

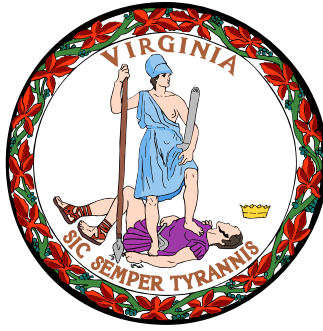


Arrive Alive

VIRGINIA 2022-2026

STRATEGIC HIGHWAY SAFETY PLAN





LETTER FROM THE GOVERNOR

Virginians have a lot to celebrate. From the splendor of the Blue Ridge Mountains to the beauty of our beaches, we live in a State that has a great deal to offer. As Governor it is my responsibility and pleasure to make sure the Commonwealth continues to be a sought-after place to live, work, and recreate. A key to our success is our ability to move people, goods, and services across our transportation network effectively and most importantly, safely.

We all have experienced what it is like to not be able to travel or get together with friends and family. The COVID-19 pandemic raised our awareness on the importance of highway safety and health. While the pandemic was traumatic enough, we also saw a rise in risky behavior on our roads despite a drop in vehicle miles traveled. Though traffic-related serious injuries continued to decline during the pandemic, fatalities increased. Despite ongoing progress with highway safety improvements, more people have been killed per year in recent years and serious injuries are not declining as much as they have in the past. This public health situation cannot continue with a vision towards zero.

Virginia's safety motto—"Arrive Alive"—is something we all want to achieve for ourselves, our families, our friends, and our co-workers. It underscores that each of us have a responsibility to do our part to make sure we all get to where we are going without being harmed or killed. Arrive Alive requires a safe system of safe road users, safe roads, safe vehicles, safe speeds, and post-crash care. It is the reason why the Virginia Department of Transportation (VDOT), the Virginia Department of Motor Vehicles (DMV), and the Virginia State Police (VSP) join forces with other safety stakeholders to regularly update our Strategic Highway Safety Plan (SHSP), which lays out how we will reduce traffic-related fatalities and serious injuries.

This 2022-2026 SHSP details how the Commonwealth will address infrastructure and behavioral safety. This plan outlines the Safe System guiding principles to follow as we move forward and remember that road deaths and serious injuries are unacceptable. We are also stressing the need to promote a safety culture throughout the Commonwealth and ensure our actions are equitable. I am proud to note that Virginia was the first state in the nation to establish an Office of Diversity, Equity, and Inclusion that will help us achieve that objective in this plan.

I salute the agencies, organizations, and individuals who have devoted time and effort to updating this plan and giving us a road map for a bright future. Please join me in helping Virginia meet the vision of zero and **Arrive Alive**.

Governor Glenn Youngkin

VIRGINIA 2022-2026 STRATEGIC HIGHWAY SAFETY PLAN EXECUTIVE CHARTER

WHEREAS motor vehicle crashes in the Commonwealth of Virginia over the past five years (2016-2020) resulted in 4,097 fatalities and 37,127 serious injuries with a total economic impact of about \$7.4 billion per year;

WHEREAS the Commonwealth of Virginia understands that deaths and serious injuries caused by motor vehicle crashes are unacceptable;

WHEREAS the Commonwealth of Virginia seeks to identify and seize all opportunities to enhance the safety of Virginia's surface transportation system by reducing the risk of fatalities and serious injuries caused by crashes;

WHEREAS the U.S. Congress has passed laws requiring states develop, implement, evaluate, and update a five-year Strategic Highway Safety Plan (SHSP) that identifies key safety needs with strategies and actions to address those needs;

WHEREAS the Commonwealth of Virginia has updated the SHSP using a data-driven, results-oriented approach that considers input from safety stakeholders and the public with the goal of addressing infrastructure and behavioral safety problems on all public roads;

WHEREAS the SHSP defines enforcement, education, engineering, and emergency response and medical services actions that federal, state, and local officials and private sector safety partners and stakeholders can implement to reduce fatalities and serious injuries caused by motor vehicle crashes on Virginia's roads;

WHEREAS the Commonwealth of Virginia updated the SHSP with oversight by a Steering Committee of those safety partners; and

THEREFORE, IT IS AGREED THAT the following partner agency executives will commit to continue their support of the SHSP implementation and evaluation:

Commission of the Virginia Alcohol Safety Action Program (VASAP)	Department of Health (VDH)	Federal Partners include: Federal Highway Administration (FHWA) Federal Motor Carrier Safety Administration (FMCSA) National Highway Traffic Safety Administration (NHTSA)
Department of Education (DOE)	Department of Motor Vehicles (DMV)	
Department of Fire Programs (DFP)	Department of Transportation (VDOT)	
	Virginia State Police (VSP)	

The partner agency executives support and are committed to the SHSP implementation by providing focus and direction to mitigate the public health problem caused by traffic crashes. Each partner agrees to:

- Align agency goals with the SHSP's vision, mission, goals, and objectives
- Encourage collaboration among the agencies and stakeholders
- Support and aid implementation and review progress on SHSP actions
- Communicate information about the SHSP strategies and actions within agencies and in public forums
- Share progress on SHSP implementation and safety initiatives

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Source: Getty Images.



Arrive Alive Virginia

Virginia Strategic Highway Safety Plan

EXECUTIVE SUMMARY

Virginia's Strategic Highway Safety Plan (SHSP) is the guiding five-year plan for road safety efforts in the Commonwealth. The plan's theme—"Arrive Alive"—provides direction and focus to the programs and projects that will provide a transportation system for residents and visitors to arrive safely at their destinations. The plan sets forth a vision and mission that link directly to Virginia's Toward Zero Deaths (TZD) initiative that is supported on the national level by Federal Highway Administration (FHWA), National Highway Traffic Safety Administration (NHTSA), Federal Motor Carrier Safety Administration (FMCSA), American Association of State Highway Transportation Officials (AASHTO), Governors Highway Safety Association (GHSA), and other national organizations.

VISION

Towards Zero Deaths and Serious Injuries from motor vehicle crashes so that all road users arrive safely at their destination.

MISSION

To fulfill the Vision through a collaborative, data-driven, multimodal and Safe System approach that incorporates actions from the four Es of road safety—Enforcement, Education, Engineering, and Emergency Response and Medical Services to achieve safe travel for Everyone.

Since 2014, traffic fatalities have increased in Virginia, climbing to 847 in 2020. The story for serious injuries is better as serious injuries have steadily declined, yet nearly 7,000 people were seriously injured in traffic crashes in 2020. Motor vehicle crashes are a leading cause of death for young Virginians and a serious public health problem that takes substantial resources to respond to and provide treatment or hospitalization. According to data from the Virginia Department of Health (VDH), motor vehicle crashes are one of the top four leading causes of death from 2015 to 2019 for Virginians between the ages of 5 and 34.

To make progress towards the plan's vision and mission, Virginia established a goal of reducing fatalities and serious injuries by 50 percent by 2045. Virginia also established measurable objectives for 2022 through 2026 that will be used to track progress towards this goal. The objectives consider a linear reduction in fatalities and serious injuries over the next five years that, if extended, would reach the 50 percent goal reduction in 2045.

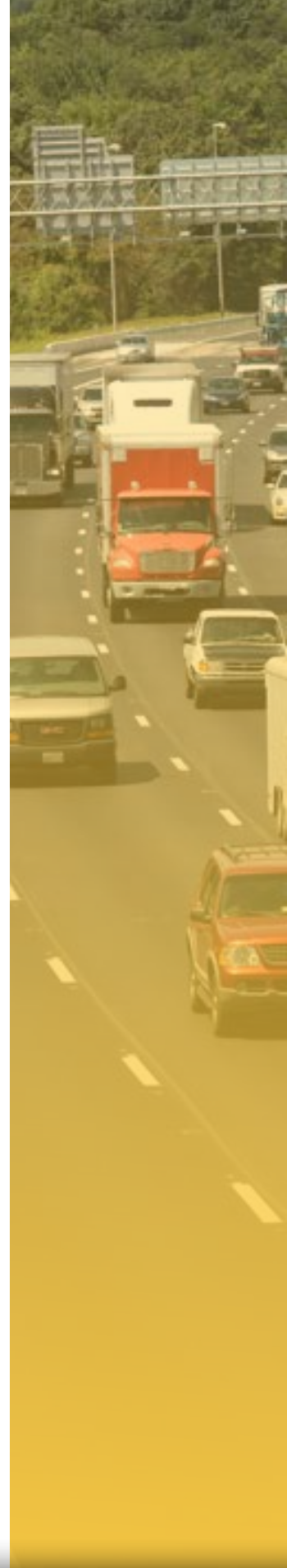
New to the 2022-2026 SHSP are the addition of guiding principles which align with Virginia's [VTrans 2045](#) long-range transportation plan's safety vision and guiding principles to ensure all safety efforts in Virginia are coordinated. The Virginia SHSP guiding principles come from the Safe System approach, which has proven to be effective in reducing fatalities and serious injuries. Virginia added a seventh guiding principle to this list that focuses on equity. The guiding principles are:

- ***Death/serious injury is unacceptable***
- ***Humans make mistakes***
- ***Humans are vulnerable***
- ***Redundancy is crucial***
- ***Safety is proactive***
- ***Responsibility is shared***
- ***Actions consider equity***

Equity and safety culture are the foundation of a Safe System. Equity in transportation is defined as the fair distribution of transportation resources, benefits, costs, programs, and services that considers differences in income, geography, ability, and other factors along with equitable access to affordable and reliable transportation options. Safety culture is the shared values, actions, and behaviors that demonstrate a commitment to safety over competing goals and demands. To effectively implement a Safe System, a culture must be in place that instills the expectation that users of the road system will be protected and that the responsibility for a safe transportation system is shared among the 4Es of highway safety—education, engineering, enforcement, and emergency response and medical services—and every user. To learn more about what individuals can do to support building a safety culture in Virginia, go to the [What You Can Do to Support the SHSP](#) chapter.

Another new aspect of the 2022-2026 SHSP is the identification of priority strategies that are aligned with the guiding principles. These strategies represent proven approaches that successfully reduce traffic related fatalities and serious injuries.

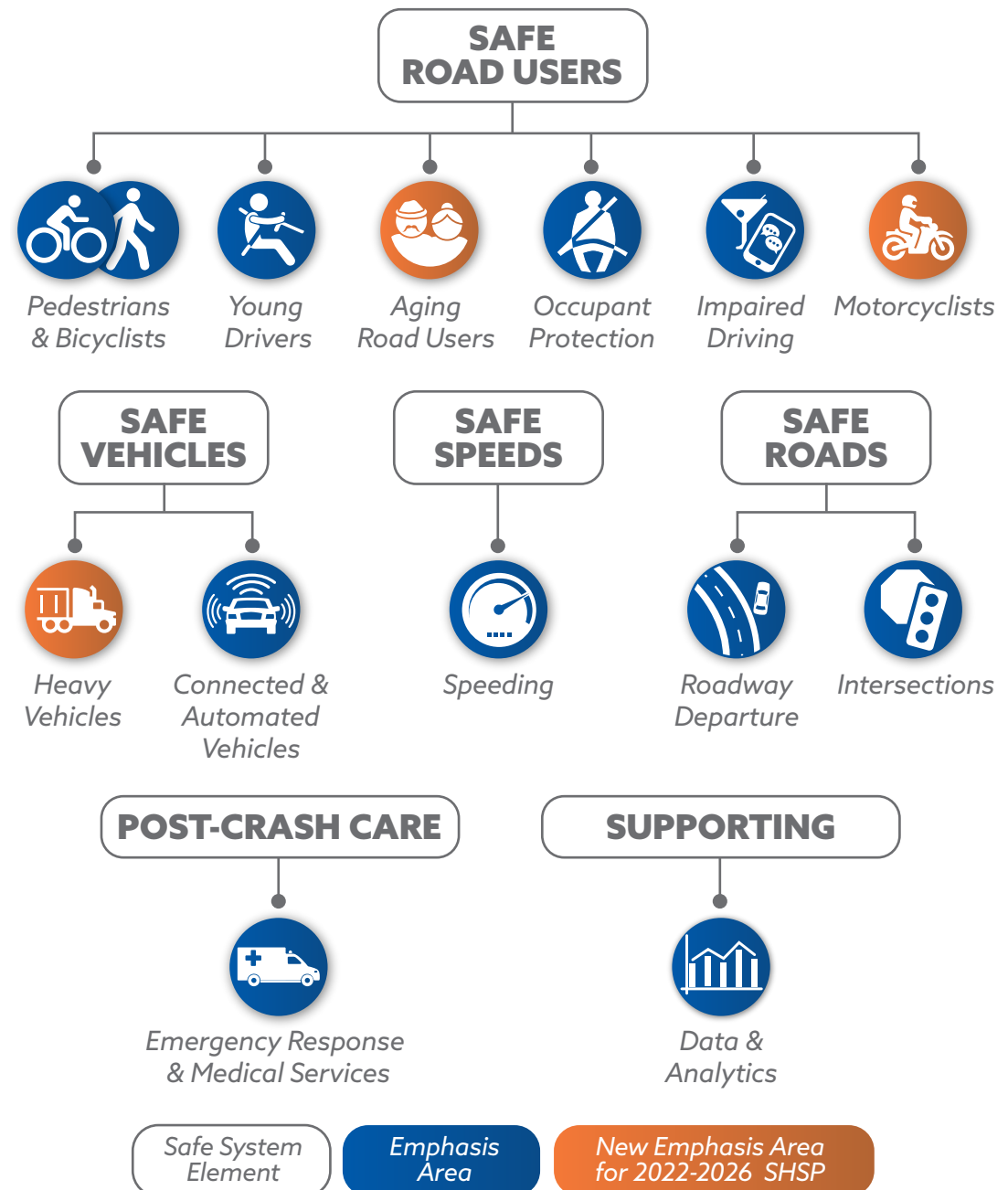
- Implement road improvements that ensure human mistakes and vulnerabilities do not result in serious injuries or fatalities
- Adopt an approach that considers risk when prioritizing locations for safety improvements and programs
- Recognize road safety as a public health issue and establish policies and programs that promote safe behavior and reduce crash severity outcomes
- Develop and implement programs that provide education and awareness to high-risk road users
- Implement innovative solutions and utilize current and emerging technologies





Virginia identified 13 emphasis areas (EAs), which are the predominant factors that contribute to or result in fatalities and serious injuries. The EAs have been categorized within the five Safe System elements as shown in Figure 1. The exception is data and analytics which is a supporting EA. One of the first steps taken by the SHSP Steering Committee was to review the safety data and determine where to focus efforts over the next five years. Virginia identified 106 ongoing, short-term, or long-term actions across the 13 EAs to guide Virginia toward reducing fatalities and serious injuries over the five-year plan period and to ultimately fulfill this plan's vision, mission, and goals. Each action falls under one of the five priority strategies.

FIGURE 1. SAFE SYSTEM EMPHASIS AREAS









VIRGINIA'S TRAFFIC SAFETY DIRECTION

Virginia's Strategic Highway Safety Plan (SHSP) continues to be the guiding document for road safety efforts in the Commonwealth. The motto "Arrive Alive" says it all. The plan provides direction and focus to the programs and projects that will provide a transportation system for residents and visitors to arrive safely at their destinations. The word safety has taken on new meaning due to the COVID-19 pandemic whose impact has affected every aspect of life including transportation. Most people expected traffic-related fatalities and serious injuries to decline during the pandemic given the drop in vehicle miles traveled (VMT) and people's desire to stay safe at home. However, in Virginia, as in most states in the U.S., traffic fatalities increased during the pandemic due mainly to speeding and other risky behaviors.

This fact has prompted safety stakeholders from around the state to focus and coordinate efforts to make sure people can drive, walk, bicycle, or ride safely. The vision for fatalities and serious injuries remains zero. Virginia's [Toward Zero Deaths](#) website underscores the premise that zero is not an impossible goal; it will take all of us to get there.

Zero is not an impossible goal for Virginia; it will take all of us to get there.

SHSP STRUCTURE

The SHSP structure, as shown in Figure 2, includes the following:

Tier 1 – Vision, Mission, Goal establish overarching statements of the plan. All components in the following tiers are geared toward accomplishing these elements.

Tier 2 – Guiding Principles define statements that Virginia holds true and that guide decisions about traffic safety.

Tier 3 – Priority Strategies are approaches that have proven to reduce fatalities and serious injuries. All strategies are built on the foundation of the guiding principles.

Tier 4 – Actions, which are specific to each emphasis area, detail how Virginia will implement each priority strategy and accomplish the goal to reduce fatalities and serious injuries.

FIGURE 2. SHSP STRUCTURE



VISION, MISSION, AND GOAL

The plan, which is updated every five years, sets forth a vision, mission, and goal for fatalities and serious injuries that link directly to Virginia's Toward Zero Deaths initiative that is supported on the national level by Federal Highway Administration (FHWA), National Highway Traffic Safety Administration (NHTSA), Federal Motor Carrier Safety Administration (FMCSA), American Association of State Highway Transportation Officials (AASHTO), Governors Highway Safety Association (GHSA) and other national organizations.

VISION *Towards Zero Deaths and Serious Injuries from motor vehicle crashes so that all road users arrive safely at their destination.*

MISSION *To fulfill the Vision through a collaborative, data-driven, multimodal and Safe System approach that incorporates actions from the four Es of road safety—Enforcement, Education, Engineering, and Emergency Response and Medical Services—to achieve safe travel for Everyone.*

GOAL *To **reduce deaths and severe injuries by half by 2045** (an average decline of approximately 2 to 4 percent per year).*

If Virginia achieves this goal, it will mean approximately **424 fewer deaths and 3,399 fewer injuries**.

The SHSP is supported by a multidisciplinary group of stakeholders who are actively involved as members of the Steering Committee, as shown in Figure 3. It is:

- A comprehensive, multi-stakeholder, multimodal plan that sets goals and strategies to reduce highway deaths and serious injuries
- A coordinated framework for reducing deaths and serious injuries
- A data-driven plan that uses recent information to select critical emphasis areas, factors contributing to crashes, and potential solutions
- An effort that establishes common performance measures for reductions in fatalities and serious injuries
- A compilation of proven strategies and actions to address Virginia's traffic safety problems
- A plan that includes input and involvement of federal, state, local, and private sector stakeholders

FIGURE 3. STEERING COMMITTEE SAFETY STAKEHOLDERS



OBJECTIVES

To achieve the goal of reducing fatalities and serious injuries by 50 percent by 2045, Virginia established measurable objectives for 2022 through 2026 that will be used to track progress towards the goal. The objectives consider a linear reduction in fatalities and serious injuries over the next five years that, if extended, would reach the 50 percent goal reduction in 2045. This linear reduction results in 17 fewer fatalities and 136 fewer serious injuries each year.

The objectives are to reduce the total number of fatalities 12 percent from 847 in 2020 to 745 in 2026 as shown in Figure 4 and to reduce the total number of serious injuries from 6,798 in 2020 to 5,982 in 2026 as shown in Figure 5. Additionally, objectives have been set for 2022 through 2026 for each emphasis area to reduce the combined number of fatalities and serious injuries. Previous SHSP efforts have not achieved the proposed objectives. That is why Virginia must embrace a Safe System approach, implement the priority strategies and actions outlined in this plan, and continue to emphasize roadway safety as a priority for everyone to achieve the new objectives.

The SHSP objectives are not the same as the annual safety targets submitted to FHWA and NHTSA since the SHSP objectives span multiple years and are related to the long-term 2045 goal. According to guidance from FHWA, the SHSP multiyear objectives provide an opportunity to drive consistency for the annual targets and encourage the individuals involved in setting the annual targets also to be involved in developing the SHSP objectives. Virginia has embarked on a more rigorous statistical method to set annual targets, which have recently predicted increasing fatalities and leveling of the serious injury reductions. More information on target setting is provided in the [Performance-Based Safety Planning Appendix](#).

Making improvements to highway safety performance measure outcomes are more difficult and transformative than in the past as travel behaviors have changed since the COVID-19 pandemic began. With limited resources and personnel, every strategy and action must count toward achieving our goals and objectives. Reducing risks requires that all parts of the transportation system are strengthened, so that if one part fails, the other parts still protect people. Such outcomes require intentional planning, meaningful analysis, and a strong commitment to focused implementation.

FIGURE 4. 2022-2026 FATALITY OBJECTIVES

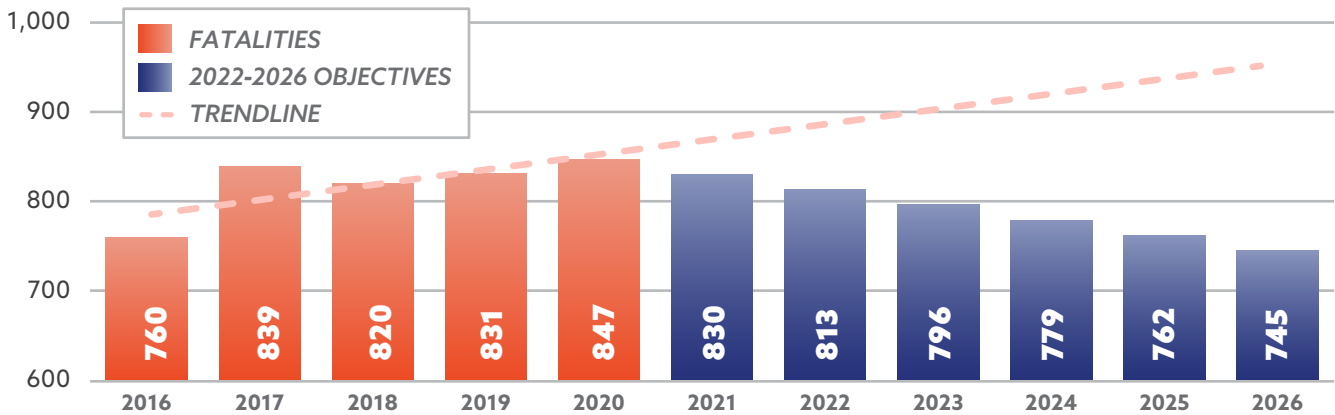
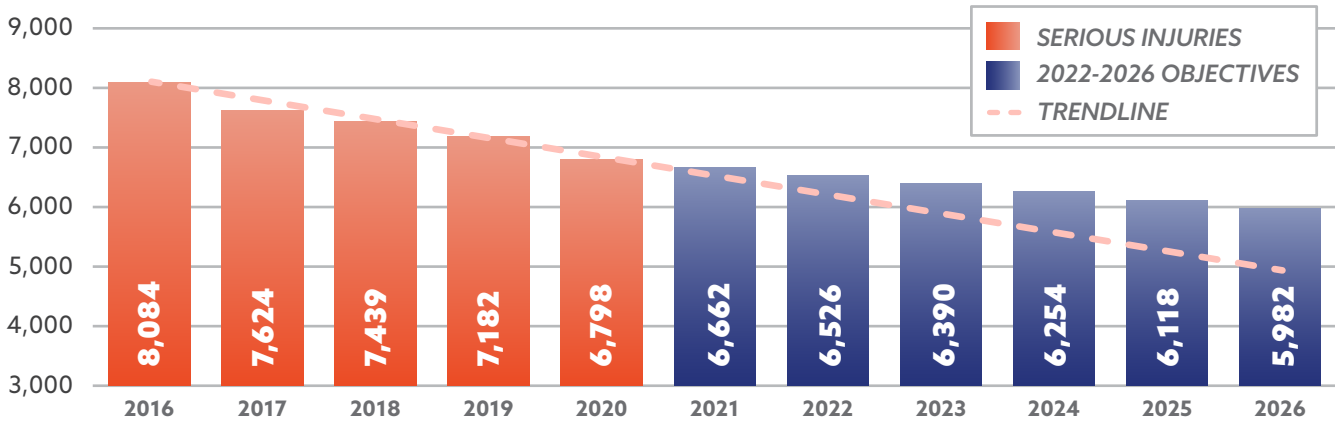


FIGURE 5. 2022-2026 SERIOUS INJURY OBJECTIVES



The SHSP also coordinates and consolidates the safety efforts of several plans including the DMV Highway Safety Office's [Highway Safety Plan](#) (HSP), the Virginia State Police's [Commercial Vehicle Safety Plan](#) (CVSP), and VDOT's [Highway Safety Improvement Program](#) (HSIP). Other plans linked to the SHSP efforts include:

- Virginia's Long-Range Transportation Plan (VTrans 2045)
- Metropolitan Transportation Plans
- Local Transportation Safety Plans
- SMART SCALE (Multimodal Transportation Projects)
- Pedestrian and Bicycle Safety Action Plans
- Transportation Alternatives Program (TAP)
- Revenue Sharing Projects
- Locality Revenue Projects

Virginia's SHSP effort is led by the heads of the various state agencies that have a role in traffic safety along with several associations representing metropolitan planning organizations and law enforcement. Representatives, designated by the agency/organization executives, serve on an SHSP Steering Committee that meets periodically throughout the year to manage the SHSP. Members of the Steering Committee include:

- Transportation engineers and planners
- Regional and local transportation planners and officials
- Authorized law enforcement officers and specialists
- Education and prevention specialists and subject matter experts
- Health professionals (medical and public health) and emergency response and medical services personnel
- Data specialists
- Federal agency representatives

GUIDING PRINCIPLES

New to the 2022-2026 SHSP are the guiding principles which align with the [VTrans 2045](#) safety vision and guiding principles to ensure all safety efforts in Virginia are coordinated. The SHSP guiding principles are based on the elements of a Safe System approach (safe roads, safe road users, safe speeds, safe vehicles, and post-crash care) and include the Safe System guiding principles with an additional guiding principle, actions consider equity, as shown in Figure 6.

- Death/serious injury is unacceptable
- Humans make mistakes
- Humans are vulnerable
- Redundancy is crucial
- Safety is proactive
- Responsibility is shared
- Actions consider equity





The [Safe System](#) approach, which has been successfully implemented in Europe, Australia, and New Zealand and which is promoted by the U.S. Department of Transportation and others in America, aims to eliminate fatal and serious injuries for all road users through a holistic view of the transportation system. Safe System is a collaborative approach that recognizes that people make mistakes and works to build, maintain, and operate roads and vehicles that eliminate risks or mitigate the severity of crashes as well as educate users on their responsibility to not engage in risky behavior. Further, when a crash occurs, responsive and appropriate medical care is provided to minimize the consequences of the crash. The approach also collaborates across the 4Es of highway safety: Education, Engineering, Enforcement, and Emergency Response and Medical Services, and emphasizes that Virginia is taking a new approach to the SHSP by defining the key criteria for decisions on traffic safety.

FIGURE 6. VIRGINIA'S SAFE SYSTEM APPROACH



Source: FHWA.

Equity and safety culture are the foundation of a Safe System. Equity in transportation is defined as the fair distribution of transportation resources, benefits, costs, programs, and services that considers differences in income, geography, ability, and other factors along with equitable access to affordable and reliable transportation options. Equity must also be inclusive and ensure that all residents regardless of who they are, where they live, or how they use the transportation system are actively engaged in the public dialogue on improving road safety, particularly those from underserved and underrepresented communities.



Source: Getty Images.

This plan's mission strives to achieve safe travel for everyone, which requires respect and focus on the diversity of Virginians in race, socioeconomic status, gender, age, ability, and travel mode. As noted, [*this plan includes a seventh guiding principle—actions consider equity*](#). The SHSP strives to use a data-driven approach to achieve equity in transportation safety by incorporating equity considerations into strategies and actions. Example guidelines for considering equity in transportation across the 4Es include:

- Engineering improvements should benefit all users, particularly those that are most vulnerable in the transportation system
- Educational programs should focus on and be easily understood by Virginia's diverse and underserved communities
- Enforcement should be fairly applied to all communities and populations
- Emergency response and medical services should be available to serve victims of any crash, regardless of location, in a timely manner

The plan also builds on VDH's equity efforts that developed a [Health Opportunity Index](#) (HOI), which is used by VDOT in the Pedestrian Safety Action Plan. The HOI identifies the social, economic, educational, demographic, and environmental factors at the census tract level that might impact transportation plans and projects.

Equity is also a consideration in how law enforcement is applied. The SHSP is following the guidance from the [Governors Highway Safety Association](#) (GHSA), the [National Safety Council](#) (NSC), and others in supporting the equitable and just application of the law by enforcement officers regardless of a person's race. To make sure this principle is adopted, the SHSP integrates equity into all aspects of the plan to address institutional and systemic biases and ensure the safety needs of everyone are met—regardless of who they are, where they travel or what mode they use.

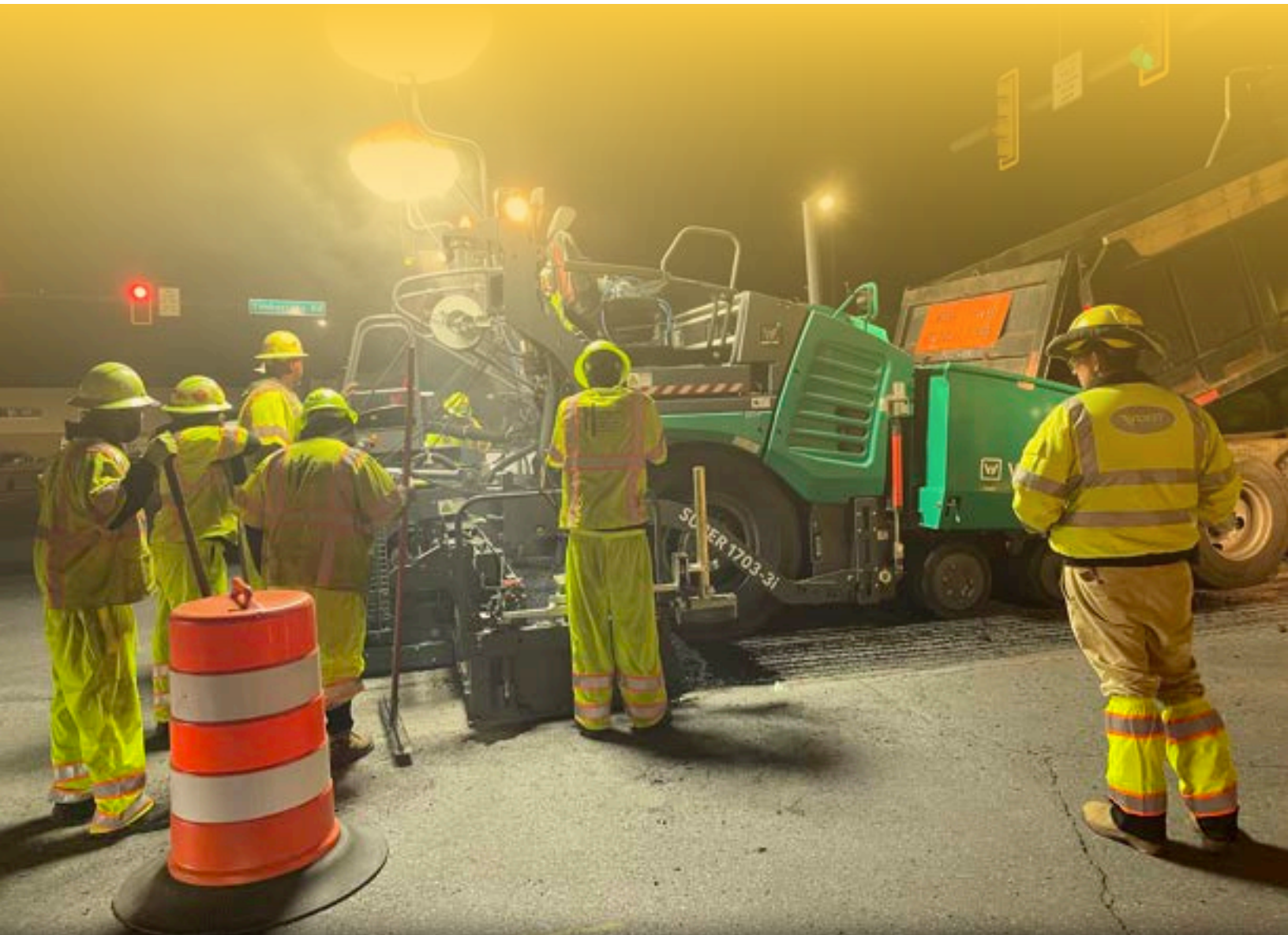
[Safety culture](#) is the "shared values, actions, and behaviors that demonstrate a commitment to safety over competing goals and demands." To effectively implement a Safe System, one of the cornerstones that needs to be in place is a culture that instills the expectation that users of the road system will be protected and that the responsibility for a safe transportation system is shared among the 4Es and every user. Refer to the [What You Can Do to Support the SHSP](#) chapter for more insight into building the safety culture in Virginia.

Both equity and safety culture link directly to the mission of achieving safe travel for everyone because achieving zero fatalities and serious injuries requires the active involvement of all residents, workers, and visitors who want to travel safely on Virginia's public roads.

PRIORITY STRATEGIES

Another new aspect of the 2022-2026 SHSP is the identification of priority strategies that are aligned with the guiding principles. These strategies represent proven approaches that successfully reduce traffic-related fatalities and serious injuries. These strategies are sorted into the plan's emphasis areas as appropriate followed by the actions that will implement the effective solution. The priority strategies are:

- Implement road improvements that ensure human mistakes and vulnerabilities do not result in serious injuries or fatalities
- Adopt an approach that considers risk when prioritizing locations for safety improvements and programs
- Recognize road safety as a public health issue and establish policies and programs that promote safe behavior and reduce crash severity outcomes
- Develop and implement programs that provide education and awareness to high-risk road users
- Implement innovative solutions and utilize current and emerging technologies





Source: Getty Images.

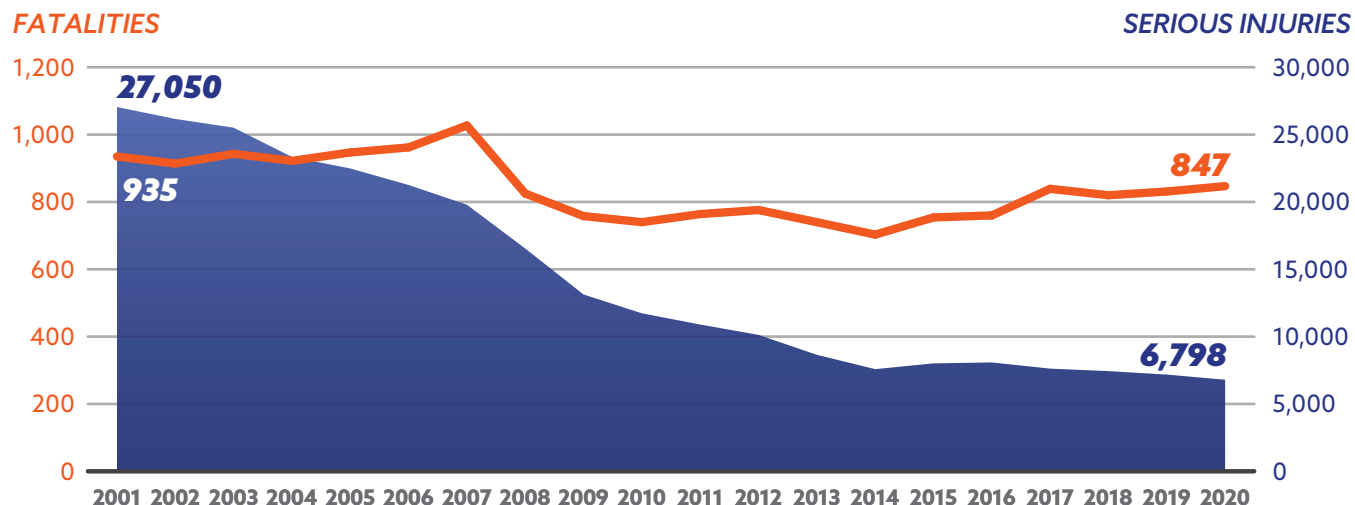
THE STATE OF TRAFFIC SAFETY

FATALITIES AND SERIOUS INJURIES

Twenty years ago, 935 people were killed and another 27,050 people were seriously injured on Virginia's roads as shown in Figure 7. In 2020, those numbers had decreased to 847 people killed and 6,798 people seriously injured; however, the paths to the 2020 numbers have been very different. Virginia has seen a decrease in the number of serious injuries per year since 2000, with a decrease from 2001 to 2014 of approximately 1,500 serious injuries per year and a much smaller decrease from 2015 to 2020 of approximately 240 serious injuries per year.

