Agenda

Metro
600 NE Grand Ave.
Portland, OR 97232-2736

Meeting:	**RTP Safety work group meeting #4**
Date:	Tuesday, Jan. 24, 2017
Time:	9-11 a.m.
Place:	Metro Regional Center, 370 A/B
Purpose:	Final review of safety performance targets, measures and high injury corridors
Outcome(s):	Final input of safety performance targets, measures and high injury corridors

9 a.m.	**Welcome & introductions & partner updates** *Who have you talked to about this work? What have you heard?*	Tom Kloster
9:15 a.m.	**Safety performance and targets** *Review changes and provide final input*	Lake McTighe
10:00 a.m.	**High injury corridors** *Review changes and provide final input*	Lake McTighe
10:45 a.m.	**Next steps**	Tom Kloster
11 a.m.	**Adjourn**	

Meeting Packet	Next Meeting
• Agenda	**Tuesday, April 4, 2017** 9-11 a.m. MRC, room 270
• Cover memo	
• Minutes from past meeting (Oct. 20, 2016)	
• Performance Targets and Measures draft report	
• High Injury Corridors draft report	

Directions, travel options and parking information
Covered bike racks are located on the north plaza and inside the Irving Street visitor garage. Metro Regional Center is on TriMet bus line 6 and the streetcar, and just a few blocks from the Rose Quarter Transit Center, two MAX stations and several other bus lines. Visit our website for more information: http://www.oregonmetro.gov/metro-regional-center

Memo

Metro
600 NE Grand Ave.
Portland, OR 97232-2736

Date: Tuesday, January 17, 2017
To: 2018 RTP Safety Work Group
From: Lake McTighe, Transportation Safety Project Manager
Subject: 2018 RTP Safety Work group Meeting #4

The Safety Work Group last met in October, 2016. At that meeting the Work Group provided comments on the RTP safety system evaluation measures and regional High Injury Corridors (HICs). Metro staff refined the system evaluation measures and the HICs using the input from the Work Group.

The purpose of the fourth meeting of the Work Group is to review the final draft safety performance targets and measures and the regional HICs before they are presented to Metro's technical and policy advisory committees. Metro staff is seeking a recommendation from the Work Group to finalize these elements.

Metro staff seeks input from the Work Group on the following questions:

1. Does the Work Group have any final comments on the transportation safety targets?
2. Does the Work group support the methodology used to identify annual rolling targets for pedestrian, bicycle and auto fatal and serious crashes?
3. Does the Work Group have any final comments on the transportation safety system evaluation measures and methodology?
4. Does the Work Group have any final comments on the regional High Injury Corridors?

Metro staff will be presenting the safety performance target and measures and the HICs on the following dates:

- TPAC - Jan 27
- MTAC - Feb 1
- Metro Council work session - Feb 7
- JPACT - Feb 16
- MPAC - Feb 22

Metro staff will share the Work Group's recommendations and comments on the performance targets and measures and the high injury corridors with the advisory committees and the Metro Council.

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Metro | *Meeting Summary*

Safety Work Group Meeting Summary
(Draft until approved by work group)
Meeting #3
October 20, 2016, 9 to 11 AM
Metro Regional Center, Room 501

ATTENDED (Work Group):
Becky Bodoyni, Multnomah County Health
Luke Pelz, Beaverton
Anthony Buczek, Metro
Tegan Enloe, Hillsboro
Nick Fortey, FHWA
Tom Kloster, Metro
Lake McTighe, Metro
Jeff Owen, TriMet
Lidwien Rahman, (alternate for ODOT/Oregon Walks)
Katherine Burns, ODOT
Kari Schlosshauer, SRTS National Partnership
Chris Strong, Gresham
Aszita Mansor, Multnomah County
Dyami Valentine, Washington County
Stacy Revay, Beaverton
Noel Mickelberry, Oregon Walks
Dana Dickman, Portland Bureau of Transportation
Eileen Cunningham, Multnomah County
Rob Sadowsky, BTA

ATTENDED (Interested Persons/Metro Staff/ Invited Guests):
Clint Chiavarini, Metro
Cindy Pederson, Metro
Jamie Snook, Metro
Mike Serritella, Metro

UNABLE TO ATTEND:
Joe Marek, Clackamas County
Stacy Shetler, Washington County
Mike Ward, Wilsonville
Clay Veka, Portland
Amanda Owings, Lake Oswego

Follow-up actions

- ✓ Investigate Metro developing a safety crash model **(Metro is pursuing this but it will not be available for the 2018 update)**
- ✓ Develop annual rolling targets for bicyclists and pedestrians
- ✓ Provide definition of proven safety counter measures
- ✓ Look at removing B, C and property damage only crashes from the High Injury Corridors analyses – areas with high levels of bicycling and walking, where a high number of minor crashes are occurring are showing up (**Metro reviewed and has determined to remove those crashes from the analysis)**

Welcome & introductions

Tom Kloster, meeting chair, welcomed the workgroup.

RTP update

Lake McTighe, safety work group lead, provided an update of the RTP process and the Regional Leadership Forums. She also recapped the purpose of the work group and the timeline for the update of the Regional Transportation Safety Plan. She highlighted the progress made by the group to date, referring to the first part of the meeting memo.

Safety System Evaluation Performance Measure Discussion

- Lake provided an overview of the relationship of system evaluation measures to monitoring measures and targets in the RTP.
- She noted that the region has never had system evaluation measures for safety.
- She reminded the work group that they had reviewed the draft safety evaluation measures at the July 26 meeting, and that the RTP performance measures work group had provided feedback at the Sept. 12 and Oct. 14 meetings. The recommended measures under discussion reflect the input from the work groups.

The work group discussed the **safety infrastructure investments system evaluation measure and the definition of a transportation safety project.** The discussion centered on how to incorporate safety and equity considerations priorities when developing project proposals. The work group agreed to moving forward with the definition of a safety project and the evaluation measure.

- Noel (Oregon Walks) - Clarifying question about defining Historically Underrepresented Communities
- Nick (FHWA) – Safety outcomes from more general projects? How are positive externalities considered within all transportation projects? Safety as a primary interest vs. safety as a general principal in transportation planning.
- Chris (Gresham) – Question regarding merging criteria around regional balance and Historically Underrepresented Communities – How are these different elements being measured?
- Tegan (Hillsboro) –Concern about including Historically Underrepresented Communities and equity lens in identifying where safety investments are going and potential prioritization; equity should be considered separately not as part of system evaluation measure, safety investments should be made regardless of race, income, etc.
- Should “proven countermeasures” be defined?

- Chris – Some jurisdictions do not call out 'safety projects' – so it may be challenging to identify them for the RTP

The work group discussed the **VMT exposure system evaluation measure.** The discussion focused on how VMT Exposure would be measured – particularly on how it would relate to specific local issues affecting VMT (new development, etc.) as well as how the data from this system evaluation measure would be used. The work group agreed to moving forward with continuing to test and analyze the evaluation measure.

- Kari (Safe Routes to School) – Have you thought about how outputs from the evaluation measure will impact actions, implementation?
- Lake – we will share information with local jurisdictions so they can use it to help guide project refinement for the RTP
- Chris – Is this used for tracking progress – seems to be more of a monitoring measure. How would the information gained from this system evaluation be used? Would this be used to judge projects as "good" or "bad"?
- Lake – it is just one tool to understand what is happening. It is a system measure, not a project measure. But if there was higher rise in VMT in one area compared to others it would be helpful to dig deeper and try to understand what is happening.
- Tom Kloster – Need to align functional class with highway's excluded from VMT exposure
- Dyami (Washington County) May be problematic to use 'per-capita' measures, some high density areas will not be flagged – should this be measured by physical space/area? How do we address the issue of VMT created by through-traffic?
- Kari – Wouldn't highways be helpful in looking at public health related outcomes – issues of environmental justice (air quality)?
- Grace – In our equity work group, we are looking at exposures impacts from pollution (this is separate from VMT Exposure; VMT is being looked at as it relates to "Safety" and as it related to "Air Quality"
- Nick – How can we make sure that the system doesn't flag/miss areas based on unique use/design characteristics or development patterns?

Regional High Injury Corridors Discussion

Lake provided a re-cap

- Refer to commonly asked questions and GIS methodology hand outs
- HIC is available on-line
- Why Metro developed – recommended as follow up action in 2014 RTP, provides a consistent approach across the region, has an urban focus and focuses on fatal and severe crashes.
- Methods described in FAQ – had several goals, including narrowing down to subset of streets to support planning and prioritization
- Aug 23, additional safety work group meeting to walk through HICs
- Updated the HICs to only include crashes on the regional transportation network. Captures 60% of severe crashes, which occur on 6% of all streets, and 23% of the regional transportation network
- Overlap with HICs identified by other jurisdictions – completely overlaps with Washington County's High Crash Corridors, with some distinctions (identifies Cornell

from Main to Butler, not the entire length; only segments of Hwy 217 are indentified, not the entire length)

- There was discussion about removing the bike and pedestrian weights for non-severe crashes

Next steps

- Next meeting will be January 24
- At that meeting the Work Group will finalize input on performance targets and measures and the high injury corridors
- Safety updates to Metro technical and policy advisory committees will take place in late January and February

Getting there safely

2018 Regional Transportation Plan update

TRANSPORTATION SAFETY

Performance Targets & Measures - DRAFT

January 2017

Metro
Making a great place

INTRODUCTION

This report outlines the recommended 2018 Regional Transportation Plan (RTP) safety targets and performance measures developed by the Regional Transportation Safety Work Group.

Safety Performance Target

By 2035 eliminate transportation related fatalities and serious injuries for all users of the region's transportation system, with a 16% reduction by 2020 (as compared to the 2015 five year rolling average), and a 50% reduction by 2025.

Safety System Evaluation Measures

1. Safety Infrastructure Investments – Number, cost and percent of safety projects in the RTP investment packages region-wide and in areas with historically marginalized communities.[1]

2. Exposure to Crash Risk – Approximates the risk of exposure to crashes by identifying whether the package of future transportation investments increases or decreases the sum of all non-freeway vehicle miles traveled (VMT) in Transportation Area Zones (TAZ) for RTP investment packages region-wide and in areas with historically marginalized communities.

Safety Monitoring Measures and Targets

For monitoring purposes, identifies annual targets, based on a five year rolling average of the number of people killed and seriously injured in traffic crashes in the region, by mode, per 100 million vehicle miles traveled, and per 100 thousand people. These safety monitoring measures and targets fulfill the requirements of the FAST-ACT and FHWA for MPO safety performance targets.

[1] Historically Marginalized Communities are identified as areas where there are high concentrations of people of color, people with low-incomes, people with limited English proficiency, older adults, and youth relative to the region.

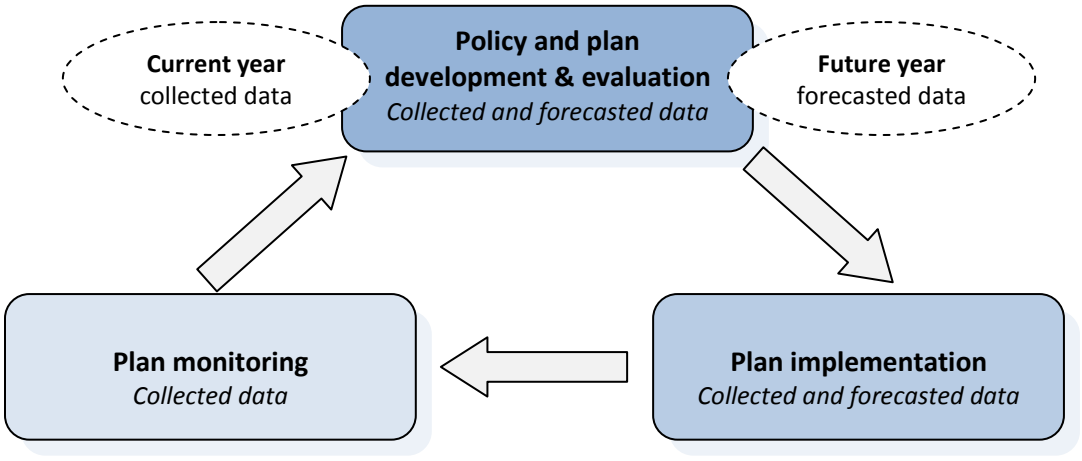
POLICY FRAMEWORK FOR SETTING PERFORMANCE TARGETS AND MEASURES

Performance measures are indicators that enable decision-makers and other stakeholders to monitor changes in system condition and performance against established visions, goals, objectives and policies. The policy framework guiding the update of regional transportation safety performance measures and targets is captured in Metro's Regional Transportation Safety Plan Policy Framework Report (July 2016). It includes an overview of the policies that currently exist at the federal, state and regional level related to transportation safety, highlighting those that have changed since the region's first Regional Transportation Safety Plan was completed in March 2012. In particular, the report highlights policies that reflect:

- Continued emphasis on improving transportation safety
- Growing use of the Towards Zero Deaths and Vision Zero frameworks and targets
- Use of data, performance measurement, and evaluation
- Recognition of vulnerable users
- Integration of equity and public health perspectives

Performance measures serve as the dynamic link between RTP goals and plan implementation by formalizing the process of target-setting, evaluation and monitoring to ensure the RTP advances toward achievement of the region's transportation, land use, economic, and environmental goals. The RTP refers to the process of plan development, evaluation and monitoring over time as the performance measurement system, as shown in Figure 1.

Figure 1: RTP Performance Measurement System



Metro's Performance Measures Scoping Report (April 2016) provides the background and context for reviewing and refining adopted regional transportation performance measures and targets for the 2018 RTP.[2] The report describes the three layers of measurement in the 2014 RTP. These are listed in Table 1 table below with the corresponding 2014 RTP safety measures.

Table 1: Current & Proposed Targets and Performance Measures

Measure/Target	2014 RTP Measure/Target	Recommended 2018 RTP Measure/Target
RTP Performance Targets set time bound, quantifiable goals for achieving the region's desired policy outcomes for investment in the region's transportation system. These measures use a combination of modeled and observed data.	*"By 2040, reduce the number of fatal and severe injury crashes for pedestrians, bicyclists, and motor vehicle occupants each by 50% compared to 2007 2011 average."*	By 2035 eliminate transportation related fatalities and serious injuries for all users of the region's transportation system, with a 16% reduction by 2020 (as compared to the 2015 five year rolling average), and a 50% reduction by 2025.
RTP System Evaluation Measures compare the base year conditions with alternative investment packages (projects) to document how well each package of transportation investments performs on an array of measures that are linked to RTP goals, and in most cases, overlap with the RTP performance targets.	The region does not currently forecast the regional safety target, though this is being explored.	1. Number, cost and percent of safety projects in the RTP investment packages region-wide and in areas with historically marginalized communities. 2. Exposure to crash risk through the sum of all non-freeway vehicle miles traveled (VMT) in Transportation Area Zones (TAZ) for RTP investment packages region-wide, and in historically marginalized communities.
RTP Monitoring Measures support the region's federally-required Congestion Management Process reporting between RTP update cycles. State DOTs and MPOs are now required to set performance targets for the Federal safety performance measures identified in MAP-21.	*"Number of fatalities, serious injuries and crashes per vehicle mile traveled for all modes of travel region-wide."* The region does not currently set targets for monitoring measures, but will do so to comply with federal regulations.	Annual targets, based on a five year rolling average of the number of people killed and seriously injured in traffic crashes in the region, by mode, per 100 million vehicle miles traveled, and per 100 thousand people.

[2] See the 2018 RTP Performance Measures page: http://www.oregonmetro.gov/public-projects/2018-regional-transportation-plan/performance and the meeting packet for April 25, 2016

PERFORMANCE TARGET

RTP Performance Targets set time bound, quantifiable goals for achieving the region's desired policy outcomes for investment in the region's transportation system.

