STATE OF WASHINGTON
OFFICE OF GOVERNOR JAY INSLEE

September 30, 2024

Dear fellow Washingtonians:

We are committed to the value that death and serious injuries on our roads are preventable and unacceptable. Despite a lot of dedicated work and collaboration since we adopted the last Target Zero Plan in 2019, we are sadly experiencing an increase in fatalities. Business as usual is not working.

It's time to redouble our efforts. The data shows us we must also repair historical inequities that have led to disproportionately high fatalities and serious injuries on and around Tribal lands and in other historically marginalized neighborhoods and communities.

Our transportation agencies in Washington are embracing a comprehensive approach to traffic safety called the Safe System, which is used to make roads safer around the world. We have a lot to do, but we are well positioned to do this work together.

I wrote five years ago that formulating this plan was an opportunity for introspection, innovation and growth. That is even more relevant and important today. For nearly a century, our state and our country have favored fast, efficient travel by private automobile. Continuing on this path is not safe or sustainable.

We must transform our system with a focus on all elements of safety:

- Safer land use to allow everyone to get where they want to go using any mode of travel, including walking, rolling and transit.
- Safer roads to keep road users safely separated and to avoid letting mistakes cause death or serious injury.
- Safer speeds through a combination of smart road design and creating a culture where drivers value life over getting to their destination a few minutes faster.
- Safer road users who understand the rules of the road and avoid the risks that lead to the worst outcomes. We must also directly confront the dangers of alcohol- and drug-impaired driving.
- Safer vehicles that support safe driving and keep everyone inside and outside of those vehicles safe, too.
- Post-crash care that is swift and effective and which provides the opportunity to learn from our mistakes.

Washington has a stand-alone agency and inter-agency commission dedicated to traffic safety. State agencies sit at the table with local representatives. This is a strong foundation for making the Safe System a reality.

We must focus on all these elements if we are to eliminate death and serious injuries on our roads. This 2024 Target Zero Plan outlines the strategies and tactics that will help us save thousands of lives if we all dedicate ourselves to this important task. Please join me in making our roads safer for everyone traveling in Washington every day.

Very truly yours,

Jay Inslee
Governor

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WASHINGTON STATE

STRATEGIC HIGHWAY SAFETY PLAN 2024




TARGET ZERO

Zero Deaths and Zero Serious Injuries by 2030

Executive Summary & Policy Recommendations

Washington developed its first Target Zero Plan in 2000, establishing the goal of zero fatalities and serious injuries on Washington roads. At the time, 2030 was an aspirational timeline for this vision. And like any ambitious goal, there have been both advances and setbacks.

Washington experienced a reduction in traffic fatalities following the establishment of the 0.08 *per se* blood alcohol concentration limit, the primary seatbelt law, child restraint laws, laws prohibiting distracted driving, and enhancements in ignition interlock and other laws related to driving under the influence of impairing substances. However, since the COVID-19 pandemic response began in 2020, we have seen a rapid increase in fatalities and serious injuries.

Many have asked if we intend to change the goal or the target date. We do not. Moving the target farther into the future will not get us closer to our goal. Zero deaths remains the only acceptable roadway safety outcome. We know it is possible, because we understand that these crashes are preventable. There are 327 incorporated cities and unincorporated county areas in Washington. Of these, 148 achieved zero fatal crashes over the five-year period of 2019-2023.

Our goal is not to eliminate crashes of all severities completely. Some of the strategies outlined in this plan are aimed at preventing crashes from occurring, while others are designed to reduce their severity. In order to prevent death and disability, timely and effective post-crash responses are also critical.

We need to implement more safety strategies in a more coordinated way. We also need to let go of ineffective practices. This is not always easy. Americans and Washingtonians have historically valued travel in private motor vehicles that is as fast and convenient as possible. An over-emphasis on speed and convenience has compromised our safety. It has led to unsafe driver behaviors and to road designs that prioritize throughput. Lax vehicle regulation has allowed increasingly large, fast, and powerful vehicles to dominate the landscape, putting other road users—including people who walk, bike, roll, and ride motorcycles—at greater risk.

An increase in motorists driving more miles increases the exposure to, and likelihood of, roadway crashes. Higher speeds increase severity because crash forces increase exponentially with speed. And while vehicles are being equipped with more safety features to protect occupants, walkers and rollers are still exposed and vulnerable when struck by a multi-ton projectile.

This plan is about finding a balance between allowing people and goods to travel where they need to go without the high cost of death and serious injury. In 2022 alone, the societal financial cost of crashes in Washington was greater than $20 billion.

We can reach zero deaths and serious injuries if we maintain our commitment to Target Zero and employ evidence-based measures used to prevent death and serious injury around the world. This plan is based upon three foundational elements that will help us reach Target Zero: Prosocial Traffic Safety Culture, the Safe System Approach, and an Equity Framework.

Prosocial traffic safety culture means that everyone shares responsibility to allow and encourage safe travel. This includes policy makers, authorities who build and maintain transportation systems, and every day travelers, including truck drivers, private motorists, motorcyclists, walkers, and rollers.

Reaching Target Zero requires all of us to share this responsibility and use real-world experience to implement safety strategies. In the spirit of building a safe culture in Washington, we engaged hundreds of partners and community members in the development of the 2024 Target Zero Plan. These included cross-agency meetings; listening sessions with Tribal representatives, community-based organizations, and advocates; and input from people in the community through surveys and conversations. We also held listening sessions for regional and metropolitan transportation planning organizations, cities, and counties. We look forward to continuing to build on these relationships and expand community input as implementation of this plan moves forward. Everyone in Washington plays a role in keeping our roads safe.

Safe System Approach

The best way we know to operationalize this safety culture is the framework called the Safe System Approach (SSA). Many of the concepts contained within the SSA are currently in use in Washington and around the world. What differentiates the Safe System Approach from previous approaches is the coordination and collective effort it requires across traditionally separate agencies, jurisdictions, disciplines, and groups of transportation professionals and road users.

All six Safe System Approach elements are required to function in concert to eliminate serious injuries and fatalities:

- **Safer Road Users:** All road users engage in proactive safe behaviors, including paying attention, being visible, and following traffic laws. Road users also avoid high risk behaviors that lead to crashes and the potential for serious or fatal injury.
- **Safer Land Use Planning:** Understanding where people will live, work, attend school, and shop, authorities plan for shorter vehicle travel distances and safe travel using all modes, including active transportation, transit, and private and shared vehicles.
- **Safer Speeds:** Recognizing that crash forces increase exponentially with speed, transportation officials reduce drivers' operating speeds through self-enforcing road designs that encourage speeds that are safe for the road context and for all anticipated road users. Motor vehicle drivers' speeds are also managed through safer vehicle design, driver education, and proactive enforcement.
- **Safer Roads:** Transportation facilities are designed and built to separate users in time and space, manage speeds, and reduce crash impact angles at locations where road users are most likely to come into conflict. Facilities are designed and built to support safe travel using all modes: walking, rolling, biking, riding, driving, and transit.
- **Safer Vehicles:** Vehicles are designed and built to keep all road users inside and outside of the vehicle safe. This includes reduced vehicle mass, speed control, shapes that reduce injury severity for road users outside of the vehicle, active collision avoidance, technology that supports sober and attentive driving, increased visibility, and effective occupant protection.
- **Effective Post-Crash Care and Response:** First responders can arrive quickly at a crash scene and address the most imminent threats to life and health, limiting injury severity when a crash occurs. Investigations and data collection inform all system partners to reduce the recurrences of crashes resulting from lapses in any of the Safe System elements.

A wide range of partners are involved in creating and maintaining a safe transportation system, including the Governor, legislators, Tribes, federal partners, state agencies, local and regional authorities and agencies, law enforcement, educators, advocates, and people who take care to travel safely (and influence others to do so, as well).

Each element of the Safe System Approach improves safety and provides additional safeguards to prevent a tragedy if or when another element fails. At a very basic level, a safe system separates road users in space and time and reduces crash forces when conflicts do occur. The approach does not prevent all crashes, but it helps to avoid fatal or life-altering consequences. These elements combine to reduce exposure to crash risks, the likelihood of a crash, and injury severity.

The Safe System Approach recognizes that safety doesn't rely only on road design, only on driver behavior, only on vehicle designs and technology, or only on public safety services. There is no single solution to reduce fatalities and serious injuries. Prevention of crashes, reductions in force, protection in crashes, and responses to crash events are all important ways to prevent death and reduce injury severity.

Equity Framework

To reach zero deaths and serious injuries on Washington roads, we must also contend with significant inequities in the risks that some road users face compared to others. For decades, demographics, including race, ethnicity, language, legal status, income, and wealth, have determined which communities face greater risks and who benefits from greater protections.

The history of redlining and other racial segregation, colonialism, and persistent socioeconomic disparities in Washington and in the United States have led some people and some communities to face far more transportation and other environmental inequities. At the same time, historically marginalized groups in historically underinvested communities have been denied the kinds of safe transportation facilities, access to public transit, and other protective factors that reduce crash exposure.

American Indian and Alaska Native people are the most overrepresented racial or ethnic group in traffic fatalities in Washington. Black road users are the second most overrepresented group in traffic fatalities. This has remained the case over many years and across road user types: drivers, passengers, walkers, bicyclists, and rollers. Tribal and rural communities are also affected by a general lack of safety infrastructure, fewer first responders covering larger distances, and often, roadways with higher posted speed limits.

Target Zero Emphasis Areas

Risk factors most commonly associated with fatal crashes fall into four categories. These are not mutually exclusive. Most crashes involve more than one of these (within and/or across categories):

1. **High-Risk Road User Behavior:** Impairment, Speeding, Distraction, and Lack of Seat Belt Use
2. **Road User Age Groups:** Young Drivers (age 15-24) and Older Drivers (age 70+)
3. **Locations:** Intersections and Lane Departures (including roadway departures)
4. **Road Users by Mode of Travel:** Motorcyle Riders, Heavy Vehicles, and Active Transportation Users (walkers and rollers)

This plan provides data from the most recent three-year period for which fatality and serious injury data are complete. Readers and users of the plan are encouraged to find updated data in future years available from the Washington Traffic Safety Commission's Data Dashboards and through the Washington Department of Transportation's Crash Data Portal. The Commission typically releases preliminary data for the prior calendar year in May and final data for the prior year in December.

These data help us to identify significant risks, which then point to potential solutions. Sources for effective countermeasures to prevent serious injury and fatal crashes include Countermeasures that Work, published by the National Highway Traffic Safety Administration (NHTSA). This provides information on the costs and effectiveness of measures to keep road users safer using education, enforcement, and other methods to impact road user behavior. For safe road design the Federal Highway Administration (FHWA) Proven Safety Countermeasures describes a range of roadway treatments that improve safety on highways, county roads, city streets, and at locations where road users intersect.

Using the goals, policies, and strategies in the Target Zero Plan, upcoming implementation efforts will include a basic structure for activity implementation, tracking, evaluation, and reporting. Many of the strategies outlined are planned or underway. Additional implementation plans will be developed by WTSC, WSDOT, and other state agencies, as well as Tribal, regional, county, and local officials during this time. WSDOT will update its Highway Safety Improvement Program (HSIP) report annually. WTSC will update its current Triennial Highway Safety Plan in 2024 and 2025 and develop a new 3HSP in 2026. These documents outline many of the implementation strategies and funding for the safety projects, strategies, and tactics outlined in this document.

Policy Recommendations

Prosocial traffic safety culture requires policy solutions that address identified risk factors. The Target Zero Plan features these policy recommendations to further develop and strengthen Washington's Safe System Approach for all road users. Many of these also support equity goals by reducing disparities in investment with the goal of reducing and eliminating disparate impacts in traffic safety outcomes.

There is no single policy change that will get Washington to zero traffic deaths. Instead, these recommendations work together to build and reinforce a Safe System and prevent traffic deaths. The question is not about choosing one strategy[1] over the other. The question is how soon Washington can adopt and implement these proven and promising strategies. Washington has consistently embraced changes to improve traffic safety. Many of the following are strategies employed by cities, states, and countries that are successfully reducing traffic fatality numbers and rates. Washington cannot reasonably expect to reach Target Zero without adopting these, as well.

- **Impaired Driving:** Establish a *per se* limit of 0.05% BAC for driving under the influence of alcohol in Washington. This is the most common limit for driving around the world and the level at which scientists have determined that individuals are too impaired to drive safely (i.e., the point at which a driver's risk of crash involvement has doubled).
- **Safer Speeds:** Increase strategies to reduce driver speeds on all road types. This can include increased law enforcement, automated enforcement systems, road designs focused on speed managment, and the use of speed-limiting technology in vehicles on Washington roads.
- **Driver Education Affordability:** Provide financial assistance to novice drivers in Washington to access a certified driver education course. Fewer than half of young drivers under the age of 25 have completed formal driver education in Washington. Those who do not complete a safety course have a 70% higher rate of involvement in an injury crash between the ages of 18 and 25.[2]
- **Driver Education Access:** Expand opportunities for formal driver education services around the state, particularly in underserved rural areas. Increase driver training for novice drivers who speak languages other than English.
- **Prioritizing Active Transportation Infrastructure:** Continue to fund Complete Streets projects at the state and local levels to provide safe, accessible, and protected sidewalks, bike lanes, trails, and crossings for active transportation users. Vulnerable road users need separate facilities to travel safely and to avoid conflicts with vehicles that are large and travel at speeds likely to cause serious or fatal injuries to unprotected people who walk, bike, and roll. In areas where they interact with motor vehicle traffic, reduce exposure through engineering, education, and enforcement strategies.

1 The terms "strategy" and "countermeasure" are used interchangeably in this plan.

2 Washington Department of Licensing

- **Disproportionate Impact:** Remove financial barriers and provide grants with upfront funding to Tribes for traffic safety programs and projects. American Indians and Alaska Natives are the most overrepresented racial or ethnic group in the state for traffic fatalities. Barriers to obtaining state funds to implement effective strategies have exacerbated and prolonged these risks.
- **Impaired Driving:** Revisit legal limits for cannabis-impaired driving based upon new research and data. Also consider making DUI presumptive if there is any substance that physically or mentally impacts the individual.
- **Toxicology Lab Facilities:** Remedy the DUI case backlog at the State Toxicology Lab by addressing the root causes of the backlog, including turnover of toxicologists.
- **Young Drivers:** Expand the requirement to complete a driver education course in order to obtain a Washington driver's license for first-time licensees through age 24 (currently through age 17). Along with driver education, the experience that young drivers gain through intermediate licensing significantly reduces the risk of a crash in the age group that currently has the highest rates of crash involvement.
- **Safer Drivers:** Increase dedicated traffic patrol units in cities and counties that have significant numbers of serious injury and fatal crashes. Emphasize high-risk behaviors, including DUI and speed.
- **Roadway Design:** Prioritize funding for roadway design strategies that reduce crossing conflicts for all road users at intersections, reduce travel speed, and keep vehicles on the roadway.
- **Safer Vehicles:** Collect data and study the impact of increased vehicle sizes and weights on crash risk and injury severity, particularly in relation to collisions involving vulnerable road users struck by larger and taller passenger vehicles.

We cannot continue to do the same things and expect different results. Increased coordination of these efforts and adoption of the policy priorities listed above will be necessary to reverse the current trend of increased fatalities and serious injuries so that we can move much closer to Target Zero over the next few years. 2030 is coming soon. We need to approach Target Zero today with the sense of urgency it deserves. The life we save may be your child's, your parent's, your co-worker's, your neighbor's, or your own.

Acknowledgments

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Introduction

1.1 TRANSPORTATION SAFETY: A CALL TO ACTION

Washington's streets and roads connect us to one another. They connect us to jobs, education, goods and services, and opportunity. Risking death and serious injury while simply trying to complete these daily tasks is unacceptable. We need to do more than imagine a world with zero fatalities and serious injuries involving motor vehicles. We need a plan, and we need to implement this plan. The public roadways we use need to be more than efficient and convenient. They also need to be safe and accessible to everyone, whether they travel on foot or on wheels.

All public roadways should offer ways for people to travel safely along or across them using a variety of modes. This requires extra care and attention to protect our most vulnerable road users.

We should all arrive at our destinations safe and unharmed, every time.

In Washington, 810 people died and 3,413 people were seriously injured in crashes involving motor vehicles in 2023. This represents an 85% increase since 2013 in fatalities and a 78% increase for serious injuries. On average, someone suffers a serious injury in Washington every 2.6 hours, and each day two people are killed in traffic crashes.

The individuals in these crashes are parents, children, teachers, students, coworkers, friends, and neighbors. The effects of roadway tragedies are widespread and far-reaching; the toll is both emotional and economic.

WASHINGTON STATE FATALITIES, 1968–2023

SOURCE: WTSC HISTORICAL COUNTS, CFC FILES

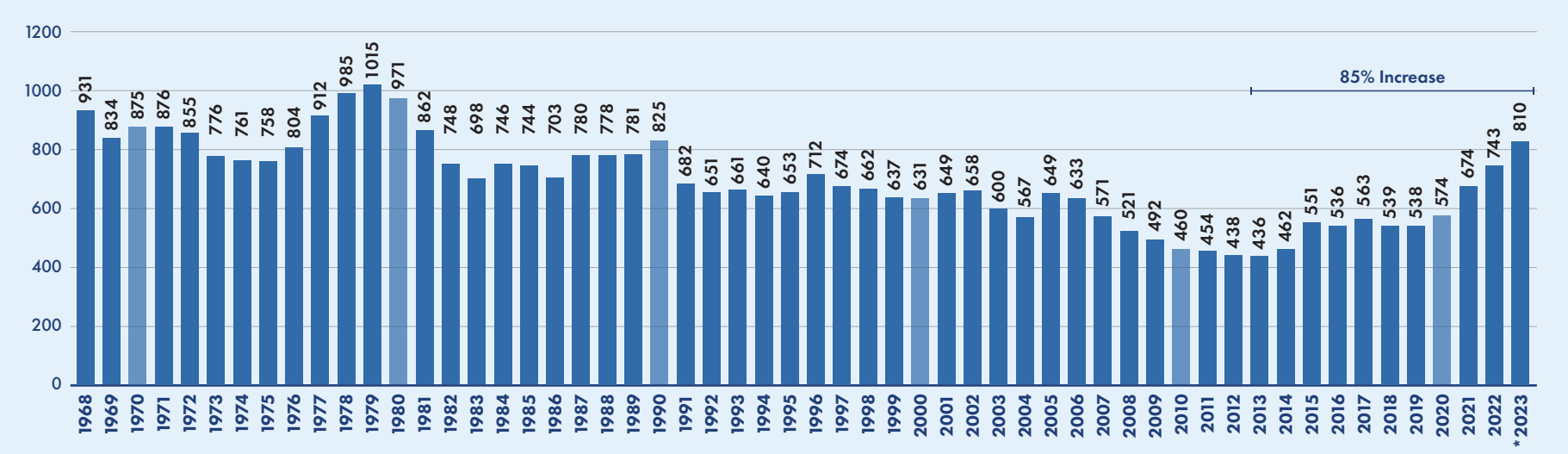


FIGURE 1. WASHINGTON STATE TRAFFIC FATALITIES, 1968-2023

**2023 data is an unofficial estimate, incomplete, subject to change.*

Beyond the savings in human lives, safety is an investment. Safer roads and safer communities can save billions of dollars. The societal financial cost of motor vehicle crashes in Washington for 2022 is estimated to be $20.48 billion,[1] which is 3.2% of the real gross domestic product (GDP) of the state[2] and represents $2,600 per person in Washington.[3]

These recent increases in fatalities and serious injuries are tragic. Creating a safer transportation system will require a serious commitment from all safety partners. Policy makers provide the rules, tools, and resources. Transportation professionals need to change how projects are selected, funded, and implemented. Educators help develop safe road users, and first responders prevent the worst outcomes when crashes occur. The public can assist by encouraging policy makers to commit the funding and resources to achieve our shared safety goals and by promoting a prosocial safety culture in our communities.

In 2022, Finland saw zero traffic deaths in two-thirds of its municipalities, and they saw their traffic deaths fall to an 80-year low in 2023. This rests on the foundation of a prosocial traffic safety culture and a national commitment to achieve zero deaths and serious injuries. Washington State has been an early leader and partner in the growing national movement for safer roads. Through efforts by government agencies, safety partners, businesses, and the public, a renewed interest and resolve to address roadway safety is growing. This momentum is also seen at the national level. In 2022 the U.S. Department of Transportation developed the first-ever National Roadway Safety Strategy, and in 2023 the American Association of State Highway and Transportation Officials (AASHTO) held a national Safety Summit. We can leverage the national strategy and summit actions, along with our Target Zero Plan, to save lives. This vision must become a reality for every person who lives, works, plays, and travels in Washington.

1 WSDOT analysis using FHWA method for estimating crash cost for highway safety analysis

2 Bureau of Economic Analysis, GDP by State.

3 WA Office of Financial Management, Total population and percent change website.

What is Target Zero?

Target Zero represents Washington's goal of eliminating fatalities and serious injuries on all public roadways by all road users by 2030. However, it represents more than just a number to be reached. It is our collective commitment to the shared goal and to creating a transportation system built around safety for every mode and every user. To follow through on this commitment, we must seize the opportunity to reduce the potential for future crashes, so we never have roadway deaths and serious injuries again. To improvise from President Kennedy, our goal is zero, not because it is easy, but because it is hard. And it is the only morally acceptable goal.

In 2000, Washington developed the first Target Zero Plan in the U.S., establishing the goal of zero fatalities and serious injuries. At the time, 2030 was an aspirational timeline for this vision. While data has continued to show an increase in fatalities and serious injuries over the past decade, maintaining the original goal of zero by 2030 is important because zero is the only acceptable traffic safety outcome. While challenging, we know it is possible to improve for several reasons:

- We've made meaningful progress before. From 2005 to 2013, Washington's fatalities reduced by 32%.
- Countries outside the U.S. currently experience traffic fatality rates per population that are less than half our rates in Washington. Within these countries, some cities have experienced zero fatalities.
- Of the 327 incorporated cities and unincorporated county areas in Washington, 148 achieved zero fatal crashes over the five-year period of 2019-2023.[1]

This is the seventh version of the Target Zero Plan. As we near 2030, we must act boldly and urgently to continuously improve the way we design, operate, and maintain the transportation system and educate our road users. It has taken decades to build the system we have inherited, so we must act to achieve and maintain zero fatalities and serious injuries. This updated plan lays out new, challenging initiatives, and a new way of thinking about transportation safety as part of a larger system. Thank you for joining us on this journey.

Local Safety Planning in Washington. While the Target Zero Plan provides inspiration and guidance for statewide roadway safety improvement, much of the day-to-day work of safety occurs at the regional, Tribal, and local levels. While state routes account for 7,000 centerline miles (9% of all public roads), city and county facilities account for more than 56,000 miles (72%), making safety on all public roads vital to achieving statewide goals.

More than 100 entities in Washington—local agencies, regional agencies, and Tribal nations—have developed or are developing Local Road Safety Plans, Vision Zero Plans, and Comprehensive Safety Action Plans with the same vision to eliminate fatalities and serious injuries on Tribal roads, city streets, and county roads.

1 Washington Traffic Safety Commission, 2024

1.2 SYSTEMS THINKING

Our surface transportation system is comprised of many parts, such as road users, vehicles, transportation infrastructure (roads, sidewalks, paths, intersections, etc.), transportation agencies, funding structures, policies, and laws. These different parts interact and, in combination, can create the potential for fatal and serious injury crashes. Washington's traffic safety leaders recognize that safety requires systems thinking, which allows us to understand and continuously improve the system elements and how they interact with each other to reach desired goals.

Crashes (observable events) are relatively random and rare outcomes. Crashes can occur for numerous reasons. Looking only at individual crashes presents a limited understanding of the system's operation and the reasons that crashes occur, as **Figure 2** shows.[1] Systems thinking tries to understand the trends and patterns that lead to these events (e.g., run off road crashes in a curve), and also the influence of underlying structures on those patterns (e.g., driver speeds, sharp curve after a long, straight highway). Finally, we need to understand and change the mental models of the partners responsible for the parts of the system that are interacting to produce undesirable traffic safety outcomes. For example, one organization or agency might believe that free flow speed is the most important aspect of roadway travel. That organization's decisions might compromise safety.

Reaching the goal of eliminating fatalities and serious injuries from our roadways requires transportation professionals and partners to think deeply and broadly across disciplines and jurisdictional boundaries. In addition to understanding the interplay of transportation system elements, we also need to consider how other societal systems (e.g., land use and development, social services, health policy, etc.) influence transportation and contribute to the likelihood and severity of crashes.

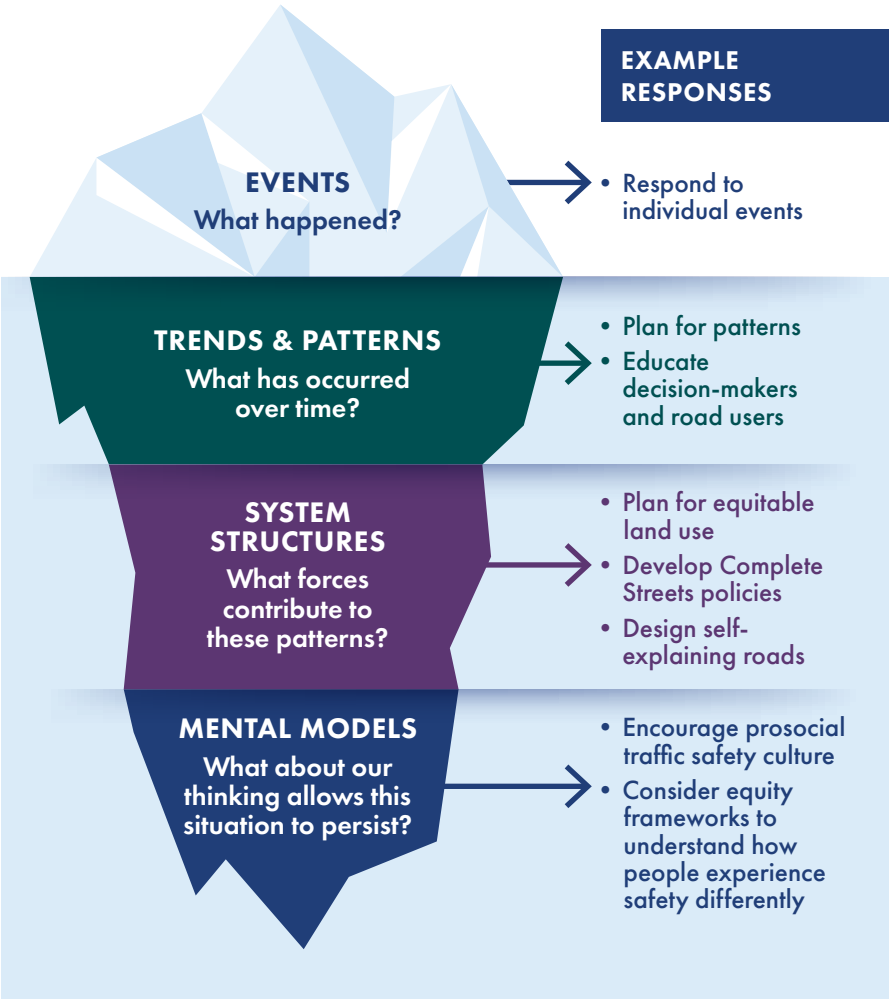


FIGURE 2. SYSTEMS THINKING LEVELS OF CURRENT CONDITIONS

1 Adapted from the iceberg model. https://mutomorro.com/iceberg-model/

Road Safety Performance Metrics

Crashes occur for many different reasons. These contributing factors are often related to errors or failures within the system. In the past, we often discussed safety without defining it; this led to different people not talking about the same thing. To discuss safety consistently now, descriptions of three key road safety performance metrics—exposure, likelihood, and severity—must be understood.

- **Exposure.** The number of people interacting with the transportation system, in what mode, and for how long affects safety. Increases in motor vehicle miles traveled and miles traveled by walking, rolling, and cycling mean more people are on the system. In addition, crossing widths, time and distance for active transportation, length of road segment, intersection size, and conflict points increase the potential for crashes to occur.
- **Likelihood.** Many roadway system aspects (e.g., intersection design, roadway geometry, signal timing, lane striping) and vehicle design (e.g., vision-obstructing pillars, maneuverability, safety devices) can affect the likelihood of a crash occurring. Similarly, road users who are distracted, impaired, speeding, or engaging in other high risk behaviors also increase the likelihood of causing or being involved in a crash.
- **Severity.** Vehicle speeds, crash angles, differences in size and weight among the units involved, and lack of safety equipment use are the primary factors in crash severity. Other influences on severity include lack of protection from crash forces (e.g., occupants not wearing seat belts, pedestrians struck by a driver), physical health of road users involved in a crash, and the availability and responsiveness of post-crash care.

Applying these concepts can help us to recognize how our laws, policies, programs, projects, and strategies influence the system. To arrive at strategies that will prove effective for all people in Washington, we must include the assessment of safety performance in a multimodal and community-based context. Changes in one mode of travel may positively or negatively influence other modes. For example, multimodal assessment recognizes that changes for the safety of people in vehicles may result in negative effects to people walking or rolling, whereas improvements for pedestrians can result in safety improvements for people using all modes, including drivers.

1.3 PROSOCIAL TRAFFIC SAFETY CULTURE

"The roadway transportation system is a shared community that consists of various users including drivers, motorcyclists, passengers, cyclists, pedestrians, and others. This system is designed, maintained, and managed by various stakeholders including departments of transportation, transportation engineers, maintenance districts, city and county and Tribal road departments, elected officials, policy makers, law enforcement officers, traffic safety leaders… and others. Each of us is a member of the roadway transportation community because we depend on this shared system to connect us with people, places, goods, and services. For this system to meet everyone's needs and be sustained, we have an obligation to one another to act in ways that support the system."

—Center for Health and Safety Culture, Montana State University, Proactive Traffic Safety

Traffic safety culture refers to our shared belief system about our individual actions that affect safety.

Prosocial traffic safety culture goes further, referring to shared beliefs about our responsibility for collective actions that create a safe transportation system for everyone. Joint responsibility and collective actions involve two important parts:

- Road operators and partners who are responsible for planning, developing, operating, and maintaining a safe system.
- Road users who act to ensure the safety of themselves and the safety of the other members of the community using the transportation system.

Prosocial traffic safety behaviors are part of our positive daily choices. These actions are motivated by a shared identity and social bonds with a group. Sometimes culture is influenced by public policy.

To foster these prosocial traffic safety behaviors, we must create a traffic safety culture that encourages these behaviors and a social environment that rewards them. Recent data shown in **Figure 3** suggests that many people in Washington are already comfortable taking actions to help others be safer. This suggests that strategies to grow prosocial traffic safety behaviors may be effective in Washington.

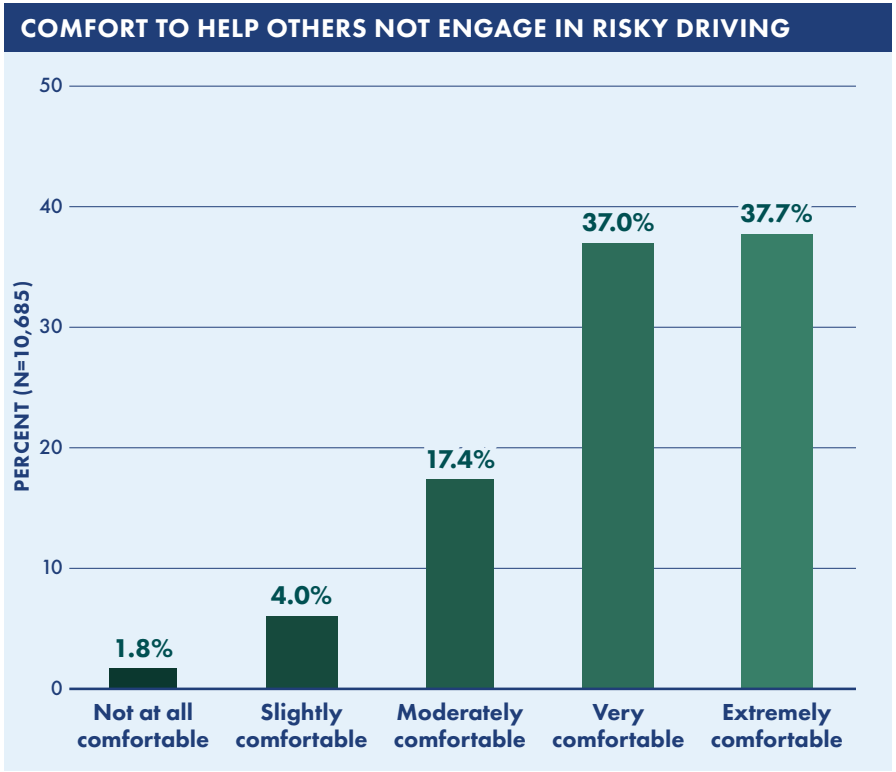


FIGURE 3. SELF-REPORTED COMFORT TO ACT IN WAYS THAT HELP OTHERS NOT ENGAGE IN RISKY DRIVING BEHAVIORS[1]

Source: WA Traffic Safety Survey, 2023

Prosocial traffic safety culture creates a social environment to encourage actions that increase the safety of others, which leads to support for shared traffic safety goals.

"Seeing the tears in my brother's eyes I knew something horrific had happened. Wrapping his arms tightly around me… his voice barely audible… he whispered, 'Trevor's been killed'. Gasping for breath, the gut-wrenching pain took me to my knees.

In an instant I went from being a banker to dedicating my lifework to preventing impaired driving in memory of my little son and in honor of my then six-year-old daughter who survived the crash. Public safety is up to each of us for all of us."

—Linda Thompson, mother of Trevor Pierce age 3, killed on August 16, 1986, by an impaired driver (repeat offender)

1 Question 31: How comfortable would it be for you to:
1. Ask someone to use a seat belt?
2. Take some action to prevent someone who is going to drive who is perhaps too impaired to drive safely (like getting them a ride, asking them to stay, etc.)?
3. Ask someone who is speeding or driving aggressively to slow down?
4. Ask a driver who is using their cell phone or who is distracted to focus on driving

1.4 EQUITY FRAMEWORK

The Centers for Disease Control and Prevention (CDC) describe transportation as an important social determinant of health that "affects the ability of people to move efficiently and safely through public and private spaces. Active transportation—specifically walking, cycling, and rolling—has direct and indirect impacts on health at both individual and community levels."[1] However, individuals using the transportation system experience significantly different outcomes related to death and serious injury. Some of these differences are attributable to lack of investment in segregated communities, defined by redlining policies that were put in place nearly a century ago in cities across the U.S.

Land use decisions are often skewed in favor of some interests over others. Underinvestment becomes institutionalized, and the negative effects have become worse over time. This produced neighborhoods with higher speed arterials and a lack of street lighting, sidewalks, protected/separated bike lanes, and pedestrian crossing locations.

CDC researchers concluded: "lower-income neighborhoods often lack sidewalks or have poorly maintained sidewalks with limited connectivity. Structural racism has governed the trajectories of communities across the United States, creating multidecade place-based effects. These effects are often not acknowledged as a fundamental cause of transportation inequities. Individually focused behavioral countermeasures and siloed infrastructure projects cannot sufficiently address present-day inequities. Transportation researchers must understand and address upstream factors—like redlining—that continue to undermine positive population-level transportation outcomes." Understanding the structural inequality underlying unsafe land use planning and road placement is important for selecting safety strategies and countermeasures that address the root causes contributing to serious injury and fatal crashes. A recent example is WSDOT's use of a social equity index to understand the correlation between equity characteristics and vulnerable road user crashes, as outlined in **Appendix D**.

The equity framework for achieving Target Zero is based on an understanding that interconnections among public policies for transportation, health, housing, and environment have resulted in inequities. Marginalized communities face disproportionate burdens and impacts that were created by policy makers and funders across these systems, including higher rates of roadway deaths for American Indian, Alaska Native, and Black road users.

Inequity in systems also occurred in part because transportation funders, policy makers, and design practices prioritized higher-speed, vehicle-oriented mobility through marginalized communities. As these systems were built decades ago, safety was defined as a reduction in total crashes (versus fatal and serious injury crashes). Congestion-related vehicle crashes were prioritized. These crash types usually resulted in property damage or minor injuries, versus less frequent but higher severity crashes.

1 Taylor, N.L., et. al. (2023). Structural racism and pedestrian safety: Measuring the association between historical redlining and contemporary pedestrian fatalities across the United States, 2010-2019.

Projects were often developed to reduce cost and complexity, leading decision makers to place roadways near or through marginalized neighborhoods, instead of other locations that were perceived as more valuable and/or more difficult to build in. These projects were built without places for the people in those same neighborhoods to walk, bike, and roll, resulting in negative effects on safety, culture, economic vibrancy, and personal security.

The current transportation system and network was built over decades, and it will take time to make changes to meet the needs and expectations of today. An equitable approach to transportation safety requires us to:

- Disaggregate data by population demographics such as race/ethnicity, income, housing, disability, English proficiency, other equity-related factors, and mode use to gauge existing and potential negative impacts within traditionally underserved populations.
- Understand how limited transportation options within different road design and operational context might affect transportation behaviors, and how to consider these factors in safety projects and programs.
- Address any differences in land use policy that led to underinvestment and disparate impacts for some demographic groups.
- Increase the effectiveness of traffic enforcement while eliminating disparities in its application. Focus efforts statewide on crash-causing driving behaviors and deemphasize low-risk infractions.
- Improve land use policy, infrastructure project selection, and transit access with a focus on historically underinvested communities.
- Include affected communities in transportation decision-making.

Land Use. Historical inequities in city planning led to inequitable zoning laws and practices, including housing segregation via redlining and exclusionary zoning. These policies led to the concentration of certain populations, particularly communities of color, in specific neighborhoods. The lack of transportation investment meant limited access to transportation, food, employment, health care, education, and recreation within a reasonable distance, further exacerbating existing inequities.

Marginalized people, who are most in need of affordable and reliable transportation options, may be the least likely to have these options in their neighborhoods due to lack of investment and roadways designed solely for the automobile. The lack of investment in transportation options increases their exposure to conditions that may result in roadway crashes. The outcome is a perpetuating cycle of poverty and inequity.

Equity in Transportation Policy

Transportation investments that rectify past inequities would result in improved public health, access to jobs, workforce development, and environmental justice. Recent legislation in Washington, described below, provides an opportunity to invest in a more equitable approach.

HEAL Act. The passage of the Healthy Environment for All (HEAL) Act is the first statewide law in Washington to create a coordinated state agency approach to environmental justice. It prioritizes voices from disproportionately impacted communities to reduce disparities in health, safety, and quality of life.[1]

Complete Streets. The Move Ahead Washington transportation package passed in 2022 introduced a mandate for consideration of Complete Streets approaches in all significant transportation projects undertaken by WSDOT on state highways. Projects must consider and accommodate all road users and their modes of transportation, including walking, rolling, and using transit. While the directive applies to WSDOT projects, many other agencies around the state have adopted a local Complete Streets ordinance and are applying these principles to their transportation projects.[2]

Growth Management Act. In 2023 the legislature adopted several changes to the Growth Management Act that embed equity and transportation safety (HB 1181, 2023). These changes reduce potential crash exposure through support for transportation-efficient land use planning and mode shift.[3]

Changes included:

- Requiring use of multimodal level of service standards for roads, transit service, and active transportation, which shifts from a driving-centered evaluation to one that considers all modes.
- Explicitly incorporating requirements to plan for safety. “Priority must be given to inclusion of transportation facilities and services providing the greatest multimodal safety benefit to each category of roadway users for the context and speed of the facility.”
- Adding equity language, for example directing jurisdictions to identify system needs to equitably meet current and future demands and to equitably implement the multimodal network.
- Adding a requirement that local jurisdictions must include Americans with Disabilities Act (ADA) transition plans.

Equity in the Safe System Approach

To implement the Safe System Approach equitably, must understand the causes of disparities in roadway safety outcomes, and makers must prioritize transportation investments in marginalized communities.

Our work to reduce crashes must include engaging the community so that we understand their needs. This requires communicating with non-English speakers, developing culturally relevant materials, and establishing platforms and engagements to hear from those who are unable to participate in public meetings because of costs, inability to travel longer distances easily or at all, caregiving responsibilities, and other factors.

1 WSDOT Environmental Justice

2 WSDOT Complete Streets

3 WSDOT Land Use and Transportation Planning

Socioeconomic and Demographic Factors in Washington

Within Washington, urban, suburban, and rural areas of the state exhibit substantial differences related to how people travel. Several state and national datasets that are helpful in identifying communities that experience persistent poverty (USDOT Areas of Persistent Poverty), are disadvantaged (USDOT Disadvantaged Communities score), are socially vulnerable (the CDC Social Vulnerability Index), or experience environmental health disparity (Washington Department of Health [WA DOH] Environmental Health Disparities Score). WA DOH provides online maps to visually communicate data on social, health, and safety vulnerabilities by census tract.[1]

Responsibility for road design, construction, maintenance, enforcement, post-crash care, and safety is divided among city, county, state, and federal jurisidictions and Tribal nations. County roads account for the greatest number of road miles, yet they often exhibit the least funding investment per mile. State and county roads in unincorporated areas are those that most frequently cross and abut Tribal lands.

1 Washington Tracking Network

The CDC Social Vulnerability Index considers multiple factors in four domains:

HOUSEHOLD COMPOSITION AND DISABILITY

- POPULATION 65+ (%)
- POPULATION UNDER 18 (%)
- POPULATION WITH A DISABILITY (%)
- SINGLE PARENT HOUSEHOLD (%)

SOCIOECONOMIC DETERMINANTS

- MEDIAN HOUSEHOLD INCOME
- NO HIGH SCHOOL DIPLOMA (%)
- POPULATION 19 TO 64 WITH NO HEALTH INSURANCE
- POPULATION LIVING IN POVERTY (%)
- UNEMPLOYED (%)

HOUSING TYPE AND TRANSPORTATION

- HOUSING WITH 10+ UNITS (%)
- MOBILE HOMES (%)
- NO ACCESS TO A PRIVATE VEHICLE (%)
- OVERCROWDED HOUSING (%)
- POPULATION LIVING IN GROUP QUARTERS (%)

RACE, ETHNICITY, AND LANGUAGE

- LIMITED ENGLISH PROFICIENCY (LEP)
- PEOPLE OF COLOR (RACE/ETHNICITY)

People in historically marginalized, segregated, and underinvested census tracts in Washington also experience higher rates of serious injuries and fatalities in traffic crashes.

Individuals with lower incomes are increasingly forced to find lower-cost housing far outside of population centers. As a result, they must travel farther to get to their workplaces, schools, medical care, shopping, and other locations as part of their daily lives. This added distance creates additional exposure due to miles traveled to reach these locations on facilities that may lack safety features found on other roadways.

Others who are not able to afford a personal vehicle are more likely to walk, bike, or roll, either as their primary mode or to access public transit. This leaves them more vulnerable and exposed to a higher likelihood of crashes that are more serious when they occur.

Community Concerns: A Delicate Balance to Achieve Road Safety Outcomes

One of the challenges we must address is a perception that enforcement of traffic laws is in conflict with the goals of equity. For enforcement to be most effective, it needs to be equitably applied, which means that law enforcement focuses on deterring high-risk behaviors. Some community members experience encounters with law enforcement as risky or dangerous.

Traffic stops are the most common way in which members of the public encounter law enforcement. Historic disparities in traffic stops and arrests in communities of color in Washington and the United States must be addressed when we engage these communities around behavioral traffic safety, which has traditionally relied upon traffic enforcement (and the related threats of fines or arrest) as a primary deterrent and countermeasure.

While a substantial majority of Washingtonians see effective traffic enforcement as essential to maintaining safer roads, groups that have historically experienced the greatest disparities in the criminal justice system expressed lower support for traffic enforcement on the Statewide Traffic Safety Survey (2023). The level of support is lower among Black survey respondents, 54% expressed support for enforcement of distracted driving laws for using a cell phone, and 60% expressed support for enforcement of laws against driving under the influence of alcohol. Support for enforcement of speed laws among Black respondents—specifically for driving 10 or more miles over the posted limit—was 43% (37% were opposed and 20% were neutral). This occurred even though Black respondents were more likely to view speeding as very dangerous or extremely dangerous (43% versus 35% of all other respondents).

> "Traffic crashes are a legacy of colonization. We did not ask for these roads."
>
> *—Tribal Representative, October 2023, Target Zero Listening Session*

Deep and ongoing engagement and continued law enforcement training will be essential to craft and implement effective strategies in disproportionately affected communities. Equitable enforcement practices are likely to be more effective, as enforcement should focus solely on preventing, reducing, and disrupting the most dangerous behaviors on the road. Research in Connecticut,[1] North Carolina,[2] and elsewhere has shown that serious traffic crashes and fatalities can be decreased, along with racial disparities in traffic stops, when law enforcement agencies use data to focus officers' attention on high-risk locations and high-risk driver behaviors.

1 https://www.nber.org/system/files/working_papers/w32692/w32692.pdf

2 https://injepijournal.biomedcentral.com/articles/10.1186/s40621-019-0227-6#Sec1

Advancing Equity to Save Lives

It will take time, effort, patience, and mutual understanding to engage affected communities around solutions that effectively address disparities in social vulnerability, under-investment, enforcement actions, and the steps to provide roadway safety to everyone.

Addressing the most harmed populations in our society will reinforce Washington's commitment to zero fatalities and serious injuries for everyone. Today's transportation and community safety leaders must address the negative legacy created by prior systemic choices and take action to avoid burdening more people and places with similar decisions today and in the future. We cannot reach Target Zero without correcting these disparities so the system provides benefits to all.

Enforcement and Equity

Washingtonians clearly want effective and equitable enforcement of traffic laws. Multiple research studies have found that law enforcement policies and practices can be applied in ways that increase safety, reduce crime, and reduce racial disparities.

The Washington State Patrol (WSP) employs enforcement strategies and trains its troopers to operate in ways that are consistent with these methods, including:

- Using real-time crash and crime data to proactively deploy troopers to high-risk areas where they focus on high-risk driving behaviors, such as speeding, distraction, and impairment by alcohol or drugs.
- Using extensive public outreach before, during, and after high-visibility patrols (HiVE) so that the public is aware of these efforts and where they are happening. This approach is proactive and preventative, providing motorists the opportunity to follow traffic laws and avoid stops and citations. WSP reports the outcomes of these patrols by district so that the public is aware of their impact.
- WSP training dictates that troopers are to provide an introduction first during their initial contact with a motorist followed by a brief explanation of why the motorist was being contacted. Research indicates that notifying Black motorists for the reason they were stopped by law enforcement can reduce the likelihood of escalation into an arrest or use of force by 2.5 times.[1]

1 Escalated polices stops of Black men are linguistically and psychologyically distinct in their earliest moments, PNAS, 2023

1.5 TRIBES AND TARGET ZERO

Through the Centennial Accord, the state and Tribes have formally committed to working together on a government-to-government basis to address several common problems, including traffic safety issues. Tribes play a vital role in traffic safety outcomes and are active partners with other agencies in addressing the goals identified in the Target Zero Plan.

CRASH HISTORY

From 2020-2022, 107 American Indians and Alaska Natives (AI/AN) died in traffic crashes in Washington. These crashes occurred on reservation and non-reservation roadways. During that period, the AI/AN traffic fatality rate by population was 39 deaths per 100,000 people in the population. This rate is more than three times higher than the rate for the next highest race/ethnicity.

Federal and state funding sources typically require that grant recipients expend their own resources initially and then submit invoices for reimbursement by the funder. These requirements pose significant risks and barriers to Tribes, including those with members who would benefit most from these programs.

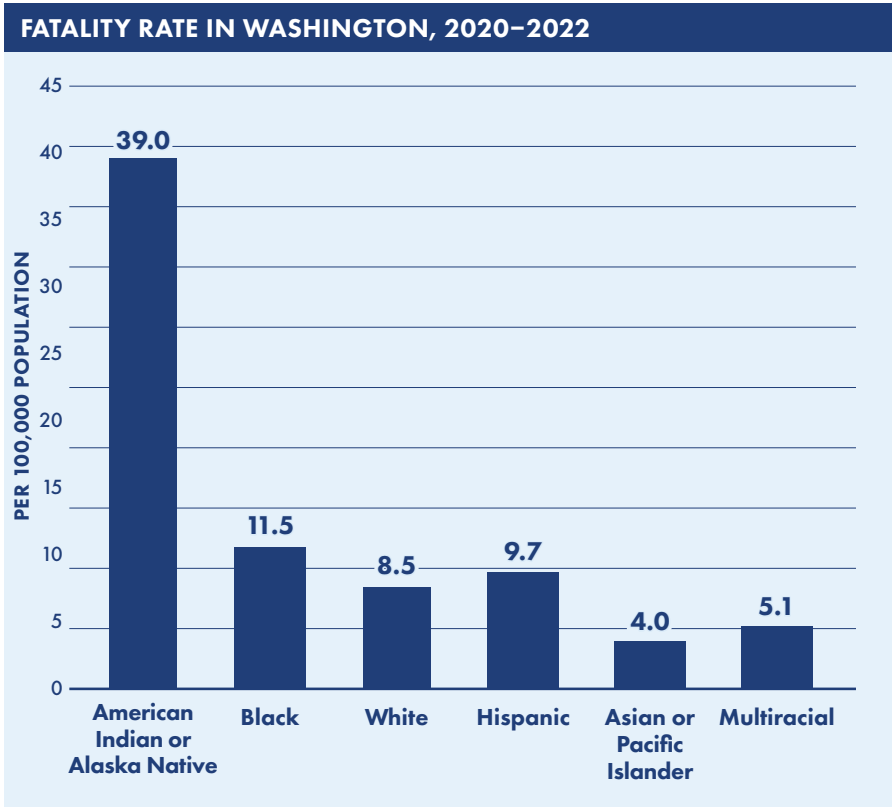


FIGURE 4. FATALITY RATE PER 100,000 POPULATION BY REPORTED RACE IN WASHINGTON, 2020-2022

During this period, 69% of the AI/AN people killed in traffic crashes died in events occurring in just six of Washington's 39 counties, as noted in **Table 1**. More than one-third occurred in Yakima County alone. Yakima County also experienced one of the highest proportions of all fatalities that were AI/AN people; this list also includes Ferry and Okanogan counties.

> "For those making recommendations for changes on reservations, please… review some of the legal complications that reservations deal with related to land ownership, right of way procurement, road law enforcement, and other legal challenges Tribes experience."
>
> *—Tribal listening session participant*

TABLE 1. COUNTIES WITH THE **HIGHEST NUMBER** OF AMERICAN INDIAN AND ALASKA NATIVE PERSONS KILLED IN TRAFFIC CRASHES, 2020-2022

COUNTY	AI/AN % OF COUNTY POPULATION	AI/AN FATALITIES	ALL TRAFFIC FATALITIES	AI/AN % OF COUNTY FATALITIES
YAKIMA	6.6%	37	154	24.0%
KING	1.1%	12	398	3.0%
SPOKANE	1.7%	7	150	4.7%
OKANOGAN	12.5%	6	22	27.3%
WHATCOM	3.1%	6	43	14.0%
SNOHOMISH	1.6%	6	146	4.1%

TABLE 2. COUNTIES WITH THE **HIGHEST PERCENTAGES** OF AMERICAN INDIAN OR ALASKA NATIVE PERSON TRAFFIC FATALITIES, 2020-2022

COUNTY	AI/AN % OF COUNTY	AI/AN FATALITIES	ALL TRAFFIC FATALITIES	AI/AN % OF COUNTY FATALITIES
FERRY	18.3%	4	8	50.0%
OKANOGAN	12.5%	6	22	27.3%
YAKIMA	6.6%	37	154	24.0%
PEND OREILLE	3.1%	2	10	20.0%
CLALLAM	6.0%	5	27	18.5%
WHATCOM	3.1%	6	43	14.0%

Contributing Factors. Attributes related to AI/AN fatalities match statewide emphasis areas. The highest proportion is Impaired Road User Involved, at 67% (72 of 107). See **Figure 5** on the following page.

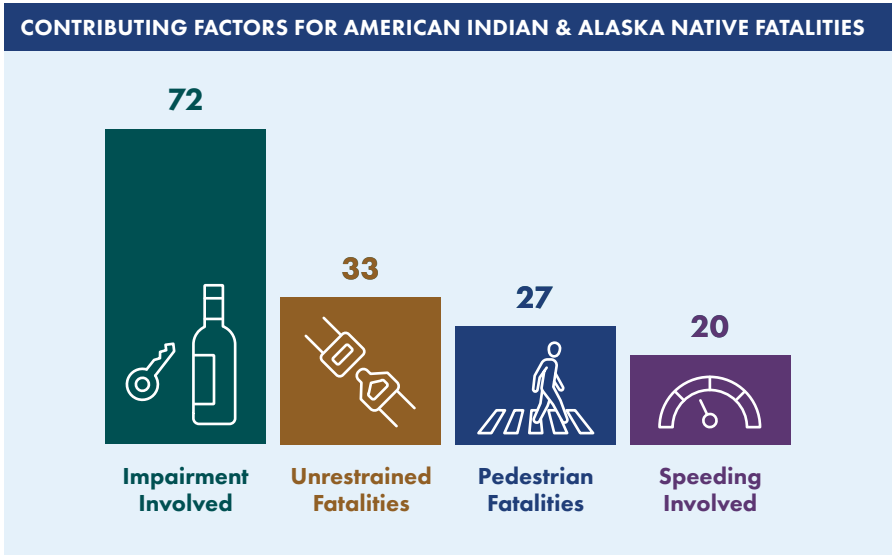


FIGURE 5. TOP 4 RISK FACTORS INVOLVED IN AMERICAN INDIAN AND ALASKA NATIVE FATALITIES, 2020-2022

**Note: Categories are not mutually exclusive. n=107*

These are the statistics, but the underlying stories are about real people and the families they leave behind. The numbers clearly show the higher likelihood of an AI/AN person being killed in crashes that involve certain contributing factors.

Compared to all other racial and ethnic groups in Washington, AI/AN fatality rates are substantially higher across several emphasis areas:

- Unrestrained Fatalities: 7.2 times
- Pedestrian Fatalities: 6.3 times
- Impaired Road User Involved Fatalities: 5.4 times
- Total Fatalities: 4.8 times
- Speeding Involved Fatalities: 2.7 times

WTSC also conducts case file reviews of individual crashes, including pedestrian and bicyclist crashes under RCW 43.59.156. While they are small in number, fatalities of Native people are important to understand as American Indians and Alaska Natives are the most overrepresented groups in traffic fatalities across the state.

SYSTEM CHALLENGES

It is important to recognize the disparity in magnitude and the need to identify responses in consultation with Tribal leaders in a manner that respects and reflects Indigenous knowledge and culture.

Reservations often include a mix of Tribal, state, county, city, and Bureau of Indian Affairs (BIA) roads, which creates jurisdictional complexities with law enforcement, Emergency Medical Services (EMS), crash reporting, road maintenance, and capital safety projects. Additionally, many Tribes in the state hold properties that are non-contiguous to their reservations, which provide vital services to their communities.

One of the problems that compounds these jurisdictional barriers is the set of complex rules governing federal and state funding. Many Tribes employ few if any people to plan, build, and maintain transportation systems for Tribal members. Like other governmental entities, they rely upon the availability of federal and state funds available through grants. Tribes with few staff members often lack the positions needed to apply for grants and then monitor, track, and account for grant funds. Most grants must go to the jurisdiction that owns and operates the facility; Tribal members rely on using roads the Tribe does not own and thus cannot change. Federal and state funding sources typically require that grant recipients expend their own resources initially and then submit invoices for reimbursement by the funder (usually a state agency). These funding requirements and limitations pose significant risks and barriers to Tribes, including those with members who would benefit most from these programs. Agencies do not have the discretion or flexibility to modify these requirements, even when they believe it would be reasonable to do so.

