Washington State Crash Injuries Involving Substances

By Joe Lee

TRIP

TRAFFIC RECORDS INTEGRATION PROGRAM

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Purpose of this Report

An established issue in traffic safety is the prevalence of substances in crashes.[1] Washington State Department of Transportation (DOT) maintains statewide crash records which are collected by the Washington State Patrol (WSP). WSP operates toxicology labs and maintains records of substances-related to driving related infractions such as crashes.

The purpose of the following analysis of the Traffic Record Integration Program (TRIP) linkage is to provide baseline information of the injury categories from the DOT crash data which are linked to the WSP toxicology lab data. The analysis will focus on the frequency of non-fatal injuries in substance-related crashes.

Data Utilized in this Report

Since crashes are the basis of the TRIP data repository, this report uses data from the DOT's crash data and WSP's toxicology data. It is important to note that the toxicology data in TRIP only covers driving under the influence (DUI) and drug recognition evaluation (DRE) cases in Washington.[2]

In Washington, there were 1,555,266 total DOT crashes from calendar years (CY) 2009-2021. There are 246,546 total records in the WSP toxicology data. However, since WSP's toxicology records start in CY 2012 and are currently linked through the CY 2020 within the TRIP repository, this report will utilize linked DOT and WSP data from CY 2012 to 2020 for analysis. Furthermore, the TRIP linkage creates a subsample of total crashes and toxicology tests in Washington. In this subsample, it was reported that 2.1% of contributing circumstances are substance-related, see Appendix A. Substance-related contributing circumstances represent 62,726 crashes over the same period in crash records. In total, there are 67,686 crashes that can be linked to a toxicology record.[3]

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[1] Substance related is the aggregation of relevant contributing circumstances categories recording the role of drugs and/or alcohol in crashes which is determined from the contributing circumstances coding section of Police Traffic Collision Report. (See Appendix B) https://www.wsp.wa.gov/wp-content/uploads/2020/01/2020-Police-Traffic-Collision-Instruction-Manual-Tenth-Edition.pdf
See Appendix for list of all options for contributing circumstances in Police Traffic Collisions Reporting.

[2] Drug recognition evaluations (DRE) are a set of roadside tests which law enforcement officers conduct to determine the presence of drugs. DUI and DRE cases are designated by Washington State Patrol Toxicology Lab.
National Highway Traffic Safety Administration, "Advanced Roadside Impaired Driving Enforcement: Participant Guide",https://www.nhtsa.gov/sites/nhtsa.gov/files/2023-04/15941-2023_ARIDE_Participant_Guide-tag.pdf

[3] A successful linkage is a TRIP ID which can be identified in both the DOT crash data and WSP toxicology data and shares a crash and offense date.

Analysis

How often are injuries or non-fatal crashes linked to toxicology?

DOT categorizes crash-related injuries into four categories. The agency categorizes these from least severe to most severe:

1. No apparent injury
2. Possible injury
3. Suspected minor injury
4. Suspected serious injury (see Appendix B for further definitions)

'Possible injuries' are injuries without a visible source such as a complaint of pain or nausea. A suspected minor injury are small injuries which have a visible source such as bruises. Suspected serious injuries are injuries that require emergency medical services such as cuts or burns. These four injury categories are all considered non-fatal.

Table 1 shows the percent and count of total crashes by injuries and fatalities linked to WSP toxicology data. As shown in Table 1, there are a total of 9,462 overall injuries in substance-related crashes, making up 44.8% of crashes. There was a total of 47 fatalities linked to a WSP toxicology record from 2012 to 2020 (see Table 1).

Table 1: Percent and Count of Total Crashes by Injuries and Fatalities Linked to Toxicology

Record Types	Percent	Count
Fatalities	0.2%	47
Injuries	44.8%	9,462

Note: Non-traffic fatalities and injuries are not included in this table. All data is from TRIP and is a subsample generated from WSDOT crash data and WSP Toxicology data covering the years 2012-2020. Injuries are the totals percent and counts of all injury categories.

