Texas Department of Transportation

UTSA
The University of Texas at San Antonio

PROJECT SUMMARY REPORT

0-7180: Select High Risk Pedestrian Midblock Crossings and Perform Safety Evaluations for Developing Pedestrian Crossings

Background

Pedestrian fatalities on high-speed, high-volume, multi-lane roads pose a growing concern in Texas. Despite limited pedestrian-miles traveled, the disproportionate fatality share highlights an urgent need for targeted safety interventions. San Antonio, Houston, and Dallas consistently report the highest pedestrian crash counts statewide, underscoring the importance of identifying specific high-risk midblock locations and implementing effective treatments.

While midblock pedestrian crossings offer essential connectivity, they present unique challenges in traffic safety. Several promising countermeasures exist, yet Texas lacks localized Crash Modification Factors (CMFs) to assess their effectiveness. This project aimed to fill that gap by developing actionable strategies and data-driven tools to help TxDOT districts select optimal pedestrian treatments and enhance safety at midblock crossing sites.

What the Researchers Did

The researchers conducted a comprehensive literature review to evaluate the current state of practice surrounding crash rates and severity at midblock crossings. They examined technical reports and publications from transportation agencies, FHWA, NCHRP, and peer-reviewed journals. Findings were synthesized into a detailed summary of risk factors, proven countermeasures, advanced analytics for site prioritization, and relevant case studies that support effective safety action planning. The research team compiled pedestrian safety and crash data from public and institutional sources—CRIS, state highway safety plans (HSIP, SHSP, HSP), Vision Zero strategies, and platforms like Replica and INRIX. These inputs were integrated to calculate exposure-based crash rates and assess midblock crossing risks. A location-specific geodatabase for Dallas, Houston, and San Antonio was created, quality-controlled for analysis, and designed to support advanced methods like machine learning for identifying high-risk midblock sites.

To identify high-risk midblock crossings in Dallas, Houston, and San Antonio, researchers conducted a multi-tiered analysis combining five years of crash data, spatial mapping, and engineering judgment. They assessed crash patterns using geospatial tools and consulted agency experts to select candidate sites for field evaluation. On-site reviews documented geometric design, driver and pedestrian behaviors, and visibility conditions. A ranking framework classified crossing segments based on crash frequency, predicted counts, pedestrian activity, and physical attributes. In lieu of direct volume data, pedestrian demand models incorporated land use, bus stop density, and sidewalk access. The study produced statistical summaries, predictive models, field reports, and a prioritized list of high-risk locations.

To identify effective midblock crossing safety treatments for Texas, researchers conducted a broad review of national and international countermeasures. They surveyed agencies via email and phone to gather insights from engineers, stakeholders, and public safety officials. This

Research Performed by:
University of Texas at San Antonio (UTSA)

Research Supervisor:
Dr. Hatim Sharif, UTSA

Researchers:
Samer Dessouky
Jose Weissmann

Project Completed:
08-31-2025

outreach informed crash trend analyses in three Texas cities, supported by site visits and local engagement. Based on effectiveness, feasibility, and cost, the team recommended treatments—such as beacons, signals, and signage—and produced a literature review, survey summary, and prioritized countermeasure list.

To improve the precision of treatment effectiveness estimates, researchers developed crash modification functions tailored to midblock characteristics, moving beyond generic CMFs. They used before-after analysis supplemented with cross-sectional models. The study produced CMFs, along with methodological guidance for broader interpretation and application. To address pedestrian crashes at critical midblock crossings, researchers developed a data-driven action plan identifying target locations, analyzing site-specific risks, and prioritizing countermeasures. These measures, including infrastructure, education, and enforcement, were selected based on crash history, traffic conditions, and projected pedestrian demand. The plan offers tailored implementation guidance, spanning funding, design, outreach, and evaluation. Deliverables included a safety action plan, a technical brief with the next steps for community engagement.

What They Found

Key risk factors at midblock crossings included high-speed traffic, multiple travel lanes, lack of pedestrian refuge, and limited lighting. The presence of nearby transit stops, retail activity, and low-income neighborhoods amplified pedestrian exposure and crash severity. Evaluation of pedestrian safety treatments—including pedestrian hybrid beacons (PHBs), rectangular rapid-flashing beacons (RRFBs), raised medians, and enhanced crosswalk markings—revealed substantial crash reduction potential. The newly developed SPFs and CMFs offer robust, evidence-based guidance for identifying optimal treatment locations. These findings underscore the importance of strategic midblock site selection, where targeted deployment can maximize safety benefits by reducing crash frequency and severity.

What This Means

This project equips TxDOT districts with a systematic approach to pedestrian safety at midblock crossings. It delivers CMFs, site-ranking methodologies, and implementation guidance rooted in local data and crash trends. These tools can optimize safety investments, promote equitable access, and significantly reduce pedestrian fatalities across urban corridors. Supporting materials—such as the Midblock Pedestrian Safety Crossing Action Plan, technical reports, and training resources—offer long-term value in planning, design, and public engagement for pedestrian safety infrastructure.

For More Information

Project Manager:
Katelyn Kasberg, RTI (512) 416-4728

Research Supervisor:
Hatim Sharif, UTSA, (210) 458-6478

Project Monitoring Committee Members:
Tahmina Khan, Alberto Guevara, Gus Escobedo, Jr., Jennifer Loa, Khalid Jamil, Matthew Maestre

Research and Technology Implementation Division
Texas Department of Transportation
125 E. 11th Street
Austin, TX 78701-2483

www.txdot.gov
Keyword: Research

Technical reports when published are available at
https://library.ctr.utexas.edu.

This research was sponsored by the Texas Department of Transportation and the Federal Highway Administration. The contents of this report reflect the views of the authors, who are responsible for the facts and accuracy of the data presented here. The contents do not necessarily reflect the official view or policies of FHWA or TxDOT. This report does not constitute a standard, specification, or regulation, nor is it intended for construction, bidding, or permit purposes. Trade names were used solely for information and not for product endorsement.