K47 A Seven-Year Review of Vehicular Crash Toxicology Data at the West Tennessee Regional Forensic Center

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Learning Overview: The goals of this presentation are to: (1) describe trends of alcohol and drug use in vehicular fatalities at the West Tennessee Regional Forensic Center from 2011 to 2017; and (2) identify variables that may be related to vehicular substance use, such as age, gender, race, and crash type.

Impact on the Forensic Science Community: Drug-related vehicular fatalities remain an important public safety issue. This research provides a preliminary assessment of toxicology data for vehicular fatalities in Shelby County, TN. The hope is to provide direction for future research on postmortem toxicology.

According to 2016 data from the Governors Highway Safety Association, 43.6% of nationwide motor vehicle fatalities tested positive for at least one drug.[1] The Centers for Disease Control (CDC) show that alcohol was involved in 28% of motor vehicle fatalities in 2016, while other illicit drugs were implicated in 16% of fatalities.[2] Recent data indicate that drug-related motor vehicle crashes remain an important public safety issue.[1,2] The purpose of this work is to describe the trends of alcohol and drug use in motor vehicle fatalities at the West Tennessee Regional Forensic Center (WTRFC) from 2011 to 2017.

Information was extracted from the Forensic Death Investigation and Decedent Information (ForensicDIDI) database for all fatal vehicular crashes in Shelby County, TN, from 2011 to 2017. A total of 1,150 fatal vehicle crashes were reported. Of these, 717 (62%) decedents had toxicology data available. For the 717 decedents with toxicology data, 412 (57.5%) tested positive for at least one substance, while 305 (42.5%) tested negative for any substance. Drugs were consolidated into six classes and analyzed for trends of use from 2011 to 2017.

Analysis revealed that 78% of decedents with positive toxicology results were male. Decedents were 46% White, 49% Black, and 5% other races. Close to half of decedents (48%) were between the ages of 18 and 34 years. Polysubstance use was noted among 44% of decedents, with the remaining 56% of decedents testing positive for a single substance. A majority of decedents (74%) were drivers, while 26% were passengers, pedestrians, or unknown. Single vehicle crashes (54%) were slightly more common than multiple vehicle crashes (45%). Alcohol (38%) was the most commonly detected drug, followed by marijuana (28%) and opioids (13%). Cocaine (8%) and benzodiazepines (7%) were detected in a similar number of decedents, while amphetamines (3%) and methamphetamine (3%) were found in the lowest numbers. Overall, drug use remained steady with a slight increase in substance use during the 2015–2017 period. The most notable increase was marijuana, particularly in the years 2016–2017. Amphetamine use has shown a decline, while methamphetamine use has slightly increased. Seventy-five percent of decedents who tested positive for alcohol were at or above the legal limit Blood Alcohol Concentration (BAC) of 0.08. Furthermore, 67% of decedents had a BAC between 0.1 and 0.3. In terms of polysubstance use, 44% of decedents tested positive for two or more drugs. Polysubstance use increased during 2015–2017, with the years 2016 and 2017 showing an increase in polysubstance use that closely parallels the number of single-substance users. For the two most common drugs, alcohol and marijuana, 76 decedents tested positive for both substances, which equates to 43% of marijuana users and 31% of alcohol users.

This review of toxicology data at the WTRFC serves as an initial look at the prevalence of drug- and alcohol-related motor vehicle fatalities in Shelby County. Decedents who tested positive for one or more drugs were overwhelmingly male and nearly half of decedents were in the 18-to-34-year-old age range. Alcohol, marijuana, and opioids were the most common drugs implicated in fatalities, with alcohol being the most prevalent. Marijuana use showed a notable increase and was consistently the second most common substance detected. A sizeable percentage (44%) of decedents were found to be positive for two or more substances, pointing to polysubstance use while driving as a common issue. Future research in this area could work to better characterize postmortem drug levels that indicate intoxication.

Reference(s):

1. *Drugged Driving* National Institute on Drug Abuse, last modified March 2019, https://www.drugabuse.gov/publications/drugfacts/drugged-driving.
2. *Impaired Driving: Get the Facts* Centers for Disease Control and Prevention, last modified March 22, 2019, https://www.cdc.gov/motorvehiclesafety/impaired_driving/impaired-drv_factsheet.html.

Vehicular Fatalities, Toxicology, Forensic Pathology

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