# Appendix E. BEST PRACTICES TOOLKIT


**BEST PRACTICES TOOLKIT**

El Paso County is working towards making the County a safer place to live and work and reducing the number of deaths and serious injuries on El Paso County roads. The plan is built on a data-driven process including a crash data analysis. The crash data analysis collected and analyzed crash data from 2015 to 2019 and found the top contributing factors of crashes in El Paso County are speeding, intersections, lane departure, and unrestrained occupants. All crash data analyzed as a part of this plan is presented in a data dashboard that can be accessed online. A network screening was conducted, locating priority intersections and road segments that experienced the most crashes. Road safety audits were conducted at 10 priority of the locations to provide guidance on how to best mitigate crashes in those areas. A Vision Zero Resolution was also drafted, committing El Paso County to reducing the number of deaths to zero.

The best practices toolkit provides information on resources related to tasks included in the El Paso County Local Road Safety Plan mentioned above: crash analysis emphasis areas, data dashboard, network screening, road safety audits, and Vision Zero.

## Local Road Safety Plan Development

Local Road Safety Plans are an FHWA Proven Countermeasure for addressing fatalities and serious injuries on local roadway networks. These plans provide the framework for identifying, analyzing, and prioritizing roadway safety improvements on local roads, which are tailored to local issues and needs. The Local Road Safety Plan development process results in a prioritized list of issues, risks, actions, and improvements that can be used to address severe crashes on local roads.

FHWA provides a variety of resources and tools to assist in plan development for local jurisdictions, including stakeholder engagement and outreach, collaboration on regional resources, identification of target crash types and contributing factors, and goals for implementation and evaluation:

Local Road Safety Plan Do-It-Yourself Website

Proven Safety Countermeasures | Local Road Safety Plans

Proven Safety Countermeasures

Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices, 10th Edition, 2020 (ghsa.org)

Institutionalizing Safety in Transportation Planning Processes: Techniques, Tactics, and Strategies

Human Factors Guidelines for Road Systems

## Emphasis Areas

Emphasis areas are developed as a part of safety data analysis in order to focus efforts to improve safety to proven countermeasures targeting the types of crashes seen most frequently (i.e., those identified as emphasis areas). As countermeasures are considered for each emphasis area, it is important to consider what evidence-based and effective countermeasures are available for each particular emphasis area. The identified emphasis areas in El Paso County are: intersection, speeding, unrestrained, and lane departure. Resources for countermeasures for each of these emphasis areas are identified below.

As new emphasis areas are developed from future crash analysis, the following resources are available for identifying evidence-based countermeasures:

- NCHRP 500 Series;
- FHWA Crash Modification Factors Clearinghouse;
- Highway Safety Manual, Countermeasures that Work
- NCHRP 622: Effectiveness of Behavioral Highway Safety Countermeasures

### Intersection Related Crashes

Over 30 percent of fatalities and nearly 43 percent of serious injuries occur at or near intersections in El Paso County. The most common type of fatal collisions at intersections are broadside crashes. Additionally, 44 percent of intersection fatalities occur at "Stop Controlled" intersections.

Resources for intersection countermeasures in general:

In general, conducting an intersection control evaluation is a data-driven, performance-based method to screen intersection alternatives and identify an optimal solution for improving intersection safety. Intersection solutions are individual and based on each intersection configuration. Beginning with an Intersection Control Evaluation (ICE) allows a jurisdiction to identify and address each specific issues present at an evaluated intersection.

Intersection Control Evaluation | Intersection Safety - Safety | Federal Highway Administration (dot.gov)

About | Intersection Safety - Safety | Federal Highway Administration (dot.gov)

Resources for broadside and reducing left-turn conflict intersection countermeasures:

Minimizing conflict points is a key component to reducing broadside intersection crashes. There are several ways to accomplish a reduction in conflict points, however it is specific to intersection design. Roundabout intersection designs or those with reduced left-turn conflicts are effective methods for reducing conflict points, but they also can be expensive solutions. Benefit-cost evaluations should be completed prior to implementing safety treatments. Resources for this evaluation can be found in the ***Implementation*** Section of this Toolkit.

