

# Washington State Alcohol-Related Crash Records

By Joe Lee



**TRAFFIC RECORDS INTEGRATION PROGRAM**



## TRAFFIC RECORDS INTEGRATION PROGRAM

### Purpose of this Report

An established issue in traffic safety is the prevalence of substances in crashes.<sup>1</sup> 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 is to provide information about the Traffic Record Integration Program (TRIP) linkage between the DOT crash records and WSP toxicology records focusing on alcohol-related crash records between the two datasets.

### 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.<sup>2</sup>

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. From 2012-2020, Washington had 4.9% of contributing circumstances in crashes that are related to alcohol. Alcohol-related contributing circumstances represent 54,235 crashes over the same period in crash records. In total, there are 67,686 crashes that can be linked to a toxicology record.<sup>3</sup>

### Questions Addressed in this Report

#### How often do the toxicology and police-reported Blood Alcohol Content (BAC) records match?

The issue for BAC records is the consistency of processing. Alcohol has cultural entrenchment but more practically for crash records because roadside breathalyzer tests are common. How and when alcohol is recorded in crash records can occur in a few ways: 1) a roadside breathalyzer test; 2) toxicology lab

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<sup>1</sup> Substance related is the aggregation of the most current comprehensive method to record the role of drugs and/or alcohol in crashes which is determined from the contributing circumstances coding section of Police Traffic Collision Report.

<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.

<sup>2</sup> 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](https://www.nhtsa.gov/sites/nhtsa.gov/files/2023-04/15941-2023_ARIDE_Participant_Guide-tag.pdf)

<sup>3</sup> 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. The TRIP ID super sedes the offense data because a date of crash or offense does not align to a person first a record does not have a way to link between datasets.



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alcohol testing; or 3) a person can refuse a breathalyzer and the Police Traffic Collision Report (PTRC) contributing circumstance can still be recorded as under the influence of alcohol even with no breathalyzer test (Appendix A). Each one of these options represents different ways data gets recorded and, the hurdles to get into the finalized crash data.

The toxicology lab tests two samples per DUI case which is then averaged out for the matching outcome in the crash data. In the DOT crash data, there is only one BAC record per driver which is the average of the two breathalyzer tests. Table 1 shows the breakdown of matched vs mismatched BAC records for crash and toxicology data. Table 1 shows that 46.8% of alcohol toxicology tests link to crashes from the total 24,875 DUI records. From 2012 to 2020, DOT has 26,906 BAC records showing a similar number of records between the DOT crash data and the WSP toxicology data. The records matching in a one-to-one manner is lacking between BAC records in both datasets. Only 3.6% of linked records have perfectly matching BAC records.<sup>4</sup> Of the 10,735 total linked mismatched BAC records between the DOT and WSP datasets, 2.5% are mismatched BAC records with different BACs recorded between the two datasets. There are some near mismatching records constituting 0.7% of these mismatched records. The issue with the near mismatching records are the toxicology records being .001 or less, lower than the BAC records in the DOT data. The remaining mismatched BAC records have only one BAC recorded per crash from either dataset.

**Table 1: Toxicology BAC Records Linked to Crash BAC Records**

<b>Record Types</b>	<b>Percent</b>	<b>Count</b>
Total Linked BAC Records	46.8%	11,632
Matching Linked BAC Records	3.6%	897
Total Linked Mismatched BAC Records	43.2%	10,735
Total Toxicology Alcohol Records	.	24,875

**Note:** Total Toxicology Alcohol Records have been calculated by averaging the two samples which are tested as stand practice for toxicology testing. All data is from TRIP and is a subsample generated from WSDOT crash data and WSP Toxicology data covering the years 2012-2020. Linked records are individual records from both data sets which share a TRIP ID and event date. Matched records are linked records which have data values which are alike.

