DEA TOX

DRUG ENFORCEMENT ADMINISTRATION

TOXICOLOGY TESTING PROGRAM

QUARTERLY REPORT

3rd Quarter – 2021

U.S. Department of Justice
Drug Enforcement Administration
Diversion Control Division
Drug and Chemical Evaluation Section

Contents

Introduction

The Drug Enforcement Administration's Toxicology Testing Program (DEA TOX) began in May 2019 as a surveillance program aimed at detecting new psychoactive substances within the United States. In response to the ongoing synthetic drug epidemic, the Drug Enforcement Administration (DEA) awarded a contract with the University of California at San Francisco (UCSF) to analyze biological samples generated from overdose victims of synthetic drugs.

In many cases, it can be difficult to ascertain the specific substance responsible for the overdose. The goal of DEA TOX is to connect symptom causation to the abuse of newly emerging synthetic drugs (e.g. synthetic cannabinoids, synthetic cathinones, new synthetic opioids, other hallucinogens, etc.).

DEA has reached out to local health departments, law enforcement partners, poison centers, drug court laboratories, hospitals and other medical facilities to offer testing of leftover or previously collected samples for analysis of synthetic drugs. DEA TOX is interested in patients thought to have ingested a synthetic drug, where the traditional drug screen has produced little or no viable options to explain the symptoms exhibited by the patient (alcohol and THC are exempted). DEA TOX may approve leftover un-used biological samples (or biological samples) for testing from a medical facility or law enforcement partner only.

Once DEA TOX is contacted (**DEATOX@DEA.GOV**) and upon approval by DEA of the request for testing of specific samples, the originating laboratory is invited to send their samples to the Clinical Toxicology and Environmental Biomonitoring (CTEB) Laboratory at UCSF. DEA covers the full cost of analysis for each sample approved for testing. Using liquid chromatography- quadrupole time-of-flight mass spectrometry, synthetic drugs identified within the samples are confirmed and quantified. The CTEB laboratory currently maintains a comprehensive drug library consisting of the following:

910 new psychoactive substances (**NPS**);
161 traditional illicit drugs (**TID**);
92 prescription or over-the-counter (**OTC**) drugs;
15 dietary supplement stimulants (**DSS**); and
Multiple precursor chemicals, additives or impurities (**P/A/I**)

This publication presents the results of cases analyzed and completed by the CTEB laboratory from July 1, 2021 through September 30, 2021.

What's New?

We have now included two new sets of data in the report:

- Range of drug levels for NPS and TID detected in each type of biological sample analyzed; some ranges of P/A/I levels are also reported when requested
- Total number of each type of biological samples analyzed

Summary

Between July 1, 2021 through September 30, 2021, 181 biological samples from 165 cases originating from seventeen states, namely Alabama (8), California (5), Delaware (1), Florida (1), Georgia (12), Kansas (1), Kentucky (26), New York (2), North Carolina (3), New Mexico (1), Oregon (4), Pennsylvania (49), Tennessee (38), Texas (3), VA (1), Washington (3), and Wisconsin (7), were submitted to DEA TOX. These samples were analyzed for NPS, TID, prescription or OTC drugs, DSS and P/A/I. The biological samples submitted consisted of 76 serum, 17 plasma, 51 whole blood, and 37 urine samples.

DEA TOX identified and confirmed a total of 1,358 substances that consisted of 159 NPS detections, 521 TID detections, 555 prescription or OTC drug detections, 14 DSS detections, and 109 P/A/I detections during this reporting period (Fig. 1A). While some drugs identified could be placed in more than one category, for purposes of this report and for consistency, DEA TOX placed such substances in a single category only. Substances that are not approved by the Food and Drug Administration for medical use within the U.S. are considered NPS.

A breakdown of the 1,358 total drug and metabolite confirmations demonstrated 128 different drugs, which consisted of 34 NPS, 16 TID, 70 prescription and OTC drugs, 3 DSS, and 5 P/A/I (Fig. 1B).