Metro's Regional Transportation Safety Plan Policy Framework Report (July 2016) demonstrates existing policy direction for the region to develop a target of eliminating transportation related fatalities and serious injuries. Additionally, several current or soon to be adopted plans have "zero deaths" visions and/or targets, including the Oregon Transportation Safety Action Plan, Portland Vision Zero Action Plan, Clackamas County Transportation Safety Action Plan, Washington County Transportation Safety Action Plan, and the Hillsboro Transportation Safety Action Plan. In 2016, the Federal Highway Administration adopted a national target of zero traffic fatalities.

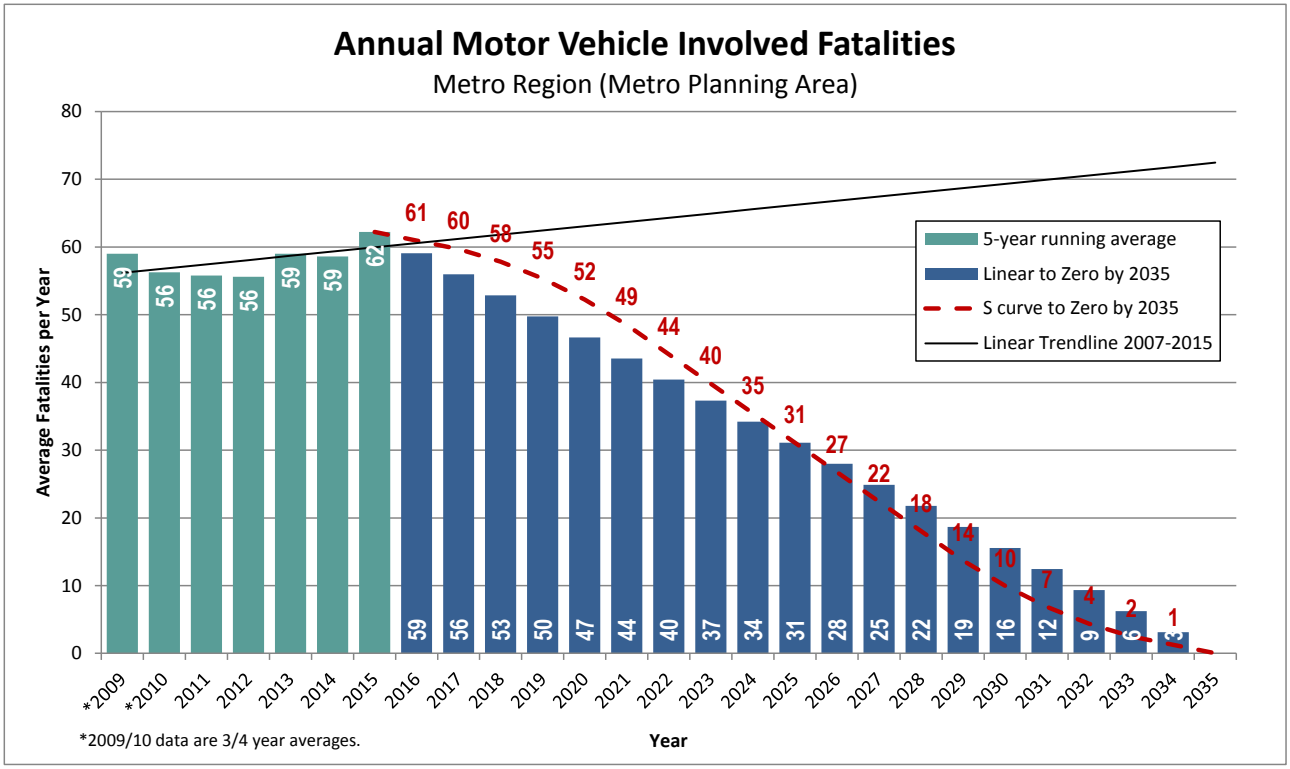
The Safety Work Group recommends a target of zero deaths and fatalities by 2035; the target includes a specified date, refers to "all users" of the transportation system, and includes interim targets. The interim targets correspond with the monitoring measures annual targets.

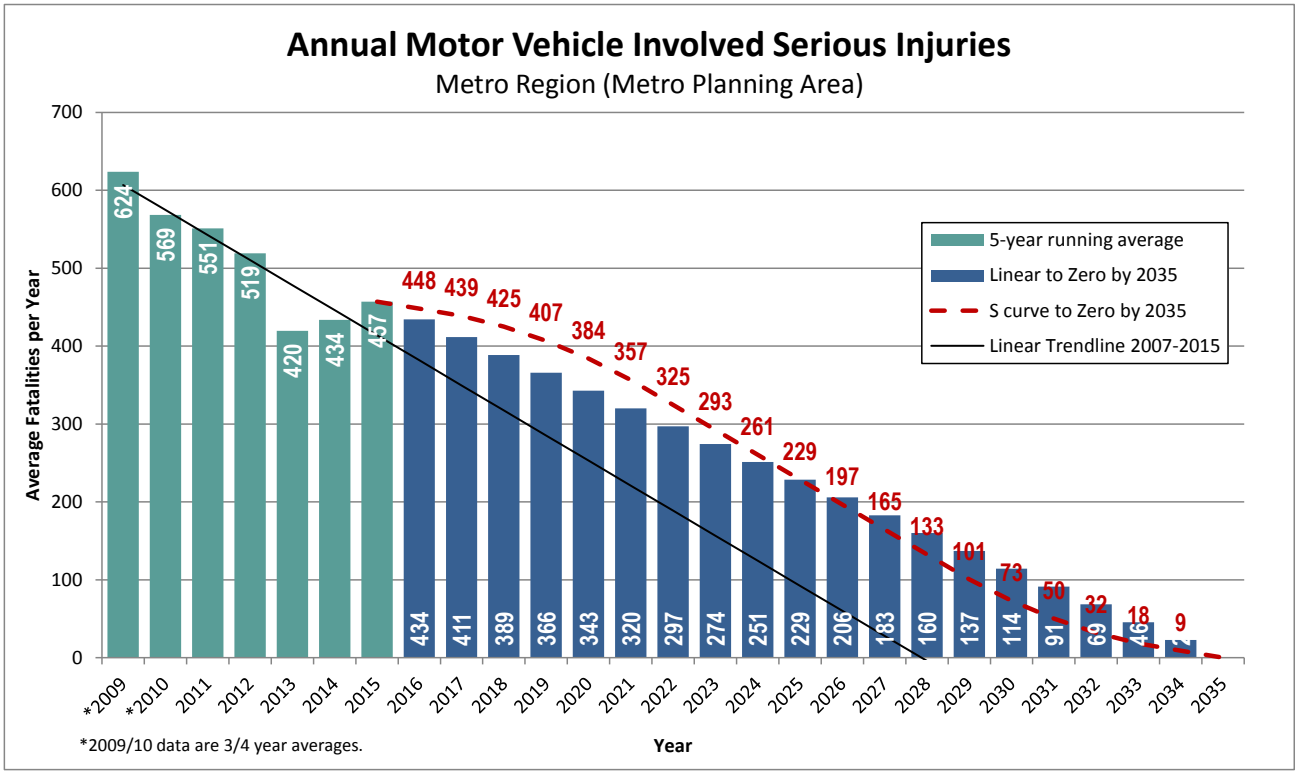
Recommended 2018 RTP Safety Performance Target

"By 2035 eliminate transportation related fatalities and serious injuries for all users of the region's transportation system, with a 16% reduction by 2020 (as compared to the 2015 five year rolling average), and a 50% reduction by 2025."

- This target would replace the current 2014 Safety Performance Target.
- A five year rolling average of ODOT crash data is used to track the target.
- Progress towards meeting the 2035 target (annual and interim targets) would be tracked through the annual rolling monitoring targets.
- The target year of 2035 would not change in subsequent RTP updates.

The two graphs on the next page show the linear trend line for fatalities and serious injuries in the region. The trend for fatalities is increasing because of the trend in pedestrian deaths. The graphs also shows two different ways to forecast future deaths and fatalities – one using a linear trend based on a zero deaths and serious injuries by 2035 and one an "S-curve" forecasted trend line, also based on zero deaths and fatalities by 2035, but anticipating a less immediate change as plans and policies take time to be implemented; ODOT is employing this method in the recently adopted state safety action plan. Metro recommends using the "S-curve" forecasting method.


Annual Motor Vehicle Involved Fatalities
Metro Region (Metro Planning Area)
Average Fatalities per Year
Year
*2009/10 data are 3/4 year averages.
5-year running average
Linear to Zero by 2035
S curve to Zero by 2035
Linear Trendline 2007-2015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S curve to Zero by 2035
Linear Trendline 2007-2015

SYSTEM EVALUATION MEASURES

RTP System Evaluation Measures compare the base year conditions of the transportation system with alternative investment packages of projects and programs to document how well each package of transportation investments performs on an array of measures that are linked to RTP Goals, and in most cases, overlap with the RTP Performance Targets.

The current RTP does not include system evaluation measures for safety. The RTP Transportation Equity Work Group recommended both safety system evaluation measures be included in the 2018 RTP.

Transportation Safety – Infrastructure Investments

This system evaluation measure identifies the number, cost and percent of safety projects in the RTP investment packages region-wide, and the number, cost and percent of safety projects in areas with historically marginalized communities to identify where and at what level of investment the package of future transportation projects addresses transportation safety.

This system evaluation measure requires providing a definition of a "safety project" in order to track safety investments.

For the purpose of the RTP and infrastructure investments system evaluation measure, **safety projects are defined as**: Infrastructure projects with the primary intent to address a safety issue, and allocate a majority of the project cost to a documented safety countermeasure(s) to address a specific documented risk, or improve safety for vulnerable users, including people walking and bicycling, older adults and youth.

Safety countermeasures are actions taken to improve transportation safety and therefore decrease the number of injuries and fatalities. Safety countermeasures may include geometric design, systemic safety, and intelligent transportation systems. Examples of proven safety countermeasures include, but are not limited to, FHWA's nine proven safety countermeasures: road diets, medians and pedestrian crossing islands, pedestrian hybrid beacons, roundabouts, access management, retroreflective backplates, safety edge, enhanced curve delineation, and rumble strips.[3]

Transportation Safety – Exposure to Crash Risk

This system evaluation measure approximates the risk of exposure to crashes by identifying whether the package of future transportation investments increases or decreases the sum of all non-freeway vehicle miles traveled (VMT) in Transportation Area Zones (TAZ) for RTP investment packages region-wide, and in historically marginalized communities

[3] http://safety.fhwa.dot.gov/provencountermeasures/

MONITORING MEASURES

RTP Monitoring Measures support the region's federally-required Congestion Management Process reporting between RTP update cycles. (Metro has had limited resources and capacity to track System Monitoring Measures every two years as intended, and, observed data is not always readily available; crash data for example, is usually at least one year old. To aid better reporting, Metro will be moving toward a new online "Mobility Corridors" tool for monitoring.)

State DOTs and MPOs must now report on the federally required performance measures identified in MAP-21 and the FAST Act.[4] Metro will report on these measures in each update of the RTP, 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.

The measures identified in Table 3, below, are proposed to replace the 2014 RTP safety monitoring measure: "Number of fatalities, serious injuries and crashes per vehicle mile traveled for all modes of travel region-wide."

The measures in Table 3 include the five FHWA safety measures that Metro is required to report on and additional monitoring measures proposed by Metro and the Safety Work Group, to measure: "The five year rolling average of the number of people killed and seriously injured in traffic crashes in the region, by mode, per 100 million vehicle miles traveled, and per 100 thousand people."

Table 2: Annual Monitoring Targets for FHWA and RTP Transportation Safety Performance Measures

Reporting Year (based on a 5-year rolling average)	FHWA Performance Measures						
	Fatalities (People)	Fatality Rate		Serious Injuries (People)	Serious Injury Rate		Non-Motorized Fatalities and Serious Injuries (People)
		Per VMT (People/ 100 MVMT)	Per capita (People/ 100k pop)		Per VMT (People/ 100 MVMT)	Per capita (People/ 100k pop)	
2011 - 2015 (Base)	62	0.9	4.0	457	6.4	29.4	113
2014 - 2018	58	0.8	3.6	425	5.8	26.5	105
2015 - 2019	55	0.7	3.4	407	5.5	25.1	101
2016 - 2020	52	0.7	3.2	384	5.1	23.4	95
2017 - 2021	49	0.6	2.9	357	4.7	21.5	88

Note: Due to rounding, addition of numbers across modes may result in minor variation from totals.

[4] The final safety rule can be accessed at: http://safety.fhwa.dot.gov/hsip/rulemaking/ Significant federal rulemaking activities to implement the performance provisions first included in the Moving Ahead in the 21st Century Act (MAP-21) Act and subsequent provisions contained in the Fixing America's Surface Transportation (FAST) Act have been underway for nearly 4 years by the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA).

Reporting Year (based on a 5-year rolling average)	Motor Vehicle Only					
	Fatalities (People)	Fatality Rate		Serious Injuries (People)	Serious Injury Rate	
		Per VMT (People/ 100 MVMT)	Per capita (People/ 100k pop)		Per VMT (People/ 100 MVMT)	Per capita (People/ 100k pop)
2011 - 2015 (Base)	38	0.5	2.4	368	5.2	23.7
2014 - 2018	35	0.5	2.2	343	4.7	21.3
2015 - 2019	34	0.5	2.1	328	4.4	20.2
2016 - 2020	32	0.4	1.9	309	4.1	18.8
2017 - 2021	30	0.4	1.8	287	3.8	17.3

Note: Due to rounding, addition of numbers across modes may result in minor variation from totals.

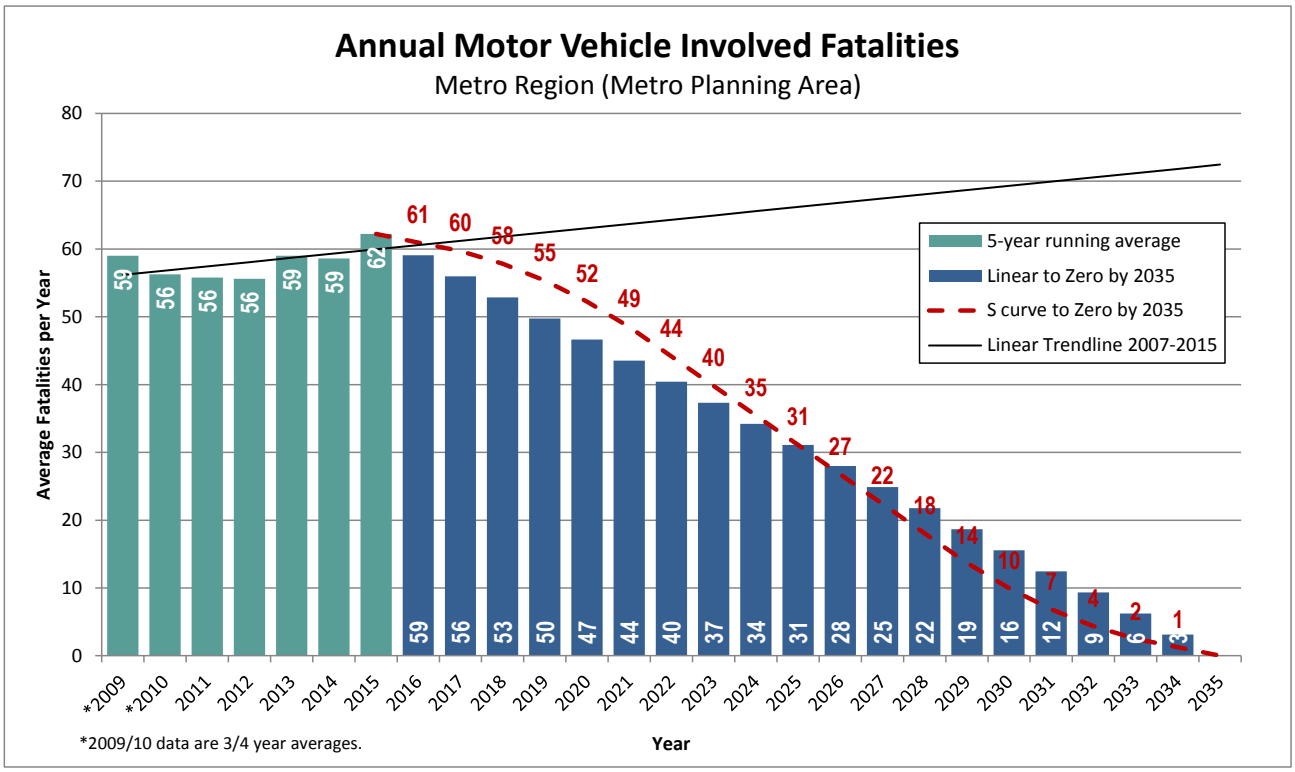
Reporting Year (based on a 5-year rolling average)	Pedestrians					
	Fatalities (People)	Fatality Rate		Serious Injuries (People)	Serious Injury Rate	
		Per VMT (People/ 100 MVMT)	Per capita (People/ 100k pop)		Per VMT (People/ 100 MVMT)	Per capita (People/ 100k pop)
2011 - 2015 (Base)	22	0.3	1.4	56	0.8	3.6
2014 - 2018	20	0.3	1.3	52	0.7	3.2
2015 - 2019	20	0.3	1.2	49	0.7	3.0
2016 - 2020	18	0.2	1.1	47	0.6	2.8
2017 - 2021	17	0.2	1.0	43	0.6	2.6

Note: Due to rounding, addition of numbers across modes may result in minor variation from totals.

