OREGON TRANSPORTATION SAFETY ACTION PLAN

Chapter 3 – Transportation Safety in Oregon

prepared for

Oregon Department of Transportation

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CRASH HISTORY AND TRENDS

In the five-year period from 2009 to 2013, 1,675 people were killed and 7,191 were seriously injured in Oregon in more than 230,000 reported roadway crashes.[1] Transportation fatalities and serious injuries occur in every region of Oregon, for all system users, and on all types of streets and highways.

Safety professionals study statewide crash data and regional details to understand the history of crashes and use that information to improve roadway safety. Though the locations, types, and attributes[2] of past crashes are not perfect predictors of the future, they provide important clues to help engineers and other professionals identify safety needs, select targeted treatments, and evaluate the effectiveness of strategies. Answering the question, "what does the crash data tell us?" is an important first step toward developing and implementing an effective TSAP.

Statewide Crash History and Trends

Figure 1 illustrates the recent trend of traffic fatalities and serious injuries in Oregon.[3] In the most recent year of the study period, 2013, there were 313 people killed and 1,418 seriously injured. Serious injuries are considered "life altering" for the victim, their loved ones, or both; examples include loss of limbs, paralysis, and disfigurement. In many cases these injuries make it difficult to work, care for family members or pursue other typical daily activities.

Note: Data to be updated, including additional of some 2014 and 2015 crash info.

[1] Crash injury severity is determined by the "KABCO" scale, where K=Killed, A=Serious Injury, B=Minor Injury, C=Possible Injury, and O=Property Damage Only.

[2] "Attributes" as used in this plan means characteristics of a crash that may be useful for analysis. In some cases they may contribute to a crash occurring or its severity, but that is not required for them to be considered.

[3] In 2011 the State of Oregon made a change to reporting in the Crash Analysis & Reporting (CAR) system that resulted in a higher number of crashes reported for the 2011 data file compared to previous years, resulting from the addition of previously unavailable, non-fatal crash reports. The result of this change is a false perception that the number of non-fatal crashes increased by 15 percent from 2010 to 2011.

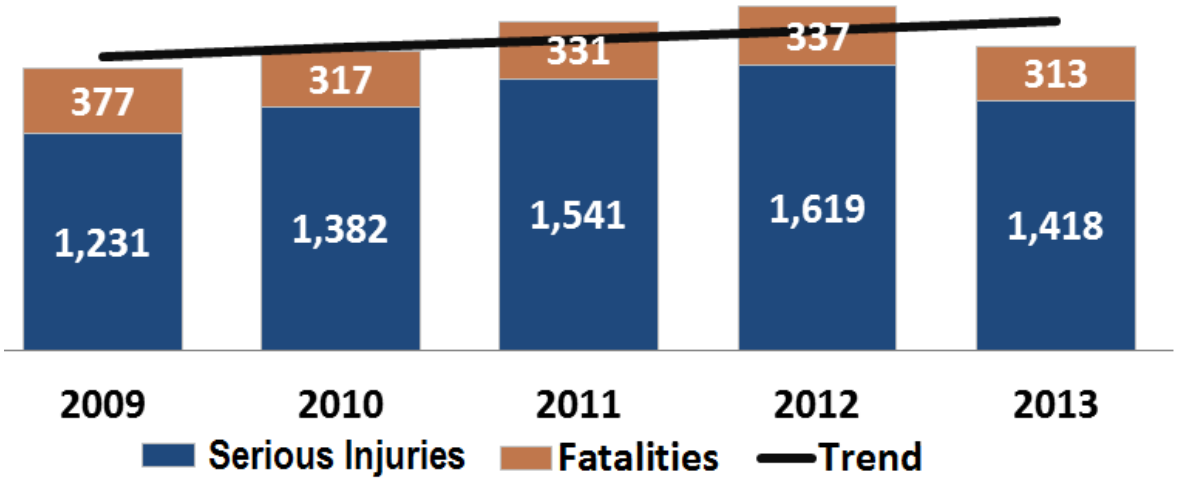

Figure 1. Oregon Fatalities and Serious Injuries, 2009-2013

Roadway crashes and resulting outcomes are not limited to either urban or rural areas of Oregon. As illustrated in Figure 2, fatalities and serious injuries have a nearly equal distribution by location.

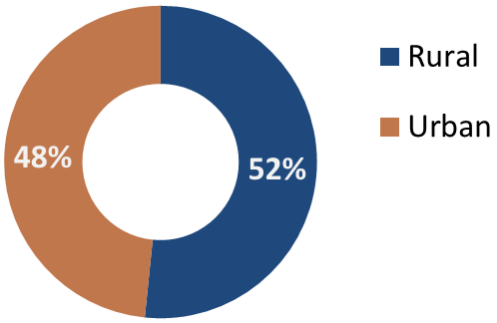

Figure 2. Oregon Fatalities and Serious Injuries by Location (Rural/Urban), 2009-2013

Fatal and serious injury crashes also occur on all types of roadways. Roads are classified as follows:

Interstate. Highest classification of arterials, designed and constructed with mobility and long-distance travel in mind. Direction lanes, separated by barrier, and ramp-only access.

Freeway/Expressway. Directional travel lanes usually 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.

Principal Arterial. Provides a high degree of mobility through rural areas, and abutting land uses can be served directly.

Minor Arterial. Provides moderate-length trips and offers connectivity to the higher arterial system, providing intra-community continuity.

Collector. Gathers traffic from local road and connects to the arterial network.

