



# STREETS

SAFE TRAVEL ENVIRONMENT EVALUATION IN TEXAS SCHOOLS

## FINAL REPORT 2018-2024

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## Acknowledgements

We want to thank all the participants, schools, and districts for working with us on this project. We are grateful for your support and collaboration on this research project.

## Study overview

The STREETS Study (Safe TRavel Environment Evaluation in Texas Schools) is a five-year (2018 – 2023) natural experiment that is evaluating the City of Austin Safe Routes to School (SRTS) program. In 2016, the City of Austin approved \$27.5 million in Mobility Bond Funds for Safe Routes to School infrastructure projects, including protected bike lanes, pedestrian islands, shared-use paths, and pedestrian hybrid beacons. The UTHealth School of Public Health is evaluating these transformative infrastructure changes. The evaluation includes a comparison study with schools outside the city of Austin.



## 2023-2024 Progress

During the final school year we collected Wave 3 (fall 2023) and 4 (final-spring 2024) with the 5th grade cohort students (Austin ISD and Round Rock ISD only). Additionally, we completed the two final waves (once per semester) of the cross-sectional ACS tallies and one final school policy survey (in all participating school districts).

We made steady progress in the analyses of data from previous years, including: (1) active commuting to school tally data, (2) MAPS data, (3) child physical activity (accelerometer/GPS) data, (4) National Oceanic and Atmospheric Administration (NOAA) weather data, and (5) cost-analyses.

### Physical Activity in Children | Cohort study

We measured 48 cohort students from 5 schools. All of these participants were 5th grade students from 5 schools completing the third and fourth (final) measurement periods. Wave 3 (final) MAPS environmental audits for these 5 schools were also completed.

### Active Commuting to School Tally | Cross-sectional study

Out of the 71 schools in the study 46 schools (66%) completed the active commuting to school tallies this year. We collected 605 tallies in the fall and 555 tallies in the spring. The policy survey was completed by 50 schools (71%).



## STREETS Study 2018-2024 Report

### Physical Activity in Children | Cohort study

- We enrolled 531 child-parent dyads. Of them, 229 children and 234 parents completed all four assessment timepoints.
- Child and parent data have been cleaned and analysis is underway.
- Accelerometer and GPS data have been cleaned and fully processed for baseline, and a Python-based code to time-match accelerometer and GPS data has been developed, allowing to identify (for participants with sufficient valid data) trips to and from school by travel mode (walking, cycling, motor vehicle). Data cleaning and processing for follow-up timepoints 2, 3, and 4 are underway.
- The MAPS environmental audits were also completed for all school timepoints.
- A GIS dataset of neighborhood characteristics surrounding each cohort participant's home location (5-minute walk) and home-to-school sausage buffer has been constructed. Variables in this dataset include urban design features that influence active commuting to school, like road-network connectivity, sidewalk and cycle lane coverage, etc. These variables can be used to assess the moderating effects of the underlying built environment features at baseline.



### Active Commuting to School Tally | Cross-sectional study

- Out of the 95 originally recruited schools in this study, 77 schools (81%) completed the active commuting to school tallies at baseline. By the final wave (Spring 2024) there were 71 schools remaining, of which 46 (66%) completed the final tally.
- The school health policy survey was completed by 56 schools (59%) at baseline and 50 schools (71%) for the final time point in April 2024.
- A GIS dataset of neighborhood characteristics surrounding each school has been constructed. We operationalized the school neighborhood using a 1-mile buffer that matches the recruitment area for the cohort study and represents a walkable distance (< 20-minute walk) to schools. Variables in this dataset include urban design features that influence active commuting to school, like road-network connectivity, sidewalk and cycle lane coverage, etc. We also included variables generally known to influence overall levels of physical activity beyond active commuting to school behaviors (e.g., park and green space availability, recreational centers, etc.). These variables can be used to explore the influence of the school neighborhood built environment on active commuting to school participation rates and, secondarily, to explore possible inequalities in access to activity-promoting features across schools by sociodemographic profiles of the student population.

### Cost analysis study

- We have received the final cost data from our partners at the City of Austin. In addition to cost, this also includes information on the completion of construction projects.
- We have acquired and cleaned GIS data on sidewalk facility construction from the City of Austin and adjacent municipalities where some of the comparison schools are located. Analysis is underway to calculate change in the length of safe routes to school infrastructure per school neighborhood, defined as increases in sidewalk length within 1-mile of each school. Using the estimated cost per foot of new sidewalk infrastructure, we will conduct the cost-effectiveness analysis.



