



TRAFFIC RECORDS INTEGRATION PROGRAM

Multi-Collision Drivers Impact on Washington

By Joe Lee

June 2021

Forecasting and Research
The Office of Financial Management

Injuries and fatalities resulting from motor vehicle collisions are a public health concern. On average, between 2015 and 2019, 566 individuals died and 2,308 suffered serious injuries due to collisions each year in Washington state. These collisions can be the result of many factors, but one concern is drivers who are involved in multiple collisions over a short period of time. This brief will examine the impact of multi-collision drivers on motor vehicle collisions in the state.

Between 2009 and 2019, 1,566,258 drivers in Washington state were involved in collisions. During that time, 270,013 of those drivers were involved in multiple collisions. This brief accounts for all drivers in a collision within the state including non-state residents. Multiple-collision drivers were involved in a substantial proportion of overall collisions in Washington and made up 17.2% of total drivers with a collision during this timeframe, see Figure 1.

Figure 1: Multi-collision drivers as a percent of all drivers with a collision from 2009-2019

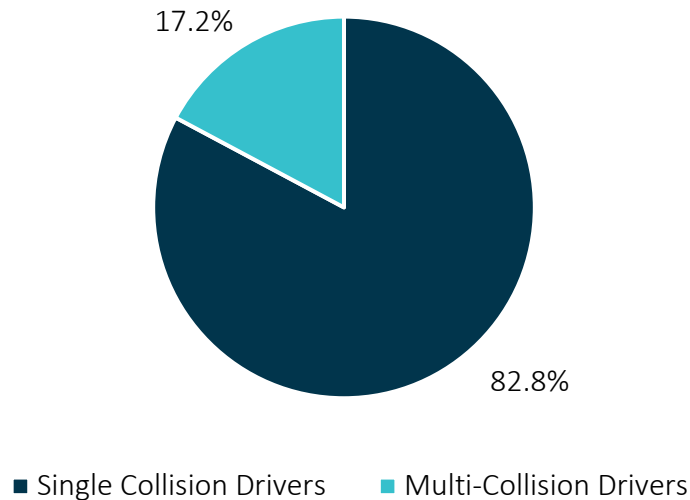


Figure 2 shows collisions from drivers having multiple collisions as a percentage of all drivers with a collision per cohort. If a driver had multiple collisions during the reporting year, they are included in the cohort. A driver is defined as having multiple collisions if they have two or more collisions in the reporting year and the three previous years. Overall, the percentage of multi-collision drivers increased 2.9% from 2012 to 2019. From 2012 to 2019, the cohorts averaged 14.8% of drivers involved with multiple collisions. The percentage of these multi-collision drivers declined slightly, 0.4%, in 2019. The decline comes after two years of almost one in six drivers in the 2017 and 2018 cohorts being involved in multiple collisions. The average number of multi-collision drivers was 25,998.8 over the eight years. The multi-collision drivers who have their multiple collisions in the reporting year averaged 18.2% of all multi-collision drivers in the year, a substantial proportion of each cohort. The increasing proportion of multi-collision drivers indicates they are having an increasing impact on the composition of collisions in Washington.

Figure 2: Percent of collisions in a single calendar year that involve a driver that was involved in two or more collisions in the previous three calendar years

