



2021–2025
MARYLAND
STRATEGIC HIGHWAY SAFETY PLAN

DECEMBER 2020



From the Transportation Secretary

The safety of everyone using the state's transportation network is the top priority for the Maryland Department of Transportation (MDOT).

In 2019, Maryland officially enacted a law establishing our ultimate traffic safety goal as zero vehicle-related deaths and serious injuries on Maryland roadways by 2030. The legislation also called for the development of a Vision Zero program within MDOT. The development and implementation of this 2021-2025 Maryland Strategic Highway Safety Plan (SHSP) will utilize the fundamentals of Vision Zero as part of a comprehensive approach to reduce fatalities and serious injuries on roadways across the state.

This SHSP utilizes a data-driven approach to build effective strategies, create action steps and establish performance measures to help achieve these long-term goals. The "Four Es of Safety" – Engineering, Enforcement, Education and Emergency Medical Services – serve as the foundation for these strategies and action steps.

Engaging state and local agencies, along with private partnerships and key safety partners, we have developed an all-encompassing plan to address the multi-faceted issue of traffic safety. This plan exemplifies the importance of collaboration to produce positive results.

A new component to the 2021-2025 SHSP is the role autonomous vehicles will play in traffic safety. Maryland's vision for Connected and Automated Vehicles (CAV) is to uphold and enhance a safe, efficient and equitable transportation future by delivering collaborative and innovative CAV solutions. As we implement this SHSP, we will continue to work with partners interested in researching, testing and implementing CAVs in Maryland.

The Maryland SHSP Executive Council wishes to thank the Maryland Highway Safety Office and SHSP Emphasis Area Teams for their support and guidance in developing the 2021-2025 SHSP. Their work in developing extensive and proactive safety strategies will enable successful implementation during the next five years and beyond.

Safety is everyone's responsibility and MDOT is committed to working with our partners and key stakeholders to implement the projects outlined on the following pages. I am incredibly honored to present a Strategic Highway Safety Plan that will keep Maryland moving toward our goal of zero deaths.

Thank you,

Gregory Slater
Secretary, Maryland Department of Transportation

Executive Summary

Between 2015 and 2019, an annual average of 530 deaths and 3,093 serious injuries occurred on Maryland public roadways. The Maryland Department of Transportation Motor Vehicle Administration's (MDOT MVA) Highway Safety Office (MHSO), Maryland Department of Transportation State Highway Administration (MDOT SHA), and the State of Maryland recognize that these deaths and injuries are preventable. In Maryland, as in the United States, motor vehicle crashes are a leading cause of death and disability. The consequences go beyond the victim and have a significant impact on family, friends, coworkers, and employers.

To prevent these unnecessary deaths and serious injuries, Maryland leaders continue to build partnerships with government agencies, private organizations, traditional safety advocates, and nontraditional partners. Maryland has adopted a comprehensive approach to address highway safety in the State. Under the Zero Deaths Maryland umbrella, these agencies use a data-driven and interdisciplinary strategy that applies education, enforcement, engineering, and emergency medical services to prevent fatal and severe crashes. The Zero Deaths Maryland strategy incorporates principles from Vision Zero and other proven safety programs to provide a broad systems perspective that considers the interaction of the road user with the road design as a necessary component to achieve zero deaths on our roads.

ZERØ DEATHS MARYLAND

To update the current Strategic Highway Safety Plan (SHSP) for the next five years (2021-2025), the SHSP development team convened safety leaders and stakeholder groups from multiple disciplines to participate in a series of meetings and surveys. This process confirmed the final list of Emphasis Areas (EAs), developed strategies in each EA, and created an action plan to meet the new performance targets. The six EAs include: Distracted Driving, Impaired Driving, Infrastructure, Occupant Protection, Pedestrians and Bicyclists, and Speed and Aggressive Driving.

The framework in Figure 1 visually describes Maryland's strategic approach to reduce fatalities and serious injuries in the six EAs. The foundation of the SHSP is data. Data are used throughout the plan's life cycle to develop and implement strategies and to evaluate progress toward the performance targets. The four Es of transportation safety — Enforcement, Engineering, Education, and Emergency Medical Services — serve as the cornerstones of the action plan. Multidisciplinary stakeholder communities are represented on the EA teams that implement the SHSP strategies. Coordination, collaboration, and communication power the engine that drives the six EA teams. Within each EA, special focus is given to the key groups identified at the center of the figure.

Evaluation of the SHSP implementation measures progress toward performance targets to reduce fatalities and serious injuries in each of the established EAs over the next five years. The ultimate goal is zero deaths in Maryland by 2030.

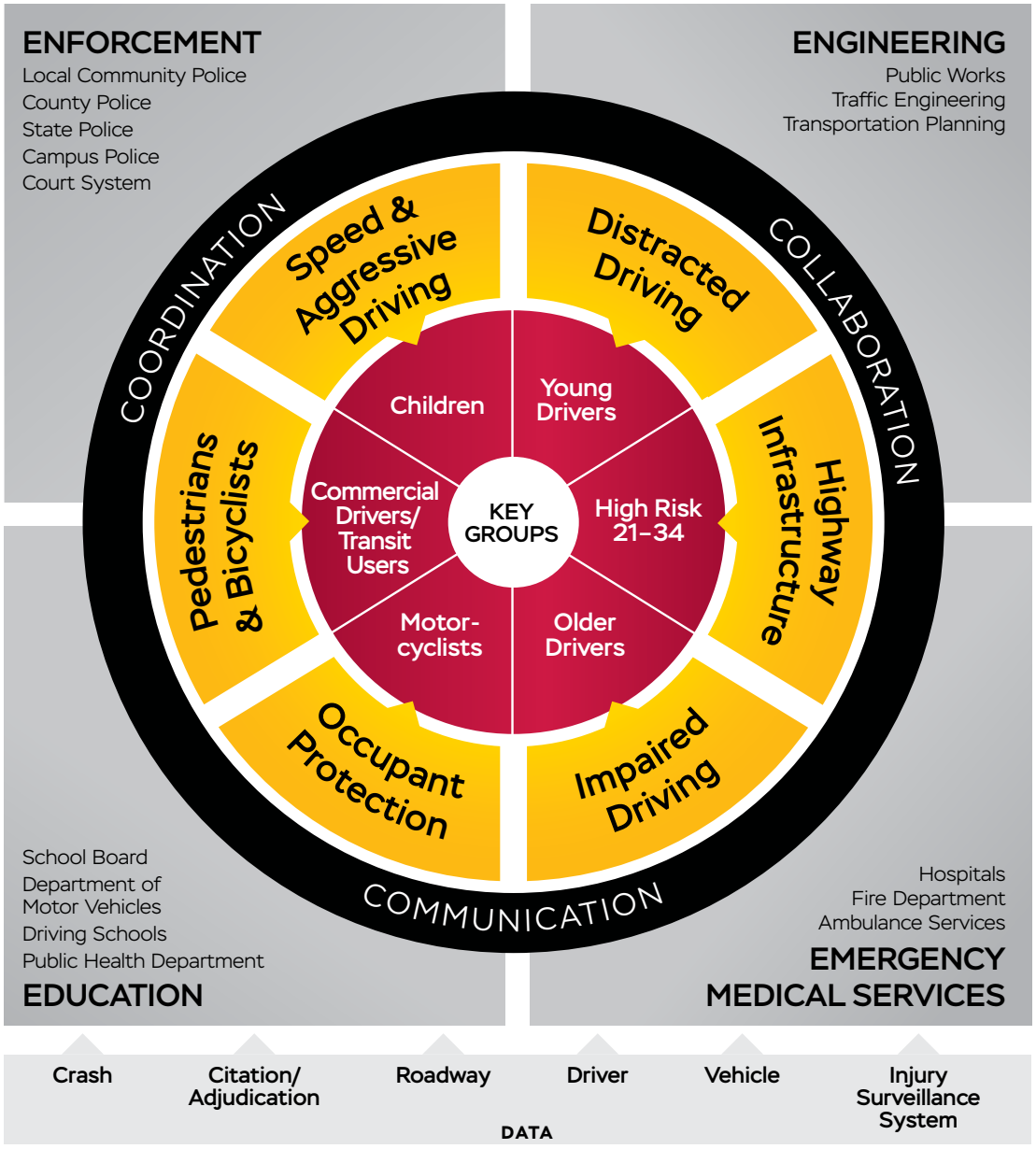


Figure 1. Maryland's Strategic Approach to Reduce Fatalities and Serious Injuries
Data is the foundation for the SHSP's development, implementation of strategies, and progress tracking. The four Es are the cornerstones of the action plan that are driven by coordination, collaboration and communication amongst the six EA teams.

Table of Contents

1 Background

History of the SHSP in Maryland

Since 2003, when Maryland adopted the state's first Strategic Highway Safety Plan (SHSP), the plan has been enhanced based on emerging issues, prevailing legislation, federal guidance, and outcomes. Maryland consults with the NHTSA and FHWA to update and affirm the content of each revision. As shown in the adjacent figure, Maryland has sponsored and developed five SHSPs, including the current SHSP, with each iteration built upon previous experiences and results. The SHSPs of the past provide a solid foundation upon which future plans are built and more success is accomplished. Despite recent increases, Maryland has been successful in reducing fatalities and serious injuries on our roadways.

The first Maryland SHSP, which spanned 2003-2005, was modeled after the American Association of State Highway and Transportation Official's (AASHTO) national plan and focused on the State's transportation safety problems in 23 program areas. In 2006, Maryland updated the SHSP based on the process recommended by the 2005 Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) legislation. The result was a statewide, comprehensive safety plan that provided a coordinated framework for establishing statewide goals, targets, and key Emphasis Areas (EAs) developed in consultation with federal, state, local, and private-sector safety stakeholders.

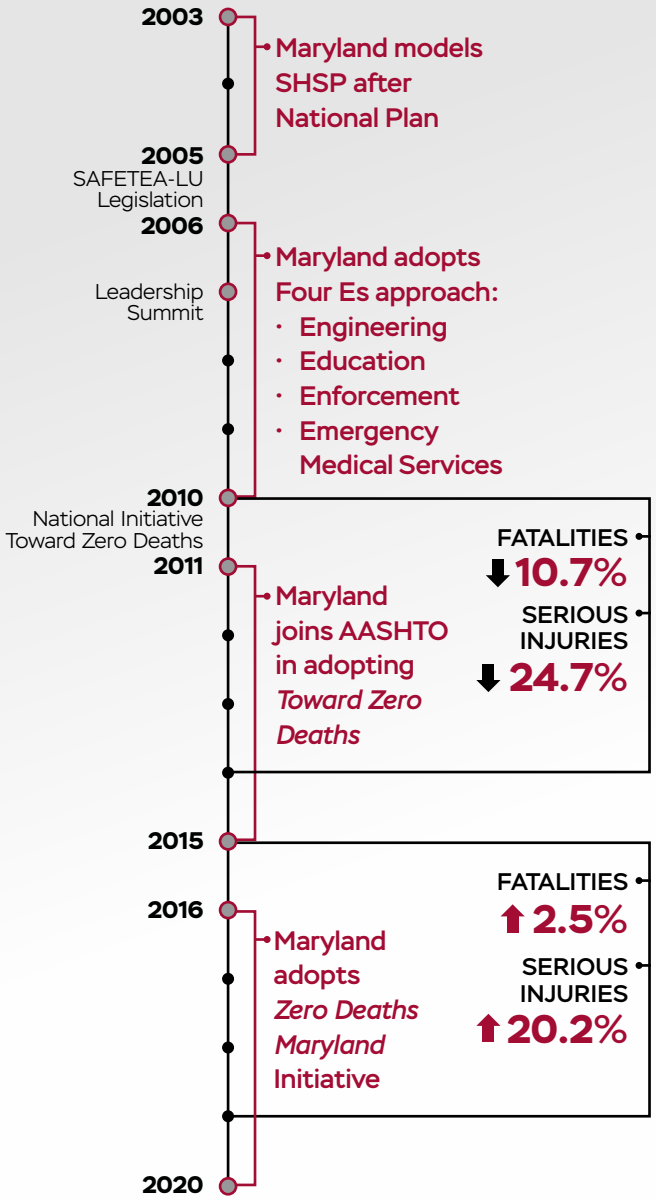


Figure 2. Maryland's SHSP Timeline Overview

In 2010, Maryland joined other states and AASHTO in adopting the Toward Zero Deaths (TZD) national vision. Through a Governor's Proclamation, Maryland's TZD campaign was adopted by the Maryland Chiefs of Police Association, the Maryland Sheriffs' Association, the Maryland EMS Board, and the Maryland Association of County Health Officers. For the 2011-2015 SHSP, Maryland set a goal of reducing motor vehicle related fatalities and injuries by one-half of the 2008 baseline by 2030, with an eventual goal to achieve zero traffic deaths. With that goal in mind, and using a data-driven approach, the 2011-2015 SHSP strategies included the following six Emphasis Areas:

- Distracted Driving
- Impaired Driving
- Infrastructure
- Occupant Protection
- Pedestrians
- Aggressive Driving

These same Emphasis Areas were adopted in the 2016-2020 SHSP with the addition of Bicyclists to the Pedestrian EA. That plan maintained the TZD approach and also took into consideration the Moving Ahead for Progress in the 21st Century Act (MAP-21) of 2012 and the Fixing America's Surface Transportation (FAST) Act of 2015. The goal of reducing motor vehicle related fatalities and injuries by one-half by 2030 remained.

2021-2025 SHSP

While the SHSP has evolved with each new plan, Maryland has always used a multi-disciplinary approach to crash prevention and severity mitigation, including strategies that address roadway design, driving behaviors, technology, and policies. The vast compendium of stakeholders who carry out this work include, but are not limited to, academic institutions and staff, agricultural professionals, engineers, first responders, government officials, law enforcement, policy makers, public health professionals, and traffic planners. Maryland believes that crashes are preventable and views zero as the only acceptable number of motor vehicle deaths.

In 2019, the Maryland legislature passed a Vision Zero bill that was later signed by Governor Hogan. The law set a goal of zero motor vehicle related fatalities or serious injuries by 2030.

Established in October of 2019, Maryland's Vision Zero law provides for an MDOT-designated coordinator to oversee the implementation of the plan, collaboration with other State agencies and local authorities, a State-funded budget, yearly reporting and strategies to achieve the established goals. Such strategies include, but are not limited to, identifying state and local laws, policies and regulations that hinder the development and implementation of Vision Zero; proposing changes to state and local laws to allow for innovative engineering and traffic calming, data collection, safety program effectiveness and development of best practices; proactively engaging community members; developing a long-term plan; prioritizing resources; and investing more resources into construction needs for high-crash intersections and roadways.

Because traffic crashes are predictable and preventable events, any fatality or severe injury on the roads is unacceptable. This is the Zero Deaths Maryland philosophy and is aligned with the Zero Deaths Vision adopted by the U.S. Federal Highway Administration. Like the Toward Zero Deaths approach in previous Maryland Strategic Highway Safety Plans, Zero Deaths Maryland uses a data-driven and interdisciplinary strategy that applies education, enforcement, engineering and emergency medical services strategies to prevent fatal and severe crashes. The Zero Deaths Maryland strategy emphasizes a broad systems perspective that considers the interaction of the road user with the roadway infrastructure as a necessary component to achieve zero deaths.

Using a data-driven approach, this 2021-2025 MD SHSP builds on the experience, efforts, and successes from previous SHSPs. The six Emphasis Areas identified in the 2011-2015 and 2016-2020 SHSPs remain. Interim performance targets are set to mark the progress Maryland makes as we strive for zero fatalities.

The annual performance targets for each of the SHSP's Emphasis Areas are set using an exponential trend line. Historic data starting with 2005-2009 were used to determine these targets. Moving five-year averages are used to calculate projections, and the targets for each individual year are taken from the midpoint of the five-year average (e.g., 2022 annual interim target = midpoint of the 2020-2024 average). The same methodology was used for serious injury targets. Finally, this same method was applied to the five performance measures required by the FHWA: fatalities, fatality rate, serious injuries, serious injury rate, and non-motorized fatalities and serious injuries.

All traffic safety documents in the state of Maryland conform to this methodology, including the SHSP, the MDOT's Transportation Plan (MTP) [1], the MHSO's Highway Safety Plan (HSP) [2], the MDOT SHA's Highway Safety Improvement Plan (HSIP) [3], MDOT SHA's Commercial Vehicle Safety Plan (CVSP) [4], and the Traffic Records Coordinating Committee's (TRCC) [5] Traffic Records Strategic Plan (TRSP) [6]. Additionally, all planning documents developed by the MHSO staff and all State-level reporting to the Governor use the SHSP Emphasis Area fatality and serious injury target-setting methodology.

Crash data reported by MHSO are derived from MDOT SHA, which maintains a database derived from reports submitted to, processed, and approved by the Maryland State Police official crash reporting system. Data are regularly updated and subject to change.

Development of the 2021-2025 SHSP

In early 2020, Maryland contracted the Crash Center for Research and Education (Crash Core) to lead the 2021-2025 SHSP development effort. Crash Core is a Maryland-based, non-profit research organization dedicated to transportation safety. To begin, the development team conducted one-on-one interviews with key traffic safety partners across Maryland. Safety partners included leaders from government agencies, education and outreach professionals, local law enforcement, and emergency services agencies. During the interviews, the team solicited insight into the status of traffic safety initiatives and current and future safety priorities for Maryland roadways. Questions focused on several topics including traffic safety needs in engineering, education, enforcement, and emergency medical services (the four Es of transportation safety); the utility of the current SHSP in the stakeholder's activities; the level of involvement in the ongoing Emphasis Area team meetings and activities; and their view of what should be included in the 2021-2025 SHSP.

Additionally, the development team conducted interviews with each Emphasis Area (EA) team chairperson. These interviews covered the chairperson's personal experience with the EA team — such as operations of the EA team, opinion about the progress and feasibility of existing action steps, potential need for additional resources, and EA evaluation and progress tracking.

The information gleaned from all the interviews aided in the development of an online survey that was distributed to a broader group of safety partners. Information gathered from this safety partner survey helped refine goals, solicit new/updated action steps, identify emerging issues, and examine the progress of each SHSP Emphasis Area.

After collecting information from the safety partner survey, the SHSP development team met with each EA team to present the plan for the development of the 2021-2025 MD SHSP, providing another opportunity to solicit the

group's priorities. The conversation focused on the EA team's vision for the updated SHSP, related goals, emerging traffic safety issues, measuring SHSP progress, and thoughts about how to maintain the relevance of the action plan throughout the 2021-2025 term.

The development team planned a safety partner workshop to further discuss and obtain consensus on strategies and action plans for the 2021-2025 SHSP in late March 2020. The onset of the COVID-19 pandemic – and restrictions placed on Maryland residents by the Governor – resulted in virtual workshops to replace the in-person workshop. A virtual workshop was held for each EA and was attended by the EA team members and representatives from a variety of stakeholder groups including State and local government agencies, non-governmental organizations, private businesses and advocates, and law enforcement, among others.

After the workshops, a second online survey was distributed to attendees to obtain feedback on the proposed Emphasis Area strategies and action steps developed through the previously described interviews, survey and workshops. This feedback survey solicited opinions about priorities within the action plan, performance measure development and potential agencies that could spearhead or collaborate to carry out the EA action plans. Several more virtual meetings with the EA teams refined the strategies and action plans that would later be presented for approval.