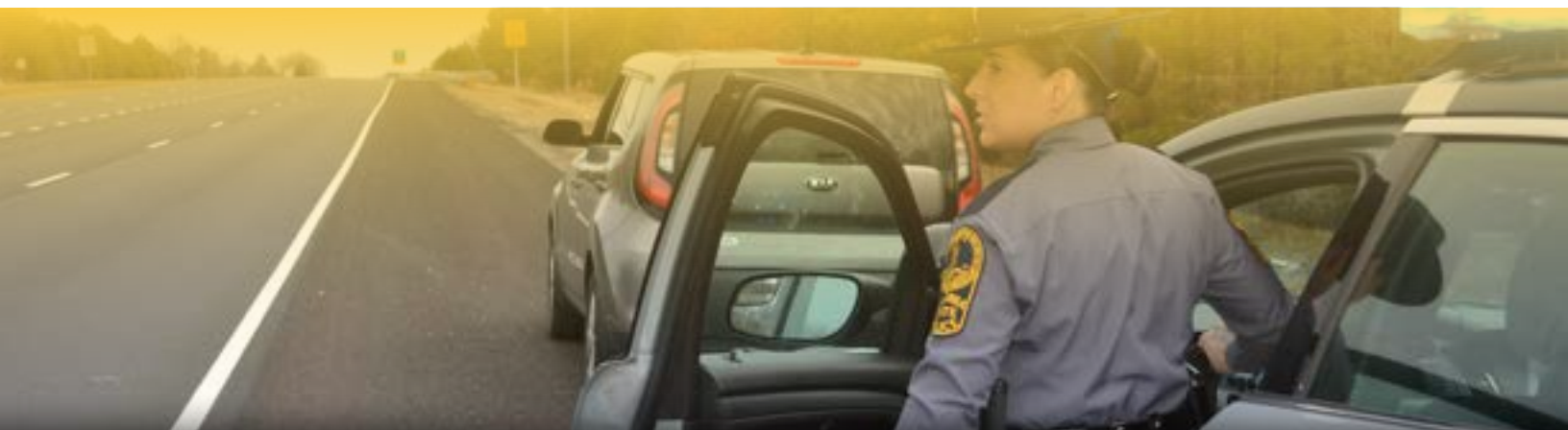
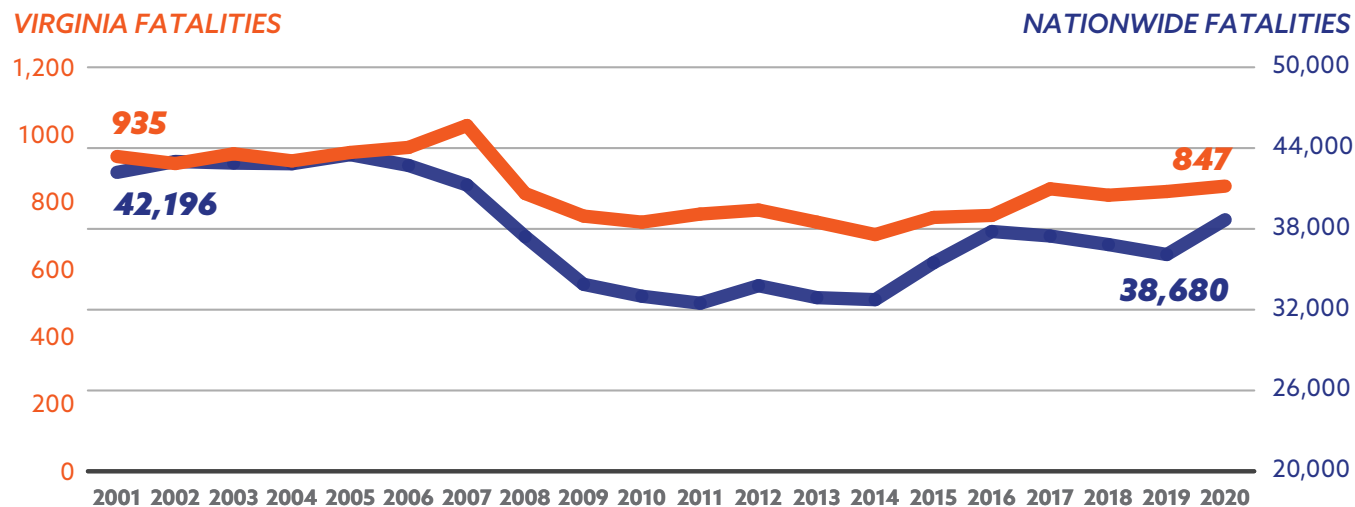
The number of fatalities has fluctuated greatly since 2001 and can be characterized into three main trends: increasing fatalities between 2001 and 2007, decreasing fatalities between 2007 and 2014, and increasing fatalities since 2014. The statewide trends between 2001 and 2016 closely resemble the trends in nationwide fatalities as shown in Figure 8. However, fatalities in Virginia have continued to increase since 2016 while fatalities nationwide decreased until 2019. NHTSA has estimated that the nationwide fatality total increased to 38,680 in 2020.

FIGURE 7. TREND IN FATALITIES AND SERIOUS INJURIES, 2001-2020



Note: Fatality data for 2001 through 2019 is reported from the NHTSA Fatality Analysis Reporting System (FARS). Fatality data for 2020 and serious injury data are reported from VDOT's Roadway Network System (RNS).

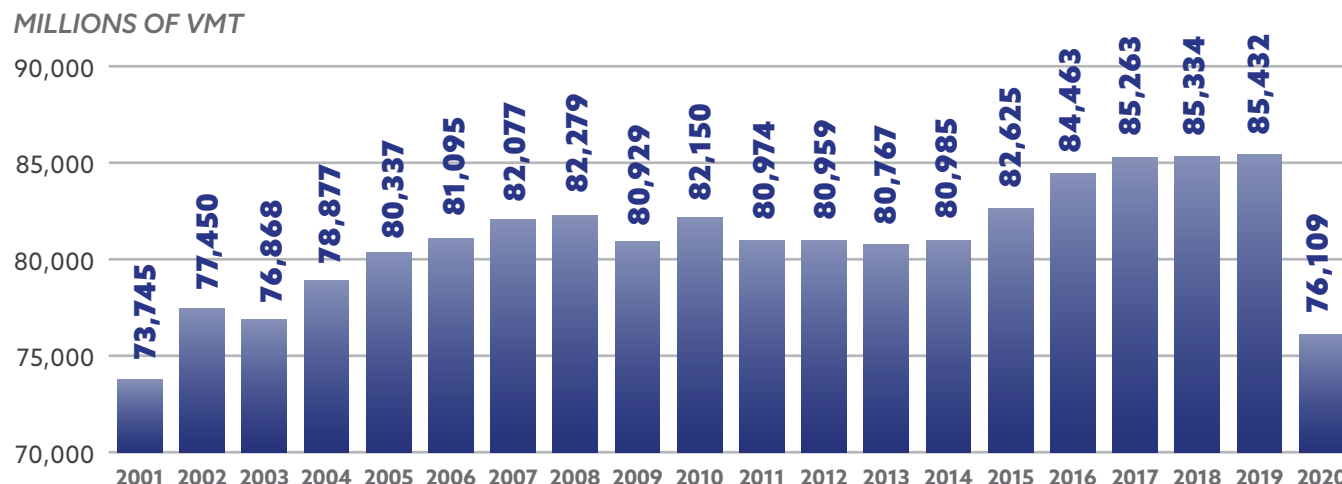
FIGURE 8. COMPARISON OF STATEWIDE AND NATIONWIDE FATALITY TRENDS, 2001-2020



VEHICLE MILES TRAVELED AND FATALITY AND SERIOUS INJURY RATES

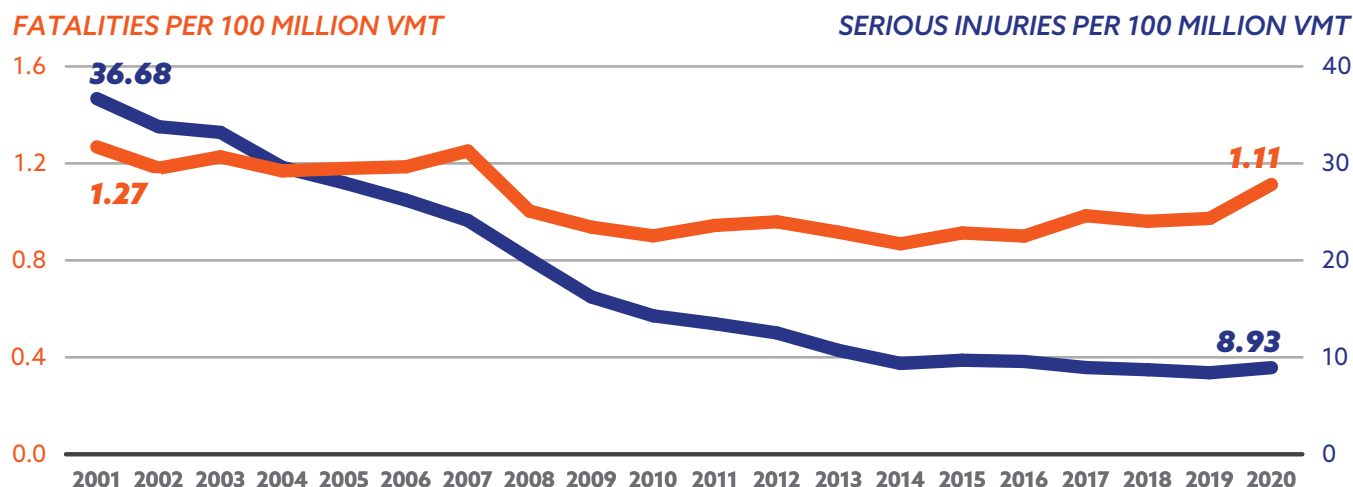
The amount of yearly travel in Virginia, measured in VMT, is a key measure to understand the trends in fatalities and serious injuries. Over the past 20 years, VMT steadily increased from 2001 to 2008 (by approximately 1,200 million per year), held steady from 2009 to 2014, and increased from 2014 to 2019 (by approximately 900 million per year) as shown in Figure 9. The shift from steady VMT before 2014 to increasing VMT after 2014 coincides with the low point in annual fatalities as shown in Figure 7. VMT decreased by approximately 10 percent in 2020 due to the COVID-19 pandemic as many Virginians worked from home and otherwise did not travel, resulting in VMT dropping below 2002 levels.

FIGURE 9. VEHICLE MILES TRAVELED PER YEAR, 2001-2020



Since serious injuries have decreased over the past 20 years while VMT has increased, the decline in serious injury rate has been more significant than the decline in serious injuries as shown in Figure 10. The fatality rate decreased from 2007 to 2014 as fatalities decreased and VMT held steady. The increase in the fatality rate between 2014 and 2019 indicates that fatalities grew at a faster rate than VMT. Although VMT decreased by approximately 10 percent in 2020, fatalities increased from 2019, which led to a 15 percent increase in the fatality rate.

FIGURE 10. TRENDS IN FATALITY AND SERIOUS INJURY RATES, 2001-2020



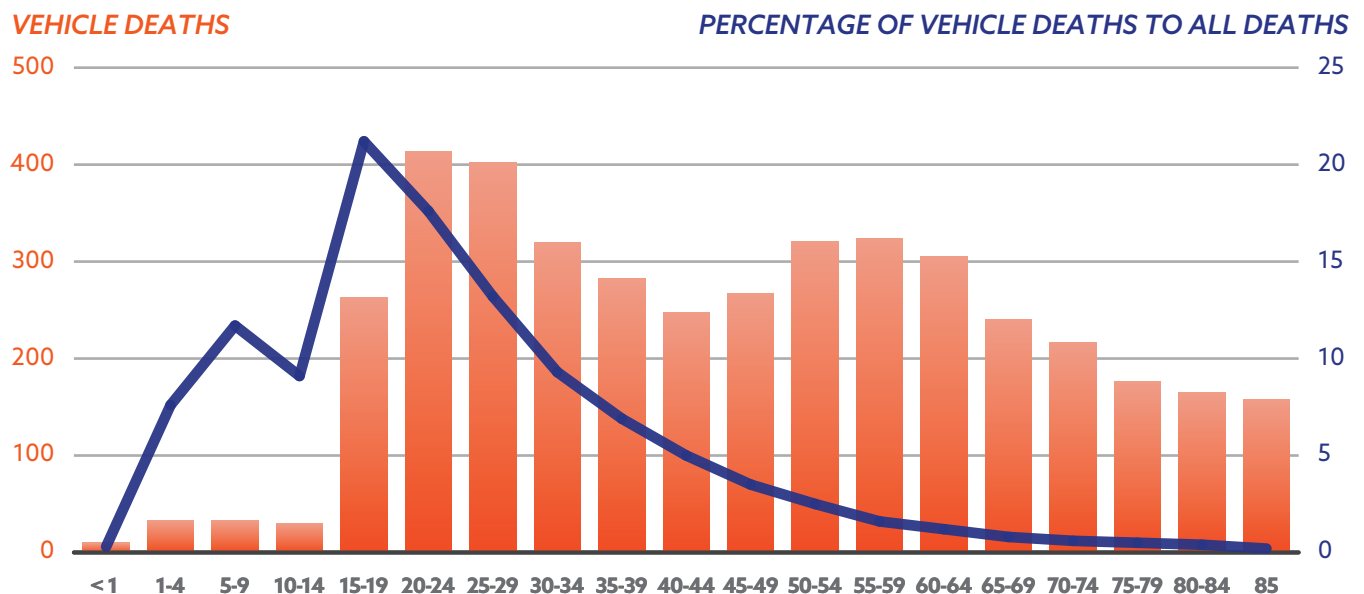
LEADING CAUSES OF DEATH

Motor vehicle crashes are a leading cause of death for young Virginians and a serious public health problem that takes substantial resources to respond to and provide treatment or hospitalization. According to data from VDH, motor vehicle crashes are one of the top four leading causes of death from 2015 to 2019 for Virginians between the ages of 5 and 34 as shown in Table 1. Motor vehicle crashes account for approximately 20 percent of all deaths for Virginians between the ages of 15 and 19, which is the second leading cause of death after suicide. The number and percentage of vehicle deaths compared to all deaths is summarized for various age ranges in Figure 11. While the percentage of vehicle deaths compared to all deaths drops for Virginians 35 and older, at least 200 Virginians died in motor vehicle crashes between 2015 and 2019 for each five-year age range between 15 and 74.

TABLE 1. LEADING CAUSES OF DEATH IN VIRGINIA, 2015-2019

RANK	AGE RANGE					
	5-9	10-14	15-19	20-24	25-29	30-34
1	Cancer	Cancer	Suicide	Non-Transport Incidents	Non-Transport Incidents	Non-Transport Incidents
2	Motor Vehicle Crashes	Suicide	Motor Vehicle Crashes	Suicide	Suicide	Suicide
3	Non-Transport Incidents	Motor Vehicle Crashes	Homicide	Motor Vehicle Crashes	Motor Vehicle Crashes	Major Cardiovascular Diseases
4	Chronic Lower Respiratory Diseases	Non-Transport Incidents	Non-Transport Incidents	Homicide	Homicide	Motor Vehicle Crashes

FIGURE 11. NUMBER AND PERCENTAGE OF VEHICLE DEATHS BY AGE RANGE, 2015-2019



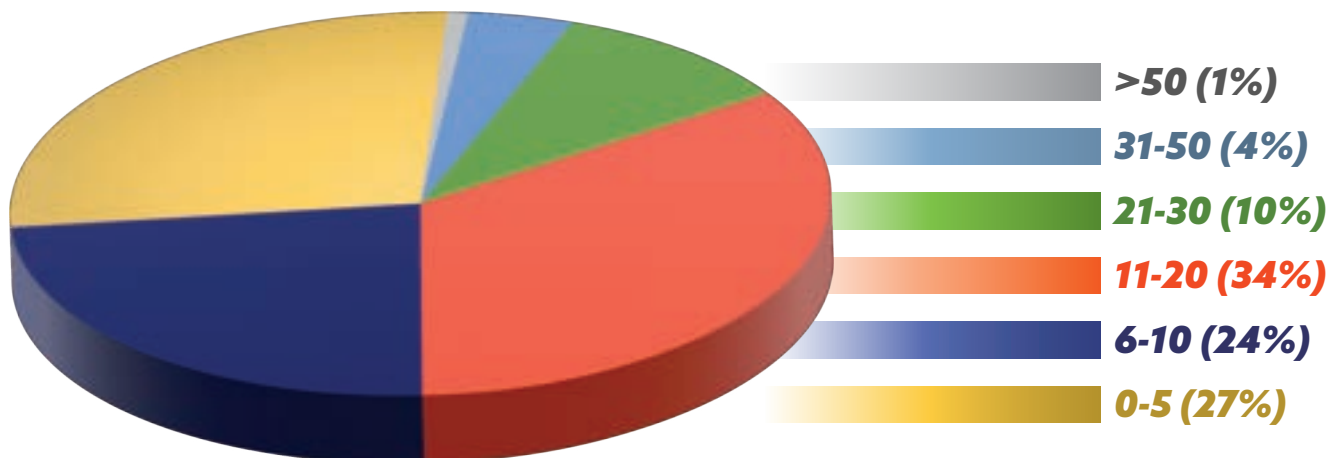
Traffic safety is also being recognized as a health equity concern. Health and equity are fundamentally linked with transportation safety, mobility, and access. Beginning with vulnerable users who are walking and biking, primarily in urbanized areas, VDOT collaboration with VDH identified that nearly half (48 percent) of pedestrian fatal crashes and 62 percent of pedestrian injury crashes occurred in communities with very low or low [health opportunities](#). These areas have lower incomes, education levels, vehicle ownership, and other social determinants of health tracked and indexed by VDH. Health equity is also related to the young driver, aging road users¹ and those living in rural areas with longer emergency response times. Additional research is ongoing to determine demographic correlations with severe crashes across the Commonwealth extending to rural jurisdictions.

*Every **68 minutes** Virginia **EMS and trauma** are providing care to fatal or seriously injured casualties.*

AGE OF VEHICLE FLEET

Advancing vehicle technology can contribute to reducing the number of fatalities and serious injuries on Virginia roads by mitigating the severity of crashes (e.g., crumple zones, seat belts, air bags) or helping prevent crashes from occurring (e.g., blind spot detection, electronic stability control, driver assistance). NHTSA estimated that the average vehicle on the road in 2012 had a 56 percent lower fatality risk than the average vehicle on the road in the 1950s and that vehicle safety contributed to saving over 27,000 lives nationwide in 2012.² In 2020, 27 percent of the approximately 8.4 million registered vehicles in Virginia were less than five years old while another 24 percent were between six and ten years old as shown in Figure 12. Fifty percent of the registered vehicles in Virginia were model year 2011 or newer.

FIGURE 12. AGE OF VEHICLE FLEET IN VIRGINIA, 2020



¹ According to NHTSA, drivers ages 75 to 79 are 3.5 times more likely to be killed in a crash than drivers 30 to 65 years old. The ratio increases to 9.5 times after age 80.

² https://www.nhtsa.gov/sites/nhtsa.gov/files/documents/newer-cars-safer-cars_infographic_010320_2-tag.pdf.

AGE OF LICENSED DRIVERS

Since 2016, the number of licensed young drivers (between the ages of 15 and 20) in Virginia has not fluctuated much but the number of licensed drivers older than 65 has increased each year as shown in Figure 13. From 2016 to 2020, the number of licensed drivers ages 65 and older increased by approximately seven percent. VTrans defined ten macro-trends, or emerging patterns of change likely to impact state government and require a response, in its [Technical Guide: Development and Monitoring of VTrans Long-Term Risk & Opportunity Register](#). One macrotrend was the growth of the 65+ cohort, which reflected the change in relative proportion of Virginia's population over age 65. The percentage of Virginia's population ages 65 and older is projected to grow 16 percent by 2030 and 18 percent by 2040 as shown in Figure 14.³ From 2016 to 2020, drivers ages 19 and under made up 5 percent of all licensed drivers in Virginia. This percentage is projected to remain similar since the percentage of the population ages 19 and under in Virginia is projected to remain at 25 percent through 2040.

FIGURE 13. AGE OF LICENSED DRIVERS IN VIRGINIA

NUMBER OF LICENSED DRIVERS

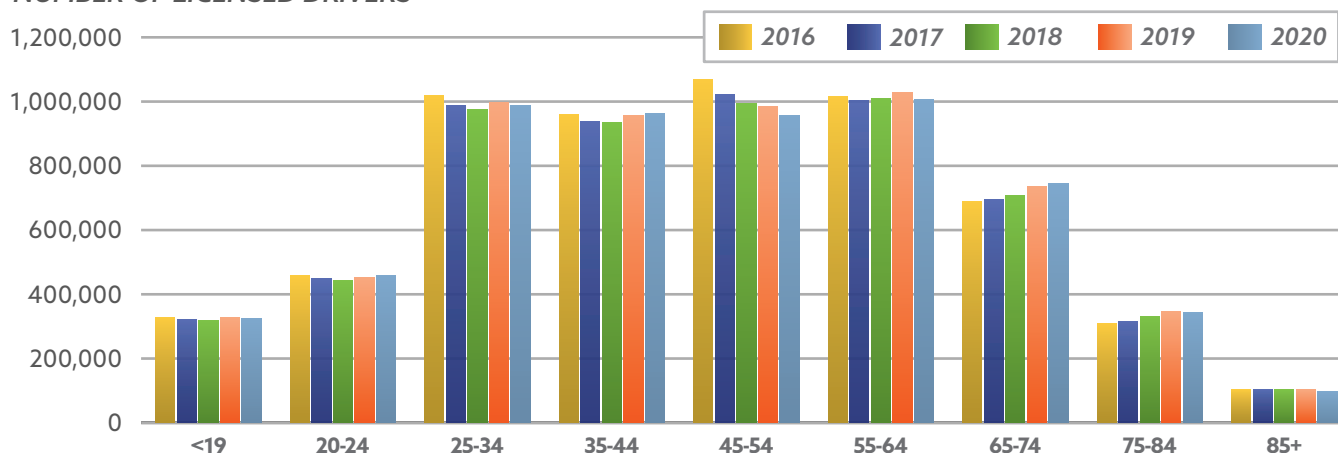
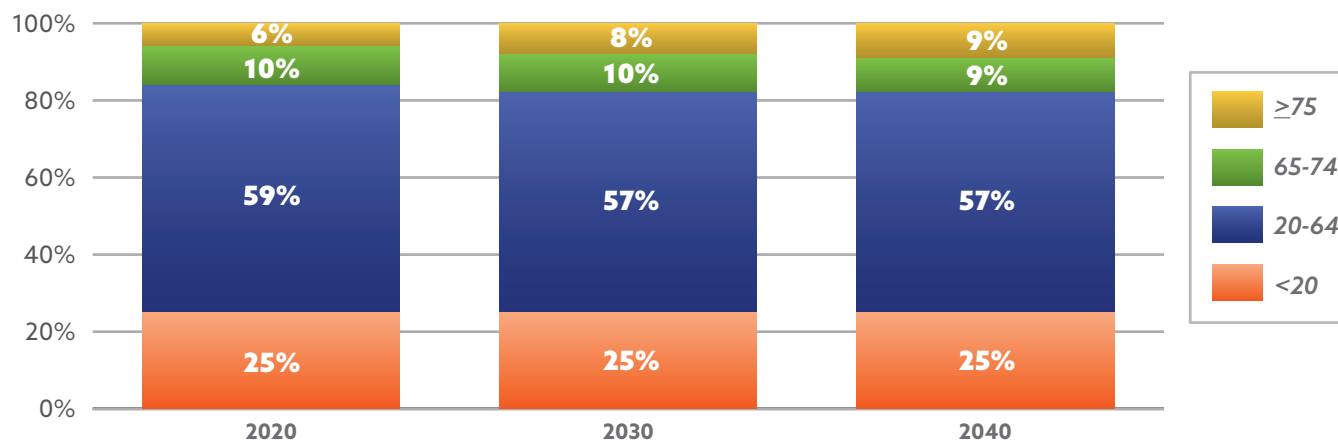


FIGURE 14. FORECASTED POPULATION DISTRIBUTION IN VIRGINIA BY AGE GROUP, 2020-2040

PERCENTAGE OF POPULATION



³ Based on data from the Weldon Cooper Center for Public Service, July 2019.



Source: Getty Images.

NETWORK SCREENING

Determining where to focus resources for infrastructure improvements and behavioral interventions is fundamental to reducing severe crashes in the Safe System approach. Advancements in data sources and collection with new analytics has provided award-winning methods for Virginia's 4E partners to conduct roadway network screening to identify priority locations for treatment.

VDOT and the DMV Highway Safety Office (HSO) release and periodically update several network screening-level data-sets to identify parts of Virginia's transportation network where roadway safety can be improved.

POTENTIAL FOR SAFETY IMPROVEMENT

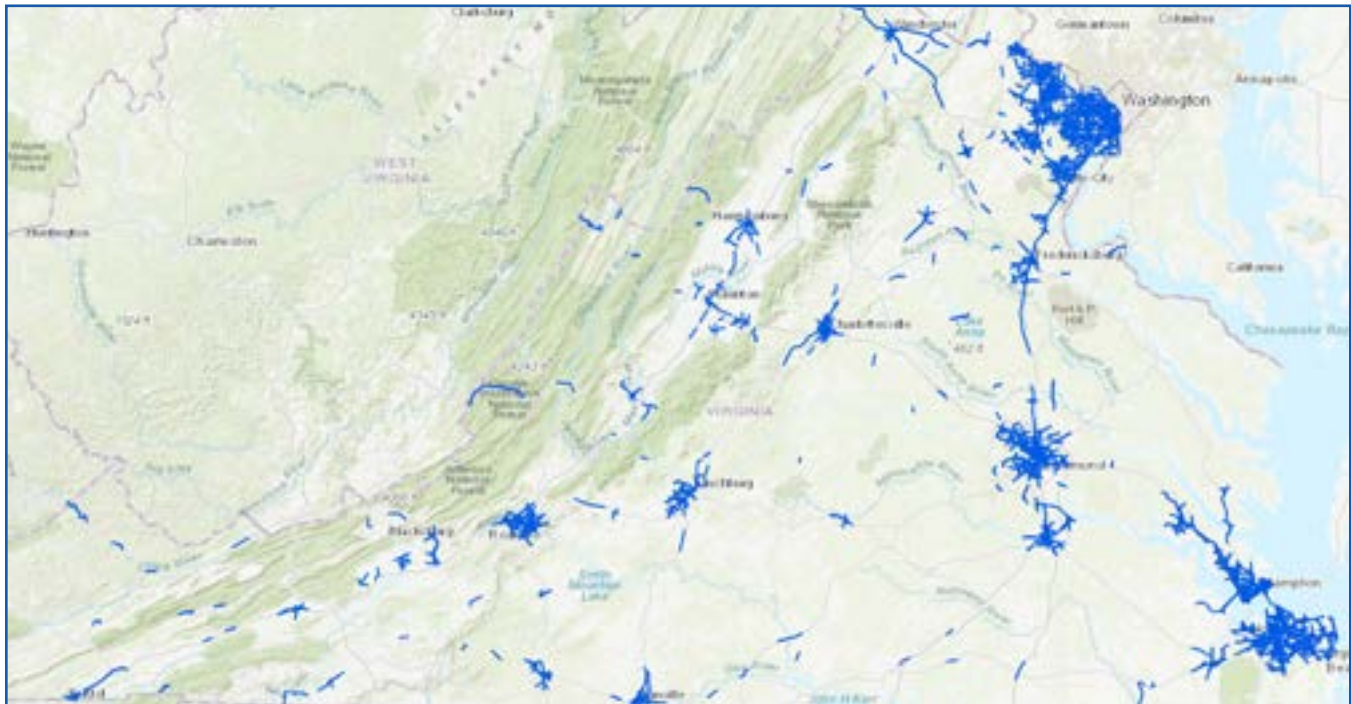
Potential for safety improvement ([PSI](#)) is a measure that identifies how much the long-term crash frequency could be reduced at a particular site (road segment or intersection) based on methodologies from the Highway Safety Manual. VDOT annually conducts network screening analysis for all intersections and roadways throughout the State with sufficient roadway, traffic volume, and crash data. This information and mapping are used to prioritize locations for further investigation and HSIP project scoping. Every other year, the PSI information is used to identify VTrans [needs](#), which aids engineers and planners to identify locations where larger capital infrastructure projects should be considered for [SMART SCALE](#) funding.

PEDESTRIAN SAFETY ACTION PLAN

PRIORITY CORRIDORS

VDOT, through its Pedestrian Safety Action Plan (PSAP), conducts a predictive systemic analysis to identify and prioritize roadway segments that may benefit most from pedestrian countermeasures. The systemic analysis considers factors such as vehicle traffic, posted speed limit, roadway geometry, pedestrian crash history, the VDH HOI, population and employment density, and other census-level information. Many of the priority corridors identified were in developed areas along multilane roadways where pedestrians may frequent. The priority corridors are categorized by percentile and used to determine where to focus HSIP resources and for SMART SCALE application project planning and scoping. Figure 15 shows the priority corridors that scored into the top five percent using 2016-2020 data.

FIGURE 15. VIRGINIA PSAP TOP FIVE PERCENT STATEWIDE CORRIDORS

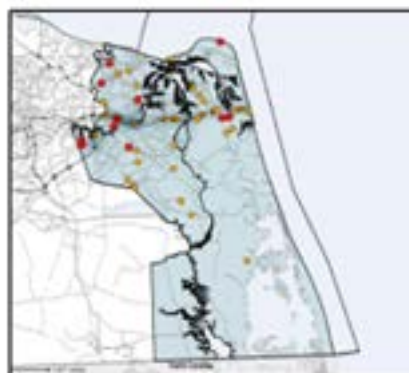
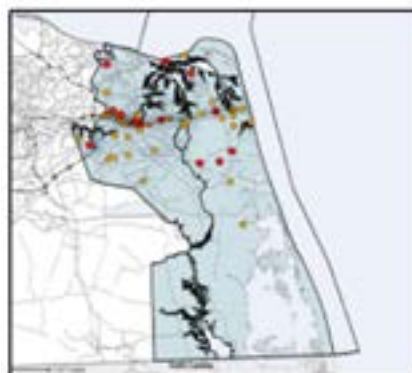


BEHAVIORAL MAPPING AND DATA PROFILES

For behavioral programs and campaigns funded by NHTSA and State funds, the DMV HSO annually publishes legislative area, jurisdictional, and corridor information and maps for those emphasis areas that fall under safe road users and safe speeds. This information is provided to local, regional, and statewide partners to indicate areas in which behavioral safety can be improved. Table 2 is an example from Virginia Beach that shows an annual data summary and crash maps for the speed emphasis area. It was taken from the DMV's HSO's [FY 2022 Highway Safety Plan](#).

TABLE 2. EXAMPLE VIRGINIA BEACH SPEED EMPHASIS AREA DATA AND MAPPING

DEPARTMENT OF MOTOR VEHICLES - HIGHWAY SAFETY OFFICE				
Portsmouth Region				January 2021
Virginia Beach City Speed Crash Statistics				
Available Crash Data - Calendar Year	2016	2017	2018	2019
Speed Crashes	812	813	781	715
Speed Fatal Crashes	6	7	13	11
Highest Time Period	3:00 pm-5:59 pm 6:00 am-8:59 am (34%)	3:00-5:9 pm (43%)	9:00 pm-11:59 pm (46%)	3:00 am-5:59 am (27%)
Highest Day(s)	Monday (50%)	Sunday-Tuesday (58%)	Friday (31%)	Saturday (27%)
Highest Month(s)	May (33%)	March (29%)	July (31%)	February-March (36%)
Speed Serious Injury Crashes	48	37	39	40
Highest Time Period	6:00 pm-8:59 pm Midnight-2:59 am (42%)	Midnight-2:59 am (24%)	3:00 pm-5:59 pm Midnight-2:59 am (52%)	6:00 pm-8:59 pm (28%)
Highest Day(s)	Friday (21%)	Saturday-Sunday (44%)	Monday (26%)	Sunday (32%)
Highest Month(s)	May (15%)	December-September (22%)	May (15%)	March (18%)
Speed Injury Crashes	299	302	297	266
Highest Time Period	3:00 pm-5:59 pm (23%)	3:00 pm-5:59 pm (25%)	3:00 pm-5:59 pm (29%)	3:00 pm-5:59 pm (23%)
Highest Day(s)	Friday (18%)	Saturday-Wednesday (32%)	Friday (21%)	Tuesday (16%)
Highest Month(s)	April-March (22%)	December-September (24%)	December-June (24%)	March (11%)



The blue gradient represents the density of all speed crashes.

This report was generated by the Center for Geospatial Information Technology



- Speed Fatal Interstate Crashes
- Speed Serious Injury Interstate Crashes

- Speed Fatal Non-Interstate Crashes
- Speed Serious Injury Non-Interstate Crashes



Source: Getty Images.

EMPHASIS AREAS

In updating the SHSP, one of the first steps taken by the Steering Committee was to review the safety data and determine where to focus efforts over the next five years. The resulting emphasis areas are the predominant factors that contribute to or result in fatalities and serious injuries either because of the large numbers or because there are disturbing increases and impacts. Figure 16 and Figure 17 show the breakdown of fatalities and serious injuries by emphasis area from 2016 to 2020.

FIGURE 16. STATEWIDE FATALITIES BY EMPHASIS AREA

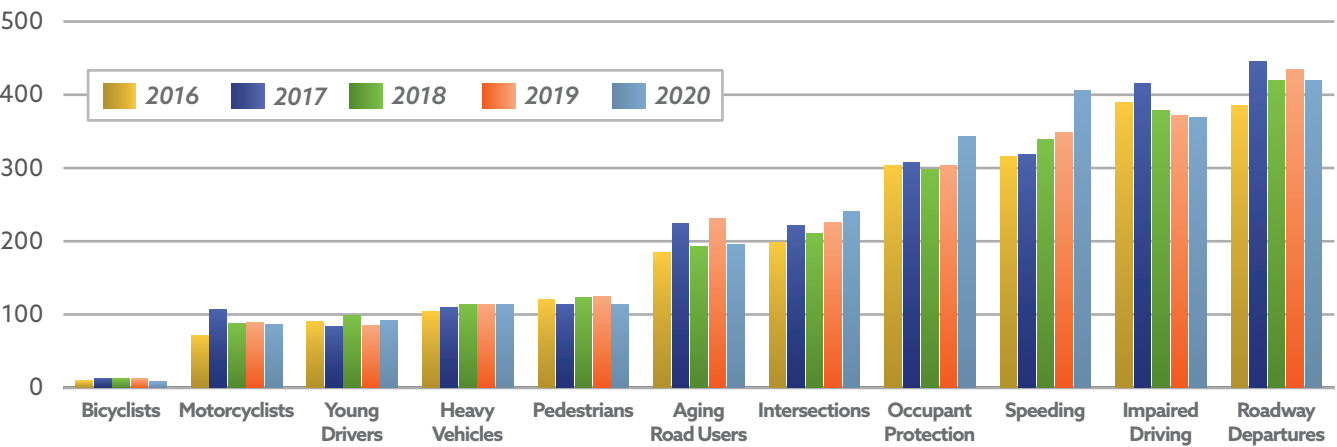
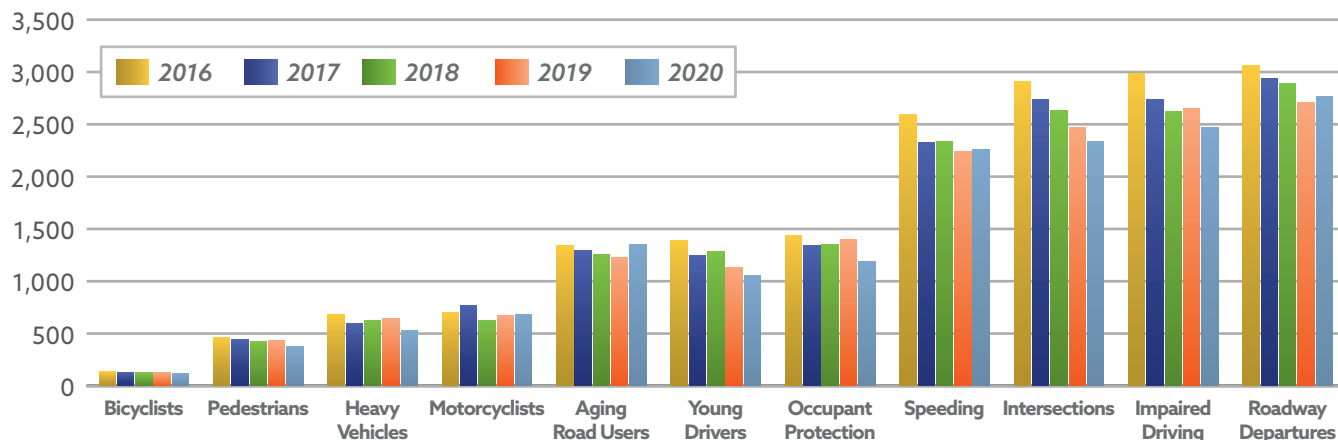


FIGURE 17. STATEWIDE SERIOUS INJURIES BY EMPHASIS AREA



While Figure 16 and Figure 17 indicate the emphasis areas that have contributed to the most fatalities and serious injuries between 2016 and 2020, they do not reveal which user types, driving behaviors, or crash types typically occur in the same crash. Table 3 shows the number of fatalities and serious injuries for each emphasis area (in one column) that include another emphasis area (in each row). Each emphasis area chapter that follows contains a further breakdown of this table to differentiate the number of fatalities and serious injuries and provide more information about the two highest contributing factors (other emphasis areas) to the emphasis area summarized in that chapter.