To address this complex mix of jurisdictions and experts, Tribes have multiple forums that meet regularly for transportation and traffic safety issues. The WA Tribal Transportation Planning Organization (TTPO) holds quarterly meetings to support the development of Tribal transportation planning capacity. The TTPO goal is to improve Tribal government's planning and programming activity through enhanced coordination with Tribal, federal, state, and local governments. Several Tribes throughout Washington received funding under USDOT programs to develop their own traffic safety plans for their reservations. The unique priorities of individual Tribes are reflected in those plans.

Priority Strategies

Tribal representatives identified as priority strategies to reduce the frequency and severity of roadway crashes on Tribal lands and those crashes involving American Indians or Alaska Natives.

Increase Tribal Representation in Leadership Positions. The input of Tribes through representation can influence projects and strategies to improve roadway safety for American Indians and Alaska Natives and reduce the potential for crashes on Tribal lands. In 2019, the legislature passed a law tying state transportation funds to the inclusion of Tribes on regional transportation planning boards.

Tribal Traffic Safety Plan: Tribal agencies seek funding to support the gathering and analysis of traffic crash and fatality data to develop a Tribal Traffic Safety Plan. This plan can help Tribes identify needs specific to their geographies and communities, and then prioritize projects and strategies.

Seat Belt and Child Passenger Restraint Use: The WTSC Tribal Liaison has participated in a partner group to provide input into the development of a "How-To Guide for Increasing Seat Belt Use in Indian Country." The focus was on developing a guide for state transportation officials and other entities to help them be more responsive to Tribes' needs and explore culturally tailored countermeasures and strategies. Information gleaned from these partner meetings will help support countermeasures and strategies to address seat belt use rates amount Washington Tribes. The How-To Guide should be finalized in late 2024.

Child passenger safety technician training courses (CPST) will continue to be offered to Tribal Nations. The COVID pandemic severely disrupted these and other Tribal traffic safety activities. In the past year (2023-24) CPST courses were offered to the Muckleshoot Indian Tribe, Spokane Tribe of Indians, and the Confederated Tribes and Bands of the Yakama Nation.

Tribal Law Enforcement Tools: The WTSC Tribal Liaison is engaging Tribal police chiefs in traffic safety discussions and planning to better understand their needs, which will be unique for each Tribe. These discussions also allow an opportunity for respectful inclusion of Indigenous knowledge to support much more meaningful decision making and partnerships with WTSC. The size and location of Tribal lands and police agencies vary widely. Some only have a few officers. In addition to basic equipment and enforcement tools, other effective tools include incentives for positive behavior, which have been effective in the past and fit with their prosocial traffic safety culture.

Examples include the following:

- Bike and pedestrian safety event equipment (bike helmets, pads, bike repair kits, reflectors, coloring books, helmet stickers)
- Incentives for seat belt checks (t-shirts, sweatshirts, reflective vests)
- Portable Speed Feedback Signs
- Automated External Defibrillators for patrol cars
- Portable Breath Tests
- LiDAR Speed Device

Active Transportation Grants: WSDOT's Active Transportation Division oversees grant programs that invest in pedestrian and bicyclist facilities, speed management and traffic calming, and education or encouragement programs. Tribes are eligible for all of these and in 2023 the division began developing an active transportation assistance program prioritizing Tribes and other entities that have not received grants in the past. This program aims to build capacity and advance the partnerships needed to provide safety improvements on streets and roads that serve Tribal members and lands.

1.6 THE SAFE SYSTEM APPROACH

The Safe System Approach (SSA) recognizes that safety is increased when we examine how all parts of the system interact to support and strengthen all parts of the system. Vision Zero and the Sustainable Safety Approach originated through efforts in Sweden and The Netherlands, respectively, in the 1990s. The combination of their thinking evolved into what we know today as the SSA. Washington began its journey toward this approach when WSDOT adopted the sustainable safety principles in 2013, and then updated the WSDOT design manual in 2015. In the 2019 update of Target Zero, Washington brought the SSA into its safety practices. Since then, Washington has adapted this approach to incorporate local innovations and international advances in safety practices.

The Washington State SSA provides a framework for operationalizing traffic safety among policy makers, system owners and operators, and road users. This approach reflects the obvious truth that preventing death and serious injury requires multiple elements to be in place so that if one fails, other layers of protection are available to prevent the most tragic outcomes. We apply it in an equitable manner, so it benefits everyone using the system. **Figure 6** illustrates Washington's version of the SSA Principles (outer ring) and SSA Elements (inner ring).

The SSA aims to reduce fatalities and serious injuries by creating a system that supports the following elements: safer land use, safer vehicles, safer speeds, safer roads, safer road users, and post-crash care. These elements are supported by core principles:

- Death and serious injuries are unacceptable
- We support safe road use
- We work to reduce large crash forces because humans are vulnerable
- We all work together with the philosophy of a shared responsibility
- Safety is proactive
- We strengthen all parts of the system to create redundancy

FIGURE 6. WASHINGTON STATE'S SAFE SYSTEM APPROACH

Safe System Approach Principles

Washington's SSA framework is based on six principles, starting with the value statement (deaths and serious injuries are unacceptable), followed by the primary reason for injury outcomes (prevent exposure to large forces) and required actions (safety is proactive, support safe road user behaviors, and shared responsibility). The principles finish with a direct connection to the interdependent SSA elements: strengthen all parts.

PRINCIPLE 1: DEATH OR SERIOUS INJURY IS UNACCEPTABLE

People deserve to be able to travel safely to their destination. Whether they drive a car, take the bus, walk, roll, or bicycle, they should not be exposed to the risk of death or serious injury during their travels. Target Zero partners are focused on understanding the safety challenges and opportunities within the transportation system and prioritizing strategies to prevent death and serious injury.

> **"THESE ARE NOT JUST DOTS ON A MAP."**
>
> *— Tribal representative, Target Zero listening session*

High-level officials have committed to the elimination of fatalities and serious injuries, including the WSDOT Secretary's 2023 Executive Order E1085.01: Advancing the Safe System Approach for All Users. Its purpose is to achieve the goals of the Target Zero Plan, and it further states, "Through the Safe System Approach, WSDOT intends to systematically reduce fatal and serious injury crash potential statewide."

PRINCIPLE 2: SHARED RESPONSIBILITY

All parties within the system—including government at all levels, private industry (e.g., vehicle manufacturers, consulting firms, etc.), nonprofit/advocacy organizations, the healthcare system, first responders, researchers, and individual road users—are vital to preventing fatalities and serious injuries on Washington's roadways.

The transportation system is comprised of many elements that influence each other, with many partners who are responsible for these different elements. Partners can be classified as "traditional" (e.g., engineers, law enforcement agencies) and "influencers" (e.g., families, social services, land use). Traditional partners have the highest responsibility and are held accountable for building and operating a safe transportation system; influencer partners are those without a formal traffic safety role but with an interest and influence over safety within their social environment. Target Zero partners include key federal and state traffic safety agencies, along with Tribal governments, cities, counties, regional planning organizations, community-based organizations, and others. Collectively, this partnership is responsible for taking actions to reduce or prevent crashes through safety-focused projects, programs, initiatives, and campaigns all around our state.

PRINCIPLE 3: SUPPORT SAFE ROAD USER BEHAVIOR

People make mistakes and sometimes make behavioral decisions that contribute to crashes. Many systems and factors lie beyond the direct effects of transportation safety professionals (e.g., funding for early prevention and intervention services, availability of treatment facilities for mental health or substance misuse, housing costs, etc.). However, transportation professionals can support and encourage safe behaviors with design and policy decisions. A transportation system should be self-explaining and self-enforcing, meaning that roads are designed and operated to support safe road use, to reduce the ability to travel at excess speeds, and to be forgiving of errors. When supported by education, these designs reduce the potential for road user behaviors that can lead to death and serious injury.

A safe system is one that 1) encourages road users to comply with the safe behavior standards, 2) removes conditions that may influence the violation of those standards, and 3) is designed to ensure errors and violations do not result in serious or fatal injuries. Planning, designing, and operating roadways and active transportation facilities that encourage safe behaviors and remove opportunities for unsafe behaviors will help to protect all road users.

Other layers of defense to encourage safer behaviors are:

- Prosocial safety culture
- Culturally relevant education and training
- Reminders from signs, pavement marking, and signals
- Self-explaining roadways
- Law enforcement

> "In a well-designed system, safety measures make sure that human fallibility does not lead to human fatalities."
>
> *—Pete Buttigieg, U.S. Secretary of Transportation*

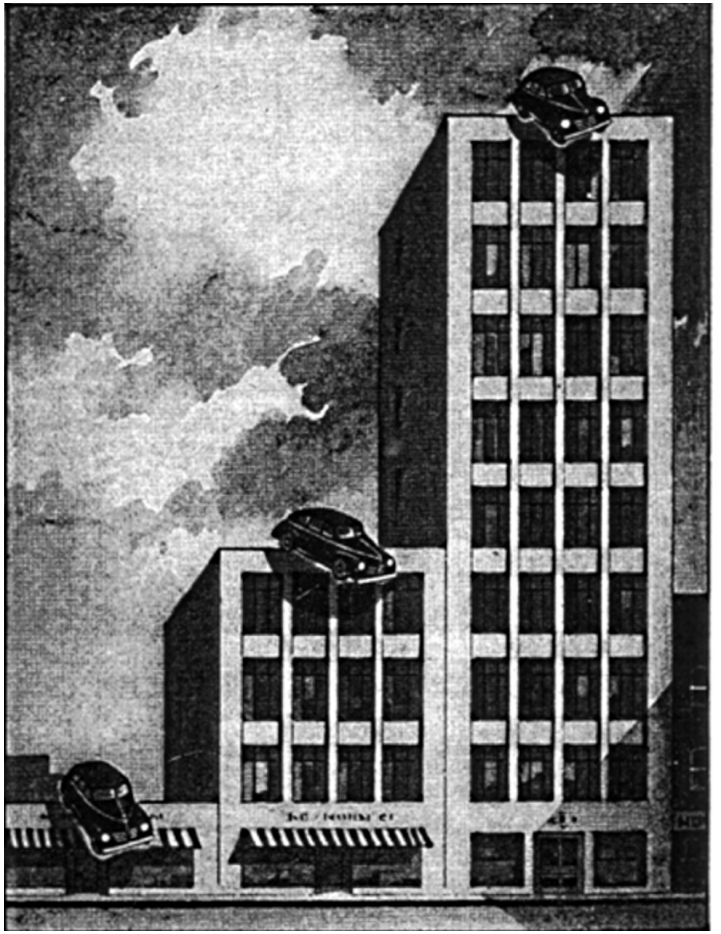
PRINCIPLE 4: PREVENT EXPOSURE TO LARGE FORCES

The human body has limits for tolerating crash forces before death or serious injury occurs; therefore, it is critical to design and operate a human-centric transportation system that accommodates and protects physical human vulnerabilities.

The average car weighs 4,000 pounds (which is significantly heavier than 30 years ago).[1] The transfer of force in equation form is $KE=(1/2)mv^2$, where KE = Kinetic Energy; m = Mass of an object; and v = Velocity. When this large object collides at high speed with a fixed object, another vehicle, or a person, the impact severity is high. It increases exponentially by the driver's speed.

The connection between the force equation and safety has been understood for a long time, illustrated by this image from 1936 (see **Figure 7**).[2] A vehicle traveling 20 mph generates the same force of impact as that same vehicle dropping from a height of 13.5 feet. At 40 mph, the force is equal to the vehicle dropping from 54 feet.

> "We need to find the balance between speed and efficiency with regard to motor vehicles and pedestrian/bicycle interactions."
>
> *—Listening session participant in Yakima County*



20 mph
Height: 13.5 ft

40 mph
Height: 54 ft

60 mph
Height 121.5 ft

FIGURE 7. SPEED AND THE FORCE OF IMPACT

1 How much does the average car weigh?

2 *Man and the Motor Car* by Robert Whitney, 1936.

PRINCIPLE 5: SAFETY IS PROACTIVE

With the proactive approach we identify and address potential contributing factors and crash types in the transportation system, rather than waiting for crashes to occur and reacting afterwards.

Historically, safety investments have been focused on locations where crashes have been reported. While this reactive approach has been beneficial, fatal and serious injury crashes rarely occur repeatedly at the same location over time. From a system perspective, we can take proactive actions that reduce the contributing factors to crashes by mitigating recognizable, predictable factors before future crash events occur.

For example, a jurisdiction may identify lane departure crashes as one of its most common contributors, but no single location has experienced multiple fatal or serious injury crashes. Proactive treatments such as curve warning signs, pavement marking, and rumble strips can be implemented systemwide to reduce the potential for future lane departure crashes.

PRINCIPLE 6: STRENGTHEN ALL PARTS

Reducing likelihood, exposure, and severity of crashes requires that all parts of the transportation system be strengthened, so that if one system element fails, the others remain in place to prevent serious or fatal injury. This principle ties directly to the SSA Elements: safer land use, safer roads, safer road users, safer vehicles, safer speeds, and post-crash care.

For example, speeding may be a risk factor when driver operating speeds are too high for the location and type of road use present (e.g., higher pedestrian activity). Strengthening the system could involve multiple layers, including fostering a culture that discourages speeding and reducing posted speed limits based on land use context to prioritize injury minimization. In addition, road users can be educated on why their operating speed matters. Deterrence and enforcement through high visibility or emphasis patrols can be layered on to reinforce the posted speed limit. System owners can implement operational and design changes to the roadway itself to separate users and communicate that lower speeds are more appropriate for the given context or make physical changes to the roadway that reduce speeds. In Figure 8, the yellow line represents a potential serious or fatal injury, and the vertical slices represent how SSA elements work as a system to prevent that outcome.

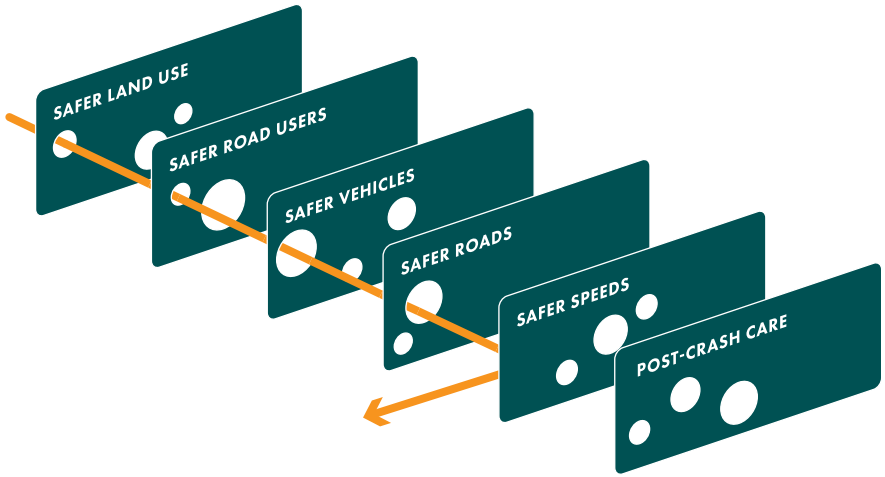


FIGURE 8. THE SAFE SYSTEM APPROACH PREVENTS SERIOUS OR FATAL INJURY EVEN WHEN ONE ELEMENT FAILS

Safe System Approach Elements

The six Washington SSA elements used in Target Zero are described in the following sections.

ELEMENT 1: SAFER LAND USE

When land use and transportation are planned efficiently, the necessities of daily life can be closer together and easier to access, which makes active transportation modes more viable and results in fewer motor vehicle trips. This reduces exposure to crashes, promotes walking and biking, reduces congestion and air pollution, and contributes to a prosocial traffic safety culture. The land use and transportation systems work together to create the network within which people operate and interact with one another and the adjacent land use.

More vehicles within the transportation system results in a greater potential for crashes. Transportation systems like buses, light and heavy rail, and ferries help to reduce exposure by removing vehicles from the system, as does active transportation use. Shortening travel distances overall also reduces exposure, and therefore crashes. Safer land use planning is critical to the safe system as it influences how travel will occur and how attractive the use of transportation modes beyond driving are. To achieve optimal transportation safety for people using all modes, land use planning that prioritizes safety and equitable access to mobility is a fundamental starting point.

Land use decisions determine development within the transportation system, the use of different transportation modes, and how much time and effort each trip will take. Land use decisions should facilitate multimodal trips for all purposes, from the 20% of trips for commute purposes to the other 80% of our trips for activities like getting groceries, taking children to school, going to the park, and participating in community life. Separating pedestrians and cyclists from motor vehicle traffic reduces conflicts and allows people to feel safer. Infrastructure investments and land use policies that address people's perceived safety concerns will increase willingness to use multimodal transportation and in doing so reduce the exposure, likelihood, and severity of crashes.

Such approaches are particularly critical in low-income and other under-invested communities where residents are often more dependent upon lower-cost public transit and active transportation options (walking and rolling) rather than travel by private vehicle. They are essential for non-drivers.

Transportation-efficient locations where many destinations are within close proximity reduce the number and length of trips people need to make. With sufficient density of activity (housing and destinations), roadway infrastructure designs that support active modes and transit access enable mode choices. The associated treatments—e.g., shorter crossings, wide sidewalks, protected bike lanes, etc.—reduce exposure, likelihood, and severity of crashes for all users.

For example, siting primary schools in infill locations (versus greenfield development) makes it easier to provide safe routes to school for students close to housing. While the number and mix of land uses is important in creating vibrant places, the form and scale also matter. Placing limits on block lengths, as was recently codified in the City of Pasco, creates a more favorable environment for pedestrians.[1] Providing housing and services that meet the needs of seniors in locations with frequent and reliable transit service supports their transportation independence as they age out of driving safely.

Infill development in existing urban areas and the creation of town centers all contribute to improving the efficiency of land use and safety. Conversely, greenfield development, especially when it leapfrogs busy roadways, creates unfavorable conditions for people who now must cross busy facilities with high-speed motor vehicles. The potential conflicts are worsened in locations where there is little expectation for the presence of active transportation users. Land use decisions send strong context signals to drivers about what to expect and how to drive to keep everyone safer.

ELEMENT 2: SAFER ROAD USERS

Road user decisions and behaviors fundamentally increase or decrease the likelihood of a crash occurring and the severity of a crash when it occurs. For instance, drivers choosing to drive impaired by substances or drowsy from lack of sleep are less fit to drive, as they have slower reaction times and make poor driving decisions. Another example is road user convenience, which shows up as red light running, speeding, motorcyclists splitting lanes to ride between vehicles, or active transportation users crossing against a Don't Walk traffic signal.

Our safety culture, regulations, and personal values set and define the expectations and boundaries for road user behaviors. These aspects are often articulated and enforced with traffic laws and the "rules of the road."[2] Speeding is one example. Regulatory speed limits should be set based on the context and design of the roadway. However, the speed a driver selects is affected by more than the law. Just like any human behavior, their speed selection is socially influenced and constructed by what is generally deemed acceptable. For example, neighbors may have shared expectations about an "appropriate" safe speed in their communities, while drivers on a freeway may assume everyone around them has shared expectations about the acceptability of exceeding the posted speed limit. Thus, road users may feel a social obligation to abide by these publicly acceptable behaviors in addition to rules determined through traffic laws.

1 City of Pasco, Ordinance No. 4694, Amend PMC Title for Street Connectivity

2 Revised Code of Washington (RCW) 46.61, Rules of the Road.

Strategies with the goal of increasing road user intentions to behave safely include more formal legal and policy approaches, as well as less formal social norms:

- **Traffic Safety Culture:** Strategies to grow a positive traffic safety culture can both encourage safe behaviors and discourage violations. Such strategies may rely on social rewards and sanctions from the groups in the social environment, including peers, families, neighbors, employers, co-workers, and other community members. A prosocial traffic safety culture goes beyond the individual to benefit all.
- **Education:** Driver, motorcyclist, and bicyclist education programs communicate the laws (and norms) that define the standards for safe behavior and the initial development of the skills necessary to practice these safe behaviors. Driver education can also teach skills for road users and prepare them to recognize conditions and scenarios that may pose higher potential for a crash. Public education campaigns—developed and provided in a culturally-relevant manner—help to educate all road users on safe road behaviors. Informally, everyone learns from those around them. Children learn road user behaviors from their parents and other adults by observing them. Employees in businesses and agencies with a fleet may receive training in the workplace. Those operating motorcycles or commercial motor vehicles such as heavy trucks must take additional training to be familiar with the handling characteristics of these vehicles.
- **Enforcement:** Traffic laws support the separation of road users in time and space, providing a level of safety for all road users if people follow the laws. Legal systems communicate the laws associated with safe driving and the penalties for violating these rules. Law enforcement agencies help remind road users of these laws by being visible and present. When necessary, they intervene when road users engage in risky and illegal behaviors. These enforcement functions also deter those who do not come into direct contact with law enforcement. Since sworn officers cannot always be everywhere, automated enforcement systems, when selected and operated responsibly and effectively, can provide a continuous presence to deter behaviors like speeding and red light running.

ELEMENT 3: SAFER VEHICLES

Vehicle design serves multiple goals, including efficiency, comfort, status, recreation, business activity, and safety of those inside the vehicle. Ideally, vehicles are designed and regulated to facilitate safe driving behaviors and minimize the frequency and severity of crashes using safety measures that incorporate the latest technologies. Vehicles with increased mass will increase the magnitude of the transfer of force when a crash occurs. In addition, vehicle designs and related policies can increase the likelihood of a crash occurring and the severity when it does occur:

- **Speed.** Most vehicles sold can travel at speeds well above posted speed limits, and no vehicles currently have standard controls to limit driver speeds based on what is safe or legal.
- **Mass.** While electric vehicles are designed to be more energy efficient and reduce emissions, they are heavier and produce more horsepower and faster acceleration compared to similar gas-powered vehicles. This combination can increase crash forces.

- **Grill Height.** Light duty trucks have become larger over time with a taller box-shaped front grill, making it more difficult for drivers to see objects immediately in front of their vehicle, including young children. When a crash occurs, the vehicle strikes pedestrians or bicyclists higher on their bodies, resulting in head and thoracic injuries that are more serious than a crash involving a vehicle with a low front hood profile. According to an Insurance Institute for Highway Safety (IIHS) review of 18,000 pedestrian deaths, the increased risk of death based upon hood height and shape were:
  - » +26% for a blunt shaped front end (>65 degrees) with a height between 30-40 inches
  - » +45% for hood heights above 40 inches, including sloped (less than 65 degrees) or blunt shapes.[1]
- **Vulnerable User Safety.** Vehicle safety improvements over the past few decades have decreased crash forces for vehicle occupants. However, federal regulations have not prioritized improving safety for people outside the vehicle.
- **Triple-trailers.** Some states outside Washington allow triple-trailers (a large truck with three separate trailers connected) and higher vehicle weight limits. This increases the vehicle mass while decreasing its maneuverability and deceleration, all of which increase crash forces.
- **Inspections.** Washington does not require vehicle inspections, which allows vehicles in poor working order to remain on the road.
- **Motorcycle Design.** Motorcycles can travel at high speeds and offer riders less stability and protection than cars and trucks.

Clearly, there is a need to improve vehicle design features for safety. There are also new technologies being developed that should be standardized across all vehicles, including technology on the horizon to improve pedestrian detection in automatic braking systems, detection systems that can disable the ignition if impairment is detected, and automatic speed limiters that restrict a driver from exceeding posted speeds. Safety ratings should also evolve to holistically consider all aspects of safety for drivers, other vehicle occupants, and all road users who could be exposed to a crash with the vehicle.

While the state's regulations do not include vehicle safety ratings, we do have regulatory powers associated with driver education and license endorsement requirements that could address growing vehicle sizes and unfamiliar technologies. Taxes and fees can also be structured to incentivize the purchase of vehicles that provide greater safety to vehicle occupants, other motorists, and active transportation users.

1 Hu, W., Monfort, S.S., & Cicchino, J.B. (2023). The association between passenger-vehicle front-end profiles and pedestrian injury severity in motor vehicle crashes. Insurance Institute for Highway Safety.

ELEMENT 4: SAFER ROADS

In the safe system, roadways are designed to reduce conflicts among all road users, including people driving personal and commercial vehicles, transit operators, pedestrians, and bicyclists. Because conflicts cannot be eliminated completely, designing transportation infrastructure to accommodate human mistakes and injury tolerances can reduce the severity of crashes that do occur. Examples include physically separating people using different modes and traveling at different speeds, providing dedicated times for different users to move through a location, and alerting users to objects, encroaching vehicles, and other road users.

Washington introduced the Safe System Hierarchy of Controls in 2019, a framework prioritizing policies and countermeasures based on their effectiveness. This structure guides WSDOT in design and operational decision-making, supporting the Complete Streets approach and evaluating roadways using the Level of Traffic Stress (LTS) index, which measures factors like roadway width, speed, and traffic volume. In 2024, the Federal Highway Administration (FHWA) adapted this approach into the Safe System Roadway Design Hierarchy, emphasizing physical changes to the road system to enhance safety.[1]

Safety professionals identify, prioritize, implement, and evaluate safety projects, strategies, and countermeasures on the roadway to encourage safe road use. Self-explaining and self-enforcing roadway designs encourage this safe behavior, reducing the potential for fatal or serious injury crashes.

Roundabouts are a good example of self-explaining designs that reduce exposure to crashes by dramatically decreasing the number and type of road user conflicts; reducing the impact angle of vehicles; lowering drivers' operating speeds in the intersection; guiding traffic from all directions in a circular path; and separating traffic by designating travel lanes. Roundabouts also make crossing distances shorter for those walking and biking. Those designed with a divider between directions at the crossing point enable pedestrians to cross only one vehicle travel direction at a time.

1 See Figure 12 on page 80 and Figure 13 on page 81 for more information.

ELEMENT 5: SAFER SPEEDS

Reducing driver speeds can support the Safe System Approach in three ways: expanding drivers' field of vision, providing additional time and space for drivers to stop, and reducing impact forces. As speed increases, so does the likelihood of a crash occurring because drivers experience a narrowing of vision, increased response times, and longer stopping distances. Additionally, as the driver's speed increases, all other users who interact with that driver are less able to judge or react.

Planners and engineers communicate target speeds to drivers by selecting and modifying roadway conditions, setting posted speed limits, and designing the look and feel of the roadway's cross section to provide cues for appropriate speeds. Safer speeds are further supported by land use context and communication of regulatory speed limits through signing, driver education, social norms, legal standards, and enforcement. By implementing safe system solutions for safer roads and safer speeds, professionals can reduce both the likelihood that crashes occur and the severity of injury outcomes when they do.

> Increased driver speed dramatically increases the force of a crash.
>
> At 23 mph, 90% of pedestrians will survive a vehicle crash. That drops to a 50% survival rate at 42 mph.
>
> —*USDOT National Roadway Safety Strategy, 2023*

ELEMENT 6: POST-CRASH CARE

Timely and appropriate emergency medical response to traffic crashes saves lives and reduces the severity of injury outcomes. Nearly 40% of all deaths from roadway crashes did not occur at the crash scene. Many trauma-related deaths are preventable with timely access to effective, organized emergency medical services and trauma care systems. People who are injured in crashes rely on first responders to quickly locate and stabilize their injuries and transport them to medical facilities. Post-crash care also includes forensic analysis at the crash site, traffic incident management, and other activities.

CHAPTER 2

Current Conditions

CHAPTER 2

Current Conditions

2.1 CRASH DATA COLLECTION

The Target Zero Plan was developed using the best available safety data to identify potential emphasis areas and safety improvement opportunities for all public roads in Washington, with an understanding that not all crash events are reported. Therefore, we use the collision database as an imperfect representative sample of crash history. Emphasis Areas were determined from an analysis of 2020-2022 Washington crash data, a comparison of those three years to the previous three-year period (2017-2019), and incorporation of inputs from engagement activities.

ANSI D16.1-2017[1] and MMUCC 6th Edition[2] provide guidelines for standard reporting of motor vehicle crashes in the U.S. In Washington, WAC 446-85-010 (reporting threshold), RCW 46.52.030 vehicle owner and RCW 46.52.070 (police officer reports) add requirements. To meet these reporting criteria, a motor vehicle crash must:

1. Have property damage of at least $1000 or injury of any individual;
2. Be on a public roadway;
3. Involve at least one motorized vehicle; and
4. Not involve an intentional act, a legal intervention, or be medically caused.

Crash data are collected from law enforcement by the Washington State Patrol (WSP) and managed by the WTSC and WSDOT. The data from WTSC focuses on fatal crashes and individuals in these crashes while the WSDOT crash data is enhanced with additional data and covers all reported motor vehicle crashes on public roadways in the state.

Practitioners often use these datasets to determine where, how, and why crashes are happening and what approaches may reduce the potential of crashes happening in the future. WSP, WTSC, and WSDOT provide summaries of the data through online portals:

- WSP Collision Analysis Tool. The collision analysis database stores collision data submitted by law enforcement officers. The web page allows citizens and law enforcement agencies to perform queries and produce reports on collision data within their jurisdiction.
- WTSC Crash Data Dashboards. WTSC maintains crash-level and person-level data for all fatal crashes involving a motor vehicle in Washington. These include official state data reported to the National Highway Traffic Safety Administration (NHTSA) under the Fatality Analysis Reporting System (FARS). Separate dashboards are available by demographics, road user behavior, location, and road type.
- WSDOT Crash Data Portal. This data portal includes high-level and basic summarized crash data of all injury types for members of the public and WSDOT personnel, consultants, and partners.

A fatal crash is a crash within which the most severe injury was a death within 30 days of the crash because of injuries sustained during the crash. A serious injury crash is a crash which included bodily injuries such as broken bones; serious lacerations; crush injuries; suspected injuries to the skull, chest, or abdomen; or significant burns.

1 Manual on Classification of Motor Vehicle Traffic Accidents, 2017. 8th Edition

2 Model Minimum Uniform Crash Criteria 5th Edition

2.2 COMMUNITY AND LOCAL AGENCY ENGAGEMENT

Transportation leaders are working to align planning and goals for traffic safety with community goals, values, and input. A key success factor in that effort includes engaging directly with community members to ask about their traffic safety concerns and what they feel is important, especially those disproportionately affected by traffic crashes. Robust roadway safety engagement supports projects and strategies that address community needs, especially those that include considerations for differences across cultures. Addressing critical gaps increases equitable outcomes while also building sustainable, inclusive infrastructure, programs, and services that meet the safety needs of all communities.

This Target Zero effort included engagement with traditional roadway safety partners, influencer (non-traditional) safety partners, and the public. Activities included engaging with people who are at a greater likelihood for serious injury and death in traffic crashes and who are most affected by under-investments in traffic safety systems. The team identified Yakima County and South King County as priority geographic areas, given crash history and equity-related data. Alongside intercept surveys at community events and an online survey in these regions, the consultant team hosted facilitated listening sessions with community-based organizations (CBOs) that serve those communities. The team also hosted facilitated listening sessions with Tribal representatives from around the state (more information below); the purpose was to better understand what they felt was important to address with road safety challenges, to hear concerns, and to invite their recommendations. The Washington Traffic Safety Commission also conducted a large-scale, statewide traffic safety survey.

In addition, listening sessions were held with local agencies and regional and metropolitan transportation planning organizations.

Target Zero Foundations Workshop

Recognizing that developing the 2024 Target Zero Plan required a departure from the strategies that have become standard in the industry, safety leaders took a significant and crucial early step of bringing together transportation industry leaders, advocates, sponsors, and community organizations for a two-day workshop aimed to align plan authors with shared language, embed shared values within decision-making conversations, and increase readiness for framing and developing the plan.

The Foundations Workshop was held September 26-27, 2023, at St. Martin's University in Lacey, WA, and included a virtual option for those who could not participate in person. Designed to increase collaboration and commitment among traffic safety partners and networks to achieve zero traffic fatalities and serious injuries, the workshop blended essential elements of the Safe System Approach, prosocial traffic safety culture, and an equity framework.

The planning team carefully considered the individuals, advocates, and organizations that should attend, emphasizing collaboration and long-term participation over token involvement. They thoughtfully explored the incorporation of equity principles, meaningful inclusion of community voice, and planned for balance between education, advocacy, and relationship development to reach the objectives over the two-day workshop. The team sent an online survey to invitees in advance of the workshop to tap into partner insights, ensuring the workshop content resonated with the diverse perspectives it sought to represent.

The planning team shaped workshop activities to guide participants through processes that encouraged them to question commonly accepted truths and traditionally held assumptions, and explore new frames for thinking about problems, solutions, and goals.

One workshop exercise included participants identifying system-level challenges and possible actions to overcome those challenges. The challenges identified were:

1. Political climate and policymakers' willingness to make change, especially for potentially unpopular policies.
2. Buy-in at all levels within partner organizations that is needed to support Target Zero and enable the Safe System Approach.
3. Community readiness to change and accept the kind of system needed to achieve Target Zero.

The Foundations Workshop was a critical first step in the plan update, fostering collaboration, innovative thinking, and a commitment to a safer transportation system. The focus was on embracing innovative approaches in our commitment to achieve zero traffic fatalities and serious injuries. Attendees recognized the importance of navigating uncharted territory, particularly in the realm of equity and outreach in strategic highway safety planning. The desire for a "different" plan resonated throughout the conversations, as did the positive response to the inclusion of equity and community sections, underscoring a commitment to a safer, more inclusive transportation system.

King County and Yakima County Surveys

The team identified Yakima County and South King County as priority geographic areas given crash history and demographic disparities. Intercept surveys were conducted in the fall of 2023 at two sites in King County and two in Yakima County. King County surveys were conducted in person at a Kent Community Safety event and in the Skyway neighborhood at a Renton Avenue South community event. Yakima County sites included the Central Washington State Fair and the Yakima Training Center Fall Festival. Survey staff conducted surveys in English and Spanish in Skyway and at both Yakima County events. People were asked to respond to several traffic safety questions. When people named their top three roadway safety concerns, speeding, aggressive or reckless driving, and unsafe roads each made up about 20% of the responses. Distracted driving and lack of pedestrian or biking infrastructure each made up 13% of responses. Uneducated drivers, drivers impaired by alcohol and/or drugs, and lack of enforcement together made up about 10% of responses.

The survey asked people to choose the two factors that may lead to serious crashes they were most concerned about from a list that included speeding, alcohol or drug-impaired driving, aggressive or reckless driving, other, or none of these. 56% of respondents chose distracted driving, 53% chose aggressive or reckless driving, 43% selected alcohol or drug-impaired driving, and 35% selected speeding.

This table summarizes some of the responses related to enforcement activities:

ENFORCEMENT STRATEGY	SUPPORT	DO NOT SUPPORT	DO NOT CARE
DRIVING UNDER THE INFLUENCE PATROLS	94%	4%	2%
SPEED PATROLS	89%	6%	4%
SEAT BELT PATROLS	88%	5%	7%
DISTRACTED DRIVING PATROLS	76%	10%	14%
RED LIGHT SAFETY CAMERAS	76%	17%	6%
SPEED SAFETY CAMERAS	71%	20%	9%

Among 80 people who responded to questions about what is not working, 59 (74%) of responses were related to enforcement. Respondents said there are not enough patrols, or that the police who are out are not stopping people. They said the penalties for traffic violations were not harsh enough and police are busy with “more serious crimes.” Several described the police as not having the support or the staffing levels needed to properly enforce traffic violations. Some described traffic and red-light cameras as ineffective. Others said there are not enough traffic cameras and red-light cameras.

Community-Based Organizations

To learn more about community priorities and perspectives related to improving traffic safety outcomes, the project team organized several listening sessions for community-based organization (CBO) representatives (three in October 2023, two in April 2024). Notes from those sessions were shared with the participants to confirm they had been clearly heard, along with information about how their participation affected the Target Zero Plan's content. Because the data indicated disproportionate crash outcomes for some racial groups, priority audiences included people of color, people who use Spanish as one of their primary languages, and people who use languages other than English and Spanish. Other focus areas included people with disabilities, people who live in rural areas, people with low incomes, and drivers aged 16-30 years old. Common themes and topics included the following:

- Engaging youth in the process, this may include youth ambassador programs, stipends for participation in traffic safety programs, ongoing training opportunities for safe driving behavior, and youth-focused listening sessions.
- Increasing the language accessibility of essential safety signage. Many people in the state speak Spanish or other languages, so translating signs and other key messages can support safe travel for those who do not use English.
- Providing transit access and safety improvements, including efforts to improve personal safety on public transit.

- Expanding passenger train frequency and speed to reduce traffic loads on major interstates. Improve transit awareness with additional advertisement opportunities designed to promote use.
- Maintaining facilities and providing paths for active transportation users. Lack of upkeep poses challenges for individuals who rely on walking, cycling, or using mobility devices during travel.
- Increasing enforcement for unsafe driver behaviors, including speeding and impairment; coupled with a clear and community-informed definition of safety. Ideas included studying and implementing passive enforcement (e.g., speed feedback signs, empty police vehicle to deter speeding), active enforcement (with a caveat about understanding the potential for negative interactions with police, especially for people of color), and automated enforcement (e.g., red light or speed cameras).

2.2 Community and Local Agency Engagement

- Designing safer roads, like narrow lanes that require drivers to proceed slowly and cautiously.
- Providing ongoing driver education, including roadway elements like roundabouts and the potential safety implications of driving a large SUV or pickup truck.
- Sharing the road among all users, including people who bicycle and use mobility devices. Lack of sidewalks or shoulders in rural areas introduces potential for crashes for those who use active transportation modes.
- Making safety improvements in areas with high freight traffic, with the installation of additional signing and intersection controls at state highways to provide better and safer connectivity between communities for pedestrians, bicyclists, and rollers. Additionally, updating policies and permits for freight traffic regarding noise controls, air pollution, and loading and unloading zones.
- Updating policies to include developer responsibility in improving traffic safety at the time of development.
- Increasing traffic safety campaigns among all community groups to eliminate disparities in traffic injuries and fatalities.
- Engaging with rideshare providers. These efforts should be led at the community level in languages those communities use.
- Cultivating relationships with vehicle manufactures to ensure human safety and vehicle design are leading to the innovation and design of new vehicles.

Tribal Representation

As part of the Target Zero plan update, WTSC and WSDOT are investing in relationships with Tribes to understand how to better engage and support them, especially in those geographies where they are disproportionately adversely impacted by traffic safety. This includes WSDOT and WTSC participation in Tribal-led traffic safety efforts, including the Yakama Nation Tribal Traffic Safety Committee (TTSC). WTSC and WSDOT also participate also participates in the steering committee for the Northwest Tribal Technical Assistance Program (NW TTAP) and the WA Tribal Transportation Planning Organization (TTPO). The NW TTAP provides free training, technical assistance, and technology transfer to support Tribal transportation programs. WSDOT and WTSC Tribal liaisons also attend the annual Elected Tribal Official Academy Tribal Liaison meeting where all 29 federally recognized Tribes have representatives.

WTSC and WSDOT identified American Indian and Alaska Native people and Tribal lands as a particular safety focus due to overrepresentation found in the reported crash history within and around those sovereign lands. American Indian and Alaska Native people are the most over-represented groups in traffic fatalities relative to their numbers in the general population. The project team engaged Tribal Nations and communities and people within those geographies. In two Tribal listening sessions (October 2023 and March 2024) and other contacts, Tribal representatives provided valuable input. Notes from those sessions were shared with the participants to confirm they had been clearly heard, along with information about how their participation affected the Target Zero Plan's content.

Feedback from Tribal representatives included the following:

- Identifying concerns about the accuracy of the data about personal injuries and fatalities incurred in roadway crashes.
- Suggesting improved communication between state and Tribal enforcement to have equal accountability and clarity in traffic crash and infraction reporting.
- Requesting additional care be taken regarding the communication of fatalities and serious injuries on Tribal lands, given the personal and traumatic nature of these events. Identifying traffic deaths as “dots on a map” depersonalizes and disrespects the people who were killed.
- Expressing concerns about the plan name and approach, “Target Zero,” given the reality of increased roadway crashes in recent years.
- Addressing driver behavior issues, including impairment, speeding, and a concern that lack of seat belt use is becoming an issue again.
- Highlighting the need for increased infrastructure development specifically with the addition of crosswalks, improved lighting, and bike paths.
- Noting the need to align transportation safety improvements with Tribal growth through education and mitigation planning.
- Requesting equal transportation infrastructure investment and maintenance in Tribal areas while sharing stories about the current lack of investment.
- Identifying the need to increase availability of driver education programs for all age groups.
- Addressing specific issues on reservations, including the ramification of freeway crashes resulting in increased traffic on Tribal roads that are not designed or operated for this detour.
- Requesting collaborative decision making among jurisdictions that includes Tribal leaders. Many rural Tribal members are often pedestrians bicycle users, and horse riders, while most infrastructure projects in long-range plans are focused on drivers.

Statewide Traffic Safety Survey

The Washington Traffic Safety Survey was a large-scale statewide data collection and analytical effort in 2023 to help gain actionable information to inform WTSC's mission to reduce traffic fatalities and serious injuries within the state. The research team collected more than 10,000 completed surveys by adults 18+ living in Washington through both mail and online modes. Respondents included participation from all counties in Washington and all 17 Target Zero regions.[1]

The survey was developed to collect opinions and experiences about traffic safety in Washington. Questions ranged widely among topics, including those shown in **Figure 9**. The analysis of the survey indicated that people felt safest using public transportation and least safe walking, jogging, or riding a bicycle on public roads. These results highlight the need to focus the safety plans on vulnerable road users to ensure they feel safe to use public roads. Most people agreed that zero deaths and serious injuries is the only acceptable goal for Washington public roads. This is a strong positive norm that can support innovative traffic safety plans to support Target Zero.

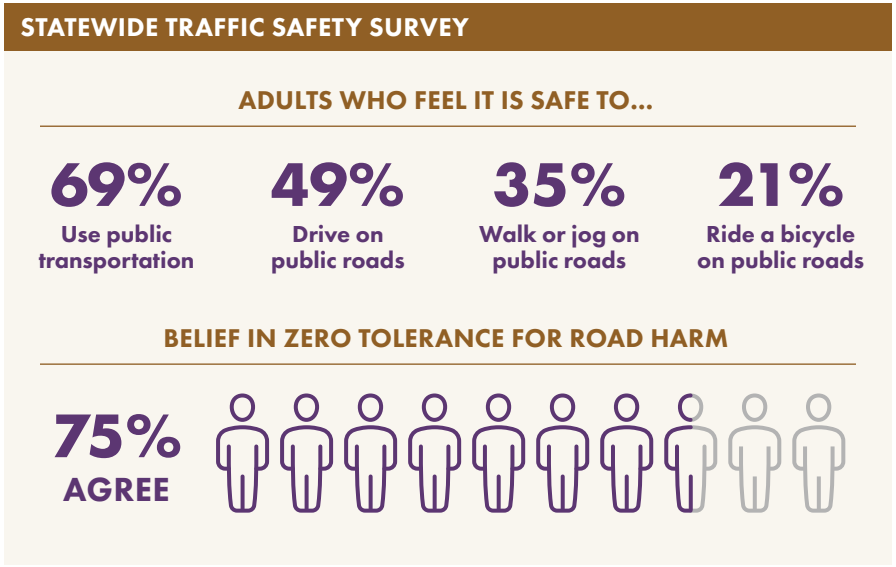


FIGURE 9. SAMPLE SURVEY RESULTS, STATEWIDE TRAFFIC SAFETY SURVEY, 2023[2]

Risky Driving Behaviors. An important part of traffic safety culture is our perception of behaviors by people important to us in our social environment. The survey indicated that most people (86%) believed others disapproved of them engaging in risky driving behaviors such as speeding, driving distracted, driving without a seat belt, or driving impaired by alcohol and/or drugs. Moreover, the more people believed people important to them disapproved of risky behaviors, the less likely they themselves were to report engaging in those risky behaviors or being involved in at-fault crashes.

1 WA Traffic Safety Survey Methodological Plan, Market Decisions Research, 2023.

2 Respondents were asked, "How dangerous do you feel it is to..." and provided the following options: *Not at all dangerous, Slightly dangerous, Moderately dangerous, Very dangerous, Extremely dangerous.*

Prosocial Behaviors. Most strategies try to change the risky behavior of individuals, but survey results indicated that most people in Washington do not frequently engage in risky behaviors. Most people behave in ways that support safety. This is a strength we can use to encourage the minority of people engaging in risky behaviors to be safer. These strategies encourage people in important social groups to take actions to encourage safer behaviors. These "prosocial" behaviors are intended to benefit others in our social environment. This includes people who do not have traditional traffic safety roles. Examples of prosocial behaviors to improve traffic safety are encouraging passengers to ask the driver to wear their seat belt, friends encouraging each other to not speed, and families creating rules to turn off the cellphone while driving. The survey showed that most people in Washington (92%) are comfortable taking prosocial actions that help others be safer. This suggests there is a strong foundation for supporting strategies that encourage prosocial behaviors to encourage the minority of people in our social environment who are engaging in risky behaviors to drive more safely.

Traffic Safety Culture Strategies. Strategies based on traffic safety culture measure the existing culture to determine which cultural beliefs influence the behavior we want to change. For example, survey results indicated that people who reported speeding more regularly believed it was more common, assumed it to be less dangerous, and perceived less social disapproval from important others. This suggests that the intention to speed could be reduced in several ways:

- **Attitude.** Describe the dangers of speeding
- **Social Support Norm.** Demonstrate social disapproval by the social groups the audience identifies with strongly
- **Perceived Norm.** Dispel the mistaken belief that risky behavior is common

For example, while only a small percentage of people (17%) reported speeding often or regularly, the perception was that most people (50%+) were frequently speeding more than 30% of the time.

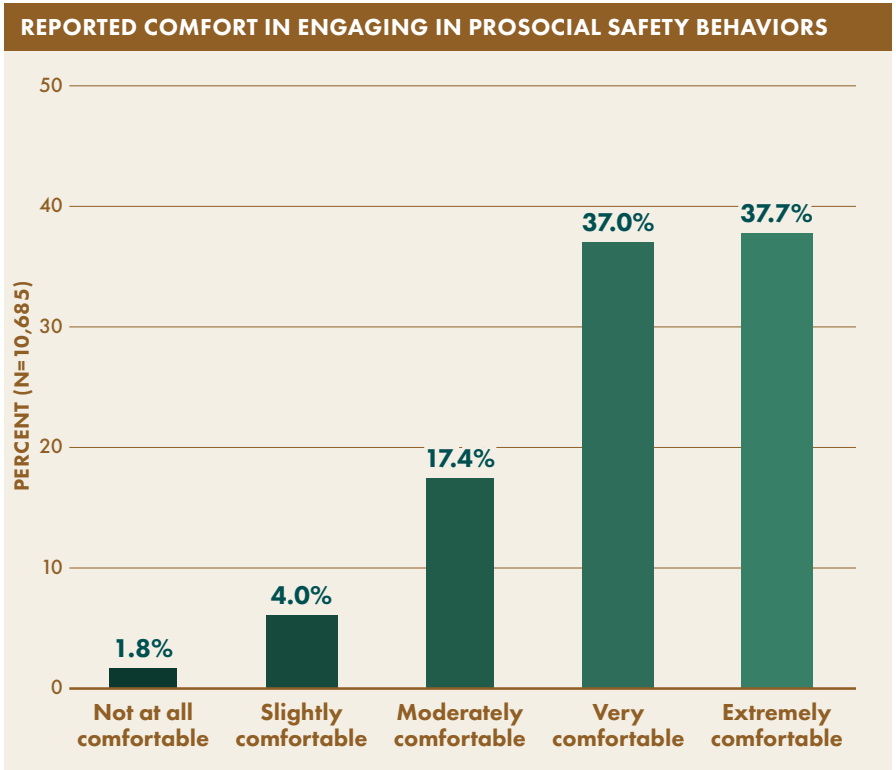


FIGURE 10. REPORTED COMFORT IN ENGAGING IN PROSOCIAL TRAFFIC SAFETY CULTURE BEHAVIORS

Local and Regional Agency Consultation

WTSC and WSDOT staff and consultant team members consulted with partners at the following additional events throughout the development of the Target Zero Plan:

Washington Transportation Professional Forum is a group of practitioners that includes more than 1,000 individuals from Washington's cities, counties, Tribes, regional planning organizations, consultants, vendors, nonprofits, and other organizations. With meetings facilitated by WSDOT, its purpose is to discuss local agency transportation issues of statewide significance.

On April 30, 2024, WTSC, WSDOT, and FHWA staff presented to 273 forum attendees, sharing the status of the Target Zero Plan update, the Rail-Highway Crossing Safety Program call for projects, and the Safe Streets and Roads for All grant program. During the presentation, participants were asked to complete a questionnaire about their use of the Target Zero Plan and recommendations for the update. Results of the questionnaire included the following feedback:

- 44% reported never using the Target Zero Plan. Most who reported using it do so most commonly when working on a project proposal or funding request.
- Suggested improvements for the 2024 update included the following:
  - *"Make the recommendation section more prominent."*
  - *"Categorize countermeasures by user type."*
  - *"Reduce length."*
  - *"Work toward realistic goals. Zero fatalities goal is impossible to meet."*
  - *"Speak to the life cycle cost of safety enhancements so policy makers understand the cost associated with operations and maintenance."*

MPO/RTPO/WSDOT Coordination Committee Meeting, May 14, 2024. WTSC presented the Target Zero Plan activities to date to regional planning organization leaders, solicited feedback during the meeting, and invited additional feedback through the review process.

Washington State Association of County Engineers, June 26, 2024. WSDOT shared the Target Zero update process with 40+ county engineers and staff. He described changes to the document and emphasis areas, the Safe System Approach, the Vulnerable Road User Safety Assessment and how that data is being used, and grant funding opportunities for local agencies. The session included questions from county staff about the data trends and the updates to the plan.

SHSP Update Webinars and Office Hours (June, July, August 2024). As part of the pre-public draft review and public draft review, WTSC, WSDOT, and consultant team staff hosted three 2-hour listening sessions in the form of virtual office hours. Each included a short presentation and open question-and-answer session.

2.3 EMPHASIS AREAS SELECTION

Findings from analysis of crash data, the statewide attitudinal survey of drivers, and discussions with the public at events, community-based organizations, Tribal representatives, and local and regional agencies led to the primary areas of emphasis for the 2024 SHSP.

One way to analyze crashes that result in fatalities and serious injuries is to categorize them by different attributes. These can include road user behaviors, age, vehicle types, and location type. To support the selection of emphasis areas for this Target Zero Plan, the team studied the most common attributes in the three-year period (2020-2022) and the change over time between the 2017-2019 period and 2020-2022 period.

Proportions. Identify the attributes most common to fatal and serious injury crashes, to identify overrepresentation of certain location types, behaviors, and road users that can be feasibly addressed during the life of this Target Zero Plan. **Table 3** shows the attributes selected as the Target Zero emphasis areas, organized by category..

Trends. Systems thinking includes analysis of trends in system performance over time, such as the percentage change in fatalities and serious injuries between two time periods (2017-19 vs 2020-22).

TABLE 3. TARGET ZERO EMPHASIS AREAS

EMPHASIS AREA	FATALITIES 2020-22	FATALITY PROPORTION	CHANGE IN AVERAGE FATALITIES: 2017-19 TO 2020-22	SERIOUS INJURIES 2020-22	SERIOUS INJURIES PROPORTION	CHANGE IN AVERAGE SERIOUS INJURIES: 2017-19 TO 2020-22
ALL AREAS	1,991	100%	+21%	8,440	100%	+26%
HIGH RISK BEHAVIOR						
IMPAIRMENT INVOLVED	1,188	60%	+29%	1,928	23%	+40%
SPEEDING	633	32%	+25%	2,090	25%	+33%
UNRESTRAINED OCCUPANT	417	21%	+31%	978	12%	+48%
DISTRACTED ROAD USER	347	17%	-17%	1,525	18%	-19%
CRASH TYPE / LOCATION						
LANE DEPARTURE	877	44%	+10%	3,363	40%	+35%
INTERSECTION RELATED	472	24%	+33%	2,822	33%	+23%
ROAD USERS BY AGE						
YOUNG DRIVER (15-24) INVOLVED	519	26%	+23%	2,419	29%	+27%
OLDER DRIVER (70+) INVOLVED	251	13%	+11%	838	10%	+26%
ROAD USERS BY MODE OF TRAVEL						
ACTIVE TRANSPORTATION USERS	428	21%	+19%	1,456	17%	+2%
MOTORCYCLISTS	318	16%	+25%	1,440	17%	+18%
HEAVY VEHICLE INVOLVED	255	13%	+10%	506	6%	+17%

For updates to fatalities after 2022, refer to the WTSC Fatalities Dashboard. For updates to serious injuries after 2022, refer to WSDOT Crash Data Portal.

Attributes are not mutually exclusive, resulting in the sum of each column being greater than the total number or percentage.

To further describe the data above, the following are data definitions, additional information, and subsets of the emphasis area data. Detailed definitions are available on the Target Zero Performance Dashboard.

Additional information regarding data sources and analysis considerations are included in **Appendix C**. In some cases, the fatality and serious injury definitions are not identical because coding criteria differ between crash databases.

Impairment Involved is defined slightly differently for fatalities and serious injuries.

Fatalities: A driver, pedestrian, or bicyclist with a Blood Alcohol Concentration (BAC) of 0.08 or higher or positive for an impairing drug as confirmed by the state toxicology laboratory, or reported as impaired by alcohol or drugs by investigating law enforcement.

Serious Injuries: Any driver, pedestrian, or bicyclist for whom the investigating officer indicated that the person was impaired by drugs or alcohol and reported in contributing circumstances or unit impairment fields on the Police Traffic Collision Report (PTCR). Note that road users who are seriously injured are rarely tested for BAC or drugs.

This emphasis area includes all modes. For example, of the 1,188 fatalities that occurred in crashes involving impairment by any road user (motor vehicle driver, pedestrian, bicyclist, etc.), 1,012 (85%) involved an impaired motor vehicle driver.

Distracted Road Users. Distraction includes a long list of items, including but not limited to other occupants, a moving object in the vehicle, eating or drinking, or using portable electronic devices.

This is a contributing factor that can be difficult to capture, since law enforcement complete reports after the crash event occurred. Due to a coding change in the PTCR in 2020 related to distracted driving, WTSC studied the effects of that change, promotion of the Driving Under the Influence of Electronics (E-DUI) Act, and other factors on the Distracted Road User Involved data. Researchers discovered that the discontinuation of the "inattention" code in the PTCR correlated with use of "other distractions" and "unknown distraction" increased at the same rate, essentially replacing that code. In addition, use of the specified distraction codes also increased—most notably cell phone use and distractions outside the vehicle.[1]

> Roadway design, pedestrian and bike infrastructure, and roadway maintenance came up again and again in both the in-person and online outreach as ways to increase safety and demonstrate investment in rural communities, communities of color, and low-income communities.

Speeding Drivers. Speeding is defined as exceeding the posted speed limit or driving too fast for conditions at the time of the collision as indicated by the investigating officer. The majority of speeding drivers are reported as driving too fast for conditions.

1 Hoff, S. Distracted Driving in Washington State During COVID-19: 2020 Observation Survey, Enforcement, and Crashes, WTSC, 2021.

Unrestrained Occupants. A fatally or seriously injured driver or passenger of a passenger vehicle (excluding limousines, motorcycles, three-wheel automobiles, motorhomes, school and transit buses, and medium/heavy trucks used to haul trailers) who was either not restrained or improperly restrained at the time of the crash.

Young Driver (ages 15-24) Involved. Defined as a fatal or serious injury crash that includes a young driver involved, but that does not necessarily indicate the young driver caused the crash or was the fatally or seriously injured person in the crash (see **Appendix C**). This group of motor vehicle drivers and can be further broken down into subgroups.

- *15-17-year-old drivers involved:* 5% of fatalities and a 116% increase from 2017-19
- *18-20-year-old drivers involved:* 9% of fatalities and a 21% increase from 2017-19
- *21-24-year-old drivers involved:* 14% of fatalities and an 11% increase from 2017-19

Older Driver (ages 70+) Involved.[1] Defined as a fatal or serious injury crash that involves an older driver, but that does not necessarily indicate they older driver caused the crash or was the fatally or seriously injured person (see **Appendix C**). This group of motor vehicle drivers can be further broken down into subgroups.

