2018 Regional Transportation Plan

Regional Transportation Safety Strategy

A strategy to achieve Vision Zero in the greater Portland region

December 6, 2018

oregonmetro.gov/safety

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Metro is the federally mandated metropolitan planning organization designated by the governor to develop an overall transportation plan and to allocate federal funds for the region.

The Joint Policy Advisory Committee on Transportation (JPACT) is a 17-member committee that provides a forum for elected officials and representatives of agencies involved in transportation to evaluate transportation needs in the region and to make recommendations to the Metro Council. The established decision-making process assures a well-balanced regional transportation system and involves local elected officials directly in decisions that help the Metro Council develop regional transportation policies, including allocating transportation funds.

Regional Transportation Plan website: **oregonmetro.gov/rtp**
Regional Transportation Safety Strategy web site: **oregonmetro.gov/safety**

The preparation of this strategy was financed in part by the U.S. Department of Transportation, Federal Highway Administration and Federal Transit Administration. The opinions, findings and conclusions expressed in this strategy are not necessarily those of the U.S. Department of Transportation, Federal Highway Administration and Federal Transit Administration.

Public service
We are here to serve the public with the highest level of integrity.

Excellence
We aspire to achieve exceptional results

Teamwork
We engage others in ways that foster respect and trust.

Respect
We encourage and appreciate diversity in people and ideas.

Innovation
We take pride in coming up with innovative solutions.

Sustainability
We are leaders in demonstrating resource use and protection.

Metro's values and purpose

We inspire, engage, teach and invite people to preserve and enhance the quality of life and the environment for current and future generations.

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BEFORE THE METRO COUNCIL

FOR THE PURPOSE OF ADOPTING THE 2018 REGIONAL TRANSPORTATION SAFETY STRATEGY	)))))	RESOLUTION NO. 18-4894 Introduced by Chief Operating Officer Martha Bennett in concurrence with Council President Tom Hughes

WHEREAS, in 2008 the Metro Council adopted Resolution No. 08-3940, which defined six desired outcomes for a successful region, including that "people have safe and reliable transportation choices that enhance their quality of life"; and

WHEREAS, federal law requires metropolitan planning organizations such as Metro to adopt safety performance measures and targets; and

WHEREAS, in 2012 Metro published the first Regional Transportation Safety Plan, which created a data-driven framework and urban-focused safety plan aimed at reducing fatalities and serious injuries in the greater Portland region; and

WHEREAS, in 2016 Metro created a Transportation Safety Work Group consisting of transportation safety experts, representatives from the Metro Technical Advisory Committee (MTAC) and the Transportation Policy Alternatives Committee (TPAC), and community organizations, which was tasked with providing technical input and recommendations to Metro staff regarding an update of the 2012 RTSP to be included as a topical plan as part of the 2018 Regional Transportation Plan (RTP) update; and

WHEREAS, the Transportation Safety Work Group met seven times from 2016 through 2017 and provided input to Metro staff regarding the development of a new Regional Transportation Safety Strategy (RTSS) to be adopted concurrently with the 2018 RTP; and

WHEREAS, the RTSS establishes a new regional Vision Zero safety goal, and provides updated objectives, policies, targets, and performance measures to address the common causes and types of fatal and serious injury crashes identified in the greater Portland region; and

WHEREAS, Metro released the initial draft of the 2018 RTSS for public review and comment on June 29, 2018; and

WHEREAS, Metro provided a 45-day public comment period on the draft 2018 RTSS from June 29 to August 13, 2018, and received comments through September 6, 2018; and

WHEREAS, the Metro Council held a public hearing on August 2, 2018 to accept public testimony and comments regarding the draft RTSS; and

WHEREAS, Metro staff invited four Native American Tribes, the Federal Highway Administration, the Federal Transit Administration, the ports of Portland and Vancouver, and other federal, state and local resource, wildlife, land management and regulatory agencies to consult on the public review draft RTSS in accordance with 23 CFR 450.316, and convened four separate consultation meetings on August 6, 14 and 21 and September 6, 2018; and

WHEREAS, the Metro Council, the Joint Policy Advisory Committee on Transportation (JPACT), the Metro Policy Advisory Committee (MPAC), MTAC, TPAC, the Federal Highway Administration, the Federal Transit Administration, the Oregon Department of Transportation, local government elected officials and staff, business and community leaders, public agencies, private and non-profit organizations and the public, assisted in the development of the 2018 RTSS and provided comment on the RTSS throughout the planning process conducted for the 2018 RTP update; and

WHEREAS, JPACT and MPAC have recommended approval of the 2018 RTSS by the Metro Council; and

WHEREAS, the Metro Council held two additional public hearings on the 2018 RTSS identified in Exhibit A on November 8 and December 6, 2018; now therefore,

BE IT RESOLVED that the Metro Council hereby adopts the 2018 Regional Transportation Safety Strategy attached to this Resolution as Exhibit A, as amended by the "Summary of Comments Received and Recommended Actions" in Exhibit B, as a component of the 2018 Regional Transportation Plan (RTP).

ADOPTED by the Metro Council this 6th day of December, 2018.

Tom Hughes, Council President

Approved as to Form:

Nathan A. S. Sykes
Acting Metro Attorney

Public awareness campaigns can be an effective way to engage the public, such as ODOT's Oregonian Crossing campaign, spreading the message that every intersection is a crosswalk
Photo: Metro

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FOREWORD

The 2018 Regional Transportation Safety Strategy ("Regional Safety Strategy") updates the region's first Regional Transportation Safety Plan, which was completed in 2012. The Regional Safety Strategy is a topical plan of the Regional Transportation Plan and updates regional safety goals, objectives, policies, targets and performance measures.

With the federal Transportation Equity Act for the 21st Century (TEA-21) in 1998, safety and security appeared as planning factors for metropolitan planning organizations to address in transportation planning. The Safe, Accountable, Flexible, Efficient Transportation Equity Act (SAFETEA-LU), adopted in 2005, placed a greater emphasis on addressing safety and established the Highway Safety Improvement Program (HSIP) as a core Federal-aid program. Signed into law 2012, the Moving Ahead for Progress in the 21sr century Act (MAP-21) required States and metropolitan planning organizations to adopt safety performance measures and targets. This requirement was maintained in the most recent federal surface transportation legislation the Fixing America's Surface Transportation Act (FAST Act), signed into law in 2015.

The Regional Safety Strategy was developed by a regional transportation safety technical work group as part of the update of the 2018 Regional Transportation Plan. The Joint Policy Advisory Committee on Transportation (JPACT), the Metro Policy Advisory Committee (MPAC), the Transportation Policy Alternatives Committee (TPAC) and the Metro Technical Advisory Committee (MTAC) provided policy and technical guidance. Development of the Regional Safety Strategy was informed by state, county and city transportation safety action plans.

The purpose of the Regional Safety Strategy is to provide a specifically urban-focused overarching data-driven framework for increasing traffic safety on roadways in the greater Portland area. The plan focuses on strategies and actions drawn from best-practices and proven to reduce traffic related deaths and serious injuries.

The Regional Safety Strategy does not mandate adoption or implementation of the safety strategies and actions described in the plan; transportation elements required to be included in local transportation system plans are listed in the Regional Transportation Functional Plan.

23 U.S. Code 409 states that crash and safety data, including reports, surveys, schedules, and 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 or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing federal-aid highway funds, shall not be 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.

Designing for safety supports equity, human and environmental health, air quality and economic prosperity
Photo: Metro

EXECUTIVE SUMMARY

Traffic related deaths and severe injuries are a critical and preventable public health and social equity issue in the greater Portland region. Between 2011 and 2015, there were more than 116,000 traffic crashes resulting in 311 deaths and 2,102 people severely injured.[1]

Many public and private agencies, organizations and individuals are deeply concerned and care about roadway safety. Working together these many partners can reach Vision Zero.

Traffic crashes are the leading cause of unintentional injury and death for young people ages 5 to 24 in Multnomah, Washington and Clackamas County, and the second leading cause of unintentional injury death for people ages 25 to 84.[2]

On average, 62 people die each year on the region's roadways and 420 people experience a life changing injury. Nearly two people are either killed or severely injured every day in our region in a traffic crash; every 10 days a person riding a bike is killed or severely injured; every 5 days a person walking is killed or severely injured.

Sixty percent of these fatal and severe injury crashes occur on just 6 percent of the region's major streets. These roadways are identified in this document as Regional High Injury Corridors and Intersections. They are also where we tend to travel the most, where we run to catch the bus, cross the street to get to schools and shops, ride our bikes or drive.

Top three findings

The Regional Transportation Safety Strategy identifies three top findings to that must be addressed to make daily travel safer for all people, whether driving, walking, bicycling or taking transit.

1. Traffic deaths are increasing and are disproportionately impacting people of color, people with low incomes and people over age 65

- Serious crashes (fatal and severe injury crashes combined) have fluctuated since 2007, but more recently have been increasing. Initial data from 2016, 2017 and 2018 indicate that the trend is continuing. This is a trend that is also happening at the state and national levels.

[1] 2018 Metro State of Safety Report ~ unless otherwise noted, all crash data findings are from the 2018Metro State of Safety Report

[2] Oregon Death Certificates: Center for Health Statistics, Center for Public Health Practice, Public Health Division, Oregon Health Authority. Accessed March 13, 2018. For 2012-2016. Unintentional injuries were the 4th leading cause of death (just about tied for third with cerebrovascular disease/stroke); within the category of unintentional injury deaths, transport injuries are the third leading cause behind falls and poisoning (poisoning includes drug overdoses).

- The regional annual fatality rate by population and vehicle miles traveled (for 2011-2015) has increased compared to the 2012 Metro State of Safety Report.[3]
- Your risk of dying in a motor-vehicle involved crash is higher if you are a person of color, are over 65 or have a lower income.[4]
- A majority of Regional High Injury Corridors are in communities with higher densities of people of color, people with low incomes and English language learners.[5]
- A majority of pedestrian deaths are in are in communities with higher densities of people of color, people with low incomes and English language learners.
- Older drivers are twice as likely to die in a traffic crash. For male drivers age 70 to 79 and female drivers age 75 to 85 and older the share of serious crashes is double that of drivers in other age groups.
- In Oregon, American Indians/Alaska Natives have the highest average rate of vehicle related deaths (5.9 per 100,000) 1.8 times the rate among whites (3.3 per 100,000), and American Indians/Alaska Natives and Black or African American had the highest hospitalization rate -52.2 and 46.2 per 100,000, compared to 45.5 for whites and 20.8 Asian Pacific Islander for traffic related injuries.[6] This data is not currently available at the regional level.

2. Traffic deaths are disproportionately impacting people walking

- Auto-only crashes comprise ninety-one percent of all crashes, and thirty-eight percent of all fatal crashes. Pedestrian crashes make up two percent of all crashes, and thirty-six percent of all fatal crashes.
- Pedestrian traffic deaths are steadily increasing, are the most common type of fatal crash, and have the highest severity of any crash type.
- Pedestrian fatalities have steadily increased to 2015 at the local, regional, state and national levels.
- In the region, a pedestrian crash is more than 26 times as likely to be fatal than a crash not involving a pedestrian, and more than 110 times as likely to be fatal as a rear end crash, the most common crash type.

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[3] Fatality rates for traffic related crashes are the proportion of all crashes, person deaths or severe injuries for every 1 million people or every 100 million vehicle miles traveled.

[4] *Motor Vehicle Traffic-Related Pedestrian Deaths — United States*, *2001–2010*, Centers for Disease Control and Prevention (2013); *Dangerous by Design*, National Complete Streets Coalition (2016); *Income Disparities in Street features that Encourage Walking*, Bridging the Gap (2012); *Pedestrians Dying at Disproportionate Rates in America's Poorer Neighborhoods*, Governing, August 2014; *America's Poorer Neighborhoods Plagued by Pedestrian Deaths*, Governing Research Report (August 2014)

[5] The map at the end of this section shows the overlap of Regional High Injury Corridors and census tracts with both higher than regional average concentration and double the regional density of people of color, people with low income, and/or English language learners.

[6] Oregon Public Health Authority, 2008-2014 crashes

- Roadway design is critical to pedestrian safety. Seventy-seven percent of serious pedestrian crashes occur on arterial roadways in the region. This pattern is seen at the state level as well.

3. A majority of traffic deaths are occurring on a subset of arterial roadways

- Arterial roadways are the location of the majority of the serious crashes in the region. Sixty-six percent of all serious crashes occur on a roadway designated as an arterial.
- In the region, seventy-three percent of non-freeway serious crashes occur on a roadway designated as an arterial; seventy-seven percent of serious pedestrian crashes occur on a roadway designated as an arterial; sixty-five percent of serious bicycle crashes occur on a roadway designated as an arterial.
- A majority of Regional High Injury Corridors are arterial roadways.
- A majority of the High Injury Corridors and Intersections – and a majority of pedestrian deaths and severe injuries – are in areas with race and income marginalized communities.

The Regional Safety Strategy uses a Safe System approach and identifies effective and proven strategies and actions to address these and other data-driven findings.

Traffic deaths and life changing injuries impact the lives of our families, friends, neighbors and community members. They also have a major economic cost – estimated at $1 billion for our region. Research sponsored by AAA found that in large urban areas, such as the greater Portland region, costs resulting from crashes are over three times more than congestion. ~ "Crashes vs. Congestion: What's the Cost to Society?" Cambridge Systematics, 2011

Achieving Vision Zero with a Safe System approach

While the greater Portland region has one of the lowest crash rates in the country, our elected and community leaders acknowledge that the high number of tragedies on our roadways is largely predictable and preventable and that no loss of life from a traffic crash is acceptable. They are stepping up to declare that "enough is enough" and to devise plans and policies for a safe future on our roadways. Just as we expect the right to safe water to drink and clean air to breathe, so too should we expect the right to move about safely.

The region is employing a Vision Zero Safe System approach with an adopted goal to eliminate deaths and severe injuries for all users of the transportation system by 2035.

The Safe System approach has been developed and refined over many decades of application. Since it was first introduced, in Europe, it has been taken up at the country,

state, and city levels around the world. The system is often branded under a public policy identity, such as Vision Zero or Toward Zero Deaths, which aims to connect with the public and establish a direct link to the desired outcome. [7]

The Safe System approach involves a holistic view of the transportation system and the interactions among travel speeds, vehicles and road users. It is an inclusive approach that prioritizes safety for all user groups of the transportation system - drivers, motorcyclists, passengers, pedestrians, bicyclists, and commercial and heavy vehicle drivers. Consistent with the region's long-term safety vision, it recognizes that people will always make mistakes and may have road crashes—but the system should be designed so that those crashes should not result in death or serious injury. Design emphasizes separation – between people walking and bicycling and motor-vehicles, access management and median separation of traffic – and survivable speeds.

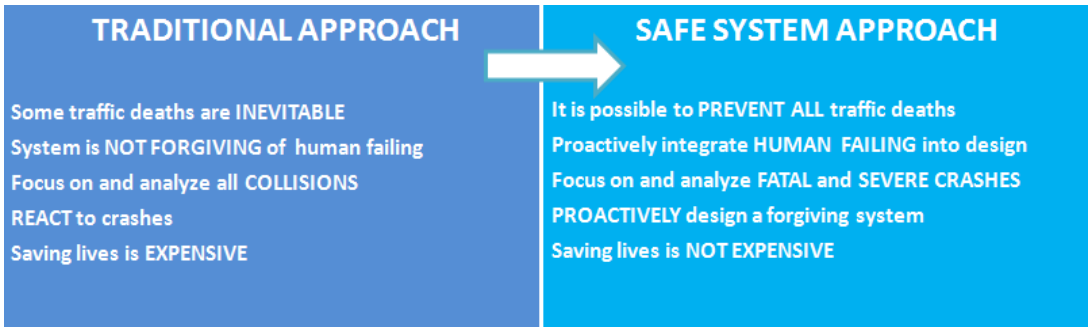


Figure 1: Vision Zero is a Safe System Approach
Source: Metro

The Safe System approach focuses on **key guiding principles** that shape how transportation safety is addressed.

1. **No death or serious injury is acceptable** – lack of safety should not be a trade-off for faster mobility. Rather, the transportation system should be both safe and efficient.

2. **Traffic deaths and severe injuries are preventable** - the focus is on fatal and severe injury crashes, not all crashes. This is one of the most important shifts in how traffic safety is perceived and addressed, shifting the focus to how and where people are dying. It helps prioritize and focus efforts to lead to more immediate outcomes.

3. **People make mistakes that can lead to road crashes** – design roadways so that crashes do not result in a serious injury. Safety should focus on systems-level changes above influencing individual behavior.

4. **Humans are vulnerable to injury** – especially people walking, bicycling, riding motorcycles and working in the right-of- way, and we must operate our transportation system to avoid serious injury.

[7] Sustainable and Safe: A Vision and Guidance for Zero Road Deaths (2017) World Resources Institute and Global Road Safety Facility

5. **Responsibility is shared** – the people that design, build, manage, and use roadways and vehicles and provide post-crash care have a shared responsibility to prevent severe injuries and deaths.

6. **Proactive versus reactive actions** – rather than waiting for events to occur and reacting, a proactive approach should be taken to make the transportation system safe, systemically addressing risk. All parts of the system must be strengthened so that if one part fails road users are still protected.

7. **Data driven decision making**- use data, research and evaluation to understand crashes and risks and to guide decision making.

The Safe System approach provides a framework for strategies and actions that starts with safe travel for all, including reducing disparities for people of color and people with low incomes and for people walking and bicycling. It focuses on proven and effective strategies that create safe streets, safe speeds, safe vehicle and safe people.

Governments are increasingly using the Safe System approach because it is proving to be effective in the countries where it has been in place for decades. Many countries, states, and cities that have adopted a Safe System approach have reduced road fatalities at a faster rate than others that followed the traditional approach.[8]

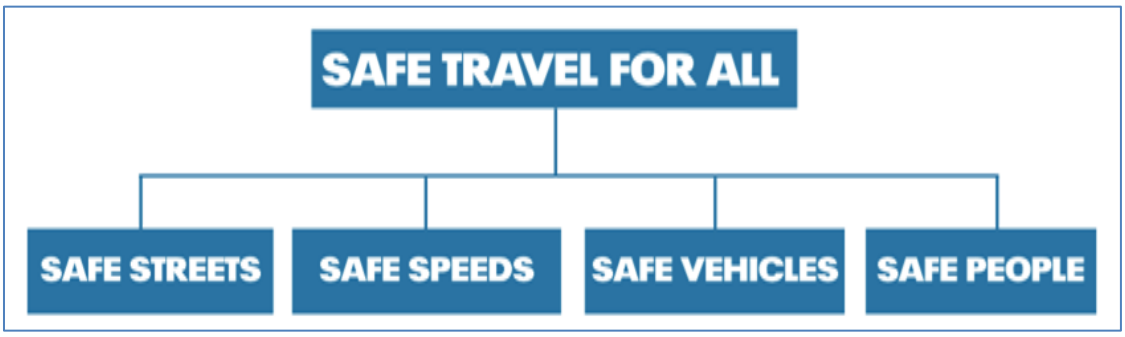


Figure 2: Vision Zero Safe System Approach
Source: Vision Zero Network

Six data-driven strategies

The Regional Transportation Safety Strategy identifies six strategies and fifty-three actions to address findings from analysis of 2011-2015 crash data. Strategies and actions with proven effectiveness were prioritized. Actions for each strategy can be found in Chapter 4.

[8] Sustainable and Safe: A Vision and Guidance for Zero Road Deaths (2017) World Resources Institute and Global Road Safety Facility

1 Protect vulnerable users and reduce disparities[9]

Vulnerable users have higher fatality rates. Increasing safety for vulnerable users increases safety for all transportation users and reduces disparities.

2 Design roadways for safety

Arterial roadways have the highest serious crash rate per road mile and per vehicle mile traveled. Prioritizing and standardizing safety in street design for all modes can prevent dangerous behaviors and save lives.

3 Reduce speeds and speeding

Speed is a fundamental contributing factor in crash severity. Reducing speeds and speeding saves lives.

4 Address aggressive and distracted driving

Dangerous behaviors include those that arise from aggressive or distracted driving and can lead in an instant to injury or death. Policies and roadway design can reduce the likelihood of and minimize the impact of bad decisions.

5 Address impairment

Crashes involving alcohol and drugs have a much higher likelihood of being fatal than other crashes. Providing options to people using the roadways while drunk or intoxicated or preventing it in the first place saves lives.

6 Ongoing engagement and coordination

Many partners are needed to implement Vision Zero. Ongoing engagement and coordination among all partners is essential.

Achieving a Vision Zero target is a challenge, but not impossible

Vision Zero is an ambitious goal but one the region must strive for. With coordinated effort, proven strategies and focused investments the region can move towards Vision Zero. Safety projects in the 2018 Regional Transportation Plan and on the region's High Injury Corridors and Intersections will make it safer to walk, catch the bus, drive, and ride a bicycle or motorcycle. They will address streets with high risk characteristics and prevent crashes from happening. Programs will educate and inform people on safer behaviors and connect people with travel options that reduce driving, thereby reducing exposure to traffic crashes.

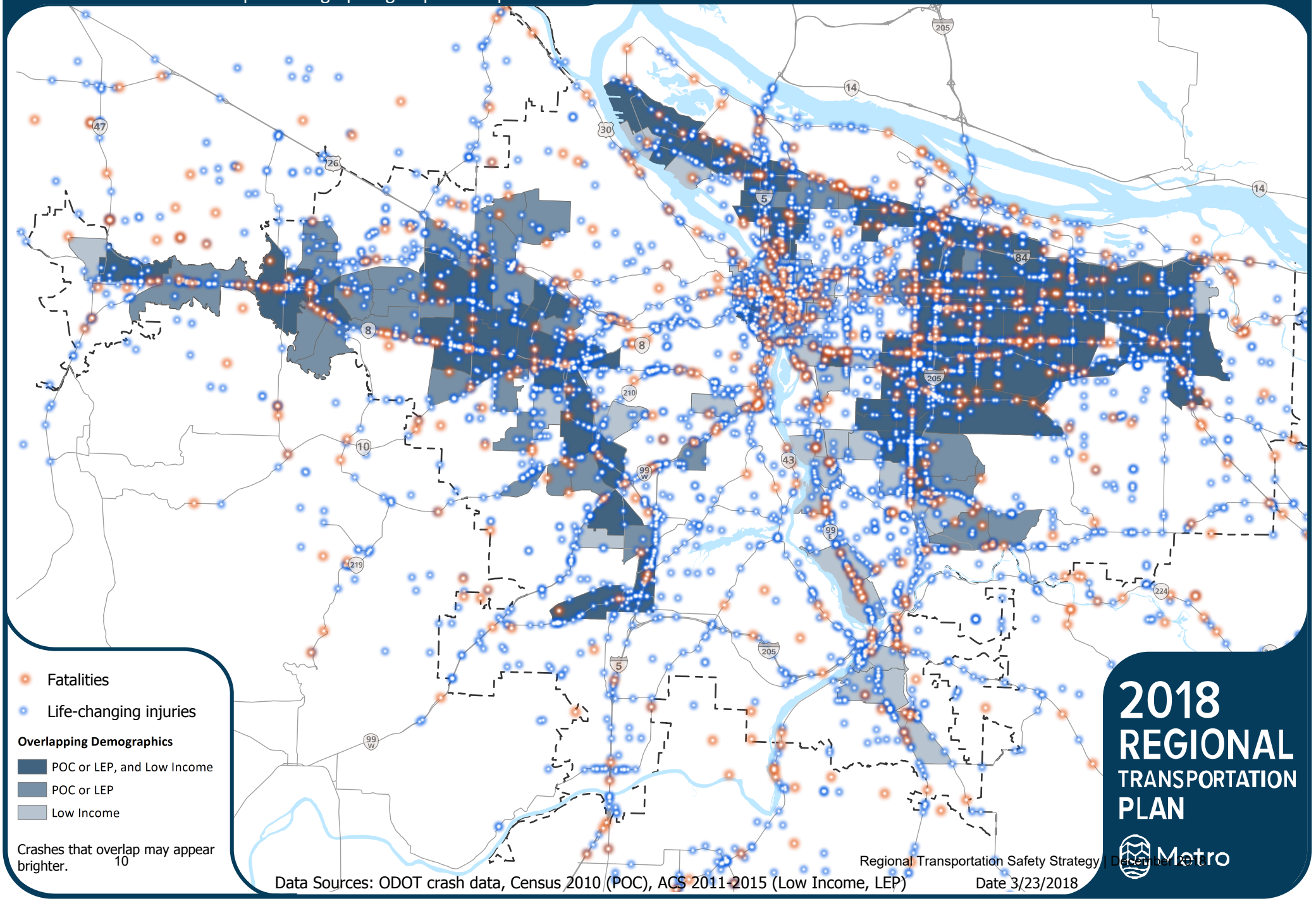
[9] Vulnerable users are people that are more vulnerable to being killed or seriously injured in crashes. Vulnerable users are pedestrians, bicyclists, motorcycle operators, children, older adults, road construction workers, people with disabilities, people of color and people with low income

Serious crashes map 2010-2015

The following map shows the location of fatal and severe injury crashes for people driving, walking and riding bicycles that occurred on roadways within the Metropolitan Planning Area boundary between 2011 and 2015. The location of the crashes overlap with the region's equity focus areas – census tracts with higher than regional average concentrations and double the density of one or more of the following: people of color, people with low income, and/or English language learners.

Fatal and Serious Crashes Overlapping Communities of Color, English Language Learners, and Lower-Income Communities

This map shows the overlap of fatal and life changing crashes involving people driving, biking and walking with census tracts with higher than regional average concentrations and double the density of one or more of the following: people of color, people with low income, and English language learners. Census tracts where multiple demographic groups overlap are identified.



WE REMEMBER

Your stories inspire us to take serious action and save future lives.

The Regional Transportation Safety Strategy is dedicated to all of the people who have been killed or seriously injured while using the transportation system in the greater Portland region—the daughters, sons, mothers, fathers, wives, husbands, siblings, and friends who have been killed or severely injured on our streets.

Oregon and SW Washington Families for Safe Streets is comprised of victims of traffic crashes and families whose loved ones have been killed or severely injured in traffic crashes in Oregon and SW Washington. The group is modeled after the original Families for Safe Streets group banded together in New York City in 2014. With stories and advocacy, Oregon and SW Washington Families for Safe Streets seek cultural and physical changes on streets and the rapid implementation of a safe system approach such as Vision Zero. Oregon and SW Washington Families for Safe Streets envision communities where pedestrians, bicyclists and vehicles safely co-exist, and children and adults can travel freely without risk of harm – where no loss of life in traffic is acceptable.

The following stories of loved ones killed inspire us to do better and achieve Vision Zero.

Ryan Asbury was struck and killed while walking to work at SW 170th Avenue and SW Farmington Road. He was 20 years old.

September 14th 2016 a warm sunny day at 11:20 a.m. my family's life changed forever. Ryan was walking to work and only four blocks from home when a driver chose not to stop at a red light. Ryan suffered a massive traumatic brain injury and never regained consciousness. After a month and a half in the trauma unit at OHSU his health started to deteriorate, we chose no more medical interventions instead comfort care. He passed away on November 24th 2016 Thanksgiving Day. The driver responsible only received two tickets for killing my son. One for running a red, second for not yielding to a pedestrian. If this wasn't reckless driving what is? It's been hard to move forward still suffer from anger and loss. My family will never be the same his loss is unbearable. ~Ivy Asbury, Ryan's mother

Joseph Stone was struck and killed while walking in the crosswalk at SE 156th and SE Division Street. He was 25 years old.

My son, Joseph Stone lost his life in October 2013, due to the careless actions of an inattentive driver. Joe was 25 years old, and just beginning to find his purpose in life, which was ended all too soon. As a driver, Joe was always especially vigilant when approaching crosswalks. On October 4, 2013, Joe was a pedestrian, on his way to the bus stop. He could have just crossed busy Division Street at 157th, which at the time was an "unmarked"

crossing. Everyone out in East County knows that crossing Division anywhere other than at a light or a crosswalk is dangerous. So he didn't. He walked a block down, to 156th and waited at the crosswalk for the only oncoming vehicle to stop, before starting across the street. But he never made it. Instead, he was struck by an SUV, who had just entered the roadway from a side street. He was just a step or two from the center median. Joe's head went through the vehicle's windshield and the impact caused him to land 71 feet east of the crosswalk. Joe died the next day. The driver of the SUV told the police that he noticed the vehicle in front of him stopping, so he changed lanes to pass it. The law says that both a driver and a pedestrian have the responsibility of exercising due care. This driver received citations for failing to yield to a pedestrian in a crosswalk, and careless driving. The law also says that because the driver wasn't impaired, speeding, or using his phone, the penalty he pays is to take a class and perform community service. No fine, no license suspension. Joe paid with his life. ~Kim Stone, Joseph's Mother

Dustin Finney was struck and killed while riding his bike at SE Division Street and SE 85th Avenue in 2011. He was 28 years old.

An underage drunk driver veered into the bike lane striking two young men, killing my son, and leaving an injured 17 year old to face the carnage left behind as the driver fled. Dustin was a college student, an outspoken advocate for equality for all people, and a lover of nature. He was a loving son, grandson, and brother. He had a dream of using his education in Environmental Science for the public good and very much wanted to meet the perfect woman for him. ~Kristi Finney-Dunn, Dustin's mother

Tracey Sparling was killed while riding her bike at NE 14th and NE Burnside Street. She was 19 years old.

My niece, Tracey Sparling was an energetic, creative, ambitious young woman with an infectious smile. She had such an amazingly promising future. In 2007, shortly after starting her sophomore year at PNCA, Tracey was in the bike lane stopped at a red light next to a cement truck on 14th & Burnside. When the light turned green she went forward and was run over in a right hook turn. As bystanders held her hand, Tracey died within seconds after being crushed by the truck. Our family lost our only precious granddaughter. The driver quit commercial driving in Oregon. ~Susan Kubota, Tracey's aunt

Peilian Wu was struck and killed crossing NW Walker Road at NW 180th Avenue to catch the bus. She was a grandmother.

On December 28, 2005, my neighbor Peilian Wu was killed crossing NW Walker Road (at NW 180th Ave) to get to the bus stop that we both used. I felt great grief for her and her family, and astonished grief as a fellow pedestrian. Fei Fei and Dong Dung lost their grandmother who they lived live within a three generation household. Her fellow employees lost an infectious cheerful co-worker, I lost a dynamic good neighbor, and we lost a valued community member. It took me three years before I mustered the courage to cross the road

to use that bus stop again or to walk to the local park and stores. One death or fatal injury by vehicle crashes is one death too many. We can and must do better to make our communities safer for people of all ages to walk, whether to get to shops, schools or parks, for physical or mental health boosts, or just to enjoy some time and company out in our community. ~Kathryn Harrington, Peilian's neighbor

Aaron Wagner-Sturdy was struck and killed by a MAX train while bicycling through the cross walk at the Gresham City Hall MAX station in 2003. He was 16-years old.

My son was headed home from youth group and was killed on a cross walk by a TriMet train. My son was alive under the train. While they were waiting to get another driver for the train, there was a nurse at the scene who held his hand. Once they finally pulled him out from under the train, he then passed away. I have been working to improve safety for many years to others. I worked to pass SB 829 to check all cross walks at TriMet stations. TriMet changed 80 crosswalks at 45 stations. We all need to work together to make a difference and save lives on our roadways. TriMet has been a part of our roads since the early 80s. I live each day to try and make it safe for others. My son had a saying" Dream Big" don't let the little things get in your way, to me that means I can't save my son , but I can save someone else's life. ~Darla Sturdy, Aaron's mother

Danielle Sale and Jenee'Hammel were struck and killed by a bus while crossing the street in April 2010. Danielle was 22-years old, Jenee' was 26.

Danielle Sale left Harvey's Comedy Club with four of her friends including her fiancé Erik Gittings. They stopped at a crosswalk at Glisan and Broadway in Old Town in Portland. The light turned green and as they got half way across the street in the crosswalk, a TriMet bus driven by Sandi Day took a left hand turn from the right hand curb lane. The driver crossed three lanes of traffic making the turn. The TriMet bus driven by Day, struck the pedestrians in the crosswalk and drug them 60 feet after striking them. Day then put the bus in reverse and backed over them. She then put the bus back in drive, ran them over again, and turned the bus off. When a 16 ton city bus is turned off, it kneels 7-10 inches where Danielle and Erik were trapped in the right hand wheel well. Danielle Nicole Sale died after they got her out from under the bus almost 45 minutes later. Erik Gittings survived with horrible injuries. Jenee' Hammel was also killed under the left rear wheel of the bus that night while her family members were injured and witnessed the crash and aftermath. Noted today as the worst crash in TriMet's history. ~David Sale, Danielle's father

Pedestrian scale lighting and sidewalk buffers in downtown Forest Grove increase pedestrian safety and security. Photo: Metro

CHAPTER 1 INTRODUCTION

This chapter provides context for the Regional Transportation Safety Strategy ("Regional Safety Strategy"), including the role of Metro in transportation safety planning for the region, the policy framework that was used to guide the development of the Regional Safety Strategy, relationship to other plans, the planning process and public engagement, and the organization of the document.

The Regional Safety Strategy sets regional transportation safety policy for the Regional Transportation Plan and provides a framework for working towards zero traffic related deaths and severe injury crashes in the region by 2035.

The Regional Safety Strategy provides the transportation safety action plan for the greater Portland region, defined as the area within the Metropolitan Planning Area (MPA) boundary. The MPA is slightly larger than the region's Urban Growth Boundary. The Regional Safety Strategy is a topical plan of the Regional Transportation Plan.

Transportation safety is protection from death or bodily injury from a motor-vehicle crash through design, regulation, management, technology and operation of the transportation system.

Individual and public security is protection from intentional criminal or antisocial acts while engaged in trip making through design, regulation, management, technology and operation of the transportation system.

1.1 Metro's role in transportation safety planning

As the region's Metropolitan Planning Organization (MPO), Metro has a variety of roles and requirements in transportation safety planning.

1. Safety policy and planning.
    - Setting and reporting on federally required safety performance targets.
    - Developing the Regional Transportation Safety Strategy and the Regional Transportation Plan (RTP), including safety goals, objectives, targets and performance measures, policies, strategies and actions, and investment strategies.
    - Reporting on performance outcomes measured against level of investment.
    - Allocating federal transportation funding through a project selection process informed by regional safety policies.
    - Developing and reporting on the Metropolitan Transportation Improvement Plan (MTIP), including project consistency with regional plans and policies.

- Reviewing local comprehensive and transportation plans for consistency with the Regional Transportation Plan.
- Supporting and introducing safety legislation.
- Convening jurisdictions and agencies to achieve better coordination.

2. Data collection, maintenance, analysis and interpretation.
    - Gathering and maintaining data such as roadway network, traffic volumes, and vehicle miles traveled.
    - Data collection and benchmarking of community norms, behaviors and values.
    - Improving crash and risk data and analysis tools.
    - Coordinating with the Oregon Department of Transportation and other partners on crash data.
    - Analyzing, interpreting and sharing regional data.
3. Encouraging best practices in transportation safety and roadway design with funding and programmatic support.
    - Developing regional street design guidelines.
    - Developing criteria for regional funding sources.
    - Supporting use of tools such as the Highway Safety Manual.
4. Collaborating on efforts to highlight safety in materials, messaging and campaigns.

1.2 Policy framework for the Regional Safety Strategy

This section describes the policy framework that guided the development of the Regional Safety Strategy. A review of current federal, state, regional and local policies related to transportation safety reveal a continuing and growing emphasis on transportation safety for all modes.[10] Five themes emerged from the policy review. The policy framework coupled with analysis of regional crash data guide the policies, strategies and actions in the Regional Safety Strategy.

1. Setting ambitious transportation safety goals for zero deaths and serious injuries.
2. Growing use of the Safe System approach, evident in policies such as Vision Zero, Towards Zero Deaths and Drive to Zero, to achieve better safety results.
3. Using data-driven decision making, using data, performance measurement and evaluation to develop data-driven safety plans, strategies and actions and monitor progress towards goals.
4. Applying social equity (especially for race and income) and public health perspectives into safety plans and policy.

[10] Metro Transportation Safety Policy Framework Report, July 2016

5. Recognition of vulnerable users and the need to take additional actions to protect them.

Each of the five policy themes is explained in more detail below.

❶Setting ambitious goals

Setting a goal of zero deaths and severe injuries, with interim targets for reaching the goal, reflects the perspective that these deaths are not accepted as unpreventable deaths.[11] Setting ambitious transportation safety goals is increasingly used as a policy tool because ambitious goals are resulting in better outcomeswhen those ambitious targets are supported by rigorous interventions and prioritization.[12] A recent report by the World Resources Institute found that many countries, states and cities that have adopted a Safe System approach have reduced road fatalities at a faster rate than others that followed a more traditional approach.[13] These places have also set ambitious targets, but the key is that they are supported by specified interventions and a coordinated leadership implementing the actions. In the U.S., from the federal level down, setting ambitious goals is redefining how safety is addressed:

- In October 2016, the U.S. Department of Transportation and the National Safety Council launched the 'Road to Zero' Coalition to end roadway fatalities in the next thirty years. The Secretary of Transportation noted that "setting the bar for safety to the highest possible standard requires commitment from everyone to think differently about safety – from drivers to industry, safety organizations and government at all levels."[14]
- In 2016, Oregon adopted its Transportation Safety Action Plan with a target of zero serious crashes by 2035.
- In the early 2000s, Washington and Minnesota were the first states to adopt the Toward Zero Deaths goal into their safety plans. Both states have had fewer fatalities and severe injury crashes, than did non-Toward Zero Deaths states and the rate of decline was faster.[15]

[11] Sustainable and Safe: A Vision and Guidance for Zero Road Deaths (2017) World Resources Institute and Global Road Safety Facility
[12] Towards Zero: Ambitious Road Safety Targets and Safe Systems Approach (2008) Transport Research Centre
[13] Sustainable and Safe: A Vision and Guidance for Zero Road Deaths (2017) World Resources Institute and Global Road Safety Facility
[14] Road to Zero Coalition, National Safety Council http://www.nsc.org/learn/NSC-Initiatives/Pages/The-Road-to-Zero.aspx and https://www.nhtsa.gov/press-releases/us-dot-national-safety-council-launch-road-zero-coalition-end-roadway-fatalities
[15] Munnich, Lee W., Jr., F. Douma, X. Qin, J.D. Thorpe, and K. Wang. 2012. Evaluating the Effectiveness of State Toward Zero Deaths Programs. Technical Report. Minneapolis: Center for Excellence in Rural Safety, University of Minnesota.

- Clackamas County has been a leader in setting aggressive safety targets. The county was the first local government in the state to develop a safety action plan. It uses the Toward Zero Deaths framework.
- Over 40 cities in the U.S. have adopted Vision Zero plans and have identified themselves as Vision Zero cities, including the City of Portland. The City of Portland has adopted a Vision Zero target for 2025 and developed an ambitious Vision Zero Plan with an equity lens. In 2016, the City of Hillsboro adopted a safety action plan with a target of zero by 2035. Beaverton completed a Transportation Safety Action Plan in 2017 with a goal of zero fatalities and severe injuries by 2035. Washington County has completed a plan with a vision of moving towards zero deaths. Outside the Portland region, the City of Eugene has adopted a Vision Zero Plan and the City of Molalla has Drive to Zero Molalla.

❷ Use a Safe System approach

The Safe System approach has been developed and refined over many decades of application. Since it was first introduced in Europe it has been taken up at the country, state, and city levels around the world. The U.S. Department of Transportation is taking initial steps towards applying the Safe System approach at the national level.[16]

The system is often branded under a public policy identity, such as Vision Zero or Toward Zero Deaths, which aims to connect with the public and establish a direct link to the desired outcome. The best-known brand may be Sweden's Vision Zero. The name of this policy refers to the foundational principle that no loss of life should be acceptable on the roads. It also establishes an ambitious target to reach zero traffic fatalities. [17]

The Safe System approach involves a holistic view of the transportation system and the interactions among travel speeds, vehicles and road users. It is an inclusive approach that prioritizes safety for all user groups of the transportation system - drivers, motorcyclists, passengers, pedestrians, bicyclists, and commercial and heavy vehicle drivers. Consistent with the region's long-term safety vision, it recognizes that people will always make mistakes and may have road crashes—but the system should be forgiving and those crashes should not result in death or serious injury.

Whether the approach is called Vision Zero, Toward Zero Deaths, or Road to Zero, the Safe System approach focuses on **key guiding principles** that shape how transportation safety is addressed.

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[16] *New Safety UTC Envisions Safe Systems Approach for U.S. Roadways.* (October 2017) University Transportation Centers Program and U.S. DOT Office of the Assistant Secretary for Research and Technology.
https://www.transportation.gov/sites/dot.gov/files/docs/utc/286546/utcnewsletter115october.pdf
This national safety UTC is focused on implementing a collaborative, multidisciplinary, safe systems approach to reducing transportation-related injuries and fatalities, and to helping traffic safety become recognized as a public health priority in the United States.

[17] Sustainable and Safe: A Vision and Guidance for Zero Road Deaths (2017) World Resources Institute and Global Road Safety Facility

1. **No death or serious injury is acceptable** – lack of safety should not be a trade-off for faster mobility. Rather, the transportation system should be both safe and efficient.

2. **Traffic deaths and severe injuries are preventable** - the focus is on fatal and severe injury crashes, not all crashes. This is one of the most important shifts in how traffic safety is perceived and addressed, shifting the focus to how and where people are dying. It helps prioritize and focus efforts to lead to more immediate outcomes.

3. **People make mistakes that can lead to road crashes** – design roadways so that crashes do not result in a serious injury. Safety should focus on systems-level changes above influencing individual behavior.

4. **Humans are vulnerable to injury** – especially people walking, bicycling, riding motorcycles and working in the right-of- way, and we must operate our transportation system to avoid serious injury.

5. **Responsibility is shared** – the people that design, build, manage, and use roadways and vehicles and provide post-crash care have a shared responsibility to prevent severe injuries and deaths.

6. **Proactive versus reactive actions** – rather than waiting for events to occur and reacting, a proactive approach should be taken to make the transportation system safe, systemically addressing risk. All parts of the system must be strengthened so that if one part fails, road users are still protected.