TABLE 3. EMPHASIS AREA HEAT MAP FOR FATALITIES AND SERIOUS INJURIES

	Impaired Driving	Speeding	Occupant Protection	Roadway Departure	Intersections	Young Drivers	Bicyclists	Pedestrians	Aging Road Users	Motorcyclists	Heavy Vehicles
Total	15,082	13,486	8,146	16,470	14,478	6,524	702	2,739	7,642	3,892	3,629
Impaired Driving	—	5,666	3,998	7,255	4,680	2,156	182	1,081	1,988	837	1,049
Speeding	5,666	—	3,923	7,232	3,195	2,511	53	290	1,668	1,299	1,249
Occupant Protection	3,998	3,923	—	5,040	2,140	1,335	0	10	929	3	680
Roadway Departure	7,255	7,232	5,040	—	0	2,553	24	0	1,897	1,263	1,197
Intersections	4,680	3,195	2,140	0	—	2,429	417	1,256	3,454	1,339	885
Young Drivers	2,156	2,511	1,335	2,553	2,429	—	155	212	610	305	304
Bicyclists	184	54	0	25	419	157	—	1	136	3	21
Pedestrians	1,113	308	10	0	1,269	215	1	—	634	6	151
Aging Road Users	1,992	1,671	929	1,897	3,454	610	136	629	—	558	769
Motorcyclists	852	1,313	3	1,271	1,359	309	3	6	568	—	95
Heavy Vehicles	1,049	1,249	680	1,197	885	304	21	146	769	93	—

LEGEND



In keeping with the integration of the Safe System approach, Virginia adopted the emphasis areas shown in Figure 18 and categorized them within the five Safe System elements. The exception is data and analytics which is a supporting emphasis area.

FIGURE 18. 2022-2026 SHSP EMPHASIS AREAS



Three new emphasis areas, shown in orange in Figure 18, were added based on concerns over the increasing number of crashes and the impact on the transportation system. They include:

- Aging Road Users (drivers and pedestrians 65 years and older)
- Motorcyclists
- Heavy Vehicles, which include commercial vehicles, large trucks, and buses

EMPHASIS AREA STRUCTURE

Each of the emphasis areas include one or more of the priority strategies, as appropriate, followed by the actions that will implement that strategy. Each action has also been assigned a time frame under which the action may be initiated: ongoing, short term (one to two years), or long term (three to five years).

The following chapters include a description of each emphasis area, supporting crash data analysis that demonstrates the nature and extent of the problem, and the strategies and actions. Each action is labeled with one or more icons to indicate which 4E will be responsible for implementing the program or project. The 4Es of safety include:



Engineering involves the design, operation, and maintenance of the road and surrounding environment and the efforts that prevent crashes or reduce their severity.



Enforcement are the actions taken by authorized law enforcement to equitably ensure all road users follow the law.



Education involves the information and materials that are distributed on traffic safety issues through public awareness campaigns, the media, social media, driver's education, presentations, and meetings.



Emergency Response and Medical Services is the post-crash care that involves emergency responders who provide medical and trauma services in the event of a crash.

To make sure that the plan is implemented, Virginia has developed and is using a tracking and monitoring program that identifies the implementation progress on each action as well as the yearly numbers and rates of fatalities and serious injuries overall and for each emphasis area.



Source: Getty Images.

SAFE ROAD USERS

The first element is safe road users. The Safe System approach addresses the crash risk of all road users, including those who walk, bicycle, drive, ride transit, and travel by other modes. All road users are considered equal regardless of how they choose to travel. Each road user has a responsibility to operate, to the best of their ability, within the boundaries set by system managers and laws in the Commonwealth. Education and enforcement can help to modulate road user behavior.

Human beings make mistakes, but there is a need to acknowledge that driving, riding, bicycling, and walking needs to be the primary task when using the roads. It is each person's responsibility to comply with the rules and act appropriately within the road system design.



Source: Getty Images.

EMPHASIS AREA

BICYCLISTS AND PEDESTRIANS

Emphasis Area	Bicyclists and Pedestrians
Safe System Element	Safe Road Users
How are bicyclist fatalities and serious injuries defined?	All bicyclists killed or seriously injured in a crash. This does not include non-bicyclists killed or seriously injured in a crash involving a bicyclist.
How are pedestrian fatalities and serious injuries defined?	All pedestrians killed or seriously injured in a crash. This does not include non-pedestrians killed or seriously injured in a crash involving a pedestrian.

Many people use Virginia's transportation system to walk or bicycle for part or all of their trip. Bicyclists and pedestrians are more vulnerable than motorists to the kinetic energy of a crash and thus more likely to suffer severe injuries when involved in a collision. As recreational bicycling and bicycling as a primary mode of transportation becomes more popular throughout Virginia, programs, and projects to accommodate bicycle use have been increasing. Pedestrian facilities and accommodations have also been improving through HSIP, TAP, and SMART SCALE funding, among other sources.

From 2016 to 2020, 57 bicyclist fatalities and 645 serious injuries occurred in Virginia. Bicyclist fatalities increased from 10 in 2016 to 13 in 2017, 2018, and 2019 before decreasing to 8 in 2020 as shown in Figure 19. Bicyclist serious injuries decreased from 140 in 2016 to 118 in 2020.

From 2016 to 2020, 596 pedestrian fatalities and 2,143 serious injuries occurred in Virginia. Pedestrian fatalities increased from 78 in 2015 to 121 in 2016 and have remained within seven fatalities of the 2016 total in the years since as shown in Figure 20. Pedestrian serious injuries decreased from 467 in 2016 to 432 in 2019 before there was a more significant reduction to 373 in 2020. The greater reductions in bicyclist and pedestrian fatalities and serious injuries in 2020 compared to previous years may be attributed to changing travel volumes and patterns due to the COVID-19 pandemic.



VDOT conducted detailed crash assessments for bicyclist and pedestrian crashes in 2017 that led to the development of the Pedestrian and Bicyclist Safety Action Plans. The assessments indicated four major factors that influence bicyclist and pedestrian road safety outcomes:

- **Speed** – higher speeds narrow the driver’s field of view, increase the distance traveled while reacting and braking, and increase collision severity
- **Crossing** – many severe crashes occur when bicyclists or pedestrians cross the road, both at and outside of intersections (mid-block)
- **Visibility/Conspicuity** – the ability for drivers to see bicyclists and pedestrians is crucial as most fatalities and many serious injuries occur when light is limited
- **Community** – adjacent land use and the socioeconomic and demographic community composition contribute to the level of bicyclist and pedestrian activity⁴

FIGURE 19. BICYCLIST FATALITIES AND SERIOUS INJURIES

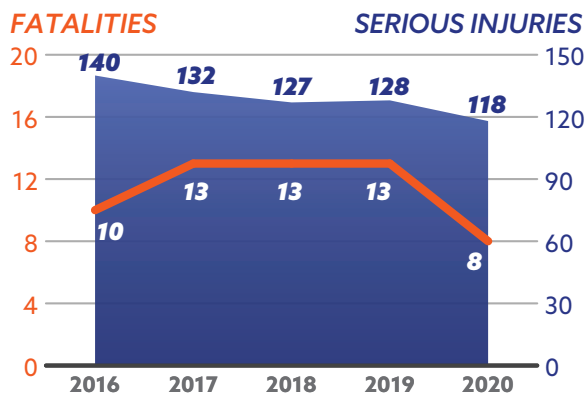
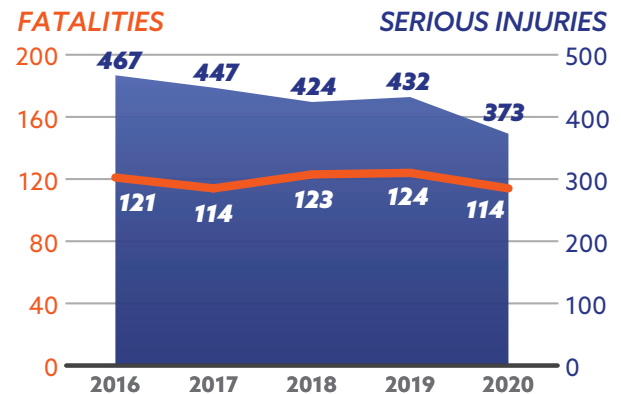
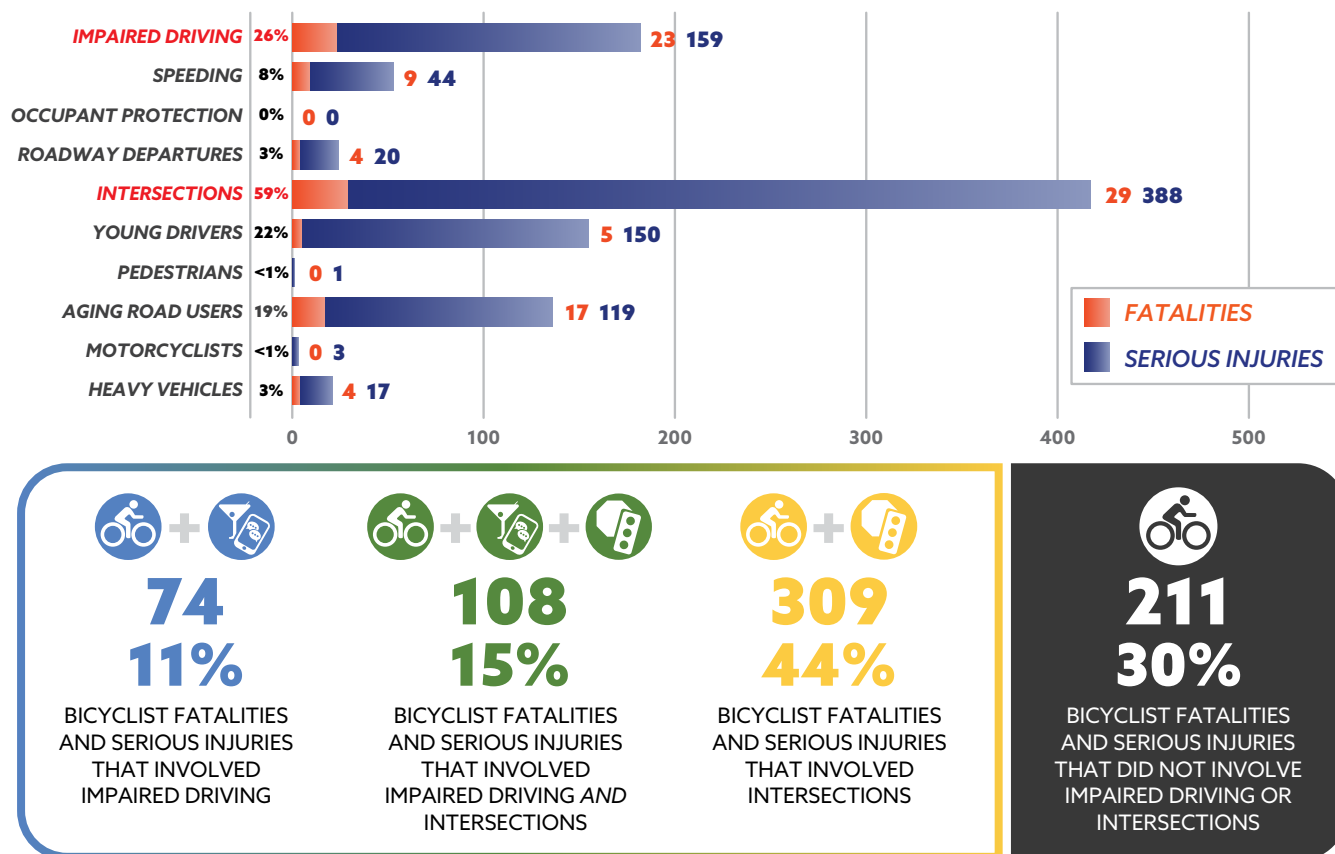


FIGURE 20. PEDESTRIAN FATALITIES AND SERIOUS INJURIES



⁴ VDOT’s Pedestrian Safety Action Plan identifies that the VDH Health Opportunity Index (HOI), a composite score of 13 factoring indicators of the social determinates of health, is spatially correlated with bicyclist and pedestrian crashes and risk.

FIGURE 21. CONTRIBUTING FACTORS TO BICYCLIST FATALITIES AND SERIOUS INJURIES

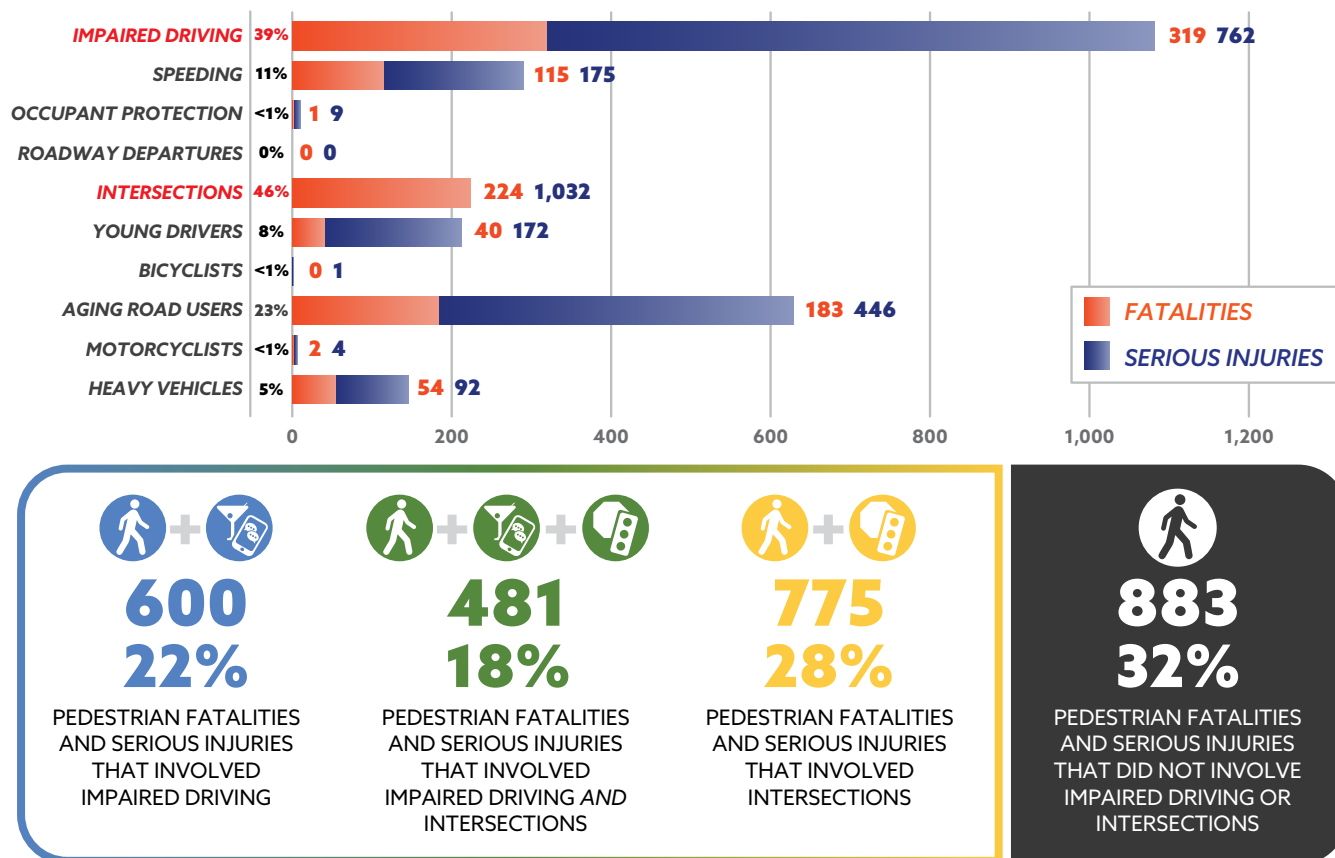


The emphasis areas factors that contribute most to bicyclist fatalities and serious injuries are intersections and impaired driving, which contribute to 59 and 26 percent of all bicyclist fatalities and serious injuries as shown in Figure 21. Aging road users and young drivers are other overlapping factors needing consideration. Fifteen percent of bicyclist fatalities and serious injuries involved impaired driving and occurred at an intersection.

Intersections and impaired driving are also the top contributing factors for pedestrian fatalities and serious injuries as they contribute to 46 and 39 percent of the fatalities and serious injuries as shown in Figure 22. This means that 54 percent of pedestrian fatalities and serious injuries occur outside the influence of intersections (mid-block). Eighteen percent of the pedestrian fatalities and serious injuries involved impaired driving and occurred at an intersection.



FIGURE 22. CONTRIBUTING FACTORS TO PEDESTRIAN FATALITIES AND SERIOUS INJURIES



Two different age groups of bicyclists, those between 16 and 25 and those between 46 and 55, account for approximately 40 percent of the total bicyclist fatalities and serious injuries as shown in Figure 23. Young bicyclists account for approximately 24 percent of the fatalities and serious injuries with 12 percent for bicyclists 15 and younger and 12 percent for bicyclists between 16 and 20. Males were predominately more involved in severe crashes, particularly for those older than 45. Pedestrian fatalities and serious injuries are more evenly dispersed among all age groups as shown in Figure 24. Pedestrians aged 16 to 25 made up the highest proportion of fatalities and serious injuries, consisting of 316 male and 168 female fatalities and serious injuries. Young pedestrians account for approximately 18 percent of the fatalities and serious injuries with 10 percent for pedestrians 15 and younger and 8 percent for pedestrians between 16 and 20.

Across all ages, approximately 82 percent of all bicycle fatalities and serious injuries and 65 percent of all pedestrian fatalities and serious injuries were male.



FIGURE 23. NUMBER OF FATALITIES AND SERIOUS INJURIES BY AGE AND GENDER—BICYCLISTS

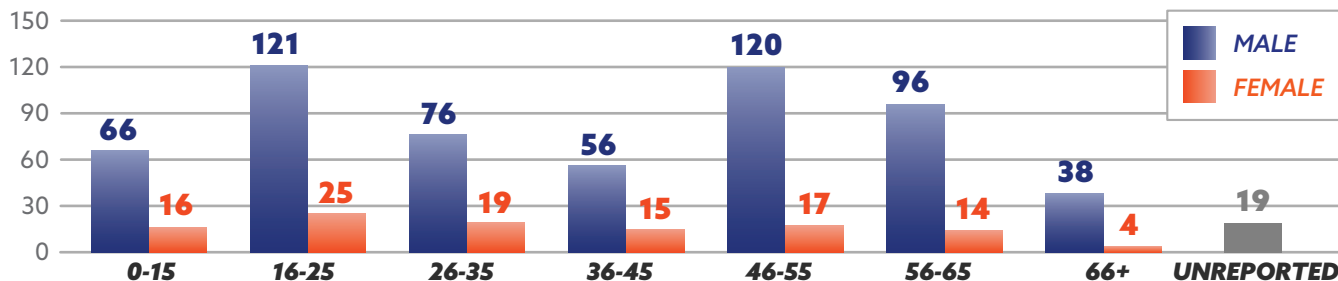
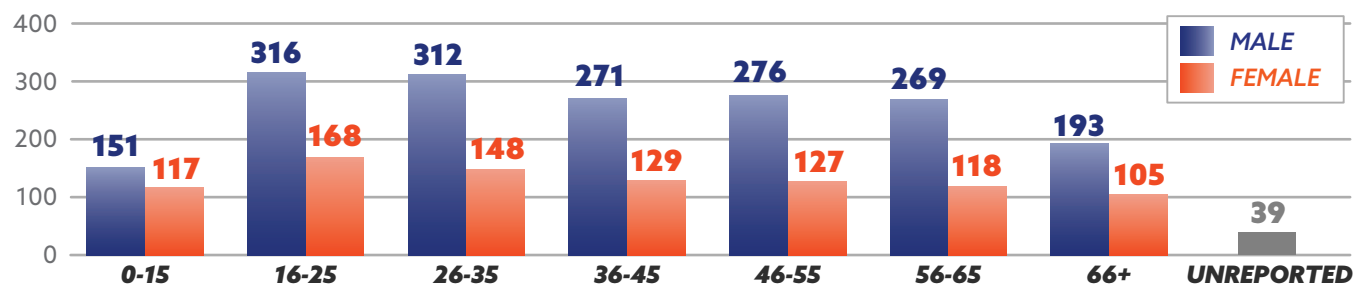


FIGURE 24. NUMBER OF FATALITIES AND SERIOUS INJURIES BY AGE AND GENDER—PEDESTRIANS



Approximately 27 percent of bicyclist fatalities and serious injuries occurred during dark conditions as shown in Figure 25, with 10 percent occurring on roads without lighting. About 55 percent of pedestrian fatalities and serious injuries occurred during dark conditions as shown in Figure 26. This over-representation is occurring even though most vehicular travel is heaviest during daylight hours. Approximately 26 percent occur on roads without lighting. For fatalities, the proportion increases to 41 percent occurring during dark conditions on roads without lighting.

FIGURE 25. PERCENTAGE OF FATALITIES AND SERIOUS INJURIES BY LIGHTING CONDITION—BICYCLISTS

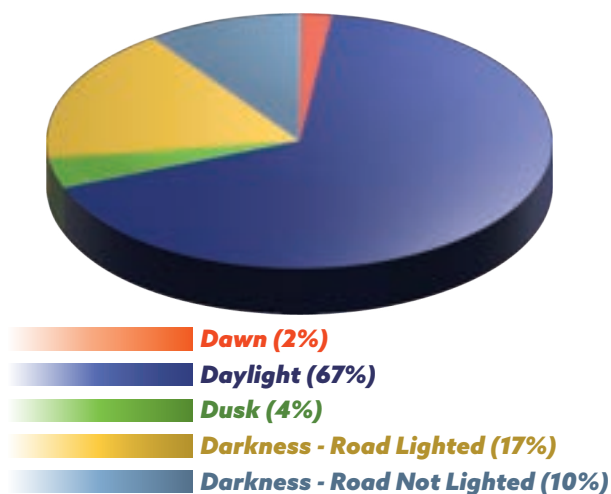
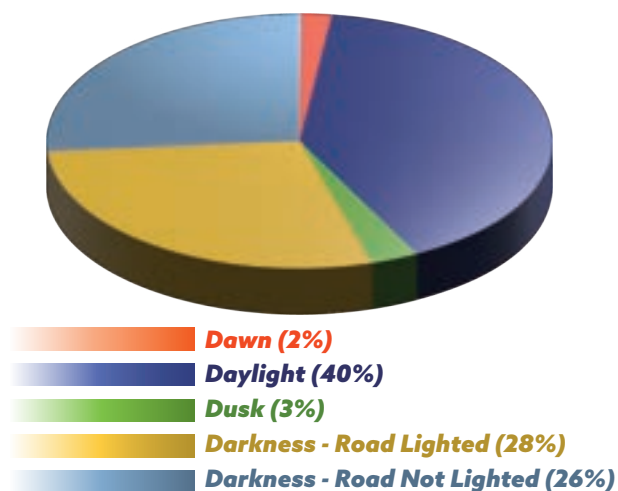


FIGURE 26. PERCENTAGE OF FATALITIES AND SERIOUS INJURIES BY LIGHTING CONDITION—PEDESTRIANS



Both bicyclist and pedestrian fatalities and serious injuries follow the same trend in relation to the road speed limit where the crash occurred: as speed increases the percentage of crash-related deaths also increases. Although more bicyclists and pedestrians are seriously injured on a road with a 25 or 30 miles per hour (mph) speed limit, less than three percent of bicyclists and 12 percent of pedestrians involved in crashes were killed. The larger low speed limit numbers are likely due to more non-motorized activity in lower speed cities, towns, and residential areas. Conversely, on a road with a 55 or 60 mph speed limit, approximately 22 percent of bicyclists and 37 percent of pedestrians involved in crashes were killed as shown in Figure 27 and Figure 28.

FIGURE 27. NUMBER OF FATALITIES AND SERIOUS INJURIES BY ROAD SPEED LIMIT—BICYCLISTS

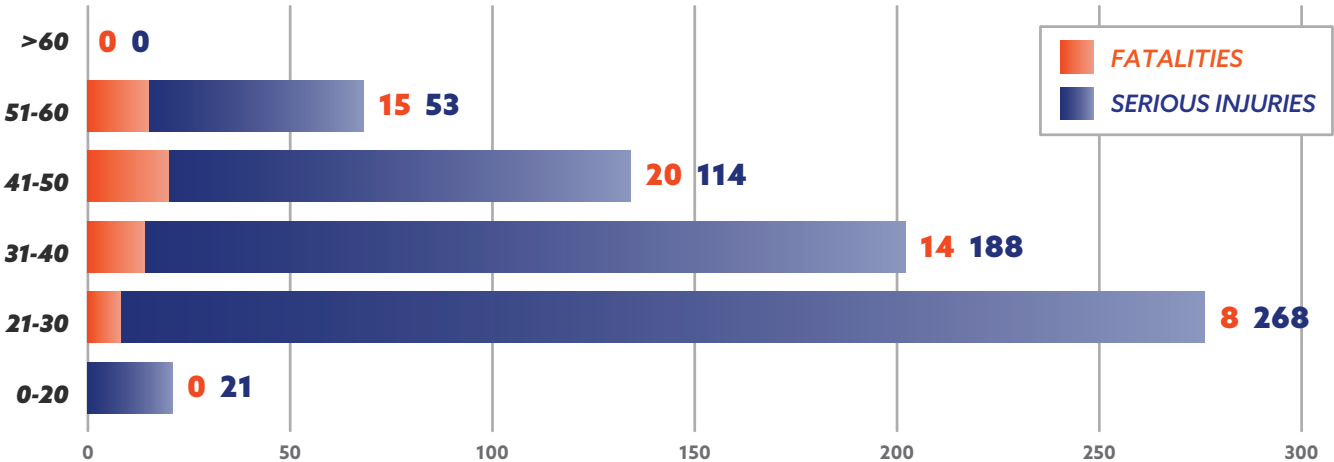
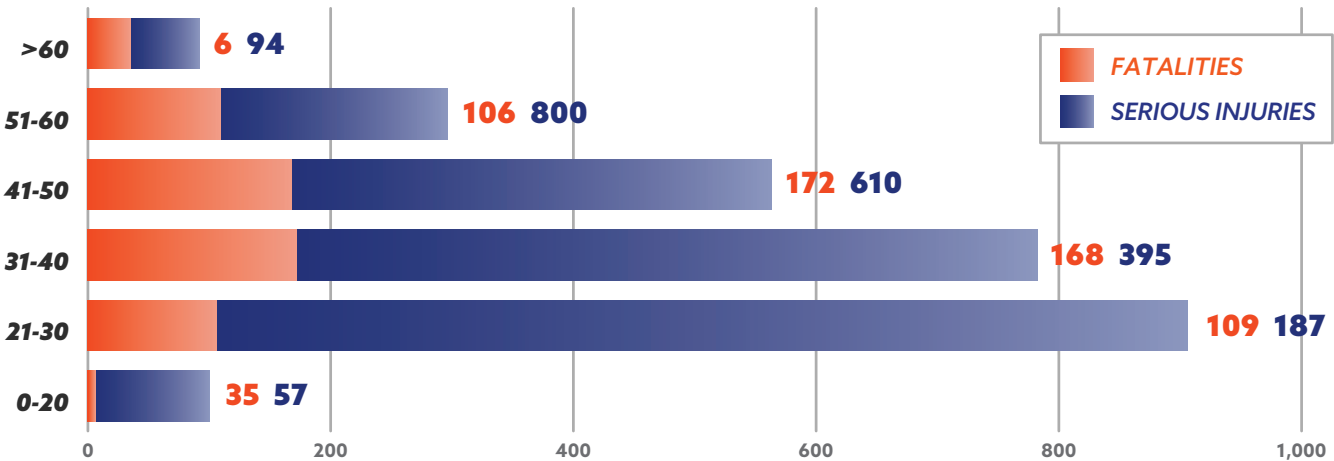


FIGURE 28. NUMBER OF FATALITIES AND SERIOUS INJURIES BY ROAD SPEED LIMIT—PEDESTRIANS



Additionally, studies have shown that survivability (risk of death) and serious injury risk increases dramatically with increasing vehicle speed at time of impact. Table 4 shows the average risk of a severe injury and death for a pedestrian at various speed limits based on the results from a recent GHSA [study](#)⁵ on speeding.

TABLE 4. RISK OF SERIOUS INJURY AND DEATH BY MILES PER HOUR (MPH)

Average Risk	Speed for Severe Injury	Speed for Risk of Death
10%	16 MPH	23 MPH
25%	23 MPH	32 MPH
50%	31 MPH	42 MPH
75%	39 MPH	50 MPH
90%	46 MPH	58 MPH

Further, as indicated in the [State of Traffic Safety](#) chapter, assessment of pedestrian crashes has been found to be strongly correlated with 48 and 60 percent of death and injuries, respectively, occurring in areas with very low or low social determinant of health (HOI). This indicates the need to work with VDH and other stakeholders on health equity, active and safe transportation issues in these areas.

While bicyclist and pedestrian data is considered separately, safety stakeholders in Virginia have identified one list of actions in Table 5 that can be completed in the next five years to reduce the number of bicyclist and pedestrian fatalities and serious injuries. Each action has been categorized under the appropriate strategy and the 4E that is responsible for implementation. The actions have also been assigned a time frame under which implementation may be initiated: ongoing, short term (one to two years), or long term (three to five years).

The objective of these actions is to reduce the total number of bicyclist fatalities and serious injuries from 126 in 2020 to 111 in 2026—a reduction of approximately 3 fatalities and serious injuries per year—and to reduce the total number of pedestrian fatalities and serious injuries from 487 in 2020 to 428 in 2026—a reduction of approximately 10 fatalities and serious injuries per year.

⁵ Governors Highway Safety Association (GHSA), *Speeding Away from Zero: Rethinking a Forgotten Traffic Safety Challenge* (2019).



TABLE 5. BICYCLIST AND PEDESTRIAN STRATEGIES AND ACTIONS**Priority Strategy 1: Implement road improvements that ensure human mistakes and vulnerabilities do not result in serious injuries or fatalities.**

Revise design practices to emphasize context and target speed that reflects the needs of pedestrians and bicyclists. **[Long Term]**

Priority Strategy 2: Adopt an approach that considers risk when prioritizing locations for safety improvements and programs.

Update and enhance the Virginia Pedestrian Safety Action Plan (PSAP) biannually with VDH Health Opportunity Index and other transportation and social determinant for travel and risk considerations with potential travel demand inputs from recent research. Enhance the use of PSAP data and findings in project planning and development. Implement PSAP policy recommendations. **[Ongoing]**

Priority Strategy 3: Recognize traffic safety as a public health issue and establish policies and programs that promote safe behavior and reduce crash severity outcomes.

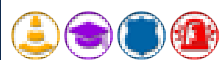
Investigate and share successful education and enforcement initiatives that positively impact knowledge and compliance with traffic laws by motorists, bicyclists, and pedestrians including speeding, impaired or distracted driving, and midblock crossing. **[Ongoing]**



Recruit new and effective partners to ensure the pedestrian and bicycle programs are reaching diverse and underserved communities and to ensure equity and social determinants of health are at the forefront to decrease pedestrian- and bicycle-related crashes. **[Ongoing]**



Promote the collaborative effort Prioritizing Active Transportation, Health, and Safety (PATHS), which includes VDH, VDOT, and DMV to better serve community needs and improve health outcomes by cross sectorial sharing of knowledge, resources, and experience. **[Ongoing]**



Continue the statewide DMV HSO pedestrian taskforce to assess and develop countermeasures to implement strategies and encourage existing coalitions to address pedestrian fatalities and serious injuries. **[Ongoing]**



Provide outreach materials that are current and available from partners to advise and educate all road users on safe practices. This includes motorists when driving near and around pedestrians and bicyclists and facility use by bicyclists and pedestrians. **[Ongoing]**

Priority Strategy 4: Develop and implement programs that provide education and awareness to high risk road users.

Conduct pedestrian and bicyclist safety training events. Provide outreach materials that are current and available from partners to advise and educate pedestrians and bicyclists about maintaining visibility and practicing safe pedestrian and bicyclist actions. **[Ongoing]**



Develop or enhance and disseminate educational materials and videos to educate road users and law enforcement on compliance with traffic control devices, factors associated with pedestrian and bicyclist crashes, and the significance of speed on pedestrian and bicyclist injury severity. Promote pedestrian- and bicyclist-related laws in an easy-to-understand manner for each age and community. **[Ongoing]**



Provide resources to schools, including Safe Routes to Schools, to educate students how to walk or bicycle safely in environments with traffic and other safety risks. **[Ongoing]**

Priority Strategy 5: Implement innovative solutions and utilize current and emerging technologies.

Collect and use pedestrian and bicyclist crash, volume, and infrastructure data to identify trends and gaps to improve safety. Continue data integration and sharing with partners and stakeholders. **[Ongoing]**



Enhance and deploy policy guidance on road crossing design considerations for uncontrolled, unsignalized, and traffic signal-controlled intersections during maintenance and construction project planning and development. Consider and implement proven pedestrian and bicyclist countermeasures, new technologies, or innovative designs at higher-risk crossing locations. **[Ongoing]**



EMPHASIS AREA

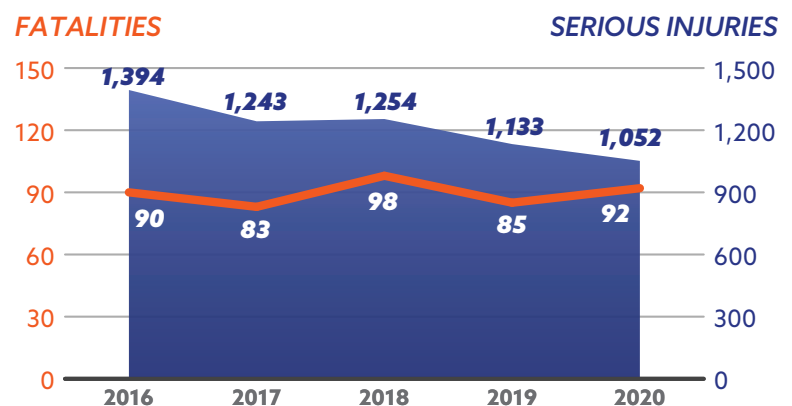
YOUNG DRIVERS

Emphasis Area	Young Drivers
Safe System Element	Safe Road Users
How are young driver fatalities and serious injuries defined?	All people of any age who are killed or seriously injured in a crash where one or more drivers were between the ages of 15 and 20.

According to NHTSA, young drivers are overrepresented in terms of involvement in fatal crashes compared to the number of all licensed drivers in 2019.⁶ There are any number of reasons for young driver crashes, but often it is their lack of experience behind the wheel. Some young people may also engage in risky behavior, which is associated with brain development, that can lead to problems on the road. Brain development research suggests that judgment, decision making, and deferring immediate reward are not fully developed until about age 25.

Young drivers were involved in 16 percent of all fatalities and serious injuries in Virginia. Between 2016 and 2020, 448 people died and 6,096 were seriously injured in traffic crashes involving a young driver in Virginia as shown in Figure 29. Serious injuries declined approximately 25 percent between 2016 and 2020. Fatalities have fluctuated annually between 2016 and 2020, most recently with an increase from 85 in 2019 to 92 in 2020.