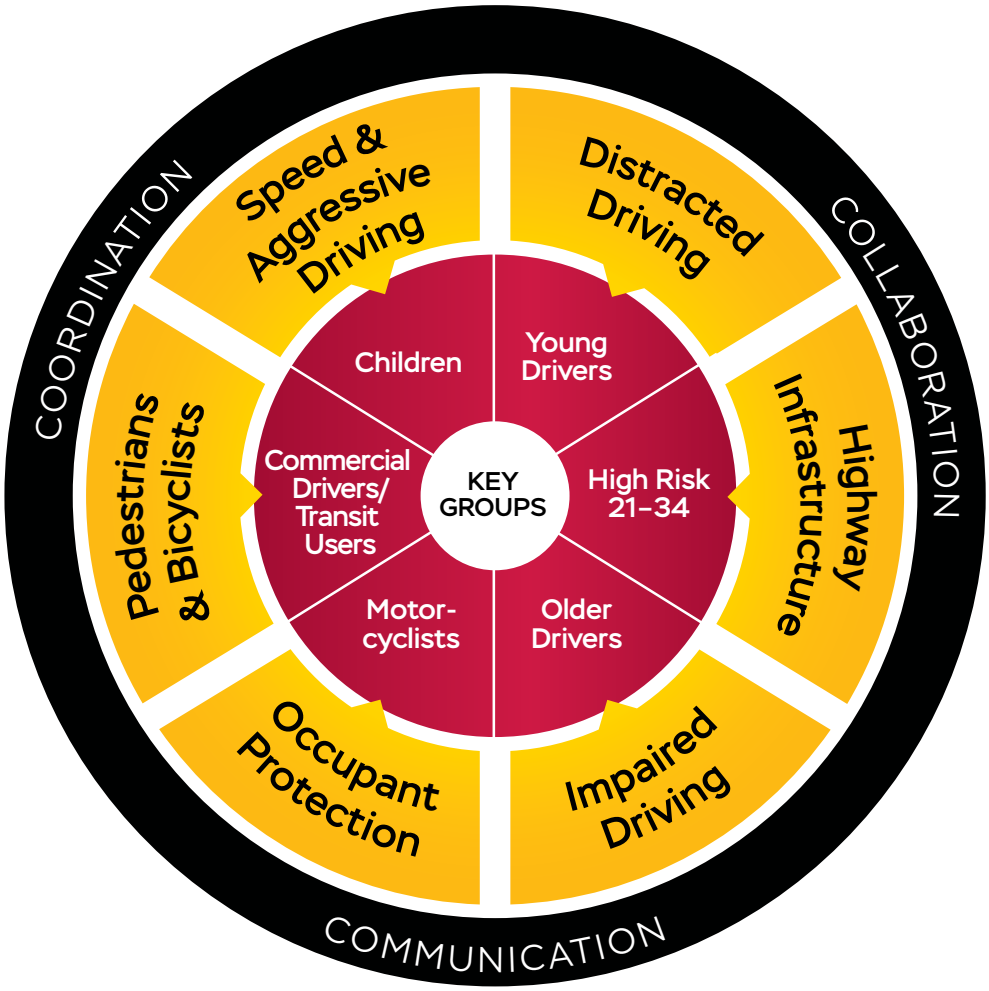


Figure 3. Maryland's Emphasis Areas and Key Groups

The SHSP strategy and action plan development culminated with the delivery of findings from interviews, meetings, and workshops to the SHSP's Steering Committee (MHSO management) for feedback and approval for use in the 2021-2025 SHSP. Subsequently, the Executive Council, Steering Committee, and EA Team Chairpersons met to review the proposed strategies and action steps.

The 2021-2025 SHSP encompasses the essence of the previous plan and further incorporates systemic enhancements, innovation and implementation that is data-driven. The result is an evidence-based approach that culminated in the confirmation of the plan's six EAs and six key groups, as illustrated in Figure 3.

Connections to Other Maryland Safety Plans

Specific goals and targeting methodologies of other Maryland agency plans align with the efforts of Maryland's SHSP. Those plans include the Highway Safety Improvement Program (HSIP), Commercial Vehicle Safety Plan (CVSP), Highway Safety Plan (HSP), and the safety components of the Statewide Transportation Improvement Program (STIP) and Maryland Transportation Authority's (MDTA) Strategic Plan for Connected and Automated Vehicles. Integrating the SHSP into statewide and metropolitan long range transportation plans (LRTPs), STIPs, HSIPs, CVSPs, HSPs, etc. advances the State's safety agenda as they incorporate statewide priorities and goals of reducing fatalities, fatality rates, serious injuries and serious injury rates [7].

Additionally, the MDOT MVA addresses motorcycle safety, older and medically at-risk drivers, and young drivers through data evaluation, internal review, enhancement of processes and outreach. Specific action steps related to enforcement, education, roadway infrastructure, public information and program administration for motorcycles, older drivers, and younger drivers will be addressed by action steps across the EA teams as the data indicates.

Other plans, including Maryland local jurisdiction plans and Metropolitan Transportation Plans, have been developed in coordination with the SHSP. While the MHSO urges Maryland jurisdictions to develop a local SHSP that takes on the principles and overall goals of the Maryland SHSP, local jurisdictions are encouraged to develop a plan suited to their specific concerns. As of 2020, six Maryland counties have incorporated an SHSP, seven more counties are in development, and several cities and counties are creating Vision Zero plans. These and other state and local transportation planning documents are valuable complements to the implementation and success of Maryland's SHSP.

Maryland Crash Trends and Traffic Records

2.1 Crash Trends

From 2015 to 2019, 2,647 people were killed in motor vehicle related crashes in Maryland (529 per year), and another 15,467 people were seriously injured (3,093 per year). During this period, on average, 1.5 people were killed and 8.5 were seriously injured every day. A crash was reported every 5 minutes. Since 2015, traffic deaths and serious injuries have increased (see table below). These increases follow declines in fatalities and serious injuries from 2009 through 2014.

Economic, social and demographic factors will affect how much time people drive on the roads and are at risk of crashing. To compare annual trends in fatalities, it is important to adjust for these changes in vehicle miles traveled. In Maryland, vehicle miles traveled (VMT) increased from 57.3 billion miles in 2015 to 60.1 billion miles in 2019. Adjusting for VMT, the fatality rate per 100 million VMT decreased from 0.91 in 2015 to 0.89 in 2019. The fatality rate per VMT continues to be lower than the national fatality rate as it has every year since 1992.

In 2020 vehicle miles traveled declined dramatically. On March 5, 2020, Governor Hogan declared a state of emergency in Maryland due to the coronavirus outbreak. Soon after, the governor issued a stay-at-home order for all nonessential

ONE WEEK IN MARYLAND

10	60	2,229
FATALITIES	SERIOUS INJURIES	POLICE-REPORTED CRASHES

Statewide Fatalities and Serious Injuries

	2015	2016	2017	2018	2019	FIVE-YEAR AVERAGE	% CHANGE FROM 2015 TO 2019
Fatalities	521	522	558	512	535	529.4	2.5%
Serious Injuries	2,598	3,167	3,347	3,233	3,122	3,093.4	20.2%

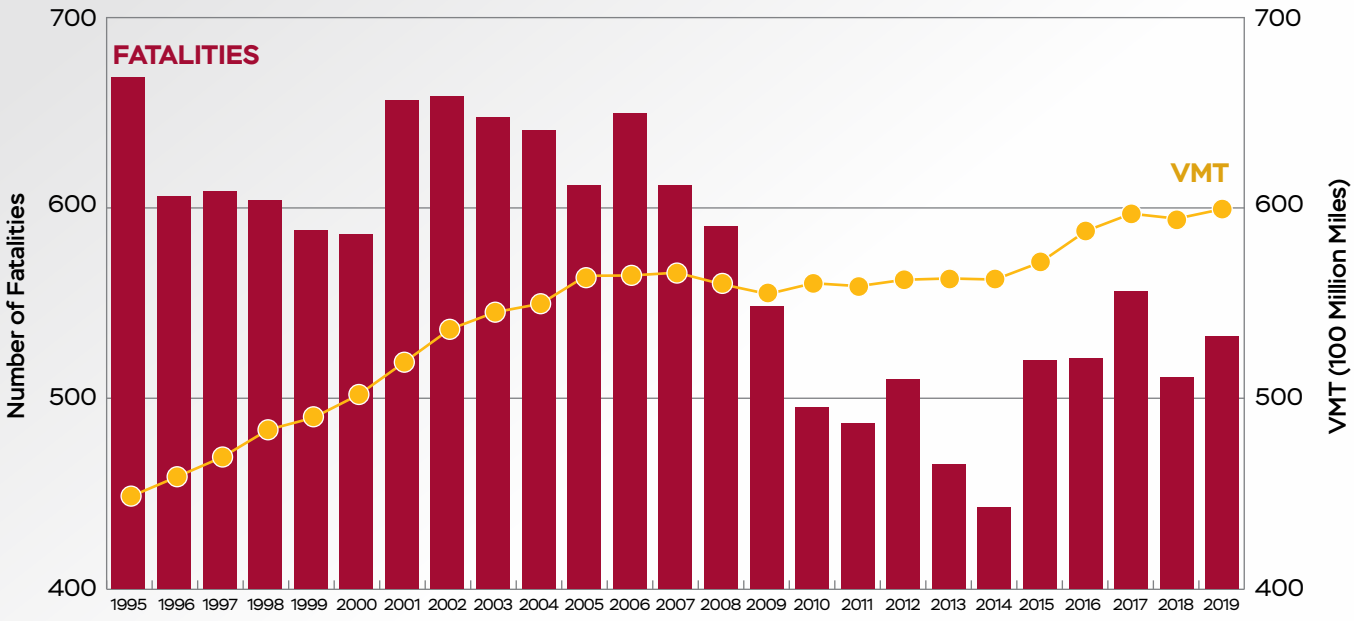
*Source: Maryland Highway Safety Office Benchmark Report

Fatality Rate, Vehicle Miles Traveled, Maryland and National

YEAR	VMT (100 MILLION MILES)	FATALITIES*	FATALITY RATE* (FATALITIES PER 100M VMT)	NATIONAL FATALITY RATE**
2015	573.14	521	0.91	1.15
2016	589.74	522	0.89	1.19
2017	598.92	558	0.93	1.17
2018	596.29	512	0.86	1.13
2019	601.36	535	0.89	1.10

*Source: SHA-SID/eMAARS and ACRS
**Source: NHTSA, Fatality Analysis Reporting (FARS)

Maryland VMT and Traffic Fatality Trends for State and Local Roadways



professions. As a result, there was an immediate and unprecedented decline in traffic volume on Maryland roadways. Early 2020 crash data show a corresponding decline in the number of crashes, but not a corresponding change in the number of fatalities. It is hypothesized that increased speeds and impaired driving have increased crash severity and resulting fatalities. The MHSO is monitoring crash and fatality trends as Maryland enters the different phases of the pandemic recovery.

2.2 Maryland Traffic Records and Information Systems

While working within the data system described in Figure 1, and while using data-driven strategies across all stakeholder agencies, Maryland strives to achieve zero traffic-related fatalities. The Maryland Traffic Records Coordinating Committee (TRCC) supports the data needs of the SHSP and Zero Deaths Maryland. Established in 2007, the TRCC coordinates the traffic records system in Maryland, which includes the following six components:

- Police crash report data
- Roadway information
- Citation and adjudication data
- Driver licensing data
- Vehicle registration data
- Injury surveillance data

The TRCC measures successful coordination through the following six data quality metrics:

- **ACCESSIBILITY:** how easy it is to retrieve and manipulate data in a system component, in particular by the entities that do not own the data system
- **ACCURACY:** how reliable the data are (e.g. how many mistakes do they have), and if the data accurately represent an event
- **COMPLETENESS:** how many variables or data components related to a particular event are available, or what percentage of events are included in the data (e.g. unreported crashes)
- **INTEGRATION:** how well various data systems (e.g., roadway inventory, driver licensing, EMS, etc.) are connected or linked to each other or how easily they can be linked to one another
- **TIMELINESS:** how quickly an event is added to a data system component
- **UNIFORMITY:** how consistently information is coded in the data system, and/or how well it meets accepted data standards

Maryland maintains traffic records information system components in compliance with federal recommendations and State requirements to support stakeholder needs and the management of Maryland's highway safety programs. The

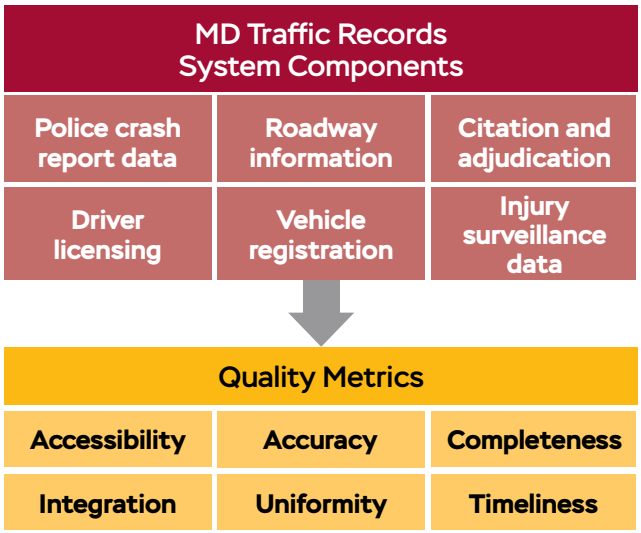


Figure 4. Components of Maryland's Traffic Records System

combined efforts of the policy leaders, decision makers, and technical experts who participate in the TRCC are crucial to improving the Maryland traffic records system.

Moreover, TRCC members participate in EA activities to help ensure consistent and appropriate support of the SHSP. EA teams depend on quality data analysis to properly identify vulnerable groups, adapt and refine prevention strategies, and evaluate the effectiveness of implemented strategies. The 2021-2025 MD SHSP will rely heavily on the TRCC's efforts to improve data quality and accessibility to address the teams' data needs as they evolve over the next five years.

The TRCC has adopted a 2021-2025 Traffic Records Strategic Plan (TRSP) to coincide with the 2021–2025 SHSP. These plans are purposefully written in coordination with one another to further align and strengthen the connection between Maryland's traffic records system and its traffic safety programs. The process of developing strategies in both the TRSP and the SHSP are mutually reinforcing. Each SHSP EA team develops strategies with a vision and understanding of the data needed to carry out and measure the EA-related activities. The TRCC develops strategies in consideration of the end users, such as the EA team members.

3 Emphasis Areas and the Use of Effective Strategies

The Maryland SHSP is led, in different capacities, by several groups of traffic safety professionals from state and local government and private industry: Executive Council, Steering Committee, EA Chairpersons, EA team. The SHSP includes a suite of Emphasis Areas and strategies designed to reduce traffic-related fatalities and serious injuries on all public roads [8] that will be funded and implemented through existing Federal safety programs such as the HSP, CVSP, HSIP, and state safety programs. As described in the following sections, the Maryland SHSP Executive Council considered a variety of key factors to determine the emphasis areas and strategies that will prevent casualties on our roadways. In cooperation with the four Es of transportation safety, these strategies create the blueprint for addressing both behavioral and infrastructure challenges and opportunities in Maryland [9].

Although they are stand-alone entities, the Emphasis Areas are designed for cross collaboration and mutual reinforcement. To promote further collaboration across the EAs, the Infrastructure EA developed strategies designed to address the other EAs' infrastructure needs. This new framework promotes EA team collaboration, assures that infrastructure needs are prioritized across the SHSP, and reduces redundancy with other Maryland state agencies' efforts.

The following are the 2021-2025 Maryland Strategic Highway Safety Plan Emphasis Areas:

- Distracted Driving
- Infrastructure
- Impaired Driving
- Occupant Protection
- Pedestrians and Bicyclists
- Speed and Aggressive Driving

Focusing on the prevention of fatalities and serious injuries as well as the state's plan of safe, accessible and effective multi-modal transportation systems [10], the SHSP development team and EA teams directed their attention to six core strategies. These core strategies provide the foundation for the SHSP. Maryland's 2021-2025 SHSP strategies to prevent death and injury are as follows:

DATA: Use the collection, analysis, and evaluation of data on all roads in Maryland to identify the Emphasis Area safety issues, key audiences,

SHSP EXECUTIVE COUNCIL
The leaders of the Maryland Agencies tasked with the development and implementation of the SHSP.

STEERING COMMITTEE
Responsible for day-to-day SHSP leadership, administration, and coordination.

EA CHAIRS & CO-CHAIRS
These partners lead the EA team in the administration of the action plan, coordination of efforts and progress assurance.

EA TEAM
The EA teams plan, collaborate and follow through with implementation and evaluation of relevant action steps.

and locations of concern, as well as support the improvement of data quality (accessibility, accuracy, completeness, integration, timeliness, uniformity).

ENFORCEMENT: Support the improved enforcement of laws pertaining to the Emphasis Area laws, as well as support enforcement initiatives that promote safe behaviors.

INFRASTRUCTURE: Improve roadway environments related to the Emphasis Area through the support of system-wide prevention strategies, engineering treatments, and land-use planning.

LEGISLATION: Support legislation and adjudication efforts to reduce the problems of the Emphasis Area.

OUTREACH: Promote a systemic safety culture through the support of outreach initiatives including public awareness, education, training, and media campaigns focused on the Emphasis Area.

VEHICLE ENGINEERING AND TECHNOLOGY: Identify, promote, and support the implementation of effective engineering and technological approaches to support the Emphasis Area prevention strategies.

Under the 2021-2025 MD SHSP, the six EA teams created an action plan for each strategy. The action plan lays out steps within each strategy that, when implemented, will move Maryland closer to zero deaths. Designed to establish or expand interventions that improve safety, the steps in the action plan were developed by a consensus among the multi-disciplinary safety partners of the EAs. The action plan is a living document, meant to provide the flexibility to alter the activities as needed. It contains information about agencies, groups, organizations, private industry, or persons whose insight or expertise may help advance the prevention strategies, as well as a measure of performance for each action step. The EA teams can use the action plan to help identify new stakeholders, determine strategies for engaging stakeholders, and comprehensively and effectively make progress toward their goals. The SHSP Action Plans are intended to be living documents that will be updated, reviewed, and referenced on an ongoing basis over the five-year SHSP time frame. Figure 5 describes the framework of the 2021-2025 Maryland SHSP.