Fig. 1A Detection frequency

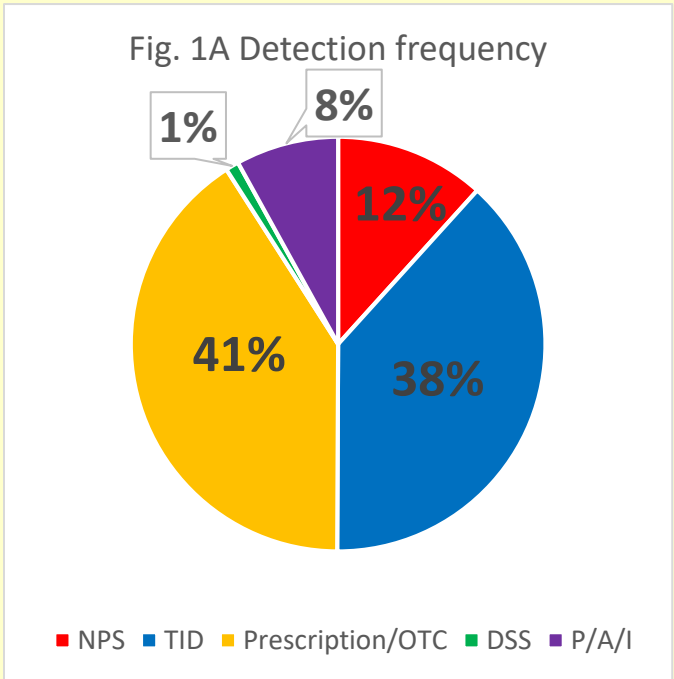
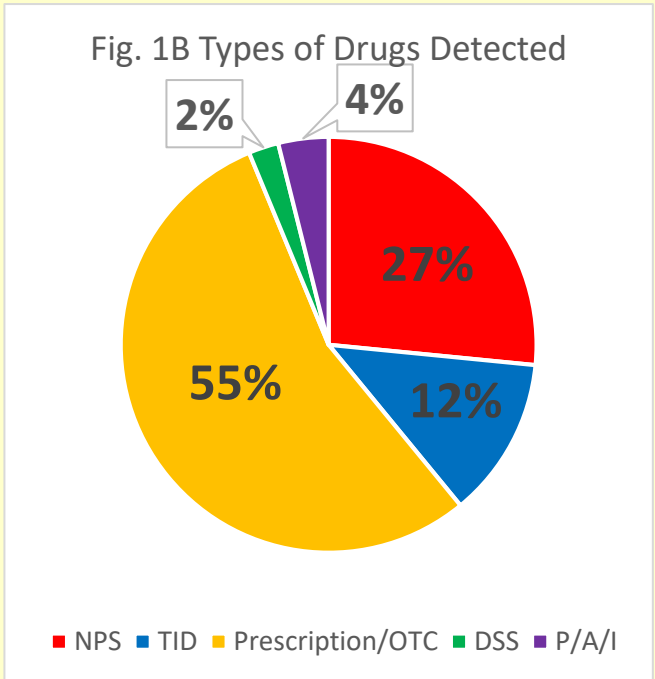


Fig. 1B Types of Drugs Detected



New Psychoactive Substances

DEA TOX confirmed 159 detections comprising of 34 NPS[§] (Table 1) from nine different classes of drugs (Figure 2A) in the third quarter of 2021. The total encounters for each NPS class are summarized in Figure 2B.

