



# S3 Conference

Screening ❖ Safety ❖ Strategy

*Hosted by DISA Global Solutions*

- ## New Psychoactive Substances: The Evolution of Drug Testing



# ***David Kuntz PhD, F-ABFT***



Executive Director for Analytical Toxicology  
Clinical Reference Laboratory • Lenexa, KS, USA  
**David.Kuntz@crlcorp.com**



1. Overview of growing  $\Delta$ -8-THC use, opioids, and synthetics affecting screening. Fentanyl analogs, 7-OH, nitazenes, and poly-drug trends.

2. Testing approach and matrix drive detection. Sensitivity, confirmation steps, cutoff rationale, and panel update planning.

3. Program implications for HR and Safety. Risk signals, random and post-incident focus, safety-sensitive prioritization, policy, and MRO coordination.



- ❖ The Executive Order for reclassification of Marijuana from Schedule I to Schedule III is not the focus of this talk.
- ❖ We have two experts who are speaking today and will provide their insights on what is possibly happening in 2026.
- ❖ My goal is to provide insight into the prevalence of several drug groups and their impact to workplace safety.
- ❖  $\Delta$ -8-THC, fentanyl, and 7-OH/Kratom data will be presented based on studies performed at CRL.

# Why Should We be Concerned About $\Delta$ -8-THC ?



- ❖ Although  $\Delta$ -8 THC is legal in many states, the effect on performance has only been limitedly studied.
- ❖ The safety risks from CBD-derived cannabinoids from hemp are very real, as performance is affected in a manner similar to  $\Delta$ -9-THC, even though detection throughout the day is challenging due to vaping and gummies.
- ❖ Industrial hemp value in 2024 was \$445 million. Industrial hemp grown in the open was 45,924 acres (71 square miles), up 46% from 2023.
- ❖ CBD in selected strains can be as high as 25% for CBD products and conversion to other CBD-derived cannabinoid products.
- ❖ One hemp plant can produce one pound of crude hemp oil.





The U.S. market for Delta-8 THC and other hemp-derived cannabinoids increased from \$200.5 million in sales in 2020 to nearly \$38.5 billion in 2024, to an estimated \$49 Billion in 2029.

There are an estimated 350,000 employees working in the marijuana industry in some capacity.

The McConnell amendment included in the 2025 Budget Bill would essentially eliminate their production, eliminate revenue, and jobs associated with the industry.

Additional proposals are trying to increase the minimum dose and container requirements. Other proposals add to add quality control measures to assure public safety in a currently uncontrolled market.



- ❖ The 2018 Farm Bill for Hemp Producers did not anticipate the hemp industry producing products that escape government rule.
- ❖ The Senator Mitch McConnell amendment to the November 2025 Budget Bill contained legislation to essentially eliminate marijuana products and derivatives (i.e.,  $\Delta 8$ ,  $\Delta 10$ , HHC, etc.)
  - Products must be essentially THC free and not contain more than 0.4 mg per package (not per dosage unit).
  - Even beverages contain 1 mg of THC which also makes them illegal.
- ❖ Hemp industry is busy to change the law before November 26, 2026, when the ban is enforced.
- ❖ This will protect the CBD products but would essentially put CBD-derived cannabinoid products into illegal distribution.

# Impact of Banning THC Designers to 0.4 mg Limit



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5000 mg



1500 mg



1 mg



2000 mg



# Extraction of CBD from Hemp to Make $\Delta$ -8-THC



- Step 1** – Extract the hemp oil using advanced extraction methods to create an oil rich in CBD.
- Step 2** – Create a CBD isolate by distilling the raw hemp oil until there is only a CBD isolate.
- Step 3** – Dissolve the CBD into an organic solvent.
- Step 4** – Add hydrochloric and other acids for up to 18 hours at 100°C.
- Step 5** – Separate the acid fraction when the chemical reaction is complete.
- Step 6** – Neutralize using sodium bicarbonate.



# Alternative Cannabinoids Created From CBD



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## $\Delta$ 10-THC

- *Modification via chemistry and similar in potency*

## HHC (Hexahydrocannabinoid)

- *Resistant to storage degradation and promoted for insomnia and pain*

## THCP (Tetrahydrocannabiphorol)

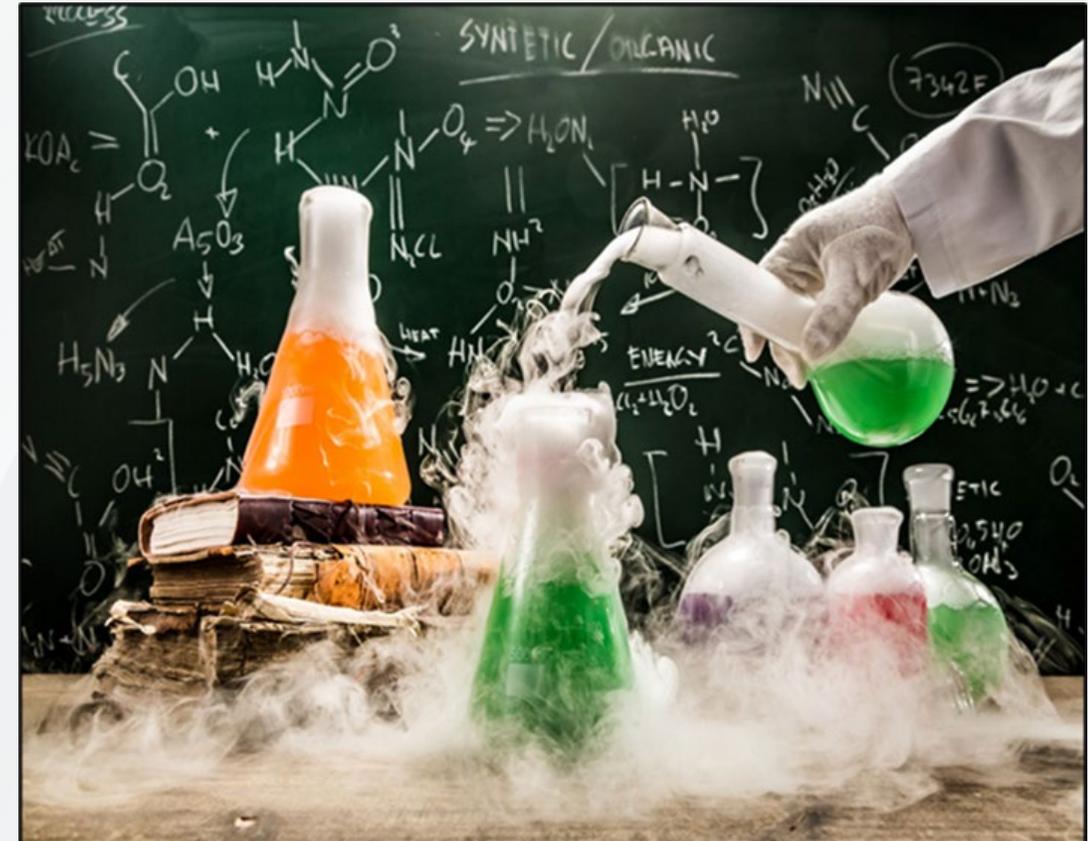
- *Longer side chain makes it 33 times more potent*