Local. Provides direct access to abutting land, and are not intended for long distance travel. Local roads are often designed to discourage through traffic. [4]

As shown in Figure 3, the distribution of fatal and serious injury crashes by roadway functional classification is not equal. Crashes with severe outcomes are most common on Principal Arterials and Minor Arterials, as well as Rural Collector roads.

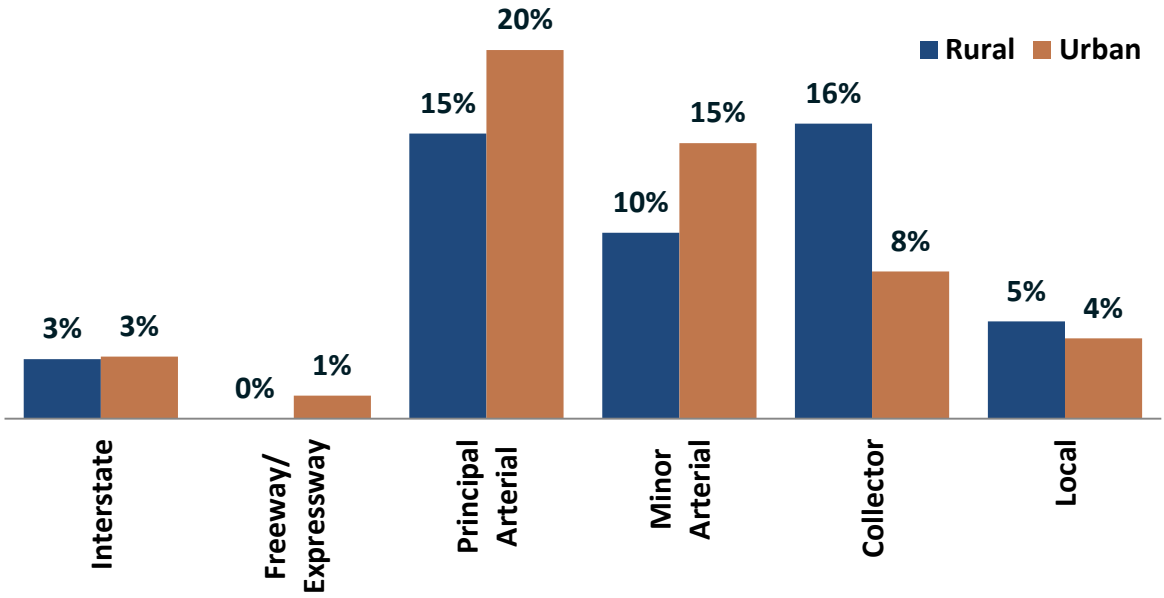

Figure 3. Oregon Fatal and Serious Injury Crashes by Roadway Functional Classification, 2009-2013

Statewide Crash Attributes

One way to study fatal and serious injury crashes is to categorize them by attribute (e.g., age of driver, alcohol involvement, roadway departure). With an understanding of these attributes it is possible to develop plans, policies, and programs to reduce crash frequency and severity. Table 1 shows a number of attributes related to fatal and serious injury crashes in Oregon. In some cases the attribute may contribute directly to the crash occurring or to its severity. However, due to limitations of crash data elements (because in most cases the reporting officer was not at the scene when the crash occurred), this analysis only concludes that the category correlates to the crash, not that it was necessarily the cause.

[4] Highway Functional Classification Concepts, Criteria and Procedures, Federal Highway Administration, Washington, DC, 2013. https://www.fhwa.dot.gov/planning/processes/statewide/related/highway_functional_classifications/sectionoo.cfm

Table 1. Fatal and Serious Injury Crashes by Attribute, 2009-2013

Attribute	Fatal and Serious Injury Crashes						Percent Total
	2009	2010	2011	2012	2013	Total	
Unrestrained Occupants	203	170	231	225	200	1,029	13.4%
Alcohol and/or Other Drugs Involved	288	280	362	403	362	1,695	22.1%
Alcohol Involved (No Drugs)	246	239	316	344	300	1,445	18.9%
Aggressive Driving Involved [5]	501	548	603	567	548	2,767	36.1%
Speed-Related Crashes [6]	379	421	453	415	399	2,067	27.0%
Inattentive Drivers Involved	55	71	79	80	65	350	4.6%
Unlicensed Drivers Involved	89	85	136	156	137	603	7.9%
Young Drivers - 15-20 Involved	209	234	244	235	196	1,118	14.6%
Young Drivers - 21-25 Involved	192	250	269	280	257	1,248	16.3%
Older Drivers - 65-75 Involved	158	192	199	221	211	981	12.8%
Older Drivers - 76 or Older Involved	113	95	128	131	100	567	7.4%
Pedestrian(s) Injured or Killed	128	155	164	174	149	770	10.0%
Bicyclists(s) Injured or Killed	66	44	80	79	65	334	4.4%
Work Zone Involved	34	24	25	22	14	119	1.6%
School Bus or School Zone Involved	4	16	6	8	10	44	0.6%
Commercial Motor Vehicle Involved	49	73	82	53	65	322	4.2%
Intersection Crashes	419	499	575	581	559	2,633	34.4%
Roadway or Lane Departure Crashes [7]	747	793	882	879	802	4,103	53.5%
						7,665 [8]	

The attributes listed in Table 1 are not mutually exclusive, so they cannot be summed to calculate a total number. For example, in many cases roadway or lane departure crashes are also speed-related, so those two attributes can be correlated to a single crash, but they will show up twice in the table.

