



# Alcohol and Drug Prevalence Among Seriously or Fatally Injured Road Users

By Amy Berning

## Background

NHTSA is interested in learning about the prevalence of drug and alcohol positivity among road users in the United States. This study collected blood samples across several Level-1 trauma centers and morgues from those admitted after motor vehicle crashes. The results of this research increase our knowledge of substance use and traffic safety. The National Roadside Surveys were designed to provide information on the prevalence of alcohol and drugs in drivers, *at the time of driving*. NHTSA's "Virginia Beach study" on crash risk examined the prevalence of alcohol and drugs in crash-involved drivers and control (non-crash) drivers. That study increased our knowledge considerably regarding crash risk associated with alcohol and drug use; however, most crashes resulted in property damage only or minor injuries, limiting information on serious crashes. In this current study, NHTSA advanced the research on two significant fronts. First, the focus was on the most serious of crashes – those that involved someone either admitted to a Level-1 trauma center, or who had died at the scene of the crash and been transported to a medical examiner's office. Second, the study obtained data across types of road users besides drivers, such as pedestrians and bicyclists.

NHTSA released interim results of this study in October 2020 (DOT HS 813 013) that included an analysis of alcohol and other drug prevalence before and during the COVID-19 public health emergency from the data collection in our initial five sites. Additional interim data were included in the Office of Behavioral Safety Research series, *Research Notes on COVID and Traffic Safety* (DOT HS 813 011, DOT HS 813 069, DOT HS 813 135). Since then, data were obtained from two more sites, and thousands more road users.

## Research Objective

This study examined prevalence of alcohol and over-the-counter, prescription, and illegal drugs in the blood of a large sample of seriously or fatally injured drivers and other road user crash victims.

## Methods

Participants	
Drivers, including motorcyclists	4,798
Passengers	1,031
Bicyclists	255
Pedestrians	983
Other	129
Unknown	83

The study included seven Level 1 trauma centers with large catchment areas. Medical examiner (ME) offices participated at four sites. Due to staggered on-boarding, researchers conducted data collection in the periods shown.

Jacksonville, FL: September 10, 2019, to July 31, 2021	Worcester, MA: January 27, 2020, to July 31, 2021
Charlotte, NC: September 16, 2019, to July 31, 2021	Iowa City, IA: August 24, 2020, to July 31, 2021
Miami, FL: October 17, 2019, to July 31, 2021	Sacramento, CA: November 13, 2020, to July 31, 2021
Baltimore, MD: December 11, 2019, to July 31, 2021	

Level-1 trauma centers routinely obtain blood samples from all patients; from each of these samples approximately 6 ml of blood was collected to test for the presence of alcohol and other drugs. Blood samples were de-identified and sent to a forensic toxicology lab for screening and confirmatory analyses. Samples were tested for a variety of drugs known to have potentially impairing effects on driving-related behaviors. The drugs included "parent" drugs and their active metabolites.

## Results

Table 1 provides summary information on the 7,279 road users in the study. See the full report for detail on drug and alcohol prevalence across road user types (e.g., passengers, pedestrians) and drug categories.

Cannabinoids (active THC) and alcohol were the most prevalent drugs, with 25.1% and 23.1%, respectively, of road users testing positive. Stimulants (10.8%) and opioids (9.3%) followed. The ME cases tended to show higher positivity than the trauma center cases for each drug category. Overall, 19.9% of the road users tested positive for two or more categories of alcohol or other drugs. The use of multiple substances at once – often called “polydrug use” – may be especially of concern, as the impairing effects can interact. For drivers, alcohol was combined with one other category of drugs in 7.6% of the

trauma center and 17.7% of the ME cases, with cannabinoids (4.8% and 12.3%, respectively) being most common.

Breaking the data down further, and using results from only trauma centers, the presence of alcohol or other drugs was notable across road user types: 54.4% of drivers including motorcycle operators, 54.6% of pedestrians, 54.1% of passengers, 43.1% of bicyclists, and 61.0% of other road users (e.g., mopeds, all-terrain vehicles, electric kick scooters).