## THC-O-Acetate

- *Reported to be LSD-like and 3 times as potent*

## THCV (Tetrahydrocannabivarin)

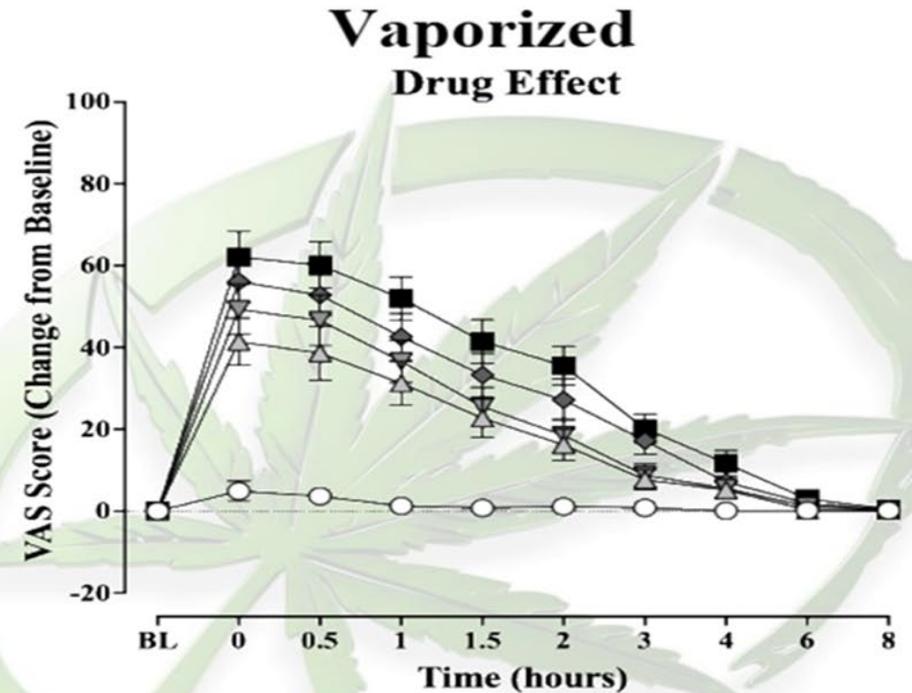
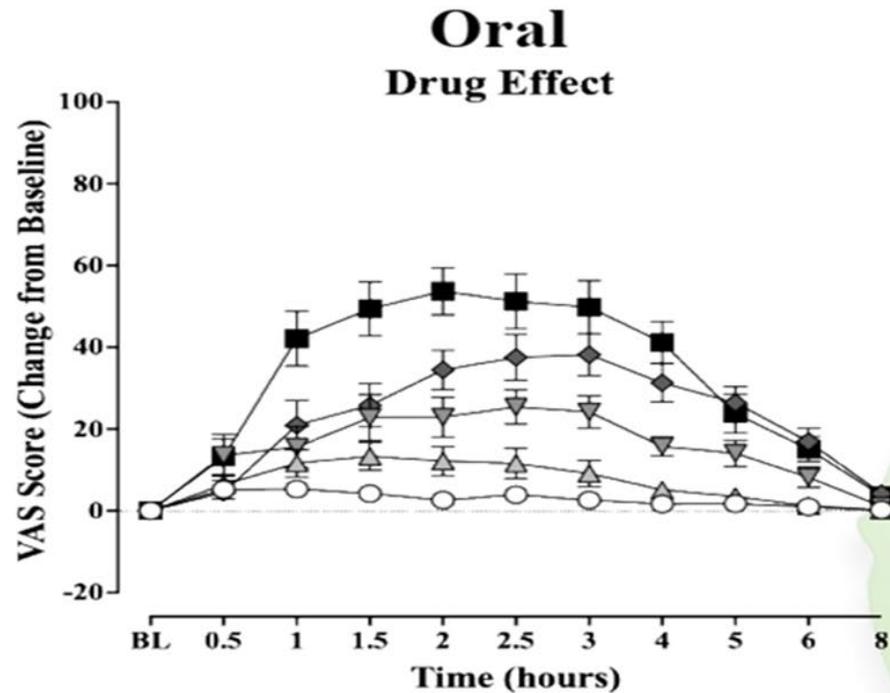
- *Reduces tremors and reduces appetite*