7. **Data driven decision making**- use data, research and evaluation to understand crashes, risks and to guide decision making.

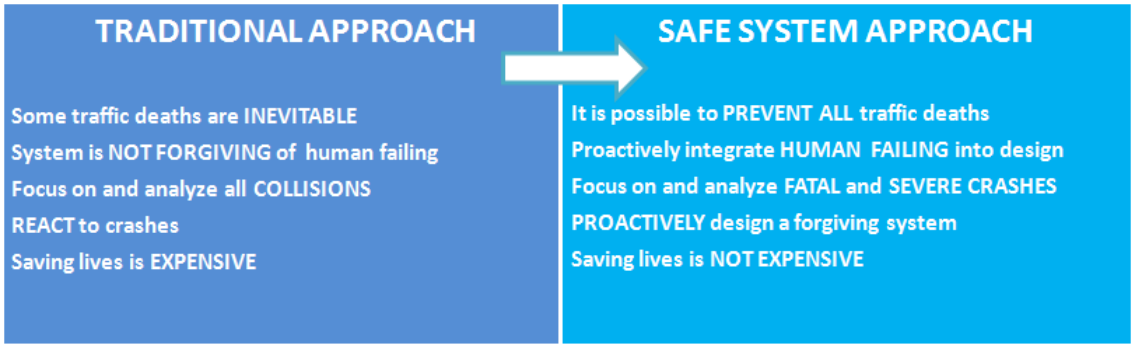

Figure 3: Vision Zero is a Safe System Approach
Source: Metro

The Safe System approach provides a framework for strategies and actions that starts with safe travel for all, including reducing disparities for people of color, people with low

incomes and for people walking and bicycling. **Figures 3 and 4** illustrate the Safe System approach framework.[18]

Safe travel for all embraces the guiding principle that serious traffic crashes are preventable and that no death or severe injury is acceptable.

Safe streets encompasses roadway design that reduces the severity of crashes, education on how to navigate new roadway designs, information such as signage, and technology such as automated speed enforcement. Safety features are integrated into the road design from the outset, including segregating road users, segregating motor-vehicle traffic with medians and barriers, setting appropriate speeds to slow traffic, and designing roads that are "self-explaining" that is, they are designed so that the road user is aware of what is expected of them and behaves appropriately. There is also an emphasis on a proactive approach to road safety, with improvements made to improve both the actual and perceived risks of road safety.

Safe speeds encompasses reducing speeding, evaluating how posted speeds are set and establishing appropriate speed limits, enforcing existing speed limits, especially with automated speed enforcement, and educating road users. Speed is a primary factor in the severity of many crashes and reducing speeding and speeds is seen as a critical way to prevent serious crashes. [19] When speed increases, the risk of a crash and of its severity increases as well. The severity of a crash follows from the laws of physics. At higher speeds, the kinetic energy released in a crash increase with the square of the speed and the changes of speed experienced by those struck by or occupying the vehicles involved increase with speed.[20] Speed limits in Safe System approaches are based on aiding crash avoidance and a human body's limit for physical trauma.

Safe vehicles encompasses vehicle technology, vehicle design (such as freight truck guards), licensing and registration, including increasing the frequency of license testing. Vehicles are designed, built and regulated to minimize the occurrence and consequences of crashes, with the emphasis on collision survivability for all modes involved in the crash. There are two main strands to safer vehicles – technology and road-worthiness. Vehicle technology, such as autonomous vehicles, holds great promise for improving safety, but policies and regulations will be needed to ensure that all road users benefit equally.

Safe people encompasses education and coordination focused on reducing traffic and road rule compliance. Programs such as Safe Routes to School provide foundational transportation behavior training. Campaigns, messaging, media and public perception all inform how people operate and travel within the public right-of-way.

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[18] The safe systems approach to road safety, Brake the road safety charity, UK (September 2015) http://www.brake.org.uk/facts-resources/15-facts/1484-safe-systems-facts-page

[19] Safety Study: Reducing Speeding-Related Crashes Involving Passenger Vehicles, National Transportation Safety Board (2017)

[20] Speed and Crash Risk Research Report. International Transport Forum and International Traffic Safety Data and Analysis Group. (2018)

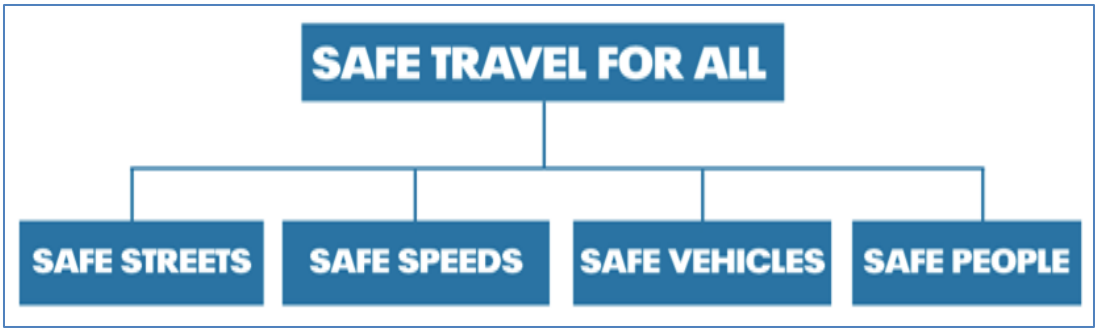


Figure 4: Vision Zero Safe System Approach
Source: Vision Zero Network

Governments are increasingly using the Safe System approach because it is proving to be effective in the countries where it has been in place for decades. Many countries, states, and cities that have adopted a Safe System approach have reduced road fatalities at a faster rate than others that followed the traditional approach.[21]

❸ Data driven decision making

A data driven approach to safety uses crash data, risk factors, and other supported methods to identify the best possible locations to achieve the greatest benefits. Within the Safe System approach the focus is on fatal and severe injury crashes, not all crashes, and systemic approaches to prevent serious crashes from occurring.

Policies at all levels of government emphasize collecting and tracking data on fatal and severe injury crashes, crash risks, contributing factors and countermeasures to crashes to inform plans and investments. Understanding why fatal and severe injury crashes occur and who is most vulnerable is used to direct limited investments and to develop policies and actions to reduce fatal and severe crashes.

Strategies to improve data collection and availability (timelines, accuracy, etc), types of data available (post-hospital data, demographics, etc) must be pursued to support data driven plans and policies. Also needing greater attention is how crash risk is defined and addressed. Crash risk must be carefully defined based on data.

[21] Sustainable and Safe: A Vision and Guidance for Zero Road Deaths (2017) World Resources Institute and Global Road Safety Facility

Figure 5: Data driven safety analysis
Source: Federal Highway Administration

The Federal **Highway Safety Improvement Program** (HSIP) requires a data driven, strategic approach to improving highway safety that focuses on performance. Beginning in 2016, the HSIP National Summary Report includes an evaluation of how states are using data-driven safety decision making to support their safety action plans.[22]

The Oregon Department of Transportation's **All Roads Transportation Safety** program (ARTS) uses federal funds from the Highway Safety Improvement Program, and uses a data driven approach that addresses safety for all public roads in the state of Oregon.[23]

The **2018 Metro State of Safety Report** documents roadway crash data and patterns in the region. The Oregon Department of Transportation has assembled and distributed statewide crash data since 2007. The data includes numerous information fields for each geocoded crash and is complemented by Metro datasets of transportation infrastructure, transportation operations, and spatial data. The combination of these provides the opportunity of detailed analyses of the safety of the region's transportation system and land use patterns.

❹ Applying a racial equity and public health lens

A review of current policies shows that there is a growing need to more explicitly link equity and public health with transportation safety planning.

- Recognizing that transportation related injuries and fatalities are a public health priority and applying public health principles to solve a population health issue is one way that a public health lens is being applied to transportation safety.

- Recognizing the disproportionate impact of serious traffic crashes on people of color, people with low incomes and older adults and taking equity driven actions to reduce the disproportionate impact on these populations is one way that an equity lens is being applied to transportation safety.

[22] U.S. Department of Transportation, Federal Highway Administration, Highway Safety Improvement Program (HSIP) https://safety.fhwa.dot.gov/hsip/ (April, 2017)
[23] Oregon Department of Transportation, All Roads Transportation Safety, http://www.oregon.gov/ODOT/Engineering/Pages/ARTS.aspx

The Regional Safety Strategy applies a public health and race and income equity lens to the policies, strategies and actions. Additionally, it looks at the safety issues for other vulnerable groups such as children, older adults, and people walking, bicycling or riding motorcycles.

Equity

Numerous reports and studies, mostly at the national level, are providing data showing that your risk of dying in a motor-vehicle involved crash is higher if you are a person of color, are over 65 or have a lower income.[24] These disparities in public health and safety outcomes demonstrate the need and necessity to apply an equity and public health lens.

Title VI of the Civil Rights Act of 1964 prohibits discrimination of any person based on race, color, and national origin in programs and activities receiving federal financial assistance, including transportation. This important legislation is a cornerstone to providing an equitable transportation system, however it does not address the systemic effects of racism which continue to create inequitable outcomes for communities of color, including in transportation safety. Applying a racial equity lens in analysis and in the development of policies, strategies and actions begins to identify ways to address the systemic effects of racism.

In 2016, Metro adopted the Strategic Plan to Advance Racial Equity, Diversity and Inclusion.[25] The Racial Equity Strategy, as it is known, lays the foundation for the region's policy approach to reducing disparities and eliminating barriers for people of color. The Metro Council provided policy direction that the Regional Transportation Plan and its topical and modal plans to use a racial and income equity lens when developing policies, strategies and actions.

Racial equity, as defined in the Regional Transportation Plan, is when race can no longer be used to predict life outcomes and outcomes for all groups are improved.

[24] *Motor Vehicle Traffic-Related Pedestrian Deaths — United States, 2001–2010*, Centers for Disease Control and Prevention (2013); *Dangerous by Design*, National Complete Streets Coalition (2016); *Income Disparities in Street features that Encourage Walking*, Bridging the Gap (2012); *Pedestrians Dying at Disproportionate Rates in America's Poorer Neighborhoods*, Governing, August 2014; *America's Poorer Neighborhoods Plagued by Pedestrian Deaths*, Governing Research Report (August 2014)

[25] Racial Equity Strategy, Metro, June 2016 https://www.oregonmetro.gov/strategic-plan-advance-racial-equity-diversity-and-inclusion

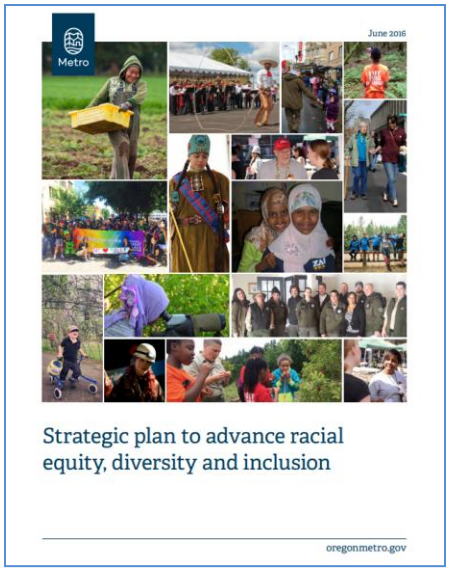


Figure 6: Metro's Racial Equity Strategy
Source: Metro

Public health

Public health and transportation have long been linked, and more recently traffic deaths and serious injuries are being seen as a public health crisis. As part of the built environment, where you live and travel (and your zip code) is one of the social determinants of health. The health map below shows that streets and transportation routes are one of the determinants of health (Barton and Grant, 2006).

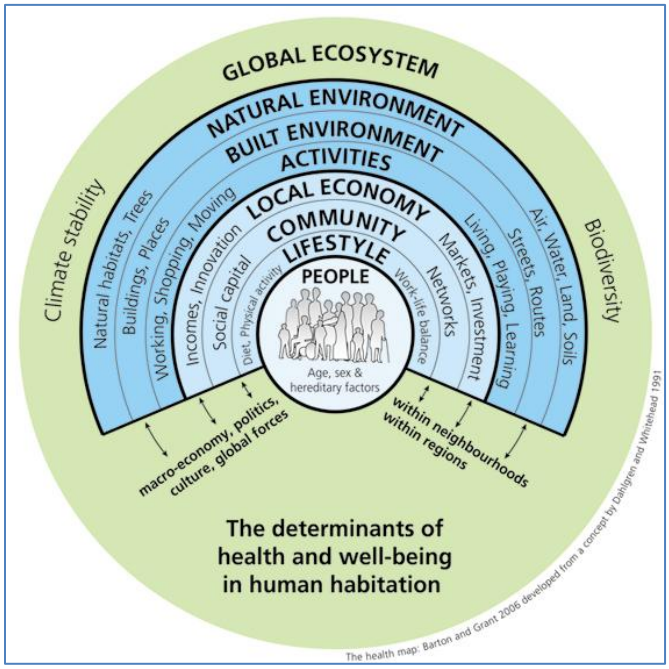


Figure 7: Determinants of health and well being
Source: Boston and Grant, 2006

The Safe System approach to transportation safety recommends that all areas of government, including public health and transportation, must work together and coordinate to achieve zero serious crashes.

The Centers for Disease Control has identified reducing serious crashes as a "winnable battle." Because of the large-scale impact to public health, because evidence-based interventions exist and can be broadly implemented, intensive focus and efforts could have a significant impact in a relatively short period of time.[26]

Public health is impacted by transportation safety and other aspects. Providing safe and inviting streets can have a profound effect on increasing physical activity which impacts health. Conversely, the barrier that unsafe streets present in many neighborhoods can have a negative effect on health. Stark racial disparities in health outcomes, such as diabetes, could be prevented through increased physical activity.

Applying public health principles to transportation safety requires looking at safety from a different perspective. For example, public health principles focus on upstream interventions that have increasing population impact and decreased individual effort. Interventions that require high amounts of individual effort have a relatively small population impact, while interventions that require low individual effort have a high population impact.[27]

The health of Oregonians is also directly connected to transportation safety.

-Oregon Transportation Options Plan, 2015

❺ Prioritize vulnerable users

Vulnerable users are people that are more vulnerable to being killed or seriously injured in crashes. Vulnerable users are pedestrians, bicyclists, motorcycle operators, children, older adults, road construction workers, people with disabilities, people of color and people with low income.

Emphasizing this policy theme in the Regional Safety Strategy helps identify strategies and actions to reduce disparities for these populations and provide safe travel for all.

The 2016 Dangerous by Design report identifies people of color, people with low incomes and older adults as the populations most vulnerable to traffic deaths. The report states that

[26] CDC Winnable Battles Final Report
Winnable battles are high burden, high priority public health work focused on aligning and accelerating intra- and inter-agency work and encouragement programs to think more broadly about partnerships beyond traditional public health partners.
[27] Health Impact Pyramid. Thomas Friedman.

between 2005 and 2014, Americans were 7.2 times more likely to die as a pedestrian than from a natural disaster.[28]

The U.S. Department of Transportation launched the **Safer People, Safer Streets Initiative** in early 2015, recognizing that bicyclist and pedestrian injuries and fatalities have steadily increased since 2009 while motor vehicle crash fatalities have declined.[29] The goal of the initiative is to increase safety for people walking and bicycling, and states that supporting walking and bicycling "supports national goals."

In order to reduce the risk of increased exposure to traffic injury and air pollution for all road users, the Public Health Department recommends that Metro prioritize the design and maintenance of non-automobile facilities by:

- ***Including safety features for pedestrians and bicyclists such as separation from motorized traffic when possible. Prioritize non-automobile users in design and maintenance of streets.***
- ***Providing a parallel bicycle route one block removed from high-volume roads when feasible to reduce exposure to localized pollution while still maintaining access to community destinations.***

- Oregon Health Authority, Community Climate Choices Health Impact Assessment

1.3 Relationship to other plans

Transportation safety is an element of all state, regional and local land use and transportation plans and is achieved through the implementation and update of these plans. This section describes plans that relate to the Regional Safety Strategy.

A safer transportation system is sustainable and can help meet broader environmental, social and health goals identified in our land use and comprehensive plans. Increasing and promoting public transportation, walking and bicycling can help mitigate climate change and improve air quality by reducing carbon dioxide emissions from motor vehicles. Increasing the safety and security of public transportation, walking and bicycling also increases people's physical activity and enhances their quality of life and ability to access jobs and education. A transportation system that offers a variety of safe transportation options can better address the needs of a variety of demographic groups, including people of color, women, people with low incomes, people with limited mobility, youth and older adults.

[28] Dangerous by Design 2016 (January 2017) Smart Growth America, National Complete Streets Coalition
[29] Safer People, Safer Streets: Summary of the U.S. Department of Transportation Action Plan to Increase Walking and Biking and Reduce Pedestrian and Bicyclist Fatalities (September 2014)

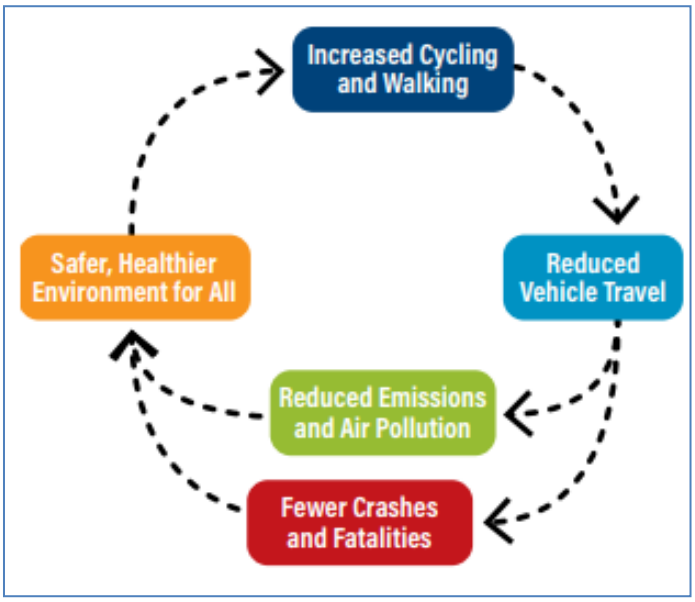


Figure 8: Environmental and Health Benefits of a Safe Transportation System
Source: Sustainable and Safe: A Vision and Guidance for Zero road Deaths (2017)

Transportation Planning Rule (TPR)

The Oregon Transportation Planning Rule (TPR) is located in Division 12, Chapter 660 of the Oregon Administrative Rules and implements Statewide Planning Goal 12 (Transportation) which "promotes the development of safe, convenient and economic transportation systems." The rule emphasizes a reduction in vehicle miles traveled and specifies what local governments and state agencies are responsible for in transportation planning to meet the broad objectives of Goal 12.

Specifically, the Transportation Planning Rule requires jurisdictions within a Metropolitan Planning Organization area to adopt a Transportation System Plan that contains specific elements including a public transportation plan, a bicycle and pedestrian plan, a parking plan and transportation financing program. While safety is a theme and element of the Transportation Planning Rule, there is currently no requirement that transportation safety plans be developed as part of the Transportation System Plan.

Action 6.14 of the Regional Safety Strategy recommends updating sections of OAR 660-012-0000 the Transportation Planning Rule to require Transportation System Plans to include a transportation safety plan and to identify safety as a need and to clarify that making a known safety problem worse constitutes a "significant effect."

Oregon Transportation Safety Action Plan (TSAP)

The Federal Highway Administration requires every state to have a Strategic Highway Safety Plan, a statewide coordinated safety plan providing a comprehensive framework for reducing fatalities and severe injuries. The Oregon Transportation Safety Action Plan serves

as the Oregon Strategic Highway Safety Plan and must be updated every five years. It is a topical plan of the Oregon Transportation Plan.

In 2016, the Oregon Transportation Commission adopted an updated Oregon Transportation Safety Action Plan with a target of zero traffic deaths and severe injuries by 2035. The plan identifies Emphasis Areas for near term focus, goals, policies and strategies. It addresses all modes of transportation on all public roads in Oregon.

The Oregon Transportation Safety Action Plan shapes regional and local safety plans, including the Regional Safety Strategy, and is in turn, shaped by and responsive to the needs identified in local, county, regional and Tribal safety plans.

Regional transportation system plans must be consistent with the Oregon Transportation Plan and its topical and modal plans, including the Oregon Transportation Safety Action Plan.

2040 Growth Concept

The 2040 Growth Concept is the greater Portland area's long-range growth management plan and provides a concept of land-use and transportation policies. Among other things, it emphasizes providing transportation choices and safe neighborhoods.

The Urban Growth Management Functional Plan provides tools to meet goals of the 2040 Growth Concept and the Regional Transportation Functional Plan (see below) implements the transportation elements of the 2040 Growth Concept.

Both the 2040 Growth Concept and the Urban Growth Management Functional Plan provide the land use context to which transportation decisions, including actions to reduce crashes and increase transportation safety, are guided by.

Regional Transportation Plan (RTP)

The Regional Transportation Plan is the transportation system plan for the greater Portland area and lays out the region's transportation concepts and policies to support a complete and interconnected transportation system that supports all modes of travel and implementation of the 2040 Growth Concept.

For the 2018 update, safety was identified as a key policy area. The Regional Safety Strategy is a topical plan of the 2018 Regional Transportation Plan and updates the transportation safety elements.

Regional Transportation Functional Plan (RTFP)

The Regional Transportation Functional Plan is the implementing plan of the Regional Transportation Plan and specifies what local Transportation System Plans are required to include. It serves as the primary transportation policy implementation of the 2040 Growth Concept.

For safety, the Regional Transportation Functional Plan specifies that:

- New street construction and re-construction must be designed to improve safety (3.08.110 A);
- Cities and counties must consider safety improvements (along with TSMO strategies and operational and access management improvements) before other strategies to meet transportation needs and performance targets and standards (3.08.220);
- Each city and county shall include performance measures for safety (3.08.230 D);

The Regional Safety Strategy includes Action 6.13 which recommends updating the Regional Transportation Functional Plan to require Transportation System Plans to include a Transportation Safety Action Plan, with data analysis that addresses all modes and is based on a safety inventory based on both an analysis of crash rates and an analysis of crash risks; to require that Transportation System Plans identify safety as a need; and to require that transportation projects do not make a known safety problem worse, and to be consistent with the Regional Safety Strategy.

Topical and modal plans of the Regional Transportation Plan
Transportation safety is a component of other regional topical and modal plans of the Regional Transportation Plan, including the Climate Smart Strategy, Regional Freight Plan, Regional Transit Plan, Regional Travel Options Plan, Transportation System Management and Options Plan, RTX the Emerging Technologies Strategy and the Regional Active Transportation Plan. Implementing these plans helps achieve Vision Zero. Additionally, Metro's regional street and trail design guidelines emphasize engineering and design treatments to achieve safe streets for all users.

Local Comprehensive Plans
Oregon's statewide planning goals are achieved through local comprehensive plans. Comprehensive plans are long-range plans which include the goals and policies to help jurisdictions prepare for and manage expected population and economic growth.

Local Transportation System Plans and Transportation Safety Action Plans are parts of the overall Comprehensive Plan; local Transportation System Plans must "conform with local and regional comprehensive land use plans." This planning hierarchy reinforces the approach that transportation decisions, including how to address safety, should respond to the context of the surrounding land use.

Local Transportation System Plans (TSP)
Local transportation system plans, or TSPs, developed by cities and counties in the region must be consistent with the Regional Transportation Plan and are required by the Oregon Transportation Planning Rule. Transportation System Plans are long-range plans that guide transportation investments to achieve desired goals and outcomes. The plans include policies, plans for different transportation modes, and a finance plan.

Typically, safety is a theme and goal in Transportation System Plans but there is not a separate plan or section with specific safety strategies, actions or projects. As more jurisdictions in the greater Portland area are developing Transportation Safety Action Plans

and benefitting from them, the need for specific safety plans as part of Transportation System Plans is being recognized.

The Regional Safety Strategy includes Actions 6.13 and 6.14 which recommends updating the Regional Transportation Functional Plan and the Transportation Planning Rule to require Transportation System Plans to include a Transportation Safety Action Plan, including analysis of crash data to identify common crash types and contributing factors, identification of high risk and high injury locations, and recommended actions and projects.

Local Transportation Safety Action Plans (TSAP)
Several cities and counties in the region have adopted or are in the process of developing local transportation safety action plans. Clackamas County was the first county in the state to adopt a Transportation Safety Action Plan in 2012. Portland adopted the first Vision Zero Plan in the region, Hillsboro adopted a Transportation Safety Action Plan in 2017 with a Vision Zero target, and Washington County completed a Transportation Safety Action Plan in 2017. Coordinating implementation of these plans is an important element of achieving Vision Zero.

Health Impact Plans
More often cities and counties are developing health impact plans that link public health with transportation access and safety. These plans are typically developed by the public health department with input from land-use and transportation. Clackamas County's Blueprint for a Healthy Clackamas County, 2017-2020, provides an example of a health impact plan that includes specific strategies to link public health and transportation safety.

1.4 Planning process and public engagement

The Regional Transportation Safety Strategy was updated in coordination with and as part of the update of the Regional Transportation Plan between the summer of 2015 and December 2018. A technical work group provided technical review and expertise as the Safety Strategy was developed. Throughout the planning process, transportation safety was repeatedly identified as a major issue for the region.

- In responses to Metro quick polls and public opinion surveys safety was identified as a top concern.
- Elected and community leaders highlighted safety as one of eight policy focus areas for the 2018 Regional Transportation Plan and indicated early support for adoption of a Vision Zero framework and target.

Regional leadership

The Metro Council, the Joint Policy Advisory Committee on Transportation (JPACT), Metro Policy Advisory Committee (MPAC), and community and business leaders provided policy direction for the Regional Safety Strategy. Early on in the process regional leaders provided direction to use a Vision Zero goal and framework. They supported the development of

Regional High Injury Corridors and Intersections to help guide investments and supported identifying specific projects in the Regional Transportation Plan as safety projects.

Regional leaders provided policy direction at four Regional Leadership Forums and safety was consistently one of the top policy issues. Additionally, the Metro Council committed to supporting a Regional Safety Strategy with a Vision Zero target and framework with a racial and income equity lens.

Safety Technical Work Group

A Regional Transportation Safety Technical Work Group was formed in April 2016 and provided the primary technical work and guidance on the update of the Regional Safety Strategy. The work group developed the updated safety targets and support for the Vision Zero and Safe Systems framework.

The Regional Transportation Plan's Transportation Equity and Performance Measure Work Groups provided review and substantial input on the Safety Strategy throughout the process. The Transportation Equity Work Group supported adopting a Vision Zero target and proposed two safety system evaluation measures to better understand the impact of the 2018 Regional Transportation Plan investment strategies on areas with historically underserved communities. The Transportation Equity Work Group also recommended considering how racial equity and public health were impacted by the Safety Strategy.

The technical work group included representation from the following agencies and organizations. Families for Safe Streets, police and fire were not represented on the work group. This gap in representation needs to be rectified in future regional safety work groups.

- Federal Highway Administration
- Oregon Department of Transportation, Region 1
- Clackamas County
- Multnomah County Public Health
- Washington County
- City of Beaverton
- City of Gresham
- City of Hillsboro
- City of Lake Oswego
- City of Portland
- City of Wilsonville
- TriMet
- National Safe Routes to School Partnership
- Oregon Walks
- The Street Trust

Figure 9: First meeting of the safety work group in May 2016
Photo: Metro

Metro technical advisory committees

In addition to the Regional Transportation Plan technical work groups, Metro's technical advisory committees, Transportation Policy Advisory Committee (TPAC) and Metro Technical Advisory Committee (MTAC), provided valuable review and input on the development of the Regional Safety Strategy.

2018 Regional Transportation Plan engagement

The Regional Transportation Safety Strategy was updated in coordination with and as part of the update of the Regional Transportation Plan between the summer of 2015 and December 2018. Transportation safety was highlighted as a topic in all Regional Transportation Plan engagement activities.

Phase 1: Getting started - Beginning in summer 2015, the first phase consisted of engaging local, regional, state, business and community partners to prioritize the regional challenges to be addressed in the update and the process for how the region should work together to address them. This engagement included:

- interviews with 31 stakeholders;
- discussion groups in partnership with Metro's diversity, equity and inclusion team with communities of color and youth on priorities and issues related to racial equity;
- a partnership with PSU's Center for Public Service and 1000 Friends of Oregon to explore components of inclusive public engagement to develop an approach to better reach underrepresented communities;
- a public involvement retrospective that summarized previous feedback from communities of color on transportation planning and project development;
- and an online survey with more than 1,800 participants to help identify the top transportation issues facing the greater Portland region.

Phase 1 concluded in December 2015 with the Joint Policy Advisory Committee on Transportation (JPACT) and Metro Council approval of the work plan and public participation plan. In addition to implementing the 2014 Climate Smart Strategy, the adopted work plan identified seven policy topics for the Regional Transportation Plan update to focus on – safety, equity, freight, transit, finance, performance, and design.

Phase 2: Framing trends and challenges - The second phase began in January 2016 and concluded in April 2016. In this phase, Metro engaged the public, jurisdictional partners and business and community leaders to document key trends and challenges facing the region as well as priority outcomes for investment in the region's transportation system. This included:

- an online survey with more than 5,800 participants;
- and publication of a Regional Snapshot on transportation.

Also in April 2016, the Metro Council convened members of the Metro Policy Advisory Committee (MPAC), the Joint Policy Advisory Committee on Transportation (JPACT), state legislators, community and business leaders and other interest groups to discuss the key trends and challenges facing the region.

Metro staff also worked with Oregon Department of Transportation economist and jurisdictional partners, individually and through a technical work group, to forecast a budget of federal, state and local funds the greater Portland region can reasonably expect by 2040 under current funding trends.

Phase 3: Looking forward - From May 2016 to May 2017 technical work and public engagement activities continued to focus on finalizing a shared vision statement for the plan, developing draft strategies for safety, transit and freight, and updating the evaluation framework and system performance measures for evaluating plan performance. The engagement for this phase included:

- discussion groups in partnership with Metro's diversity, equity and inclusion team with communities of color and youth to review actions and priorities for the agency's racial equity strategy;
- focus and discussion groups on transportation priorities for communities of color and strategies to improve engagement with underrepresented groups;
- an online survey focusing on priorities for communities of color;
- an online survey with more than 2,600 participants on investment priorities and funding;
- and discussion groups with communities of color on hiring practices and priorities related to the Planning and Development Department equity plan.

The Metro Council hosted the second and third Regional Leadership Forums. In Regional Leadership Forums 1 and 2, there was consensus that a bold vision and more funding are needed to build a 21st century transportation system. In forum 3, leaders discussed a shared vision for the future transportation system and potential near-term priorities for addressing regional transportation challenges in ways that supported the vision. Participants also identified actions to build a path to future funding.

Metro staff also compiled background information and online resource guide maps to support jurisdictional partners as they updated their investment priorities for further evaluation and public review during Phase 4. In addition, staff launched the RTP Project Hub – an online visual database – for jurisdictional partners to use to update project information and collaborate with other jurisdictions. Phase 3 concluded with Metro Council directing staff to release a Call for Projects to update the region's transportation near- and long-term investment priorities to support regional goals for safety, congestion relief, affordability, community livability, the economy, social equity and the environment.

Phase 4: Building a shared strategy - The fourth phase began in June 2017 with release of a second Regional Snapshot on transportation and the Call for Projects for jurisdictional partners to update the plan's regional transportation project priorities. Agencies were asked to identify projects that address regional needs and challenges, reflect public priorities and maximize progress toward the region's agreed upon vision and goals for the future transportation system.

Local jurisdictions and county coordinating committees worked within a constrained budget and capital funding targets to determine the project priorities to put forward for inclusion in the plan in collaboration with Oregon Department of Transportation, Metro, SMART and TriMet. All project submissions were required to come from adopted plans or studies that provided opportunities for public input.

In summer 2017, Metro analyzed three funding scenarios: 10-year constrained project priorities (years 2018-2027), 2040 constrained project priorities (for years 2028-2040) and 2040 strategic project priorities (for years 2028-2040, if funded). The analysis tested new and updated outcomes-based system performance measures to evaluate performance of the transportation system as a whole for each scenario to help inform finalizing the plan's project priorities in Phase 5. Metro staff also prepared an interactive map of proposed projects and lists that was made available on the project website for the public and partners to use to learn more about the projects under consideration. The safety, transit, freight and emerging technology strategies continued to be developed on parallel tracks. Jurisdictions also piloted project-level evaluation criteria on 50 projects; the pilot project evaluation will be advanced during the next update of the Regional Transportation Plan.

The results of the analysis were released in November 2017. Engagement on the Call for Projects included:

- a community leaders' forum for feedback on the results,
- Metro Councilor briefings to business and neighborhood groups,
- and an online survey with more than 2,900 participants.

The analysis was also summarized in a larger discussion guide for decision-makers that also relayed key issues and the results of the Call for Projects. A fourth and final Regional Leadership Forum was held in March 2018 to discuss findings and recommendations from the technical analysis and public engagement to inform finalizing the plan during Phase 5.

State and local agencies updated the draft project list based on results from the analysis and recommended actions.

Phase 5: Adopting a plan of action - The fifth, and final, phase of the process began in April 2018 and focused on finalizing and adopting the region's investment priorities and

strategies recommended through 2040. The 2018 Regional Transportation Plan was available for public review in June 2018, with a formal comment period from June 29 through August 13. For this comment period, engagement activities included:

- an online survey with a high level summary the plan,
- an interactive map of projects, project lists and a briefing book that provides a more in-depth summary,
- and draft documents, including the 2018 Regional Transportation Plan and safety, transit, freight and emerging technology strategies, available for review and comment.

The Metro Council held a hearing on August 2, 2018. All comments received during the comment period were summarized in a public comment report. Recommended changes to the draft materials in response to comments received during the comment period were also summarized in a public comment log and provided for consideration by the Metro Policy Advisory Committee (MPAC), the Joint Policy Advisory Committee on Transportation (JPACT), and the Metro Council during the adoption process.

The Metro Policy Advisory Committee (MPAC), the Joint Policy Advisory Committee on Transportation (JPACT), recommended adoption of the Regional Transportation Plan and the safety, transit, freight and emerging technology strategies to the Metro Council in October 2018. The Metro Council held legislative hearings on in November and December and adopted the Regional Transportation Plan, project priorities and strategies for safety, transit, freight and emerging technologies in December 2018.

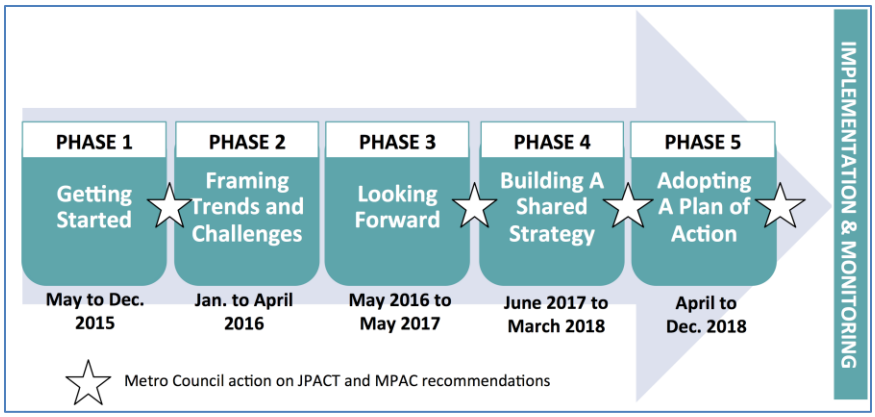


Figure 10: 2018 Regional Transportation Plan update timeline and process

"What's your goal?" video

Metro interviewed people in the greater Portland area and asked them what the traffic fatality goal should be for their family – everyone said zero. They were all asked if that should be the goal for everyone – they all said yes.

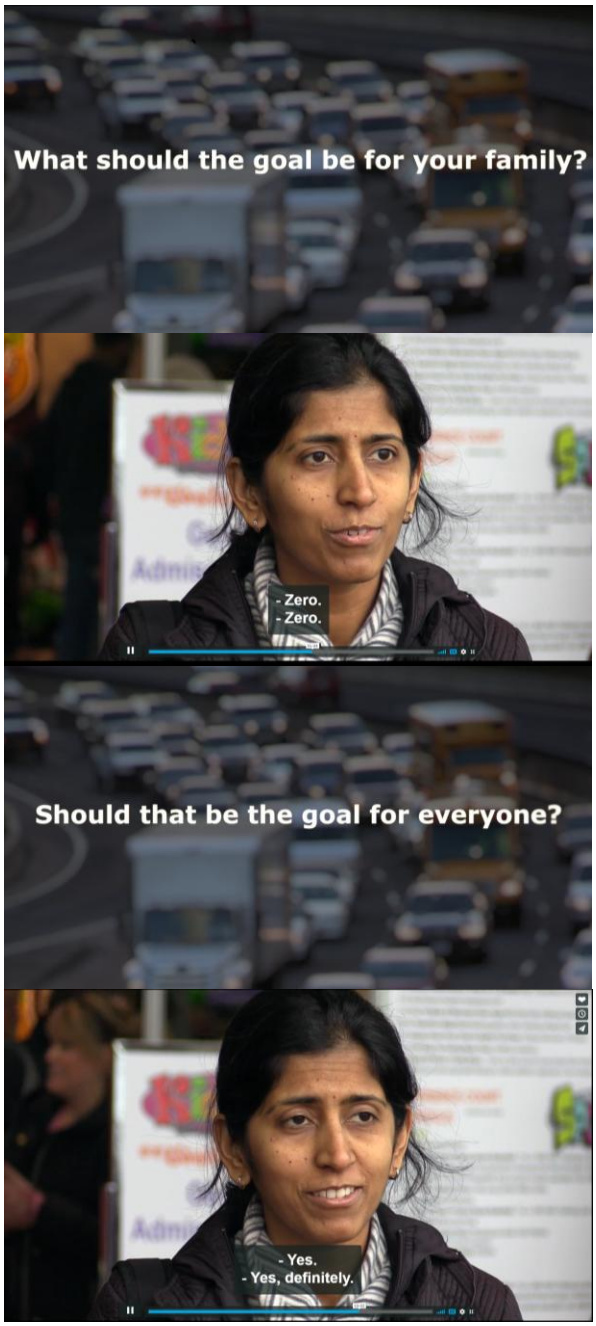


Figure 11: What's your Goal? (video)
Source: Metro, KidFestNW Portland Expo Center, February 18, 2017

Focus groups and stakeholder interviews

To develop the work plan for the update the Regional Transportation Plan, Metro conducted focus groups and stakeholder interviews. Input from these processes was used to shape the work program and policy focus areas for the update. Safety was confirmed as a priority focus area through the input.

In June 2015, Metro sought input from culturally-based and youth focus groups on questions related to equity, transportation, housing, parks and natural areas, and community engagement. Input related to safety included bicycle safety, personal safety on the MAX, and safety at bus shelters including lighting and presence of a shelter, lack of sidewalks and lack of safe routes to get to parks. [30]

Figure 12: Participants in the Metro Discussion Groups, June 2015
Photo: Metro

In October 2015, Metro conducted stakeholder interviews for the update of the Regional Transportation Plan. Interviewees included elected officials, businesses, and community organizations from across the greater Portland area. Input related to safety that emerged from the interviews were: making safety the highest priority, allowing for mode separation of modes, such as separated bicycle facilities, to improve traffic flow and safety, improving safety around schools, and lack of sidewalks.[31]

Online public comment opportunities

For the update of the Regional Transportation Plan, Metro provided opportunities for the public to comment online about transportation priorities. Safety was consistently a top concern and need identified by the people who commented.

[30] Metro Discussion Groups (August 2015)
https://www.oregonmetro.gov/sites/default/files/2016/01/29/RTP-2018-DiscussionGroupReport-20150805.pdf
[31] 2018 RTP Update Stakeholder Interview Report (October 2015)
https://www.oregonmetro.gov/sites/default/files/2015/10/30/RTP-2018-StakeholderInterviews-20151027.pdf

Metro conducted an online quick poll in July and August 2015. After traffic, safety was identified as a top transportation issue, and it was identified as the top transportation issue in Multnomah County.[32]

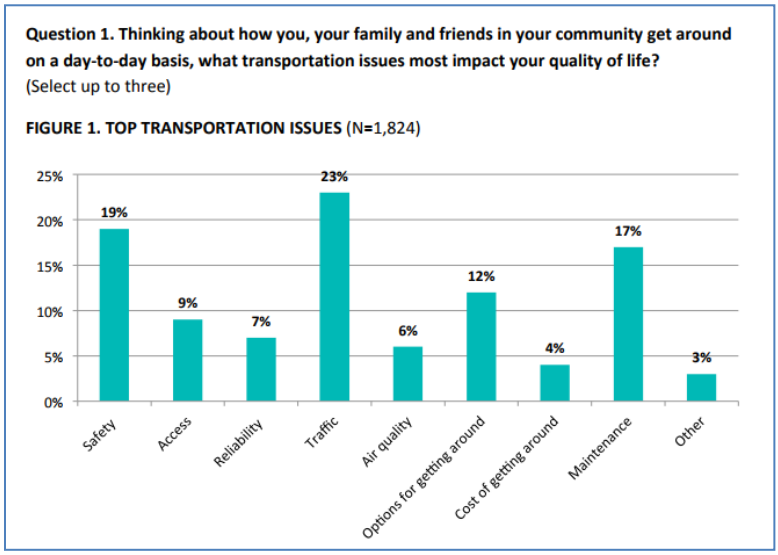


Figure 13: Metro Quick Poll, August 2015
Source: Metro

In the online public comment period in March 2017, reducing fatal and severe injury crashes for people walking, bicycling and driving was identified as the highest need after maintaining the transportation system.[33]

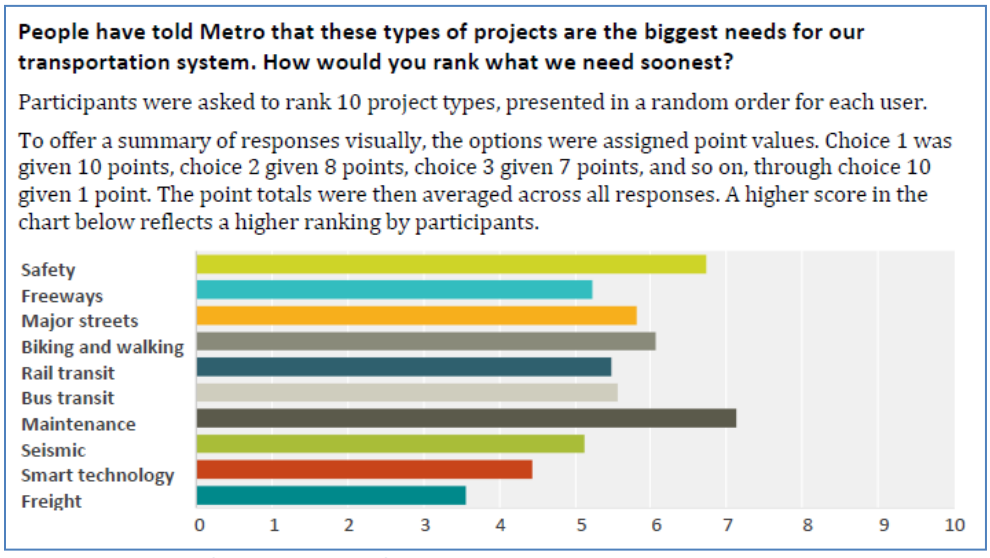


Figure 14: Metro On-line Survey, March 2017
Source: Metro

[32] 2018 RTP Update Online Quick Poll 1 report (October 2015)
https://www.oregonmetro.gov/sites/default/files/2015/10/21/RTP-QuickPoll1-Results-20151021.pdf
[33] 2018 RTP Update Public Comment Report: Priorities for our transportation future (May 2017)
https://www.oregonmetro.gov/sites/default/files/2017/05/12/RTP-winter-comment-report-051217.pdf

1.5 Document organization

The Regional Safety Strategy is organized into six chapters, with a foreword, executive summary, and back matter such as a glossary and list of acronyms. Supporting documents are provided as stand-alone appendices. This section provides an overview of the different parts of the document.