Table 2 expands on the data displayed in Table 1 by showing the counts and percentage of crash related injuries from all categories (i.e., unknown, no apparent injury, possible injury, suspected minor injury, and suspected serious injury) and fatalities over time (i.e., 2012 to 2020). Findings showed that "no apparent injuries" make up 49.9% of injury outcomes for drivers (see Table 2). Table 2 shows that for each step up in injury severity (i.e., no apparent injury to possible injury; possible injury to suspected minor injury), the average annual percent decreases as does the standard deviation of the annual outcomes from 2012 to 2020.[4] Annually, possible injuries averaged 2.2%, suspected minor injuries annually averaged 1.8%, and suspected serious injuries annually averaged 0.9% of crash-related injuries

[4] A standard deviation is a measure of data dispersion (i.e., the larger the standard deviation the more volatile the data).

linked to WSP toxicology data. The respective categories standard deviation is 0.3%, 0.2%, and 0.1% following the same pattern as the average annual percentages. The more severe the injury category is the more stable the involvement of substances are in a crash.

Table 2: Count and Percentage of Crash-Related Injuries Categories Over Time Linked to WSP Toxicology

Year	Unknown	No Apparent Injury	Possible Injury	Suspected Minor Injury	Suspected Serious Injury	Fatalities
2012	66 (0.3%)	646 (3.1%)	437 (2.1%)	452 (2.1%)	201 (1.0%)	12 (0.06%)
2013	66 (0.3%)	735 (3.5%)	463 (2.2%)	337 (1.6%)	190 (1.0%)	*
2014	91 (0.4%)	881 (4.2%)	370 (1.8%)	367 (1.7%)	171 (0.8%)	*
2015	113 (0.5%)	1,097 (5.2%)	465 (2.2%)	378 (1.8%)	167 (0.8%)	*
2016	134 (0.6%)	1,356 (6.4%)	526 (2.5%)	383 (1.8%)	191 (0.9%)	*
2017	144 (0.7%)	1,389 (6.6%)	497 (2.4%)	351 (1.7%)	187 (0.9%)	*
2018	177 (0.8%)	1,452 (6.9%)	538 (2.6%)	386 (1.8%)	206 (1.0%)	*
2019	197 (0.9%)	1,514 (7.2%)	531 (2.5%)	397 (2.0%)	204 (1.0%)	*
2020	81 (0.4%)	1,454 (6.9%)	409 (1.9%)	421 (1.8%)	212 (1.0%)	*
Total	1,073 (5.1%)	10,535 (49.9%)	4,250 (20.1%)	3,480 (16.5%)	1,732 (8.2%)	47 (0.2%)
Average	118.8 (0.6%)	1169.3 (5.5%)	470.7 (2.2%)	385.8 (1.8%)	192.1 (0.9%)	5.2 (0.02%)
SD	47.7 (0.2%)	338.0 (1.6%)	58.2 (0.3%)	34.9 (0.2%)	15.5 (0.1%)	2.9 (0.01%)

Note: Non-traffic fatalities and injuries are not included in this table. The percentages calculated by the total injury records in every category from 2012-2020. See Appendix for definitions on injury categories. All data is from TRIP and is a subsample generated from WSDOT crash data and WSP Toxicology data covering the years 2012-2020. (*) Indicates redactions due to small number of observations. SD is short for standard deviation.

In total, non-fatal crashes make up 99.8% of substance-related crashes with a plurality of substance-related crashes having no apparent injuries (Table 1 and 2). Table 2 shows 5.1% of these non-fatal crash records are listed as 'unknown' so the 44.8%**Error! Reference source not found.** of substance-related crashes have some type of injuries associated which is drastically higher than 14.9% of overall injuries recorded in crashes. The percent of injuries in substance-related crashes compared to the overall prevalence of crash-related injuries is worth monitoring going forward.

Limitations

It is important to note the limitations of the linkage between toxicology records and DOT records. In DOT crash records when a BAC is reported it is alcohol-related but actual BACs are reported at a lower rate than alcohol is listed as a contributed circumstance. When a toxicology record is found to link to a crash record it means there is a very high probability that the toxicology record is related to a crash. A toxicology record that does not link to a crash means that the record is more than likely just related to a driving offense. All records which can be linked have a unique TRIP ID for a driver. An additional condition is to have matching dates for a crash (DOT) and offense (WSP) to be considered linked. Injury data from DOT is not recorded by medical professionals so there are general issues of reliability outside of the simple broadness of the categories. The linkage TRIP uses to generate IDs used as the main linking

component is a probabilistic matching algorithm with some deterministic processes used for quality assurance. This means that not every record will be exactly matched but there is a high level of confidence in the matching process.