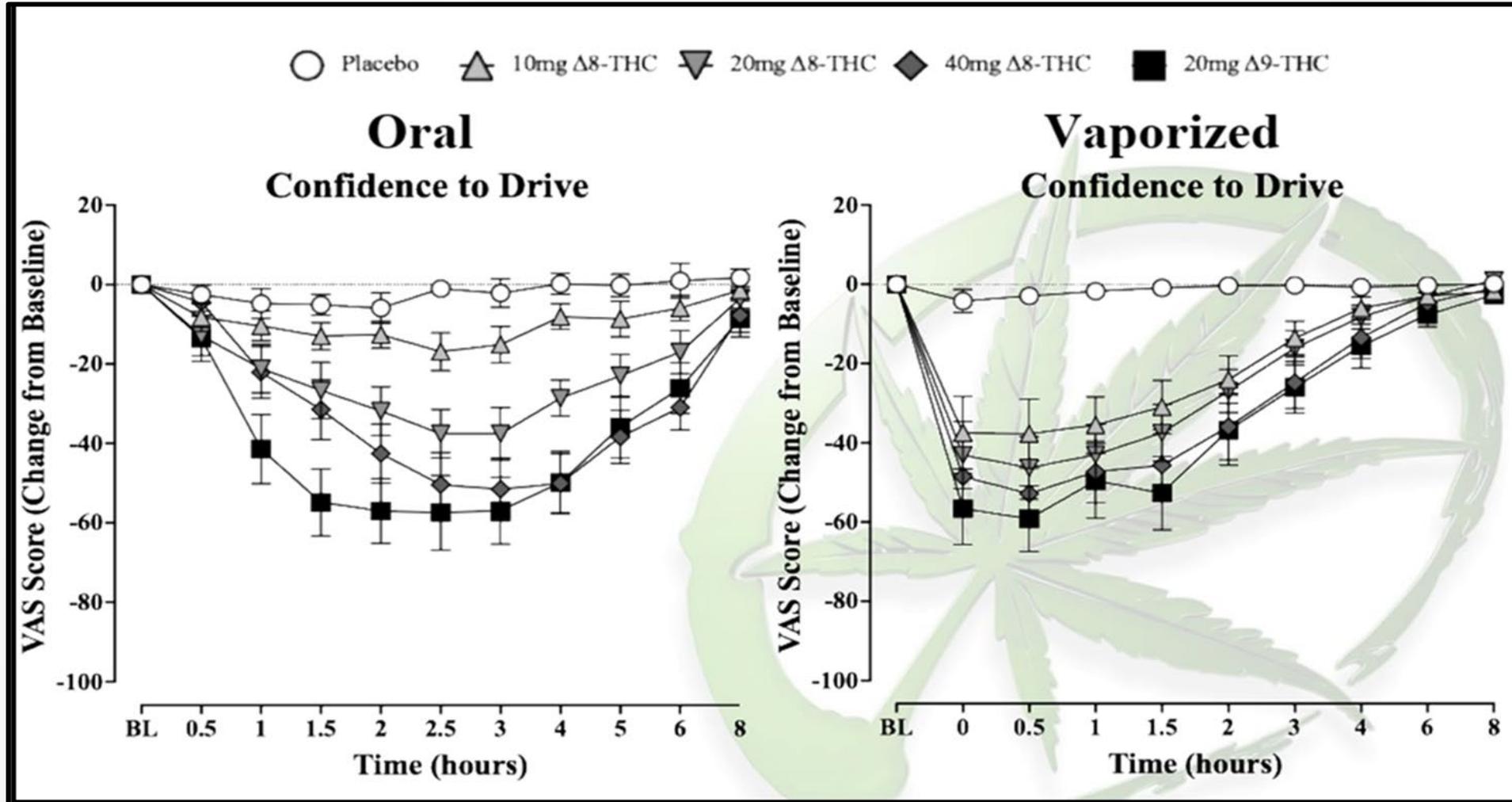


## Subjective Drug Effect

○ Placebo    ▲ 10mg  $\Delta$ 8-THC    ▼ 20mg  $\Delta$ 8-THC    ◆ 40mg  $\Delta$ 8-THC    ■ 20mg  $\Delta$ 9-THC



# Driving Confidence $\Delta$ -8-THC vs. $\Delta$ -9-THC





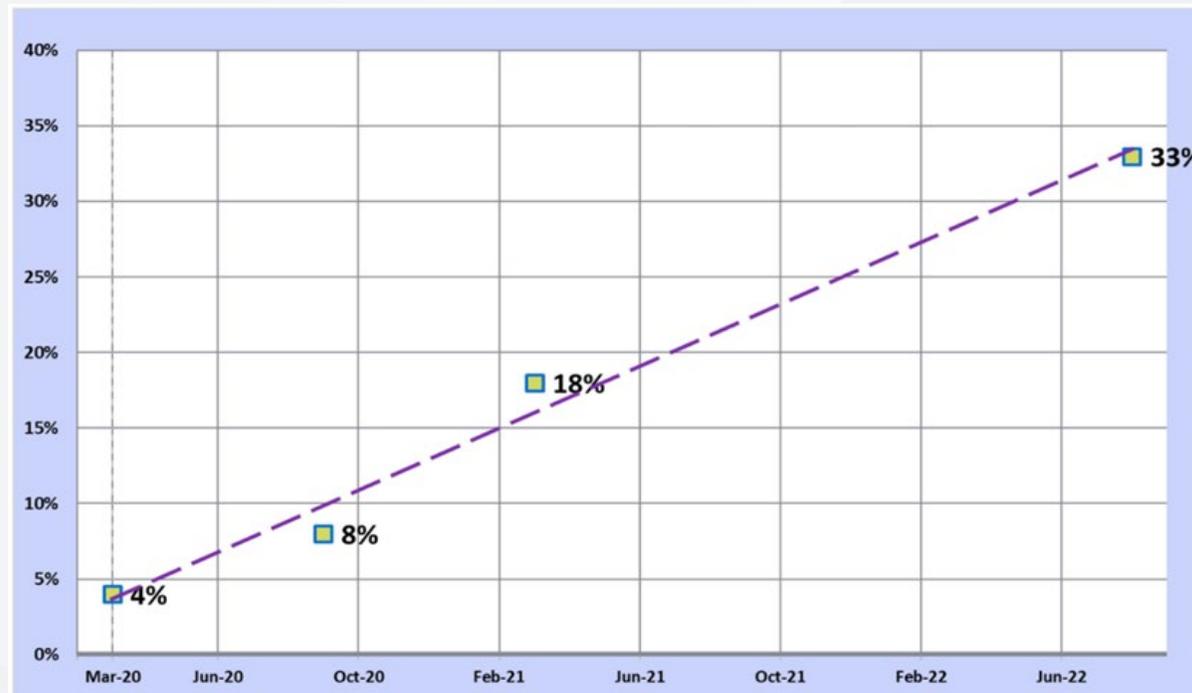
- ❖ The AAA study covered 2000 users from 8 states with different opinions on their driving abilities.
  - 84.8% drive the same day they consume
  - 53% drive within one hour
  - 44.1% consume cannabis multiple times per day
  - 46% believe cannabis has little or no effect on their driving
- ❖ Comparing results from the two studies reminds me of drinking and driving. Never too impaired to drive home! The Breathalyzer would tell us the truth!
- ❖ The volunteers in the Hopkins study reported changes in driving confidence using edibles from 1 hour post ingestion to 8 hours. Vaporized was almost instant and did not fully recover for up to 8 hours.

Examination of Cannabis Users' Perceptions and Self-Reported Behaviors to Inform Messaging to Deter Impaired Driving, Hill L, et al.  
(Technical Report) AAA Foundation for Traffic Safety, March 2025.

# Δ-8-THC Use in 561,993 Non-Regulated Marijuana Users



- ❖ CRL has been collecting data on Δ-8-THC use in marijuana users for five years, with the last three years collecting comparison data from the same analysis. In the last three years, more than 500,000 marijuana-screen positive samples have been tested to demonstrate the use of one “legal weed” product, with many others possibly ingested as well.
- ❖ This graphic presents the early adoption of Δ-8-THC from March of 2020–July 2022 from manual review of data.