**Table 1. Drug Category Prevalence by Case Source for All Road Users**

Drug Category	Trauma Center (n=6,382)			Medical Examiner (n=897)			Total (N=7,279)		
	n	%	95% CI	n	%	95% CI	N	%	95% CI
Alcohol	1,364	21.4	[20.4, 22.4]	321	35.8	[32.7, 39.0]	1,685	23.1	[22.2, 24.1]
Cannabinoids <sup>A</sup>	1,579	24.7	[23.7, 25.8]	251	28.0	[25.1, 31.0]	1,830	25.1	[24.2, 26.1]
Stimulants	675	10.6	[9.8, 11.3]	112	12.5	[10.4, 14.8]	787	10.8	[10.1, 11.5]
Sedatives	475	7.4	[6.8, 8.1]	73	8.1	[6.5, 10.1]	548	7.5	[6.9, 8.2]
Opioids	541	8.5	[7.8, 9.2]	137	15.3	[13.0, 17.7]	678	9.3	[8.7, 10.0]
Antidepressants	64	1.0	[0.8, 1.3]	10	1.1	[0.6, 2.0]	74	1.0	[0.8, 1.3]
Over-the-Counter	106	1.7	[1.4, 2.0]	39	4.3	[3.2, 5.8]	145	2.0	[1.7, 2.3]
Other Drugs	97	1.5	[1.2, 1.8]	36	4.0	[2.9, 5.4]	133	1.8	[1.5, 2.2]
Positive for Any Drug	3,456	54.2	[52.9, 55.4]	607	67.7	[64.6, 70.7]	4,063	55.8	[54.7, 57.0]
Drug Negative	2,926	45.8	[44.6, 47.1]	290	32.3	[29.3, 35.4]	3,216	44.2	[43.0, 45.3]
Positive for 2 or More Drug Categories	1,163	18.2	[17.3, 19.2]	286	31.9	[28.9, 35.0]	1,449	19.9	[19.0, 20.8]

<sup>A</sup>Active THC (Δ-9-THC or 11-OH-THC).

Notes: “Drug” refers to alcohol and all other drugs included on this study’s toxicology panel. This table combines data from all road users (drivers, pedestrians, bicyclists) included in the study.

Table 2 examines driver blood alcohol concentrations (BACs). The majority of drivers tested negative for the presence of

alcohol. However, nearly 20% had BACs of .08 grams per deciliter (g/dL) or higher.

**Table 2. Driver BAC Ranges by Case Source**

BAC Range	Trauma Center (n=4,243)			Medical Examiner (n=555)			Total (N=4,798)		
	n	%	95% CI	n	%	95% CI	N	%	95% CI
Negative	3,326	78.4	[77.1, 79.6]	339	61.1	[57.0, 65.1]	3,665	76.4	[75.2, 77.6]
.02 – .049 g/dL	78	1.8	[1.5, 2.3]	17	3.1	[1.9, 4.7]	95	2.0	[1.6, 2.4]
.05 – .079 g/dL	74	1.7	[1.4, 2.2]	11	2.0	[1.1, 3.4]	85	1.7	[1.4, 2.2]
.08 – .149 g/dL	229	5.4	[4.7, 6.1]	43	7.7	[5.7, 10.2]	272	5.7	[5.0, 6.4]
.15+ g/dL	536	12.7	[11.7, 13.7]	145	26.1	[22.6, 29.9]	681	14.2	[13.2, 15.2]
Any Alcohol	917	21.6	[20.4, 22.9]	216	38.9	[34.9, 43.0]	1,133	23.6	[22.4, 24.8]

## Summary and Limitations

This study provided data on the presence of alcohol and other drugs among a sample of seriously or fatally injured roadway users, including drivers, pedestrians, and bicyclists. The results revealed alcohol was highly prevalent, especially among fatally injured drivers. The most common substance was cannabis (active THC), followed closely by alcohol, with opioids, stimulants, and sedatives also present at notable levels. People driving with high BACs remain a concern. This type of research does not allow for determining whether the subjects were impaired at the time of the crash. The sites were selected for their large catchment areas and willingness to participate in this complex study, and results cannot be assumed to be generalizable across the country. Comparisons across sources, such as specific sites or trauma centers and medical examiners should be made with caution. The study results should not be used to imply impairment, or increased risk associated with alcohol and other drug presence.

## Full Report:

Thomas, F. D., Darrah, J., Graham, L., Berning, A., Blomberg, R., Finstad, K., Griggs, C., Crandall, M., Schulman, C., Kozar, R., Lai, J., Mohr, N., Chenoweth, J., Cunningham, K., Babu, K., Dorfman, J., Van Heukelom, J., Ehsani, J., Fell, J., ... & Moore, C. (2022, December). *Drug prevalence among seriously or fatally injured road users* (Report No. DOT HS 813 399). National Highway Traffic Safety Administration.



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