- *70-79-year-old drivers involved:* 8% of fatalities and a 12% increase from 2017-19
- *80+ year-old drivers involved:* 9% of fatalities and a 34% increase from 2017-19

Motorcyclist Fatalities and Serious Injuries. Different from the "involved" definitions for some other emphasis areas, this includes only the number of motorcyclists (drivers or passengers) who were themselves killed or seriously injured.

Active Transportation User Fatalities and Serious Injuries. Different from the "involved" definitions for some other emphasis areas, this includes only the number of active transportation users who were killed or seriously injured in a crash involving a motor vehicle. Active transportation users are people who use a human-scale and often human-powered means of travel to get from one place to another. Active transportation includes walking, bicycling, using a mobility assistive or adaptive device such as a wheelchair or walker, using micromobility devices such as skateboards, and using electric-assist devices such as e-bikes and e-foot scooters.

Heavy Vehicle Involved. This attribute is based on vehicle type and weight, independent of whether or not the vehicle is a commercial vehicle, although many heavy vehicles are also commercial vehicles. See **Appendix C** for more information.

Intersection Related. Reported as at intersection and related; intersection-related but not at intersection; at driveway within major intersection; entering roundabout; circulating roundabout; exiting roundabout; roundabout related but not at roundabout; or traffic calming circle.

Lane Departure. Includes both run-off-road and opposite direction crashes (excluding wrong-way crashes).

1 Washington uses this age range based on an analysis of crash history. Strategies provided in this plan are consistent with those drivers and pedestrians older than 65 identified in 23 U.S.C. 148(g)(2), Highway Safety Improvement Program Special Rules.

CHAPTER 3

Emphasis Areas and Countermeasures

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Emphasis Areas and Countermeasures

3.1 INTEGRATING THE SSA ELEMENTS: STRENGTHEN ALL PARTS

Systems thinking leads to system-based solutions by:

1. analyzing transportation safety trends,
2. assessing the influence from interacting system elements, and
3. adjusting as needed to support system goals.

For the Target Zero Plan, the foundation for successful outcomes begins with data-informed approaches to identify and better understand the contributing factors to fatal and serious injury crashes. We apply the results to determine appropriate strategies to improve the safety outcomes.

This safety management process has resulted in a set of SSA-aligned strategies to address the emphasis areas, which represent different layers of safety countermeasures being taken. For example, as driver speed and vehicle size increase, so do the severity of crashes, leading to more serious injuries. Countermeasures to address this include federal and state legislation changes, roadway design changes, additional emphasis patrols, regulation of vehicle size and features, driver training and licensing, enhanced emergency services planning, and public service campaigns educating road users about safe behaviors.

All Target Zero emphasis areas can be addressed by multiple types of strategies, and no emphasis area can be completely addressed by any one SSA element alone. This integrated approach is vital because of the complex nature of roadway safety. In the Safe System Approach, the elements come together to form a single interdependent system. Changes to one of these elements (i.e., sub-systems) can affect others, and these interactions are important to understand.

Past and present decisions and actions at the system level can (1) create conditions that prompt unsafe acts, and (2) produce weak defenses against crashes and injury outcomes. Here is a hypothetical example of how these factors can converge:

> A truck driver, driving after a sleepless night, crashed while driving too fast for road conditions (driver error) after a recent snowfall on a rural highway. The driver's speed was motivated by the long-standing company policy to give financial bonuses for on-time or early delivery. The unplowed and unsanded winter road conditions resulted in part from the budgetary decision made the previous year to reduce funding for winter maintenance services.

While the final critical action in the crash causal chain was the driver's, it took place within a broader transportation system the driver does not control. Our truck driver's experience demonstrates that decisions and actions by safety partners and influencers in the past can result in the potential for a future crash. In this case, the crash occurred because the fatigued driver's speeding (individual action) occurred within a weakened system caused by the bonus policy (private company) and budgetary decision (policymakers). Our shared responsibility is to make decisions and take actions that create a system that has adequate defenses to prevent harm.

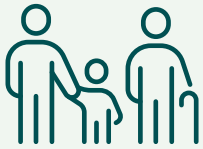
3.2 EMPHASIS AREA CATEGORIES

The emphasis areas are categorized into four groups: *High Risk Behavior*, *Crash Type/Location*, *Road Users by Age Group*, and *Road Users by Mode of Travel*. Neither the categorized groups nor the emphasis areas themselves are mutually exclusive. Safety is a complex system where strategies to address each emphasis area also affect other areas. Each emphasis area chapter includes an introductory description and crash history trends, along with some key issues for that topic. The chapter then focuses on priority strategies to address the data-informed safety characteristics and contributing factors.

EMPHASIS AREA CATEGORIES

HIGH RISK BEHAVIOR

CRASH TYPE / LOCATION



ROAD USERS BY AGE GROUP

ROAD USERS BY MODE OF TRAVEL

Strategies in this section range from short-term (e.g., high visibility enforcement of existing traffic safety laws, curve warning signs) to long-term (e.g., roundabout installations, support for speed limiters as standard equipment on motor vehicles). During the life of this plan, efforts will further refine and prioritize projects and strategies by location, implement those treatments, and evaluate their effectiveness.

3.3 HIGH RISK BEHAVIOR

IMPAIRMENT • SPEEDING • DISTRACTION • UNRESTRAINED OCCUPANTS

Human behaviors are a factor in most fatal and serious injury crashes. In fact, more than three-quarters of fatalities in Washington involve one or more of the "fatal four" road user behaviors: impairment by alcohol and/or drugs, speeding, lack of restraints (seat belts and child passenger seats), and/or distraction. Getting to zero fatalities and serious injuries will require a change in behaviors through education and enforcement, and by minimizing the effects of these behaviors through infrastructure projects. It also requires systems thinking, which can include letting go of judgment around these behaviors as only personal failings. Thinking upstream about root causes, and about transportation as a single system within a complex system of community life, can help us implement the Safe System Approach related to behavior.

This section evaluates which behaviors are likely to result in fatal and serious injury crashes, and how to address those behaviors and their effects to get to Target Zero.

The Washington Traffic Safety Commission's Together We Get There public education campaign encourages prosocial traffic safety culture and safe road user behaviors. Public service announcements have been created and broadcast to target specific audiences that may engage in higher risk behaviors or be disproportionately affected by traffic crashes.

IMPAIRMENT

Drugs like alcohol, cannabis, opioids (including fentanyl), benzodiazepines, and others affect a person's central nervous system, which in turn impairs cognition, judgment, vision, balance, reflexes, and gross and fine motor control. When these essential faculties are degraded, a person's ability to drive safely is significantly reduced. Impaired drivers are less able to moderate speed, maintain vehicle direction within lanes and roadways, and react appropriately to traffic conditions and emergency situations. Impaired road users may be struggling with addiction, emotional trauma, or other issues that lead to driving under the influence. Someone who is impaired is at high risk of taking unsafe actions. Impaired road users may travel in lanes improperly, depart from appropriate travel lanes or pathways, and fail to yield the right-of-way at signals or intersections. Due to the cognitive impairment that results from alcohol and/or drug use, drivers who are impaired are also more likely to engage in other high-risk behaviors, including speeding and lack of seat belt use.

RCW 46.61.502 states that a person is guilty of driving while under the influence of intoxicating liquor, cannabis, or any drug when:

- The person has a blood alcohol concentration of 0.08 % or higher within two hours of driving;
- The person has a blood THC concentration of 5.00 ng/mL or higher within two hours of driving;
- The person is under the influence or affected by intoxicating liquor, cannabis, or any drug; or
- The person is under the combined influence of intoxicating liquor, cannabis, or any drug.

Violation of this statute is a gross misdemeanor. Violations are classified as a class B felony if:

- The person has three or more prior offenses within 15 years (increased from 10 years by HB 1493 in June 2024).
- The person has been previously convicted of:
  - » Vehicular homicide while under the influence.
  - » Vehicular assault while under the influence.
  - » A comparable out-of-state offense.

RCW 46.61.504 contains similar provisions for a person who has actual physical control of a vehicle while under the influence of intoxicating liquor, cannabis, or any drug.

Violations of RCW 46.61.502 and .504 carry several potential sanctions, including imprisonment between 24 hours and 364 days, electronic home monitoring, 24/7 sobriety program monitoring, monetary fines ranging from $350 to $5,000, license suspension, and/or the requirement of an alcohol ignition interlock. Penalties for individuals convicted of multiple offenses, those with an alcohol concentration of 0.15 or higher, or for drivers who refuse to submit to a test may be increased.

RCW 46.20.720 describes Washington's interlock program, which features a compliance-based approach. It is also graduated based upon the offense history of the individual.

CRASH HISTORY

Motor vehicle drivers impaired by alcohol or drugs were involved in 51% of traffic fatalities during 2020-2022 and 20% of serious injury crashes. Data from the most recent period shows increases in the number of crashes resulting in fatalities that involved an alcohol- or drug-impaired driver. The tables below include fatalities and serious injuries in crashes where one or more road users (including drivers, pedestrians, and bicyclists) was impaired.

TABLE 4. IMPAIRED ROAD USER INVOLVED FATALITIES

	2017	2018	2019	2020	2021	2022	CHANGE: 2017-2019 TO 2020-2022
FATALITIES	334	292	294	341	408	439	**+29%**
PROPORTION OF FATALITIES	59%	54%	55%	59%	61%	59%	

For updates to fatalities after 2022, refer to the WTSC Impairment Fatalities Dashboard.

TABLE 5. IMPAIRED ROAD USER INVOLVED SERIOUS INJURIES

	2017	2018	2019	2020	2021	2022	CHANGE: 2017-2019 TO 2020-2022
SERIOUS INJURIES	430	497	452	589	663	676	**+40%**
PROPORTION OF SERIOUS INJURIES	19%	22%	20%	24%	23%	22%	

For updates to serious injuries after 2022, refer to WSDOT Crash Data Portal.

OVERLAPPING FACTORS

Of the 1,188 fatalities in crashes involving Impaired Road Users (2020-2022):

- 27.6% (328) involved a Distracted Road User
- 35.9% (427) involved a Speeding Driver
- 48.0% (570) involved a Lane Departure

Note: The speeding or distracted driver involved was not necessarily the impaired road user. Categories are not mutually exclusive.

SYSTEM CHALLENGES

Behaviors: In the 2023 Statewide Road User Survey, 5.4% of respondents reported driving a vehicle under the influence of alcohol within the last 12 months, and 5.6% of respondents reported driving under the influence of cannabis within the last 12 months.

Legal: Public attitudes about impaired driving have evolved significantly and continue to change over time. Washington first established a law prohibiting driving under the influence of alcohol with a *per se* 0.10% BAC limit in 1979. The *per se* BAC limit was reduced from 0.10% to 0.08% in 1998. These limits apply to individuals of legal drinking age or older holding a standard driver license. The threshold for individuals under the age of 21 is 0.02% BAC and 0.00 THC. Federal law establishes the BAC limit for Commercial Driver's License holders at 0.04%. (It is important to note that a person can be arrested for impairment even if they are below the *per se* limit. In these cases, the officer's observations of impairment and the results of the Standard Field Sobriety Test provide evidence of impairment.[1])

1 See: Driving under the influence, RCW 46.61.502, and Physical control of a vehicle while under the influence, RCW 46.61.504

Norway established the first *per se* BAC limit for DUI at 0.05% in 1936. Since then, BAC limits of 0.05% or lower (e.g., 0.03% in Japan and 0.02% in parts of the European Union) have been set in countries that are home to 84% of the world's population. NHTSA found that a driver's risk of a crash at 0.05 BAC is double the risk of a sober driver. The risk is more than triple at 0.07 and nearly quadrupled at Washington's current *per se* limit of 0.08 BAC.

Most impaired drivers are affected by drugs obtained legally. Alcohol is the most common impairing substance found in drivers involved in fatal crashes, followed by cannabis. Washington voters passed Initiative 502 in 2012, which legalized recreational cannabis use for adults ages 21 and older. I-502 also established the current threshold of THC concentration of 5.00 nanograms of delta-9 THC per mL or higher for impaired driving.

Legislation to lower the BAC limit for alcohol to 0.05% has been introduced in the Washington legislature four times, including 2017, 2022, 2023, and 2024. Legislation is expected to be introduced again in 2025. The 0.05% BAC limit is the most common standard internationally, and it has been found to reduce alcohol-involved fatal crashes by 11% on average across several countries studied. In Washington, there were more than 1,100 fatal crashes involving alcohol-positive drivers over the last decade.

Beyond the criteria for determining impairment, there are additional legal issues which allow impaired driving to persist at such high rates in Washington. These include delays in processing evidence (e.g., toxicology), delayed or inconsistent charging decisions, lack of experienced DUI prosecutors handling these cases, the current public defender shortage, and coordination of records between agencies and systems. These delays result in delayed access to assessment and treatment, application of sanctions, and delays in license suspensions or ignition interlock requirements.

COVID-19: When Washington first saw increases in fatalities in 2020, there was a suspicion that the impact of the pandemic on the population's emotional health led to increases in substance use. Eventually, surveys and other research documented that emotional wellbeing was harmed and substance use did increase. It was initially thought that this impact was temporary and would begin to resolve as the state and the nation returned to "normal." But after three years, it is clear the "new normal" includes higher rates of substance use and impaired driving. Temporary COVID-19 measures were enacted in 2020 to allow bars and restaurants to sell alcohol during a statewide lockdown. While some of these provisions have ended, Washington continues to allow alcohol sales to include home delivery and takeout of single-serve drinks when purchased with meals.

In addition to changes in driver behaviors towards impaired driving during and after the pandemic, the state's already low staffing levels for law enforcement were reduced further due to impacts from the COVID-19 pandemic.

Prior to the pandemic, Washington's ratio of law enforcement officer per population was the lowest in the U.S. Additionally, many law enforcement officers became eligible to retire. COVID-19 exacerbated the low staffing levels leading to fewer Driving Under the Influence (DUI) stops and arrests.

PRIORITY STRATEGIES

Because impaired driving crashes can occur anywhere, regardless of road conditions or road type, comprehensive behavioral interventions to support safer road use must be implemented broadly to prevent impaired driving, to intervene when it occurs, and to respond in ways that deter future impaired driving and address underlying substance use disorders, when they are present.

Impairment and Prosocial Traffic Safety Culture

We are more likely to see more safe, sober road users (Individuals) if they have the:

- Attitude that they are responsible for their own safety and for the safety of others.
- Knowledge that alcohol and other impairing drugs cloud their judgement and have physical and cognitive effects that prevent safe road use and safe driver behavior.
- Skills and awareness to make alternative travel plans to get home safely without driving while impaired.

Friends, family, and others in the social network can support safe, sober road use if they:

- Create and reinforce social norms that everyone drives only when sober.
- Provide safe travel alternatives (other than driving themselves) to people who have used impairing substances.
- Intervene if someone is about to drive impaired.
- Model use of other modes of travel when they themselves have consumed impairing substances.
- Do not serve or encourage people to consume impairing substances if they know the person is going to drive.

Organizations support safe and sober road use if they:

- Establish policies and norms for sober road use.
- Serve or sell impairing substances legally and responsibly, if they are in that business.

Communities support sober road use if they:

- Establish and support education and prevention programs to prevent substance use and misuse.
- Provide transit service, ride-home programs, active transportation infrastructure, free overnight parking, and other opportunities for all residents to get home safely when they have used alcohol and/or drugs.
- Reinforce social norms around sober driving through deterrence, enforcement, treatment, and rehabilitation services.
- Provide self-enforcing roads, separated and protected active transportation infrastructure, and other elements of roadway design that will reduce the likelihood and severity of a crash if a driver chooses to drive impaired.

Policymakers support safe and sober travel if they:

- Appropriate necessary funding for education, prevention, deterrence, enforcement, treatment, intervention.
- Enact laws that are effective to prevent impaired driving and to intervene effectively when someone travels in an unsafe manner due to alcohol or drug impairment.
- Establish regulations for vehicles that prevent someone from driving impaired.
- Establish regulations and funding for infrastructure treatments that reduce the risk of serious injuries or fatalities when an impaired driver is involved.

Safer Road Users: WTSC hosts the Washington Impaired Driving Advisory Council (WIDAC), which is a multi-disciplinary council comprised of citizens, people affected by impaired driving crashes, treatment providers, public health specialists, law enforcement, prosecutors, judges, and other public agency representatives.

Partnerships in Public Health and Prevention: Through WIDAC, SPE, and the Washington Healthy Youth (WHY) Coalition, WTSC collaborates closely with partners across the local and state levels of public health and prevention. These collaborations include offering and receiving consultation on social marketing campaigns, supporting mutually beneficial legislation, attending training and conferences, collaborating on and disseminating research, and identifying ways to leverage resources to shore up existing programming that promotes mental health and prevents driving impaired. Traffic safety partners collaborate with LCB to ensure the effective enforcement of alcohol and cannabis licensees. WTSC supports coalitions statewide in the implementation of alcohol, cannabis, and opioid prevention programs. Each of these touch points strengthen the overall traffic safety system and offer upstream prevention practices to align with upstream traffic safety strategies.

Education and Prevention: Schools, community coalitions, and public health agencies provide education to children about substance misuse to prevent early initiation of substance use. The developing brain is vulnerable to substance use; eliminating the early use of alcohol or cannabis reduces the likelihood they will develop a substance use disorder. Developmentally appropriate education and prevention services throughout school grades can help reduce the incidence of substance use and misuse and dependence during adolescence and early adulthood.

As young people approach driving age, more education is needed on the specific impacts of alcohol and, especially, cannabis use on driving. The general population can also be better educated on the risks of impaired driving and on safer alternatives to driving impaired.

Unfortunately, BAC limits have led some drivers to believe that driving is safe if they are below the 0.08% *per se* limit, and they are unaware that exhibiting signs of impairment (even at lower BAC levels) can result in arrest. Education is necessary to correct this misunderstanding and to provide accurate information on the risks associated with driving after consuming alcohol, cannabis, or other impairing substances, including prescription medications, alone or in combination. The fastest growing type of impairment involved in fatal crashes is polysubstance use—most often involving alcohol and cannabis together.

Prevention efforts are deployed to avoid impaired driving incidents from occurring. These efforts are directed at all drivers and bystanders. Viable alternatives to driving for someone who has consumed impairing substances are a critical aspect of prevention. These include alternative forms of transportation, including transit, taxis, ride shares, and sober drivers. Positive traffic safety culture encourages bystanders to intervene to prevent friends and family from driving impaired by offering safe alternatives, such as a sober ride or a place to sleep.

For individuals with a substance abuse disorder, access to treatment can also help avoid impaired driving and criminal justice involvement. Training and compliance monitoring for licensed alcohol and cannabis retailers also helps to prevent sales and service to minors and over-service to impaired individuals.

Early Intervention: Washington recently modified the provisions for deferred prosecution on Driving Under the Influence (DUI) charges to encourage defendants to use this option on a first-time offense. The law allows a person to have a second deferred prosecution if they are used on the first and the second offense, in recognition of the nature of substance use disorders. We know that relapse is a predictable occurrence and often a stage in recovery.

Intervention and Treatment: DUI courts combine the benefits of treatment, deterrence, and accountability. Victim impact panels, which are one component of treatment courts, can help DUI offenders understand the devastating impacts of their behavior on victims. Treatment courts are effective when done well. But they are also much more resource-intensive, requiring both time and commitment for implementation.

Effective treatment courts rely upon the availability of treatment services that are accessible, affordable, and effective. Like many states, Washington experiences shortages of qualified and experienced treatment providers. This is particularly challenging in more rural areas and remote geographic regions.

Drivers with multiple DUI charges or convictions are likely to meet the criteria for a substance use disorder, as their substance use interferes with major life activities.

The Washington Impaired Driving Advisory Council (WIDAC) has identified several other strategies to reduce impaired driving on Washington roads.

Safer Alternative Modes to Driving Impaired: Safer roads and active transportation facilities reduce the likelihood of impaired driving. Sidewalks, marked crosswalks, taxis and ride-hailing services, and reliable transit service provide safer travel options to those who choose to use impairing substances. Safety features in the built environment—such as rumble strips, median barriers, and separation of modes—can also help reduce the chances of a serious or fatal crash when someone chooses to drive impaired.

Public policy:

- Reduce the legal *per se* limit for DUI from 0.08% to 0.05% blood alcohol concentration.
- Overcome legal barriers to conducting publicized sobriety checkpoints.
- Increase treatment availability and access for DUI offenders, including deferred prosecution and pre- and post-conviction.
- Remedy the DUI case backlog at the State Toxicology Lab by addressing the root causes of the backlog, including turnover of toxicologists. Consider ways to outsource some testing to private labs to relieve and reduce the backlog of testing. Improve data system integration to increase communication about case status among law enforcement, prosecutors, the courts, and the toxicology lab.

Support and justice for victims/families:

- Increase the use of advocates for victims and survivors.
- Enforce accountability for offenders who endanger, injure, or kill while driving impaired.

Increased law enforcement capacity:

- Establish or reinstate dedicated traffic patrol units (will require increased staffing levels overall in many jurisdictions).
- Establish dedicated patrol positions to deter impaired drivers and intervene in suspected DUI.
- Coordinate across city, county, Tribal, and state jurisdictions for high-visibility emphasis patrols, crash investigations, data sharing, and opportunities for training and mentoring.
- Continue to increase access and participation for officers to receive Advanced Roadside Impaired Driving Enforcement (ARIDE) and Drug Recognition Expert (DRE) training.
- Expand the capacity of the interlock program, ensure access for indigent clients, increase interlock compliance, and expedite timely adjudication of interlock violations.
- Continue training to address the potential for bias in policing.

Toxicology:

- Increase comprehensive drug testing in crashes and DUI arrests, including expansion of the phlebotomy program (officers trained to take blood samples from suspected impaired drivers subject to a warrant).
- Increase ability to screen for impairing drugs (current and novel substances).

Data sharing and integration:

- Increase the availability and awareness of local-level data regarding locations where DUI-related crashes are occurring.
- Increase efforts to collect "last drink" locations of drivers arrested for DUI for alcohol and disseminate among traffic safety and justice system partners.
- Improve information sharing between law enforcement, Department of Licensing, and the Administrative Office of the Courts to assess whether pre-adjudication restrictions and requirements (e.g., license suspension or interlock installation) are applied for each DUI defendant and that due process requirements are met.
- Improve information sharing among agencies throughout the DUI case, including adjudication and probation/monitoring to ensure that information about each driver's status is accurate and up-to-date.

Prosecution:

- Direct training to prosecutors to include standards of evidence, trial preparation, use of experts, scientific knowledge of impairment, and changes in case law related to impaired driving offenses.
- Mentoring and supporting prosecutors to handle and specialize in DUI prosecution.
- Discourage some practices like dismissing or pleading down impaired driving charges.

Adjudication and probation:

- Increase treatment availability and promote treatment participation.
- Expand use of a therapeutic court model, including DUI and drug courts.
- Use validated risk assessment instruments to inform pre-adjudication, adjudication, and post-adjudication decisions.
- Consistent monitoring of offenders through visits, drug testing, and/or electronic monitoring to reduce recidivism.
- Educate judges, magistrates, hearing examiners, and other officials.

Drowsy driving is another form of impaired driving. A drowsy driver was involved in 39 deaths and 240 serious injuries from 2020 to 2022, which reflect 18% and 15% increases, respectively, from 2017-2019. Data on drowsy driving is most likely underreported since drivers may be reluctant to admit they dozed off prior to a crash.

A driver who has been awake for 18 hours experiences cognitive impairment like that of driver with a blood alcohol content (BAC) of 0.05%. After 24 hours of being awake, a driver's impairment is like a BAC of 0.10% or higher, beyond the current 0.08% legal limit in Washington. In addition to drowsiness from lack of sleep, factors such as alcohol, drugs, and over-the-counter and prescription medications can contribute to drowsiness.

Washington addresses drowsy driving through education campaigns and infrastructure solutions like rumble strips and rest areas.

Treatment and rehabilitation:

- Increase the use of treatment as an alternative to incarceration.
- Screen all DUI offenders for a substance use disorder.
- Increase access to treatment and address geographic inequities across the state.
- Ensure that DUI offenders have access to recommended treatment regardless of financial or insurance status.
- Programs may also include accountability measures to victims or their families impacted by the impaired driver's behavior.

Licensing:

- Educate every licensed driver in the state on the risks and impacts of impaired driving.
- Provide timely and efficient due process to drivers cited for DUI.
- Expand use of interlock devices and support compliance of drivers with interlock requirements.

More expansive and detailed strategies, efforts, programs, and goals are outlined in WIDAC's Strategic Plan (2023).

SPEEDING AND SPEED MANAGEMENT

The speed at which a driver operates a vehicle is a factor in all crashes. At higher speeds greater crash forces result during a crash, resulting in more serious injuries to the occupants and people outside the vehicle. Controlling driving speed can prevent crashes and reduce their impact by lessening the severity of injuries sustained by the victims.

This is true regardless of whether a driver is speeding (driving over the legal posted limit) or traveling at a legal speed that carries these forces into the crash. The SSA's emphasis on safer speeds applies to excessive speeds, to speeds too high for current road and weather conditions, and to the need to design roads and set regulatory speed limits to achieve vehicle operating speeds that minimize the potential for personal injury.

Speeding is defined in Washington as exceeding the posted speed limit or driving too fast for conditions at the time of the crash as reported by the investigating officer. Drivers may be traveling well under the posted speed limit, but they may be considered to be speeding when road conditions, traffic (including people using all modes), or weather conditions such as icy roads, poor visibility, or fog are present.

OVERLAPPING FACTORS

Of the 633 fatalities in crashes involving a Speeding Driver (2020-2022):

- 66.5% (421) involved an Impaired Driver
- 61.6% (390) involved a Lane Departure
- 34.0% (214) involved a Younger Driver (15–24)

Note: Categories are not mutually exclusive.

Crash forces increase exponentially with speed.

CRASH HISTORY

TABLE 6. SPEEDING FATALITIES

	2017	2018	2019	2020	2021	2022	CHANGE: 2017-2019 TO 2020-2022
FATALITIES	174	182	152	173	207	253	**+25%**
PROPORTION OF FATALITIES	31%	34%	28%	30%	31%	34%	

For updates to fatalities after 2022, refer to the WTSC Speeding Fatalities Dashboard.

TABLE 7. SPEEDING SERIOUS INJURIES

	2017	2018	2019	2020	2021	2022	CHANGE: 2017-2019 TO 2020-2022
SERIOUS INJURIES	499	522	548	647	703	740	**+33%**
PROPORTION OF SERIOUS INJURIES	22%	23%	24%	27%	24%	24%	

For updates to serious injuries after 2022, refer to WSDOT Crash Data Portal.

SYSTEM CHALLENGES

Perceptions of Speed and Safety: A 2023 WTSC survey of more than 10,000 Washington residents 18 years or older found that 66% of drivers reported driving 10+ mph over the speed limit at some time in the previous 30 days. Only 33% of drivers reported that they never drove 10+ mph over posted speeds in the last month.

Speeding in School Zones: A 2022-2023 study of speed in school zones by the Washington Traffic Safety Commission (WTSC) found that in 118 school zones with permanent or temporary speed reductions in school zones to 20 MPH most drivers were speeding 6+ MPH over the posted speed limit.[1] Nearly 75% of drivers in the study were speeding in school zones. Drivers passing through the school zone on their way to somewhere else were slightly more likely to speed than those entering or leaving the school sites.

Increased Crash Likelihood: There is a limit to the rate at which the visual system and brain can process information, and this ability is reduced as traveling speed increases. The higher the speed, the less information can be processed over the distance traveled. This effectively narrows the field of vision that the brain can process. As a result, a driver's ability to respond to visual inputs is reduced (e.g., the driver is less likely to recognize when another road user or other object enters their field of vision). This, along with negatively affecting the ability of other drivers and active transportation users to react, increases the likelihood of a crash.[2]

Increased Crash Severity: Force in equation form is $KE=(1/2)mv^2$, where KE = Kinetic Energy; m = Mass of an object; and v = Velocity. This means that the energy transferred in a roadway crash increases exponentially by the speed a driver travels, making it the primary factor in the amount of force in a crash. This is particularly concerning when a crash involves an active transportation user, because the force is applied directly to the human rather than to a vehicle designed to direct force away from its passengers.

It's Not Just "Speeding": Over a 10-year period, 58% of active transportation user fatalities occurred on roads with posted speed limits of 40 mph or lower. Among these, only 5% included crashes in which the driver was reported to be exceeding the posted limit. These data suggest that higher observed or anticipated active transportation and transit use should influence changes to posted speed limits.

COVID-19: The 2020 pandemic response correlated with unprecedented levels of speeding on previously-congested highways and arterials. In addition to changes in driver behaviors towards speeding during and after the pandemic, law enforcement levels were reduced during this time.

> A listening session participant in King County said that automated enforcement is effective in areas where she drives. She has observed people driving visibly slower and more safely in areas where speed cameras are used.

1 WTSC, 2023, Driver Speeding Behavior in 20 MPH School Zones

2 Speed, Tunnel Vision, and Reaction Time. America Walks, October 2022.

SPEED MANAGEMENT ADVISORY BODIES

Washington State Injury Minimization and Speed Management Policy Elements and Implementation Recommendations: WSDOT convened a multi-agency, multidisciplinary group to study multiple reports, scientific papers, statutes, manuals, and recommendations from across the country on the issues related to speed and safety. As expected, the information reviewed showed a direct link between driver speed and more severe injury outcomes for those involved in a traffic crash. The facts provided robust justification for an injury minimization and speed management policy.

The resulting Washington State Injury Minimization and Speed Management Policy Elements and Implementation Recommendations includes recommendations relevant for cities, counties, and the state:[1]

- Adopt and implement an injury minimization speed setting approach.
- Adopt a broader Safe System Approach to identify and prioritize locations for speed management improvements.
- Consider injury minimization and speed management in all transportation investments and project phases regardless of funding source.
- Collaborate with neighboring jurisdictions for consistency.
- Require training for transportation agency practitioners on injury minimization and speed management techniques.
- Adopt access control, access management policies, and land use development policies/ordinances and practices that consider desired vehicle operating speeds that minimize the potential for personal injury.

WSDOT is developing speed management workshops to offer to local agencies and is updating its Design Manual and Traffic Manual to support safer speeds.

Speed Management Advisory Cooperative (SMAC): The SMAC was established in 2024 by the WTSC to develop a statewide plan to slow speeds and improve traffic safety reflective of the Safe System Approach. It will provide analysis and recommendations for promoting safer speeds. It will encourage the expansion of Local Road Safety Plans to reflect the full complement of principles and elements of the Safe System Approach, including safer speeds.

PRIORITY STRATEGIES

States and local jurisdictions should set appropriate speed limits to reduce the significant risks drivers impose on others—especially vulnerable road users—and on themselves. To achieve desired speeds, agencies often implement other speed management strategies concurrently with setting speed limits, such as self-enforcing roadways, traffic calming measures, and speed safety cameras. (Safe System Roadway Design Hierarchy, FHWA, 2024).

1 Washington State Injury Minimization and Speed Management Policy Elements and Implementation Recommendations.

Regulatory Speed Limit Setting: Standard maximum speed limits are established in RCW 46.61.400: 25 miles per hour on city and town streets, 50 mph on county roads, 60 mph on state highways. Per RCW 46.61.415 local authorities can establish a higher (up to 60 mph) or lower speed limit based on an engineering and traffic investigation, sometimes called a speed study. Cities, towns, counties, and WSDOT may also set a maximum speed limit of 20 mph on a nonarterial street or road without conducting such a study if they have established procedures for doing so. Additional guidance is found under WAC 468-95-045 to specify that factors such as roadside development and environment, parking practices, pedestrian activity, crash experience, and other factors such as Comprehensive Plans should be considered—in essence, the context for the street or road.

Safer Speeds for All: Several local jurisdictions have developed speed limit setting policies based on the Washington State Injury Minimization and Speed Management Policy Elements and Implementation Recommendations. These policies consider contextual elements like functional classification, geometric design, land use, access density, and signal density as they relate to the possibility of a given crash type that either would or wouldn't be fatal at a given operating speed. This approach supports a shift to safer land use by considering the existing and future context of a roadway and how that land use can play into safer speeds on Washington's roads.

Self-Explaining Roads and Speed Management: Measures include the use of road and roadside design elements, such as lane narrowing, reduce turn radii, remove right turn lanes, install protected intersections, bulb-outs, gateways, refuge islands, road reallocations, landscaping, roundabout designs, and horizontal and vertical deflection, to elicit lower driving speeds along the roadway. Land use strategies should also be considered, including setbacks.[1]

Smart Signage: By alerting the right driver at the right time, with the right message addressing specific behaviors, this smart signage has the unique ability to address a driver's specific behavior. Intelligent driver feedback signs that can identify speeding, distracted driving, and unbelted drivers and notify them in real-time to correct the risky driver behavior that is detected. Pierce County and King County each have a pilot program utilizing this technology. Spokane Public Schools is developing a pilot model for using smart signage to develop a School District Traffic Safety Plan. Advised by the SMAC, the WTSC will collect speed, distraction, and seat belt use data in school zones. These data points will inform the development of local road safety planning efforts.

High Visibility Enforcement (HVE): Washington experienced a 32% increase in fatalities involving speeding drivers (2017-19 to 2020-22). During this time, enforcement of traffic laws dropped due to the COVID pandemic and personnel shortages. Particularly on highways and arterial roads that lack traffic calming designs, HVE is necessary to reduce speeding and intervene when drivers are travelling at speeds that are unsafe for the road context and conditions. Safety improvements from HVE include preventing speeding among drivers generally and intervening with drivers who evidence unsafe behaviors.

1 WSDOT Design Manual, 1103 Speed Management

Tracking Habitual Speeders: In January 2024, the National Transportation Safety Board issued a recommendation that asks states to implement a program to identify repeat speeding offenders and measurably reduce speeding recidivism. Research is underway by the DOL to gather data about habitual traffic offenders, specifically habitual speeders, and habitual speeders who are also impaired by alcohol or drugs (or vice versa).

Speed Safety Cameras: Unlike HVE campaigns which are episodic, automated enforcement can provide reminders and deter speeding motorists at set locations all day every day. Automated speed enforcement is an evidence-based countermeasure that has been found to reduce injury crashes by 20% to 25% in the areas where conspicuous cameras are placed.[1] Currently, there are at least 15 cities in Washington which use speed safety cameras, including Bellevue, Des Moines, Everett, Federal Way, Fife, Kenmore, Kent, Lake Forest Park, Lakewood, Lynnwood, Moses Lake, Renton, Seattle, Spokane, and Tacoma. The legislature passed updated legislation in 2024, making additional changes to local Automated Traffic Safety Camera programs that were amended in 2022 as part of the Move Ahead Washington package. The new law, effective June 6, 2024[2]:

- Authorizes automated traffic safety cameras to be used to detect speed violations on state routes within city limits that are classified as city streets and in work zones on city streets and county roads.
- Authorizes certain civilian employees to review infractions detected using automated traffic safety cameras and automated bus safety cameras and to issue notices of infraction.
- Establishes a maximum $145 fine amount for all traffic safety camera violations, as adjusted for inflation every five years, and authorizes the doubling of the fine amount for school zone speeding infractions.
- Requires that traffic camera infraction penalties for a first violation and subsequent violation within 21 days of the first violation be reduced to 50% of the penalty for recipients of certain state public assistance programs.
- Restricts the use of revenue generated by traffic cameras to cities and counties for certain traffic safety activities—including capital projects, maintenance, and related costs—and be used in overburdened communities in proportion to their populations, with exceptions.
- Requires local agencies to conduct an equity analysis before adding or relocating cameras in new locations.

Speed Limiters for Motor Vehicles: The WTSC supports the adoption of active or passive speed limiters as standard equipment in commercial and passenger vehicles and encourages the National Highway Traffic Safety Administration (NHTSA) to consider rules that would require this technology. Passive speed limiters alert the driver if they are exceeding the posted speed limit, and active speed limiters restrict the driver's ability to travel at speeds above set limits.

1 Around the world (e.g., the United Kingdom), automated speed enforcement systems generate citations that go on the driver's record.

2 Relevant RCW for state routes: RCW 46.63.200. For non-state routes: RCW 46.63.220 and RCW 46.63.250.

DISTRACTION

Distraction is a risky behavior that can increase the likelihood of roadway crashes. In Washington, many people understand the risk and danger of distracted driving, but some still choose to drive, walk, roll, and bike distracted. Like speeding, engaging or not engaging in distracting activities is a decision that road users can make at any time during their trip.

Distracted driving is any activity that takes attention away from the task of driving. It is often associated with electronic device use, but it doesn't have to be. Distracted driving comes in three different forms:

- **Cognitive/mental distraction.** The driver's mind is not focused on driving.
- **Visual distraction.** The driver looks at anything other than the road ahead.
- **Manual distraction.** The driver takes one or both hands off the wheel for any reason.

The Driving Under the Influence of Electronics (E-DUI) Act, passed in 2017 in Washington, states:

- Drivers **cannot** hold a phone or any other electronic device with their hands while driving.
  - » Even when stopped in traffic or at traffic signal.
  - » Includes all electronic devices, including phones, tablets, laptops, and video games.
  - » No typing messages or accessing information.
  - » No watching videos or using cameras.
- Drivers **can** use your electronic devices if:
  - » Hands-free and can start use by a single touch or swipe of a finger.
  - » Parked or out-of-the-flow of traffic.
  - » Contacting emergency services.

In addition to the E-DUI Act, the Dangerously Distracted law also passed in 2017. The law defines "dangerously distracted" as any activity that a driver does that interferes with safe driving, such as grooming, smoking, eating, or reading. "Dangerously distracted" is a secondary offense. That means that a driver can only receive a ticket for "dangerously distracted" if they have committed another traffic offense, too. A ticket for dangerously distracted will add an additional $100 to the citation.

CRASH HISTORY

TABLE 8. DISTRACTED ROAD USER FATALITIES

	2017	2018	2019	2020	2021	2022	CHANGE: 2017-2019 TO 2020-2022
FATALITIES	162	128	127	104	128	115	**-17%**
PROPORTION OF FATALITIES	29%	24%	24%	18%	19%	15%	

For updates to fatalities after 2022, refer to the Target Zero Performance Dashboard.

TABLE 9. DISTRACTED ROAD USER SERIOUS INJURIES

	2017	2018	2019	2020	2021	2022	CHANGE: 2017-2019 TO 2020-2022
SERIOUS INJURIES	643	621	617	428	557	540	**-19%**
PROPORTION OF SERIOUS INJURIES	29%	28%	27%	18%	19%	17%	

For updates to serious injuries after 2022, refer to WSDOT Crash Data Portal.

OVERLAPPING FACTORS

Of the 374 fatalities in crashes involving Distracted Road Users (2020-2022):

- 53.6% (186) involved a Lane Departure
- 50.4% (175) involved an Impaired Road User

Note: Categories are not mutually exclusive.

Reporting Limitations. The ability for law enforcement personnel to collect distracted driving information is limited. Therefore, it is reasonable to assume that the proportion of distracted driving in the crash database is underreported compared to other attributes.

Distracted Driving Data Changes: Due to a coding change in the Police Traffic Collision Report (PTCR) in 2020 related to distracted driving, WTSC studied the effects of that change, promotion of the Driving Under the Influence of Electronics (E-DUI) Act, and other factors on the Distracted Road User Involved data. Researchers discovered that the discontinuation of the "inattention" code in the PTCR correlated with use of "other distractions" and "unknown distraction" increased at the same rate, essentially replacing that code. In addition, use of the specified distraction codes also increased—most notably cell phone use and distractions outside the vehicle.[1] Researchers concluded that these changes are unlikely to affect the data for analysis purposes.

1 Hoff, S. Distracted Driving in Washington State During COVID-19: 2020 Observation Survey, Enforcement, and Crashes, WTSC, 2021.

SYSTEM CHALLENGES

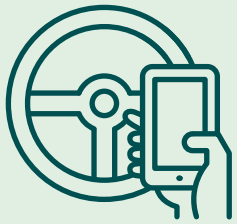
The Science of Attention: Inattentional blindness occurs when a person's attention is on one thing and that person does not notice unexpected things entering the visual field. It limits a person's attentional, cognitive, and processing resources. Attention plays a major role in visual perception. Driving distracted allows the driver's attention to shift, choosing another task to be the focus. Even when looking ahead at the road, a driver's visual field can be limited if the driver is focused on something other than driving. For instance, when talking on the phone—even hands free, looking ahead, and with both hands on the wheel—a driver's visual field will be limited because the focus is on being present on the phone call.

Vehicles: While vehicle manufacturers are adding safety features, such as collision alerts and automatic braking, they are also adding features likely to distract drivers, including large video displays. Current vehicles include capabilities (some of which are illegal under Washington state law) to connect smartphones and other devices, allowing drivers to use dashboard screens to check email and use other smartphone applications. Lane-keeping assistance, automatic braking, and other similar features can reduce the likelihood of crashes resulting from distraction. However, it is important that advanced features remain supplementary. They are not intended to be used as an excuse for drivers to use distracting devices like cell phones.

Driver Perception of Risk

- **Not everyone chooses to drive distracted.** In fact, the WTSC 2018 Observational Survey shows that 8.2% of drivers were driving distracted, down from 9.2% in both 2016 and 2017. These surveys involve point-in-time observations. The statewide survey conducted in 2023 found that 61-72% of respondents reported that they have not held, talked on, looked at, read, manually typed, or interacted with a cell phone or device in the last 30 days.
- **Avoiding distractions most of the time is not enough.** While most people understand that distracted driving is unsafe and choose to avoid distractions most of the time, people may still lapse into brief behaviors that are distracting, which increases the likelihood of crash involvement. Combining distraction and higher speeds increases the likelihood a crash will result in a serious injury or a fatality.
- **Even if a person is a very skilled driver, that person cannot perform well in the driving environment while distracted.** In a survey conducted in March 2017, the WTSC asked questions regarding distracted driving to 847 drivers ages 16–34. A large percent (96%) of these drivers agreed that using a cell phone while driving is dangerous; however, 55% said they felt safe driving using just one hand on the steering wheel while using a phone, and 81% said they felt safe using a hands-free device to talk while driving. But research indicates that cell phone use reduces brain activity associated with driving by 37% or more.
- **A person can only do one task at a time.** You can toggle from one task to the other, but it is impossible for a person to do any two tasks at the exact same time. Further, drivers who toggle between other tasks while driving might experience inattention blindness and visually miss things in the environment. Returning a driver's focus to the road is not instant. A period of readjustment occurs after the driver's eyes have returned to the road and will delay response time.

PHONE USE WHILE DRIVING



65%

Have not held and talked on the phone while driving

DRIVERS AGED 18–34

Are signficantly more likely to talk on their phones while driving than other age groups

Source: Market Decisions Research

PRIORITY STRATEGIES

Improve Data Reporting: To the extent possible, strive to improve crash data collection on crash reports with the inclusion of source of distraction such as hands-free mobile phone, handheld phone, other electronic device, or vehicle integrated devices.[1] Explore the use of other sources of data such as telematics data collected from devices, vehicles, and roadway infrastructure.

Education about Distraction: Educate drivers (teen driver education), walkers, riders, scooters, and skaters about the dangers of distracted driving, walking, riding, or rolling.

Roadway Treatments: Traditional engineering solutions for motor vehicle drivers such as warning signs, longitudinal and transverse rumble strips, and roadside devices such as guardrail and cable barrier can help reduce the number and severity of crashes resulting from distraction.

Advanced Vehicle Safety Features: Lane-keeping assistance, automatic braking, and other similar features can reduce the likelihood of crashes resulting from distraction. However, these features must be activated and understood to be helpful. Educating drivers about proper use of these tools is important.

High Visibility Enforcement (HVE): The objective of HVE is to deter cell phone use by increasing the perceived risk of getting caught by combining public outreach activities with support of enforcement activities. Law enforcement officers actively seek out cell phone users through special roving patrols or through a variety of enforcement techniques such as the spotter technique where a stationary officer will radio ahead to another officer when a driver using a cell phone is detected. Officers report that higher vantage points, SUVs, and unmarked vehicles are strategies useful in identifying violators.[2] Additionally, semi-automated enforcement systems can detect distracted driving and seat belt violations, sending the information to an officer stationed downstream who can respond to the infraction.

Workplace Efforts: WTSC has developed a program designed to help businesses create a workplace culture of safe and responsible driving. Drive Focused at Work helps employers educate their workforce about distracted driving, keep employees safe, and lower costs. Elements include understanding how distracted driving impacts the workplace, implementing a policy, conducting training, and continuing a dialogue with employees to promote a culture that includes focused driving. Without explicit policies directing employees to avoid distractions, they may feel obligated to conduct business calls while driving, such as answering the phone when a supervisor calls.

1 https://www.nhtsa.gov/book/countermeasures-that-work/distracted-driving/data-surveillance

2 https://www.nhtsa.gov/book/countermeasures-that-work/distracted-driving/countermeasures/enforcement/high-visibility-cell-phone-enforcement

UNRESTRAINED OCCUPANTS

Seat belts are a powerfully effective tool to reduce the severity of a traffic crash for drivers and passengers inside motor vehicles. Per the Traffic Safety Commission's 2023 study, "Seat Belt Use in Washington State," 93.3% of front seat occupants were using their seat belt.[1]

Restraining all occupants of a vehicle to improve safety involves use of two categories of devices – safety restraint systems (seat belts) installed in the vehicle, and child passenger safety systems that are added to increase the safety of children riding in vehicles (car seats and booster seats).

Washington State Restraint Laws: RCW 46.61.688 covers passengers over 16 years of age. People driving or riding in a motor vehicle shall wear a seat belt. Drivers are responsible for ensuring all child passengers under the age of 16 either wear a seat belt or use an approved child restraint device.

RCW 46.61.687 covers child passengers:

- Children under the age of two must be properly secured in a rear-facing car seat.
- Children between the ages of two and four must ride in a car seat with a harness (rear or forward facing).
- Children ages four and older must ride in a car or booster seat until they are 4'9" tall.
- Children over 4'9" tall must be secured in a properly fitted seat belt (typically starting at 8-12 years old).
- Children under 13 must ride in the back seat when practical to do so.

CRASH HISTORY

TABLE 10. UNRESTRAINED OCCUPANT FATALITIES

	2017	2018	2019	2020	2021	2022	CHANGE: 2017-2019 TO 2020-2022
FATALITIES	104	107	108	110	152	155	**+31%**
PROPORTION OF FATALITIES	18%	20%	20%	19%	23%	21%	

For updates to fatalities after 2022, refer to the WTSC Unrestrained Occupants Fatalities Dashboard.

TABLE 11. UNRESTRAINED OCCUPANT SERIOUS INJURIES

	2017	2018	2019	2020	2021	2022	CHANGE: 2017-2019 TO 2020-2022
SERIOUS INJURIES	228	232	201	291	341	346	**+48%**
PROPORTION OF SERIOUS INJURIES	10%	10%	9%	12%	12%	11%	

For updates to serious injuries after 2022, refer to WSDOT Crash Data Portal.

1 https://wtsc.wa.gov/wp-content/uploads/2024/03/Seat-Belt-Use-in-WA-State-2023_Feb2024.pdf

OVERLAPPING FACTORS

Of the 417 fatalities in crashes involving an Unrestrained Occupant (2020-2022):

- 69.5% (290) involved an Impaired Road User
- 69.0% (288) involved a Lane Departure
- 44.6% (186) involved a Speeding Driver
- 31.4% (131) involved a Young Driver (15–24)

Note: Categories are not mutually exclusive.

SYSTEM OBSERVATIONS

Seat Belt Observational Data: Washington has one of the highest front seat seat belt use rates in the country at 93.3%. Despite a sustained high belt use rate for many consecutive years, the number of unrestrained fatalities and serious injuries has increased. Between 2017-19 and 2020-22, the 3-year average unrestrained occupant fatalities have increased 31% and serious injuries increased 48%. In 2020-22, unrestrained motor vehicle drivers and occupants represented 21% of traffic fatalities in the state.

Behaviors and Beliefs around Seat Belt Use:[1]

- 90% said they always wear a seat belt in a vehicle within a few miles of their home.
  - » 93% always wear a seat belt in a vehicle many miles away from their home, and 83% always wear a seat belt when in the backseat of a vehicle.
- 73% asked someone who was not using a seat belt to use a seat belt.
- 92% reported having a family rule about always wearing a seat belt.
- 47% of those employed said their employer has a policy about always using a seat belt.
- 81% said that those important to them would somewhat or strongly approve if they asked someone who was not using a seat belt to use a seat belt.
- 89% believe that people in their community usually or always wear a seat belt.
- 80% would be very or extremely comfortable asking someone to use a seat belt.

SEAT BELT USE: WHO, WHEN, & WHERE

Source: Market Decisions Research

1 2023 Washington Traffic Safety Survey

Risks Associated with Non-Use of Seat Belts: According to NHTSA, people who buckle up in the front seat of a passenger car can reduce the risk of fatal injury by 45% and moderate to critical injury by 50%. Wearing a seat belt in a light truck can reduce the risk of fatal injury by 60% and moderate to critical injury by 65%. According to the Insurance Institute of Highway Safety, exposure to unbelted occupants increases the risk of injury or death to other occupants in the vehicle by 40% (MacLennan et al., 2004).[1] In a frontal crash, an unbelted rear-seat passenger sitting behind a belted driver increases the risk of fatality for the driver by 137% compared with a belted rear-seat passenger.[2] NHTSA reports that rear seat passengers (ages 8 and above) are three times more likely to be killed in a crash if they are unrestrained.

Populations Less Likely to Use Seat Belts: Currently, we know–based on seat belt citation and fatal crash history data, as well as other research–that some people from population groups are less likely to use seat belts.

- **Race, Ethnicity, and Gender.** There is a variety of evidence demonstrating that Hispanic males, American Indian and Alaska Native (AI/AN) males, and males aged 55 and older are more likely not to be wearing seat belts while driving. According to the WTSC's Research and Data Division's 2024 brief on AI/AN traffic deaths, one-third of AIAN deaths were unrestrained vehicle occupants, versus less than 20% of all other races.
- **Rural Geographies.** A recent study found states with lower seat belt use among drivers and passengers residing in rural areas.
- **Younger Occupants.** From 2020-2022, there were 267 fatalities of drivers and occupants for ages 15-24. Of these, 40% were unrestrained, compared to 35% for all vehicle occupants.

1 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1730165/

2 https://pubmed.ncbi.nlm.nih.gov/23411155/

CHILD PASSENGER SAFETY

In Washington between 2018-2022, 68 children ages 0-15 years old died in crashes in which they were unrestrained vehicle occupants. From 2018-2022, 5% of unrestrained passenger fatalities were children ages 0-15 years old.

Knowledge of Child Passenger Restraint Use and State Law: Child restraint systems can be complicated, and many are installed incorrectly. Many parents and caregivers know how complicated these systems can be: rear facing, forward facing, booster seats, and harnesses; different cars have different anchor points; seats are different; and more. Data collected from Washington car seat checks in FFY 2023 shows 73.6% misuse of child restraints. Much of the observed misuse involved the harness or seat belt being too loose or not being used correctly with the harness slot or lower anchors. A 2023 observational survey showed that the proportion of children in proper restraints and seating positions decreased as the children's age increased (see **Figure 11**).

Availability of Child Restraints for Use by Nondriving Caregivers: No state or federal law requires ride-hailing services such as Uber or Lyft to provide child restraint seats. Taxis do not routinely have them available and are not required to. Micro-transit services that local transit agencies are experimenting with fall under taxi laws. Also, public agencies that transport children should have adequate child passenger restraint devices and training.

Nondriving parents seeking to use these services would be expected to carry a child restraint seat that may weigh up to 30 pounds or more, along with their child, when utilizing these modes of transportation. Since many nondrivers may not drive due to disability, this lack of child-safe transportation represents an equity issue.[1]

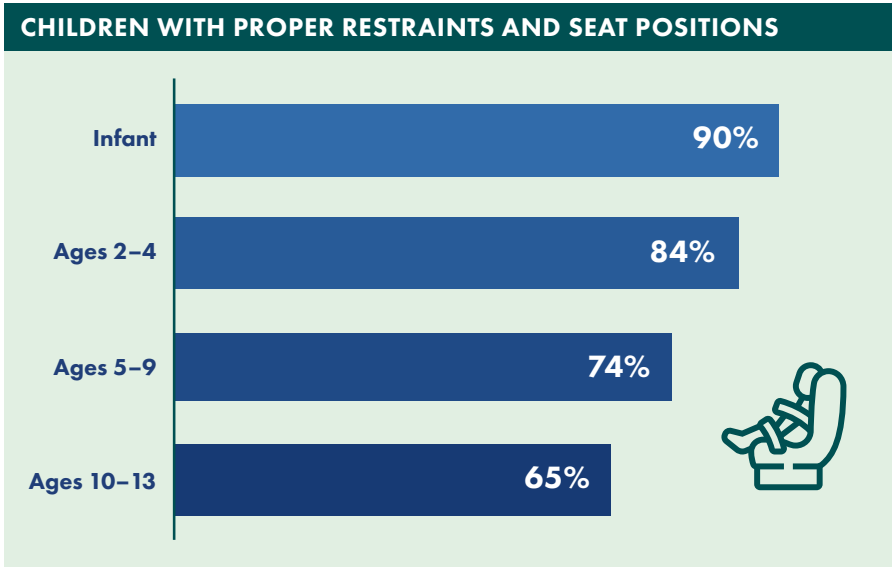


FIGURE 11. PROPORTION OF OBSERVED CHILDREN WITH PROPER RESTRAINTS AND SEATING POSITIONS

Source: 2023 CPS Observational/Intercept Surveys

1 Anna Letitia Zivarts, *When Driving Is Not an Option: Steering Away from Car Dependency*, 2024, Island Press

Modeling Seat Belt Use: Several studies have identified a link between adult and child occupant restraint status (Benedetti et al., 2017; Lee et al., 2019; Raymond et al., 2018; Starnes, 2003; Vachal, 2019). A study of child passengers in North Dakota found that when drivers were wearing their seat belts, children were 35 times more likely to be restrained than when the driver was not wearing a seat belt (Vachal, 2019). In other words, children are more likely to be restrained when the adults in the vehicle are also restrained. Additionally, a nighttime observational study in Tennessee found a link between front-seat passenger belt use and driver belt use, where 82% of front-seat passengers were restrained when drivers were also restrained, compared to just 42% when drivers were not restrained (Boakye et al., 2019).[1]

PRIORITY STRATEGIES

Proper Car Seat Use: Awareness and Education: Proper use of child restraints is important to improve safety. Parents and caregivers should be educated with culturally relevant and audience-appropriate materials to install child safety seats appropriately. A study found significant increases in overall observed restraint use and booster seat use following exposure to interventions and concluded that applying messages that increase perception of vulnerability is a promising approach to increase booster seat use.[2]

Proper Car Seat Use: Law Enforcement Training: Trained law enforcement officers determine if a child restraint system is appropriate for the child's individual height, weight, and age based on state law. Because of the duration of time required for a formal certification training in child seat use, in 2011 the WTSC supported the creation of a Car Seat Awareness training for law enforcement agencies.

Modeling Seat Belt Use: Educate parents about the importance of the link between adult and child seat belt use.

Seat Belt-Focused Enforcement Patrols: Washington supports aggressive efforts to publicize seat belt patrols and seat belt use alongside law enforcement aggressively enforcing the state's seat belt law. Traffic and transportation safety professionals sharing seat belt usage messages across communities while participating in annual Click it or Ticket programs provide a statewide platform that communicates the importance of seat belt safety.