FIGURE 29. YOUNG DRIVER FATALITIES AND SERIOUS INJURIES

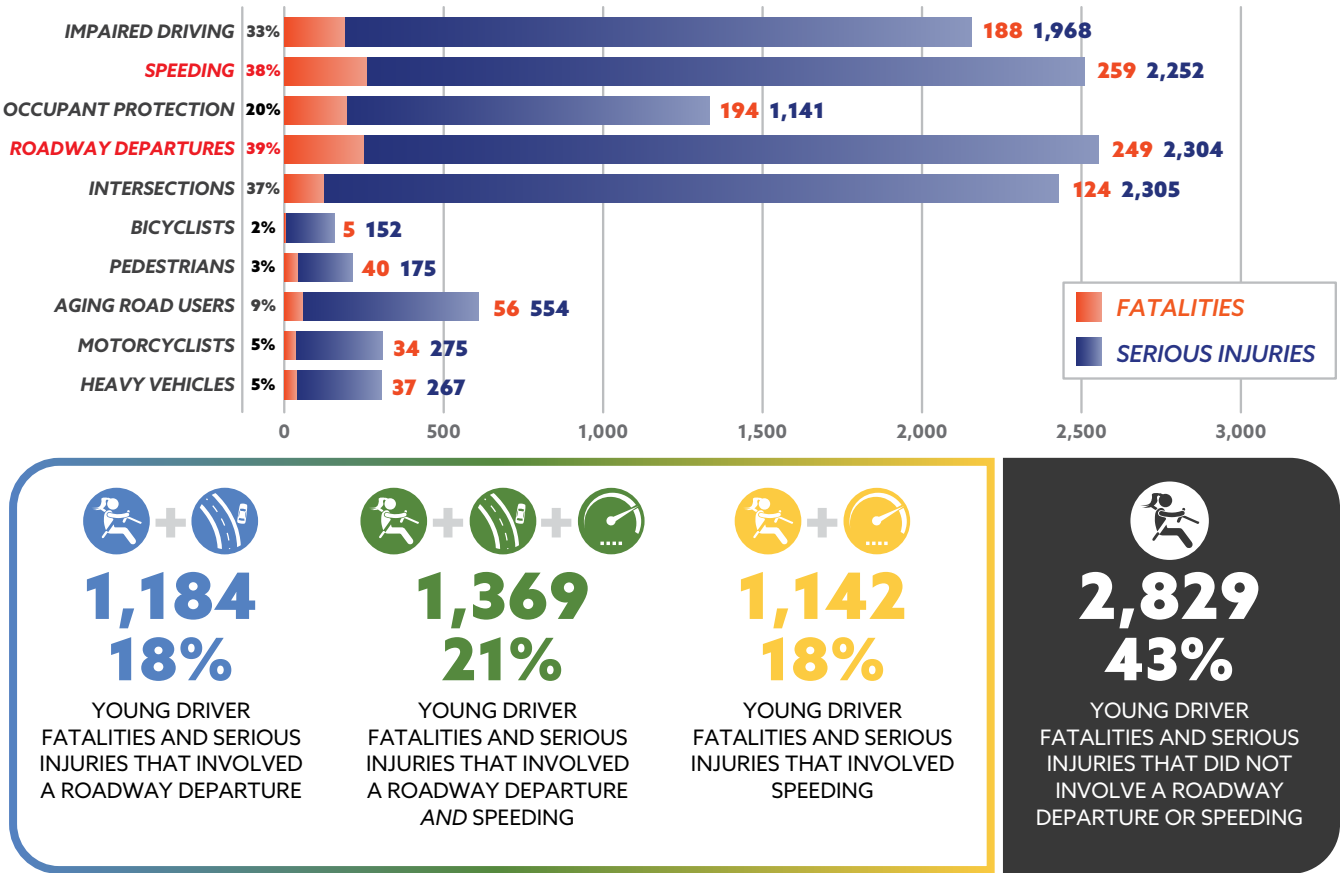


⁶ NHTSA, June 2021. Traffic Safety Facts, 2019 Data, Young Drivers, National Highway Traffic Safety Administration, DOT HS 813 130.

Source: Getty Images.

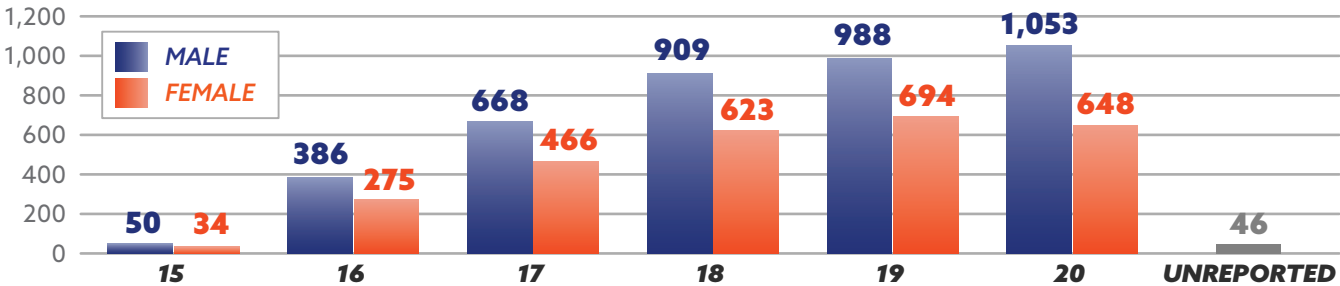
The emphasis area factors that contribute to most young driver fatalities are speeding and roadway departures as shown in Figure 30. For serious injuries, the primary factors are roadway departures, intersections, and speeding. Twenty-one percent of young driver fatalities and serious injuries involved both roadway departure and speeding.

FIGURE 30. CONTRIBUTING FACTORS TO YOUNG DRIVER FATALITIES AND SERIOUS INJURIES



Across all ages, male young drivers contribute to more fatalities and serious injuries than female young drivers, accounting for approximately 59 percent of the fatalities and serious injuries that involved a young driver as shown in Figure 31. The number of fatalities and serious injuries associated with young drivers increases as age increases for both males and females, except for a slight decrease in fatalities and serious injuries between crashes involving 19- and 20-year-old females.

FIGURE 31. NUMBER OF FATALITIES AND SERIOUS INJURIES BY AGE AND GENDER OF YOUNG DRIVER



Given the high numbers of roadway departure and intersection severe crashes, most young driver fatalities and serious injuries involve a crash with a fixed object or an angle crash as shown in Figure 32. Rear end crashes are also a serious injury problem.

FIGURE 32. NUMBER OF FATALITIES AND SERIOUS INJURIES BY CRASH TYPE

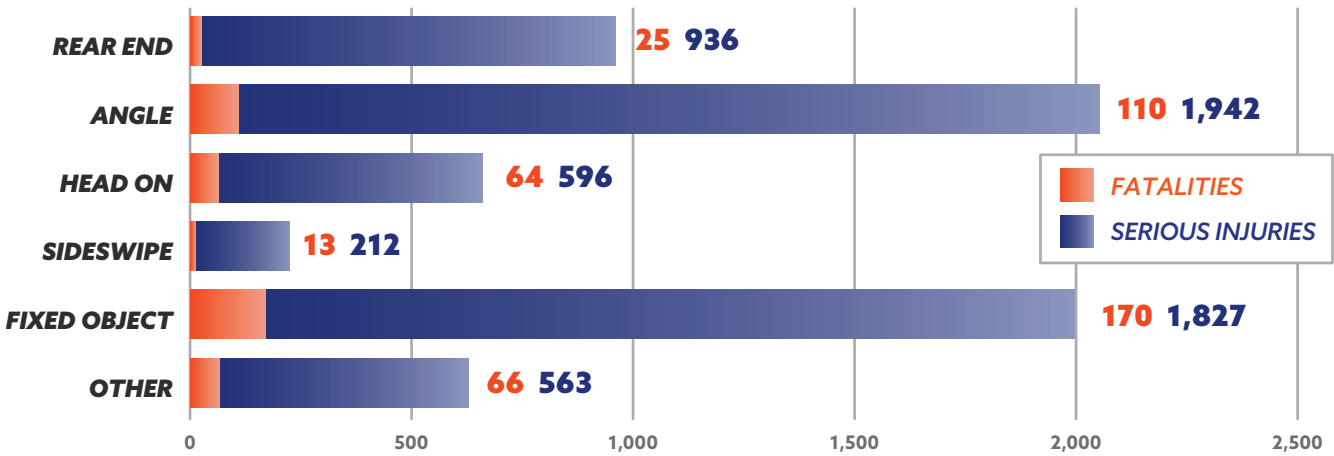
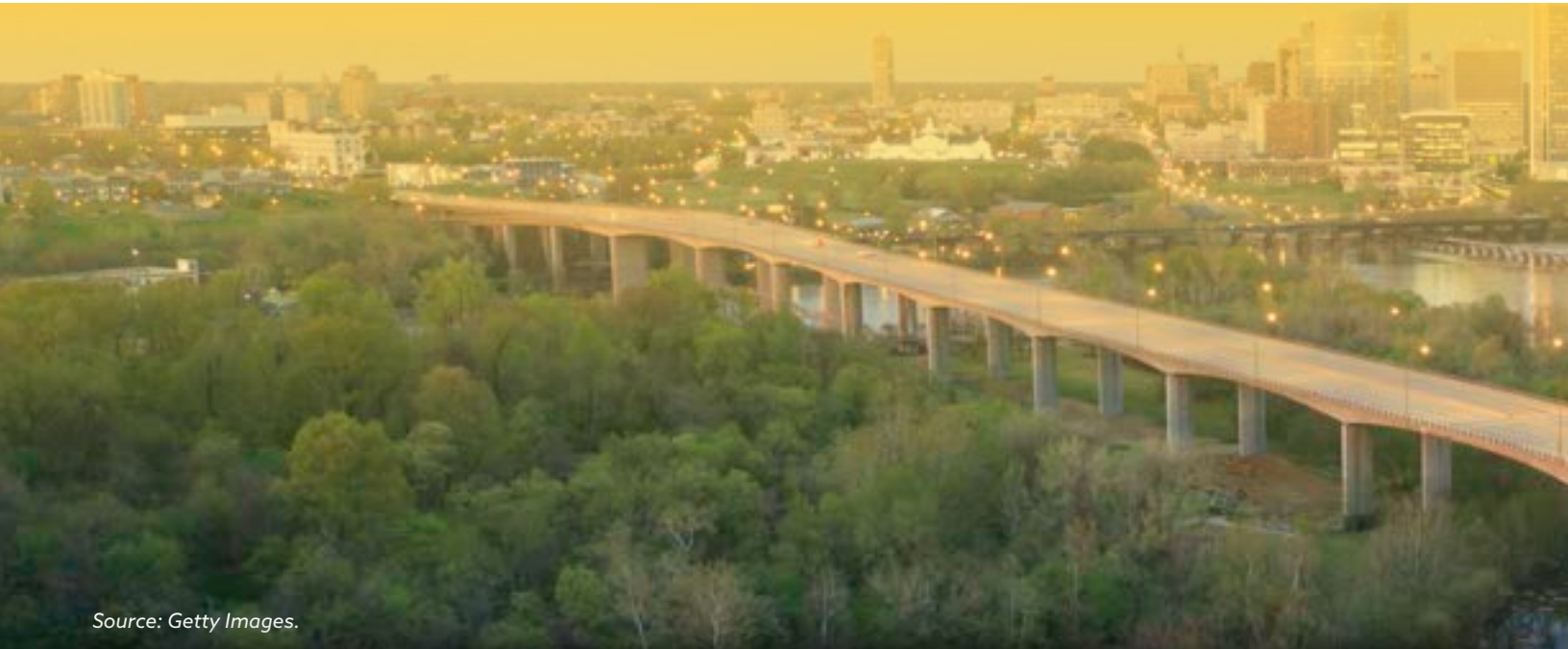






































Table 6 is a list of actions to be implemented over the next five years to reduce young driver related fatalities and serious injuries. Given the inexperience and developmental challenges, actions focus on helping these drivers gain appropriate experience with varying driving circumstances while encouraging less risky behaviors. Each action has been categorized under the appropriate strategy and the 4E that is responsible for implementation. The actions have also been assigned a time frame under which implementation may be initiated: ongoing, short term (one to two year), or long term (three to five years).

The objective of these actions is to reduce the total number of young driver fatalities and serious injuries from 1,144 in 2020 to 1,007 in 2026—a reduction of approximately 23 fatalities and serious injuries per year.



Source: Getty Images.

TABLE 6. YOUNG DRIVER STRATEGIES AND ACTIONS

Priority Strategy 4: Develop and implement programs that provide education and awareness to high risk road users.	
   	Distribute the 45-hour Parent Teen guide to promote meaningful parent engagement and provide coaching tips and sample lessons for developing safe, collision-free driving habits that will last a lifetime. [Ongoing]
   	Foster parent awareness and the attributes of graduated provisional licensing laws through engaging school outreach efforts. [Ongoing]
   	Conduct educational campaigns, events, trainings, and social media messaging and peer-to-peer initiatives on topics such as safety belt use, impaired driving, zero tolerance laws, distracted driving, speeding, and other highway safety issues (intersections, rail grade crossings, and Operation Lifesaver) for drivers aged 20 and younger, and continuously review and embrace research for evidence-based curricula and messaging. [Ongoing]
   	Review, on a continuous basis, education curricula and resources (Driver Education Curriculum, 45-Hour Parent/Teen Guide, Health Smart Virginia) for youth between the ages of 8 and 14 to develop a safety culture focused on the proper use of restraints, driver and passenger responsibilities, and shared road use (bicycle, pedestrian). [Ongoing]
   	Recruit new and effective partners to ensure targeted equitable messaging reaches drivers aged 20 and younger in diverse and underserved communities. [Long Term]
   	Educate highway safety partners on the Driver Education Curriculum content and continuously monitor and update the curriculum as needed. [Long Term]
   	Evaluate the effectiveness of all in-car and behind-the-wheel programs and research best practices for road skills testing, report findings, and make recommendations as necessary. [Long Term]
   	Review judicial licensing ceremony outcomes (survey judges and parents) and determine strategies and best practices for improving resources and materials. [Long Term]
   	Review and revise the content and resources for the Virginia Driver's Manual . [Long Term]





EMPHASIS AREA

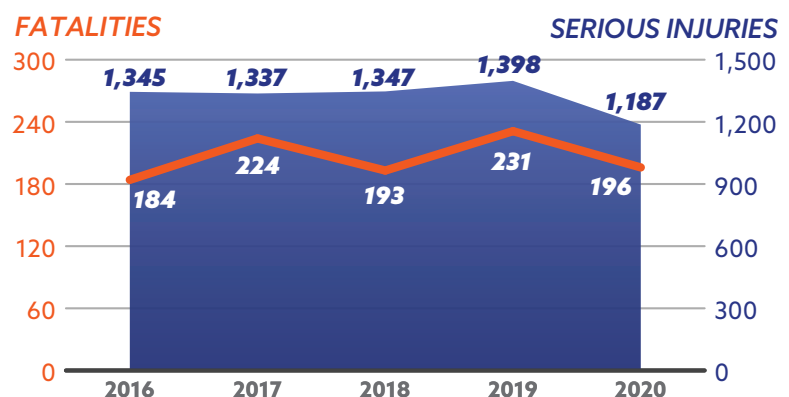
AGING ROAD USERS

Emphasis Area	Aging Road Users
Safe System Element	Safe Road Users
How are aging road user fatalities and serious injuries defined?	All people of any age killed or seriously injured in a crash where one or more drivers was age 65 or older plus the number of pedestrians age 65 or older killed or seriously injured.

According to the U.S. Census, 15.9 percent of Virginia's current population is age 65 and older. The percentage for the U.S. is 16.5 percent. Researchers at the University of Virginia project that one in five Virginians will be over age 65 by 2030. Aging road users today are expected to not only live longer, but they are also expected to drive longer than in the past. While aging road users tend to be safer drivers than younger drivers, in that they usually wear seat belts and do not drive impaired, aging impacts the ability to drive safely. As people age, skills necessary for safe driving worsen. These changes also increase the aging road user's susceptibility to injury due to the kinetic energy in a crash. Aging affects people's vision, reaction time, flexibility, and judgment at different levels and different times, making it difficult to establish a cut-off age when it is no longer safe to drive. The current process leans on the older adult to self-regulate their driving.

As shown in Figure 33, aging road user fatalities and serious injuries both increased until 2019 before decreasing from 2019 to 2020, undoubtedly due to less driving during the COVID-19 pandemic. Between 2016 and 2020, 7,642 people were killed or seriously injured in a crash involving an aging road user.

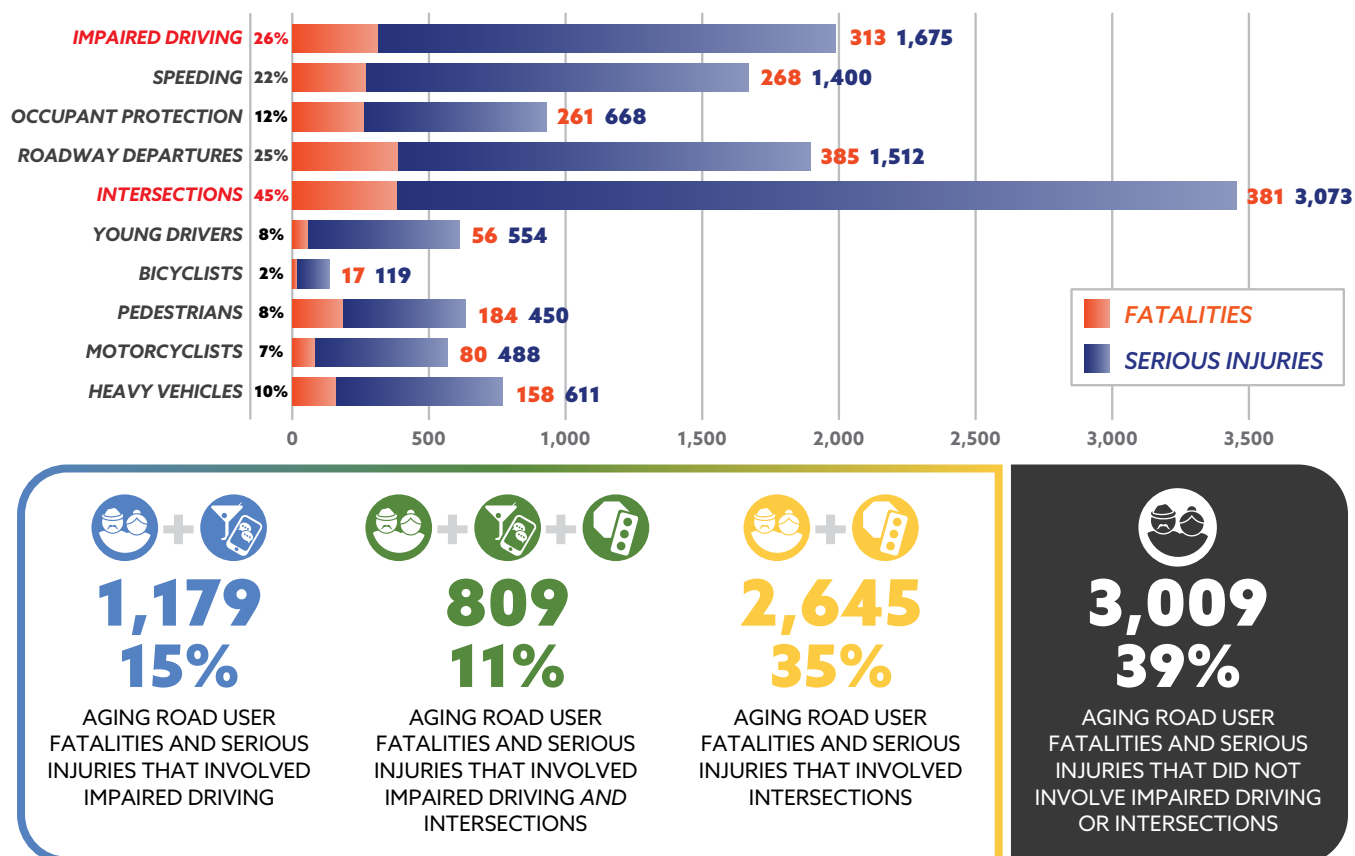
FIGURE 33. AGING ROAD USER FATALITIES AND SERIOUS INJURIES



Source: Getty Images.

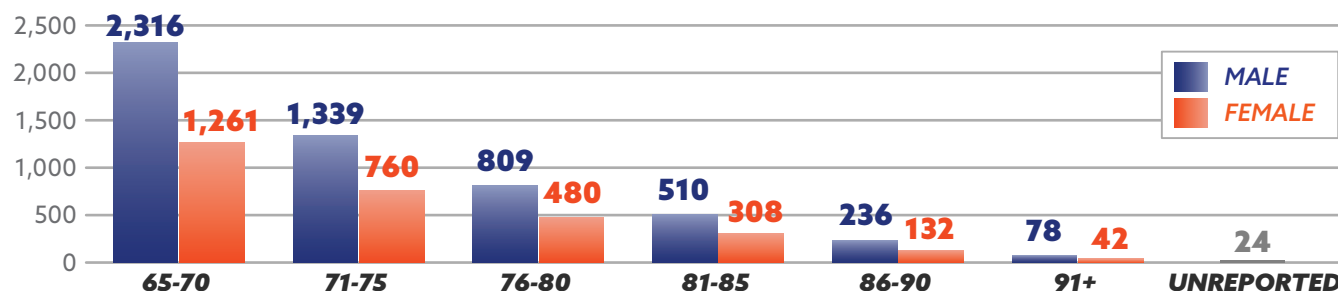
Approximately 45 percent of aging road user fatalities and serious injuries occur at intersections and 26 percent involve impaired driving as shown in Figure 34. Intersections are a problem for older drivers because aging often makes it difficult to judge the speed and distance of oncoming traffic when making a left turn or crossing a road. Further, depth perception and reaction times increase for aging drivers and walking speeds decrease for aging pedestrians. Aging drivers may have different distractions, like surveillance errors and secondary driving tasks, that may contribute to both intersection and roadway departure issues. Approximately 11 percent of the aging road user fatalities and serious injuries involved an impaired driver and occurred at an intersection.

FIGURE 34. CONTRIBUTING FACTORS TO AGING ROAD USER FATALITIES AND SERIOUS INJURIES



Approximately 43 percent of all aging road user fatalities and serious injuries involved road users aged 65-70 as shown in Figure 35. The number of fatalities and serious injuries associated with aging road users decrease as individuals age, but there were over 1,300 fatalities and serious injuries involving males and females over 81. Across all ages, approximately 64 percent of all aging road user fatalities and serious injuries involved an aging male.

FIGURE 35. NUMBER OF FATALITIES AND SERIOUS INJURIES BY AGE AND GENDER OF AGING ROAD USER



Most aging road user fatalities and serious injuries involve an angle crash as shown in Figure 36, which is not surprising given the fact that intersections are the major contributing factor. The next highest crash type is rear end crashes which also are likely to occur in and around intersections followed by fixed object and head on roadway departure crash types.

FIGURE 36. NUMBER OF FATALITIES AND SERIOUS INJURIES BY CRASH TYPE

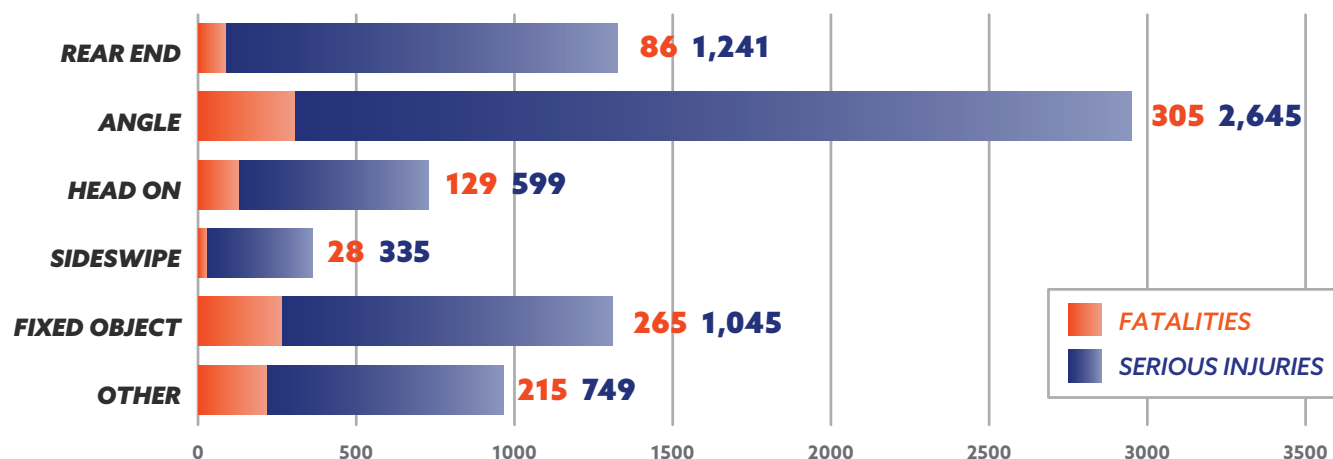
























Table 7 is a list of actions to be implemented over the next five years to reduce aging road user related fatalities and serious injuries. Each action has been categorized under the appropriate strategy and the 4E that is responsible for implementation. The actions have also been assigned a time frame under which implementation may be initiated: ongoing, short term (one to two years), or long term (three to five years).

The objective of these actions is to reduce the total number of aging road user fatalities and serious injuries from 1,383 in 2020 to 1,217 in 2026—a reduction of approximately 28 fatalities and serious injuries per year.



Source: Getty Images.

TABLE 7. AGING ROAD USER STRATEGIES AND ACTIONS

Priority Strategy 4: Develop and implement programs that provide education and awareness to high risk road users.	
   	Conduct education and awareness activities focusing on the mature driver and their caregivers and the general driving population to reduce crashes, injuries, and fatalities. [Ongoing]
   	Work with Department of Aging and Rehabilitation Services to conduct older driver assessments across the Commonwealth. [Ongoing]
   	Work with the Department of Aging and Rehabilitation Services and the Grand Driver coordinator to conduct CarFit events statewide. [Ongoing]
   	Recruit new and effective partners to make sure the aging road user program is reaching diverse and underserved communities and to ensure equity is at the forefront to decrease fatalities. [Long Term]
   	Develop and promote materials and resources, e.g., the DRPT Senior Navigator Transportation resource to educate seniors about available transportation options including transit for seniors and persons without access to automobiles. [Long Term]
   	Promote partnerships and educate safety professionals at metropolitan planning organizations, regional planning councils, and local governments on addressing the special needs of the aging population in their transportation, land use, and housing plans. [Long Term]
   	Provide law enforcement officers, front line licensing personnel, and health care providers resources to recognize, assess, and report at-risk aging drivers. [Long Term]
   	Develop materials to be distributed or provided by other means to seniors with information on innovative road improvements such as pedestrian Hybrid Beacon signals, roundabouts, etc. [Long Term]
   	Investigate the development of materials that educate older drivers on vehicle technology and how it improves safety and mobility. [Short Term]



Source: Getty Images.



Source: Getty Images.

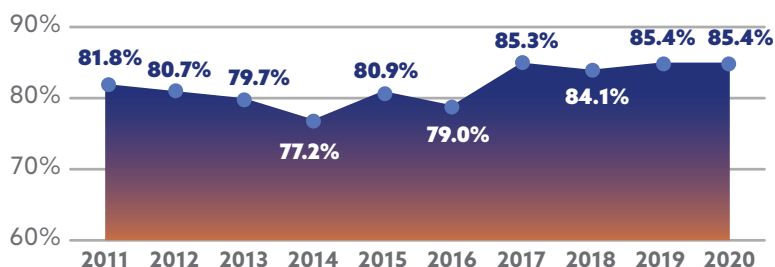
EMPHASIS AREA

OCCUPANT PROTECTION

Emphasis Area	Occupant Protection
Safe System Element	Safe Road Users
How are unrestrained fatalities and serious injuries defined?	All unrestrained people killed or seriously injured in a crash in a passenger car, pickup, van, SUV, motor home, recreational vehicle, emergency vehicle, single-unit truck, or tractor trailer.

Occupant protection involves the use of seatbelts and child safety seats—two of the most effective vehicle safety devices to prevent death and serious injury during a crash, particularly when combined with modern vehicle airbags and structural strength. According to NHTSA, of the 22,215 passenger vehicle occupants killed in 2019, 47 percent were not wearing a seat belt. Nationally, the seat belt use rate was 90.3 percent in 2019.⁷ The 2020 Virginia seat belt use survey was not conducted due to the COVID-19 pandemic. In Virginia, the rate is 85.4 percent, as shown in Figure 37.

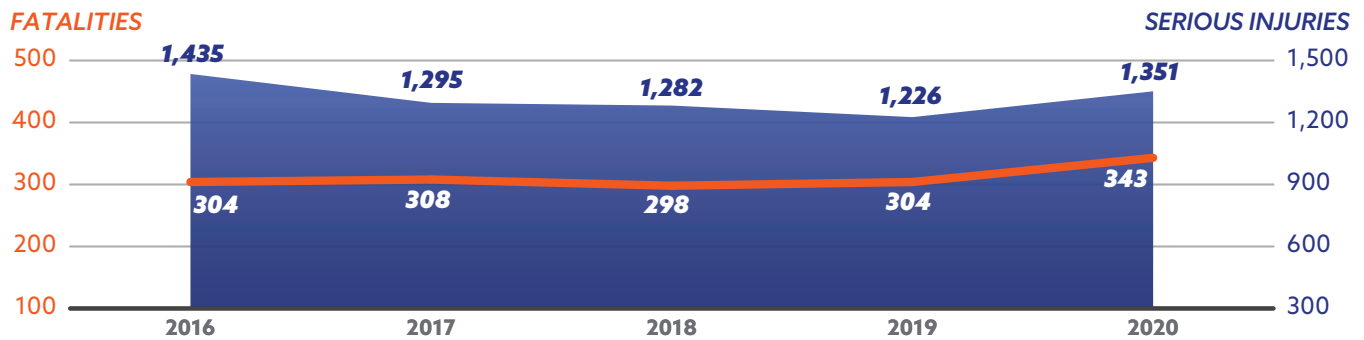
FIGURE 37. TREND IN VIRGINIA'S SEAT BELT USE RATE, 2011-2020



There is more work to be done to emphasize the importance of properly using a seat belt or child safety restraints. Even with increased average use rates rising from 77.2 percent in 2014 to an average of 85 percent since 2017, 38 percent of all fatalities and 18 percent of all serious injuries involved unrestrained occupants in the last five years. When pedestrians and vehicle types where safety restraints are not used are excluded, unrestrained occupants make up 54 percent of fatalities and 22 percent of serious injuries in the last five years. Further, despite lower vehicle miles traveled on Virginia roads due to the COVID-19 pandemic, unrestrained fatalities increased 13 percent and serious injuries increased more than 10 percent from 2019 to 2020 as indicated in Figure 38. This result occurred after years of flat or slight decreases in fatalities and serious injuries. Over the past five years (2016 to 2020), 8,146 unrestrained people were killed or seriously injured in crashes in Virginia.

7 NHTSA. <https://www.nhtsa.gov/risky-driving/seat-belts>.

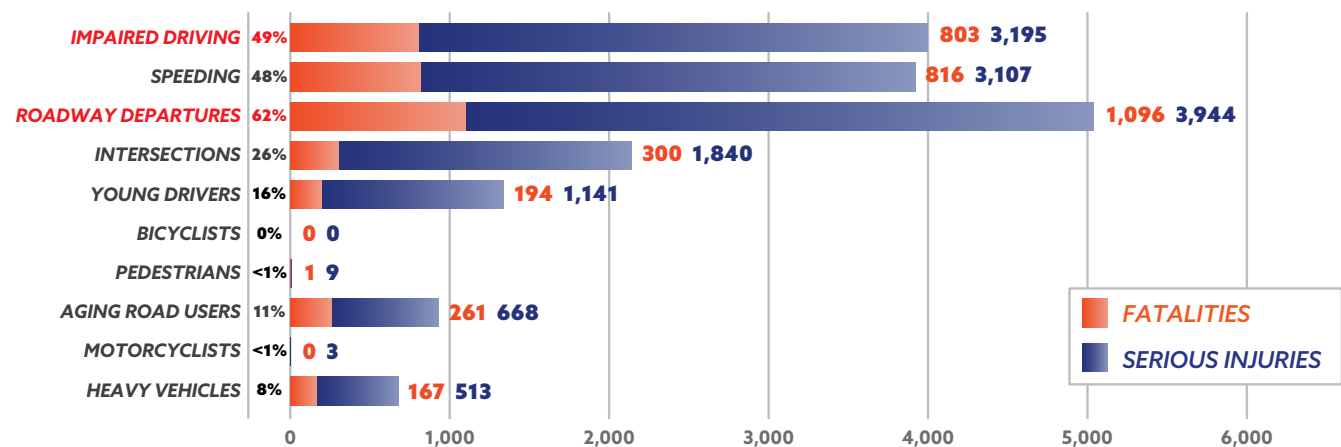
FIGURE 38. UNRESTRAINED FATALITIES AND SERIOUS INJURIES



Additionally, motor vehicle crashes remain one of the leading causes of death for children four years and older (see [State of Traffic Safety](#)). Using the correct safety seat or booster seat has been shown to significantly help decrease the severity of crashes on children. Some common mistakes are no restraint used, children under 8 seated in the front seat (if rear seat not available), premature use of seat belt rather than booster seat, child restraint not properly installed, and incorrect fit of safety seat harness on child.

The emphasis area factors that contribute most to unrestrained fatalities and serious injuries are roadway departures (62 percent) and impaired driving (49 percent) as shown in Figure 39. These two factors are followed closely by speeding (48 percent). The top two factors also overlap as 32 percent of the fatalities and serious injuries involved both a roadway departure and impaired driving, which points to a prevalence in riskier behavior of unrestrained driving coupled with impaired driving and roadway departures.

FIGURE 39. CONTRIBUTING FACTORS TO UNRESTRAINED FATALITIES AND SERIOUS INJURIES



1,353
17%

UNRESTRAINED
FATALITIES AND SERIOUS
INJURIES THAT INVOLVED
IMPAIRED DRIVING



2,645
32%

UNRESTRAINED
FATALITIES AND SERIOUS
INJURIES THAT INVOLVED
IMPAIRED DRIVING AND
A ROADWAY DEPARTURE



2,395
29%

UNRESTRAINED
FATALITIES AND SERIOUS
INJURIES THAT INVOLVED
A ROADWAY DEPARTURE



1,753
22%

UNRESTRAINED FATALITIES
AND SERIOUS INJURIES
THAT DID NOT INVOLVE
IMPAIRED DRIVING OR
A ROADWAY DEPARTURE

Road users aged 16 to 25 made up the highest proportion of unrestrained fatalities and serious injuries, consisting of 1,640 male and 862 female fatalities and serious injuries as shown in Figure 40. Across all ages, approximately 66 percent of all unrestrained fatalities and serious injuries were male, which is consistent with national trends showing seat belt use as the lowest among young males.

FIGURE 40. NUMBER OF FATALITIES AND SERIOUS INJURIES BY AGE AND GENDER OF UNRESTRAINED PERSON

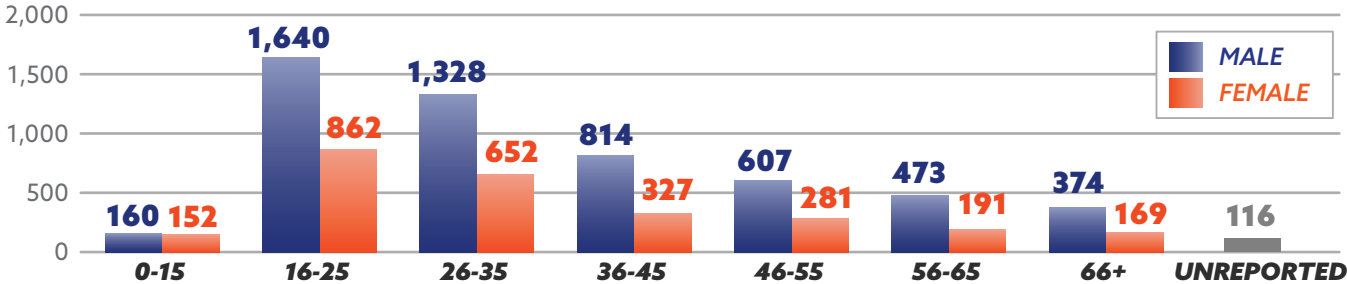


Figure 41 provides a map of where the highest number of unrestrained fatalities and serious injuries are occurring across Virginia. Not surprisingly, the urban areas with the most people and traffic have the highest numbers. The top ten jurisdictions with the highest numbers of all unrestrained fatalities and serious injuries are shown in Table 8. However, there are more rural jurisdictions that have high numbers for their population and vehicle miles traveled that deserve concentration of mitigating actions.