### Qualitative Interviews

- Seven (7) qualitative interviews were conducted in 2020 with City of Austin SRTS staff/community members/stakeholders. These data have been incorporated into two manuscripts for submission within the next month.
- Twenty (20) parent and child interviews were conducted in 2021. Pilot interviews were conducted prior to data collection with cohort participants that were not part of the study sample to test length and comprehension of the questions. Using these data, we have a draft manuscript (to be submitted very soon) exploring the impact of the COVID-19 pandemic on physical activity (PA) and active commuting to school (ACS) among 4th and 5th-grade students and their caregivers.
- Eight (8) school administrator and teacher interviews were completed in 2022. The research questions generated responses in the following topics: 1) School challenges, 2) Safe Routes to School programming, 3) Barriers and facilitators to active commuting to school, 4) Active commuting to school program or policy expectations, and 5) Effects of the 2016 Mobility Bond and COVID-19 pandemic. A report was developed that will be used to inform further analyses and publications.
- Twelve (12) interviews were completed in 2023 with adolescent girls who were past participants of the STREETS Study and who were attending middle school. A manuscript is in process using these data to understand and evaluate the determinants of active commuting to school (ACS) among adolescent girls and elicit their ideas for possible intervention strategies.

## Other activities

- The STREETS Technical Advisory Committee has met annually to disseminate information about the major grant activities and results; provide updates on study progress, including recruitment and data collection; and solicit feedback from community stakeholders. Our latest meeting was held on April 12, 2024. Kris Hafezizadeh, Austin ISD Director of transportation, has been an active member of the advisory committee.
- STREETS research staff and the Principal Investigator meet monthly with City of Austin SRTS partners to update them on our study progress and to check in on the progress of construction. We have also submitted an abstract on the novel Academic/Municipal partnership for the Safe Routes Partnership conference later this year, which was accepted for an oral presentation.
- Campus Improvement Plan (CIP) data have been collected annually from the STREETS schools, and we will use these data to develop recommendations for school-level policies related to SRTS.
- We have also made significant progress on publications and presentations. See attached tables.
- In addition to grant outcomes, we have trained several doctoral students and post-doctoral fellows, including:
  - Katie Burford, PhD
  - Yuzi Zhang, PhD
  - Brooklyn Baker, MPH, PhD (c)
  - Eugen Resendiz, PhD