Foreword
Provides the genesis, purpose, limitations, and scope of the plan.

Executive Summary
Provides a short summary and key elements of the plan.

We Remember
Describes why it is important to take serious action to eliminate deaths and serious injuries from traffic crashes through community stories.

Chapter 1: Introduction
Provides and introduction to and context for understanding the strategy.

Chapter 2: Regional Transportation Safety Policy
Describes regional safety goals, objectives, targets and policies, including regional high injury corridors and intersections.

Chapter 3: Trends and Factors in Serious Crashes
Provides key findings from analysis of crash and transportation system data and other sources.

Chapter 4: Strategies and Actions
Describes recommended data-driven strategies and actions to help achieve Vision Zero.

Chapter 5: Implementation
Describes steps for Metro and partners to take to begin implementing the strategy.

Chapter 6: Measuring Progress
Describes performance measures to monitor progress towards achieving Vision Zero.

Acronyms
Defines acronyms used in the document.

List of Partners
Provides a initial list of the agencies, organizations, non-profits, private entities, industry and the public that could play a role in implementing the strategy.

Resources
Provides a list of resources for further information.

Glossary
Defines terms used in the document.

Appendix
Regional High Injury Corridors and Intersections Report
This report describes the purpose, background and methodology used to identify regional high injury corridors and intersections on the regional transportation network. The analysis was concluded in April 2017. The analysis will be updated approximately every five years.

2018 Metro State of Safety Report
This report describes the data used in the analysis, the attributes of the data, data limitations, and the process Metro used to analyze the data. The 2018 Metro State of Safety Report presents the findings, identifying trends and relationships of serious crashes with environmental factors and includes roadway and land use characteristics. The analysis will be updated approximately every five years.

CHAPTER 2 REGIONAL TRANSPORTATION SAFETY POLICY

This chapter describes adopted regional policies related to transportation safety, including vision, goals, objectives, targets and performance measures. Chapters 4 and 5 describe the strategies and actions to take to achieve regional goals and targets.

The information in this chapter is included in the policy chapter of the 2018 Regional Transportation Plan. To move from vision to action, the Regional Safety Strategy uses a strategic plan framework where strategies and actions are informed by and build off of a strong policy foundation. The Regional Transportation Plan and each regional modal and topical plan starts with the regional transportation vision, identifies desired goals, measureable objectives for each goal, specific policies that describe what must be done to achieve desired outcomes, and then specific actions to implement policies. Each strategy is a series of actions. Targets and performance measures track progress (see Chapter 6).

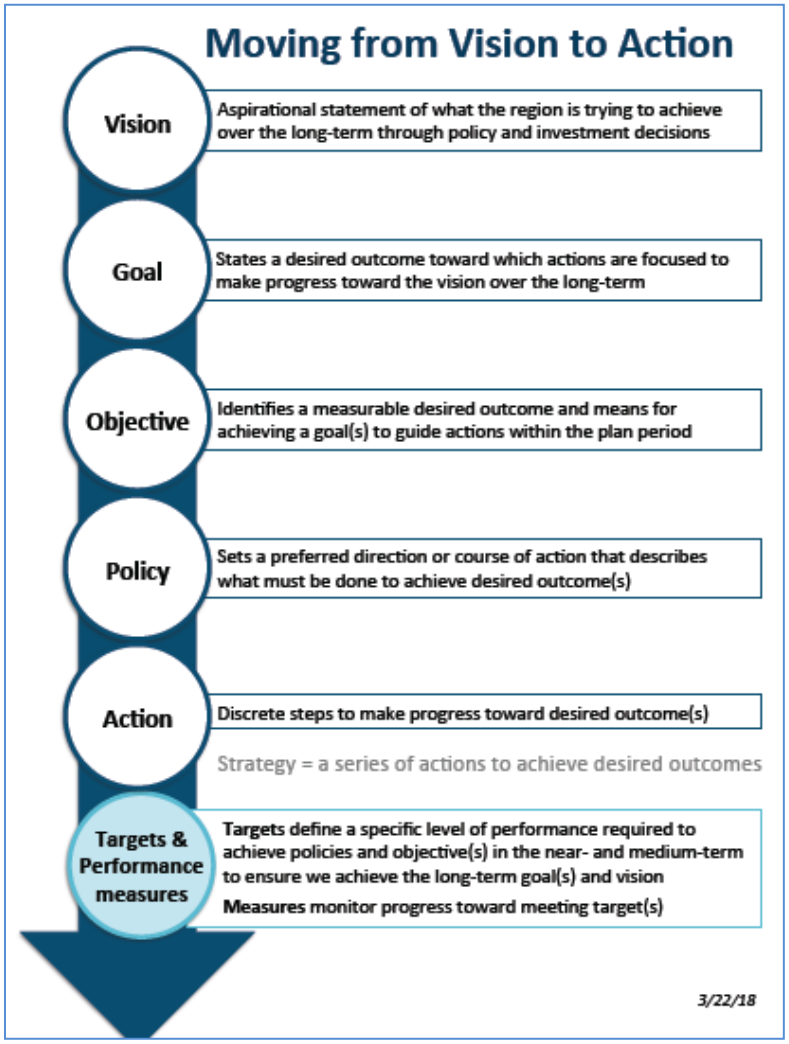


Figure 15: Components of the Regional Transportation Plan and topical and modal plans
Source: Metro

2.1 Regional Transportation Plan vision

The 2018 Regional Transportation Plan provides a vision for the transportation system. Transportation safety is a crucial element of the vision.

> ***In 2040, everyone in the Portland metropolitan region will share in a prosperous, equitable economy and exceptional quality of life sustained by a safe, reliable, healthy, and affordable transportation system with travel options.***

2.2 Safety and security goal and objectives

The 2018 Regional Transportation Plan has ten goals for the regional transportation system. Goal 5 is the transportation safety and security goal.

Individual and personal security while traveling has an important relationship to transportation safety, especially for people of color. Fear of harassment or being targeted can deter people of color from walking, bicycling or using transit.

Goal 5: Safety and Security

People's lives are saved, crashes are avoided and people and goods are secure when traveling in the region.

Objective 5.1 Transportation Safety

Eliminate fatal and severe injury crashes for all modes of travel.

Objective 5.2 Transportation Security

Reduce vulnerability of the public and critical passenger and freight transportation infrastructure to crime and terrorism.

2.3 Vision Zero safety target

The Regional Safety Strategy updates the regional transportation safety target in the Regional Transportation Plan with a Vision Zero target.

> ***By 2035 eliminate transportation related fatalities and serious injuries for all users of the region's transportation system, with a sixteen percent reduction by 2020 (as compared to the 2015 five year rolling average), and a fifty percent reduction by 2025.***

The target year of 2035 will not change in subsequent Regional Transportation Plan updates and progress towards meeting the target will be monitored each year. Refer to Chapter 6 for a description of how progress towards meeting the 2035 target, and the 2020 and 2025 interim targets, will be tracked.

The Vision Zero target is consistent with 2016 Oregon Transportation Safety Action Plan target of "no deaths or life changing injuries on Oregon's transportation system by 2035."

2.4 Regional safety policies

Policies in the Regional Transportation Plan guide investments in the region in support of meeting the regional transportation vision and goals.

Each of the regional network concepts in the Regional Transportation Plan - for transit, freight, arterials and throughways, bicycle and pedestrian – identifies supporting policies to develop and implement the regional transportation system.

Polices are also identified for Racial and Social Equity, Emerging Technologies, Transportation System Management and Operations and Safety. Transportation safety is mentioned in many of the Regional Transportation Plan policies. The 2018 Regional Transportation Plan is the first plan to include separate section dedicated to safety and security policies. See Chapter in this document 4 for strategies and actions.

Policy 1. Focus safety efforts on eliminating traffic deaths and severe injury crashes to achieve Vision Zero.

To reach the goal of eliminating deaths and severe injuries from traffic crashes, this policy directs safety related efforts to focus on fatal and severe injury crashes, as opposed to all crashes. Focusing on serious crashes is a key tenant of the Safe System approach. It entails identifying where serious crashes occur and focusing on those locations, identifying the risk factors involved in serious crashes and addressing and eliminating those risks, focusing enforcement and education on high risk behaviors that lead to serious crashes and less or no enforcement or education on low risk behaviors. When enforcement is used, precautions must be implemented to ensure equitable actions and outcomes.

Policy 2. Prioritize safety investments, education and equitable enforcement on high injury and high risk corridors and intersections, with a focus on reducing speeds and speeding.

This policy directs safety investments, education and equitable enforcement to be prioritized on the corridors where the most serious crashes have occurred or have a risk of occurring (due to identified risk factors such as lack of roadway separation or excessive speeding). This policy approach, prioritizing corridors where deadly crashes are or could occur, more effectively uses limited resources where the most serious issues are. Additionally, this policy emphasizes the systemic approach to safety to addresses known safety risk factors corridor wide to prevent serious crashes from occurring in the future.

Policy 3. Prioritize investment that benefit people with higher risk of being involved in a serious crash, including people of color, people with low incomes, people with disabilities, people walking, bicycling, and using motorcycles, people working in the right-of-way, youth and older adults.

This policy is based on the Safe System approach of prioritizing safety efforts on people with the highest risk of dying in a traffic crash as a key strategy to eliminating serious crashes overall. This policy also helps implement Metro's Strategic Plan for Advancing Equity, Diversity and Inclusion.

Policy 4. Increase safety for all modes of travel and for all people through the planning, design, construction, operation and maintenance of the transportation system, with a focus on reducing vehicle speeds.

This policy requires that transportation safety be integrated into every aspect of the transportation system. It is a key element of the Safe System approach which takes a systemic and holistic approach. Safe travel speeds is a core element of achieving Vision Zero. Speed limits in Safe System approach are based on aiding crash avoidance and a human body's limit for physical trauma. An unprotected pedestrian hit at over 20mph has a significant risk of death or life-changing injury. A car in a side-on collision can protect its occupants up to around 30mph; a car in a head-on collision up to around 40mph. Establishing survivable speeds on streets where people using different modes at variable speeds and with different levels of physical protection are essential. Additionally, a diversity of users must be taken into account as the system is developed. For example, people of color, older adults and children may have different needs that must be addressed at every phase.

Policy 5. Make safety a key consideration in all transportation projects, and avoid replicating or exacerbating a known safety problem with any project or program.

While most policies are proactively focused on improving safety, this policy requires that transportation projects and programs clearly evaluate the impacts on all users of the transportation system and do not negatively impact any of those users by either replicating something which has been shown to increase safety problems for roadway users or making a current safety issue worse.

Policy 6. Employ a Safe System approach and use data and analysis tools and performance monitoring to support data-driven decision making.

The Safe System approach is proven to reduce serious crashes. The approach is based on data driven strategies and actions. Collecting, maintaining and analyzing data on a regular basis is critical to focusing investments where they will be most effective. Additionally, monitoring progress and assessing the outcome of investments in safety is crucial to learning from the past and improving in the future.

Policy 7. Utilize safety and engineering best practices to identify low-cost and effective treatments that can be implemented systematically in shorter timeframes than large capital projects.

Many solutions to improve safety are inexpensive. This policy prioritizes addressing safety problems on a corridor level sooner rather than later to prevent serious crashes from occurring in the future. Rather than postponing safety interventions until a larger and more expensive project can be funded this policy directs that low-cost and effective treatments be implemented first.

Policy 8. Prioritize investments, education and equitable enforcement that increase individual and public security while traveling by reducing intentional crime, such as harassment, targeting, and terrorist acts, and prioritize efforts that benefit people of color, people with low incomes, people with disabilities, women and people walking, bicycling and taking transit.

Individual and personal security while traveling has an important relationship to transportation safety, especially for people of color. Fear of harassment or being targeted can deter people of color from walking, bicycling or using transit and may increase the use of motor-vehicle transportation. Though individual and public security can be challenging to address, a variety of approaches are needed to create a safe and welcoming transportation system, including: collecting data, utilizing Crime Prevention Through Environmental Design, taking into account a diversity of users when developing and operating the transportation system, educating people to look out for and care for one another, designing security into projects (such as street lighting, visibility, call boxes), equity training for public safety and transportation professionals, and including a wide range of groups in design and decision making.

Policy 9. Make safety a key consideration when defining system adequacy (or deficiency) for the purposes of planning or traffic impact analysis

This policy specifies that safety data, analytical tools and metrics must be part of the evaluation when defining the adequacy of capacity on the transportation system. To design and operate safe roadways, there is a need to evaluate the impacts of increased capacity to safety.

2.5 Regional High Injury Corridors and Intersections Map

Regional High Injury Corridors and Intersections are segments of roadway or intersections in the greater Portland area where the highest concentrations of Fatal and Severe Injury (Injury A) crashes involving a motor vehicle occur on the regional transportation network. Metro developed a replicable and quantitative assessment of the crash performance on roadways, using 2010-2014 Oregon Department of Transportation crash data, on the regional transportation network to support planning and prioritization of corridor safety efforts. Sixty percent of fatal and severe injury crashes for motor-vehicle occupants,

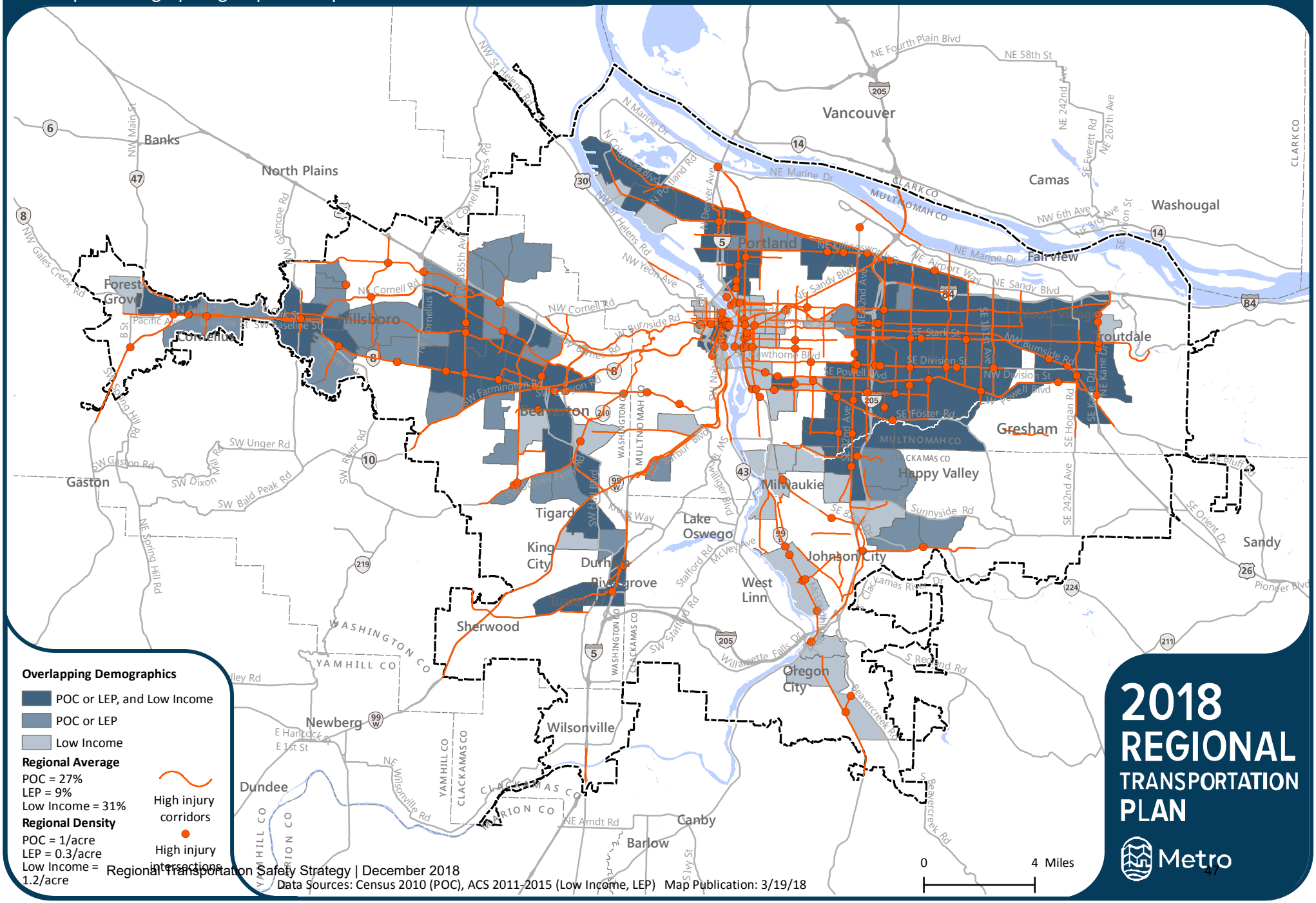
pedestrians and bicyclists occur on just six percent of the roadway miles in the region.[34] Even more striking, fifty percent of serious pedestrian crashes occur on just two percent of all roadways in the region, and fifty percent of serious bicycle crashes occur on just three percent of the region's roadways. Identifying these high injury roadways provides a tool to help prioritize investments where they will have the greatest impact. Using a systemic, corridor approach to safety investments has been shown to be an effective and proven way to reduce serious crashes.

The following map illustrates the High Injury Corridors and Intersections in the greater Portland region. A majority of high injury corridors are in communities with higher concentrations of people of color, people with low incomes and English language learners. The Regional High Injury Corridors and Intersections are identified to help prioritize safety near term investments. Metro will update this map every five years. In the interim, other safety investments may be identified that warrant priority based on other data and analysis.

[34] High injury corridors for serous crashes for all modes were identified, as were high injury corridors for auto only serious crashes, bicycle/auto only serious crashes, and pedestrian/auto only serious crashes. The map on the following page shows the combined corridors for all modes where 60 percent of all fatal and serious crashes occurred between 2010 and 2014, and were identified by using the following methodology: Fatal and Injury A (serious) crashes for all modes were assigned to the network; "Injury B", "Injury C", and "PDO (property damage only)" crashes involving bikes and pedestrians were also added to the network. Fatal and Injury A crashes are given a weight of 10; roadways are analyzed in mile segments; if a segment has only one Fatal or Injury A crash it must also have at least one B/C (minor injury) crash, for the same mode, to be included in the analysis. Roadway segments were then assigned an N-score (or "crash score") by calculating the weighted sum by mode and normalizing it by the roadway length. To reach 60 percent of Fatal and Severe Injury crashes, roadway segments had to have an N-score of 39 or higher; high injury Bicycle Corridors had to have an N-score of 6 or more, and high injury Pedestrian Corridors had to have an N-score of 15 or more. Intersections with the highest weighted crash scores were also identified; five percent of intersections had an N-score (or "crash score") higher than 80 and are also shown on the map, and one percent of intersections (the top 1%) had to have an N-score higher than 128.

High Injury Corridors Overlapping Communities of Color, English Language Learners, and Lower-Income Communities

This map shows the overlap of regional high injury corridors and road intersections with census tracts with higher than regional average concentrations and double the density of one or more of the following: people of color, people with low income, and English language learners. Census tracts where multiple demographic groups overlap are identified.



2018 REGIONAL TRANSPORTATION PLAN

Metro

Data Sources: Census 2010 (POC), ACS 2011-2015 (Low Income, LEP) Map Publication: 3/19/18

There can be multiple factors that contribute to a crash
Photo: Metro

CHAPTER 3 TRENDS AND FACTORS IN SERIOUS CRASHES

This chapter **highlights key findings** from the analysis of five years of Oregon Department of Transportation crash data, 2011-2015, documented in the **2018 Metro State of Safety Report**. Data and findings from other national and state data sources and studies are also referenced.

"Serious crashes" are Fatal and Severe Injury (Injury A) crashes combined

Refer to the 2018 Metro State of Safety Report for the comprehensive data analysis for the greater Portland region.

Using data to identify trends and understand the underlying contributing factors in fatal and severe injury crashes is the first step in identifying the **data-driven strategies and actions** in the next chapter, and is an element of a Safe Systems approach to transportation safety.

3.1 Top three findings

Three top findings emerged from the analysis of serious crashes in the region and highlight a need for urgent action and focused strategic direction.

❶ Traffic deaths are increasing and are disproportionately impacting people of color, people with low incomes and people over age 65.

❷ Traffic deaths are disproportionately impacting people walking.

❸ A majority of traffic deaths are occurring on a subset of arterial roadways.

Making headway on these three findings is central to the region achieving the Vision Zero target, and will require using the Safe System approach, focusing safety efforts on the most serious crashes, focusing investments in High Injury Corridors and low-income and communities of color and prioritizing pedestrian safety.

Each of the top three findings is described in more detail below. The remainder of the chapter identifies other key findings from the data, including findings on vulnerable users, roadway design, speed and speeding, alcohol and drugs, and aggressive and distracted driving.

Roadway improvements make it safer for this older adult to walk across SE Division Street in Portland
Photo: Metro

❶ Traffic deaths are increasing and are disproportionately impacting people of color, people with low incomes and people over age 65.

- Serious crashes (fatal and severe injury crashes combined) have fluctuated since 2007, but have more recently been increasing. Initial data from 2016, 2017 and 2018 indicate that the trend is continuing. This is a trend that is also happening at the state and national levels.
- The regional annual fatality rate by population and vehicle miles traveled (for 2011-2015) has increased compared to the 2012 Metro State of Safety Report.[35]
- Your risk of dying in a motor-vehicle involved crash is higher if you are a person of color, are over 65 or have a lower income.[36]

[35] Fatality rates for traffic related crashes are the proportion of all crashes, person deaths or severe injuries for every 1 million people or every 100 million vehicle miles traveled.
[36] *Motor Vehicle Traffic-Related Pedestrian Deaths — United States, 2001–2010,* Centers for Disease Control and Prevention (2013); *Dangerous by Design*, National Complete Streets Coalition (2016); *Income Disparities in Street features that Encourage Walking,* Bridging the Gap (2012); *Pedestrians Dying at Disproportionate Rates in America's Poorer Neighborhoods,* Governing, August 2014; *America's Poorer Neighborhoods Plagued by Pedestrian Deaths*, Governing Research Report (August 2014)

- A majority of Regional High Injury Corridors are in communities with higher densities of people of color, people with low incomes and English language learners.
- A majority of pedestrian deaths are in are in communities with higher densities of people of color, people with low incomes and English language learners.
- Older drivers are twice as likely to die in a traffic crash. For male drivers age 70 to 79 and female drivers age 75 to 85 and older the share of serious crashes is double that of drivers in other age groups.
- In Oregon, American Indians/Alaska Natives have the highest average rate of vehicle related deaths (5.9 per 100,000) 1.8 times the rate among whites (3.3 per 100,000), and American Indians/Alaska Natives and Black or African American had the highest hospitalization rate -52.2 and 46.2 per 100,000, compared to 45.5 for whites and 20.8 Asian Pacific Islander for traffic related injuries.[37] This data is not currently available at the regional level.

❷ Traffic deaths are disproportionately impacting people walking.

- Auto-only crashes comprise ninety-one percent of all crashes, and thirty-eight percent of all fatal crashes. Pedestrian crashes make up two percent of all crashes, and thirty-six percent of all fatal crashes.
- Pedestrian traffic deaths are steadily increasing, are the most common type of fatal crash, and have the highest severity of any crash type.
- Pedestrian fatalities have steadily increased to 2015.
- A pedestrian crash is more than 26 times as likely to be fatal than a crash not involving a pedestrian, and more than 110 times as likely to be fatal as a rear end crash, the most common crash type.
- Roadway design is critical to pedestrian safety. Seventy-seven percent of serious pedestrian crashes occur on arterial roadways.

❸ A majority of traffic deaths are occurring on a subset of arterial roadways.

- Arterial roadways are the location of the majority of the serious crashes in the region. Sixty-six percent of all serious crashes occur on a roadway designated as an arterial.
- In the region, seventy-three percent of non-freeway serious crashes occur on a roadway designated as an arterial; seventy-seven percent of serious pedestrian crashes occur on a roadway designated as an arterial; sixty-five percent of serious bicycle crashes occur on a roadway designated as an arterial.
- Many of these arterial roadways are identified as Regional High Injury Corridors and Intersections.

[37] Oregon Public Health Authority, 2008-2014 crashes

3.2 All crashes

This section provides key findings for all crashes. Refer to the 2018 Metro State of Safety Report for additional information.

Serious crashes are increasing. Since 2007, the total reported crashes and all injury crashes have increased, region wide and in every city and county. Serious crashes (fatal and severe injury crashes combined) have fluctuated since 2007, but have more recently been increasing. Initial data from 2016, 2017 and 2018 indicate that the trend is continuing. This is a trend that is also happening at the state and national levels.

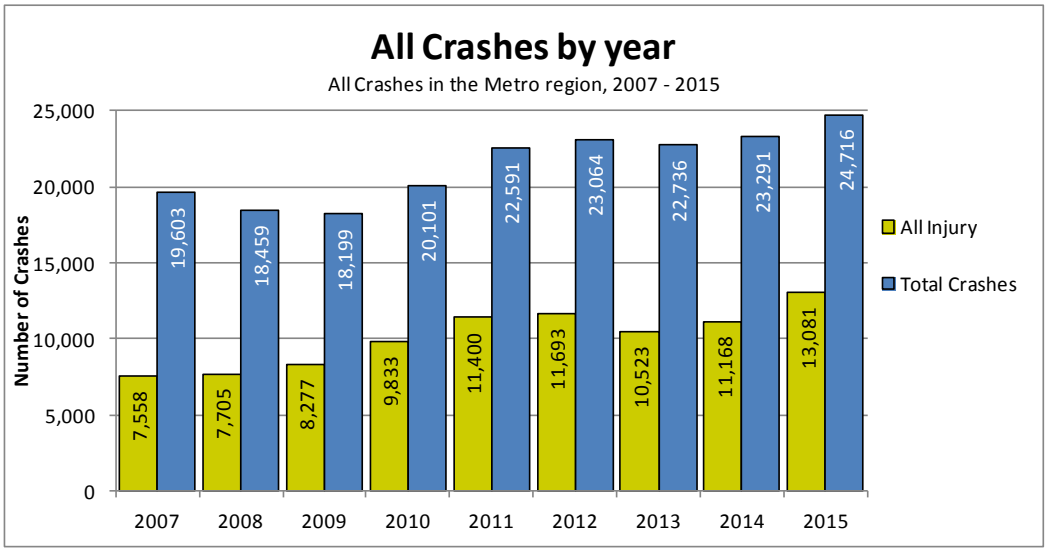


Figure 16: All crashes by year
Source: 2018 Metro State of Safety Report

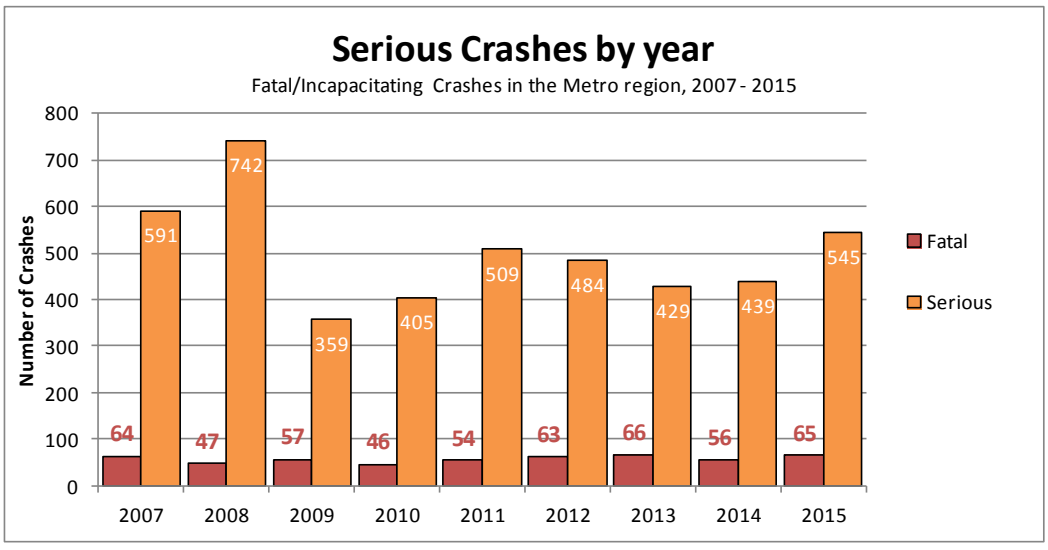


Figure 17: Fatal and Serious Crashes by year
Source: 2018 Metro State of Safety Report

Between 2011 and 2015, there were 304 fatal crashes killing 311 people, 2,102 crashes resulting in a life-changing injury, and 57,865 crashes resulting in some sort of injury.

On average, 62 people die each year on the region's roadways and 420 people experience a life changing injury. Nearly two people are either killed or severely injured every day in our region. Every 10 days a person riding a bike is killed or severely injured. Every 5 days a person walking is killed or severely injured.

Year	Total Crashes	Fatal Crashes (Fatalities)	Injury A Crashes	Injury B Crashes	Injury C Crashes	All Injury Crashes (Injuries)	Serious Crashes
2011	22,591	54 (54)	455	2,487	8,404	11,400	509
2012	23,064	63 (66)	421	2,654	8,555	11,693	484
2013	22,736	66 (68)	363	2,428	7,666	10,523	429
2014	23,291	56 (57)	383	2,512	8,217	11,168	439
2015	24,716	65 (66)	480	2,655	9,881	13,081	545
METRO	**116,398**	**304 (311)**	**2,102**	**12,736**	**42,723**	**57,865 (81,718)**	**2,406**

Figure 18: Crashes by year in the greater Portland area, 2011-2015
Source: 2018 Metro State of Safety Report

Traffic fatality rates are increasing. The regional annual fatality rate by population and vehicle miles traveled (for 2011-2015) has increased compared to the 2012 Metro State of Safety Report. The serious crash rate has decreased, and the all injury crash rate has increased.

2007-2009	Population (2010)	Annual VMT	All injury		Serious Crashes		Annual Fatal crashes	
			per 1M residents	per 100M VMT	per 1M residents	per 100M VMT	per 1M residents	per 100M VMT
Metro	1,481,118	9,308,676,259	5,106	81.2	359	5.7	36	0.59
2011-2015	**Population (2015)**	**Annual VMT (2015)**	**Annual Injury crashes**		**Annual Serious crashes**		**Annual Fatal crashes**	
			per 1M residents	per 100M VMT	per 1M residents	per 100M VMT	per 1M residents	per 100M VMT
Metro	1,603,229	10,437,000,000	7,219	111	300	4.6	39	0.60

Figure 19: Fatality rates
Source: 2012 and 2018 Metro State of Safety Reports

Clackamas County has the lowest serious crash rate per population and vehicle miles traveled, compared to Portland, East Multnomah County, and Washington County. Clackamas County was the first local jurisdiction in Oregon to have an adopted safety plan. While annual fatality rates in the region have increased, annual serious crash rates by population have slightly decreased in the region overall, Clackamas and Multnomah Counties and the City of Portland, and have increased in Washington County. Annual serious crash rates by vehicle miles decreased in the region as a whole, Clackamas, East Multnomah, and Washington Counties and increased in the City of Portland.

2007-2009 Annual Crashes						
			All injury		Serious Crashes (Fatal/Incapacitating)	
Sub-Region	Population	Annual VMT	per 1M residents	per 100M VMT	per 1M residents	per 100M VMT
Clackamas	256,986	1,615,525,690	4,210	67	593	9.4
Portland	583,627	4,376,272,685	6,500	87	388	5.2
East Multnomah	136,130	654,385,044	4,856	101	333	6.9
Washington	499,259	2,669,124,479	4,030	75	210	3.9
METRO	**1,481,118**	**9,308,676,259**	**5,106**	**81**	**359**	**5.7**

Figure 20: 2007-2009 annual crashes by population and VMT
Source: 2012 Metro State of Safety Report

2011-2015 Annual Crashes						
			Annual Injury crashes		Annual Serious crashes	
Sub-Region	Population (2015)	Annual VMT (2015)	per 1M residents	per 100M VMT	per 1M residents	per 100M VMT
Clackamas	290,630	2,102,000,000	6,269	87	226	3.1
Portland	620,540	4,303,000,000	8,918	129	387	5.6
Multnomah (excl. Portland)	152,611	744,000,000	6,664	137	296	6.1
Washington	539,448	3,287,000,000	5,932	97	242	4.0
METRO	**1,603,229**	**10,437,000,000**	**7,219**	**111**	**300**	**4.6**

Figure 21: 2011-2015 annual crashes by population and VMT
Source: 2018 Metro State of Safety Report

With the highest population and vehicle miles traveled, Portland has the largest share of the region's serious crashes.

	2011-2015 Annual Crashes						
Sub-Region	All	Fatal (Fatalities)	Injury A	Injury B	Injury C	All Injury	Serious
Clackamas	3,482	10.2 (10.4)	55	395	1,362	1,822	66
Portland	11,475	31.2 (31.8)	209	1,216	4,078	5,534	240
Multnomah (excl. Portland)	1,870	6.2 (6.2)	39	245	727	1,017	45
Washington	6,452	13.2 (13.6)	117	692	2,378	3,200	130
METRO	**23,280**	**60.8 (62.2)**	**420**	**2,547**	**8,545**	**11,573**	**481**

Figure 22: 2011-2015 annual crashes by sub-region
Source: 2018 Metro State of Safety Report

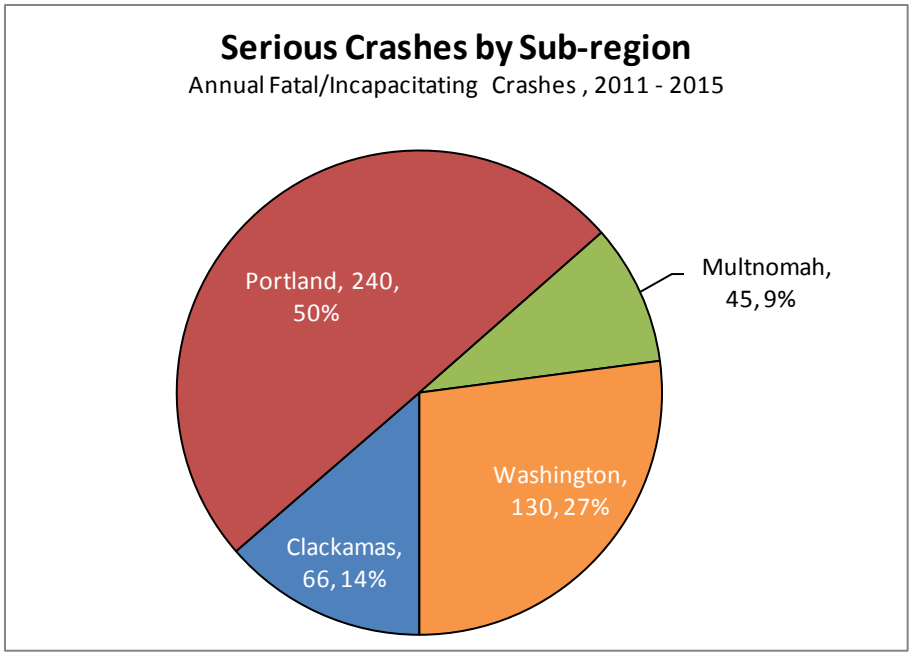


Figure 23: Serious crashes by sub-region
Source: 2018 Metro State of Safety Report

Seatbelt use in the region exceeds ninety-nine percent. Serious crashes have a higher percentage of no seat belt use - nearly nine percent, compared to less than one percent for all crashes. Males were seventy-one percent more likely than females to be reported without a seat belt.

Seat Belt Use (All crashes, 2011-2015)					
Gender	**Seat Belt Use**	**No Seat Belt**	**Unknown**	**% Seat Belt Use**	**% No Seat Belt**
Males	81,267	769	47,229	99.1%	0.9%
Females	80,854	445	34,213	99.5%	0.5%
Unknown	245	2	6,261	99.2%	0.8%
METRO	**162,366**	**1,216**	**87,703**	**99.3%**	**0.7%**
Seat Belt Use (Serious crashes, 2011-2015)					
Gender	**Seat Belt Use**	**No Seat Belt**	**Unknown**	**% Seat Belt Use**	**% No Seat Belt**
Males	622	79	164	88.7%	11.3%
Females	768	51	100	93.8%	6.2%
Unknown	0	0	0	-	-
METRO	**1,390**	**130**	**264**	**91.4%**	**8.6%**

Figure 24: Seat belt use, 2011-2015
Source: 2018 Metro State of Safety Report

Not all communities have the same safety issues. Gladstone, Beaverton and Portland have the highest serious crash rate per captia. West Linn, Lake Oswego and Wilsonville have the lowest serious crash rate per capita. Portland, Beaverton, unincorporated Clackamas

County, Gresham, unincorporated Washington County and Hillsboro have the highest number of serious crashes.

City	2011-2015 Annual Crashes						
	All	Fatal	Injury A	Injury B	Injury C	All Injury	Serious
Beaverton	1,987	3.0	35	179	729	946	38
Cornelius	101	0.0	4	11	37	52	4
Durham	13	0.0	0	1	6	7	0
Fairview	88	0.2	1	13	35	49	1
Forest Grove	137	0.6	5	19	45	69	5
Gladstone	136	0.4	2	16	51	70	2
Gresham	1,356	3.4	27	170	546	747	30
Happy Valley	221	1.0	3	28	91	123	4
Hillsboro	1,413	3.6	26	177	545	751	29
Johnson City	0	0.0	0	0	0	0	0
King City	9	0.0	0	1	1	2	0
Lake Oswego	282	0.0	4	29	96	130	4
Maywood Park	27	0.0	1	2	12	15	1
Milwaukie	210	0.4	5	28	77	109	5
Oregon City	588	1.8	8	62	232	304	10
Portland	11,479	31.2	209	1,216	4,079	5,536	240
Rivergrove	1	0.0	0	0	0	0	0
Sherwood	160	0.2	2	18	58	79	3
Tigard	935	1.6	12	91	353	457	13
Troutdale	167	0.8	4	22	63	89	5
Tualatin	486	0.4	7	50	199	256	7
West Linn	213	0.6	2	23	78	104	3
Wilsonville	218	0.0	2	23	76	102	2
Wood Village	67	0.2	1	7	24	32	1
Unincorp Clack	1,651	6.0	30	187	670	893	36
Unincorp Mult	155	1.6	4	29	45	81	6
Unincorp Wash	1,180	3.8	26	144	397	571	30
METRO	**23,280**	**60.8**	**420**	**2,547**	**8,545**	**11,573**	**481**

Figure 25: 2011-2015 annual crashes
Source: 2018 Metro State of Safety Report

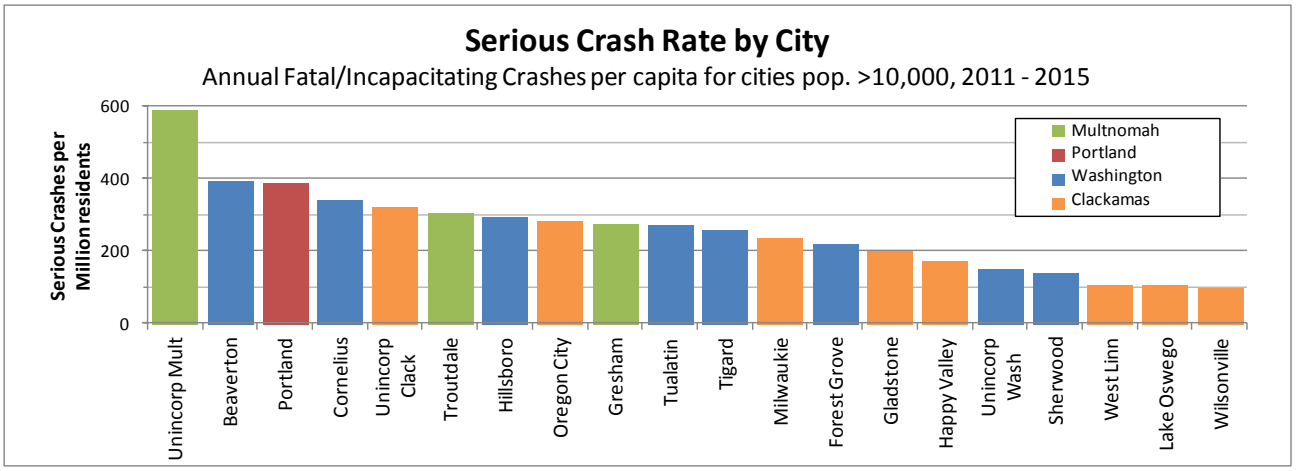


Figure 26: Serious Crash Rate by City
Source: 2018 Metro State of Safety Report

The greater Portland region has one of the lowest roadway fatality rates of any urban metro area with a population greater than 1 million, most likely due to land use and transportation policies. The worst regions in the nation for overall fatality rates are concentrated in Florida and the Sun Belt, where driving is the completely dominant mode of travel. The safest regions in the nation for overall fatality rates are Boston, Minneapolis-St. Paul, Portland, New York, and Chicago. In general, the safest urban regions are those that exhibit dense urban environments and higher usage of non-auto travel modes. These findings indicate that regional and local land use and transportation plans, policies and investments are increasing transportation safety.