Reporting Year (based on a 5-year rolling average)	Bicyclists					
	Fatalities (People)	Fatality Rate		Serious Injuries (People)	Serious Injury Rate	
		Per VMT (People/ 100 MVMT)	Per capita (People/ 100k pop)		Per VMT (People/ 100 MVMT)	Per capita (People/ 100k pop)
2011 - 2015 (Base)	2.2	0.03	0.14	33	0.5	2.1
2014 - 2018	2.0	0.03	0.13	31	0.4	1.9
2015 - 2019	2.0	0.03	0.12	30	0.4	1.8
2016 - 2020	1.8	0.02	0.11	28	0.4	1.7
2017 - 2021	1.7	0.02	0.10	26	0.3	1.6

Note: Due to rounding, addition of numbers across modes may result in minor variation from totals.

The annual targets are calculated using the "S-curve" forecasting trend. The S-curve forecast method was developed assuming the five-year average number of crashes may be relatively flat in the near future; start to decline in a few years in recognition of different projects, programs and actions implemented in the region and/or automated vehicles; an flatten out again in the future as it becomes more difficult to address the remaining fatalities.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Metro Region (Metro Planning Area)
Average Fatalities per Year
Year
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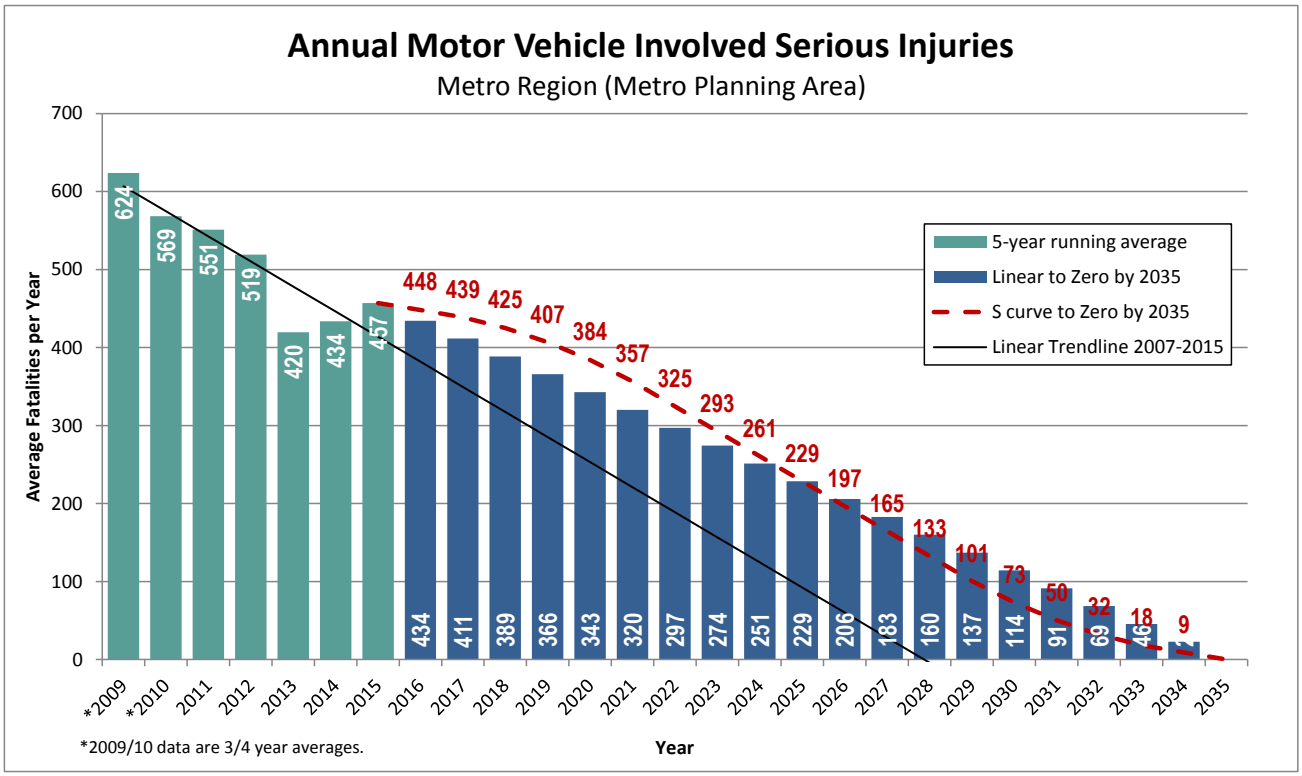
5-year running average
Linear to Zero by 2035
S curve to Zero by 2035
Linear Trendline 2007-2015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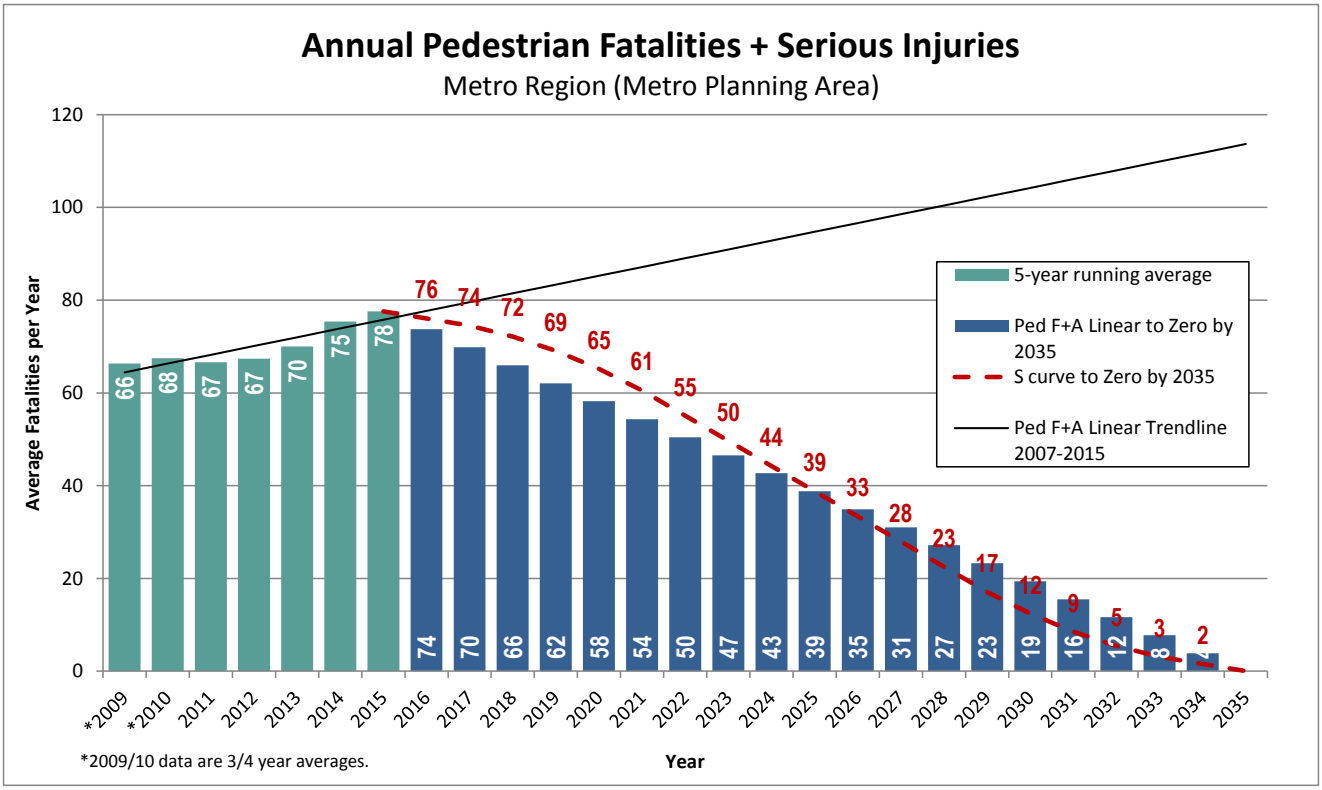
Annual Pedestrian Fatalities + Serious Injuries
Metro Region (Metro Planning Area)
Average Fatalities per Year
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*2009/10 data are 3/4 year averages.
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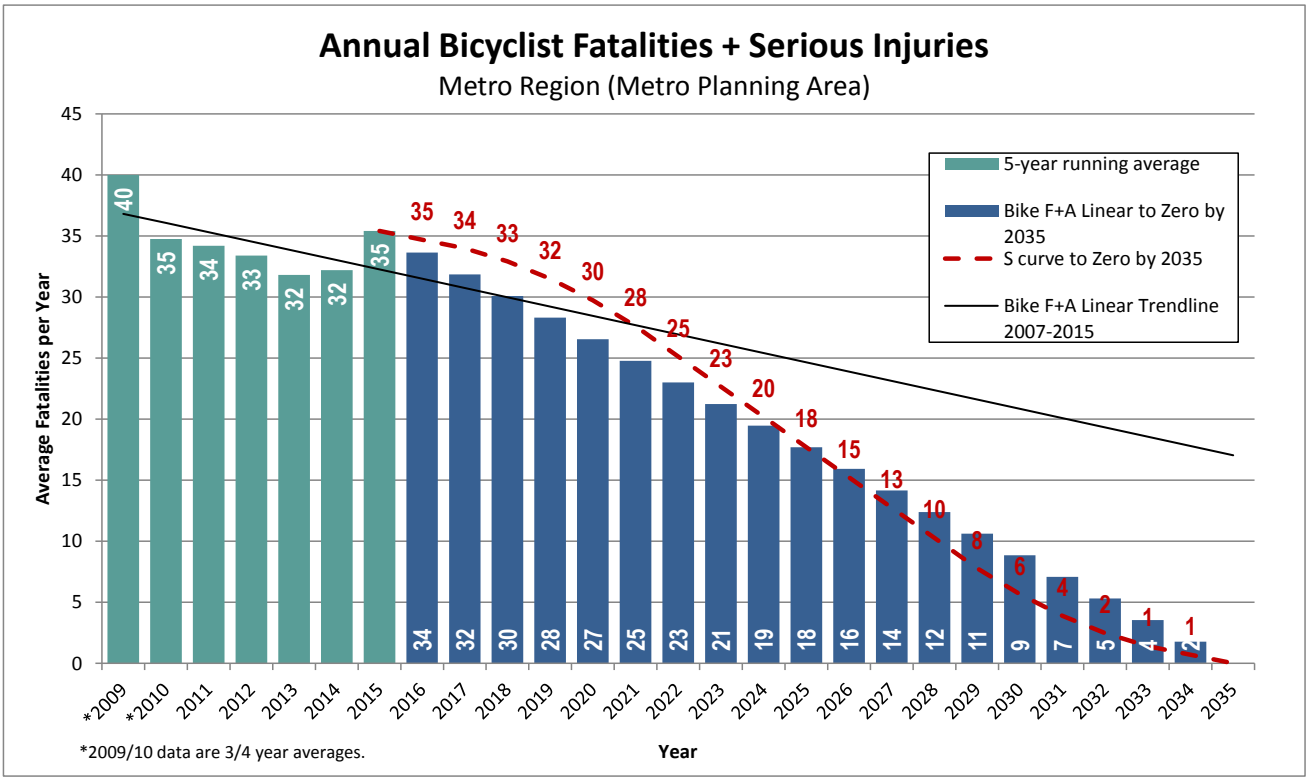
Ped F+A Linear to Zero by 2035
S curve to Zero by 2035
Ped F+A Linear Trendline 2007-2015


Annual Bicyclist Fatalities + Serious Injuries
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Average Fatalities per Year
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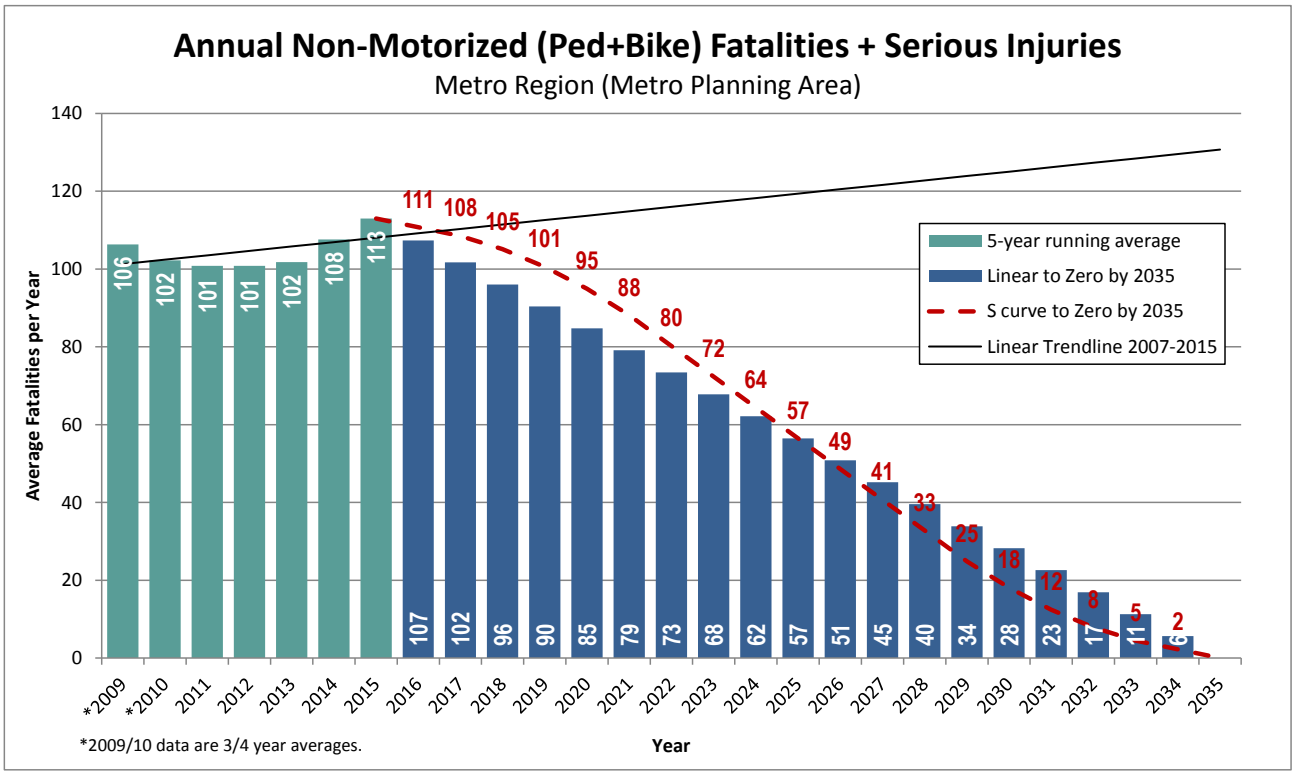
*2009/10 data are 3/4 year averages.
5-year running average
Bike F+A Linear to Zero by 2035
S curve to Zero by 2035
Bike F+A Linear Trendline 2007-2015


Annual Non-Motorized (Ped+Bike) Fatalities + Serious Injuries
Metro Region (Metro Planning Area)
Average Fatalities per Year
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S curve to Zero by 2035
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2033
2034
2035

Clean air and clean water do not stop at city limits or county lines. Neither does the need for jobs, a thriving economy and sustainable transportation and living choices for people and businesses in the region. Voters have asked Metro to help with the challenges and opportunities that affect the 25 cities and three counties in the Portland metropolitan area.

