Older Road Users Emphasis Area
Strategies, Countermeasures and Action Plans

Strategy Number	Description
1	Reduce wrong-way crashes.
2	Design and operate roadways to meet the needs of older road users.
3	Implement effective methods and tools to prepare older road users to deal with the limitations brought on by the aging process.
4	Improve mobility options for older road users.
5	Implement methods to reduce injury severity among older road users.

STRATEGY 1

Reduce wrong-way crashes.

Countermeasures

Focus	Number	Description	Action Plan
Crash mitigation programs	1A	Track and disseminate the results of wrong-way crash mitigation programs around the state.	
Wrong-way drivers	1B	Install wrong-way driver warning signs, pavement markings, and advanced technology to detect and warn wrong-way drivers, particularly at high-speed intersections with medians where drivers are likely to turn into oncoming traffic.	✓

Wrong-Way Drivers Countermeasure (1B) Action Plan

Install wrong-way driver warning signs, pavement markings, and advanced technology to detect and warn wrong-way drivers, particularly at high-speed intersections with medians where drivers are likely to turn into oncoming traffic.

Element	Description
Steps for Implementation	1. Form regional task forces that include the state transportation agency, local transportation agencies, local law enforcement agency, and other entities to share information about wrong-way driving events and collaborate on methods and countermeasures to address the issue. 2. Use 911 call logs and/or crash data to identify the location of wrong-way events/crashes and the characteristics of wrong-way drivers. While event and crash data typically do not provide the actual wrong-way entry point, these data can be used to determine corridors with a high frequency of wrong-way maneuvers. 3. Conduct field reviews of exit ramps and intersections in the identified area to ensure the signing and pavement markings in place meet the current state standards and are in adequate condition. Any noted traffic control device deficiencies should be corrected as soon as possible. The field review should also note other items that may increase the likelihood of wrong-way maneuvers, such as the location of nearby businesses that serve alcohol and special event facilities, the location of driveways near the ramp, the downstream intersection geometry and traffic control devices, and the interchange design. A one-page field review sheet can be found in Appendix B of Texas A&M Transportation Institute Research Report 0-6769-1. 4. Consider low-cost signing and pavement marking countermeasures, such as: • Additional DO NOT ENTER and/or WRONG WAY signs. • Oversized DO NOT ENTER and/or WRONG WAY signs. • Lower-height DO NOT ENTER and/or WRONG WAY signs. • Wrong-way arrow pavement markings. • Red retroreflective sheeting on DO NOT ENTER and WRONG WAY sign supports. 5. Consider active detection and warning systems, such as: • Red flashing lights around the border of WRONG WAY signs. • Blank-out WRONG WAY signs. • Internally illuminated WRONG WAY signs. 6. Consider access management and geometric modifications. 7. Identify innovative countermeasures, and fund research to examine their design, feasibility, and effectiveness. 8. Develop cost estimates for the purchase, installation, and maintenance of selected countermeasures. 9. Obtain funding to purchase and install selected countermeasures. 10. Install, document, and test selected countermeasures. 11. Evaluate installed countermeasures using wrong-way driving event and crash data, as well as surrogate measures (e.g., percent self-corrected). 12. Document and share evaluation results and lessons learned.
Participating Organizations	TxDOT, city agencies, municipalities, and law enforcement agencies

Element	Description

Effectiveness	***
	• In closed-course studies, participants felt installing oversized signs and adding red retroreflective sheeting on the sign support and red flashing lights around the border of the sign made it easier to recognize a WRONG WAY sign (Texas A&M Transportation Institute Research Report 0-6769-1).
	• In 2014, researchers found red flashing lights around the border of WRONG WAY signs at freeway exit ramps resulted in a 38% reduction in wrong-way driving events (Texas A&M Transportation Institute Research Report 0-6769-1). Using a more recent data set, in 2017, researchers attributed a 32% reduction in wrong-way driving events to red flashing lights around the border of WRONG WAY signs. This finding equates to an event (non-crashes and crashes) modification factor of 0.68 with a 95% confidence interval of 0.45 to 0.91 (forthcoming National Cooperative Highway Research Program [NCHRP] report).
	• At divided highway intersections, researchers have found the following treatments deter wrong-way movements (forthcoming NCHRP report):
	  ○ DO NOT ENTER and WRONG WAY signs on the outside of a wrong-way turn.
	  ○ Wrong-way arrow pavement markings for the through lanes.
	  ○ The presence of a centerline in the median opening.
	  ○ Use of stop or yield lines when interior right-of-way treatments are provided.