# Δ-8-THC Presence in Δ-9-THC Donor Samples (2023-2025)



Δ-8-THC USE IN POSITIVE Δ-9-THCC DONOR SAMPLES FROM 2023-2025

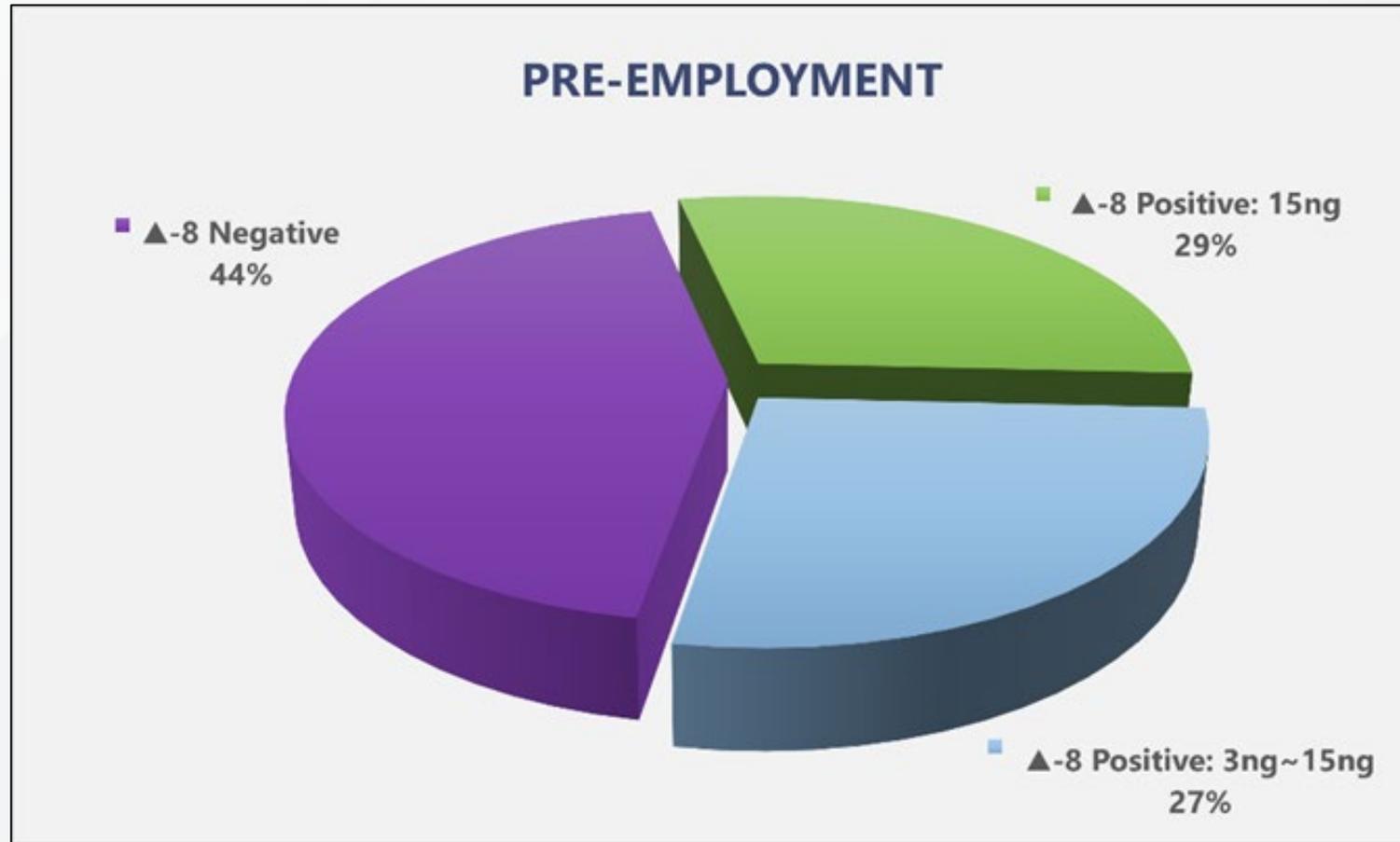
■ ▲ 8 Negative 3ng    
 ■ ▲ 8 Positive 15ng    
 ■ ▲ 8 Positive 3ng-15ng