Employer-Based Projects: Workplace seat belt programs include a variety of components such as education, messaging, and incentives. Common elements of effective workplace seat belt use programs involved management's commitment to their employees' safety, including formal policies that require the use of a seat belt when in a company-owned vehicle or driving/traveling in a motor vehicle while on the job, education and safety training workshops, and incentives for wearing a seat belt as well as costs for non-compliance.[3]

Real-Time Occupant Restraint Feedback Signage: Smart signage provides immediate feedback to drivers and passengers. These signs are being tested in Washington in 2024.

1 https://www.nhtsa.gov/book/countermeasures-that-work/seat-belts-and-child-restraints/understanding-problem

2 https://www.nhtsa.gov/book/countermeasures-that-work/seat-belts-and-child-restraints/countermeasures/other-strategies-behavior-change/programs

3 https://www.nhtsa.gov/book/countermeasures-that-work/seat-belts-and-child-restraints/countermeasures/other-strategies-behavior-change/employer

The data show that crashes involving lane departure and intersections are top emphasis areas because of their high proportion of roadway fatalities and serious injuries.

Safe System Roadway Design Hierarchy[1]: In 2019 Washington introduced the Safe System Hierarchy of Controls as a structure to prioritize policies and safety countermeasures by effectiveness. Adapted from previous efforts by the Centers for Disease Control (CDC), this structure helps guide design operational decision making for WSDOT. The five tiers are arranged from most to least aligned with the Safe System Approach principles (arranged from top to bottom). This approach emphasizes the importance of engineering to support the agency's Complete Streets approach and the use of Level of Traffic Stress (LTS) to evaluate a roadway's active transportation qualities. LTS is a quantitative index that incorporates roadway width, posted speed, and traffic volume measures (factors that contribute to crash exposure and severity). It provides performance metrics that align with the top tiers of the Hierarchy of Controls.

For an approved list of engineering countermeasures related to crash type and location, see Appendix B: Select Emphasis Area Strategies.

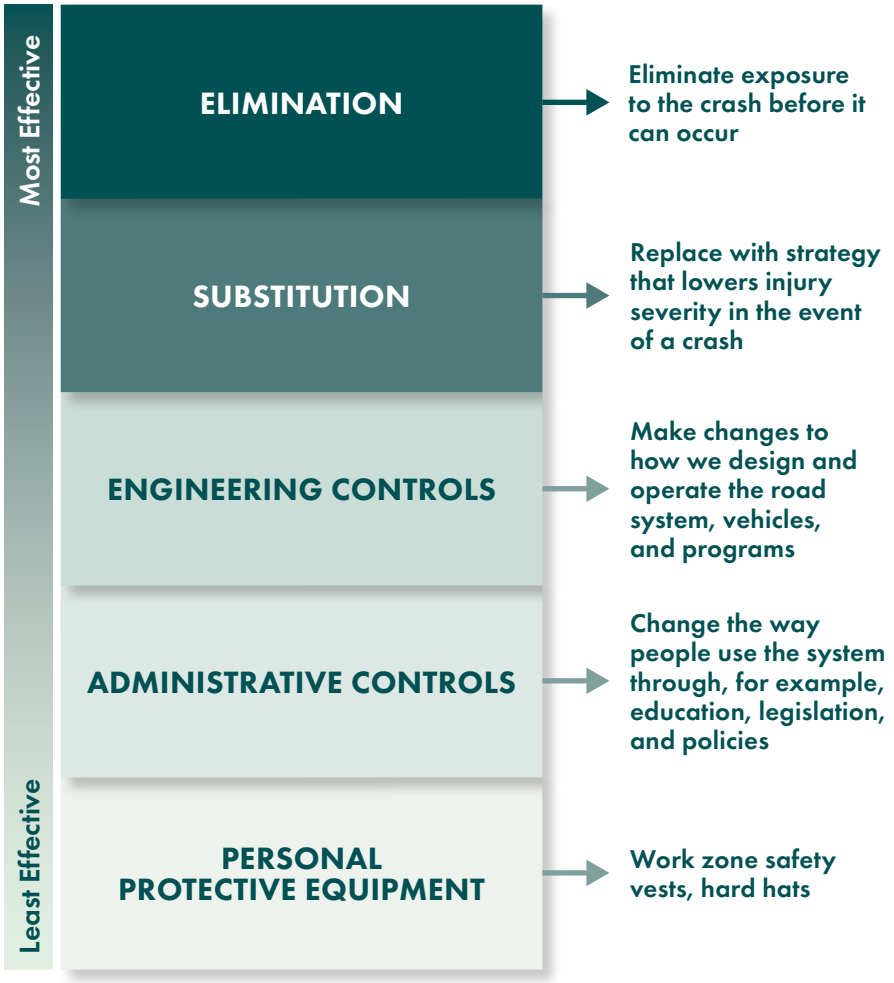


FIGURE 12. HIERARCHY OF CONTROLS FROM THE 2019 TARGET ZERO PLAN

1 Hopwood C., K. Little, D. Gaines, "Safe System Roadway Design Hierarchy: Engineering and Infrastructure-related Countermeasures to Effectively Reduce Roadway Fatalities and Serious Injuries," FHWA-SA-22-069, Washington, DC, 2024.

In 2024, the FHWA adapted and built upon this approach when developing the Safe System Roadway Design Hierarchy to support implementation of the Safe System Approach in the U.S. The FHWA Safe System Roadway Design Hierarchy includes four tiers. In this hierarchy, physical changes to the system are more effective than changes that rely on road users to make safe decisions.

FIGURE 13. SAFE SYSTEM ROADWAY DESIGN HIERARCHY, FHWA, 2024[1]

LANE DEPARTURE

A lane departure crash involves a driver unintentionally leaving their lane of travel. This includes leaving a lane to the right (run-off-the-road crashes) as well as leaving a lane to the left (either head-on or run-off-the-road crashes). It excludes crashes where a driver encroaches on another lane of travel in the same direction and wrong way crashes. The surrounding environment, and particularly the roadside, can be designed or modified to reduce the severity of these crashes.

CRASH HISTORY

TABLE 12. LANE DEPARTURE FATALITIES

	2017	2018	2019	2020	2021	2022	CHANGE: 2017-2019 TO 2020-2022
FATALITIES	265	260	272	248	308	321	**+10%**
PROPORTION OF FATALITIES	47%	48%	51%	43%	46%	43%	

For updates to fatalities after 2022, refer to the Target Zero Performance Dashboard.

1 https://highways.dot.gov/sites/fhwa.dot.gov/files/2024-01/Safe_System_Roadway_Design_Hierarchy.pdf

TABLE 13. LANE DEPARTURE SERIOUS INJURIES

	2017	2018	2019	2020	2021	2022	CHANGE: 2017-2019 TO 2020-2022
SERIOUS INJURIES	852	785	857	1023	1161	1179	**+35%**
PROPORTION OF SERIOUS INJURIES	38%	35%	38%	42%	40%	38%	

For updates to serious injuries after 2022, refer to WSDOT Crash Data Portal.

OVERLAPPING FACTORS

Of the 877 fatalities in crashes involving lane departure (2020-2022):

- 64.9% (570) involved an Impaired Road User
- 44.4% (390) involved a Speeding Driver
- 32.8% (288) involved an Unrestrained Occupant

Note: Categories are not mutually exclusive.

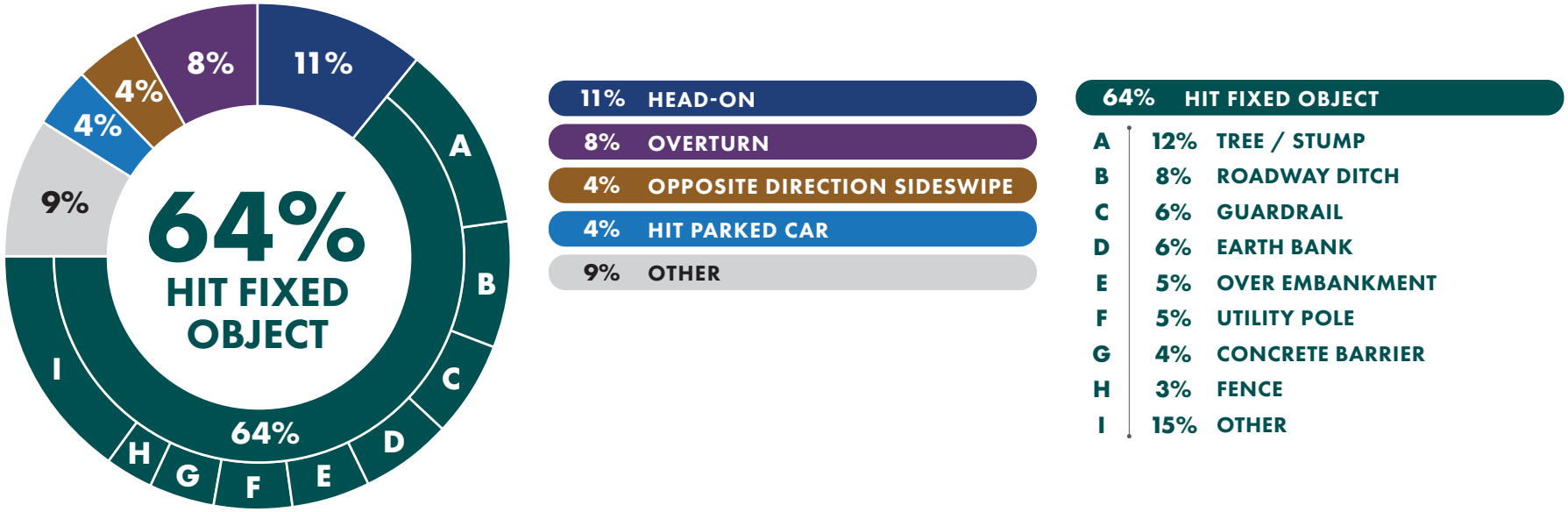


FIGURE 14. TYPES OF LANE DEPARTURE CRASHES RESULTING IN FATALITIES AND SERIOUS INJURIES (2018-2022)

Lane Departure by Location: Lane departure crashes that result in fatalities and serious injuries occur on all types of roadways in Washington, not just state routes, and not just county roads. For example, only one-third of fatalities and serious injuries involving lane departure occurred on state highways (see **Figure 15**).

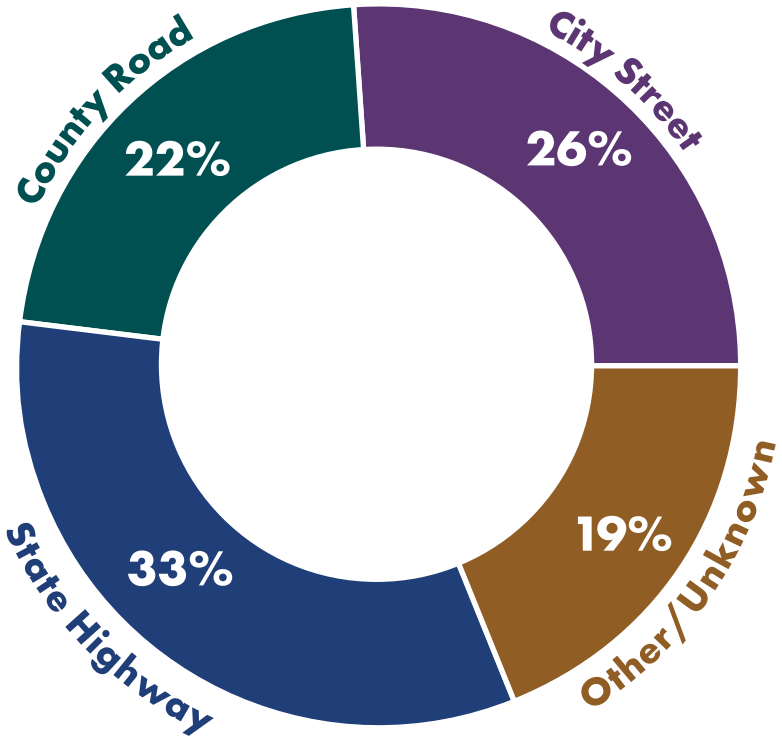


FIGURE 15. ROAD OWNERSHIP OF LANE DEPARTURE FATALITIES AND SERIOUS INJURIES

Safety in Rural Areas: Rural communities face many of the same traffic safety issues as their urban counterparts, but often with a greater proportion of morbidity and mortality. Nationally, nearly half of all fatal crashes (45%) occur on rural roads even though only 19% of the U.S. population lives in rural areas (GHSA, 2022). The risk of dying in a crash is 62% higher on a rural road than an urban road for the same length trip. Crash and mortality rates in rural communities are impacted by many of the same issues that urban communities face but are exacerbated by factors such as poorer roadway infrastructure, limited emergency medical services resources, and more risky driver behavior.

PRIORITY STRATEGIES

Systemic Data Collection, Analysis, and Evaluation: Analyzing and evaluating data to determine roadway alignments and making an inventory of existing fixed objects will assist in prioritizing safety investment projects, tracking changes, and making modifications over time. Tools like LiDAR and emerging technologies using machine learning can help agencies develop and maintain and inventory of roadside assets.

Lane Departure Safety Framework: Like the Roadway Design Hierarchy, a three-level framework assists in reducing lane departure fatal and serious injury crashes. The most cost-effective countermeasures focus on keeping drivers on the roadway and within their lane. If this fails, then helping a driver return to their lane before a crash occurs is the next best strategy. If a crash does occur, engineers aim to minimize the injury outcome of the crash; this is the most expensive and least effective set of treatments.

FIGURE 16. LOW-COST DELINEATORS APPROACHING A HORIZONTAL CURVE. (WSDOT LOCAL PROGRAMS)[1]

- **Keep drivers on the roadway:** If drivers stay within their intended lane of travel, then by definition, lane departure crashes do not occur. Several design changes increase the likelihood that drivers will stay on the roadway.
  - » Install curve warning signs, chevron signs, and/or delineators at horizontal curves.
  - » Enhance signing with flashing beacons, including actuated beacons based on approaching driver's presence or speed.
  - » Improve friction via high friction surface treatments (HFST) or basic roadway surface overlays.
  - » Install lighting.
  - » Install edge lines, especially on curves.
  - » Install wider edge lines.
  - » Install center lines.
  - » Install delineation on roadside hardware.
  - » Reduce posted speeds in locations where road geography increases the risks of road or lane departure.

1 LRSP Virtual Workshop, WSDOT, 2023.

- **Help drivers re-enter their lane:** Once a driver departs their lane (off the roadway or into oncoming traffic), the following treatments can aid the driver to return to their lane before a crash occurs.
  - » Reduce motor vehicle operating speeds.
  - » Centerline and edge line rumble strips.[1]
  - » Pavement edge treatments.
  - » Add and widen shoulders.
  - » Traversable roadsides (slope flattening).
  - » Remove objects from clear zones.
- **Minimize the consequences of leaving the roadway:** If drivers are unable to stay on or get back on the roadway, then the best option remaining is to minimize the consequences of encountering the roadside. Strategies to reduce injury severity on the roadside include the following:
  - » Design necessary appurtenances (signs, lighting, etc.) within the clear zone as breakaway or yielding.
  - » Install crashworthy barriers (guardrail, median barrier, crash cushions).
  - » Install, update, and maintain guardrail end treatments.
  - » Note: There is increasing concern that larger and heavier vehicles are being marketed, such as SUV and light duty truck models, which exceed the design limits of guardrail treatments. This is something that should be considered and addressed as part of the comprehensive Safe System Approach. HB 1674 (introduced in 2023), if passed, would require vehicle dealers to provide written disclosure that describes the increased risk, add fines for certain traffic infractions is committed using a light truck or SUV, and require educational awareness campaigns.

1 Rumble strips installations should provide room for people to walk, bike, and roll outside the rumble strip, especially areas where people depend on using the shoulder for active transportation.

INTERSECTIONS

Intersections manage the flows of road users across multiple roadways. However, where routes intersect and paths cross, each of the resulting conflict points represents potential for crashes. The opportunity for fatal and serious injury crashes increases by approach speed, type of conflict, and by the combination of road users, including vulnerable road users.

Intersection crashes vary based on the operation of the intersection. Intersection types can include traditional intersection designs (i.e., 4 legs, 4 directions of travel intersection at a central point) and circular designs like roundabouts. Reducing vehicle speeds and separating different road user modes can reduce the number of type of conflict points, which affects crash likelihood and severity. This can be achieved with traditional and innovative intersection design and treatments.

CRASH HISTORY

From 2020 to 2022, 24% of fatalities and 33% of serious injuries were intersection related.

> *"Structurally changing the roads to make them safer will improve safety 24/7."*
>
> *—Listening session participant in King County*

OVERLAPPING FACTORS

Of the 472 fatalities in intersection-related crashes (2020-2022):

- 50.8% (240) involved an Impaired Road User
- 22.7% (107) were Active Transportation Users

TABLE 14. INTERSECTION-RELATED FATALITIES

	2017	2018	2019	2020	2021	2022	CHANGE: 2017-2019 TO 2020-2022
FATALITIES	130	111	113	150	147	175	**+33%**
PROPORTION OF FATALITIES	23%	21%	21%	26%	22%	24%	

For updates to fatalities after 2022, refer to the Target Zero Performance Dashboard.

TABLE 15. INTERSECTION-RELATED SERIOUS INJURIES

	2017	2018	2019	2020	2021	2022	CHANGE: 2017-2019 TO 2020-2022
SERIOUS INJURIES	738	800	763	780	973	1,069	**+23%**
PROPORTION OF SERIOUS INJURIES	33%	36%	34%	32%	33%	35%	

For updates to serious injuries after 2022, refer to WSDOT Crash Data Portal.

PRINCIPAL COMPONENTS OF INTERSECTION SAFETY

There are five main considerations in intersection safety[1]:

1. **Number and Type of Conflict Points.** More potential points of conflict lead to higher likelihood of crashes. Crossing movements, which include left-turns (at unsignalized intersections, or during permissive left phases of signalized intersections and right-angle ("T-bone" crashes) have the highest potential for fatalities and serious injuries.
2. **Speeds at the Intersection.** Higher speeds result in the potential for greater injury severity.
3. **Visibility.** Road users need to know an intersection is upcoming (user expectation). Once they approach, road users need to be able to see other conflicting movements.
4. **Combination of Road User Modes.** Any conflicts involving pedestrians or bicyclists have a relatively high potential for fatal and serious injury outcomes.
5. **Assignment of Right of Way for Crossing and Turning.** How drivers and active transportation operate at the intersection in terms of yielding, stopping, turning, and crossing.

1 For more information, see the functional characteristics of intersections described in WSDOT Design Manual, Section 1310.

PRIORITY STRATEGIES

Intersection design can limit conflict points, promote lower speeds, increase visibility for all users, and reduce conflicts between different road users.

Minimizing and Modifying Conflict Points

Conflict points at an intersection represent the crossing of potential paths from each entry and exit point of a roadway approach, each of which represents an opportunity for a crash. Depending on the type of conflict, the likelihood of a higher severity injury due to a crash is possible.

- **Crossing conflicts** (often associated with left-turns, or when a driver disobeys a stop sign or red traffic signal indication) result in the greatest potential for fatal and serious injury outcomes.
- **Merging and diverging conflicts points** — where road users are moving in the same direction — are associated with less severe crash types.

Intersection layouts include a multitude of designs including stop-controlled, traditional signalized, roundabouts, median U-turn intersections, and several other designs. Each type of intersection has different conflict point characteristics. Roundabouts have a quarter of the conflict points of a traditional intersection. To reduce conflicts and lower severity, future designs should move away from traditional intersections wherever possible and replace them with roundabouts and other intersection types described on the following pages.

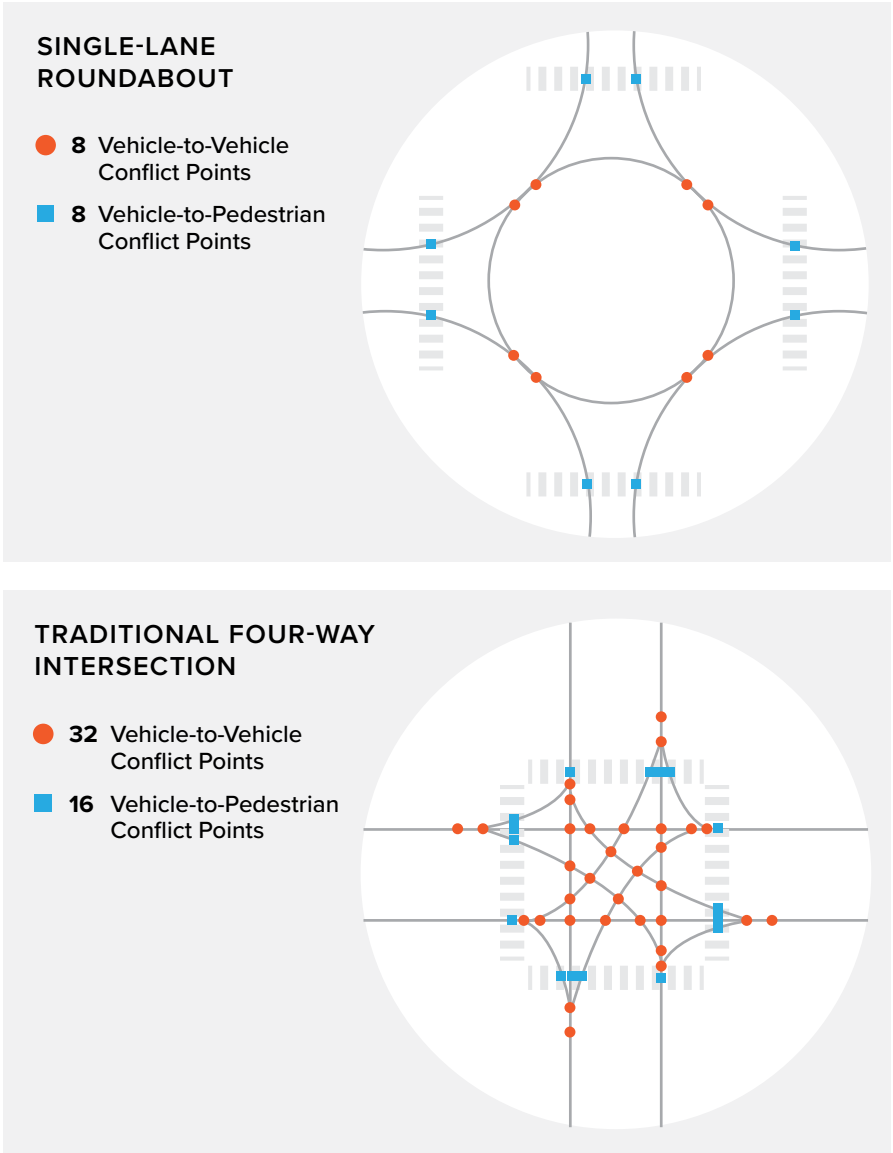


FIGURE 17. INTERSECTION CONFLICT POINTS

Source: Guidelines for the Planning and Design of Roundabouts (this image pulled from https://www.mass.gov/info-details/what-are-roundabouts)

In these changes, the infrastructure and information provided to roadway users must address the needs of people walking, rolling, and bicycling, as well as drivers. Pedestrians who are blind or visually impaired have particular needs in these less common road configurations that can be met through accessible pedestrian signals and design cues.

When right-of-way and funding are available, innovative intersection design has been proven to offer benefits over traditional intersections. Below is a list of a few of these designs.

Restricted Crossing U-Turn (RCUT): intersections can reduce the number of left turn conflicts by half and assist in decreasing crash potential on divided roadways. **Figure 18** illustrates the allowed movements at an RCUT intersection.

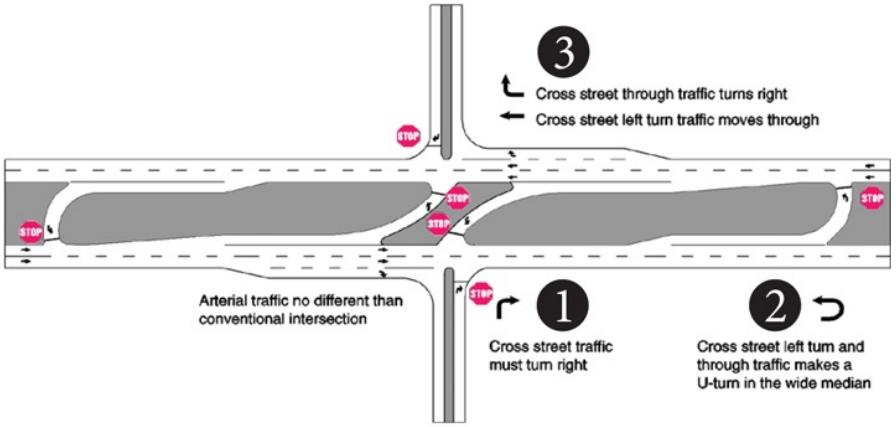


FIGURE 18. RESTRICTED CROSSING U-TURN (RCUT) INTERSECTION [FHWA PROVEN SAFETY COUNTERMEASURES, 2021]

FIGURE 19. DIVERGING DIAMOND INTERCHANGE AT I-5 AND SR-510, LACEY, WA (WSDOT)

Diverging Diamond Interchange (DDI): is also known as a double crossover diamond interchange. The primary difference between a DDI and a conventional diamond interchange is the design of directional crossovers on either side of the interchange. This eliminates the need for left-turning drivers to cross the paths of approaching through-vehicles. It also incorporates what is essentially a two-phase signal operation versus what can be up to eight phases at a traditional diamond interchange configuration. The overall design can increase vehicle throughput and safety without the need to widen beyond the existing road or bridge footprint at a limited access interchange [WSDOT DDI website]. Washington's first DDI was completed in Lacey, WA, at Interstate 5 and State Route 510.

Roundabouts: Have proven to be the most effective in severity reductions by eliminating all left turn conflicts, reducing speeds, and adjusting the angle of a crash should it occur. Roundabouts also provide benefits for efficiency, resiliency, and sustainability. Despite concerns from pedestrian and bicycle advocates about accessibility and stress that they may experience at a roundabout, numerous studies in the U.S have shown that roundabouts do work for bicyclists and pedestrians, including those who are blind or visually impaired. Washington has approximately 600 roundabouts with zero recorded pedestrian or bicycle fatalities.

Compact Roundabouts: Where funding or right-of-way are not available, agencies have started to implement smaller innovative intersections which can be built faster and cheaper and capture the safety benefits of roundabouts. In the roundabout vernacular, they are called “compact” roundabouts. Compact roundabouts enable investments at a larger number of intersections, increasing the overall safety benefit.

FIGURE 20. LEFT: SINGLE-LANE ROUNDABOUT (WSDOT).[1] RIGHT: COMPACT ROUNDABOUT (FHWA)

1 https://www.wsdot.wa.gov/publications/manuals/fulltext/m22-01/1320.pdf

Stop Controlled Intersections: Many intersections in Washington are controlled with two-way or all-way stop control. Several safety countermeasures can be implemented to prevent future crashes at these unsignalized intersections:

- Improved Visibility – Enhanced Signing, Delineation and Lighting.
- Improved Maintenance – A suitable schedule for inspection, cleaning and replacement should be established and damaged signs should be replaced. Vegetation maintenance ensures signs can be seen.
- Install Stop Bars – on a minor road approach and where conditions allow a stop bar can be seen by an approaching road user.
- Supplemental Stop Signs Mounted over the Roadway – can provide approaching motorists a clear message that they must stop ahead.
- Flashing Beacons – provides a visible signal ahead.
- Transverse Rumble Strips – warn motorists that something unexpected is ahead.

Protected Intersections: A protected intersection is a comprehensive design approach that keeps bicyclists physically separated from drivers up to the intersection, including the corners. Protected intersections also provide benefits for pedestrians. The term protected in this context refers to the separation provided between general purpose vehicle lanes, bicyclists, and pedestrians.[1]

Intersection Speeds

Intersection Design: The approach speed and speed through an intersection are critical factors in the outcome of a crash for the occupants of a vehicle or a pedestrian or bicyclist struck by a driver at an intersection. This is connected directly to the angle of entry. Most intersections built in the US prior to 2000 were 90-degree intersections. This angle is least successful in mitigating a crash that will cause bodily harm to users, be it a driver-to-driver crash or a driver striking an active transportation user. Alternative designs like RCUTs and roundabouts modify these approach angles, which reduces vehicle speeds and changes the conflict types to merging and diverging. In addition, turning vehicle speeds can be managed by designing tighter corner radii with mountable aprons.

Improve Driver Compliance: Speed safety cameras, red light cameras, and high-visibility enforcement can all assist with driver compliance through an intersection.

1 WSDOT Design Manual, Chapter 1310: Intersections

Intersection Visibility

Low-Cost Treatments: At signalized intersections, low-cost treatments include advance signing, retroreflective backplates, and adding signal heads (per lane and supplemental) to increase visibility. Signing and pavement marking can reduce crashes at unsignalized crashes. Intersection lighting provides greater visibility at night, and the luminaire structures can provide a daytime benefit, designating an intersection ahead. Vegetation maintenance is important to ensure all traffic signal heads are visible.

Intersection conflict warning systems can be installed to warn drivers in real-time (on mainline or side streets) of conflicting motor vehicle traffic. These systems are most often used at high-speed rural intersections or at locations with identified sight distance restrictions.

Separating Movements and Modes

Protected left-turn phases at signalized intersections and turn lanes at all intersections can help separate different driver movements from one another, though care must be taken to consider the effect of additional lanes on pedestrian and bicyclist safety. Leading pedestrian intervals allow for people walking and biking to begin crossing earlier in the phase, allowing for less exposure and increased visibility. Disallowing permissive left turns and right turns during the WALK phase, and disallowing vehicles to make a right turn on red at traffic signals can reduce conflicts with crossing pedestrians.

DESIGN POLICY

Intersection Control Analysis/Evaluation (ICE) Policy: Washington State DOT Design Manual Chapter 1300 provides policy directing the way that WSDOT evaluates a change in intersection control. This policy incorporates the three major considerations for intersection safety.

WSDOT Design Manual: This manual guides the design of state facilities. Cities and Counties may adopt their own design manuals and/or refer to the WSDOT Design Manual. It is updated annually and now incorporates treatments such as protected intersections, a comprehensive design approach with a suite of design features that keep bicyclists physically separated from motorists and provide benefits for pedestrians as well.[1]

Roundabout First Policy: Washington is implementing a roundabout first policy to identify roundabouts as a preferable choice in comparison to signalization in most conditions.

Active Transportation Programs Design Guide: WSDOT's 2024 guide is intended to support local agency and Tribal grant applicants in understanding what types of treatments will receive more favorable consideration for active transportation grant program funding because of their proven effectiveness. It brings together guidance from national publications into one place and has material on intersections as well as accessibility and other topics.[2]

1 https://wsdot.wa.gov/engineering-standards/all-manuals-and-standards/manuals/design-manual

2 https://wsdot.wa.gov/sites/default/files/2024-02/WSDOT-Active-Transportation-Programs-Design-Guide_0.pdf

Highway-Rail Grade Crossings: The train-involved crash data in Target Zero is limited to fatal and serious injury crash events between trains and motor vehicles at highway-rail grade crossings. Between 2020 and 2022, there were one fatality and four serious injuries involving trains and vehicles at these crossings. Active transportation user-involved crashes with a train, even if the crash occurred at the roadway crossing with the rail line, are not included in the typical crash database, but are included in the Washington State Utilities and Transportation Commission (UTC) Highway-Rail Grade Crossing State Action Plan. When scoring higher-risk at-grade crossings, UTC assigns each crossing a transportation equity index score associated with its respective block group.[1]

The Washington UTC has regulatory authority over safety at most public railroad crossings. The UTC's Rail Safety Program oversees rail operations in the state, inspects railroad crossings, resolves complaints received from the public and other partners, and funds rail safety projects. The commission also promotes public awareness in partnership with the national nonprofit Operation Lifesaver Program. Strategies to prevent train and vehicle crashes include outreach and projects to improve safety at public crossings. For more information, visit the UTC website.[2]

These crossings are multi-jurisdictional, meaning both roadway and railroad authorities are responsible for different aspects of design and maintenance. WSDOT maintains more than 100 at-grade railroad crossings on the state highway system. The agency also works in partnership with railroads, port authorities, cities, counties, and others to improve safety at highway-rail grade crossings. WSDOT provides technical support, standard plans, and design assistance through the Development Division Railroad Liaison.[3] WSDOT has several programs that fund safety improvement projects at railroad crossings.[4] It also participates in Operation Lifesaver, and WSDOT's Railroad Liaison serves on the National Committee on Uniform Traffic Control Devices and the Highway-Railroad Community of Interest dedicated to improving safety at crossings.

1 https://www.utc.wa.gov/public-safety/rail-safety/state-action-plan

2 https://www.utc.wa.gov/public-safety/rail-safety

3 https://wsdot.wa.gov/engineering-standards/design-topics/utilities-railroad-agreements/highway-railroad-coordination

4 https://wsdot.wa.gov/business-wsdot/support-local-programs/funding-programs/highway-safety-improvement-program/highway-safety-improvement-program-call-projects

Work Zones: From 2020-22, there were 18 fatalities and 98 serious injuries related to work zones. The most frequently occurring factors were driver distraction and inattention (39%), lane departure (31%), young driver involvement (30%), and speeding (26%).

Safety of workers and the traveling public is a high priority during project development and construction, maintenance work, or any other roadway activities. Detailed work zone policy and guidance documents help agencies develop comprehensive transportation management plans to address work zone safety impacts. Current and upcoming safety strategies include the following:

RCW 46.61.212 defines roadway work zones and requires drivers approaching a work zone to reduce their speed and, if the opportunity exists, yield the right of way by making a lane change or moving away from the lane or shoulder occupied by a work zone vehicle.

RCW 46.61.527, directs the secretary of transportation to adopt standards for the use of traffic control devices in roadway construction zones on state highways, including the establishment of reduced speeds. This statute makes it an infraction for drivers to violate posted construction zone speeds.

Site-specific, multimodal traffic control plans to address unique work zone safety and mobility impacts.

Positive protection devices, such as concrete barriers or transportable attenuators whenever possible. This protects workers from nearby traffic, and the traveling public from equipment, materials, or excavation.

Speed safety cameras. The legislature established provisions to allow WSDOT and WSP to use speed safety cameras in work zones on state highways, including interstates. Enacting legislation through SB 5272 in 2023. A second bill to modify provisions was enacted in 2024 through SB 6115.

Traffic Safety: A Lifelong Journey | Lifecycle of Road Users

Driving a personal vehicle is often considered the normal or default mode of travel in the U.S. However, everyone uses multiple modes of travel across their lifespan. Traffic safety approaches must consider the needs of every road user, including people walking, rolling, and cycling.

A human-centered approach reframes this perspective, considering the needs and experiences of individuals throughout their lives. Such an approach also recognizes that not everyone drives for transportation, due to age, ability, personal choice, or economic factors. It also recognizes that a driver's skill and experience change over time. By considering changing needs and abilities, an equity-based approach also considers pedestrians, bicyclists, and transit riders, and recognizes that each of us will need to use multiple modes of travel in our lives for safe movement. We can understand this as a multimodal continuum over time.

This new paradigm starts at the very beginning of life, long before someone is responsible for their own transportation. During the pre-novice stage, children can be exposed to age-appropriate traffic safety education, fostering awareness and positive behaviors from a young age. Washington's new school-based bicycle safety education program launched in 2022 will reach 90% of all students in the state at full implementation. This program will reinforce knowledge of traffic laws and train students to be confident and competent riders, while also building empathy for bicyclists for the next generation of motor vehicle drivers. The availability of free transit passes for youth around the state is creating a new generation of people riding transit, passenger rail, and Washington State Ferries (where these services are available).

As some become novice drivers in their teens, personalized learning, performance-based assessments, and graduated licensing programs can provide the necessary skills and experience for safe driving. Others may become novice drivers in adulthood. Personalized, language-specific learning opportunities can prove critical for safety, too.

This approach also acknowledges the dynamic nature of individual needs. As people navigate life transitions, like changes during midlife and their senior years, their abilities and circumstances change that may require a need for different approaches to driving and other travel modes. Neurodivergent drivers, for instance, may require specific accommodations and support. Similarly, adults experiencing cognitive or physical decline may need assistance in planning for transportation independence after their driving years end, if that has been their primary form of transportation. Friends and family members need information to encourage their loved ones to acquire new skills that enable them to maintain their transportation independence for as long as possible. Recognizing these diverse needs allows us to provide proactive support and resources throughout the life course, ensuring everyone can navigate the road safely and confidently. People with visual, hearing, or other physical disabilities may require other accommodations to allow them to drive or to provide sufficient alternatives for travel. This includes impairments that may be permanent, as well as those that may develop as the result of an injury, illness, or the aging process.

This lifelong approach offers several advantages. By understanding the unique needs of each stage, approaches become more relevant and effective. Tailored education, personalized support, and flexible transportation options create a system that caters to individuals, not just statistics. This, in turn, fosters a prosocial culture of shared responsibility and community engagement with traffic safety, ultimately leading to safer roads for everyone.

YOUNG DRIVERS

Young drivers face an increased crash risk due to both their relative immaturity and inexperience. According to the National Institutes of Health (NIH), the development of the prefrontal cortex, which is responsible for executive brain functions, is not complete in most humans until the age of 25. Executive functions include the capacity to plan, self-monitor, and control impulses. When a young person is learning to drive, they lack the skills and experience necessary to recognize and respond to risk appropriately. NIH reports that motor vehicle crashes are one of the primary causes of death and injury for individuals ages 15 to 24 years.[1]

Young drivers are defined in Target Zero as ages 15-24 years old. In Washington, a young person can obtain an instruction permit at age 15. At age 16, they can obtain an intermediate license under RCW 46.20.075, after several conditions are met, including six months with an instruction permit and completion of an approved driver safety education course in accordance with the standards established in RCW 46.20.100. A young person who obtains a license to drive at age 18 or older is not required to meet these requirements.

CRASH HISTORY

TABLE 16. YOUNG DRIVER (AGE 15-24) INVOLVED FATALITIES

	2017	2018	2019	2020	2021	2022	CHANGE: 2017-2019 TO 2020-2022
FATALITIES	151	143	127	143	200	176	**+23%**
PROPORTION OF FATALITIES	27%	27%	24%	25%	30%	24%	

For updates to fatalities after 2022, refer to the WTSC Young Driver Fatalities Dashboard.

TABLE 17. YOUNG DRIVER (AGE 15-24) INVOLVED SERIOUS INJURIES

	2017	2018	2019	2020	2021	2022	CHANGE: 2017-2019 TO 2020-2022
SERIOUS INJURIES	677	605	625	698	824	897	**+27%**
PROPORTION OF SERIOUS INJURIES	30%	27%	28%	29%	28%	29%	

For updates to serious injuries after 2022, refer to WSDOT Crash Data Portal.

1 Arain, M. et. al. (2013). Maturation of the adolescent brain, *Neuropsychiatric Disorders and Treatments*, 9: 449-461.

Young drivers ages 15-24 make up just 10.6% of the driving population, but they were involved in crashes that resulted in 26% of all fatalities and 29% of all serious injuries between 2020 and 2022.

OVERLAPPING FACTORS

Among the 519 fatalities involving a Younger Driver (age 15–24) between 2020 and 2022:

- 56.4% (293) involved an Impaired Driver
- 48.5% (252) involved a Lane Departure
- 41.2% (214) involved a Speeding Driver

Note: Categories are not mutually exclusive.

Impairment, speeding, and unrestrained occupants were the top risky driver behaviors that were present in young driver-involved fatalities between 2020 and 2022 (driver impairment is significantly higher among those 21-24 years old compared to drivers 15-20 years old). Higher rates of these behaviors correlates with brain research which shows that teens and young adults below the age of 25 are more likely to engage in high-risk behaviors because they tend to be more impulsive and less likely to understand or think about the consequences of their decisions to drive after using alcohol or drugs, drive at higher speeds, or to not use a seat belt.

SYSTEM CHALLENGES

Washington's graduated driver license system helps young drivers gain valuable experience safely, but a substantial proportion of Washington's young drivers are waiting until age 18 to get their licenses. At age 18 they can get a license without going through any professional driver training if they can pass the written and driving exams. Reasons young adults wait to get their license include the expenses associated with being a licensed driver, required driver education classes to earn a license at age 16 or 17 (including the cost of these classes), and lack of access to a motor vehicle.[1] (WTSC, 2020)

The data show significant differences in fatal and injury crash involvement (i.e., crash rate per population of licensed drivers in that age group) based upon completion of a driver education course. Novice drivers licensed at age 18-20 years old with no driver training prior to licensure had a 78% higher rate of fatal and injury crash involvement, compared to same-age drivers who had completed driver training. Slightly older drivers also showed a significant difference in crash rates between those who have and have not completed driver training. Specifically, drivers age 21-24 who lacked driver education had crash rates that were 67% higher compared to their peers who had completed a driver training course. These findings suggest that formal driver training is associated with significantly reduced injury and fatality outcomes.

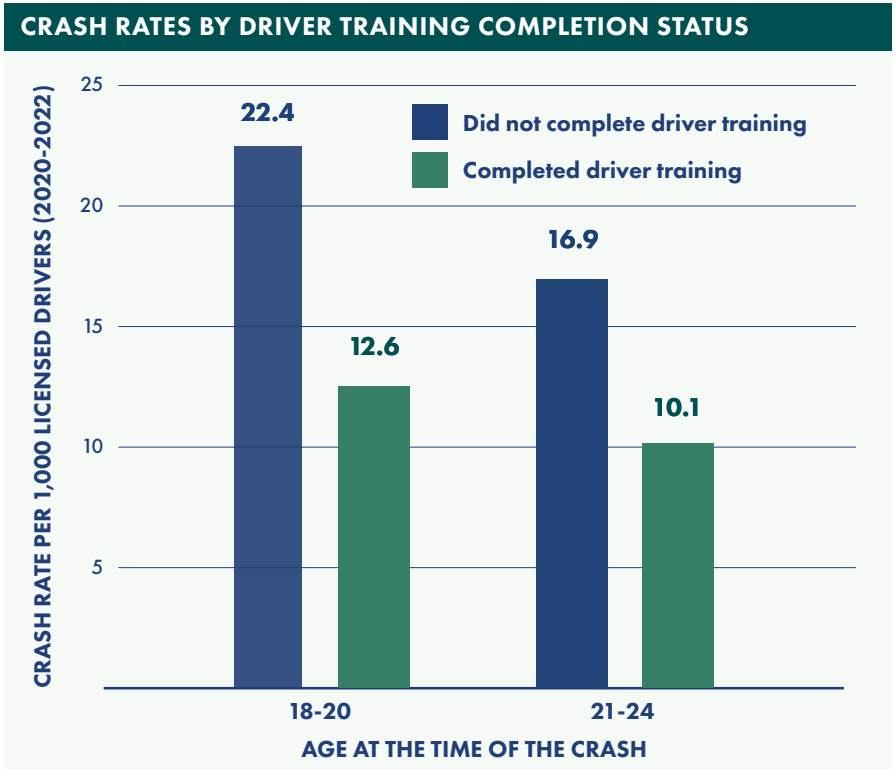


FIGURE 21. CRASH INVOLVEMENT RATES FOR 18-24 YEAR OLDS, INJURY AND FATAL CRASHES IN WASHINGTON BY DRIVER TRAINING COMPLETION STATUS

1 https://wtsc.wa.gov/wp-content/uploads/dlm_uploads/2020/09/GDL-Program-Attitude-and-Behavior-Survey-Results-V2_Oct2020.pdf

> "Many [youth] are driving without a license, no driver education background, and lack of familiarity with traffic laws."
>
> *—Tribal listening session participant, describing the lack of driver's education opportunities in rural areas*

PRIORITY STRATEGIES

Extend Intermediate Requirements: Extending intermediate license and driver training requirements to older novice drivers (18+ years old) is another approach to increasing safe driving behaviors. In this approach, it would also be advisable to increase access to and affordability to state authorized driver training courses to avoid exacerbating existing inequities. Extending these requirements without improving the accessibility and affordability of driver training could lead to young people further delaying licensure to "wait out" the requirements, or choosing to drive unlicensed. WTSC estimates that extending requirements for driver education and intermediate licensing through age 24 would result in approximately 4,000 fewer injury crashes in Washington per year.

SB 5583 requires DOL to research the feasibility, and provide recommendations, for expanding mandatory driver education as a requirement for obtaining a driver license from age 18 to 24.

This includes, but is not limited to:

- Courses that can satisfy this expanded educational requirement.
- Assessment of public and private resources.
- Current access to drivers' education (and how to improve access).
- Developing a plan for public outreach and education.
- Collaboration with Educational Service Districts to determine if they can support facilitation.
- Options to address financial need (for students enrolled in schools and private settings).
- Approaches by other states who have similar requirements.
- Requiring DOL to research mandatory driver education refresher courses on the topics of risk management and hazard protections one year after licensure and appropriateness for intermediary card holders, and
- Assessment of directly providing driver training education or facilitating partnerships with driver educators to close availability and accessibility gaps in rural and underserved areas.

Opportunities also exist in Washington to strengthen Graduated Driver Licensing (GDL) restrictions, one of which is to adjust nighttime restrictions to begin at 9:00 pm instead of 1:00 am.[1]

1 WTSC Policy Brief: Reducing the Risks of Injury and Fatal Crashes among Young Drivers, 16 through 25 Years of Age.

Improve Driver Education and Intervention: Encourage improvement of training programs and standards with inclusion of hazard identification and traffic safety instructor development to match NHTSA standards. Support mentorships, teen/parent driving contracts, and legislation and funding for financial assistance to underserved populations to cover a portion or the full cost of the driver training.

Foster Compliance with Washington's GDL Laws and Strengthen Restrictions: Adjust licensing restrictions with extended nighttime restrictions (i.e., start the nighttime restriction earlier), a lengthier permit holding period, and strengthened passenger restrictions. Provide parents, law enforcement, and driver education program providers information about the GDL program to encourage support for legislation. Provide education and training to parents about driving risks their children face and how to set appropriate limits to reduce these risks. Encourage Tribal communities to adopt GDL laws and provide resources to improve awareness.

Make Driver Education Accessible: Policy makers can increase access to driver education by reducing the cost for students generally or subsidizing the cost for low-income drivers specifically. Tribal representatives identified this need, seeking more funding for programs in rural areas that serve Tribal populations and an education incentive program. Making driver safety education more affordable would allow more drivers to receive training and an intermediate license at age 16- or 17-years-old.

Peer to Peer Education: Programs such as Teens in the Driver Seat provide peer-based traffic safety education in Washington high schools, junior highs, and colleges, empowering youth to actively promote traffic safety. The program addresses all major risks for this age group, including impairment, speeding, and distraction. It applies several frameworks—peer-to-peer, traffic safety culture, shared risk, and protective factors—to change behaviors among young people.

Individual Incentives: Incentivizing safe driving choices on the individual level to encourage newer drivers to establish good driving habits. One example of this is the smartphone app "You in the Driver Seat," where any young driver in Washington can earn gift cards for driving distraction free and not speeding.

Education by Community Influencers: Empowering influential community members, such as law enforcement and first responders, to deliver in-school traffic education through assemblies or small group presentations.

Driver Skills Exam Update: A pilot study is underway to modernize Washington's driver skills exam. This effort includes identifying critical components that should appear on a driver skills test to evaluate a driver's potential. The pilot study has the potential to introduce Hazard Perception testing. Washington would be the first state in the U.S. to include this feature.

Provide Active Transportation and Transit: Providing active transportation facilities and transit availability will help offer additional modal options for young people, which will positively affect young driver safety by reducing their use of motor vehicles. Increasing the frequency, reliability, and availability of transit services supports this. Move Ahead Washington introduced free transit services for riders ages 18 and younger. This was recently expanded to Amtrak services in the state.[1]

1 https://wsdot.wa.gov/about/news/2022/youth-can-ride-transit-free-most-washington

OLDER DRIVERS

People aged 70 years old and older are the fastest growing segment of the population in Washington. The aging of the state's population brings with it new issues and challenges, including how to keep older drivers safe and mobile. Driving means independence to an older individual. It enables connection with community and health related visits.

Fatalities involving older drivers in Washington have been trending upward, with a recent fatality increase of 11% from 2017-2019 to 2020-2022. This is partially due to increased exposure: there are a greater number of older adults in the state, and they are keeping their licenses longer and driving more than previous generations. Between 2020 and 2022, 96% of the population aged 70-74 years old held a valid driver license; and 75% of the population aged 85+ years old had a driver license.

CRASH HISTORY

TABLE 18. OLDER DRIVER (AGE 70+) INVOLVED FATALITIES

	2017	2018	2019	2020	2021	2022	CHANGE: 2017-2019 TO 2020-2022
FATALITIES	71	66	89	74	83	94	**+11%**
PROPORTION OF FATALITIES	13%	12%	17%	13%	12%	13%	

For updates to fatalities after 2022, refer to the Target Zero Performance Dashboard.

TABLE 19. OLDER DRIVER (AGE 70+) INVOLVED SERIOUS INJURIES

	2017	2018	2019	2020	2021	2022	CHANGE: 2017-2019 TO 2020-2022
SERIOUS INJURIES	199	210	258	256	287	295	**+26%**
PROPORTION OF SERIOUS INJURIES	9%	9%	11%	11%	10%	10%	

For updates to serious injuries after 2022, refer to WSDOT Crash Data Portal.

OVERLAPPING FACTORS

Of the 251 fatalities involving an Older Driver (70+):

- 39.0% (98) were Intersection-related
- 38.6% (97) involved an Impaired User
- 33.4% (84) involved a Lane Departure

Note: Older driver may not be the impaired road user. Categories are not mutually exclusive.

SYSTEM CHALLENGES

As people age, they may experience declines in their driving abilities because of age-related changes and/or medical conditions. Older people are particularly vehicle-dependent because unlike younger people, they live disproportionately in more remote, rural areas with few, if any, transportation choices. Increased availability of transit service, including micro-transit, paratransit, Dial-a-Ride, and other flexible services in addition to fixed-route service can increase transportation independence in such areas.

Car ownership and driving are strongly linked to independence and life satisfaction for older adults who can drive for transportation. However, most people still outlive their ability to drive. The average American male outlives his ability to drive by six years, and the average American female by 10 years.[1]

Fragility is more common in older adulthood – for a given crash force, an older person will sustain a greater level of injury and have a harder time recovering from a resulting injury. This is true for older people outside the vehicle as well as inside.

PRIORITY STRATEGIES

Identify Drivers at Elevated Medical Risk: Establish and develop updated guidelines for medical conditions and the potential for medications to affect driving. Driver license restrictions or revocations, when needed, can assist in limiting risks.

Improve Methods for Evaluating Driving Abilities: Implement programs that allow for screening and evaluating of older drivers' physical and cognitive abilities along with training for law enforcement, licensing providers, medical professionals, and community members to recognize diminishing abilities. With the new guidelines and education, reevaluation referrals can assist in providing proper screening.

Train driver licensing office representatives on how to best identify customers with physical and cognitive conditions that can interfere with the safe operation of a motor vehicle. Adding restrictions to licenses such as daylight driving only, specific geographical areas, or low speed roads can assist with risk reduction.

Involve caregivers and family members of older drivers in discussions and education about aging and driving and provide techniques they can use to help the older driver assess safe driving, and, when necessary, transition from driving.

1 AAA Foundation. These data are included on a gender binary because that's how the referenced study collected the data. This plan acknowledges that it does not represent everyone.

Improve Older Driver Competency: Increase driver education opportunities, with the development of classes and partnerships to introduce older road users to new vehicle technologies, roadway technologies, and roadway designs to support continued learning of safe vehicle and road use.

Road Visibility Improvements: Improving signage, pavement markings and the readability of roadway signs can better accommodate the needs of older drivers. These treatments also make the system safer for all road users.

Provide Active Transportation and Transit Options: Providing active transportation facilities and transit availability will help keep older people active and better drivers (making travel safer for everyone) by supporting their overall health, and when they are unable to drive themselves, these facilities will offer additional modal options. Access to transit is limited across most of Washington, as are services to take older individuals to appointments. Making improvements to these options will positively affect older driver safety. Increase the frequency, reliability, and availability of transit services, carpooling, etc., to provide lifelong mobility options for older road users.

Older Driver Study Proviso (HB 1125, Section 208): This study has been commissioned by the legislature to develop a comprehensive plan aimed at improving older driver safety, including a report on the plan by December 1, 2024. The plan will include the following:

- A comprehensive review of DOL policies surrounding older drivers and medically at-risk drivers, including the medical assessment review process and the counter assessment process in licensing service office.
- A feasibility analysis of DOL establishing a medical advisory board to advise on general policy for at-risk drivers, driving privileges for individual medically at-risk drivers, and an appeals process for drivers whose privileges are revoked or restricted due to medical conditions.
- A recommended assessment tool to determine a driver's potential risk to themselves or others when operating a motor vehicle so DOL may make informed decisions on appropriate courses of action within the older driver program.
- Detailed information on how each component of the plan improves the safety associated with older drivers, while preserving the maximum level of older driver independence and privacy.

3.6 ROAD USERS BY MODE OF TRAVEL

ACTIVE TRANSPORTATION USERS

The Washington State Vulnerable Road Users Safety Assessment, completed in November 2023, is provided in Appendix D.

Active transportation users are people who use a human-scale and often human-powered means of travel. Active transportation includes walking, bicycling, using a mobility assistive or adaptive device such as a wheelchair or walker, micromobility devices such as skateboards, and electric-assist devices such as e-bikes and e-foot scooters. People may use those modes for the entire length of a trip or to access public transportation, passenger rail, ferry service, or airports. They are essential to a multimodal system.

Walking, bicycling, and rolling are distinct modes with some differences in trip characteristics, and in the infrastructure and operational strategies that may be recommended. They are combined here for purposes of discussion because they share many common factors–most notably vulnerability to crash forces in a vehicle collision.

During the 2020-2022 study period, 21% of all traffic fatalities and 17% of all traffic serious injuries were active transportation users. These figures continue to trend upwards. In 2021 active transportation user deaths reached their highest number ever recorded in Washington. Compared to 2017-2019, the 2020-2022 figures show a 19% increase in fatalities for people who walk, bike, and roll; and a 2% increase in serious injuries. Combined 2020–2022 active transportation user fatalities and serious injuries (3,675) in Washington constituted an average of 3.3 people per day who were killed or seriously injured while walking, biking, or rolling.

CRASH HISTORY

TABLE 20. ACTIVE TRANSPORTATION USER FATALITIES

	2017	2018	2019	2020	2021	2022	CHANGE: 2017-2019 TO 2020-2022
FATALITIES	124	119	116	123	160	145	**+19%**
PROPORTION OF FATALITIES	22%	22%	22%	21%	24%	20%	

For updates to fatalities after 2022, refer to the WTSC Active Transportation User Fatalities Dashboard.

TABLE 21. ACTIVE TRANSPORTATION USER SERIOUS INJURIES

	2017	2018	2019	2020	2021	2022	CHANGE: 2017-2019 TO 2020-2022
SERIOUS INJURIES	449	523	460	397	509	550	**+2%**
PROPORTION OF SERIOUS INJURIES	20%	23%	20%	16%	17%	18%	

For updates to serious injuries after 2022, refer to WSDOT Crash Data Portal.

SYSTEM CHALLENGES

Exposure. Between 2017 and 2022, motor vehicle miles traveled (VMT) decreased by 9%, which should have decreased exposure for active transportation users.[1] This decrease in VMT reflected changes in driving patterns during the COVID pandemic when many commuters shifted to teleworking. However, the number of crashes involving people walking and biking increased during this time. An increase in drivers traveling at speeds significantly above posted speed limits resulted in more severe injury outcomes in crashes involving active transportation users.