Figure 2A. Number of Substances Identified for Each NPS Class

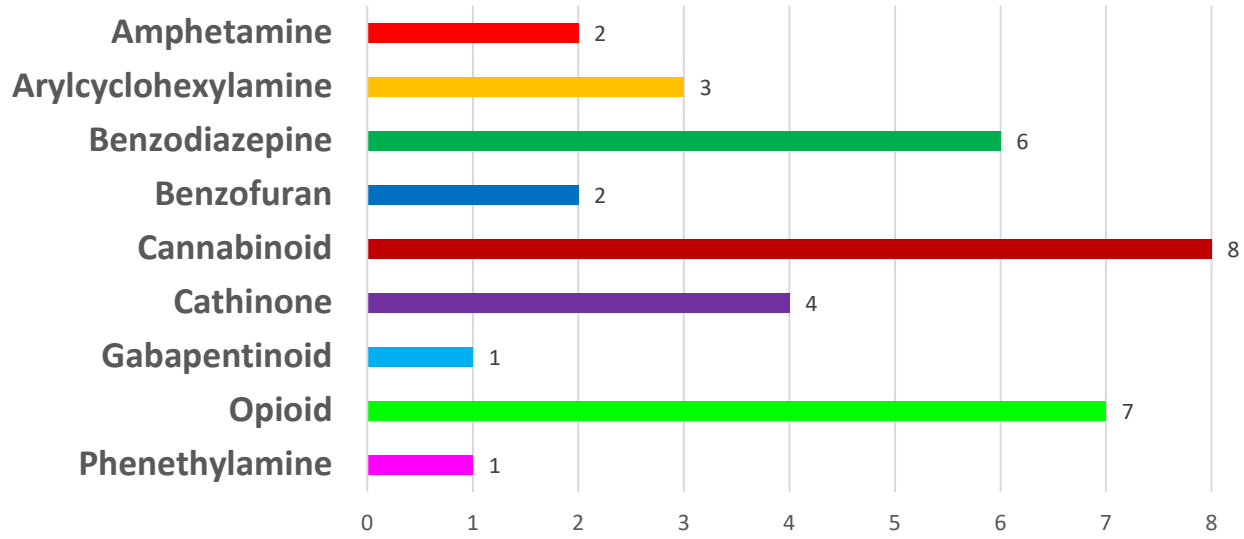


Figure 2B. Total Encounters for Each NPS Class

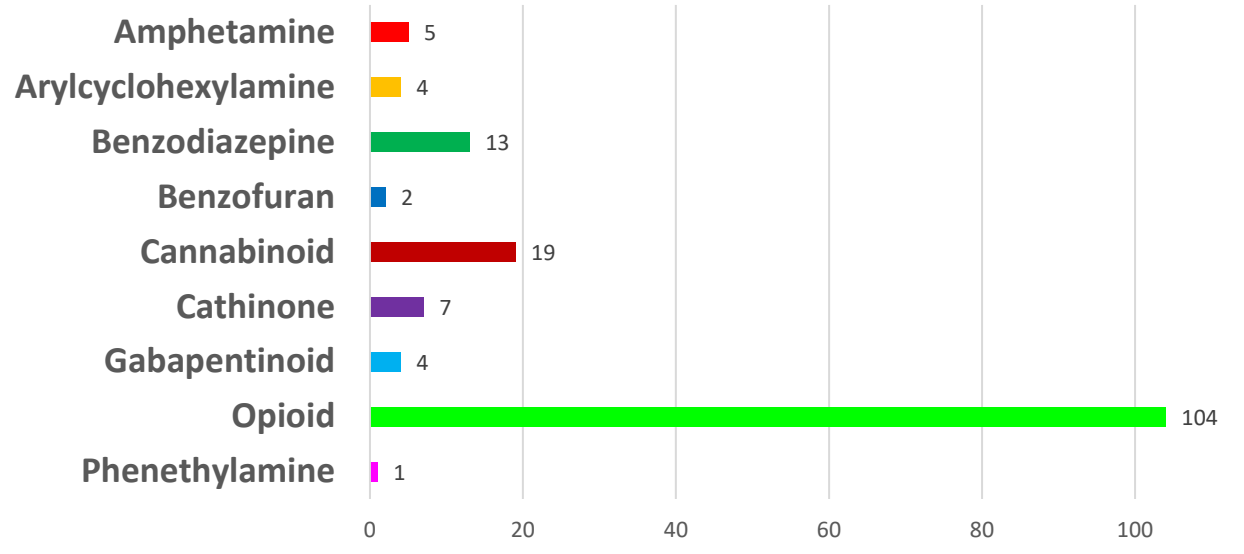


Table 1. NPS detected – 3rd Quarter 2021

Drug Class	Substance	Freq.	States Found*	Confirmed Levels (ng/mL)**			
				S	P	WB	U
Amphetamines	2-Fluoro-methamphetamine	2	GA, WA	10.3		1.8	
	2,5-DMA	3	GA	1.8		5.6	
Arylcyclo-hexylamines	2-Fluoro Deschloroketamine	2	GA, WA	5		0.8	
	4-Methoxy-PCP	1	GA			1670	
	Deschloro-N-ethyl Ketamine	1	GA			0.4	
Benzodiazepines	Bromazolam	2	VA, WA	141		94.7	
	Clonazolam	1	DE		1.5		
	Etizolam	5	GA, TN(3), WA	6.8 - 11		1 - 13.4	
	Flualprazolam	2	WA	0.2 - 9.5			
	Flubromazepam	1	GA	1.6			
	Flubromazolam	2	GA, NC	3.4		4.4	
Benzofurans	5-MAPB	1	WA	109			
	6-APB	1	KY		11.4		
Cannabinoids	11-nor-9-carboxy-delta-8-THC	4	TX(4)	31.6	929		109 - 292
	Delta-8-THC	1	TX		Qual		
	4CN-MDMB-BUTINACA acid	1	GA			4.5	
	ADB-4en-PINACA	1	AL			1.1	
	ADB-BINACA	1	AL			1.1	
	ADB-BUTINACA	6	AL(5), GA			0.4 - 34	
	ADB-P7AICA	2	GA, NC			0.5 - 1.1	
	CPMINACA acid metabolite	1	WI				944
	MDMB-4en-PINACA	1	AL			0.6	
	MDMB-4en-PINACA acid	1	AL			3.3	
Cathinones	Alpha-PipBP	1	KY				6.5
	Buphedrone	1	GA				Qual
	Eutylone	4	GA(4)	5.8 - 12.2		16.9 - 50.6	
	N-Ethyl Hexylone	1	KY				1.2

Drug Class	Substance	Freq.	States Found	Confirmed Levels (ng/mL)			
				S	P	WB	U
Gabapentinoid	Phenibut	4	DE, GA(3)	200		366	Qual