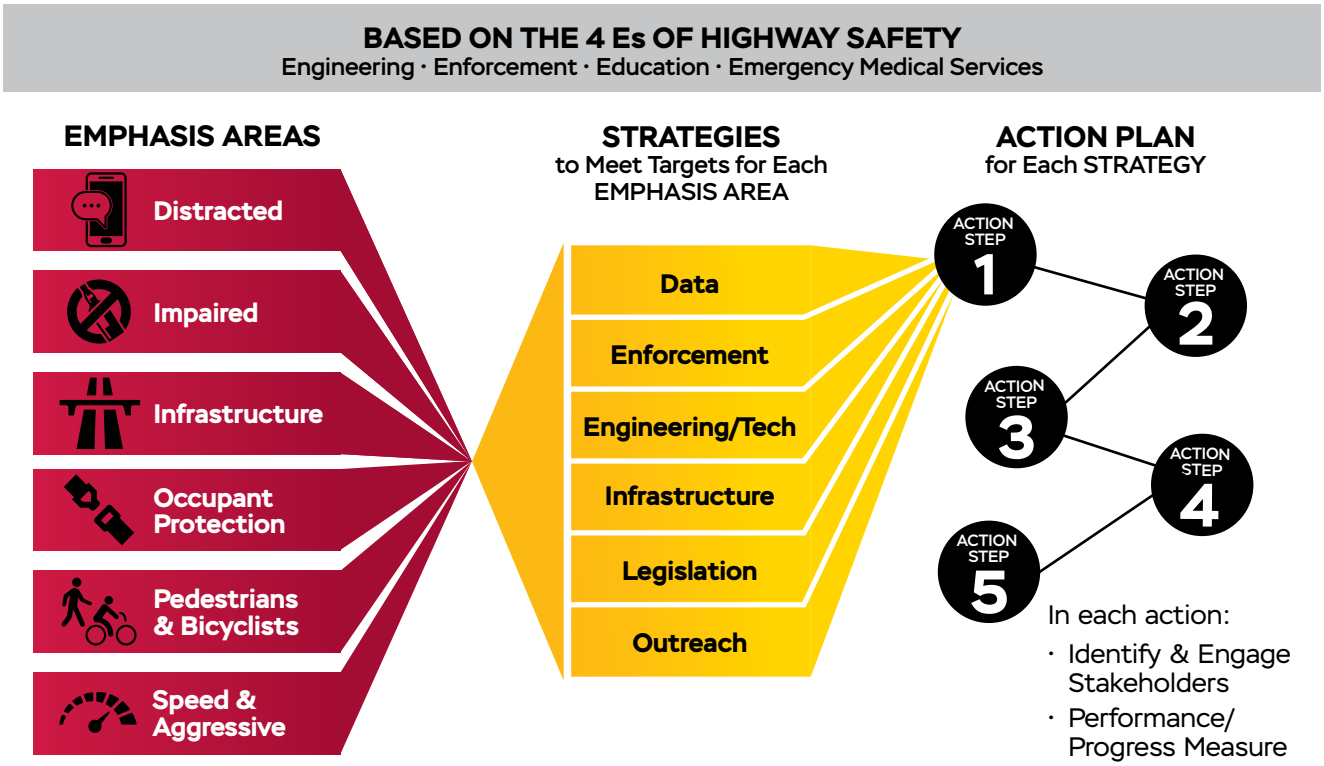


Figure 5. Maryland's Strategic Highway Safety Plan Structure

3.1 Distracted Driving

Each year in Maryland between 2015 and 2019, an average 181 people were killed and 1,507 seriously injured each year in crashes in which distraction was recorded as a contributing factor. A distracted driving crash occurs when a driver shifts attention away from the driving task due to a number of things, including adjusting vehicle console controls, tending to a passenger or child, or using a cell phone (e.g., talking, texting, or other use).

Distracted driving is not a new issue but has moved into the spotlight in the past decade as more drivers own cell phones. While talking and texting are issues in the forefront, research also shows that drivers using voice-based and touch screen features in their vehicles were distracted for more than 40 seconds when performing complex tasks such as programming their navigation system [11].

Crashes involving distracted driving are poorly understood. Reliability of data and underreported distraction crashes are recognized as two of the biggest challenges with regard to fully understanding and preventing distracted driving. A crash report consists of an investigating officer's opinions based on their observations at a crash scene, interviews with witnesses, physical evidence, and other factors. Determining whether a driver was distracted leading up to a crash can be difficult enough; establishing what the distraction was can be just as difficult.

The Distracted Driving EA team coordinates the efforts of State transportation agencies, safety partners, stakeholders, and law enforcement to reduce distracted driving related fatalities and serious injuries.

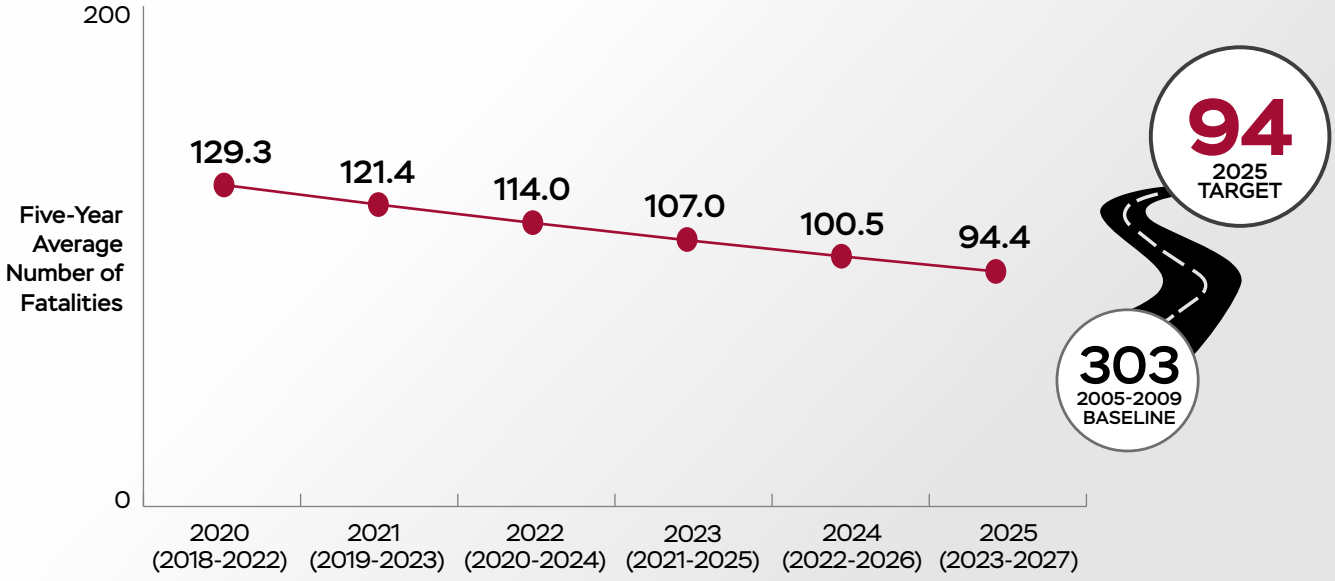
3.1.1 Performance Targets

The Distracted Driving EA team, in cooperation with the SHSP Executive Council, will be responsible for meeting or exceeding the following performance targets:

FATALITY TARGET: Reduce the number of distracted driving related fatalities on all roads in Maryland from the five-year average (2005-2009) of 303 to 94 or fewer by December 31, 2025.

SERIOUS INJURY TARGET: Reduce the number of distracted driving related serious injuries on all roads in Maryland from the five-year average (2005-2009) of 3,648 to 665 or fewer by December 31, 2025.

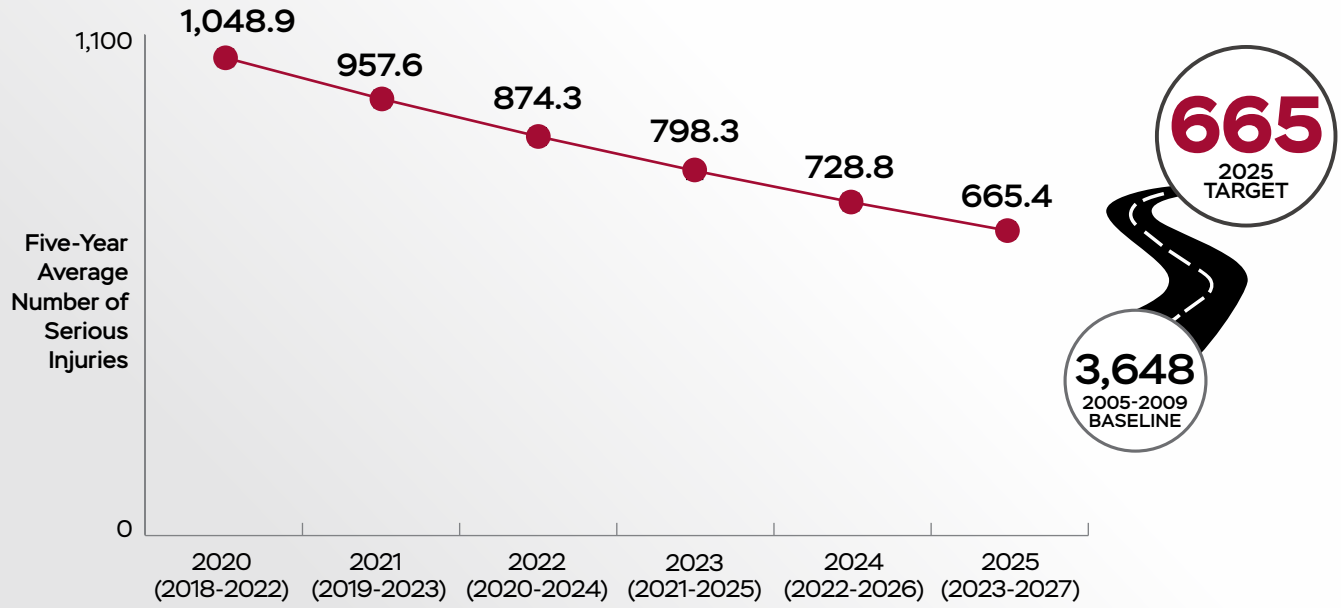
Distracted Driving Fatalities and Interim Targets



Annual Target*

**Note: The annual target represents the mid-year of the five-year average. For example, the 2020 target is the five-year annual average from 2018–2022.*

Distracted Driving Serious Injuries and Interim Targets



Annual Target*

**Note: The annual target represents the mid-year of the five-year average. For example, the 2020 target is the five-year annual average from 2018–2022.*

3.1.2 Strategies to Meet MD SHSP's Distracted Driving Reduction Targets

In accordance with the overall SHSP, the Distracted Driving EA team will implement the following strategies to drive down death and serious injuries on Maryland's roadways. These strategies include the highway safety elements of engineering, education, enforcement, and emergency medical services and address both behavioral and infrastructure issues, as well as incorporating the State's plan for safe, accessible and effective multi-modal transportation systems [12]. Maryland's strategies to meet the goals in reducing distracted driving include the use of:

DATA: Use the collection, analysis, and evaluation of data on all roads in Maryland to identify distracted driving safety issues, key audiences, and locations of concern, as well as support the improvement of the data quality (accessibility, accuracy, completeness, integration, timeliness, uniformity).

ENFORCEMENT: Support the improved enforcement of distracted driving laws, as well as support enforcement initiatives that promote safe behaviors.

INFRASTRUCTURE: Improve roadway environments to reduce distracted driving through the support of system-wide countermeasures, engineering treatments, and land-use planning.

LEGISLATION: Support legislation and adjudication efforts to reduce distracted driving.

OUTREACH: Promote a systemic safety culture through the support of outreach initiatives including public awareness, education, training, and media campaigns focused on reducing distracted driving.

VEHICLE ENGINEERING AND TECHNOLOGY: Identify, promote, and support the implementation of effective engineering and technological approaches to reduce distracted driving.

Maryland understands that eliminating distracted driving will decrease crash occurrence and save lives. The Distracted Driving Emphasis Area calls for a safe system approach to countermeasures and a traffic safety culture intolerant of distracted driving. Associated with these strategies is an action plan designed to reach the goals named for the Distracted Driving EA. The action plan includes steps aimed to improve data collection, enhance enforcement programs, improve roadway environments to prevent distraction, support distraction prevention policy, educate the public on the risks of distracted driving, and utilize new technology to reduce the number of associated fatalities and serious injuries.

3.2 Impaired Driving

Impairment from alcohol or drugs is a well-known risk factor for road traffic injury. These substances impair coordination and the ability to perceive and respond to hazards. In Maryland, 30.8% of traffic-related fatalities between 2015 and 2019 involved alcohol and/or drugs, compared to 6.4% of traffic-related injuries. From 2015 through 2019, an average 163 people died each year and an additional 446 were seriously injured in crashes involving a driver impaired by alcohol or drugs (based on the state impaired definition). Over a quarter (25.6%) of impaired driving fatal crashes occur between midnight and 2:59 am, and Saturday has the highest number of impaired driving fatal crash fatalities (24%).

The Impaired Driving EA team, focused on both alcohol and drug impairment, collaborates with State transportation agencies, safety partners, stakeholders, and law enforcement to reduce impaired driving related fatalities and serious injuries.

3.2.1 Performance Targets

The Maryland crash report includes a blood alcohol concentration (BAC) level and/or drug impairment measure when possible; however, the Maryland criteria for impairment is not dependent upon a BAC or substance threshold. In Maryland, an impaired driving crash is indicated by the investigating officer based on the driver's condition, BAC, and/or any detected substance use. Conversely, FARS data considers a driver alcohol-impaired only when the BAC is greater than 0.08 grams per deciliter (g/dL). Therefore, Maryland SHSP impaired driving targets and those based on NHTSA's Fatality Analysis Reporting System (FARS) data are separate and distinct within this SHSP. Both Federal and State impaired driving targets are included here to maintain continuity with previous Maryland SHSPs and to maintain the link with other State plans that exclusively use State crash data as the source for problem identification and program evaluation.

The Impaired Driving EA team, in cooperation with the SHSP Executive Council, will be responsible for

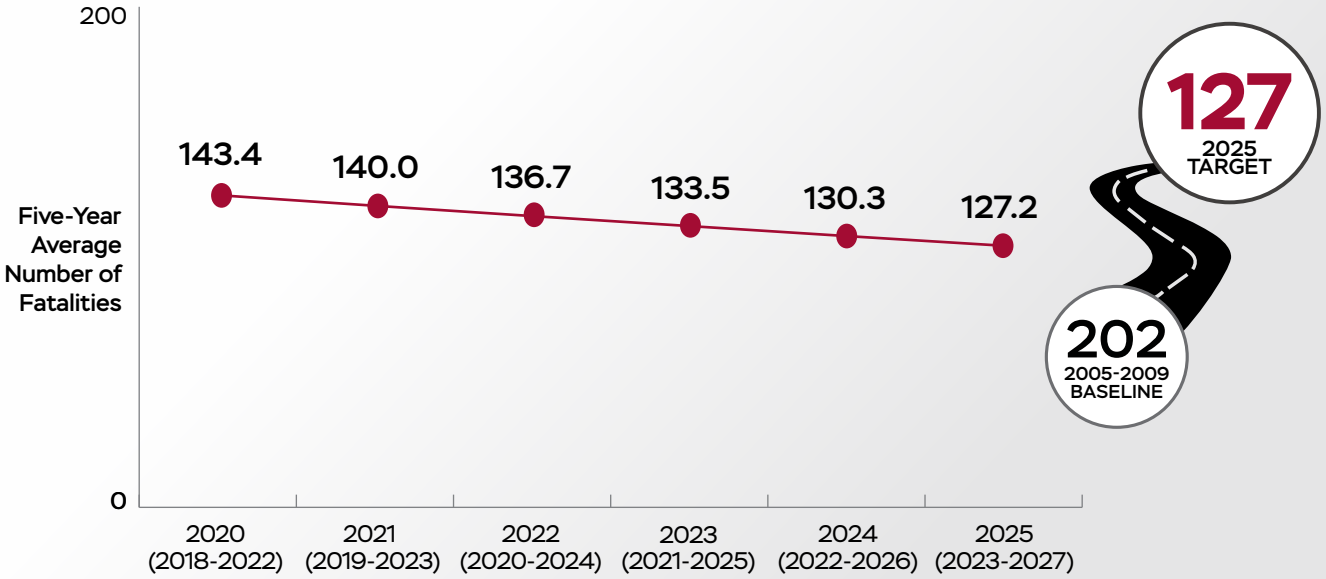
meeting or exceeding the following performance targets:

STATE-DEFINED IMPAIRED DRIVING FATALITY TARGET: Reduce the number of State-defined (alcohol/drug) impaired driving related fatalities on all roads in Maryland from the five-year average (2005-2009) of 202 to 127 or fewer by December 31, 2025.

STATE-DEFINED IMPAIRED DRIVING SERIOUS INJURY TARGET: Reduce the number of impaired (alcohol/drug) driving related serious injuries on all roads in Maryland from the five-year average (2005-2009) of 809 to 223 or fewer by December 31, 2025.

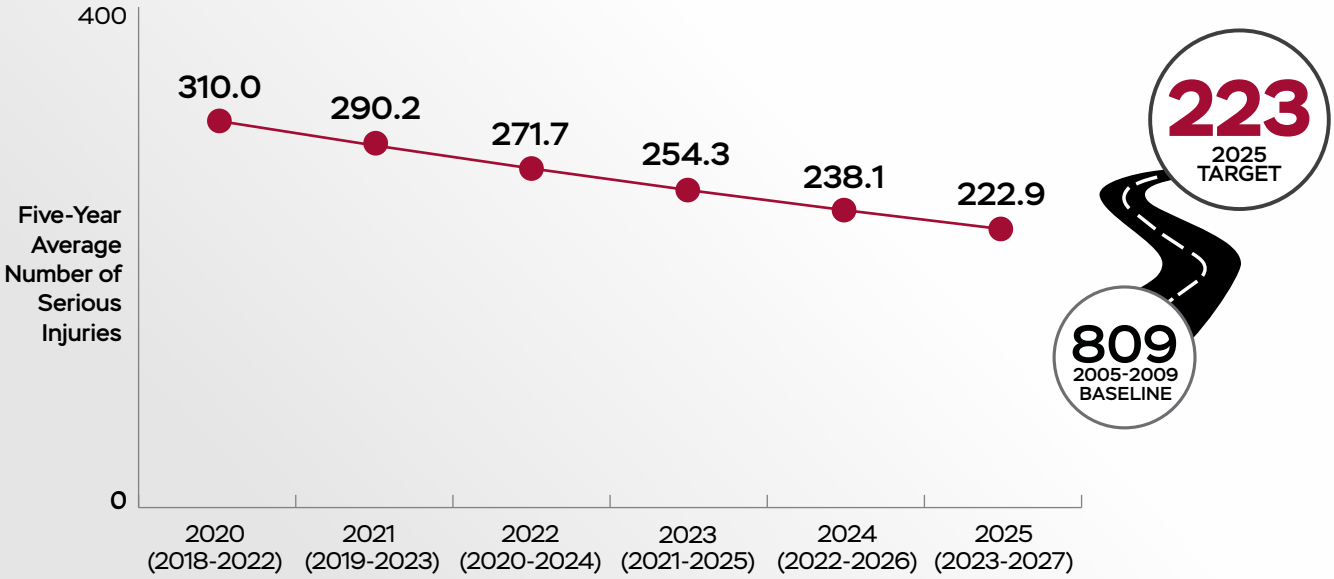
NHTSA-DEFINED IMPAIRED DRIVING FATALITY TARGET: Reduce the number of NHTSA-defined (BAC 0.08) impaired driving related fatalities on all roads in Maryland from the five-year average (2005-2009) of 174 to 124 or fewer by December 31, 2025.

Impaired Driving Fatalities and Interim Targets



*Note: The annual target represents the mid-year of the five-year average.
For example, the 2020 target is the five-year annual average from 2018–2022.

Impaired Driving Serious Injuries and Interim Targets



*Note: The annual target represents the mid-year of the five-year average.
For example, the 2020 target is the five-year annual average from 2018–2022.

3.2.2 Strategies to Meet MD SHSP's Impaired Driving Reduction Targets

In accordance with the overall SHSP, the Impaired Driving EA team will implement the following strategies to drive down death and serious injuries on Maryland's roadways. These strategies include the highway safety elements of engineering, education, enforcement, and emergency medical services and address both behavioral and infrastructure issues, as well as incorporating the State's plan for safe, accessible, and effective multi-modal transportation systems [13]. Maryland's strategies to meet the goals in reducing impaired (by alcohol or drugs) driving include the use of:

DATA: Use the collection, analysis, and evaluation of data on all roads in Maryland to identify impaired driving safety issues, key audiences and locations of concern, as well as support the improvement of data quality (accessibility, accuracy, completeness, integration, timeliness, uniformity) of impaired driving related data.