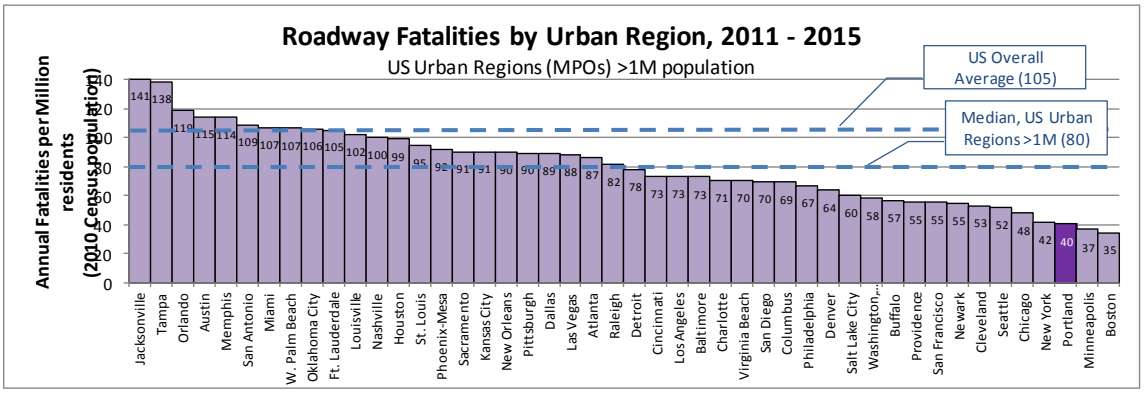


Figure 27: Roadway fatalities by urban region, 2011-2015
Source: 2018 Metro State of Safety Report

The City of Portland's fatality rates are higher than regional fatality rates, but both Portland and the region's fatality rates are lower than the State of Oregon (especially when the Portland region is excluded), and lower than the U.S. The greater Portland region has 39 fatalities per one million people, Oregon has 88 fatalities per one million people, and the U.S. has 109 fatalities per one million people. The United Kingdom and European Union data are included in the table below for reference as international best practice.

2011 - 2015	Average Annual Fatalities	Population (2015)	Annual VMT (2015)	Annual Fatality rate per 1M residents	Fatality rate per 100M VMT
Metro	62.2	1,603,229	10,437,000,000	39	0.60
Median, regions >1M pop.*				*78*	n/a
City of Portland	31.8	620,540	4,303,000,000	51	0.74
*Median, cities >300,000 pop.**				*72*	n/a
Oregon	356	4,028,977	36,000,000,000	88	0.99
Oregon excl. Metro region	294	2,425,748	25,562,000,000	121	1.15
US	*35,092*	*321,418,820*	*3,095,373,000,000*	*109*	*1.13*
UK**	2,123	64,128,226	520,600,000,000	33	0.41
EU – 28**	32,463	506,592,457	4,322,500,000,000	64	0.75

* All data for other regions and cities is 2010 - 2014

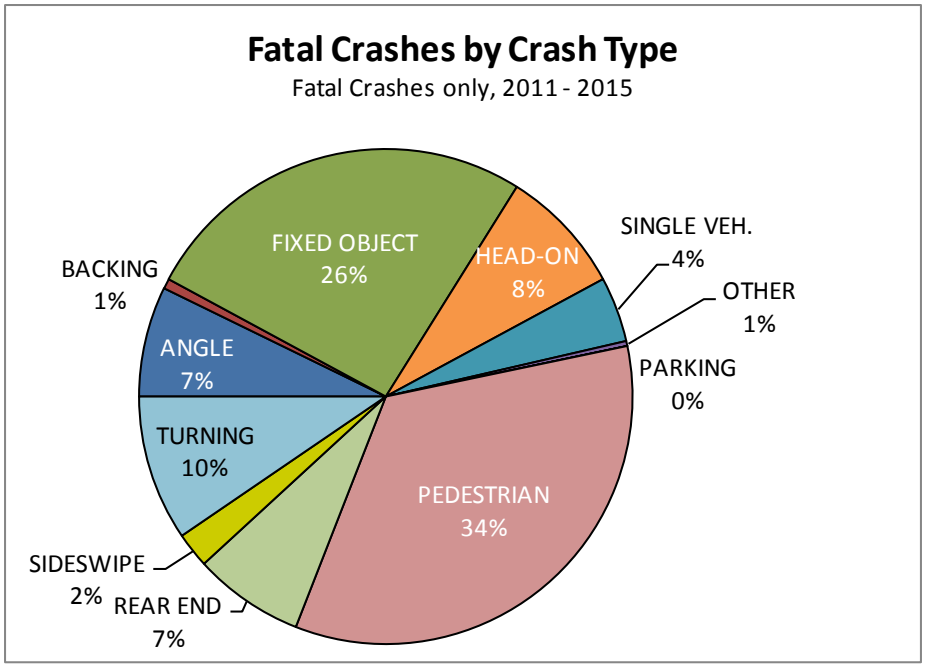
** All data for UK and EU is for year 2013

Figure 28: Metro crash rates per 100 million VMT and 1 million people, compared to other places, 2011-2015
Source: 2018 Metro State of Safety Report

There is a strong correlation between fatality rates and annual per capita vehicle miles traveled. States with higher vehicle miles traveled (VMT) typically also have higher per capita fatality rates, as the typical exposure to risk is increased. The District of Columbia has the lowest per capita VMT at 5,610, and exhibits one of the lowest annual fatality rates of 65 per million people – less than one-third of the national average. Wyoming, with the highest per capita VMT of 17,900, also has the highest annual fatality rate at 310 per million people– two-hundred thirty-five percent of the national average. The national average is 9,500 VMT per capita and 109 fatalities per million residents.

Oregon statistics are 8,650 VMT per capita (ninety-one percent of the national average) and 85 fatalities per million people (eighty-one percent of the national average). The greater Portland region statistics are 6,506 VMT per capita and 39 fatalities per million people. The City of Portland has a slightly higher VMT per capita at 6,934 and 51 fatalities per million people.

For all crashes, the most common fatal crash types were pedestrian and fixed object. The most common serious crash types were turning and rear end. For the purpose of establishing crash type, bicycles are considered vehicles, and so there is no separate bicycle crash type.



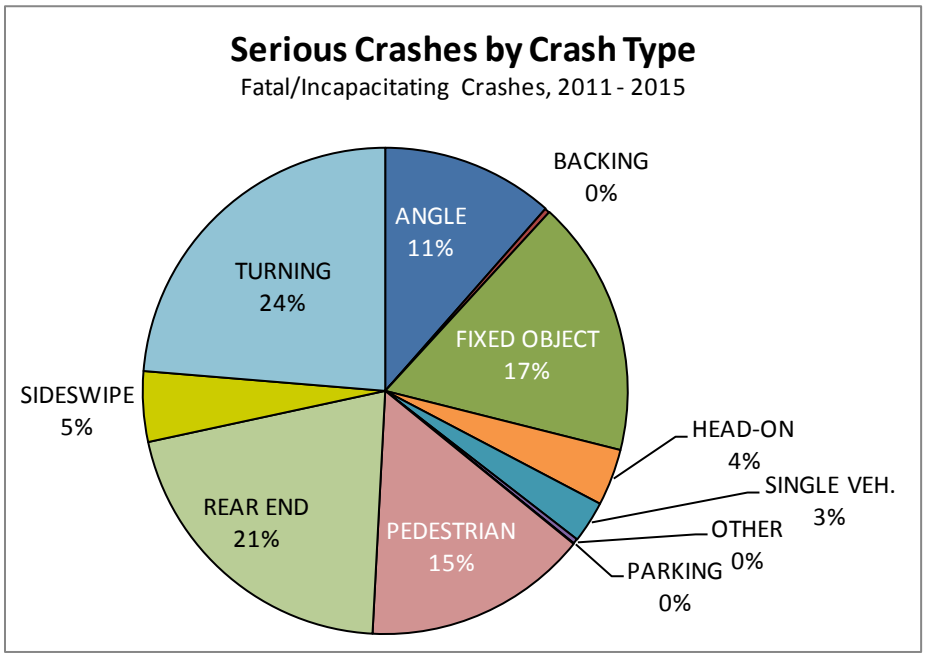


Figure 29: Fatal and serious crash types, 2011-2015
Source: 2018 Metro State of Safety Report

A **pedestrian crash** results when the first harmful event is any impact between a motor vehicle in traffic and a pedestrian. It does not include any crash where a pedestrian is injured after the initial vehicle impact. Pedestrian is the most common fatal crash type in the region and the most common crash type to be fatal. Pedestrian crashes constitute thirty-four percent of fatal crashes, fifteen percent of serious crashes, though only two

percent of all crashes in the region. Alcohol or drugs and failure to yield ROW are the most common contributing factors in serious pedestrian crashes.

A **fixed object crash** results when one vehicle strikes a fixed or other object on or off the roadway. Though not a common crash type, fixed object is the second most common fatal crash type in the region. Fixed object crashes constitute twenty-six percent of fatal crashes, seventeen percent of serious crashes, though only seven percent of all crashes in the region.

A **turning crash results** when one or more vehicles in the act of a turning maneuver is involved in a collision with another vehicle (including bicycles). Turning is the second most common crash type in the region, as well as the most common serious crash type. Turning crashes constitute ten percent of fatal crashes, twenty-four percent of serious crashes, and twenty-two percent of all crashes in the region.

Rear end crashes are the most common type of crash in the region. They are rarely fatal, but often serious. Rear end crashes constitute seven percent of fatal crashes, twenty-one percent of serious crashes, and forty-five percent of all crashes in the region. Aggressive driving, fail to stop, following too closely, and excessive speed are factors in a substantial proportion of serious and fatal rear end crashes.

Alcohol and drugs, excessive speed, fail to yield right-of-way, and aggressive driving (defined as excessive speed and/or following too close) are the most common factors in serious crashes. Each crash may have several contributing factors. Crashes involving alcohol and drugs have a much higher likelihood of being fatal than other crashes.

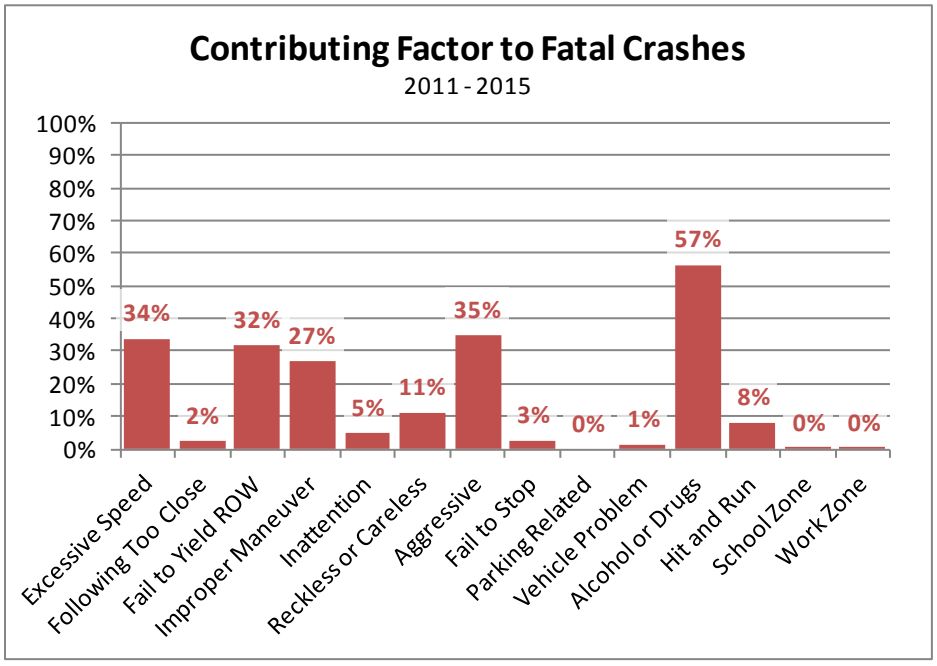


Figure 30: Serious crashes by contributing factor, 2011-2015
Source: 2018 Metro State of Safety Report

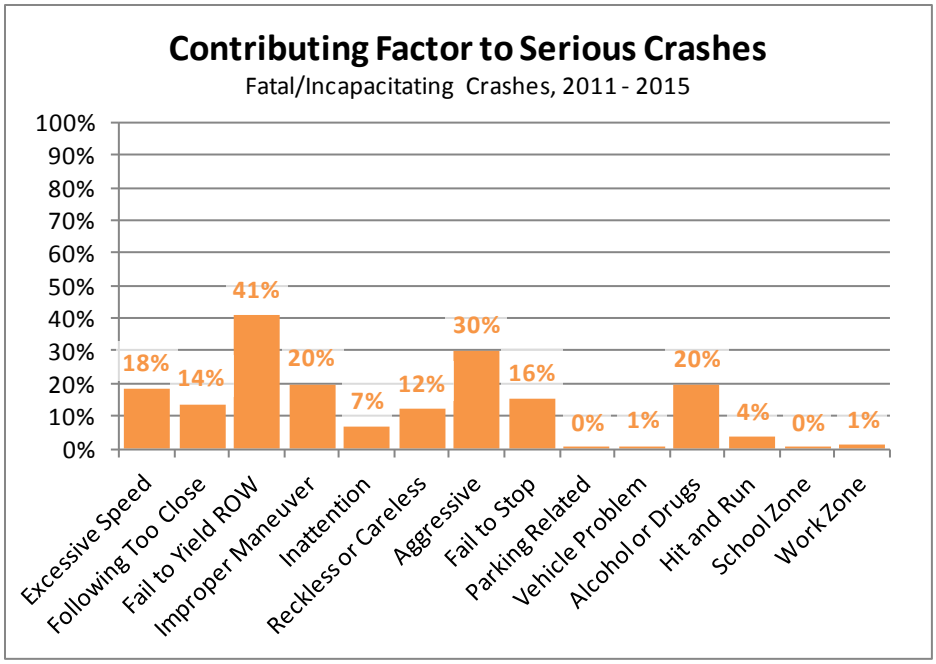


Figure 31: Serious crashes by contributing factor, 2011-2015
Source: 2018 Metro State of Safety Report

Traffic crashes contribute to congestion and cost the region more than congestion. Traffic deaths and life changing injuries impact the lives of our families, friends, neighbors and community members. They also have a major economic cost – estimated at $1 billion for our region. According to analysis conducted by Cambridge Systematics in a report for AAA of America, the total cost of crashes per person in the greater Portland-Vancouver region $1,220. The report found that in urbanized areas the total cost of traffic crashes is over three times the cost of congestion. In large urban areas, such as the greater Portland region, costs resulting from crashes are over three times more than congestion.[38] According to FHWA, in 2009 dollars, the cost of a single motor vehicle fatality is $6,000,000.[39]

3.3 Vulnerable users are at a higher risk

This section provides key findings for vulnerable users. Refer to the 2018 Metro State of Safety Report for additional information.

Vulnerable users can have higher fatality rates and are at greater risk of death or severe injury in the event of a crash. Vulnerable users are pedestrians, bicyclists, motorcycle operators, children, older adults, and road construction workers, people with disabilities, people of color and people with low income. Increasing safety for vulnerable users increases safety for all transportation users.

[38] Crashes vs. Congestion: What's the Cost to Society (November 2011) AAA and Cambridge Systematics.
[39] The 11 comprehensive cost components include property damage; lost earnings; lost household production (non-market activities occurring in the home); medical costs; emergency services; travel delay; vocational rehabilitation; workplace costs; administrative costs; legal costs; and pain and lost quality of life.

Slower speeds and pedestrian oriented design create a safe and welcoming street in downtown Lake Oswego
Photo: Metro

Crashes involving people on motorcycles, people walking and people riding bicycles tend to be more serious compared to auto-only crashes. Auto-only crashes comprise ninety-one percent of all crashes, and thirty-eight percent of all fatal crashes. Pedestrian crashes make up two percent of all crashes, and thirty-six percent of all fatal crashes. Motorcycle crashes comprise two percent of all crashes, and eighteen percent of all fatal crashes, and bicycle crashes comprise two percent of all crashes and four percent of fatal crashes. **Figure 32** shows all reported crashes and serious crashes by mode.

	Pedestrians		Bicyclists		Autos Only		Motorcycle		Truck Involved	
Year	All Injury	Serious	All Injury	Serious	All Injury	Serious	All Injury	Serious	All Injury	Serious
2011	418	65	481	32	10,502	412	312	72	250	20
2012	511	88	560	37	10,622	359	353	63	277	16
2013	428	67	485	33	9,607	327	356	76	238	11
2014	480	81	509	38	10,179	320	302	55	281	22
2015	474	81	477	35	12,129	429	339	86	320	19
METRO	**2,311**	**382**	**2,512**	**175**	**53,039**	**1,847**	**1,662**	**352**	**1,366**	**88**

Figure 32: All reported crashes, by mode and year
Source: 2018 Metro State of Safety Report

Pedestrian crashes are the most common type of fatal crash. There were an average of 62 traffic related deaths between 2011 and 2015. More than one third of those deaths were pedestrians.

Pedestrian crashes have the highest severity of any crash type. A pedestrian crash is more than twenty-six times as likely to be fatal than a crash not involving a pedestrian, and more than 110 times as likely to be fatal as a rear end crash, the most common crash type.

Pedestrian deaths are increasing. Pedestrian fatalities have steadily increased to 2015. Serious pedestrian crashes increased somewhat over the 5-year period. If the region continues in its trend of pedestrian deaths will continue to rise. Figure 33 shows the linear trendline for pedestrian deaths and life changing injuries if changes are not made. Similar figures in Chapter 6 show a steep decline in motor-vehicle only serious crashes.

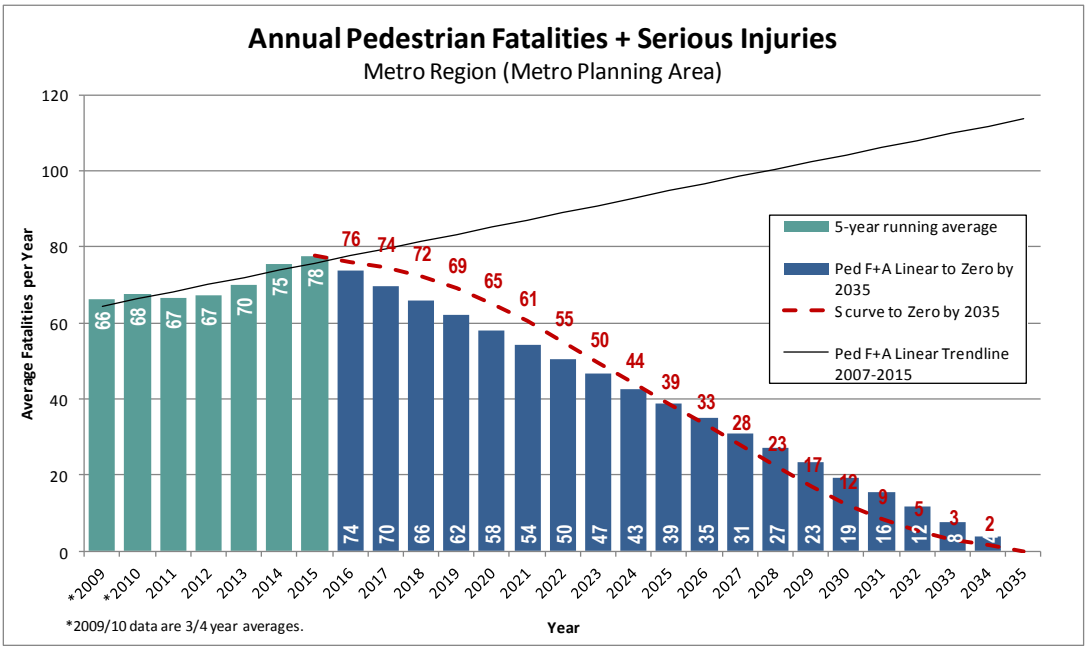


Figure 33: Trend of annual pedestrian fatalities and serious injuries, 2011-2015
Source: Metro

A recent national study found that nationwide pedestrian deaths increased forty-six percent between 2009 and 2016. [40] This same study found that the rise in the number of SUVs involved in fatal single-vehicle pedestrian crashes (82% increase) was larger than the increases in the number of cars, vans, pickups, or medium/heavy trucks involved in these crashes. The power of passenger vehicles involved in fatal single-vehicle pedestrian crashes increased over the study period, with larger increases in vehicle power among more powerful vehicles.

[40] An examination of the increases in pedestrian motor vehicle fatalities during 2009-16. Insurance Institute for Highway Safety (May 2018)

Pedestrian safety is not the same across the region. The City of Portland has the highest number of annual pedestrian deaths, and Gladstone, Gresham and Portland have the highest serious pedestrian crash rate per capita. Happy Valley, West Linn and Tualatin have the lowest serious pedestrian crash rate per capita.

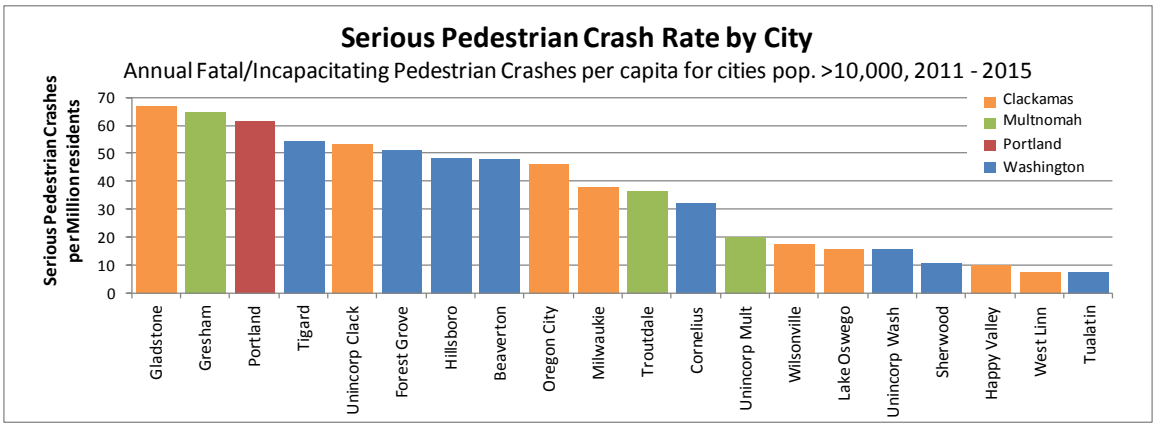


Figure 34: Serious pedestrian crash rate by city, per capita
Source: 2018 Metro State of Safety Report

A majority serious pedestrian crashes occur in areas with higher densities of people of color, people with low incomes and English language learners. Sixty-one percent of pedestrian deaths and sixty-six percent of severe injury pedestrian crashes occur in these areas, while only thirty-nine percent of the region's population lives in these areas. Data is not available on the race and ethnicity or income of the people killed or severely injured.

Fatality rates for pedestrians are more than three times as high in neighborhoods where more than a quarter of the population lived in poverty. There were 12.8 pedestrian deaths per 100,000 residents, compared to 3.5 pedestrian deaths per 100,000 residents, in areas with poverty rates below the national rate of fifteen percent.[41]

Your risk of dying in a motor-vehicle involved crash is higher if you are a person of color, are over 65 or have a lower income.[42] While no published national or Oregon data assesses the income or poverty status of those killed in traffic crashes, multiple analyses on the location of crashes confirms that in poorer areas and in communities of color risk of death from a traffic crash is higher. A report published in 2013 by the Centers for Disease Control and Prevention examined mortality data from 2001-2010 and found racial and ethnic minorities recorded higher annualized death rates. People 75 and older also had significantly higher death rates in the study.

[41] Governing, 2014
[42] *Motor Vehicle Traffic-Related Pedestrian Deaths — United States, 2001–2010*, Centers for Disease Control and Prevention (2013); *Dangerous by Design*, National Complete Streets Coalition (2016); *Income Disparities in Street features that Encourage Walking*, Bridging the Gap (2012); *Pedestrians Dying at Disproportionate Rates in America's Poorer Neighborhoods*, Governing, August 2014; *America's Poorer Neighborhoods Plagued by Pedestrian Deaths*, Governing Research Report (August 2014)

The 2016 Dangerous by Design report found that African Americans and Latinos are twice as likely to be killed as a pedestrian in a traffic crash. Bridging the Gap, a program of the Robert Wood Johnson Foundation, conducted field research measuring the presence of sidewalks, lighting, crosswalks and traffic calming devices in 154 communities. The resulting study, "Income Disparities in Street Features that Encourage Walking," found such infrastructure was more common in high-income communities.

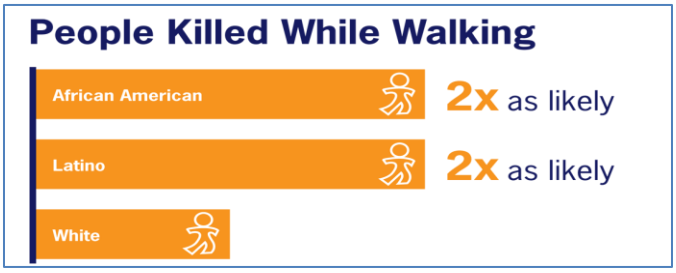


Figure 35: National pedestrian traffic deaths, 2008-12, and race by census tract
Source: Dangerous by Design, 2011 and Safe Routes to School National Partnership

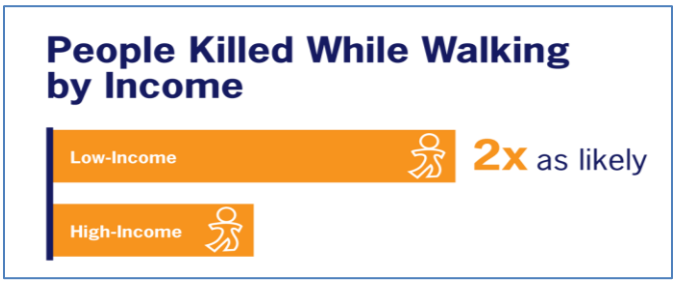


Figure 36: National pedestrian traffic deaths, 2008-12, and census tract per capita income
Source: Governing, 2014 and Safe Routes to School National Partnership

In Oregon, American Indians/Alaska Natives have the highest average rate of vehicle related deaths (5.9 per 100,000) 1.8 times the rate among whites (3.3 per 100,000), and American Indians/Alaska Natives and Black or African American had the highest hospitalization rate - 52.2 and 46.2 per 100,000, compared to 45.5 for whites and 20.8 Asian Pacific Islander for traffic related injuries.[43] This data is not currently available at the regional level.

A majority of Regional High Injury Corridors are in communities with higher concentrations of people of color, people with low incomes and English language learners. In the greater Portland region a majority of high injury corridors and intersections are in communities of color and low-income communities, and forty percent are in communities that are both low-income and communities of color. Refer to the map of Regional High Injury Corridors and Intersections in Chapter 2 to see how they overlap with race and income marginalized communities.

[43] Oregon Public Health Authority, 2008-2014 crashes

	% high injury corridors	Corridor miles	% high injury intersections	Number of intersections
Communities of color & English language learner	50%	250	51%	71
Low-income communities	54%	268	75%	104
Overlap of communities of color, English language learner and low-income	40%	198	46%	64
Region-wide	100%	499	100%	138

Figure 37: Overlap of regional high injury corridors & intersections, communities of color, English language learners, and low-income communities Source: Metro Equity Analysis, 2018

Older drivers are twice as likely to die in a traffic crash. For male drivers age 70 to 79 and female drivers age 75 to 85 and older, the share of serious crashes is double that of drivers in other age groups.

	Total Male Drivers (2011 – 2015)			Total Female Drivers (2011 – 2015)		
Age Group	**All Crashes**	**Serious**	**Percent Serious**	**All Crashes**	**Serious**	**Percent Serious**
14-17	3,076	17	0.6%	3,579	42	1.2%
18-21	9,572	99	1.0%	9,413	93	1.0%
22-24	7,518	91	1.2%	7,466	77	1.0%
25-29	12,431	96	0.8%	11,968	123	1.0%
30-34	11,897	114	1.0%	10,804	105	1.0%
35-39	10,343	122	1.2%	9,247	67	0.7%
40-44	10,421	63	0.6%	8,898	86	1.0%
45-49	9,218	87	0.9%	8,053	70	0.9%
50-54	9,114	77	0.8%	7,500	43	0.6%
55-59	8,248	115	1.4%	6,810	53	0.8%
60-64	6,734	66	1.0%	5,529	38	0.7%
65-69	4,589	41	0.9%	3,823	38	1.0%
70-74	2,408	48	2.0%	2,180	22	1.0%
75-79	1,428	33	2.3%	1,306	24	1.8%
80-84	820	4	0.5%	813	21	2.6%
85+	747	10	1.3%	777	15	1.9%
Unknown	15,669	16	0.1%	11,098	14	0.1%
METRO	**124,233**	**1,099**	**0.9%**	**109,264**	**931**	**0.9%**

Figure 38: Age and gender of drivers involved in crashes, regardless of fault
Source: Metro 2018 State of Safety Report

For young people below the age of 25, motor vehicle crashes are a leading cause of death and the leading cause of years of life lost. Traffic crashes are the leading cause of unintentional injury death for people ages 5 to 24 in Multnomah, Washington and Clackamas County, and the second leading cause of unintentional injury death for people ages 25 to 84.[44]

Serious bicycle crashes are on a downward trend. Serious bicycle crashes have fluctuated over the 5-year period and fatal crashes have declined. **Figure 39** shows the linear trend line for bicyclist deaths and severe injuries. A better understanding of what has contributed to this positive direction should be developed to continue the investments, programs, or other elements that have made it safer to ride a bicycle in the region.

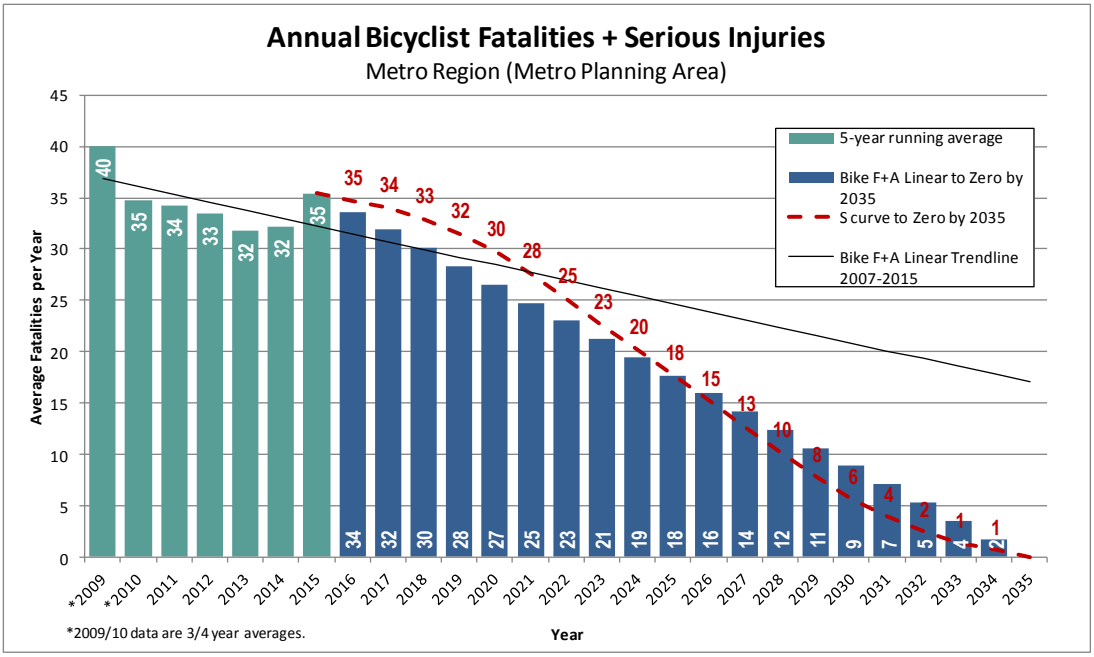


Figure 39: Annual Bicycle Fatalities and Serious Injuries
Source: Metro

[44] Oregon Death Certificates: Center for Health Statistics, Center for Public Health Practice, Public Health Division, Oregon Health Authority. Accessed March 13, 2018. For 2012-2016. Unintentional injuries were the 4th leading cause of death (just about tied for third with cerebrovascular disease/stroke); within the category of unintentional injury deaths, transport injuries are the third leading cause behind falls and poisoning (poisoning includes drug overdoses).

Motorcyclist fatalities and severe injuries are increasing. While all injury motorcycle crashes have remained relatively flat between 2011 and 2015, serious motorcycle crashes are trending upward. Motorcycle crashes tend to be severe. Motorcycle crashes comprise two percent of all crashes, and eighteen percent of all fatal crashes.

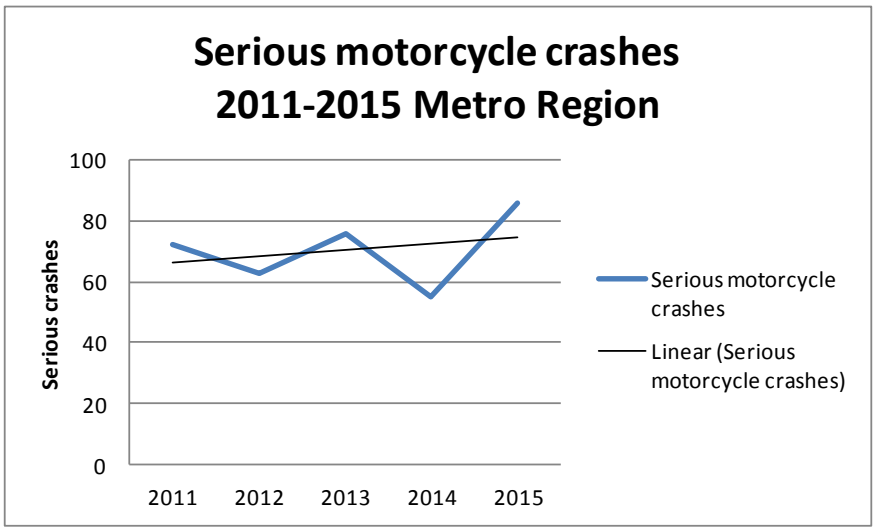


Figure 40: Serious Motorcycle Crashes, 2011-2015
Source: Metro, 2011-2015 ODOT crash data

3.4 Roadway design is a factor in serious crashes

This section provides key findings for the relationship between roadway design and serious crashes. The location of serious crashes was analyzed by functional classification, number of lanes, and vehicle miles traveled by functional class. Other design elements of the roadways, such as presence of biking and walking facilities and degree of separation, on-street parking, access management, median separation, enhanced crossings, or presence or absence of street lighting were not included the analysis. These types of design elements can enhance safety for all modes. Future analysis should include these elements to help illustrate that not all arterial roadways have the same safety issues. Additional analysis could also look at major roadways where no serious crashes are occurring to develop an understanding of what characteristics those roads have. Refer to the 2018 Metro State of Safety Report for additional information.

Arterial roadways have the highest serious crash rate per road mile and per vehicle mile traveled. Analysis of the crash data provide information on the type of roadways where most fatal and severe crashes are occurring. The analysis found that a majority of fatal and severe crashes are occurring on arterial roadways.

Roadway Classification	Total Road-Miles	Annual VMT (2015)	Annual Crashes per Road-Mile		Annual Crashes per 100M VMT	
			All Injury	Serious	All Injury	Serious
Freeway	304	4,455,000,000	5.9	0.16	40	1.1
Arterial	772	4,281,000,000	9.8	0.41	176	7.4
Collector	994	1,081,000,000	1.7	0.09	158	8.2
Local	4,565	620,000,000*	0.1	0.01	87	4.3
METRO	**6,635**	**10,437,000,000**	**1.7**	**0.07**	**111**	**4.6**

*** VMT for local streets is a low-confidence estimate**

Figure 41: Annual crashes per road mile and VMT by functional class
Source: 2018 Metro State of Safety Report

Arterial roadways have the highest percentage of serious crashes. Seventy-three percent of the region's non-freeway serious crashes, sixty-six percent of all serious crashes (including freeways), seventy-seven percent of the serious pedestrian crashes, and sixty-five percent of the serious bike crashes occur on arterial roadways (arterial roadways comprise twelve-percent of the non-freeway roadway network).

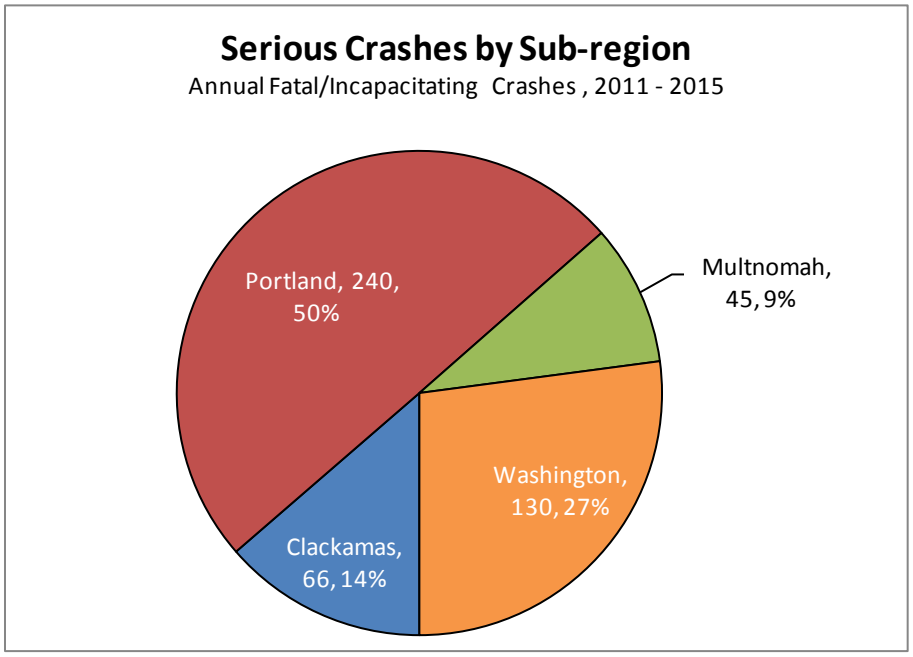


Figure 42: Serious crashes by roadway class
Source: 2018 Metro State of Safety Report

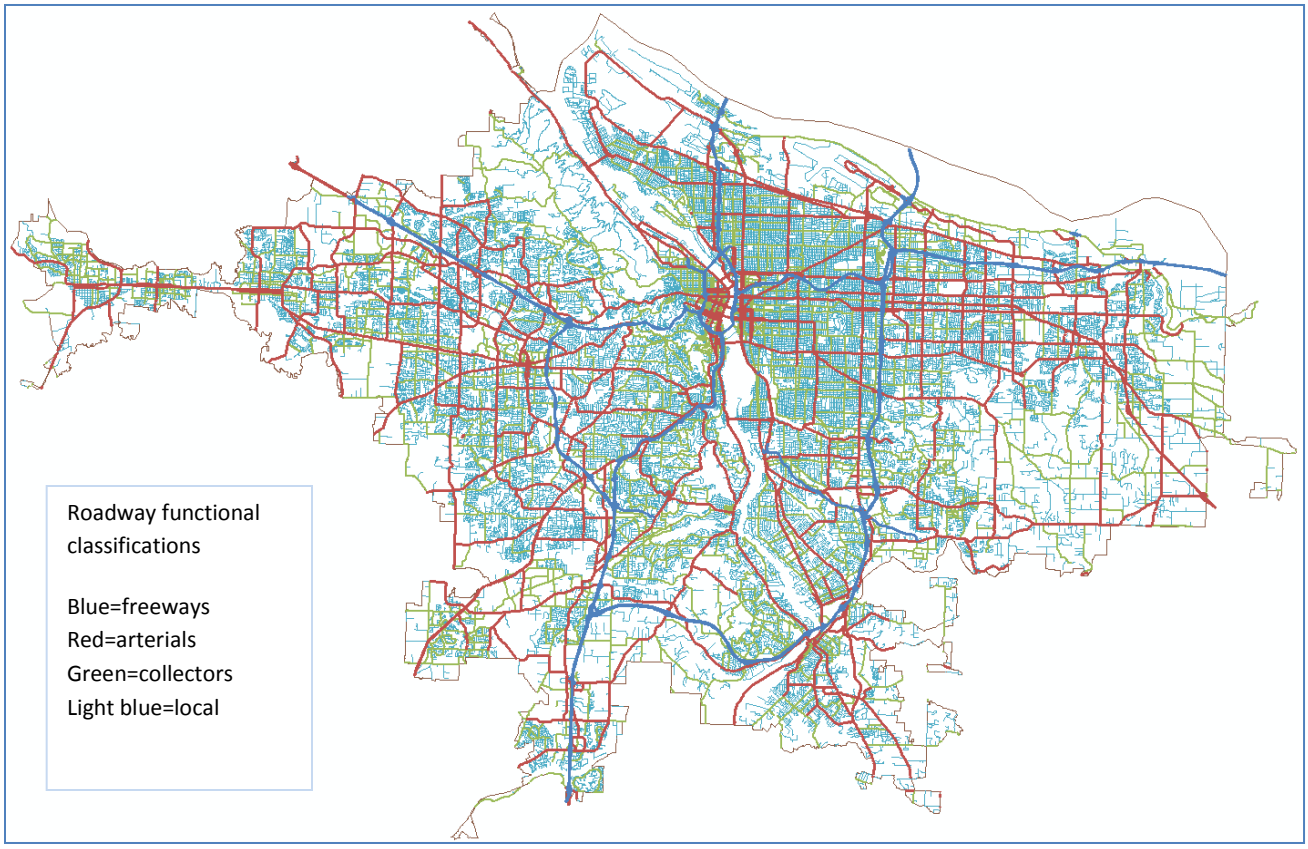


Figure 43: Roadway functional classifications in the greater Portland region
Source: Metro

Most Regional High Injury Corridors are arterial roadways. Sixty percent of all fatal and severe injury crashes occur on just six percent of the region's roadways. These roadways are identified as Regional High Injury Corridors and Intersections. Many of these roadways also have the characteristics of high risk corridors, and a majority of these roadways are frequent transit corridors.[45]

Streets with more traffic lanes have higher fatal and severe injury crash rates per mile. Roadways with more traffic lanes have higher fatal and severe injury bicycle crash rates per mile. The serious bicycle crash rate per road mile increases dramatically for roadways with 4 or more lanes. When normalized by motor vehicle traffic volume, the serious bike crash rate on narrower roads is higher than on wider roads. While the reason for this is not clear from the data, it may be related to a higher use of narrower roads by cyclists relative to traffic volume as compared to multi-lane roadways.