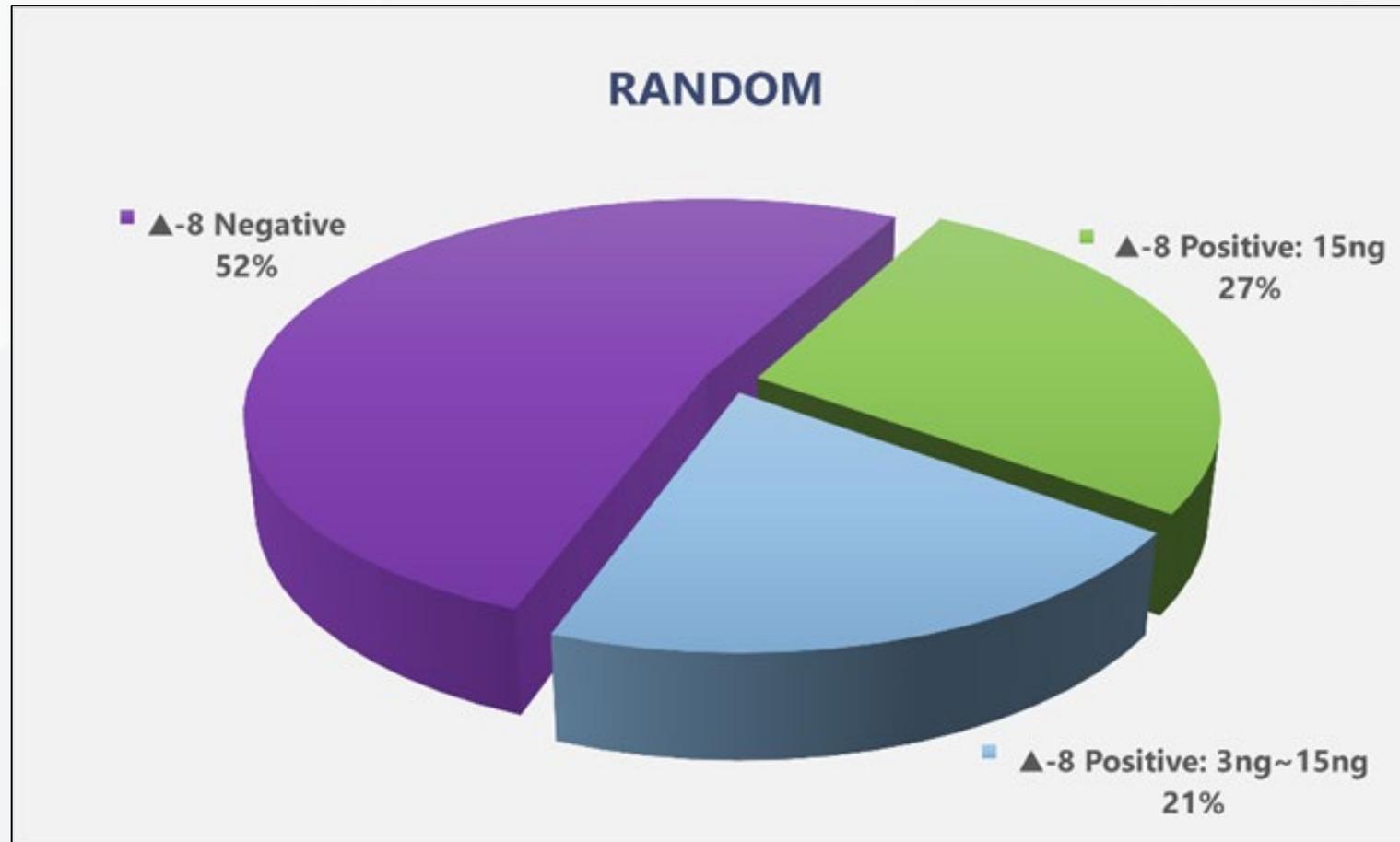
← Δ-8-THC Light Users

← Δ-8-THC Active Users

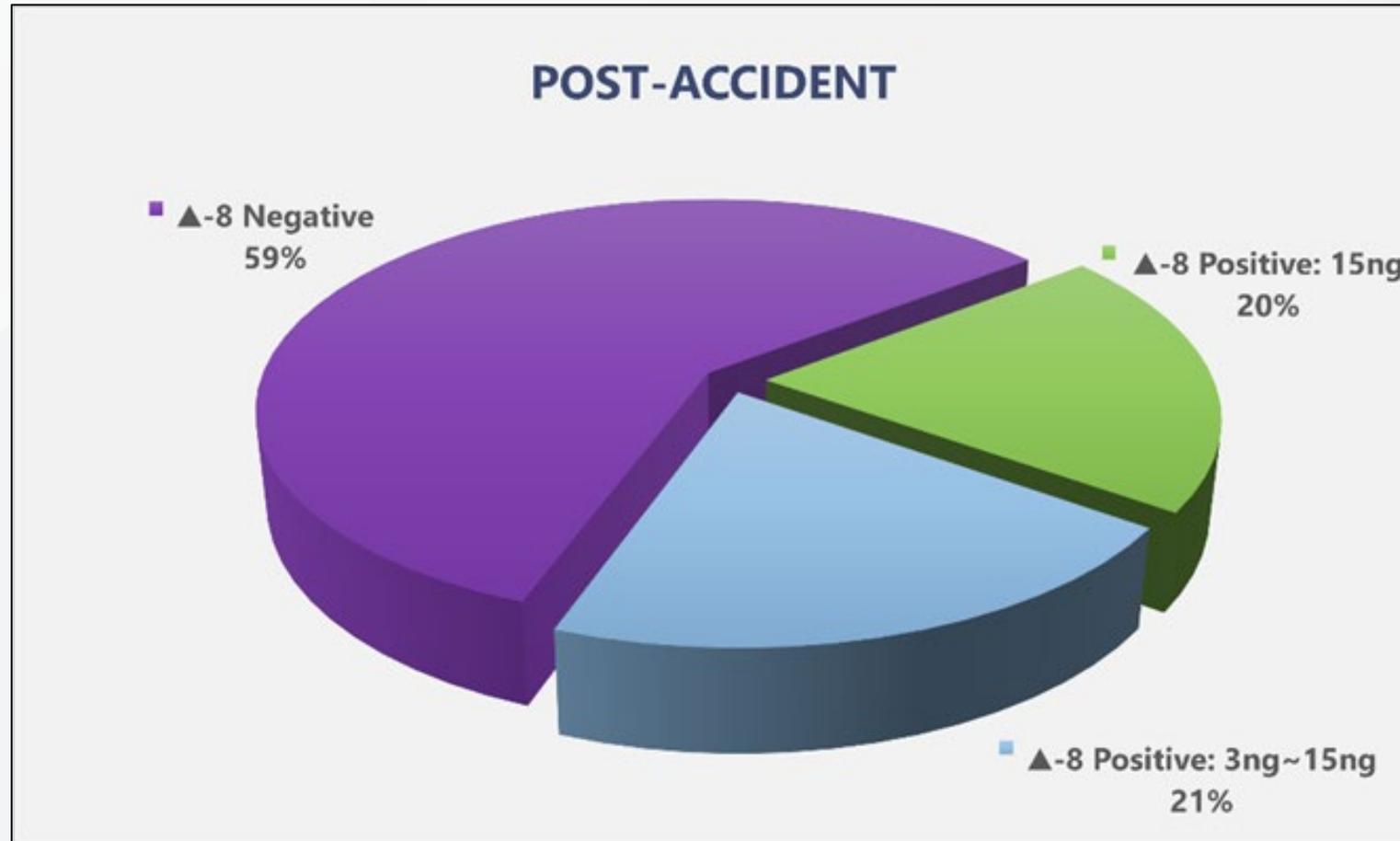
← Δ-9-THC Only Users



56% of Pre-Employment Donors are Using Δ-8-THC

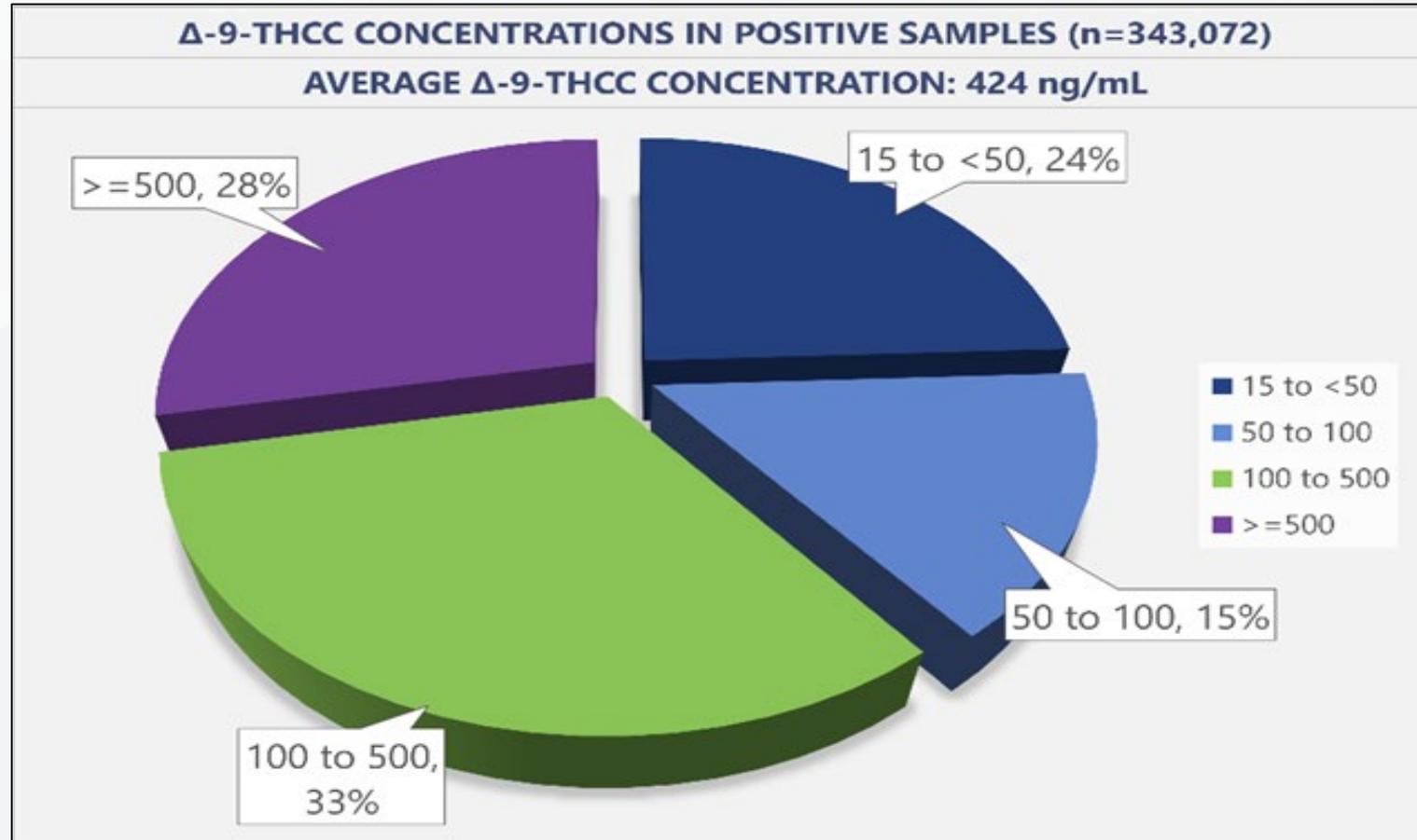


48% of samples contained Δ-8-THC



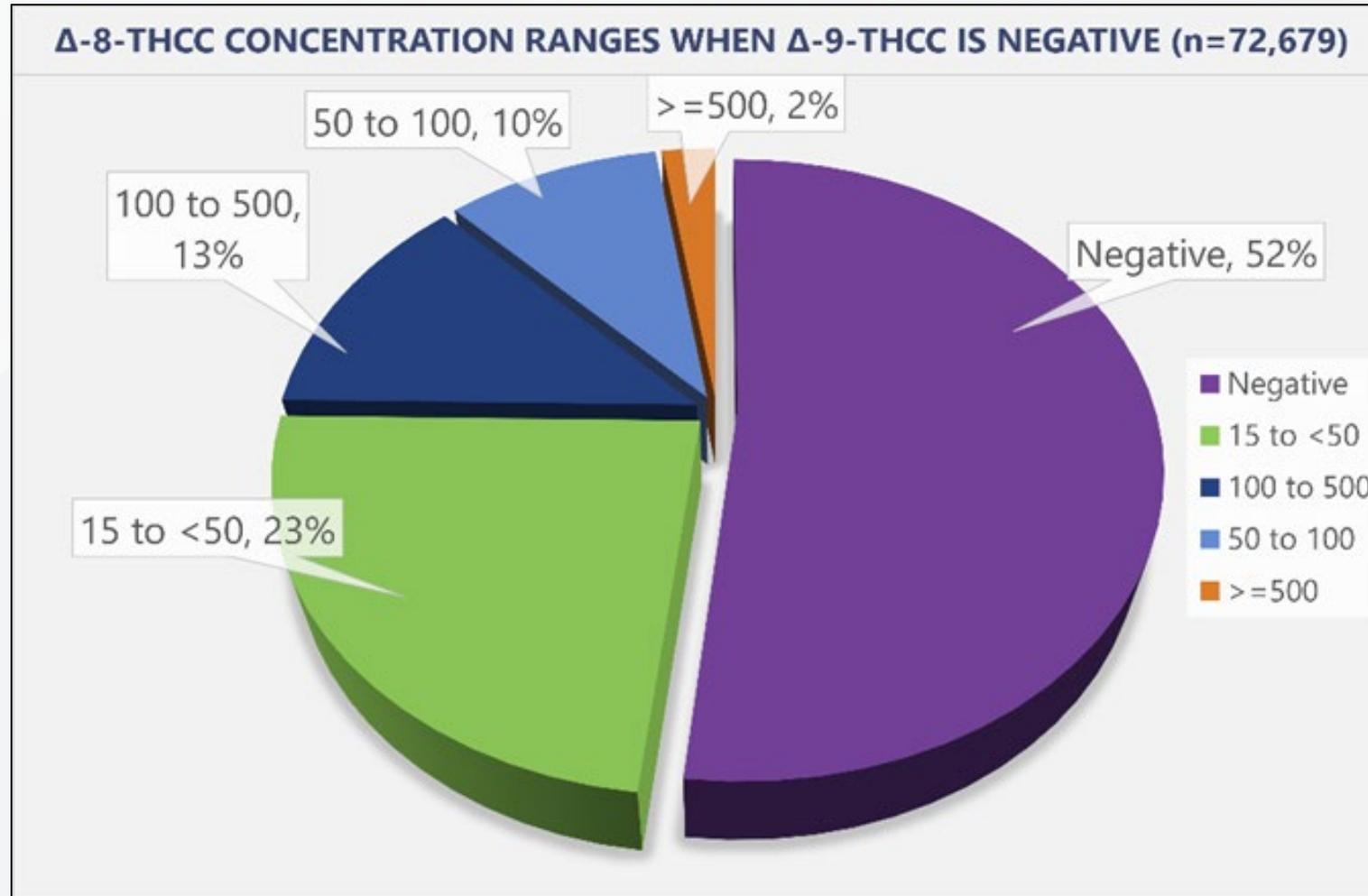
41% of Post-Accident Tests Also Contained Δ-8-THC

# Average $\Delta$ -9-THC Urine Levels - 424 ng/ml !!!



The amount of  $\Delta$ -9-THC used has been increasing dramatically over the last years!

# $\Delta$ -8-THC Concentrations when $\Delta$ -9-THC is Negative



Nearly 35,000 samples reported positive for  $\Delta$ -8-THC use.  
Nearly 38,000 samples likely contain alternative cannabinoids.

# Fentanyl – The Next Drug Added for Federal Testing



- ❖ The evolution of fentanyl abuse became a national disaster, with 70,000 people dying each year due to unexpected overdose from a purchased street tablet. Many of these people are recreational and not routine opioid users.
- ❖ The Mexican border lockdown in 2025 had a dramatic reduction in positive rates. The constant publicity of the dangers may also have affected use.
- ❖ Fentanyl is an exceptional drug for the treatment of severe pain. Anyone who has used this post-operative for severe pain has found this drug to be wonderful! However, severe limits are necessary for those in need to avoid addiction.
- ❖ Fentanyl was added to the HHS federal agencies in July 2025.
- ❖ Fentanyl is still pending DOT implementation date.





## Wave #1

Wave #1 started around 2000 with the rise in opioid prescriptions from "Fake Pain Clinics"

## Wave #2

Wave #2 began in 2010 with heroin deaths due to reduction in prescription availability

## Wave #3

Wave #3 is focused on fentanyl beginning in 2015 with more than 100,000 deaths per year