A regional approach simply makes sense when it comes to providing services, operating venues and making decisions about how the region grows. Metro works with communities to support a resilient economy, keep nature close by and respond to a changing climate. Together we're making a great place, now and for generations to come.

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2018 Regional Transportation Plan

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Getting there safely

2018 Regional Transportation Plan update

TRANSPORTATION SAFETY

High Injury Corridors - DRAFT

January 2017

Metro
Making a great place

REGIONAL HIGH INJURY CORRIDORS

Regional High Injury Corridors (HICs) are stretches of roadways in the Portland metropolitan area where the highest concentrations of severe crashes involving a motor vehicle occur on the regional transportation network. [1] Metro developed a replicable and quantitative assessment of the crash performance on roadways on the regional transportation network to support planning and prioritization of corridor safety efforts.

A majority (60%) of severe crashes in the region occur on 23% of the roadways on the regional transportation network, and 6% of all streets in the region.

Corridors	Miles of Streets	% of all severe crashes (2010-2014)	% regional transportation network (1,739 miles)	% of all streets (6,565 miles)
Regional 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%

Purpose

Metro developed the HICs to help meet the safety goals and targets of the Regional Transportation Plan (RTP).[2] As part of the 2018 update of the RTP, Metro is updating the 2012 Regional Transportation Safety Plan and the 2012 Metro State of Safety Report. The 2014 RTP identified the need to identify HICs in the update of the transportation safety plan to provide another tool to support planning and prioritization of safety efforts.

The 2012 Metro State of Safety Report identified several factors contributing to high severe crash rates in the region: arterial roadways, multi-lane roadways, lack of lighting, and behavior (e.g. drunk driving). At the time, however, Metro lacked the ability to quantify risk by specific roadways.

[1] The regional transportation network is comprised of the arterial and throughway, freight, transit, bicycle and pedestrian networks shown in the network maps in Chapter 2 of the 2014 Regional Transportation Plan, http://www.oregonmetro.gov/regional-transportation-plan

[2] Metro is currently updating the RTP, including the safety performance measures and targets. A new safety target will be proposed in the 2018 RTP: "By 2035 eliminate transportation related fatalities and serious injuries for all users of the region's transportation system, with a 16% reduction by 2020 (as compared to the 2015 five year rolling average), and a 50% reduction by 2025."

A recommendation of the 2014 Regional Transportation Safety Plan was to develop performance measurements to identify high-crash arterials in the region. Metro began to research methods for identifying regional high injury corridors in 2015 to fulfill this recommendation and incorporate the findings into the update Regional Transportation Safety Plan and the 2018 RTP.

Project evaluation criteria and evaluation processes for the RTP have not yet been decided on, but safety will most likely be included and high injury corridors may also be used in the RTP evaluation. Projects submitted to the RTP will identify if they are on a high injury corridor and whether they are a safety project.[3] This information will be used to help assess the level of investment in the plan specifically directed towards safety and specifically addressing safety issued on a high injury corridor. This information may also possibly be used in the RTP project evaluation.

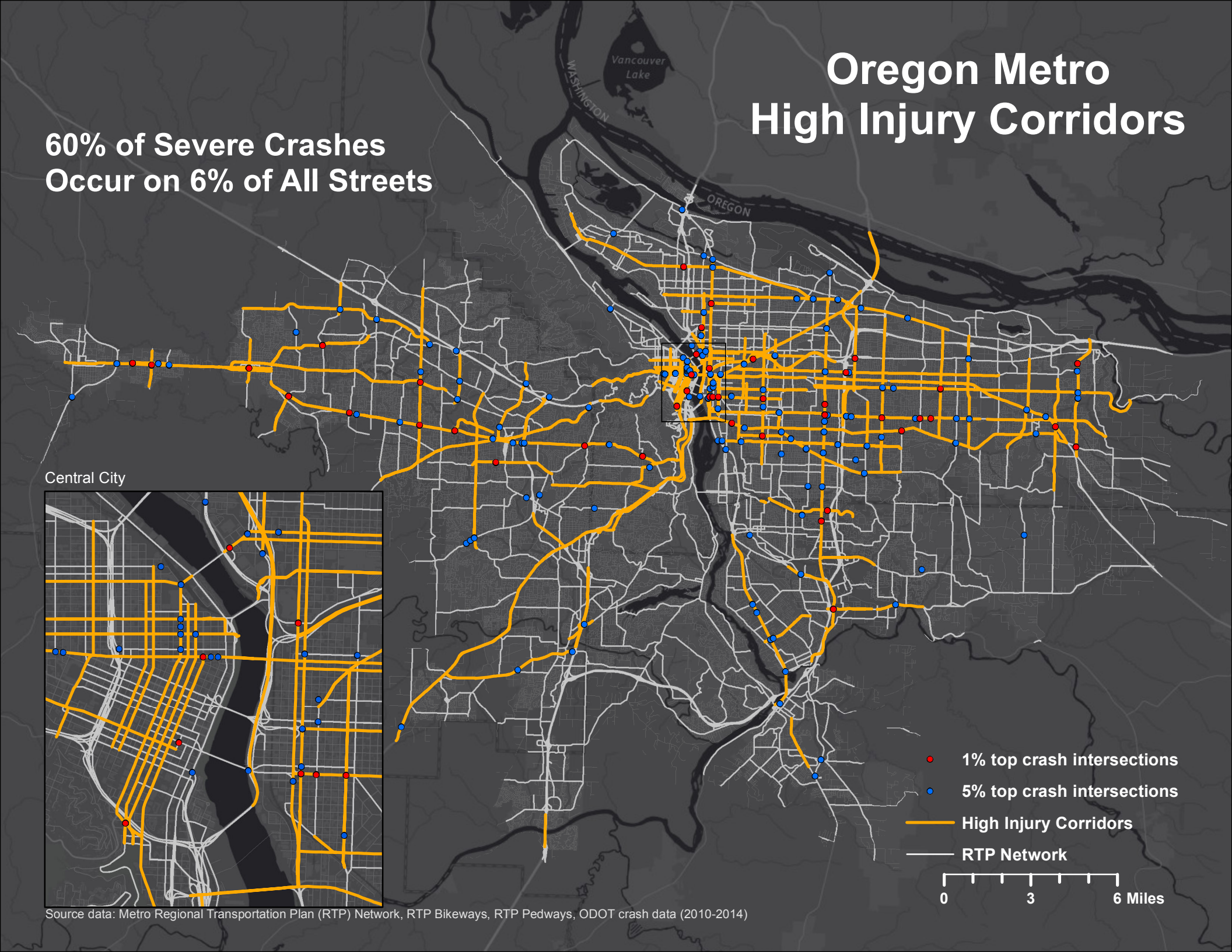
High Injury Corridors

The following maps show the combined high injury corridors and for each mode. The thirty-five corridors with the highest severe crashes per miles for each mode and combined are listed after each map. A full list of corridors for each mode and combined is provided at the end of the report.

[3] In the RTP, regional safety projects are defined as infrastructure projects with the primary intent to address a safety issue, and allocate a majority of the project cost to a documented safety countermeasure(s) to address a specific documented risk, or improve safety for vulnerable users, including people walking and bicycling, older adults and youth. Example safety countermeasures include, but are not limited to, FHWA's nine proven safety countermeasures: road diets, medians and pedestrian crossing islands, pedestrian hybrid beacons, roundabouts, access management, retroreflective backplates, safety edge, enhanced curve delineation, and rumble strips.

Oregon Metro
High Injury Corridors

60% of Severe Crashes
Occur on 6% of All Streets



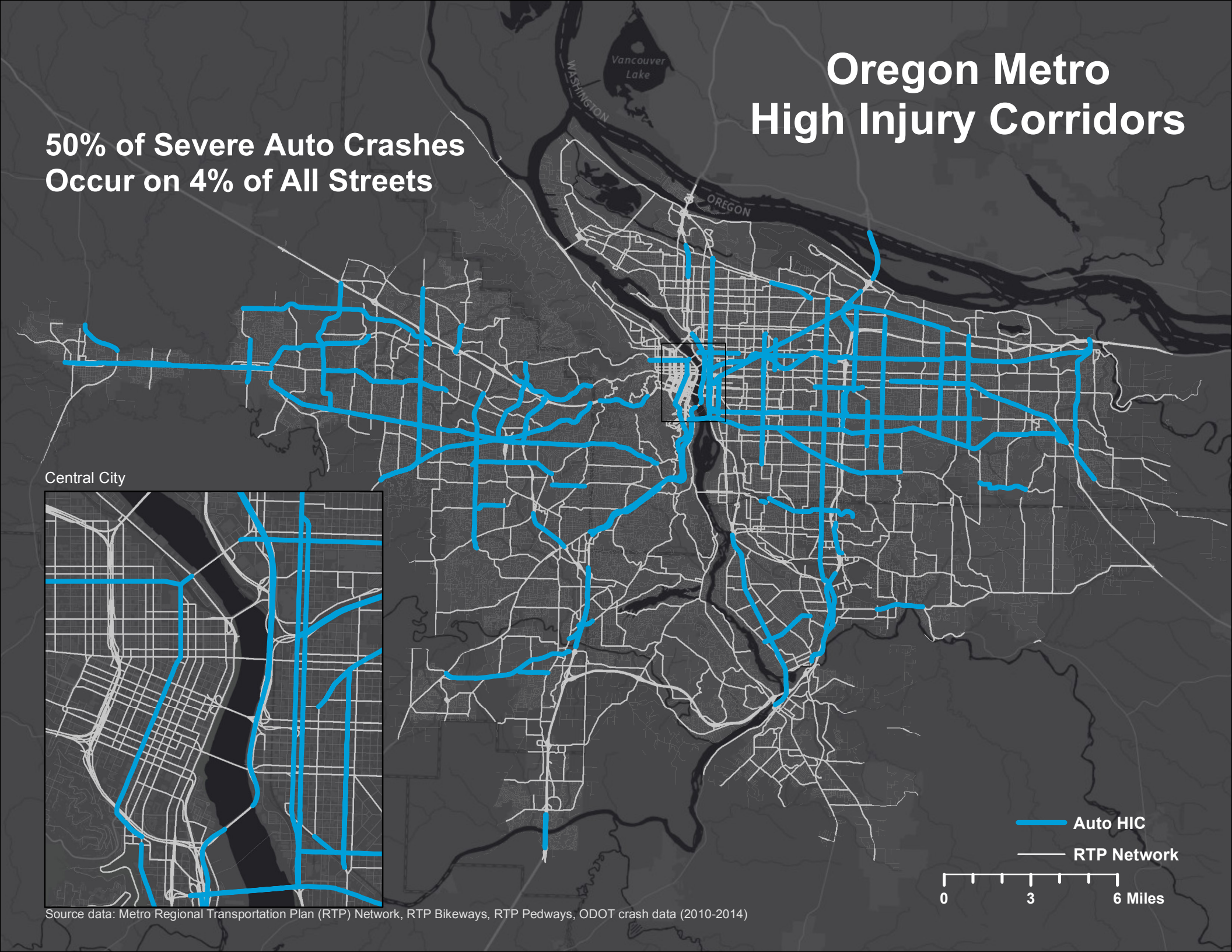
Source data: Metro Regional Transportation Plan (RTP) Network, RTP Bikeways, RTP Pedways, ODOT crash data (2010-2014)

Top 35 Combined (Ped/Bike/Auto) High Injury Corridors –Severe Crashes per Mile

Corridor	From	To	Jurisdiction	# of Severe Crashes	Length	Severe Crashes per Mile	In Top 35 HIC?		
							Ped	Bike	Auto
I-5 Southbound	I-405 at Fremont Bridge	Burnside Bridge	Portland	13	1.5	8.61			X
Adair	Baseline	Pacific Highway	Cornelius & Forest Grove	13	1.5	8.48		X	X
Division	7th	190th	Gresham & Portland	80	9.6	8.29	X	X	X
I-5 Northbound	Marquam Bridge	I-405 at Fremont Bridge	Portland	18	2.5	7.13			X
181st	Sandy	182nd (Merging)	Gresham	14	2.1	6.62	X	X	X
Tualatin Valley Highway	Hocken	10th	Washington Co, Beaverton & Hillsboro	55	8.3	6.60		X	X
Broadway	SW 4th	Naito	Portland	13	2.0	6.36	X	X	X
Ross Island Bridge	Grand	I-5	Portland	8	1.4	5.81			X
82nd	Killingsworth	E. Berkeley	Clackamas Co, Gladstone & Portland	75	13.4	5.60	X	X	
Foster	136th	50th & Powell	Portland	26	4.7	5.57	X	X	
102nd	Sandy	Cherry Blossom (Merging)	Maywood Park & Portland	15	2.9	5.19	X		X
Powell	Burnside	McLoughlin	Portland	65	12.9	5.04	X	X	
I-84 Westbound	82nd	Martin Luther King Jr.	Gresham & Portland	24	4.8	5.04			X
Rosa Parks	42nd	Killingsworth	Portland	8	1.6	4.98			X
96th	99th & Washington	Division	Portland	5	1.0	4.96	X		X
I-5 Southbound	Hwy 217	Tualatin River	Tigard	5	1.0	4.85			X
185th	Springville	Farmington	Washington Co & Hillsboro	29	6.0	4.82		X	X
SE/NE 162nd	Powell	Sandy	Gresham & Portland	18	3.8	4.76	X		
Martin Luther King Jr.	Columbia Blvd.	Division	Multnomah Co, Beaverton & Portland	27	5.8	4.66	X	X	
Sunset Highway (Eastbound)	Hwy 217	Tunnel	Portland	9	1.9	4.63			X
Grand Avenue	Broadway	Powell	Portland	16	3.5	4.63	X	X	
Highway 217 Southbound	Beaverton Hillsdale	Sunset Highway	Beaverton	8	1.8	4.57			X
Washington Street	Stark	Thorburn	Portland	9	2.0	4.56			X
Tualatin Valley Highway	341st	17th	Washington Co, Cornelius & Hillsboro	5	1.1	4.54			X
Halsey	I-84 at NE 67th	Sandy	Portland	7	1.6	4.48			X
McLoughlin	Jefferson	Oregon City Bridge	Clack Co, Gladstone, Milwaukie, Ore City	30	6.8	4.41	X		
Highway 8 / Canyon	Hocken	Sunset Highway	Portland	17	3.9	4.41			
I-205 Southbound	Washington State Line	Marine Dr	Beaverton	7	1.6	4.36			X
Wiedler	24th	Broadway (Merging)	Portland	6	1.4	4.31		X	
Highway 217 – Northbound	Pacific Highway	Scholls Ferry	Beaverton & Tigard	7	1.6	4.29			X
I - 84 Eastbound	I-5	I-205	Portland	21	4.9	4.28			X
Highway 8 / Baseline	TV Highway (near SW 17th)	TV Highway (near SE 10th)	Hillsboro	7	1.7	4.22	X		
Beaverton Hillsdale	Capitol Highway	Lombard	Washington Co, Beaverton & Portland	22	5.3	4.13			X
112th	Holgate	Market	Beaverton	6	1.5	3.98			
Highway 217 - Northbound	Beaverton Hillsdale	Sunset Highway	Clack Co, Wash Co, Lake Oswego, Tigard & Tualatin	7	1.8	3.96			X