Wider roadways are the location of a disproportionate number of serious crashes in relation to both their share of the overall system and the vehicle-miles travelled they

[45] Characteristics if high risk roads are identified by looking at crash history on an aggregate basis to identify particular severe crash types (e.g. pedestrian) and then use the roadway characteristics associated with particular crash types (e.g. arterial roadways with four-or more lanes, posted speed over 35 mph, unlit streets) to understand which roadways may have a higher risk of the same type of severe crash.

serve. Fifty-four percent of fatal and severe crashes occur on roadways with 4 or more traffic lanes. Roadways with 4 or more traffic lanes comprise nineteen percent of the regional roadway network. Wider roadways are particularly hazardous to pedestrians. The serious pedestrian crash rate increases dramatically for roadways with 4 or more lanes. Even when normalized by motor vehicle traffic volume, the serious pedestrian crash rate on wider roadways is still substantially higher than on narrower roads. This follows trends documented in the American Association of State Highway and Transportation Officials (AASHTO) Highway Safety Manual. Roads with more lanes have an especially high serious crash rate for pedestrians, producing higher crash rates per mile and per vehicle mile traveled as compared to other modes.

Intersection design is critical to bicycle safety. A majority of fatal and severe injury bicycle crashes occur at an intersection, and fail-to-yield right-of-way is the top contributing factor in serious bicycle crashes. Seventy-three percent of serious bicycle crashes occurred at an intersection, compared to forty-nine for all serious crashes for all modes. Fail to yield to right-of-way was a contributing factor in eighty-two percent of serious bicycle crashes and fifty percent of fatal bicycle crashes. The data do not specify whether the driver, the bicyclist, or both were under the influence of alcohol. Other factors, such as Fail to Yield ROW, Excessive Speed, and Aggressive Driving, are for the driver.

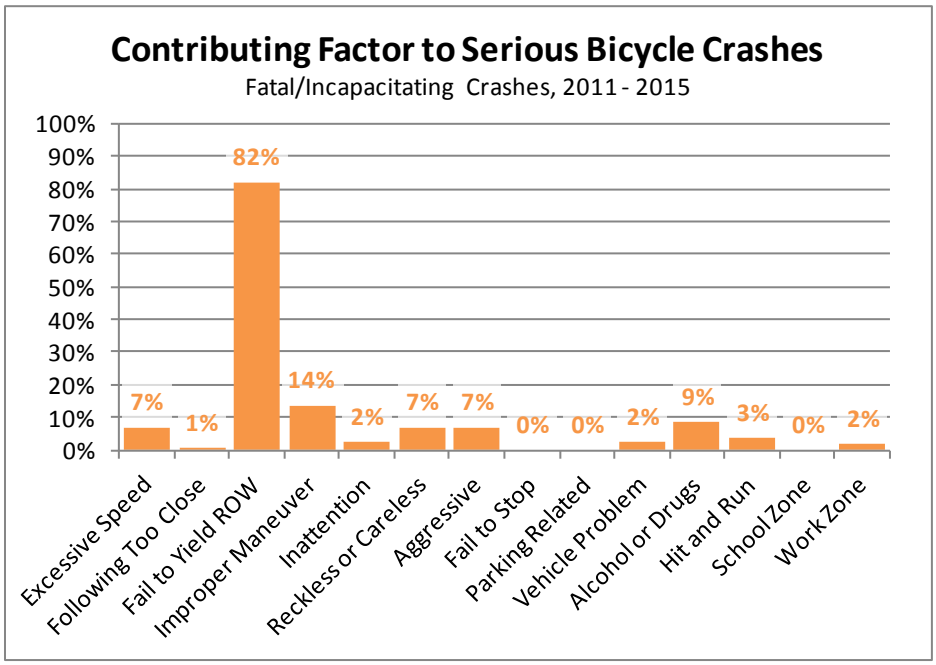


Figure 44: Contributing Factors to Serious Bicycle Crashes
Source: 2018 Metro State of Safety Report

Crash factors differ by roadway type. For freeway crashes, alcohol and drugs is the most common factor for fatal crashes and aggressive driving is the most common factor for serious crashes. For non-freeway crashes, alcohol or drugs is the most common factor for fatal crashes and fail to yield right-of-way is the most common factor for serious crashes.

Serious pedestrian crashes are disproportionately represented after dark. While thirty-nine percent of all serious crashes happen at night, sixty-four percent of serious pedestrian crashes happen at night, indicating that visibility of pedestrians is an important safety feature.

3.5 Speed and speeding are major factors in serious crashes

This section provides key findings related to speeding.[46] Refer to the 2018 Metro State of Safety Report for additional information.

Speed is a fundamental contributing factor in crash severity. Crashes involving higher speeds will tend to increase the severity of the crash and likelihood of death. Reducing speeds and preventing speeding saves lives. On average, 1,000 Americans are killed every month in speed-related crashes. In Oregon, speeding is the most common behavioral issue associated with fatal and serious injury crashes.

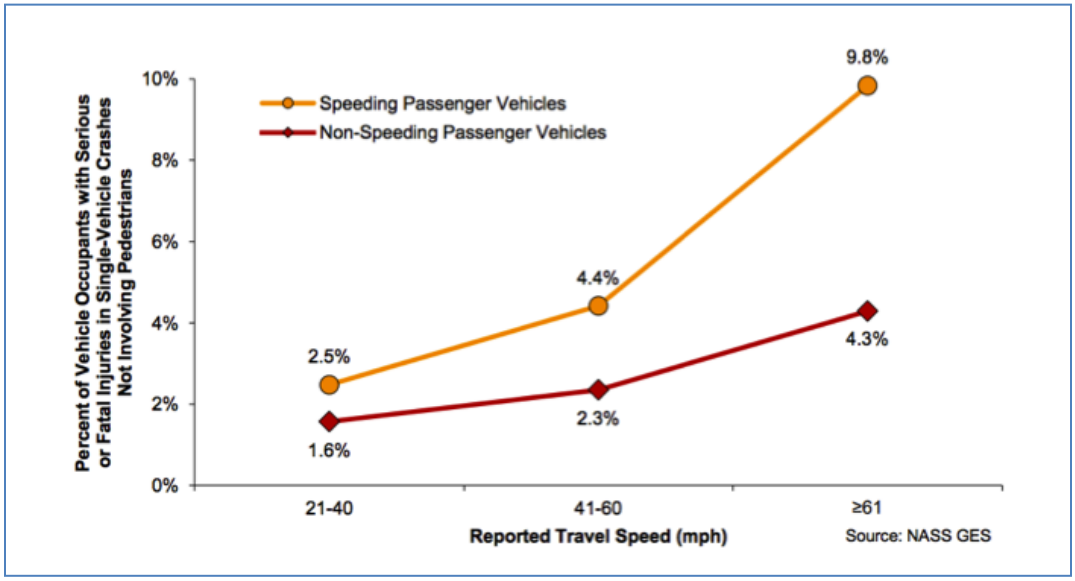
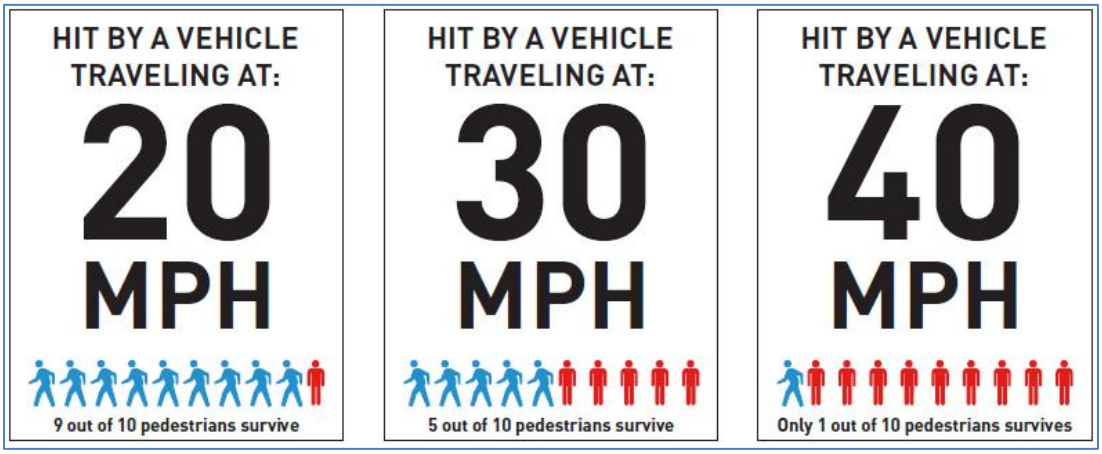


Figure 45: Percent of passenger vehicle occupants sustaining serious or fatal injuries in speeding-related and all crashes, by reported travel speed, 2014
Source: National Automotive Sampling System (NASS) General Estimates System (GES)

Crash severity increases with the speed of the vehicle at impact. Inversely, the effectiveness of restraint devices like air bags and safety belts, and vehicular construction features such as crumple zones and side member beams decline as impact speed increases. The probability of death, disfigurement, or debilitating injury grows with higher speed at impact.

[46] In the 2018 Metro State of Safety Report, excessive speed is defined as speed too fast for conditions; driving in excess of posted speed; speed racing; failed to decrease speed for slower moving vehicle. Fatal and severe crashes occurring at higher speeds, but not fitting these definitions, are not counted as speed-related crashes.

Pedestrians, bicyclists and motorcyclists are more vulnerable to dying or being seriously injured in a speed related crash. Nine out of ten pedestrians will survive being hit by a vehicle traveling 20 mph, whereas only one out of ten pedestrians will survive being hit by a vehicle traveling 40 mph.



Source: Vision Zero Network

Alone or in combination with other factors, excessive speed is a major factor in fatal and severe injury crashes. While seven percent of all crashes involve speed as a factor, speed is a major factor in thirty-four percent of fatal and severe crashes. Ninety-seven percent of serious speed related crashes involved aggressive behavior, and thirty-eight percent involved alcohol. Forty-one percent of fatal freeway crashes involve excessive speed. Thirty-five percent of fatal crashes involved aggressive behavior, defined as either excessive speed or following too close.

A majority of excessive speed related serious crashes occur on arterial roadways. Fifty-five percent of serious excessive speed related crashes occurred on an arterial roadway, and seventy-one percent occurred at a non-intersection.

3.6 Aggressive and distracted driving are major factors in serious crashes

This section provides key findings aggressive and distracted driving related crashes. Refer to the 2018 Metro State of Safety Report for additional information.

Dangerous behaviors include those that arise from aggressive or distracted driving. Dangerous behaviors arising from aggressive and distracted driving include failing to yield the right of way, following too close, and excessive speed.

Distracted driving is any activity that diverts attention from driving, including talking or texting on the phone, eating and drinking, talking to people in the vehicle, fiddling with the stereo, entertainment or navigation system—anything that takes attention away from the task of safe driving. Texting is the most alarming distraction. Sending or reading a text takes your eyes off the road for 5 seconds. At 55 mph, that's like driving the length of an entire football field with your eyes closed.

Cell phone use while driving is a growing concern in transportation safety. Drivers use their cell phones 88 out of 100 trips (analysis of 570 million trips in US). On average, more than 8 people are killed and 1,161 more are injured in crashes involving a distracted driver each day in the U.S. In 2015, the number rose to 10 people every day.

Based on limited data, Oregon appears to have the lowest rate of driving and cell phone use in the country; states with hands free cell phone laws have lower rates of cell phone use while driving and it can be assumed lower distracted driving related crashes.

Distracted driving crashes occur frequently. On average, a crash involving a distracted driver occurs every 2.5 hours in Oregon.[47]

A majority of drivers in Oregon drive distracted. In Oregon, seventy-five percent of drivers drive distracted when alone, and forty-four percent when driving with passengers. [48] A national study found that drivers use their phones during eighty-eight out of 100 trips.[49]

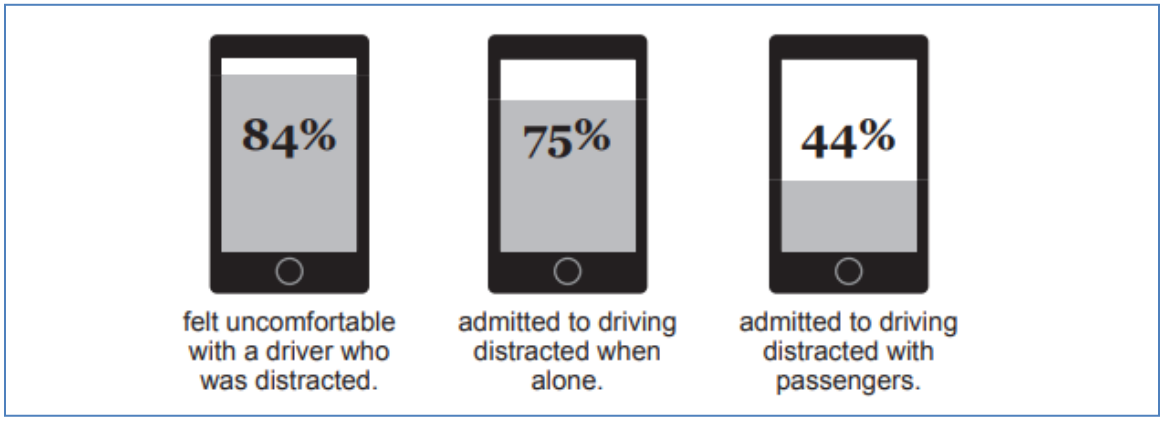


Figure 46: Distracted driving in Oregon
Source: Reducing Distracted Driving in Oregon, ODOT 2017

Dangerous behaviors are a major contributing factor in fatal and severe injury crashes. Aggressive driving is a factor in thirty-six percent of fatal crashes. Forty percent of serious crashes are fail to yield right of way involved.

Aggressive behavior is a major contributing factor in auto only crashes, compared to other modes. Forty-one percent of auto-only serious crashes involved aggressive behavior, compared to nine percent of pedestrian involved crashes and eight percent of bicycle

[47]

[48] Southern Oregon University. Distracted Driving: An Epidemic, A Study of Distracted Driving Attitudes, Behaviors and Barriers Preventing Change (2016). — www.oregon.gov/ODOT/Documents/Distracted Driving

[49] *Zendrive Research: Largest Distracted Driving Behavior Study.* (April 2017) http://blog.zendrive.com/distracted-driving/ The research analyzed 5.6 billion miles, 570 million trips and 3 million drivers

involved crashes. Sixty-four percent of serious freeway crashes involved aggressive behavior.

Aggressive behavior is a major contributing factor in rear end crashes, the second most common type of serious crashes. Rear end crashes account for twenty-one percent of serious crashes, and seventy-three percent of those crashes involved aggressive behavior.

3.7 Alcohol and drugs are major factors in serious crashes

This section provides key findings for crashes involving drugs and alcohol. Refer to the 2018 Metro State of Safety Report for additional information.

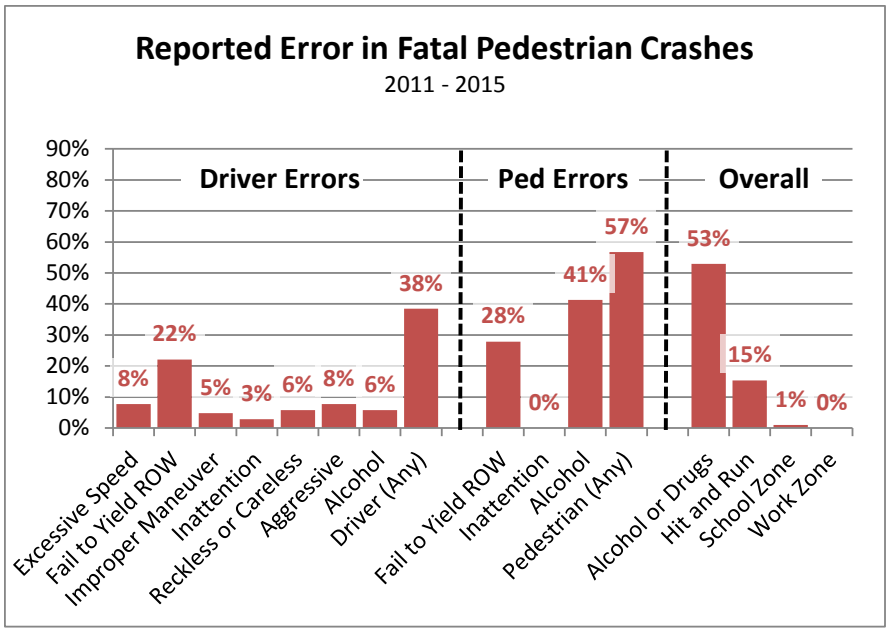
Crashes involving alcohol and drugs have a much higher likelihood of being fatal than other crashes. Fifty-seven of fatal crashes involved alcohol or drugs, while five percent of al crashes involved alcohol and drugs.

Nationally, the percentage of fatally injured drivers who were drinking was highest for Native Americans (57%) and Hispanics or Latinos (47%). [50]

A majority of serious alcohol and drug involved crashes are auto only crashes. Fifty-six percent of serious alcohol involved, and fifty-seven of serious drug involved crashes are auto-only crashes.

Pedestrian crashes have a high likelihood of involving alcohol or drugs. Thirty-eight percent of serious pedestrian crashes are alcohol and/or drug involved. Twenty-seven percent of serious alcohol involved, and twenty-nine percent of serious drug involved crashes are pedestrian involved.

[50] This report looks at two primary figures – fatalities per VMT (by age and ethnic group) and CIR of male drivers by the same categories. Both figures point to higher numbers for people of color. The report offers some potential cultural explanations for the stark differences, none of which were numerically proven – the consensus though is that something needs to be done to address these differences but the proper route for creating change is unknown at this time. NHSTA, 2006



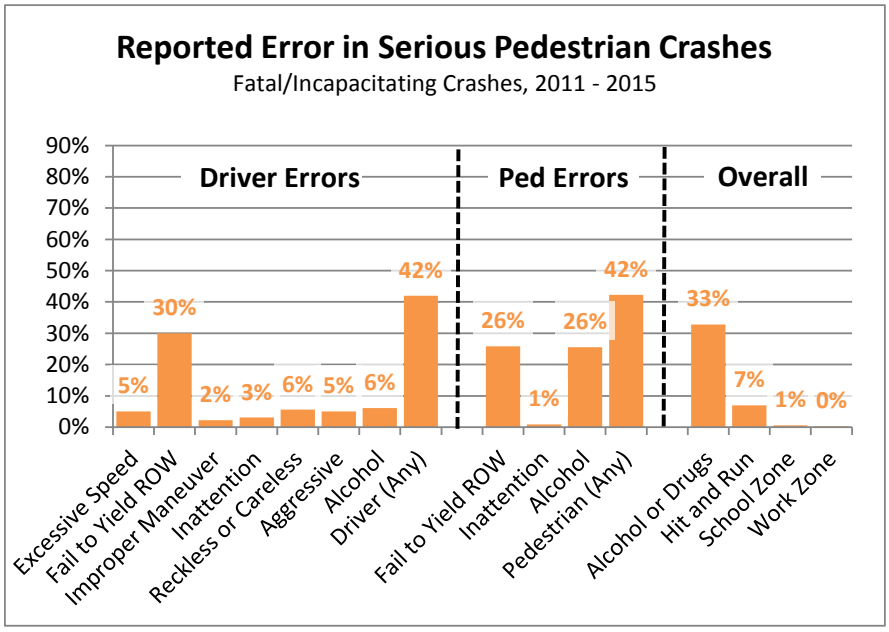


Figure 47: Reported error in fatal and serious pedestrian crashes
Source: 2018 Metro State of Safety Report

The majority of serious alcohol and drug involved crashes occur at night. Seventy-seven percent of serious alcohol involved, and fifty-six percent of serious drug involved crashes occurred at night.

CHAPTER 4 STRATEGIES AND ACTIONS

This chapter describes the strategies and actions of the Regional Safety Strategy, which are based as much as possible on evidence-based counter measures. Data-driven transportation safety plans identify strategies and actions to address the most common causes and types of fatal and serious injury crashes through analysis of crash data.

Traffic safety problems are systemic. Addressing safety therefore requires a comprehensive systemic response that includes an array of evidence based actions. The Safe System approach provides a framework for strategies and actions that starts with safe travel for all, including reducing disparities for people of color, people with low incomes and for people walking and bicycling.

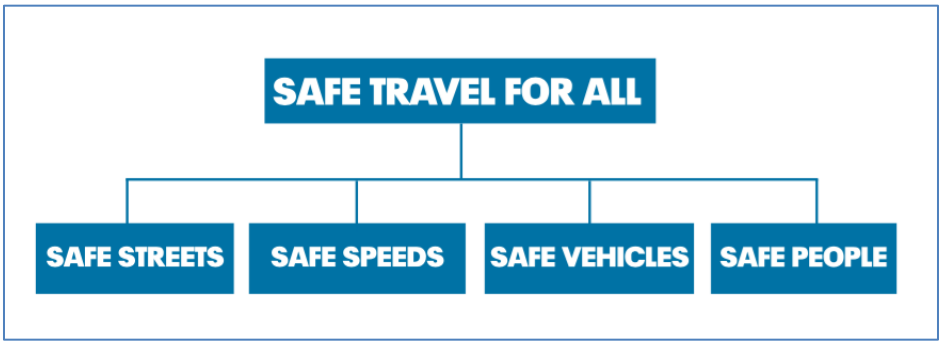


Figure 48: Vision Zero Safe System approach
Source: Vision Zero Network

The six strategies in the Regional Safety Strategy are of equal importance and represent a multi-pronged approach to reducing fatal and severe crashes in the region. Consistent with the Safe System approach, the strategies and actions emphasize systemic solutions and de-emphasize individual behavior change, especially enforcement.

- **Enforcement related actions** raise equity concerns because of the potential disproportionate impact on people of color and people with low income.[51] While high visibility enforcement of speeding, impaired and distracted driving have been proven to be effective at reducing those types of crashes, the potential equity impacts must be weighed against the benefits. The enforcement actions in the Regional Safety Strategy prioritize automated enforcement and education. Action 4.1 which does recommend targeted enforcement also recommends taking actions to reduce disproportionate impacts either from racial profiling or fines.

[51] *A Billionaire and a Nurse Shouldn't Pay the Same Fine for Speeding.* New York Times (March 15, 2018)
The Constitutionality of Income-Based Fines. Alec Schierenbeck, University of Chicago Law Review, forthcoming (March 2, 2018)
The High Costs of Disparities for People of Color in Multnomah County, Lee Van Der Voo & Nick Budnick. (2017). http://invw.org/2017/02/02/being-black-in-multnomah-county/ This review found that white residents charged in relatively minor cases in Multnomah County — those with a single count — paid a median fine of $181, while African-American defendants paid $261.

- **Increasing personal security**, such as protection from harassment and violence on the street, is recognized as an important element of transportation safety. However it is beyond the scope of the Regional Safety Strategy to identify specific actions to address personal security at this time.

Strategies and actions for the Regional Safety Strategy were developed with the recognition of existing city, county and state transportation safety and transportation plans as the foundation for reaching regional safety targets, goals and objectives.

The Regional Safety Strategy strategies and actions are recommended best practices, and are not mandated.

Implementation is contingent on the availability of funding and political will.

Strategies are broad areas of action designed to achieve an overall aim. The strategies identified respond to the most common causes of fatal and severe crashes in the region and the most common crash types. Each of the six strategies identifies specific recommended actions.

Actions are specific steps that a variety of partners can take to address specific safety problems. Actions in the Regional Safety Strategy were identified from multiple sources, including state and local transportation safety action plans and research of current best practices to address the primary factors in fatal and serious crashes. Agencies review the specific nature of the safety risks/problems and apply actions as appropriate. Detailed engineering analysis will help to determine the appropriate combination of treatments for high injury corridors and locations.

Leads and partners are identified for each action. A full list of partners with a role in transportation safety is provided at the end of the document. Many of the actions require multiple partners and/or could be implemented in various ways depending upon the lead agency or agencies. Actions where Metro is identified a lead agency indicates that Metro has committed taking steps to implement that action. More work is needed to confirm commitment to implementing actions and to identifyadditional, specific partners.

The effectiveness of each action to reduce fatal and severe injury crashes, based on research and studies, is noted.

- Proven = proven to be effective based on several evaluations with consistent results
- Recommended = generally accepted to be effective based on evaluations or other sources
- Unknown = limited evaluation or evidence; experimental; outcomes inconsistent or inconclusive among studies

One recent study provided a Traffic Safety Best Practices Matrix that identifies strategies and actions implement using the Safe System approach to achieve Vision Zero.[52] Proven safety countermeasures included in the actions have been documented by the Federal Highway Administration and/or the Oregon Department of Transportation.[53]

Timing of implementing actions

Many of the actions are currently being implemented to varying degrees by some agencies and jurisdictions. Expanding the number of jurisdictions utilizing proven tools to reduce fatal and severe injury crashes is critical to implementing the Regional Safety Strategy.

While some actions, such as enacting safety legislation or updating plans, are short term, many of the actions will require ongoing implementation and resources, such as convening safety work groups and education programs, to be successful. Early and aggressive implementation of the strategies and actions will result in more lives saved. When the Regional Safety Strategy is reviewed when the Regional Transportation Plan is updated, the timing and number of actions should be refreshed. **Figure 49** lists the six strategies identified for the Regional Safety Strategy.

Figure 49: Six strategies of the Regional Transportation Safety Strategy
Source: Metro

[52] *A Vision for Transportation Safety: Framework for Indentifying Best Practice Strategies to Advance Vision Zero.* Arielle Fleisher, Megan Wier, and Mari Hunter. Transportation Research Record: Journal of the Transportation Research Board, No. 2582. (2016)
[53] https://safety.fhwa.dot.gov/provencountermeasures and www.oregon.gov/ODOT/HWY/TRAFFIC-ROADWAY/docs/pdf/CRF_Appendix.pdf

4.1 Protect vulnerable users and reduce disparities

Vulnerable users have higher fatality rates. Increasing safety for vulnerable users increases safety for all transportation users and will reduce disparities.

Vulnerable users are people who are more vulnerable to being killed or seriously injured in crashes. Vulnerable users are pedestrians, bicyclists, motorcycle operators, children, older adults, road construction workers, people with disabilities, people of color and people with low income.

This strategy is focused on protecting users of the transportation system who are more vulnerable to dying or being seriously injured.

Actions for this strategy are focused on proven and recommended programs, education, data collection and monitoring that result in roadways that are safe for the youngest, oldest and most vulnerable users of the transportation system. These actions compliment the other strategies. Distracted walking is a growing concern. However, it has been documented that distraction is not fully or consistently recorded in FARS and other police crash databases. Additionally, a recent study cites an increase in SUVs. The current trend toward more powerful vehicles may be contributing to higher speeds and as a result, more pedestrian crashes and more severe pedestrian injuries.[54]

#	Strategy 1 Actions	Lead	Partners	Effectiveness
1.1	Implement Safe Routes to School programs and infrastructure projects, prioritizing schools in areas with a higher concentration of populations of people with lower incomes, people of color and people with low English proficiency.	ODOT, Metro, cities and counties	Schools, public health, advocates	Recommended
1.2	Provide culturally and age appropriate ongoing education of traffic laws and street designs.	ODOT, cities and counties, advocates, public health	Advocates, Metro	Recommended
1.3	Increase opportunities to provide education and products to increase visibility of people walking and bicycling (e.g. lights, reflective materials).	ODOT, cities and counties, schools	Public health, advocates	Recommended

[54] An examination of the increases in pedestrian motor vehicle fatalities during 2009-16. Insurance Institute for Highway Safety (May 2018)

1.4	Continue to improve data collection and reporting of vulnerable users, including: • Collecting and making crash data on race and ethnicity of victims available; • Supporting and developing programs to coordinate and collect bicycle and pedestrian count data. • Evaluate motorcycle, pedestrian and bicycle crash locations and risk factors through analysis of existing data and development of new data sources.	ODOT, Metro cities, counties, police, research institutions	Public health, advocates	Recommended
1.5	Promote and advocate for opportunities to increase large vehicle industry awareness and implement safety benefits including, but not limited to, rear wheel and side guards, sensors, front and side mirrors, and high visibility cabs. Explore opportunities to collaborate with the US DOT, ODOT, Port of Portland, City of Portland and other agencies to increase use of such safety features.	Metro, cities, counties, ODOT, Port of Portland, US DOT	Advocates, large vehicle industry	Proven
1.6	Evaluate pedestrian and bicycle crash locations and risk factors in Transportation System Plans though analysis of existing data and development of new data sources.	Cities, counties, ODOT	Metro, research institutions	Recommended
1.7	Complete the regional active transportation network, filling sidewalk gaps and bicycle gaps on the designated regional pedestrian and bicycle network, including arterial roadways, by 2040.	Metro, cities and counties, ODOT, TriMet, SMART	Senior advocates, advocates, public health	Recommended
1.8	Prioritize funding for projects that: • Reduce fatal and severe injury crashes; • Increase safety for vulnerable users, including people walking, bicycling and accessing transit and schools (increasing safety for vulnerable users has been shown to increase safety for all users); and/or • Are on a high risk or injury location, with demonstrated crash history, safety concern or other risk factor; and/or • Increases safety in areas with high concentrations of people of color, people with low-incomes and people with low English proficiency.	Metro, ODOT, counties and cities	Public health, advocates	Recommended
1.9	Pursue policies and tools to reduce vehicle miles traveled, including congestion pricing, multimodal facilities, transit and Transportation Demand Management programs. Reducing vehicle miles is a key element of the Safe System approach.	ODOT, Metro, cities and counties	Advocates, public health	Recommended

4.2 Design roadways for safety

Arterial roadways have the highest serious crash rate per road mile and per vehicle mile traveled. Prioritizing and standardizing safety in street design for all modes can prevent dangerous behaviors and save lives.

This strategy is focused on designing the transportation system, especially arterial roadways, to enable and encourage safe behaviors and reduce the severity of crashes when they do occur, primarily through greater separation and slower speeds. Designing roadways to be safe for children, older adults and people walking and bicycling makes the system safe for all users.

Arterial roadways have the highest serious crash rate for all modes, and should be the primary focus of regional safety efforts. Safety interventions that match solutions to the crash pattern and street and neighborhood context are needed. Just fifty-one percent of the region's arterials have completed sidewalks and only thirty-six percent have completed bikeways. [55]Even bringing arterials up to adopted design standards, however, will not fully address the needed safety improvements, especially for head on crashes and for people walking and bicycling.[56]

Actions for this strategy focus on designing for survivable auto speeds on arterial roadways, providing greater separation and protection between people walking, bicycling and driving and adding medians, roundabouts, access management and other design solutions to prevent crashes. The safest arterial roadways are accessed managed, include street calming, provide separation between modes, provide safe crossing for vulnerable users, and provide intuitive visual cues that make it clear that people using different modes share the space. These roadways keep all people safer – even when they make mistakes.

Considering context with a performance-based approach and using flexibility in design is important – cities and counties in the region have different safety needs and will therefore have different approaches to improving safety. However, using proven and effective countermeasures that have been shown to work in a variety of contexts will improve safety everywhere.

[55] State and regional standards require sidewalks and bikeways on urban arterials. Regional Transportation Functional Plan 3.08.130(4) and 3.08.140(4).
[56] On arterial roadways in the region, fifty-one percent have a sidewalk on at least one side and thirty-six percent have a bikeway. Arterial roadways are required to have sidewalks and bikeways.

#	Strategy ❷ Actions	Lead	Partners	Effectiveness
2.1	Implement/prioritize context sensitive and universal design and engineering solutions such as the Federal Highway Administration proven safety countermeasures, the Highway Safety Manual and other resources that have been shown to support safe speeds, protect vulnerable users and reduce fatal and severe crashes, focusing on arterial roadways and high injury corridors and intersections. Countermeasures with proven safety benefits include: • medians and pedestrian crossing islands • protected left turn signals • separation of travel modes on streets with higher traffic speeds, volumes, and truck volumes with protected bikeways and walkways • bicycle boxes • bicycle intersection treatments • lead pedestrian intervals • pedestrian hybrid beacons • roundabouts • road diets • access management • driveway consolidation • backplates with retroreflective borders • freight aprons Pedestrian design should account for the needs of all potential users, including those with physical or mental limitations. Design and engineering solutions should account for designated truck routes to safely move freight and agricultural equipment amid other modes.	Cities, counties, ODOT, Metro	TriMet, SMART, public health, advocates	Proven and/or recommended
2.2	Develop and adopt Complete Streets policies and Complete Streets checklists.	ODOT, Metro, cities and counties	Public health, advocates	Unknown
2.3	Provide context sensitive best practices for Safe System street design in the Designing Livable Streets regional street design guidelines and tools.	Metro	ODOT, cities and counties, public health, advocates	Unknown
2.4	Review standards for auto travel lane widths and develop criteria to explore making 10' travel lanes the preferred standard for arterial roadways in certain contexts, allowing more right-of-way for wider sidewalks, protected bikeways and other safety features.	Cities, counties, ODOT, TriMet	Metro, public health, advocates	Recommended (*greater separation of modes)*

2.5	Develop criteria and spacing standards and/or policies for enhanced pedestrian crossings in areas with pedestrian activity (such as transit access) and where enhanced crossings are greater than 530 feet apart.	Cities, counties, ODOT	Metro, public health, advocates	Recommended
2.6	Explore policies to make protected bike lanes the preferred design for arterial roadways with posted speeds of 30 mph or higher, and/or average daily traffic above 6,000 autos per day, and/or heavy truck volumes. Connections at intersections should be re-evaluated as protected bike lanes are installed.	Cities, counties, ODOT	Metro, NACTO, public health, advocates	Recommended
2.7	Illuminate the transportation system appropriately by: • Requiring new development and redevelopment in the urban area to install street and sidewalk lighting. • Integrating street and sidewalk lighting into major transportation improvement projects, where appropriate. • Exploring a variety of lighting options and identify the appropriate contexts to use them. Consider street lighting designs and practices that limit impacts on neighborhoods, wildlife and agriculture.	Cities, counties, ODOT	Metro	Recommended
2.8	Investigate and perform engineering reviews for crashes that result in fatalities and severe injuries to determine effective countermeasures for preventing future severe crashes. Conduct routine evaluation of effectiveness of traffic safety interventions.	Police, cities, counties, ODOT, academic institutions	Metro, advocates, public health	Recommended
2.9	Standardize Highway Safety Manual crash prediction project analysis to guide project development as part of the traffic analysis procedure.	ODOT, cities and counties	Metro, academic research institutions	Recommended

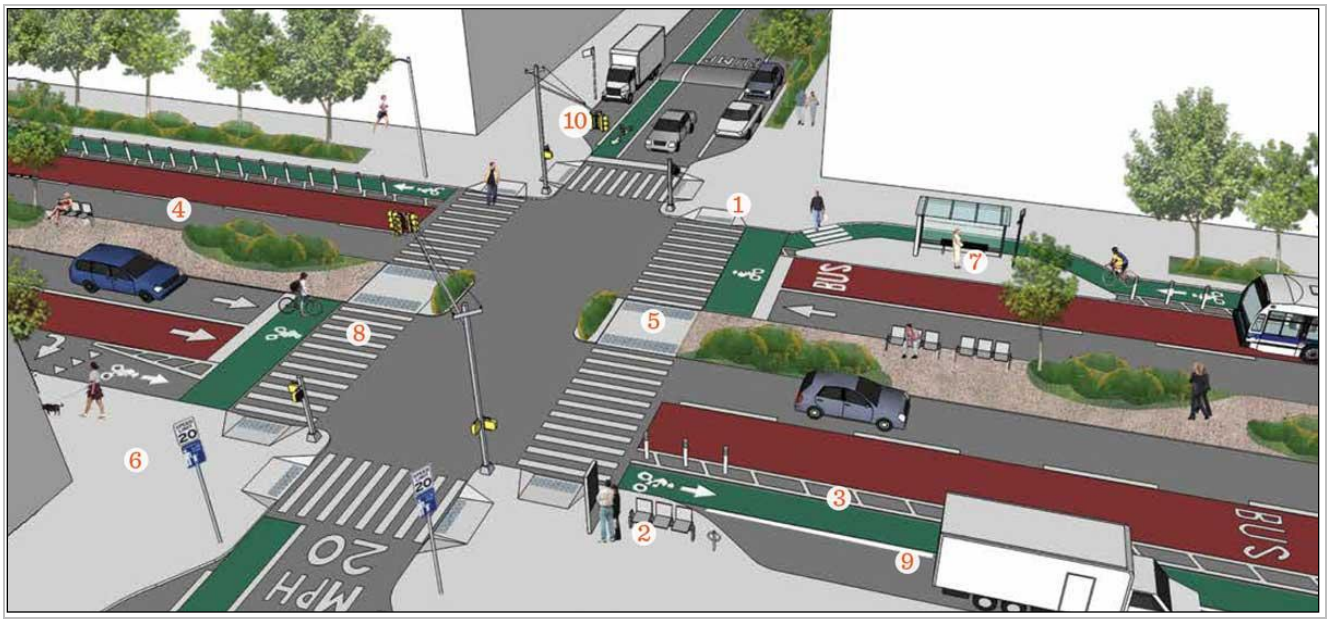


Figure 50: Example of a vision zero street (1)ADA accessibility, (2)public amenities, (3) protected bike lanes, (4) narrow vehicle lanes, (5) pedestrian islands, (6) wide sidewalks, (7) dedicated mass transit facilities, (8) signal protected pedestrian crossings, (9) dedicated unloading zone, (10) signal retiming
Source: Vision Zero Streets.org

4.3 Reduce speeds and speeding

Speed is a fundamental contributing factor in crash severity. Reducing speeds and preventing speeding saves lives.

The Vision Zero Network recommends recognizing and prioritizing speed as a fundamental factor in crash severity as a key principle to achieving zero deaths and severe injuries.

This strategy is focused on reducing the prevalence of speeding as well as reducing motor-vehicle speeds on arterial roadways to survivable speeds. A comprehensive approach to reducing speeds and speeding is necessary and typically involves multiple countermeasures. For example, the National Highway Traffic Safety Administration states that "no single strategy will be appropriate for all locations, and combinations of treatments may be needed to obtain speed limit compliance and achieve crash reduction goals."

The National Transportation Safety Board's landmark report and recommendations on speeding recommend a new approach to setting speeds.[57] The report describes the Safe System approach to speed limits, which differs from the traditional view that drivers choose reasonable and safe speeds. In the Safe System approach, speed limits are set according to the likely crash types, the resulting impact forces, and the human body's ability to withstand these forces. It allows for human errors (that is, accepting humans will make mistakes) and acknowledges that humans are physically vulnerable (that is, physical tolerance to impact is

[57] National Transportation Safety Board, "Reducing Speeding-Related Crashes Involving Passenger Vehicles" (July 2017)

limited). Therefore, in this approach, speed limits are set to minimize death and severe injury as a consequence of a crash.

The National Transportation Safety Board includes 19 recommendations for decreasing the prevalence of speeding related injuries, including the following:

- increasing automated enforcement
- improving speeding related data collection
- increasing the availability of intelligent speed adaptation on new vehicles
- reconsidering using the 85th percentile speed to set speed limits
- increasing the use of the Safe System approach to design in urban areas

Actions for this strategy are focused on proven countermeasures such as designing arterial roadways that result in slower speeds, lowering posted speeds, and increasing the use of automated speed enforcement. Arterial roadways with higher serious crash rates and Regional High Injury Corridors are prioritized.

#	Strategy ❸ Actions	Lead	Partners	Effectiveness
3.1	Design arterial roadways to achieve appropriate safe target speeds for the roadway context, generally 35 mph or less, using design elements that have been shown to effectively result in lower speeds. A majority of excessive speed-related serious crashes occur on arterial roadways.	Cities, counties, ODOT	Metro, TriMet, SMART, public health, advocates	Proven
3.2	Change state law to increase the number of jurisdictions eligible for fixed speed camera installation, especially at high injury locations. Utilize speed feedback cameras given the low cost and effectiveness and immediate information to drivers.	Cities, counties, ODOT	Metro, public health, advocates	Proven
3.3	Utilize authority provided through House Bill 2409 to issue speeding tickets through red light cameras. Change state law to increase the number of jurisdictions eligible to use this tool.	Cities, counties, ODOT, Metro	Public, health, advocates	Proven
3.4	Work with ODOT to modernize speed setting practices, including a multi-modal approach to set speed limits, incorporating factors such as land use, crash history and the presence of vulnerable road users.	Cities, counties, ODOT	ODOT, Metro, public health, advocates	Proven
3.5	Fund and install intelligent speed adaptation technologies that alert the vehicle traveling over the speed limit, prioritizing high risk and high injury corridors.	ODOT, cities, counties	Metro, public health, advocates	Proven

3.6	Utilize flexibility so that design speeds can be set at a target speed below the posted speed to increase safety. Use the injury minimization or safe system approach where speed limits are set according to the crash types that are likely to occur, the impact forces that result, and the human body's tolerance to withstand these forces.	ODOT, cities, counties	Public health, advocates, police, fire	Recommended
3.7	Change Oregon speed zone law from basic rule limits to limits only to reduce confusion and increase compliance with speed limit.	ODOT, cities, counties	Public health, advocates, police, fire	Unknown

4.4 Address distracted and aggressive driving

Aggressive or distracted driving can lead in an instant to injury or death. System design, education and policies can reduce and minimize the impact of bad decisions.