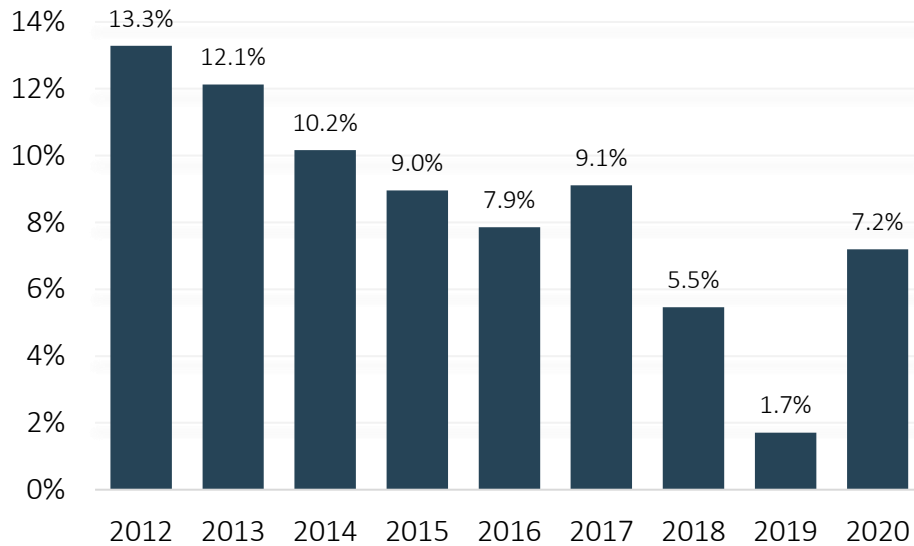
Figure 1 shows an overall downward trend in the percentage of matching records from DOT and the WSP toxicology lab. The average of annual linked records from 2012 to 2020 is 8.4%, and 2019 to 2020 saw a rebound from 1.7% to 7.2%. The downward trend and the lower number of perfect matches between the toxicology and crash data can indicate that the points of friction in the reporting process for crashes can be substantial. The low numbers of matched toxicology and crash records can indicate potential improvements for the reporting process of crashes (see Appendix B). There is an opportunity

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<sup>4</sup> Matching records mean the values of the linked records are the same.

for TRIP to reduce the friction of the data aggregation process which could benefit both WSP and DOT by removing the reliance of amending already existing records.

**Figure 1: Percent of Matching BAC Records Between Crash and Toxicology Data 2012-2020**



**How often are the police reporting BAC without a toxicology lab result in a crash?**

Due to the common consumption of alcohol, there have been long-standing processes for dealing with impaired driving.<sup>5</sup> Breathalyzers are the main reason for law enforcement forgoing the use of the toxicology labs. Table 2 is the breakdown between linked and unlinked BAC records and which of those records have all the necessary parts for linking. The prevalence of breathalyzer usage may be seen in 82.5% of unlinked BAC DOT crash records (Table 2) due to recorded BACs not having any connection to the toxicology lab data. Alcohol-related crashes in crash data include almost 60% more total records than total toxicology alcohol records. The unlinked DOT BAC records have 2.8 times more records than the total linked toxicology-DOT crash records. DOT has 26,906 BAC records from 2012 to 2020 of which 3,631 are linkable. The 3,631 DOT BAC records are 31.4% of the total possible linked BAC toxicology records. A way for TRIP to add value to traffic safety data would be creating metrics for example tracking use of blood tests to track the use of roadside breathalyzers.

**Table 2: Total Unlinked BAC Records in Crash data**

<b>Record Types</b>	<b>Count</b>	<b>Percent</b>
Unlinked BAC Records	32,730	82.5%

<sup>5</sup> National Institute on Alcohol Abuse and Alcoholism, “Alcohol Use in the United States: Age Groups and Demographic Characteristics: Prevalence of Lifetime Drinking”, <https://www.niaaa.nih.gov/alcohols-effects-health/alcohol-topics/alcohol-facts-and-statistics/alcohol-use-united-states-age-groups-and-demographic-characteristics>, accessed August 2023



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Total BAC Records	39,652	.
Linkable BAC Records	3,631	13.4%
Possible Linkable BAC Records	26,906	

**Note:** BAC records for this table are from DOT crash data. Linkable in this table refers to records from 2012 to 2020 because the DOT data exceeds this period both before and after. All data is from TRIP and is a subsample generated from WSDOT crash data and WSP Toxicology data covering the years 2012-2020.

