Evaluating the Impact of Safe Routes to School Infrastructure on Active Commuting in Central Texas Schools

Deanna Hoelscher, PhD, RDN, LD, CNS, FISBNPA

Yuzi Zhang, PhD, MS; Leigh Ann Ganzar, DrPH; Kevin Lanza, PhD; Deborah Salvo, PhD; Sarah Bentley, MPH and Adriana Pérez, PhD

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STREETS Study Overview

Study Aim: To determine effects of SRTS infrastructure changes on population-level **active commuting to school (ACS)** over time.

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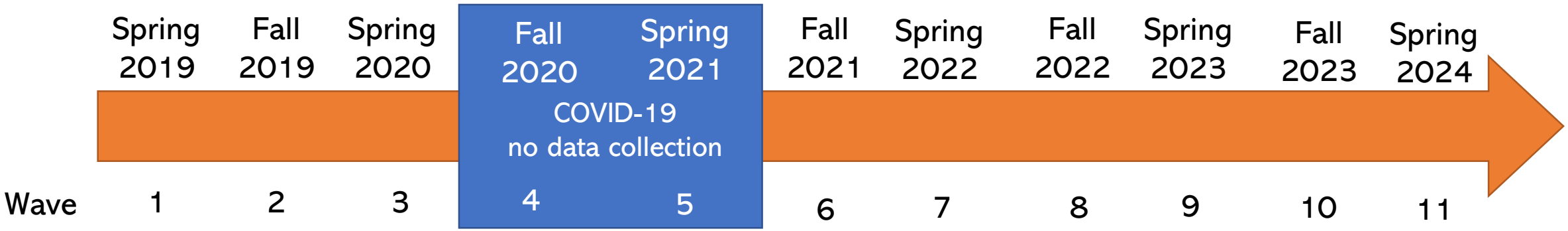
Study Design & Data Collection

- Serial cross-sectional sample; longitudinal study
- Data collection
  - January 2019-May 2024 each spring and fall semester (11 waves of potential data collection)
  - 92 elementary schools
    - 69 Infrastructure schools (municipal-funded)
    - 23 Comparison schools (surrounding school districts, no infrastructure funding)
  - No data collection for Wave 4 (fall 2020) and Wave 5 (spring 2021) due to COVID-19

Analytic Sample



- The baseline measurement (1st measured wave) for participating schools ranged from Wave 1 (Spring 2019) to Wave 7 (Spring 2020)
- To control for confounding effects, only schools with the baseline at Wave 1 or Wave 2 were included in the analysis:
  - 84 elementary schools (91%)
    - 64 infrastructure schools
    - 20 comparison schools

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Variables and Measures

School-level ACS

- SRTS tally recorded by teachers
- Grade 3-5 classrooms
- Tuesday, Wednesday, and Thursday: AM & PM
- School-level total ACS trips:
  - Number of trips to/from schools made by walking or biking
  - Summed across classrooms; average of percentages in each school

SRTS infrastructure

- Intention-to-treat analysis: Infrastructure schools vs. comparison schools
  - Expose to SRTS infrastructure vs. not exposed to SRTS infrastructure
- Policy implementation analysis: Infrastructure implementation status in infrastructure schools at each wave
  - Pre, during, and post-construction

Analysis

- Mixed-effect linear models using R and SAS, with the school as the level of analysis, controlling for school-level covariates
  - School-level characteristics:
    - Texas Education Agency – academic year 2018
      - Total school enrollment, number of girls, % race/ethnicity, community type (urban versus suburban), % economically disadvantaged students, % students with limited English proficiency.
  - Daily weather information:
    - NOAA Local Climatological Data.
    - Average daily weather measurements across Tuesday, Wednesday, and Thursday:
      - Mean daily maximum dry bulb temperature, mean daily precipitation, mean daily average wind speed

Participating School Characteristics

	Infrastructure	vs. Comparison
Total school enrollment	558	656
The number of girls	271	321
% major urban communities	86%	15%
% economically disadvantaged students	58%	38%
% limited English proficiency students	37%	17%
Number of measured waves	6.2	4.6

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School-level ACS over time: Analysis 1