Dangerous behaviors arise from distracted or aggressive driving, including following too close, disregarding traffic signals or stop signs, failing to stop, failing to yield the right of way when turning and excessive speeding. Aggressive driving is extremely common among U.S. drivers. A recent study by the AAA Foundation for Traffic Safety found that nearly eighty percent of drivers expressed significant anger, aggression or road rage behind the wheel at least once in the previous year. Distracted driving, especially the use of smart phones while driving, is difficult to track though it is generally agreed that instances of 'texting while driving" are increasing.

This strategy is focused on reducing and minimizing the impact of dangerous behaviors. Dangerous behaviors often arise from larger social issues and norms that are difficult to address within the context of transportation alone. Seeking opportunities to partner and collaborate with partners working on these larger social issues and norms, including public health, schools and community and non-profit groups is important to address the root causes of aggressive and distracted driving.

Actions for this strategy focus on changing overall systems and using education and technology to reduce the prevalence of dangerous behaviors in the first place. Targeted high-visibility enforcement is included with an emphasis on taking actions to reduce the disproportionate impacts on and over policing of people of color and people with low incomes. Action 4.6 is a catch-all action to get at the larger social issues and norms that can lead to aggressive and distracted driving.

#	Strategy 4 Actions	Lead	Partners	Effectiveness
4.1	Focus high visibility enforcements on dangerous behaviors (speeding, failing to yield to pedestrians, signal violations, improper turns/illegal turns, texting while driving) and high injury corridors, taking actions to reduce the disproportionate impacts on people of color and people with low incomes, including fully implementing Oregon's anti-racial profiling bill (House Bill 2355). Research shows that high-visibility enforcement can reduce drunk driving fatalities by as much as 20%.	Police, cities, counties	Metro, ODOT, advocacy groups, public health	Recommended
4.2	Increase penalties for dangerous behaviors, identifying actions to reduce the disproportionate impacts from fines on people of color and people with low incomes, such as diversion classes and other non-monetary penalty options.	State, cities, counties, police	Metro, ODOT, advocacy groups, public health	Recommended
4.3	Support implementation of recommendations identified in the Reducing Distracted Driving in Oregon report and House Bill 2597, "Distracted Driving Law."	ODOT, police, cities and counties, Metro	Public health, advocates, auto industry	Unknown
4.4	Support auto insurance companies to provide lower auto insurance costs to drivers that install technologies to turn off phone while driving.	ODOT, Metro, cities, counties, advocates	Public health, advocates	Unknown
4.5	Compile a comprehensive list of contacts of private sector companies that operate large numbers of vehicles in the region, such as ride hailing services and trucking companies, and identify a process that supports state and local partners to engage in outreach regarding safe driving behaviors to members, workforces and customers.	Metro, ODOT, cities and counties	ODOT, cities and counties, commercial vehicle companies	Unknown
4.6	Support legislation to increase frequency of driver education, testing, inclusion of urban transportation safety in test materials and driver's license renewal.	Metro, ODOT, cities and counties	Advocates, public health	Recommended

4.5 Address impairment

Crashes involving alcohol and drugs have a much higher likelihood of being fatal than other crashes. Providing options to people using the roadways while drunk or intoxicated or preventing it in the first place saves lives.

This strategy is focused on upstream solutions to reduce the prevalence of people using the roadways while impaired. Intoxication arises from larger social issues and norms that are difficult to address within the context of transportation alone. Seeking opportunities to partner and collaborate with partners working on these larger social issues and norms, including public health, schools, community and non-profit groups is important to address the root causes of impaired driving.

Actions for this strategy focus on changing overall systems and using education and technology to prevent impaired driving from occurring. Targeted high-visibility enforcement is included with an emphasis on taking actions to reduce the disproportionate impacts on people of color and people with low incomes. Some actions support research to better understand the impact of some interventions, such as increased access to ride-share options such as Uber and Lyft.[58]

#	Strategy 5 Actions	Lead	Partners	Effectiveness
5.1	Identify funding to send law enforcement to Drug Recognition Experts (DRE) training, and training to prevent profiling.	Police, cities, counties	State, public health, advocates	Recommended
5.2	Adopt National Transportation Safety Board recommendation to reduce Blood Alcohol Concentration limit to 0.05.	State	Advocates, public health, Metro, cities and counties	Proven
5. 3	Implement pre-paid morning parking programs in areas where appropriate (to prevent towing/ticket for drivers who choose another way home).	Cities, counties	Public health, advocates	Recommended
5.4	Promote use of apps such as SaferRide developed by NHSTA, which provide people easy ways to find a safe ride home.	Cities, counties, ODOT, Metro	Public health, advocates	Recommended
5.5	Explore opportunities to support the U.S. DOT to work with industry groups and vehicle manufacturers to further the use of technology to reduce impaired driving.	ODOT, Metro, cities and counties	Public health, advocates	Recommended

[58] Does Uber Really Prevent Drunk Driving? It Depends on the Study" New York Times, April 7, 2017. – initial research suggests that the increase in availability of ride-hailing services such as Lyft and Uber could help lower the incidents of drunk driving, supporting the overall approach of providing travel options and other programs to support not driving drunk.

5.6	Support culturally appropriate safety programs and educational messages, paired with outreach and investments, to curb the risk of impaired driving, using resources such as NHSTA's Impaired Driving Segmentation research (2017). Messaging is more effective when there is an in-depth understanding of what messages work for different groups, and when paired with other investments. Coordinate with public health initiatives and partners.	ODOT, Metro, cities and counties, advocates, public health	Public health, advocates	Recommended
5.7	Support research to better understand the impacts of increased access to TNCs such as Uber and Lyft, and to transit, in reducing the prevalence of drunk driving.	Metro, research institutions, ODOT, TNCs	Public health, advocates	Recommended

4.6 Ongoing engagement and coordination

Many partners will implement Vision Zero. Ongoing engagement and coordination among all partners is essential.

One of the most important elements of a Safe System approach is bringing together all of the people and organizations that contribute to the safety of the transportation system. For this reason, coordination and leadership are critical to success.

Many public and private agencies, organizations and individuals are deeply concerned and care about roadway safety. Working together, these many partners can reach Vision Zero.

This strategy focuses on the need to increase and maintain coordination and engagement among partners. As the region's Metropolitan Planning Organization, Metro plays an important role in convening and facilitating regional discussions and efforts to ensure partnerships are successful in achieving the regional vision.

Actions for this strategy focus on convening partners, setting work programs, tracking progress, maintaining and improving data, introducing and supporting legislation and updating regulations and policies.

#	Strategy ❻ Actions	Lead	Partners	Effectiveness
6.1	Develop Metro work program to implement actions where Metro is a lead or one of several leads. Include work program elements to support implementing actions where Metro is not the lead.	Metro	Cities, counties, ODOT, public health, advocates, police, fire, TriMet, SMART	Recommended
6.2	Convene, as needed, transportation safety meetings with local and state partners to implement 2018 RTSS. Determine frequency of meetings in work program developed in Action 6.1. Identify police and fire representatives to participate in regional coordination meetings.	Metro	Cities, counties, ODOT, FHWA, public health, advocates, police, fire, TriMet, SMART	Recommended
6.3	Provide an annual Vision Zero report back to Joint Policy Advisory Committee on Transportation (JPACT) and Metro Council, reporting on MAP-21 safety targets and regional safety plan implementation.	Metro	Cities and counties, ODOT, TriMet, SMART, public health, advocates	Recommended
6.4	Review the strategies and actions of the Safety Strategy prior to each update of the Regional Transportation Plan and update as needed.	Metro	Cities and counties, ODOT, TriMet, SMART, public health, advocates	Recommended
6.5	Maintain and update Metro crash data. • Update Metro webpage annually with MAP-21 transportation safety performance measure data; include data on race and ethnicity as available. • Update and maintain regional crash map tool and crash map. • Develop a regional crash prediction modeling tool that utilizes and links social and environmental factors with injury data.	Metro	FHWA, ODOT, public health, academic inst.	Recommended /Proven
6.6	Identify opportunities to engage and partner with community based organizations and advocates, especially to increase opportunities for proactive monitoring and feedback gathering from the community on their safety issues and concerns. Conduct targeted outreach/education to communities near high injury arterials and intersections, focusing on historically marginalized communities.	Metro, ODOT, cities and counties	Public health, advocates	Recommended

6.7	Support development of city and county Transportation Safety Action Plans and Vision Zero targets; include a transportation safety plan, with data analysis that addresses all modes and is based on a safety inventory based on both an analysis of crash rates and an analysis of crash risks in the updates of Transportation System Plans; participate in local, regional and state safety task forces, and develop and participate in state, regional and city safety summits.	Metro, ODOT, DLCD, cities and counties	Public health, advocates, TriMet, SMART	Recommended
6.8	Identify opportunities to develop safety workshops for state, regional, county and city staff on Safe System framework and priorities, including racial equity and public health.	Metro, ODOT, TriMet, cities and counties	FHWA	Recommended
6.9	Convene regular local safety meetings of state and local transportation and public health professionals, equity representatives, police and fire, and community and advocacy organizations, to review progress on implementing safety plans and collaborate on specific topics, such as impairment, distracted driving, street design and enforcement. Integrate Vision Zero/Toward Zero Deaths framework and priorities, including racial equity and public health.	Local agencies	ODOT, Metro, public health, advocates, police, fire, TriMet, SMART	Recommended
6.10	Identify funding for and develop at least one annual coordinated culturally appropriate and targeted mass media safety campaign in the region, utilizing campaign materials developed by NHSTA, Drive Toward Zero, Vision Zero, Toward Zero Deaths and other sources as appropriate. Strong, targeted advertising with high-visibility enforcement and publicity about that enforcement have proven to be most effective.	Metro, cities, counties, ODOT	Advocates, public health	Proven
6.11	Support safety legislation, regulations and funding at the state and federal level that implement Vision Zero and do not increase racial disparities.	Metro, ODOT, cities, counties, advocates	Advocates, public health	Recommended
6.12	Monitor federal and state autonomous vehicle policies and ensure that they do not place the burden of safety on vulnerable users (such as requiring them to carry a sensor or install a phone application to be picked up by an autonomous vehicle) and require rigorous safety testing of all autonomous vehicles prior to public deployment.	Metro, ODOT, cities and counties	Advocates, public health, AV industry	Unknown

6.13	Update the Regional Transportation Functional Plan to require Transportation System Plans to include a transportation safety plan, with data analysis that addresses all modes and is based on a safety inventory based on both an analysis of crash rates and an analysis of crash risks, to require that Transportation System Plans identify safety as a need, and to require that transportation projects do not make a known safety problem worse, and to be consistent with the Regional Safety Strategy.	Metro	Cities, counties, ODOT, TriMet, advocates, public health	Unknown
6.14	Update the following sections of OAR 660-012-0000, the Oregon Transportation Planning Rule: • Section 0020 (2), requiring Transportation System Plans to include a transportation safety plan, with data analysis that addresses all modes and is based on a safety inventory based on both an analysis of crash rates and an analysis of crash risks. • Section 0030 (1) and (2), identifying safety as a need. • Section 0060 (1)(c), clarifying that making a known safety problem worse constitutes a "significant effect".	DLCD, Metro, ODOT	Cities and counties, advocates	Recommended
6.15	Best practices recommend that police periodically review, update and conduct trainings to reflect new traffic safety priorities.	Police, state, cities, counties,	Advocates, public health	Recommended

Implementing the Safety Strategy requires focusing resources so they will have the greatest impact and result in fewer lives lost.
Photo: Metro

CHAPTER 5 IMPLEMENTATION

This chapter describes steps within the next five years to implement the Regional Safety Strategy. Implementation of the Regional Safety Strategy is also identified in the Implementation chapter of the 2018 Regional Transportation Plan.

With the Safe System approach, **coordination across all areas of government and with other partners**, **including the public**, is necessary to implement strategies and actions. Strategy 6, "Ongoing Engagement and Coordination" of the Safety Strategy, identifies specific actions that Metro and partners can take to ensure coordination. Implementation is always contingent on the availability of funding and the political will to take steps which may be politically challenging.

Current efforts

There are many efforts underway in the greater Portland region that are increasing safety and reducing crashes. These efforts must be sustained and increased to keep pace with an increase in population, vehicle miles traveled and a growing economy which could result in an increase in more serious crashes. Efforts underway that increase safety include:

- Implementing adopted land use plans
- Developing and implementing county and city transportation safety action plans
- Filling sidewalk gaps and adding enhanced pedestrian crossings
- Adding protected bikeways and protected intersections
- Increasing awareness of the Safe System approach
- Increasing awareness of the role of speed in serious crashes
- Investigating fatal and serious injury crash sites
- Collecting data on race and ethnicity in traffic stops
- Improving coordination among partners
- Increasing use of speed cameras to reduce speeding
- Increasing Safe Routes to School programs and infrastructure
- Increasing public access to safety data and the ability to report safety issues
- Increasing focus on preventative actions on high risk roads
- Supporting better technology in motor vehicles to increase safety
- Continuing widespread seat belt use
- Increasing police training to identify drug and alcohol use
- Creating innovative public awareness campaigns

5.1 Metro transportation safety program

Metro will develop a work program (Safety Strategy Action 6.1) describing tasks and a timeline to take direct action or support partners in implementing the Regional Safety Strategy and the Regional Safe Routes to School Program. Steps to implement actions where Metro is the lead or co-lead will be identified. Metro's work program will focus on actions to be taken in the next five years following adoption of the 2018 Regional Transportation Plan.

Metro tasks in the work program will land in one of five areas:

1. **Safety policy and planning** – this area will include tasks such as supporting and introducing safety legislation, convening partners and identifying updates to the Regional Transportation Functional Plan for consistency with the Regional Safety Strategy.
2. **Data collection, maintenance, analysis and interpretation** – this area will include tasks such as improving crash and risk data and analysis tools, such as a crash prediction model, and developing a geo-coded posted speed data set.
3. **Encouraging best practices in transportation safety and roadway design with funding and programmatic support** – this area will include tasks such as developing Safe System regional street design guidelines and developing safety criteria for regional funding sources.
4. **Collaborating on efforts to highlight safety in materials, messaging and campaigns** – this area will include tasks such as partnering with ODOT on a follow up to the successful Oregonians Crossing campaign.

An annual progress report will be given to the Metro Council, JPACT and MPAC (Safety Strategy Action 6.3). The progress report will include progress made towards meeting federally required transportation safety targets and progress on actions by Metro and partners.

5.2 Engagement and coordination

Transportation safety and achieving zero deaths and serious injuries is everybody's business. Government alone cannot achieve the broader changes needed to reach Vision Zero. In addition to national, state, regional and local agencies, multiple organizations, private entities and the public play a role in achieving Vision Zero. Engineers, emergency medical service providers, law enforcement, educators, public health professionals, community based organizations and non-profits, the media, industry and business, research and academic institutions, and users of the transportation system all have a role.

Each action in Chapter 4 identifies leads and partners to implement the action. More work is needed to confirm commitment to implementing actions and identifying additional partners

or leads. A full list of partners, which will be added to as necessary, is provided at the end of the document.

Safety Strategy Actions 6.2 and 6.9 recommend convening safety work groups at the regional and local level, or continuing to support those that are already meeting. Complementing state safety committees and work groups, regular regional and local safety work groups will support state, regional and local coordination.

As noted in Safety Strategy Action 6.2, police and fire representatives need to be involved at the regional level.

5.3 Implementing and updating plans

Implementing the 2040 Growth Concept and adopted land use and transportation system plans will help achieve the Vision Zero target. At the same time, making travel safe for all modes is critical to achieving adopted land use and transportation policies such as the Climate Change Strategy. Building walkable and bikeable communities, reducing travel distances, locating jobs and housing near each other and making transit more accessible all contribute to safer communities.

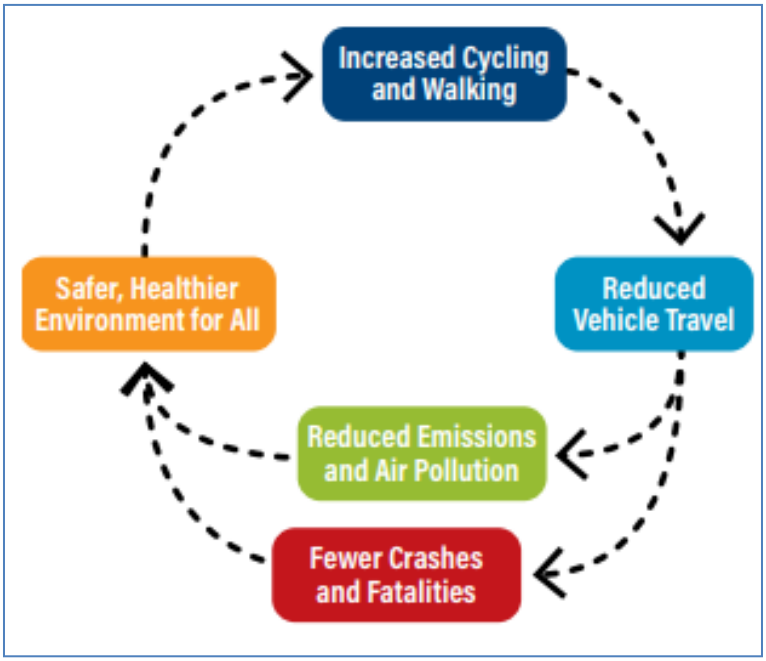


Figure 51: Environmental and Health Benefits of a Safe Transportation System
Source: Sustainable and Safe: A Vision and Guidance for Zero road Deaths (2017)

As described in Chapter 3, the greater Portland region has one of the lowest roadway fatality rates of any urban metro area with a population greater than 1 million, and a lower fatality rate than Oregon and the U.S. The safest regions in the nation for overall fatality rates are Boston, Minneapolis-St. Paul, Portland, New York, and Chicago. In general, the safest urban regions are those that exhibit dense urban environments and higher usage of

non-auto travel modes. These findings indicate that regional and local land use and transportation plans, policies and investments are increasing transportation safety.

The Regional Transportation Plan is updated every five years. As part of the update, safety policies, strategies and actions should be reviewed and evaluated. Crash data analysis in the Metro State of Safety Report will be updated to reflect five years of crash data. The Regional High Injury Corridors and Intersections will also be reviewed and updated.

Local Transportation System Plans are updated every four years to be consistent with the Regional Transportation Plan. Safety Strategy Actions 6.13 and 6.14 recommend updating the Transportation Planning Rule and the Regional Transportation Functional Plan to require that safety plans be included in Transportation System Plans.

5.4 Regional Transportation Plan safety projects

The 2018 Regional Transportation Plan includes a list of projects and programs that are meant to address the highest public priorities and most immediate regional transportation challenges. The project list identifies the projects that are planned to be built in the next 25 years. Safety is a priority of the Regional Transportation Plan, and especially on high injury corridors and intersections and in race and income marginalized communities (equity focus areas).

Each time the Regional Transportation Plan is updated it provides an opportunity to identify safety focused projects that will reduce serious crashes. Identifying safety projects in the Regional Transportation Plan helps regional leaders and the public better understand how, when, and where safety problems are being addressed. It also provides an understanding of how much investment is being planned for safety projects. Ideally all projects located on a high injury corridor should identify safety as a primary purpose or secondary objective in the Regional Transportation Plan.

The Regional Safety Strategy developed definitions for safety projects and safety benefit projects for the Regional Transportation Plan. The definition of a safety project was developed to be consistent with Highway Safety Improvement Program criteria.

Definition of a safety project and safety benefit projects

A* safety project *has the primary purpose of reducing fatal and severe injury crashes or reducing minor/non-injury crashes by addressing a documented safety problem at a documented high injury or high risk location with one or more proven safety counter measures.

A* safety benefit project *include design features that increase safety for one or more roadway user, but may not necessarily address an identified safety issue at an identified high injury or high risk location.

A critical element of the Regional Safety Strategy is completing projects that make the transportation system safer and more secure, especially in high risk and high injury corridors and intersections and in race and income marginalized communities.

The 2018 Regional Transportation Plan's 2040 Constrained project list identifies 816 capital projects submitted by local and state agencies and special districts.

- **Safety Projects**: 132 projects, sixteen percent, of all projects on the 2040 Constrained list in the RTP are identified as safety projects. Those projects identify reducing fatal and severe injury crashes or reducing minor/non-injury crashes as the primary purpose of the project. Seventy-nine percent of these safety projects are located on a high injury corridor, and seventy-three percent are in an equity focus area (see map below: Projects with Primary Purpose of Reducing Crashes).
- **Safety Benefit Projects**: 551 projects, sixty-eight percent, of all capital projects on the 2040 Constrained list have been identified to provide a safety benefit. Sixty percent of the safety benefit projects are on a high injury corridor, and seventy percent are located in an equity focus area (see map below: Projects with a Safety Benefit).
- **All capital projects on High Injury Corridors**: 458 of all capital projects on the 2040 Constrained list in the RTP, fifty-six percent, intersect with a regional high injury corridor. Of these projects, 126 are not identified as a Safety Benefit project because some are roadway extensions, some are transit projects, some are information technology system projects, etc. These projects provide other benefits that are critical to the transportation system.
- **Programs that impact safety**: In addition to capital projects, the regional Safe Routes to School, Transit Oriented Development and Transportation System Management and Operations programs provide safety benefits.

The following table provides additional detail on how safety is reflected in the projects of the Regional Transportation Plan.

Table 1: Safety and safety benefit projects in the 2040 Constrained investment strategy of the 2018 RTP

	C10 2018–2027	C 2040 2018–2040
Safety projects		
Number of **safety projects** with the primary purpose of reducing crashes	82	132
Number of **safety projects** on a High Injury Corridor*	72	104
Number of **safety projects** in Equity Focus Areas*	67	96
Estimated investment in **safety projects** ($2016) *includes I-5 Rose Quarter project in first ten years for $390 million*	$691million	$ 1 billion
Safety benefit projects		
Number of **safety benefit projects**	281	551
Number of **safety benefit projects** on a High Injury Corridor*	184	333
Number of **safety benefit projects** in Equity Focus Areas*	211	387
Estimated investment in **safety benefit projects** ($2016) *includes I-5 Rose Quarter project in first ten years, and I-5 Columbia River and OR 212/224 in 2028-2040 for a total of $3.6 billion*	$2.3 billion	$ 7.6billion

**Does not include projects that are programmatic and are not geographically specific.*

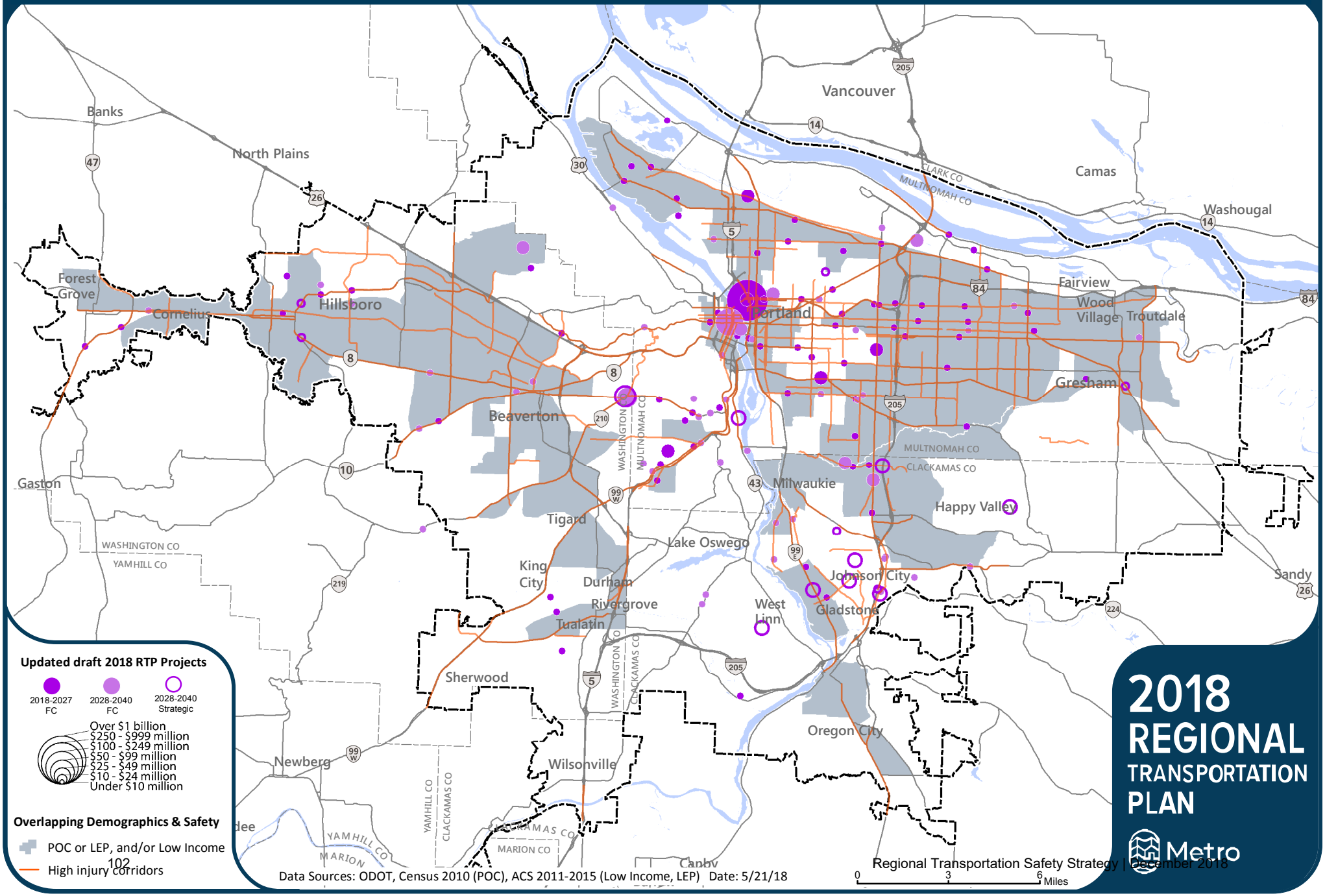
The maps on the following pages show the location of safety projects and safety benefit projects.

- The map titled: "2018 Regional Transportation Plan Projects with the Primary Purpose of Reducing Crashes" shows the location of projects that identified the primary project purpose as either "reduces fatal and severe injury crashes" or "reduces crashes," overlapped with regional high injury corridors and census tracts with higher than regional average concentrations and double the density of one or more of the following: people of color or English language learners, and/or people with low income.

- The map titled: “2018 Regional Transportation Plan Projects with a Safety Benefit” shows the general location of projects in the 2018 Regional Transportation Plan that provide a safety benefit, overlapped with regional high injury corridors and census tracts with higher than regional average concentrations and double the density of one or more of the following: people of color or English language learners, and/or people with low income.

2018 Regional Transportation Plan Projects with the Primary Purpose of Reducing Crashes

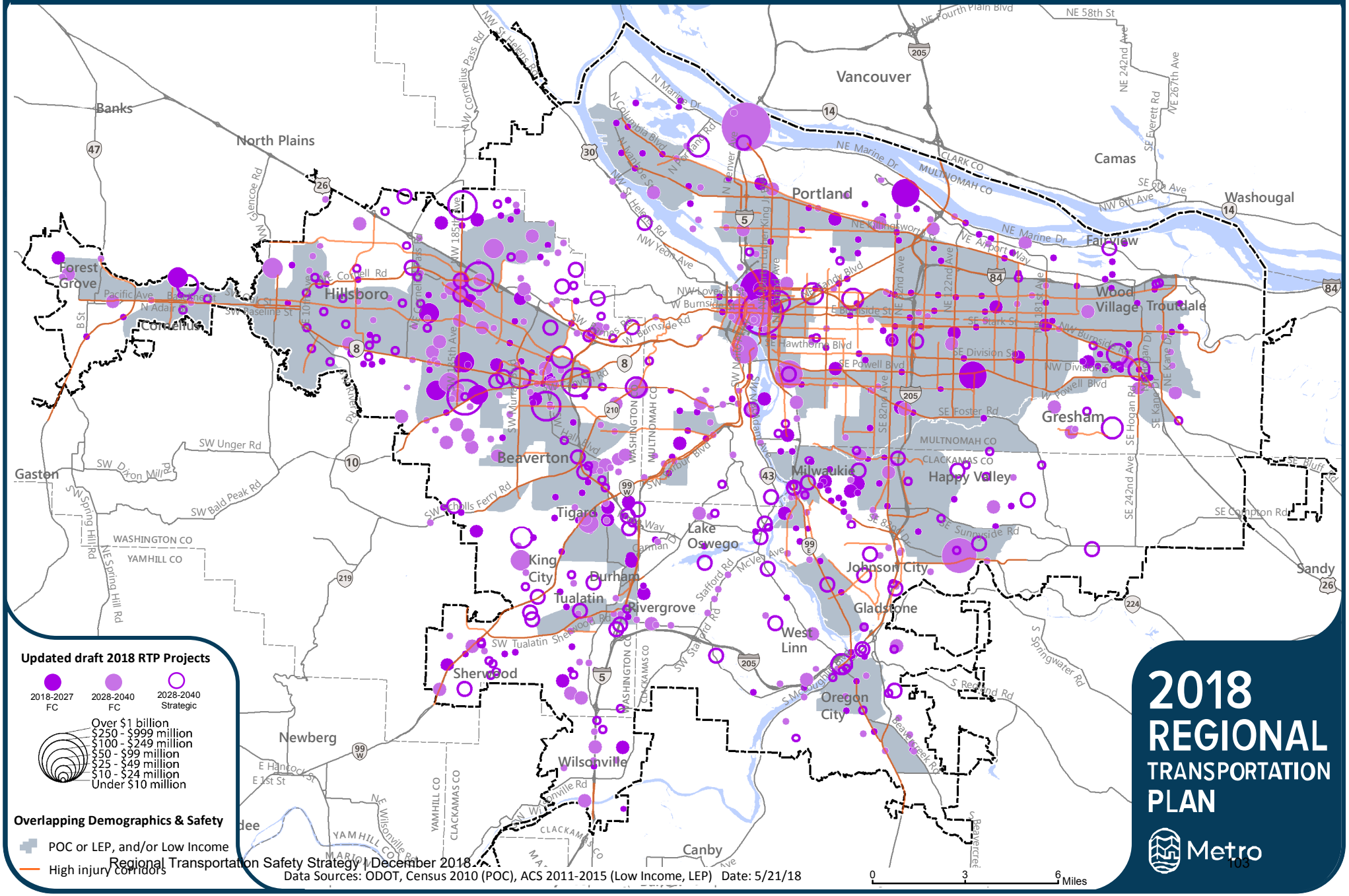
This map shows projects in the 2018 Regional Transportation Plan with the primary purpose of "reducing fatal and severe injury crashes" or "reducing crashes," overlapped with regional high injury corridors and census tracts with higher than regional average concentrations and double the density of one or more of the following: people of color or English language learners, and/or people with low income.



2018 REGIONAL TRANSPORTATION PLAN

Metro

2018 Regional Transportation Plan Projects with a Safety Benefit: This map shows projects in the 2018 Regional Transportation Plan that provide a safety benefit, overlapped with regional high injury corridors and census tracts with higher than regional average concentrations and double the density of one or more of the following: people of color or English language learners, and/or people with low income. Safety benefit projects are projects that increase safety for one or more roadway user. These projects may not necessarily address an identified safety issue at an identified high injury or high risk location, but they do include design treatments known to increase safety and reduce serious crashes.



Data Sources: ODOT, Census 2010 (POC), ACS 2011-2015 (Low Income, LEP) Date: 5/21/18

2018 REGIONAL TRANSPORTATION PLAN

Metro

5.5 Funding for safety

Programs and capital projects that improve safety can be funded from a variety of federal, state and local sources. Examples of funding programs that are dedicated specifically to safety and have specific safety criteria include the federal Highway Safety Improvement Program and the Oregon Department of Transportation's All Roads Transportation Safety Program, Safety Leverage funds and Rail Crossing Safety program.

The federal Highway Safety Improvement Program, or HSIP, provides funding for safety hot spots and systemic improvements. All modes are eligible. Cities, counties and the state are eligible to receive the funding. The All Roads Transportation Safety, or ARTS, program administered by the Oregon Department of Transportation, allocates both federal HSIP and state funding. All jurisdictions are eligible for some of the funds and some of the funds are dedicated to state owned facilities. Funding through the ARTS program is focused on reducing serious crashes and both hot spot and systemic treatments. The Oregon Department of Transportation has Safety Leverage funds that can be combined with roadway paving and other maintenance projects on state owned facilities.

How much funding goes to safety projects?

Because the funding sources are varied and are not always specific to transportation safety, it can be difficult to determine how much funding is allocated to address identified safety issues on high injury and/or high risk corridors. In an effort to understand the level of federal and state funding going to projects that address a safety problem, Metro identified investments in safety in the equity assessment for the **2018-2021 Metropolitan Transportation Improvement Program (MTIP)**.[59] This high level assessment provides an indication of spending on safety in the greater Portland area. The assessment found that:

- Approximately 38 percent of the transportation projects in the 2018-2021 MTIP are identified as transportation safety related.
- Approximately 13% of the $1.2 billion 2018-2021 MTIP contributed to safety projects.
- The average cost of transportation safety related projects in the 2018-2021 MTIP is $2.3 million.
- Half of the safety investments in the 2018-2021 MTIP are located in race, income and/or language marginalized communities.

How much funding is needed?

Is the level of spending on safety enough to achieve adopted goals? How much funding is needed to effectively implement state, regional and local transportation safety action plans

[59] April 6, 2017 Memo "Transportation Equity Assessment – 2018-2021 MTIP Results." The MTIP records how all federal transportation money is spent in the Portland metropolitan area. It also monitors and records state- and locally-funded projects that may significantly affect the region's air quality.

and achieve Vision Zero targets is a difficult question to answer. Without crash prediction modeling tools that can help assesses the system wide impacts of future plans and policies, it is challenging to know if the region is investing enough in safety to eliminate fatal and severe injury crashes by 2035. However, the increase in serious crash rates in the past few years indicates that current levels of funding have not been adequate and without an increase in funding and policy implementation, serious crashes will continue to occur.

A 2015 study released by the RAND Corporation found that current funding levels are not adequate and that just a ten percent increase in funding for state transportation safety programs would save more than a thousand lives and avoid more than two-hundred thousand injuries each year while providing a substantial return on investment. The study found that even higher levels of investment would save thousands of lives annually and save billions of dollars.[60]

What's missing?

Among the dedicated funding programs for transportation safety, and other funding sources that may address safety, the region is missing funding which prioritizes corridor-wide, systemic, safety treatments focused on reducing fatal and severe injury crashes. This type of programmatic funding would address the top injury corridors in the region andis needed to address the safety issues on regional high injury corridors.

[60] "Using Cost-Effectiveness Analysis to Prioritize Spending on Traffic Safety" Liisa Ecola, et.al. RAND Corporation, Research Report, December 2015.

CHAPTER 6 MEASURING PROGRESS

This chapter **describes the adopted performance measures** that will be used to track progress towards adopted goals, objectives and targets. Progress towards the region's Vision Zero target will be measured by the number of fatal and severe injury crashes reduced annually.

Regional Safety Target

By 2035 eliminate transportation related fatalities and serious injuries for all users of the region's transportation system, with a sixteen percent reduction by 2020 (as compared to the 2015 five year rolling average), and a fifty percent reduction by 2025.

In addition to tracking observed crashes, Metro will work to develop tools such as crash prediction models that will allow for and support system evaluation measures for future scenarios and planning. Metro will work with regional partners, the Oregon Department of Transportation and the Federal Highway Administration to develop ways to measure safety performance in the future to support decision making.

6.1 Annual safety targets

State Departments of Transportation and Metropolitan Planning Organizations must report on the federally required safety performance measure identified in MAP-21 and the FAST Act. Metro will report on these measures in each update of the Regional Transportation Plan, and in the Metropolitan Service District report of performance measures that Metro is required to submit in accordance with ORS 197.301 to the Department of Land Conservation and Development (DLCD) every two years. Additionally, Metro will report out annually to the Metro Council and the Joint Policy Advisory Committee on Transportation (JPACT).

To satisfy federal requirements, Metro will report on the five-year rolling average of the number of people killed and seriously injured in traffic crashes in the region, per 100 million miles traveled (per VMT) and the number of non-motorized fatalities and serious injuries, as shown in **Figure 52**. Metro is also tracking fatal and serious injuries per 100 thousand people.

Reporting Year (based on a 5-year rolling average)	FHWA Performance Measures						
	Fatalities (People)	Fatality Rate		Severe Injuries (People)	Severe Injury Rate		Non-Motorized Fatalities and Severe Injuries (People)
		Per VMT (People / 100 MVMT)	Per capita (People/ 100k pop)		Per VMT (People / 100 MVMT)	Per capita (People/ 100k pop)	
2011 - 2015	62	0.6	4.0	458	4.5	29.5	113
2014 - 2018	58	0.5	3.6	426	4.0	26.5	105
2015 - 2019	55	0.5	3.4	407	3.8	25.1	101
2016 - 2020	52	0.5	3.2	384	3.6	23.4	95
2017 - 2021	49	0.4	2.9	357	3.3	21.5	88

Source: Oregon Department of Transportation 2011-2015
Note: Due to rounding, addition of numbers across modes may result in minor variation from totals. These measures reflect people killed or seriously injured rather than fatal or serious injury crashes. Severe injuries do not include fatalities.

Figure 52: Metro MPO Safety Performance Targets
Source: Metro

Metro set the annual targets using the same methodology as the Oregon Department of Transportation in the 2016 Transportation Safety Action Plan. Targets are set using the "S-curve" as shown in **Figures 53 and 54**.