FIGURE 41. LOCATION OF UNRESTRAINED FATALITIES AND SERIOUS INJURIES

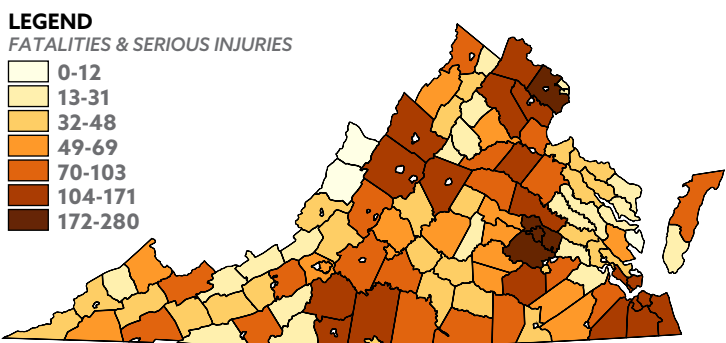


TABLE 8. NUMBER OF UNRESTRAINED FATALITIES AND SERIOUS INJURIES BY JURISDICTION

Rank	Jurisdiction	Unrestrained Fatalities + Serious Injuries	Percentage of Total Fatalities + Serious Injuries
1	Chesterfield County	280	21%
2	Fairfax County	229	9%
3	City of Richmond	208	18%
4	Henrico County	198	17%
5	City of Hampton	171	10%
6	Prince William County	170	17%
7	City of Newport News	169	14%
8	City of Norfolk	165	15%
9	Spotsylvania County	165	23%
10	City of Portsmouth	159	16%

Table 9 shows a list of actions to be implemented over the next five years to reduce unrestrained fatalities and serious injuries. Each action has been categorized under the appropriate strategy and the 4E that is responsible for implementation. The actions have also been assigned a time frame under which implementation may be initiated: ongoing, short term (one to two years), or long term (three to five years).

The objective of these actions is to reduce the total number of unrestrained fatalities and serious injuries from 1,694 in 2020 to 1,491 by 2026—a reduction of approximately 34 fatalities and serious injuries per year.

TABLE 9. OCCUPANT PROTECTION STRATEGIES AND ACTIONS

Priority Strategy 3: Recognize traffic safety as a public health issue and establish policies and programs that promote safe behavior and reduce crash severity outcomes.	
	<p>Conduct at least three statewide, high visibility seat belt enforcement campaigns with supporting media to educate the public on the importance of using seat belts and the enforcement of alcohol-related laws during nighttime hours to include seat belt enforcement and include a statewide observational pre- and post-survey. [Ongoing]</p>
Priority Strategy 4: Develop and implement programs that provide education and awareness to high risk road users.	
	<p>Conduct seat belt educational and awareness campaigns to educate the public on the importance of using seat belts and include social media and messaging to reach diverse and underserved and areas of need communities. [Ongoing]</p>
	<p>Conduct Virginia Child Passenger Safety (CPS) and Education Program to include outreach activities to Virginia's low-income populations, and areas of need including diverse and underserved communities. [Short Term]</p>
	<p>Conduct child safety seat and safety belt checks across the Commonwealth providing statewide access to certified CPS technicians and provide child safety restraints to eligible parents/guardians through the Low-Income Safety Seat Distribution Program, especially in areas of need to include diverse and underserved communities. [Ongoing]</p>
	<p>Recruit new and effective partners to ensure the occupant protection program is reaching diverse and underserved communities and to ensure equity is at the forefront of the program to increase the seat belt use rate and decrease unrestrained fatalities, serious injuries, and other consequences. [Long Term]</p>
	<p>Coordinate the NHTSA Standardized CPS Technician Certification Courses, CPS Technician Refresher Courses, Renewal Course and CPS Special Needs Certification Courses. [Ongoing]</p>
	<p>Use data and other sources to determine which population groups are choosing not to wear safety belts and determine why, if possible, to inform future education and communication initiatives. [Long Term]</p>
	<p>Increase the number of certified CPS technicians/instructors, especially at mother/infant units, neonatal intensive care units, pediatric units, etc. in hospitals to provide staff education. [Ongoing]</p>
	<p>Promote passage of a primary seat belt law and publicize safety belt use and the expected fatality and serious injury reductions that could be achieved with increased seat belt use. [Long Term]</p>



EMPHASIS AREA

IMPAIRED DRIVING

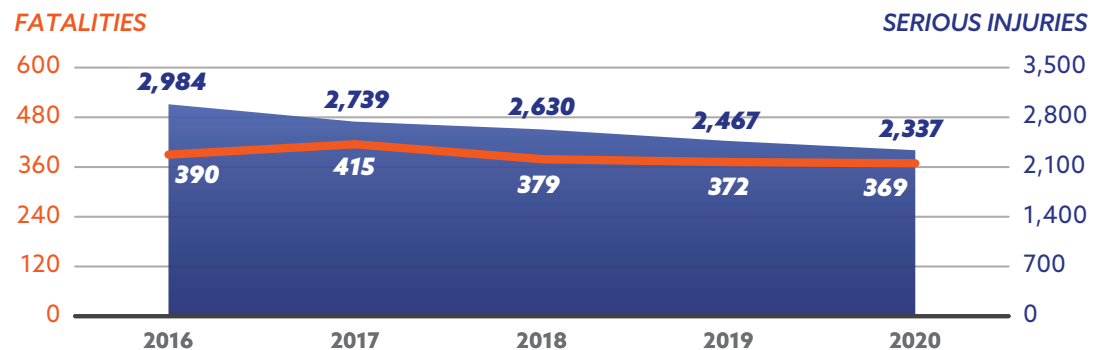
Emphasis Area	Impaired Driving
Safe System Element	Safe Road Users
How are impaired driving fatalities and serious injuries defined?	All people killed or seriously injured in a crash where one or more drivers was drunk, distracted, drowsy, or using drugs.

Impaired driving includes the 4 Ds—drunk, drugged, distracted, and drowsy driving. The following statistics point to the fatal and serious consequences of these risky driving behaviors.

- Every day, about **28 people in the United States die in drunk-driving crashes**—that's one person every 52 minutes, according to NHTSA
- Nationally, **56 percent of drivers involved in fatal and serious injury crashes tested positive for at least one drug⁸**
- In 2019, **3,142 people were killed in motor vehicle crashes involving distracted drivers**, according to NHTSA
- Determining a precise number of drowsy-driving crashes, injuries, and fatalities is not yet possible. NHTSA estimates that in 2017, 91,000 police-reported crashes involved drowsy drivers. These crashes led to an estimated 50,000 people injured and nearly 800 deaths.

In Virginia, impaired driving accounts for 36 percent of fatalities and serious injuries. In 2020, fatalities were down 11 percent from a peak of 415 in 2017 as shown in Figure 42. However, VMT decreased in 2020 due to the COVID-19 pandemic, so the rate of these fatalities and serious injuries is higher than previous years. Also, in 2021 the Virginia General Assembly legalized the use of cannabis by adults in the Commonwealth. Simple possession (one-ounce, private residence use), home cultivation (four plants per household), and sharing (gifting without compensation) became legal for anyone 21 years or older. With a three-year schedule of sale and use regulation in development, legal sales to adults 21 or older may begin in 2024. Based on studies (Aydelotte, 2017) showing measurable increases in fatality rates in Washington and Colorado after legalization, Virginia's highway safety partners will continue to monitor the possible impacts.

FIGURE 42. IMPAIRED DRIVING FATALITIES AND SERIOUS INJURIES



8 NHTSA. (2021). Update to Special Reports on Traffic Safety During the COVID-19 Public Health Emergency: Fourth Quarter Data (October-December 2020). <https://rosap.nhtl.bts.gov/view/dot/56125>.

Source: Getty Images.

The emphasis area factors that contribute most to impaired fatalities and serious injuries are roadway departures (48 percent) and speeding (38 percent), which are followed closely by intersections (31 percent) as shown in Figure 43. The top two factors overlap in that 21 percent of the fatalities and serious injuries involved both a roadway departure and speeding, which points to a prevalence in riskier driving behavior—such as looking at one’s phone in the case of distracted driving—coupled with speeding and the propensity for roadway departure. Unrestrained occupants are another highly overlapping factor at 27 percent.

FIGURE 43. CONTRIBUTING FACTORS TO IMPAIRED DRIVING FATALITIES AND SERIOUS INJURIES

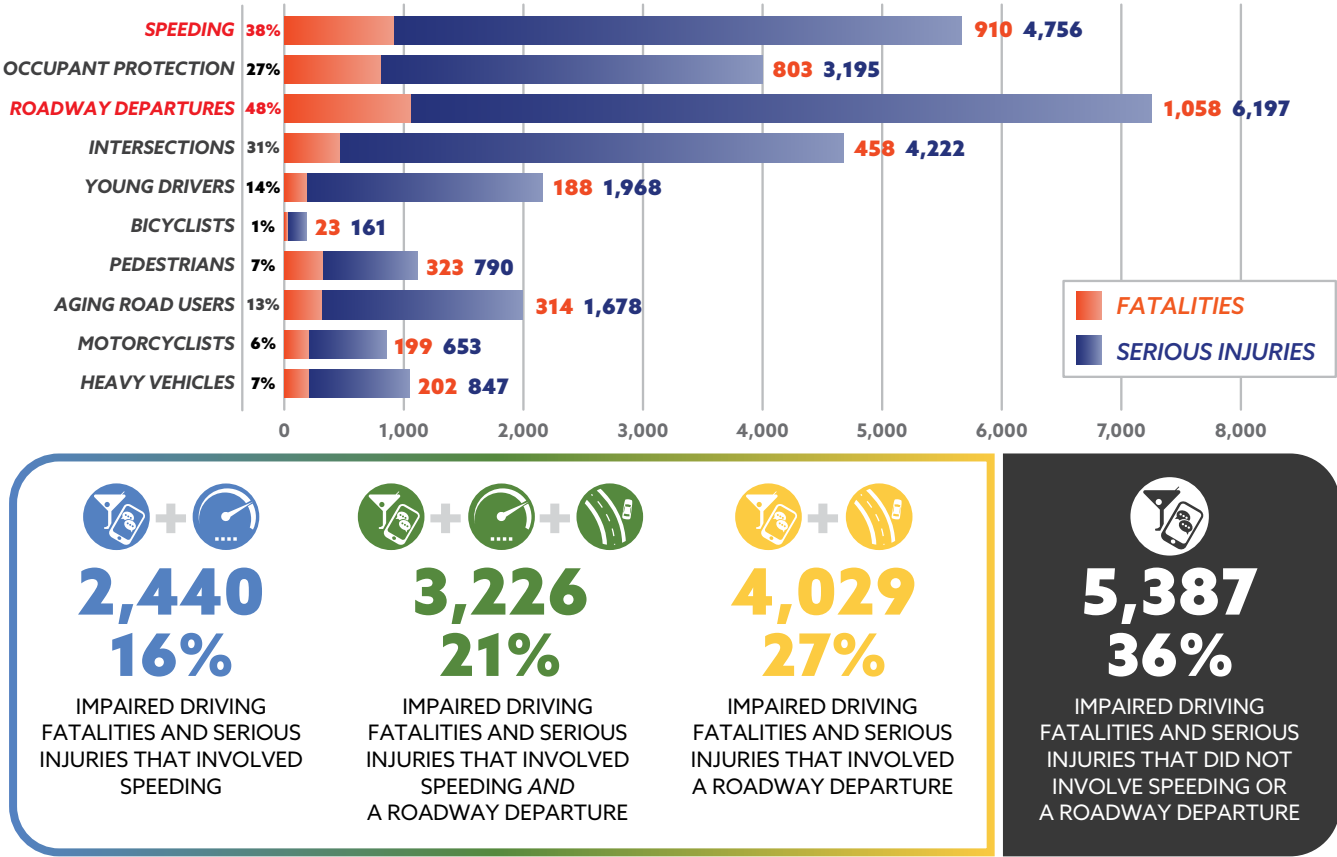


Figure 44 shows nearly two-thirds of all impaired driving fatalities and serious injuries involved males (66 percent). More than a third of impaired driving fatalities and serious injuries involved males aged 16 to 35. When isolated in terms of age (male and female), more than half of impaired fatalities and serious injuries that occurred between 2016 and 2020 were drivers between the ages 16 to 35 (52 percent). These findings are consistent with national trends that show that impaired driving is most prevalent among males and younger drivers.

FIGURE 44. NUMBER OF FATALITIES AND SERIOUS INJURIES BY AGE AND GENDER OF IMPAIRED DRIVER

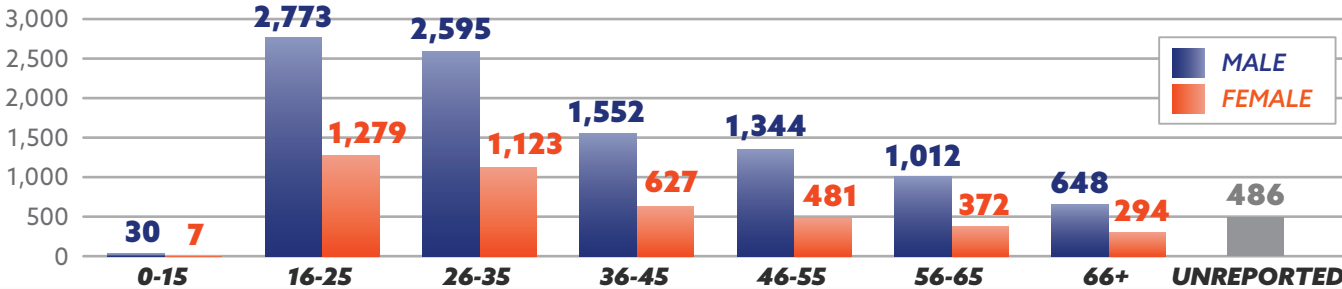


Figure 45 illustrates the number of fatalities and serious injuries involved in a crash based on the number of behaviors exhibited by one driver (e.g., 1,179 people were killed or seriously injured in a crash that involved one driver who was drowsy and distracted but not drinking nor on drugs). The two most prevalent behaviors that contributed to fatalities and serious injuries were distracted and drunk driving.

FIGURE 45. NUMBER OF FATALITIES AND SERIOUS INJURIES PER IMPAIRED DRIVING BEHAVIOR

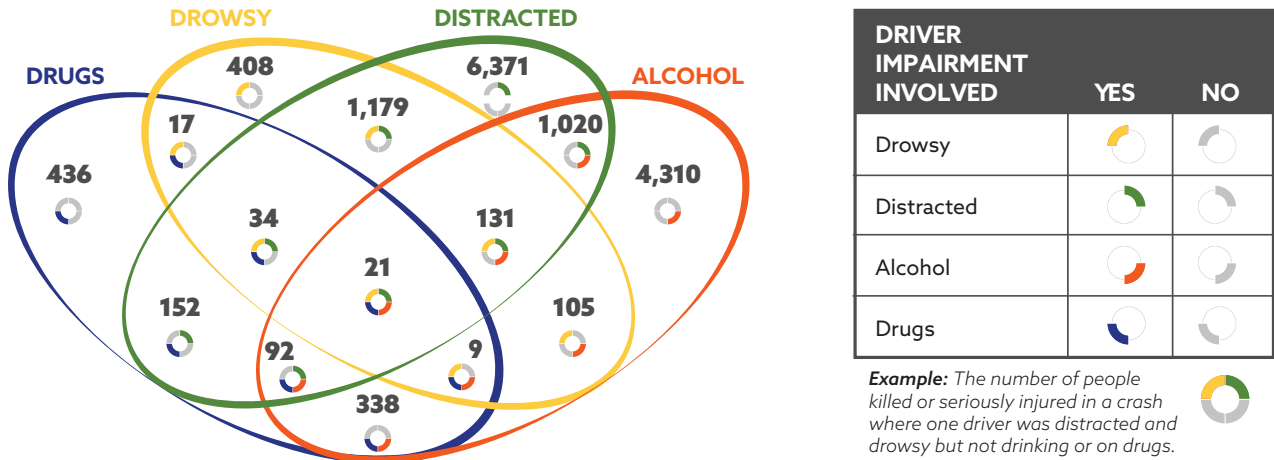


Figure 46 provides a map of where the highest number of impaired driving fatalities and serious injuries are occurring across Virginia. Not surprisingly, the urban areas with the most people and traffic have the highest numbers. The top ten jurisdictions with the highest numbers of all impaired driving fatalities and serious injuries are shown in Table 10.

FIGURE 46. LOCATION OF IMPAIRED DRIVING FATALITIES AND SERIOUS INJURIES

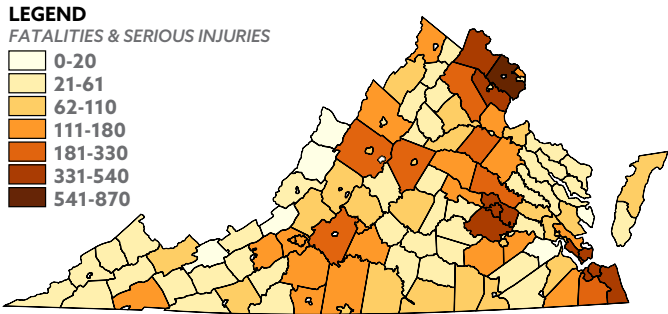






















































TABLE 10. NUMBER OF IMPAIRED DRIVING FATALITIES AND SERIOUS INJURIES BY JURISDICTION

Rank	Jurisdiction	Impaired Driving Fatalities + Serious Injuries	Percentage of Total Fatalities + Serious Injuries
1	Fairfax County	871	36%
2	City of Newport News	544	44%
3	City of Hampton	514	31%
4	Chesterfield County	492	38%
5	City of Virginia Beach	465	43%
6	Prince William County	444	43%
7	Henrico County	431	36%
8	City of Richmond	386	33%
9	City of Norfolk	375	33%
10	Loudoun County	374	45%

Table 11 lists actions to be implemented over the next five years to reduce impaired driving fatalities and serious injuries. Each action has been categorized under the appropriate strategy and the 4E that is responsible for implementation. The actions have also been assigned a time frame under which implementation may be initiated: ongoing, short term (one to two years), or long term (three to five years).

The objective of these actions is to reduce the total number of impaired driving fatalities and serious injuries from 2,706 in 2020 to 2,381 in 2026—a reduction of approximately 54 fatalities and serious injuries per year.

TABLE 11. IMPAIRED DRIVING STRATEGIES AND ACTIONS

Priority Strategy 3: Recognize traffic safety as a public health issue and establish policies and programs that promote safe behavior and reduce crash severity outcomes.				
				Conduct impaired driving high visibility enforcement (HVE) campaigns (to include saturation patrols and checkpoints) supported by a comprehensive media plan and provide support to the existing Driving Under the Influence (DUI) Task Force. [Ongoing]
				Conduct alcoholic beverage compliance checks to reduce the incidence of underage alcohol purchases and overservice, and through youth peer-to-peer educational programs that focus on zero tolerance. [Ongoing]
				Manage the ignition interlock program through VASAP and investigate new technological strategies. [Long Term]
				Work with law enforcement officers and the toxicology labs to determine drugs present in drivers. [Short Term]
				Monitor high Blood Alcohol Concentration (BAC) and repeat offenders through VASAP and recommend referrals for treatment assessment to include substance use disorders and/or mental health screenings when appropriate. [Ongoing]
Priority Strategy 4: Develop and implement programs that provide education and awareness to high risk road users.				
				Increase the number of law enforcement officers who participate in trainings for Advanced Roadside Impaired Driving Enforcement (ARIDE), Drug Recognition Experts (DRE), Standardized Field Sobriety Training (SFST), Advanced DUI courses, and breath alcohol test equipment. [Ongoing]
				Conduct training sessions for the Virginia Alcohol Safety Action Program (VASAP) program case managers and staff on DWI offender monitoring, ignition interlock and offender recidivism. [Short Term]
				Conduct training and provide information at conferences for judges, prosecutors, and magistrates on DUI and drugged driving enforcement methods, DUI dockets, and DUI Courts. [Ongoing]
				Coordinate with the Judicial Outreach Liaisons and the Traffic Safety Resource Prosecutors to work with the Virginia Supreme Court to assist with information dissemination and to establish a point of contact between the Highway Safety Office and the judiciary. [Long Term]
				Conduct sports marketing related outreach efforts to reach high-risk populations. [Short Term]
				Promote consumer awareness and acceptance of the Driver Alcohol Detection System for Safety (DADSS). [Short Term]
				Recruit new and effective partners to make sure the alcohol and drug impaired driving program reaches diverse and underserved communities and to ensure equity is at the forefront to decrease alcohol related fatalities. [Long Term]
				Investigate the possibility of conducting a distracted driving enforcement effort on handheld phone use and evaluate its effectiveness. [Long Term]



EMPHASIS AREA

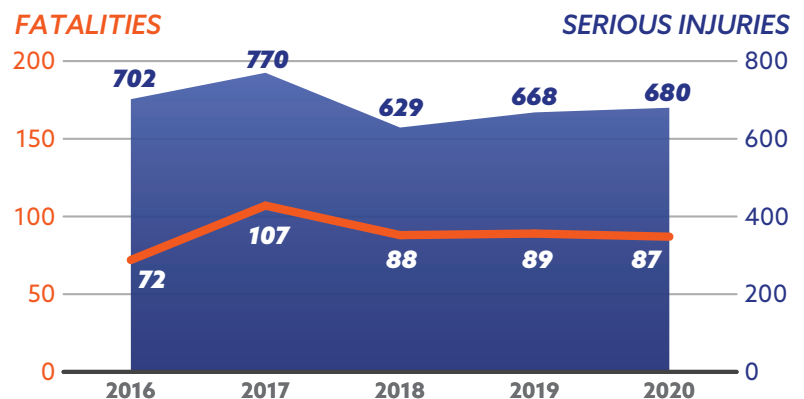
MOTORCYCLISTS

Emphasis Area	Motorcyclists
Safe System Element	Safe Road Users
How are motorcyclist fatalities and serious injuries defined?	All motorcyclists killed or seriously injured in a crash. This does not include non-motorcyclists killed nor seriously injured in a crash involving a motorcycle.

Motorcyclists are vulnerable road users given the fact there is no protection between the rider, other vehicles, and the roadway. Motorcyclists are a new emphasis area in the SHSP. In Virginia, motorcycle endorsements increased from 421,309 in 2016 to 422,782 in 2019 before a 1.0 percent decline in 2020. Interestingly, motorcycle registrations annually dropped on average 1.1 percent during the past five years.

From 2016 to 2020, 443 motorcyclist fatalities and 3,449 serious injuries occurred in Virginia, which accounted for 11 percent of the fatalities and 9 percent of the serious injuries statewide. Motorcyclist fatalities decreased in 2020 (87) from a 2017 peak of 107, but serious injuries were on the rise in 2020 (680) from a low of 629 in 2018 as shown in Figure 47.

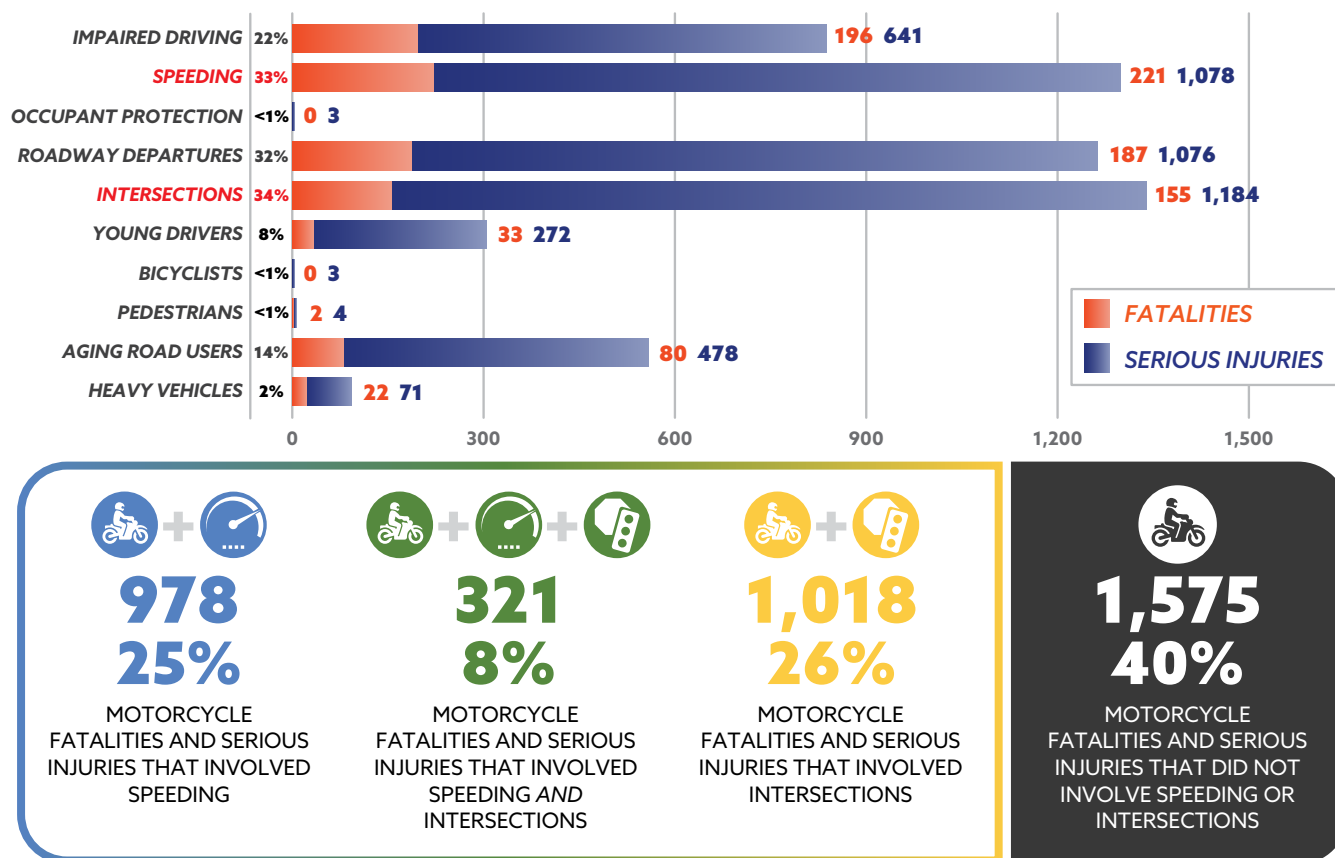
FIGURE 47. MOTORCYCLIST FATALITIES AND SERIOUS INJURIES



The emphasis area factors that contribute most to motorcyclist fatalities and serious injuries are intersections (34 percent) and speeding (33 percent) as shown in Figure 48, followed closely by roadway departures (32 percent). While these factors contribute to motorcyclist fatalities and serious injuries, there is not much overlap. Only 8 percent of the fatalities and serious injuries involved both an intersection and speeding.

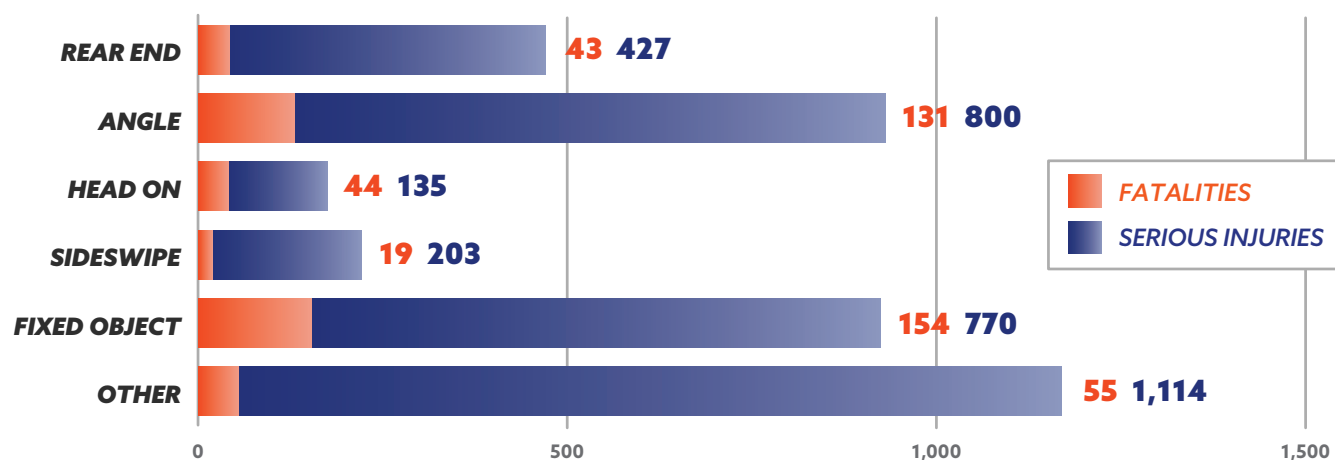
Source: Getty Images.

FIGURE 48. CONTRIBUTING FACTORS TO MOTORCYCLE FATALITIES AND SERIOUS INJURIES



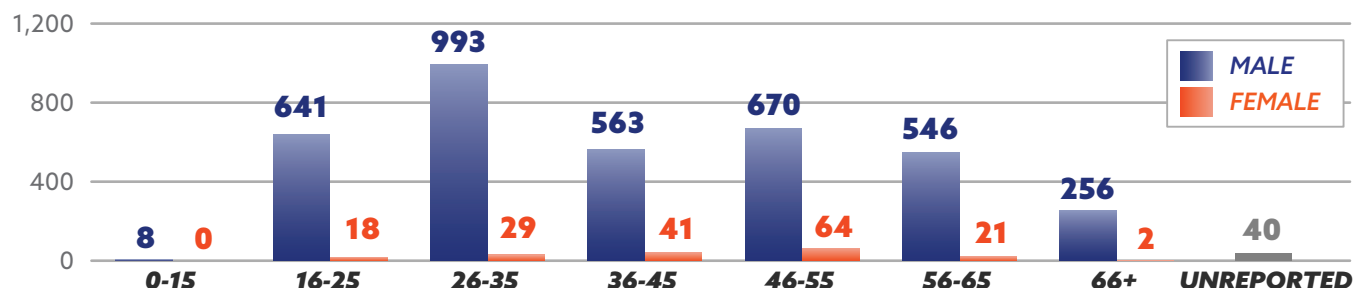
For crash types, those classified as “other” crashes (primarily non-collision crashes) were 30 percent of all motorcyclist fatalities and serious injuries from 2016 to 2020 as shown in Figure 49. Angle crashes, one of the most severe types of crashes associated with intersections and driveways, accounted for 24 percent of motorcyclist fatalities and serious injuries (131 fatalities and 800 serious injuries). Fixed-object crashes contributed to 24 percent of motorcyclist fatalities and serious injuries (154 fatalities and 770 serious injuries).

FIGURE 49. NUMBER OF MOTORCYCLIST FATALITIES AND SERIOUS INJURIES BY CRASH TYPE



Approximately 94 percent of all motorcyclist fatalities and serious injuries involve a male motorcyclist as shown in Figure 50 with approximately 26 percent between the ages of 26 and 35.

FIGURE 50. NUMBER OF FATALITIES AND SERIOUS INJURIES BY AGE AND GENDER OF MOTORCYCLIST



The functional class of road where most motorcyclist fatalities and serious injuries occur are minor arterial and collector roads accounting for 47 percent of fatalities and serious injuries as shown in Figure 51.

FIGURE 51. NUMBER OF MOTORCYCLIST FATALITIES AND SERIOUS INJURIES BY FUNCTIONAL CLASS

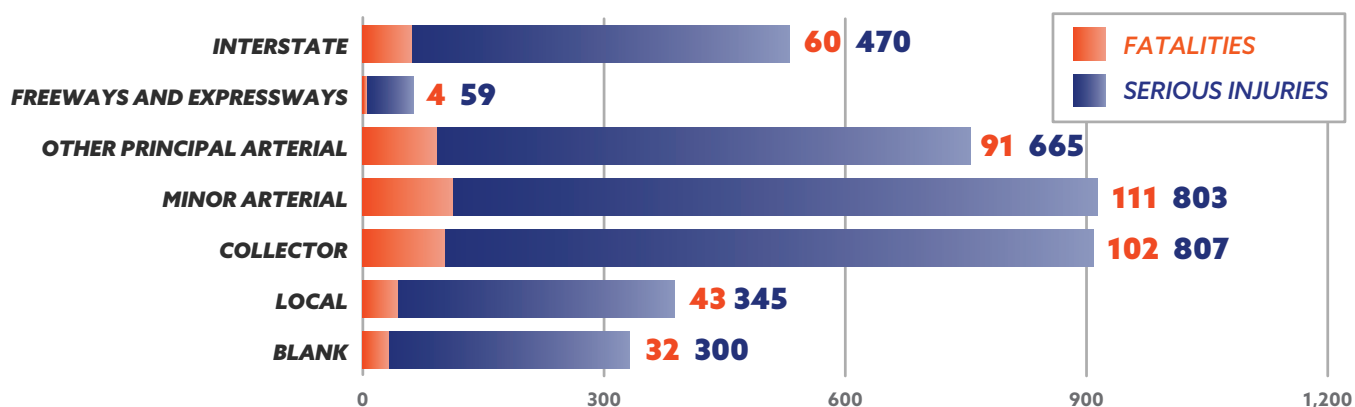



Table 12 lists actions to be implemented over the next five years to reduce motorcyclist fatalities and serious injuries. Each action has been categorized under the appropriate strategy and the 4E that is responsible for implementation. The actions have also been assigned a time frame under which implementation may be initiated: ongoing, short term (one to two years), or long term (three to five years).



Source: Getty Images.

The objective of these actions is to reduce the total number of motorcyclist fatalities and serious injuries from 767 in 2020 to 675 in 2026—a reduction of approximately 15 fatalities and serious injuries per year.

TABLE 12. MOTORCYCLISTS STRATEGIES AND ACTIONS

Priority Strategy 1: Implement road improvements that ensure human mistakes and vulnerabilities do not result in serious injuries or fatalities.	
	Deploy engineering solutions and best practices that address motorcyclist, moped, and motorized scooter-specific infrastructure issues, work zone issues and mitigation including drainage and shoulders, communication of road conditions, pavement conditions, enhanced road delineation, and traffic control devices. [Long Term]
Priority Strategy 4: Develop and implement programs that provide education and awareness to high risk road users.	
	Conduct a motorcyclist safety media campaign that includes motorist awareness of motorcyclists and motor scooters, information for young and aging riders, and increase the media messaging in areas with high numbers of motorcyclist crashes and fatalities. [Short Term]
	Increase participation and conduct the Basic Rider Training, 3-Wheeled Vehicle Training, and Advanced Rider Training courses throughout the Commonwealth through partnerships with the licensed Motorcyclist Training Sites. [Ongoing]
	Distribute Rider Alert cards to all licensed training sites. [Short Term]
	Increase the number of licensed motorcyclist training sites in areas with high numbers of motorcyclist crashes. [Long Term]
	Recruit new and effective partners to make sure the motorcyclist safety program reaches diverse and under-served communities and to ensure equity is at the forefront of the program. [Long Term]
	Conduct law enforcement training in motorcyclist DUI detection, motorcyclist crash investigation, Zero Tolerance, and motorcyclist specific laws. [Long Term]
	Collect and link crash, injury, licensing (endorsement), violation, and registration data for analysis to identify high risk locations and behaviors related to motorcyclist, moped, and motorized scooter fatal and serious injury crashes. [Long Term]
	Identify and support legislation and policies that acknowledge the importance of safety gear including helmets and address penalties for riding without an endorsement as well as behaviors such as speeding and/or careless driving. [Long Term]



Source: Getty Images.



Source: Getty Images.



SAFE VEHICLES

The second element is safe vehicles. Advanced vehicles include “active” safety measures to help prevent crashes from occurring and “passive” safety devices providing protection when a crash does occur. While manufacturers are key stakeholders in the continuously evolving automated vehicle safety industry, the interaction and connectivity with road elements and traffic control with multimodal users will also improve safety.

EMPHASIS AREA

HEAVY VEHICLES

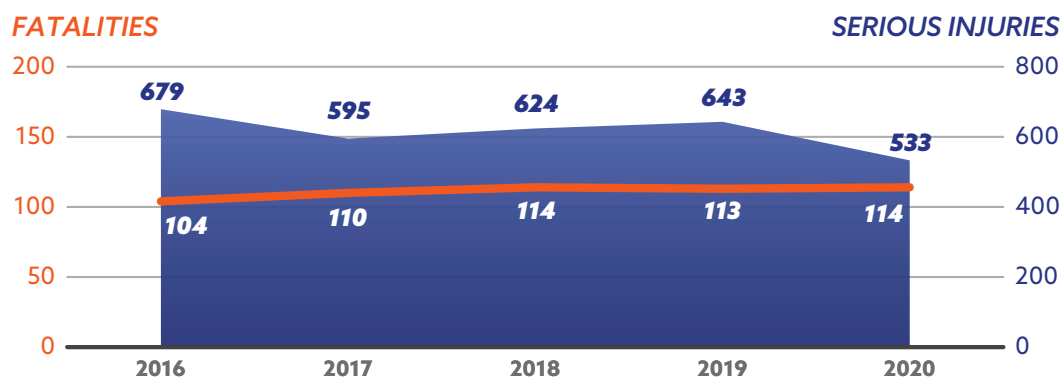
Emphasis Area	Heavy Vehicles
Safe System Element	Safe Vehicles
How are heavy vehicle fatalities and serious injuries defined?	All people killed or seriously injured in a crash where one or more vehicles involved was a commercial vehicle or had a heavy vehicle body type.