[5] Aggressive Driving Involved consists of Too Fast for Conditions, Following Too Closely, and /or Driving in Excess of Posted Speed (note that duplicate crashes are not counted more than once).

[6] Speed-related Crashes consists of Too Fast for Conditions and/or Driving in Excess of Posted Speed (note that duplicate crashes are not counted more than once)

[7] The Roadway or Lane Departure definition excludes intersections, pedestrian-related, and bicycle-related crashes.

[8] This is not a summation of the numbers in the table, but rather the total number of fatal and serious injury crashes in the study period.

The crash attributes shown above can be organized into three categories:

1. Road Users
2. Behavioral Issues
3. Roadway Locations

Road Users

Road users are illustrated in Figure 4, and they range from typical motor vehicle drivers to non-motorized road users and those operating special vehicles (e.g., school buses, commercial motor vehicles). Young drivers (age 15-25) are involved in the highest proportion of fatal and serious injury crashes, followed by older drivers (age 65+) and motorcyclists.[9] Regarding age groups, young drivers and older drivers are targeted in the TSAP because they are typically overrepresented in traffic crashes compared to middle-age motorists (age 26-64).

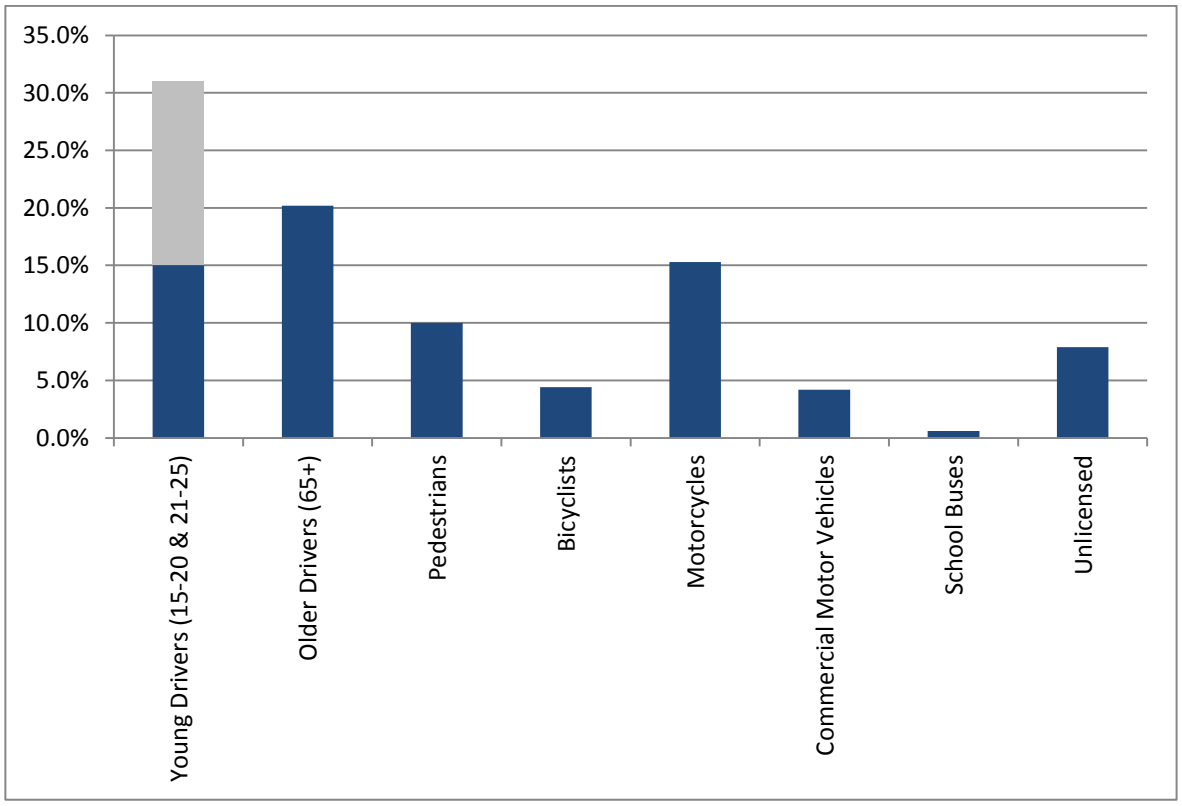

Figure 4. Proportion of Fatal and Serious Injury Crashes by Involved Road User, 2009-2013

Note: Young Drivers age 15-20 are illustrated by the blue bar. 21-25 are illustrated by the grey bar.

[9] Note that some road user attributes are not mutually exclusive. For example, some motorcycle riders are also young drivers.

Behavioral Issues

Behavioral issues (e.g. speeding, impaired driving, and distracted driving) have a significant effect on the frequency and severity of roadway crashes. In fact, more than 90 percent of all crashes involve human error.[10] Some of these crash attributes are choices a motorist makes before getting behind the wheel (e.g., drinking alcohol). Others are actions taken during a trip that affect the road users and others (e.g., speeding, not wearing a safety belt). As shown in Figure 5, speeding is the most common behavioral issue associated with fatal and serious injury crashes in Oregon, followed by alcohol-involved drivers. Note that although inattention shows up as a lower percentage in this figure, but the actual occurrence of this attribute could be higher. It can be difficult for law enforcement officers to accurately identify inattention, as it often must be self-reported.