ENFORCEMENT: Support the enforcement of laws pertaining to the impaired driving Emphasis Area, as well as support enforcement initiatives that promote safe behaviors.

INFRASTRUCTURE: Improve roadway environments for the impaired driving Emphasis Area through the support of system-wide countermeasures, engineering treatments, and land-use planning.

LEGISLATION: Support legislation and adjudication efforts to advance the goals of the impaired driving Emphasis Area .

OUTREACH: Promote a systemic safety culture through the support of outreach initiatives including public awareness, education, training, and media campaigns focused on the concerns of the impaired driving Emphasis Area .

VEHICLE ENGINEERING & TECHNOLOGY: Identify, promote, and support the implementation of effective engineering and technological approaches to support the impaired-by-alcohol or drugged driving emphasis area's countermeasures.

Maryland understands that eliminating impaired driving will decrease crash occurrence and save lives. The Impaired Driving Emphasis Area calls for a safe system approach to countermeasures and a traffic safety culture intolerant of impaired driving. Associated with the above strategies is an action plan designed to reach the goals named for the Impaired Driving EA. The action plan includes steps aimed to improve data collection, enhance enforcement programs, improve roadway environments to prevent impaired driving related crashes, support impaired driving prevention policy, educate the public on the risks of impaired driving, and utilize new technology in an effort to reduce the number of associated fatalities and serious injuries.

3.3 Infrastructure

Roadways and intersections are designed and built based upon certain assumptions and standards including but not limited to traffic volume, design speed, roadway users and built environment.

TRAFFIC VOLUME
The number of vehicles crossing a section of road in a given time period.

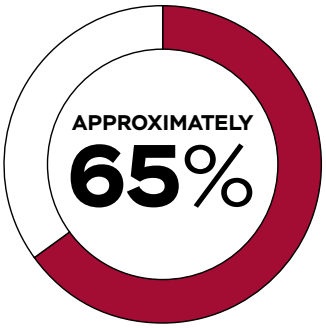
DESIGN SPEED
The geographic and geometric features of a road that influence or are influenced by the speed at which vehicles travel.

ROADWAY USERS
All road users that travel on a given road including vehicle occupants, motorcycles, bicycles, pedestrians, etc.

BUILT ENVIRONMENT
The physical components of a road.

Over time, as neighborhoods and cars change, road use also changes. These changes lead to some roadway designs underperforming in terms of safety and mobility. Engineers and planners continually evaluate traffic system data and look for ways to address safety and mobility needs in a timely and cost efficient manner. An average of 308 fatalities and 1,826 serious injuries occurred in crashes involving infrastructure-related matters each year between 2015 and 2019. The key areas for infrastructure improvement are intersection and intersection-related crashes, run-off-the-road crashes, and work zone crashes.

- Intersection crashes are those that occur in an intersection or are intersection-related. An average of 141 fatalities and 1,130 serious injuries occurred in intersection-related crashes each year from 2015 to 2019.
- Maryland defines run-off-the-road crashes as one where a vehicle strikes a fixed object and leaves the road, or where the location of the crash was reported as off-road or in the median. An average of 166 fatalities and 699 serious injuries occurred in run-off the-road crashes each year from 2015 to 2019
- Work-zone crashes are those crashes occurring in construction, maintenance, and utility work zones. From 2015 to 2019, Maryland has an average of nine fatalities and 46 serious injuries in work-zone related crashes annually



Infrastructure fatalities that occur on the State-owned road system

Approximately 65% of these fatalities occur on the State-owned road system, but this safety problem is spread across both the State and local roadway networks. As a result, approaches to preventing these crashes must include empowering local jurisdictions as well.

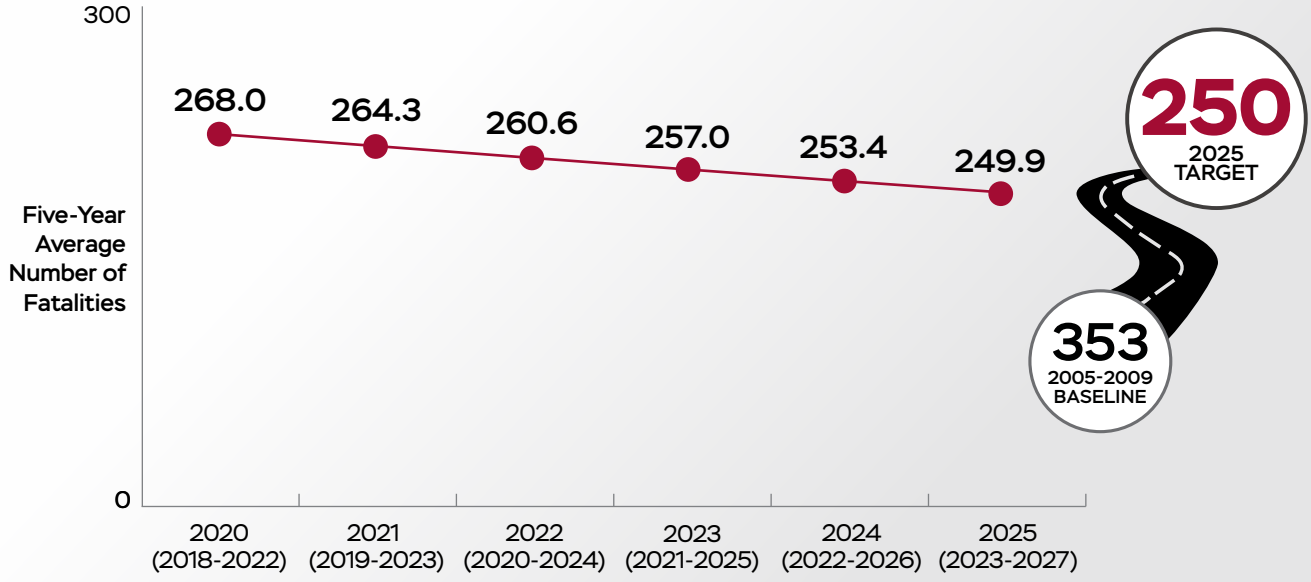
3.3.1 Performance Targets

The Infrastructure EA team, in cooperation with the SHSP Executive Council, will be responsible for meeting or exceeding the following performance targets:

FATALITY TARGET: Reduce the number of infrastructure-related fatalities on all roads in Maryland from the five-year average (2005-2009) of 353 to 250 or fewer by December 31, 2025.

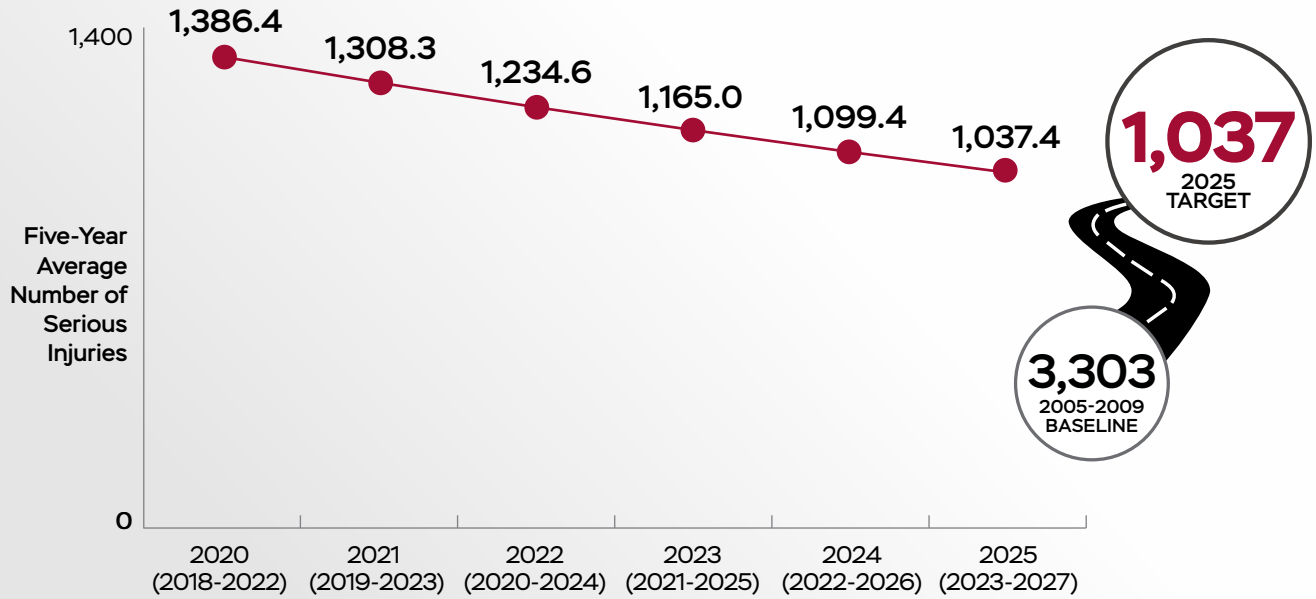
SERIOUS INJURY TARGET: Reduce the number of infrastructure-related serious injuries on all roads in Maryland from the five-year average (2005-2009) of 3,303 to 1,037 or fewer by December 31, 2025.

Highway Infrastructure Fatalities and Interim Targets



Note: The annual target represents the mid-year of the five-year average. For example, the 2020 target is the five-year annual average from 2018–2022.

Highway Infrastructure Serious Injuries and Interim Targets



Note: The annual target represents the mid-year of the five-year average. For example, the 2020 target is the five-year annual average from 2018–2022.

3.3.2 Infrastructure Strategies to Meet MD SHSP's Targets

In accordance with the overall SHSP, the Infrastructure EA team will implement the following strategies to drive down death and serious injuries on Maryland's roadways. These strategies include the highway safety elements of engineering, education, enforcement, and emergency medical services and address both behavioral and infrastructure issues, as well as incorporating the State's plan for safe, accessible and effective multi-modal transportation systems [14].

As addressed in the Infrastructure EA Action Plan, the Infrastructure strategies will include, but are not limited to, the identification, development and implementation of system-wide improvements to: reduce fatalities and serious injuries at high-risk locations, corridors and with roadway elements (lighting, signage, etc.); reduce the number and severity of infrastructure-related crashes (e.g., intersection-related, run-off-the-road, work-zone related, etc.); and address the safety of vulnerable user groups (e.g., bicyclists, pedestrians, motorcyclists, older and younger drivers, etc.).

To promote cross collaboration between Emphasis Areas with mutual reinforcement, the Infrastructure EA developed strategies designed to address the infrastructure needs of the five other EAs. This new framework assures that significant infrastructure needs are prioritized across the SHSP and reduces redundancy with other MD State agencies' efforts. The overarching Infrastrucutre EA strategy is to improve roadway environments through the support of system-wide countermeasures, engineering treatments, and land-use planning to:

- Reduce distracted driving
- Reduce impaired driving crashes
- Protect occupants by reducing the severity of crashes
- Protect pedestrians and bicyclists
- Reduce speed and aggressive driving behaviors

Associated with these strategies is an action plan designed to reach the goals of the Infrastructure EA. This pertains to the collection of crash data and analysis as part of the State's Highway Safety Improvement Program planning. Additionally, the State will screen Candidate Safety Improvement Locations for spot safety improvements or identification of systemic safety projects. To address the EAs, the screening of collected data will focus on crash types that include intersection, run-off-the road, work zone, and pedestrian- and bicycle-involved. To mitigate for these crash types, Maryland will employ countermeasures such as signing and lighting, geometric improvements, traffic signals, guardrails, line striping and raised pavement markers, sidewalks, and others identified in the annual action plans. This effort addresses the goal to reduce fatal and serious injury crashes at high-risk locations or corridors in Maryland.

3.4 Occupant Protection

Research has clearly defined the benefits of restraint use during a collision. While automotive safety technologies continue to evolve, the restraint system remains a major factor in mitigating injury or preventing death in a collision. If all front seat occupants of a vehicle buckled up, Marylanders would reduce the risk of fatal injury by 45% and moderate-to-serious injury by 50% if in a passenger car; 60% and 65% if in a light truck [15].

In the last five years, the State of Maryland seat belt usage rate varied between 92.9% (2015) and 90.4% (2019). This leaves 10% of our road users vulnerable to increased injury or death at any given time. On a given day in Maryland, 10% of front seat occupants are not fully restrained, which poses a high risk for death or serious injury. In fact, 35% of all traffic fatalities in Maryland include unrestrained vehicle occupants.

The Occupant Protection EA team collaborates with State transportation agencies, safety partners, stakeholders, and law enforcement to increase occupant protection and reduce related fatalities and serious injuries.

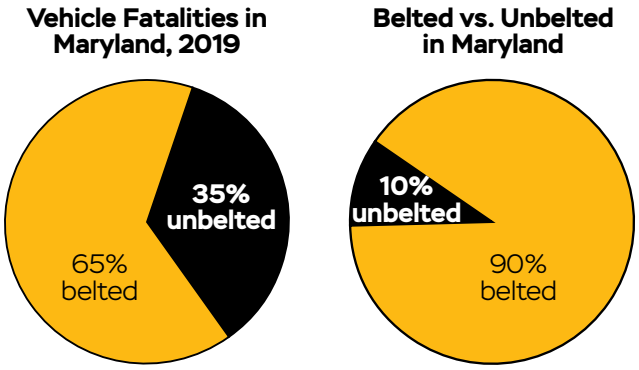


Figure 6. More than 1/3 of occupants who die in MD crashes are from the small 10% of Marylanders who weren't belted.

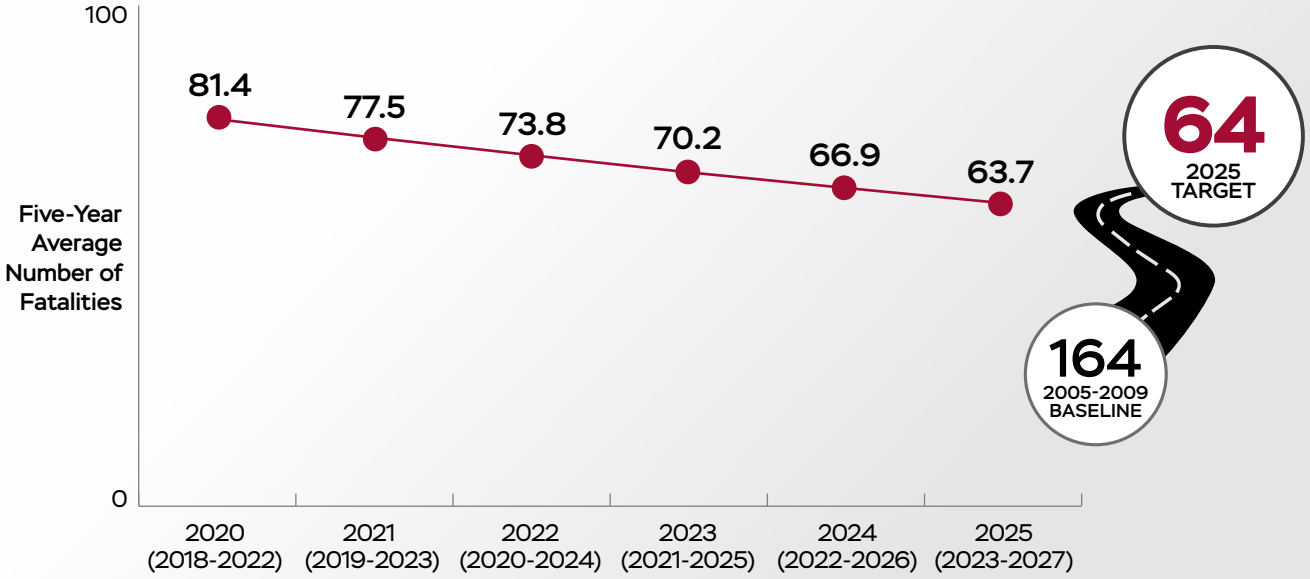
3.4.1 Occupant Protection Performance Targets

The Occupant Protection EA team, in collaboration with the SHSP Executive Council, aims to meet or exceed the following performance targets:

FATALITY TARGET: Reduce the number of unrestrained fatalities on all roadways in Maryland from the five-year average (2005-2009) of 164 to 64 or fewer by December 31, 2025.

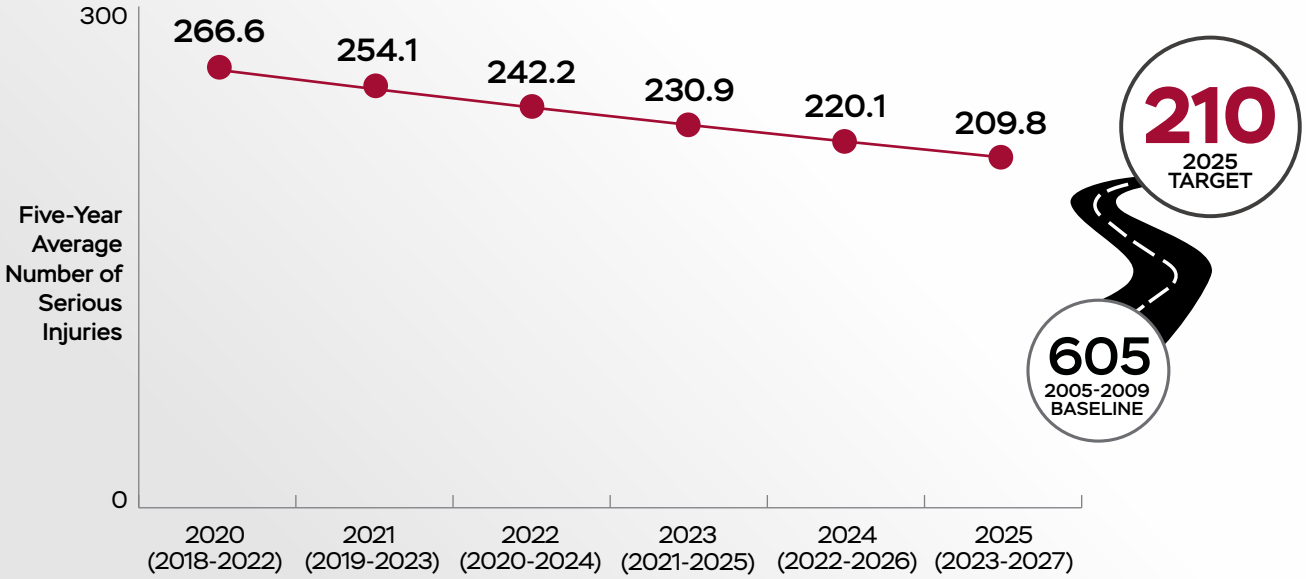
SERIOUS INJURY TARGET: Reduce the number of unrestrained serious injuries on all roadways in Maryland from the five-year average (2005-2009) of 605 to 210 or fewer by December 31, 2025.

Unrestrained Fatalities and Interim Targets



**Note: The annual target represents the mid-year of the five-year average. For example, the 2020 target is the five-year annual average from 2018–2022.*

Unrestrained Serious Injuries and Interim Targets



**Note: The annual target represents the mid-year of the five-year average. For example, the 2020 target is the five-year annual average from 2018–2022.*

3.4.2 Strategies to Meet MD SHSP's Occupant Protection Targets

In accordance with the overall SHSP, the Occupant Protection EA team will implement the following strategies to drive down death and serious injuries on Maryland's roadways. These strategies include the highway safety elements of engineering, education, enforcement, and emergency medical services and address both behavioral and infrastructure issues, as well as incorporating the State's plan for safe, accessible and effective multi-modal transportation systems [16]. Maryland's strategies to meet the goals in the Occupant Protection EA include the use of:

DATA: Use the collection, analysis, and evaluation of data on all roads in Maryland to identify occupant protection safety issues, key audiences and locations of concern, as well as support the improvement of the data quality (accessibility, accuracy, completeness, integration, timeliness, uniformity).