Effect of Vehicle Size. Another trend is the increase in larger passenger vehicles such as light duty trucks and SUVs on the road. The mass, size, and shape of the striking vehicle directly affect the severity and nature of injuries sustained by the active transportation user. Not only are pickup trucks and SUVs heavier than traditional passenger cars, but their height also significantly changes the crash angles when an active transportation user is struck. According to a recent study by the Insurance Institute for Highway Safety, a vehicle hood's leading edge that is 40 or more inches above the road surface increases the risk of a pedestrian fatality in a crash by 45%, compared to vehicles with a leading edge that is only 30 or fewer inches off the ground.[2]

Speed. Driving speed is the most important factor associated with pedestrian and bicyclists fatalities and serious injuries. Seventy-eight percent of pedestrian fatalities and 74% of bicyclist fatalities occurred on roads with a posted speed above 25 mph. Where a motorist is traveling faster than 25 mph, crashes are more likely to occur, and when they do they are more likely to result in serious injuries or fatalities. Only 1% of pedestrian and bicyclist serious injuries and fatalities occurred on roads with a reported posted speed limit of 20 mph.

Designing roads at higher speeds often lead to longer intersection spacings and fewer traffic controls, resulting in crossing locations that require the pedestrian to travel longer distances and to judge closing speed of the driver to decide whether they have time to cross. The alternative is to follow along the shoulder or sidewalk—if available—with associated costs and burdens in time, potential security concerns, adverse weather conditions, and other tradeoffs.

1 Vehicle Miles Traveled

2 Vehicles with higher, more vertical front ends pose greater risk to pedestrians, IIHS, 2023

Pedestrian Crashes at Crossings. Three out of every five pedestrian fatal and serious injury crashes (60%) occur when the pedestrian is crossing the street. In most of these crashes the person walking was either reported as using the roadway (47%) or a marked or unmarked crosswalk (49%). 56% of the pedestrian crashes were documented as being intersection related, yet limited infrastructure data is available to help understand the contributing factors of those crashes. State and local jurisdictions don't have complete, current inventories of the presence or absence of sidewalks or crosswalk markings; a pedestrian may be in the roadway because no other option to cross has been provided.[1]

In 52% of bicyclist fatal and serious injury crashes, the bicyclist was using the roadway. This may reflect the lack of separated bicyclist lanes, which is especially concerning at intersections where separated bicycle lanes are dropped to make space for motor vehicle turn lanes. More data regarding the availability of bicycle lanes and sidewalks will help to determine the extent to which investments are needed to address bicyclist and pedestrian crashes occurring in the roadway.

Crashes by Location. Most fatal and serious injury crashes for both pedestrians (87%) and bicyclists (85%) occur in population centers (cities and census designated places). Of the crashes that occur in population centers, 81% were in high equity index census tracts—in locations where it's more likely that people rely on walking, bicycling, and transit access for everyday transportation, and where pedestrian/bicyclist facilities are less likely to be provided.

Only 4% of pedestrian fatal and serious injury crashes and 6% of bicyclist fatal and serious injury crashes occurred in rural areas.

Underserved road users in rural and Tribal areas also use active modes of travel - sometimes to travel relatively long distances. Rural roadways are much less likely to have separated pedestrian and bicyclist facilities.

Nighttime Crashes. About 57% of pedestrian fatal and serious injury crashes occurred at night. Of those, 72% occurred at a location where streetlights were on, suggesting that typical street lighting practices may not be adequate for reducing the potential for pedestrian crashes in dark conditions. Pedestrian scale lighting design seeks to address this concern, but is not yet widely implemented in most areas.

Road Characteristics: Crash Severity, Likelihood and Vehicle Speed: Pedestrian and bicyclist fatalities appear more likely to occur at locations where more active transportation users are found and where posted speed limits or operating speeds are higher. More than half (56%) of pedestrian and bicyclist fatal and serious injury crashes occur on roads with a posted speed limit greater than 25 mph. Looking at fatalities alone, 78% of pedestrian fatalities and 74% of bicyclist fatalities occurred on roads with a posted speed above 25 mph. Only 1% of pedestrian and bicyclist serious and fatal crashes occurred on roads with a posted speed of 20 mph (as noted previously, at 20 mph 9 out of 10 people were survive being hit by a motor vehicle).

1 In 2023 the legislature appropriated $5 million to develop a comprehensive statewide inventory of sidewalks that will assess their accessibility and condition. That work is underway. https://sidewalks.washington.edu/2024/06/07/washington-state-proviso/

Inequitable Outcomes in Active Transportation User Safety:
Both pedestrian and bicyclist fatal and serious injury crashes were more likely to occur in high equity score census tracts. While not the only measure of equity-related variables, certain racial, cultural, and ethnic group identities are overrepresented in the crash data. People who are American Indian or Alaska Native comprise 1% of the Washington population but make up 7% of active transportation fatalities. Those who have a multiple racial heritage make up less than 9% of the population and 14% of fatalities. African Americans make up just over 4% of the population, but 6% of pedestrian fatalities. No data is available on whether a crash victim had a disability or was low-income, both of which are additional factors associated with reliance on walking, biking, and/or transit access.

Active transportation users ages 65 and older are two to eight times more likely to die than younger people when struck by a motor vehicle. Approximately 15% of pedestrians 65 and older die after being hit by a motor vehicle, in part due to a decline in physical resiliency. Population trend predictions indicate that this is an issue that is expected to increase in coming years. In 2022, 17.1% Washington residents were 65 and older and by 2030, the baby boomer generation (those born between 1946 and 1964) will make up 1 of every 5 individuals in Washington. By the year 2050, the number of adults over 60 is forecasted to represent over 29% of the state's total population.

Data is lacking for traffic deaths of people who are houseless, the numbers of whom have increased in our state over the last 10 years. Focusing implementation efforts on destinations that serve this population will be important for eliminating fatal and serious injury crashes that involve them.

RELATED PLANS AND PROGRAMS

Several recent plans provide detailed recommendations for specific safety measures. These include the Action Plan for Implementing Pedestrian Crossing Countermeasures at Uncontrolled Locations (2018 Safe Transportation for Every Pedestrian (STEP) Plan), Washington State Injury Minimization and Speed Management Policy Elements and Implementation Recommendations (2020), Washington State Active Transportation Plan (2021) and WSDOT Vulnerable Road Users Safety Assessment Report (2023). These documents collectively provide a systematic framework of information and guidance for addressing pedestrian and bicyclist issues and potential safety improvement measures.

In 2019, the legislature passed Substitute Senate Bill 5710, which required the WTSC to convene the Cooper Jones Active Transportation Safety Council (ATSC), governed by RCW 43.59.156. The purpose was to use data to identify patterns related to fatalities and serious injuries of active transportation users, with the goal of identifying improvements. The council may monitor implementation progress of ATSC recommendations and seek opportunities to expand consideration and implementation of the principles of systematic safety, including data collection improvement. To better understand active transportation user data, the WTSC conducts fatal case file reviews with members of the ATSC. The observations from the case reviews often lead to the development of study teams, which in turn, can lead to ATSC recommendations. The council provides these recommendations to the legislature annually in the Cooper Jones Active Transportation Safety Council's Annual Report. To date, the legislature has acted on 15 recommendations, including expanding the use of traffic safety cameras, making it easier for local jurisdictions to lower speed limits, and providing funding for research to recommend active transportation user lighting standards.

In 2022 the legislature passed SB 5687 which expanded the allowable use of 20 mph speed limits to local authorities and beyond only residential and business districts. In 2023 the legislature passed HB 1181, updating the Growth Management Act. This requires jurisdictions to apply multimodal level of service standards and give priority to multimodal safety in Comprehensive Plan updates. Local jurisdictions must include a transition plan for transportation as required in Title II of the Americans with Disabilities Act (ADA) of 1990. Taken together, these policy directives point to the need for robust planning for safe, accessible active transportation and transit access in local land use decisions.

Action Plan for Implementing Pedestrian Crossing Countermeasures at Uncontrolled Locations: The STEP Plan provides recommendations for process change to improve current practice and inform a desired future state in which appropriately controlled crossings are available to meet pedestrian needs that have not been addressed in the design and construction of the current driving-oriented facilities.

Recommendations include several statewide policy changes already underway, along with actions that need more work to fully implement. These include the following:

- Ongoing data collection, analysis, and evaluation.
- Land use context and modal facilities and treatments, volume, and behavior analysis to inform facility types and locations.
- Methodologies for prioritizing pedestrian improvements that are responsive, flexible, and transparent.
- Crossing enhancements following guidance that considers posted speed, traffic volume, crossing proximity, and roadway configuration.

Washington State Active Transportation Plan: The Washington State Active Transportation Plan (ATP) describes the state's active transportation network as an incomplete patchwork, with high-quality segments in some locations and no facilities in others. Development of the plan included the first-ever comprehensive evaluation of state routes for active transportation purposes and an equity and safety analysis. The plan was built on the STEP, the speed management policy framework, and other sources to arrive at recommendations.

In areas with greater population density, there are opportunities to encourage road users to shift from motor vehicles to bicycling and walking. Land use planning plays an important role for increasing population density, planning shorter routes of travel, and reserving spaces for safe active transportation travel.

Network needs include:

- Creating facilities suitable for people of all ages and abilities, using the level of traffic stress (LTS) index to measure how wide, fast, and busy a road is.
- Increasing safe crossings for active transportation users.
- Designing crossings to address the context of the roadway, including road size, speed, and volume of vehicle traffic.
- Installing wayfinding signs to allow active transportation users to navigate an area, such as guide signs for motor vehicle users.
- Improving the state's capacity to understand and manage assets.
- Partnering across jurisdictions to provide network connectivity.

ATP implementation is supported by the 2022 Move Ahead Washington legislation, including increased investments in grants to local agencies and the Complete Streets requirement on WSDOT projects changing state routes over time to improve active transportation safety, accessibility, and connectivity (a requirement for projects greater than $500,000 under RCW 47.04.035).

Access to High Capacity Transit: Upcoming transit expansion in Washington will add more than 100 new High-Capacity Transit (HCT) stations, many of which will be along high-posted-speed-limit state routes with high vehicle volumes. WSDOT's Management of Mobility Division is completing a project titled "Removing Highway Barriers to High-Capacity Transit Station Access" that addresses the need for safe, well-planned access to HCT by active transportation users. The draft document contains national best practices and recommendations for infrastructure treatments, suggested changes to the WSDOT Design Manual, and recommended policy language to improve safety for people who walk, bike, and roll to and from HCT.

Active Transportation Crash Analysis for Washington State Target Zero Plan: Crash data from 2020 through 2022 gives additional insight into the patterns associated with fatal and serious injury pedestrian and bicyclist crashes. The findings point to road characteristics, places, and population groups where safety investments will likely have the greater potential to reduce future deaths and serious injuries among these travelers as well as for people using other modes.

PRIORITY STRATEGIES

Using the Safe System Approach to address crash exposure, likelihood, and severity is the core of this Target Zero Plan. For active transportation users, this starts with three main opportunities: lowering driving speeds, increasing crossing treatments, and separating facilities from motorized traffic traveling along the system.

> "We prioritize maintenance for car features of the road, but not sidewalks or bike lanes."
>
> *—Community listening session participant in Yakima County*

The following active transportation safety treatments can be relatively low-cost, but each will require political leadership and a true commitment to changing the transportation system.

- Road reconfigurations: Set a standard for a change to every road that has less than 15,000 vehicles per day. Reduce the number of travel lanes, assess posted speed limit, narrow travel lanes, and install separated bicycle and pedestrian facilities. Road reconfigurations can also be considered on roadways with greater than 15,000 vehicles where appropriate.
- Increase use of automated traffic safety cameras.
- Use default and/or category speed limit setting practices and post lower speeds, iterating down to the target speed for the land use and mix of people and destinations.
- Leading pedestrian intervals at all traffic signals.
- Raised crossings.
- Right turn lane and slip lane removal at intersections
- Curb extensions, median islands, or other treatments to reduce crossing distance for people walking or biking and make them more visible to drivers who are turning.

The following are recommendations and serve as topics to expand on in the Target Zero Implementation Plan:

Reducing Driving Speeds

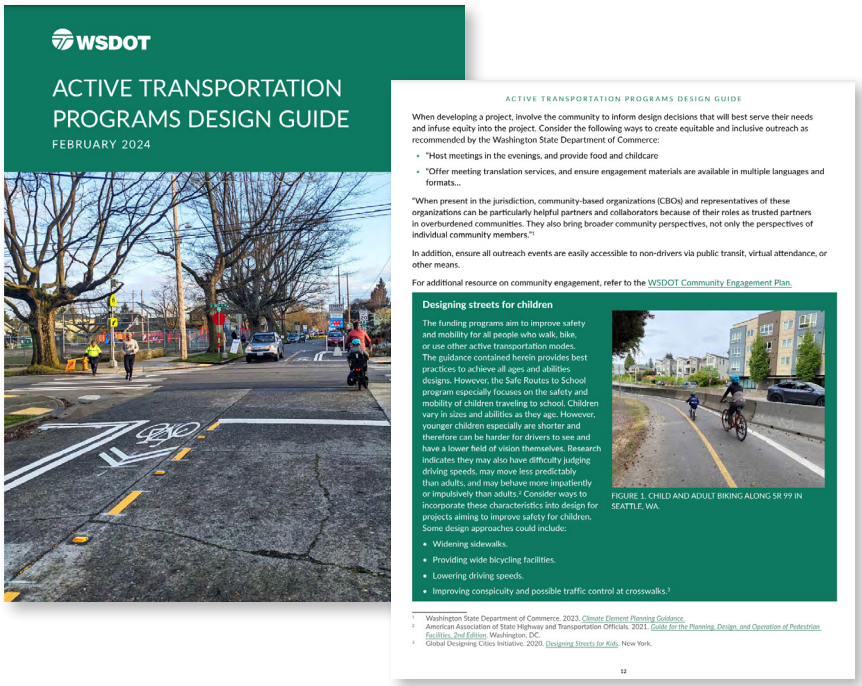
- Inventorying the transportation system to identify multimodal networks and their associated speed limits and differences from target speeds in population centers; tracking progress of speed reduction efforts.
- Communicating the importance of lower speed limits for the safety of all road users to drivers, the public, and elected officials.
- Changing the way that posted speed limits are set with the goal of minimizing injury severity and likelihood, implementing the approach outlined in the Injury Minimization and Speed Management policy framework in population centers.
- Installing speed management treatments such as road diets, roundabouts, automated traffic safety cameras and gateway treatments with culturally relevant installations – refer to the WSDOT Active Transportation Funding Programs Design Guide.
- Right-sizing Washington roads. This process includes the following elements:
  - » Inventorying multilane roads.
  - » Evaluating road reconfiguration.
  - » Systematically implementing road reconfiguration to lower speeds and create space utilized for separated active transportation users.

Investing in pedestrian and bicyclist crossings:

- Implementing the Washington State Safe Transportation for Every Pedestrian Action Plan for Implementing Pedestrian Crossing Countermeasures at Uncontrolled Locations.
- Inventorying the transportation system to identify multimodal roadways where there are destinations, transit connections, and other pedestrian/bicyclist crossing needs with the goal of minimizing out-of-direction travel by optimizing the frequency of low traffic stress crossings in population centers.
- Based on the inventory, installing crossing treatments with higher frequency in population centers at legal crossings and at mid-block crossing locations.
- Utilizing leading pedestrian intervals and pedestrian scrambles at traffic signals.
- Providing adaptive pedestrian signals in locations that can be expected to have higher numbers of slower-moving pedestrians, so time is extended to accommodate their travel speeds.

Providing separated pedestrian/bicyclist linear facilities.

- Installing separated pedestrian and bicyclist facilities such as sidewalks, shared use paths and bicycle boulevards – refer to the WSDOT Active Transportation Funding Programs Design Guide.
- Institute requirements for construction of new roads in population centers to include active transportation facilities.
- Prioritizing walk/bike facilities including appropriately controlled crossings and linear facilities for access to public transportation stops and schools.



Other Opportunities:

- Lowering vehicle miles traveled.
  - » Implementing recommendations in the WSDOT Vehicle Miles Traveled (VMT) Targets – Final Report.
  - » Changing the way the vehicle miles traveled are calculated to include consideration for the safer miles traveled via public transportation.
  - » Implementing strategies that affect the cost of motor vehicle use, like congestion pricing and parking fees.
  - » Considering how public transportation systems like buses and light rail help to reduce crash exposure by removing vehicles from the system and investing in transit systems for their contributions to safety and other co-benefits.
- Creating transportation efficient communities through land use policy by reducing walkable/bikeable distances to destinations.
- Focusing on improvements that will serve Tribal communities:
  - » Investing in active transportation and transit on Tribal lands.
  - » Working with Tribal governments to understand and meet their needs.
- Supporting public transportation for safer multimodal travel by:
  - » Completing an equity analysis of gaps in transit service where transit would reduce potential for serious/fatal crashes.
  - » Providing transit passes tied to income, and to seniors, like the youth free passes funded under Move Ahead Washington.
  - » Increasing the frequency of service to decrease the time cost of public transportation and increase ridership, which will mean fewer people driving and save lives by decreasing exposure.
  - » Reduce the potential for crashes at public transportation stops and nearby crossings. When necessary, eliminate stops on high-speed, high-volume roads, which will require alternate routes or changes to the roadway to consider the safety of public transportation riders.

WHO CAN MAKE A DIFFERENCE:

- Policymakers, including those who make zoning decisions for housing, businesses, and public resources.
- Policymakers who set taxes and fees, which create incentives and disincentives to use different modes of travel.
- Owners of public roads, streets, and highways in Washington.
- Entities who communicate with and inform the public about the importance of lower speeds, their role in driving the speed limit or lower, and what it will take to achieve a positive traffic safety culture.
- Agencies that provide public transportation.
- The public.

MOTORCYCLISTS

Motorcyclists constitute a subset of vulnerable road users facing an elevated level of risk, primarily due to the limited protection motorcycles offer riders compared to other types of vehicles. A motorcycle is also smaller, making it less visible to drivers than other motorized vehicles. According to the U.S. Department of Transportation (USDOT), in 2021 a crash involving a motorcyclist was nearly 24 times more likely to be fatal per 100 million VMT than a standard vehicle.[1]

Motorcycles are 3% of registered vehicles in Washington. From 2020 to 2022, motorcyclists involved in just 1.8% of all reported motor vehicle crashes, but they constituted 16.8% of all people killed in traffic crashes in the state. Between the years 2017-2022 the overall number of motorcycle crashes decreased but the number of fatalities and serious injuries increased. Combined 2020 – 2022 motorcyclist fatalities and serious injuries (1,758) constituted an average of 1.6 crashes in Washington each day that resulted in a rider being killed or seriously injured.

CRASH HISTORY

TABLE 22. MOTORCYCLIST FATALITIES

	2017	2018	2019	2020	2021	2022	CHANGE: 2017-2019 TO 2020-2022
FATALITIES	80	80	95	93	92	133	**+25%**
PROPORTION OF FATALITIES	14%	15%	18%	16%	14%	18%	

For updates to fatalities after 2022, refer to the WTSC Motorcyclist Fatalities Dashboard.

TABLE 23. MOTORCYCLIST SERIOUS INJURIES

	2017	2018	2019	2020	2021	2022	CHANGE: 2017-2019 TO 2020-2022
SERIOUS INJURIES	400	400	421	424	470	546	**+18%**
PROPORTION OF SERIOUS INJURIES	18%	18%	19%	17%	16%	18%	

For updates to serious injuries after 2022, refer to WSDOT Crash Data Portal.

1 USDOT Traffic Safety Facts 2021 Data

OVERLAPPING FACTORS

Of the 318 motorcyclist fatalities (2020-2022):

- 53.4% (170) involved an Impaired Driver
- 47.7% (152) involved a Speeding Driver
- 33.6% (107) involved a Lane Departure

Note: Categories are not mutually exclusive.

SYSTEM CHALLENGES

Interactions between motorcycles and larger vehicles carry additional risks due to the design of motorcycles and the lack of protection for riders and passengers. Motor vehicle drivers may not be aware of required maneuvers for a motorcycle to avoid a crash. Drivers may have a difficult time judging the speed or distance of a motorcycle on the roadway due to its narrow profile.[1] Due to the lack of protection and relative instability, motorcycles and their riders will generally suffer far worse damage and injury.

There is also a significant disconnect between riders' perception of risk and the actual causes and contributing factors of serious crashes involving motorcycles. Most riders involved in motorcycle crashes, regardless of severity, were found to have taken specific actions that contributed to the crash and/or increased its severity.

Unendorsed Riders: In Washington, 20% of motorcycles are registered to individuals without an endorsement. In fatal crashes where a motorcycle driver or passenger were killed, 35% of the motorcycle drivers were unendorsed.

Motorcyclist Safety Risks. In Washington's 2023 statewide survey, motorcycle riders were asked what they believe are the greatest risks to motorcycle riders' safety. In nearly 75% of the responses provided, riders thought their greatest potential for crashes were other drivers on the road who were impaired, driving too fast, driving agressively, driving distracted, not looking for motorcyclists or checking blind spots, and not adhering to safety or traffic laws. Some listed pedestrians, weather, and stationary and moving objects including potholes, debris, animals, and children. The reality is that most serious injury and fatal motorcycle crashes (around 75%) are caused by rider error and choices.

From 2021-2024, law enforcement has reported an increase in the number of riders who are traveling at excessive speeds, sometimes over 100 mph. Law enforcement is reporting an increase in the number of riders failing to stop for law enforcement officers (eluding police).

1 Traffic Safety Facts: Motorcyclists, NHTSA, 2022.

PRIORITY STRATEGIES

Rider Education and Endorsement: Educate and collaborate with dealers and manufacturers to promote motorcycle training. Include additional incentives, to complete training classes and outreach opportunities.

Prosocial Traffic Safety Culture among Motorcycle Riders: Promote self-policing within the motorcycle community to discourage impaired riding and reckless behaviors. Increase the desire to obtain ongoing training.

Prosocial Traffic Safety Culture for Vehicle Drivers: Promote safe motor vehicle operation to reduce the potential for motorcyclist-involved crashes.

Increase Rider Safety Awareness: Education of motorcycle vulnerability and enhancement to the visibility of the rider can provide added safety. Increase outreach to the dangers of riding and how to minimize the risks. Address rider behavior through education, training, and awareness campaigns to enhance overall motorcycle safety in Washington. Washington's Motorcycle Safety Program promotes safe and sober riding.

Motorcycle-Specific Safety Equipment: Encourage motorcyclists to wear all the gear all the time. Protective equipment includes motorcycle helmets that meet USDOT safety standards, gloves, boots, long pants, and a durable long-sleeved jacket, and eye and face protection. Washington has a primary motorcycle helmet law in RCW 46.37.530.

Proper helmet use can limit lives lost in a motorcycle crash. The NHTSA estimates 37% effectiveness in preventing fatalities for motorcycle riders and 41% for passengers.[1] Additionally, motorcyclists should be encouraged to implement visibility enhancement methods to include highly visible and reflective protective gear, lane placement, and technological advances.

1 Source: USDOT Traffic Safety Facts 2021 Data

Law Enforcement Motorcycle Awareness: Enforcement is a deterrent for dangerous and illegal behaviors on our roads. Education to law enforcement officers about motorcycle laws increases their understanding of crash causation factors and motorcycle safety violations. In addition to training, information and refreshers are provided through social media and roll call videos designed for law enforcement audiences.

High visibility enforcement (HVE) campaigns are conducted in areas where data show there have been a larger number of serious and fatal motorcycle crashes. Patrols watch for behaviors by motorcyclists and motor vehicle drivers that increase risk, including impairment and excessive speed. Following or riding too closely also endangers motorcyclists. Law enforcement is also encouraged to increase their use of the authority to impound a motorcycle from unendorsed riders. If this becomes a more common practice, it will provide a powerful incentive for those who ride to obtain their endorsements.

Increase Motorist Awareness of Motorcyclists: This countermeasure can reduce motorcycle crashes by addressing the behaviors of other motor vehicle drivers (non-motorcyclists) and raising motorist awareness of motorcycles. These programs include Watch Out For Motorcyclists, Share the Road, and Look Twice-Save A Life. Education and outreach include responsibility as a driver, blind spots, motorcycle visibility, searching for motorcyclists, humanizing motorcyclists, following distance, space management around motorcycles, inattentional blindness, selective attention, distractions, and cultural equity.

Additional Strategies:

- Use relevant communication components in all motorcycle safety outreach and education programs, including peer-to-peer messaging.
- Provide messages that are culturally relevant, multilingual, and appropriate to the audience. WTSC uses a wide mix of media channels including social media, websites, and traditional including print, TV, and radio.
- Expand the motorcycle safety work group into a more extensive Motorcycle Safety Advisory Council.

Wildlife Involved: Wildlife-involved crashes resulted in 11 fatalities and 60 serious injuries from 2020 to 2022. Of the 11 fatalities where wildlife was involved, 10 were motorcyclists. Forty-eight of the 60 serious injuries sustained in wildlife-involved crashes were motorcyclists. WSDOT identifies locations with high rates of wildlife strikes through crash data and carcass removal data. To prevent future wildlife crashes in those locations, WSDOT has used variable message signs, flashing beacons, warning signs, wildlife crossing structures, barrier fencing, wildlife detection systems, and maintenance of roadside vegetation.

HEAVY VEHICLES

Heavy vehicles play a vital role in Washington State's transportation industry, facilitating the movement of goods over long distances and within commercial and residential neighborhoods. As an international gateway with commercial seaports, land border crossings, and distribution networks, Washington relies on heavy trucks to support its economy.[1]

Heavy vehicles present unique safety challenges due to their size, weight, maneuverability, and longer stopping distances compared to passenger vehicles. These attributes result in a small margin of error for drivers.

> "Truck crashes do not occur in isolation, but as part of a larger system, involving the roadway and environment, vehicle condition, and the other vehicles in the traffic system. If we want to reduce the toll of truck [crashes], we need to broaden our understanding beyond just trucks and truck drivers so that human fallibility does not lead to human fatalities."
>
> *—Daniel Blower, University of Michigan*

From 2020 to 2022, 13% of fatalities occurred in crashes that involved a heavy vehicle. Note that involvement does not mean the heavy vehicle driver was at-fault or that they were the party killed in the crash.

1 Washington State Freight System Plan, WSDOT, 2022.

CRASH HISTORY

TABLE 24. HEAVY VEHICLE-INVOLVED FATALITIES

	2017	2018	2019	2020	2021	2022	CHANGE: 2017-2019 TO 2020-2022
FATALITIES	85	64	83	69	96	90	**+10%**
PROPORTION OF FATALITIES	15%	12%	15%	12%	14%	12%	

For updates to fatalities after 2022, refer to the Target Zero Performance Dashboard.

TABLE 25. HEAVY VEHICLE-INVOLVED SERIOUS INJURIES

	2017	2018	2019	2020	2021	2022	CHANGE: 2017-2019 TO 2020-2022
SERIOUS INJURIES	166	138	128	124	189	193	**+1%**
PROPORTION OF SERIOUS INJURIES	7%	6%	6%	5%	6%	6%	

For updates to serious injuries after 2022, refer to WSDOT Crash Data Portal.

OVERLAPPING FACTORS

Of the 255 fatality crashes involving a Heavy Vehicle (2020-2022):

- 51.3% (131) involved an Impaired Road User

SYSTEM CHALLENGES

Driver Behavior: The behavior of heavy vehicle drivers and other drivers sharing the roadway with them influences the outcome of heavy truck crashes. Including heavy vehicles in the Target Zero Plan allows for a focus on initiatives aimed at improving driver training, addressing fatigue management, and promoting adherence to safety regulations such as speed limits and hours-of-service rules.

According to the Insurance Institute of Highway Safety, large truck drivers spending more than 8 hours traveling are twice as likely to be involved in a roadway crash. Longer working hours can cause sleep deprivation, disrupted sleep patterns, and general fatigue.[1]

In 2022, 35% of fatal crashes in Washington involving a large truck involved a large truck driver who had previously been in a recorded traffic crash. In that same year, 25% of fatal crashes involving a large truck involved a large truck driver who had a previous speeding conviction in the previous 5 years.[2]

1 IIHS, https://www.iihs.org/topics/large-trucks#overview

2 Previous Driving Records of Large-Truck Drivers Compared to Drivers of Other Vehicle Types in Fatal Crashes, USDOT.

Shared Responsibility: Other Drivers. Other drivers share this responsibility and must be aware of heavy vehicles. A national study of crashes from the 1990s identified drivers of passenger vehicles alone contributed to 70% of fatal, two-vehicle crashes that involved a heavy truck.[1] Most importantly, the research supports the Safe System Approach principles of shared responsibility, supporting safe road user behaviors, and reducing large crash forces.

Safer Vehicles: Truck safety inspections: In 2019, 18% of heavy trucks inspected in Washington were placed out of service due to critical safety violations. Research performed in Washinton in the late 1980s, concluded large defective truck and trailer equipment is twice as likely to be involved in a crash than without defects (Jones & Stein, 1989). In addition, improperly loaded cargo can lead to truck instability and crashes. In 2019, 22% of truck inspections in Washington found cargo securement violations.[2] Increased safety equipment and technologies can help mitigate and potentially prevent significant crash severity. This can be achieved by advancing driver assistance system technologies (rear and side cameras, blind spot detection, adaptive cruise control, etc.) that assist driver awareness of their surroundings, prevent lane departures, and assist with proper braking.

Post-Crash Care: In 2020, the average emergency medical system response time to heavy truck crashes in Washington was 14 minutes, with longer response times in rural areas.[3]

PRIORITY STRATEGIES

Motor Carrier Safety Assistance Program (MCSAP): The Motor Carrier Safety Assistance Program (MCSAP) is a federal grant program that provides financial assistance to states to help reduce the number and severity of crashes and hazardous materials incidents involving commercial motor vehicles. The goal of the MCSAP is to reduce commercial motor vehicle-involved crashes through consistent, uniform, and effective safety programs. Washington State's Commercial Vehicle Safety Plan (CVSP) is required as part of the MCSAP. Federal goals established through the state's Commercial Vehicle Safety Program align closely with state goals and enhance national goals. The full coordination with our federal partners through the MCSAP provides for an exchange of data that Washington can use to better identify crash reduction goals.

Expand beyond Vehicle Inspections: Approximately 3.5 million commercial motor vehicle inspections are conducted each year nationally to ensure trucks and buses driving on the highways are operating safely (Motor Carrier Safety Assistance Program – Grant Comprehensive Policy, FMCSA, 2018). Inspection programs were expanded in the 1980s in response to vehicle quality concerns. Partially because of these inspections, vehicle defects are currently not identified as a primary contributor in most heavy vehicle crashes.

1 Blower, D.F. The Relative Contribution of Truck Drivers and Passenger Car Drivers to Two-Vehicle, Truck-Car Traffic Crashes

2 Commercial Vehicle Safety Plan, Federal Motor Carrier Safety Administration

3 Source: Washington State Department of Transportation

Driver behavior does remain a primary contributor in fatal and serious injury crashes involving heavy vehicles, so a shift to a driver-focused program—at the local, regional, state, and national levels—could result in a more effective change to traffic safety outcomes regarding heavy trucks. Research-backed programs focused on heavy truck-involved crash causation could support a shift toward addressing those causes, while maintaining the most vital aspects of the current vehicle inspection efforts.

Provide Additional Road Infrastructure: Due to the potential fluctuations of heavy vehicle loads, these vehicles can be susceptible to overturns on horizontal curves. Installation of curve warning signs, interactive signing, and truck rollover warning signs can aid in the reduction of collisions. In some cases, these signs specifically identify heavy vehicles and only interact with them (e.g., by detecting vehicle height, then turning flashers on a truck rollover warning sign).

Truck Parking and Rest Areas: The USDOT has noted truck parking shortages are a national safety concern. An increase in truck parking can play a role in reducing potential fatigue related crashes by providing locations for heavy vehicle drivers to rest. The 2022 Washington Truck Parking Assessment[1] documents a process of compiling a new truck parking inventory, identifying truck parking needs and issues, and conducting a truck parking conditions analysis.

The 2023 Washington State Safety Rest Area Strategic Plan's[2] mission is to provide "safe, sustainable option for rest during road trips." Its five focus goal areas include safety, commercial truck parking, sustainable operations, customer experience, and resilience.

Driver Training: Heavy Vehicle Drivers and Others: Increasing education efforts, curriculum, and improved safety and hazard awareness can provide more skills to heavy vehicle drivers. In addition, analysis supports the importance of focusing on behavior of the drivers of the other vehicles.[3] Raising awareness of safe driving practices and consideration for sharing the transportation system with trucks can support shared responsibility among road user modes.

Technological Advancements: The inclusion of heavy trucks in the SHSP provides an opportunity to leverage technological advancements in vehicle safety systems (e.g., collision avoidance systems, lane departure warnings, and electronic stability control) to mitigate the risks associated with these vehicles. In 2020, only 15% of heavy trucks in the United States were equipped with advanced safety features like lane departure warning systems and automatic emergency braking.[4]

Local Law Enforcement Training: WTSC has developed and implemented a program to train local law enforcement to assess heavy vehicle drivers for impairment. While WSP has received this training historically, expanding it to local enforcement provides them the confidence and skills to know what to look for.

1 Washington Truck Parking Assessment, WSDOT, 2022.

2 Washington State Safety Rest Areas Strategic Plan, WSDOT, 2023.

3 Driver-Related Factors in Crashes Between Large Trucks and Passenger Vehicles, FHWA, 1999.

4 Source: American Transportation Research Institute, 2020

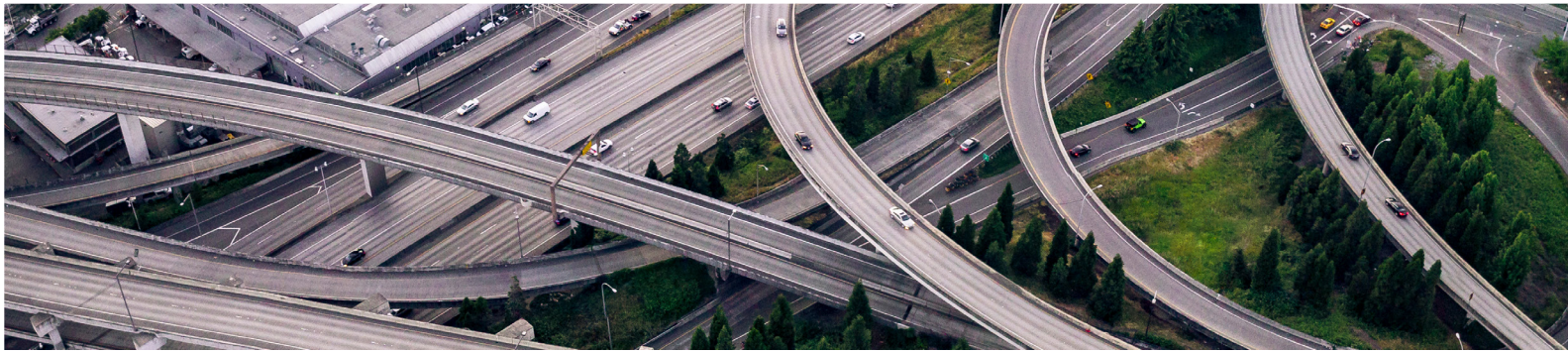
School Bus Involved: From 2020 to 2022, there were four fatalities and 20 serious injuries involving a school bus. However, none of the fatalities and only seven serious injuries were a school bus occupant. The Office of Superintendent of Public Instruction (OSPI) has overall responsibility for school bus safety. Statewide, regional transportation coordinators liaison between OSPI and local school districts. The transportation coordinators assist with school bus driver certification, initial and continuing driver training, and development of guidance documents for school districts. The OSPI and regional coordinators also collaborate with the WSP's Commercial Vehicle Division (CVD) for executing annual, high-quality, and thorough school bus safety inspections. To prevent injuries related to school buses, OSPI supports training on student management and school bus operations, and approval of higher-visibility lighting, exterior-mounted back-up cameras, and other advanced safety features (e.g., electronic stability control, collision mitigation technology) on school buses.

Other Buses: From 2020-2022, 12 fatalities and 41 serious injuries occurred in traffic crashes involving a non-school bus (e.g., transit bus, charter bus). Riding transit is one of the safest modes of transportation available.

In considering students' traffic safety, Target Zero partners are not just concerned with school bus riders. In February 2015, WSDOT, WTSC, OSPI, and the Department of Health (DOH), updated the state's School Walk and Bike Routes guide. This guide is used by school districts to develop, modify, and maintain safe school walk and bike routes. WSDOT intends to update it in the future.[11]

1 https://wtsc.wa.gov/wp-content/uploads/dlm_uploads/2014/09/SchoolWalkBikeGuide_TechnicalUpdate.pdf

CHAPTER 4



Supporting Systems

CHAPTER 4

Supporting Systems

4.1 EMERGENCY MEDICAL RESPONSE

People who are injured in crashes rely on first responders to quickly locate and stabilize their injuries and transport them to medical facilities.

Post-Crash Care Challenges. A common challenge that affects all residents in Washington are limited Emergency Medical Services (EMS) and hospital resources. Delays in response across urban, suburban, and rural areas have been shown to result in increased mortality (Byrne, et al., 2019). Rural communities are particularly affected due to long transport distances, weather/geography, limited or non-existent EMS resources, the overall lack of availability and skill of trained prehospital providers, and delays in transfer to the appropriate level of care. These issues can result in poorer outcomes for people in rural communities, with rural residents 14% more likely to die from trauma than their urban counterparts (Jarman, et al., 2016).

Beyond the limitation of EMS resources, rural communities also lack the acute hospital resources to treat the most severely injured crash victims, which results in the transfer of these patients to a level I or II trauma center for care. These delays can often be exacerbated by geography, availability of transport services, and availability of hospital system resources. Much like delays in EMS response and transfer, delays in transfer from rural hospitals to definitive care can result in statistically significant increases in trauma patient mortality (Gough, et al., 2020).

Post-Crash Care Successes. Washington has developed a coordinated system that seeks to provide appropriate and adequate care, with the goal of reducing death and disability. Washington is fortunate to have an inclusive trauma system that aims to support optimal coordination of care. Inclusive trauma systems are associated with lower morality rates.[1] Over the past 25 years, improvements to this system have contributed to the lowest mortality rate of trauma patients involved in motor vehicle crashes in recent history: from 9.7 deaths per 100 patients in 1995, to only 2.6 per 100 patients in 2017.

1 Utter GH, Maier RV, Rivara FP, Mock CN, Jurkovich GJ, Nathens AB. Inclusive trauma systems: do they improve triage or outcomes of the severely injured?

Priority Strategies to Continue Improving Post-Crash Care. EMS, unlike law enforcement and fire departments, are not considered a foundational public health service by the State of Washington, and as such are not funded at the state level. Promoting EMS to this level could help provide more equitable, sustainable resources for services providers statewide. The following additional priority strategies can improve post-crash care.

- **EMS and Trauma Steering Committee.** The Department of Health Secretary-appointed, 30-member steering committee on EMS and trauma systems consists of representatives from surgeons and physicians, hospitals, prehospital providers, firefighters, local health departments, consumers, and other affected groups. Target Zero leaders should increase participation in its technical advisory committees to increase collaboration.
- **Increase Training.** Support rural EMS and trauma hospital training to improve clinical competency and reduce EMS response time and interfacility transfer times. The Washington Chapter of the American College of Surgeons Committee will be providing Rural Trauma Team Development Courses in counties with higher-than-average traffic fatality rates and who are in areas with 60+ minutes ground transport time to an existing level I or II trauma center.
- **Prehospital Trauma Triage Designation Procedure**[1] education and outreach. These newly updated field triage guidelines represent the current best practice for the triage of trauma patients and allow EMS providers to quickly and accurately determine if the casualty is a major or moderate trauma patient. It also aids in decision making to determine the most appropriate transfer facility location.
- **Share Trauma Resources.** Connect Target Zero Managers with regional trauma resources to engage in their coalitions. Washington has eight trauma care regions with a designated regional administrator that functions in a similar capacity, but with the state trauma system.[2] These regions have regional system plans, regional councils and regional QI committees that address system and provider care concerns. These regional committees and regional administrators could be valuable partners for Target Zero Managers when building their coalitions.

1 https://doh.wa.gov/sites/default/files/legacy/Documents/Pubs/530143.pdf

2 EMS and Trauma Steering Committee, WA State Dept of Health.

4.2 TRAFFIC DATA SYSTEMS

Quality traffic records data is required for professionals to provide information that supports the Safe System Approach. With it, they:

- Diagnose the contributing factors to crashes.
- Analyze and evaluate the roadway system to identify locations or corridors with higher numbers of fatal and serious injury crashes compared to similar locations.
- Identify targeted strategies and countermeasures that will have the greatest effect on achieving the goal of zero fatalities and serious injuries.
- Assess the effectiveness of implemented countermeasures.
- Evaluate programs and projects to identify potential needs and updates to the system.

Traffic records systems include data from crashes, roadway infrastructure, driver licensing and vehicle registrations, citations and adjudications, and injury surveillance. Individually and combined, these data are essential for making informed traffic safety decisions.

Traffic Records Program Structure

The Traffic Records Program (TRP) is managed by the WTSC, Research and Data Division (RADD). The TRP consists of a grant program administered in accordance with 23 U.S.C. 405(c) through coordination with the Traffic Records Governance Council (TRGC) and Committees. Grants are awarded to agencies to implement projects that make traffic records systems improvements.

The TRGC also provides partner coordination and consensus oversight of traffic records systems improvements projects not funded through TRP grants.

The mission of the TRGC is to enhance transportation safety through coordinated projects to provide more timely, accurate, complete, uniform, integrated, and accessible traffic records data.

Many partner state agencies are represented on the TRGC and support the development, maintenance, and improvement to traffic records data systems including:

- Washington Traffic Safety Commission (WTSC)
- Washington State Department of Transportation (WSDOT)
- Washington State Patrol (WSP)
- Washington State Department of Health (DOH)
- Washington State Department of Licensing (DOL)
- Washington Association of Sheriffs and Police Chiefs (WASPC)
- Washington Technology Solutions (WaTech)
- Washington State County Road Administration Board (CRAB)
- Washington Administrative Office of the Courts (AOC)
- Washington State Office of Financial Management (OFM)

Several interrelated systems gather, maintain, store, and manage the data generated by agencies, associations, boards, and organizations.

The primary state traffic records data systems include:

CRASH

- WSDOT Collision Location and Analysis System (CLAS)
- WSP Requests for Electronic Collision Records (WRECR)
- WTSC Coded Fatal Crash Files (CFC)
- WSP Statewide Electronic Collision and Ticket Online Records (SECTOR)
- WaTech Justice Information Network Data Exchange (JINDEX)

DRIVERS AND VEHICLES

- DOL Driver and Vehicle System (DRIVES)

ROADWAY

- WSDOT Traffic Information and Planning Support (TRIPS)
- CRAB Geographic Information System – Mobility (GIS-Mo)
- WSDOT Highway Performance Monitoring System (HPMS)

CITATIONS & ADJUDICATIONS

- WSP Statewide Electronic Collision and Ticket Online Records (SECTOR)
- WaTech Justice Information Network Data Exchange (JINDEX)
- AOC Justice Information System (JIS)

INJURY SURVEILLANCE

- DOH Rapid Health Information Network (RHINO)
- DOH Washington Emergency Medical Services Information System (WEMSIS)
- DOH Comprehensive Hospital Abstract Reporting System (CHARS)
- DOH Trauma Registry
- DOH Death Vital Statistics
- Data Integration
- OFM Traffic Records Integration Program (TRIP)

Traffic Records Governance Council (TRGC) Strategic Framework

The TRGC measures the effectiveness of TRP efforts by tracking the following attributes:

- **Timeliness.** The time between the event and entry of the event into a database.
- **Accuracy.** The degree to which data is error-free and not duplicated in a database.
- **Completeness.** The degree to which records and attributes are present or missing from a database.
- **Uniformity.** The consistency of data from various jurisdictions with the same data definitions and reporting procedures.
- **Integration.** The ability of records in one database to be linked to records in another database using common identifiers.
- **Accessibility.** The ability of legitimate users to successfully obtain data or information.
- **Modernization.** The stability, security, efficiency, and sustainability of systems infrastructure.

The TRGC 2024-2026 Strategic Framework identifies key objectives in each of six different core traffic records systems to achieve traffic data system improvements, as illustrated in **Table 26**.

TABLE 26. KEY OBJECTIVES FOR TRAFFIC DATA SYSTEMS IMPROVEMENT

COORDINATION & COLLABORATION	CRASH	ROADWAY	DRIVER/VEHICLE	CITATION & ADJUDICATION	INJURY SURVEILLANCE
• Develop and implement an Enterprise Performance Management System to track data quality across all core systems. • Implement the Traffic Records Integration Program (TRIP) governance plan. (integration, accessibility) • Upgrade JINDEX from on premise to Azure Logic Apps. (modernization)	• Replace the SECTOR application with TraCS and implement master index functionality. (modernization) • Establish a statewide electronic crash/ticketing training coordinator position. (accuracy, uniformity) • Improve reporting/analysis of vulnerable road users involved in transportation system conflicts. (completeness, accessibility) • Increase MMUCC compliance. (uniformity)	• Implement all MIRE FDE requirements by 2026. (completeness, uniformity) • Improve GIS-MO training for the county roadway network. (uniformity) • Modernize HPMS/LRS legacy traffic and roadway systems. (modernization) • Expand and improve collection of traffic volume and operating speeds.	• Develop and maintain a data catalogue in DRIVES. (accuracy, completeness, accessibility) • Design and implement a legal case management system for administrative hearings/appeals. (completeness, uniformity, accessibility) • Develop a linked analytical database for internal and external partner analyses. (integration, accessibility)	• Automate exchange of information between CLJs and DOL. (timeliness, accuracy, completeness) • Improve integration of localized electronic court record systems into statewide case management systems. (completeness, uniformity) • Improve integration of records across court systems using person identifiers for complete court history. (completeness)	• Develop interfaces between EMS, ED, and other hospital data for improving quality and analysis. (accuracy, completeness, integration) • Improve hospital data quality reporting, and engagement. (accuracy, completeness) • Develop hospital data performance measures, key performance indicators, and surveillance tools for traffic safety. (accessibility)

The TRGC provides policy oversight and governance for statewide traffic records strategies and activities and is responsible for implementing the key objectives in the strategic framework. This work is achieved through the TRGC's five committees:

- **Electronic Traffic Information Processing (eTRIP).** The eTRIP committee is a forum for coordinating the technical aspects of traffic records data systems that support the electronic collection, storage, quality control, and transmission/exchange of traffic records data.
- **Grant Management and Review (GMR).** The GMR committee facilitates accountability and shared expertise among TRP grantees to ensure efficient and well-coordinated use of TRP resources.
- **Traffic Records Integration Program (TRIP).** The TRIP committee advises OFM TRIP staff on data governance issues and solutions, provides oversight of data request applications, and contributes traffic record data expertise regarding data use cases.
- **Traffic Data Analysis and Evaluation (TDAE).** The TDAE committee provides consultation and review of traffic records data analyses, research, and traffic safety program evaluation.
- **SECTOR Replacement Governance (SRG).** The SRG committee provides executive level oversight of the SECTOR replacement project. This temporary committee will sunset once SECTOR is decommissioned.

Through the TRGC's highly coordinated efforts and committee partnerships, the TRP can accomplish multiple annual data quality improvements across many traffic records data systems.

Traffic Records Priority Projects

The TRGC will implement multiple projects to address the 2024-2026 Strategic Framework key objectives, and support projects and efforts that fall outside of the key objectives but still make measurable improvements to traffic records data systems. While achieving all the key objectives is the goal, the following projects are TRGC priorities that are already underway and provide significant improvements to the TRP ecosystem.

Traffic Records Integration Program (TRIP). The purpose of TRIP is to develop, maintain, and integrate traffic records datasets across the six core traffic data systems: crash, driver, vehicle, roadway, citation, adjudication, and injury surveillance. TRIP links existing administrative datasets from multiple partner agencies to create a comprehensive crash-outcome dataset. This dataset enhances the capacity to assess collision contributing factors and the human and financial toll from crashes; expands the potential to assess behavioral factors; and adds capacity to assess the burden on the state's legal and administrative systems. TRIP accomplishes this by using crash records as the foundational integration point for linking pre- and post-crash data. TRIP staff and partners perform analysis of TRIP data to generate new information that can only be derived from integrated records to address long-standing traffic safety issues, as well as identify new crash contributors or protective factors for all road users in Washington.

- **Outcome:** By linking traffic records data, the state will have a comprehensive crash-outcome dataset to support traffic safety research and evaluation.
- **More information:** Traffic Records Integration Program

Statewide Electronic Collision and Ticketing Online Record (SECTOR) Replacement. Law enforcement partners in Washington use the SECTOR system for citation and crash reporting. First implemented in 2007, the SECTOR system is aging and in need of replacement. In June 2022, the SECTOR Replacement Governance (SRG) committee—comprised of those with appropriate knowledge and decision-making authority concerning traffic records systems—was formed to provide multi-agency collaboration on the strategy and policy operations of the SECTOR replacement efforts led by the Washington State Patrol (WSP). Efforts to identify a worthy replacement system led Washington to the Traffic and Criminal Software (TraCS) offered by the Iowa Department of Transportation. The SRG Committee is working with partner agencies, project management professionals, the legislature, and other partners to facilitate this large-scale transition from one system to another, with the goal of implementing TraCS in 2025 and decommissioning SECTOR in 2027.

- **Outcome.** TraCS is a sustainable crash/citation electronic data submission system that will provide flexibility for further enhancements and growth and improve the submission of electronic records.
- **More Information:** SRG Committee Charter

Model Inventory of Roadway Elements: Fundamental Data Elements (MIRE FDE). The MIRE is a set of core data elements developed by FHWA for the purpose of identifying critical roadway characteristics. The FDE are a subset of MIRE elements which must be collected and accessible for all public roads by mid-2026, per MAP-21. The FDEs are categorized by roadway functional classification and surface type. They include three categories for roadway segments: non-local paved roads, local paved roads, and unpaved roads. With the MIRE-FDE data elements and other available safety data, jurisdictions can analyze safety data and evaluate the safety performance of the system given the roadway and traffic characteristics at each location.

These elements are also informed by the requirements of the Highway Performance Monitoring System (HPMS), which is a national level highway information system which includes extent, condition, performance, use and operating characteristic data for public roadways nationwide.

To better be able to locate crash data on WSDOT's road system, upcoming projects include: Enterprise Intersection Data System to develop a comprehensive intersection database and Linear Referencing System Modernization to improve referencing for state and non-state routes.

- **Outcome.** The elements illustrated in MIRE FDE are critical to road and safety management in Washington. MIRE FDE helps the Washington State Department of Transportation (WSDOT) improve their roadway data inventory, traffic data inventory, and safety analyses of all roads in all jurisdictions.

More Information. FHWA - MIRE

Washington Emergency Medical Services Information System (WEMSIS) and the Rapid Health Information Network (RHINO). The Department of Health WEMSIS and RHINO systems comprise traffic records injury surveillance records from EMS response and emergency department/urgent care/outpatient facility visits. In addition to traffic injury, these systems support and inform all areas of public health. The TRGC has historically and continues to invest heavily in these systems to improve the data quality and completeness. Both systems are finally at a stage of maturity to perform meaningful traffic safety analyses. In addition, both datasets are integrated through the Traffic Records Integration Program with crash data. The TRGC will continue to invest in these systems to maintain and improve data quality while increasing the accessibility of the information for broader incorporation into traffic safety programming and evaluation.

- **Outcome.** The data quality of traffic records injury surveillance systems is continuously improved, and the information can be made accessible in a format that is easy to understand and informs traffic safety project planning and evaluation.
- **More Information.** DOH WEMSIS and DOH RHINO

CHAPTER 5

Implementation & Evaluation

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Implementation & Evaluation

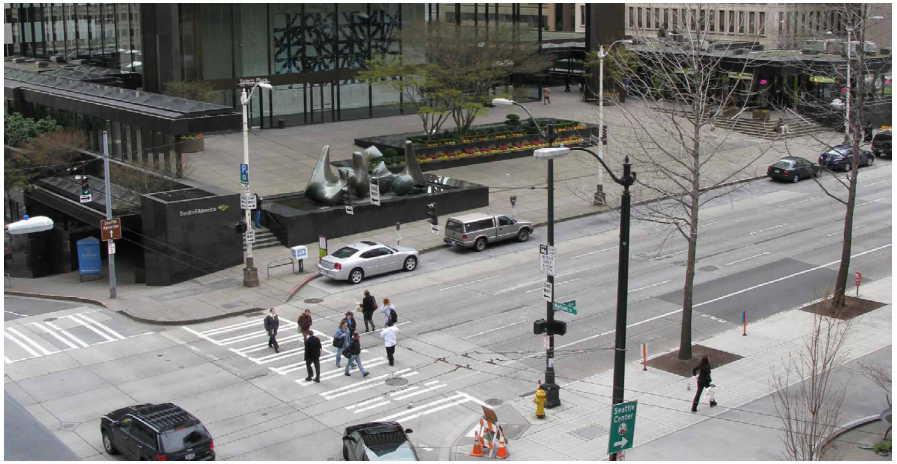
5.1 SYSTEM COLLABORATION AND INTEGRATION

To function within the Safe System Approach (SSA) framework, all relevant partners must collaborate. Partner identification must be part of this process. Collaboration levels as follows:

1. Sharing Information
2. Coordinating/Adjusting Strategies
3. Sharing Resources
4. Defining Shared Goals

For the Safe System Approach to work, we need to change the way we think about the transportation system and traffic safety – including our roles and the way we operate. The "Four E" approach to traffic safety—engineering, education, enforcement, and emergency services—was helpful to describe essential approaches, but it did not necessarily lead to successful integration. The Safe System Approach requires us to think differently and expand upon the Four Es, instead of these areas operating in their own silos. Thinking differently includes changing how we prioritize, collaborate, and select safety projects, activities, and programs. We need to implement a safe transportation system, using the principles and elements of the SSA, that reflects a prosocial traffic safety culture grounded in an equity framework. Otherwise, our efforts for system change may only bring us back to the same conditions we are experiencing today.

Plans for making significant changes can be met with resistance. It is common to hear voices of judgment question the merit of planned change ("this is nothing new"), express cynicism about the intended goal ("zero traffic fatalities is not possible") and convey fear about change itself ("I don't know what to do").



Just as change is an intentional process, managing these voices to support change also requires conscious effort. We must create hope for change and reframe these voices to recognize our strengths:

- **Curiosity:** "Let me dig deeper to learn what is new about the Safe System Approach."
- **Imagination:** "What would it take to make zero fatalities possible?"
- **Optimism:** "Change is possible if we all work together."

The foundations for change are in place and the Target Zero Plan builds upon them. In Washington, this includes committing to safety as the top priority, choosing broad-based partners, and aligning challenges and solutions with the SSA principles and related actions. These three components are helping those leading positive changes in transportation safety to think differently and make progress toward improved safety outcomes.

Traditional Safety Partners

Traditional traffic safety partners have formal roles with associated responsibility and accountability for system safety (e.g., elected officials, state agencies, law enforcement agencies, healthcare providers, etc.). They are often engaged in the development and implementation of strategic plans and establish safety goals. These partners' decisions about how to design, operate, and manage the system (e.g., funding, land uses, capital investments, policy, legislation, programs, and culture) contribute to increase or decrease the likelihood of future crashes. Policymakers control the budgets for safety investments related to the road and road user behaviors, enforcing the rules, and/or educating the road users.

Within the Safe System Approach, each partner needs to understand and implement their role in the context of the entire system and its safety outcomes. This approach includes extending their work to provide expert input for plans beyond their immediate policy areas, building support and action for equitable safety across multiple systems. They can also evaluate internal policies and traffic safety culture around safe driving by their employees while on the job or using agency vehicles, leading their communities by example. Collectively, the safety partners can thus maximize their efforts, leverage each other's skills and strengths, and work together to create a system where death and serious injuries are not inevitable.

To truly make progress toward reducing fatal and serious injury crashes, safety needs to be:

1. The primary goal for all transportation and safety agencies, meaning that safety goals are set and measured, and resources are dedicated to improving or maintaining safety.
2. A focus of all transportation and safety staff and leaders, regardless of role.
3. Integrated into agency responsibilities by providing education, training, and tools to help agencies implement safety strategies and countermeasures.
4. Part of an agency's accountability through performance measurement.