Analysis 1: "Intention-to-Treat" policy intervention

Infrastructure schools
N=64

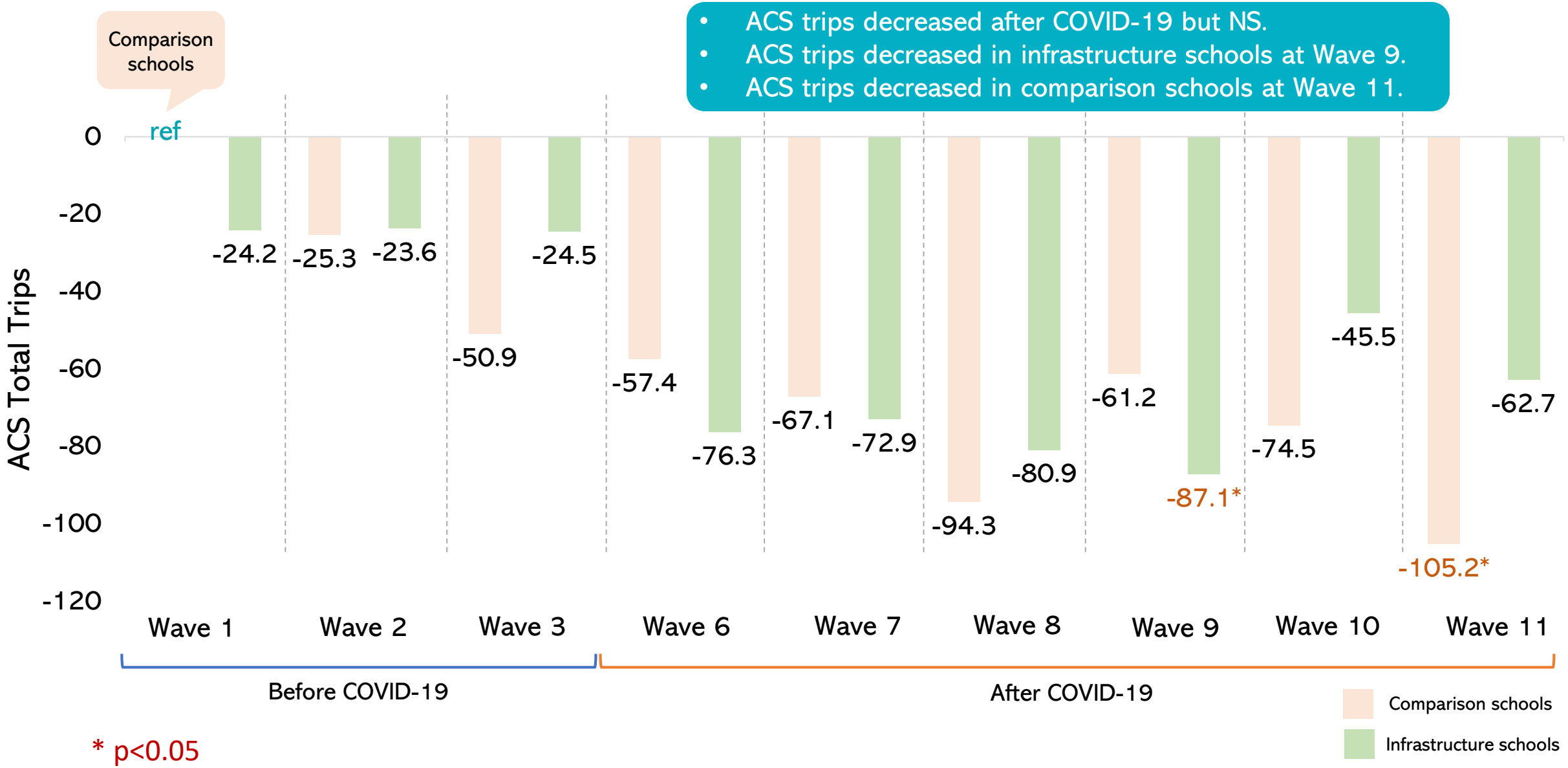
- Municipal bond funding in Central Texas
- Exposed to SRTS construction: infrastructure status at each wave

Comparison schools
N=20

- Similar to infrastructure schools located in central Texas
- No municipal funding
- Not exposed to SRTS construction

School-level ACS over time: Intention-to-Treat policy intervention in schools (Analysis 1)

- ACS trips decreased after COVID-19 but NS.
- ACS trips decreased in infrastructure schools at Wave 9.
- ACS trips decreased in comparison schools at Wave 11.