ENFORCEMENT: Support the improved enforcement of occupant protection laws, as well as support enforcement initiatives that promote safe roadway behaviors.

INFRASTRUCTURE: Improve roadway environments related to occupant protection through the support of system-wide countermeasures, engineering treatments, and land-use planning.

LEGISLATION: Support legislation and adjudication efforts to advance occupant protection for all ages.

OUTREACH: Promote a systemic safety culture through the support of outreach initiatives including public awareness, education, training, and media campaigns focused on adult and child occupant protection.

VEHICLE ENGINEERING AND TECHNOLOGY: Identify, promote, and support the implementation of effective engineering and technological approaches to advance occupant protection.

Maryland understands that increasing occupant protection use will decrease the severity of injuries and save lives. The Occupant Protection Emphasis Area calls for a safe system approach to countermeasures and a traffic safety culture that shares attitudes and beliefs in the significance of occupant protection. Associated with the above strategies is an action plan designed to reach the goals named for the Occupant Protection EA. The action plan includes steps aimed to improve data collection, enhance enforcement programs, improve roadway environments to prevent crashes and reduce occupant injury, support occupant protection policy, educate the public on the risks of restraint non-use, and utilize new technology in an effort to reduce the number of associated fatalities and serious injuries.

3.5 Pedestrians and Bicyclists

Pedestrians and bicyclists are our most vulnerable road users, unprotected against thousands of pounds of metal when involved in traffic crashes. The number of pedestrians and bicyclists on Maryland roadways is increasing at a greater rate than vehicular traffic. With the expansion of transit systems in the State, pedestrian traffic can be expected to continue to grow in the future, putting more and more vulnerable road users in conflict with vehicles. In Maryland, pedestrian and bicyclist fatalities have increased. Non-motorist traffic fatalities once comprised one in five of all traffic fatalities; they now comprise one in four.

Pedestrian crashes are defined as crashes involving a person reported as a non-motorist pedestrian type, typically someone not in a mechanized or motorized conveyance device. From 2015 through 2019, an annual average 115 pedestrians were killed and 439 were seriously injured in Maryland traffic crashes, an 11% and 23% increase, respectively, compared to the previous five-year period. Bicycle fatalities, though rare, have increased 38% from an annual average 8 (2005-2009) to 11 (2015-2019). An additional 69 were seriously injured annually from 2015 through 2019.

The Pedestrians and Bicyclists EA team collaborates with State transportation agencies, safety partners, stakeholders, and law enforcement to reduce the number of pedestrian- and bicyclist-related fatalities and serious injuries.

3.5.1 Performance Targets

The Pedestrians and Bicyclists EA team, in cooperation with the SHSP Executive Council, will be responsible for meeting or exceeding the following performance targets:

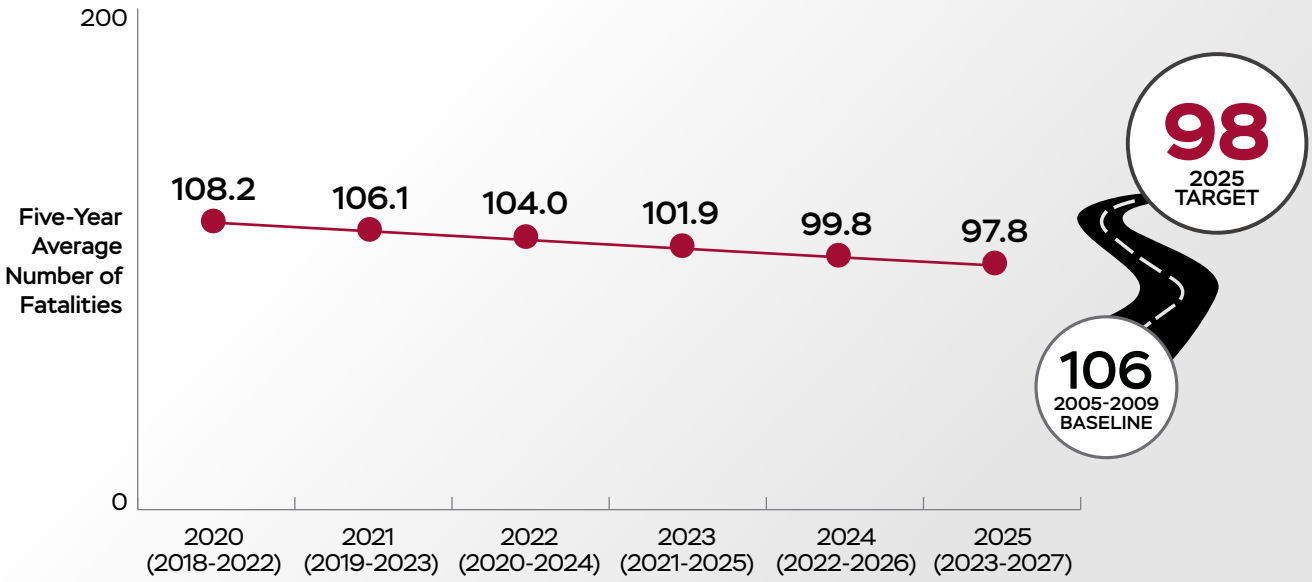
PEDESTRIAN FATALITY TARGET: Reduce the number of pedestrian fatalities on all roads in Maryland from the five-year average (2005-2009) of 106 to 98 or fewer by December 31, 2025.

PEDESTRIAN SERIOUS INJURY TARGET: Reduce the number of pedestrian serious injuries on all roads in Maryland from the five-year average (2005-2009) of 471 to 364 or fewer by December 31, 2025.

BICYCLIST FATALITY TARGET: Reduce the number of bicycle fatalities on all roads in Maryland from the most recent five-year average (2015-2019) of 11 to nine or fewer by December 31, 2025.

BICYCLIST SERIOUS INJURY TARGET: Reduce the number of bicycle serious injuries on all roads in Maryland from the five-year average (2005-2009) of 76 to 57 or fewer by December 31, 2025.

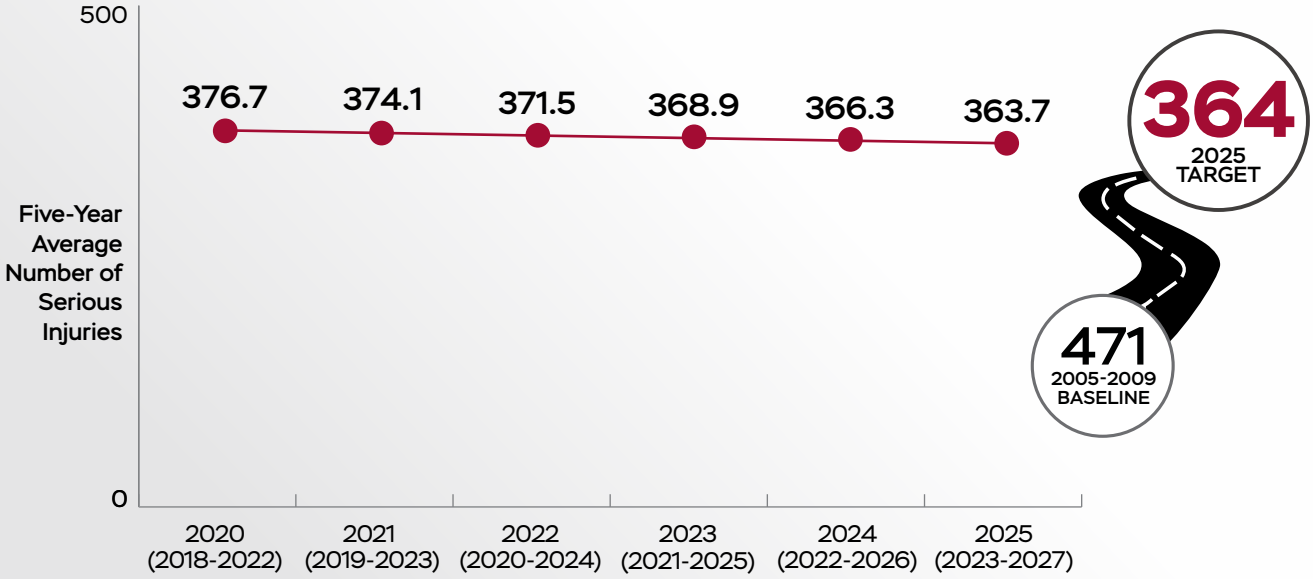
Pedestrian Fatalities and Interim Targets



Annual Target*

**Note: The annual target represents the mid-year of the five-year average. For example, the 2020 target is the five-year annual average from 2018–2022.*

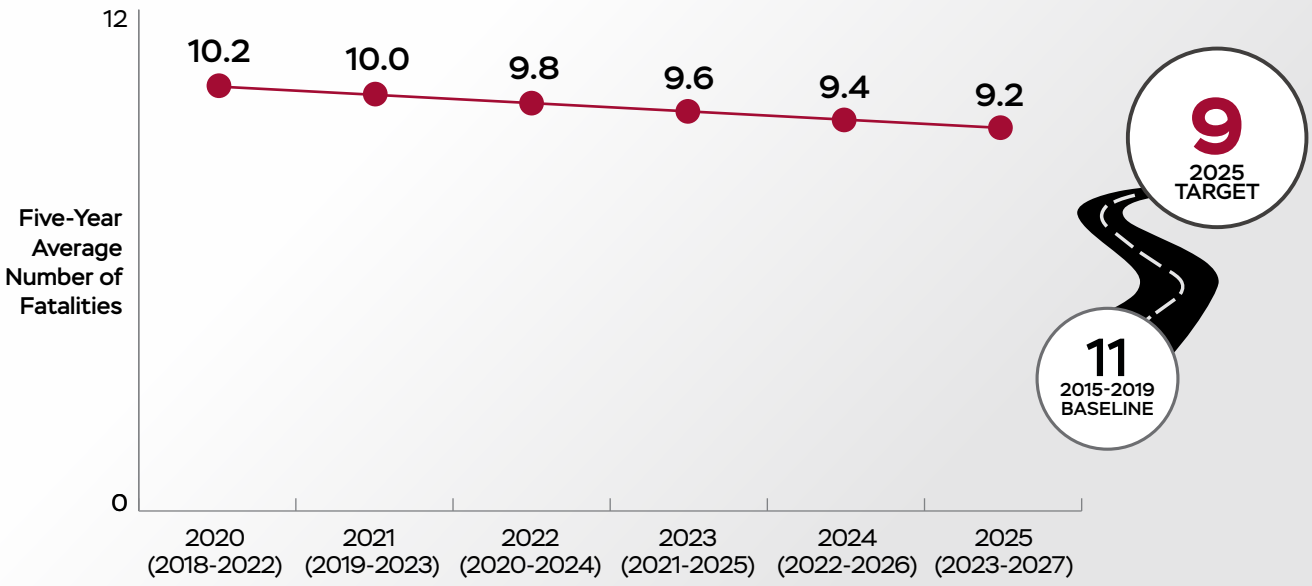
Pedestrian Serious Injuries and Interim Targets



Annual Target*

**Note: The annual target represents the mid-year of the five-year average. For example, the 2020 target is the five-year annual average from 2018–2022.*

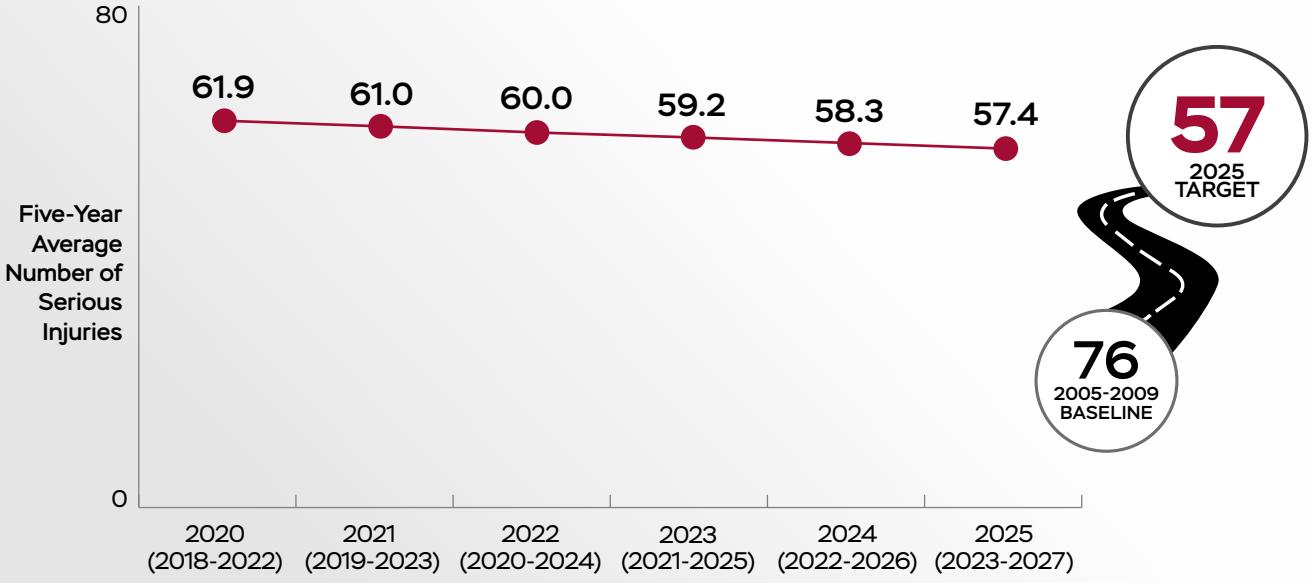
Bicycle Fatalities and Interim Targets



Annual Target*

**Note: The annual target represents the mid-year of the five-year average. For example, the 2020 target is the five-year annual average from 2018–2022.*

Bicycle Serious Injuries and Interim Targets



Annual Target*

**Note: The annual target represents the mid-year of the five-year average. For example, the 2020 target is the five-year annual average from 2018–2022.*

3.5.2 Strategies to Meet MD SHSP's Pedestrians and Bicyclists EA Targets

In accordance with the overall SHSP, the Pedestrians and Bicyclists EA team will implement the following strategies to drive down death and serious injuries on Maryland's roadways. These strategies include the highway safety elements of engineering, education, enforcement, and emergency medical services and findings from pedestrian road safety audits, and address both behavioral and infrastructure issues, as well as incorporating the State's plan for safe, accessible and effective multi-modal transportation systems [17]. Maryland's strategies to meet the goals in the Pedestrians and Bicyclists EA include the use of:

DATA: Use the collection, analysis, and evaluation of data on all roads in Maryland to identify pedestrian and bicycle safety issues, key audiences and locations of concern, as well as support the improvement of the data quality (accessibility, accuracy, completeness, integration, timeliness, uniformity).

ENFORCEMENT: Support the improved enforcement of pedestrian- and bicycle-related laws, as well as support enforcement initiatives that promote safe behaviors.

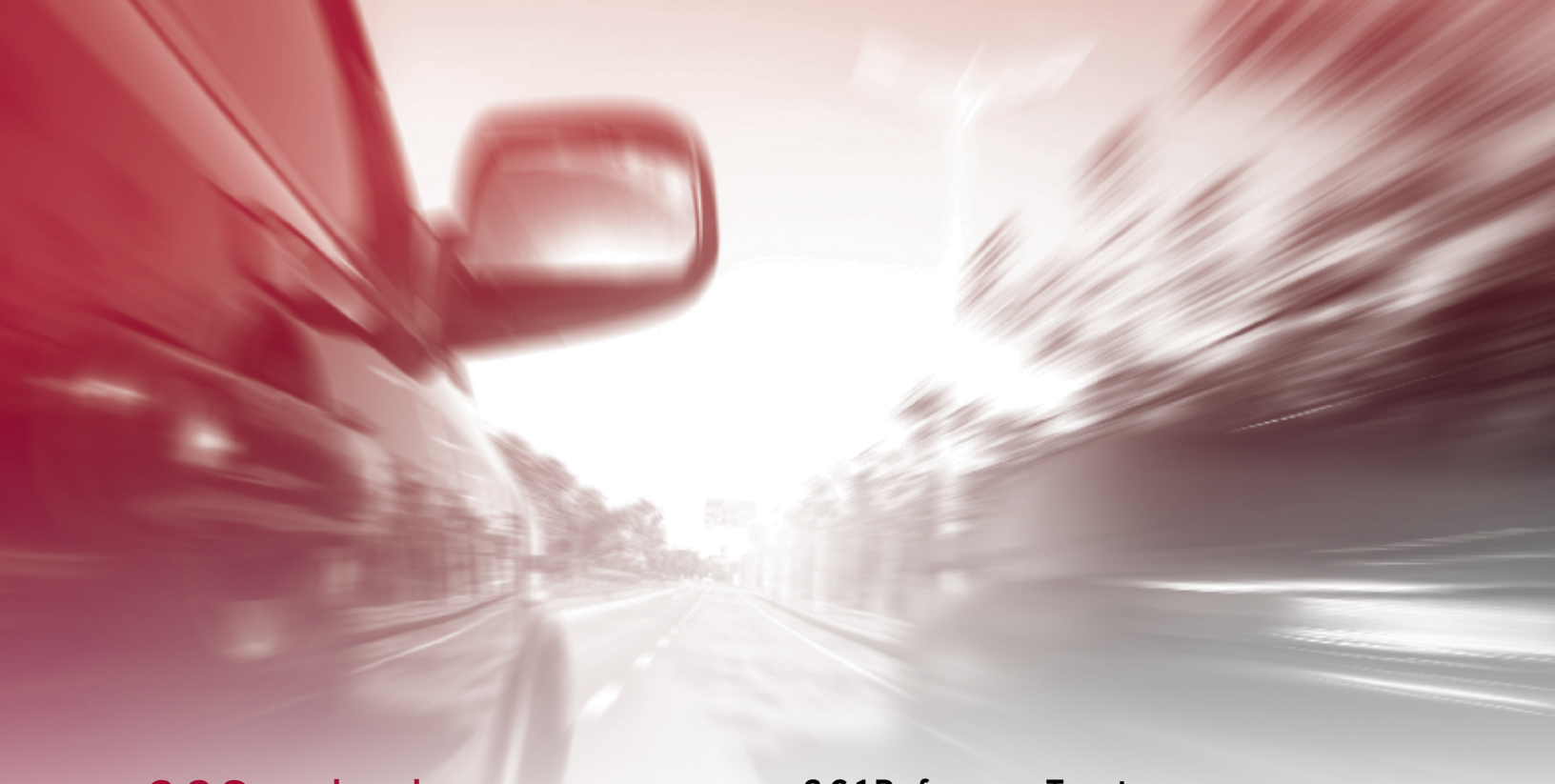
INFRASTRUCTURE: Improve roadway environments related to pedestrians and bicyclists by influencing the implementation of system-wide countermeasures, engineering treatments, and land-use planning.

LEGISLATION: Support policy, legislation, and adjudication efforts to advance pedestrian and bicycle safety.

OUTREACH: Promote a systemic safety culture through the support of outreach initiatives including public awareness, education, training, and media campaigns focused on pedestrian and bicycle safety.

VEHICLE ENGINEERING & TECHNOLOGY: Identify, promote, and support the implementation of effective engineering and technological approaches to support the prevention of collisions involving pedestrians and bicyclists.