Oregon Metro
High Injury Corridors

50% of Severe Auto Crashes Occur on 4% of All Streets



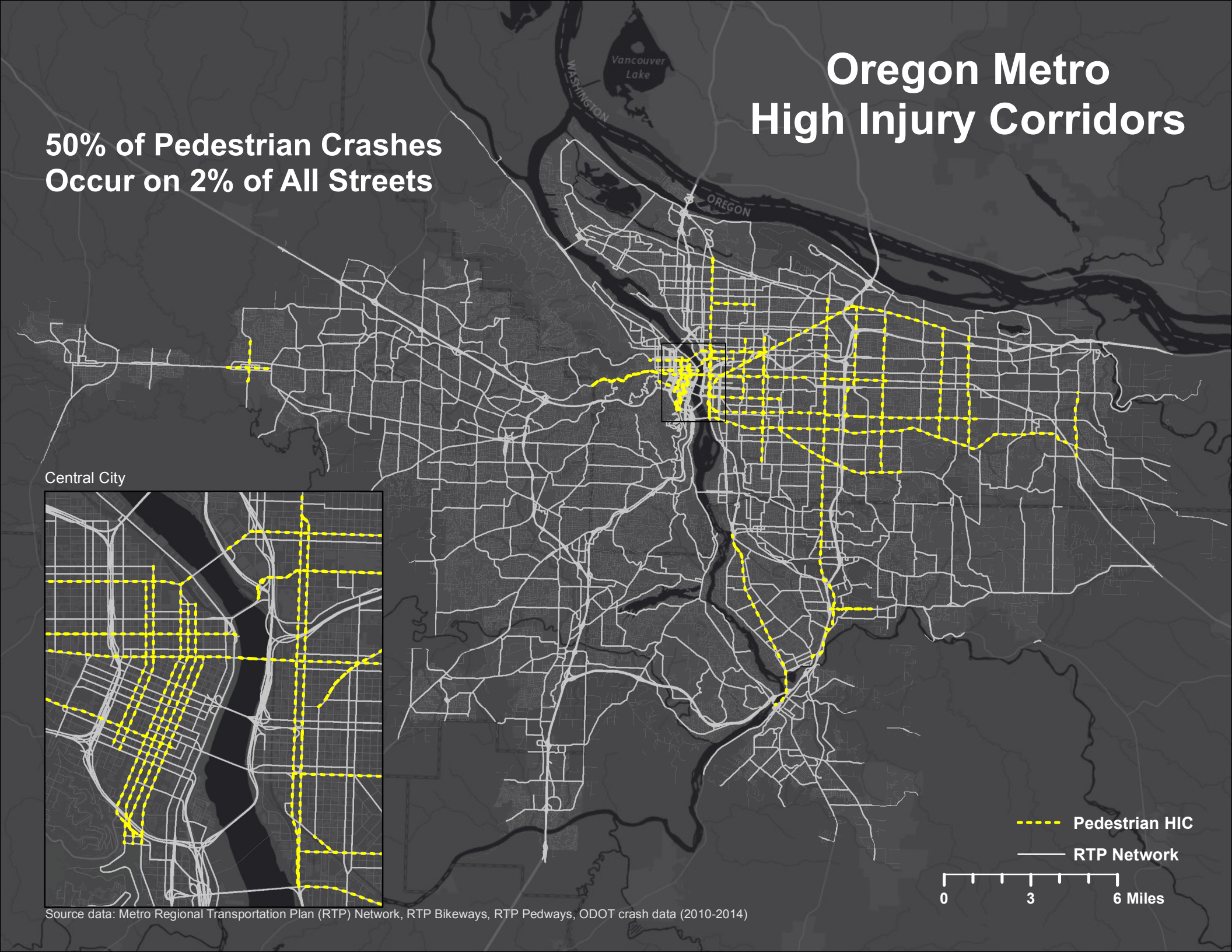
Source data: Metro Regional Transportation Plan (RTP) Network, RTP Bikeways, RTP Pedways, ODOT crash data (2010-2014)

Top 35 Auto High Injury Corridors – Severe Crashes per Mile

Corridor	From	To	Jurisdiction	# of Crashes	Length	Severe Crashes per Mile
I-5 Southbound	I-405 at Fremont Bridge	Burnside Bridge	Portland	11	1.5	7.28
Adair	Baseline	Pacific	Cornelius & Forest Grove	11	1.5	7.18
I-5 Northbound	Marquam Bridge	I-405	Portland	16	2.5	6.34
Division	7th	190th	Gresham & Portland	54	9.6	5.60
181st	Sandy	182nd	Gresham	11	2.1	5.20
Ross Island Bridge	Grand	I-5	Portland	7	1.4	5.08
Rosa Parks	Cully	Killingsworth	Portland	8	1.6	4.98
I-5 - Southbound	Hwy 217	Tualatin River	Tigard	5	1.0	4.85
Tualatin Valley Highway	Hocken	10th	Washington County, Beaverton, & Hillsboro	40	8.3	4.80
Sunset Highway (Eastbound)	Hwy 217	Tunnel	Multnomah County, Beaverton, & Portland	9	1.9	4.63
Hwy 217 Southbound	Sunset Highway	Beaverton Hillsdale	Beaverton	8	1.8	4.57
I-84 Westbound	Martin Luther King Jr.	82nd	Portland	21	4.8	4.41
I-205 Southbound	Washington State Line	Marine Dr	Portland	7	1.6	4.36
Hwy 217 Northbound	Scholls Ferry	Pacific Highway	Beaverton & Tigard	7	1.6	4.29
185th	Springville	Farmington	Washington County & Hillsboro	25	6.0	4.16
I-84 Eastbound	I-5	I-205	Portland	20	4.9	4.07
Washington Street	Stark St.	Thorburn	Portland	8	2.0	4.05
96th	SE Washington St.	SE Division St.	Portland	4	1.0	3.97
Hwy 217 Northbound	Beaverton Hillsdale	Sunset Highway	Beaverton	7	1.8	3.96
I-5 Northbound	Kruse	Nyberg	Clack. Co, Wash. Co, L. Oswego, Tigard & Tualatin	11	2.8	3.96
Broadway	SW 4th	Naito	Portland	8	2.0	3.92
Halsey	I-84 at NE 67th	Sandy	Portland	6	1.6	3.84
47th	Glisan	Wistaria	Portland	4	1.0	3.83
102nd	Sandy	Cherry Blossom	Maywood Park & Portland	11	2.9	3.81
Tualatin Sherwood	Pacific Highway	Nyberg	Washington County & Sherwood & Tualatin	17	4.5	3.75
I-205 Southbound	Washington State Line	Division	Portland	4	1.1	3.70
Brookwood	Shute	Sunset Highway	Hillsboro	4	1.1	3.68
Tualatin Valley Highway	341st	17th	Washington County, Cornelius, & Hillsboro	4	1.1	3.63
I-5 Southbound	Nyberg	Kruse	Tigard & Tualatin	5	1.4	3.62
I-205 Northbound	Airport Way	Washington State Line	Portland	6	1.7	3.59
I-5 Southbound	Wilsonville Road	Miley	Clackamas County & Wilsonville	4	1.1	3.58
SE Bob Schumacher Road	Idleman & Otty	Stevens	Clackamas County & Happy Valley	4	1.1	3.49
I-5 Northbound	Bertha Blvd	Marquam Bridge	Portland	11	3.2	3.45
Allen	Davis	92nd	Beaverton	10	2.9	3.41
Beaverton Hillsdale	Capitol Highway	Lombard	Washington County, Beaverton, & Portland	18	5.3	3.38

Oregon Metro
High Injury Corridors

50% of Pedestrian Crashes Occur on 2% of All Streets



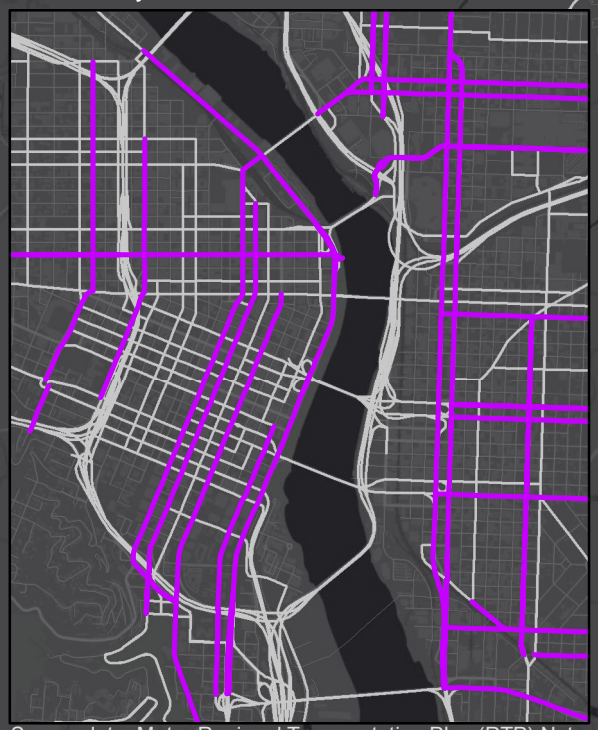
Source data: Metro Regional Transportation Plan (RTP) Network, RTP Bikeways, RTP Pedways, ODOT crash data (2010-2014)

34 Pedestrian High Injury Corridors –Severe Crashes per Mile

Corridor	From	To	Jurisdiction	# of Severe Crashes	Length (MI)	Severe Crashes per Mile	# of Minor Crashes
Division	7th	190th	Gresham & Portland	22	9.6	2.28	61
82nd	Killingsworth	Causey	Clackamas Co., Gladstone & Portland	27	13.4	2.02	93
Broadway	SW 4th	Naito	Portland	4	2.0	1.96	24
McLoughlin	Jefferson	Oregon City Bridge	Clackamas Co., Gladstone, Milwaukie, Oregon City	13	6.8	1.91	32
Foster	136th	50th Ave & Powell Blvd.	Portland	8	4.7	1.71	18
East Burnside	75th	124th	Portland	4	2.6	1.55	7
SW 4th	Sheridan	Burnside	Portland	2	1.3	1.53	20
SE 28th	Madison	Knott	Portland	3	2.0	1.49	5
SE/NE 102nd	Sandy	Cherry Blossom	Maywood Park & Portland	4	2.9	1.38	19
Burnside	At SW Barnes	NE 68th	Portland	14	10.2	1.37	56
Alberta	33rd	Martin Luther King Jr.	Portland	2	1.5	1.34	13
SE/NE 162nd	Powell	Sandy	Gresham & Portland	5	3.8	1.32	11
Highway 212	I-205	East of HWY 224 Interchange	Clackamas County & Happy Valley	3	2.4	1.25	9
Baseline	TV Highway (near SW 17th)	TV Highway (near SE 10th)	Hillsboro	2	1.7	1.21	12
Powell	Burnside	McLoughlin	Gresham & Portland	15	12.9	1.16	75
Grand	Broadway	Powell	Portland	4	3.5	1.16	12
SE 182nd	Highland & Powell	181st	Gresham	2	1.7	1.15	7
Everett	Westover	Naito	Portland	2	1.8	1.10	13
SW/NW 6th Ave.	Sheridan	Irving	Portland	2	1.8	1.10	10
Martin Luther King Jr.	Columbia	Division	Portland	6	5.8	1.03	31
SE 96th	Washington Street	Division	Portland	1	1.0	0.99	5
SE 181st	Sandy	182nd	Gresham	2	2.1	0.95	16
Sandy	7th	165th	Maywood Park & Portland	9	9.6	0.94	41
Multnomah Street	Steel Bridge	21st	Portland	2	2.2	0.91	14
Kane	257th & Stark	Orient & Palmquist	Gresham & Troutdale	2	2.2	0.89	15
SW/NW 11th	Lovejoy	Market	Portland	1	1.1	0.89	7
Cesar E. Chavez	Wistaria	Woodstock	Portland	4	4.7	0.85	27
SW/ NW 10th Ave.	Northrup	Market	Portland	1	1.2	0.80	8
Broadway	Broadway Bridge	Sandy	Portland	2	2.5	0.80	26
Lovejoy	Cornell	Broadway	Portland	1	1.3	0.77	8
NE/SE 122nd	Skidmore	Foster	Portland	4	5.5	0.73	30
1st	Glencoe	Wood	Hillsboro	1	1.5	0.68	12
Hawthorne	51st	Martin Luther King Jr.	Portland	2	3.1	0.66	18
SW/NW 5th	Irving	Sheridan	Portland	1	1.8	0.55	14

Oregon Metro
High Injury Corridors

50% of Bike Crashes
Occur on 3% of All Streets



Bike HIC

RTP Network

0 3 6 Miles

Source data: Metro Regional Transportation Plan (RTP) Network, RTP Bikeways, RTP Pedways, ODOT crash data (2010-2014)

Top 35 Bike High Injury Corridors –Severe Crashes per Mile

Corridor	From	To	Jurisdiction	# of Severe Crashes	Length (MI)	Severe Crashes per Mile	# of Minor Crashes
SE 50th	Powell	Division	Portland	2	1.1	1.79	5
NE Wielder	24th	Broadway	Portland	2	1.4	1.44	19
Marine Drive	122nd	Portland Airport	Portland	3	2.7	1.12	3
NW Everett	Westover	Naito	Portland	2	1.8	1.10	13
Skidmore	Interstate	Martin Luther King Jr.	Portland	1	1.0	0.99	11
SW/NE 257th	I-84	Kane & Stark	Troutdale	2	2.1	0.97	6
SE 28th	Woodstock	Gladstone	Portland	1	1.1	0.88	3
SE Ankeny	28th	Martin Luther King Jr.	Portland	1	1.2	0.84	14
10th	Cornelius Schefflin	Oleander	Cornelius	1	1.2	0.81	3
Powell	Burnside	McLoughlin	Gresham & Portland	9	12.9	0.70	45
Martin Luther King Jr.	Columbia	Division	Portland	4	5.8	0.69	38
SW/NW 18th	Thurman	Collins & Jefferson	Portland	1	1.5	0.69	7
Ainsworth	Vancouver	27th	Portland	1	1.5	0.67	5
Gladstone	42nd	52nd	Portland	1	1.5	0.67	7
Hawthorne	51st	Martin Luther King Jr.	Portland	2	3.1	0.66	46
Adair	Baseline	Pacific	Cornelius & Forest Grove	1	1.5	0.65	6
Foster	136th	50th & Powell	Portland	3	4.7	0.64	25
Oak	Baseline & T.V. Highway	10th	Hillsboro	1	1.6	0.62	4
Tualatin Valley Highway	Hocken	10th	Washington Co., Beaverton & Hillsboro	5	8.3	0.60	26
Grand	Broadway	Powell	Portland	2	3.5	0.58	34
Broadway	SW 4th	Naito	Portland	1	2.0	0.49	37
Clinton	50th	12th	Portland	1	2.1	0.48	7
Williams	Jessup	Wheeler	Portland	2	4.2	0.48	25
Vancouver	Weilder	Martin Luther King Jr.	Portland	3	6.3	0.47	30
SE/NE 181st	Sandy	182nd	Gresham	1	2.1	0.47	19
Multnomah	Steel Bridge	21st	Portland	1	2.2	0.45	16
Cesar E. Chavez	Wistaria	Woodstock	Portland	2	4.7	0.42	19
Division	7th	190th	Gresham & Portland	4	9.6	0.41	52
Belmont	69th	Grand	Portland	2	4.8	0.41	15
Broadway	Broadway Bridge	Sandy	Portland	1	2.5	0.40	54
SE 11th	Sandy	Clinton	Portland	1	2.6	0.39	19
Multnomah Blvd.	Garden Home	I-5	Portland	1	2.7	0.37	10
185th	Springville	Farmington	Washington Co. & Hillsboro	2	6.0	0.33	21
Barbur Drive	65th	Sheridan	Portland	2	6.3	0.32	26
NE/SE 82nd	Killingsworth	Berkeley St.	Clackamas Co., Gladstone & Portland	4	13.4	0.30	61

Methodology

Metro reviewed methods used by San Francisco, Los Angeles, Florida, Toledo, Hillsborough County MPO, Kentucky, San Diego, Mid-Ohio Regional Planning Commission, Portland and ODOT. Metro had several goals for the methodology:

- that it be replicable so that it could be used over time to track changes;
- that it be quantifiable so that assessments could be made objectively;
- that it focus on severe crashes and not fender benders;
- that it focus on the regional transportation network;
- that it identify high injury corridors and not only hot spots;
- that it capture a majority of the fatal and severe crashes in the region while also resulting in a subset of roadways in order to support planning and prioritization;
- that segments be normalized by segment length.