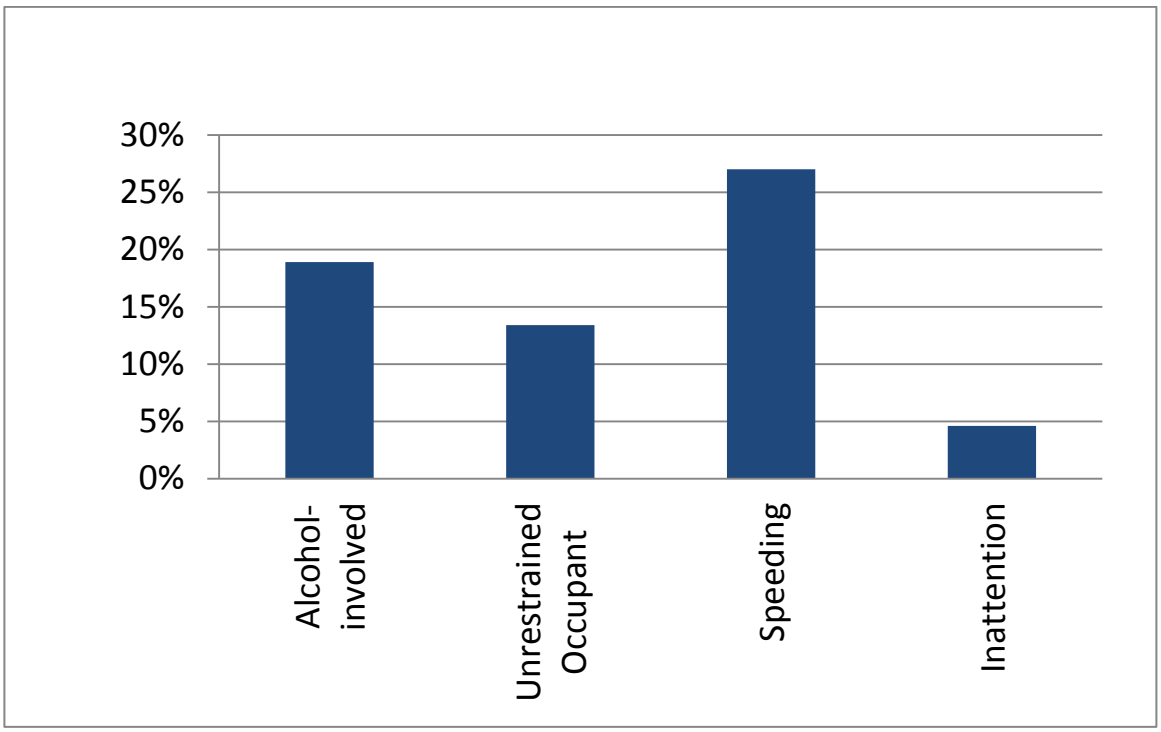

Figure 5. Proportion of Fatal and Serious Injury Crashes by Behavioral Issue, 2009-2013

Roadway Locations

Roadway locations are important because they can point safety engineers to spots experiencing crashes and to roadway elements that may contribute to increased risk for crashes. The roadway (or off roadway) locations of fatal or serious injury crashes include roadway or lane departure locations, intersections, work zones, and school zones. Figure 6 shows that more than half of fatal and serious injury crashes in Oregon occur as a result of a vehicle departing its proper lane.

[10] K. Rumar. "The Role of Perceptual and Cognitive Filters in Observed Behavior," Human Behavior in Traffic Safety, eds. L. Evans and R. Schwing, Plenum Press, 1985.

Crashes at intersections also account for a large number of fatalities and serious injuries. Approximately one out of three fatal and serious injury crashes from 2009 to 2013 occurred at an intersection.