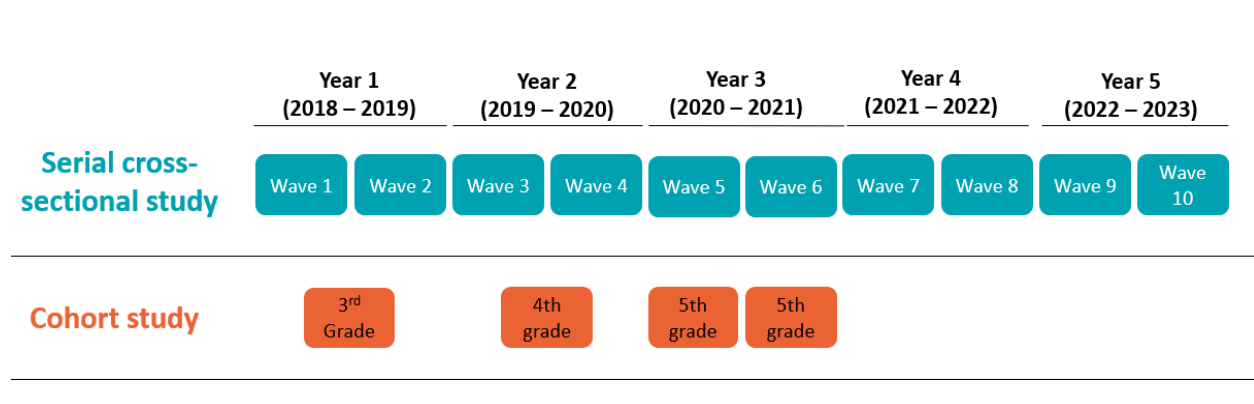


## Challenges and Opportunities

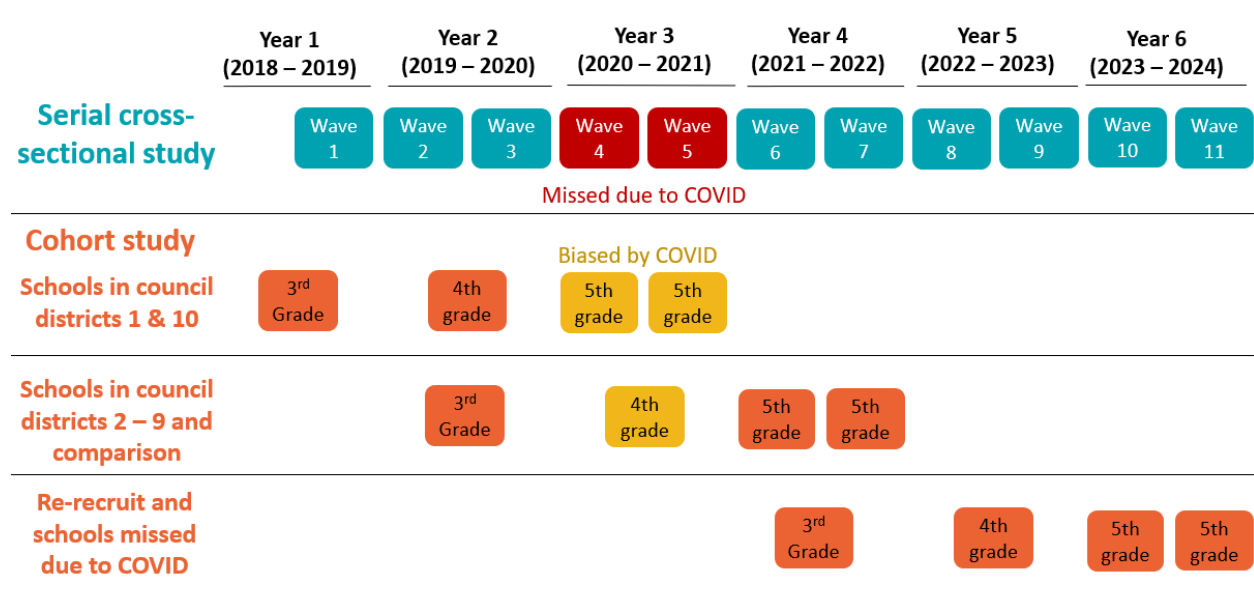
Due to a year of missed measures during the pandemic (school year 2020-2021), our study is one year behind. In 2023 we were approved for a one year no-cost extension with NIH and in order to continue one final year of data collection in school year 2023-2024. We are now done with data collection in schools.

We requested, and were granted, a second no-cost extension from NIH, beginning July 1, 2024 through June 30, 2025. This 12-month extension will allow us to complete our data analyses and disseminate study results through publications and presentations. Figures 1 and 2 illustrate the originally proposed and actual timelines.

**Figure 1. STREETS Proposed measurements in original grant**



**Figure 2. STREETS Actual measurements**





## Moving forward

### Detailed timeline and list of final grant activities

We have completed the final round of data collection in all schools. Activities left to complete include:

- **June - August 2024:** Data entry and cleaning, particularly for the processing of accelerometer and GPS unit data
- **June - August 2024:** Finalization of data from the municipalities for the cost analyses
- **July - December 2024:** Final data analysis for all aims
- **July 2024 - June 2025:** Drafting and submitting manuscripts for publication
- **July 2024 - June 2025:** Dissemination of study results through conference presentations, webinars, and blogs.
- **September 2024 and April 2025:** Meetings with advisory committee
- **September 2024 - February 2025:** School closeout and recognition to maintain community relationships and school partnerships. These closeouts include the distribution of school certificates of completion, school presentations, and STREETS materials for all participating schools and school districts.
- **December 2024 - April 2025:** Additional exploratory analyses
- **May - June 2025:** Study closeout and data archiving

### Active Middle School Communities Grant

We will be continuing our research on active travel and leisure in middle schools through a newly awarded grant called “Co-creating and implementing contextually responsive physical activity interventions with low-income adolescents”. We recently received funding for this 5-year project from the National Institute on Minority Health & Health Disparities (1R01MD019423-01).

