

## Marijuana and Driving in Alabama: A 10 Year Retrospective Study

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**Background/Introduction:** Marijuana continues to be one of the most commonly found drugs in impaired driving cases. Although classified by the DEA as a Schedule I drug, medical and recreational marijuana have been legalized in 28 and eight states as well as the District of Columbia, respectively. As a result of the push towards decriminalization, more focus has been placed on testing for marijuana use and the effects of use on driving. Many states have looked to adopt per se statutes for delta-9-tetrahydrocannabinol (THC), the active ingredient in marijuana. These statutes would be similar to the 0.08% per se for ethanol.

**Objective:** To investigate the prevalence of THC in driving under the influence and traffic crash cases analyzed by the Alabama Department of Forensic Sciences over a 10 year period, the concentrations of THC and its metabolites, the time between the incident and collection, and the demographics of these subjects.

**Methods:** Driving under the influence and traffic accident cases were evaluated over a 10 year period (2006-2016). All cases were screened by enzyme immunoassay using either a Tecan Freedom Evo75 with Immunalysis reagents or a Randox Evidence Analyzer. Confirmation and quantification of THC as well as its two metabolites, 11-nor-9-carboxy-delta-9-THC and 11-hydroxy-delta-9-THC, were performed by liquid-liquid extraction followed by analysis using LC/MS/MS. For cases with a quantitative result for delta-9-THC and 11-nor-9-carboxy-delta-9-THC, the estimated time since last use was calculated using the models created by Huestis et al.

**Results:** Between 2006 and 2016, 764 blood samples from DUI and traffic crash cases in Alabama were positive for THC. Demographic information was available for 715 of these cases. In 79% of these cases, the subject was male between 16 and 64 years of age and in 21% of cases the subject was female between 17 and 57 years of age. For males, the median THC concentration was 2.8 ng/mL with a range of 1.0-28 ng/mL compared to 2.7 ng/mL for females with a range of 1.0-15 ng/mL. 499 subjects were Caucasian (70%), 203 were African American (28%), nine were Hispanic (1%), two were Indian (< 1%), and two were unspecified (<1%). In cases where the time of the incident and the time of collection were noted, the median time difference was 112 minutes with a range from 8 minutes to 16.2 hours. The median time since last use was calculated with a lower and upper limit of 40 minutes and 7.5 hours, respectively. The median THC concentration for samples collected after a DUI stop, traffic crash, and traffic death were 2.9 ng/mL, 2.7 ng/mL, and 4.8 ng/mL, respectively. The percentage of cases at or above different cutoff concentrations was also calculated.

# of Cases	At or above Amount	% from Total Cases
726	≥ 1 ng/mL	95
521	≥ 2 ng/mL	68
339	≥ 3 ng/mL	44
214	≥ 4 ng/mL	28
154	≥ 5 ng/mL	20
118	≥ 6 ng/mL	15
84	≥ 7 ng/mL	11
70	≥ 8 ng/mL	9
51	≥ 9 ng/mL	7
39	≥ 10 ng/mL	5

**Conclusion/Discussions:** In Alabama, the average THC concentration found in blood samples from drivers has increased over the last ten years. On average, the concentration of THC found in drivers was less than 5 ng/mL (the proposed per se in many states), with 80% being below this cutoff. The time difference between the incident and collection varied widely and law enforcement should be encouraged to collect blood as close to the incident as possible.

**Keywords:** Marijuana, DUI, THC