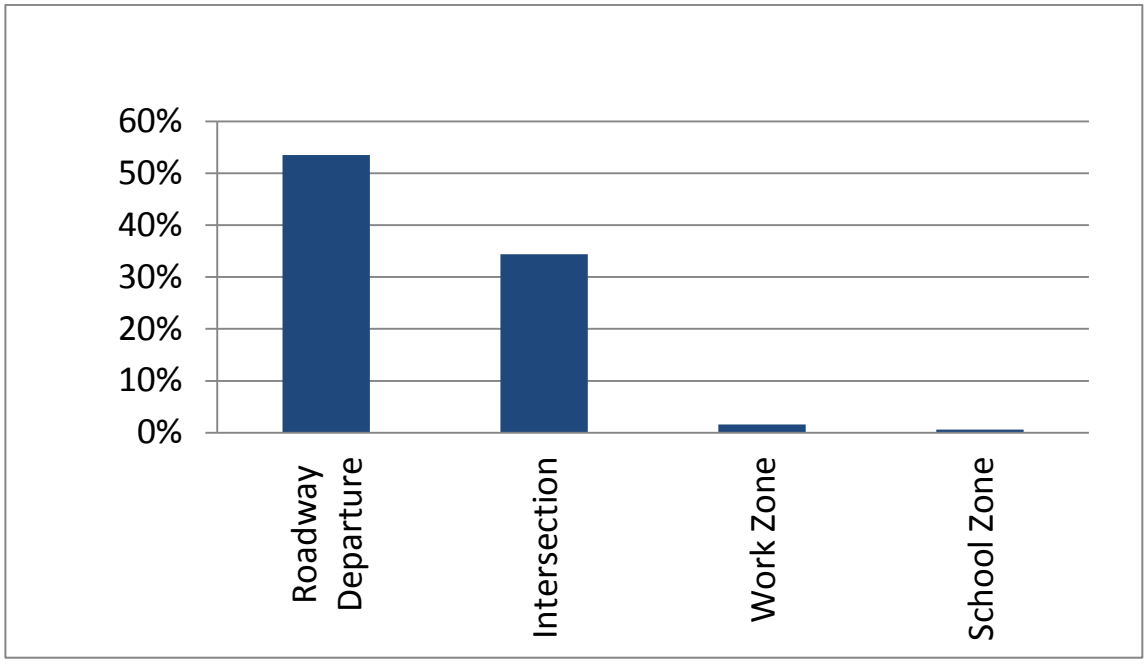

Figure 6. Fatal and Serious Injury Crashes by Location Type, 2009-2013

Most Common Statewide Crash Attributes

Following are the most common crash attributes in fatal and serious injury crashes in Oregon. Figure 7 illustrates the number of fatal and serious injury crashes that include each attribute, and also the percentage of all reported Oregon crashes (i.e., all severities) by attribute that resulted in a fatality or serious injury. For example, motorcycles were involved in 1,170 fatal and serious injury crashes during the study period, while 24 percent of all reported motorcycle-involved crashes included at least one fatality or serious injury.

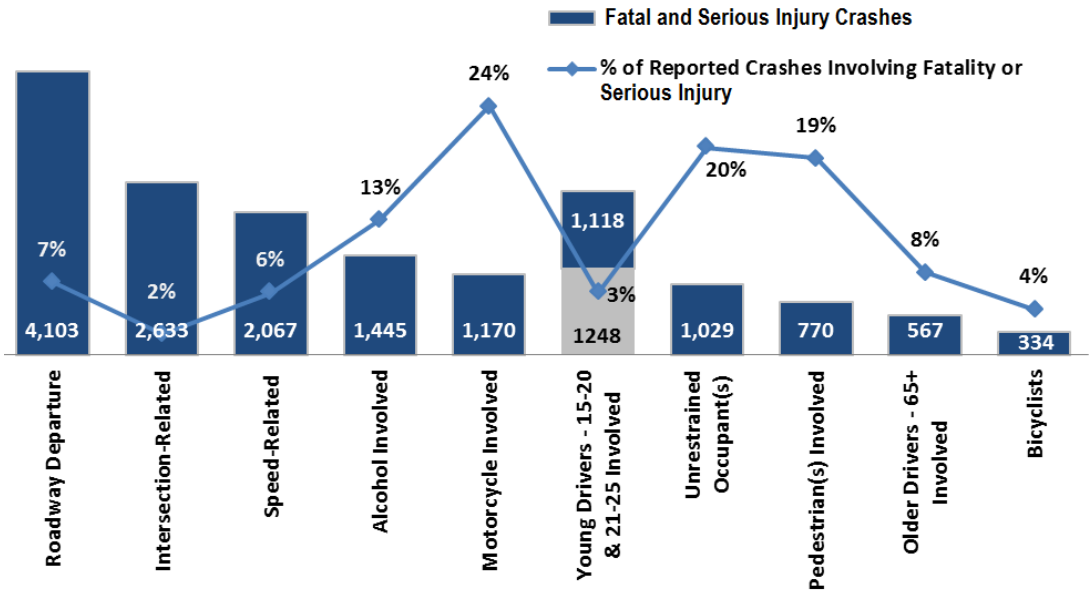

Figure 7. Fatal and Serious Injury Crashes by Most Common Attributes, 2009-2013

Note: Young Drivers age 15-20 are illustrated by the blue bar. 21-25 are illustrated by the grey bar.

Note that these categories are not mutually exclusive, as a single crash can include more than one attribute. For example, a number of alcohol-involved crashes also include unrestrained occupants, so a single crash may show up in both bars in the Figure 7 chart.

Regional Crash Attributes

The ODOT regions are illustrated in the Figure 8 map and characterized below.

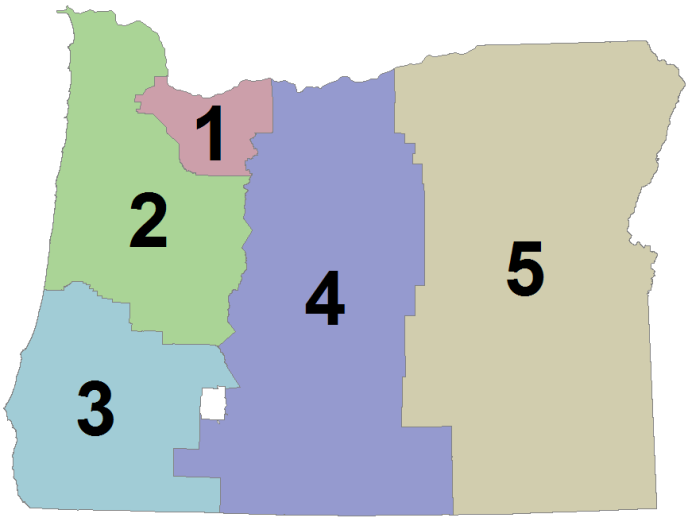

Figure 8. Oregon DOT Regions

Image Source: Oregon DOT, http://www.oregon.gov/ODOT/PublishingImages/regions.gif

Region 1: Portland Metro (Clackamas, Hood River, Multnomah and Washington Counties).

Region 2: Willamette Valley, North and Mid- Coast (Clatsop, Columbia, Tillamook, Yamhill, Polk, Marion, Lincoln, Linn, Benton and Lane Counties).

Region 3: Southern Oregon and South Coast (Douglas, Curry, Coos, Josephine and Jackson Counties).