Maryland understands that better protecting pedestrians and bicyclists will prevent crashes and save lives. The Pedestrians and Bicyclists Emphasis Area calls for a safe system approach to countermeasures and a traffic safety culture that is forward thinking. Associated with the above strategies is an action plan designed to reach the goals named for the Pedestrians and Bicyclists EA. The action plan includes steps aimed to improve data collection, enhance enforcement programs, improve roadway environments, support pedestrian and bicyclist protection policy, educate the public on pedestrian and bicyclist safety, and utilize new technology in an effort to reduce the number of associated fatalities and serious injuries.



3.6 Speed and Aggressive Driving

In Maryland between 2015 and 2019, crashes that involved a speeding driver accounted for an average 81 fatalities and 347 serious injuries each year, 15% of all motor vehicle fatalities in the State. Speeding violations (not including automated enforcement), make up 12% of the 1.7 million moving violations issued every year in Maryland. Aggressive driving violations, defined as "a combination of moving traffic offenses so as to endanger other persons or property" [18], often include speeding combined with other infractions like following too closely or overtaking and passing vehicles.

Speed and aggressive driving not only increase the number of crashes on our roads but also increase the severity of crash outcomes. Research shows that as driving speed increases on a particular road, so does the number of crashes on that road, as well as the likelihood that the crash will result in a severe injury or fatality [19].

The Speed and Aggressive Driving EA team collaborates with State transportation agencies, safety partners, stakeholders, and law enforcement to reduce the number of speed-related fatalities and serious injuries, and reduce the number of aggressive driving fatalities and serious injuries.

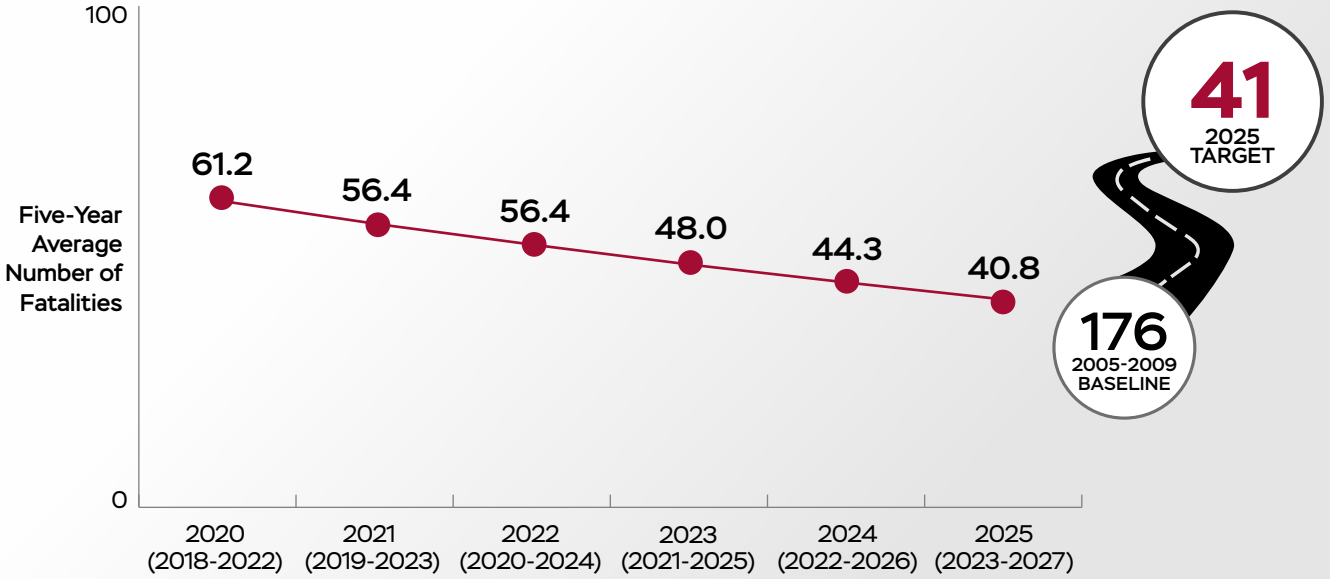
3.6.1 Performance Targets

The Speed and Aggressive Driving EA team, in collaboration with the SHSP Executive Committee, aims to meet or exceed the following performance targets:

FATALITY TARGET: Reduce the number of speed related fatalities on all roads in Maryland from the five-year average (2005-2009) of 176 to 41 or fewer by December 31, 2025.

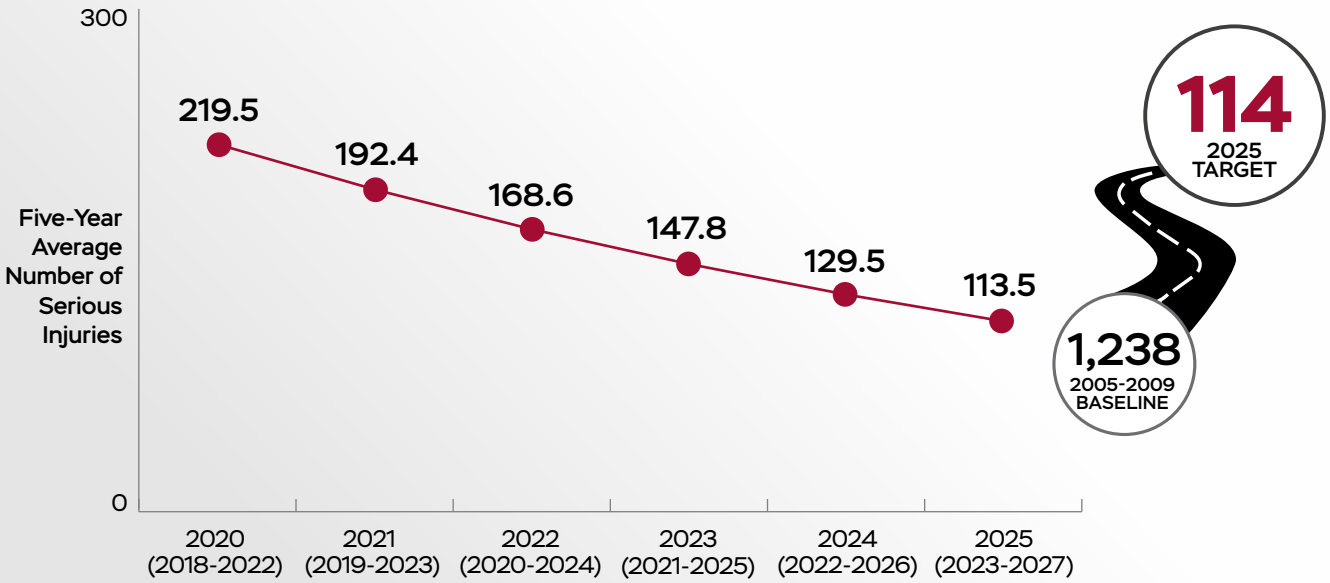
SERIOUS INJURY TARGET: Reduce the number of speed related serious injuries on all roads in Maryland from the five-year average (2005-2009) of 1,238 to 114 or fewer by December 31, 2025.

Speed Related Fatalities and Interim Targets



*Note: The annual target represents the mid-year of the five-year average.
For example, the 2020 target is the five-year annual average from 2018–2022.

Speed Related Serious Injuries and Interim Targets



*Note: The annual target represents the mid-year of the five-year average.
For example, the 2020 target is the five-year annual average from 2018–2022.

3.6.2 Strategies to Meet MD SHSP's Speed and Aggressive Driving Reduction Targets

In accordance with the overall SHSP, the Speed and Aggressive Driving EA team will implement the following strategies to drive down death and serious injuries on Maryland's roadways. These strategies include the highway safety elements of engineering, education, enforcement, and emergency medical services and address both behavioral and infrastructure issues, as well as incorporating the State's plan for safe, accessible, and effective multi-modal transportation systems [20]. Maryland's strategies to meet the goals in reducing speed and aggressive driving include the use of:

DATA: Use the collection, analysis, and evaluation of data on all roads in Maryland to identify speed and aggressive driving related issues, key audiences and locations of concern, as well as support the improvement of the data quality (accessibility, accuracy, completeness, integration, timeliness, uniformity).

ENFORCEMENT: Support the improved enforcement of speed and aggressive driving laws, as well as support enforcement initiatives that promote safe behaviors.

INFRASTRUCTURE: Improve roadway environments to reduce speed and aggressive driving behaviors by supporting the implementation of system-wide countermeasures, engineering treatments, and land-use planning.

LEGISLATION: Support legislation and adjudication efforts to reduce speed and aggressive driving violations.

OUTREACH: Promote a systemic safety culture through the support/solicitation of outreach initiatives including public awareness, education, training, and media campaigns focused on reducing speed and aggressive driving behaviors.

VEHICLE ENGINEERING AND TECHNOLOGY: Identify, promote and support the implementation of effective engineering and technological approaches to support speed and aggressive driving countermeasures.

Maryland understands that eliminating speeding and aggressive driving will prevent crashes, decrease crash severity and save lives. The Speed and Aggressive Driving Emphasis Area calls for a safe system approach to countermeasures and a traffic safety culture that is intolerant of speeding and aggressive driving. Associated with the above strategies is an action plan designed to reach the goals named for the Speed and Aggressive Driving EA. The action plan includes steps aimed to improve data collection, enhance enforcement programs, improve roadway environments, support speed and aggressive driving prevention policy, educate the public on the risks of speeding and aggressive driving, and utilize new technology in an effort to reduce the number of associated fatalities and serious injuries.

FHWA Standardized Performance and Survey Measures

The Maryland SHSP incorporates the five required Safety Performance Measures from the Federal Highway Administration. All federally required performance measures below are set using a five-year average and the exponential trend method described in the Background section. The FHWA Safety Performance Management Final Rules, published on March 15, 2016, established the following performance measures as the five-year rolling averages:

1. Number of Fatalities
2. Rate of Fatalities per 100 Million Vehicle Miles Traveled (VMT)
3. Number of Serious Injuries
4. Rate of Serious Injuries per 100 Million VMT
5. Number of Non-motorized Fatalities and Non-motorized Serious Injuries

The targets for serious injuries and serious injury rate were set in accordance with the Zero Deaths Maryland approach used for the fatalities and fatality rates. This methodology uses the number of serious injuries observed in 2005-2009 and an exponential trend line to set the 2025 goal.

The Maryland SHSP establishes the following reduction targets through December 31, 2025, for all Maryland roads.

Five-year Average (2005-2009) and 2025 Performance Targets

Five-year Average (2005-2009) | 2025 Performance Targets

FATALITIES
597 ▶ 397

FATALITY RATE
1.080 ▶ 0.647

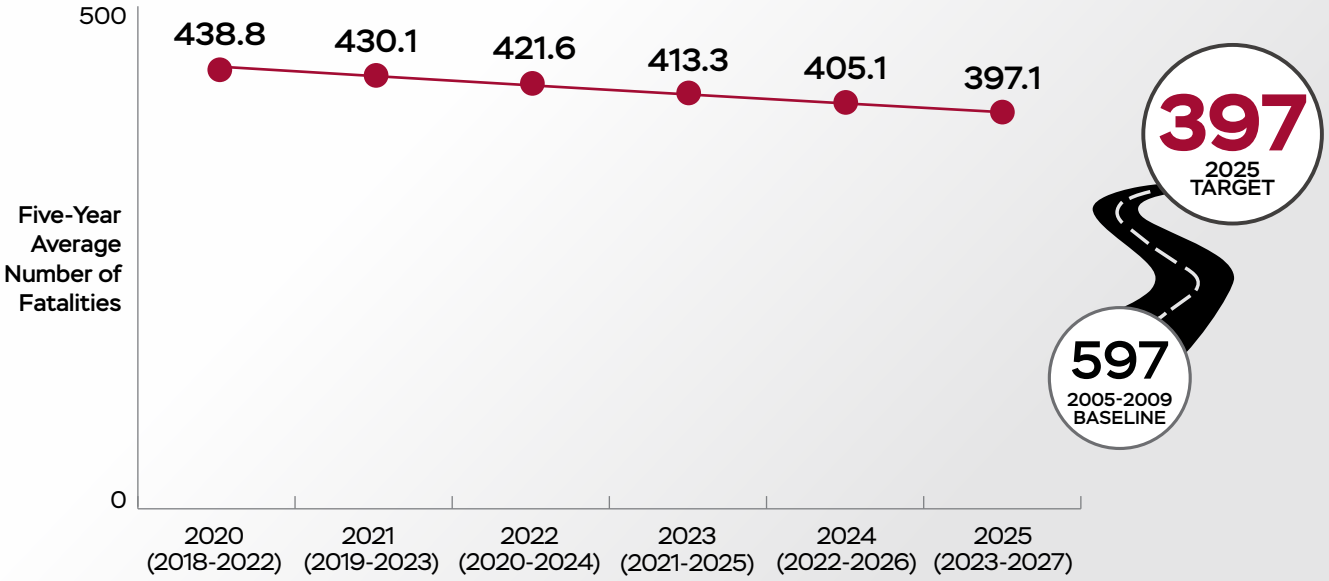
SERIOUS INJURIES
5,571 ▶ 1,668

SERIOUS INJURY RATE
9.876 ▶ 2.741

NON-MOTORIZED FATALITIES AND SERIOUS INJURIES
651 ▶ 489

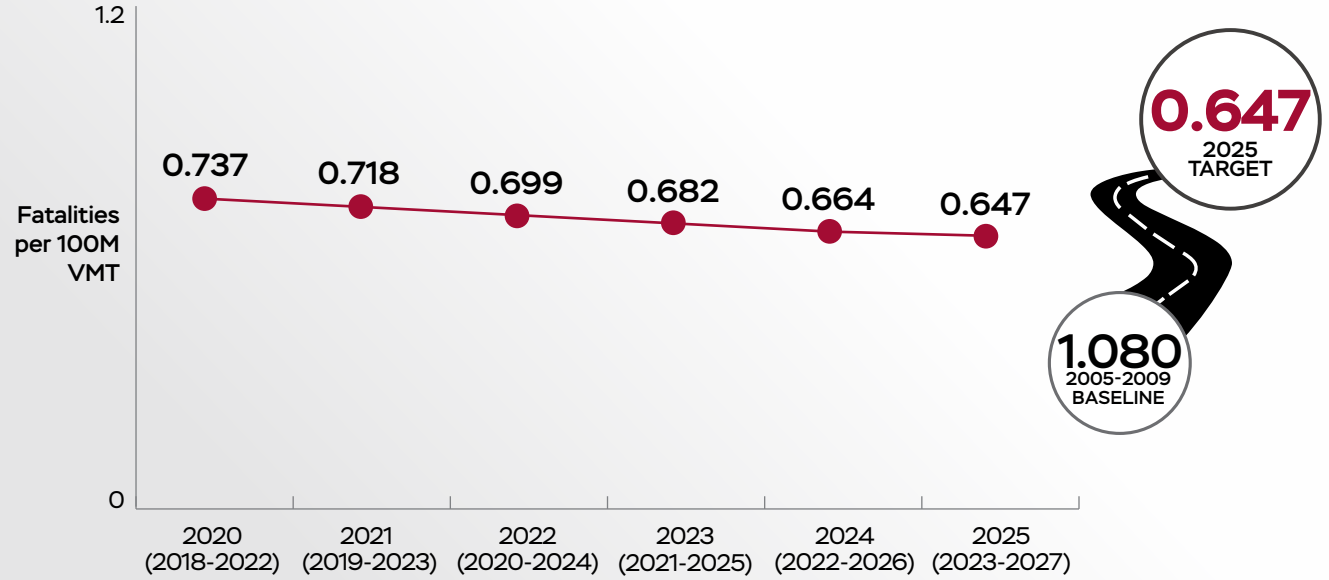
Figure 7. Five-year Average and 2025 Performance Targets

Total Fatalities in Maryland and Interim Targets



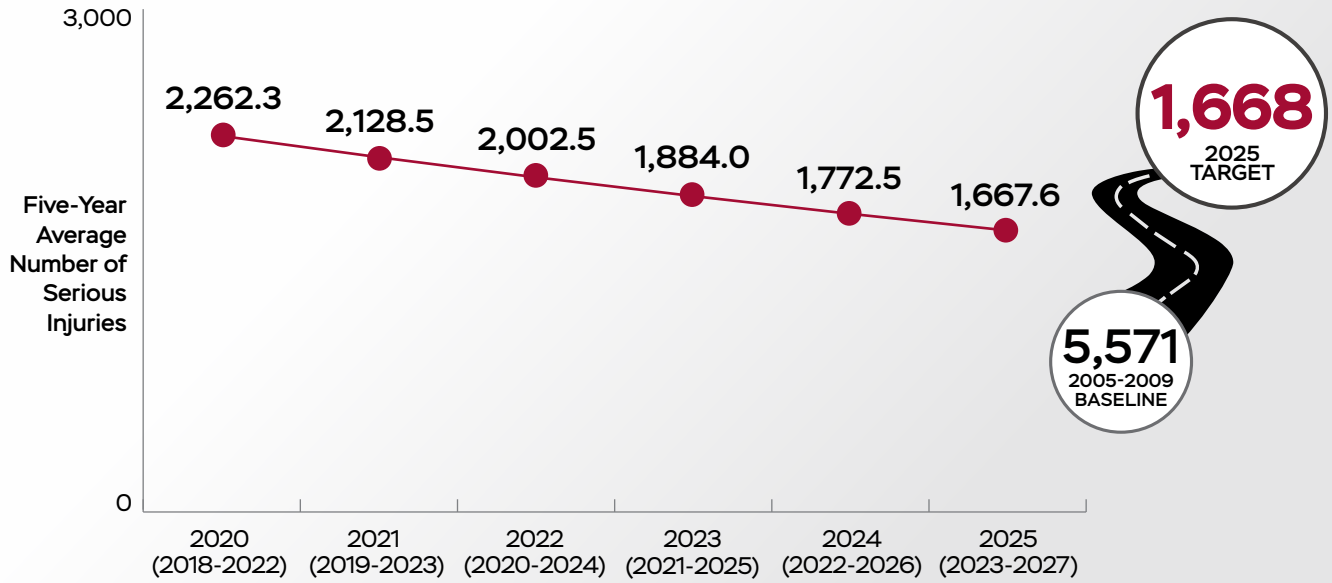
*Note: The annual target represents the mid-year of the five-year average.
For example, the 2020 target is the five-year annual average from 2018–2022.*

Fatality Rate per 100 Million Vehicle Miles Traveled (VMT) in Maryland and Interim Targets



*Note: The annual target represents the mid-year of the five-year average.
For example, the 2020 target is the five-year annual average from 2018–2022.*