Roundabouts | Intersection Safety - Safety | Federal Highway Administration (dot.gov)

Reduced Left-Turn Conflict Intersections | Intersection Safety - Safety | Federal Highway Administration (dot.gov)

Resources for stop controlled intersection countermeasures:

There are several low-cost proven countermeasures for improving safety at stop controlled intersections. Due to the low-cost of these countermeasures, a high number of intersections can be improved, resulting in large safety improvements. Measures including doubling up on oversized advance intersection warning signs with supplemental street name plaques (placing these on both sides of the street), ensuring retroflected sheeting on not only signs but also sign posts, and providing enhanced pavement markings to delineate through lane edge lanes, a properly placed stop bar, removal of vegetation, parking, or other obstructions, and doubled-up, oversized stop signs, among others.

Systemic Application of Multiple Low-Cost Countermeasures at Stop-Controlled Intersections - Safety | Federal Highway Administration (dot.gov)

**Speeding Related Crashes**

Nearly 52 percent of fatalities and 27 percent of serious injuries in El Paso County are the result of speed related crashes. There is a significant overlap between speeding related crashes and the other emphasis areas, emphasizing the need to address speeding to reduce severe crashes. Around 59 percent of speeding related fatalities were reported unrestrained, and 26 percent of speeding related fatalities and 25 percent of speeding related serious injuries occur on vertical or horizontal curves.

There are several categories of countermeasures to address speed related crashes. These can be grouped into four categories: road design and traffic calming countermeasures; pavement treatments, markings, and signs; traffic speed management and operations measures; and enforcement and publicity measures. Countermeasures need to address the individual situation on the corridor where speeding exists, and relevant resources can provide instruction and support with respect to what types of countermeasures will work best.

Speed Countermeasure Resources:

Speed Management Toolkit (dot.gov)

Engineering Speed Management Countermeasures - Safety | Federal Highway Administration (dot.gov)

Speed Management Safety - Safety | Federal Highway Administration (dot.gov)

**Unrestrained Related Crashes**

Over 38 percent fatalities and 59 percent of serious injuries in El Paso county involve unrestrained drivers or passengers. Similar to speeding, unrestrained fatalities and serious injuries overlap significantly with the other emphasis areas. For example, 41 percent of unrestrained fatalities and 54 percent of unrestrained serious injuries occur at intersection. Regardless of whether unbelted crashes occurred in intersections or at nighttime, proven countermeasures are behavioral or policy based in nature. Policy-related countermeasures include things like primary seat belt laws, increased penalties, and enforcement programs. Education programs can also be helpful, particularly as they are aimed at populations with low seat belt usage.

Unrestrained Countermeasure Resources:

What Works: Strategies to Increase Restraint Use | Motor Vehicle Safety | CDC Injury Center

Expanding the Seat Belt Program Strategies Toolbox: A Starter Kit for Trying New Program Ideas (DOT HS 812 341) | NHTSA

### Lane Departure Related Crashes

Lane departure crashes are frequently severe and account for a large number of the crashes in El Paso County, including 63 percent of fatalities and 49 percent of serious injuries. Proven countermeasures for lane departure crashes, like other types of crashes, will be specific to the roadway section where the crash occurred. Generally, lane departure crash proven countermeasures include keeping vehicles on the roadway, providing functions for safe recovery when a vehicle loses control, and reducing crash severity when a crash does occur.

Land Departure Countermeasure Resources:

Roadway Departure Safety - Safety | Federal Highway Administration (dot.gov)

Roadway Departure Countermeasures - Safety | Federal Highway Administration (dot.gov)

Around 25 percent of lane departure fatalities and 30 percent of lane departure serious injuries occur on vertical or horizontal curves. There is extensive guidance from FHWA and other sources on roadway departures specifically on rural roads, including curves. These resources cover countermeasures such as pavement friction, rumble strips and stripes, safety edge, and clear zone treatments.