Opioids	2-Methyl AP-237	3	DE, VA, WA	13.5	171	141	
	Acetyl Fentanyl	1	AL			0.9	
	Beta-hydroxy Fentanyl	26	GA, KY(3), NC, NM, OR, PA(12), TN(6), WI	0.5-5.1	1.3	0.9-5	32.4
	Isotonitazene	1	TN			0.3	
	Metonitazene	8	TN (8)			1.5-6.9	
	Mitragynine	7	CA, GA, KY, TN(2), WA(2)	39-185		32-110	7-421
	7-OH Mitragynine	6	CA, GA, WA(2), WI(2)	6.5-22.9		3.6	9-1430
	para-Fluorofentanyl	40	GA(2), KY, PA(15), TN(22)	0.3-2.8	Qual	0.7 – 49.9	
	Despropionyl para-fluoro-fentanyl	12	KY, PA, TN(10)	0.7		0.1-2.2	
Phenethylamine	2C-P	1	NC	11.9			

*AL – Alabama; CA – California; DE – Delaware; GA – Georgia; KY – Kentucky; NM – New Mexico; NY – New York; NC – North Carolina; OR – Oregon; PA – Pennsylvania; TN – Tennessee; TX – Texas; VA – Virginia; WA – Washington; WI – Wisconsin

**S – Serum; P – Plasma; WB – Whole Blood; U – Urine; in cases where "Qual" is indicated, the level is <LLOQ (lower limit of quantification) but >LOD (limit of detection) of the method except for phenibut in urine where only qualitative analysis was performed.

§ - Parent drugs or metabolites are only counted once for the number of drugs detected in Tables 1-5. If only a metabolite is encountered in the absence of a parent drug, it will still be counted as a unique substance. Both parent drugs and metabolites are counted as detections.

Traditional Illicit Drugs

DEA TOX confirmed 521 detections comprising of 16 TIDs[§] (Table 2) in the third quarter of 2021.