Cost to Implement	$$$ • Low-cost signing and pavement marking countermeasures: $100 to $500 each (includes equipment purchase and installation). • Active detection and warning systems: $10,000 to $35,000 each (includes equipment purchase and installation).
Time to Implement	• Forming regional task forces: 1 to 3 months. • Obtaining and analyzing wrong-way driving event and/or crash data: 1 to 3 months. • Conducting field reviews: 1 to 3 months. • Implementing low-cost signing and pavement marking countermeasures: 1 to 3 months. • Implementing active detection and warning systems: 6 months to 1 year. • Implementing access management and geometric modifications: 1 to 3 years. • Researching innovative countermeasures: 1 to 3 years. • Evaluating installed countermeasures: 1 to 5 years.
Barriers	• Funding. • Sample sizes insufficient to establish expected effectiveness. • A large number of freeway exit ramps and divided highway intersections. • Lack of data about actual entry points (i.e., where the wrong-way maneuver was initiated).

STRATEGY 2

Design and operate roadways to meet the needs of older road users.

Countermeasures

Focus	Number	Description	Action Plan
Roadway design standards	2A	Implement strategies and standards included in the *Human Factors Guide* and the *Handbook for Designing Roadways for the Aging Population* broadly across Texas.	✓
Safe system approaches	2B	Adopt Safe System (Vision Zero) and Complete Streets approaches to benefit older road users when designing and operating roadways.	
Intersection geometry	2C	Continue to investigate the effectiveness of intersection geometric features (e.g., channelization, island size, and lane width) related to older driver and pedestrian safety.	
Commercial develop-ments	2D	Encourage developers to work with law enforcement to proactively mitigate potential crash hazards for older motorists and pedestrians when building or expanding commercial developments based on the FHWA aging population guidance.	
Engineer training	2E	Bring FHWA and National Highway Institute training courses on the *Human Factors Guidelines* and the *Handbook for Designing Roadways for the Aging Population* to TxDOT districts, metropolitan planning organizations (MPOs), and city engineering audiences.	✓

Roadway Design Standards Countermeasure (2A) Action Plan

Implement strategies and standards included in the *Human Factors Guide* and the *Handbook for Designing Roadways for the Aging Population* broadly across Texas.

Element	Description
Steps for Implementation	1. Evaluate the time to implement and the cost effectiveness. 2. Prioritize measures to implement. 3. Implement the measures. 4. Evaluate measures to justify making the measures part of standards. 5. Publicize improvements. Note: Specifically adopt as standard practice turn-lane channelization, offset left-turn lanes, edge line and curb delineation, left-turn traffic control for signalized intersections (protected left-turn phases), advance street name signs (particularly at three-legged intersections and locations with a relatively large annual average daily traffic or a large expected number of crashes), larger signs, advance warning signs, overhead lane assignment on intersection approach, and improved signal head visibility.
Participating Organizations	TxDOT, city agencies, municipalities, and law enforcement agencies
Effectiveness	***
Cost to Implement	$$
Time to Implement	Long for full implementation. During the facilitated discussions, 10 years was mentioned a few times.
Barriers	• Lack of maintenance and construction policies and standards to require infrastructure improvements. • Funding. • In some cases, public acceptance (e.g., roundabouts).

Engineer Training Countermeasure (2E) Action Plan

Bring FHWA and National Highway Institute (NHI) training courses on the *Human Factors Guidelines* and the *Handbook for Designing Roadways for the Aging Population* to TxDOT districts, MPOs, and city engineering audiences.

