



ADFS
ALABAMA DEPARTMENT OF FORENSIC SCIENCES

Medical Cannabis Study Commission

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Typical DUI or DUI/D Scenarios

DUI – Traffic Stops



>0.08%



<0.08%,
Suspected DUI/D



DUI – Traffic Crashes



Involving Serious Injury/Deaths



2018 DUIs in AL (Top Drugs)

Rank	Drug	Number of Cases	Prevalence (%)
1	Ethanol	375	35
2	THC & Metabolites	338	32
3	Meth/amphetamine	252	24
4	Alprazolam (Xanax)	224	21
5	Clonazepam (Klonopin)	91	9
6	Cocaine	81	8
7	Diazepam (Valium)	78	7
8	Hydrocodone (Lortab)	72	7
9	Morphine	56	5
10	Buprenorphine	55	5
11	Zolpidem (Ambien)	47	4
12	Oxycodone (Oxycontin)	43	4
13	Fentanyl	38	4
14	Tramadol (Ultram)	36	3
	# of Unique Cases	1059	



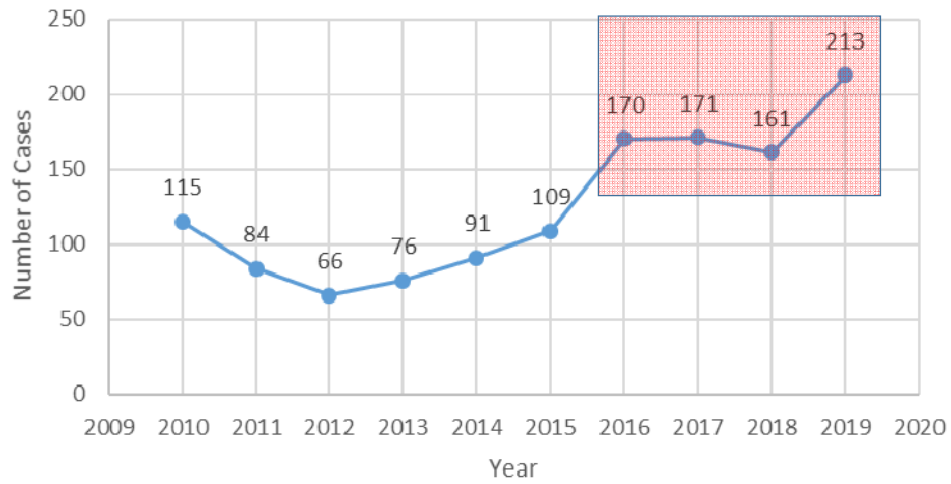
2018 Traffic Fatalities in AL (Top Drugs)

Rank	Drug	Number of Cases	Prevalence (%)
1	Ethanol	154	54
2	THC & Metabolites	91	32
3	Meth/amphetamine	54	19
4	Hydrocodone (Lortab)	25	9
5	Alprazolam (Xanax)	22	8
6	Cocaine	15	5
7	Oxycodone (Oxycontin)	11	4
8	Clonazepam (Klonopin)	10	3
9	Fentanyl	7	2
10	Lorazepam (Ativan)	7	2
11	Tramadol (Ultram)	7	2
	# of Unique Cases:	287	