Metro primarily utilized the approaches developed by San Francisco and Portland and then developed a GIS based analysis that achieved the goals. [4]

1. 2010-2014 crash data from the Oregon Department of Transportation was analyzed weighting fatal and severe crashes higher than other crashes.
2. Regional transportation networks for freight, arterial and throughway, transit, bicycle and pedestrians indentified in the 2014 RTP were combined into one regional transportation network.
3. Corridors were created based on the location of severe crashes, which were given an aggregate crash score based on the frequency and severity of crashes, normalized by the length of the segment.
4. The corridors identified as high injury corridors are the roadway segments with the highest crash score per mile on the regional transportation network. The analysis was done separately for auto only crashes, bicycle/auto crashes, and pedestrian/auto crashes to identify the corridors where at least 50% of all severe crashes for each of the modes are occurring.
5. The combined high injury corridors identify 60% of all severe crashes.

[4] "Identifying High Injury Density Corridors and Areas for Targeted Safety Improvements to Reduce Severe and Fatal Pedestrian Injuries: A Methodology" 2013 http://www.sfhealthequity.org/images/Merged_HIC_Methods_2015.pdf
Portland High Crash Network: https://www.portlandoregon.gov/transportation/54892 and High Collision Intersections: https://www.portlandoregon.gov/transportation/article/549274

6. Intersections with the highest weighted crash scores are also identified. There are 42 intersections, or 1% of all 4,200 intersections in the region that have a weighted crash score greater than 128. There are 174 intersections in the top 5%, with weighted crash scores higher than 80.

The crashes/ corridors are not normalized by vehicle miles traveled (VMT) or by population. Normalizing by VMT and population is helpful to understand crash rates, and the Metro State of Safety Report provides crash rates at various levels of geography. The high injury corridors weighted crash scores are purposefully not normalized by VMT or population because the intent was to identify corridors and intersections with the highest concentrations of severe crashes, compared to the rest of the region, no matter the number of VMT or population. This intent is tied directly to achieving a zero deaths and severe injuries target.

Consistency with other high crash locations

In the Portland metropolitan area several jurisdictions have identified high crash networks or locations, including Portland, Washington County, Clackamas County, and Hillsboro. Additionally, ODOT and many jurisdictions use Safety Priority Index System (SPIS) and All Roads Transportation Safety (ARTS) program high crash locations. The regional high injury corridors do not contradict the locations identified by these agencies, but do provide:

- a regionally consistent methodology for the regional transportation network,
- focus on fatal and severe crashes,
- are specific to the urban region,
- and identify corridors as opposed to hot spots.[5]

Both ARTS and SPIS focus on specific locations, while the HICs identify corridors. HICs and ARTS focus on severe crashes. SPIS captures locations where there are also high frequency and rate of crashes, in addition to severe crashes; a roadway segment becomes a SPIS site if a location has three or more crashes or one or more fatal crashes over the three year period. The ARTS program identifies hotspot locations, defined as a location that has at least one fatal or serious injury crash within the last five years. SPIS sites and ARTS hotspots overlap with the high injury corridors and the regional high crash intersections identify high crash locations that are not necessarily on a high injury corridor.

High risk areas

Identifying areas that have high crash risk factors (posted speed, signalized intersections, unlit streets, number of liquor establishments, lack of medians, driveway density, etc.) but do not have high concentrations of severe crashes provides a useful for further prioritizing safety efforts. Metro is exploring availability of data, resources, possibility of developing high risk

[5] The San Francisco analysis noted that "corridor-level and area-level analysis is necessary for efficient and effective injury prevention." http://www.sfhealthequity.org/images/Merged_HIC_Methods_2015.pdf

corridors, however most corridors with identified high risk factors will overlap with the high injury corridors. Part of the reason the 2012 RTSP recommended identifying high injury corridors, as opposed to high crash locations, is that a corridor approach highlights the roadways that have high risk factors. Metro reviewed the "Risk Based Pedestrian and Bicycle Project Corridors" identified in ODOT's Pedestrian and Bicycle Safety Implementation Plan (2014) and found that every risk based corridor in that plan overlapped with a regional HIC. [6]

[6] https://www.oregon.gov/ODOT/HWY/TRAFFIC-ROADWAY/docs/pdf/13452_report_final_partsA+B.pdf

GIS ANALYSIS METHODOLOGY

Part 1:

1. Prepare streets and crashes for analysis
   - Streets:
     - Combine RTP networks and save a copy of those within the study area
     - Recalculate empty "STREETNAME" and "DIRECTION" fields as NULL
     - Create a dataset of only the freeways/highways dissolved by "STREETNAME" and "DIRECTION"
     - Create a dataset of streets other than freeways/highways dissolved by "STREETNAME", where the name is not NULL
     - Merge the freeways and non-freeways datasets
     - Break the streets at each intersection
   - Crashes:
     - Select crashes within the study area that occurred during or after a specified year
     - Save a copy of the selected crashes that intersect the RTP Network
2. Select and merge streets where crashes occurred
   - Create a layer of the crashes where the injury severity is Fatal/A or B/C for modes pedestrian or bicycle
   - Flag RTP cross-streets that intersect the crashes layer
   - Combine street segments with the same "STREETNAME", "DIRECTION", and crash flag (1/yes or 0/no)
   - Add adjacent street segments that are equal or less than ¼ mile
3. Separate multi-part streets that are more than 75 feet apart
4. Combine streets by name, direction, and buffer location to get crash corridors

Part 2:

1. Join crashes to corridors and calculate weighted sum by mode and normalized by street length

Corridors (percent severe injuries)	Miles	RTP Network (1,739 miles)	All Streets (6,565 miles)
Regional HIC (60%)	398	23%	6%
RHIC – auto (50%)	282	16%	4%
RHIC – bike (50%)	177	10%	3%
RHIC – ped. (50%)	133	8%	2%

>= 5280 feet
60% severe crashes

Combined (Ped/Bike/Auto) High Injury Corridors –Severe Crashes per Mile									
Corridor	**From**	**To**	**Jurisdiction**	**# of Severe Crashes**	**Length**	**Severe Crashes per Mile**	**# Severe Ped**	**# Severe Bike**	**# Severe Auto**
I-5 Southbound	I-405 at Fremont Bridge	Burnside Bridge	Portland	13	1.5	8.61	2	0	11
Adair	Baseline	Pacific Highway	Cornelius & Forest Grove	13	1.5	8.48	1	1	11
Division	7th	190th	Gresham & Portland	80	9.6	8.29	22	4	54
I-5 Northbound	Marquam Bridge	I-405 at Fremont Bridge	Portland	18	2.5	7.13	2	0	16
181st	Sandy	182nd (Merging)	Gresham	14	2.1	6.62	2	1	11
Tualatin Valley Highway	Hocken	10th	Washington Co. & Beaverton & Hillsboro	55	8.3	6.60	10	5	40
Broadway	SW 4th	Naito	Portland	13	2.0	6.36	4	1	8
Ross Island Bridge	Grand	I-5	Portland	8	1.4	5.81	1	0	7
82nd	Killingsworth	E. Berkeley	Clackamas Co. Gladstone, Portland	75	13.4	5.60	27	4	44
Foster	136th	50th & Powell	Portland	26	4.7	5.57	8	3	15
102nd	Sandy	Cherry Blossom (Merging)	Maywood Park & Portland	15	2.9	5.19	4	0	11
Powell	Burnside	McLoughlin	Gresham & Portland	65	12.9	5.04	15	9	41
I-84 Westbound	82nd	Martin Luther King Jr.	Portland	24	4.8	5.04	2	1	21
Rosa Parks	42nd	Killingsworth	Portland	8	1.6	4.98	0	0	8
96th	99th & Washington	Division	Portland	5	1.0	4.96	1	0	4
I-5 Southbound	Hwy 217	Tualatin River	Tigard	5	1.0	4.85	0	0	5
185th	Springville	Farmington	Washington County & Hillsboro	29	6.0	4.82	2	2	25
SE/NE 162nd	Powell	Sandy	Gresham & Portland	18	3.8	4.76	5	1	12
Martin Luther King Jr.	Columbia Blvd.	Division	Portland	27	5.8	4.66	6	4	17
Sunset Highway (Eastbound)	Hwy 217	Tunnel	Multnomah Co. Beaverton & Portland	9	1.9	4.63	0	0	9
Grand Avenue	Broadway	Powell	Portland	16	3.5	4.63	4	2	10
Highway 217	Beaverton Hillsdale	Sunset Highway	Beaverton	8	1.8	4.57	0	0	8
Washington Street	Stark	Thorburn	Portland	9	2.0	4.56	1	0	8
Tualatin Valley Highway	341st	17th	Washington Co. Cornelius & Hillsboro	5	1.1	4.54	1	0	4
Halsey	I-84 at NE 67th	Sandy	Portland	7	1.6	4.48	1	0	6
McLoughlin	Jefferson	Oregon City Bridge	Clackamas Co, Gladstone, Milwaukie & Oregon City	30	6.8	4.41	13	1	16
Highway 8 / Canyon	Hocken	Sunset Highway	Beaverton	17	3.9	4.41	3	1	13
I-205 Southbound	Washington State Line	Marine Dr	Portland	7	1.6	4.36	0	0	7
Wiedler	24th	Broadway (Merging)	Portland	6	1.4	4.31	0	2	4
Highway 217 –	Pacific Highway	Scholls Ferry	Beaverton & Tigard	7	1.6	4.29	0	0	7

Combined (Ped/Bike/Auto) High Injury Corridors –Severe Crashes per Mile									
Corridor	**From**	**To**	**Jurisdiction**	**# of Severe Crashes**	**Length**	**Severe Crashes per Mile**	**# Severe Ped**	**# Severe Bike**	**# Severe Auto**
I - 84 Eastbound	I-5	I-205	Portland	21	4.9	4.28	1	0	20
Highway 8 / Baseline	TV Highway (near SW 17th)	TV Highway (near SE 10th)	Hillsboro	7	1.7	4.22	2	0	5
Beaverton Hillsdale	Capitol Highway	Lombard	Washington Co. Beaverton & Portland	22	5.3	4.13	4	0	18
112th	Holgate	Market	Portland	6	1.5	3.98	1	0	5
Highway 217 -	Beaverton Hillsdale	Sunset Highway	Beaverton	7	1.8	3.96	0	0	7
I-5 Northbound	Nyberg	Kruse	Clackamas Co. Washington Co, Lake Oswego Tigard & Tualatin	11	2.8	3.96	0	0	11
Cedar Hills	Farmington	Cornell	Beaverton	13	3.3	3.92	2	0	11
257th	I-84	Stark	Troutdale	8	2.1	3.90	1	2	5
Everett	Westover	Naito	Portland	7	1.8	3.85	2	2	3
47th	Glisan	Wistaria	Portland	4	1.0	3.83	0	0	4
Sandy	7th	165th	Portland	36	9.6	3.76	9	0	27
Allen	Davis	92nd	Beaverton	11	2.9	3.75	0	1	10
Tualatin Sherwood	Pacific	Nyberg	Washington Co. Sherwood & Tualatin	17	4.5	3.75	0	0	17
I-5 Southbound	Bertha Blvd	Powell	Portland	10	2.7	3.73	1	0	9
Highway 212	122nd / Highway 224	Clackamas Highway / 224	Clackamas County & Happy Valley	6	1.6	3.72	1	0	5
I-205 Southbound	Division St	Washington	Portland	4	1.1	3.70	0	0	4
Brookwood	Shute	Sunset Highway	Hillsboro	4	1.1	3.68	0	0	4
I-205 Southbound	Killingsworth	Alderwood	Maywood Park & Portland	6	1.6	3.66	1	0	5
Highway 8 / Pacific	Baseline	E St. (Forest Grove)	Cornelius & Forest Grove	9	2.5	3.63	1	0	8
I-5 Southbound	Nyberg	Kruse	Tigard & Tualatin	5	1.4	3.62	0	0	5
Cesar E. Chavez	Wistaria	Woodstock	Portland	17	4.7	3.61	4	2	11
I-5 Southbound	Multnomah	Capitol Highway	Portland	6	1.7	3.59	1	0	5
I-205 Northbound	Airport Way	Washington State Line	Portland	6	1.7	3.59	0	0	6
I-5 Southbound	Wilsonville Rd	Miley	Clackamas County & Wilsonville	4	1.1	3.58	0	0	4
Kane	257th & Stark	Orient & Palmquist	Gresham & Troutdale	8	2.2	3.56	2	0	6
Burnside	75th	124th	Portland	9	2.6	3.49	4	0	5
122nd	Skidmore	Foster	Portland	19	5.5	3.48	4	0	15
11th	Sandy	Clinton	Portland	9	2.6	3.48	1	1	7
Barbur	65th	Sheridan	Portland	22	6.3	3.47	3	2	17