Table 3 shows the unlinked BAC records and the rates per 1,000 crashes or drivers. As expected, there are more drivers than collisions seen in lower rates of BAC records per 1,000 drivers. In 2020, there was an increased spike beyond the rates in 2012, following a period of decline which saws its low in 2016. The dip and subsequent spike coincide with privatization of liquor in Washington State increasing prices and the impact of COVID-19 in 2020. However, the effects of lower driver activity and increased alcohol consumption is not clear.<sup>6</sup> The average number of BAC records with no toxicology record was 2,573 records. These unlinked records may show the overall possible number of roadside crash-related BAC tests from breathalyzers.

**Table 3: Rates of Reporting BAC by Total Collisions and Drivers Crash-Related Records Unlinked to Toxicology**

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020
BAC Reported no Tox record	2,696	2,453	2,501	2,485	2,593	2,688	2,785	2,593	2,489
BACs per 1,000 Collisions	24.8	22.6	20.4	18.7	18.5	19.5	21.0	20.3	25.2
BACs per 1,000 Drivers	15.9	14.2	13.4	12.3	12.2	12.7	13.6	13.3	17.2

**Note:** Both collisions and drivers are deduplicated records. All data is from TRIP and is a subsample generated from WSDOT crash data and WSP Toxicology data covering the years 2012-2020.

**How often is there a positive BAC toxicology that was not reported to the crash record?**

Figure 2 shows an upward trend in the amount of BAC tests from the toxicology lab not associated with a crash and remaining unlinked to the crash data. The increase totals two-percentage points from 2012 to 2020. There are several reasons for this increase from 2012 to 2020. One reason includes the impact

<sup>6</sup> Williams E, Kerr WC, Barnett SBL. Price Changes in Washington Following the 2012 Liquor Privatization: An Update Through 2016 With Comparisons to California, Idaho, and Oregon. *Alcohol Clin Exp Res.* 2020 Feb;44(2):501-510. doi: 10.1111/acer.14255. Epub 2019 Dec 18. PMID: 31851383; PMCID: PMC7018554.  
 Washington State Department of Transportation, "VEHICLE MILES OF TRAVEL (VMT) TARGETS – INTERIM REPORT" [https://wsdot.wa.gov/sites/default/files/2022-06/VMT-Targets-Interim-Report-June2022\\_0.pdf](https://wsdot.wa.gov/sites/default/files/2022-06/VMT-Targets-Interim-Report-June2022_0.pdf), June 2022  
 Washington State Department of Transportation, "Annual mileage and travel information" <https://wsdot.wa.gov/about/transportation-data/travel-data/annual-mileage-and-travel-information>, accessed 7/10/2023  
 Bureau of Transportation Statistics, "U.S. Vehicle Miles" <https://www.bts.gov/content/us-vehicle-miles>, accessed 7/10/2023  
 Slater, Megan. Alpert, Hillel. "Surveillance Report #119: Apparent Per Capita Alcohol Consumption: National, State, and Regional Trends, 1977–2020" *National Institute on Alcohol Abuse and Alcoholism Division of Epidemiology and Prevention Research: Alcohol Epidemiologic Data System*, <https://pubs.niaaa.nih.gov/publications/surveillance119/surveillance-report119.pdf>

of data processing, record management, or human error; however, there was almost a 179.4% increase in the number of total records generated from the toxicology lab from 2012 to 2020. The increase in records generated from the toxicology lab and the two-percentage point increase point to a relatively stable system of BAC reporting.