The delivery of people, goods, and raw materials to and from businesses, consumers, and markets is important to the Commonwealth's economy. Even though public and private bus travel declined during the COVID-19 pandemic in 2020, more than 400 million tons of freight moved to, within, and from Virginia.⁹ Trucks are the most used mode for freight, moving 63 percent of goods nationally.¹⁰ Heavy vehicles are defined as mostly trucks: semi-trailers, single-unit trucks with two or three axles, and buses. There are also several heavy vehicles designated as "other," such as large, motorized machinery and farm equipment.

From 2016 to 2020, there were 555 fatalities and 3,074 serious injuries in crashes involving heavy vehicles in Virginia, which accounted for 14 percent of the fatalities and eight percent of serious injuries statewide. Heavy vehicle fatalities increased about 10 percent from 104 in 2016 to 114 in 2020 (as shown in Figure 52), while serious injuries decreased 21.5 percent from 679 in 2016 to 533 in 2020. Although a heavy vehicle is involved in a crash, that does not indicate whether its driver was the cause. Studies have shown that under 30 percent of heavy vehicle crashes are caused by their drivers.

Safety involving heavy vehicles can be improved with education and enforcement solutions that influence passenger car and truck driver behavior. Additionally, commercial vehicle (CMV) enforcement units and weighing stations ensure that heavy vehicles meet vehicle safety and weight standards through random and scheduled inspections.

FIGURE 52. HEAVY VEHICLE FATALITIES AND SERIOUS INJURIES PER YEAR



⁹ U.S. Department of Transportation (USDOT), Bureau of Transportation Statistics and Federal Highway Administration.

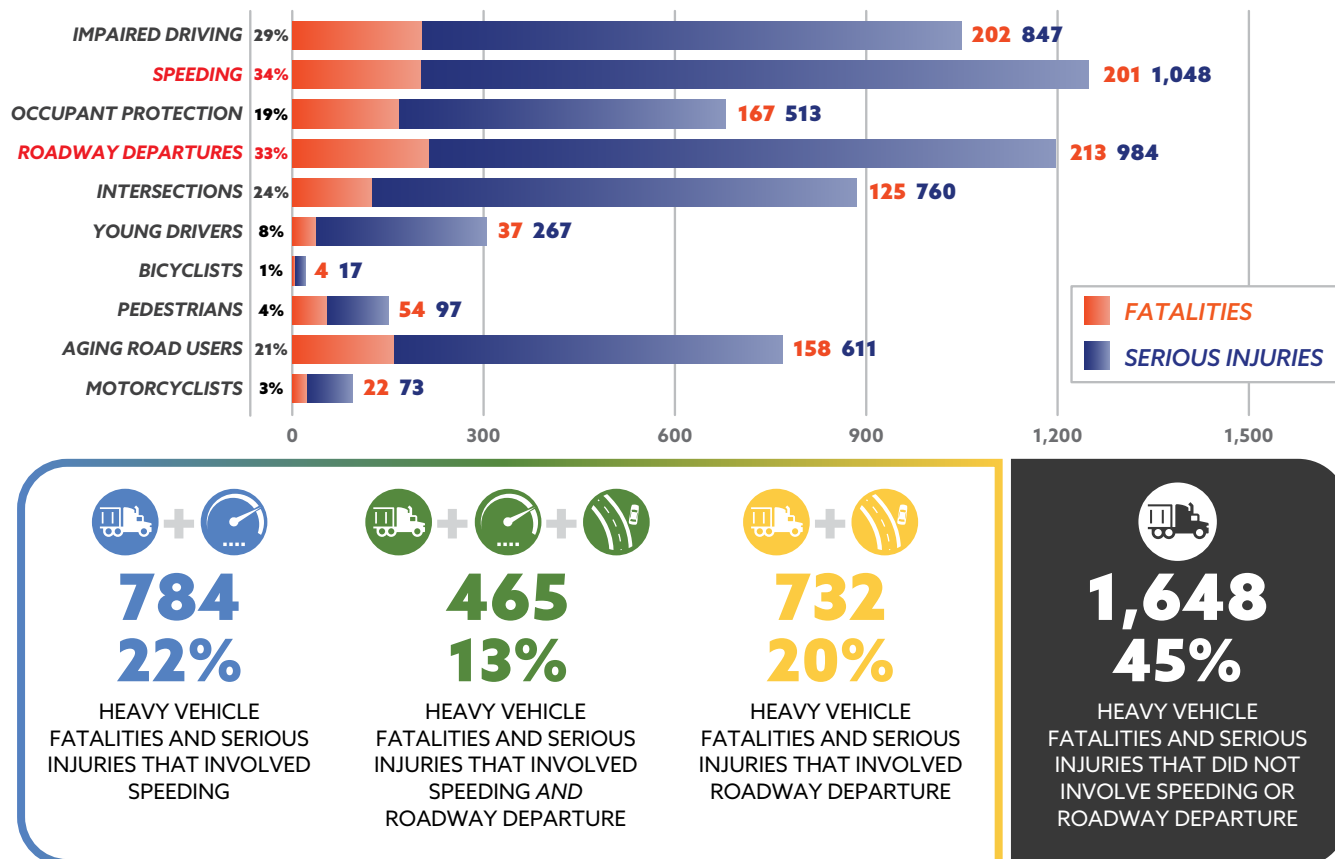
¹⁰ USDOT Bureau of Transportation Statistics. <https://www.bts.gov/content/table-1-total-value-and-modal-shares-us-north-american-freight-flows>.



Source: Getty Images.

The emphasis area factors that contribute most to fatalities and serious injuries involving heavy vehicles from 2016 to 2020 are speeding (34 percent) and roadway departures (33 percent), shown in Figure 53. There is some overlap between the two factors: about 13 percent of the heavy-vehicle-involved fatalities and serious injuries also involved both speeding and a roadway departure.

FIGURE 53. CONTRIBUTING FACTORS TO HEAVY VEHICLE FATALITIES AND SERIOUS INJURIES



Because of the long-distance function of heavy vehicle travel, the largest proportion of fatalities and serious injuries occur on interstates, freeways, and expressways (37 percent), which is followed by other principal arterials (24 percent) and minor arterials (17 percent), as shown in Figure 54. Semi-trailers, the largest vehicle body type, are involved in 44 percent of the fatalities and serious injuries involving heavy vehicles.

FIGURE 54. NUMBER OF HEAVY VEHICLE FATALITIES AND SERIOUS INJURIES BY FUNCTIONAL CLASS

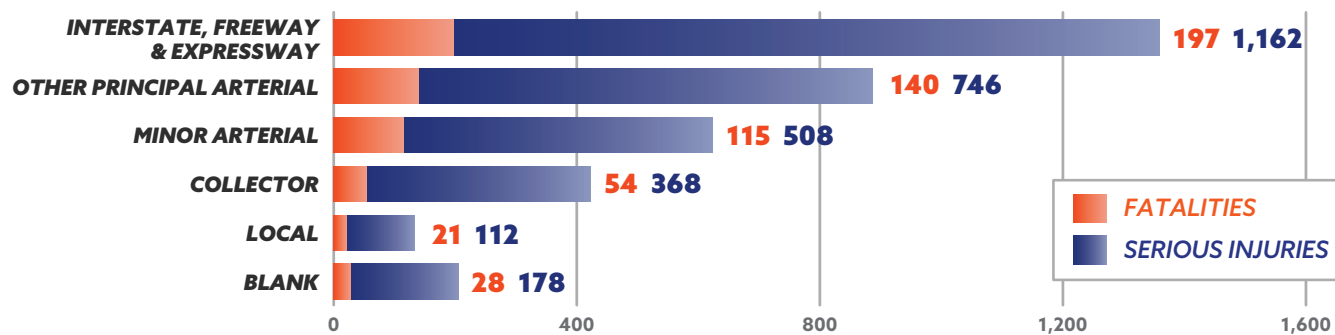


















































Table 13 lists actions to be implemented over the next five years to reduce heavy vehicle fatalities and serious injuries. Many of the actions are planned, reported, and implemented by Virginia State Police (VSP) motor carrier safety team in the annual CVSP submitted to FMCSA. Other actions are implemented through DMV-operated motor carrier service centers. Each action has been categorized under the appropriate strategy and the 4E that is responsible for implementation. The actions have also been assigned a time frame under which implementation may be initiated: ongoing, short term (one to two years), or long term (three to five years).

The objective of these actions is to reduce the total number of heavy vehicles involved fatalities and serious injuries from 647 in 2020 to 569 in 2026—a reduction of approximately 13 fatalities and serious injuries per year.

TABLE 13. HEAVY VEHICLES STRATEGIES AND ACTIONS

Priority Strategy 1: Implement road improvements that ensure human mistakes and vulnerabilities do not result in serious injuries or fatalities.				
				Provide additional truck parking facilities along highways, and additional information systems to inform truck drivers of available spaces. [Long Term]
Priority Strategy 3: Recognize traffic safety as a public health issue and establish policies and programs that promote safe behavior and reduce crash severity outcomes.				
				Increase focused enforcement in high crash areas of speed, equipment, and weight enforcement violations based on crash data analysis. [Ongoing]
				Enforce CMV regulations regarding the work hours/driving times of commercial motor vehicle drivers to reduce the incidence of drowsy driving. [Ongoing]
				Conduct the multi-agency, multi-state CMV enforcement task forces to enforce CMV violations (seat belt, speed, follow too close, etc.). [Ongoing]
				Conduct current safety compliance reviews of high-risk carriers and educate new entrants into the commercial motor vehicle business. [Ongoing]
				Collaborate with the trucking and bus industry on programs and initiatives to improve safety and reduce crashes with an emphasis on impairment (drunk, drugged, distracted and drowsy driving). [Ongoing]
				Promote the FMCSA truck and bus course for law enforcement. [Ongoing]
Priority Strategy 4: Develop and implement programs that provide education and awareness to high risk road users.				
				Educate heavy vehicle drivers on the effects of fatigue, hours of service, speed, and use of safety belts. [Ongoing]
				Increase training and education for passenger vehicle drivers about how to interact with heavy vehicles, buses, streetcars, and light rail vehicles. [Ongoing]
				Develop a strategy to expand the use of technology at commercial vehicle enforcement facilities. [Long Term]
				Educate young drivers about the nuances of driving safely around heavy vehicles, buses, streetcars, and light rail vehicles through the Driver's Education curriculum. [Ongoing]
Priority Strategy 5: Implement innovative solutions and utilize current and emerging technologies.				
				Use Weigh-in-Motion and Mainline Bypass Technologies to effectively facilitate commerce and minimize CMV back up on Virginia's interstates. [Ongoing]



EMPHASIS AREA

CONNECTED AND AUTOMATED VEHICLES (CAV)

Emphasis Area	Connected and Automated Vehicles (CAV)
Safe System Element	Safe Vehicles
How are connected and automated vehicles defined?	CAV are vehicles that use technology to perform the driving function and communicate with the road and other vehicles to operate safely.

Increasing vehicle electrification, automation, and connectivity with more shared mobility is transforming transportation safety, mobility, and accessibility. The most important from a Safe System Arrive Alive perspective is the potential to save lives and reduce injuries.

Several studies over many decades have confirmed that human errors are the major contributing factors for crash causation. While many Arrive Alive countermeasures focus on changing user behavior, the Safe System approach considers advances in vehicle technology as a crucial solution to reducing crash severity outcomes since humans make mistakes and innovations can be designed and operated to accommodate these mistakes. Automated vehicles include advanced driver assistance systems (ADAS), where driving functions are handled by the car or truck, that are evolving from many newer crash avoidance systems already in use, including:

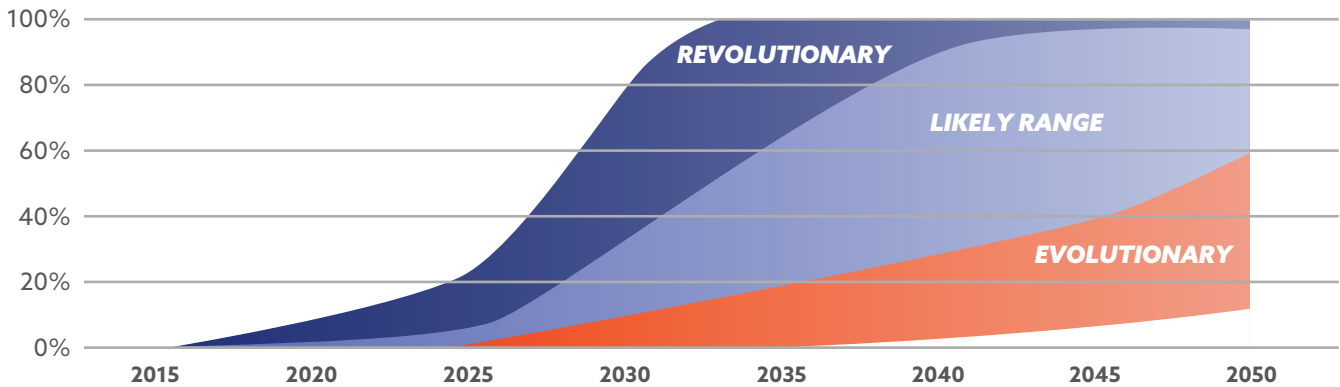
- Lane departure and blind spot alert and control
- Adaptive cruise control; frontal crash avoidance
- Backup camera and parking

Fully automated vehicles, while presently being tested, are expected to take a few decades to be common on our roads. As shown in Figure 55 and estimated by VTRANS 2045 megatrends, by 2045 the likely range of full automation is 44-88 percent of new vehicle sales with older vehicles remaining in the fleet, and a 38 to 67 percent reduction in severe crashes. Although not all crashes are expected to be prevented, the mid-range safety benefits estimate for VTRANS, accounting for increased travel, is a 48 percent reduction in severe crashes.

Source: Getty Images.

FIGURE 55. SCENARIOS WHEN FULLY AUTOMATED VEHICLES WILL BE MORE COMMON

PERCENTAGE OF NEW VEHICLE SALES



Source: ITS America – Data and the Digital Highway, ITS America Forum, November 5, 2018.






CAV also includes connections using wireless technology which are implemented as vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communications. These technologies are being tested in Virginia and across the globe as potential solutions to reduce crashes associated with the following risks:

- Changing traffic flow and network patterns
- Approaching conflicts and traffic control at intersections and interchanges
- Other vehicle trajectories and control

These CAV advances will continue to generate safety actions and countermeasures over the next five years in Virginia. Partner agencies are piloting, promoting, and tracking progress with associated technology to find opportunities to enhance safety and operations of the transportation system. In the nearer term, the actions for this SHSP period are considered key concepts for safety efforts that blend with the [2020 VDOT CAV Program Plan](#).

Table 14 provides the CAV strategies and actions in the SHSP. Each action has been categorized under the appropriate strategy and the 4E that is responsible for implementation. The actions have also been assigned a time frame under which implementation may be initiated: ongoing, short term (one to two year), or long term (three to five years).

TABLE 14. CAV STRATEGIES AND ACTIONS

Priority Strategy 5: Implement innovative solutions and utilize current and emerging technologies.	
	Assess emerging connected vehicle datasets that produce estimates of safety surrogate measures such as excessive braking and acceleration for potential application in the network screening process. [Long Term]
	Conduct pilots of smart intersection technologies that can detect vulnerable road users and alert connected vehicles to conflicts. [Long Term]
	Develop and pilot advanced tools and methods to improve safety for the motorist and worker in construction and maintenance work zones, such as automated truck mounted attenuators, worker alerts, and advanced driver alerts of work zones. [Long Term]
	Conduct a legal review and audit of the Code of Virginia to determine gaps in the existing code related to automated vehicles. [Short Term]
	Evaluate existing driver education material and safety campaigns to determine opportunities to incorporate information about connected and automated vehicles use and benefits. [Ongoing]

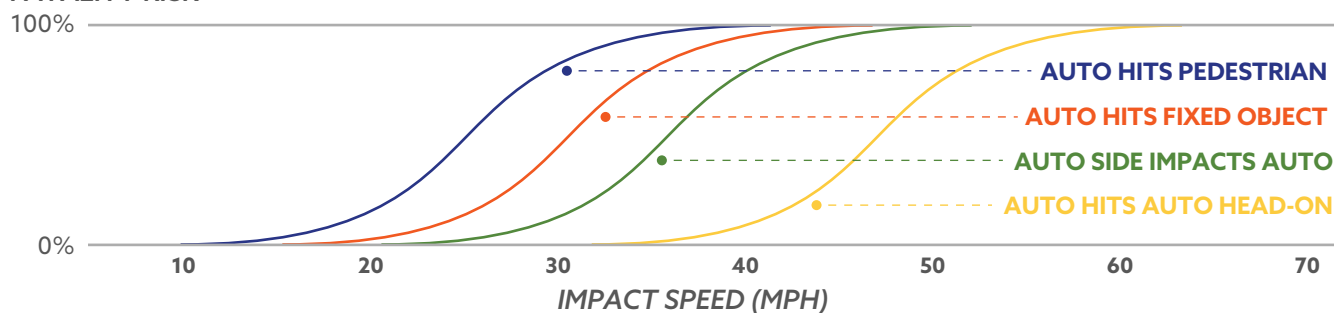


SAFE SPEEDS

The third element is safe speeds. "Speed is at the heart of a forgiving road transport system. It transcends all aspects of safety: without speed there can be no movement, but with speed comes kinetic energy and with kinetic energy and human error come crashes, injuries and even deaths." (Organization for Economic Cooperation and Development (OECD), 2016) There is a direct speed connection between crash causation and being able to survive a crash. The human body is unlikely to survive uncushioned impact at speeds faster than 30 mph, as shown in Figure 56. The consequences are compounded for vulnerable users by mode and by age.

FIGURE 56. IMPACT OF SPEED ON CRASH SURVIVABILITY

FATALITY RISK



Source: FHWA.

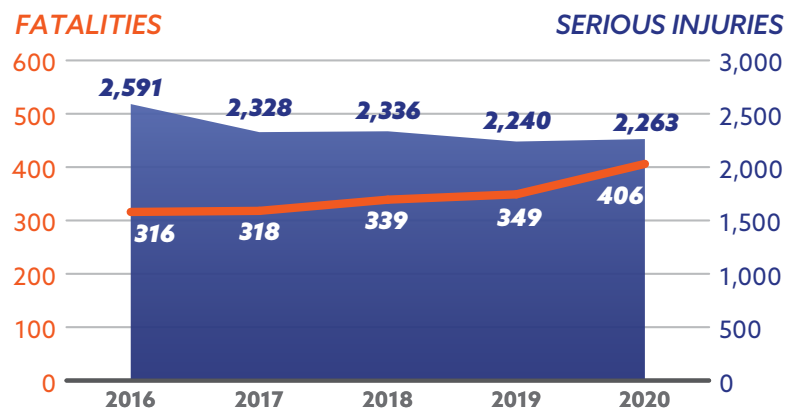
EMPHASIS AREA — SPEEDING

Emphasis Area	Speeding
Safe System Element	Safe Speeds
How are speeding fatalities and serious injuries defined?	All people killed or seriously injured in a crash where one or more drivers was driving faster than the posted speed limit or the maximum safe speed for conditions.

Analysis by NHTSA shows that in 2020, despite lower traffic volumes, traffic deaths in motor vehicle crashes increased by 7.2 percent.¹¹ One of the major causes for this increase was speeding. From 2019 to 2020 speeding fatalities increased by 11 percent in the U.S. Speeding remains a persistent problem on Virginia roads. Despite efforts to curtail speeding through engineering improvements, enforcement, and education, drivers continue to exceed speed limits and drive aggressively. The Insurance Institute on Highway Safety (IIHS) reported that 52 percent of fatal crashes involve aggressive driving, defined as committing a combination of moving traffic offenses that endanger other persons or property. Speeding is the most common aggressive behavior.

As shown in Figure 57, speeding fatalities increased by 14 percent from 2019 (349) to 2020 (406). Over four in ten fatalities involved speeding with 1,728 people killed in five years. Speeding serious injuries remained constant during the same period with almost 12,000 needing post-crash care (one in three serious injuries involved speeding).

FIGURE 57. SPEEDING RELATED FATALITIES AND SERIOUS INJURIES



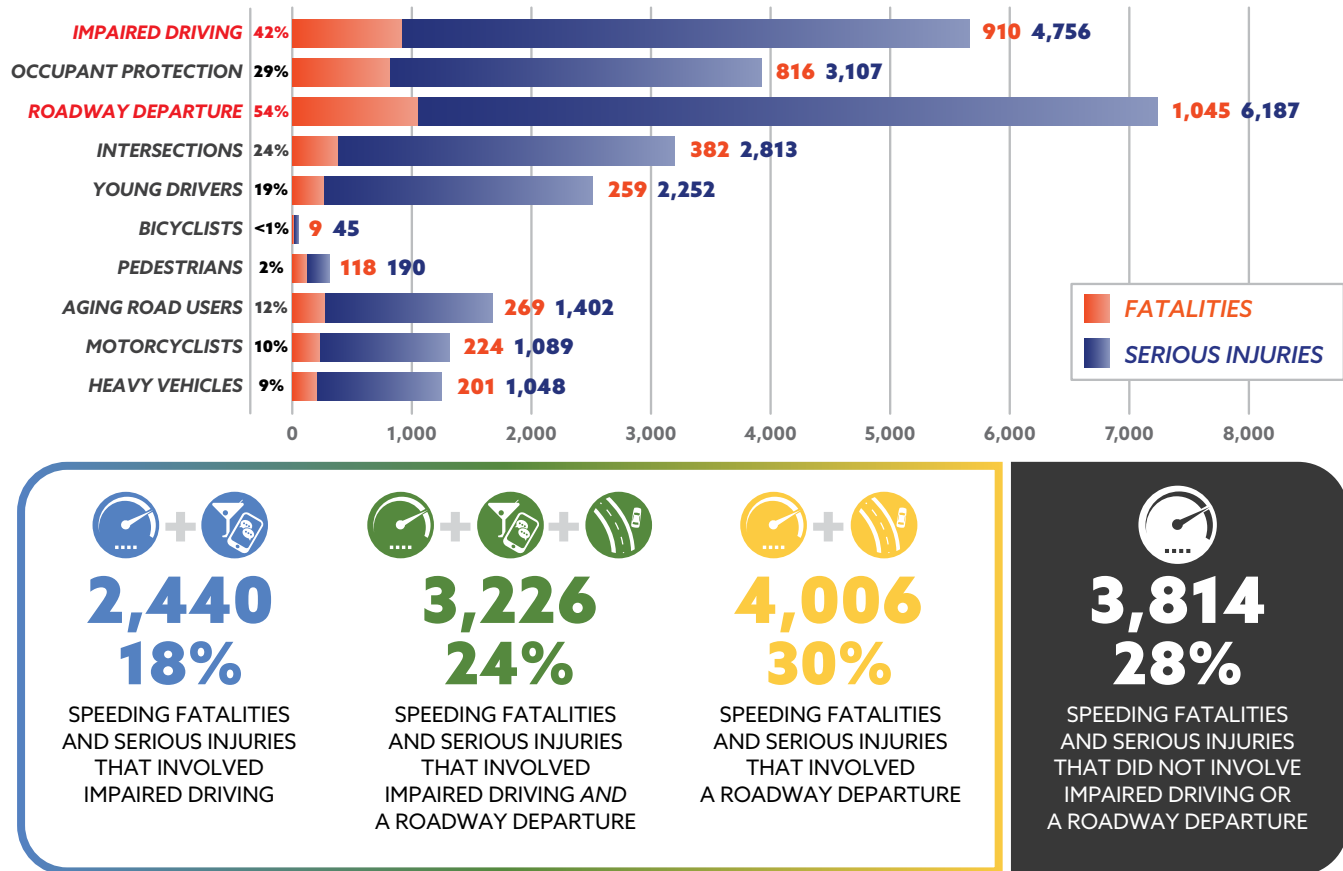
¹¹ June 2021 NHTSA. News Release, 2020 Fatality Data Show Increased Traffic Fatalities During Pandemic.



Source: Getty Images.

Major emphasis area contributing factors in speeding related fatal and serious injury crashes were roadway departures, impaired driving, and a lack of restraint use as indicated in Figure 58. Roadway departure accounted for 54 percent of fatalities and serious injuries, impaired driving 42 percent, and lack of restraint use 29 percent. These factors suggest that drivers tend to commit multiple risky behaviors. When combined, the two highest contributing factors, roadway departure and impaired driving, accounted for 24 percent of all speeding related fatalities and serious injuries.

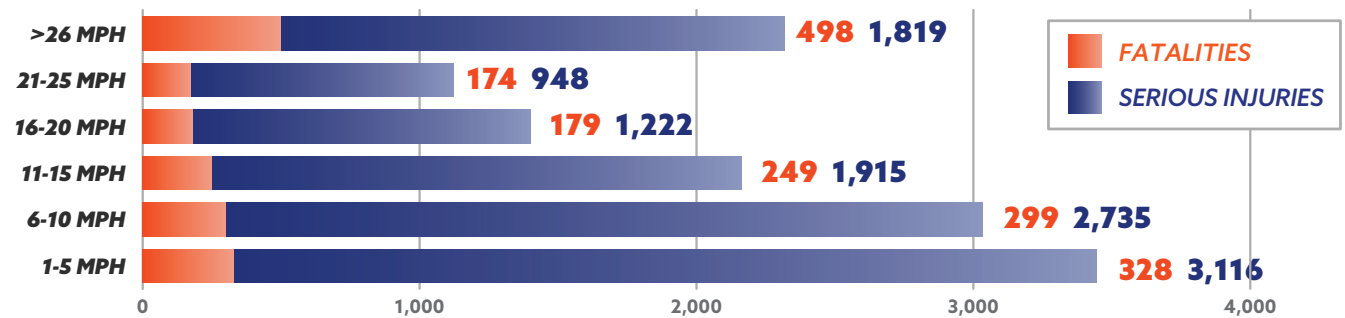
FIGURE 58. CONTRIBUTING FACTORS TO SPEEDING FATALITIES AND SERIOUS INJURIES



Source: Getty Images.

Figure 59 shows the speeding difference or how many miles per hour the vehicle was traveling over the speed limit or maximum safe speed for conditions (e.g., weather, traffic congestion) as interpreted by the reporting police officer in fatal and serious injury crashes. The largest proportion of fatalities (498) occur at speeds that are over 26 miles per hour over the speed limit or the maximum safe speed. The largest proportion of serious injuries (3,116) occur at speeds between 1 and 5 miles per hour over the speed limit or the maximum safe speed.

FIGURE 59. SPEEDING DIFFERENCE BY MILES PER HOUR (MPH) IN FATAL AND SERIOUS INJURY CRASHES



Most speeding fatalities and serious injuries involve male drivers between the ages of 16 and 35 with the highest numbers involving younger drivers aged 16 to 25 as shown in Figure 60. The age breakdown is similar for females although at lower numbers.

FIGURE 60. NUMBER OF FATALITIES AND SERIOUS INJURIES BY AGE AND GENDER OF SPEEDING DRIVER

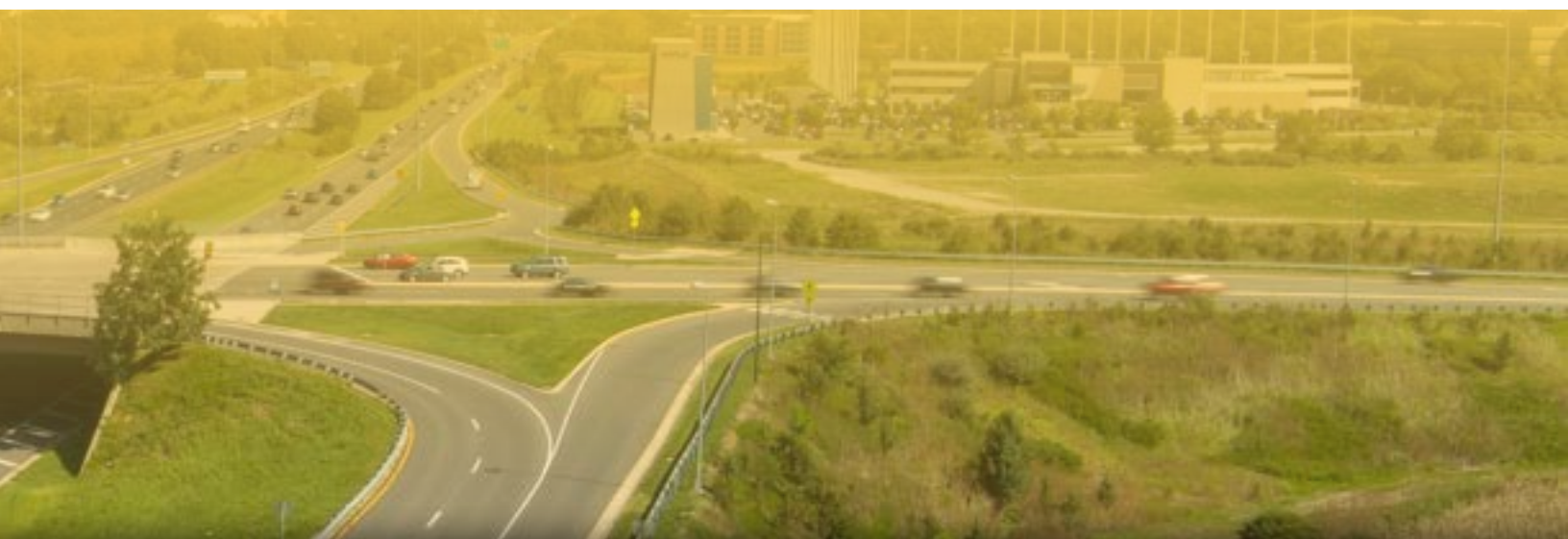
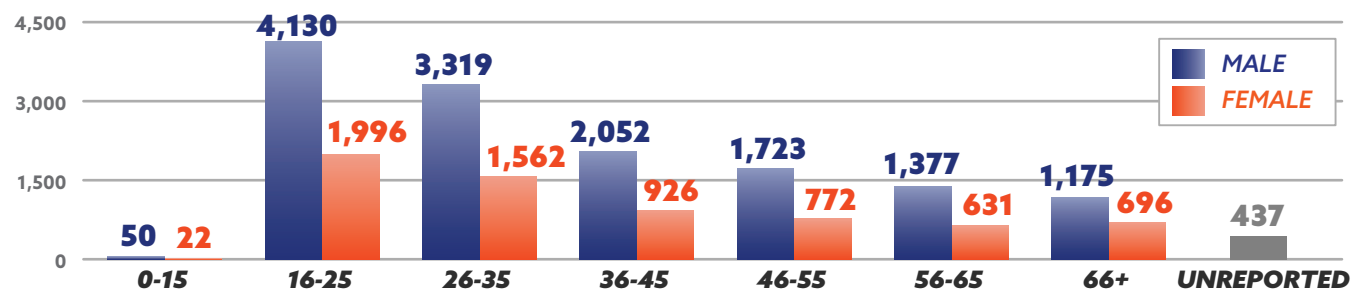










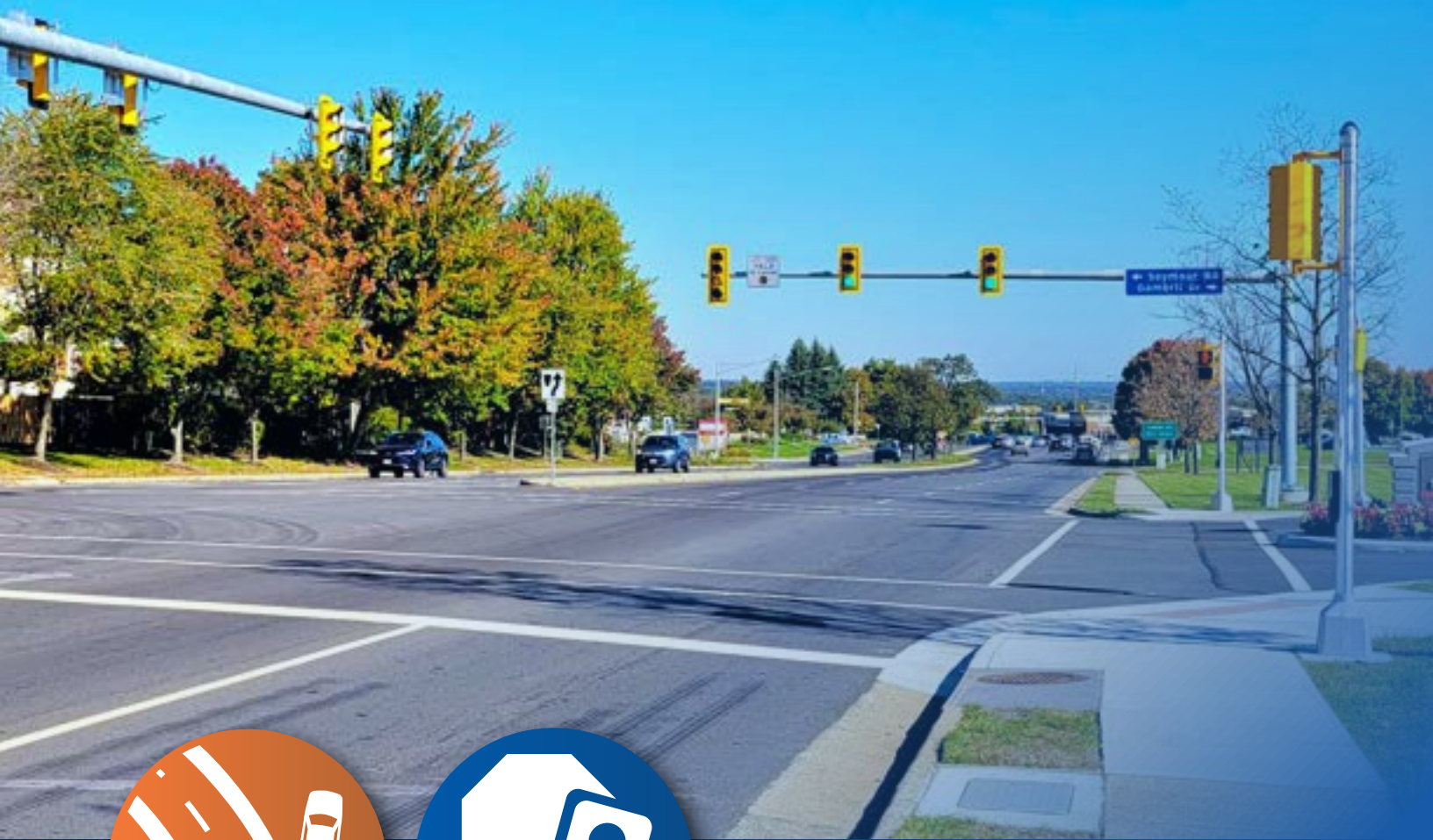


Table 15 is a list of actions to be implemented over the next five years to reduce speeding fatalities and serious injuries. Each action has been categorized under the appropriate strategy and the 4E that is responsible for implementation. The actions have also been assigned a time frame under which implementation may be initiated: ongoing, short term (one to two years), or long term (three to five years).

The objective of these actions is to reduce the total number of speeding fatalities and serious injuries from 2,669 in 2020 to 2,349 in 2026—a reduction of approximately 53 fatalities and serious injuries per year.