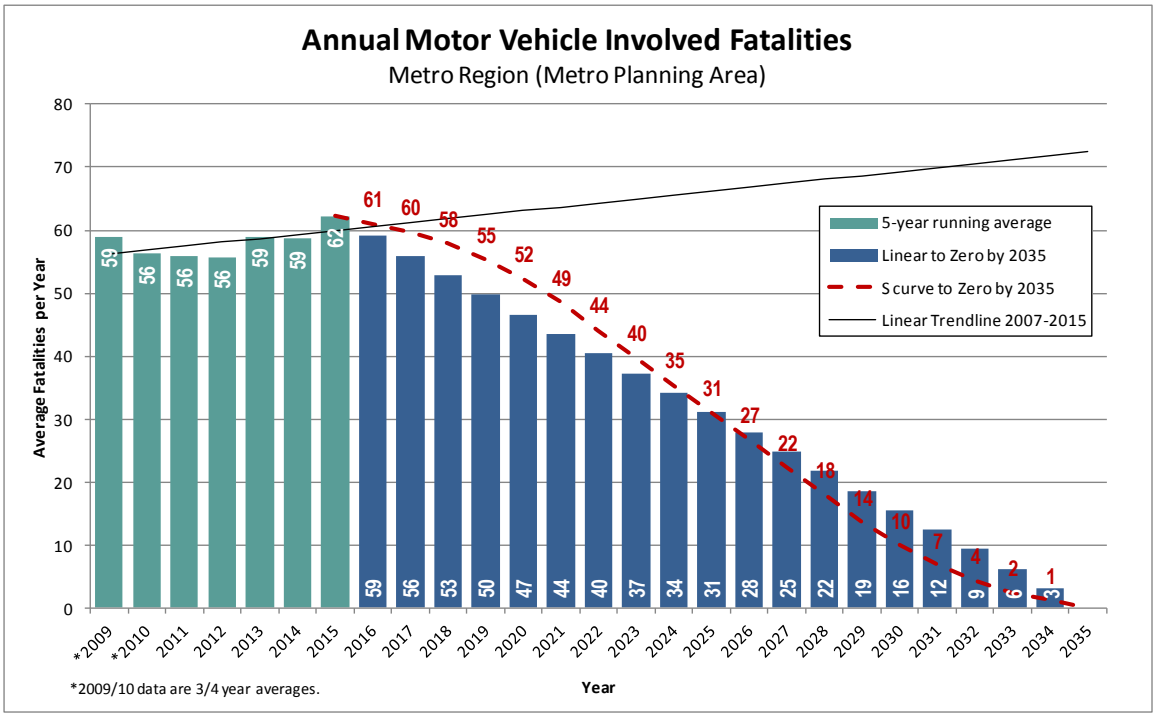


Figure 53: Annual Motor Vehicle Involved Fatalities
Source: Metro

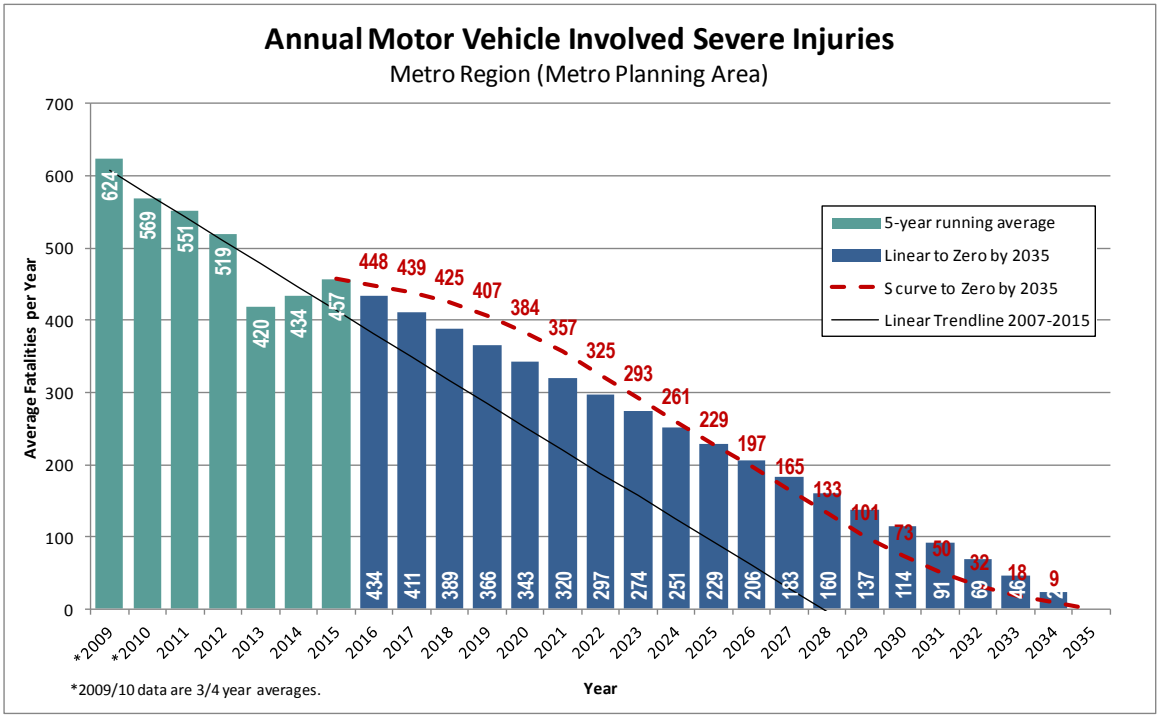


Figure 54: Annual Motor Vehicle Involved Severe Injuries
Source: Metro

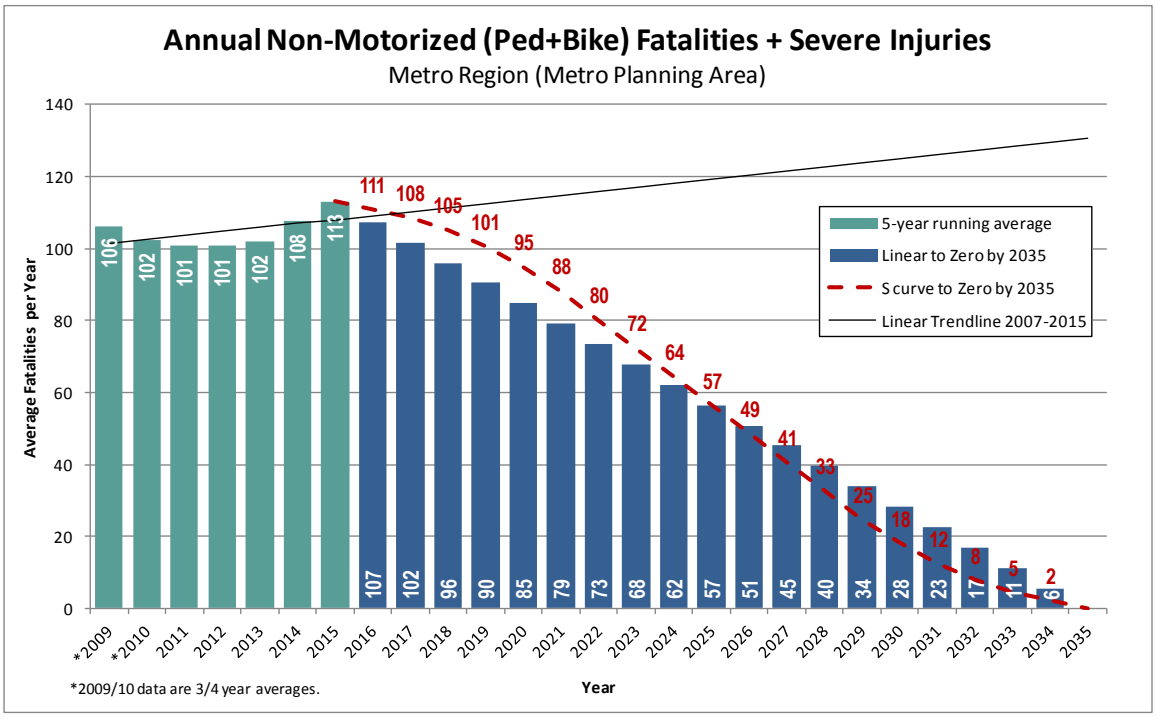


Figure 55: Annual Non-Motorized Fatalities and Severe Injuries
Source: Metro

In addition to the required federal targets, Metro also set targets for the number of fatalities and serious injuries for each mode separately, as well as per 100 million VMT and per 100 thousand people for each mode, as shown in **Figures 55-59**.

	Motor Vehicle Only					
		Fatality Rate			Severe Injury Rate	
Reporting Year (based on a 5-year rolling average)	Fatalities (People)	Per VMT (People / 100 MVMT)	Per capita (People/ 100k pop)	Severe Injuries (People)	Per VMT (People/ 100 MVMT)	Per capita (People/ 100k pop)
2011 - 2015	38	0.4	2.4	369	3.6	23.7
2014 - 2018	35	0.3	2.2	343	3.3	21.4
2015 - 2019	34	0.3	2.1	328	3.1	20.2
2016 - 2020	32	0.3	1.9	310	2.9	18.9
2017 - 2021	30	0.3	1.8	288	2.6	17.3

Source: Oregon Department of Transportation 2011-2015
Note: Due to rounding, addition of numbers across modes may result in minor variation from totals. These measures reflect people killed or seriously injured rather than fatal or serious injury crashes. Severe injuries do not include fatalities.

Figure 56: Metro MPO Motor Vehicle Fatal and Severe Injury Safety Targets
Source: Metro

	Pedestrians					
		Fatality Rate			Severe Injury Rate	
Reporting Year (based on a 5-year rolling average)	Fatalities (People)	Per VMT (People/ 100 MVMT)	Per capita (People/ 100k pop)	Severe Injuries (People)	Per VMT (People/ 100 MVMT)	Per capita (People/ 100k pop)
2011 - 2015 (Base)	22	0.2	1.4	56	0.5	3.6
2014 - 2018	20	0.2	1.3	52	0.5	3.2
2015 - 2019	20	0.2	1.2	49	0.5	3.0
2016 - 2020	18	0.2	1.1	47	0.4	2.8
2017 - 2021	17	0.2	1.0	43	0.4	2.6

Source: Oregon Department of Transportation 2011-2015
Note: Due to rounding, addition of numbers across modes may result in minor variation from totals. These measures reflect people killed or seriously injured rather than fatal or serious injury crashes. Severe injuries do not include fatalities. Includes crashes on freeways.

Figure 57: Metro MPO Pedestrian Fatal and Severe Injury Safety Targets
Source: Metro

	Bicyclists					
		Fatality Rate			Severe Injury Rate	
Reporting Year (based on a 5-year rolling average)	Fatalities (People)	Per VMT (People/ 100 MVMT)	Per capita (People/ 100k pop)	Severe Injuries (People)	Per VMT (People/ 100 MVMT)	Per capita (People/ 100k pop)
2011 - 2015 (Base)	2.2	0.02	0.14	33	0.3	2.1
2014 - 2018	2.0	0.02	0.13	31	0.3	1.9
2015 - 2019	2.0	0.02	0.12	30	0.3	1.8
2016 - 2020	1.8	0.02	0.11	28	0.3	1.7
2017 - 2021	1.7	0.02	0.10	26	0.2	1.6

Source: Oregon Department of Transportation 2011-2015
Note: Due to rounding, addition of numbers across modes may result in minor variation from totals. These measures reflect people killed or seriously injured rather than fatal or serious injury crashes. Severe injuries do not include fatalities. Includes crashes on freeways.

Figure 58: Metro MPO Bicycle Fatal and Severe Injury Safety Targets
Source: Metro

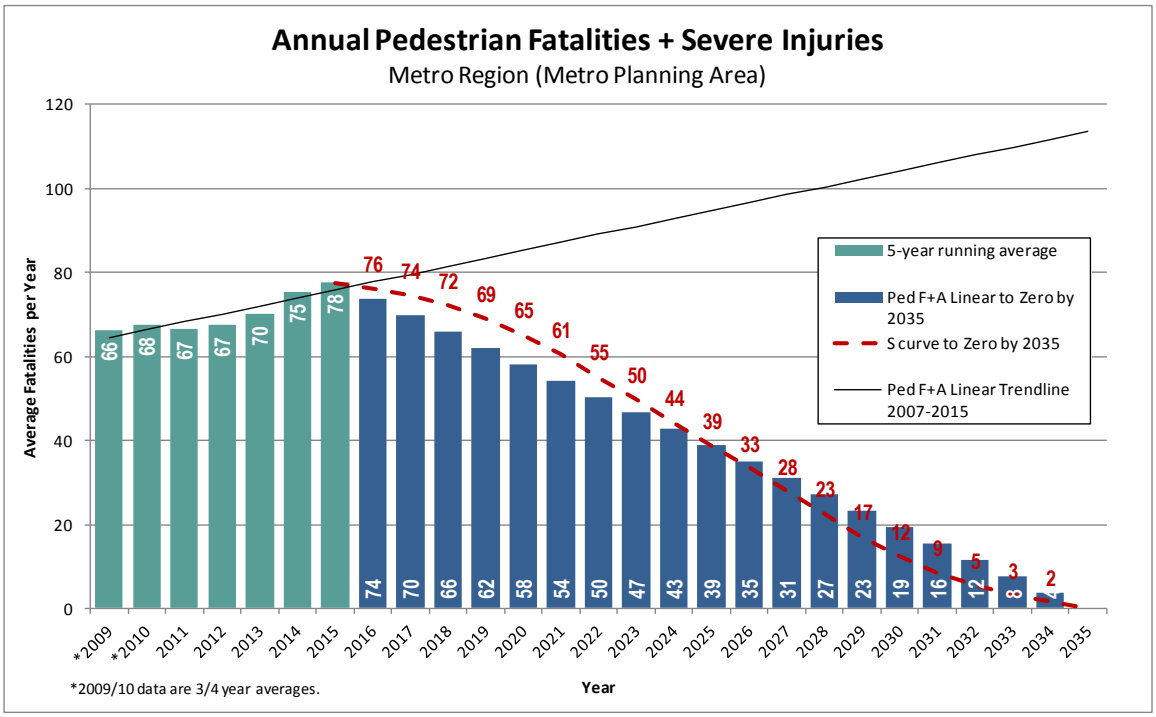


Figure 59: Annual Pedestrian Fatalities and Severe Injuries
Source: Metro

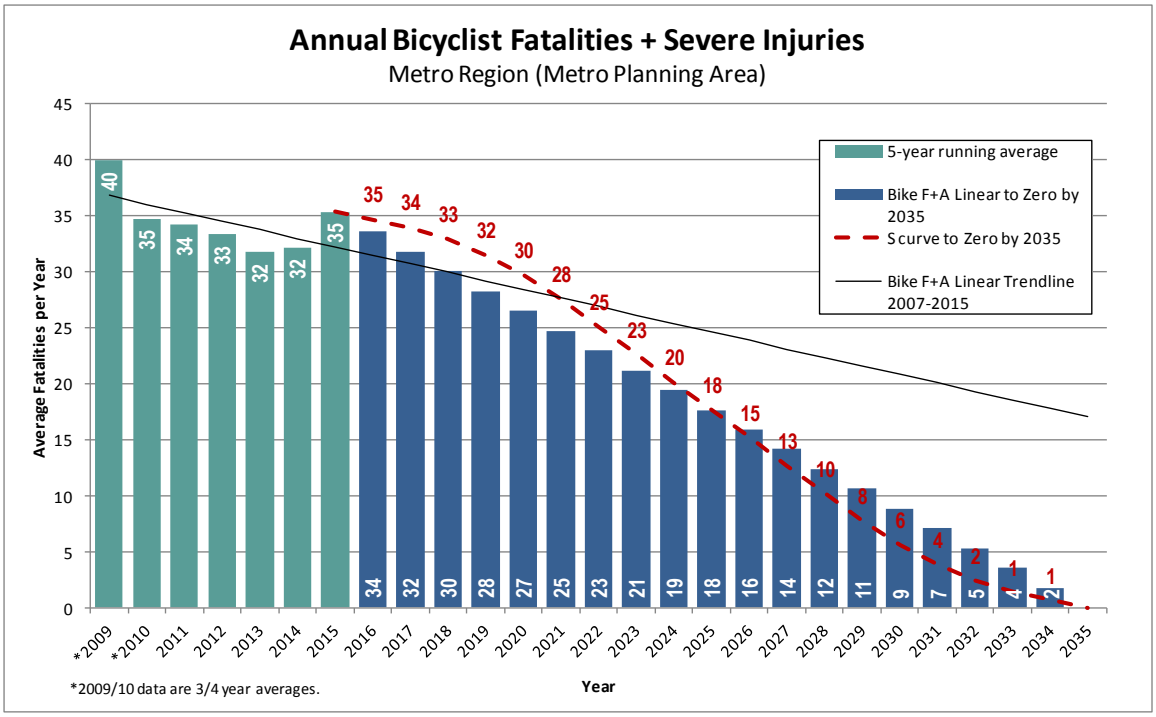


Figure 60: Annual Bicycle Fatalities and Severe Injuries
Source: Metro

ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
ARTS	All Roads Transportation Safety
ASE	Automated Speed Enforcement
AV	Autonomous Vehicle
CRF	Crash Reduction Factor
DLCD	Department of Land Conservation and Development
EMS	Emergency Medical Services
FARS	Fatal Analysis Reporting System
FAST ACT	Fixing America's Surface Transportation Act
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HSM	Highway Safety Manual
HIC	High Injury Corridor
HSIP	Highway Safety Improvement Plan
HSP	Highway Safety Plan
JPACT	Joint Policy Advisory Committee on Transportation
MAP-21	Moving Ahead for Progress in the 21st Century Act
MMLOS	Multi Modal Level of Service
MMUCC	Model Minimum Uniform Crash Criteria Guideline
MPA	Metropolitan Planning Area
MPAC	Metro Policy Advisory Committee
MPO	Metropolitan Planning Organization
MTAC	Metro Technical Advisory Committee
MUTCD	Manual on Uniform Traffic Control Devices
NHSTA	National Highway Safety Traffic Administration
NHS	National Highway System
RATP	Regional Active Transportation Plan
RTFP	Regional Transportation Functional Plan
RTP	Regional Transportation Plan
RTSS	Regional Transportation Safety Strategy
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SHSP	Strategic Highway Safety Plan
SPIS	Safety Priority Indexing System
STIP	Statewide Transportation Improvement Program
ODOT	Oregon Department of Transportation
OTP	Oregon Transportation Plan
UGMFP	Urban Growth Management Functional Plan
SHSP	State Highway Safety Plan
TDM	Transportation Demand Management
TPAC	Transportation Policy Alternatives Committee
TPR	Transportation Planning Rule
TSAP	Transportation Safety Action Plan
TSP	Transportation System Plan
VMT	Vehicle Miles Traveled

REGIONAL TECHNICAL TRANSPORTATION SAFETY WORK GROUP

Metro acknowledges the time and commitment of the Technical Transportation safety Work Group members who provided their expertise in the development of the Regional Transportation Safety Strategy.

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Stacy Shetler	Washington County
Chris Strong	City of Gresham/ MTAC member
Dyami Valentine	Washington County
Clay Veka	City of Portland
Mike Ward	City of Wilsonville

LIST OF PARTNERS

Government alone cannot achieve the broader changes needed to end traffic fatalities. In addition to national, state, regional and local agencies, multiple organizations, private entities and the public play a role in achieving Vision Zero.

National agencies
U.S. Department of Transportation
Federal Highway Administration
National Highway Traffic Safety Administration
Centers for Disease Control

State agencies
Oregon Department of Transportation
Oregon Health Authority
Department of Motor Vehicles
Oregon State Police
Department of Land Conservation and Development
Oregon Liquor Control Commission

Regional Agencies and Districts
Metro
TriMet
SMART
Port of Portland

City and County transportation and land use agencies
Transportation and land use departments/staff for the three counties and twenty-five cities

County public health agencies
Clackamas County Public Health
Multnomah County Public Health
Washington County Public Health

Schools
Public and private, K-college

Elected officials
U.S. Representatives and Senators
State Representatives and Senators
Governor
Metro Council
Metro Joint Policy Advisory Committee on Transportation
City Mayors and Councils
County Commissioners

Appointed committees
Oregon Transportation Commission

Oregon Transportation Safety Committee
Oregon Bicycle and Pedestrian Advisory Committee
Oregon Freight Advisory Committee
Oregon Transit Advisory Committee
Portland pedestrian, bicycle and freight committees
City and county transportation committees

Emergency Service Providers and County and Local Police
Clackamas, Multnomah and Washington County Sheriff's Offices
City Police

County and City Fire & Rescue
Portland Fire and Rescue
Tualatin Valley Fire and Rescue
Clackamas Fire District #1
Multnomah County Fire District #14
Washington County Fire District #2
Gresham Fire
Hillsboro Fire
Cornelius Fire
Forest Grove Fire and Rescue
Gladstone Fire
Lake Oswego Fire

Advocacy and Community Organizations
Oregon Walks
Oregon and SW Washington Families for Safer Streets
Vision Zero Network
Toward Zero Deaths
Safe Routes to School National Partnership
AARP
The Street Trust
Community Cycling Center

Commercial Vehicle Companies
Companies located and/or operating in the region

Industry Groups
Auto insurance companies
Auto manufacturers
AAA

Research and Academic Institutions
Portland State University
ODOT Research
Transportation Research Board (TRB)
Volpe Institute

RESOURCES

State and Local Transportation Safety Action Plans

- Beaverton Transportation Safety Action Plan (2017)
- Portland Vision Zero Action Plan (2016)
- Oregon Transportation Safety Action Plan (2016)
- Oregon Department of Transportation Pedestrian and Bicycle Safety Implementation Plan (2014)
- Hillsboro Transportation Safety Action Plan (2017)
- Washington County Transportation Safety Action Plan (2017 draft)
- Clackamas County Transportation Safety Action Plan (2013-*currently being updated)*

Vision Zero, Road to Zero and Toward Zero Deaths Resources

- *Sustainable and Safe: A Vision and Guidance for Zero Road Deaths*, World Resources Institute, Global Road Safety Facility (2017)
- *Moving from Vision to Action: Fundamental Principles, Policies and Practices to Advance*, Vision Zero Network
- *Vision Zero in the U.S.* (February 2017)
- *9 Components of a Strong Vision Zero Commitment*. Vision Zero Network (2015)
- *Toward Zero Deaths: A National Strategy on Highway Safety* (2014)
- *Safer People, Safer Streets: Summary of the U.S. Department of Transportation Action Plan to Increase Walking and Biking and Reduce Pedestrian and Bicyclist Fatalities* (September 2014)

Race and Ethnicity Safety Research

- *The High Costs of Disparities for People of Color in Multnomah County*, Lee Van Der Voo & Nick Budnick (2017)
- *Racial Bias in Drivers' Yielding Behavior at Crosswalks: Understanding the Effect.* Kimberly Kahn, Portland State University
- *Dangerous by Design*, National Complete Streets Coalition (2016)
- *Vision Zero, Equity & Law Enforcement*, Leah Shahum (2016)
- *Motor Vehicle Traffic-Related Pedestrian Deaths — United States, 2001–2010,"* Centers for Disease Control (2013)

- *Income Disparities in Street features that Encourage Walking,* Bridging the Gap (2012)
- *Pedestrians Dying at Disproportionate Rates in America's Poorer Neighborhoods,* Governing, (August 2014)
- *Racial/Ethnic Differences in Fatality Rates from Motor Vehicle Crashes: An Analysis from a Behavioral and Cultural Perspective*, Huda Hamdan (2013)
- *Alcohol and Highway Safety: A Special Report on Race/Ethnicity and Impaired Driving,* U.S Department of Transportation (2010)
- NHSTA Traffic Safety Facts, Race and Ethnicity Equity (2006)

Data and Research Resources

- *Speed and Crash Risk Research Report,* International Transport Forum and International Traffic Safety Data and Analysis Group (2018)
- *An examination of the increases in pedestrian motor vehicle fatalities during 2009-16,*Insurance Institute for Highway Safety (May 2018)
- *Safety Study: Reducing Speeding-Related Crashes Involving Passenger Vehicles*, National Transportation Safety Board (2017)
- *Safety for All Users Report: A Report Developed by the U.S. Department of Transportation Under Section 1442 of the Fixing America's Surface Transportation (FAST) Act* (December 2017)
- *A Right to the Road: Understanding and Addressing Bicyclist Safety*, Governors Highway Safety Association (2017)
- *Everyone Walks: Understanding and Addressing Pedestrian Safety,* Governors Highway Safety Association (2017)
- *Zendrive Research: Largest Distracted Driving Behavior Study* (April 2017)
- *Summary of Oregon Truck Safety and Guide to the 2017 Commercial Vehicle Safety Plan* (2017)
- National Highway Traffic Safety Administration, Impaired Driving Segmentation Research (2017)
- *Reducing Distracted Driving in Oregon: An Interdisciplinary Approach to a Statewide Problem*, Oregon Department of Transportation Distracted Driving Task Force (2017)
- *Distracted Driving: An Epidemic, A Study of Distracted Driving Attitudes, Behaviors and Barriers Preventing Change*, Southern Oregon University (2016)
- *A Vision for Transportation Safety: Framework for Indentifying Best Practice Strategies to Advance Vision Zero,* Arielle Fleisher, Megan Wier, and Mari Hunte,

Transportation Research Record: Journal of the Transportation Research Board, No. 2582 (2016)

- *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices*, Eighth Edition. DOT HS 812 202. Washington, DC: US Department of Transportation, NHTSA (2015)
- *Traffic Safety Facts, 2015 Motor Vehicle Crashes: Overview*, National Highway Traffic Safety Administration (2015)
- Oregon Health Authority, Injury in Oregon: data report (2014)
- *Crashes vs. Congestion: What's the Cost to Society?* Prepared for AAA by Cambridge Systematics (November 2011)
- Speed Enforcement Camera Systems Operational Guidelines, FHWA & NHTSA (2008)
- National Highway Traffic Safety Administration, State Traffic Safety Information https://cdan.nhtsa.gov/STSI.htm#
- Crash Modification Factors Clearinghouse http://www.cmfclearinghouse.org/

GLOSSARY

Access Management Enables access to land uses while maintaining roadway safety and mobility through controlling access location, design, spacing and operation.

Action Discrete steps to make progress toward a desired outcome(s).

Aggressive Driving A contributing factor to crashes, including one or more of: driving too fast for conditions, following too closely and/or driving in excess of posted speed.

All Roads Transportation Safety (ARTS) Formerly known as the Jurisdictionally Blind Safety Program, is an Oregon Department of Transportation Program that is designed to address safety needs on all public roads in Oregon. The program's goals are to: Increase awareness of safety on all roads; Promote best practices for infrastructure safety; Compliment behavioral safety efforts; Focus limited resources to reduce fatal and serious injury crashes in the State of Oregon. The program is data driven to achieve the greatest benefits in crash reduction and is blind to jurisdiction.

American Association of State Highway and Transportation Officials (AASHTO) A standards setting body which publishes specifications, test protocols and guidelines which are used in highway design and construction throughout the United States. The association represents not only highways but air, rail, water, and public transportation as well, and has a primary goal of fostering the development, operation, and maintenance of an integrated national transportation system. Policies of AASHTO are not federal laws or policies, but rather are ways to coordinate state laws and policies in the field of transportation.

Arterial Street A class of street. Arterial streets interconnect and support the throughway system. Arterials are intended to provide general mobility for travel within the region. Correctly sized arterials at appropriate intervals allow through trips to remain on the arterial system thereby discouraging use of local streets for cut-through travel. Arterial streets link major commercial, residential, industrial and institutional areas. Major arterials serve longer distance through trips and serve more of a regional traffic function. Minor arterials serve shorter, more localized travel within a community. As a result, major arterials usually carry more traffic than minor arterials. Arterial streets are usually spaced about one mile apart and are designed to accommodate bicycle, pedestrian, truck and transit travel.

Arterial traffic calming Designed to manage traffic at higher speeds and volumes, but still minimize speeding and unsafe speeds. Treatments can include raised medians, raised intersections, gateway treatments, textured intersections, refuge islands, road diets and roundabouts.

Automated Speed Enforcement (ASE) The use of a vehicle speed detection system coupled with a camera to identify speeding vehicles. When a speeding vehicle is detected, the camera system is triggered to automatically take photographs of the vehicle, including the license plate and, in some implementations, the driver. Law enforcement and ASE

vendor personnel then review the photographic evidence (typically off site and at a later time) to confirm that a speeding violation occurred, and state motor vehicle administration records are used to determine where to mail a speeding citation.

Autonomous Vehicle (AV) Also known as a driverless car, self-driving car robotic car or an unpiloted ground vehicle that is capable of sensing its environment and navigating without human input.

Basic Rule Speed A speed that is reasonable and prudent considering the conditions at the time. Speeds in excess of the posted speed are evidence of the violation. Basic rule violations can apply on any roadway.

Best Practices For purposes of this document, the term "best practices" is used as a general term of preferred practices accepted and supported by experience of the applicable professional discipline. It is not prescriptive to a particular set of standards or a particular discipline.

Bicycle A vehicle having two tandem wheels, a minimum of 14 inches in diameter, propelled solely by human power, upon which a person or persons may ride. A three-wheeled adult tricycle is considered a bicycle. In Oregon, a bicycle is legally defined as a vehicle. Bicyclists have the same right to the roadways and must obey the same traffic laws as the operators of other vehicles.

Bicycle Facilities A general term denoting improvements and provisions made to accommodate or encourage bicycling, including parking facilities, all bikeways and shared roadways not specifically designated for bicycle use.

Bike Lane A portion of a roadway that has been designated by striping, signing and pavement markings for the preferential or exclusive use of bicyclists.

Bikeway Any road, street, path or right-of-way that is specifically designated in some manner as being open to bicycle travel, either for the exclusive use of bicycles or shared use with other vehicles or pedestrians.

Collector Street A class of street. Collector streets provide both access and circulation between residential, commercial, industrial and agricultural community areas and the arterial system. As such, collectors tend to carry fewer motor vehicles than arterial streets, with reduced travel speeds. Collector streets are usually spaced at half-mile intervals, midway between arterial streets. Collectors may serve as bike, pedestrian and freight access routes, providing local connections to the arterial street network and transit system.

Complete Street A transportation policy and design approach that requires streets to be planned, designed, operated and maintained to enable safe, convenient and comfortable travel and access for users of all ages and abilities regardless of their mode of transportation.

Context Sensitive Design A model for transportation project development that requires a proposed transportation project to be planned not only to serve specific transportation objectives, but also for its effects on the aesthetic, social, economic and environmental values, needs, constraints and opportunities in a larger community setting.

Contributing Factor (to a crash) Circumstances that contribute to a crash, near-crash or incident, including factors related to the driver, the vehicle, the road environment, and other road users. The contributing factors can, for instance, be obtained from observation (e.g., video) or interviews with involved road users.

Countermeasure An activity, initiative or design element to prevent, neutralize, or correct a specific safety problem.

Crash A violent collision, typically of one vehicle with another (vehicles include bicyclists, motorcyclists, freight trucks, school buses, transit buses, etc.), a pedestrian or with a stationary objects such as a pole or guard rail.

Crash Reduction Factor (CRF) The percentage crashes reduced that might be expected after implementing a given countermeasure at a specific site. For example, the installation of centerline rumble strips on a two-lane roadway can expect a fourteen percent reduction in all crashes and a fifty-five percent reduction in head-on crashes.

Data-Driven Safety Analysis Uses data to promote the integration of safety performance into all roadway investment decisions. Broader implementation of quantitative safety analysis so that it becomes an integral part of safety management and project development decision making in order to lead to better targeted roadway investments that result in fewer fatal and serious injury crashes. Decisions are compelled by data, rather than by intuition or by personal experience.

Design Speed A tool to determine the various geometric features of the roadway. The assumed design speed should be a logical one with respect to the topography, anticipated operating speed, the adjacent land use and the functional classification of the highway. Design speed is not necessarily the maximum safe speed, nor is it necessarily the same as the designated speed.

Designated Speed As opposed to statutory speeds (e.g., 20 mph in a business district), must be established by a defined speed zoning process and investigation. Designated speeds are approved by the Oregon Department of Transportation.

Distracted Driving Engagement in any activity that could divert a person's attention away from the primary task of driving. Typical distractions include eating, dealing with passengers or pets, changing settings on vehicle devices, and, increasingly, using a cellular phone or other electronic device.

Emerging Technologies Are the technical innovations representing progressive developments within a field aimed at providing competitive advantage.

Emergency Medical Services (EMS) The treatment and transport of people in crisis health situations that may be life threatening. Emergency medical support is applied in a wide variety of situations, including traffic crashes.

Equity See Racial Equity and Social Equity

Equity Focus Areas Census tracts with higher than regional average concentrations and double the density of one or more of the following: people of color, English language learners, and/or people with lower income. Most of these areas also include higher than regional average concentrations of other historically marginalized communities, including young people, older adults and people living with disabilities.

Fatal Analysis Reporting System (FARS) A nationwide census providing NHTSA, Congress and the American public yearly data regarding fatal injuries suffered in motor vehicle traffic crashes.

Fixing America's Surface Transportation Act (**Fast Act)** A funding and authorization bill to govern United States Federal surface transportation spending, signed by President Obama on December 4, 2015. It is subsequent to MAP-21, but does not replace all of the applicable requirements of that earlier law, so both must be referenced.

Fatal Crash A death that occurs as a result of a motor vehicle crash, either at the scene or within 30 days (as a result of the crash).

Fatality Rate The number of traffic fatalities per number of vehicle miles traveled or per population in a given year. The rate is usually expressed in terms of fatalities per one hundred million miles traveled and fatalities per one million or one hundred thousand people.

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

Fixed Speed Enforcement Camera See Speed Enforcement Camera.

Freeway A design for a Throughway. Directional travel lanes are separated by a physical barrier, and access and egress points are limited to on-and off-ramp locations or a very limited number of at-grade intersections.

Functional Classification The class or group of roads to which the road belongs. There are three main functional classes as defined by the United States Federal Highway Administration: arterial, collector and local. Throughways and freeways fall under arterial in the federal classification system.

Goal States a desired outcome toward which actions are focused to make progress toward a long-term vision.

Health A condition of complete physical, mental and emotional well-being, not merely the absence of disease. Reducing serious crashes is critical to public health.

High Crash Location Highway or road segments identified by the frequency and severity of motor vehicle crashes. Identification of high crash locations is part of the safety problem identification process.

High Injury Corridors and Intersections (Metro) Roadways where the highest concentrations of fatal and severe injury crashes involving people in cars, biking and walking occur on the Regional Transportation Network. Corridors and intersections were analyzed to determine aggregate crash scores based on the frequency and severity of crashes, using the following methodology:

- Fatal and Injury A (serious) crashes for all modes are assigned to the network; "Injury B", "Injury C", and "PDO (property damage only)" crashes involving bikes and pedestrians are also assigned to the network.
- Fatal and Injury A crashes are given a weight of 10.
- Roadways are analyzed in mile segments; if a segment has only one Fatal or Injury A crash it must also have at least one B/C (minor injury) crash, for the same mode, to be included in the analysis.
- Roadway segments are assigned an N-score (or "crash score") by calculating the weighted sum by mode and normalizing it by the roadway length. To reach 60 percent of Fatal and Severe Injury crashes, roadway segments had to have an N-score of 39 or higher; high injury Bicycle Corridors had to have an N-score of 6 or more, and high injury Pedestrian Corridors had to have an N-score of 15 or more. Intersections with the highest weighted crash scores were also identified; 5 percent of intersections had an N-score (or "crash score") higher than 80 and are also shown on the map, and 1 percent of intersections (the top 1%) had to have an N-score higher than 128.

High Risk Roadways Characteristics of high risk roads are identified by looking at crash history on an aggregate basis to identify severe crash types (e.g. pedestrian) and then use the roadway characteristics associated with particular crash types (e.g. arterial roadways with four or more lanes, posted speed over 35 mph, unlit streets) to understand which roadways may have a higher risk for the same type of severe crash (even if not crashes have yet occurred).

High Visibility Enforcement (HVE) Conspicuous enforcement activities conducted in areas with a high risk of crashes. This method has proven effective in detecting alcohol-impairment and ensuring seat belt use. The most recognized type of HVE is accompanied by nationwide, large scale public media campaigns. HVE can also be integrated into the daily patrol routine, thereby indicating to the public that traffic enforcement is a law enforcement priority.

Highway Safety Improvement Program (HSIP) A core Federal-aid program with the purpose to achieve a significant reduction in traffic fatalities and serious injuries on all public roads, including non-State-owned roads and roads on tribal land. The HSIP requires a data-driven, strategic approach to improving highway safety on all public roads with a focus on performance.

Historically Marginalized Communities Is a term used for communities of people that have been historically excluded from critical aspects of social participation including voting, education, housing and more. Historical marginalization is often a result of systematic exclusion based on devaluation of any individual existing outside of the dominant culture.

Highway Safety Manual (HSM) The recognized source of information and methods for quantitatively evaluating traffic safety performance on existing or proposed roadways.

Highway Safety Plan (HSP) See Strategic Highway Safety Plan.

Impaired Driving Driving a vehicle while the driver's reflexes have suffered from alcohol or other drugs to a point that is generally considered unsafe to operate a vehicle.

Injury A/ Incapacitating Injury/ Severe Injury Synonymous terms referring to an injury from a motor-vehicle crash that prevents the injured party from walking, driving, or normally continuing the activities they were capable of performing before the injury occurred. Examples include severed, broken or distorted limbs, skull or chest injuries, abdominal injuries, unconscious at or when taken from the crash scene, unable to leave crash scene without assistance, etc.

Injury B / Moderate injury/ Visible Injury Synonymous terms referring to injuries from a motor-vehicle crash which are evident to observers at the scene of the crash. Examples include a visible lump, abrasions, cuts, bruises, lacerations, etc.

Injury C/ Minor injury/ Complaint of Pain Synonymous terms referring to injuries indicated by the victim. Examples include momentary unconsciousness, complaint of pain, limping, nausea, etc.

Intelligent Speed Adaption Technologies Any system that ensures that vehicle speed does not exceed a safe or legally enforced speed. In case of potential speeding, a human driver can be alerted, or the speed reduced automatically.

KABCO Injury Scale An injury rating scale used to determine the severity of injuries ranging from Severe Injury (A) to Minor Injury (C), and property damage only (O).

Local Jurisdiction For the purpose of this document, this term refers to a city or county within the Metro boundary.

Local Street Primarily provide direct access to adjacent land. While local streets are not intended to serve through traffic, the aggregate effect of local street design impacts the effectiveness of the arterial and collector system when local travel is restricted by a lack of

connecting routes and local trips are forced onto the arterial street network. In the urban area, local roadway system designs often discourage "through traffic movement." Regional regulations require local street connections spaced no more than 530 feet in new residential and mixed used areas, and cul-de-sacs are limited to 200 feet in length. These connectivity requirements ensure that a lack of adequate local street connections does not result in the arterial system becoming congested. While the focus for local streets has been on motor vehicle traffic, they are developed as multi-modal facilities that accommodate bicycles, pedestrians and sometimes transit.

Lower Income Focus Area Census tracts with higher than regional average concentrations and double the density of people with lower income. Lower income is defined as people with incomes below 200% of the federal poverty level (i.e., with incomes up to twice the level of poverty), as defined by the U.S. Census Bureau for 2016.

Moving Ahead for Progress in the 21st Century Act (MAP-21) (P.L. 112-141) Reauthorization of Federal highway funding, signed into law by President Obama on July 6, 2012. Subsequent adoption of the FAST Act does not replace MAP-21 in all areas of regulation of transportation safety planning and funding, so both must be referenced.

Metro Planning Area Boundary (MPA) The geographic area determined by agreement between the Metropolitan Planning Organization (MPO) and the Governor, in which the MPO conducts federally mandated transportation planning work, including: a long-range Regional Transportation Plan, the Metropolitan Transportation Improvement Program for capital improvements identified for a four-year construction period, a Unified Planning Work Program, a congestion management process and conformity to the state implementation plan for air quality for transportation related emissions.

Model Minimum Uniform Crash Criteria Guideline (MMUCC) A minimum, standardized data set for describing motor vehicle crashes and the vehicles, persons and environment involved. The Guideline is designed to generate the information necessary to improve highway safety within each state and nationally.

Motorcycle A motor vehicle having a seat or saddle for the use of the rider and designed to travel on not more than three wheels in contact with the ground. Motorcycles include mopeds, two or three-wheeled motorcycles, off-road motorcycles, scooters, mini bikes and pocket bikes.

Metropolitan Planning Organization (MPO) A regional policy body, required in urbanized areas with populations of more than 50,000 and designated by the governor of the state. MPOs are responsible in cooperation with the state and other transportation providers for carrying out the metropolitan transportation planning requirements of federal highway and transit legislation.

Manual on Uniform Traffic Control Devices (MUTCD) A document issued by the Federal Highway Administration of the United States Department of Transportation to specify the

standards by which traffic signs, road surface markings, and signals are designed, installed and used.

Mode A type of transportation distinguished by means used (e.g., such as walking, bike, bus, single- or high-occupancy vehicle, bus, train, truck, air, marine).

National Highway System (NHS) Title 23 of the U.S. Code section 103 states that the purpose of the NHS is to provide an interconnected system of principal routes that serve major population centers, international border crossings, ports, airports, public transportation facilities, intermodal transportation facilities, major travel destinations, and meet national defense requirements and serves interstate and inter-regional travel. Facilities included in the NHS are of regional significance.

National Highway Traffic Safety Administration (NHTSA) An agency of the United States Department of Transportation with the mission to "Save lives, prevent injuries and reduce economic costs due to road traffic crashes, through education, research, safety standards and enforcement activity."

National Transportation Safety Board An independent U.S. government investigative agency responsible for civil transportation accident investigation. In this role, the NTSB investigates and reports on aviation accidents and incidents, certain types of highway crashes, ship and marine accidents, pipeline incidents and railroad accidents.

Objective (in a plan) Identifies a measureable desired outcome and means for achieving a goal(s) to guide action within the plan period.

Older Adults (vulnerable) The Moving Ahead for Progress in the 21st Century (MAP-21) Act created a new Special Rule for older drivers and pedestrians under 23 USC 148(g)(2), which was continued under the Fixing America's Surface Transportation (FAST) Act. If the rate per capita of traffic fatalities and serious injuries for drivers and pedestrians over the age of 65 in a State increases over the most recent two year period, this Special Rule requires a State to include strategies to address the increases in those rates in their State Strategic Highway Safety Plan (SHSP). FHWA issued the Section 148: Older Drivers and Pedestrians Special Rule Final Guidance in May 2016.[61] TriMet's Coordinated Transportation Plan for Seniors and Persons With Disabilities identifies several principles and actions related to addressing safety and security concerns getting to, at transit stops and on transit.

Operating Speed The speed at which motor vehicles operate on that road.

Oregon Transportation Plan The official statewide intermodal transportation plan that is developed through the statewide transportation planning process by ODOT.

[61] U.S. Department of Transportation, Federal Highway Administration Older Drivers and Pedestrians Special Rule. https://safety.fhwa.dot.gov/hsip/older/

Oregon Transportation Safety Action Plan Is the state of Oregon's Strategic Highway Safety Plan (SHSP).

Pedestrian A person traveling on foot, in a wheelchair or in another health-related mobility device.

Pedestrian Facility A facility provided for the benefit and safety of pedestrian travel, including walkways, protected street crossings, crosswalks, plazas, signs, signals, pedestrian scale streetlighting and benches.

Per Capita Or, per person. Used to describe crash rate per population. Except where otherwise noted, crash rates are per million residents in this document.

Per Vehicle Miles Traveled (VMT) Is used to describe rate of something per the number of motor vehicle miles traveled, such as the crash rate per motorized vehicle miles. Except where otherwise noted, crash rates are per 100-million motorized vehicle miles travelled in this document.

People of Color Focus Area Census tracts with higher than regional average concentrations and double the density of one or more of the following: people of color and/or English language learners.

Performance Measures Also called indicators. A measure of how well the transportation system is performing that is used to evaluate the success of the objective with quantitative or qualitative data and provide feedback in the plan's decision-making process. Some measures can be used to predict the future as part of an evaluation process using forecasted data, while other measures can be used to monitor changes based on actual empirical or observed data. In both cases, they can be applied at a system-level, corridor-level and/or project level, and provide the planning process with a basis for evaluating alternatives and making decisions on future transportation investments. They can also be used to monitor performance of the plan in between updates to evaluate the need for refinements to policies, investment strategies or other elements of the plan.

Person Trip Refers to a trip made by a person from one location to another, whether as a driver, passenger, bicyclist or pedestrian.

Policy A policy is a statement of intent and describes a direction and a course of action adopted and pursued by a government to achieve desired outcome(s).

Portland Metro Region Comprised of twenty-five cities and the urbanized area of Clackamas, Multnomah and Washington Counties. Is the geographic scope of this document, and is defined as area within the Metropolitan Planning Area boundary.

Posted Speed The speeds indicated on signs along the roadway. When speeds differ from statutory speeds there must be a posted sign indicating the different speed.

Protected Bike Lanes A bikeway that is physically separated from auto traffic. Typically, they are created using planters, curbs, parked cars, or posts and are essential for creating a complete network of bike-friendly routes. For bicyclists, safety increases significantly when there is physical separation from motorists through infrastructure. Fully protected bikeways can reduce bicycle injury risk up to 90 percent.[62] Another report found that on-street bike lanes that use barriers to physically separate bicyclists from motor vehicles are 89 percent safer than streets with parked cars and without bicycling infrastructure. When physical separation is not possible, infrastructure such as striped bike lanes, bicycle boulevards and bike boxes help reduce the risk of conflict with motor vehicles.[63]

Public Health The health of the population as a whole, especially as monitored, regulated and promoted by the state.

Racial Equity When race can no longer be used to predict life outcomes and outcomes for all groups are improved.

Road Safety Audit A formal safety performance examination of an existing or future road or intersection by an independent multidisciplinary audit team. (23 CFR § 924.3).

Road Users A motorist, passenger, public transportation operator or user, truck driver, bicyclist, motorcyclist or pedestrian, including a person with disabilities. (23 USC section 148)

Roadway Departure Crash A type of crash. As used in this plan, note that the roadway or lane departure definition excludes intersections, pedestrian related and bicycle related crashes.