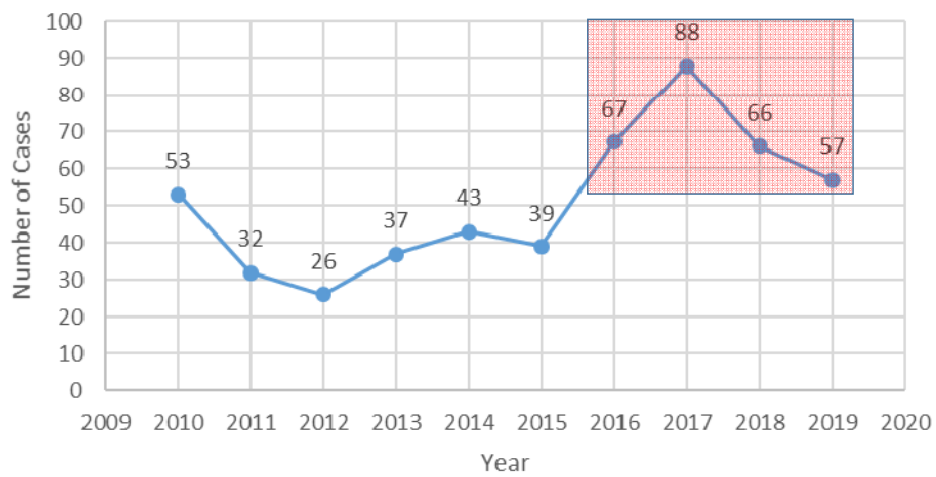




THC Prevalence in DUI Cases



THC Prevalence in Traffic Fatalities



THC Blood Concentrations in Alabama

Year	Average DUI THC Concentration (ng/mL)	Average Traffic Fatality THC Concentration (ng/mL)
2010	4.1	8.2
2011	3.9	8.3
2012	3.8	7.1
2013	3.8	6.5
2014	4.0	7.0
2015	4.2	13
2016	4.8	10
2017	4.6	9.3
2018	6.8	7.8
2019*	5.2	7.1



*Thru September 2019

THC Per Se Statutes?

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



*Alabama DUI Cases

The Concentration of THC decreases as time passes!

Time	Median THC Concentration (ng/mL)*	% of Total Cases*
0-30	3.6	4.6
31-60 min	2.9	14.2
1-2 hrs	2.9	35.4
2-3 hrs	2.9	23.0
> 3 hrs	2.6	22.8



*Alabama DUI Cases

Specimen Comparison: Best Window of Detection for DUIs?



Benefits of Oral Fluid Testing in DUID Cases

- Rapid, simple, non-invasive
- No medical professional required, saves time, \$
- Difficult to adulterate
- On-site screening devices are available
- Parent (active) drug reflects recent drug use
- Most drug concentrate in Oral Fluid (e.g. THC)
- Specimen taken proximate to time of driving



Oral Fluid Drug Testing

Roadside Screen (Probable Cause)



Confirmation (Evidentiary)



**ADFS is
1st State Crime Lab
to offer
In-house Confirmation**



<https://www.adfs.alabama.gov/services/tox/toxicology-oral-testing-program>

Typical DUI or DUI/D Scenarios

DUI – Traffic Stops



<0.08%,
Suspected DUI/D



DUI – Traffic Crashes



Involving Serious Injury/Deaths

Overdoses on Marijuana?

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CASE REPORT
PATHOLOGY/BIOLOGY

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Cannabinoid Hyperemesis Syndrome: Reports of Fatal Cases*

ABSTRACT: Cannabinoid hyperemesis syndrome (CHS) is one of the most clinically challenging effects of cannabis consumption. It is characterized by cyclic attacks of nausea and vomiting in chronic cannabis users and is resistant to treatment. The authors report the deaths of a 27-year-old female, a 27-year-old male, and a 31-year-old male with a history of CHS. The deaths had a history of chronic nausea and vomiting, chronic cannabis use, and negative laboratory, radiological, and toxicological findings. All patients had a history of emergency department visits and hospitalizations. The deaths were attributed to CHS. The authors report the deaths of three patients with CHS. The authors report the deaths of three patients with CHS. The authors report the deaths of three patients with CHS.

KEYWORDS: forensic science, forensic pathology, toxicology, cannabis, cannabinoid hyperemesis syndrome, nausea, vomiting, hot buns, marijuana, marijuana