Combined (Ped/Bike/Auto) High Injury Corridors –Severe Crashes per Mile									
Corridor	**From**	**To**	**Jurisdiction**	**# of Severe Crashes**	**Length**	**Severe Crashes per Mile**	**# Severe Ped**	**# Severe Bike**	**# Severe Auto**
Farmington	170th	Beaverton Hillsdale	Washington County & Beaverton	18	5.2	3.46	4	1	13
182nd	Powell	181st (Merging)	Gresham	6	1.7	3.45	2	0	4
Burnside	Barnes	68th	Portland	35	10.2	3.42	14	1	20
1st	Glencoe (Merging)	Wood	Hillsboro	5	1.5	3.38	1	0	4
6th	Sheridan	Irving (Union Station)	Portland	6	1.8	3.29	2	0	4
Hawthorne	51st	Martin Luther King Jr.	Portland	10	3.1	3.28	2	2	6
Lovejoy	Cornell	Broadway	Portland	4	1.3	3.08	1	0	3
Murray	Barrows	Walker	Beaverton & Tigard	18	5.9	3.08	1	2	15
4th	Sheridan	Burnside	Portland	4	1.3	3.06	2	0	2
Highway 224	82nd	Rusk Rd.	Clackamas County & Milwaukie	4	1.3	3.01	1	0	3
Highway 8 / Baseline	Tualatin Valley Highway	Pacific	Cornelius	7	2.3	3.01	1	0	6
Highway 8 / Baseline	Jenkins	Brookwood & Main	Washington Co, Beaverton & Hillsboro	14	4.6	3.01	1	0	13
Cornell	Main	Butler	Hillsboro	16	5.3	3.01	1	1	14
Evergreen	Glencoe	Cornell	Washington Co & Hillsboro	21	7.0	3.00	1	1	19
Millikan	Tualatin Valley Highway	Hocken	Beaverton	5	1.7	2.99	1	1	3
Skidmore	Interstate	Martin Luther King, Jr.	Portland	3	1.0	2.98	0	1	2
158th	Cornell	Jenkins	Beaverton	5	1.7	2.92	1	1	3
Highway 212	Mckinley	122nd Ave / Hwy 224	Clackamas Co & Happy Valley	7	2.4	2.91	3	0	4
Johnson Creek	45th	Highgate	Clackamas Co, Happy Valley, Milwaukie & Portland Airport	10	3.5	2.88	0	1	9
Capitol Highway	Lesser (Merging)	Taylors Ferry	Portland	4	1.4	2.87	1	0	3
Burnside	127th	Powell	Gresham & Portland	26	9.1	2.85	3	2	21
Jennings	River	Webster	Clackamas Co & Gladstone	6	2.1	2.84	1	0	5
Pacific Highway	Main	Barbur	Washington Co, Portland, Sherwood, Tigard & Tualatin	31	10.9	2.84	5	2	24
Hogan	242nd (Merging)	Butler	Gresham & Troutdale	11	3.9	2.83	1	2	8
Lombard	42nd	Pier Park	Portland	23	8.5	2.70	8	1	14
50th	Powell	Division	Portland	3	1.1	2.69	1	2	0
Gladstone	42nd	52nd	Portland	4	1.5	2.68	1	1	2
Garden Home	Multnomah	92nd Place	Washington Co, Beaverton & Portland	3	1.1	2.66	0	0	3
Glisan	Cesar E Chavez	202nd	Gresham & Portland	30	11.5	2.61	6	3	21
Glisan	Steel Bridge	24th	Portland	5	1.9	2.60	2	0	3

Combined (Ped/Bike/Auto) High Injury Corridors –Severe Crashes per Mile									
Corridor	**From**	**To**	**Jurisdiction**	**# of Severe Crashes**	**Length**	**Severe Crashes per Mile**	**# Severe Ped**	**# Severe Bike**	**# Severe Auto**
Lower Barnes Ferry	Pilkington	Upper Boones Ferry	Durham, Lake Oswego & Tualatin	3	1.2	2.51	0	0	3
Stark	76th	Historic Columbia River HWY	Multnomah Co, Gresham, Portland & Troutdale	30	12.0	2.50	7	2	21
28th	Madison	Knott	Portland	5	2.0	2.48	3	0	2
Oak	Baseline & T.V. Highway	10th	Hillsboro	4	1.6	2.47	1	1	2
10th	Cornelius Schefflin [illegible]	Oleander	Cornelius	3	1.2	2.44	0	1	2
10th	Northrup	Market	Portland	3	1.2	2.40	1	0	2
Broadway	Broadway Bridge	Sandy	Portland	6	2.5	2.39	2	1	3
Holgate	136th	McLoughlin Blvd	Portland	24	10.0	2.39	4	2	18
Killingsworth	Greeley	Sandy	Portland	23	9.8	2.35	8	2	13
Minter Bridge	Noland	Tualatin Valley Highway	Washington Co & Hillsboro	3	1.3	2.29	0	0	3
Main	Brookwood	Oak	Hillsboro	8	3.5	2.27	0	0	8
Multnomah	Garden Home	I-5	Portland	6	2.7	2.22	0	1	5
Belmont	69th	Grand	Portland	10	4.8	2.07	2	2	6
185th	Thurman	Jefferson & Columbia	Portland	3	1.5	2.06	1	1	1
Alberta	33rd	Martin Luther King, Jr.	Portland	3	1.5	2.01	2	0	1
Molalla	Garden Meadow	7th	Oregon City	4	2.0	1.97	0	0	4
Multnomah	Steel Bridge	21st	Portland	4	2.2	1.82	2	1	1
223rd	Halsey	Eastman (Merging)	Fairview & Gresham & Wood Village	3	1.7	1.81	0	0	3
11th	Lovejoy	Market	Portland	2	1.1	1.77	1	0	1
5th	Irving	Sheridan	Portland	3	1.8	1.64	1	0	2
Williams	Jessup	Wheeler	Portland	6	4.2	1.44	0	2	4
Sunnyside	82nd	119th	Clackamas Co & Happy Valley	3	2.1	1.40	0	0	3
Division	Troutdale	Eastwood	Multnomah Co & Gresham	6	4.4	1.35	3	0	3
Capitol Highway	Beaverton Hillsdale / [illegible]	Barbur	Portland	3	2.3	1.31	1	0	2
Eastman	223rd & Fairview	Towle (South Of Powell)	Gresham	2	1.7	1.17	0	0	2
26th	Holgate	Division	Portland	1	1.0	1.00	0	0	1
30th	Division	Stark	Portland	1	1.0	1.00	0	0	1
Jefferson	Vista	3rd	Portland	1	1.0	0.99	0	0	1
Ankney	28th	Martin Luther King, Jr.	Portland	1	1.2	0.84	0	1	0

Auto High Injury Corridors –Severe Crashes per Mile						
Corridor	**From**	**To**	**Jurisdiction**	**# of Crashes**	**Length**	**Severe Crashes per Mile**
I-5 Southbound	I-405 at Fremont Bridge	Burnside Bridge	Portland	11	1.5	7.28
Adair	Baseline	Pacific	Cornelius & Forest Grove	11	1.5	7.18
I-5 Northbound	Marquam Bridge	I-405	Portland	16	2.5	6.34
Division	7th	190th	Gresham & Portland	54	9.6	5.60
181st	Sandy	182nd	Gresham	11	2.1	5.20
Ross Island Bridge	Grand	I-5	Portland	7	1.4	5.08
Rosa Parks	Cully	Killingsworth	Portland	8	1.6	4.98
I-5 - Southbound	Hwy 217	Tualatin River	Tigard	5	1.0	4.85
Tualatin Valley Highway	Hocken	10th	Washington County, Beaverton, & Hillsboro	40	8.3	4.80
Sunset Highway (Eastbound)	Hwy 217	Tunnel	Multnomah County, Beaverton, & Portland	9	1.9	4.63
Hwy 217 Southbound	Sunset Highway	Beaverton Hillsdale	Beaverton	8	1.8	4.57
I-84 Westbound	Martin Luther King Jr.	82nd	Portland	21	4.8	4.41
I-205 Southbound	Washington State Line	Marine Dr	Portland	7	1.6	4.36
Hwy 217 Northbound	Scholls Ferry	Pacific Highway	Beaverton & Tigard	7	1.6	4.29
185th	Springville	Farmington	Washington County & Hillsboro	25	6.0	4.16
I-84 Eastbound	I-5	I-205	Portland	20	4.9	4.07
Washington Street	Stark St.	Thorburn	Portland	8	2.0	4.05
96th	SE Washington St.	SE Division St.	Portland	4	1.0	3.97
Hwy 217 Northbound	Beaverton Hillsdale	Sunset Highway	Beaverton	7	1.8	3.96
I-5 Northbound	Kruse	Nyberg	Clack. Co, Wash. Co, L. Oswego, Tigard & Tualatin	11	2.8	3.96
Broadway	SW 4th	Naito	Portland	8	2.0	3.92
Halsey	I-84 at NE 67th	Sandy	Portland	6	1.6	3.84
47th	Glisan	Wistaria	Portland	4	1.0	3.83
102nd	Sandy	Cherry Blossom	Maywood Park & Portland	11	2.9	3.81
Tualatin Sherwood	Pacific Highway	Nyberg	Washington County & Sherwood & Tualatin	17	4.5	3.75
I-205 Southbound	Washington State Line	Division	Portland	4	1.1	3.70
Brookwood	Shute	Sunset Highway	Hillsboro	4	1.1	3.68
Tualatin Valley Highway	341st	17th	Washington County, Cornelius, & Hillsboro	4	1.1	3.63
I-5 Southbound	Nyberg	Kruse	Tigard & Tualatin	5	1.4	3.62
I-205 Northbound	Airport Way	Washington State Line	Portland	6	1.7	3.59
I-5 Southbound	Wilsonville Road	Miley	Clackamas County & Wilsonville	4	1.1	3.58
SE Bob Schumacher Road	Idleman & Otty	Stevens	Clackamas County & Happy Valley	4	1.1	3.49

Auto High Injury Corridors –Severe Crashes per Mile						
Corridor	**From**	**To**	**Jurisdiction**	**# of Crashes**	**Length**	**Severe Crashes per Mile**
I-5 Northbound	Bertha Blvd	Marquam Bridge	Portland	11	3.2	3.45
Allen	Davis	92nd	Beaverton	10	2.9	3.41
Beaverton Hillsdale	Capitol Highway	Lombard	Washington County, Beaverton, & Portland	18	5.3	3.38
Canyon	Hocken	Sunset Highwa	Beaverton	13	3.9	3.37
I-5 Southbound	Bertha Blvd	Powell	Portland	9	2.7	3.36
112th	Holgate	Cherry Blossom	Portland	5	1.5	3.32
Cedar Hills	Farmington	Cornell	Beaverton	11	3.3	3.32
82nd	Killingsworth	Causey	Clackamas County & Gladstone & Portland	44	13.4	3.29
Pacific	Baseline	E St (Forest Grove)	Cornelius & Forest Grove	8	2.5	3.23
Foster	136th	50th & Powell	Portland	15	4.7	3.21
Powell	Burnside	McLoughlin	Gresham & Portland	41	12.9	3.18
162nd	Powell	Sandy	Gresham & Portland	12	3.8	3.17
Hwy 212	Highway 224 (near 122nd)	Highway 224 (near 152nd)	Clackamas County & Happy Valley	5	1.6	3.10
I-5 Northbound	Multnomah	99W	Portland	9	2.9	3.06
I205 Southbound	Killingsworth	Alderwood	Maywood Park & Portland	5	1.6	3.05
Baseline	TV Highway (near SW 17th)	TV Highway (near SE 10th)	Hillsboro	5	1.7	3.01
I-5 Southbound	Multnomah	Capitol Highway	Portland	5	1.7	2.99
I-205 Northbound	South of SE Sunnybrook Blvd.	Strawberry	Clackamas County	6	2.0	2.99
Martin Luther King Jr.	Columbia	Division	Portland	17	5.8	2.93
Grand	Broadway	Powell	Portland	10	3.5	2.89
Weidler	24th	Broadway	Portland	4	1.4	2.87
Brockman	125th & Greenway	Beard	Beaverton	3	1.1	2.82
Sandy	7th	165th	Maywood Park & Portland	27	9.6	2.82
I-5 Northbound	Rosa Parks	Columbia	Portland	3	1.1	2.81
Baseline	Jenkins	Brookwood & Main	Washington County, Beaverton & Hillsboro	13	4.6	2.80
Avery	Tualatin Sherwood	Boones Ferry	Tualatin	3	1.1	2.78
I-5 Southbound	Rosa Parks	Columbia	Portland	3	1.1	2.77
Butler	190th & Pleasant View	Regner	Gresham	5	1.8	2.75
122nd	Skidmore	Foster	Portland	15	5.5	2.75
Evergreen	Glencoe	Cornell	Washington County & Hillsboro	19	7.0	2.71
11th	Sandy	Clinton	Portland	7	2.6	2.70
1st	Glencoe	Wood	Hillsboro	4	1.5	2.70

Auto High Injury Corridors –Severe Crashes per Mile						
Corridor	**From**	**To**	**Jurisdiction**	**# of Crashes**	**Length**	**Severe Crashes per Mile**
Barbur	65th	Sheridan	Portland	17	6.3	2.68
Bethany	West Union	Cornell	Washington County & Beaverton	3	1.1	2.68
Kane	257th & Stark	Orient & Palmquist	Gresham & Troutdale	6	2.2	2.67
Garden Home	Multnomah	92nd Place	Washington County, Beaverton, &Portland	3	1.1	2.66
Cornell	Main	Butler	Hillsboro	14	5.3	2.63
Highway 47	David Hill	Martin	Washington County & Forest Grove	4	1.5	2.62
Johnson Creek	42nd	Highgate	Clackamas Co, Happy Valley, Milwaukie & PDX	9	3.5	2.59
Baseline	Tualatin Valley Highway	Pacific	Cornelius	6	2.3	2.58
I-5 Northbound	Wilsonville Road	Miley	Clackamas County & Wilsonville	3	1.2	2.58
Brookwood	Shute	Tualatin Valley Highway	Hillsboro	10	3.9	2.57
Murray	Barrows	Walker	Beaverton & Tigard	15	5.9	2.56
Halsey	84th	244th	Fairview, Gresham, PDX, Troutdale & W.V.	24	9.5	2.54
Lower Boones Ferry	Pilkington	Upper Boones Ferry	Lake Oswego & Tualatin	3	1.2	2.51
Farmington	170th	Beaverton Hillsdale	Washington County & Beaverton	13	5.2	2.50
Orient	Kane & Palmquist	Welch	Gresham	3	1.2	2.49
Barnes	Burnside	118th	Washington County, Beaverton & Portland	8	3.2	2.48
257th	I-84	Kane & Stark	Troutdale	5	2.1	2.44
Jennings	River	Webster	Clackamas County & Gladstone	5	2.1	2.37
McLoughlin	Jefferson	Willamette Drive	Clack Co, Gladstone, Milwaukie & Oregon City	16	6.8	2.35
Cesar E. Chavez	Wistaria	Woodstock	Portland	11	4.7	2.33
Lovejoy	Cornell	Broadway	Portland	3	1.3	2.31
Burnside	127th	Powell	Gresham & Portland	21	9.1	2.30
182nd	Highland & Powell	181st	Gresham	4	1.7	2.30