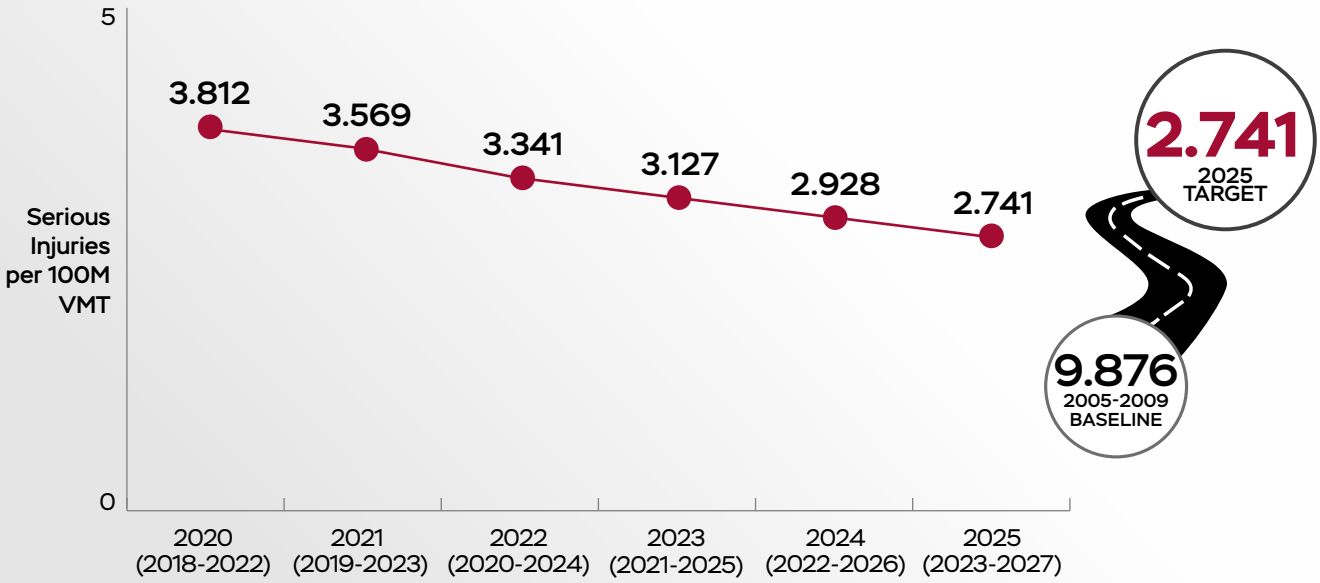
Total Serious Injuries in Maryland and Interim Targets



Annual Target*

**Note: The annual target represents the mid-year of the five-year average. For example, the 2020 target is the five-year annual average from 2018–2022.*

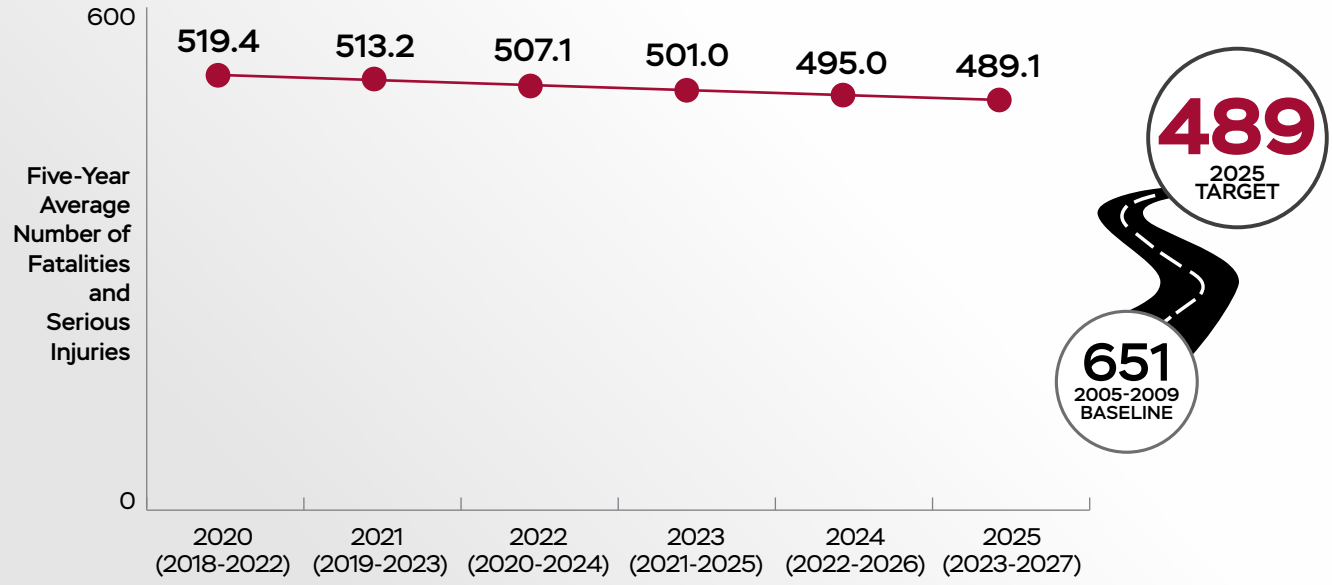
Serious Injuries Rate per 100 Million Vehicle Miles Traveled (VMT) in Maryland and Interim Targets



Annual Target*

**Note: The annual target represents the mid-year of the five-year average. For example, the 2020 target is the five-year annual average from 2018–2022.*

Total Non-Motorized Fatalities and Serious Injuries in Maryland and Interim Targets



Annual Target*

**Note: The annual target represents the mid-year of the five-year average. For example, the 2020 target is the five-year annual average from 2018–2022.*

Special Vehicles and Roadway Environments

In addition to Maryland's six Emphasis Areas, advanced driver assistance systems and autonomous vehicles, commercial motor vehicles, and work zones and traffic incident management are of particular interest to the SHSP Executive Council and Maryland safety partners due to their unique safety needs. Other special vehicles and roadway environments of concern include motorcycles, highway-rail grade crossings, school buses and bus stops, rural communities and farm equipment, and transit buses and bus stops. These concerns are not isolated to one particular EA, but rather are a shared concern amongst EAs.

Advanced Driver Assistance Systems and Automated Vehicles

The SHSP's approach to traffic safety takes into consideration the continued development and enhancement of advanced driver assistance technologies and the introduction of Connected and Automated Vehicles (CAV) on Maryland roads. The State has been advancing CAV initiatives through its Maryland CAV Working Group [21], which includes support from various MDOT Transportation Business Units, Maryland State Police, and over 300 stakeholders ranging from academia, local and other state agencies, and private companies. CAV technologies have the potential to save lives and reduce the severity of injuries, with the possibility of nearly eliminating crashes altogether. The U.S. Department of Transportation's National Highway Traffic Safety Administration has been clear on its belief that "[CAV] have the potential to remove human error from the crash equation, which will help protect drivers and passengers, as well as bicyclists and pedestrians" [22].

The Maryland CAV Strategic Framework, released in December 2020, also demonstrates the ability of all agencies across the State to help advance this life-changing technology. The SHSP Emphasis Areas consider countermeasure technologies such as enhanced sign and pavement marking visibility for human and machine vehicle operators, real-time traffic data sharing, training and enforcement development in an AV environment, in-vehicle technology to enhance the safety of the occupants, opportunities to reduce speed with the use of technology, and identifying the impacts to safety-dependent transportation planning and infrastructure. Maryland will also partner with private industries to ensure that CAV solutions are optimized across public and private facilities or technology.

Commercial Motor Vehicles

The number of commercial motor vehicles (CMVs) is increasing on roadways across Maryland. Between 2015 and 2019, CMVs were involved in 4.7% of all traffic crashes in Maryland, and 11.5% of fatal crashes involved a CMV. On a national level, the following statistics illustrate why CMV traffic safety is a concern across multiple EAs [23]:

- At least 39% of large truck occupants killed in crashes were not wearing a seatbelt
- Speed was a factor in 17% of truck crashes with at least one large truck occupant fatality
- 61% of fatal crashes involving a large truck occurred in rural areas

- 27% of fatal crashes in work zones involved a large truck
- 6% involved distraction of the large truck driver, of which 16% was related to cell phone use

Maryland's Emphasis Areas include strategies to address the risk factors of CMVs in order to reduce fatal and serious injuries on our roadways. By partnering with the Federal Motor Carrier Safety Administration (FMCSA), the SHSP safety partners will continually collaborate to advance efforts to:

- improve CMV safety from a driver and vehicle perspective through Federal and State programs
- educate road users, enforcement officers and motor carriers on CMV regulations and visibility issues
- support the use of appropriate CMV infrastructure modifications to reduce fatal and serious injuries involving CMVs

Work Zones and Traffic Incident Management

Work zones and traffic emergencies present challenging driving conditions like lane shifts, split travel lanes, reduced lane widths, concrete barriers, and uneven pavement. These events pose potential hazards requiring drivers to be prepared, continually focused, reduce speed, and obey emergency responders, road crews and work zone signs [24]. These zones are not only dangerous for the emergency responders and road crews, but also the occupants traveling through these zones. Nationally, in four out of five work zone-related crashes, the motor vehicle occupant is injured or killed [25]. In Maryland in 2018, 11 people – including two highway workers – lost their lives in work zone crashes [26]. From 2015 to 2019 an average of nine fatalities and over 1,500 injuries occurred each year in Maryland work zones. To address emergency responder fatalities, Maryland's "Move Over" law requires motorists to change lanes to give safe clearance to emergency responders and law enforcement officers. Further, the MD SHSP Emphasis Areas focus on reducing risk factors in work and emergency zones including preventing distracted driving, high speeds and aggressive driving, impairment, and unrestrained occupants.

Motorcycles

Between 2015 and 2019, an average of 71 motorcyclists (riders and passengers) were fatally injured and 287 were seriously injured each year. From 2015 through 2019 in Maryland, motorcycles were involved in an average of just under 1% of all traffic-related crashes, 3% of crashes resulting in injury, and 14% of fatal crashes. Motorcycles are significantly over-represented in fatal crashes and are therefore the focus of the Distracted Driving, Impaired Driving, Occupant Protection, Infrastructure, and Speed and Aggressive Driving Emphasis Areas.

Strategies to drive down motorcycle-related fatalities and injuries include public outreach, motorist education and awareness campaigns, and enhanced motorcycle safety training. These objectives also align with the MVA's Motorcycle Safety Action Plan.

Highway-Rail Grade Crossings

According to the U.S. Department of Transportation and the Federal Railroad Administration (FRA), the number of crashes at Highway-Rail Grade Crossings (HRGC) has consistently increased over the past 10 years. Nationally, in 2018, 2,205 crashes at HRGCs were reported to FRA showing a 4% increase relative to 2017 and 14% increase relative to 2009. Maryland has made a continuous effort to improve safety for the traveling public at highway-rail crossings, including flashing light signals, gates, and outdated component replacement. Strategies for preventing these crashes also address driver inattentiveness and speed as contributing factors.

Rural Communities and Farm Equipment Concerns

Roadway use changes when horse-drawn vehicles or farm equipment are present with other vehicles. In alignment with the Maryland State Highway Administration, the Maryland SHSP highlights the importance of safety for rural communities and farm equipment on the roadway. Studies show that three significant contributing factors are at play when a rural crash turns deadly: speed, alcohol, and unrestrained occupants [27, 28].

Rural crash prevention measures include well-lit and marked horse-drawn vehicles and farm equipment, fixed and mobile rural road signs warning of slow-moving vehicles, roadway maintenance, tree trimming to improve visibility, and outreach to increase recognition of these safety concerns. These measures can help bring awareness to the unique needs of rural communities and farm equipment operation on Maryland's roads [29]. Maryland's Emphasis Areas share the effort to prevent these fatal and serious injury crashes.

School Buses and Bus Stops

School bus crashes are relatively rare compared to other vehicle crashes. Between 2015 and 2019 in Maryland, 8,165 crashes involved a school bus. These crashes resulted in 14 fatalities (about 2.8 per year), including one school bus driver. No school bus passengers were killed during this period. Nationally, of the 264 school-age children killed in a school transportation-related crash between 2008 and 2017, 61 were occupants of the school transportation vehicle, 97 were pedestrians, five were pedal cyclists [30]. It is more likely for a student to be fatally injured as a pedestrian while waiting for or getting on or off the school bus.

More than half (56%) of the pedestrians were struck by school buses or vehicles functioning as school buses, while 44% were struck by vehicles of other body types. Strategies for preventing these tragic fatalities include educating bus drivers, students and roadway users about bus safety, informing parents and children of school bus laws and regulations, using enforcement technologies like cameras on buses, promoting enforcement of school bus-related violations, and considering infrastructure countermeasures for safe stops.

Transit Buses and Bus Stops

Transit buses and bus stops have unique safety needs that may conflict with the safety needs of other vehicles and pedestrians. To promote a safe system for all road users, our SHSP partners collaborate with other agencies in this effort, including the Maryland Transit Administration, the Federal Transit Administration and the Federal Motor Carrier Safety Administration. In alignment with the Commercial Vehicle Safety Plan, strategies across multiple Emphasis Areas include support for safe transit stops and the enforcement of laws and regulations on carriers that pose the highest future crash risk [31].

6 SHSP Implementation

Implementation of the 2021-2025 SHSP will involve the cross-collaboration of professionals representing the four Es of transportation safety including planning, engineering and operations, public outreach and education, law enforcement, and emergency medical services. Each of these disciplines plays a critical role in identifying, defining, and implementing optimal strategies that will reduce the number and severity of traffic crashes. Zero Deaths Maryland can only be achieved with the support and hard work of our Maryland safety partners. The following describes the MD SHSP's organizational structure.

GOVERNOR'S HIGHWAY SAFETY REPRESENTATIVE

Maryland's Governor has designated the Administrator of the Motor Vehicle Administration as the State's Highway Safety Representative to coordinate efforts with NHTSA, the Maryland Department of Transportation, Maryland State Police, Maryland Department of Health, Maryland Institute for Emergency Medical Services Systems, and other State agencies.

SHSP EXECUTIVE COUNCIL

The leaders of the Maryland Agencies tasked with the development and implementation of the SHSP. The Council includes leaders from Maryland's MVA, MSP, DOT, MDTA, SHA, DOH, MHSO, FHWA, and NHTSA.

STEERING COMMITTEE

Alongside the Executive Council, the Maryland Highway Safety Office is the SHSP steering committee responsible for day-to-day SHSP leadership, administration, and coordination.

EA CHAIRS & CO-CHAIRS

The Emphasis Area teams are chaired by a Program Manager from the MHSO. The co-chairs for each EA are safety professionals from various agencies and organizations around the State. These partners lead the EA team with the administration of the action plan, coordination of efforts and the responsibility to assure progress of the action plan.

EA TEAM

The EA teams consist of safety partners from all aspects of the SHSP: planners, engineers, medical, behavioral, public health, law, advocacy, and other professionals. Using a framework of strategies to improve Maryland traffic safety, the EAs consider all aspects of transportation safety and are well equipped to confront the traffic safety issues facing Maryland today. The EA teams plan, collaborate, and follow through with implementation and evaluation of relevant action steps. These strategies and action steps are enumerated in an action plan, which lays out short term, long term, or possibly ongoing activities. The EA teams meet at least quarterly and update these action plans as needed.

SHSP Evaluation and Plan Update

Maryland's SHSP Executive Council will conduct an annual review of the SHSP to monitor implementation, prioritize or re-prioritize strategies and action steps, and ensure the timeliness, accuracy, completeness, uniformity, integration and accessibility of traffic data. The annual review will monitor progress toward FHWA's Safety Performance Measures which include the number of fatalities, fatality rates, serious injury counts, serious injury rates, and non-motorized fatalities and serious injury counts in Maryland.

The MHSO management is the Steering Committee for Maryland's SHSP and will act as the liaison between the EAs and the Executive Council. On a regular basis, the MHSO will review EA team strategy implementation, performance targets, and progress made on their action plans. Based on available data and reports from EA teams, the MHSO management will recommend and assign actions to ensure implementation success as needed. Results from Maryland safety program evaluations will be used to modify strategies and their implementation through new or revised action steps.

Guided by the MHSO management, the Emphasis Area chairs have an established evaluation process, action steps, assigned roles and responsibilities, performance measures, data collection, analysis, and progress tracking. Every year, the Emphasis Area teams report on the following FHWA defined measures:

- **OUTPUT MEASURES:** The extent to which SHSP strategies and actions are implemented
- **OUTCOME MEASURES:** The degree to which SHSP strategies and activities contribute to reducing fatalities and serious injuries, improve road user safety attitudes and behaviors, etc.

The SHSP Executive Council and the MHSO management monitor and track these measures. These measures are also reported to agency leaders, safety stakeholders, and policy makers to gauge the level of SHSP implementation and impact on fatalities and serious injuries on our roadways. If the EAs do not make progress or meet goals, the Executive Council will examine the process and reconsider the EA action plan. Equipped with these measures, Maryland can direct resources and efforts to the most critical issues and strengthen the most effective prevention strategies.

Maryland 1-95 Travel Plaza

The following elements from our evaluation process guide EA leadership in the ongoing development, integration and evaluation of the SHSP:

- Determine data requirements and resources for action plans
- Document measureable objectives and performance measures
- Implement progress tracking
- Integrate with other transportation safety plans
- Conduct a comprehensive program evaluation to assess the SHSP's process and performance
- Share evaluation results to engage SHSP partnerships, take strategic action and sustain momentum

SCHEDULE FOR THE NEXT ITERATION OF THE SHSP

This SHSP will cover the time period from January 1, 2021, through December 31, 2025. The SHSP Executive Council will solicit support to produce the next iteration of the SHSP (2026-2030) in late 2024.

APPENDIX A

ACKNOWLEDGEMENTS

The Maryland Department of Transportation led the development of this update of the Strategic Highway Safety Plan in coordination with representatives from safety stakeholders across the State. MDOT would like to acknowledge the contributions of the following safety partner organizations who will continue to work together to implement the strategies in this plan:

Advocates for Highway and Auto Safety
AAA Mid-Atlantic
AAA Foundation for Traffic Safety
Baltimore County Police Department
Baltimore Metropolitan Council
BWI Airport
Calvert County Police Department
Carroll County Department of Health
Carroll County Department of Public Works
Cecil County Department of Public Works
Chesapeake Region Safety Council-NSC
Crash Center for Research and Education
Federal Highway Administration
Federal Motor Carrier Safety Administration
Harford County Sheriff's Office
Howard County Fire & Rescue
Howard County Government
Johns Hopkins University
MADD
Maryland Department of Agriculture
Maryland Department of Health
Maryland Department of Transportation
Maryland Farm Bureau
Maryland Highway Safety Office
MD Institute for Emergency Medical Services
Maryland Motor Vehicle Administration
Maryland State's Attorneys' Association
Maryland State Police
Maryland State Highway Administration
Maryland Transportation Authority Police
Montgomery County Engineering and Planning
Montgomery County Police Department
Morgan State University
National Highway Traffic Safety Administration
Prime Engineering
Prince George's County Dept. of Public Works
Prince George's County Fire & Rescue
University of MD Medical Center
University of Maryland National Study Center
Washington College
Washington Regional Alcohol Program

APPENDIX B
GLOSSARY

5-year Rolling Average: The average of five individual, consecutive annual points of data.

Aggressive Driving: Maryland law states that a person is guilty of aggressive driving if the person commits three or more of the following offenses at the same time or during a single and continuous period of driving in violation of:

- failure to obey traffic lights with steady indication
- overtaking and passing vehicles
- passing on right
- failing to obey traffic control device
- following too closely
- failure to yield right-of-way
- exceeding a maximum speed limit or posted maximum speed limit

Aggressive Driving Related Crash: A crash in which a driver has one of the following values in both the primary and secondary contributing circumstance fields of the Maryland crash report:

- failed to yield right of way
- failed to obey stop sign
- failed to obey traffic signal
- failed to obey other traffic control device
- failed to keep right of center
- failed to stop for school bus
- exceeded speed limit
- too fast for conditions
- followed too closely
- improper lane change
- improper passing
- failure to obey traffic signs, signals, or officer
- disregarded other road markings
- other improper action
- operated motor vehicle in erratic/reckless manner

Autonomous/Automated Vehicle: A vehicle that is capable of sensing its environment and moving safely with little or no human input.

Bicyclist: A person on any type of pedal cycle, including bicycles, tricycles, unicycles, and any trailers or sidecars attached to these cycles.