* p<0.05

School-level ACS over time: Analysis 2

Analysis 1: "Intention-to-Treat" policy intervention

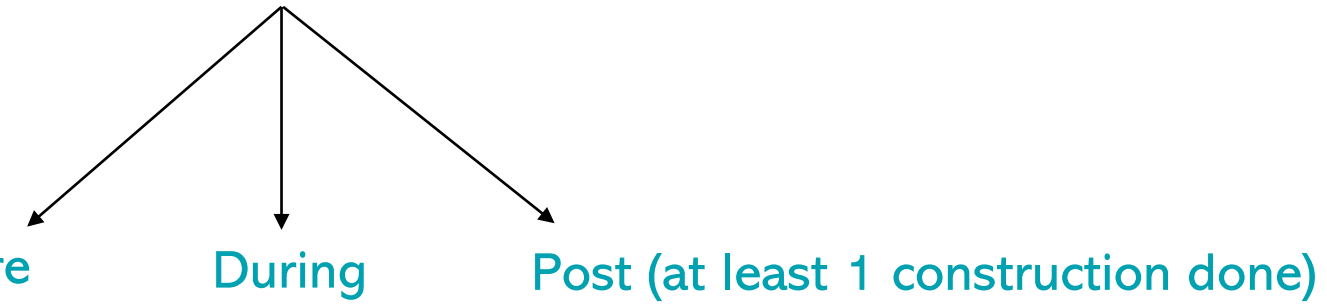
Analysis 2:
Policy implementation in infrastructure schools

Infrastructure schools
N=64

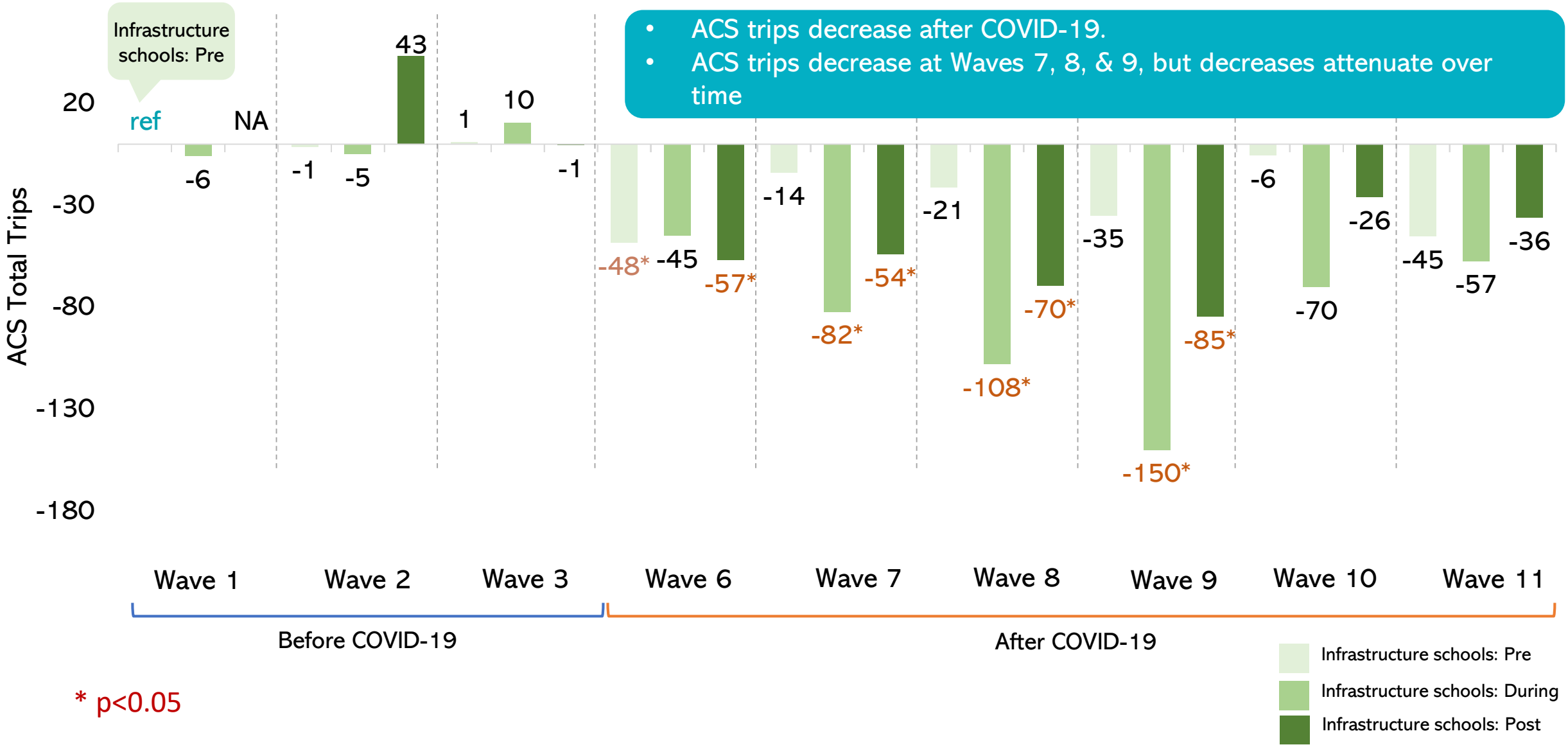
- Municipal bond funding in Central Texas
- Exposed to SRTS construction: infrastructure status at each wave