Pedestrian High Injury Corridors – Severe Crashes per Mile							
Corridor	**From**	**To**	**Jurisdiction**	**# of Severe Crashes**	**Length**	**Severe Crashes per Mile**	**# of Minor Crashes Mile**
Division	7th	190th	Gresham & Portland	22	9.6	2.28	61
82nd	Killingsworth	Causey	Clackamas Co., Gladstone & PDX	27	13.4	2.02	93
Broadway	SW 4th	Naito	Portland	4	2.0	1.96	24
McLoughlin	Jefferson	Oregon City Bridge	Clackamas Co., Gladstone, Milwaukie, & Oregon City	13	6.8	1.91	32
Foster	136th	50th Ave & Powell Blvd.	Portland	8	4.7	1.71	18
East Burnside	75th	124th	Portland	4	2.6	1.55	7
SW 4th	Sheridan	Burnside	Portland	2	1.3	1.53	20
SE 28th	Madison	Knott	Portland	3	2.0	1.49	5
SE/NE 102nd	Sandy	Cherry Blossom	Maywood Park & Portland	4	2.9	1.38	19
Burnside	At SW Barnes	NE 68th	Portland	14	10.2	1.37	56
Alberta	33rd	Martin Luther King Jr.	Portland	2	1.5	1.34	13
SE/NE 162nd	Powell	Sandy	Gresham & Portland	5	3.8	1.32	11
Highway 212	I-205	East of HWY 224 Interchange	Clackamas County & Happy Valley	3	2.4	1.25	9
Baseline	TV Highway (near SW 17th)	TV Highway (near SE 10th)	Hillsboro	2	1.7	1.21	12
Powell	Burnside	McLoughlin	Gresham & Portland	15	12.9	1.16	75
Grand	Broadway	Powell	Portland	4	3.5	1.16	12
SE 182nd	Highland & Powell	181st	Gresham	2	1.7	1.15	7
Everett	Westover	Naito	Portland	2	1.8	1.10	13
SW/NW 6th Ave.	Sheridan	Irving	Portland	2	1.8	1.10	10
Martin Luther King Jr.	Columbia	Division	Portland	6	5.8	1.03	31
SE 96th	Washington Street	Division	Portland	1	1.0	0.99	5
SE 181st	Sandy	182nd	Gresham	2	2.1	0.95	16
Sandy	7th	165th	Maywood Park & Portland	9	9.6	0.94	41
Multnomah Street	Steel Bridge	21st	Portland	2	2.2	0.91	14
Kane	257th & Stark	Orient & Palmquist	Gresham & Troutdale	2	2.2	0.89	15
SW/NW 11th	Lovejoy	Market	Portland	1	1.1	0.89	7
Cesar E. Chavez	Wistaria	Woodstock	Portland	4	4.7	0.85	27
SW/ NW 10th Ave.	Northrup	Market	Portland	1	1.2	0.80	8
Broadway	Broadway Bridge	Sandy	Portland	2	2.5	0.80	26
Lovejoy	Cornell	Broadway	Portland	1	1.3	0.77	8
NE/SE 122nd	Skidmore	Foster	Portland	4	5.5	0.73	30
1st	Glencoe	Wood	Hillsboro	1	1.5	0.68	12
Hawthorne	51st	Martin Luther King Jr.	Portland	2	3.1	0.66	18
SW/NW 5th	7th	190th	Portland	1	1.8	0.55	14
Jefferson	Vista	3rd	Portland	0	1.0	0.00	8

Bike High Injury Corridors –Severe Crashes per Mile							
Corridor	**From**	**To**	**Jurisdiction**	**# of FA Crashes**	**Length**	**FA Crashes per Mile**	**# of BC Crashes**
SE 50th	Powell	Division	Portland	2	1.1	1.79	5
NE Wielder	24th	Broadway	Portland	2	1.4	1.44	19
Marine Drive	122nd	Portland Airport	Portland	3	2.7	1.12	3
NW Everett	Westover	Naito	Portland	2	1.8	1.10	13
Skidmore	Interstate	Martin Luther King Jr.	Portland	1	1.0	0.99	11
SW/NE 257th	I-84	Kane & Stark	Troutdale	2	2.1	0.97	6
SE 28th	Woodstock	Gladstone	Portland	1	1.1	0.88	3
SE Ankeny	28th	Martin Luther King Jr.	Portland	1	1.2	0.84	14
10th	Cornelius Schefflin	Oleander	Cornelius	1	1.2	0.81	3
Powell	Burnside	McLoughlin	Gresham & Portland	9	12.9	0.70	45
Martin Luther King Jr.	Columbia	Division	Portland	4	5.8	0.69	38
SW/NW 18th	Thurman	Collins & Jefferson	Portland	1	1.5	0.69	7
Ainsworth	Vancouver	27th	Portland	1	1.5	0.67	5
Gladstone	42nd	52nd	Portland	1	1.5	0.67	7
Hawthorne	51st	Martin Luther King Jr.	Portland	2	3.1	0.66	46
Adair	Baseline	Pacific	Cornelius & Forest Grove	1	1.5	0.65	6
Foster	136th	50th & Powell	Portland	3	4.7	0.64	25
Oak	Baseline & T.V. Highway	10th	Hillsboro	1	1.6	0.62	4
Tualatin Valley Highway	Hocken	10th	Washington Co., Beaverton & Hillsboro	5	8.3	0.60	26
Grand	Broadway	Powell	Portland	2	3.5	0.58	34
Broadway	SW 4th	Naito	Portland	1	2.0	0.49	37
Clinton	50th	12th	Portland	1	2.1	0.48	7
Williams	Jessup	Wheeler	Portland	2	4.2	0.48	25
Vancouver	Weilder	Martin Luther King Jr.	Portland	3	6.3	0.47	30
SE/NE 181st	Sandy	182nd	Gresham	1	2.1	0.47	19
Multnomah	Steel Bridge	21st	Portland	1	2.2	0.45	16
Cesar E. Chavez	Wistaria	Woodstock	Portland	2	4.7	0.42	19
Division	7th	190th	Gresham & Portland	4	9.6	0.41	52
Belmont	69th	Grand	Portland	2	4.8	0.41	15
Broadway	Broadway Bridge	Sandy	Portland	1	2.5	0.40	54
SE 11th	Sandy	Clinton	Portland	1	2.6	0.39	19
Multnomah Blvd.	Garden Home	I-5	Portland	1	2.7	0.37	10
185th	Springville	Farmington	Washington Co. & Hillsboro	2	6.0	0.33	21

Bike High Injury Corridors –Severe Crashes per Mile							
Corridor	**From**	**To**	**Jurisdiction**	**# of FA Crashes**	**Length**	**FA Crashes per Mile**	**# of BC Crashes**
Barbur Drive	65th	Sheridan	Portland	2	6.3	0.32	26
NE/SE 82nd	Killingsworth	Berkeley St.	Clackamas Co., Gladstone & Portland	4	13.4	0.30	61
Naito	Ross Island Bridge	15th & Front	Portland	1	4.0	0.25	19
26th	Holgate	Division	Portland	0	1.0	0.00	11
4th	Sheridan	Burnside	Portland	0	1.3	0.00	14
Capitol Highway	Beaverton Hillsdale & Bertha	Barbur Blvd	Portland	0	2.3	0.00	24
30th	Division	Stark	Portland	0	1.0	0.00	9
28th	Madison	Knott	Portland	0	2.0	0.00	16
Eastman	223rd & Fairview	Towle	Gresham	0	1.7	0.00	13
6th	Sheridan	Irving & Stanton	Portland	0	1.8	0.00	10
122nd	Skidmore	Foster	Portland	0	5.5	0.00	32
96th	99th & Washington	Division & Powell	Portland	0	1.0	0.00	6
Kane	257th & Stark	Orient & Palmquist	Gresham & Troutdale	0	2.2	0.00	12
25th	Evergreen	Veterans	Washington County & Hillsboro	0	1.8	0.00	9
Burnside	75th	124th	Portland	0	2.6	0.00	13
14th	Northrup	Jefferson	Portland	0	1.0	0.00	5
Cornell	Main	Butler	Hillsboro	0	5.3	0.00	22
223rd	Halsey	Eastman & Fairview	Fairview, Gresham & Wood Village	0	1.7	0.00	8
Morrison	25th	Grand	Portland	0	2.0	0.00	9
Division	Troutdale	Eastwood	Multnomah County & Gresham	0	4.4	0.00	19
1st	Salmon	Grover	Portland	0	1.2	0.00	5
Greenburg	Hall	North Dakota	Beaverton & Tigard	0	1.1	0.00	5
Sagert	Boones Ferry	65th	Tualatin	0	1.2	0.00	5

Clean air and clean water do not stop at city limits or county lines. Neither does the need for jobs, a thriving economy and sustainable transportation and living choices for people and businesses in the region. Voters have asked Metro to help with the challenges and opportunities that affect the 25 cities and three counties in the Portland metropolitan area.

A regional approach simply makes sense when it comes to providing services, operating venues and making decisions about how the region grows. Metro works with communities to support a resilient economy, keep nature close by and respond to a changing climate. Together we're making a great place, now and for generations to come.

Metro | *Making a great place*

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Portland, OR 97232-2736
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2018 Regional Transportation Plan

www.oregonmetro.gov/rtp

Oct. 26, 2015

Measure #4 – Share of safety projects

Evaluation Measure Title: **Share of safety projects**
(New System Evaluation Measure)

Purpose: To identify where and at what level of investment the package of future transportation projects addresses transportation safety through the development of transportation infrastructure with proven safety countermeasures, region-wide and in areas with high concentrations of historically marginalized communities and in areas with high concentrations of focused historically marginalized communities.[1]

The **Share of safety projects** performance measure will assess the following questions for the region's transportation system region-wide and in areas with high concentrations of historically marginalized communities:

1) What percentage of the region's proposed transportation projects are identified as safety projects? [2]
2) What percentage of the total transportation investment package (cost) is attributed to safety projects?
3) What percentage of the total number of transportation safety investments are located in historically marginalized communities?
4) Is there a difference of transportation safety investment levels (cost) in areas with historically marginalized communities?
5) What is the per-person expenditure of transportation safety investments region-wide and for historically marginalized communities?

2014 RTP Goals

	Foster vibrant communities and compact urban form		Promote environmental stewardship
●	Sustain economic competitiveness and prosperity	●	Enhance human health
	Expand transportation choices		Demonstrate leadership at reducing greenhouse gas emissions
	Effective and efficient management of system	●	Ensure equity
●	Enhance safety and security		

[1] Historically marginalized communities are areas with high concentrations (compared to the regional average) of people of color, people with low-incomes, people with limited English proficiency, older adults and/or young people. Focused historically marginalized communities are areas with high concentrations (compared to the regional average) of people of color, people with low-incomes, and people with limited English proficiency.

[2] Safety Projects in the RTP are capital infrastructure projects with the primary intent to address a safety issue, and allocate a majority of the project cost to a documented safety countermeasure(s) to address a specific documented risk, or improve safety for vulnerable users, including people walking and bicycling, older adults and youth. Safety countermeasures are actions taken to improve transportation safety and therefore decrease the number of injuries and fatalities. Safety countermeasures may include geometric design, systemic safety, and intelligent transportation systems. Examples of proven safety countermeasures include, but are not limited to, FHWA's nine proven safety countermeasures: road diets, medians and pedestrian crossing islands, pedestrian hybrid beacons, roundabouts, access management, retroreflective backplates, safety edge, enhanced curve delineation, and rumble strips.

Measure #4 – Share of safety projects

Function of Performance Measure

•	System Evaluation		Project Evaluation		System Monitoring	•	Performance Target

Associated 2014 RTP Performance Target: By 2040, reduce the number of fatal and severe injury crashes for pedestrians, bicyclists and motor vehicle occupants each by 50% compared to 2007-2011 average. (*Target proposed to be updated in 2018 to: By 2040 eliminate transportation related fatalities and serious injuries for all users of the region's transportation system, with a 16% reduction by 2020 (as compared to the 2015 five year rolling average), and a 50% reduction by 2025.*)

Methodology Description:

The method for calculating the **Transportation Safety – Infrastructure Investments** performance measure will entail:

1. Calculating the number of safety projects in the regional transportation investment packages region-wide, in historically marginalized communities and in focused historically marginalized communities;
2. Calculating the cost of safety projects in the regional transportation investment packages region-wide, in historically marginalized communities and in focused historically marginalized communities;
3. Geospatial analysis of safety projects in the regional transportation investment packages region-wide, in historically marginalized communities and in focused historically marginalized communities.
4. Calculating the per-person expenditure of transportation safety projects for the number of people region-wide and for the number of people identified within in historically marginalized communities and focused historically marginalized communities.

Output Units: Percentage (%) of transportation safety projects and percentage of cost for transportation safety projects region-wide, in historically marginalized communities, in focused historically marginalized communities, and per person in each of these areas.

Potential Output of Assessment:

Area	Base Year	Interim Year	Future Year – Financially Constrained	Future Year – Strategic
Region-wide	% Safety Projects, % cost allocated to Safety Projects, % Per person			
Historically marginalized communities	% Safety Projects, % cost allocated to Safety Projects, % Per person			
Focused historically marginalized communities	% Safety Projects, % cost allocated to Safety Projects, % Per person			

Key Assumptions to Method:

Dataset Used:

Dataset	Type of Data
Geospatial and cost information for proposed transportation safety projects	Observed

Tools Used for Analysis: ArcGIS

Measure #5 – Exposure to crash risk

Evaluation Measure Title: **Exposure to Crash Risk**
(New System Evaluation Measure)

Purpose: To approximate risk of exposure to crashes by identifying whether the package of future transportation investments increases or decreases non-freeway vehicle miles traveled (VMT) within each transportation area zone (TAZ), region-wide, and in areas with high concentrations of historically marginalized communities and focused historically marginalized communities.[1]

The **Exposure to Crash Risk** performance measure will assess the following questions for the region's transportation system region-wide and in areas with high concentrations of historically marginalized communities:

1) What is the region's vehicle miles traveled in each TAZ and how does it change with the proposed package of transportation investments?
2) Is there a difference in exposure to vehicle miles traveled in TAZ's with high concentrations of historically marginalized communities?
3) Has the proposed transportation investment program held steady, increased or decreased the vehicle miles traveled exposure in historically marginalized communities?

2014 RTP Goals

	Foster vibrant communities and compact urban form		Promote environmental stewardship
●	Sustain economic competitiveness and prosperity	●	Enhance human health
	Expand transportation choices		Demonstrate leadership at reducing greenhouse gas emissions
	Effective and efficient management of system	●	Ensure equity
●	Enhance safety and security		

Function of Performance Measure

●	System Evaluation		Project Evaluation		System Monitoring	●	Performance Target

Associated 2014 RTP Performance Target: By 2040, reduce the number of fatal and severe injury crashes for pedestrians, bicyclists and motor vehicle occupants each by 50% compared to 2007-2011 average. (*Target proposed to be updated in 2018 to: By 2040 eliminate transportation related fatalities and serious injuries for all users of the region's transportation system, with a 16% reduction by 2020 (as compared to the 2015 five year rolling average), and a 50% reduction by 2025.*)

[1] Historically marginalized communities are areas with high concentrations (compared to the regional average) of people of color, people with low-incomes, people with limited English proficiency, older adults and/or young people. Focused historically marginalized communities are areas with high concentrations (compared to the regional average) of people of color, people with low-incomes, and people with limited English proficiency.

Measure #5 – Exposure to crash risk

Methodology Description: This analysis uses vehicle miles traveled per capita as a proxy for crash exposure risk. The **Transportation Safety – Vehicle Miles Traveled Exposure** system evaluation performance measure is calculated by:

1. Aggregating non-freeway vehicle miles traveled (VMT) within each transportation analysis zone (TAZ).

2. To determine increased or decreased exposure to VMT, the total non-freeway, average weekday VMT for each TAZ is divided by the area of the TAZ.

3. Calculate the total area of TAZs within the Metropolitan Planning Area boundary and the area of TAZs comprising historically marginalized communities and focused historically marginalized communities; divide the average weekday VMT by the area of TAZs with above average historically marginalized communities and the remainder of the region to control for the differing geographical extents of historically marginalized communities (around 28% of the region's land area) and the remainder of the region (around X%).

Output Units: Vehicle miles traveled per TAZ area (VMT/sq. foot TAZ)

Potential Output of Assessment:

	Base Year	Interim Year	Future Year – Financially Constrained	Future Year – Strategic
Region-wide	VMT			
Historically Marginalized Communities	VMT			
Focused Historically Marginalized Communities	VMT			

<u>Key Assumptions to Method</u>

Dataset Used:

Dataset	Type of Data
Geospatial project information for proposed transportation projects	Observed
Vehicle miles traveled by TAZ	Forecasted

Tools Used for Analysis: Metro's travel demand model and ArcGIS

Considerations:

Analysis conducted showed correlation between VMT and crashes in the region; the R2 was just over 0.25, so ¼ of the crash relationship can be explained by exposed VMT at the TAZ level.

Facilities excluded from VMT exposure analysis are (see map):

Measure #5 – Exposure to crash risk

- Hwy 26 W
- Hwy 217
- Hwy 224 the sunrise corridor
- Hwy 26 E from Burnside intersection in Gresham
- I-5
- I-205
- I-84
- I-405