Region 4: Central Oregon (Wasco, Sherman, Gilliam, Jefferson, Wheeler, Crook, Deschutes, Lake and Klamath Counties).

Region 5: Eastern Oregon (Morrow, Umatilla, Union, Wallowa, Baker, Grant, Harney and Malheur Counties).[11]

Each of ODOT's five regions has a slightly different distribution of its most common crash attributes than the statewide numbers, as shown in Figures 8 through 12. These figures show each region's fatal and serious injury crash attributes compared to Oregon overall.

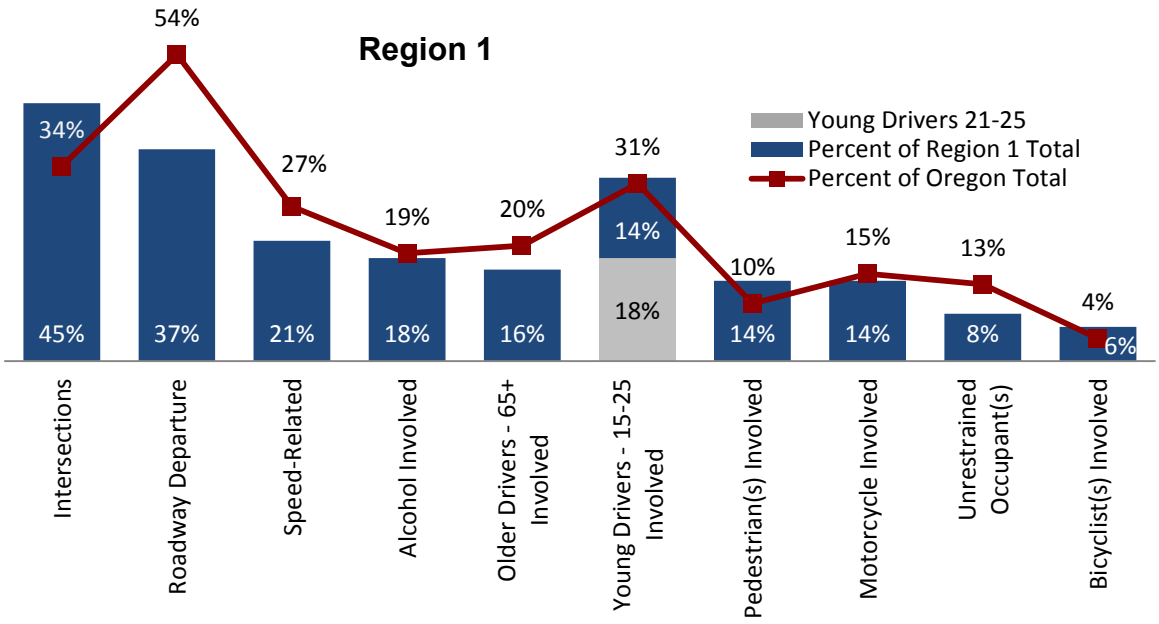

Figure 9. Region 1 Fatal and Serious Injury Crashes by Attribute, Compared to Statewide, 2009-2013

Note: Young Drivers age 15-20 are illustrated by the blue bar. 21-25 are illustrated by the grey bar.

Region 1 does not match the statewide distribution of severe crash attributes. Major differences include additional fatal and serious injury crashes at intersections and a higher proportion involving pedestrians and bicyclists. Region 1 also experienced fewer fatalities and serious

[11] ODOT Regions, Oregon Department of Transportation. http://www.oregon.gov/odot/pages/highwayregions.aspx

injuries related to roadway or lane departure, speed, older drivers, and unrestrained occupants than the statewide average.

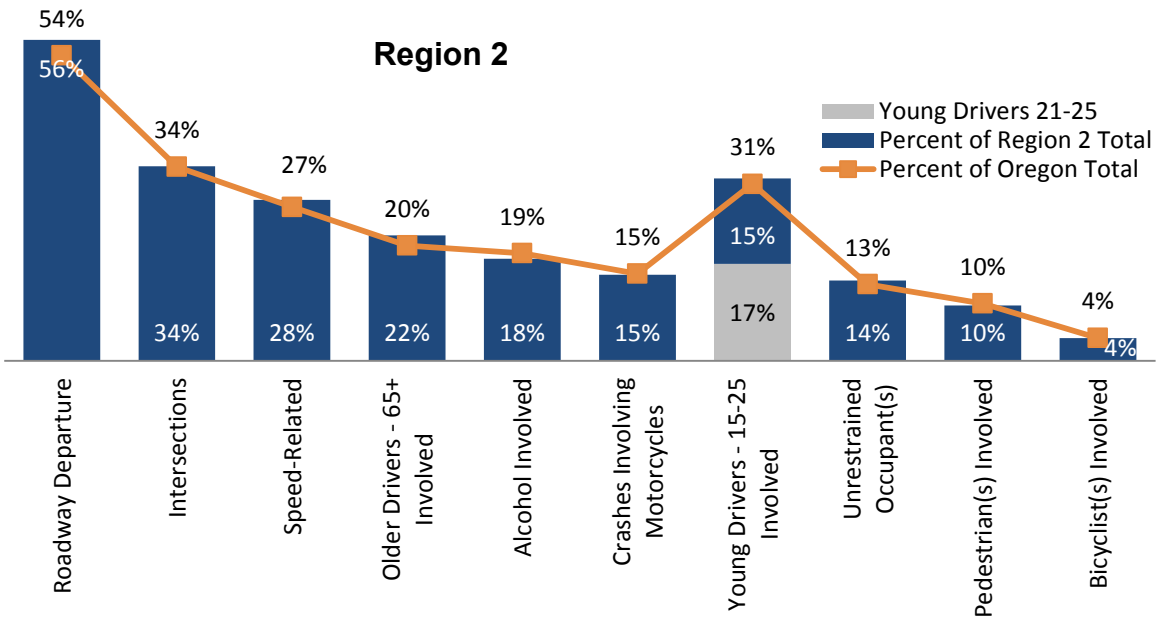

Figure 10. Region 2 Fatal and Serious Injury Crashes by Attribute, Compared to Statewide, 2009-2013

Note: Young Drivers age 15-20 are illustrated by the blue bar. 21-25 are illustrated by the grey bar.