TABLE 15. SPEEDING STRATEGIES AND ACTIONS

Priority Strategy 2: Adopt an approach that considers risk when prioritizing locations for safety improvements and programs.	
	Update and institutionalize context sensitive speed limit setting practices, with law enforcement collaboration, including within work zones and evaluate and enhance messaging on the benefits and use of such practices. [Short Term]
	Disseminate information and train law enforcement on using network vehicle speed and related crash data (VTTI Study) to support proactive presence and engagement with motorists and riders. [Short Term]
Priority Strategy 3: Recognize traffic safety as a public health issue and establish policies and programs that promote safe behavior and reduce crash severity outcomes.	
	Conduct high visibility speed selective enforcement mobilizations/patrols and conduct speed focused operations through local law enforcement and Virginia State Police. [Ongoing]
	Develop guidelines and collaborate with localities implementing automated speed enforcement in school zones and encourage automated speed enforcement for appropriate work zones. [Ongoing]
	Educate the judicial community on the need for consistent application of the law on speed-related offenses. [Ongoing]
	Conduct training of police officers on speed enforcement best practices and current law. [Short Term]
Priority Strategy 4: Develop and implement programs that provide education and awareness to high risk road users.	
	Educate to change the behavior of speeders and the overall driving population with persuasive messaging regarding the dangers of speed. [Ongoing]
	Recruit new and effective partners to make sure the speed program is reaching diverse and underserved communities and to ensure equity is at the forefront to decrease speed-related fatalities. [Short Term]
Priority Strategy 5: Implement innovative solutions and utilize current and emerging technologies.	
	Investigate the additional use of the Active Traffic Management System (ATMS) and Variable Speed Limit (VSL) practices on freeway corridors to harmonize speed and prevent weather and queue-related crashes. [Ongoing]
	Identify and evaluate advanced tools and techniques to reduce speeding and where necessary, work with the General Assembly to explore the use of these tools. [Ongoing]



SAFE ROADS

The fourth element is safe roads and roadsides that are predictable and forgiving of mistakes. Roads are safer when designed, operated, and maintained to prevent crashes and keep impacts on the human body at tolerable levels. By providing and separating time and space for users, it is possible to avoid crashes or manage the kinetic energy of collisions. The following principles have been identified to sustain safe road systems:

- Single function roads as through, distributor or access facilities in a hierarchical and connected network
- Equality in speed, direction, and mass at medium to high speeds
- Predictability of road alignment and environment that support user expectation and appropriate behavior through consistency and continuity in road design
- Injury limitation through forgiving road environment and anticipation of user behavior
- State of awareness by users' ability to assess task capability to handle driving, riding, bicycling, and walking functions

EMPHASIS AREA

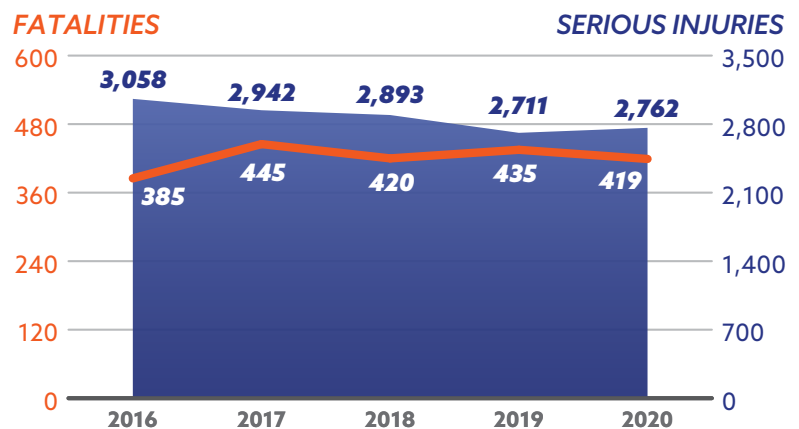
ROADWAY DEPARTURE

Emphasis Area	Roadway Departure
Safe System Element	Safe Roads
How are roadway departure fatalities and serious injuries defined?	All people killed or seriously injured in a crash where one or more vehicles crosses an edge line or centerline or otherwise leaves the traveled way, excluding intersection crashes.

Roadway departure crashes are the result of vehicles unintentionally leaving the travel lane to the left or right. Vehicles departing the travel lane to the right often overturn or hit a fixed object while vehicles departing the travel lane to the left can overturn or hit a fixed object if departing a road with a wide median or hit an oncoming vehicle. Roadway departure crashes often involve only one vehicle traveling at a high speed and result in fatalities or serious injuries. From 2016 to 2020, more people were killed or seriously injured in crashes involving a roadway departure than any other emphasis area.

From 2016 to 2020, 2,104 fatalities and 14,366 serious injuries resulting from drivers leaving their travel lanes in Virginia, which accounted for 51 percent of the fatalities and 39 percent of the serious injuries statewide. While roadway departure fatalities have increased from 385 in 2016 to 419 in 2020 as shown in Figure 61, serious injuries have decreased from 3,058 in 2016 to 2,762 in 2020.

FIGURE 61. ROADWAY DEPARTURE FATALITIES AND SERIOUS INJURIES

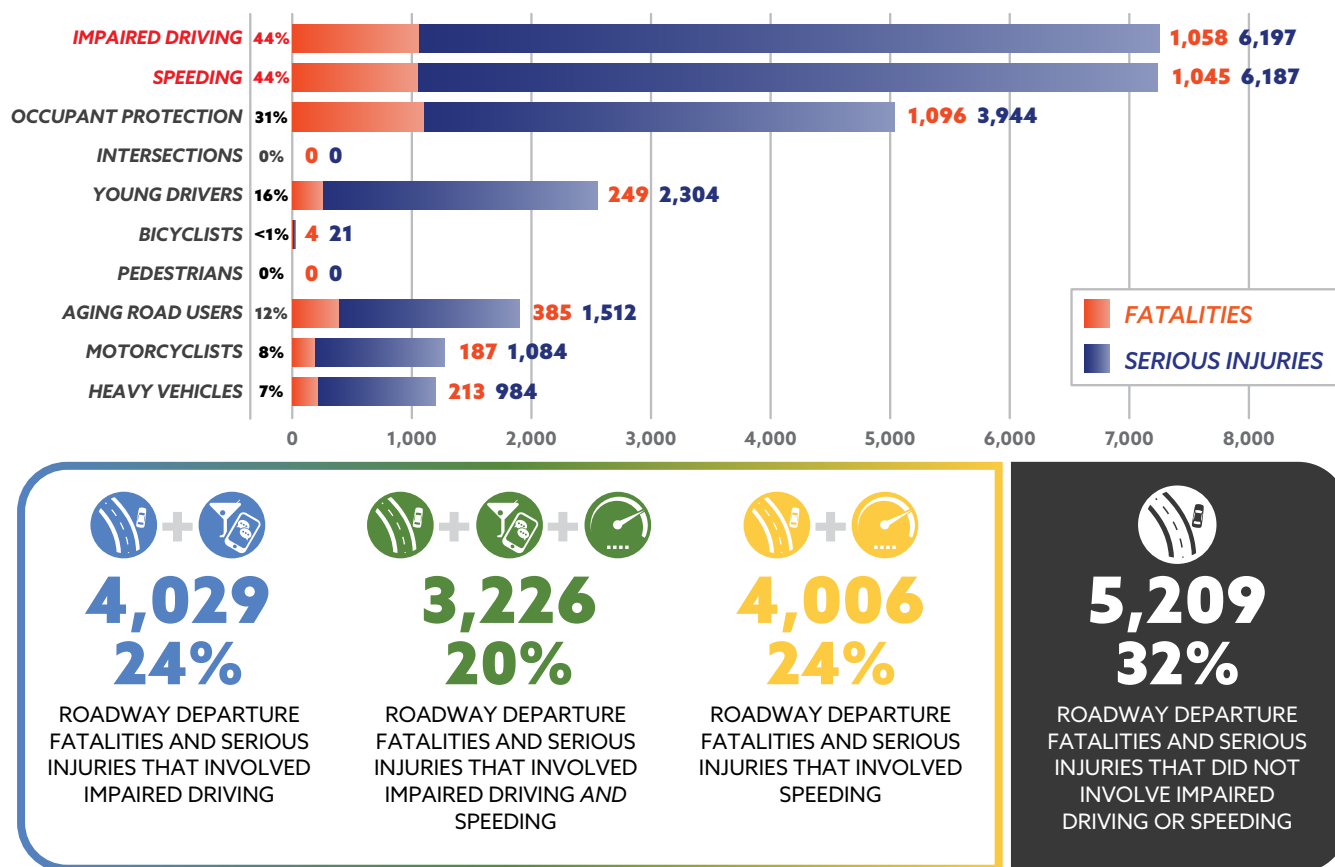


Source: Getty Images.

The emphasis area factors that contribute most to roadway departure fatalities and serious injuries are impaired driving and speeding, which both contribute to 44 percent of all roadway departure fatalities and serious injuries as shown in Figure 62. Only 32 percent of roadway departure fatalities or serious injuries did not involve either an impaired or speeding driver.

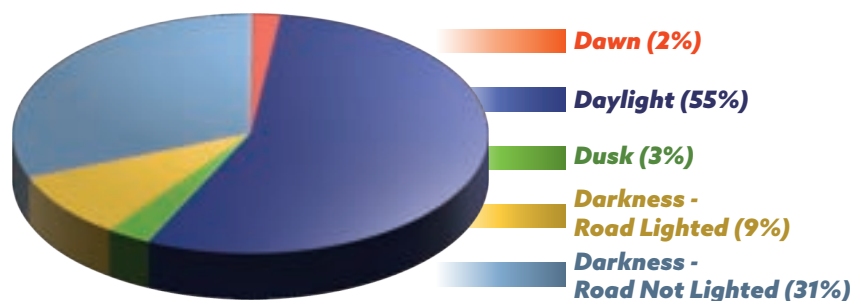
While unrestrained driving and young driver fatalities and serious injuries do not contribute to as high a percentage of roadway departure fatalities and serious injuries, 62 percent of unrestrained fatalities and serious injuries and 39 percent of young driver fatalities and serious injuries were roadway departure crashes.

FIGURE 62. CONTRIBUTING FACTORS TO ROADWAY DEPARTURE FATALITIES AND SERIOUS INJURIES



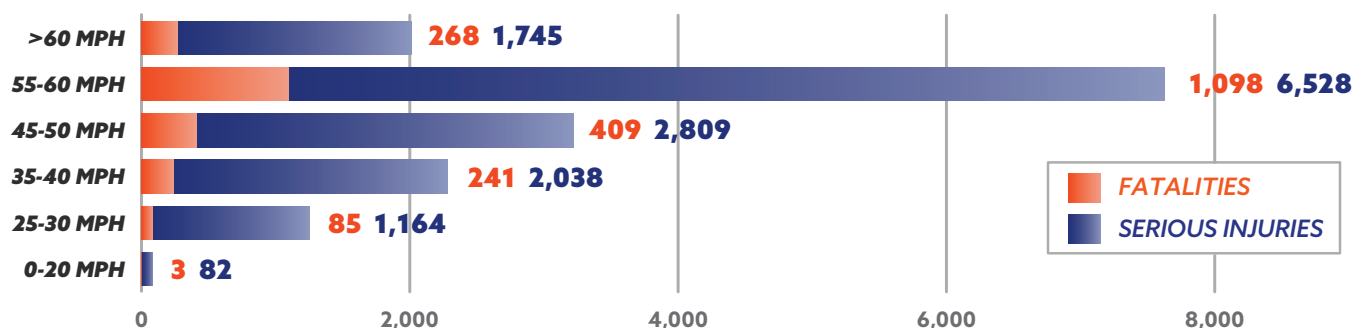
Approximately 40 percent of roadway departure fatalities and serious injuries occurred during dark conditions as shown in Figure 63. Approximately 20-25 percent of travel occurs at night which indicates this factor is overrepresented. Approximately 31 percent of roadway departure fatalities and serious injuries occur during darkness where road lighting is not present.

FIGURE 63. NUMBER OF ROADWAY DEPARTURE FATALITIES AND SERIOUS INJURIES BY LIGHTING CONDITION



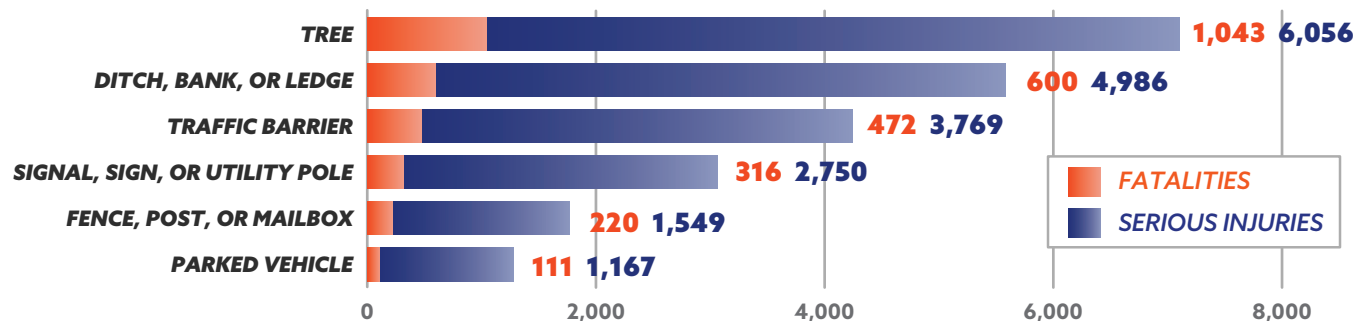
Vehicle speed is a major contributing factor to roadway departure fatalities and serious injuries. Figure 64 illustrates that speeding contributes to 44 percent of roadway departure fatalities and serious injuries; however, roadway departure fatalities and serious injuries are much more likely to occur on higher-speed roads, regardless of whether the driver is speeding. Approximately 58 percent of roadway departure fatalities and serious injuries occurred on roads with speed limits at or above 55 miles per hour.

FIGURE 64. NUMBER OF ROADWAY DEPARTURE FATALITIES AND SERIOUS INJURIES BY SPEED LIMIT



Approximately 67 percent of roadway departure fatalities and serious injuries involve a driver hitting a fixed object. Trees were the objects hit most often that resulted in fatalities and serious injuries as 1,043 people were killed and 6,056 seriously injured after hitting a tree as shown in Figure 65.

FIGURE 65. NUMBER OF ROADWAY DEPARTURE FATALITIES AND SERIOUS INJURIES BY FIXED OBJECT TYPE












Therefore, the key issues for minimizing roadway departure crashes and their consequences are:

- **Roadside conditions** – design features that enhance the ability to recover, stop, or be shielded before overturning or hitting a fixed object after leaving the travel lanes
- **Horizontal curves** – studies have shown that about 50 percent of roadway departure crashes occur on curves, so appropriate forward vision of curves, warning and delineation is needed
- **Nighttime** – while less than 25 percent of travel typically occurs during dark hours, a higher proportion of roadway departure crashes occurs during those periods
- **Behaviors** – addressing three overlapping behaviors (Figure 62) can reduce the number of roadway departures or mitigate the injury severities

Table 16 is a list of actions to be implemented over the next five years to reduce roadway departure fatalities and serious injuries. Each action has been categorized under the appropriate strategy and the 4E that is responsible for implementation. The actions have also been assigned a time frame under which implementation may be initiated: ongoing, short term (one to two years), or long term (three to five years).

The objective of these actions is to reduce the total number of roadway departure fatalities and serious injuries from 3,181 in 2020 to 2,799 in 2026—a reduction of approximately 64 fatalities and serious injuries per year.

TABLE 16. ROADWAY DEPARTURE STRATEGIES AND ACTIONS

Priority Strategy 1: Implement road improvements that ensure human mistakes and vulnerabilities do not result in serious injuries or fatalities.	
   	Promote benefits and alternate funding of complete streets, road conversions, and road/roadside design improvements, based on potential for safety network screening, during capital project planning and design. [Ongoing]
   	Improve related geometric data collection and safety analysis to promote infrastructure projects enhancing roadside design in the clear zone with context considerations to remove, relocate, shoulder, or delineate fixed objects. [Long Term]
   	Review and improve related engineering and traffic control device standards and specifications. Expand the use of and maintain existing road and bridge delineation and visibility features. [Ongoing]
   	Continue VDOT Systemic Implementation Plan for roadway departure-related traffic control devices and pavement countermeasures. [Ongoing]
   	Complete Pavement Friction Management Program development and continue data collection and support improved analysis methods. Develop and promote high-friction surface treatment (HFST) knowledge and use where appropriate. Explore application of other pavement surfacing treatments that may offer properties that uniquely respond to specific safety concerns. [Short Term]
Priority Strategy 2: Adopt an approach that considers risk when prioritizing locations for safety improvements and programs.	
   	Update Roadway Departure Plan network screening using recent safety performance research, curve inventory, and best countermeasure practices. Provide training on methods and countermeasures for consideration in maintenance and construction project planning and development. [Short Term]
Priority Strategy 3: Recognize traffic safety as a public health issue and establish policies and programs that promote safe behavior and reduce crash severity outcomes.	
   	Promote and support road safety action plans to locality, agency, and District staff through the Safety Circuit Rider Program. [Ongoing]



EMPHASIS AREA

INTERSECTIONS

Emphasis Area	Intersections
Safe System Element	Safe Roads
How are intersection fatalities and serious injuries defined?	All people killed or seriously injured in a crash that occurs within 250 feet of an intersection on a VDOT road or that was identified as occurring at an urban intersection on the crash report.

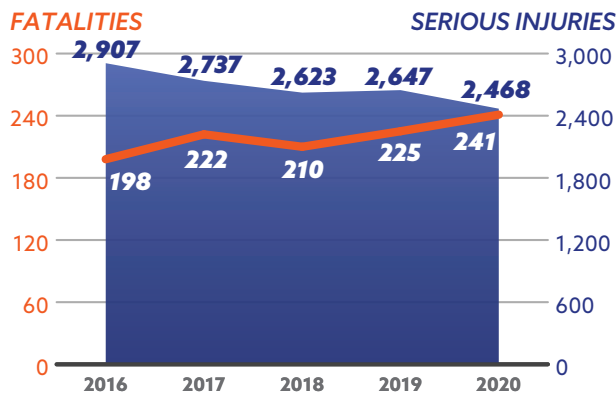
Intersections are locations where two or more roads cross at grade, which results in conflicts between all road users (e.g., vehicles, pedestrians, bicyclists, transit users). In Virginia, VDOT maintains most intersections throughout the State but 38 cities, 46 towns and two counties maintain their own intersections (VDOT's urban system). From 2016 to 2020, 1,096 fatalities and 13,382 serious injuries occurred at intersections in Virginia, which accounted for 27 percent of the overall fatalities and 36 percent of the serious injuries state-wide. Intersection fatalities have increased from 198 in 2016 to 241 in 2020 (as shown in Figure 66), while serious injuries have decreased from 2,907 in 2016 to 2,468 in 2020.

Safety at intersections can be improved with engineering solutions that separate conflicts by space or time, reduce the number of conflict points, reduce the speed and impact angle resulting in reduced severity of crashes when they occur, and/or improve the visibility of the intersection. Examples for each potential safety solution include the following:

- **Separating conflicts by space** – constructing a bicycle lane to separate bicyclists from vehicles
- **Separating conflicts by time** – creating a protected left-turn phase at a signalized intersection
- **Reducing impact energy** – constructing a roundabout to remove all crossing conflict points that lead to angle crashes
- **Improve visibility** – install reflective backplates at signalized intersections or advance warning at stop-controlled intersections

Safety at intersections can also be improved by educating drivers on how to safely drive, bicycle, or walk-through intersections, how to understand [new intersection designs](#), and how new technologies operate.

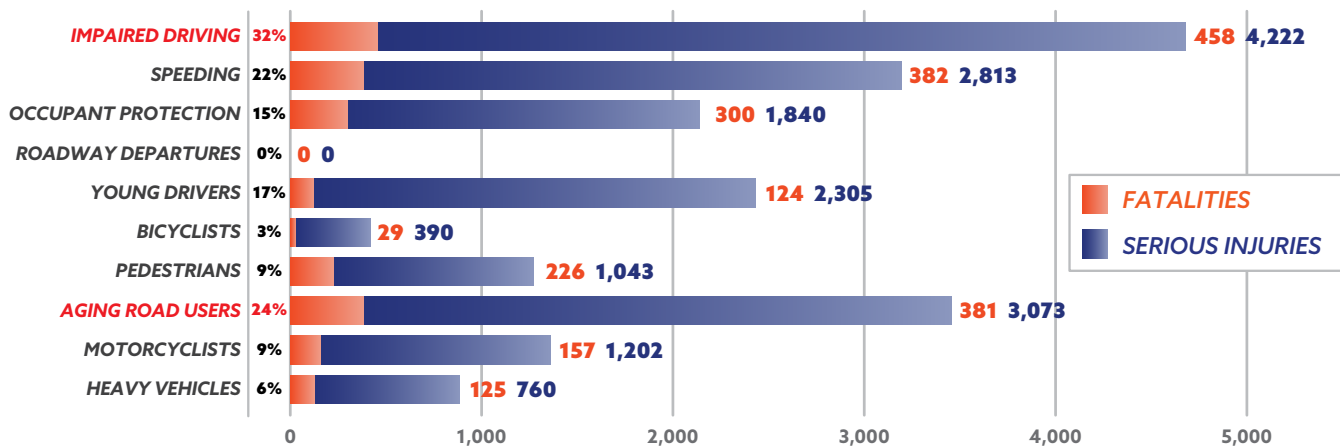
FIGURE 66. INTERSECTION FATALITIES AND SERIOUS INJURIES



The emphasis area factors that contribute most to intersection fatalities and serious injuries are impaired driving and aging road users, which contribute to 32 and 24 percent of all intersection fatalities and serious injuries as shown in Figure 67. While these two factors both contribute to intersection fatalities and serious injuries, there is not much overlap between the two as only 6 percent of the intersection fatalities and serious injuries involved both an impaired driver and an aging road user.

While pedestrian and bicyclist fatalities and serious injuries do not constitute a large percentage of intersection fatalities and serious injuries, 46 percent of pedestrian fatalities and serious injuries and 59 percent of bicyclist fatalities and serious injuries occurred at intersections.

FIGURE 67. CONTRIBUTING FACTORS TO INTERSECTION FATALITIES AND SERIOUS INJURIES



3,871
27%

INTERSECTION
FATALITIES AND SERIOUS
INJURIES THAT INVOLVED
IMPAIRED DRIVING



809
6%

INTERSECTION
FATALITIES AND SERIOUS
INJURIES THAT INVOLVED
IMPAIRED DRIVING AND
AGING ROAD USERS



2,645
18%

INTERSECTION
FATALITIES AND SERIOUS
INJURIES THAT INVOLVED
AGING ROAD USERS

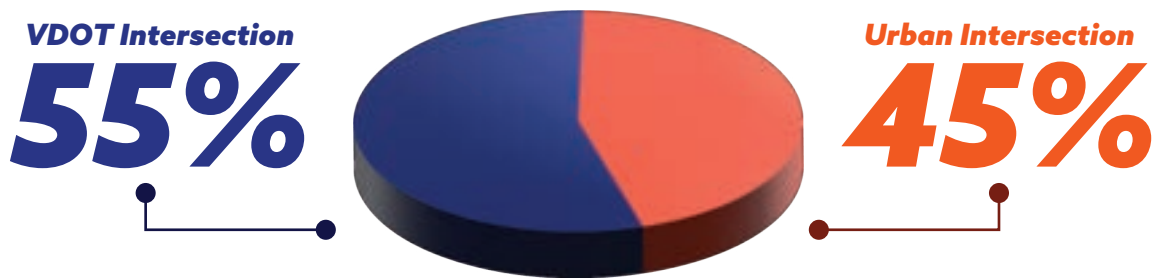


7,153
49%

INTERSECTION
FATALITIES AND SERIOUS
INJURIES THAT DID NOT
INVOLVE IMPAIRED
DRIVING OR AGING
ROAD USERS

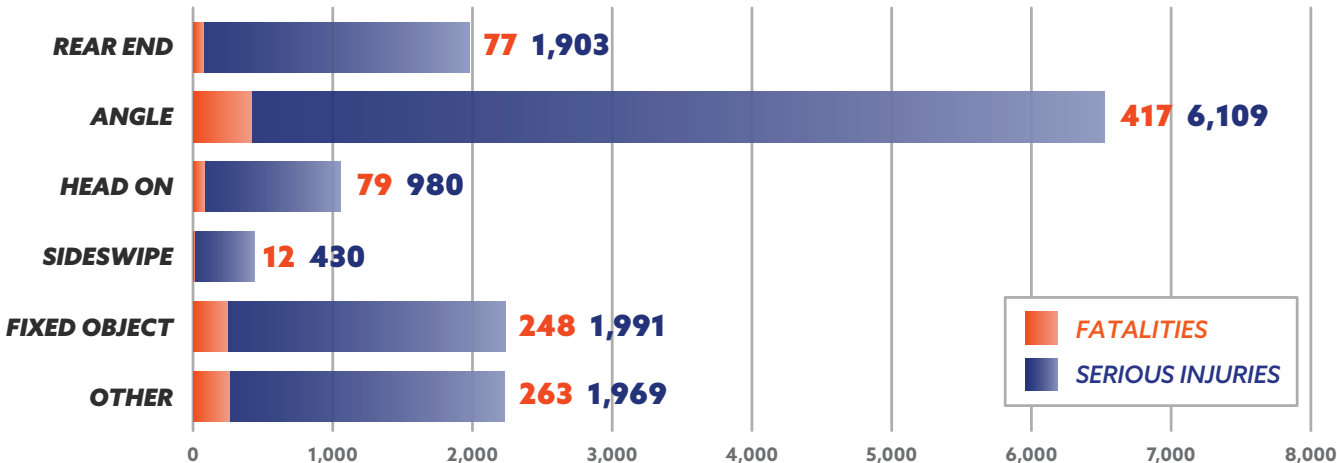
Although VDOT maintains a higher number of intersections (estimated to be 85 percent) than those maintained by cities, towns, and counties, the number of fatalities and serious injuries are evenly distributed between the two as shown in Figure 68. This indicates the needed emphasis on overrepresented urban intersections.

FIGURE 68. PERCENTAGE OF FATALITIES AND SERIOUS INJURIES BY INTERSECTION OWNERSHIP



Rear end crashes made up 32 percent of all intersection crashes from 2016 to 2020 but only accounted for 14 percent of intersection fatalities and serious injuries. Angle crashes, one of the most severe types of crashes, made up 40 percent of all intersection crashes but accounted for 45 percent of intersection fatalities and serious injuries (417 fatalities and 6,109 serious injuries) as shown in Figure 69. The crash type that contributed to the second highest number of intersection fatalities and serious injuries was fixed object crashes (a roadway departure within the defined intersection buffer area).

FIGURE 69. NUMBER OF INTERSECTION FATALITIES AND SERIOUS INJURIES BY CRASH TYPE



Approximately 32 percent of intersection fatalities and serious injuries occurred during dark conditions as shown in Figure 70, with approximately 14 percent occurring at intersections that are not lighted.

FIGURE 70. PERCENTAGE OF INTERSECTION FATALITIES AND SERIOUS INJURIES BY LIGHTING CONDITION

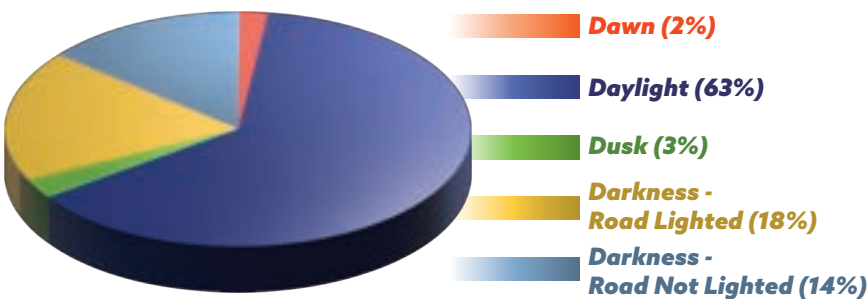


Table 17 is a list of actions to be implemented over the next five years to reduce intersection fatalities and serious injuries. Each action has been categorized under the appropriate strategy and the 4E that is responsible for implementation. The actions have also been assigned a time frame under which implementation may be initiated: ongoing, short term (one to two years), or long term (three to five years).

The objective of these actions is to reduce the total number of intersection fatalities and serious injuries from 2,709 in 2020 to 2,384 in 2026—a reduction of 54 fatalities and serious injuries per year.

TABLE 17. INTERSECTION STRATEGIES AND ACTIONS

Priority Strategy 1: Implement road improvements that ensure human mistakes and vulnerabilities do not result in serious injuries or fatalities.	
   	Update the VDOT systemic safety implementation plans for unsignalized and signalized intersections. Continue evaluation and outreach on the benefits and expand the use of these improvements at locally maintained intersections. [Ongoing]
   	Implement safety action plan for passive and active public railroad highway grade crossings, including grade separations, intersection warning and signing, gating, signalized intersection interconnection, and information on Operation Lifesaver. [Ongoing]
   	Apply access management practices in project planning and development phases to ensure proper spacing and sight distance. Consider the impacts of access management on multimodal road users. [Ongoing]
   	Disseminate information, conduct training, and implement DRPT Multimodal System Design Guidelines (2020) and VDOT Complete Streets policy to apply practical design alternative assessments based on multimodal travel demand and safety performance. [Short Term]
Priority Strategy 2: Adopt an approach that considers risk when prioritizing locations for safety improvements and programs.	
   	Expand potential for safety improvement network screening to include road and intersection types not currently covered with safety performance functions or lacking traffic volumes. Consider using additional intersection and roadway inventory elements during development of safety performance functions. [Ongoing]
   	Promote the use of the Human Factors Guide in project planning and development and provide related application training on road and traffic control design assessments. [Long Term]
Priority Strategy 3: Recognize traffic safety as a public health issue and establish policies and programs that promote safe behavior and reduce crash severity outcomes.	
   	Investigate alternate strategies to reduce red-light running for all users. Work with law enforcement and educators to initiate focused law enforcement and messaging/outreach activities to reduce red-light running. [Long Term]
Priority Strategy 4: Develop and implement programs that provide education and awareness to high risk road users.	
   	Improve users' knowledge of new and existing traffic control devices for intersections through publications, web brochures, Driver Education materials, the Safety Circuit Rider Program, and social media. [Ongoing]
Priority Strategy 5: Implement innovative solutions and utilize current and emerging technologies.	
   	Institutionalize the consideration of safe system and innovative designs through the Intersection and Interchange Control Assessment Program. Evaluate and enhance messaging on the benefits and use of innovative intersections and interchanges. [Short Term]
   	Complete deployment of VDOT modernized traffic signal control technologies and implement real-time signal monitoring and control strategies. Investigate and implement new technologies for conflict mitigation as they become available. [Ongoing]



Source: Getty Images.



POST-CRASH CARE

The final element is post-crash care in the event of a crash. From fender benders to life threatening injury crashes, the traveling public relies on first responders to quickly locate, provide traffic control, stabilize any injury, and transport to an appropriate medical facility. Fire, Enforcement, EMS, and Safety Service Patrol work in tandem to manage the incident to minimize injury, traffic backups, and potential secondary crashes. Beyond emergency services, there is follow-up investigation and documentation of the circumstances so that data is available to help mitigate the risk of future crashes by understanding the holistic safety landscape for improved actions and investments.

EMERGENCY RESPONSE AND MEDICAL SERVICES

Emphasis Area	Emergency Response and Medical Services
Safe System Element	Post-Crash Care

Emergency response and medical services (EMS) and incident response comprise one of the 4Es of highway safety and are fundamental post-crash care in the Safe System approach. Timely and appropriate emergency response to a crash where trauma care is needed reduces the consequences for those involved. Similarly, timely response to crashes or other incidents that involve disabled vehicles on the road can reduce the occurrence of secondary crashes.

Virginia's Statewide Traffic Incident Management ([VASTIM](#)) Program coordinates efforts between authorized fire, EMS, law enforcement, and VDOT incident response personnel so they can respond to crashes and other incidents quickly, efficiently, and safely. Concurrently, their aim is to return safely to home after each shift by providing advance warning and traffic control, incident protection, and promotion of move over and slow down messaging and laws.

VDOT tracks highway incident metrics and prepares [dashboard](#) information for the State and Districts. The tracking and reporting enable assessment of challenges, successes, and resources to be adaptive to changing needs. Since 2018, the median time to clear incidents, which includes crashes and disabled vehicles, has remained steady while the number of incidents has decreased as shown in Table 18. The number of incidents decreased approximately 16 percent from 2019 to 2020 because of COVID-19 on travel. The number of incidents that involved a lane closure similarly decreased in 2020; however, the median time to clear the roadway and reopen all travel lanes increased in 2020. This increase is attributed to a higher percentage of incidents involving heavy vehicles as COVID-19 did not decrease heavy vehicle traffic as drastically as passenger vehicle traffic. Incidents involving heavy vehicles typically take longer to clear from the roadway. The median incident clearance time is shorter than the median roadway clearance time because approximately 80 percent of incidents do not involve a lane closure and are often quick to clear.



TABLE 18. INCIDENT CLEARANCE SUMMARY

Year	Number of Incidents	Median Incident Clearance Time (minutes)	Number of Lane-Impacting Incidents	Median Roadway Clearance Time (minutes)
2018	92,696	21	18,204	31
2019	90,779	22	18,138	31
2020	76,643	21	16,134	37

Source: Virginia Department of Transportation, Traffic Operations Performance Report, https://www.virginiadot.org/business/resources/OperationsDivision/2020_Traffic_Operations_Performance_Report.pdf.

Virginia's EMS and trauma care system is coordinated to provide appropriate and adequate care to reduce deaths and disabilities from crashes. Decisions based on empirical data are critical to continued improvement and outcomes. National EMS Information System (NEMSIS) data is submitted into Virginia's Prehospital Patient Care Reporting System (VPHIB) with the Virginia Statewide Trauma Registry (VSTR) data elements. This data supports important analyses to improve post-crash care by assessing:

- **Arrival and on-scene time** – the amount of time before EMS arrives at the crash and the amount of time spent at the crash site before the victim is transported for care
- **Patient destination** – the amount of time in transport from the crash site to the hospital and whether the patient was taken to the appropriate hospital based on the level of trauma
- **Patient outcome** – whether the patient survived and the amount of post-crash care or disability

The SHSP recognizes the complex challenges associated with emergency and trauma care across the Commonwealth and provides actions for a collaborative approach to address and improve the outcomes from motor vehicle crashes.

Table 19 is a list of actions to be implemented over the next five years to address emergency response and medical services. Each action has been categorized under the appropriate strategy and the 4E that is responsible for implementation. The actions have also been assigned a time frame under which implementation may be initiated: ongoing, short term (one to two years), or long term (three to five years).



Source: Getty Images.

TABLE 19. EMERGENCY RESPONSE AND MEDICAL SERVICES STRATEGIES AND ACTIONS

Priority Strategy 3: Recognize traffic safety as a public health issue and establish policies and programs that promote safe behavior and reduce crash severity outcomes.



Expand Move-Over law public messaging and investigate the cost and benefits of having attenuator vehicles more accessible while learning of emerging mitigating technology with CAV. **[Short Term]**



Increase the percentage of EMS on-scene arrival responses that are within State requirements. **[Ongoing]**

Priority Strategy 5: Implement innovative solutions and utilize current and emerging technologies.



Evaluate best practices to efficiently collect, analyze, and share data from severe crash investigations (e.g., Total Station and Unmanned Aerial Vehicle (UAV) equipment and data). **[Long Term]**



Improve the Virginia EMS and Trauma Care System statewide comprehensive, robust prehospital data system with standard definitions. **[Ongoing]**



Improve to 100 percent compliance of EMS agencies reporting to VPHIB. **[Long Term]**



Work with authorized fire, EMS, law enforcement, and incident response personnel to promote and emphasize the benefits of internal multi-agency after action reviews and reports for crashes using best practices. Share any lessons learned between agencies. **[Ongoing]**



Develop Incident Command Mobile App for VDOT response personnel to enter and management to use real-time incident status with needed detours, pictures, and videos to improve the safety of responders and travelers. **[Short Term]**



Evaluate the current towing recovery incentive programs (TRIP) and update best practices, when necessary, to maintain and improve present incident clearance times. **[Ongoing]**



Investigate the legal, policy, procedural, and financial considerations to expedite the removal process of disabled and abandoned vehicles from 24 hours to 12 hours. **[Long Term]**



Investigate the legal, procedural, and financial considerations of "lift and tow" pilot to perform "emergency" relocations of disabled commercial motor vehicles and passenger vehicles on the interstate system. **[Long Term]**



Expand sharing 911 information on non-interstate (arterial) roads from more localities with VDOT Transportation Operations Centers to improve incident management and clearance while providing traveling public incident information. **[Long Term]**



Finalize localized interstate incident management plans with authorized fire, EMS, law enforcement, and incident response personnel. **[Short Term]**



Implement the Statewide Traffic Incident Management (STIM) committee initiatives to share information and garner input through the STIM website, propose quick clearance policy for consideration and implementation, and provide associated training (e.g., SHRP2 training). **[Ongoing]**



Source: Getty Images.



SUPPORTING EMPHASIS AREA

SAFETY DATA AND ANALYTICS

Emphasis Area	Safety Data and Analytics
Safe System Element	Supporting

Transportation, socioeconomic, and health data are fundamental information components to performance-based highway safety planning and implementing safe system 4E countermeasures. Data-driven processes focus decisions and resources on the purpose, needs, locations, and characteristics to mitigate crashes and their consequences and to determine the effectiveness after implementation.

Quality data are needed to:

- **Analyze the roadway network** to identify locations or corridors with higher severe crashes compared to similar locations on the system.
- **Diagnose the contributing factors** to crashes and external factors impacting the future trends.
- **Identify innovative and focused countermeasures** that will have the greatest benefits.
- **Assess the effectiveness** of implemented countermeasures.

Virginia's safety information and support data systems capture, store, transmit, and provide for the analysis to inform policies, processes, and programs.