### Conclusion

Dr. Deanna Hoelscher and the STREETS Study team at the UTHealth Houston School of Public Health in Austin extend our heartfelt thanks to all the participants, schools, and districts who collaborated with us on this research project. Your support and cooperation have been invaluable in making this study a success. The collective efforts of all involved have contributed to a better understanding of how school policies and infrastructure changes can positively impact student travel behavior, physical activity, and safety.



We hope our results will inform future urban planning and policy decisions aimed at enhancing the safety and well-being of school children. Thank you for helping support this research project that underscores the importance of safe and accessible travel environments for students!

*This study was funded by NIH (R01 HD097669) and conducted by investigators at the Michael & Susan Dell Center for Healthy Living at the UTHealth Houston School of Public Health in Austin.*

## STREETS Publications

Citation	Status
Burford K, Ganzar LA, Lanza K, Kohl HW, Hoelscher DM. School-level economic disparities in police-reported crimes and active commuting to school. <i>International journal of environmental research and public health</i> . 2021;18(20):10885. <a href="https://www.mdpi.com/1660-4601/18/20/10885">https://www.mdpi.com/1660-4601/18/20/10885</a>	Published
Hoelscher DM, Ganzar LA, Salvo D, Kohl III HW, Pérez A, Brown HS, Bentley SS, Dooley EE, Emamian A, Durand CP. Effects of large-scale municipal safe routes to school infrastructure on student active travel and physical activity: design, methods, and baseline data of the safe travel environment evaluation in Texas schools (STREETS) natural experiment. <i>International Journal of Environmental Research and Public Health</i> . 2022 Feb 5;19(3):1810. <a href="https://doi.org/10.3390/ijerph19031810">https://doi.org/10.3390/ijerph19031810</a>	Published
Ganzar LA, Salvo D, Burford K, Zhang Y, Kohl III HW, Hoelscher DM. Longitudinal changes in objectively-measured physical activity and sedentary time among school-age children in Central Texas, US during the COVID-19 pandemic. <i>International Journal of Behavioral Nutrition and Physical Activity</i> . 2022 May 19;19(1):56. <a href="https://doi.org/10.1186/s12966-022-01299-9">https://doi.org/10.1186/s12966-022-01299-9</a>	Published
Ganzar LA, Bentley SS, Salvo D, Durand CP, Anderson A, Emamian A, Hoelscher DM. Incorporating equity into active commuting to school infrastructure projects: A case study. <i>Transportation Research Part D: Transport and Environment</i> . 2022 Nov 1;112:103493. <a href="https://doi.org/10.1016/j.trd.2022.103493">https://doi.org/10.1016/j.trd.2022.103493</a>	Published
Ganzar, LA, Burford, K, Zhang, Y, Gressett, A, Kohl, HW., & Hoelscher. DM.. (2023). Association of Walking and Biking to School Policies and Active Commuting to School in Children. <i>Journal of Physical Activity and Health</i> . <a href="https://doi.org/10.1123/jpah.2022-0376">https://doi.org/10.1123/jpah.2022-0376</a>	Published
Ganzar LA, Burford K, Salvo D, Spoon C, Sallis JF, Hoelscher DM. Development, scoring, and reliability for the Microscale Audit of Pedestrian Streetscapes for Safe Routes to School (MAPS-SRTS) instrument. <i>BMC public health</i> . 2024 Dec;24(1):1-3. <a href="https://doi.org/10.1186/s12889-024-18202-9">https://doi.org/10.1186/s12889-024-18202-9</a>	Published
Burford K, Salvo D, Kohl HW III, Ganzar LA, Bauer CX, Hoelscher DM. Examination of Traffic-Related Safety, Child, and Family Factors Associated with Active Commuting to School Among Children Residing in a Large Urban City.	Under Review at Travel Behaviour and Society
Salvo D, Burford K, Zhang Y, Ganzar LA. Macro- and micro-level built environment factors around STREETS schools.	Manuscript in process