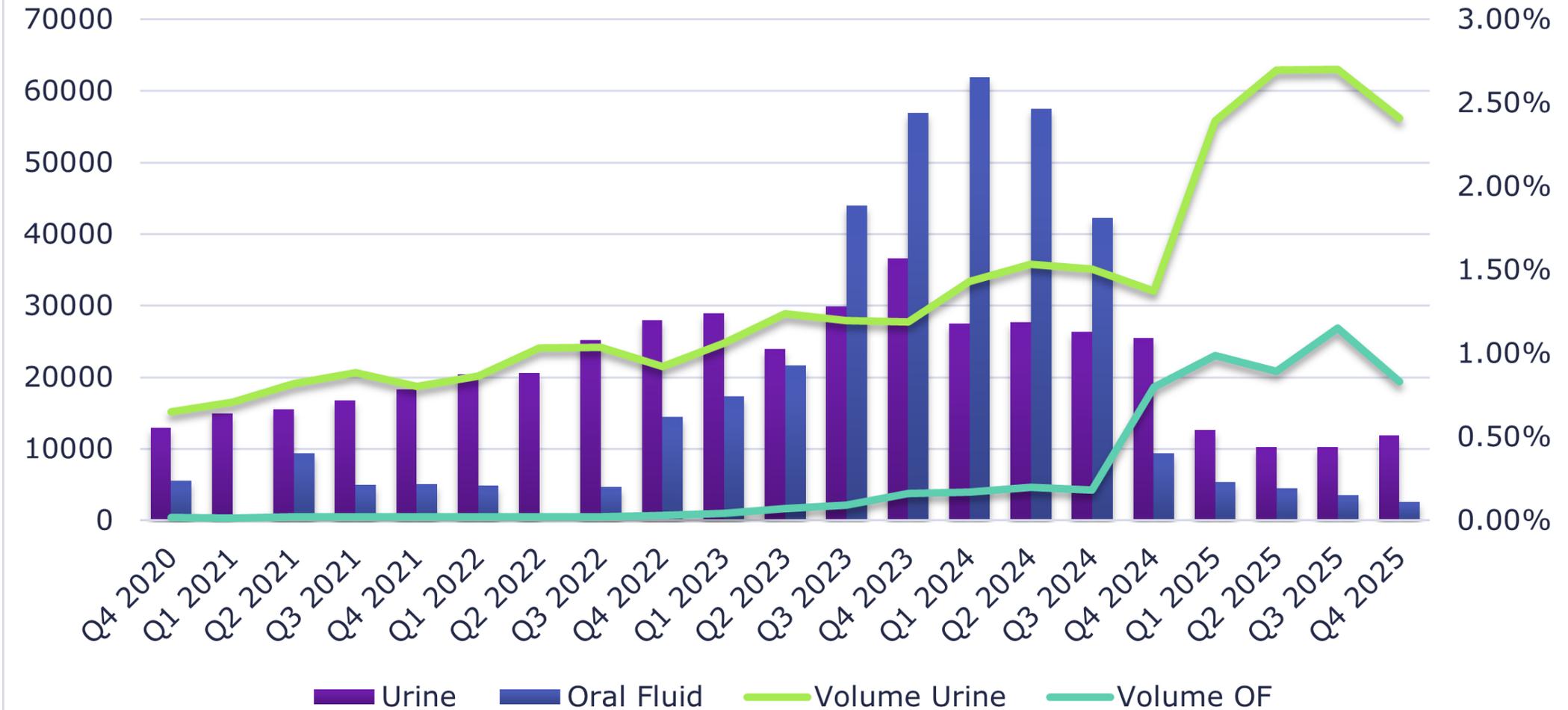
## Wave #4

Wave #4 arrived around 2014 with mixing stimulants such as cocaine and methamphetamine

7-OH ( a.k.a. Gas Station Heroin) may become Wave #5 of opioid-like drugs.



## Workplace Fentanyl Positivity Rate



- ❖ The seizure of fentanyl and other drugs has taken a dramatic turn the last couple of months, with the US destroying boats from Venezuela before unloading them at their destination in another country.
- ❖ Tons of illegal drugs are being destroyed prior to crossing US borders.
- ❖ The latest trend starting in the US is to manufacture novel drugs which are not yet banned as a Schedule I drug.
- ❖ The latest is 7-OH, which is extracted from the plant leaf of Kratom. Import the plant leaf and extract the parent compound to create and concentrate a new drug of concern.



# Kratom and 7-OH as a Drug of Concern



- ❖ Kratom is an extracted herbal from the tree leaves (*Mitragyna speciosa*) from Southeast Asia, which is known to interact with opioid receptors in the brain. In low doses it has stimulant activity, and in a high dose, a pain reliever.
- ❖ Plant option (mitragynine) is being replaced by 7-OH (active metabolite) due to enhanced potency with opioid effects stronger than morphine. It is readily available in most states as tablets, vapes, and liquids at vape shops, gas stations, and convenience stores.
- ❖ Kratom has been available in the US for years and previous attempts to regulate at a national level were not successful. But the 7-OH metabolite had not yet been isolated and chemically converted in the lab.
- ❖ In an August 2025 study of 1000 donors submitted to CRL, a 1.09% positive rate was observed! Testing is available at CRL as a panel add.
- ❖ More kratom/7-OH found than Oxycodone, Hydrocodone, and Fentanyl combined.





- ❖ Volunteers in one small clinical study with Kratom plant extract generally tolerated up to 59.2 mg daily.
- ❖ Several reported withdrawal symptoms after the 15-day study.
- ❖ Reports of sleepiness, nausea, feeling abnormal, headache, feeling hot, and vomiting.
- ❖ Several reported euphoria, which is one of the primary reasons for ingestion.
- ❖ Liver enzymes were negatively affected, but no significant liver injury.
- ❖ Mitragynine pseudoindoxyl is chemically created from mitragynine (kratom) that is more potent than 7-OH for opioid effects.
- ❖ Possibly could be the next kratom product if 7-OH moves into Schedule I later this year. The DEA needs to properly word their directive to not allow this drug.



- ❖ 7-OH is the active metabolite of the Kratom plant that is of major concern.
- ❖ In July 2025, HHS Secretary Kennedy proposed scheduling 7-OH due to addiction potential. It has not been rescheduled yet by the DEA. The plant version will continue to be allowed.
- ❖ Senator Roger Marshall from Kansas made a trip to CRL to support the rescheduling and to place focus on a local business that is one of the nations largest manufacturers of 7-OH. This has resulted in multiple TV interviews and new stories on KC local channels and continues to be actively followed.
- ❖ Multiple states and cities have recognized the 7-OH danger and are already banning the drug. Some jurisdictions are banning the original kratom plant, but it is not being considered as a federal Schedule I drug.
- ❖ When ingested in high doses over weeks, it will cause an addiction much like opioids. 7-OH abusers are going to treatment centers for recovery and report that the addiction is similar, if not worse, than prescription opioids. Drug users are spending up to \$300 per month.

# 7-OH – Known as “Gas Station Heroin”



Comments made by the ownership of CBD American Shaman on a KCTV5 December Interview. It is available to download; highly suggest that you take the 3 minutes to review the comments and his intent to keep producing psychological/pain relief drugs for consumers. His claims include:

- ❖ Science-based company that has made 100s of millions of doses.
- ❖ 7-OH is a product the world needs to have.
- ❖ 7-OH is the answer to heroin.
- ❖ Creating 7-OH saves the liver from doing the work. However, Kratom may only have 1% naturally occurring 7-OH.
- ❖ 7 warehouses for manufacturing and product storage.
- ❖ Not taking off the market unless forced.
- ❖ Other products are available to be made if 7-OH is controlled as a Schedule I drug.

The company is under close watch locally by the Midwest HIDTA (High Intensity Drug Trafficking Area). This comprises the states of Iowa, Kansas, Missouri, Nebraska, North Dakota, and South Dakota.