Citation and Adjudication Data: From the Maryland District Court, these data provide information about citations, arrests, and dispositions for all motor vehicle violations.

Commercial Motor Vehicle (CMV): Any self-propelled or towed motor vehicle used on a highway in interstate commerce to transport passengers or property when the vehicle:

1. Has a gross vehicle weight rating or gross combination weight rating, or gross vehicle weight or gross combination weight, of 4,536 kg (10,001 pounds) or more, whichever is greater; or
2. Is designed or used to transport more than eight passengers (including the driver) for compensation; or
3. Is designed or used to transport more than 15 passengers, including the driver, and is not used to transport passengers for compensation; or
4. Is used in transporting hazardous material

Commercial Vehicle Safety Plan (CVSP): Outlines the State's CMV safety objectives, strategies, activities and performance measures.

Complete Streets: Complete Streets are designed and operated to enable safe access for all users, including pedestrians, bicyclists, motorists, and transit riders of all ages and abilities. Complete Streets make it easy to cross the street, walk to shops, and bicycle to work. They allow buses to run on time and make it safe for people to walk to and from train stations.

Contributing Factor: Conditions of the environment (such as lighting, weather), vehicle (brakes, lights), road (debris, obstructions), or driver behavior (inattentiveness, driving under the influence of alcohol or drugs) that contribute to the occurrence of a crash or its severity.

Crash: A set of events that results in injury or property damage due to the collision of at least one motorized vehicle and may involve collision with another motorized vehicle, a bicyclist, a pedestrian, or a fixed object.

Distracted Driving Related Crash: A crash where at least one driver in the crash was reported to be distracted. Distracted is defined by having values of either "failure to give full time and attention" or "cell phone in use" in any of the first four available contributing circumstance fields, or any of the following values in the driver distracted by field: looked but did not see; other electronic device (tablet, GPS, MP3 player, etc.); by other occupants; by moving object in vehicle; talking or listening on cellular phone; dialing cellular phone; adjusting audio and/or climate controls; using other device controls integral to vehicle; using device/object

brought into vehicle (non-electronic); distracted by outside person, object, or event; eating or drinking; smoking related; other cellular phone related; lost in thought; or texting from a cellular phone.

Driver: Operator of a motor vehicle.

Driver Licensing Data: Collected and administered by the Maryland Motor Vehicle Administration.

Emphasis Area: An area that has been identified as a safety concern for which resources within the jurisdictions and the State are allocated to develop and implement action plans forming a Strategic Highway Safety Plan.

Emphasis Area Strategy: A strategy intended to reduce the crash frequency or severity, or both, at a specific site or for several similar locations.

Executive Council (of SHSP): Maryland's SHSP Executive Council governs the SHSP and is comprised of the Deputy Secretary of the MDOT, the MDOT MVA Administrator, the MDOT SHA Administrator, the Secretary of the Maryland Department of State Police (Superintendent), the Executive Director of the Maryland Institute for EMS Systems, the Chief of Police of the Maryland Transportation Authority, and the Deputy Secretary of Maryland's Department of Health and Mental Hygiene.

Farm Equipment: Equipment used in agricultural operations.

Federal Motor Carrier Safety Administration (FMCSA): Lead federal government agency responsible for regulating and providing safety oversight of commercial motor vehicles (CMVs); FMCSA's mission is to reduce crashes, injuries, and fatalities involving large trucks and buses.

Federal Highway Administration (FHWA): An agency within the U.S. Department of Transportation that supports State and local governments in the design, construction, and maintenance of the Nation's highway system (Federal Aid Highway Program) and various federally and tribal owned lands (Federal Lands Highway Program).

Four Es: Engineering, education, enforcement, and emergency medical services. Generally, the four Es of transportation safety define the broad stakeholder communities who address safety issues and are responsible for making the roads safe for all users:

- Engineering: highway design, traffic, maintenance, operations, planning, etc.
- Enforcement: State and local law enforcement agencies
- Education: for example, driver education, citizen advocacy groups, educators, prevention specialists, etc.
- Emergency Response: first responders, paramedics, fire and rescue, etc.

Highway Infrastructure Related Crash: A crash in which any of the following were a factor:

road surface, road type, road environment (weather, visibility), work zone, road segments (curves, grade, tunnels, number of lanes, shoulder condition, width of lanes), junction type (gradient, length, sight distance, conflict points), junctions.

High Risk Rural Road: A statewide listing of all roads, including non-state highways inventoried as SHA functional class 7 (Rural Major Collector), 8 (Rural Minor Collector) or 9 (Rural Local) with fatal and/or incapacitating injury crash frequency of four or more police reported crashes within a one-half mile section during a three-year period.

Highway Safety Improvement Program (HSIP): The purpose of the HSIP is to achieve a significant reduction in traffic fatalities and serious injuries on public roads. To obligate "core" safety funds MDOT SHA must have in effect an HSIP under which the State: 1) develops and implements a Strategic Highway Safety Plan (SHSP) that identifies and analyzes highway safety problems and opportunities to reduce fatalities and serious injuries, 2) produces a program of projects or strategies to reduce identified safety problems, 3) evaluates the plan on a regular basis to ensure the accuracy of the data and priority of proposed improvements, 4) submits an annual report to the FHWA Division.

Highway Safety Plan (HSP): A state document, coordinated with the State strategic highway safety plan as defined in 23 U.S.C. 148(a), that the State submits each fiscal year as its application for highway safety grants, which describes the strategies and projects that State plans to implement and the resources from all sources it plans to use to achieve its highway safety performance targets. Reference 23 CFR 1200. Subpart B.

Impaired Driving Related Crash: The Maryland definition of an impaired driving crash is: At least one driver in the crash is determined to be impaired by the investigating officer as indicated through the driver condition, blood alcohol content, substance use detected, and contributing factor fields on the Maryland crash report:

- person condition of "had been drinking," "using drugs," or "influenced by medications and/or drugs and/or alcohol" or
- blood alcohol concentration (BAC) between 0.01 and 0.50 or
- substance use of '"alcohol contributed," "illegal drugs contributed," "medication contributed," or "combination contributed" or
- contributing circumstance of "under the influence of drugs," "under the influence of alcohol," "under the influence of medication," or "under combined influence."

Note: This definition includes drug impairment as well as alcohol impairment, and will not match alcohol-impaired

fatality figures provided by NHTSA's Fatal Accident Reporting System (FARS), which measures only drivers with a recorded Blood Alcohol Content (BAC) greater than 0.08. Objectives for both State and federally defined impaired driving are included to maintain continuity with previous Maryland SHSP and HSPs, and to maintain a link with other State plans that exclusively use State crash data as the source for problem identification and program evaluation.

Injury Categories: Injuries reported by the investigating officer on the Maryland crash report are categorized by the injury severity code according to federal guidelines. The categories are:

Fatal Injury: Any injury that results in death within 30 days after the motor vehicle crash in which the injury occurred. If the person did not die at the scene but died within 30 days of the motor vehicle crash in which the injury occurred, the injury classification is changed from the attribute previously assigned to the attribute "fatal injury."

Suspected Serious Injury: A suspected serious injury is any injury other than fatal which results in one or more of the following:

- Severe laceration resulting in exposure of underlying tissues/muscle/organs or resulting in significant loss of blood
- Broken or distorted extremity (arm or leg)
- Crush injuries
- Suspected skull, chest or abdominal injury other than bruises or minor lacerations
- Significant burns (second and third degree burns over 10% or more of the body)
- Unconsciousness when taken from the crash scene
- Paralysis

Suspected Minor Injury: A minor injury is any injury that is evident at the scene of the crash, other than fatal or serious injuries. Examples include lump on the head, abrasions, bruises, minor lacerations (cuts on the skin surface with minimal bleeding and no exposure of deeper tissue/muscle).

Possible Injury: Any injury reported or claimed which is not a fatal, suspected serious, or suspected minor injury. Examples include momentary loss of consciousness, claim of injury, limping, or complaint of pain or nausea. Possible injuries are those that are reported by the person or are indicated by his/her behavior, but no wounds or injuries are readily evident.

No Apparent Injury: A situation where there is no reason to believe that the person received any bodily harm from the motor vehicle crash. There is no physical evidence of injury and the person does not report any change in normal function.

Injury Surveillance System: The injury surveillance system tracks the frequency, severity, and nature of injuries sustained in motor vehicle crashes. The system includes: pre-hospital emergency medical services (EMS), trauma registry, emergency department, hospital discharge, and mortality data.

Intersection: The general area where two or more roadways or highways meet, including the roadway, and roadside facilities for pedestrian and bicycle movements within the area.

Intersection Crash: A crash that occurs within the limits of an intersection.

Intersection Related Crash: Crashes reported as occurring in an intersection or being intersection related. "Intersection related" is not a location type but a judgment about the effects of intersections and their traffic controls upon traffic and crash causation. If the crash is deemed to have occurred as a result of backed-up traffic from an intersection (presumably at a non-intersection location) the junction relationship is "intersection related."

Long-Range Transportation Plan: A 20-year planning horizon vision document that reflects the application of programmatic transportation goals to project prioritization.

Maryland Highway Safety Office (MHSO): The MDOT MVA's Highway Safety Office is dedicated to saving lives and preventing injuries by reducing motor vehicle crashes through the administration of a comprehensive network of traffic safety programs. The MDOT MVA's Highway Safety Office endeavors to provide expert highway safety leadership through quality programs, ethical grants management, professional and accountable staff, and exemplary customer service.

Metropolitan Planning Organization (MPO): A federally mandated and federally funded transportation policy-making organization that is made up of representatives from local government and governmental transportation authorities. MPOs conduct planning and programming for federal transportation funds within a "3C" process (continuing, comprehensive, and cooperative).

Motor Carrier: A vehicle that transports passengers or property for compensation.

Motorcycle Crash: A crash involving at least one motorcycle, defined as a "motorcycle" body type.

Motorist: Driver or passenger of a vehicle or motorcycle.

National Highway Traffic Safety Administration (NHTSA): An agency of the U.S. DOT whose mission is to promote safer vehicles and safer driving practices to reduce deaths, injuries, medical costs and other economic losses resulting from motor vehicle crashes.

Older Driver Related Crash: A crash where at least one driver in the crash was reported to be between the ages of 65 and 110.

Pedestrian: Person on foot (using the 'pedestrian' person type and 'pedestrian on foot' pedestrian type), including a motorist who has exited a vehicle.

Pedestrian Crash: A crash where at least one involved person is reported as a pedestrian.

Performance Measures: Indicators that enable decision-makers and other stakeholders to monitor changes in road system condition and performance against established visions, goals, and objectives.

Performance Target: Goals of an SHSP EA.

Police Crash Report Data: Reported, collected and administered by the Maryland State Police.

Road System: All of the roads (local and/or highway) that are under the jurisdiction of a single agency (such as state, county, or municipality).

Roadway: The portion of a highway, including shoulders, for vehicular use.

Run-off-the-Road Crash: A crash where the first event was recorded as "striking a fixed object" or "running off the road" or the location of the crash was reported as "off-road" or "in the median."

Safe System Approach: Under the Safe System approach, road safety is a shared responsibility among everyone, including those that design, build, operate and use the road system. It takes a holistic view of the road transport system and the interactions among roads and roadsides, travel speeds, vehicles and road users.

Safety Culture: "The implicit shared values and beliefs that determine the way in which the society organizes and acts" in matters that affect safety (AAA Foundation for Traffic Safety, 2007).

Serious Injury: Generally defined as an incapacitating injury or any injury, other than a fatal injury, that prevents the injured person from walking, driving, or normally continuing the activities the person was capable of performing before the injury occurred.

Sign: An official traffic control device placed or erected by authority of a public body or official having jurisdiction for the purpose of regulating, warning, or guiding traffic.

Speed Related Crash: A crash where at least one driver in the crash was reported to be speeding, defined by having values of either "exceeded speed limit" or "too fast for conditions" in the first or second contributing circumstance fields.

State Highway Administration (SHA): The State transportation business unit responsible for maintaining Maryland's numbered highways outside Baltimore City.

Strategic Transportation Improvement Plan (STIP): A four-year, fiscally constrained, and prioritized set of transportation projects, compiled from statewide, local, and regional plans.

Strategic Highway Safety Plan (SHSP): A data-driven, comprehensive, multidisciplinary plan integrating the four Es of transportation safety – engineering, education, enforcement, and emergency medical services. It establishes statewide performance measures, goals, objectives, and Emphasis Areas and describes a program of strategies to reduce or eliminate safety hazards. It is developed by the State Department of Transportation (DOT) in consultation with federal, State, local, and tribal safety stakeholders, in accordance with 23 U.S.C. § 148.

Traffic Records Coordinating Committee (TRCC): A committee whose purpose is to continually review and assess the status of Maryland's Traffic Safety Information System and its components. It is responsible for updates to the Traffic Records Strategic Plan (TRSP); learning about technologies to improve the information system; promote, support and assist in the coordination and implementation of desired system improvements; and provide a forum for the exchange of information.

Traffic Records Strategic Plan (TRSP): A plan that incorporates all traffic records system components as identified in NHTSA's Traffic Records Program Assessment Advisory and identifies and prioritizes performance measures as the focus to help Maryland use a systems approach to proactively identify the resources needed (legislative, organizational, or budgetary) to efficiently and effectively reach these goals.

Unrestrained Occupant: A passenger-vehicle (automobile, station wagon, van, SUV, pickup truck) occupant who is: less than eight years of age recorded as not using a "child/youth restraint," eight years of age or older recorded as not using a "lap and shoulder belt" or "air bag and belt," or where restraint use was recorded as using "none" or "air bag only."

Vehicle: A device in, upon, or by which a person or property is or may be transported upon a highway, except devices moved by human power or used exclusively on stationary rails or tracks.

Vehicle Registration Data: Collected and administered by the Maryland Motor Vehicle Administration. The registration data are an inventory of data that enables the titling and registration of each vehicle under the State's jurisdiction to ensure that a descriptive record is maintained and made accessible for each vehicle and vehicle owner operating on public roadways.

Work-Zone Crash: Crashes occurring in a construction/maintenance zone.

Young Driver: Drivers aged 16-20.

REFERENCES

1. https://mdot.maryland.gov/tso/pages/Index.aspx?PageId=22
2. https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/md_fy20_hsp.pdf
3. https://safety.fhwa.dot.gov/hsip/reports/pdf/2016/md.pdf
4. https://www.fmcsa.dot.gov/sites/fmcsa.dot.gov/files/docs/fastact/445121/fy18-cvsp-maryland-final.pdf
5. https://mva.maryland.gov/Documents/MD_TRCC_Charter_Final_Signed.pdf
6. https://mva.maryland.gov/Documents/TRCC-Strategic-Plan-2015.pdf
7. Federal Highway Administration, SHSP Implementation Process Model: The Essential Eight, https://safety.fhwa.dot.gov/shsp/fhwasa10024/fhwasa10024.pdf
8. 23 US Code 148(a)(12)(F) – Highway safety improvement program. http://www.gpo.gov/fdsys/pkg/USCODE-2011-title23/html/USCODE-2011-title23-chap1-sec148.htm
9. 23 US Code 148(a)(12)(C) – Highway safety improvement program. http://www.gpo.gov/fdsys/pkg/USCODE-2011-title23/html/USCODE-2011-title23-chap1-sec148.htm
10. https://www.roads.maryland.gov/OC/Context_Driven-Access-and-Mobility-For-All-Users.pdf
11. newsroom.aaa.com/2017/10/new-vehicle-infotainment-systems-create-increased-distractions-behind-wheel
12. https://www.roads.maryland.gov/OC/Context_Driven-Access-and-Mobility-For-All-Users.pdf
13. Ibid.
14. Ibid.
15. United State Department of Transportation, NHTSA, Seat Belts, https://www.nhtsa.gov/risky-driving/seat-belts
16. https://www.roads.maryland.gov/OC/Context_Driven-Access-and-Mobility-For-All-Users.pdf
17. Ibid.
18. Evaluation of the Aggression Suppression Program, DOT HS 809 395, May 2001, https://one.nhtsa.gov/people/injury/research/aggressionwisc/chapter_1.htm
19. International Transport Forum, Speed and Crash Risk, 2018, https://www.itf-oecd.org/sites/default/files/docs/speed-crash-risk.pdf
20. https://www.roads.maryland.gov/OC/Context_Driven-Access-and-Mobility-For-All-Users.pdf

21. Maryland Transportation Authority Strategic Plan for Connected and Automated Vehicles (MDTA CAV Plan), October 2018, https://mdta.maryland.gov/sites/default/files/Files/About/18-11-05_MDTA_CAV_Strategic_Plan _Oct_2018_w_Links.pdf

22. https://www.nhtsa.gov/technology-innovation/automated-vehicles

23. Commercial Motor Vehicle Traffic Safety Facts, July 2019, https://www.fmcsa.dot.gov/sites/fmcsa.dot.gov/files/docs/safety/data-and-statistics/473411/cmvtrafficsafetyfactsheet2018.pdf

24. FHWA, National Work Zone Awareness Week, April 2020 https://ops.fhwa.dot.gov/ wz/outreach/nwzaw_factsheet_2020/nwzaw_factsheet_2020.pdf

25. MDOT, SHA, Press Release, Maryland State Highway Administration Issues Statement on Tragic Death of Worker Along MD 173, https://www.roads.maryland.gov/mdotsha/Pages/pressreleasedetails.aspx?PageId=818&newsId=2753

26. http://www.safezones.maryland.gov/images/Maryland%20SafeZones%20Fact%20Sheet%202020%20Fall.pdf

27. Traffic Safety Facts, April 2017, Rural/Urban Comparison of Traffic Fatalities, https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812741#:~:text=However%2C%20rural%20areas%20accounted%20for,all%20traffic%20fatalities%20in%202017.&text=Rural%20traffic%20fatalities%20decreased%20by,2008%20to%2019%2C038%20in%202017

28. Harland, Greenan, Ramirez, Not just a rural occurrence: differences in agricultural equipment crash characteristics by rural-urban crash site and proximity to town, Accident Analysis and Prevention, 2014 Sep;70:8-13. doi: 10.1016/j.aap.2014.02.013. Epub 2014 Mar 28. https://pubmed.ncbi.nlm.nih.gov/24686161/

29. Maryland Rural Road Safety Study – An Analysis of Farm Vehicle/Farm Equipment-Related Accidents in the State of Maryland, July 2019, https://www.mdsoy.com/wp-content/uploads/2019/07/MD-Rural-Road-Safety-Study.pdf

30. School-Transportation-Related Crashes, Traffic Safety Facts, 2019, https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812712

31. Maryland Commercial Vehicle Safety Plan for the Federal Motor Carrier Safety Administration's Motor Carrier Safety Assistance Program Fiscal Year 2017, https://www.fmcsa.dot.gov/sites/fmcsa.dot.gov/files/docs/fastact/83051/marylandaccepted-20170119.pdf

Maryland

MARYLAND DEPARTMENT OF TRANSPORTATION
mdot.maryland.gov

MARYLAND HIGHWAY SAFETY OFFICE
mva.maryland.gov/safety

ZERO DEATHS MARYLAND

facebook.com/zerodeathsmd · twitter.com/zerodeathsMD · Instagram.com/zerodeathsmd

MDOT MARYLAND DEPARTMENT OF TRANSPORTATION MOTOR VEHICLE ADMINISTRATION | Maryland Highway Safety Office

MDOT MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION

Maryland DEPARTMENT OF HEALTH

MDTA Maryland Transportation Authority

MARYLAND STATE POLICE