Zhang Y, Burford K, Perez A, Lanza K, Baker B, Hoelscher DM. Reliability and Validity of Subjectively-Reported and Objective Measures of Weather for Active Commuting to School.	Manuscript in process
Lanza K, Burford K, Zhang Y, Perez A. Weather as a modifying factor of the impact of a SRTS infrastructure intervention on active commuting to school and physical activity among elementary age children.	Manuscript in process
Bentley SS, Ingersoll C, Zhang Y, Brown III HS, Ganzar, LA, Salvo D, Hoelscher DM. COVID physical activity changes among children and their caretakers: a qualitative study.	Manuscript in process
Bentley SS, Tierney N, Baker B, Brown III HS, Ganzar, LA, Salvo D, Hoelscher DM. Adolescent girls' attitudes about active commuting to school: a qualitative study.	Manuscript in process
Burford K, Salvo D, Kohl HW III, Ganzar LA, Bauer C, Zhang Y, Resendiz E, Hoelscher DM. Using GIS and a School Environmental Audit Tool to Assess Traffic Safety and Active Commuting to School.	Manuscript in process
Burford K, Salvo D, Kohl HW III, Ganzar LA, Bauer C, Zhang Y, Resendiz E, Hoelscher DM. An Equity Analysis of Traffic-Related Safety and Active Commuting to School Among Children.	Manuscript in process
Baker B, Zhang Y, Malkani RI, Hoelscher DM. Predictors of school travel mode for Texas children and adolescents: Texas School Physical Activity and Nutrition Survey, 2019-2020.	Manuscript in process

### STREETS Presentations

Citation	Status
Ganzar LA, Emamian A, Bentley SS, Hoelscher DM. Hitting the STREETS: Austin Safe Routes to School. Oral presentation at the Healthier Texas Summit, October 2019.	Oral Presentation
Ganzar LA, Emamian A, Hoelscher DM. Hitting the STREETS: Built Environment and Policy Interventions to Increase Active Commuting to School. Oral presentation at the Outride Research Summit, Virtual: July 28, 2021.	Oral Presentation
Burford K, Ganzar LA, Lanza K, Kohl III H, Hoelscher DM. Associations of Reported Crime and Children's Active Commuting to School: The Safe TRavel Environments Evaluation in Texas Schools Study (STREETS). Oral presentation at the the Active Living Conference: Virtual, April 8, 2021	Oral Presentation

Ganzar LA, Gressett A, Kohl III H, Hoelscher DM. Associations of Reported Crime and Children’s Active Commuting to School: The Safe TRavel Environments Evaluation in Texas Schools Study (STREETS). Oral presentation at the the Active Living Conference: Virtual, April 8, 2021	Oral Presentation
Ganzar LA, Salvo D, Kohl III HK, Hoelscher DM. Associations of COVID-19-related Changes across Domains of Children’s Physical Activity and Demographic Characteristics. Poster presentation at St. David’s CHPR Conference, Virtual, February 21, 2021	Poster
Ganzar LA, Salvo D, Burford K, Zhang Y, Kohl III HW, Hoelscher DM. Longitudinal changes in objectively-measured physical activity and sedentary time among school-age children in Central Texas, US during the COVID-19 pandemic. (2022) Oral presentation at 2022 International Society of Behavioral Nutrition and Physical Activity. Phoenix, AZ, USA	Oral Presentation
Ganzar LA, Gentles C, Emamian A, Hoelscher DM. Hitting the STREETS: Evaluating Health Effects of Municipally Funded Safe Routes to School Infrastructure Projects in Austin, Texas. Oral presentation at the Equity and Resilience Workgroup Meeting of the Physical Activity Policy Research and Evaluation Network, April 11, 2022	Oral Presentation
Zhang Y, Burford K, Weng O, Ganzar LA, Hoelscher DM, Salvo D. Examining the availability and equitable distribution of recreational assets for physical activity across school neighborhoods in Central Texas. Oral presentation at the dPAD Symposium, September 2022.	Poster
Weng O, Burford K, Zhang Y, Ganzar LA, Hoelscher DM, Salvo D. Exploring food environment inequalities across public elementary school neighborhoods in Austin, Texas. Oral presentation at the American Public Health Association Conference, October 2022.	Poster
Ganzar LA, Salvo D, Burford K, Kohl HW III, Hoelscher DM. Longitudinal changes in objectively-measured physical activity and sedentary time among school-age children in Central Texas, US during the COVID-19 pandemic. Oral presentation at the dPAD Symposium, September 2022.	Poster
Ganzar LA, Salvo D, Burford K, Kohl HW III, Hoelscher DM. Longitudinal changes in objectively-measured physical activity and sedentary time among school-age children in Central Texas, US during the COVID-19 pandemic. (2022) Oral presentation at Texas School Health Advisory Committee meeting, September 2022.	Oral Presentation
Ganzar LA, Salvo D, Burford K, Kohl HW III, Hoelscher DM. Longitudinal changes in objectively-measured physical activity and sedentary time among school-age children in Central Texas, US during the COVID-19 pandemic. (2022) Oral presentation at 2022 International Society of Behavioral Nutrition and Physical Activity. Phoenix, AZ, USA	Oral Presentation