- ❖ No purposeful need for the drug. If pain relief needed, there are traditional opioids, which are controlled.
- ❖ No clinical or safety studies completed. Addiction is real. Trading one addiction for another if attempting to withdraw from opioids and alcohol addiction.
- ❖ Violation of US food, drug, and cosmetic laws.
- ❖ No traditional QC studies to verify content and safety. The same problem as CBD-derived cannabinoids such  $\Delta$ -8-THC and others.
- ❖ Two CBD American Shaman 7-OH warehouses were recently raided in the fall of 2025 in Kansas City with 73,000 packages seized.

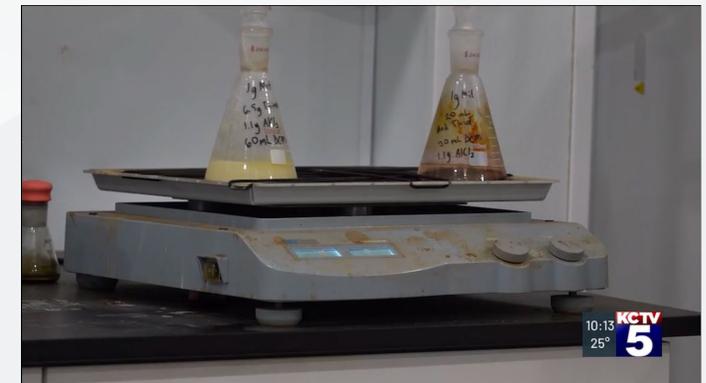
Extensive news reviews with pictures from KCTV5 new programs from inside the one manufacturing warehouse



Raw Kratom Plant



7-OH Drying to Eliminate Organics



Kratom Conversion Chemicals



Extraction of 7-OH



Mass Production



Final Product

# Packaging Pictures for Kratom and 7-OH



Able to buy 7-OH bulk powders with 2-day shipping

# Nitazenes: 50-100 Times More Potent than Fentanyl



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- ❖ These are relatively new to the US but were created in the 1950s. Nitazenes did not make it to market due to side effects and super potency creating safety issues. No margin of safety to use!
- ❖ Seven compounds were placed in temporary Schedule I status in mid-2025, which can last for 2 years as an imminent hazard to public safety without formal evaluation.
- ❖ These compounds have made it into the US, and fatalities are occurring due to the extreme potency. They are often mixed with other drugs, from stimulants to fentanyl, to create a better “high” and higher rates of addiction.
- ❖ Although there is not a liquid screening reagent for the labs to use, there are drug testing strips that are available to test your product before ingestion (buyer beware!). More than one Narcan dose will be needed to survive an overdose.
- ❖ Lab will need to use LC-MS/MS to test for the compound class.

# CRL Urine Tests – Positivity Rate Through 2025



Testing Category	2018	2019	2020	2021	2022	2023	2024	2025	2026
General U.S. Workforce	6.64%	6.24%	6.98%	7.33%	7.42%	7.52%	7.84%	7.79%	2.81%
Federally Mandated, Safety-Sensitive Workforce	2.89%	2.62%	2.28%	2.31%	2.33%	2.31%	2.30%	2.25%	0.58%
Combined U.S. Workforce	5.30%	4.91%	4.95%	5.19%	5.13%	5.09%	5.26%	5.14%	1.63%

January 2026 is one week only.

# CRL Oral Fluid Tests – Positivity Rate Through 2025



	2018	2019	2020	2021	2022	2023	2024	2025	2026
	6.08%	5.52%	5.88%	6.90%	7.59%	7.78%	8.83%	8.64%	2.73%

Testing Reason	2018	2019	2020	2021	2022	2023	2024	2025	2026
RETURN TO DUTY	7.08%	7.81%	5.65%	5.83%	8.51%	10.29%	13.82%	14.04%	10.00%
RANDOM	4.76%	3.92%	3.46%	3.33%	3.56%	4.24%	5.76%	7.02%	2.46%
PRE-EMPLOYMENT	6.40%	6.01%	6.67%	8.44%	9.26%	9.38%	10.35%	9.29%	2.92%
POST ACCIDENT	6.28%	6.33%	7.89%	8.16%	9.42%	9.34%	9.67%	10.25%	1.75%
FOR CAUSE	29.51%	38.78%	39.43%	31.88%	31.28%	31.42%	34.53%	37.99%	2.17%
FOLLOW-UP	10.09%	8.59%	10.40%	8.65%	9.39%	9.98%	14.25%	13.14%	0.00%
Combined U.S. Workforce	6.08%	5.52%	5.88%	6.90%	7.59%	7.78%	8.83%	8.64%	2.73%

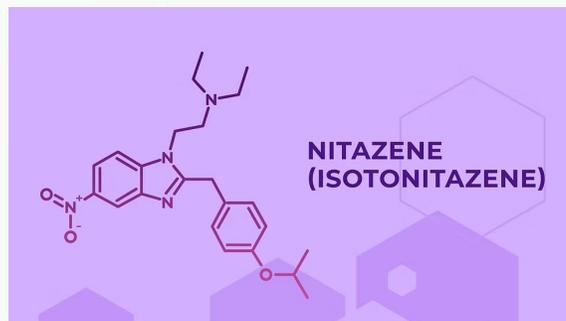
January 2026 is one week only.



- ❖ The creation of new drugs from “old chemistry papers” is an easy project for a chemist. Base chemicals from China, India, and other countries are easy to obtain. Because restrictions on the movement of the final drug have tightened over the past year, I expect manufacturing to shift to within the United States to avoid interdiction (e.g., 7-OH). This mirrors the earlier epidemic of methamphetamine production in homes, hotels, cars, and garages before cartels moved to large-scale production facilities.
- ❖ The use/misuse of these chemicals lead to workplace-safety issues and associated costs, without even considering addiction and other related risks. In many cases, these chemicals are not tested in animals before being introduced to the public. They know they are toxic!
- ❖ Most of these new compounds will be highly psychoactive and at very low concentrations in the urine and oral fluids due to their potency.
- ❖ Testing most likely will continue in urine for these new drugs. The volume of sample required for testing will most likely exhaust the volume collected oral fluids for the regular drug panel.



- ❖ The abuse of newer drugs—including CBD-designer cannabinoids such as  $\Delta$ -8-THC and others—is prevalent; kratom is being chemically modified to enhance opioid activity, and stronger narcotics (nitazenes) are present in the US, all of which are significant reasons for concern.
- ❖ The initial test for these drugs can all be done with the mass spectrometry instrumentation, but the screening reagent vendors are reluctant to develop new reagents due to several reasons.
  - Vendor cost to develop a new test (ROI)
  - FDA approval is slow (we are still waiting for FDA for oral fluid reagents!)
  - The latest drug may not be in circulation for long
  - Will the industry buy the reagent?
  - Labs will need to invest in more high-end technology to accomplish the testing
- ❖ This means that LC-MS/MS becomes the initial screening test for new drugs, as an assay can be developed in a couple of weeks. The labs can easily pivot, but there is a higher cost as all samples receive a mass spectrometry test.
- ❖ Scientifically it is an exciting challenge, but it is also very worrisome for our future safety.



**THANK YOU!**  
Any questions?



You can find me at  
**David.Kuntz@crlcorp.com**