Leadership has a key role in creating and sustaining these conditions and in doing so within an equity framework. For example, the WTSC is chaired by the governor and consists of 10 Commissioners representing state, county, and city governments (e.g., WSDOT, WSP, Health Care Authority, and the Washington State Association of Counties, among others). Leadership is also critical to keep the focus on safety when it might appear to conflict with other priorities, such as speed or convenience.

5.1 System Collaboration and Integration

Washington has already developed several stand-alone safety policies and integrated safety into critical transportation programs and plans. These include the Washington State Department of Transportation Secretary's 2023 Executive Order Advancing the Safe System Approach for All Road Users, Complete Streets legislation adopted in 2022 under Move Ahead Washington, WSDOT Design Manual modifications for Complete Streets using the Safe System, a Roundabouts First Policy, the State Active Transportation Plan published in 2021, and the Injury Minimization and Speed Management Policy Elements and Implementation Recommendations. WSDOT further committed to strategic plan goals that support the equity-based Safe System Approach; the definition of the agency's goals for diversity, equity, and inclusion specifies: "We create good policy that effectively responds to the needs of underserved communities and creates sound, equitable investment strategies."

Each safety policy provides specific opportunities and guidance to integrate the Safe System principles and strategies into decision-making. The goal of these documents is to make it clear for anyone to understand how, when, and where they can consider safety at points in the planning or project development process. Operationalizing the Safe System Approach requires the development of policies, processes, tools, and educating the workforce on how, when, and where safety can be considered in planning and project development. Tools to implement these policies and directives are essential. Additional efforts to engage influencer partners during the education process can also assist influencer partners in understanding their role in a safe system.

Influencer Safety Partners

From a system perspective, multiple factors lead to a crash and determine its severity. Because so many system factors come into play during a crash, we need a broader range of partners at the table. Influencer partners are those without a formal traffic safety role, but with an interest and influence over safety within their social environment (e.g., families, schools, workplaces, cultural organizations, etc.). These influencer safety partners are themselves safe road users, so they can help influence by example and by direct engagement.

We can engage most road users who are safe as allies to help influence others. Because these behaviors are intended to help others, they are called "prosocial" behaviors. Examples of prosocial behaviors include modeling safe behaviors, taking actions that encourage others to be safe, and championing community safety goals. Some examples of prosocial behavior within our social environment including family, schools, and workplaces:

- **Families** can talk about and make rules about cell phone use and other distractions. They can put in place actions like muting phones or using "Do Not Disturb" functions while driving.
- **Friends** can utilize a designated sober driver.
- **Schools** can encourage student-led projects that clarify norms about distracted driving and encourage not using cell phones while driving.
- **Community-based organizations** can deliver culturally relevant educational campaigns, partner in outreach and engagement for transportation plans and projects, and provide access to their buildings and events with the safety of all types of road users in mind.

- **Public Leaders**, including legislators, county commissioners, city council members, and directors of public agencies can influence people and policy to make the transportation system safer.
- **Employers** can implement model safe driving policies, including disallowing participation in calls or meetings while driving, requiring employees to observe the posted speed limit (or drive slower when conditions warrant) while driving for work purposes, and providing updated training as types of facilities and traffic laws change.
- **Voters** can talk with elected officials about the importance of budgets and policies that support traffic safety with a Safe System Approach.

Such behaviors are considered discretionary because they are not formal requirements of an assigned traffic safety role. Instead, these discretionary behaviors are motivated by our relationships with other people in our social environment (social capital).

5.2 IMPLEMENTATION PROCESS

The Target Zero Plan is the framework for engaging road users, traditional and influencer partners, planners, engineers, law enforcement agencies, and emergency medical service providers across the state in improving transportation safety in Washington. With focus and bold action, the vision of zero fatalities and zero serious injuries on Washington roadways by 2030 can be achieved.

The plan serves as the foundation for the strategy and integration of behavioral and engineering safety practices into all aspects of land use planning, transportation project programming, policy, and other safety-related activities in the state. While safety-specific plans and programs are critical to achieving the goal of zero fatalities and serious injuries in Washington, it also is important that traditional transportation planning, design, operations and maintenance, and programs and policies proactively integrate safety into their decision-making processes.

Infrastructure projects will be implemented through the Highway Safety Improvement Program (HSIP), the Safe Streets and Roads for All (SS4A) discretionary grant program, and other state, regional, local, and Tribal funding sources. Behavioral strategies will be implemented through the Triennial Highway Safety Plan and annual grant application.

To implement the Target Zero Plan, we must take actions consistent with the Safe System Approach principles and elements, focused in the near-term on the data-informed emphasis areas. As locations and detailed contributing factors are identified and prioritized, proven and innovative safety countermeasures must be funded, designed, and implemented to save lives in Washington.

5.3 MEASURES AND ACCOUNTABILITIES

Transportation safety partners, including WSDOT and WTSC, continually monitor progress on the performance of transportation programs and measures with annual reporting on the Target Zero Plan, the Highway Safety Improvement Program, and the Triennial Highway Safety Plan.

Washington's safety partners use performance metrics to track and understand system performance and needs over time. The goal is to make our efforts as effective as possible. Data from crashes involving fatalities and serious injuries form the basis for the emphasis areas within Target Zero. Safety partners can use this information to identify contributing factors that are leading to fatalities and serious injuries throughout the system.

For instance, Target Zero has identified lane departures as an emphasis area based on the proportion of fatalities and injuries that occurred in lane departure crashes. The next step would be to screen the network to identify segments or intersections experiencing more than the expected number of lane departure crashes. Further analysis of the contributing factors to these crashes can then provide insights into the type of countermeasures that would have a high potential to reduce the number and severity of this particular group of crashes. These countermeasures can be connected to one or more of the Safe System Approach Elements: Safer Land Use, Safer Road Users, Safer Roads, Safer Speeds, Safer Vehicles, or Post-crash Care.

The performance metrics help us evaluate how effective these strategies have been in reducing the targeted types of crashes. Target Zero does not evaluate an individual project's or program's effectiveness. Instead, it focuses on the overall performance of the system, setting performance-based goals across emphasis areas.

APPENDICES

Appendix A: Acronyms

Appendix B: Select Emphasis Area Strategies

Appendix C: Target Zero Data Sources

Appendix D: Vulnerable Road Users Safety Assessment

Appendix E: SHSP Update Process and Federal Requirements

Appendix F: Safety Performance Measures

Appendix G: Special Thanks

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APPENDIX A: ACRONYMS AND ABBREVIATIONS

AI/AN	American Indian/Alaska Native
ANSI	American National Standards Institute
AOC	Administrative Office of the Courts
CHARS	Comprehensive Hospital Abstract Reporting System
CVD	Commercial Vehicle Division
DOH	Department of Health
DOL	Department of Licensing
DOT	Department of Transportation
EMS	Emergency Medical Services
FARS	Fatality Analysis Reporting System
FHWA	Federal Highway Administration
GIS-Mo	Geographic Information System – Mobility
HPMS	Highway Performance Monitoring System
JINDEX	Justice Information Network Data Exchange
JIS	Justice Information System
LiDAR	Light Detection and Ranging
LRS	Linear Referencing System
MAP-21	Moving Ahead for Progress in the 21st Century
MIRE FDE	Model Inventory of Roadway Elements - Fundamental Data Elements
MMUCC	Model Minimum Uniform Crash Criteria
NHTSA	National Highway Traffic Safety Administration
OSPI	Office of Superintendent of Public Instruction
RCW	Revised Code of Washington
RHINO	Rapid Health Information Network
SECTOR	Statewide Electronic Collision and Ticket Online Records
SSA	Safe System Approach
STEP	Safe Transportation for Every Pedestrian
TRGC	Traffic Records Governance Council
TRIP	Traffic Records Integration Program
TRIPS	Traffic Information and Planning Support
TZM	Target Zero Manager
VMT	Vehicle Miles Traveled
VRU	Vulnerable Road Users

WAC	Washington Administrative Code
WA-EMSIS	Washington Emergency Medical Services Information System
WEMSIS	Washington Emergency Medical Services Information System
WSDOT	Washington State Department of Transportation
WTSC	Washington Traffic Safety Commission
WSP	Washington State Patrol
eTRIP	Electronic Traffic Information Processing
GMR	Grant Management and Review
SRG	SECTOR Replacement Governance
CLAS	Collision Location and Analysis System
WRECR	WSP Requests for Electronic Collision Records
CFC	Coded Fatal Crash Files
DRIVES	Driver and Vehicle System
CRAB	County Road Administration Board
WRECR	Washington State Patrol Requests for Electronic Collision Records
RADD	Research and Data Division
OFM	Office of Financial Management
WASPC	Washington Association of Sheriffs and Police Chiefs
WaTech	Washington Technology Solutions

APPENDIX B: SELECT EMPHASIS AREA STRATEGIES

The selection of safety strategies (i.e., countermeasures) requires careful consideration of contributing factors to crashes, findings from science-based studies, and considerations such as those provided by benefit-cost analysis.

The strategies in this appendix are inclusive but not exhaustive lists of potential treatments. Strategies are selected to achieve an optimal reduction in fatal and serious injury crashes, addressing the contributing factors and varying crash types on the roadways being considered. Safety professionals consider practices, guidelines, road context, method of applications, and community interests in selecting a preferred approach to addressing each safety need.

In addition to the lists in this appendix, the following sources offer strategies that support Target Zero goals and the Safe System Approach. Details of the WSDOT safety program are provided in the HSIP Implementation Plan.

- NHTSA Countermeasures that Work
- FHWA Proven Safety Countermeasures
- Washington Triennial Highway Safety Plan
- WSDOT Highway Safety Improvement Program Implementation Plan

Tribal Safety (TRB)

Note that the strategies under other emphasis areas are also relevant for Tribal safety.

TRB.1. Tribes are encouraged to conduct a traffic records assessment to ensure that methods being used to collect, share, and analyze crash data are providing optimal benefit to the Tribe. Include considerations of how traffic records assessments can serve as an effective tool to establish communication with state and local safety partners.

TRB.2. Tribes are encouraged to develop transportation safety plans based on an analysis of the available safety data.

TRB.3. Conduct Tribal road safety audits and assess planned roadway and operational changes to provide explicit safety consideration for all modes prior to the design, construction, and operation of a change.

TRB.4. Improve the timeliness of response to emergencies by training Tribal employees in CPR, First Aid, and basic lifesaving skills.

TRB.5. Create culturally relevant public education campaigns for both motorists and active transportation users regarding pedestrian and bicyclist safety to promote the health and welfare of Tribal members, especially children.

TRB.6. Create Tribal ordinances to reduce speed limits in reservation towns and villages. Partner with state, county, and city governments to reduce speed limits on other jurisdiction's roads that travel through reservation lands.

TRB.7. In partnership with state and federal partners, create active transportation plans that are used to prioritize roadway improvements, maintenance, and construction as well as education and other activities.

TRB.8. Conduct systematic safety studies of crashes that result in fatal or serious injury to pedestrians, bicyclists, or other active transportation users of Native American descent or occurring on reservation lands.

TRB.9. Include reservation lands in statewide roadway inventories. Comprehensive information regarding tribal jurisdiction roadways should include context, traffic controls, sidewalks, crossings, connections with trail systems, and posted and travel speeds.

TRB.10. As relevant for Tribal transportation systems, carry out strategies under other emphasis areas as appropriate.

Safer Land Use (LUS)

LUS.1. Update comprehensive plans, land use requirements, and zoning to prioritize the inclusion of multimodal transportation facilities and services that provide the greatest multimodal safety benefit to each category of roadway users, considering the context and speed of the facility.

LUS.2. Apply the WSDOT Vulnerable Road User Equity Score, CDC Social Vulnerability Index, and similar equity analysis tools in safety analysis and updates to land use and transportation policies to identify locations that have been overburdened and disadvantaged by transportation decisions, investment, or disinvestment.

LUS.3. Increase investment in infrastructure in historically underserved areas where crash rates and severity are disproportionate to local and regional rates, based on prioritization informed by data and by culturally relevant community engagement.

LUS.4. Enact and implement policies and projects to support reductions in vehicle miles traveled, as outlined in the 2023 WSDOT VMT Targets Report, produced at the legislature's request.

LUS.5. Implement policies and projects to support compact, transportation-efficient urban design with convenient access to multimodal transportation infrastructure and services.

LUS.6. Locate schools, low-income affordable housing, multi-family housing, and public facilities on lower-speed roadways and/or apply strategies listed under Speed Management to reduce exposure to high-speed environments. Prioritize

locations for these types of destinations that are served by active transportation networks and transit services.

LUS.7. Separate high-speed roads from mixed land uses. Where this combination exists, apply strategies under Speed Management to reduce crash likelihood, exposure, and severity.

LUS.8. Implement proactive access management strategies and plans to minimize crash exposure, conflicts between modes, and the likelihood of high-severity crashes associated with driveways and access points; provide active transportation network connectivity.

LUS.9. Evaluate transportation system performance using multimodal level of service and safety performance assessment to identify changes needed based on land use context and the mix of origins, destinations, users, and modes.

LUS.10. Complete infrastructure connectivity for pedestrians and bicyclists, and provide separation where needed based on crash exposure, crash history, and characteristics of the roadway and adjacent land use associated with higher existing and potential levels of use.

Systemic (SYS)

SYS.1. Incorporate Safe System and Complete Street approaches into roadway design and operational policies, projects, and procedures.

SYS.2. Develop and disseminate systemwide safety data analyses by jurisdiction to provide context for crash frequency, rate, severity, contributing factors, and proven countermeasures.

SYS.3. Support and report on the development of city, county, and regional road safety plans based on the principles of proactive safety through the Safe System and Complete Streets approaches.

SYS.4. Conduct safety audits and assess planned roadway and operational changes to provide explicit safety consideration for all modes prior to the design, construction, and operation of a change.

SYS.5. Explore the concept of Trauma Prevention Programs within fire departments and other first responders to develop collaborative approaches to reducing serious injury and fatal crashes on streets through design and operations while providing for emergency response.

SYS.6. Provide training opportunities for traffic safety agencies and partners on cultural competence, multicultural engagement, and multicultural communications.

SYS.7. Work directly in and with communities of concern to identify culturally relevant and effective methods of identifying needed changes that advance the Safe System Approach and foster a prosocial traffic safety culture.

Speed Management (SPE)

SPE.1. Set injury minimization speed limits which account for roadway design, traffic mix, context, like crash types, and environment. When lowering posted speed limits, implement communication campaigns to inform the traveling public.

SPE.2. Implement context-appropriate speed management strategies on roadways and at intersections, selected for effectiveness on the types of streets where they are being applied, to achieve desired injury minimization speed limits.

SPE.3. Place speed limit signs so they are visible, conspicuous, and installed at appropriate intervals.

SPE.4. Use electronic variable speed limit signs that change according to conditions such as weather and congestion.

SPE.5. Support the use of speed feedback signs to warn motorists that they are exceeding the speed limit; continue to research and implement the most effective locations for these signs.

SPE.6. Implement timed and coordinated traffic signals to improve traffic flow for all modes, reduce red-light running, and manage speeds for injury minimization.

SPE.7. Educate the public about the dangers of excessive speed and speeding too fast for conditions, and its role in traffic fatalities.

SPE.8. Implement neighborhood speed watch/traffic management programs in low speed areas. Implement time-limited or permanent dedication of streets closest to schools to car-free or local-only use during morning/afternoon school transportation.

SPE.9. Increase data sharing between law enforcement officers and engineering agencies to identify and develop solutions for areas where speeding is a problem and where posted speed limits do not reflect injury minimization approaches.

SPE.10. Educate prosecutors and judges to ensure speeding violations are treated seriously and fairly.

SPE.11. Work with Washington Trucking Association and WSP's Commercial Vehicle Enforcement Division to encourage company policies which, when backed with speed monitors or speed regulators, can reduce speeding in commercial vehicles.

SPE.12. Educate the public about the effects of roadway conditions on appropriate motorist speed, such as weather, congestion, daytime/nighttime, and roadway user mix.

SPE.13. Work with public agencies and other fleet operators to encourage policies which, when backed with speed monitors or speed regulators, can reduce speeding by drivers using fleet vehicles.

SPE.14. Develop an inventory of roadway speeds and analyze serious injury and fatal crashes in the context of posted speed limits and operating speeds. Use this analysis to prioritize locations for speed management treatments.

SPE.15. Develop, implement, and evaluate the effects of automated speed enforcement programs.

Lane Departure (LDX)

LDX.1. Incorporate safe system and Complete Street approaches into roadway and roadside design policies and procedures.

LDX.2. Implement roadway design to be consistent with the surrounding context; provide for separation of modes based on context and use of the road.

LDX.3. Inventory horizontal curves and gather data to support development of programs and projects to reduce the severity of lane departure crashes.

LDX.4. Install centerline rumble strips.

LDX.5. Install raised medians or median barriers.

LDX.6. Install raised pavement markers or profiled center lines.

LDX.7. Install chevron signs, curve warning signs, posted speed limit reductions, and/or sequential flashing beacons in curves.

LDX.8. Improve pavement friction using high friction surface treatments.

LDX.9. Install center and/or bicycle-friendly edge line rumble strips.

LDX.10. Develop and implement a Local Road Safety Plan.

LDX.11. Install wider, brighter, and more durable edge lines, especially on curves.

LDX.12. Install delineation on fixed objects that cannot be removed from the clear zone, such as guardrails and other roadway hardware.

LDX.13. Install dynamic curve warning signs.

LDX.14. Increase distance to roadside features on high-speed roadways by removing/relocating fixed objects, such as trees and utility poles, in the clear zone.

LDX.15. Flatten side slopes to reduce the potential for rollover crashes.

LDX.16. Install roadside safety hardware such as guardrail, cable barrier, or concrete barrier (providing for movements of vulnerable road users).

LDX.17. Install safety edge treatment to reduce edge drop-off crashes.

LDX.18. Remove or replace existing barrier that is damaged or non-functional.

LDX.19. Locate and inventory fixed objects inside the clear zone to support development of programs and projects to reduce the severity of lane departure crashes and to understand and address the potential presence and movements of vulnerable road users using shoulders for travel.

LDX.20. Install signage to increase awareness of vulnerable road users who may be in the clear zone or in a sight-limited location such as a curve or tunnel.

Intersection Related (INT)

INT.1. Incorporate Safe System and Complete Street approaches into intersection design and operations policies and procedures.

INT.2. Reduce speeds through intersections and explicitly consider vulnerable road users in design and operational choices.

INT.3. Install or convert intersections to roundabouts.

INT.4. Convert four-lane roadways to three-lane roadways with center turn lane (road diet), incorporating bike facilities wherever possible.

INT.5. Construct protected intersections for bicyclist/pedestrian movement; utilize design and signal timing to eliminate conflicts with driver movements in space and time.

INT.6. Convert permitted left turns to protected left turns at signals; provide for pedestrian mobility with protected signal phasing that doesn't conflict with turning motorists.

INT.7. Install left turn lanes designed and operated with explicit consideration for safety of active transportation users.

INT.8. Install intersection conflict warning systems (real-time warning) to warn drivers on mainline or side streets of conflicting traffic at rural intersections.

INT.9. Increase pavement friction using high friction surface treatments.

INT.10. Remove unwarranted signals.

INT.11. Modify signal phasing to implement a leading pedestrian interval; add bicycle traffic signals where bike lanes are installed.

INT.12. Install lighting, including pedestrian-scale lighting.

INT.13. Coordinate arterial signals.

INT.14. Implement flashing yellow arrows at signals.

INT.15. Optimize traffic signal clearance intervals, including consideration for leading pedestrian intervals.

INT.16. Restrict or eliminate turning maneuvers at intersections that create conflicts for drivers, pedestrians, and/or bicyclists.

INT.17. Implement restricted access to properties/driveways adjacent to intersections using closures or turn restrictions.

INT.18. Implement systemic signing, marking, and visibility improvements at intersections.

INT.19. Install red light cameras (automated enforcement) at locations with angle crashes.

INT.20. Implement automated speed enforcement cameras at locations where approach speeds are high.

INT.21. Provide targeted stop sign/signal enforcement at intersections and intersection approaches.

INT.22. Implement automated enforcement for violations in which a driver blocks a crosswalk, bike lane, bike box, or transit lane.

INT.23. Add retroreflective borders to signal back plates.

INT.24. Install transverse rumble strips on rural stop-controlled approaches.

INT.25. Provide advanced dilemma zone detection (real-time warning) for high speed approaches at rural signalized intersections.

INT.26. Increase sight distance (visibility) of intersections on approaches.

INT.27. Increase visibility of signals and signs at intersections.

INT.28. Provide targeted public information and education about crash-contributing factors found at specific intersections.

INT.29. Develop and implement a Local Road Safety Plan.

Active Transportation Users (ATU)

ATU.1. Incorporate Safe System and Complete Street approaches into identifying the need for pedestrian and bicyclist facilities, the need for separation in time and space, and the explicit consideration of all modes in design and operational decisions; address types of locations and other factors identified in the Vulnerable Road User Safety Assessment (Appendix D).

ATU.2. Invest in and construct roadway reconfigurations, roundabouts with appropriate crossing treatments and bicycling facilities, and other recommended FHWA proven safety countermeasures specific to pedestrian and bicyclist safety.

ATU.3. Revise design practices to emphasize context, modal priorities, target speed and injury minimization to reflect the needs of people walking and biking.

ATU.4. Reduce crash exposure at pedestrian and bicyclist crossings by investing in and installing refuge islands and raised crossings, and shortening crossing distances with bicycle friendly curb extensions where these crosswalk enhancements are needed.

ATU.5. Invest in and increase the use of rectangular rapid flashing beacons and pedestrian hybrid beacons where these crosswalk enhancements are needed.

ATU.6. Increase sight distance and visibility at pedestrian and bicyclist crossings by clearing vegetation, extending crossing times, adding pedestrian and bicyclist leading intervals and/or adding pedestrian scale illumination. At mid-block locations, provide adequate distance between stop bars and the crossing; apply speed management as needed to provide sufficient stopping time for motorists; and consider the use of raised crossings.

ATU.7. Invest in and construct separated pedestrian facilities (sidewalks and multi-use paths), especially in urban areas and adjacent to schools, bus stops, and school walk areas.

ATU.8. Create neighborhood greenways with pedestrian and bicyclist priority on low-volume, low-speed streets.

ATU.9. Invest in and construct more buffered bike lanes, protected separated bicycle lanes, protected intersections, and separated bicycle facilities or shared-use paths, especially in urban areas and adjacent to schools, bus stops, and school walk areas; prioritize designs that provide protected or grade-separated cycling facilities associated with pedestrian facilities rather than in the travel lane with vehicular traffic.

ATU.10. Increase infrastructure investments in underserved areas and in locations that complete network gaps serving neighborhoods and communities with higher proportions of people who rely on active transportation and transit access.

ATU.11. At traffic signals, use bicycle signal heads and provide a leading signal interval. At intersections, install colored bicycle boxes.

ATU.12. Remove permissive left turn signals that conflict with pedestrian/bicyclist movements and eliminate right turn on red at signals; provide protected signal phases for pedestrian/bicyclist movements.

ATU.13. Apply consistent signing and other pedestrian crossing features in school zones and other special zones as appropriate (based on the number of lanes, speeds, age of pedestrians, etc.).

ATU.14. Implement pedestrian and bicyclist safety zones, targeting geographic locations, destinations, and audiences with pedestrian/bicyclist crash concerns; create plans for needed roadway design and operational changes, low-speed zones, and other tactics to reduce exposure, likelihood and severity of crashes.

ATU.15. Invest in and implement the Safe Routes to School Program to construct pedestrian and bicyclist facilities near schools, and site schools in locations served by complete pedestrian and bicyclist networks.

ATU.16. Distribute and encourage the use of "School Walk and Bike Routes: A Guide for Planning and Improving Walk and Bike to School Options for Students" to assist in creating school walk route maps.

ATU.17. Implement pedestrian and bicycle safety training curriculum in schools. Develop and implement an additional module focused on teachers, parents, volunteers, and other school personnel.

ATU.18. Implement engineering, education, and enforcement elements of the Safe Routes to School program, including campaigns such as Walking School Buses and Bike Trains.

ATU.19. Provide liability protections to school districts who develop school walk route maps.

ATU.20. Increase public awareness of the significance of speed and vehicle mass on pedestrian and bicyclist injury severity.

ATU.21. Develop performance measures to evaluate completeness and quality of pedestrian and bicyclist networks, including levels of traffic stress, infrastructure inventory, route directness, and other appropriate metrics; incorporate an

equity analysis to identify disparities and disproportionate exposure to potential severe crashes.

ATU.22. Expand the bicyclist and pedestrian count program to collect miles walked/biked data (similar to collecting VMT), where people walk/bike, and walk/bike demand.

ATU.23. Initiate a statewide household travel survey or other appropriate tool to collect walk and bike data.

ATU.24. Continue to conduct a statewide assessment of student travel, and implement similar assessments at the city or school district level.

ATU.25. Provide bicyclist and pedestrian safety awareness as part of driver education programs.

ATU.26. Update driver's license exam requirements to incorporate more questions on laws pertaining to driving around vulnerable road users, to include the updated safe passing law, safety stop for bicyclists, and other more recent changes to state law; update driver's license skills test to include testing of driving around bicycle/pedestrian infrastructure, appropriate turning movements where a bike lane is installed, and other skills associated with safe vehicle operation that considers movements of people outside the vehicle.

ATU.27. Develop a pedestrian/bicyclist safety education module for use by state agencies; phase in a requirement for completion of this module for utilization of a state vehicle or for reimbursement for use of a personal vehicle on state business. Make the module available to other jurisdictions, Commute Trip Reduction participating entities, and the private sector.

ATU.28. Conduct research on implementation of the vulnerable user law, including citations, sentencing, and enhanced fines; based on findings, identify and implement recommendations for training for law enforcement, prosecutors, judges, and others to improve effectiveness of this and other laws pertaining to motorists and vulnerable road users.

ATU.29. Revise lane restrictions for passing that would clarify the law that motorists change lanes or slow when passing vulnerable road users when there are no oncoming roadway users and travel lanes do not have sufficient width to provide a minimum of three feet of separation. This revision would include situations when there is a double yellow line and motorists have sufficient line of sight to safely cross the double yellow to leave a safe passing distance of three feet or more.

ATU.30. Improve training on pedestrian and bicyclist laws for law enforcement officers at state, tribal, and local levels, including training on equity issues for enforcement.

ATU.31. Develop and implement culturally appropriate education and outreach campaigns before expanding high visibility speed enforcement or automated speed enforcement cameras in school zones and other special zones.

ATU.32. Develop and implement culturally appropriate education and outreach campaigns concerning crosswalks, crossings, and driving speeds, designed to take into account equity issues in underserved high-need communities with high serious/fatal crash rates involving pedestrians or bicyclists,

before expanding the use of high visibility crosswalk enforcement of motorists who fail to yield to pedestrians or bicyclists.

ATU.33. Expand automated speed enforcement cameras in school zones, other special zones such as hospital or park zones, and locations outside of school zones that are included in safe routes to school plans or local road safety plans; in planning the expansion utilize an equity analysis to identify and address issues associated with increased enforcement.

ATU.34. Conduct culturally relevant education and outreach regarding the risks of using active transportation modes while impaired or distracted.

ATU.35. Encourage bicycle helmet use for children and adults; develop and implement helmet giveaway programs; support educational programs on helmet fitting, helmet use, and programs for parents and caregivers on use of bicycle trailers, seats, and other ways of transporting children via bicycle.

ATU.36. Support adult bicycle education programs for new riders and people new to Washington to familiarize them with bicycle handling skills and Washington state laws; create and disseminate bicycle safety education materials in multiple languages.

ATU.37. Assess current statutes to identify gaps in definitions and recommend changes; identify implications for traffic safety data gaps and recommend actions to address these.

Heavy Vehicles (HVT)

HVT.1. Install interactive truck rollover and curve warning signage.

HVT.2. Identify and promote opportunities to prevent fatigued driving by increasing the availability of commercial truck parking.

HVT.3. Continue to emphasize the importance of vehicle size and weight in crash injury prevention.

Traffic Data Systems (TDS)

TDS.1. Increase electronic reporting of crashes and traffic violation tickets.

TDS.2. Provide officers with roadside access to driver and vehicle history information from the Department of Licensing.

TDS.3. Find ways to address and educate agency staff about the data nuances identified in Target Zero.

TDS.4. Train law enforcement officers and improve traffic data systems to improve data quality and completeness.

TDS.5. Develop and implement performance measures for all core traffic data systems across the system attributes (accuracy, completeness, uniformity, timeliness, accessibility, and integration).

TDS.6. Implement Data-Driven Approaches to Crime and Traffic Safety (DDACTS) model in local law enforcements agencies statewide.

TDS.7. Create a central repository for integrated, linked data records including crash records, health (EMS, Trauma, CHARS) records, court records, licensing records, and state toxicology records.

TDS.8. Derive a clinical classification of injury severity based on medical records to augment the investigating officer's assessment of injury severity.

TDS.9. Create connections for systems with similar or duplicate data to eliminate duplicate entry and data redundancies.

TDS.10. Provide more frequent and enhanced traffic safety trend reporting. Present data/trends in a manner that is easy to understand and is actionable.

TDS.11. Support training opportunities to enhance traffic safety data analysis and research skills.

TDS.12. Create a maintenance and support model for electronic crash and ticket reporting that further improves operations, speeds change request implementation, and enhances user support.

TDS.13. Add the pedestrian and bicyclist crash types categorized in the Vulnerable Road User Safety Assessment to the standard crash summary provided to staff at WSDOT and local agencies.

TDS.14. Pilot and implement analysis tools to support integration of safety performance analysis into planning, design, and operations.

APPENDIX C: TARGET ZERO DATA SOURCES AND NOTES

To develop the data that drive Target Zero, practitioners utilize data from multiple sources in Washington. This appendix describes those sources.

Washington Crash Data

Crash data analysis is complex and can include many different levels of focus, including crash factors surrounding:

- **Event:** weather, lighting conditions, road surface conditions, and other circumstances.
- **Vehicle:** motorcycles, heavy trucks, and other vehicles.
- **People:** drivers, vehicle passengers, and people walking and biking—both surviving and deceased.

The unit of reporting for most of Target Zero is the person or persons who are killed or seriously injured. For example, Target Zero includes counts of fatalities and serious injuries involving any distracted road user: either a distracted driver or other road user. However, it does not include data on the number of distracted drivers or road users. For instance, in a fatal crash between a motorist and a pedestrian, it is possible that both parties were distracted, but in the data, this would only be counted as one distracted fatality. Detailed data definitions for Target Zero emphasis areas derived from Washington's crash data files are available here: https://wtsc.wa.gov/dashboards/tz-performance-dashboard/. The sources of crash data and additional considerations are described below.

Coded Fatal Crash (CFC) Files

The WTSC works with our traffic records partners to gather all source documents involved in the investigation of fatal crashes. This information is used to code fatal crashes into the national Fatality Analysis Reporting (FARS) database. Using the same coding and case inclusion methods, the WTSC creates the Washington Coded Fatal Crash (CFC) analytical data files. The CFC files contain a subset of information that is ultimately also included in the FARS national database, so while there are some similarities, the FARS and CFC data files are different. The CFC files include binary analytical variables aligned with definitions developed for Target Zero and may differ from NHTSA FARS definitions. Target Zero definitions have been developed for consistent reporting between the CFC files and the statewide crash data files managed by the Washington State Department of Transportation (WSDOT).

The Fatality Analysis Reporting System

The Fatality Analysis Reporting System (FARS) is the primary source of national traffic fatality data. The Washington Traffic Safety Commission (WTSC) contracts with the National Highway Traffic Safety Administration (NHTSA) to provide FARS data for Washington State. FARS is a nationwide census of traffic fatalities. FARS contains data elements that are collected from official documents, including Police Traffic Collision Reports (PTCR), state driver licensing and vehicle registration files, death certificates, toxicology reports, and emergency medical services (EMS) reports. To be included in FARS (and CFC), a crash must involve a motor vehicle traveling on a trafficway that is customarily open to the public, and it must result in the death of a person (either an occupant of a vehicle or a pedestrian/ bicyclist) within 30 days (720 hours) of the crash.

The Collision Location and Analysis System

The Collision Location and Analysis System (CLAS), a crash data repository, is the source of Target Zero's serious injury data. CLAS is stewarded by the Washington State Department of Transportation (WSDOT). Most of the data in CLAS comes from law enforcement officers via the PTCR. CLAS stores all reportable traffic crash data for Washington State public roadways. A crash needs to meet at least one of the two following criteria to be considered reportable: 1) a minimum property damage threshold of $1,000; and/or 2) bodily injury occurred as a result of the crash. It is widely acknowledged that serious injury classifications assigned by investigating officers are not as accurate as injury severity derived from health records. The serious injury data presented in this edition of Target Zero is classified by the investigating officer at the scene.

Crash Data Analysis Considerations

CRASH DATA CULPABILITY AND FAULT

Washington is considered a "no-fault" state, meaning that law enforcement personnel do not directly indicate which party was at fault when investigating crashes. Instead, they record driver and other road user circumstances contributing to the crash, such as impairment or speeding. In crashes where only a single vehicle is involved, or only one driver or road user is recorded as having contributing circumstances, then crash fault can be assumed. However, in the absence of a standard approach to assigning culpability in crashes involving multiple units and multiple persons with contributing circumstances, comprehensive analysis centered on crash "fault" is not possible. This is important to keep in mind when considering "involved" analysis in chapters such as Young Drivers. The data shown are a simple count of all fatalities or serious injuries involving a young driver, but do NOT indicate that the young driver is always the one at fault in these crashes.

IMPAIRMENT

Only persons involved in fatal crashes are consistently linked with toxicology reports for capturing impairment in FARS and CFC files. When a toxicology test is performed on any person in a fatal crash, including surviving drivers, the WTSC analysts receive those toxicology reports directly from the lab and those

results are recorded in the FARS and CFC databases. The WSDOT statewide crash database relies on officer supplemental PTCR reports to record impairment information following the receipt of a toxicology report, which is an inconsistent reporting method for toxicology outcomes. Comparisons between FARS/CFC fatalities and fatalities in the statewide database confirm under-reporting of drug and alcohol results since the later relies on officers submitting crash report supplements. Therefore, impairment involved in traffic serious injuries is also likely under-reported.

SPEEDING

Actual travel speed of a vehicle is not recorded on Washington's crash reporting form, only the roadway posted speed. Technical Reconstructionist reports will sometimes, but not consistently, include vehicle travel speeds. Therefore, analysts do not know how fast vehicles were actually going at the time of the crash. Furthermore, the majority of speeding-related crashes are coded as "Exceeding Reasonable Safe Speed" as opposed to "Exceeding Stated Speed Limit."

DISTRACTION

It is suspected that distraction involvement in fatal and serious crashes is generally under-reported. Officers are reluctant to record specific distractions contributing to the crash without defensible proof. Even witness accounts of driver cell phone use in crash report narratives do not always mean that the driver is coded as being distracted in the contributing circumstances. When distraction is coded, the majority are coded as generic "distracted" as opposed to a more specific source of distraction such as "operating hand-held device".

MOTORCYCLISTS

Motorcyclists include motor scooters, mopeds, and some motorized bicycles. In Washington, an endorsement is required to operate a motorcycle unless the vehicle is a two-wheeled motorcycle or scooter with a 50 cubic centimeter or smaller engine and has a maximum speed of 30 miles per hour. The definition of motorcycle is driven by how the officer reports the vehicle type and information obtained from vehicle identification numbers (VINs), independent of whether or not an endorsement is required. Therefore, there may be motor scooters, mopeds, and motorized bicycles involved in fatal or serious injury crashes that do not require an endorsement, but are classified as motorcycles.

HEAVY VEHICLES

This data is based on vehicle type and weight, independent of whether or not it is a commercial vehicle. The Washington State Patrol maintains a database for the Federal Motor Carrier Safety Administration (FMCSA) that captures crash data when a commercial vehicle heavy truck is involved. While the data definitions match regarding vehicle weight requirements, the heavy truck definition from crash data may also include non-commercial vehicles, such as large vans and heavy pickup trucks.

Other Washington Data

VEHICLE MILES TRAVELED ESTIMATES

Vehicle Miles Traveled (VMT) is a measure of the total number of miles traveled by all vehicles over a segment of road over a specific period of time, usually either a day or a year. WSDOT collects and reports several different types of road and street data to the federal Highway Performance Monitoring System (HPMS) each year. WSDOT collects traffic data for state highways and relies on local jurisdictions to provide traffic data for their roads and streets.

VMT is calculated as follows:

VMT = (length of road segment) x (the Average Annual Daily Traffic [AADT] traveling on that road segment)

The total VMT for a highway network or region is a summation of VMT for all segments of roads that make up the network or region. Statewide VMT is a summation of all segments of road statewide.

DEPARTMENT OF LICENSING DRIVER RECORD DATA

The Washington State Department of Licensing (DOL) provides the driver record data used in Target Zero from their Driver and Vehicle System (DRIVES) database. This data is updated daily from several sources and contains the complete driver records for all Washington drivers.

ADMINISTRATIVE OFFICE OF THE COURTS CASE FILINGS

Washington Administrative Office of the Courts (AOC) provides court and citation data, which includes enforcement and court processing. For example, AOC collects the number of texting while driving citations when they are filed with the court. Data gaps exist, which Target Zero Partners address, such as tracking a single DUI case through the myriad of internal and external data systems that the information passes through. The AOC actively participates in the Traffic Records Committee and is working to identify and find solutions for these data gaps, and to develop methods for linking AOC data with WTSC and WSDOT crash data.

OFFICE OF FINANCIAL MANAGEMENT POPULATION ESTIMATES

Washington's Office of Financial Management (OFM) has been providing annual population estimates for revenue allocation purposes since the 1940s. OFM provides population estimates, including breakouts by county, age, gender, and race/ethnicity.

APPENDIX D: VULNERABLE ROAD USER SAFETY ASSESSMENT

WSDOT Vulnerable Road User Safety Assessment

2023

Washington State Department of Transportation

Disclaimer

Disclaimer

Under 23 U.S. Code § 148 and 23 U.S. Code § 407, safety data, reports, surveys, schedules, lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

A message from Roger Millar

As Secretary of the Washington State Department of Transportation (WSDOT), I continue to be concerned by the increasing trends in traffic fatalities and serious injuries on Washington's roads, especially for those who rely on walking and rolling as a means of transportation.

The numbers reported in this assessment on vulnerable road users represent lives lost and injured. They are our families, friends, and neighbors. Each tragic loss should instill a sense of urgency and a desire for a more proactive safety culture in Washington State.

Building upon Washington's Target Zero Strategic Highway Safety Plan, the Vulnerable Road User Safety Assessment presents a summary of the people, locations, and the contributing factors to crashes. It highlights the use of data to identify patterns and to understand and select strategies that will reduce the severity of crashes for vulnerable users and all travelers.

We need bold actions and change. We have adopted the Safe System Approach to road safety which recognizes that all people who use the state's roads should be treated equitably to be able to reach their destinations safely. It emphasizes the need to explicitly consider and address the needs of people walking, rolling, and biking in the planning, design and operation of the roadway system. When we make roads safer for those who have been made most vulnerable, we make roads safer for everyone.

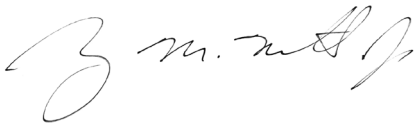
In the Safe System Approach people involved in every part of the system share responsibility to make our roads safer. This includes WSDOT's own staff, our safety partners in other agencies, emergency services and first responders, vehicle designers and regulators, and people using the roads and making decisions that affect the safety of others such as their driving speed. Everyone needs to work together to create a focused and sustained approach to safety. WSDOT is committed to actively engaging with all our partners and working proactively to reduce the frequency and severity of crashes.

In this values-based, evidence-informed assessment we evaluated socioeconomic and demographic factors in vulnerable road user crashes to better understand how equity influences road safety. We highlight our findings of overrepresentation in crashes among those in poverty, people of color, and where health disparities exist, and the assessment provides a method to identify and address these challenges.

The strategies and actions outlined for vulnerable road users in this assessment will rely heavily on reducing vehicle speeds to minimize injury potential and will move us towards creating a culture of safety within our respective safety disciplines and communities.

By working together with our partners and the public we can reverse the increasing crash trends and move towards our mutual goal of zero fatalities and serious injuries.

Sincerely,



Roger Millar, PE, FASCE, FAICP
Secretary of Transportation

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List of Acronyms

AADT	Average Annual Daily Traffic
CDC	Center for Disease Control
CPDM	Capital Program Development and Management
DEI	Diversity, Equity, and Inclusion
DOH	Department of Health
FARS	Fatality Analysis Reporting System
FHWA	Federal Highway Administration
HSIP	Highway Safety Improvement Program
I-2	WSDOT Investment Category: Improvement Program - Safety Sub-Program
KA	KABCO injury classification for crashes: K = fatal crash, A = serious injury crash
MAP-21	Moving Ahead for Progress in the 21st Century Act. Now called Transportation Performance Management (TPM)
MIRE	Model Inventory of Roadway Elements
RCW	Revised Code of Washington
SHSP	Strategic Highway Safety Plan
TPM	Transportation Performance Management (formerly MAP-21)
VRU	Vulnerable Road User
WA	Washington state
WSDOT	Washington State Department of Transportation
WTSC	Washington Traffic Safety Commission

Vulnerable Road User Safety Assessment

Purpose

Washington State Department of Transportation's Vulnerable Road User Assessment is designed to assess the safety performance of Washington state regarding its plans to improve the safety of vulnerable road users as described under 23 U.S.C. 148(l) and in federal guidance dated October 21, 2022. This assessment is a value-based, data informed process to identify areas for potential strategies and countermeasures for vulnerable road users. For purposes of this assessment, vulnerable road users are people who are walking, rolling, or cycling. The term "pedestrian" includes people using a variety of small, human propelled and low powered personal conveyances or assistive devices such as wheelchairs and scooters that are not defined as bicycles in state law. WSDOT uses "walking and rolling" to be inclusive of the movements of people using these devices. The assessment does not include motorcyclists and data related to these important road users.

WSDOT is applying the Safe System Approach to road safety and is guided by Executive Order 1085.01: Road Safety – Advancing the Safe System Approach for All Users. Through Safe System implementation, WSDOT is developing roads that consider the context, modal priorities, and design and operating speeds of facilities in their design and operations, as well as in the selection and implementation of effective countermeasures to reduce the potential exposure, likelihood, and severity of crashes.

Introduction

Washington state's Strategic Highway Safety Plan (SHSP), Target Zero, sets a goal for zero motor vehicle-related deaths and serious injuries by 2030. Washington was the first state in the nation to set zero as its goal—the only acceptable number of deaths and serious injuries on Washington roadways is zero. To reach zero, partners continue to develop safety implementation strategies to reduce the exposure, likelihood, and severity of crashes. In Washington, while all crashes are important, WSDOT is leading a shift in focus toward eliminating the highest injury severities by changing the criteria for program and project selection.

WSDOT approaches safety management through planning based on analyzing crashes that result in deaths or serious injuries. Using evidence-based practices WSDOT develops an understanding of past, current, and potential future trends. Better understanding leads to proactive strategies that effectively and efficiently reduce the potential for fatal and serious injury crashes for all road users before they occur. Strategies address road characteristics, contributing factors, and social equity considerations. These characteristics and contributing factors form the basis for developing a screening tool based on a systemic approach, from which a ranked list of potential projects is derived.

Consistent with RCW 47.05: Priority Programming for Highway Development, WSDOT analyzes and evaluates projects based on benefits and costs. This allows the agency to prioritize and program projects that have the greatest potential to reduce fatal and serious crashes. This process is a vital component of project planning, development, and operations. Many high priority projects are proactive and systemic in nature.

With the combined fatalities and serious injuries among people walking, rolling, and biking increasing, proactive countermeasures are intended to reduce the potential for injury crashes before they occur. WSDOT recognizes that vulnerable road users operate in a variety of environments and contexts. This reality makes it critical to develop context-focused strategies and countermeasures that benefit everyone using the road regardless of mode and whether they are traveling along a Washington state highway, county/city road, or local street.

This report is intended to address the entire state, including both local and state-owned roads. The report attempts to address both interests equally but cannot because of data limitations. Further work is necessary to address these differences but is outside the scope of this assessment. The report will suggest potential strategies to address these challenges.

Safe System Approach

WSDOT recently updated its Safe System Executive Order. The update expands direction to the department divisions and regions and continues to emphasize proactive systemic safety improvements. WSDOT created three proactive subcategories that emphasize walking, rolling, and biking including speed management, active transportation, and intersections (e.g., compact roundabouts). Spot locations are also considered where they meet criteria identified in the Collision Analysis Location/Collision Analysis Corridor and Intersection Analysis Locations methods. When spot locations are considered, they undergo review by a safety panel focused on both modal issues and VRUs. These discussions commonly include providing sufficient separation of VRUs from vehicle traffic; whether VRUs are being subjected to high speeds; and how specially designed active transportation facilities for VRUs are being connected into a functional network.

WSDOT safety subcategories are intended to reduce large crash forces, recognizing the context and road users on the system. Under state law, priorities to address locations need to be consistent with RCW 47.05 requiring a priority programming approach based on factual need, evaluation of life-cycle costs and benefits, defined objectives, and available revenue. WSDOT is considering a proposal to set up a safety office with the goal of reducing fatal and serious crashes across all roads and programs.

The VRU Safety Assessment considered elements of the Safe System Approach throughout the analysis, with the intent that the strategy identification process would be consistent with the Safe System Executive Order. For example, the analysis evaluated posted speeds and the strategy identification process and includes countermeasures that support safe speeds within the Safe System context.

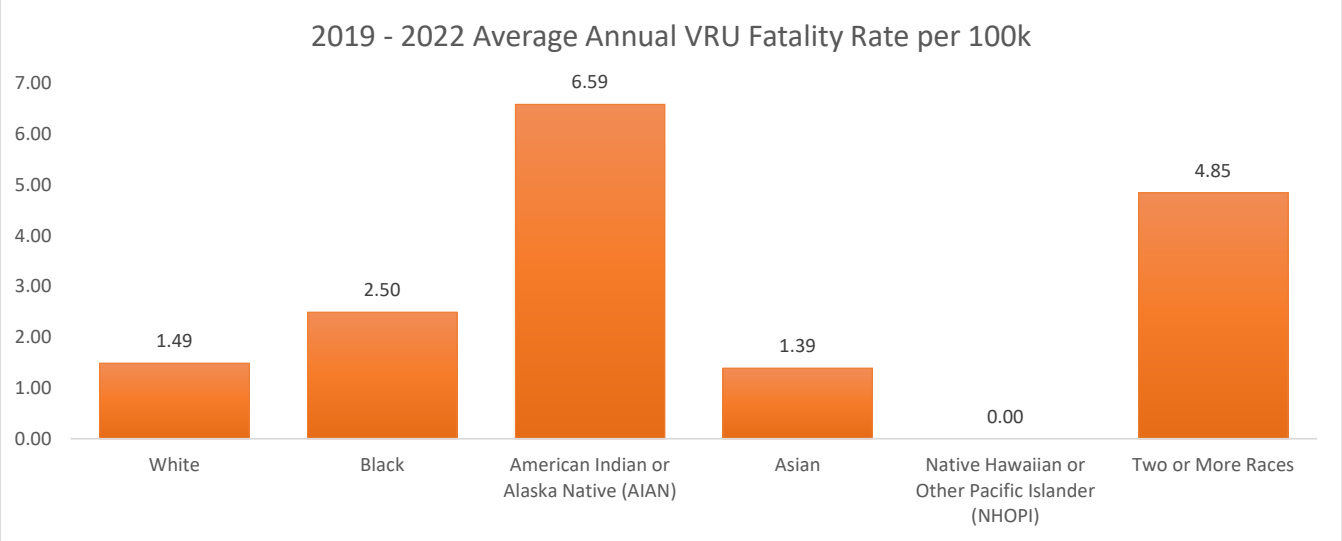
The assessment also documented how each strategy or countermeasure influences VRU crash exposure/conflicts, VRU crash frequency, and severity of VRU crashes (refer to Exhibits 17 - 20 on pp. 36-40). Findings from the assessment will support the proactive safety investment emphasized in the WSDOT Safe System Approach.

Equity

Considering equity as part of addressing VRU fatalities and serious injuries is critical to the success of WSDOT's efforts. WSDOT evaluated multiple socioeconomic/demographic variables associated with locations where fatalities and serious injuries were observed using correlation analysis (refer to Summary of Quantitative Analysis on p. 15). For people walking, rolling, and biking, more fatalities and serious injuries occur in areas with populations identified as socially vulnerable, historically disadvantaged, or experiencing persistent poverty. The analysis also showed how the fatality rates per 100,000 population for non-white groups can be as much as four times that of people identified as white (based on US Census categories; refer to Exhibit 1). Race/racial identification information is not available for serious injury data.

WSDOT assessed VRU fatal and serious injury crash densities alongside data from tools such as the USDOT Disadvantaged Communities, the CDC Social Vulnerability Index, the USDOT Areas of Persistent Poverty, and the Washington State Environmental Health Disparities Index. In each case, where these tools indicated the presence of disadvantaged populations, the locations were associated with higher vulnerable road user fatal and serious injury crash densities by census tract (all public roads) and for segments on the state highway network.

Exhibit 1. Washington state population-based fatality rates across race for people walking and biking (Source: Coded Fatality Crash files, WTSC; and Population Estimates, OFM)



Climate Change & Sustainability

During its 2023 session, the Washington State Legislature passed HB 1181 in an effort to improve the state's response to climate change by updating the state's planning framework. The bill is intended to help mitigate the impacts of climate change. A section of the bill requires multimodal transportation demand forecasts to inform the development of transportation plans. This will help plans balance

transportation system safety and convenience to provide safe, reliable, and efficient access and mobility for people and goods. This section recognizes the benefits of providing for modes that reduce emissions and promote transportation options. Importantly, the bill also states that transportation facilities and services providing the greatest multimodal safety benefit to each category of roadway user, for the context and speed of the facility, must be given priority. WSDOT recommended this bill language to correct a previous version that would have weighted safety concerns by number of recorded users, causing driver safety to be prioritized over vulnerable road users.

Complete Streets & Safety

The Washington State Legislature passed a transportation investment package in 2022 known as Move Ahead Washington. As part of that package, WSDOT was directed to apply Complete Streets approaches to projects on state routes over $500,000 beginning July 1, 2022. The criteria outlined in that directive in RCW 47.04.035 essentially define roadways that lack active transportation facilities and have characteristics that can lead to higher crash exposure, frequency, and severity for vulnerable road users. WSDOT moved rapidly to refine its processes for every stage of project development and updated the WSDOT Design and Traffic Operations Manuals to embed principles that align with the Safe System Approach, particularly safe speeds and safe roads.

Speed management for injury minimization, improved crossing treatments, separated or protected bike lanes, and other tools will be applied in future projects to carry out a Complete Streets approach that will advance safety for people walking, rolling, bicycling, accessing transit, and using other modes.

Consultation

Internal

WSDOT began internal agency consultation as a first step to gain support and understanding for the vulnerable road user safety assessment process. This included meeting with interested parties within the WSDOT Highway Safety Executive Committee and various agency divisions including Active Transportation, Project Development, Transportation Operations, and Local Programs. These groups and divisions were kept informed of the ongoing effort and had multiple opportunities to share, provide input, and review the progress throughout the process.

External

Washington Traffic Safety Commission
External consultation began with the Washington Traffic Safety Commission (WTSC), with individual meetings with leadership to discuss how the VRU assessment could be incorporated into WSDOT's update of the SHSP/Target Zero. This was an important step as WSDOT is aligning its SHSP to the Safe System Approach.

Washington State Cooper Jones Active Transportation Safety Council
On May 17, 2023, WSDOT also met with the Cooper Jones Active Transportation Safety Council (ATSC) to discuss the assessment and potential direction including incorporation of the equity component of the assessment. The ATSC serves in an advisory role to identify data gaps, study issues, and make recommendations to the legislature; for this effort they represent a statewide group that provides external input. At the ATSC meeting WSDOT provided preliminary results on the potential risk-based assessment method being developed.

Metropolitan Planning Organizations/Regional Transportation Planning Organizations
WSDOT met with the metropolitan planning organizations (MPOs) and regional transportation planning organizations (RTPOs) to discuss the VRU assessment on February 21 and August 8 of 2023 with the technical committee. In both meetings, the technical committee provided input on potential variables associated with crashes, as well as concerns with VRU speed-setting policies.

On May 9, 2023, a presentation was made to the WSDOT/MPO/RTPO Coordinating Committee This meeting highlighted consistency with the federal requirement as outlined in the Infrastructure Investment and Jobs Act. WSDOT discussed the purpose of assessing performance to identify areas for further analysis, and for identifying strategies to reduce or prevent fatal and serious injury crashes. At all meetings with MPOs/RTPOs, WSDOT outlined current performance, the people involved in the crashes, the potential improvements to crash reports, the types of crashes involved, socioeconomic considerations, and findings of the assessment.

Governor's Public Performance Review
WSDOT also presented to the Governor's Public Performance Review meeting on June 28, 2023, and discussed the vulnerable road user assessment at a high level. The presentation highlighted the value of potential speed safety cameras, challenges created by how crash data is collected related to vulnerable road users, and how the Safe System Approach could benefit all road users.

Strategic Highway Safety Plan Partners Meeting
WSDOT provided a detailed presentation on the VRU assessment at the SHSP partner's meeting on September 27, 2023. This was part of a two-day meeting to kick off the update for the 2024 Target Zero Plan. The presentation included discussion and feedback on the social equity component of the VRU assessment and findings from the assessment.

Data-informed Assessment

Consistent with Washington's Active Transportation Plan and WSDOT's approach to minimizing vulnerable road user crashes, 10 years of crash data are analyzed. Although overrepresented among fatal and serious injury crashes relative to users of other modes, vulnerable road user crashes are often dispersed, and the crash totals generally do not provide enough data points to allow reliable statistical analysis over a shorter time frame. The analysis focused on crashes where one or more person walking or biking were killed or seriously injured in a reported motor vehicle crash, referred to as VRU KA

crashes from hereon. The decision to focus on the fatal and serious injury crashes was part of the FHWA requirements for this safety assessment.

WSDOT's 10-year approach provides a larger, more robust dataset that allows for trends to be better understood. The agency recognizes that 10 years can introduce some anomalies when locations undergo change, but WSDOT's approach was to first cut the data, then perform secondary analysis for the selection of countermeasures.

Based on the SHSP, the data analysis and evaluation focused on crashes involving vulnerable road user fatalities and serious injuries and a motorized vehicle. Crash data is only available for vehicle/pedestrian and vehicle/bicyclist, not pedestrian/bicyclist or bicyclist/bicyclist crashes[1]. The data used in the assessment cover factors such as crash type, crash contributing factors, sociodemographic and equity characteristics, level of traffic stress for active transportation, and sidewalk and roadway characteristics.

The analysis followed a two-pronged approach: a statewide, all public roads review at the census tract level and a more in-depth review of the state highway network. The choice to perform two separate analyses was driven by the availability of data for analysis. For example:

- Detailed segment level information is not available for roadways other than state highways, limiting the statewide analysis of all VRU KA crashes to census tract level approaches. A systemic analysis of state highways was however completed because the segment level information are available for this portion of the network.
- Crashes are coded to the linear referencing system of state highways but only as coordinates for other roadways: non-state highway crashes therefore cannot be associated with specific segments, other than manually and this could not be accomplished on this assessment for the entire state. Other associated roadway characteristics on the non-state highway system are also not available, a necessity for systemic analysis.
- WSDOT does not currently maintain a database for intersection characteristics, so the analysis cannot consider intersection characteristics when analyzing the state highway network. The analysis relied on various crash data fields to identify, to the extent possible, which crashes were associated with an intersection and which crashes were associated with a segment. An effort is underway to collect intersection characteristics as part of the MAP21 MIRE requirements for 2026 and for improved intersection analysis.