Table 2. TID detected – 3rd Quarter 2021

Drug Class	Substance	Freq.	States Found*	Confirmed Levels (ng/mL)**			
				S	P	WB	U
Amphetamines	Amphetamine	17	AL, GA, KY(3), OR, PA, TN (9), WA	27.3 - 405	48.3	5.4 - 63.1	304 - 73600
	HHMA	1	WA	1.7			
	MDA	1	WA	74.3			
	MDEA	1	KY		0.9		
	MDMA	1	WA	181			
	Methamphetamine	38	AL(3), GA(4), KY(7), NC(2), OR(2), PA(2), TN(17), WI	2.6 - 1500	25.6 - 22100	0.8 - 1090	4.5 - 606000
	4OH-Methamphetamine	5	GA, KY(2), NC, OR	1.1	86	0.2	6.9 - 532
Arylcyclo-hexylamines	Ketamine	12	KY(5), NM(2), TN(3), WI(2)			8.7	104-38000
Cannabinoids	11-nor-9-carboxy-delta-9-THC	31	CA, GA(4), KY(7), NC(2), NM(2), OR(3), PA(11), WA	19.7 - 213	58.6 - 193	23.5 - 561.1	110 - 1970
	11-OH delta-9-THC	2	KY				Qual
Cocaine	Benzoylecgonine	52	DE, GA(5), KY(10), NC, NY(2), OR, PA(18), TN(9), VA, WI(4)	0.5 - 1630	4.7 - 988	0. 2-869	4.5 - 478000
	Cocaine	19	DE, GA, KY(4), NC, PA(5), TN(4), WI(3)	0.6 - 108		2.2 - 119	5.8 - 40200
	Cocaethylene	10	GA, KY(2), TN(5), WI(2)			Qual	Qual
	Ecgonine Methyl Ester	43	DE, GA(4), KY(8), NC(2), NY(2), OR, PA(16), TN(4), WI(5)	Qual	Qual	Qual	Qual
Lysergamide	LSD	1	OR		0.2		

Drug Class	Substance	Freq.	States Found*	Confirmed Levels (ng/mL)**			
				S	P	WB	U
Opioids	6-acetyl morphine	9	PA(7), TN, WI	0.4 - 8.5		13.4	Qual
	Codeine	18	KY, OR, PA(11), TN(5)	0.2 - 1.1	Qual	0.1- 3.5	136
	Fentanyl	110	AL, FL, GA(9), KS, KY(9), NC(2), NM(2), NY(2), OR(2), PA(42), TN(34), WA(2) WI(3)	0.2 - 39.6	0.2 - 18.2	0.2 - 122	1.3- 284
	Norfentanyl	64	GA(6), KY(9), NC(3), NM(2), NY(2), OR, PA(19), TN(17), WA(2), WI(3)	0.4 - 16.7	69	0.5 - 449	7.8 - 798
	Hydrocodone	2	CA, KY				450 - 490
	Hydromorphone	12	CA, KY(2), NC, NY, OR, TN(5), WI	8.9	65.7	0.7 - 4.4	3.3 - 1070
	Morphine	59	GA(2), KY(2), OR(2), PA(42), TN(8), WA, WI(2)	0.3 - 26.9	0.2	0.5 - 56.5	7.6 - 2221
	Oxycodone	10	GA, TN(6), VA, WI(2)	5.3		0.9 - 85.6	1310 - 5600
	Oxymorphone	3	TN, WI(2)			4.5	148 - 339

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Prescription and Over the Counter Drugs

DEA TOX confirmed 555 detections comprising of 70 prescription or OTC drugs[§] (Table 3) in the third quarter of 2021.