Regional Transportation Plan The official multimodal transportation plan that is developed and adopted through the metropolitan transportation planning process for the Portland metropolitan region.

Regional Transportation System Is identified on the regional transportation system policy maps in the Regional Transportation Plan. The system is limited to facilities of regional significance generally including regional arterials and throughways, high capacity transit and regional transit systems, regional multi-use trails with a transportation function, bicycle and pedestrian facilities that are located on or connect directly to other elements of the regional transportation system and air and marine terminals, as well as regional pipeline and rail systems.

Safety (in transportation) Protection from death or bodily injury from a motor-vehicle crash through design, regulation, management, technology and operation of the transportation system.

[62] "Route Infrastructure and the Risk of Injuries to Bicyclists: a Case-Crossover Study," Teschke, et al. American Journal of Public Health, Vol. 102, No. 12, December 2012.
[63] A Right to the Road, p.48, GHSA, 2017.

Safety Benefit Projects (in the Metro Regional Transportation Plan) Projects with design features to increase safety for one or more roadway user. These projects may not necessarily address an identified safety issue at an identified high injury or high risk location, but they do include design treatments known to increase safety and reduce serious crashes. Examples include adding sidewalks, bikeways, medians, center turn lanes and intersection or crossing treatments.

Safety Project (in the Metro Regional Transportation Plan) Has the primary purpose of reducing fatal and severe injury crashes or reducing crashes by addressing a documented safety problem at a documented high injury or high risk location with one or more proven safety counter measures.

Safe Routes to School A comprehensive engineering/education program focused on youth school travel that aims to create safe, convenient, and fun opportunities for children to walk and roll (bike, scooter, etc.) to and from schools. City or school district based programs incorporate evaluation, education, encouragement, engineering, enforcement and equity with the goal of increasing walking and rolling to school.

Safe System Approach A data-driven, strategic approach to roadway safety that aims to eliminate fatal and severe injury crashes. The approach is based on a foundational understanding of the underlying causes of traffic fatalities and severe injuries (using data) and is based on the principle that errors are inevitable but serious crashes should not be. Transportation safety policies that use a Safe System approach include Vision Zero, Towards Zero Deaths, Road to Zero and Sustainable Safety.

Safe System Approach Speed Setting Speed limits are set according to the likely crash types, the resulting impact forces and the human body's ability to withstand these forces. It allows for human errors (that is, accepting humans will make mistakes) and acknowledges that humans are physically vulnerable (that is, physical tolerance to impact is limited). Therefore, in this approach, speed limits are set to minimize death and severe injury as a consequence of a crash.

Safety Data Includes, but is not limited to, crash, roadway and traffic data on all public roads. For railway- highway grade crossings, safety data also includes the characteristics of highway and train traffic, licensing and vehicle data.

Security (public and personal) Protection from intentional criminal or antisocial acts while engaged in trip making through design, regulation, management, technology and operation of the transportation system.

Serious Crash In this document refers to the total number of Fatal and Severe Injury (Injury A) crashes combined.

Severity A measurement of the degree of seriousness concerning both vehicle impact (damage) and bodily injuries sustained by victims in a traffic crash.

Stakeholders Individuals and organizations with an interest in or who are affected by the transportation planning process, including federal, state, regional and local officials and jurisdictions, institutions, community groups, transit operators, freight companies, shippers, non-governmental organizations, advocacy groups, the general public and people who have traditionally been underrepresented.

State Highways In Oregon, is a network of roads that are owned and maintained by the Highway Division of the Oregon Department of Transportation (ODOT), including Oregon's portion of the Interstate Highway System.

State Transportation Improvement Program (STIP) The funding and scheduling document for major street, highway and transit projects in Oregon for a four-year period. The document is produced by ODOT, consistent with the Oregon Transportation Plan (the statewide transportation plan) and planning processes as well as regional transportation plans and process and the Metropolitan Transportation Improvement.

Strategic Highway Safety Plan (SHSP) A comprehensive, multi-disciplinary plan, based on safety data developed by a State Department of Transportation in accordance with 23 U.S.C. 148.

Side Guard for Trucks Vehicle-based safety devices designed to keep pedestrians, bicyclists, and motorcyclists from being run over by a large truck's rear wheels in a side-impact collision.

Social Equity The idea that all members of a societal organization or community should have access to the benefits associated with civil society. The pursuit of an equitable society requires the recognition that there are a number of attributes that give members of a society more or less privilege and that in order to provide equitable situations, the impacts of these privileges (or lack thereof) must be addressed. For transportation, equity refers to fair treatment or equal access to transportation services and options. In the context of safety, transportation equity relates to improving the travel choices and the safety of travel while not unfairly impacting one group or mode of transportation. More specifically, it means improved safety for all transportation options and lessening the risks or hazards associated with different choices of transportation.

Speed Enforcement Camera A camera which captures an image of a vehicle for the purposes of speed enforcement, and does not include hand held radar and other devices operated by law enforcement officers to make an on-the-scene traffic stop, issue a traffic citation or other enforcement action at the time of the violation.

Speed Limit Speed limits are limited to specific roadways such as interstates, roadways within city limits and school speed zones. In addition, speed limits apply to certain types of vehicles on any roadway – large trucks, school buses and vehicles transporting children or workers.

Speeding Driving too fast for conditions and/or driving in excess of posted speed.

Speed-Related Crashes Attributes of crash include driving too fast for conditions and/or driving in excess of posted speed (note that duplicate crashes are not counted more than once).

Safety Priority Indexing System (SPIS) A systemic scoring method that identifies potential safety problems on state highways. The SPIS score is based on three years of crash data and considers crash frequency, crash rate and crash severity. A highway segment becomes a SPIS site if a location has: 1) three or more crashes OR; 2) one or more fatal crashes, over the three-year period.

Spot Safety Improvement An improvement or set of improvements that is implemented at a specific location on the basis of location-specific crash experience or other data-driven means.

State Highway Safety Improvement Program A program of highway safety improvement projects, activities, plans and reports carried out as part of the Statewide transportation improvement program under section 135(g). (23 USC section 148)

Statutory Speeds Roadway speed that is specifically described in the law, such as 15 mph in an alley, 20 mph in a business district, 20 mph in a school zone, 25 mph in a residence district and 65 mph on most freeway sections. Statutory speeds are not required to be posted.

Statewide Transportation Improvement Program (STIP) Oregon Department of Transportation's capital improvement program for state and federally-funded projects.

Strategy Involves setting goals, determining actions to achieve the goals and mobilizing resources to execute the actions. A strategy describes how the ends (goals) will be achieved by the means (resources).

Strategic Plan Defines the desired direction and outcomes to guide decisions for allocating resources to pursue the strategy.

Strategic Highway Safety Plan (SHSP) A State's comprehensive transportation safety plan, based on safety data, developed after consultation with a broad range of safety stakeholders and approved by the Governor of the State or a responsible State agency. It is developed by a State Department of Transportation in accordance with 23 U.S.C. 148. To obligate HSIP funds, among other requirements, a State shall have in effect a State highway safety improvement program under which the State develops, implements and updates a Strategic Highway Safety Plan (SHSP) that identifies and analyzes highway safety problems and opportunities as described under the program.

Street A generally gravel or concrete- or asphalt-surfaced facility. The term collectively refers to arterial, collector and local streets that are located in 2040 mixed-use corridors, industrial areas, employment areas and neighborhoods. While the focus for streets has been on motor vehicle traffic, they are designed as multi-modal facilities that accommodate

bicycles, pedestrians and transit, with an emphasis on vehicle mobility and special pedestrian infrastructure on transit streets.

Sustainability Using, developing and protecting resources in a manner that enables people to meet current needs and provides that future generations can meet future needs, from the joint perspective of environmental, economic and community objectives. This definition of sustainability is from the 2006 Oregon Transportation Plan and ORS 184.421(4). The 2001 Oregon Sustainability Act and 2007 Oregon Business Plan maintain that these principles of sustainability can stimulate innovation, advance global competitiveness and improve quality of life in communities throughout the state.

Systemic Safety Improvement An improvement or set of improvements that is widely implemented (e.g. an entire corridor or an entire transportation network) based on high-risk roadway features that are correlated with particular severe crash types.

Target A numerical goal or stated direction to be achieved for which quantifiable or directional targets may be set, assigning a value to what the Regional Transportation Plan is trying to achieve. Targets are expressed in quantitative terms and provide an important measure of progress toward achieving different goals within a timeframe specified for it to be achieved.

Traffic Refers to movement of motorized vehicles, non-motorized vehicles and pedestrians on transportation facilities. Often traffic levels are expressed as the number of units moving over or through a particular location during a specific time period.

Toward Zero Deaths Is the United States' highway safety vision. The National Strategy on Highway Safety provides a platform of consistency for state agencies, private industry, national organizations and others to develop safety plans that prioritize traffic safety culture and promote the national Toward Zero Deaths vision. As a strategic policy it is similar to Vision Zero.

Transportation Demand Management (TDM) A general term for any action or set of strategies designed to influence the intensity, timing and distribution of travel in order to make more efficient use of transportation infrastructure and services. Methods may include but are not limited to offering other modes of travel such as walking, bicycling, ride-sharing and vanpool programs, car sharing, providing opportunities to link or "chain" trips together, individualized marketing and trip-reduction ordinances.

Transportation Planning Rule (TPR) Oregon's statewide planning goals established state policies in 19 different areas. The TPR implements the Land Conservation and Development Commission's Planning Goal 12 (Transportation) which requires ODOT, MPOs, Counties and Cities, per OAR 660-012-0015 (2) and (3), to prepare a Transportation System Plan (TSP) to identify transportation facilities and services to meet state, regional and local needs, as well as the needs of the transportation disadvantaged and the needs for movement of goods and services to support planned industrial and commercial development, per OAR 660-012-0030(1).

Transportation System Management (TSM) Strategies and techniques for increasing the efficiency, safety, capacity or level of service of a transportation facility without major new capital improvements. Examples include traffic signal improvements, traffic control devices such as medians, parking removal, channelization, access management, re-striping of high occupancy vehicle lanes, ramp metering, incident response, targeted traffic enforcement and programs that smooth transit operations.

Transportation System Plan (TSP) The transportation element of the comprehensive plan for one or more transportation facilities that is planned, developed, operated and maintained in a coordinated manner to supply continuity of movement between modes and between geographic and jurisdictional areas. The TSP supports the development patterns and land uses contained in adopted community plans. The TSP includes a comprehensive analysis and identification of transportation needs associated with adopted land use plans. The TSP complies with Oregon's Transportation Planning Rule, as described in statewide Planning Goal 12.

Trip A one-way movement of a person or vehicle between two points. A person who leaves home on one vehicle, transfers to a second vehicle to arrive at a destination, leaves the destination on a third vehicle and has to transfer to yet another vehicle to complete the journey home has made four unlinked passenger trips.

Urban Growth Boundary The politically defined boundary around an urban area beyond which no urban improvements may occur. In Oregon, UGBs are defined so as to accommodate projected population and employment growth within a 20-year planning horizon. A formal process has been established for periodically reviewing and updating the UGB so that it meets forecasted population and employment growth.

Value Pricing A demand management strategy that involves the application of market pricing (through variable tolls, variable priced lanes, area-wide charges or cordon charges) to the use of roadways at different times of day. Also called congestion pricing or peak period pricing.

Vision In this document, an aspirational statement of what the region is trying to achieve over the long-term through policy and investment decisions.

Vision Zero A system and approach to public policy developed by the Swedish government which stresses safe interaction between road, vehicle and users. Highlighted elements include a moral imperative to preserve life and that the system conditions and vehicles are adapted to match the capabilities of the people that use them. Vision Zero employs the Safe System approach.

Volume- to-Capacity (v/c) Ratio This is a measure of potential roadway capacity. A ratio expressing the relationship between the existing or anticipated volume of traffic on a roadway and the designed capacity of the facility. V/C standards set ratios as a minimum operating standard. Deficiencies can be addressed by lowering traffic volumes through

demand management, transit, etc. or by increasing capacity through access management, signal timing, adding lanes, etc., or a combination of methods.

Vehicle miles traveled (VMT) A measurement of the total miles traveled by all vehicles for a specified time period. For regional planning purposes, VMT generally includes trips with an origin and a destination within the MPA boundary and excludes pass through trips (i.e., trips with a beginning and end point outside of the MPO) and external trips (i.e., trips with a beginning or end point outside of the MPO boundary). VMT is often estimated prospectively through the use of metropolitan area transportation models.

Vulnerable Users In this document, refers to groups of people that are more vulnerable to being killed or severely injured in traffic crashes. Vulnerable users are people that are more vulnerable to being killed or seriously injured in crashes. Vulnerable users are pedestrians, bicyclists, motorcycle operators, children, older adults, road construction workers, people with disabilities, people of color and people with low income.

LIST OF HIGH INJURY CORRIDORS

The following list of high injury corridors was determined using 2010-2014 Oregon Department of Transportation crash data. Analysis to determine the corridors will be replicated approximately every five years prior to the update of the Regional Transportation Plan. It is likely that the corridors will change over time and that there may be fewer corridors as safety plans, policies and projects are implemented.

The list of corridors are ordered based on average annual number of serious crashes per mile, based on data from 2010-2014. There are 181 corridors identified. Corridors at the top of the list have an annual average of nearly two serious crashes per mile; corridors at the bottom of the list have approximately 0.2 serious crashes per mile.

The list includes the corridor name, direction if applicable, extent and jurisdiction or facility owner. The list also identifies if the corridor is on the high injury network for pedestrians, bicycles, auto only, all three or the combined network. Some corridors are only on one of the networks, or on all four. Note that some corridors are only on the combined network, which identifies where 60 percent of all serious crashes are occurring, regardless of mode; the other networks identify where 50 percent of serious crashes for each mode are occurring.

Corridors	Miles of Streets	% of all serious crashes (2010-2014)	% regional transportation network (1,739 miles)	% of all streets (6,565 miles)
Regional Combined HIC (auto, bike, pedestrian)	398	60%	23%	6%
Auto HIC (auto only)	282	50%	16%	4%
Bike HIC (bike/auto)	177	50%	10%	3%
Ped HIC (pedestrian/auto)	133	50%	8%	2%

Refer to the April 2017 High Injury Corridors and Intersections Report for additional information.

Regional High Injury Corridors, 2010-2014 Serious Crashes within the MPO Planning Area					Network						
#	High Injury Corridors (by serious crashes per mile)	From	To	Facility Owner or Jurisdiction	Ped	Bike	Auto	All	Annual Average Serious Crashes/ Mile	Corridor Length (Mile)	Total Serious Crashes 2010-2014
1	I-5 SB	I-405 at Fremont Bridge	Burnside Bridge	ODOT	●		●	●	1.7	1.5	13
2	SE Division St.	SE 7th Ave.	SE 190th Ave.	Gresham, Portland	●	●	●	●	1.7	9.3	80
3	Hwy 8 - N Adair St.	Pacific Ave.	E Baseline	ODOT		●	●	●	1.7	1.5	13
4	I-5 NB	Marquam Bridge (East Bank)	I-405 at Fremont Bridge	ODOT	●		●	●	1.4	2.5	18
5	SE 11th Ave.	SE Sandy Blvd.	SE Milwaukie Ave.	Portland	●	●	●	●	1.4	1.3	9
6	NW Broadway	NW Naito	SW 4th	Portland	●	●	●	●	1.4	1.9	13
7	Hwy 8 - SE/SW Tualatin Valley Highway	SW Cedar Hills Blvd.	SE 10th Ave. (Hwy 8)	ODOT	●	●	●	●	1.4	8.1	55
8	SE/NE 181st Ave.	NE Sandy Blvd.	SE Yamhill St.	Gresham	●	●	●	●	1.3	2.1	14
9	SE/NE Grand Ave.	SE Powell Blvd.	NE Broadway	Portland	●	●	●	●	1.2	2.7	16
10	SE/NE 82nd Ave.	E Arlington St.	N Killingsworth St.	ODOT	●	●	●	●	1.1	13.1	75
11	SE Foster Blvd.	SE 50th & Powell	SE 136th Ave.	Portland	●	●	●	●	1.1	4.7	26
12	Hwy 30BY - NE Portland Hwy.	NE 42nd Ave.	NE Killingsworth St.	ODOT			●	●	1.1	1.5	8
13	SE Washington St.	SE 74th Ave	SE 109th Ave	Portland			●	●	1.1	1.7	9
14	NE 102nd Ave.	Cherry Blossom Dr.	NE Sandy Blvd.	Portland	●		●	●	1.0	2.9	15
15	SE Powell Blvd.	SE Grand Ave.	SE Mt Hood Highway	Portland, Gresham	●	●	●	●	1.0	12.9	66
16	I-84 WB	82nd Ave	MLK Jr. Blvd.	ODOT			●	●	1.0	4.8	24
17	SE 96th Ave.	SE Washington St.	SE Division St.	Portland	●		●	●	1.0	1.0	5
18	Hwy 8 - SW Baseline/Tualatin Valley Highway	SW 341st St.	SW 17th Ave.	ODOT	●		●	●	1.0	1.0	5
19	I-5 SB	Kruse Way	Carman Dr.	ODOT			●	●	1.0	1.0	5
20	SW/NW 185th Ave.	SW Farmington Rd.	NW Springville Rd.	Hillsboro, Washington County		●	●	●	1.0	6.0	29
21	SE/NE 162nd Ave.	SE Powell Blvd.	NE Sandy Blvd.	Portland, Gresham	●		●	●	1.0	3.8	18
22	NW Everett St.	NW Westover Road	Pacific Hwy W	Portland	●	●		●	0.9	1.5	7
23	SE Mcloughlin Blvd.	SE Grand Ave.	Ross Island Bridge	ODOT	●	●	●	●	0.9	2.6	12

Source: Metro

Data: Oregon Department of Transportation Crash Data, 2010-2015

Regional High Injury Corridors, 2010-2014 Serious Crashes within the MPO Planning Area					Network						
#	High Injury Corridors (by serious crashes per mile)	From	To	Facility Owner or Jurisdiction	Ped	Bike	Auto	All	Annual Average Serious Crashes/ Mile	Corridor Length (Mile)	Total Serious Crashes 2010-2014
24	Hwy 26 - Sunset Highway EB	Hwy 217	Tunnel	ODOT			●	●	0.9	1.9	9
25	SE Mcloughlin Blvd.	SE Jefferson	Oregon City Arch Bridge	ODOT	●		●	●	0.9	6.5	30
26	W/E Burnside St.	SW Barnes Rd.	SE Gilham	Portland	●		●	●	0.9	7.7	35
27	Hwy 217 SB	Sunset Highway	SW Beaverton Hillsdale Hwy.	ODOT			●	●	0.9	1.8	8
28	N Interstate Ave.	N Denver St.	N Argyle St.	Portland	●	●		●	0.9	1.8	8
29	NE Halsey St.	Sandy	I-84	Portland			●	●	0.9	1.6	7
30	Hwy 8 - SW Canyon Rd.	Sunset Hwy	Tualatin Valley Hwy	ODOT	●		●	●	0.9	3.9	17
31	I-205 SB	Washington State line	Marine Drive	ODOT			●	●	0.9	1.6	7
32	N/NE Wiedler St.	Broadway Bridge	NE 24th Ave.	Portland		●	●	●	0.9	1.4	6
33	Hwy 217 NB	SW Pacific Hwy (99W)	SW Scholls Ferry Rd	ODOT			●	●	0.9	1.6	7
34	I-84 EB	I-5 interchange	1-205 interchange	ODOT			●	●	0.9	4.9	21
35	Hwy 10 - SW Beaverton Hillsdale Hwy	SW Capitol Hwy.	Sw Lombard Ave.	ODOT	●		●	●	0.8	5.2	22
36	Hwy 8 - SW/SE Baseline Rd.	SW 17th Ave.	SE 10th Ave. (TV Hwy)	ODOT	●		●	●	0.8	1.7	7
37	SW Cedar Hills Blvd.	SW Farmington Rd.	NW Cornell Rd.	Beaverton			●	●	0.8	3.1	13
38	SE Hawthorne Blvd.	SE Martin Luther King Jr.	SE 51st Ave.	Portland	●	●	●	●	0.8	2.5	10
39	NE/SE Sandy Blvd.	SE 7th Ave.	NE 162nd Ave.	Portland	●		●	●	0.8	9.0	36
40	SE 112th Ave.	Cherry Blossom Dr.	SE Holgate Ave.	Portland			●	●	0.8	1.5	6
41	Hwy 217 NB	SW Beaverton Hillsdale Highway	Sunset Highway	ODOT			●	●	0.8	1.8	7
42	I-5 NB	SW Nyberg St.	Kruse Way	ODOT			●	●	0.8	2.8	11
43	SW 257th Ave.	SE Stark St.	I-84	Troutdale		●	●	●	0.8	2.1	8
44	NE 47th Ave.	NE Glisan	NE Wistaria	Portland			●	●	0.8	1.0	4
45	SE Holgate Blvd.	SE McLoughlin Blvd.	SE 136th Ave.	Portland		●	●	●	0.8	6.4	24
46	SW Allen Blvd.	SW 92nd	SE Davis Rd.	Beaverton		●	●	●	0.7	2.9	11

Source: Metro

Data: Oregon Department of Transportation Crash Data, 2010-2015

Regional High Injury Corridors, 2010-2014 Serious Crashes within the MPO Planning Area					Network						
#	High Injury Corridors (by serious crashes per mile)	From	To	Facility Owner or Jurisdiction	Ped	Bike	Auto	All	Annual Average Serious Crashes/ Mile	Corridor Length (Mile)	Total Serious Crashes 2010-2014
47	SW Tualatin Sherwood Rd.	SW Nyberg St.	SW Pacific Hwy.	Washington County,Tualatin, Sherwood			●	●	0.7	4.5	17
48	I-5 SB	Ross Island Bridge	Bertha Blvd	ODOT			●	●	0.7	2.7	10
49	I-205 SB	SE Washington St.	SE Division St.	ODOT			●	●	0.7	1.1	4
50	NE Shute Rd.	Brookwood	Shute	Hillsboro			●	●	0.7	1.1	4
51	I-205 SB	NE Alderwood Rd.	I-84 interchange at Killingsworth	ODOT			●	●	0.7	1.6	6
52	NE/SE Cesar Chavez Ave.	SE Woodstock Ave.	NE Wistaria St.	Portland	●	●	●	●	0.7	4.7	17
53	SW/NW 6th Ave.	SW Sheridan St.	NW Irving St (Union Station)	Portland	●		●	●	0.7	1.6	6
54	Hwy 8 - Pacific Ave.	Mountain View Ln.	E St. (Forest Grove)	ODOT			●	●	0.7	2.5	9
55	I-5 SB	Carman Dr.	SW Nyberg Rd.	ODOT			●	●	0.7	1.4	5
56	I-5 SB	Ne Multnomah Blvd.	Sw 48th Ave.	ODOT			●	●	0.7	1.7	6
57	I-205 NB	Airport Way	Washington State line	ODOT			●	●	0.7	1.7	6
58	I-5 SB	NE Butteville Rd	SW Wilsonville Rd.	ODOT			●	●	0.7	1.1	4
59	SE/NE 122nd Ave.	SE Foster Blvd.	NE Skidmore St.	Portland			●	●	0.7	5.3	19
60	NE/SE Kane/257th Dr.	SE Welch Rd.	SE Stark St.	Gresham, Troutdale	●		●	●	0.7	2.2	8
61	SE Bob Schumacher Rd.	SE Idleman Rd.	SE Stevens	Clackamas County, Happy Valley			●	●	0.7	1.1	4
62	E Burnside St.	NE 75th	NE 123rd	Portland	●			●	0.7	2.6	9
63	Hwy 99W - SW Barbur Blvd.	4th & Barbur & Sheridan	Pacific Hwy & SW 64th Ave.	ODOT		●	●	●	0.7	6.3	22
64	SE 182nd Ave.	SE Yamhill St.	SE Powell Blvd.	Gresham	●		●	●	0.7	1.7	6
65	I-5 NB	Bertha Blvd	Marquam	ODOT			●	●	0.7	3.2	11
66	NE/SE Martin Luther King Jr Blvd.	N Marine Dr.	SE Division St.	Portland	●	●	●	●	0.7	8.8	30
67	SE 60th Ave.	Stark	Halsey	Portland	●	●		●	0.7	1.8	6
68	N/S 1st Ave.	1st	Glencoe	Hillsboro			●	●	0.7	1.5	5
69	Hwy 10 - SW Farmington Rd.	Beaverton Hillsdale	Clark Rd.	ODOT			●	●	0.7	6.0	20

Source: Metro

Data: Oregon Department of Transportation Crash Data, 2010-2015

Regional High Injury Corridors, 2010-2014 Serious Crashes within the MPO Planning Area					Network						
#	High Injury Corridors (by serious crashes per mile)	From	To	Facility Owner or Jurisdiction	Ped	Bike	Auto	All	Annual Average Serious Crashes/ Mile	Corridor Length (Mile)	Total Serious Crashes 2010-2014
70	NE Multnomah St.	Rose Quarter TC	NE 21st	Portland	●	●		●	0.7	1.2	4
71	SW Murray Blvd.	SW Walker	SW Burrows	Beaverton, Tigard		●	●	●	0.7	5.5	18
72	NE Glisan St.	202nd Ave.	NE Sandy Blvd.	Gresham, Portland		●	●	●	0.6	9.3	30
73	SE Jennings Ave.	River Rd.	Webster	Gladstone, Clackamas County			●	●	0.6	1.9	6
74	NW Glisan St.	NW 24th Ave.	Steel Bridge	Portland	●			●	0.6	1.5	5
75	Hwy 212	Hwy 212	172nd	ODOT	●		●	●	0.6	4.3	14
76	Molalla Ave.	7th St.	Hwy 213	Oregon City			●	●	0.6	2.2	7
77	Hwy 8- W Baseline Rd.	SW Brookwood	SE Cornelius Pass Road	ODOT			●	●	0.6	4.5	14
78	NW Lovejoy St.	NW Broadway	NW Cornell Rd.	Portland	●		●	●	0.6	1.3	4
79	I-5 NB	SW Barbur Blvd.	SW Multnomah Blvd.	ODOT			●	●	0.6	2.9	9
80	SW 4th Ave.	Burnside	Barbur & Sheridan	Portland	●			●	0.6	1.3	4
81	E Burnside St.	NE 128th	E Powell	Gresham, Portland			●	●	0.6	8.6	26
82	SE Milwaukie Ave.	SE 11th Ave.	SE Nehalem St.	Portland			●	●	0.6	2.7	8
83	NE Cornell Rd.	E Main St.	NE Butler St.	Hillsboro			●	●	0.6	5.3	16
84	Hwy 224 - Clackamas Hwy	SE Rusk Rd.	SE 82nd Dr.	ODOT			●	●	0.6	1.3	4
85	SE Belmont	Grand & Morrison Bridge	SE 69th	Portland		●		●	0.6	3.3	10
86	NW Evergreen Rd.	NW Cornell Rd.	NW Glencoe Rd.	Hillsboro, Washington			●	●	0.6	7.0	21
87	SE 50th Ave.	Hawthorne	Foster & Powell	Portland	●	●		●	0.6	1.0	3
88	SW Millikan Way	Millikan	Millikan & Tualatin Valley	Beaverton		●		●	0.6	1.7	5
89	I-205 NB	SE Sunnybrook Blvd.	Strawberry Lane	ODOT			●	●	0.6	2.0	6
90	SE Flavel St.	SE 52nd	SE 72nd	Portland	●			●	0.6	1.0	3
91	NE Marine Dr.	Marine Dr. (at Airport)	NE 122nd Blvd.	Portland		●		●	0.6	2.7	8
92	N/NE Skidmore St.	N Interstate Ave.	NE Martin Luther King Jr.	Portland		●		●	0.6	1.0	3

Source: Metro

Data: Oregon Department of Transportation Crash Data, 2010-2015

Regional High Injury Corridors, 2010-2014 Serious Crashes within the MPO Planning Area					Network						
#	High Injury Corridors (by serious crashes per mile)	From	To	Facility Owner or Jurisdiction	Ped	Bike	Auto	All	Annual Average Serious Crashes/ Mile	Corridor Length (Mile)	Total Serious Crashes 2010-2014
93	Hwy 99W - SW Pacific Hwy.	Barbur (99W)	SW Rein Rd.	ODOT			●	●	0.6	10.4	31
94	Hwy 30 - N/NE Lombard St.	N Commando Ave	NE Portland Hwy	ODOT	●			●	0.6	7.8	23
95	SW/NW 158th Ave.	NW Cornell Rd.	SW Merlo Rd.	Beaverton		●		●	0.6	1.7	5
96	Hwy 213	Beavercreek	Hwy 213	ODOT			●	●	0.6	3.1	9
97	SW Capitol Hwy.	Taylors Ferry	SW Lesser Rd.	Portland			●	●	0.6	1.4	4
98	N Columbia Blvd.	Hwy 213	N Burgard/ N Smith	Portland			●	●	0.6	10.4	30
99	N/NE Killingsworth St.	NE Sandy Blvd.	N Greeley Ave.	Portland		●		●	0.6	6.6	19
100	SE Thiessen Rd.	SE Johnson Rd.	SE Hill Rd.	Clackamas County		●	●	●	0.6	1.4	4
101	SE Hogan St.	SE Butler	NE 242nd	Gresham, Troutdale		●		●	0.6	3.9	11
102	SW Brockman Rd.	SW Greenway Blvd.	SW Murray Blvd.	Beaverton			●	●	0.6	1.1	3
103	I-5 NB	N Rosa Parks Way	Columbia Blvd.	ODOT			●	●	0.6	1.1	3
104	N Williams St.	N Wheeler St.	N Killingsworth St.	Portland		●		●	0.6	2.1	6
105	NW Bethany Blvd.	Cornell	West Union	Beaverton, Washington County			●	●	0.6	1.1	3
106	SW Scholls Ferry Rd.	Scholls Ferry	Beaverton Hillsdale	Washington County, Multnomah County, Beaverton, Tigard, Portland			●	●	0.6	9.0	25
107	SW Avery St.	Boones Ferry Road	Tualatin Sherwood Hwy.	Tualatin			●	●	0.6	1.1	3
108	SE Fuller Rd.	King	Harmony	Clackamas County			●	●	0.6	1.1	3
109	SE 136th Ave.	SE Powell Blvd.	SE Foster Blvd.	Portland				●	0.6	1.4	4
110	I-5 SB	Columbia Blvd.	Rosa Parks Way	ODOT			●	●	0.6	1.1	3
111	SW Butler Rd.	Regner	190th	Gresham			●	●	0.6	1.8	5
112	SE Oatfield Rd.	82nd Dr.	SE Thiessen	Milwaukie, Clackamas County				●	0.6	1.5	4
113	SE/NW 12th Ave.	SE Milwaukie Ave.	NE Lloyd Blvd.	Portland	●			●	0.5	1.8	5
114	N/NE Rosa Parks Blvd.	N Willamette Blvd.	N Vancouver St.	Portland		●		●	0.5	1.5	4

Source: Metro

Data: Oregon Department of Transportation Crash Data, 2010-2015

Regional High Injury Corridors, 2010-2014 Serious Crashes within the MPO Planning Area					Network						
#	High Injury Corridors (by serious crashes per mile)	From	To	Facility Owner or Jurisdiction	Ped	Bike	Auto	All	Annual Average Serious Crashes/ Mile	Corridor Length (Mile)	Total Serious Crashes 2010-2014
115	SE Gladstone St.	26th	42nd	Portland		●		●	0.5	1.5	4
116	SW Garden Home Rd.	SE 92nd	Pacific Hwy	Beaverton, Portland, Washington			●	●	0.5	1.1	3
117	SE Oak St.	10th & Oak	Oak & Tualatin Valley	Hillsboro		●		●	0.5	1.5	4
118	Hwy 224 - Clackamas Hwy	Harrison	SE Lake Rd.	ODOT		●		●	0.5	1.5	4
119	I-205 NB	Cascade Hwy S (approx.)	SE 82nd Dr. (approx.)	ODOT				●	0.5	1.5	4
120	SE/NE 148th Ave.	SW Powell Blvd.	NE Columbia Blvd.	Portland		●		●	0.5	4.6	12
121	NE Halsey St.	NE 82nd	SW 257th	Fairview, Gresham, Portland, Troutdale, Wood			●	●	0.5	9.1	24
122	SE 72nd Ave.	SE Powell	SE Alberta St.	Portland, Multnomah County, Clackamas County		●		●	0.5	3.4	9
123	SW Macadam Ave.	Bancroft	Sellwood Bridge	Portland			●	●	0.5	2.3	6
124	Hwy 47 - NE Nehalem Hwy	UGB	Quince St.	ODOT			●	●	0.5	1.5	4
125	I-5 NB	SW Wilsonville Rd. (approx.)	SW Miley Rd.	ODOT			●	●	0.5	1.2	3
126	SW/NE/NW Brookwood Parkway	Tualatin Valley Highway	NW Evergreen Parkway	Hillsboro			●	●	0.5	3.9	10
127	SE Stark St.	Thorburn	Columbia River & Stark	Gresham, Portland, Troutdale, Multnomah County				●	0.5	11.7	30
128	Hwy 8 - W Baseline St.	Pacific Ave & Adair	Tualatin Valley Hwy & SW 345th Ave.	ODOT				●	0.5	2.0	5
129	SW Lower Boones Ferry Rd.	Upper Boones Ferry	SW Jean Road	Durham, Lake Oswego, Tualatin			●	●	0.5	1.2	3
130	SE Orient Dr.	SE Kane & SE Palmquist	SE Chase Rd.	Gresham			●	●	0.5	1.2	3
131	SE Johnson Creek Blvd.	32nd	SE Highgate Drive	Happy Valley, Milwaukie, Portland, Clackamas County, Multnomah			●	●	0.5	4.0	10
132	NE/SE 28th Ave.	28th & Halsey	28th	Portland	●			●	0.5	2.0	5
133	Hwy 26 - Sunset Highway WB	13th Ave	Hwy 217	ODOT			●	●	0.5	4.9	12
134	Hwy 26 - Sunset Highway EB	Canyon	Hwy 217	ODOT				●	0.5	1.2	3

Source: Metro

Data: Oregon Department of Transportation Crash Data, 2010-2015

Regional High Injury Corridors, 2010-2014 Serious Crashes within the MPO Planning Area					Network						
#	High Injury Corridors (by serious crashes per mile)	From	To	Facility Owner or Jurisdiction	Ped	Bike	Auto	All	Annual Average Serious Crashes/ Mile	Corridor Length (Mile)	Total Serious Crashes 2010-2014
135	SW Barnes Rd.	W Burnside	NW Cornell	Beaverton, Portland, Washington			●	●	0.5	3.7	9
136	SE Oatfield Rd.	Oatfield	82nd	Gladstone, Clackamas County		●		●	0.5	2.5	6
137	N/S 10th Ave.	10th	10th & Cornelius Schefflin	Cornelius		●		●	0.5	1.2	3
138	NE Broadway	Broadway Bridge	NE 39th	Portland	●	●		●	0.5	2.5	6
139	SW Walker Rd.	SW Canyon (Hwy 8)	NW Amberglen Pkwy.	Beaverton, Hillsboro, Washington			●	●	0.5	5.8	14
140	NE 201st Ave.	NE Glisan	NE Sandy	Gresham, Fairview				●	0.5	1.2	3
141	NW Yeon Ave.	NW 29th Ave.	NW Kittridge St.	Portland			●	●	0.5	1.2	3
142	SE 52nd Ave.	52nd & Powell	52nd & Flavel	Portland		●		●	0.5	2.1	5
143	SW/NW 10th Ave.	SW Market St.	NW Northrup St.	Portland	●			●	0.5	1.2	3
144	SW Multnomah Blvd.	19th & I-5 Fwy - Multnomah Blvd	Garden Home	Portland		●		●	0.5	2.5	6
145	NW Cornell Rd.	Cornelius Pass	NW Bethany	Beaverton, Hillsboro, Washington			●	●	0.5	4.7	11
146	E/W Main St.	Bancroft	Oak	Hillsboro			●	●	0.5	3.4	8
146	NE Alberta St.	NE 30th Ave.	NE Martin Luther King Jr.	Portland	●			●	0.5	1.3	3
147	SW Minter Bridge Rd.	Cypress & Minter Bridge & Tualatin Valley	Minter Bridge	Hillsboro, Washington County			●	●	0.5	1.3	3
148	SW Roy Rogers Rd.	Scholls Sherwood	SW Pacific Hwy	Sherwood, Washington County			●	●	0.5	1.3	3
149	SW Jenkins Rd.	Cedar Hills & Jenkins	Baseline & Jenkins	Beaverton			●	●	0.5	2.2	5
150	SW Skyline Blvd.	Burnside	Sunset Hwy (Hwy 26)	Portland			●	●	0.4	1.4	3
151	Hwy 47 - Tualatin Valley Highway	Pacific	SW Seghers Rd.	ODOT				●	0.4	5.1	11
152	SE 174th Ave.	SE Stark St.	SE 174th Ave. & South of SE Powell Blvd.	Gresham, Portland, Multnomah County			●	●	0.4	2.3	5
153	SE Webster Rd.	Oatfield Rd.	SE Roots Rd.	Gladstone, Clackamas County				●	0.4	1.4	3
154	I-84 WB	NE 148th	NE 111th	ODOT			●	●	0.4	1.9	4
155	NE 15th Ave.	NE Knott St.	NE Lombard St.	Portland		●		●	0.4	2.4	5

Source: Metro

Data: Oregon Department of Transportation Crash Data, 2010-2015

Regional High Injury Corridors, 2010-2014 Serious Crashes within the MPO Planning Area					Network						
#	High Injury Corridors (by serious crashes per mile)	From	To	Facility Owner or Jurisdiction	Ped	Bike	Auto	All	Annual Average Serious Crashes/ Mile	Corridor Length (Mile)	Total Serious Crashes 2010-2014
156	SE 92nd Ave.	SE Stark St.	South of SE Flavel St.	Portland				●	0.4	3.8	8
157	SE Sunnybrook St.	82nd	Sunnybrook & Sunnyside	Happy Valley, Clackamas County				●	0.4	1.5	3
158	SW/NW 18th Ave.	SW Jefferson St.	NW Thurman St.	Portland		●		●	0.4	1.5	3
159	SE River Rd.	McLoughlin	River	Milwaukie, Clackamas County	●			●	0.4	2.5	5
160	NE Prescott St.	Martin Luther King Jr	33rd Ave	Portland	●				0.4	6.0	12
161	NE Century (231st) Blvd.	Baseline	Cornell	Hillsboro	●				0.4	1.0	2
162	NE/SE 28th Ave.	28th & Gladstone	28th & Woodstock	Portland	●	●			0.4	1.1	2
163	N Vancouver Ave.	Vancouver & Weidler &	Martin Luther King Jr	Portland		●			0.4	3.9	7
164	SW/NW 11th Ave.	SW Market St.	NW 11th Ave. & NW Lovejoy St.	Portland	●				0.4	1.1	2
165	NE 57th Ave.	57th & Halsey	57th & Cully	Portland	●				0.3	1.2	2
166	SE 17th Ave.	Center	Nehalem	Multnomah County, Clackamas County, Milwaukie		●			0.3	3.1	5
167	Hwy 43 - Willamette Dr.	Pacific & Willamette	Willamette	ODOT		●			0.3	3.1	5
168	SW Durham Rd.	72nd & Durham	SW Pacific Hwy	Tigard		●			0.3	2.5	4
169	SW Boones Ferry Rd.	Lower Boones Ferry	Greenhill Lane	Durham, Tualatin, Washington County		●			0.3	3.3	5
170	SW/NW Naito Pkwy.	Ross Island Bridge	NW Thurman St.	Portland		●			0.2	3.3	4
171	N Willamette Blvd.	N Ainsworth St.	N Richmond St.	Portland		●			0.2	3.3	4
172	SE Morrison St.	Grand	25th & Morrison	Portland	●				0.2	1.0	1
173	SW 209th Ave.	Tualatin Valley Hwy	Farmington	Hillsboro, Washington County		●			0.2	2.1	2
174	Pilkington Rd.	Boones Ferry & Pilkington	Pilkington	Lake Oswego, Rivergrove, Clackamas County	●				0.2	1.1	1
175	SE Ankeny St.	Martin Luther King Jr	28th & Ankeny	Portland		●			0.2	1.2	1
176	N 19th Ave.	NW Susbauer Rd.	Baseline (Pacific Hwy.)	Forest Grove	●				0.2	1.2	1
177	SW Parkway Ave.	Printer Parkway	SW Town Center Loop	Wilsonville	●				0.2	1.3	1

Source: Metro

Data: Oregon Department of Transportation Crash Data, 2010-2015

Regional High Injury Corridors, 2010-2014 Serious Crashes within the MPO Planning Area					Network						
#	High Injury Corridors (by serious crashes per mile)	From	To	Facility Owner or Jurisdiction	Ped	Bike	Auto	All	Annual Average Serious Crashes/ Mile	Corridor Length (Mile)	Total Serious Crashes 2010-2014
178	SW Denney Rd.	Scholls Ferry	Hall	Beaverton		●			0.1	1.4	1
179	NE Ainsworth St.	27th	Ainsworth & Vancouver	Portland		●			0.1	1.5	1
180	SE Clinton St.	SE 12th	SE 50th	Portland		●			0.1	2.1	1
181	SW Boones Ferry Rd.	SW Terwilliger	Knaus Rd.	Lake Oswego, Portland, Clackamas County, Multnomah		●			0.1	2.1	1

Source: Metro
Data: Oregon Department of Transportation Crash Data, 2010-2015

APPENDICES

Regional High Injury Corridors and Intersections Report

This report describes the purpose, background and methodology used to identify regional high injury corridors and intersections on the regional transportation network. The analysis was concluded in April 2017. The analysis will be updated approximately every five years.

2018 Metro State of Safety Report

This report describes the data used in the analysis, the attributes of the data, data limitations, and the process Metro used to analyze the data. The 2018 Metro State of Safety Report presents the findings, identifying trends and relationships of serious crashes with environmental factors and includes roadway and land use characteristics. The analysis will be updated approximately every five years.

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