The more detailed segment information available at the state highway level enabled characteristics to be identified that are more likely to be associated with higher densities of VRU fatal and serious injury

*Note: **1** While WSDOT does not currently have full access to EMS, hospital, or trauma data, Washington has shown leadership in studying how this data can be accessed by interested parties. In part, this effort led to a National Cooperative Highway Research Program Project NCHRP 17-120, A Method to Link Crash, Emergency Medical Service, and Trauma Registry. Another study in Washington looked at Emergency Records and Micromobility Crashes. WSDOT is also funding a study with Portland State University on understanding of the exposure rate based on VRU usage.*

crashes, a systemic analysis. An additional analysis using numerous crash data fields in the WSDOT Engineering Crash Datamart enabled the development of a set of crash types for crashes involving people walking or rolling and those involving people biking. Refer to Custom Crash Types for Pedestrians and Bicyclists (Exhibits 11 and 12) for more information.

Value-based, data informed safety analysis helps engineers to identify characteristics more likely to be associated with VRU fatalities and serious injuries, areas of focus, crash types, and countermeasures. The analysis approach is used to maximize the value of investments for projects, programs, and activities related to WSDOT's implementation of the Safe System Approach.

Fortunately, efforts to reduce exposure to potentially fatal or serious injuries for the most vulnerable road users lead to effective strategies for not just the VRU, but vehicle drivers as well. This represents a shift from modal-based selection to focus on the most effective countermeasures to reduce crash exposure for everyone.

This change is an evolution from a system oriented primarily around modes or numbers of specific types of users and was highlighted in Washington's SHSP (refer to Target Zero 2019, p. 194).

Overview of Vulnerable Road User Safety Performance

Historical trends

Exhibit 2 and Exhibit 3 illustrate the pedestrian and bicyclist fatalities and serious injuries in Washington state from 2013 to 2022. Unfortunately, pedestrian fatalities in 2022 were 141% higher than in 2013 based on the 2022-year end data file; serious injuries among those walking or rolling have also increased by 22% since 2013. Fatalities among those biking have remained stable since 2013 but fatalities among those rolling was 73.2% higher in 2022 compared to 2013.

Pedestrian fatalities in 2022 were 141% higher than in 2013.

Exhibit 2. Pedestrian and Bicyclist Fatalities in Washington State (Source: Preliminary fatality data from Coded Fatality Files (WTSC) (Dec. 2022)

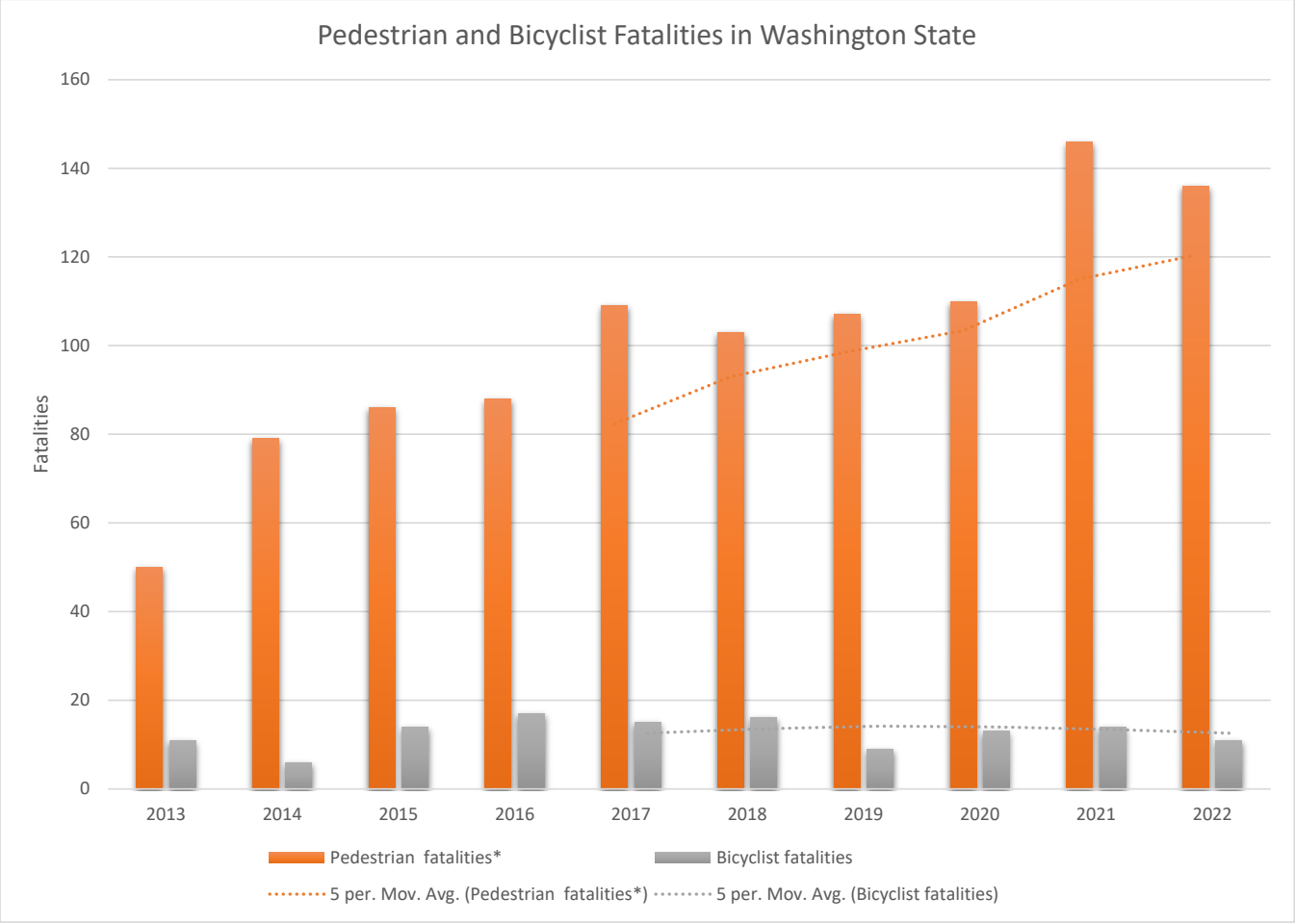
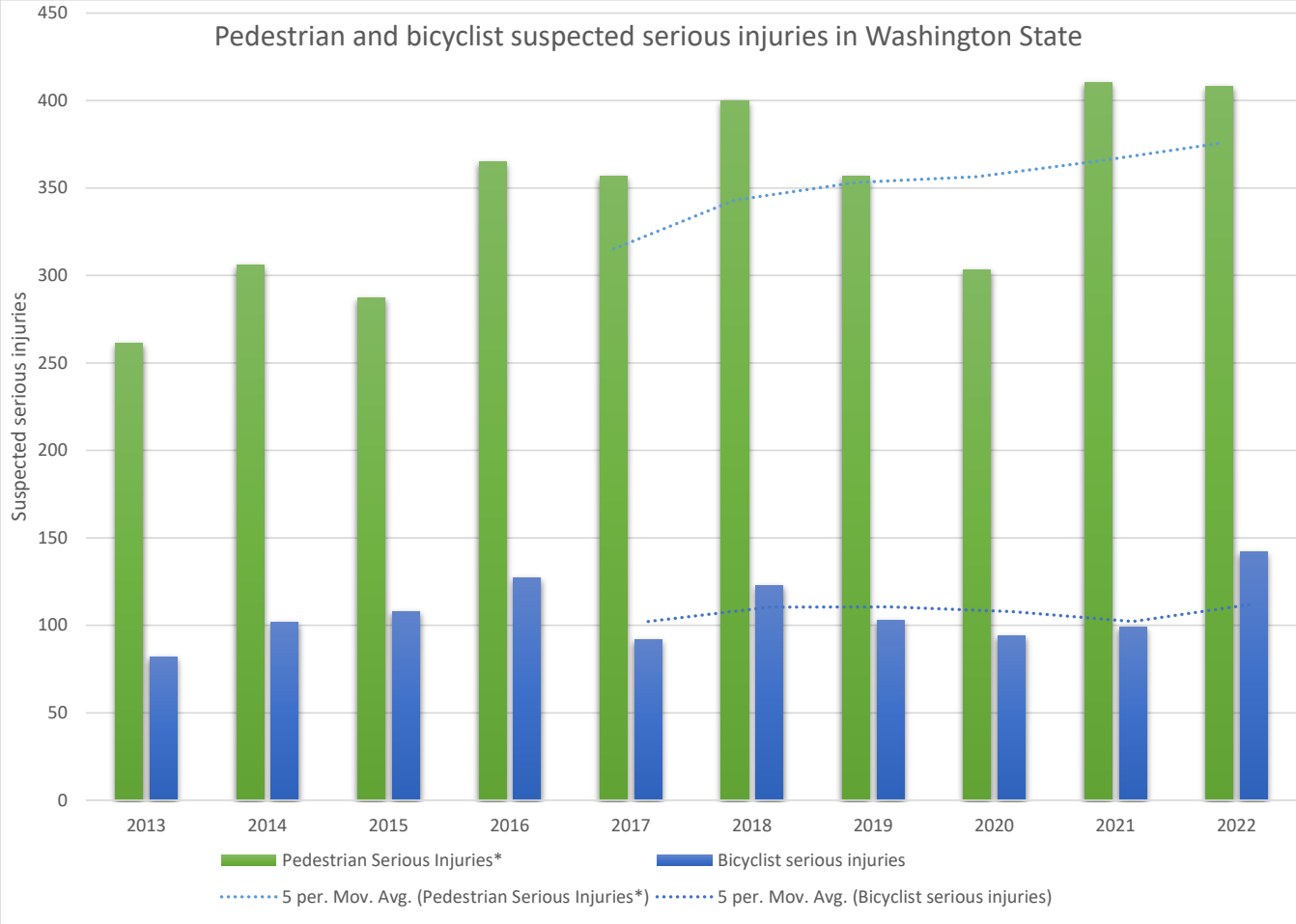
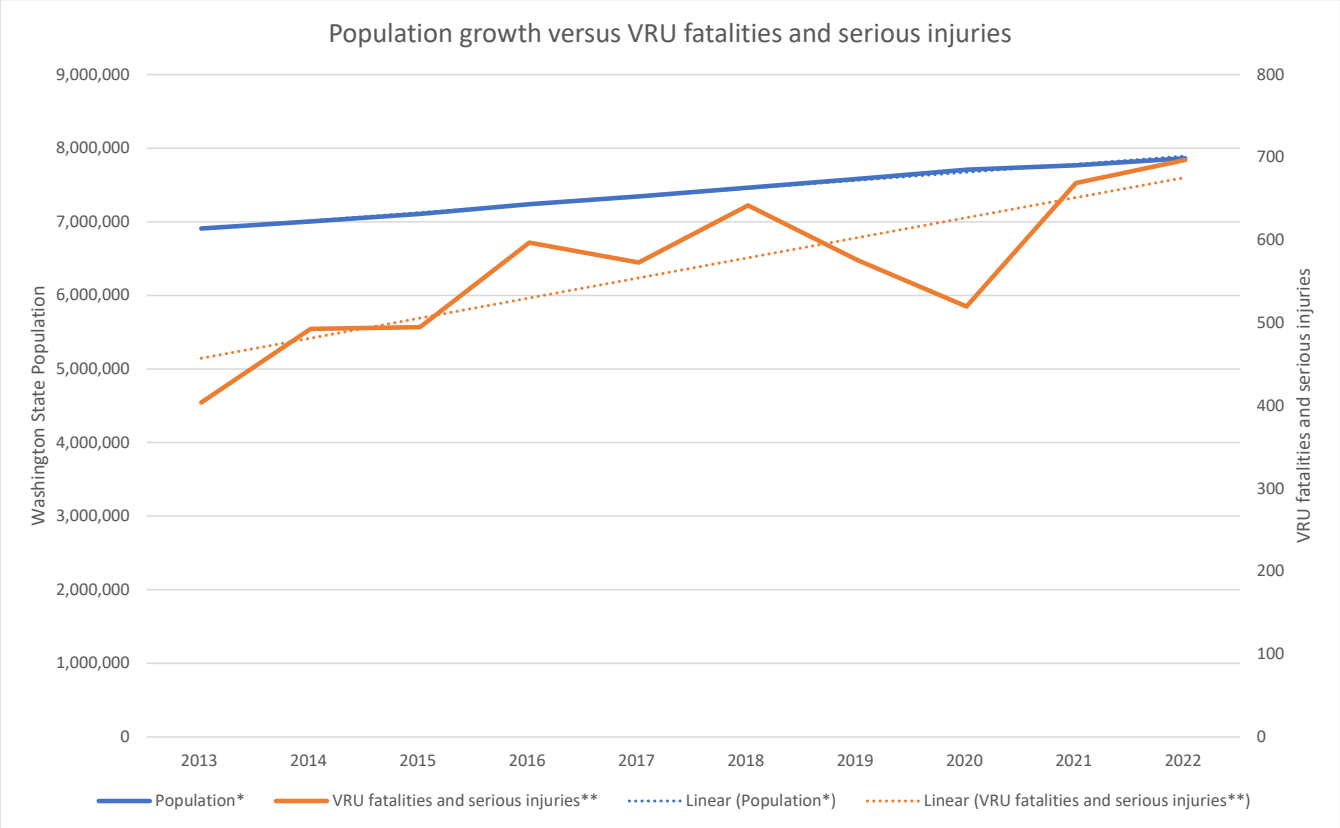


Exhibit 3. Pedestrian and Bicyclist Suspected Serious Injuries in Washington State (Source: Crash data from WSDOT Engineering Crash Datamart, Year-end snapshot 2022, May 2022



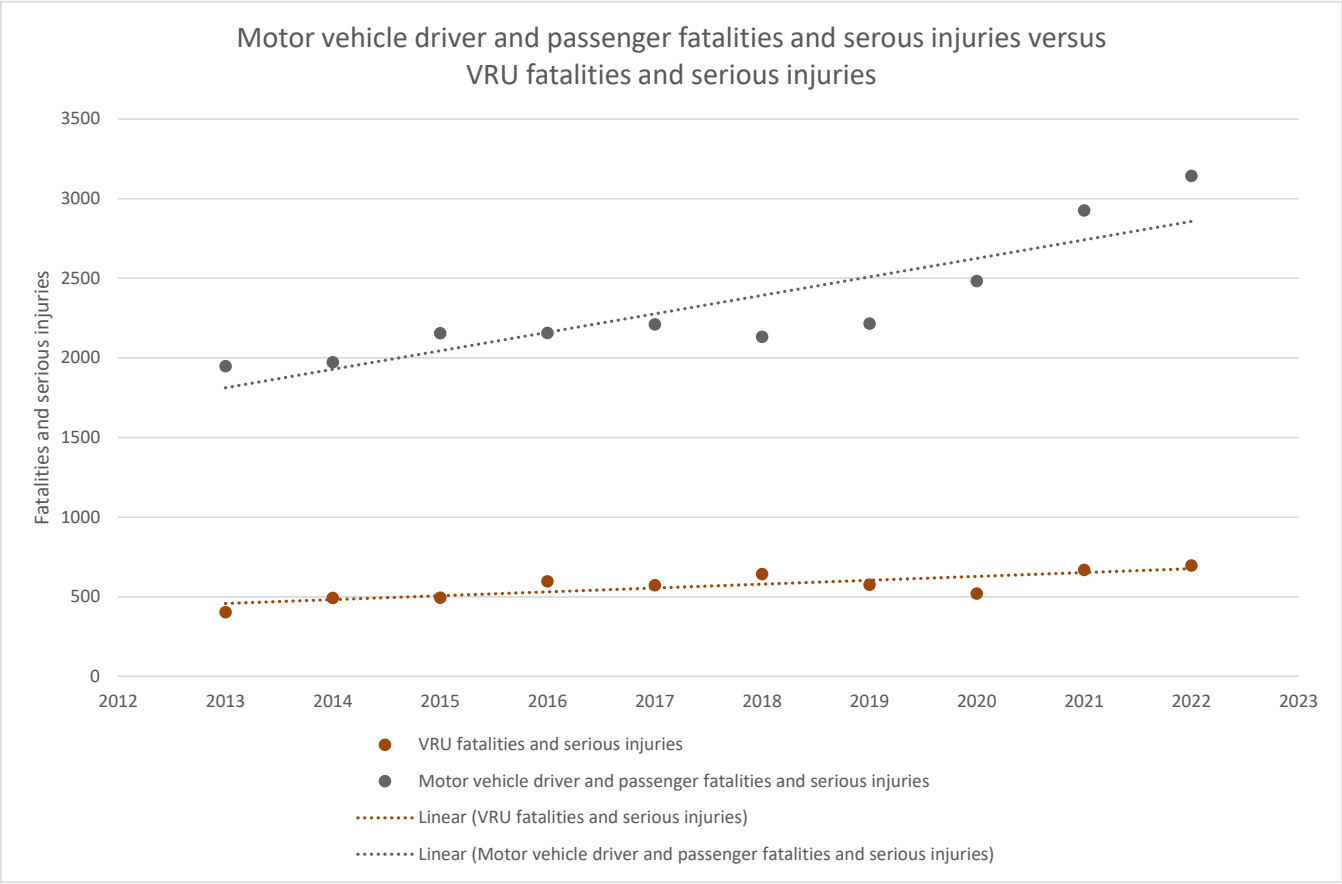
Using population growth to understand potential increases in pedestrian volumes, it is noted that the fatalities and serious injuries among VRUs have increased faster than the population growth in Washington since 2013, as shown in Exhibit 4. The 2021 State Active Transportation Plan noted that population growth alone cannot explain the steady increase in fatalities. The ATP also compared mode use with data from the National Household Transportation Survey in 2009 and 2017 and noted that increases in commute trips by walking or bicycling grew faster than population growth. In addition, while not counted as a separate trip, in 2017 approximately 85 percent of public transportation users in Washington reported walking or bicycling to access transit.

Exhibit 4. Population growth versus VRU fatalities and serious injuries (Source: Preliminary fatality data from Coded Fatality Files (WTSC) (May 2023 Preliminary Data; serious injury data from WSDOT Engineering Crash Datamart, 2022 year end; and population data from WA OFM)



When comparing the fatalities and serious injuries for motor vehicle drivers and passengers over time with that of VRU fatalities and serious injuries, it is evident that fatalities and serious injuries among drivers and passengers have increased at a slightly faster rate than the VRU fatalities and serious injuries in terms of total fatalities and serious injuries, refer to Exhibit 5. Yet, as noted earlier, VRUs have seen a 72.5% increase in fatalities in this timeframe. WSDOT remains optimistic that the fatality and serious injury spikes from behavioral issues such as extreme speeding and impairment will drop below pre-pandemic levels but has not immediately seen changes in 2022. This points to the importance of implementing the mitigating measures of the Safe System Approach.

Exhibit 5. Statewide comparison between the motor vehicle driver and passenger fatalities and serious injuries and VRU fatalities and serious injuries (Source: Preliminary fatality data from Coded Fatality Files (WTSC) (May 2023 Preliminary Data; serious injury data from WSDOT Engineering Crash Datamart, 2022 year end)



WSDOT has set a target of zero fatal and serious injury crashes by 2030. Current trends make it unlikely that the state can achieve this goal in that time frame. In discussions with the Washington Traffic Safety Commission, the focus has been on identifying bold actions needed to reduce fatal and serious injury crashes. Safety agencies are working together to develop these actions. However, given the aspirational nature of WSDOT's target setting, it has failed to meet targets or make significant progress as defined by FHWA.

Exhibit 6 summarizes the progress the state of Washington has made for each of the Transportation Performance Management (MAP-21) safety performance measures. Fatalities and serious injuries among VRUs make up 22.2% of all road user fatalities and serious injuries when considering fatalities and serious injury counts for 2022.

Exhibit 6. Statewide Summary of Significant Progress for TPM Safety Performance Measures: 2018 through 2022

Performance Measure	Target: 2018-2022 rolling average	Outcome: 2018-2022 rolling average	Baseline: 2016-2020 rolling average	Target/ Baseline Met?	Significant progress?
Number of fatalities	440	615.00	550	No/No	No
Rate of fatalities per 100 million VMT on all public roads	0.735	1.049	0.919	No/No	No
Number of serious injuries	1819	2585.8	2271.2	No/No	No
Rate of serious injuries per 100 million VMT on all public roads	3.042	4.412	3.797	No/No	No
Number of non-motorized fatalities and serious injuries	464.6	620 .8	581.6	No/No	No

Summary of Quantitative Analysis

Data and Methodology

The Washington VRU Safety Assessment used data from 2013 through 2022, a 10-year period. The analysis used crash data from the WSDOT Engineering Crash Datamart and the Washington State Coded Fatality Files from the Washington Traffic Safety Commission, and only crashes which resulted in a vulnerable road user death or serious injury were included. The assessment leveraged sociodemographic and equity data at the tract level and was supplemented with segment data (such as posted speed, number of lanes, and cross-section) for the state highway analysis. WSDOT does not currently have an intersection database and is taking actions to collect this information as part of the upcoming MIRE requirements from MAP-21 (TPM).

The first step in the analysis was a statewide review of factors describing people, place, and context for the crash. These include population characteristics, race, age, time of day, equity, and sociodemographic metrics referred to in the FHWA Guidance for Vulnerable Road User Safety Assessments, and the Environmental Health Disparity Index v.2.0 from the Washington Department of Health. The analysis also included the Social Vulnerability Index of the Centers for Disease Control; various USDOT metrics such as the Disadvantaged Communities Sum of Scores and Transportation Disadvantaged Score, Areas of Persistent Poverty, Historically Disadvantaged Communities, the USDOT Travel Barriers Score, and the red line indicator.

The second step was to develop a custom set of crash types for pedestrians and bicyclists, respectively. This was necessary as the current crash reporting form and system do not provide for detailed crash typing but rather only identify crashes as involving a pedestrian or bicyclist. The crash types developed for this purpose will help WSDOT identify potential countermeasures.

The third step was to study and assess the equity and sociodemographic information for the state and to use this knowledge to develop a custom and WSDOT-Specific VRU Equity score that can be used to prioritize or screen locations on state highways for further analysis or investments or for informing grant program technical assistance and decision making. This custom score was discussed throughout the department and with interested parties as part of the collaboration process.

The fourth and last step was the review of the state highway network across a multitude of factors to identify characteristics associated with higher VRU fatal and serious injury crash densities per mile than others. Factors reviewed included, for example:

- Environmental Health Disparity Index v.2.0 (WA DOH)
- Social Vulnerability Index (CDC)
- Disadvantaged Communities Sum of Scores (USDOT)
- Transportation Disadvantaged Score (USDOT)
- Areas of Persistent Poverty (USDOT)
- Historically Disadvantaged Communities (USDOT)
- Travel Barriers Score (USDOT)
- Red line indicator (USDOT)
- Posted speed limit
- Number of lanes
- Federal functional class
- Urban versus rural status
- Proximity to highway urbanized areas, cities, population centers, urban growth boundaries, schools, transit stops
- Presence of sidewalks
- Tribal lands
- Urban areas
- Jurisdiction
- AADT

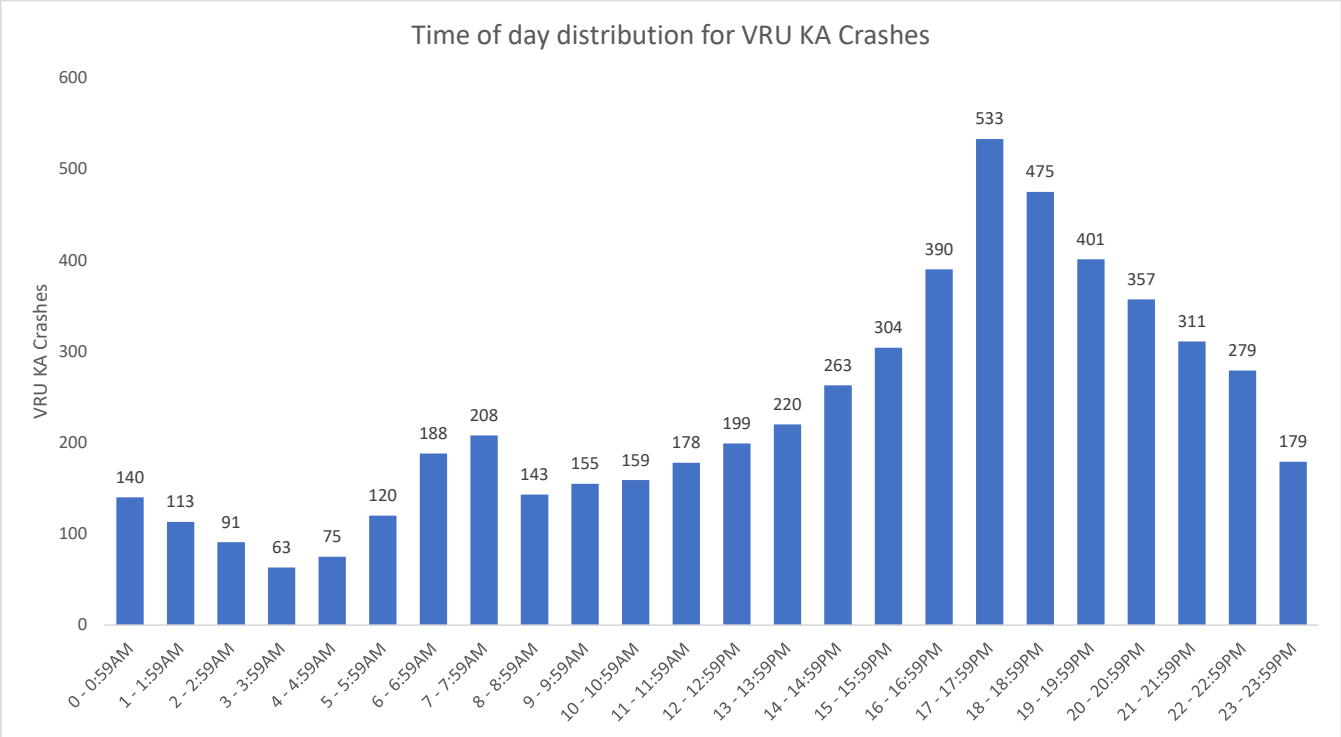
Findings

The VRU Safety Assessment included an in-depth analysis of crashes on all public roads by census tract and then state highways. The following sections summarize some of the highlights of the analysis.

Time of Day

Exhibit 7 provides the time-of-day distribution for VRU fatal and serious injury (KA) crashes. There is a slight peak from 5-8 a.m. and then a higher peak around 5-6 p.m. The morning and evening peak periods are more pronounced for pedestrian KA crashes than they are for bicyclist KA Crashes.

Exhibit 7. Time of day Distribution of VRU KA Crashes Statewide (WSDOT Engineering Crash Datamart, 2022 year end)

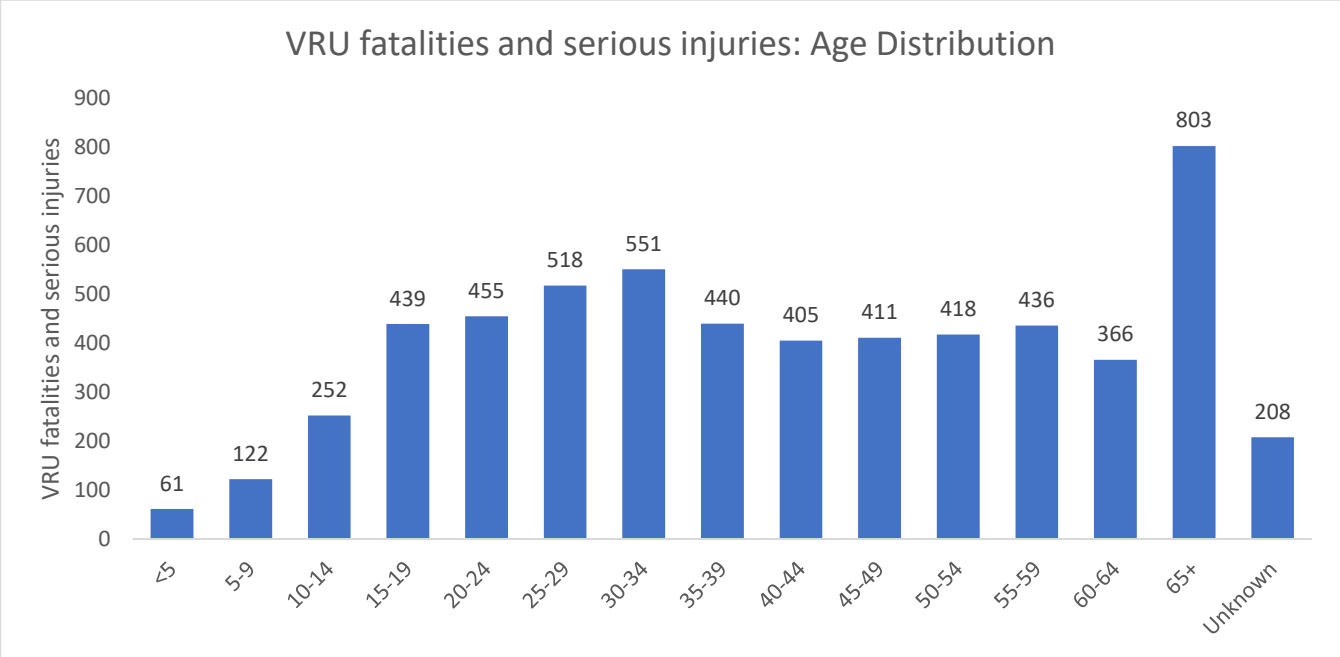


Age

The age distribution for VRU fatalities and serious injuries differs slightly between pedestrians and bicyclists but all age groups are affected by these injuries. Exhibit 8 shows the distribution of VRU fatalities and serious injuries across the different age groups.

People older than 65 represent the age group with the highest number of crashes resulting in deaths and serious injuries.

Exhibit 8. Statewide Age Distribution of VRU fatalities and serious injuries (WSDOT Engineering Crash Datamart, 2022 year end)



Contributing Factors

The sections below summarize the prevalence of aberrant behaviors identified by the reporting officer as part of the crash report form for VRU KA crashes. The intent of the section is to provide insights into factors that may or may not have contributed to these crashes, possible countermeasures, and the likelihood that these countermeasures may minimize future crashes. It is important to note that impairment, distraction, and speeding factors are underreported in crash report forms. For example, NHTSA reports that only 44% of the drivers in fatal crashes in 2021 had known BAC levels in Washington state (Traffic Safety Facts 2021 Data: State Alcohol-Impaired-Driving Estimates (dot.gov)).

Alcohol/drugs for VRU-KA crashes

- 12.2% of the VRU KA crashes involved one or more road user impaired by alcohol/drugs
- 5.92% of the drivers in VRU KA crashes were impaired by alcohol/drugs
- 7.03% of the pedestrians in VRU KA crashes were impaired by alcohol/drugs
- 2.69% of the bicyclists in VRU KA crashes were under the influence of alcohol/drugs

Distraction

- 20.22% of the drivers in VRU KA crashes were distracted
- 13.94% of the pedestrians in VRU KA crashes were distracted
- 15.87% of the bicyclists in VRU KA crashes were distracted

Failure to use crosswalk

- 7.67% of the pedestrians in VRU KA crashes failed to use the crosswalk (WSDOT has not individually verified if a crosswalk was available)

Disregarded stop and go light (traffic signal)

- 0.78% of drivers in VRU KA crashes disregarded the stop and go light.
- 1.13% of pedestrians in VRU KA crashes disregarded the stop and go light
- 3.53% of bicyclists in VRU KA crashes disregarded the stop and go light

Failure to grant right of way

- 17.17% of drivers in VRU KA crashes did not grant right of way to the VRU
- 17.43% of pedestrians in VRU KA crashes did not grant right of way to the vehicle
- 18.72% of bicyclists in VRU KA crashes did not grant right of way to the vehicle

Speeding

- In 3.3% of the VRU KA crashes the driver exceeded the speed limit or exceeded reasonable safe speeds
- 2.06% of drivers in VRU KA crashes were exceeding reasonable safe speeds and 1.24% exceeded the speed limit

Hit and run

- 16.4% of the VRU KA crashes were hit-and-run crashes

Equity and Demographics

WSDOT performed an in-depth investigation into each of the equity measures listed in the guidance for VRU safety assessments issued by FHWA.

Some of these metrics consisted of multiple variables or what is more commonly known as an index. WSDOT wanted to view each of the metrics/indexes independently, including whether WSDOT had the data accessible, and whether the data was useful in the equity analysis in the Washington context. WSDOT's initial review also considered whether the equity metric/index was correlated to VRU fatal and suspected serious injury rates by 100 thousand people population for Washington Census Tract (a population grouping used for planning purposes) and VRU crash densities (how many crashes occur on state highways per mile).

After review of the FHWA metrics/indices, WSDOT also reviewed a number of Washington state proposed indices. With multiple indices, WSDOT was concerned that variables in different metrics/indices overlapped, meaning that more that more than one metric/index had the same input variable

which would lead to overcounting the value of a particular variable in comparison to a different but equally important variable that did not overlap. To avoid this overcounting, WSDOT recommended in its outreach, a Washington Specific VRU Equity score be calculated as the maximum value of any of the following as shown in Exhibit 9:

Exhibit 9. Selection of Statewide Washington-specific VRU Equity scores from existing metrics

Variable	Variable scoring
If Area of Persistent Poverty (USDOT)	0= no, 10 = yes
If tribal land	0= no, 10 = yes
Social Vulnerability Index (CDC)	A score of 12 converted to a score out of 10
Environmental Health Disparities Index (WA DOH)	1 to 10
Disadvantaged Communities score (USDOT)	1 to 10
Using census tracts, using range of highest and lowest values divided in equal parts to create a score out of 10 for school density.	1 to 10
Using census tracts, using range of highest and lowest values divided in equal parts to create a score out of 10 for transit stop density.	1 to 10
Using census tracts, using range of highest and lowest values divided in equal parts to create a score out of 10 for transit route mileage density	1 to 10

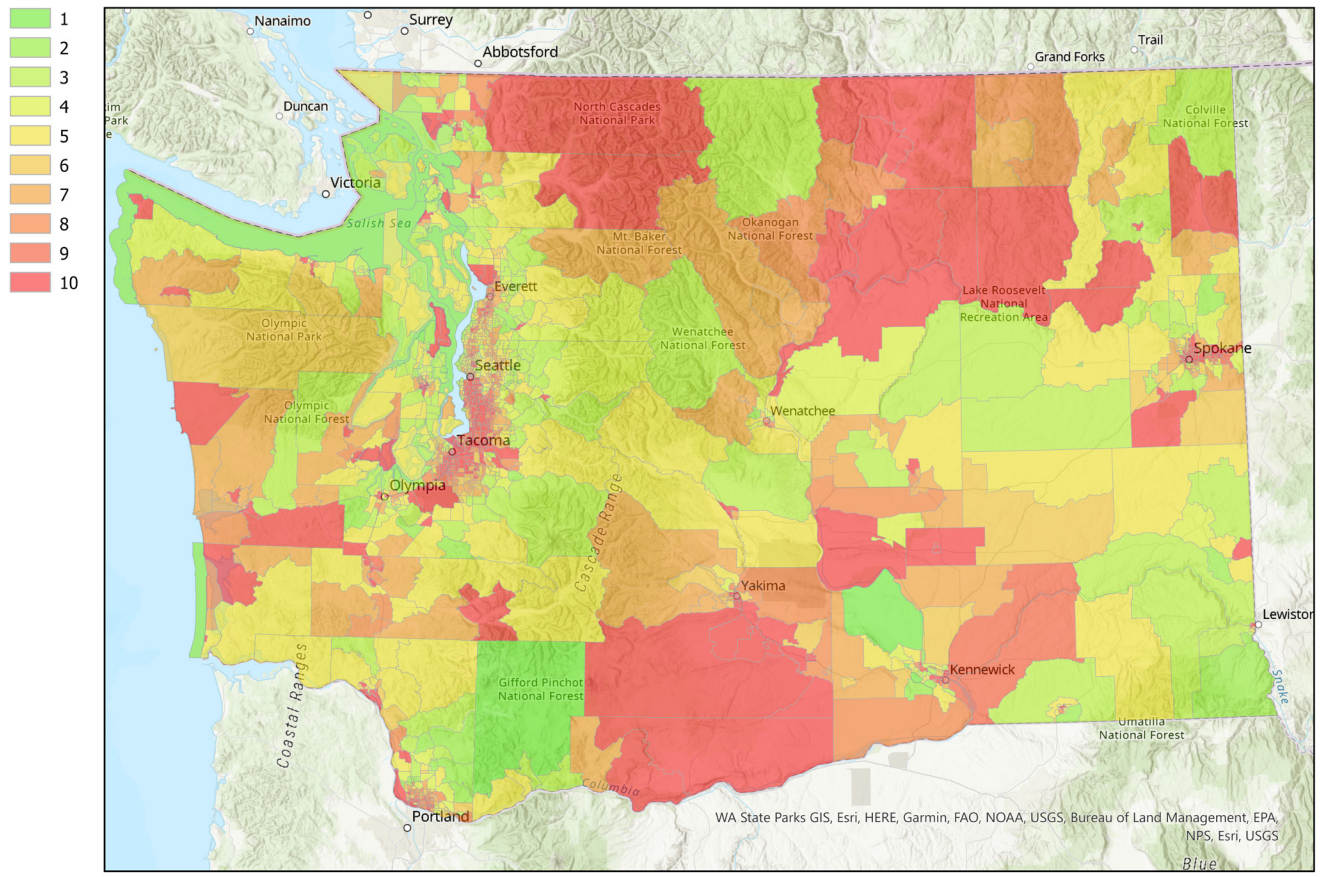
In other words, if a census tract scored high on any of the listed variables above, that became the variable used as its equity metric, the Washington-specific VRU Equity score.

Washington's custom VRU Equity score is strongly correlated with VRU KA crash density per mile.

WSDOT proposed that tribal lands receive a high score (10) given the disproportionate rate of fatalities as outlined by our Active Transportation Plan, other studies within Washington, and as substantiated in this assessment. WSDOT notes that the score of 10 for tribal land was higher than other indices provided for tribal lands.

WSDOT used different variable weights to test different scenarios before finalizing its recommended method of selecting a maximum score of 10. Included in the equity assessment were school density, transit stop density and transit route mileage density. These variables were included to indicate that walking and rolling to transit and schools in lower income communities is an equity consideration as an affordable form of transportation, and one that may increase crash exposure. The next step was to use the scores of each index as an individual variable in the Washington-specific VRU Equity score. Each of the six variables shown were independently correlated to VRU crashes. Exhibit 10 shows a map of Washington- specific VRU Equity scores.

Exhibit 10. Statewide WSDOT Vulnerable Road User Equity score per census tract



This Washington-specific VRU Equity score was assessed for correlation with VRU KA crash and injury metrics. WSDOT found that the custom VRU Equity score is strongly correlated with VRU KA crash density. This Washington-specific VRU Equity score can be considered to support systemic analysis, screening, and prioritization of locations for analysis and/or investment.

Custom Crash Types for Pedestrians and Bicyclists

As part of the VRU Safety Assessment WSDOT developed custom crash types for pedestrians and bicyclists for use in analysis and countermeasure selection. The purpose of the crash typing was to identify location type (segment or intersection), pedestrian or bicyclist action, driver action, etc. that could help support analysis and countermeasure selection. Exhibits 11 and 12 provide this custom crash typing based on currently available data fields from the WSDOT Engineering Crash Datamart along with distribution for each group of crashes. Note that the "Other" category is a compilation of crashes that could not be categorized in the listed crash types, and that the counts and metrics provided are statewide for the 10 years from 2013 through 2022.

The most common crash type for both pedestrians and bicyclists was crossing movements on segments and drivers going straight.

Exhibit 11. Custom Pedestrian Crash Types developed for Statewide VRU KA analysis and countermeasure selection; 2013-2022, 10-year total (VRU KA Crash Data Source: WSDOT Engineering Crash Datamart, 2022 year-end)

VRU Custom Pedestrian Crash Types	Number of Pedestrian KA Crashes	Percent of total Pedestrian KA Crashes (%)
No signal/traffic control: Pedestrian not crossing at crosswalk & driver going straight	865	19.87%
No signal/traffic control: Pedestrian crossing at crosswalk & driver going straight	484	11.12%
At signal: Pedestrian crossing at crosswalk & driver going straight	368	8.45%
At signal: Pedestrian crossing & driver turning left	356	8.18%
Pedestrian walking in roadway (not crossing) & driver going straight	356	8.18%
Standing or working in roadway	203	4.66%
No signal/traffic control: Pedestrian crossing & driver turning left	185	4.25%
Not in Roadway	170	3.91%
At signal: Pedestrian Crossing & driver turning right	117	2.69%
Pedestrian walking on shoulder (not crossing) & driver going straight	117	2.69%
No signal/traffic control: Pedestrian crossing & driver turning right	60	1.38%
Pushing or working on vehicle	49	1.13%
At signal: Pedestrian not crossing at crosswalk & driver going straight	40	0.92%
Other	983	22.58%

Exhibit 12. Custom Bicyclist Crash Types developed for Statewide VRU KA analysis and countermeasure selection; 2013-2022, 10-year total (VRU KA Crash Data Source: WSDOT Engineering Crash Datamart, 2022 year-end)

VRU Custom Bicyclist Crash Types	Number of Bicyclist KA Crashes	Percent of total Bicyclist KA Crashes (%)
No signal/traffic control: Bicyclist crossing and driver going straight	191	16.05%
Bicyclist riding along roadway and driver turning left	171	14.37%
Bicyclist riding along roadway and driver going straight	130	10.92%
Bicyclist riding along roadway and driver turning right	86	7.23%
Bicyclist riding along roadway and driver not going straight or turning left or right	81	6.81%
At signal: Bicyclist crossing and driver going straight	74	6.22%
Bicyclist turned into path of vehicle, same direction, driver going straight	74	6.22%
Bicyclist riding along shoulder and driver going straight	58	4.87%
Bicyclist turned into path of vehicle, opposite direction, driver going straight	31	2.61%
At signal: Bicyclist crossing and driver turning right	23	1.93%
Bicyclist riding along designated bike route and driver going straight	23	1.93%
At signal: Bicyclist crossing and driver turning left	21	1.76%
No signal/traffic control: Bicyclist crossing and driver turning left	19	1.6%
No signal/traffic control: Bicyclist crossing and driver turning right	18	1.51%
Other	190	15.97%

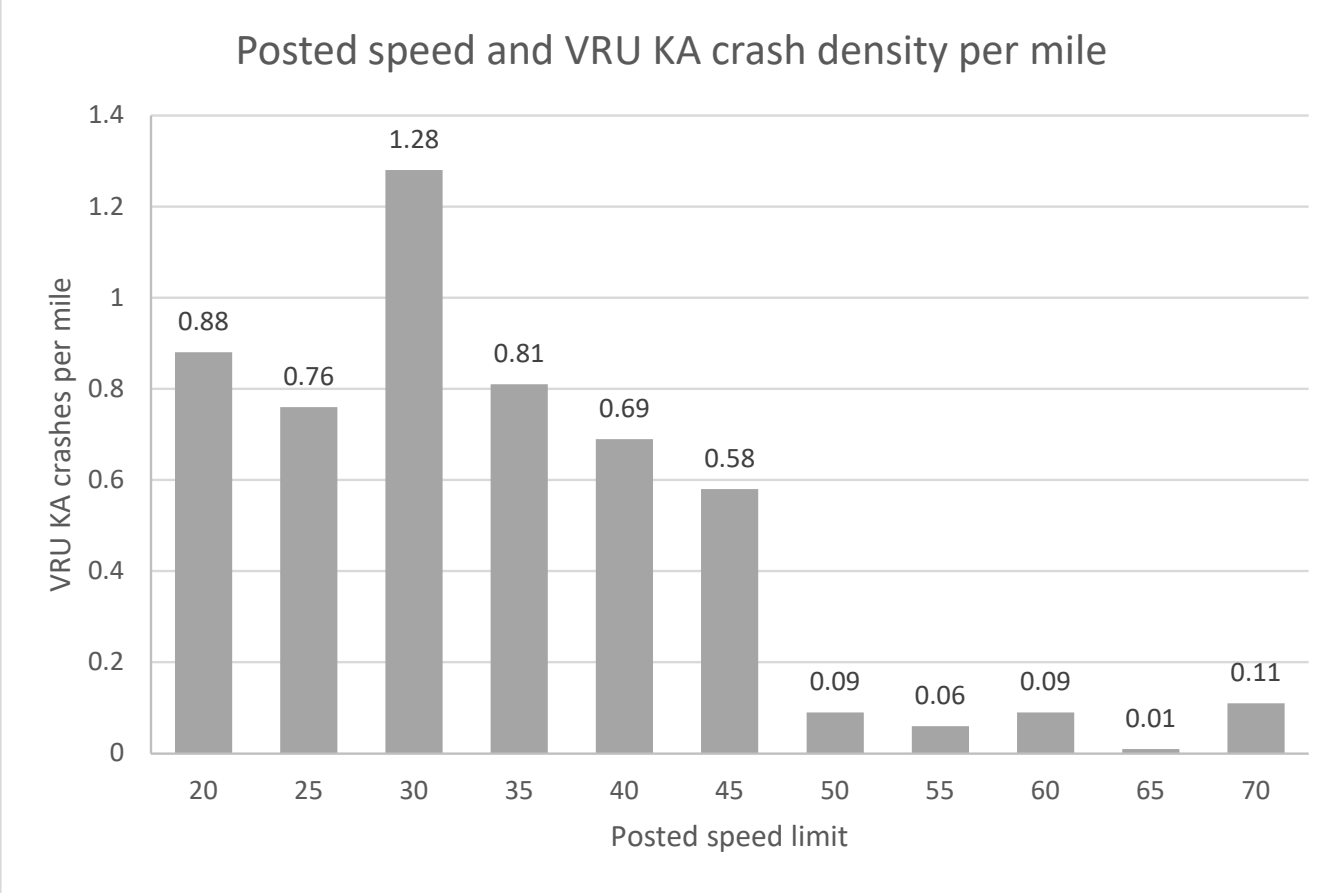
Locations and Location Types

The VRU KA crashes are more prevalent on urban roads, with a VRU KA crash density of 0.53 per mile compared to rural roads at 0.04 per mile. These crashes happen most frequently on urban arterials but occur on other parts of the network (refer to Exhibit 13). When considering the VRU KA crash density on state highways, the assessment showed that the crash density on state highways under city jurisdiction is significantly higher at 2.27 per mile than on state highways under WSDOT jurisdiction: 0.12 per mile. These roads are typically urban/suburban arterials.

Crash density on state highways under city jurisdiction is significantly higher than on state highways under WSDOT jurisdiction.

While VRU KA crashes occur on all parts of the state highway network, they are particularly prevalent at posted speeds from 25-45 mph for all roads. Speeds are an exponential factor in the forces on the humans involved in motor vehicle crashes. Exhibit 13 below shows the distribution of the VRU KA crashes on state highways. This means that small changes can result in much higher forces. At lower posted speeds it is not uncommon to see higher pedestrian volumes (exposure), and fewer pedestrians

Exhibit 13. VRU KA Crash Density per Mile for Posted Speed Limits on State Highways (WSDOT Engineering Crash Datamart, 2022 year-end)



as posted speeds increase. The fact that more VRU are using the system at posted speeds from 20-25 means that VRU crash frequency is potentially higher, and some of those crashes will result in fatalities or serious injuries. Research shows that sedans traveling at speeds 30 mph, 50% are likely to result in deaths and for 40 mph, 90% in deaths[2]. As speeds increase it is also more difficult for pedestrians to judge how fast a vehicle will close on their location or how a driver might be able to perceive and react to their presence. When considering the number of lanes, the data shows that facilities with more than two lanes are associated with much higher VRU KA crash density per mile. For one-way urban arterials this increase in VRU KA density occurs when there is more than one lane. One-way facilities with more than one lane also had higher associated VRU KA crash densities per mile.

The next section provides a list of characteristics associated with higher KA crash densities per mile. It reflects the results of some of the analysis completed on state highways. Note that multifactorial analysis was performed for the VRU safety assessment but that it is not included in the report because of complexity. Rather, results from the more in-depth analysis are presented as part of findings throughout the report.

Location considerations

Exhibit 14 summarizes the factors or characteristics associated with higher VRU KA crash densities per mile on state highways. WSDOT will consider using these factors as part of the process of identifying areas for further analysis, ranking, or prioritization. From this table, the following are the type of locations shown to predominate in VRU KA crashes, and facilities with these characteristics will receive emphasis in project selection on state highways:

- locations with speeds between 25-45 mph
- urban/suburban principal and minor arterials
- with volumes 5,000 to 50,000
- within a mile of schools and transit stops

For speeds posted 30 mph and above, death and serious injury potential rapidly increases. Target speeds and adjustment to achieve targets speeds is an important concept for these locations to bring speed and crash forces down. Appropriate speed management techniques and self-enforcing/explaining roads concepts will help reduce speeds at these locations.

Lower vehicular volume and lower speed 20-25 mph local roads commonly see increased volumes of people walking and biking. This increase in exposure is likely to increase the likelihood of crashes with people walking and rolling. While the crash forces are lower, more crashes will occur and as numbers increase so will serious injuries and fatalities. In addition, drivers will not always travel at or below the

*Note **2**: This research is based on sedan-sized vehicles and does not reflect the changing mix of vehicle sizes and types, or that larger vehicles have been dominating sales in recent years.*

posted speed limit of 20-25 mph and will sometimes drive at much higher speeds. These lower posted speed crashes occur with vehicles of different height, size, and mass.

Humans differ in body type and characteristics, and there exists different injury tolerances between individuals. In these urban situations, distractions and impairment also increase for all road users, both for drivers and those walking and rolling. Exhibit 14 below shows characteristics correlated with higher density of VRU KA crashes on state highways only. The exhibit does not include local roads as information on roadway characteristics was not available and could therefore not be assessed in this effort.

Exhibit 14. Summary of characteristics associated with higher VRU KA crash densities per mile on state highways in Washington state; 2013-2022, 10 year total (VRU KA Crash Data Source: WSDOT Engineering Crash Datamart, 2022 year-end)

Characteristic correlated with higher density of fatal and serious injury vulnerable road user crashes	Length	VRU KA Crashes	VRU KA Crashes per mile	% of Total Length	% of Total KA Crashes
State highways[1]	**8247.32**	**1559**	**0.19**	**100%**	**100%**
Posted speed: 25 - 45	1280.98	977	0.76	16%	63%
Number of lanes > 2 and <9 (bidirectional)	1707.16	658	0.39	21%	42%
Principal arterials and minor arterials	1252.45	998	0.80	15%	64%
Urban area	2464.66	1310	0.53	30%	84%
Highway urbanized area	2458.84	1310	0.53	30%	84%
Within population center: all state highways in population centers except limited access freeways	2544.63	1266	0.50	31%	81%
Within 1,000 feet of population center boundary: all state highways within 1,000 feet of population centers except limited access freeways	627.06	94	0.15	8%	6%
Tribal land	315.35	83	0.26	4%	5%
Within urban growth boundary	423.09	150	0.35	5%	10%
Within 5 miles of urban growth boundary	4016.24	1244	0.31	49%	80%
Level of Traffic Stress of 2 or 3	171.01	105	0.61	2%	7%
One-way urban arterials with 2 to 4 lanes	29	69	2.38	0%	4%
Undivided arterials with 4 to 7 lanes	84.83	216	2.55	1%	14%
AADT for rural roads: 75,000 to 100,000	13.08	7	0.54	0%	0%
AADT for urban roads: 5,000 to 50,000	1611.23	1122	0.70	20%	72%
Within 1 mile of schools	2346.8	1233	0.53	28%	79%
Within 1 mile of transit stops	3025.91	1350	0.45	37%	87%
Mileage used to identify active transportation needs and costs in the WSDOT Active Transportation Plan[2]	1844.95	1044	0.57	22%	67%
Individual State Routes with WSDOT VRU Equity score of 6 or greater	4382.7	1210	0.28	53%	78%

Notes: **1** This mileage includes all mainlines, ramps, spurs, couplets, alternative route types, reversible lanes and grade separated high occupancy vehicle lanes. **2** This mileage includes all mainlines, ramps, spurs, couplets, alternative route types, except limited access freeways.

Potential systemic measures for identification, screening, ranking, or prioritization

WSDOT continues to use the Safe System Approach to analyze and address road safety. While this Vulnerable Road User Safety Assessment is directed towards the Highway Safety Improvement Program, its findings and metrics can be applied across funding sources and jurisdictions to help reach Washington's goal of zero fatalities and serious injuries. In keeping with the principles of the Safe System, WSDOT recognizes that under the Safe System Approach, safety can be assessed by considering the exposure/conflicts between traffic (e.g., volume and crossing points of VRU with vehicles), the crash likelihood (the potential that a crash can occur), and the crash severity (i.e., given that a crash has occurred; the combination of factors that can lead to increased severity, such as speed, mass, angle, and protection of the occupant or VRU in the crash).

Safety increases as: (exposure/conflicts + likelihood of a crash + severity potential) decreases

This recognition is important in understanding how strategies work to reduce crashes resulting in death and serious injuries. Exposure as a measure is typically correlated to volumes; however, from a safety perspective, the importance of conflict reduction is important to highlight as indicated in the equation. Changes in VRU volumes and conflicts can be addressed by high quality treatments, such as separation by lanes, leading pedestrian intervals, removal of vehicle permitted turning movements. Robust tools for collecting VRU data or estimating volumes is important in understanding potential outcomes. When gaps in VRU systems are closed (network continuity increases) walking and rolling volumes can increase dramatically, yet methods to estimate the future changes and benefits can often undercount because of latent demand for the system. Engineers and planners use the context of the road to better understand land use interactions and the potential for more or fewer VRUs and the appropriate speed for the mix of modes. WSDOT has proposed national and state level research on the topic of exposure estimation and will continue to emphasize this concern at national, state, and local levels.

Understanding severity is critical in the Safe System Approach. The Safe System Approach directly addresses the fact that, by reducing kinetic energy, crash severity is reduced. Injuries occur when crash forces are greater than a human can withstand. It is important to understand that:

Kinetic Energy = (1/2) (Mass x Velocity^2)

What this means for the vulnerable road user is that, while the weight of the vehicle is important, vehicle speed is even more significant given its exponential effect (velocity x velocity). Small increases or decreases in speed can change the crash kinetic energy or injury potential substantially. Treatment solutions that reduce speeds, emphasize pedestrian presence, and provide improved conspicuity at intersections, or non-intersection midblock locations are important strategies for addressing VRU crashes. Visibility of pedestrians can lead to earlier slowing of vehicles because the walker or roller is recognized sooner.

WSDOT also recognizes that the height of the vehicle is an important factor in crash severity because a greater area of the vehicle comes into contact with a VRU's body during a crash and a blunt front end impacts the torso with its vital organs or, for larger sport utility vehicles or pickup trucks, the head. While WSDOT does not regulate vehicles, it provides this information to the public in meetings related to safety as an attempt to help others understand how vehicle choice influences crash severity.

A pedestrian next to a privately owned vehicle showing the threat larger vehicles present to vulnerable road users. Photo credit: Barb Chamberlain, WSDOT.

Methodology used to select strategies

WSDOT first reviewed the raw data using descriptive statistics. Doing so allowed the agency to consider characteristics of people and place, contributing factors, crash types, and when crashes were occurring. From this data, WSDOT found that VRU KA crashes are increasing and particularly those crashes where pedestrians are killed or seriously injured, and crashes where bicyclists are seriously injured.