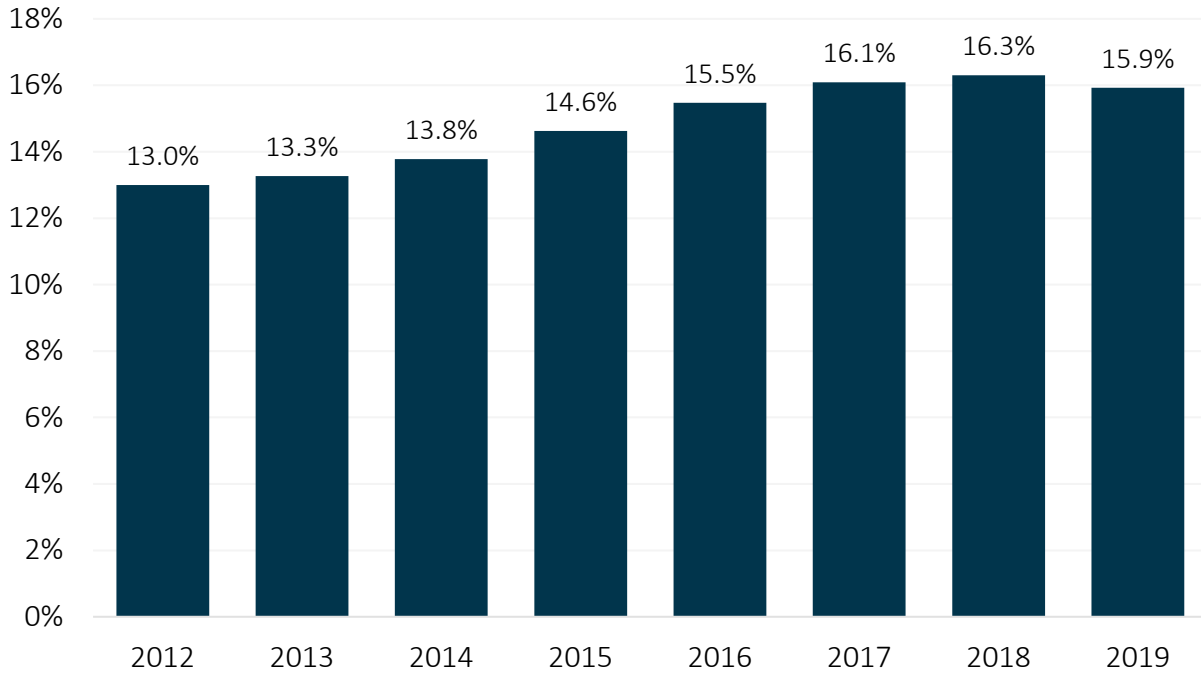


Table 1 shows drivers with three or more collisions as a percentage of all multi-collision drivers and their collisions from 2009-2019. What is notable is the consistency in the percentage of drivers with three or more collisions averaging 30.7% and 32.7%, respectively. Drivers end the period slightly higher than their average where their collisions finish slightly below the average. The relative stability of drivers with three or more collisions is notable over the 11 years.

Table 1: Annual percentages of drivers and collisions who are multi-collision drivers with 3+ collisions of multi-collision drivers

<u>Year</u>	<u>Drivers</u>	<u>Collisions</u>
2009	29.27%	30.74%
2010	30.19%	31.92%
2011	30.68%	32.30%
2012	31.11%	32.92%
2013	31.75%	33.67%
2014	31.77%	33.72%
2015	31.31%	33.52%
2016	31.19%	33.62%
2017	30.93%	33.21%
2018	30.35%	32.27%
2019	30.10%	31.92%

Findings

- Multi-collision drivers have increased 2.9% from 2012 to 2019.
- Multi-collision drivers that have multiple collisions within the same calendar year averaged 18.2% from 2012-2019 when controlling for recent driver history.
- Drivers involved in three or more collisions were involved in over 30% of both driver activity and collisions from multi-collision drivers.

Limitations

Drivers involved in many collisions over just a few years' time may be a population of drivers who exhibit high-risk driving behaviors that lead to the crashes. However, a limitation of the crash data is that culpability or fault in a crash is not assigned. While this research has provided opportunity to identify a potentially high-risk group of drivers, more work is needed to determine the role these drivers played in collisions.

The Washington State Department of Transportation's (WSDOT) raw driver data is a set of pooled annual cross-sections covering 2009-2019. The scope of the data is drivers who have been involved in a collision. These records do not longitudinally track drivers. To longitudinally track drivers, a key was generated identifying the total number of individual drivers. The key creates a panel dataset from these cross-sections, enabling driver records to be tracked over the 11 years of data tables.

A limitation of the driver data is the inability to conduct quality control on the concatenated key. The key was created by combining the full name and DOB of an individual. Driver records in this data are missing 13.6% of the first names, 22.6% of middle initials, 12.1% of last names, and 14.0% of DOBs. Any record missing a first name, last name, or DOB was excluded from analysis. All non-traffic records were also removed. These keys allow for the total number of drivers and their associated collisions to be calculated over the 11 years. Looking at drivers as the observation unit means that if a single collision has four participants then four drivers would have a collision. The results are the number of recorded drivers being higher than the number of recorded collisions. The choice to focus on drivers is because drivers are nested in collisions. In addition, using drivers creates a base for TRIP to focus on those who sustain serious injuries and fatalities in collisions.

Some checks can be done within the WSDOT data to help identify individual drivers. After review one duplicated multi-collision driver key was removed. Checking keys against collision reports gives a way to audit whether there are duplicate collisions being counted. The key and year are used to reshape the data so that driver's collisions can be counted. Given the keys are tied to an individual, a simple count of keys per year gives number of drivers in a year.

Figure 1 shows the cumulative total drivers with multiple collisions divided by the total drivers in a collision from 2009-2019. Figure 2 looks at the contemporaneous year and the previous three years of data to establish if a driver had more than one collision to create a cohort for the



TRAFFIC RECORDS INTEGRATION PROGRAM

contemporaneous year. Drivers are included if they were involved in multiple collisions in the contemporaneous year. This process is done for each year between 2012 to 2019. For each cohort, the number of collisions from multi-collision drivers is divided by all collisions from all drivers with a collision from the contemporaneous year. Table 1 shows the annual percentages of drivers with three or more collisions and the collisions they were involved in during the period.

About TRIP

In 2019, the Washington Traffic Safety Commission contracted with the Office of Financial Management to manage the Washington State Traffic Records Integration Program (TRIP). The purpose of the program is to develop and maintain a database for public safety research to further the goals of the Vision Zero 2030 strategic plan adopted by Washington state. TRIP will create a synergetic avenue of information for the public and policymakers on to address long-standing issues as well as new risks for drivers in Washington. The linkage of health and traffic data will give Washington the means to use public health traffic information to save lives.