Region 2 is a near-perfect match to the statewide proportions and distribution of the top attribute. The region has a mix of urban and rural transportation needs, similar to the State of Oregon.

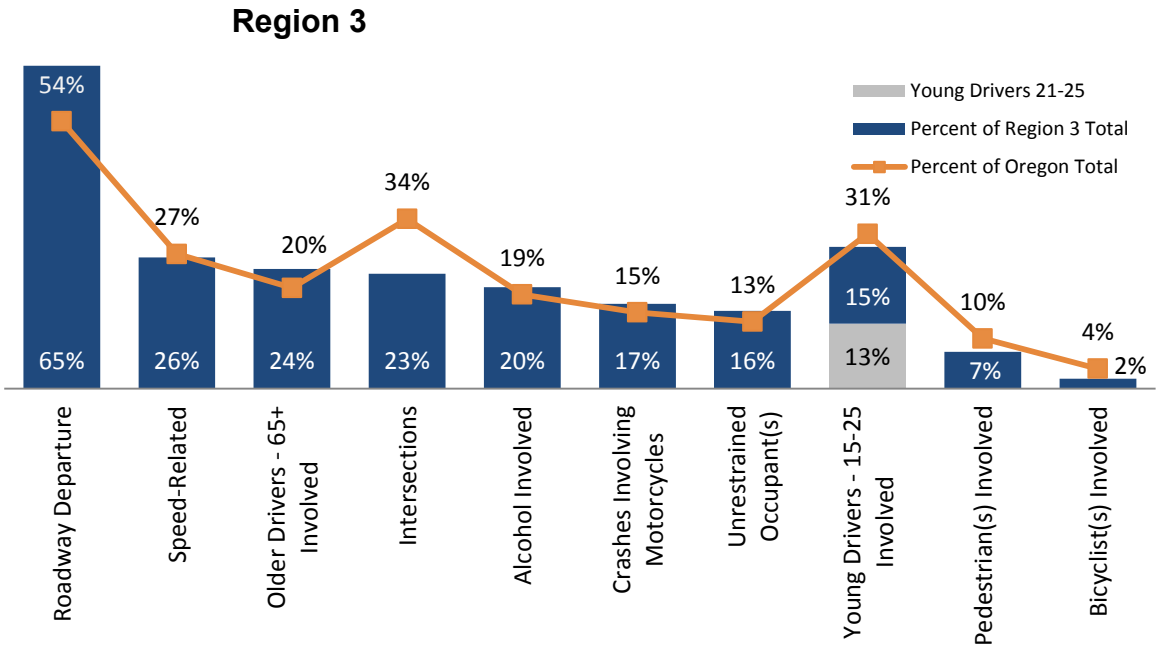

Figure 11. Region 3 Fatal and Serious Injury Crashes by Attribute, Compared to Statewide, 2009-2013

Note: Young Drivers age 15-20 are illustrated by the blue bar. 21-25 are illustrated by the grey bar.

Region 3 has a higher frequency of roadway or lane departure and speed-related fatal and serious injury crashes compared to the statewide average. It also experienced a lower proportion of intersection-related fatal and serious injury crashes than the rest of the state.

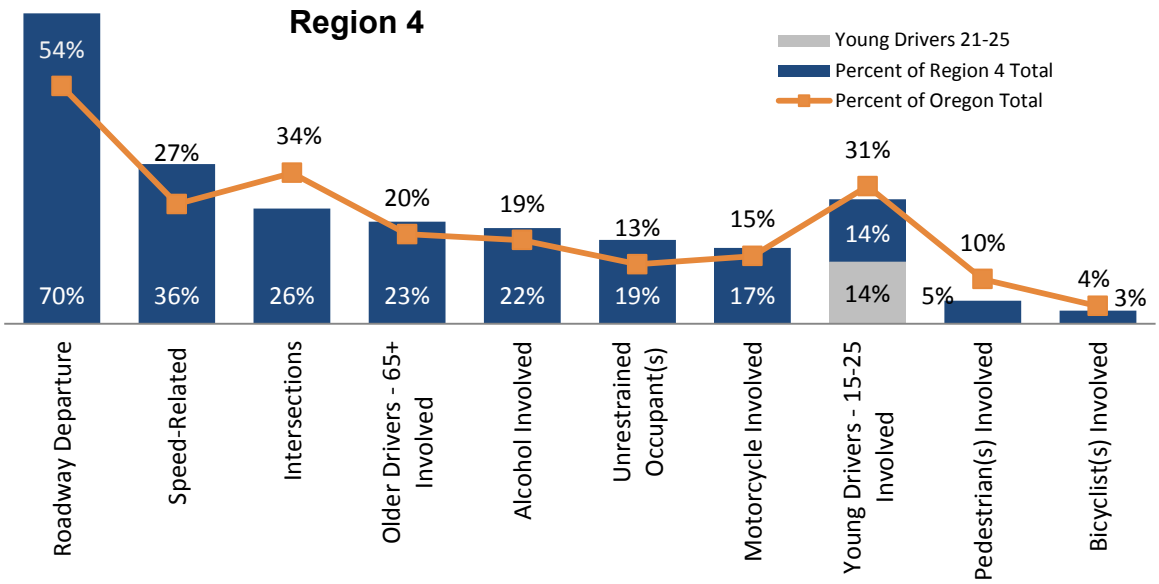

Figure 12. Region 4 Fatal and Serious Injury Crashes by Attribute, Compared to Statewide, 2009-2013