**Figure 2: Toxicology BAC Records Not Reported to WSDOT Crash Records 2012-2020**

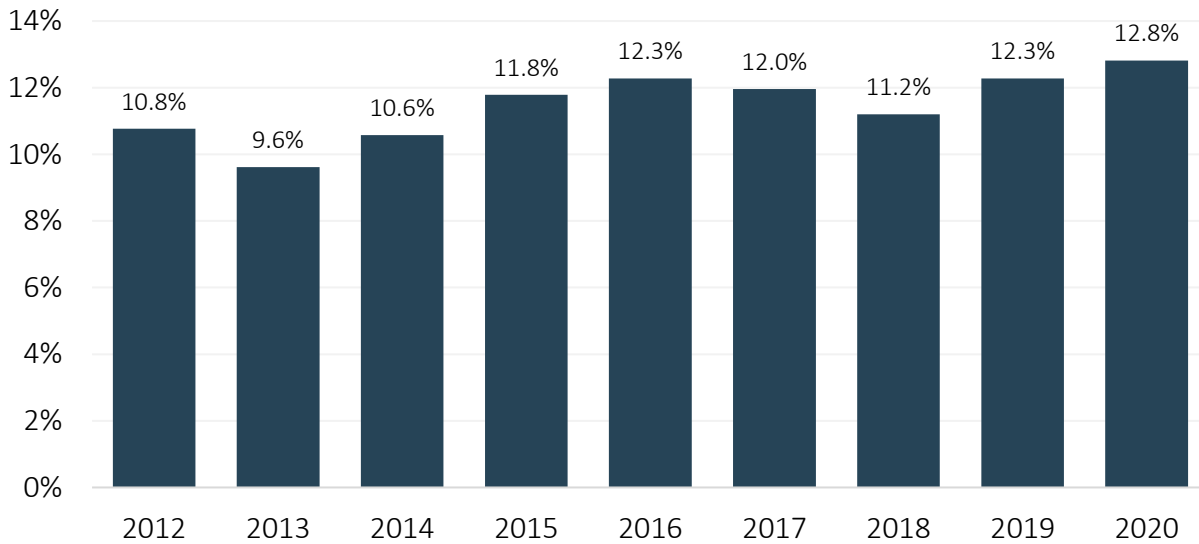


Table 4 shows the breakdown from total records to BAC cases.<sup>7</sup> The total toxicology tests with a positive BAC result but not an associated crash record amounts to 11.7% or 24,875 cases. Of total BAC cases which can be reported for crashes 62.7% are not reported as such. The total BAC cases account for 56.1% of toxicology cases. 11.7% of positive BAC results are missing a unique TRIP ID and a matching crash and offense date. A likely reason for the unlinked records is that 11.7% of total toxicology records are unrelated to a crash and are just related DUI arrests.

**Table 4: Total Toxicology BAC Records Not Reported to WSDOT Crash Records**

<b>Record Types</b>	<b>Percent</b>	<b>Count</b>
Positive BAC Records	11.7%	24,875
Total BAC Cases	.	39,656
Total Cases	.	70,626
Total Toxicology Records	.	246,546

**Note:** Total toxicology records include drugs. The Positive BAC Records can be thought of as unlinked 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.

<sup>7</sup> A case is a set of records which all share a case number.



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### Limitations

It is important to note the limitations of the linkage between WSP toxicology records and DOT records. When a BAC is reported in DOT crash data, these records are alcohol-related crashes regardless of contributing circumstances. DOT BAC records do not have a way to definitively distinguish between breathalyzers or toxicology lab tests. When a toxicology record is found linked to a crash record it means there is a very high probability that the toxicology record is related to that 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 but also requires to have matching dates for a crash (DOT) and offense (WSP) to be considered linked.

### Next Steps

TRIP shows potential to bridge gaps in alcohol-related crash records as a pathway to improve the reporting process which impacts public health and safety outcomes in Washington. There is an opportunity for TRIP to create sustained improvements in public health and safety data by linking further toxicology records with crashes. Linking crash data and other TRIP datasets provides data quality improvements or the potential of new metrics through data flags or the verification of similar types of data like drugs alcohol or injuries. These data enhancements could lead to annual data feeds for sustained improvement of data.



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## Appendix A: Contributing Circumstance Categories for Crashes

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<b>Under Influence of Alcohol</b>	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

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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: Toxicology Recording Process Decision Tree