Element	Description
Steps for Implementation	1. Identify availability of courses. A handbook course may not exist. Consider working to develop a course or asking for a course from the U.S. Department of Transportation. 2. Select the desired training format: • Option 1: NHI instructors deliver a low-cost NHI course (limited to a few locations to be selected by TxDOT). • Option 2: NHI instructors deliver one in-person course and one condensed webinar course (similar to Interstate Access Justification Report training conducted a few years ago; each district sent two representatives to an in-person training in Austin, and one condensed webinar version was offered to any others). • Option 3: NHI instructors conduct a train-the-trainer course to TxDOT staff, Local Technical Assistance Program (LTAP) staff, or others. The course is then delivered through TxDOT, LTAP, etc. 3. Deliver training to TxDOT divisions and districts, MPOs, city engineering audiences, and the consultant community. Also deliver training during the Texas District of the Institute of Transportation Engineers conference and other similar statewide conferences.
Participating Organizations	TxDOT divisions and districts, MPOs, city engineering audiences, and consultant community
Effectiveness	Determining effectiveness is difficult for training.
Cost to Implement	$
Time to Implement	Short
Barriers	• Needed TxDOT management support and direction. • The difficulty of determining whether training is effective.

STRATEGY 3

Implement effective methods and tools to prepare older road users to deal with the limitations brought on by the aging process.

Countermeasures

Focus	Number	Description	Action Plan
Apps	3A	Initiate a pilot program designed to test a smartphone-based application that provides real-time information and warnings to older road users.	
Training	3B	Encourage participation by older road users in education and training opportunities, such as AARP Smart Driver™.	
Licensing	3C	Encourage adoption of a law requiring periodic driver licensing tests for adults.	✓

Note: renumbered from the original listing.

Licensing Countermeasure (3C) Action Plan

Encourage adoption of a law requiring periodic driver licensing tests for adults.

Element	Description
Steps for Implementation	1. Gather data from other states concerning periodic driver licensing tests for adults. (Participating organization: TTI) 2. Create a statewide, multidisciplinary advisory panel including the TxDOT Legislative Affairs Office, city government affairs offices, Municipal League, safety advocates, Transportation Committee (legislature), and others. 3. Develop alternate solutions to periodic driver licensing tests for adults: safe-driving courses for older users, vision and/or cognitive testing, reporting of drivers to the Medical Advisory Board, and preparation for older drivers taking tests. (Participating organizations: TTI and University of Texas *Journal of the American Planning Association*) 4. Conduct a public opinion poll about periodic driver licensing tests for adults, making sure to include a summary of potential benefits prior to gathering opinions. (Participating organizations: TxDOT and TTI) 5. Develop a technical advisory team or task force to address older road users. (Participating organizations: Strategic Highway Safety Plan Executive Team, Older User Emphasis Area Team, AARP, and Public Health) 6. Develop an informational packet on the benefits of periodic driver licensing tests, alternate solutions for adults, and results of the poll. (Participating organizations: TxDOT and TTI) 7. Present findings about periodic driver licensing tests and alternate solutions for adults to the TxDOT Legislative Affairs Office, city government affairs departments, the Texas Municipal League, safety advocates, the Legislative Transportation Committee, and legislators willing to champion a bill. (Participating organizations: TxDOT, cities, law enforcement agencies, safety advocates, and legislature) 8. Enact statewide legislation. (Participating organization: Texas Legislature) 9. Evaluate outcomes. (Participating organizations: TxDOT and TTI)
Participating Organizations	See above for each step.
Effectiveness	*
Cost to Implement	$$
Time to Implement	Medium
Barriers	• Legislative support. • Public support. • Cost to implement. • Technical expertise.

STRATEGY 4

Improve mobility options for older road users.

Countermeasures

Focus	Number	Description	Action Plan
Regional clearing-houses	4A	Create regional clearinghouses on mobility options available to older road users, and educate the public on methods for identifying mobility options at the community level.	
Recom-mended strategies	4B	Identify current and recommended strategies for improving older person mobility in urban and rural areas.	✓

Recommended Strategies Countermeasure 4B Action Plan

Identify current and recommended strategies for improving older person mobility in urban and rural areas.