Cannabis is one of the oldest and the most popular recreational drugs produced from plants belonging to the genus *Cannabis* (1). It is estimated that 162.5 million people between ages of 15–65 years have used cannabis at least once (2) and among these, 13 million are dependent on cannabis (3). Currently, medical cannabis and cannabinoids are mostly used clinically in numerous conditions such as nausea and vomiting secondary to chemotherapy, appetite stimulation in HIV/AIDS infection, alleviating chronic pain (neuropathic and cancer pain), and treatment of spasticity due to multiple sclerosis or paraplegia (4). However, cannabinoids are responsible for numerous short-term and long-term adverse effects, including mood changes, depression, anxiety, and impaired attention and is correlated with schizophrenia (5–7). Cannabinoid hyperemesis syndrome (CHS) is a variant of cyclical nausea and vomiting syndrome that was first described in 2004 as an adverse effect of cannabis consumption (8). Since introduced by Allen et al., numerous cases of CHS have been reported. Its legitimacy was validated by Rome IV criteria in 2016 for functional gastrointestinal disorders with defined diagnostic criteria (9). CHS typically occurs in males with excessive daily cannabis use over a prolonged period of time (more than 2 years). It is resistant to the current treatment, however, it is relieved by repeated consumption of cannabis use. Interestingly, patients with this condition engage in a repetitive and compulsive behavior of taking hot showers to temporarily reduce their symptoms (10–13). Diagnosis of CHS is generally established after numerous emergency department visits and negative laboratory, radiological, and toxicologic tests to exclude nonfunctional causes of nausea and vomiting (14). However, while laboratory tests are negative in finding a physiological cause for the vomiting, most of these individuals develop nonspecific electrolyte disturbances, indeed the nausea pathophysiology can attribute CHS to cause of death.

Despite recent attention toward CHS, limited publications exist in the forensic journals regarding its complications. To the best of our knowledge, this is the first publication reported about fatalities attributed to CHS. In this case report, we present three medico-legal autopsy cases with a well-documented history of marijuana use. The toxicological findings and circumstances attributed to death will be discussed.

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Cannabis as a cause of death: A review

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ABSTRACT

Synthetic cannabinoids have caused a large number of emergency presentations to hospitals for adverse cardiovascular events including numerous deaths, particularly for the more potent analogs acting on the CB1 receptor. While smoked cannabis use is often associated with significant changes in heart rate and cardiac output, amongst other physiological changes, it has been rarely considered in the forensic literature as a significant contributory or causal factor in sudden unexpected death. A review of case reports of admissions to hospitals for cardiovascular events was undertaken together with a review of epidemiological studies, and case reports of sudden death attributed, at least in part, to use of this drug. These publications show that use of cannabis is not without its risks of occasional serious medical emergencies and sudden death, with reports of at least 35 persons presenting with significant cardiovascular emergencies who had recently smoked a cannabis preparation. At least 13 deaths from a cardiovascular mechanism have been reported from use of this drug which is very likely to be an under-estimate of the true incidence of its contribution to sudden death. In addition, many cases of stroke and vascular arteritis have also been reported with the latter often involving a limb amputation. While it is a drug with widespread usage among the community with relatively few deaths when faced with a circumstance of very recent use (within a few hours), a positive blood concentration of THC and a possible cardiac-related or cerebrovascular cause of death in this drug should be considered, at least, a contributory cause of death in cases of sudden or unexpected death.

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Medical Marijuana: Routes of Administration

- Oral
 - Pills, tablets
 - Tinctures (e.g. LA 1:20, 1:10, 1:1 (THC:CBD))
 - Edibles
- Smoking
- Vaping
 - Concentrates
 - Leaf material
- Inhalers



% of Medical MJ Prescription per illness

State	Pain	Cancer	PTSD	HIV/AIDS	Seizures	Spasms
Hawaii	84%	7%	13%	0.6%	<2%	12%
Montana	63%	5%	13%	5%*	<8%	N/A
West Virginia	22%	7%	16%	0.5%	5%	5%
Arizona	89%	2%	1%	0.3%	0.6%	0.4%
New Mexico	34%	5%	51%	0.8%	1%	N/A
Minnesota	64%	9%	18%	1%	4%	11%
New York	53%	12%	3%	1%	3%	N/A
Rhode Island	60%	8%	11%	0.5%	1%	5%
Delaware	58%	9%	9%	2%	2%	12%
Arkansas	31%	4%	11%	0.7%	3%	6%
New Hampshire	32%	10%	6%	N/A	2%	N/A
Ohio	53%	6%	13%	N/A	3%	N/A
Colorado	93%	5%	12%	0%	4%	37%