Table 3. Prescription or OTC drugs detected – 3rd Quarter 2021

Drug Class	Substance	Frequency	States Found*
Anesthetic	Lidocaine	48	GA(2), KY(2), PA(35), TN(8), TX
Antibiotic	Sulfomethoxazole	5	CA, KY(2), NM, OR
Anticonvulsants	Carbamazepine	1	GA
	Furosemide	2	CA, KY
	Gabapentin	17	CA(2), DE, GA, KY(4), NM(2), OR, PA, TN(3), WA, WI
	Lamotrigine	1	KY
Antidepressants	Amitriptyline	3	CA, PA, TN
	Bupropion	2	CA, KY
	Citalopram	9	CA, GA, KY(2), PA(2), TN(2), WI
	Doxepin	1	OR
	Nordoxepin	1	DE
	Fluoxetine	6	CA, KY, OR, PA, TN, TX
	Norfluoxetine	3	DE, CA, KY
	Nortriptyline	1	CA
	Paroxetine	1	TN
	Sertraline	6	CA, GA, TN(3), WI
	Trazodone	15	AL, CA(2), GA, KY, NM(2), PA(4), TN(3), WI
	mCPP**	14	AL, CA(3), GA, NM(2), PA(3), TN(3), WI
	Venlafaxine	1	CA
Antidiabetic	Metformin	3	CA, NM(2)
Antidiarrheal	Loperamide	3	KY, TN(2)
Antihistamines	Chlorpheniramine	4	TN(4)
	Diphenhydramine	42	AL, GA, KY(4), NM(2), PA(3), TN(26), VA, WI(4)
	Doxylamine	3	TN(3)
	Hydroxyzine	6	KY(2), PA(3), TN
Antipsychotics	Aripiprazole	3	CA, GA(2)
	Haloperidol	1	WI
	Olanzapine	6	AL, GA(2), OR, TN(2)
	Risperidone	1	KY
Antiretrovirals	Emtricitabine	1	KY
	Tenofovir	1	KY
Anxiolytic	Meprobamate	1	DE

Drug Class	Substance	Frequency	States Found*
Benzodiazepines	Alprazolam	13	GA(3), KY, OR, TN(6), WA(2)
	Alpha-Hydroxyalprazolam	2	KY, TN
	Chlordiazepate	1	PA
	Clonazepam	7	CA, DE, KY(2), PA, TN(2)
	7-Aminoclonazepam	8	CA, DE, KY, PA, TN(4)
	Desalkylflurazepam	1	VA
	Diazepam	6	KY, PA(2), TN(3)
	Nordiazepam	9	DE, KY(2), PA(2), TN(4)
	Lorazepam	6	DE, KS, NM(2), OR(2)
	Lormetazepam	1	DE
	Midazolam	14	KS, KY(4), NM(2), NY(2), OR, PA(2), TX, WI
	Mirtazapine	4	AL, PA, TN(2)
	Oxazepam	4	KY, PA, TN(2)
	Temazepam	1	PA
Cardiovascular	Amiodarone	3	GA, PA, TN
	Atenolol	2	KY, TN
	Atropine	4	CA, KY, PA, TN
	Carvedilol	1	KY
	Clonidine	50	KY, NM(2), PA(45), TN(2)
	Diltiazem	1	CA
	Furosemide	1	CA
	Lisinopril	3	NM, PA(2)
	Metoprolol	6	CA(3), PA(2), TN
	Propanolol	1	CA
	Warfarin	1	CA
Cough Suppressants	Dextromethorphan	7	DE, KY, TN(3), TX, WI
	Dextrophan	7	DE, KY, TN(3), TX, WI
Decongestants	Norpseudoephedrine	3	CA, KY(2)
	Phenylephrine	2	KS, KY
	Pseudoephedrine	1	KY
Muscle Relaxants	Baclofen	3	CA, PA, TN
	Cyclobenzaprine	3	GA, TN, WI
	Methocarbamol	1	PA
Opioids	Buprenorphine	7	CA, KY(2), NM, PA(2), WI
	Norbuprenorphine	3	KY(2), NM
	Methadone	17	CA, KY(2), OR(2), PA(12)
	EDDP	14	CA, KY, OR(2), PA(10)
	EMDP	5	OR, PA(4)
	Naloxone	31	DE, GA(4), KS, KY(6), NM, PA(10), TN(8)
	Naltrexone	1	CA
	Tramadol	17	GA, KY(2), PA(9), TN(4), WI
	Desmethyl-cis-tramadol	7	GA, PA(3), TN(2), WI