High Friction Surface Treatment (HFST) Curve Selection and Installation Guide

HFST Case Studies and Noteworthy Practices

Safety Benefits of Rumble Strips

Rumble Strip Decision Support Guide

Safety Edge Benefits

Safety Edge | FHWA Proven Countermeasures

Safety Edge Guide Specification

Clear Zone Noteworthy Practices

## Rural Roads

Rural and urban roads have different characteristics related to density of road networks, land use, and travel patterns. As a result, safety issues and proven countermeasures will be different in rural environments than urban environments. Much of El Paso County is made up of rural roadways. Rural road-focused countermeasures will be helpful to incorporate, in addition or in tandem with emphasis area countermeasures, in the rural roadway areas of the County.

Rural Road Resources:

Safety Improvements on High Risk Rural Roads

Improving Safety on Rural Local and Tribal Roads

## Vision Zero

El Paso County is committed to reducing fatal and serious injury crashes. Adopting a Vision Zero resolution and ultimately developing a vision zero plan underscores that commitment towards building a transportation system able to provide safe travel for all visitors and residents. The Vision Zero approach contains foundational elements and actionable strategies. Foundational elements include building a data framework, setting measurable goals, building accountability and providing transparency.

Vision Zero Resources:

Zero Deaths - Safety | Federal Highway Administration (dot.gov)

Vision, Strategies, Action: Guidelines for an Effective Vision Zero Action Plan – Vision Zero Network

Guide to Developing a Vision Zero Plan | Collaborative Sciences Center for Road Safety

Safe System Approach

## Impaired Driving

Driving impaired is when a motor vehicle is operated by a person under the influence of alcohol or drugs. There are many effective strategies to address and lower impaired driving, including strengthening impaired driving laws and enforcement efforts, increasing education and awareness campaigns, and utilizing technologies to prevent impaired drivers from operating vehicles. Impaired driving was not selected as an emphasis area but it is a factor in fatalities and serious injuries in the County.

Impaired Driving Resources:

Centers for Disease Control and Prevention: Strategies to Reduce or Prevent Alcohol-Impaired Driving

Countermeasures to Address Impaired Driving Offenders

World Health Organization Drunk Driving Countermeasures

Policy Impact: Alcohol Impaired Driving

## Data Dashboard

Safety data dashboards allow users to visualize trends of fatalities and serious injury collisions over time. Maps of crash trends by jurisdiction, by crash type, and by road conditions can provide insights into the top contributing circumstances, visualizing crash times, and to generally see what is happening with respect to fatal and serious injury crashes in the area that might not be as apparent when looking at the raw data.

Link to Data Dashboard here.

## Network Screening

Network screening is a data driven process used to identify and prioritize locations most likely to produce future crashes and where the potential to improve safety is highest. Crash data from a region is spatially located then separated into intersections and segments. Details need to be identified to determine segment length and intersection radii, once completed crash criteria including crash frequency, crash severity, most frequent collision types, and most frequent fatal and serious injury collision types are returned. Once categorized and prioritized top locations are identified for both segments and intersections and can be utilized to identify locations for road safety audits and other countermeasures and treatments.

Network Screening Resources:

Screening Your Network to Improve Roadway Safety Performance | FHWA

Highway Safety Manual Part B – Roadway Safety Management Process

## Road Safety Audits

Road Safety Audits are a formal safety examination of an intersection or segment. RSAs ae typically conducted when an intersection or segment has a high level of fatal or serious injury crashes. The RSA answers what elements of the road may present a safety concern and what opportunities exist to mitigate or eliminate those identified safety concerns. Road Safety Audits are performed by a multi-disciplinary team, consider all potential road users, accounts for all road user capabilities and limitations, and generates a formal report with findings and recommendations.

Road Safety Audit Resources:

FHWA Road Safety Audit Guidelines

Road Safety Audit | Proven Countermeasures

## Implementation

Comparing the costs and benefits of various alternatives, especially at spot locations is very important to addressing safety in the most efficient manner, as funding for safety improvements is often limited. Evaluation of these benefits may vary depending on the implementation of a given countermeasure, whether it be systemically or at a priority location. Tools and guides provided by FHWA and American Association of State Highway and Transportation Officials (AASHTO) are available for completing comparative analysis between the expected crash reductions of different countermeasures and aid in the selection of appropriate countermeasures based on the crash types a nd severities being addressed.

Evaluation Resources:

Benefit-Cost Analysis Guide

Systemic Safety Project Selection Tool

Highway Safety Manual Predictive Method Tools