Burford K, Zhang Y, Weng O, Ganzar LA, Hoelscher DM, Salvo D. Inequities in active travel infrastructure coverage across school neighborhoods in Central Texas. (2023) Presented at Active Living Research Conference.	Oral Presentation
Ganzar LA, Bentley SS, Salvo D, Durand CP, Anderson A, Emamian A, Hoelscher DM. Incorporating equity into active commuting to school infrastructure projects: A case study. (2023) Presented at Active Living Research Conference.	Oral Presentation
Zhang Y, Burford K, Weng O, Ganzar LA, Hoelscher DM, Salvo D. Examining the availability and equitable distribution of recreational assets for physical activity across school neighborhoods in Central Texas. (2023) Poster presentation at Active Living Research Conference.	Poster
Ganzar LA, Bentley SS, Salvo D, Durand CP, Anderson A, Emamian A, Hoelscher DM. Incorporating equity into active commuting to school infrastructure projects: A case study. (2023) Presented at the Society for Public Health Education Conference	Oral Presentation
Ganzar LA, Bentley, SS, Hoelscher DM. Safe Streets for Everyone? Implications of School and Municipal Policies on Safe Routes to School Implementation and Equity. (2023) Webinar at Dell Center for Healthy Living.	Oral Presentation/Webinar
Ganzar LA, Bentley SS, Salvo D, Durand CP, Anderson A, Emamian A, Hoelscher DM. (2024) UT Public Health Coalition Spring 2024 Research Symposium.	Oral Presentation
Zhang Y, Burford K, Perez A, Lanza K, Baker B, Hoelscher DM. (2024) Measuring weather in active living research: Agreement between objective measure and teacher’s perceived weather conditions from the national. International Society of Behavioral Nutrition and Physical Activity.	Poster
Salvo D. (2024) Lessons learned from conducting a natural experiment of the effects of urban cycling infrastructure expansion on active travel behaviors in Mexico City: the good, the bad, and the ugly.  Oluyomi AA. (2024) Natural Experiment in Active Transportation: Lessons Learned from the Houston Travel-Related Activity In Neighborhoods (TRAIN) Project.  Ganzar LA. (2024) Taking it to the STREETS: Lessons Learned from Evaluating Infrastructure to Increase Active Commuting to Schools.  International Society of Behavioral Nutrition and Physical Activity.	Symposium Presentation
Emamian A, Gentles C, Bentley SS, Hoelscher DM. Safe Streets for Everyone? Lessons Learned from a Novel Municipal/University Partnership on SRTS Implementation and Equity. October 2024.	Accepted - Safe Routes Partnership - Oral Presentation

Baker B, Zhang Y, Malkani RI, Hoelscher DM. Predictors of school travel mode for Texas children and adolescents: Texas School Physical Activity and Nutrition Survey, 2019-2020. October 2024.	Accepted to American Public Health Association - Oral Presentation
Ganzar LA, Zhang Yuzi, Bentley SS, Salvo D, Hoelscher DM. Challenges and Opportunities in Conducting School-Based Intervention Research during the Societal Disruption of the COVID-19 Pandemic. October 2024.	Submitted to American Public Health Association - Oral Presentation
Salvo D, Villa U, Ganzar LA, Bentley SS, Hoelscher DM. Uncovering the patterns and drivers of children’s active travel through GPS, accelerometer, and GIS integration. October 2024.	Accepted to International Society for Physical Activity and Health - Oral Presentation
Salvo D, Jauregui A, Ganzar LA, Oluyomi A, Kohl III HW, Hoelscher DM. Rigor versus pragmatism for real-world impact: The challenges of natural experiments in physical activity research. October 2024.	Accepted to International Society for Physical Activity and Health - Oral Presentation
Salvo D, Hoelscher DM. Evaluating the Impact of SRTS Infrastructure on Active Commuting in Central Texas Schools: Findings from the STREETS Study. September 2024.	Accepted to Texas Trails and Active Transportation Conference