Next Steps

Going forward any analysis of crash-related injuries from TRIP will be utilizing additional datasets from the Department of Health (DOH). This will help to evaluate what injuries are categorized as and how close those records are to the DOT injury categories.

To further this analysis, combining DOT crash data with DOH injury data would allow a more detailed analysis of substance-related crashes utilizing the toxicology data. TRIP has the potential to bridge gaps in substance-related crash records to provide new insights into how substances impact public health and safety outcomes in Washington . There is an opportunity for TRIP to create sustained improvements in public health and safety data by further linking injury and toxicology records.

The linkage between crash data and TRIP datasets offers opportunity to improve data quality through data flags or the verification of similar types of data like drugs alcohol or injuries. These data improvements could lead to annual data transfers to sustain benefits from the TRIP linkage.

Appendix A: Contributing Circumstance Categories for Crashes

Under Influence of Alcohol	**Had Taken Medication**
Under Influence of Drugs	Non-Motorist on Wrong Side of Road
Exceeding Stated Speed Limit	Hitchhiking
Exceeding Reasonable Safe Speed	Failure to Use Xwalk
Did Not Grant RW to Vehicle	Operating Handheld Cell Phone
Improper Passing	Operating Hands-Free Cell Phone
Follow Too Closely	Operating Other Electronic Devices (computer, navigation, etc.)
Over Center Line	Driver Adjusting Audio or Entertainment System
Failing to Signal	Smoking
Improper Turn/Merge	Eating or Drinking
Disregard Stop and Go Light	Reading or Writing
Disregard Stop Sign - Flashing Red	Grooming
Disregard Yield Sign - Flashing Yellow	Driver Interacting with Passengers, Animals or Objects Inside Vehicle
Apparently Asleep or Fatigued	Other Driver Distractions Inside Vehicle
Improper Parking Location	Distractions Outside Vehicle
Operating Defective Equipment	Unknown Distraction
Other Contributing Circ Not Listed	Driver Not Distracted
None	Lost in Thought / Day Dreaming
Improper Signal	Distracted by Other Occupant
Improper U-Turn	Distracted by Adjusting Vehicle Controls
Light Violation: No Lights/Fail to Dim	Other Distractions
Did Not Grant R/W to Non-Motorist	Disregard Traffic Sign and Signals
Inattention	Apparently Emotional (Depressed, Angry, Disturbed, etc.)
Improper Backing	Physically Impaired
Disregard Flagger / Officer	Racing
Apparently Ill	Operating Recklessly or Aggressively
Apparently Fatigued	Overcorrecting / Oversteering

All options from Police Traffic Collision Reports for contributing circumstance recording options and are from WSDOT data. Bolded categories are used to determine substance related records.

Appendix B: Definitions

Police Traffic Collision Report Manual Chapter 5 Section 2 defines injuries categories[5]:

No Apparent Injury: Applies when the officer at the scene has no reason to believe that at the time of the collision the person received any bodily harm due to the collision.

Suspected Serious Injury (Serious Injury) – applies to any injury other than fatal that results in one or more of the following: Severe lacerations resulting in exposure of underlying tissues/muscle/organs or resulting in significant loss of blood, broken or distorted extremity, crush injuries, suspected skull, chest, or abdominal injury other than bruises or minor lacerations, significant burns, unconsciousness when taken from the scene, paralysis.

Suspected Minor Injury (Non-Disabling Evident Injury): Applies to any injury that is evident at the collision scene, other than fatal or serious injuries. Examples include lump on head, abrasions, bruises, or minor lacerations.

Possible Injury: Applies to any injury reported or claimed that is not a fatal, suspected serious or suspected minor injury. Examples include momentary unconsciousness, claim of injury, limping, complaint of pain, or nausea. Possible injuries are those that are reported by the person or are indicated by his/her behavior, but no wounds or injuries are readily evident."

[5] Washington State Patrol, "Police Traffic Collision Instruction Manual" https://www.wsp.wa.gov/wp-content/uploads/2020/01/2020-Police-Traffic-Collision-Instruction-Manual-Tenth-Edition.pdf