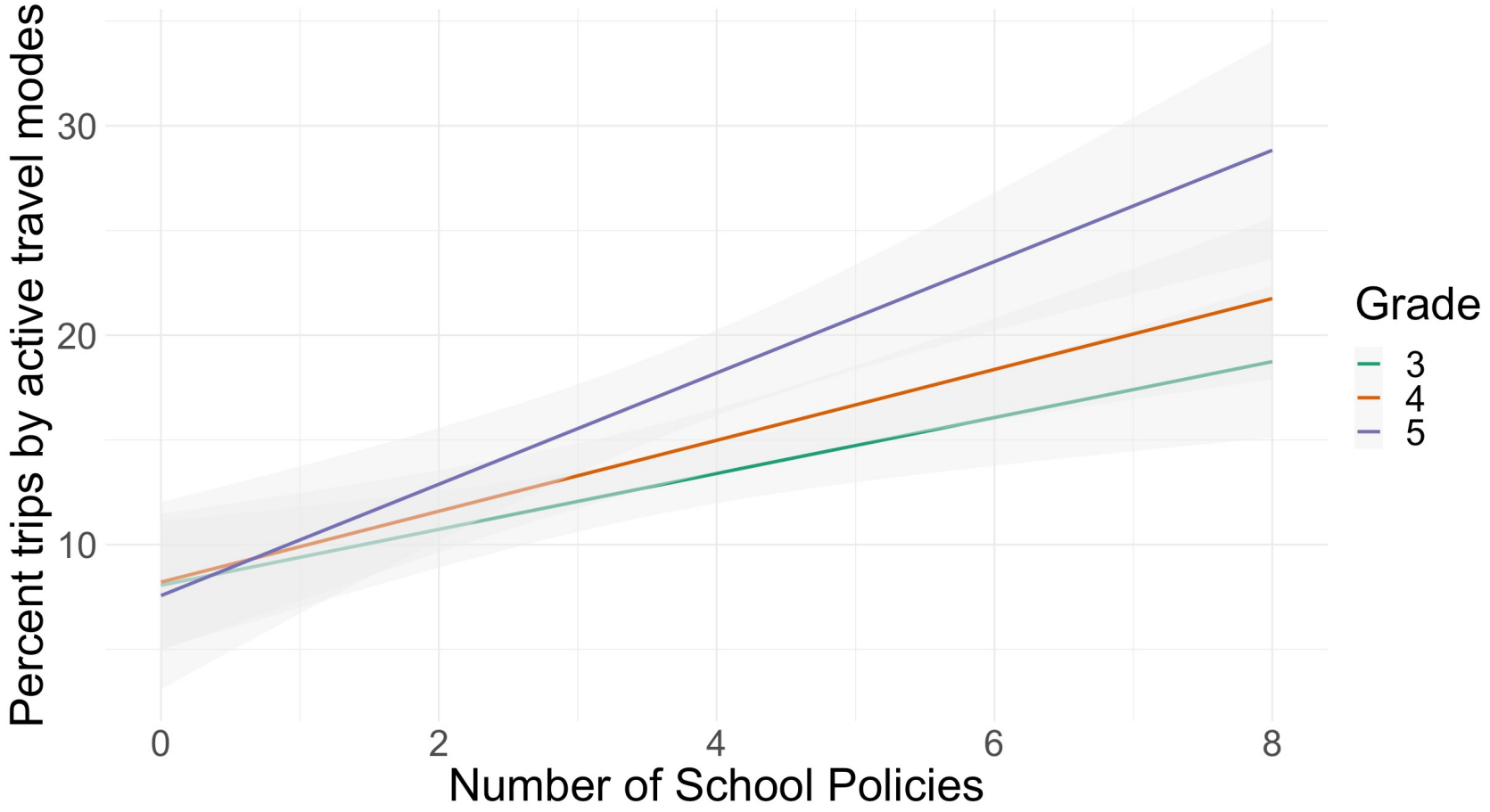
- Qualitative data will be collected to provide context and confirm findings for the infrastructure changes.
  - Key informant interviews with schools, parents, stakeholders, and children
- A cost effectiveness study (Study 3) will provide information on the relative return on investment
  - Cost of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



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  - Deanna Hoelscher, PhD, RDN, Principal Investigator
  - Bill Kohl, PhD
  - 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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