Element	Description
Steps for Implementation	1. Identify current transit/transportation options for the older population: transit (urban and rural transit), taxi and network companies, volunteer networks, councils of governments/MPOs (inventory and data), social services, and nonprofits serving older adults. 2. Research barriers to use of transportation services by older users: cost, fear of trying something new and unfamiliar, limited availability in rural areas, physical limitations, scheduling conflicts, agency coordination and/or competition, state/federal laws (pertaining to funding), and geographic challenges. • Survey current volunteer programs; find out what does and does not work, and identify steps to implementing such programs and promoting them to the public. • Develop and offer training on volunteer driving programs to senior centers, churches, medical facilities, AAA chapters, and MPOs. 3. Contact the Florida and California departments of transportation to identify volunteer driving programs and traditional services already in place (e.g., Drive a Senior). 4. Provide information to older road users on mobility options and overcoming barriers to use, and identify the entity and mechanism to update and keep the information current.
Participating Organizations	MPOs, medical facilities, churches, TxDOT, social service agencies, and AAA
Effectiveness	**
Cost to Implement	$
Time to Implement	Medium
Barriers	• Cost and state or federal laws relating to funding. • Fear of trying something new. • Limited availability in rural areas and other geographic challenges. • Physical limitations. • Scheduling conflicts. • Agency coordination or competition.

STRATEGY 5

Implement methods to reduce injury severity among older road users.

Countermeasures

Focus	Number	Description	Action Plan
Safe systems approach	5A	Adopt a safe system (Vision Zero) approach to reduce the consequences of human error.	
Education	5B	Educate older drivers on vehicle safety and available resources. Educate medical professionals and law enforcement on issues regarding aging drivers, and encourage them to initiate discussions with those drivers.	✓
Vehicle safety features	5C	Provide incentives for purchase of vehicles with enhanced safety features.	
Safety belt use	5D	Determine older road users' safety belt use from TxDOT surveys, and conduct a targeted campaign explaining the benefits of safety belt use.	
Dealer involvement	5E	Work with the Texas Automobile Dealers Association to educate older vehicle purchasers on vehicle safety technologies, and provide incentives for purchasing safer vehicles.	

Education Countermeasure (5B) Action Plan

Educate older drivers on vehicle safety and available resources. Educate medical professionals and law enforcement on issues regarding aging drivers, and encourage them to initiate discussions with those drivers.

Element	Description
Steps for Implementation	1. Identify resources, such as agencies and websites that educate older drivers and their caregivers. Create handouts and flyers about topics such as My Car Does What?; CarFit; warning signs (limitations associated with age); self-assessment tools; and fact sheets with statistics, common mistakes, and challenges older drivers face. 2. Put together a packet of information (from step 1) that can be disseminated to: • Dealerships and salespeople: ○ Encourage training about vehicle technology by having salespeople demonstrate it to buyers. ○ Raise awareness of vehicle characteristics that may benefit older drivers. ○ Provide CarFit training and implementation. ○ Provide packets for dissemination. ○ Develop a recognition program for those serving older drivers, such as "This dealership certified on older driver vehicle education." • The medical community: ○ Identify resources for educating older road users from Florida and California departments of transportation and others. ○ Provide packets for dissemination. ○ Offer training on the resources available. ○ Conduct workshops at medical conferences. ○ Hold lunch-n-learn for medical offices. • Law enforcement: ○ Provide packets for dissemination. ○ Check with the National Highway Traffic Safety Administration and other states to seek available resources. ○ Offer training. ○ Work with the Texas Municipal Police Association (TMPA) to develop a Texas Commission on Law Enforcement credit class on older drivers. • The general public: ○ Provide packets for dissemination to active senior communities, DMVs, tax offices, car service agencies (e.g., oil change locations, insurance companies, post offices, and senior centers). ○ Create a system for drivers to report anonymously by sending in cards when an older driver is seen making poor driving choices. ○ Send packets to drivers participating in the Mature Driver Program. ○ Work with DMV or DPS (Texas KidSafe Program with Baylor Scott & White Health) to identify addresses.
Participating Organizations	DMV, DPS, outreach organizations, TMPA, and TxDOT
Effectiveness	***
Cost to Implement	$$
Time to Implement	Medium

Element	Description
Barriers	• Who will champion this movement? • Support for an aging road user summit or a statewide coalition. • Stakeholder buy-in (lack of time and resources). • Dissemination methods.