Note: Young Drivers age 15-20 are illustrated by the blue bar. 21-25 are illustrated by the grey bar.

Region 4 has a higher frequency of roadway or lane departure and speed-related fatal and serious injury crashes compared to the statewide average, partially because of its high number of rural road miles. It also has a higher proportion of unrestrained occupants than the state overall.

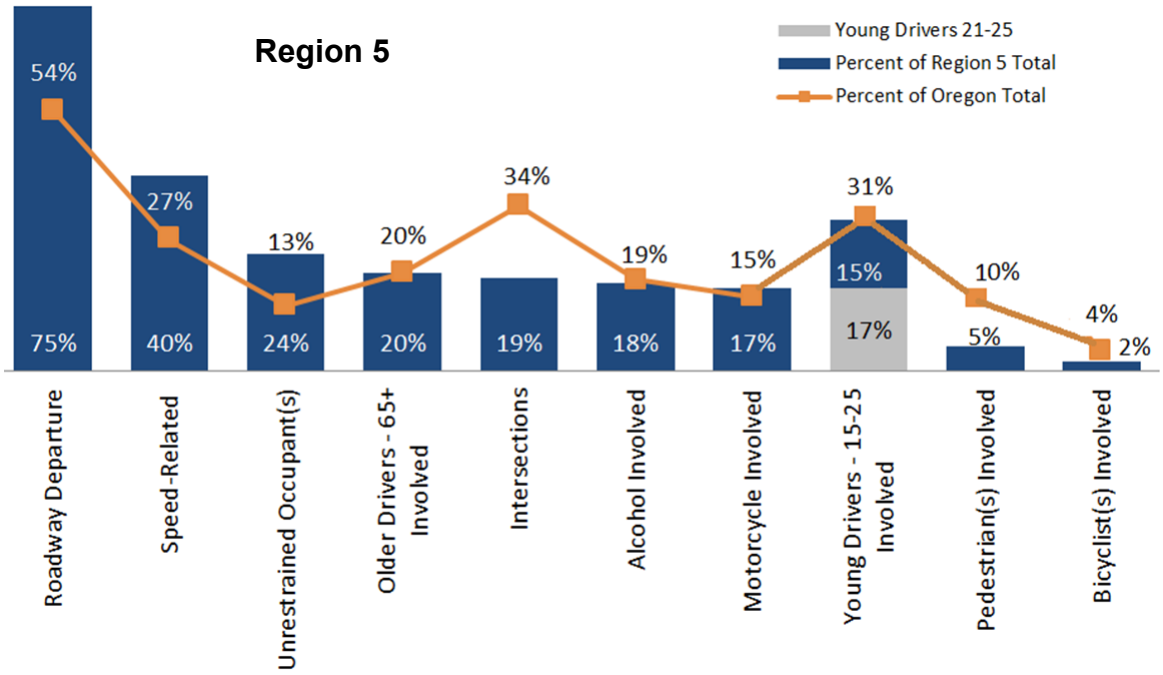

Figure 13. Region 5 Fatal and Serious Injury Crashes by Attribute, Compared to Statewide, 2009-2013

Note: Young Drivers age 15-20 are illustrated by the blue bar. 21-25 are illustrated by the grey bar.

Region 5 is also quite rural, which contributes to its higher frequency of roadway or lane departure and speed-related fatal and serious injury crashes compared to the statewide average. It also experienced a lower proportion of intersection-related and pedestrian-involved fatal and serious injury crashes than the rest of the state.

CONCLUSION

Oregon's crash history provides an important starting point toward deciding the distribution of limited resources by region, attribute, and potential countermeasures. Over the past decade transportation fatalities and serious injuries have decreased, but recent years have resulted in a slight increase, reminding safety professionals that there is much work to be done.

Some of the most common attributes of fatal and serious injury crashes in Oregon include certain roadway users (older drivers and young drivers), road user behaviors (speeding, alcohol involvement), and roadway locations (intersections, roadway or lane departure). In some cases these attributes are directly connected. For example, young drivers tend to drive more aggressively and are involved in an elevated number of speeding-related crashes. Pedestrian and bicyclist-involved crashes occur more often in urban-heavy Regions than other parts of the state.

In some regions the most common attributes are similar to the statewide average, with notable exceptions in Region 1 (higher proportion of intersection-related and pedestrian-involved) and

Regions 3 and 5 (higher proportion of roadway or lane departure; lower proportion of intersection-related and pedestrian-involved).

It is important to address both infrastructure and human behavior safety issues to meet Oregon's long term vision. Safety data analysis is an important part of identifying infrastructure and behavioral factors that affect the safety of the transportation system. Safety data analysis supports identification of emphasis areas, development of performance measures and targets, implementation of strategies, and evaluation of effectiveness.