Findings point not only to selection of treatments to address common crash types, but also to the need for top-level policy and guidance to support engineering decisions. WSDOT updated its design manual in 2023 to add a great deal of guidance for topics such as speed management and separation of vehicles and people walking and rolling. Specific treatments and strategies identified below will be supported by this guidance and future updates grounded in the Safe System Approach. These approaches include the need to explicitly consider VRUs in decision-making when design or operational decisions might lead to increases in: vehicle speeds, crossing distances and times for VRUs, and vehicle-oriented solutions that reduce available separation and useable walking and rolling space.

When reviewing time of day for VRU KA crashes, VRU KA crashes increase in the peak hours. This correlates with increased exposure, as driving, walking, rolling, and bicycling will increase during these periods. As the data illustrate, proximity to transit locations are strongly associated with VRU KA crashes. During peak traffic periods, demand for transit increases and transit headways are often shorter. With increases in the numbers of people walking, rolling, and biking to and from the transit stops exposure and conflicts increase. Decisions to cross in order to catch transit may result in an increase in mid-block crashes and crashes at marked and unmarked crossings.

Another factor to consider with time of day is signal progression and timing. Signal coordination reduces the number of drivers stopping at intersections. With longer signal cycles to keep up with vehicular demand, the wait times for those walking and biking at signalized locations increases. All of these factors could potentially increase driving speeds, which increases decision-making complexity for those crossing at locations. The longer signal times may also result in crossing against a don't walk or red signal. The complexity of crossing decisions increases at night and when driver turning movements are permitted against walk indications at crosswalks.

It is important to recognize that unmarked intersections of public roads are legal crosswalks in Washington. Washington state law allows pedestrians to enter the roadway to cross at locations other than marked and unmarked crosswalks as long as they yield the right-of-way to all vehicles upon the roadway (RCW 46.61.240). This statute also directs pedestrians to use marked crosswalks when crossing between adjacent signalized intersections; the distance to be considered "adjacent" is not defined in statute.

In general, strategies to address these challenges would include additional crossings, appropriate controls for crossings associated with transit stops and schools, consideration of route directness for pedestrian network connectivity, signal timing reviews, consideration of whether the posted speed is appropriate for the mix of uses in the corridor, application of speed management measures, and intersection modifications to reduce crossing times and distances, including midblock islands. Pedestrian scale lighting where crossing occurs could provide additional conspicuity.

Maintenance comes up anecdotally as a safety factor that does not currently have a good data source; shrubbery obscuring a driver's view of a pedestrian stepping into the street to cross provides an example of this as a topic to explore further in future. Reducing periodic sight and path obstructions (e.g., vegetation, parked vehicles) is important to VRUs at both segments and intersections of roads, shoulders, sidewalks, and paths.

As the assessment and Safe System Approach suggest, speeds are a critical factor in severity determination. One might question why at lower speeds are fatalities and serious injuries still high. While speeds between 20-25 crash forces are generally survivable, the number of all crash injury types will be high because of higher volumes and conflicts with walking and rolling. With more total crashes it is recognized that some will result in serious and fatal injury and therefore these injuries will be higher.

As stated previously, lower speeds are important when VRU volumes are higher to reduce injury potential. Solutions that calm traffic, provide speed feedback, and warn of speed zones are common at these speeds. At speeds 30 and above deaths and serious injuries rapidly rise because forces are much higher as this assessment described earlier. At these speeds, forces will commonly exceed the human tolerance levels for injury.

Engineering to reduce speeds through self-enforcing/self-explaining roads is important. These roads intend to elicit behaviors that result in proper speed choice for the context and presence of VRUs. In existing road systems, it is difficult to achieve driver compliance with posted speed limits when the road is designed with wider lanes, large curves, and no visual constraints. WSDOT developed the Injury Minimization and Speed Management Recommendations document for use by policy makers and professionals in efforts to reduce speed and subsequent crash forces. WSDOT has also incorporated a target speed setting approach in its manuals, guidance, and in how it treats speed setting requests. At higher speeds, visibility becomes important. Lighting that addresses driver visibility may not always make the walker and roller as visible as one might desire. Lighting at the human scale (e.g., pedestrian lighting) can increase the conspicuity of VRUs under dark conditions.

Data on VRU KA crashes indicate the presence of behavioral aspects in impairment, distraction, failure to use a crosswalk, failure to grant right of way, and hit and run as areas that could benefit from education and enforcement actions. Engineering to create self-enforcing roads and to provide appropriate facilities for vulnerable road users can shape the built environment people respond to as they make decisions about how to use the transportation system. Other solutions lie beyond engineering, such as the frequency and availability of transit service that could replace driving (reducing exposure and likelihood) as a way home for someone who is impaired, and the availability of first responders (reducing severity) to provide post-crash care in a timely manner.

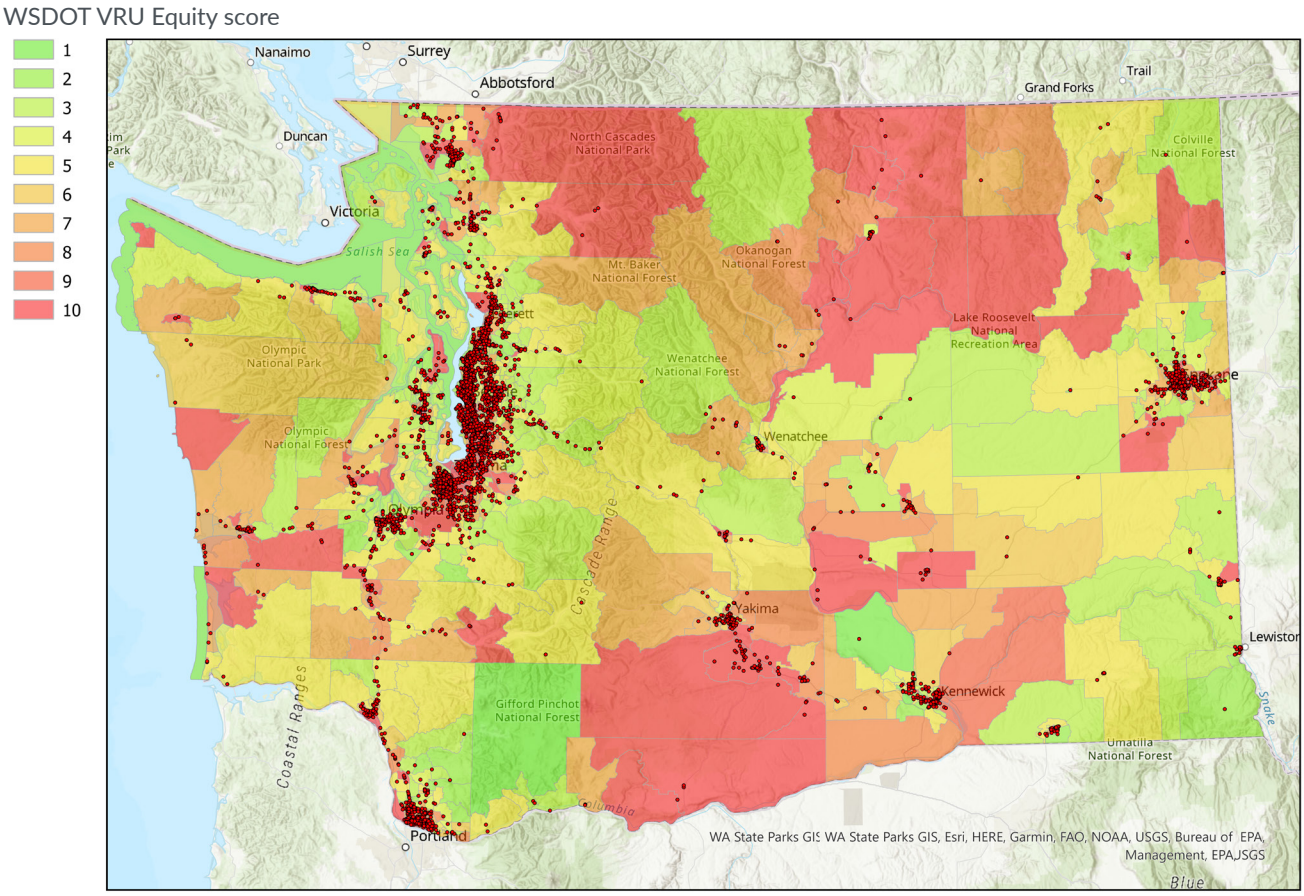
WSDOT will continue to work with the Cooper Jones Active Transportation Council, the Washington Traffic Safety Commission, and other partners on specific countermeasures or programs that would be grounded in equity and the Safe System Approach.

While "Failure to use crosswalk" is indicated in the macro-level analysis, WSDOT recognizes that coding relies on the officer knowing that an unmarked crosswalk is a legal crosswalk and that in some cases impact forces with the VRU may result in the person being thrown from the crosswalk location. It is important when reviewing these crashes for countermeasures to analyze individual crash reports and perform additional field reviews before determining the contributing factors and what the solution(s) are to reduce the likelihood and severity of crashes at the location.

WSDOT's review indicates a significant spike in crashes involving older people. As the population ages, a greater proportion of VRUs are people age 65 or older, resulting in increasing exposure for that demographic. Older individuals are more likely to exhibit reduced function for vision, mobility, and cognitive processing and are therefore more likely to be involved in crashes. Because they are more frail and susceptible to injury, these crashes tend to be more severe. Strategies outlined in this assessment that support all active transportation users will also support VRU emphasis areas pertaining to older pedestrians and bicyclists.

Exhibit 15 shows the WSDOT VRU Equity score and is overlayed with crashes occurring throughout the state over a 10-year period.

Exhibit 15. Statewide vulnerable road user fatal and serious injury crashes 10-year total (VRU KA Crash Data Source: WSDOT Engineering Crash Datamart, 2022 year-end)

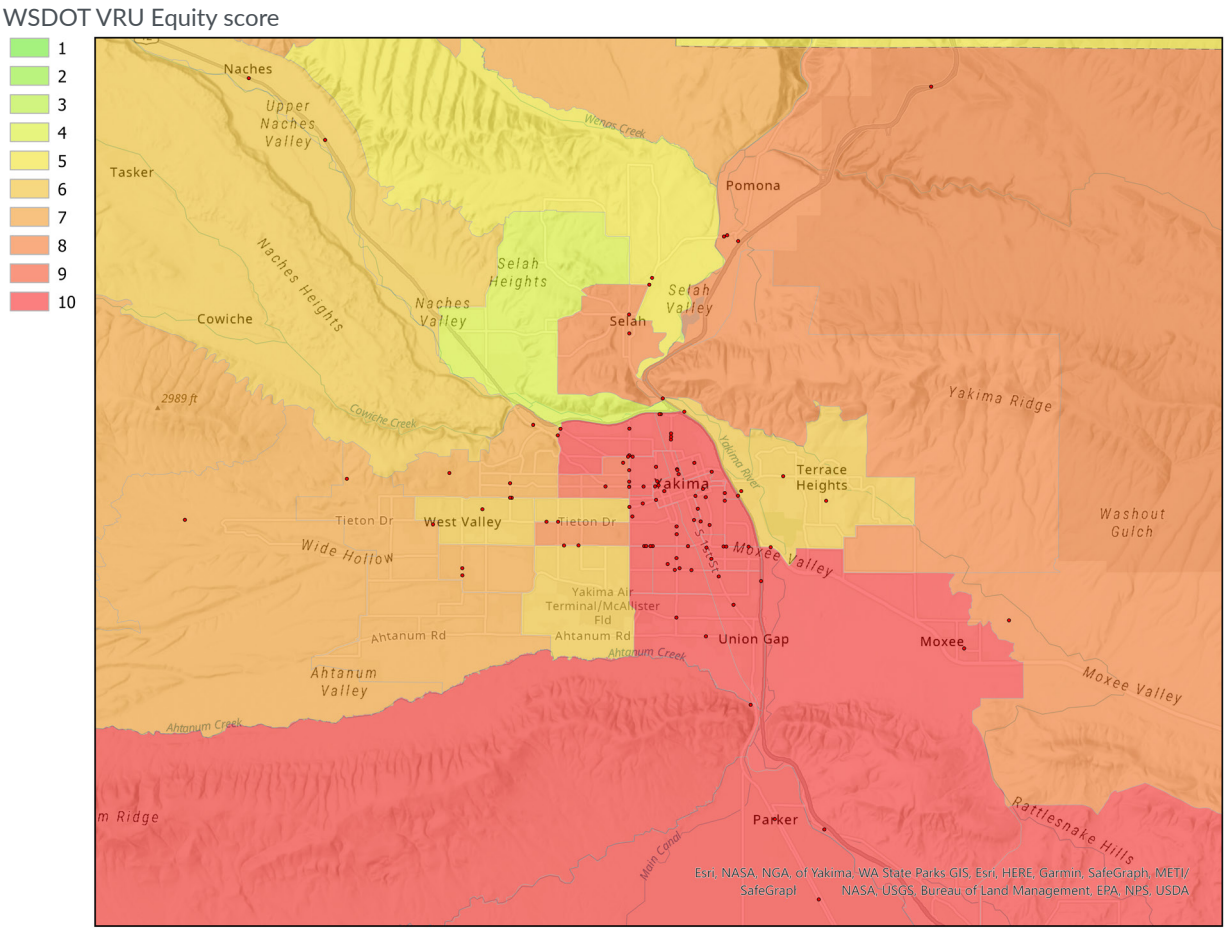


Equity and demographic considerations

WSDOT found a significant correlation to VRU KA crashes based on socioeconomic and demographic factors using the max 10 scoring method (WSDOT's custom VRU Equity score). This approach will be used to identify locations based on rank order with the low of 0 and high of 10. In locations within cities and on county roads, this information will be used in considering grant applications for these projects, coupled with other requirements specific to each funding program. For WSDOT, this list will also supplement the agency's current method outlined within its HSIP Implementation plan. Doing so will ensure project equity considerations.

WSDOT found a significant correlation between crashes and socioeconomic and demographic factors.

Exhibit 16. Yakima area vulnerable road user fatal and serious injury crashes showing higher crash density in census tracts with high WSDOT VRU Equity scores. (VRU KA Crash Data Source: WSDOT Engineering Crash Datamart, 2022 year-end)



Crash type considerations

WSDOT found that the highest number of VRU KA crashes occur when pedestrians are not at a crosswalk and the driver is going straight. The second highest number of VRU KA crashes are when pedestrians are at uncontrolled locations and using a crosswalk with the driver going straight. When at a signal, VRU KA crashes are evenly split between those involving a driver going straight and left-turn crashes. While not as high in number as left-turn crashes, right-turn crashes are significant as well.

The data also shows that VRU KA crashes are occurring when pedestrians are walking or rolling in the roadway and on shoulders but not in the roadway. The data indicates that an emphasis toward mid-block crossings along between intersection and at locations where there are no traffic controls at intersection would be beneficial. Consideration of locations where pedestrians are walking or rolling along or on the road surface would be beneficial as well, with identification of whether a lack of appropriate and ADA-accessible facilities forces pedestrian movements into the roadway. For bicyclists, VRU KA crashes

are most likely to occur when they are crossing the road. Other relatively frequent VRU KA crashes for bicyclists occur when they are struck by a driver who is going straight or turning, while the bicyclist is riding along the road. Protected bike lanes can reduce these types of crashes.

Program of Strategies

WSDOT's intent is to screen locations based on its equity analysis approach, together with the HSIP Implementation Plan methods, in order to select projects that address VRU crashes before they happen in a systemic and proactive manner. WSDOT will develop ranked lists for locations on the state and local system and will also provide a GIS map online for consideration and use for all project types. Many grant programs have individual criteria and scopes, and for these programs the VRU analysis may serve as an informative tool but will not supersede statutory requirements and criteria.

WSDOT is providing a list of strategies in this section that can be used in projects to prioritize the needs and safety of vulnerable road users. The list shows which projects address the three categories—exposure/conflicts, likelihood, and severity—and also align with a wide range of potential countermeasures. Within the Safety Program at WSDOT these projects will fall into the proactive category and will generally focus on systemic treatments, with individual locations also being considered. Within local grants, and within the funding and legislative requirements, it is the intent is that cities and counties will address individual locations as appropriate to reduce exposure, likelihood, and severity through both spot and systemic safety approaches.

How the VRU relates to the SHSP, HSIP, and Local Safety Plans

The VRU assessment will become part of the next Strategic Highway Safety Plan. An updated version of Target Zero is intended for publication in 2024, and this VRU assessment will be an appendix to that document. WSDOT recognizes the value of a VRU safety assessment, analysis and evaluation of data, particularly as they can inform more proactive approaches to reduce the likelihood of serious and fatal crashes.

In previous iterations of the SHSP, crashes involving walking, rolling, and biking were part of the road user chapters. In the future, with the updated version of the SHSP focused on the Safe System Approach, this VRU assessment will likely form the base data analysis for an emphasis area within Target Zero. Similar to the approach WSDOT is taking to develop its Safety Program, both the local and state HSIP funding approaches will be consistent with the Target Zero emphasis areas and strategies/countermeasures when developing a programmatic approach to investment within the proactive and reactive subcategories. WSDOT has developed a subcategory for active transportation and speed management as part of the safety subprogram for state highways under WSDOT jurisdiction.

WSDOT currently requires local governments, cities, and counties to develop a Local Road Safety Plan to receive HSIP funding. The VRU assessment will inform the selection of countermeasures through the WSDOT Local Programs Division grant cycles with the cities and counties. Because of the importance of VRUs, it is recommended that processes for inclusion of a VRU component in Local Road Safety Plans be developed.

Conclusion and Actions

WSDOT remains concerned as the number of vulnerable road user fatal and serious injury crashes continues to increase. To offset these increases, WSDOT is adopting the Safe System Approach as its primary strategy. With the Safe System Approach, the agency continues to adjust its design and operations policies and practices to benefit vulnerable road users. These changes remain focused on addressing speeds, increasing separation (time and space), decreasing exposure, and increasing VRU conspicuity through engineering measures to improve their visibility to drivers. One example of this effort is the preference for the installation of roundabouts versus signalized intersections and optimizing those roundabouts for VRUs. Another is a study of lighting and pedestrian safety being undertaken by WSDOT in partnership with the Washington Traffic Safety Commission with funding from the legislature.

The findings in this report suggest a number of specific actions and directions for WSDOT to prioritize its funds to improve the safety of people walking, rolling, and bicycling. With the new Complete Streets directive in place, this provides for the opportunity to integrate these not only into projects funded with the HSIP, but across the agency's work. The agency's commitment to the Safe System Approach will guide its work. Other solutions will rely on the actions of partner agencies, from local jurisdictions to transit agencies, to first responders.

The Safe System recognizes the importance of data in enabling meaningful data analysis for actionable insights. WSDOT found data availability to be a challenge in assessing VRU KA crashes. The analysis was performed at a macro level, and important information on VRU volumes, sidewalks, and intersection configurations and operations was not availble at the local and state level. WSDOT has subsequently collected sidewalk information and has started a process to gather additional intersection information. The ability to estimate demand based on data such as origins, destinations, transit stops, and intersection density is important to understanding VRU system needs and in the development of proactive safety strategies. Information on route directness recognizes the human element and potential choices a VRU will make to cross or travel along a segment of road or at an intersection. This leads to greater understanding of VRU KA crashes.

Crash data is typically provided from a driver's perspective, and pedestrian and bicyclist information is relatively limited. WSDOT created crash types to categorize the type of crashes involved for pedestrians and bicyclists. It is recommended that determining how information for VRU crashes could and should be collected, development or refinement of common definitions, and the deployment of the custom crash types presented in this report for agency analysis would greatly improve these types of assessments.

The assessment found that the frequency of VRU KA crashes increases during the peak hours. Crossings by VRUs increase, as does vehicle travel along the road during the peak hours. These crossings include midblock, and non-intersection crossings that may be the result of people trying to catch transit. The pedestrian's route directness need, location of existing crossings if any, and larger vehicle volumes lead to increased vehicle-VRU conflict.

Individuals 65 and older walking and biking are experiencing the most fatalities and serious injuries. WSDOT will consider locations with aging populations to identify appropriate projects for speed management, pedestrian visibility, and additional information to drivers and VRUs on such as markings and signage (such as speed feedback signs, Pedestrian Hybrid Beacons/Rectangular Rapid Flashing Beacons and additional crossing controls and signs).

Crashes involving bicyclists were highest when the bicyclist was crossing, but for bicyclist riding along the roadway, crashes involving both through and turning movements predominate.

The assessment indicated impairment, distraction, failure to use crosswalk, failure to grant right of way, and hit-and-run as contributing factors to crashes. WSDOT will work with the Washington Traffic Safety Commission, Cooper Jones Active Transportation Council, Washington State Patrol, and local law enforcement to determine best approaches for education and enforcement, as well as determine what infrastructure might help reduce crash exposure, likelihood and severity for VRUs.

The data showed the majority of VRU deaths and serious injury crashes occurring between 25-45 mph, on urban principal and minor arterials with AADTs between 5,000 and 50,000, within a mile of a school or transit stop which are identified by the WSDOT VRU Equity score of 6 or greater. WSDOT also found a high percentage of crashes occurring within a thousand feet of transit locations and schools. Further research on this topic could help uncover typical origin and destinations and reasoning for VRUs in the vicinity of schools, transit, and other origins and destinations. This research could help generate guidance to help designers analyze origins and destinations for VRU in the vicinity of schools, transit stops, and other significant destinations, so that safe routes and crossings can be designed to provide for VRU needs including route directness.

WSDOT developed—and will implement—a socioeconomic equity-based method for screening VRU safety performance. The variables included in this method are: Area of Persistent Poverty, tribal land, Social Vulnerability Index, Washington State Environmental Health Disparities Index, Disadvantaged Communities Score, school density, transit stop density, and transit route mileage density. WSDOT found correlation to be high with VRU KA crashes, and the method provides for a good means to identify locations for further analysis and potential systemic or individual projects.

Summary of Proposed Actions

The proposed actions that follow represent a number of actions WSDOT will consider. WSDOT intends to prioritize and schedule these actions in consultation with Highway Safety Executive Committee.

- Assess with the WTSC the current status of the Rapid Health Information Network (RHINO) program, which links emergency department, hospitals, urgent care and outpatient clinics, for future inclusion in WSDOT VRU assessments.
- Assess with the WTSC the current status of the Traffic Records Integration Program (TRIP) which is linking crashes to toxicology, driver licensing and vehicle registrations, injury data from emergency rooms, inpatient, outpatient, trauma, and adjudication for future inclusion in WSDOT VRU assessments.
- Identify data gaps related to vulnerable road users, including methods to address, collect, use, and analyze appropriate data.
- Work with the WSDOT Transportation Data Office to incorporate new pedestrian and bicyclist crash types into crash reporting post processing efforts so that agencies and consultants have access to this information for analysis.
- Finalize development of Active Transportation and Speed Management subcategories and ranking methods in the WSDOT I-2 Safety Program.
- Develop systemic safety approaches to address specific leading crash type(s), road characteristics, or contributing factors to VRU crashes.
- Incorporate a requirement for Vulnerable Road User components into Local Road Safety Plans.
- Form a statewide team of local and state transportation agencies to address issues related to City Streets as Part of State Highways. Address identification of VRU locations for further assessment, funding opportunities and constraints, current and potential focus areas on projects, and specific considerations during design and operational decision making.
- Incorporate Washington-specific VRU Equity assessments or information into grants application and decision processes where appropriate and not limited by legislative and regulatory requirements.
- Continue to review and update design and operational guidance as necessary to incorporate self-enforcing/self-explaining roads criteria.
- Develop polices and processes by defining safety performance as a measure of exposure/conflicts, likelihood of a crash, severity of a crash.
- Develop policies and processes on the explicit consideration of vulnerable road users where projects have the potential to affect exposure/conflicts, likelihood of a crash, and/or severity of a crash.
- Develop and evaluate a context-based target speed setting approach statewide that focuses on injury minimization.
- Develop a process for inclusion of a Vulnerable Road User component in Local Road Safety Plans.

WSDOT sees the VRU assessment as an important component of the Safe System Approach's implementation, as it helps prioritize proactive safety investment. WSDOTs goal is to provide an environment of safe mobility for all road users. Lessons learned during the VRU assessment can be used to inform safety practices and change these practices as new knowledge is brought forth through improved understanding.

Appendix

Exhibit 17. Summary countermeasures and how they influence pedestrian crash exposure, likelihood and severity at intersections

Intersections[1]				
FHWA Category	**Pedestrian Safe System Treatment**	**Exposure**	**Likelihood**	**Severity**
Intersection Treatments	ADA Curb Ramps	✓	✓	
Markings, Signs, Signals	High-Visibility Crosswalks	✓	✓	
Intersection Treatments	Curb Extension	✓	✓	
Shared Roadway	Pedestrian Refuge Island	✓	✓	
Shared Roadway	Raised Crosswalk	✓	✓	✓
Shared Roadway	Raised Intersection (incl. Raised Pedestrian Crossings)	✓	✓	✓
Shared Roadway	Pedestrian Scale Lighting/Illumination (crossing)		✓	
Intersection Treatments	Roundabout with Pedestrian Facilities	✓	✓	✓
Shared Roadway	Physical Barrier to restrict parking near crossings	✓	✓	
Shared Roadway	Pedestrian Overpasses/Underpasses	✓	✓	✓
Markings, Signs, Signals	Automated Pedestrian Detection		✓	
Markings, Signs, Signals	Pedestrian Crossing Advance Atop Lines	✓	✓	
Other Measures	Access to Transit (Bus stops)		✓	
Intersection Treatments	Improved Right-Turn Slip-Lane Design	✓	✓	
Traffic Calming	Modified T-Intersections & Mini-Circles		✓	
Traffic Calming	Compact Roundabouts		✓	✓
Intersection Treatments	Intersection Median Barriers	✓	✓	
Intersection Treatments	Reduced Corner Radii	✓	✓	
Intersection Treatments	Modify Skewed Intersections for Better Perpendicular Alignment	✓	✓	
Other Measures	Full Street Closure	✓	✓	✓
Other Measures	Partial Street Closure	✓	✓	
Intersection Treatments	Left Turn Prohibitions	✓	✓	
Markings, Signs, Signals	Pedestrian-only Phase/Scramble	✓	✓	
Intersection Treatments	Prohibit Turn-On-Red	✓	✓	
Markings, Signs, Signals	Signal Timing	✓	✓	✓
Markings, Signs, Signals	Pedestrian Hybrid Beacon (PHB)		✓	✓
Markings, Signs, Signals	Leading Pedestrian Interval (LPI)	✓	✓	
Markings, Signs, Signals	In-Street Pedestrian Crossing Sign	✓	✓	✓
Intersection Treatments	Eliminate Right Turn Lane	✓	✓	
Intersection Treatments	Eliminate Slip-Lane	✓	✓	
Markings, Signs, Signals	Rectangular Rapid Flashing Beacon (RRFB)		✓	✓
Markings, Signs, Signals	Half Signal for Pedestrians	✓	✓	
Markings, Signs, Signals	Pedestrian Traffic Signal	✓	✓	
Markings, Signs, Signals	Pedestrian signal phase separated from left turn phase		✓	
Intersection Treatments	Protected Intersection	✓	✓	✓
Markings, Signs, Signals	Stop Sign (Standard)	✓	✓	✓
Markings, Signs, Signals	Flashing Stop Sign	✓	✓	✓
Markings, Signs, Signals	Accessible Pedestrian Signal	✓	✓	
Markings, Signs, Signals	Traffic signal timing to accommodate slower pedestrian speeds	✓	✓	
Traffic Calming	Neighborhood Traffic Circle		✓	✓
Markings, Signs, Signals	Full Traffic Signal		✓	✓
Markings, Signs, Signals	Turning Vehicles Stop for Pedestrians Sign		✓	✓
Markings, Signs, Signals	Pedestrian Countdown Signal	✓	✓	

Note: **1** Refer to https://wsdot.wa.gov/publications/manuals/fulltext/m22-01/1310.pdf for more information.

Exhibit 18. Summary countermeasures and how they influence pedestrian crash exposure, likelihood and severity on segments

Segments				
FHWA Category	**Pedestrian Safe System Treatment**	**Exposure**	**Likelihood**	**Severity**
Shared Roadway	Pedestrian Scale Lighting/Illumination (Segment)		✓	
Shared Roadway	Sidewalks with curb and gutter	✓	✓	✓
Shared Roadway	Sidewalk with buffer	✓	✓	✓
Shared Roadway	Paved Shoulders	✓		
Other Measures	Transit Stop Improvements (Includes transit stop shelters and platforms)	✓		
Shared Roadway	Road Reconfiguration including narrowing	✓	✓	
Shared Roadway	Lane Width Reduction (Road Diet)	✓	✓	
Shared Roadway	Driveway Ramps to reduce speed	✓	✓	
Shared Roadway	Consolidate Driveways	✓	✓	
Shared Roadway	Narrow Driveway Entrances	✓	✓	
Traffic Calming	Chicanes		✓	✓
Traffic Calming	Speed Humps		✓	✓
Traffic Calming	Speed Tables		✓	✓
Traffic Calming	Placemaking Gateway Treatment		✓	
Traffic Calming	Specific Paving Treatments (Color, Type, Markings)		✓	
Other Measures	Full Street Closure	✓	✓	✓
Other Measures	Partial Street Closure	✓	✓	✓
Markings, Signs, Signals	Traffic signal timing through multiple traffic signals to lower driver speeds	✓	✓	✓
Other Measures	Speed-Monitoring Trailers		✓	✓
Markings, Signs, Signals	High-Visibility Crosswalks		✓	
Intersection Treatments	Roundabout	✓	✓	✓
Markings, Signs, Signals	Speed Feedback Sign		✓	
Other Measures	Automated Traffic Safety Cameras		✓	
Shared Roadway	Shared Use Path/Sidepath	✓	✓	✓
Markings, Signs, Signals	20 mph speed zone designation and signs for residential or business districts		✓	✓
Markings, Signs, Signals	School/playground 20 mph speed zone with flashing beacons and signage		✓	✓
Traffic Calming	Chokers or pinch-points		✓	✓
Shared Roadway	Walkway with bio-swale/ditch buffer	✓	✓	✓
Other Measures	Pedestrian-only streets	✓	✓	

Exhibit 19. Summary countermeasures and how they influence bicyclist crash exposure, likelihood and severity at intersections

Intersections				
FHWA Category	**Bicyclist Safe System Treatment**	**Exposure**	**Likelihood**	**Severity**
Shared Roadway	Bridge and Overpass Access	✓	✓	
Shared Roadway	Tunnel and Underpass Access	✓	✓	
Shared Roadway	Lighting Improvements		✓	
Shared Roadway	Streetcar Track Treatments		✓	
Shared Roadway	Physical Barrier to restrict parking near crossings	✓	✓	
Intersection Treatments	Reduced Corner Radii	✓	✓	
Intersection Treatments	Roundabout with Bicyclist Facilities	✓	✓	✓
Intersection Treatments	Bicycle Intersection Crossing Markings		✓	✓
Intersection Treatments	Sight Distance Improvements		✓	
Intersection Treatments	Turning Restrictions	✓	✓	
Intersection Treatments	Left Turn Prohibitions	✓	✓	
Intersection Treatments	Turn-On-Red-Restrictions	✓	✓	
Intersection Treatments	Left Turn Phasing	✓	✓	
Intersection Treatments	Merge and Weave Area Redesign	✓	✓	
Intersection Treatments	ADA Curb Ramps	✓	✓	
Intersection Treatments	Curb Extension	✓	✓	
Intersection Treatments	Modify Skewed Intersections for Better Perpendicular Alignment	✓	✓	
Intersection Treatments	Eliminate Slip-Lane	✓	✓	
Intersection Treatments	Protected Intersection	✓	✓	✓
Maintenance	Repetitive/Short-term Maintenance	✓	✓	✓
Maintenance	Major Maintenance	✓	✓	✓
Maintenance	Hazard Identification Program	✓	✓	✓
Traffic Calming	Neighborhood Traffic Circle		✓	✓
Trails and Shared-Use Paths	Path Intersection Treatments		✓	
Markings, Signs, Signals	Optimizing Signal Timing for Bicyclists		✓	
Markings, Signs, Signals	Bike-activated Signal Detection		✓	
Markings, Signs, Signals	Bike detection confirmation light and signage	✓	✓	
Markings, Signs, Signals	Sign Improvements for Bicyclists		✓	
Markings, Signs, Signals	Pavement Marking Improvements		✓	
Markings, Signs, Signals	School-zone Improvements	✓	✓	✓
Markings, Signs, Signals	Rectangular Rapid Flashing Beacons (RRFB)		✓	
Markings, Signs, Signals	Bicycle Signal Heads		✓	
Markings, Signs, Signals	High-Visibility Crosswalks	✓	✓	
Markings, Signs, Signals	Stop Sign (Standard)	✓	✓	✓
Markings, Signs, Signals	Flashing Stop Sign	✓	✓	✓
Other Measures	Law Enforcement		✓	
Other Measures	Bicyclist/ Motorist Education	✓	✓	✓
Other Measures	Transit Access	✓	✓	
Other Measures	Wayfinding	✓	✓	
Other Measures	Landscaping/ Aesthetics	✓	✓	
Other Measures	Full Street Closure	✓	✓	✓
Other Measures	Partial Street Closure	✓	✓	
Markings, Signs, Signals	Bicycle box	✓	✓	
Markings, Signs, Signals	Two-stage bicycle turn box	✓	✓	

Exhibit 20. Summary countermeasures and how they influence bicyclist crash exposure, likelihood and severity on segments

Segments				
FHWA Category	**Bicyclist Safe System Treatment**	**Exposure**	**Likelihood**	**Severity**
Shared Roadway	Roadway Surface Improvements		✓	
Shared Roadway	Bridge and Overpass Access	✓	✓	
Shared Roadway	Tunnel and Underpass Access	✓	✓	
Shared Roadway	Lighting Improvements		✓	
Shared Roadway	Parking Treatments	✓	✓	
Shared Roadway	Driveway Ramps to reduce speed	✓	✓	
Shared Roadway	Consolidate Driveways	✓	✓	
Shared Roadway	Narrow Driveway Entrances	✓	✓	
Shared Roadway	Lane Width Reductions (road diet)	✓	✓	
Shared Roadway	Road Reconfiguration including Narrowing		✓	
Shared Roadway	Streetcar Track Treatments		✓	
Shared Roadway	Sidewalks with curb and gutter	✓	✓	✓
On-Road Bike Facilities	Bike Lanes	✓	✓	✓
On-Road Bike Facilities	Wide Curb Lanes	✓	✓	
On-Road Bike Facilities	Paved Shoulders	✓	✓	
On-Road Bike Facilities	Shared Bus-Bike Lanes	✓	✓	
On-Road Bike Facilities	Contraflow Bike Lanes	✓	✓	
On-Road Bike Facilities	Buffered bike lanes	✓	✓	
On-Road Bike Facilities	Separated Bike Lanes	✓	✓	
Maintenance	Repetitive/Short-term Maintenance	✓	✓	✓
Maintenance	Major Maintenance	✓	✓	✓
Maintenance	Hazard Identification Program	✓	✓	✓
Traffic Calming	Chicanes			✓
Traffic Calming	Speed Tables/ Humps/ Cushions			✓
Traffic Calming	Traffic Diversion	✓	✓	
Traffic Calming	Visual Narrowing	✓	✓	✓
Traffic Calming	Specific Paving Treatments (Color, Type, Markings)		✓	
Traffic Calming	Chokers		✓	✓
Trails and Shared-Use Paths	Separate Shared-Use Paths	✓	✓	
Trails and Shared-Use Paths	Shared Use Path Treatments/Sidepath	✓	✓	
Markings, Signs, Signals	Sign Improvements for Bicyclists		✓	
Markings, Signs, Signals	20 mph designation and signs for residential or business districts		✓	✓
Markings, Signs, Signals	School/playground 20 mph signs with flashing beacons and signage		✓	✓
Markings, Signs, Signals	Bike Wayfinding Signs and Markings		✓	
Other Measures	Law Enforcement		✓	
Other Measures	Bicyclist/ Motorist Education	✓	✓	✓
Other Measures	Transit Access	✓	✓	
Other Measures	Wayfinding	✓	✓	
Other Measures	Landscaping/ Aesthetics	✓	✓	
Other Measures	Full Street Closure	✓	✓	✓
Other Measures	Partial Street Closure	✓	✓	✓
Other Measures	Automated Traffic Safety Cameras		✓	

Title IV and ADA Information

Title VI Notice to Public

It is the Washington State Department of Transportation's (WSDOT) policy to assure that no person shall, on the grounds of race, color, or national origin, as provided by Title VI of the Civil Rights Act of 1964, be excluded from participation in, be denied the benefits of, or be otherwise discriminated against under any of its programs and activities. Any person who believes his/her Title VI protection has been violated, may file a complaint with WSDOT's Office of Equity and Civil Rights (OECR). For additional information regarding Title VI complaint procedures and/or information regarding our nondiscrimination obligations, please contact OECR's Title VI Coordinator at (360) 705-7090.

Americans with Disabilities Act (ADA) Information

This material can be made available in an alternate format by emailing the Office of Equity and Civil Rights at wsdotada@wsdot.wa.gov or by calling toll free, 855-362-4ADA(4232). Persons who are deaf or hard of hearing may make a request by calling the Washington State Relay at 711.

APPENDIX E: SHSP UPDATE PROCESS AND FEDERAL REQUIREMENTS

This appendix explains the federal requirements regarding establishing and updating the Strategic Highway Safety Plan (SHSP) for all 50 states. Target Zero is Washington's SHSP.

Two major federal laws influence the content and implementation of Target Zero: Moving Ahead for Progress in the 21st Century (MAP- 21) Act and the Fixing America's Surface Transportation (FAST) Act. Under these laws, the Federal Highway Administration (FHWA) sets policy that guides the implementation and evaluation of the SHSP.

The Highway Safety Improvement Program (HSIP) is a core federal-aid program with the purpose of achieving a significant reduction in fatalities and serious injuries on all public roads. The HSIP requires a data-driven, strategic approach to improving highway safety on all public roads that focuses on performance. The HSIP regulation under 23 CFR 924 establishes the FHWA's HSIP policy, as well as program structure, planning, implementation, evaluation, and reporting requirements which states must follow to successfully administer the HSIP. The HSIP Final Rule updates HSIP requirements under 23 CFR 924 to be consistent with MAP-21 and the FAST Act, and clarifies program requirements.

In addition to clarifying other programs, the HSIP Final Rule contains performance management requirements for SHSP updates. FHWA has been working in partnership with key stakeholders for many years to prepare for these new rules. They will reinforce a data-driven approach to making safety decisions, improve collaboration across a wide range of safety partners, and provide transparency for the American public as states set goals, report on safety targets and, most importantly, save lives.

23 USC 148 requires all states to have an updated, approved SHSP which is consistent with specific requirements under section 148. The updated SHSP must be submitted to the FHWA Division Administrator, who will ensure that the state has followed a process that meets these requirements.

The following sections describes the 2024 Washington State SHSP update process.

Consultive Process

The state has conferred with a required list of stakeholders (partners) throughout the SHSP update process, considered their input prior to decision-making, and routinely informed them about actions taken regarding SHSP development. Partners were consulted informally throughout and formally during these events.

Target Zero Foundations Workshop (September 2023). Held in Lacey, WA (with a virtual option), 70 safety partners—federal, state, and local—participated in this two-day event to increase collaboration and commitment, and to begin preparations for the SHSP update. Agency participants included

FHWA, WSDOT, WTSC, WSP, DOL, HCA, City of Bonney Lake, City of Kent, City of Wenatchee, King County, See Chapter 2, Current Conditions, for workshop outcomes.

Public Surveys: King County, Yakima County (Summer-Fall 2023). King County surveys were conducted in-person at a Kent Community Safety event and in the Skyway neighborhood at a Renton Avenue South community event. Yakima County sites included the Central Washington State Fair and the Yakima Training Center Fall Festival. More than 80 individuals responded to the in-person survey questions.

Community-based Organization Listening Sessions (October 2023 and April 2024). The SHSP update team conducted five listening sessions that included participation by the following community-based organizations:

- Asian Pacific Islander Coalition of Yakima (APIC-Yakima)
- Bike Clark County
- Community in Motion
- Community to Community Development
- Consulate of Mexico
- Disability Rights Washington
- Free Clinic of Southwest Washington
- Kitsap Black Student Union
- Legacy of Equality, Leadership and Organizing (LELO)
- People Empowerment and Renewal Services (PEAR)
- Transportation Choices Coalition
- UTOPIA
- Villa Comunitaria
- Yakima-350 Climate Action
- Yakima Bikes and Walks
- Yakima Valley Council of Governments
- Yakima Valley Farmworkers Clinic
- Washington State Coalition of African Community Leaders

Tribal Listening Sessions (October 2023 and March 2024). The SHSP update team conducted two listening sessions that included participation by Tribal representatives or liaisons from the following Tribal nations and related organizations:

- Confederated Tribes of the Umatilla Indian Reservation
- Cowlitz Tribe
- Elwha Klallam Tribe
- Jamestown S'Klallam Tribe
- Nooksack Tribe
- Northwest Tribal Technical Assistance Program Center
- Port Gamble S'Klallam Tribe
- Snoqualmie Tribe
- Suak – Suiattle Tribe
- Tulalip Tribes
- Yakama Nation

Washington Traffic Safety Survey (2023). The statewide data collection and analytical effort led by WTSC resulted in more than 10,000 completed surveys by adults 18 and older living in Washington. Questions ranged widely, and results were used in the development of the SHSP's strategies.

WSDOT/MPO/RTPO Coordination Committee Meeting (May 2024). WSDOT and WTSC staff participated in this meeting to discuss the status of the SHSP update and solicit feedback.

Washington State Association of County Engineers (June 2024). WSDOT shared the SHSP update process and status with more than 40 county engineers and staff. He described changes to the document and emphasis areas, the Safe System Approach, the Vulnerable Road User Safety Assessment and how that data is being used, and grant funding opportunities for local agencies.

SHSP Update Webinars and Office Hours (June, July, August 2024). As part of the pre-public draft review and public draft review, WTSC, WSDOT, and consultant team staff hosted three 2-hour listening sessions in the form of virtual office hours. Each included a short presentation and open question-and-answer session. The following agencies and other entities were represented at one or more of these events:

- Cities: Mt. Vernon, Tukwila, Shoreline, Tacoma
- Counties: Adams, King, Pierce, Snohomish, Spokane, Thurston

Coordination

The SHSP is aligned with other transportation plans in the state. Relevant transportation and safety plans were reviewed and applicable strategies in the SHSP. Agencies responsible for developing other transportation and safety plans in Washington—including WSDOT, WTSC, and local agencies—were active participants in the SHSP update. This collaboration ensured that safety plans and safety elements in transportation plans had a high degree of coordination.

Data-Driven Analysis

For the 2024 SHSP update, recent and historic Washington crash data on all public roads (regardless of roadway ownership and maintenance) were analyzed to document proportions and trends related to crash types, crash severity, crash demographics, and contributing factors. Two three-year periods, 2017-2019 and 2020-2022, were compared due to the influence of the COVID-19 pandemic response that began in March 2020. This information was used by WSDOT, WTSC, and other safety partners to inform the current conditions chapter of the SHSP, support the data-driven approach to the SHSP required by MAP-21 legislation, and support identification and confirmation of the most appropriate emphasis areas for the SHSP.

A key part of the analysis was an assessment of crash categories to identify those contributing to Washington's fatal and serious injury crashes. The following categories stood out as the most common, becoming the SHSP's emphasis areas:

1. Impairment
2. Speeding

3. Unrestrained Occupants
4. Distraction
5. Intersection Related
6. Lane Departure
7. Young Drivers
8. Older Drivers
9. Active Transportation Users
10. Motorcyclists
11. Heavy Vehicles

Performance-Based Planning

The Target Zero Plan includes goals and measurable objectives to enable Washington to track and monitor the status of SHSP implementation efforts and monitor progress for required Safety Performance Measures:

- Number of roadway fatalities
- Number of roadway serious injuries
- Roadway fatalities per vehicle miles traveled (i.e., fatality rate)
- Roadway serious injuries per vehicle miles traveled (i.e., serious injury rate)
- Combined nonmotorized fatalities and nonmotorized serious injuries

Each of the five safety performance measures has an annual target based on a five-year rolling average and applies to all roads regardless of ownership or functional classification. The number of fatalities, rate of fatalities, and number of serious injuries have identical annual targets in the SHSP and Highway Safety Plan and the reporting of these results will occur in the HSIP annual report for FHWA and the Highway Safety Plan Annual Report for NHTSA. Along with these five primary measures, a performance analysis was completed for high-risk rural roads and older pedestrians and drivers to meet the Special Rules requirements

Strategy Selection

The Target Zero Plan identifies priority strategies to reduce or eliminate fatalities and serious injuries. The range of emphasis area actions correlates with the magnitude of the problem – crashes occur under a wide variety of conditions and contributing factors, so multiple actions are necessary to fully address the problem. Over time, strategies and actions will be assessed based on achievements in meeting performance measures and targets.

The diversity of partners has contributed to a list of strategies and actions representative of engineering, enforcement, emergency response, and education solutions. The Speeding sub-area provides an example of actions that span multiple disciplines, describing activities that include road user education on speeding, facility design considerations, and posted speed limit setting policies.

Schedule to Evaluate and Update SHSP

To evaluate whether the policies, strategies, emphasis areas, and actions are contributing to fatality and serious injury reductions, the Target Zero Plan establishes performance measures that align with FHWA requirements under the MAP-21 rule and NHTSA. On an annual basis, WSDOT will conduct the following activities:

- Analyze crash data to evaluate progress toward the five overarching safety targets.
- Coordinate with WTSC to evaluate progress on the FHWA required overlapping safety targets and NHTSA required performance measures and targets.
- Set annual safety performance targets based on the most recent data and coordination with safety stakeholders.
- Review fatalities on high-risk rural roads and fatalities and serious injuries per capita among aging drivers and pedestrians to assess if action is needed to comply with MAP-21.
- Publish the annual crash report to monitor and evaluate safety performance.
- Encourage transportation and safety partners to integrate the Target Zero Plan strategies and actions into other transportation and safety planning documents and evaluate the results.
- Review progress on the actions established for each emphasis area.
- Update the Washington Target Zero Plan no later than five years from the previously approved version in compliance with MAP-21.

Identification of SHSP Issues

On June 22, 2023, as part of this update to the SHSP and in concordance with 23 CFR 924.13(a)(2), WSDOT and its safety partners met to identify issues related to the SHSP's process, implementation, and progress that should be considered. Attendees included staff from WSDOT (including Local Programs), WTSC, Washington State Patrol, the Department of Licensing, and the Governor's Office.

Issues identified included concerns that the 2019 SHSP's data-heavy production was difficult for some readers to understand. WSDOT also learned that implementing the 2019 SHSP's strategies varied widely by emphasis area. Safety partners recommended changes to the 2024 SHSP to support further implementation, including reduction in the number of pages and expanded use of plain language to improve approachability. The results of that meeting informed the 2024 SHSP update. Further, WSDOT and WTSC conduct ongoing evaluation of the SHSP process, including implementation, during the period between updates.

SHSP Update Considerations

Per 23 U.S.C. 148(d)(1)(B), WSDOT and its safety partners, in developing of this SHSP update, took into consideration the following:

The findings of road safety audits (RSA): State agency staff, local agencies in consultation, and consultant support team members brought extensive road safety audit experience to the SHSP update. Their findings were incorporated throughout. For example, WSDOT and its safety partners are

aware that WTSC staff and the SHSP update's consultant project manager participated in a recent RSA in Bellevue, Washington. Common findings in this and other RSAs in Washington are consistent with *Section 3.3 High Risk Behavior, Speeding and Speed Management*; and *Section 3.6 Road Users by Mode of Travel, Active Transportation Users*. Further, RSAs are included as recommended strategies in Appendix B, including strategies TRB.3 and SYS.4.

The locations of fatalities and serious injuries: As described in *Section 2.2 Community and Local Agency Engagement*, WSDOT and its safety partners, "identified Yakima County and South King County as priority geographic areas, given crash history and equity-related data." This led to a focus on these areas for extensive public engagement in these locations, including multiple listening sessions with community-based organizations in those communities.

The locations that do not have an empirical history of fatalities and serious injuries, but possess risk factors for potential crashes: The SHSP includes references to non-crash-history risk factors throughout. This concept is first described in *Section 1.6 The Safe System Approach*. Principle 5: Safety is Proactive states that, "we identify and address potential contributing factors and crash types in the transportation system, rather than waiting for crashes to occur and reacting afterwards." This focus on risk factors continues with a description of the FHWA Roadway Design Hierarchy (*Section 3.4 Crash Type/Location*), strategies in the Lane Departure content of that same section, and throughout Appendix B.

WSDOT uses the SHSP emphasis areas and FHWA Proven Safety Countermeasures to proactively address the contributing factors and crash types on the state-owned system. WSDOT safety subcategories address network and corridor-level road characteristics to cost-effectively reduce crash potential.

Rural roads, including all public roads, commensurate with fatality data: Rural road safety needs are addressed specifically in *Section 1.5 Tribes and Target Zero*, *Section 3.3 High Risk Behavior* (related to seat belt use), and *Section 3.4 Crash Type/Location: Lane Departure*, where the plan states, "Nationally, nearly half of all fatal crashes (45%) occur on rural roads even though only 19% of the U.S. population lives in rural areas."

Motor vehicle crashes that include fatalities or serious injuries to pedestrians and bicyclists: The Vulnerable Road Users Safety Assessment, first completed in 2023 and included as Appendix D, informed the Active Transportation Users section of this SHSP.

The cost-effectiveness of improvements: Safety improvement cost is described throughout the SHSP, including *Section 2.2 Community and Local Agency Engagement*; *3.6 Road Users by Mode of Travel: Active Transportation Users*; Appendix B; and Appendix D; among others.

Improvements to rail-highway grade crossings: *Section 3.4 Crash Type/Location* includes a subsection focused on rail-highway grade crossing.

Safety on all public roads, including non-State-owned public roads and roads on Tribal land. The SHSP indicates all public roads were analyzed, and that strategies are recommended for all public roads, including non-State-owned public roads and roads on Tribal land. *Section 1.5 Tribes and Target Zero* focuses on Tribal safety needs.

High Risk Rural Roads Special Rule

The Fixing America's Surface Transportation Act (FAST Act), signed into federal law in 2015, requires each state to include its definition for High Risk Rural Roads (HRRR) in the Strategic Highway Safety Plan. This continues a Special Rule from MAP-21, per the US Congress, for improvements in safety for HRRR. Eligible roadways for the HRRR Special Rule include smaller rural roads, which consist of the following functional classifications: rural major collector, rural minor collector, and rural local access.

The Washington State SHSP defines High Risk Rural Roads at the county level. Counties are defined as HRRR counties if their smaller rural roads (defined above) rank in the top 10 counties statewide, based on either of the following:

- Fatal and serious injury crash rate per mile of road
- Fatal and serious injury crash rate per million vehicle miles traveled (VMT)

Based on federal criteria, the HRRR Special Rule applies to a state if "the fatality rate on [all] rural roads in a state increases over the most recent two-year period for which data are available." FHWA calculates this rate using fatalities and VMT for all eligible roadways in the state.

Each year, this rate is calculated by dividing the number of fatalities by the number of vehicle miles traveled. Analysts compare five-year averages, separated by a two-year period, in order to determine if a state qualifies for the HRRR Special Rule. If this number increases by at least one-tenth in that comparison, the state is required to implement the special rule in order to increase resources for rural roads.

For any years that Washington State is obligated to implement the HRRR Special Rule, the state is required to put up funding to match 200% of the federal monies that our state received. A review of the fatal crash rate on Washington's rural roads indicates that the HRRR Special Rule currently applies to Washington. Strategies to address the increase in fatalities and serious injuries on rural roadways are included in the SHSP.

Older Drivers and Pedestrians Special Rule

The Older Drivers and Pedestrians Special Rule at 23 U.S.C. 148(g)(2) provides: "If traffic fatalities and serious injuries per capita for drivers and pedestrians over the age of 65 in a State increases during the most recent 2-year period for which data are available, that State shall be required to include, in the subsequent Strategic Highway Safety Plan of the State, strategies to address the increases in those rates..."
To determine whether the Older Drivers and Pedestrians Special Rule applies in a State, the FHWA will consider older drivers and older pedestrians collectively. If the rate of traffic fatalities and serious injuries for drivers and pedestrians 65 years of age and older in a State increases during the most recent 2-year period, then the Older Drivers and Pedestrians Special Rule applies.

A review of the per capita older drivers and pedestrians (over 65 years old) fatalities and serious injuries was conducted per Highway Safety Improvement Program (HSIP) Reporting Guidance. For WSDOT's approved HSIP Annual Report for Federal Fiscal Year 2024, this is the data for older driver and pedestrian fatalities and serious injuries.

TABLE 27: OLDER DRIVER AND PEDESTRIAN FATALITIES AND SERIOUS INJURIES

PERFORMANCE MEASURE	2017	2018	2019	2020	2021	2022	2023
NUMBER OF OLDER DRIVER AND PEDESTRIAN FATALITIES	90	70	98	84	101	109	111
NUMBER OF OLDER DRIVER AND PEDESTRIAN SERIOUS INJURIES	186	190	210	217	239	259	297

The most recent assessment indicates that this rule applies to the update process in Washington State. Therefore, this SHSP update includes strategies to address the increase in the older driver and older pedestrian fatal and serious injuries rate, taking into account the recommendations included in the 2014 FHWA publication, "Handbook for Designing Roadways for the Aging Population (FHWA-RD-01-103)." Those safety strategies are provided in *Section 3.5: Road Users by Age Group*.

Washington State maintains that, based on further statewide analysis by age group, that older drivers over 70 years old are of particular interest in this State. WSDOT and its safety partners will continue to conduct data analysis for older drivers and pedestrians 65 and older to adhere to this Special Rule. However, the same safety data analysis results compels the State to focus on older drivers 70 years old and older for this SHSP update and its implementation.

APPENDIX F: SAFETY PERFORMANCE MEASURES

State agencies are responsible for administering federal safety funds from the U.S. Department of Transportation report and setting annual performance goals. The Federal Highway Administration (FHWA) and National Highway Traffic Safety Administration (NHTSA) agree that zero fatalities on our nation's roads is the only acceptable goal. However, agencies recognize that reaching zero fatalities will require time and significant effort by many different partner agencies and that interim goals will be necessary.

In Washington state, the MPOs and WSDOT worked together to jointly develop a collaborative approach in support of data, process, and target-setting decision making. This Target Setting Framework Group has agreed WSDOT will take the lead in establishing safety targets, which MPOs will support.

WSDOT and WTSC update all five statewide targets for the upcoming year. These targets will be submitted to FHWA as part of that year's Highway Safety Improvement Program (HSIP) report, which is typically approved by FHWA by September 30. Then MPOs have until February 28 of the following year (180 days after the HSIP reporting deadline) to either agree to plan and program projects so they contribute toward the accomplishment of the State DOT HSIP targets or commit to a quantifiable target for their Metropolitan Planning Area. In Washington, MPOs have agreed to support the WSDOT targets.

Target-setting methodologies can change, and readers should refer to the HSP and HSIP for the most up-to-date information. Target Zero analysts set annual targets using trend line projections, which are then compared to the Target Zero line. That data, plus the most recent preliminary year of data, is then used to calculate seven 5-year rolling averages for trend line projections. However, Target Zero values do not include the preliminary data, and therefore are only calculated using six 5-year rolling averages. The exception to this method is when the trend line value is higher than the most recent 5-year rolling average. In these instances, the annual goal is set equal to the most recent 5-year average (maintenance goals).

Target Zero generally looks at a projected trend line towards the 2030 goal. A one-year look at the targets provide only a limited and variable perspective on where Washington State actually is in terms of traffic safety goals. This type of look captures "noise" in the data, while a longer look smooths out that noise and shows overall trends. For these reasons, readers should refer to the HSP and HSIP for the current targets and explanation.

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Tribal representatives from listening sessions (see Appendix E)




WASHINGTON STATE

STRATEGIC HIGHWAY SAFETY PLAN 2024

TARGET ZERO