Comparison schools
N=20

- Similar to infrastructure schools located in central Texas
- No municipal funding
- Not exposed to SRTS construction



School-level ACS over time: Policy implementation in infrastructure schools (Analysis 2)



* p<0.05

Discussion

- SRTS infrastructure negatively affects ACS in the short-term because of construction periods.
- Attaining positive effects in ACS after urban transformations may require longer follow-up periods.
- Infrastructure changes are essential, but other promotional, educational, and cultural supports are needed to promote and sustain behavior change.
- ACS behaviors changed after COVID-19, but longer follow-up is needed to see if these changes persist.

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Deanna Hoelscher, PhD, RDN, LD, CNS, FISBNPA

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- **UTHealth Houston, School of Public Health in Austin**
- **Michael & Susan Dell Center for Healthy Living**
- **Deanna.M.Hoelscher@uth.tmc.edu**

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STRATEGIC PLAN GOALS

Number of Participating Schools & School-level %ACS

	Infrastructure Schools, N=64				Comparison Schools, N=20			
Wave	N	Total	To School	From School	N	Total	To School	From School
1	60	13.1 (9.7)	10.3 (7.7)	16.0 (12.7)	6	14.4 (10.9)	13.3 (11.4)	17.6 (11.1)
2	54	14.4 (12.0)	12.9 (10.5)	15.9 (14.4)	19	14.4 (9.6)	11.6 (8.4)	17.3 (11.3)
3	44	13.6 (10.5)	10.2 (8.5)	16.9 (13.5)	15	14.3 (10.4)	10.4 (9.1)	18.3 (12.8)
4	No data collection during COVID-19							
5								
6	45	13.8 (10.2)	12.0 (9.4)	15.5 (11.4)	9	15.2 (12.0)	12.4 (11.4)	18.0 (12.7)
7	41	12.3 (10.5)	10.0 (8.6)	14.6 (12.8)	12	11.9 (9.6)	8.4 (7.2)	15.5 (12.3)
8	41	13.2 (10.7)	11.8 (10.0)	14.6 (11.7)	8	9.0 (7.3)	5.8 (5.4)	12.6 (9.8)
9	35	12.7 (10.4)	11.6 (10.7)	13.8 (10.6)	8	11.4 (9.3)	9.0 (9.4)	13.8 (9.7)
10	42	14.3 (12.8)	12.7 (12.1)	15.9 (14.2)	8	17.6 (11.2)	14.8 (10.3)	20.7 (12.4)
11	37	13.0 (12.7)	11.1 (11.7)	15.0 (14.0)	7	13.6 (8.5)	9.4 (6.6)	17.8 (11.0)

School-level ACS over Time: Policy intervention*Construction status

- ACS trips decrease after COVID-19 but not significant.
- ACS trips decrease in Infrastructure schools at Waves 7, 8, & 9, but the level alleviates for post- than during the construction.
- ACS trips decrease in comparison schools at Wave 11.