Driver & Vehicle (DMV)	Citation (VSP)
Crash TREDs (DMV) and RNS (VDOT)	Adjudication Department of Justice (DOJ)
	Injury & EMS (VDH)
	Health Equity (opportunity) (VDH)
Roadway (RNS VDOT)	Supporting, e.g., S-E data Virginia Information Technologies Agency (VITA) & Office of Intermodal Planning & Investment (OIPI)













































To reach our vision of zero fatalities and serious injuries, data must be more uniform, timely, complete, accurate, integrated, and accessible. To continually enhance safety data Virginia's Traffic Records Coordinating Committee (TRCC) provides 4E partner oversight and resources. While there is a wealth of data being collected and assessed to improve highway safety, some information needs to be collected, maintained, and updated. Furthermore, emerging cloud-sourced data provide opportunities for understanding and focusing safety initiatives, such as real-time traffic volume and speed information.



Source: Getty Images.

Table 20 is a list of actions to be implemented over the next five years to improve data- and analysis driven highway safety efforts. Each action has been categorized under the appropriate strategy and the 4E that is responsible for implementation. The actions have also been assigned a time frame under which implementation may be initiated: ongoing, short term (one to two year), or long term (three to five years).

TABLE 20. SAFETY DATA AND ANALYTICS STRATEGIES AND ACTIONS

Priority Strategy 2: Adopt an approach that considers risk when prioritizing locations for safety improvements and programs.				
				Provide coordinated statewide safety performance data to MPO, PDC, and locality partners. [Ongoing]
Priority Strategy 5: Implement innovative solutions and utilize current and emerging technologies.				
				Coordinate with TRCC partner agencies on TREDs and RNS enhancements to include data integration needs and requirements. [Ongoing]
				Improve training methods for local and state law enforcement agencies on electronic crash data collection and reporting to TREDs. [Ongoing]
				Enhance mapping to include street names, addresses, and route numbers. Enhance ease and accuracy of the front-end mapping of crash locations by reporting officers. [Ongoing]
				Share data with approved Commonwealth agencies through the Secure Connected Government Data Portal. [Long Term]
				Incorporate non-personal information from emergency medical services incident reporting data and trauma registry data into TREDs. [Long Term]
				Populate, monitor, and enhance as necessary the electronic data transfer to federal partners (e.g., NHTSA, FMCSA, FHWA, FRA, FTA). [Ongoing]
				Integrate Highway Safety Manual (HSM) methods into VDOT information systems, software, policies, and procedures. Investigate software tools for highway safety planning and for project development analysis to determine needs and requirements for data translation, software functionality, training, and reporting. Implement and provide training for safety-related software. [Long Term]
				Complete the Federal Regulation Model Inventory of Roadway Elements (MIRE) fundamental data collection requirements with consideration of adding other beneficial elements. Create a safety data mart integrating available roadway, roadside, and traffic control device asset and condition data with crash and traffic data to support safety analysis, mapping, and reporting needs. [Long Term]
				Upgrade the inventory of crash data and roadway and traffic engineering asset data on State- and locally maintained roads and integrate into the VDOT linear referencing system (LRS). Adopt a common data dictionary for core data elements. [Ongoing]
				Use emerging and traditional safety data and methods to expand and create innovative analysis tools to positively affect implementation of behavioral and infrastructure safety programs. [Ongoing]

WHAT YOU CAN DO TO SUPPORT THE SHSP

Safety culture is a cornerstone of a Safe System. Building that culture throughout the Commonwealth cannot be done in a vacuum; it must be adopted and infused across individuals, communities, governments, businesses, and schools. This section provides concrete ways to be an active participant in Virginia's safety culture.

STATE OFFICIALS AND AGENCIES

- Provide visible and active leadership that prioritizes highway safety at the highest levels and promotes the SHSP vision, mission, and goal through implementation of the strategies and actions
- Provide crucial highway safety information and analysis tools to local and regional stakeholders and elected officials on a regular basis
- Explore new ways to support rural and local agencies in identifying safety needs and implementing low-cost, effective countermeasures
- Collaborate with universities on continued research needs for highway safety advancements
- Promote policies that support safe road user behavior among all agency employees and reward positive driving behaviors
- Foster increased public-private partnerships to leverage additional resources, expertise, and opportunities to advance the SHSP actions and supporting technologies
- Attend annual Virginia Highway Safety Summit: <https://tzdva.org/safety-summit-presentations-2021/>

LAW ENFORCEMENT

- Commit to visible, consistent, fair, just and impartial traffic enforcement utilizing data to identify potential problem locations
- Actively participate in high-visibility enforcement campaigns including Click It or Ticket and Drive Sober or Get Pulled Over
- Train officers in recognizing and apprehending impaired drivers (drunk, drugged, distracted, or drowsy) through participation in training programs including Drug Recognition Experts (DRE), Standardized Field Sobriety Test (SFST), and Advanced Roadside Impaired Driving Enforcement (ARIDE)
- Perform vigorous enforcement to prevent speeding and aggressive driving and prioritize enforcement in areas with high concentrations of pedestrians and bicyclists
- Participate in training to improve the collection and reporting of traffic crash data which is used to develop and implement traffic safety programs
- Adopt agency policies that promote traffic safety including seat belt use of all officers and restricted use of hand-held devices except in emergency situations
- Support zero tolerance for lack of seat belt use and/or child safety restraints, and alcohol/drug use by drivers under age 21

ENGINEERING AND PLANNING

- Keep up to date on the latest SHSP developments: <https://www.virginiadot.org/info/hwysafetyplan.asp>
- Learn more about how to integrate and then implement the Safe System approach with planning studies and project development and design and roadway operation and maintenance activities. Example resources are provided for the Highway Safety Improvement Plan (HSIP): <https://safety.fhwa.dot.gov/hsip/docs/fhwasa2018.pdf>.
- Implement safety improvements identified in the SHSP and FHWA Proven Countermeasures
- Improve and adopt transportation plans, design standards and policies that encourage alternate modes of travel and enhance safety for non-motorized users by providing facilities and accommodations.
- Identify opportunities to pilot test proven and new safety countermeasures
- Improve communication information about construction projects, particularly new designs to younger and older road users
- Enhance roadway infrastructure and technology for advancing connected automated vehicle (CAV) deployment

REGIONAL PLANNING ORGANIZATIONS

- Prepare a regional data-driven safety plans and educate member agencies and officials on the significance of the public health and safety issues and how they can contribute locally and regionally to save lives and reduce injuries
- Emphasize safety problem identification and equity in transportation plans and when prioritizing improvements
- Encourage member jurisdictions to adopt a [Vision Zero](#), Safe System approach to addressing safety—starting with forming an interdisciplinary safety committee and plan to lead stakeholder actions to improve roadway safety
- Participate in the implementation of this SHSP by incorporating SHSP safety strategies and actions in the Transportation Improvement Program and other planning documents and plans:
<https://www.virginiadot.org/info/hwysafetyplan.asp>

HEALTH PROFESSIONALS/PROVIDERS AND EMERGENCY RESPONDERS

- Work with family physicians and public health departments to educate patients and clients on safe driving habits and identifying indicators of declining driving skills among family members
- Conduct regular safety events for the public (safety seats, helmets, etc.)
- Arrange for EMS and fire departments to teach pedestrian and bicycle safety to children by conducting safety rodeos and safety towns (York County Example: <https://www.yorkcounty.gov/601/Safety-Town>)
- Participate in traffic incident management training and statewide committee
- Identify opportunities to partner with local and regional planners and engineers to [promote health equity](#) in transportation decisions and project development and participate in highway safety meetings, workshops, and conferences

CIVIC AND COMMUNITY ORGANIZATIONS/GROUPS

- Engage with local and regional officials to form safety coalitions or committees to identify and implement actions
- Host or sponsor presentations, workshops, and other messaging and outreach to promote traffic safety
- Work with schools, community leaders, and elected officials to adopt public policy and/or deliver infrastructure and behavioral improvements to increase safety

BUSINESS AND CORPORATIONS

- Promote a Phone Down and Buckle Up or Love Clicks (seat belt) use campaign (e.g., during workplace safety meetings) and implement a corporate policy requiring these and other safe behaviors (e.g., not speeding) in all company owned vehicles or when driving on company time
- Adopt corporate safety policies and actions and conduct a safety pledge signing such as the DriveSmart Virginia [Corporate Pledge](#), which also restricts the use of handheld electronic devices while driving on company time

SCHOOLS

- Get involved in Virginia's Safe Routes to School Program, which includes Walk to School Day, Bike to School Day, among many opportunities: <https://www.virginiadot.org/programs/srts.asp>
- Urge teens to get their school or group involved with Youth of Virginia Speak out about Traffic Safety (YOVASO): <https://www.yovaso.org/about/>
- Provide information to parents about on child passenger restraint and teen graduated driver licensing through the driver's education program and conduct safety checks
- Provide permanent or temporary [Traffic Gardens](#) to teach and inspire safe walking, biking, and driving behaviors and skills at a young age
- Enhance school curriculums by providing traffic safety related questions, exercises, and projects across various subjects

FAMILIES AND INDIVIDUALS

- Demonstrate safe driving, walking, and riding behaviors:
 - » Buckle up and ensure all passengers are properly restrained
 - » Put down your phone and other electronic devices when driving
 - » Obey speed limits and maintain plenty of space
 - » Never drive drowsy or under the influence of any substance (alcohol and other drugs), including prescription and over-the-counter medications
 - » If walking use roads and facilities appropriately:
 - Use sidewalks and shared use paths if available. If not available, walk facing traffic
 - Cross the street at visible, marked locations
 - Be aware of your surroundings
 - At night, wear reflective clothing, lights, or carry a flashlight
 - » If bicycling, use roads and facilities appropriately:
 - Ride with traffic keeping to the right if a bike lane or shared use path is not available
 - Always wear a helmet
 - At night, use appropriate lights (white on front and red on rear) and wear reflective clothing/ items and/or lights
 - Be aware of your surroundings
- Monitor the driving skills of younger, inexperienced, or aging family and friends. Be prepared to speak about their behavior or abilities in a kind manner. For more information on reporting an unsafe driver, go to the [Medical Fitness for Safe Driving](#) brochure.
- Visit the VDH website to get a safety seat check in your area: <https://www.vdh.virginia.gov/child-passenger-safety/safety-seat-checks/>
- Considering motorcycling? Enroll in motorcycle rider training courses: https://www.dmv.virginia.gov/drivers/#m_course.asp
- Mature drivers should register for CarFit to get the latest information on getting the best fit in their personal vehicles <https://www.car-fit.org/>

GLOSSARY AND ACRONYMS

GLOSSARY

Fatalities: Fatalities (motorists and non-motorists) that resulted from injuries sustained within 30 days as the result of a specific motor vehicle crash. (<https://safety.fhwa.dot.gov/hsip/spm/docs/factsheet-mmucc-4edition.pdf>).

Serious Injuries: A suspected serious injury is defined in the MMUCC 4th Edition (<https://safety.fhwa.dot.gov/hsip/spm/docs/factsheet-mmucc-4edition.pdf>) as any injury other than fatal that 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

ACRONYMS

Arrive Alive, Virginia contains many acronyms for agencies, offices, organizations, programs and other traffic safety resources and elements. This list will help practitioners, partners, and stakeholders to become familiar with the diverse safety language used by the 4E community.

AAA – American Automobile Association

AADT – Average Annual Daily Traffic

AASHTO – American Association of State Highway and Transportation Officials

ADA – Americans with Disabilities Act

ARIDE – Advanced Roadside Impaired Driving Enforcement

ATMS – Active Traffic Management System

BAC – Blood Alcohol Concentration

CAV – Connected and Automated Vehicles

CDC – Centers for Disease Control

CIOT – Click It or Ticket

CMF – Crash Modification Factor or Function

CMV – Commercial Motor Vehicle

CPS – Child Passenger Safety

CTB – Commonwealth Transportation Board

CVSP – Commercial Vehicle Safety Plan

DADSS – Driver Alcohol Detection System for Safety

DCR – Department of Conservation and Recreation

DEI – Diversity, Equity, and Inclusion

DFP – Department of Fire Programs

DMV – Department of Motor Vehicles

DOE – Department of Education

DRE – Drug Recognition Expert

DRPT – Department of Rail and Public Transportation

DUI – Driving Under the Influence

EA – Emphasis Area

EMS – Emergency Medical Services

FARS – Fatality Analysis Reporting System

FHWA – Federal Highway Administration

FMCSA – Federal Motor Carrier Safety Administration

GDL – Graduated Drivers License

GHSA – Governors Highway Safety Association

GIS – Geographic Information System

GVWR – Gross Vehicle Weight Rating

HFST – High Friction Surface Treatment

HOI – Health Opportunity Index

HPMS – Highway Performance Monitoring System

HRRR – High Risk Rural Roads

HSM – Highway Safety Manual

HSIP – Highway Safety Improvement Program

HSO – Highway Safety Office

HSP – Highway Safety Plan

HVE – High Visibility Enforcement

IID – Ignition Interlock Device

ITS – Intelligent Transportation Systems

LE – Law Enforcement

LEP – Limited English Proficiency

LRS – Linear Referencing System

MPO – Metropolitan Planning Organization

MMUCC – Model Minimum Uniform Crash Criteria

NCHRP – National Cooperative Highway Research Program

NEMSIS – National EMS Information System

NHS – National Highway System

NHTSA – National Highway Traffic Safety Administration

NSC – National Safety Council

OECD – Organization for Economic Cooperation and Development

OIPI – Office of Intermodal Planning and Investment

PBPP – Performance-Based Planning and Programming

PDC – Planning District Commission

PATHS – Prioritizing Active Transportation Health and Safety

PSAP – Pedestrian Safety Action Plan

PSI – Potential Safety Improvement

RNS – Roadway Network System

ROW – Right of Way

RSA – Roadway Safety Assessments

RTZ – Road to Zero

SFST – Standardized Field Sobriety Test

SHSP – Strategic Highway Safety Plan

SMART SCALE – System Management and Allocation of Resources for Transportation: Safety, Congestion, Accessibility, Land Use, Economic Development and Environment.

SPF – Safety Performance Function

SRTS – Safe Routes to Schools

STEP – Safe Transportation for Every Pedestrian

STIM – Statewide Traffic Incident Management

TAP – Transportation Alternatives Program

TIM – Traffic Incident Management

TOC – Traffic Operations Center

TPO – Transportation Planning Organization

TRCC – Traffic Records Coordinating Committee

TREDS – Traffic Records Electronic Database System

TZD – Toward Zero Deaths

UAV – Unmanned Aerial Vehicle

V2I – Vehicle to Infrastructure

VASAP – Virginia Alcohol Safety Action Program

VDH – Virginia Department of Health

VDOT – Virginia Department of Transportation

VITA – Virginia Information Technologies Agency

VMT – Vehicle Miles Traveled

VPHIB – Virginia's Prehospital Patient Care Reporting System

VSL – Variable Speed Limits

VSP – Virginia State Police

VSTR – Virginia Statewide Trauma Registry

VZ – Vision Zero

YOVASO – Youth of Virginia Speak Out

APPENDIX B: DATA SOURCES AND DEFINITIONS

The Traffic Records Electronic Data System (TREDS) is a state-of-the-art data system maintained by the DMV HSO that automates and centralizes all crash data in Virginia. TREDS records electronic submissions of police crash reports (FR-300s) and integrates with other data systems for data mining, analysis, and reporting. TREDS staff assesses and submits fatality data to NHTSA to be included in FARS. TREDS data is also transmitted to VDOT and incorporated into VDOT's Roadway Network System (RNS) that ties crash, roadway inventory, and traffic volume data together for additional analysis and reporting. The identified EA user groups or vehicle type definitions below do not imply that driver or person to be "at fault."

Bicyclists

All pedal bicyclists and tricyclists killed or seriously injured in a crash. This does not include non-bicyclists killed or seriously injured in a crash involving a bicyclist.

Pedestrians

All pedestrians killed or seriously injured in a crash including persons on foot, roller skates, skateboard, or wheelchair, plus roadway workers and emergency responders. This does not include non-pedestrians killed or seriously injured in a crash involving a pedestrian.

Young Drivers

All people of any age killed or seriously injured in a crash where one or more drivers were between the ages of 15 and 20.

Aging Road Users

All people of any age killed or seriously injured in a crash where one or more drivers was age 65 or older plus the number of pedestrians age 65 or older killed or seriously injured.

Occupant Protection

All unrestrained people killed or seriously injured in a crash in a passenger car, pickup, van, SUV, motor home, recreational vehicle, emergency vehicle, single-unit truck, or tractor trailer.

Impaired Driving

All people killed or seriously injured in a crash where one or more drivers was drunk, distracted, drowsy, or using drugs based on the following definitions:

DRUNK: Driver Blood Alcohol Content ≥ 0.08 or Driver Drinking Type =

- 2: Drinking – Obviously Drunk
- 3: Drinking – Ability Impaired
- 4: Drinking – Ability Not Impaired
- 5: Drinking – Not Known Whether Impaired

DISTRACTED: Driver Distraction Type =

- 1: Looking at Roadside Incident
- 2: Driver Fatigue
- 3: Looking at Scenery
- 4: Passenger(s)
- 5: Radio/CD, etc.
- 6: Cell Phone
- 7: Eyes Not on Road
- 8: Daydreaming
- 9: Eating/Drinking
- 10: Adjusting Vehicle Controls
- 11: Other
- 12: Navigation Device
- 13: Texting

DROWSY: Driver Condition Type =

- 6: Fatigued
- 7: Apparently Asleep

DRUGGED: Driver Drug Use =

- 1: Yes

Motorcyclists

All motorcyclists killed or seriously injured in a crash including motorcycles, scooters, and mopeds. This does not include non-motorcyclists killed or seriously injured in a crash involving a motorcycle.

Heavy Vehicles

All people killed or seriously injured in a crash where one or more vehicles involved was a commercial vehicle or had a heavy vehicle body type based on the following definitions:

Vehicle Body Type =

- 4: Truck – Single Unit Truck (2-Axles)
- 13: Bus – School Bus
- 14: Bus – City Transit Bus/Private Owned Church Bus
- 15: Bus – Commercial Bus
- 23: Truck – Single Unit Truck (3 Axles or More)
- 25: Truck – Truck Tractor (Bobtail-No Trailer)

Commercial Vehicle Configuration Type =

- 3: Bus (Seats 9-15 People, Including Driver)
- 4: Bus (Seats 16 or More People, Including Driver)
- 5: Single Unit Truck (2 Axles, 6 Tires)
- 6: Single Unit Truck (3 or More Axles)
- 7: Truck Trailer(s) [Single-Unit Truck Pulling Trailer(s)]
- 8: Truck Tractor (Bobtail)
- 9: Tractor/Semi-trailer (One Trailer)
- 10: Tractor/Doubles (Two Trailers)
- 11: Other Truck Greater than 10,000 lbs. (Not Listed Above)

Speeding

All people killed or seriously injured in a crash where one or more drivers was driving faster than the posted speed limit or the maximum safe speed for conditions at the time of the crash as reported by investigating officer for contributing circumstances.

Roadway Departures

All people killed or seriously injured in a crash where one or more vehicles crosses an edge line or centerline or otherwise leaves the traveled way, excluding intersection crashes. Roadway departure crashes are identified using four fields from the crash report: vehicle count, vehicle maneuver type, first crash event, and collision type.

Intersections

All people killed or serious injured in a crash that occurs within 250 feet of an intersection of two public roadways on a VDOT road or that was identified as occurring at an urban intersection based on the relation to roadway field on the crash report.

APPENDIX C: 2022-2026 SHSP UPDATE PROCESS

In December 2020, Virginia conducted a survey with members of the Steering Committee asking them to provide their thoughts on the following:

- The approach for the upcoming update of the SHSP
 - How outreach to stakeholders should be conducted
 - The involvement of the Executive and Steering Committees and the role of the emphasis areas
 - Whether the SHSP had an impact on their daily jobs and if it was helpful
 - The structure of the SHSP and if it should be reorganized and presented in a different way
 - The ideal number of emphasis areas
 - The identification of any new or emerging areas
 - The use of data to select the emphasis areas, strategies, and actions
 - The 2022-2026 five-year safety performance measure objectives
 - Suggestions for improvements
- » Focus on those emphasis areas that can make the greatest impact
 - » Streamline strategies and actions and prioritize them based on their potential to reduce fatalities and serious injuries
 - » Add an emphasis area for commercial vehicles and heavy trucks
- Outreach elements:
 - » Conduct outreach meetings for each emphasis area
 - » Provide a draft framework of the plan for stakeholders to react to rather than offering an open slate

Information on virtual engagement opportunities, which would be necessary due to the COVID-19 pandemic, and what other states were doing with their SHSP was provided to the Steering Committee along with the survey. Information from this survey was used to establish the overall update process. Some of the information collected from the survey included the following:

- Incorporate the Safe System approach
 - Incorporate lessons learned and best practices from other virtual planning activities
 - Use crash fatality and serious injury proportions and trend analysis to determine priorities
 - Structure:
 - » Identify key strategies that apply to all emphasis areas in lieu of strategies for each emphasis area
 - » Keep the emphasis area structure and identify 10 to 12 key actions that would make the greatest impact on fatalities and serious injuries
- The Steering Committee met in June 2021 to finalize the update approach, which would incorporate the Safe System approach with the addition of the guiding principle “actions consider equity.” The group also affirmed adopting the following goal and objectives for the plan:
- Overall goal: Reduce the 2020 number of traffic-related fatalities and serious injuries by 50 percent by 2045
 - Yearly objectives: Reduce fatalities by 17 per year to achieve overall goal of 424 by 2045 and reduce serious injuries by 136 per year to achieve overall goal of 3,399 by 2045

Rather than including specific strategies for each emphasis area, the Steering Committee agreed to focus on five key priority strategies and incorporate the appropriate ones into emphasis area plans. Those priority strategies included:

- Implement road improvements that ensure human mistakes and vulnerabilities do not result in serious injuries or fatalities
- Adopt an approach that considers risk when prioritizing locations for safety improvements and programs
- Recognize road safety as a public health issue and establish policies and programs that promote safe behavior and reduce crash severity outcomes
- Develop and implement programs that provide education and awareness to high-risk road users

- Implement innovative solutions and utilize current and emerging technologies

Emphasis area team meetings were held in August 2021 to gain input into the draft actions that were compiled from the following sources:

- The previous SHSP
- Proven countermeasures from FHWA and NHTSA's Countermeasures That Work
- SHSPs recently updated in other states

Emphasis area teams were asked to do the following:

- Review actions and select 10 that would include a mix of what can be done today and what can be done in the future. Refrain from just selecting all ongoing strategies and focus on priorities.
- Combine or reword actions whenever possible
- Apply the action test for each action:
 - » What can actually be accomplished? (What is working today and ideas for the future.)
 - » Is there an interest in pilot testing a program or project?
 - » Is it feasible in terms of budget and resources?
 - » Are there policy or political considerations that require it to be included?
 - » Is there a way to combine or rewrite actions to result in fewer actions?
- Determine the time frame, e.g., those actions that can be initiated in the next two years (short term) ; those that can be done in the next three to five years (longer term) and any that are ongoing
- Identify any new actions that support the priority strategies and are not included on this list

Participants in the emphasis area meetings revised the actions as needed to develop a final list of recommended actions, which were then shared with stakeholders across the Commonwealth. Meetings were held in September 2021 in the following VDOT regions:

- Southwestern
- Northwestern
- Northern Virginia
- Central
- Eastern

Upon registering for the meeting, stakeholders were asked to download the list of actions for the emphasis areas of their choice and review prior to the virtual meeting. During the meeting, organizers shared how the Safe System approach will be incorporated into the updated plan, the key priority strategies, statewide fatality and serious injury data along with specific data for each region, and then a brief review of the actions for all the emphasis areas. By using a polling platform, participants were asked to select the three actions they felt would be most effective in reducing fatalities and serious injuries.

Nearly 200 individuals from a multidisciplinary range of agencies and organizations registered for the meetings and 150 participated in the meetings. In addition to the virtual meetings, Virginia also posted a survey on the SHSP on DMV's Towards Zero Deaths Webpage - <https://tzdva.org/safetyplan-2/>. At their October 2021 meeting, the Steering Committee gave final approval on the following:

- The final outline for the plan
- The vision, mission, and goal
- The fatality and serious injury objectives
- How the plan would be aligned with the Safe System approach
- Information on how specific groups could support implementation of the SHSP
- The final list of actions for each emphasis area

Once approval was received, the SHSP project management team began to draft the plan which was presented to the Commonwealth Transportation Board (CTB), followed by final approval by the Governor's designee.

ALIGNMENT OF SHSP WITH THE SAFE SYSTEM APPROACH

Components of SHSPs most aligned with the Safe System guiding principles are the use of effective strategies and countermeasures and the multidisciplinary approach that addresses the 4Es. Following are other ways it is aligned.

ENSURES ADEQUATE LEADERSHIP, COLLABORATION, AND COMMUNICATION

Implementation of the plan is in coordination with other statewide safety partners and programs and involves a broad range of agencies. According to the International Transport Forum, leadership is a key element of a successful paradigm shift to a Safe System. The recently published Core Elements for Vision Zero Communities, from the Institute of Transportation Engineers (ITE) and the Vision Zero Network, focuses four of its 10 elements on the importance of leadership and commitment.

USES A PERFORMANCE-BASED APPROACH

The SHSP process provides an opportunity to establish longer-term goals and objectives that align with annual safety performance targets. This provides consistency and direction across all safety plans and programs.

USES DATA-DRIVEN PROBLEM IDENTIFICATION

The SHSPs analyze and make effective use of State, regional, local, or and Tribal safety data. States should use the best available safety data to identify emphasis areas and strategies to inform safety improvement opportunities on all public roads.

USES EFFECTIVE STRATEGIES AND COUNTERMEASURES

High priority should be given to strategies that can eliminate roadway fatalities and serious injuries within the SHSP emphasis areas.

INCORPORATES THE 4ES

The SHSP incorporates solutions from the 4Es: engineering, education, enforcement, and emergency response and medical services. The SHSP emphasis areas were aligned with the Safe System elements and the plan adopted the Safe System guiding principles with the addition of "actions consider equity."

Safe System Elements

- Safe Road Users:
 - » Pedestrians and bicyclists
 - » Aging road users
 - » Younger drivers
 - » Motorcyclists
 - » Impaired driving
 - » Occupant protection
- Safe Vehicles:
 - » Heavy vehicles
 - » Connected and autonomous vehicles
- Safe Speeds:
 - » Speeding

- Safe Roads:
 - » Roadway departure
 - » Intersections
- Post-Crash Care:
 - » Emergency response and medical services

Guiding Principles

- Death/serious injury is unacceptable
- Humans make mistakes
- Responsibility is shared
- Safety is proactive
- Redundancy is crucial
- Actions consider equity

How Virginia SHSP Was Integrated with the Safe System Approach

- Organized around the Safe System guiding principles and elements
- Incorporated equity into the guiding principles
- Committed to a "zero" vision and established performance management strategies
- Refocused the speeding emphasis area to consider speed management and roadway design
- Used proactive data collection and analysis to develop priority strategies and actions

APPENDIX D: FEDERAL REQUIREMENTS

Federal law¹² requires states to develop a Strategic Highway Safety Plan (SHSP) and update that plan every five years. From the law FHWA sets [HSIP](#) policy requirements include the following for state SHSPs:

- The SHSP update shall be conducted by the State DOT in consultation with safety stakeholders including, but not limited to:
 - » A highway safety representative
 - » Regional transportation planning organizations and metropolitan planning organizations
 - » Representatives of major modes of transportation
 - » Authorized traffic enforcement officials
 - » A highway-rail grade crossing safety representative.
 - » Representatives conducting a motor carrier safety program
 - » Motor vehicle administration agencies
 - » County transportation officials
 - » State representatives of non-motorized users
 - » Other Federal, State, tribal, and local safety stakeholders
- Analyze safety data to address safety problems and opportunities on all public roads and for all road users
- Identify emphasis areas and strategies that have the greatest potential to reduce highway fatalities and serious injuries
- Consider the findings of road safety audits, locations of fatalities and serious injuries and locations that possess risk factors for potential crashes, the cost-effectiveness of improvements, and improvements to rail-highway grade crossings
- Adopt performance-based goals that are coordinated with other state highway safety programs
- Address engineering, management, operations, education, enforcement, and emergency services elements when determining SHSP strategies
- Consider the results of State, regional, local, and tribal transportation and highway safety planning processes and be consistent with other transportation plans, i.e., Statewide Transportation Improvement Program (STIP), HSIP, HSP, CVSP
- Conduct an evaluation to confirm emphasis areas and strategies and identify issues related to the SHSP's process and implementation
- Define "high risk rural road" and include in a subsequent SHSP an emphasis area for older drivers and pedestrians if fatalities and serious injuries per capita increase during the most recent two-year period for which data are available
- Provide a detailed description of the update process
- Be approved by the Governor of the State or a responsible State agency official that is delegated by the Governor
- Approval of the [update process](#) by the FHWA Virginia Division Administrator

12 Moving Ahead for Progress in the 21st Century (MAP-21) and Fixing America's Surface Transportation (FAST) acts.

SPECIAL RULES

HIGH-RISK RURAL ROADS IN VIRGINIA

A definition for High-Risk Rural Roads (HRRR) with significant safety risks is required to be incorporated in the SHSP. Eligible roadways for the HRRR Special Rule include lower volume and width rural roads, which consist of the following functional classifications:

- Rural Major Collector
- Rural Minor Collector
- Rural Local Roads

Rural road functional class limits are defined after each Federal census based on land-use densities. The Virginia definition of significant risk in the past, which is based on FHWA regulations, identifies the highway segments and intersections on either of the following:

- Locations that are above the Critical Cash Rate (one standard deviation above the state average) for that classification
- Above a minimum crash threshold on a segment from the FHWA led Roadway Departure Plan
- Roadway intersections, geometry and cross-section characteristics correlated with severe crashes, such as curves meeting delineation warrants

In the future, Virginia will continue to explore more rigorous data driven network screening methods for HRRR segments and intersections. For the years that Virginia must implement the HRRR Special Rule, the State is required to provide funding to match 200% of the Federal allocations that the State received in 2009. In the years Virginia will have to implement the HRRR Special Rule, the HRRR funds (HSIP set aside) will be spent to implement VDOT's systemic safety improvement plan approved by the Commonwealth Transportation Board (CTB). For rural roads, the systemic improvements are enhanced intersection traffic control devices and curve delineation with rumble strip(e)s where appropriate to mitigate roadway departure crashes.

OLDER ROADWAY USERS

Identifying and providing strategies and actions for older roadway users is also an SHSP requirement if the rate of traffic fatalities and serious injuries for drivers and pedestrians 65 years of age and older increases during the most recent two-year period (two time periods of five-year rolling average rates of fatalities and serious injuries using a two-year spread). Although the Older Drivers and Pedestrians Special Rule does not presently apply to Virginia, this Plan includes an Aging Road User Emphasis Area with actions that address the current trends of severe crashes for those 65 and older.

VULNERABLE ROAD USERS

Identifying and providing strategies and actions vulnerable road users (VRU) is also an SHSP requirement. Vulnerable road users are defined as non-motorists. If the number of traffic fatalities for VRUs is equal to or greater than 15 percent of the total state fatalities in a single year period, then the VRU Special Rule applies. Although the VRU Special Rule does not presently apply to Virginia, this Plan includes Bicyclist and Pedestrian Emphasis Areas with actions that address the current trends of severe crashes for road users.

APPENDIX E: PERFORMANCE-BASED SAFETY PLANNING

Performance management that uses asset, operational, and safety data to support decisions to achieve performance goals has been used for a long time in transportation agencies. A transition occurred in 2012 with federal transportation legislation that defined national performance measures and required setting targets for those measures. The law specifically calls for performance-based decision making within metropolitan and statewide transportation planning organizations to drive the programming of projects. Safety measures were included for infrastructure (FHWA-HSIP) and behavioral (NHTSA-HSP) programs. While performance-based planning and target setting for behavioral HSP programs and projects funded with NHTSA administered allocations had been occurring for some time, this combination of planning and target setting was new to the VDOT HSIP.

However, Virginia has been well aligned to fulfill these best planning and programming practices and federal requirements for HSIP to collaborate on safety performance through the established Office of Intermodal Planning and Investment ([OIPI](#)). OIPI provides leadership for three components of performance-based planning and programming (PBPP): to plan, invest, and manage our transportation system. The Planning program establishes the VTrans statewide long-term vision, goals, objectives, and policy needs. VTrans also establishes mid-term transportation needs that feed the investment program through the [SMART SCALE](#) prioritization process. The performance management, target setting, and federal reporting is led by the third program area.

While our U.S. Department of Transportation partners agree that zero fatalities and serious injuries on our nation's highway is the only acceptable vision, Virginia recognizes that reaching zero will take time, resources, and cultural shifts. This plan set a goal to reduce fatalities and serious injuries by 50 percent over the next 25 years

following VTrans mega-trend assessments. The 2022-2026 objectives in this plan follow annual reductions that would lead to the 50 percent reduction goal.

State agencies administering federal safety funds must set and report annual performance targets. VDOT (HSIP) and DMV (HSP) set separate performance targets as shown in Table 21. Three targets overlap and are set through collaboration between VDOT and DMV each year.

TABLE 21. VIRGINIA'S HIGHWAY SAFETY PERFORMANCE TARGETS

DMV HSO Annual HSP Due July 1 st	VDOT Annual HSIP Report Due August 31 st
Number of Traffic Fatalities on all public roads	
Number of Fatalities per 100 million vehicle miles traveled (VMT)	
Number of Serious Injuries on all public roads	
Number of pedestrian fatalities	Number of serious injuries per 100 million VMT
Number of bicyclist fatalities	Number of bicyclist and pedestrian fatalities and serious injuries on all public roads
Number of unrestrained passenger vehicle occupant (all positions) fatalities	
Number of motorcyclist fatalities	
Number of unhelmeted motorcyclist fatalities	
Number of speeding-related fatalities	
Number of fatalities involving a driver with a BAC of 0.08 and above	
Observed seat belt use for passenger vehicles	

While VDOT (HSIP) and DMV (HSO) have been coordinating on target setting for some time, the Commonwealth Transportation Board (CTB)—who had new target approval requirements—requested OIPI and VDOT collaborate with DMV to develop more data-driven targets. Starting with the 2020 targets, Virginia replaced the previous trendline-based approach to setting targets with the development of a robust statistical model that used crash history and external factors to develop predictions for the three overlapping targets shown in Table 21 plus the remaining HSIP targets. The new target-setting process also included the assessment of expected severe crash reductions from infrastructure projects funded through HSIP and SMART SCALE. Rate measure targets were based on VMT projections from recent years used in the model.¹³

In addition to setting targets, this process highlighted the difficulty of reducing severe crash reductions based on the factors identified. The PBPP process identified the following fundamental feedback for the CTB into investment strategies:

- HSIP infrastructure improvements that are lower cost systemic treatments spread across the network can be nine times more effective than spot or corridor HSIP projects and many times more effective than larger SMART SCALE funded improvements
- Behavioral factors, shifting population ages, and shifting transportation modes are key factors in severe crashes that require more resources to mitigate severe crashes and reverse trends

Based on this feedback from the target setting and seeing the expected effectiveness of programmed projects, legislation was proposed and codified to provide additional state funds for infrastructure (HSIP) and behavioral (HSP) programs. The CTB and VDOT Commissioner also directed the majority HSIP funds to focus on lower cost systemic countermeasures with known severe crash reduction benefits.¹⁴

A useful resource for PBPP is to monitor and report the effectiveness of improvements, programs, and initiatives. While this is much more difficult for specific behavioral programs and projects, reporting on HSIP infrastructure project benefits (crash reductions) is a FHWA requirement. Annual state [reports to FHWA](#) provide a simple before-and-after completion crash summary (known as naive study) by severity. Crash reductions determine the benefit or modification resulting from the improvement. For example, a 20 percent reduction in fatal and injury crashes would result in a 0.80 modification of the number before the improvement. More robust assessment and determination of specific project element crash modifications are conducted at the national level by a [FHWA Pooled Fund Study](#) and National Cooperative Highway Research Program (NCHRP) research projects. Most crash modification factors/functions (CMF) are also reported and compiled in the FHWA [CMF Clearinghouse](#) and are used in [Highway Safety Manual](#) planning and project safety analysis of expected project benefits. Behavioral programs and projects use the NHTSA national research synthesis, [Countermeasures That Work](#), which is regularly updated with new findings on benefits.

In addition to safety-focused infrastructure improvements, VDOT is working with OIPI to determine best practices to determine and report the crash reductions from capital projects funded through the multimodal [SMART SCALE](#) prioritization process. Initial work has used equivalent property damage only (EPDO) weighted scores based on the value (cost) of crashes by severity. This measure is used in the safety scoring of expected benefits based on published CMFs (see linked Technical Guide). This nation-leading work will help show the benefits of larger investments and will hopefully guide PBPP in the future.

13 TRB Publication, [Estimating Baseline Numbers for Safety Measure Target Setting in Virginia](#), explains the methods and models developed.

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APPENDIX F: REFERENCES AND RESOURCES

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