Drug Class	Substance	Frequency	States Found*
Pain Relievers	Acetaminophen	49	AL, CA(4), GA(4), KY(10), NC(2), NM, NY(2), PA(12), TN(7), WA(2), WI(4)
	Naproxen	8	CA, GA, KY, PA(4), TN
Respiratory	Albuterol	4	KY, PA(3)
Stimulant	Ephedrine	2	GA, KY
Tuberculostatic	Levofloxacin	1	TN

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**mCPP is an expected metabolite of trazadone

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Dietary Supplement Stimulants

DEA TOX confirmed 14 detections comprising of three DSS (Table 4) in the third quarter of 2021.

Table 4. DSS detected – 3rd Quarter 2021

Drug Class	Substance	Frequency	States Found*
DSS	Hordenine	1	KY
	PEA	7	CA(2), GA, KY(2), NC, TN
	Synephrine	6	KY(3), NY(2), WI

*CA – California; GA – Georgia; KY – Kentucky; NY – New York; NC – North Carolina; TN – Tennessee; WI – Wisconsin

Precursors/Additives/Impurities

DEA TOX confirmed 109 detections comprising of five P/A/I (Table 5) in the third quarter of 2021.

Table 5. P/A/I detected – 3rd Quarter 2021

Drug Class	Substance	Frequency	States Found	Confirmed Levels (ng/mL)**			
				S	P	WB	U
Additive	Phenacetin	19	AL(5), KY(2), PA(4), TN(7), WI	1.6 - 10.7		0.1 43.9	Qual
	Promethazine	2	KY, WA	Qual	Qual		
	Xylazine	47	PA	1.2 - 55.8			
Impurity	N,N-dimethyl-amphetamine	4	GA(2), TN(2)	145		0.8 - 24.7	
Precursor	4-ANPP	37	FL (1), GA(4), KY(3), NC, NY, PA(5), TN(20), WI(2)	0.2 - 12.6	0.1	0.2 - 20.6	1.0 - 6.0

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**S – Serum; P – Plasma; WB – Whole Blood; U – Urine; in cases where "Qual" is indicated, only qualitative analyses were performed.

Contact Information

We invite medical and law enforcement facilities to contact our program if you encounter an overdose of a suspected synthetic drug and desire to have any leftover biological samples (blood preferred) analyzed further for such synthetic substances.

- **Sample Qualifications:**
  - Patients thought to have ingested a synthetic drug, where the traditional drug screen has produced little or no viable options to explain the symptoms exhibited by the patient (alcohol and THC are exempted).

- **How to Contact Us and Send Your Samples:**
  - Once the above qualifications are satisfied:
    - Email **DEATOX@DEA.GOV** with a brief description of the case (including initial toxicology screen and history) and a request for testing.
    - DEA will respond to each inquiry, and if approved, will send the instructions for packing and shipping of sample(s) to UCSF.
      - The main reason for disapproval of a case would be the identification of substances including methamphetamine, heroin, fentanyl, cocaine, LSD, PCP etc. in a routine toxicology screening at your facility.
      - This program's goal is to connect symptom causation to abuse of newly emerging synthetic drugs (e.g. synthetic cannabinoids, synthetic cathinones, fentanyl-related substances, other hallucinogens etc.).
  - Ensure that you de-identify and label the sample with a numerical value, sex, date of birth or age, and the date and time the sample was collected in accordance with the labeling instructions (sent with shipping instructions).
  - Keep a master list of the patients and the numerical values you allocated to each sample at your institution.

- **Cost of Sample Analysis:**
  - DEA will cover the full cost of testing the patient samples.
    - The sender will only be responsible for paying for packing and shipping samples to UCSF.

- **Turn-around Time:**
  - Results are expected within three weeks of receipt of the sample at UCSF except in rare occurrences when a novel substance is identified.

PUBLIC DOMAIN NOTICE

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Clinical Toxicology
and Environmental Biomonitoring Laboratory

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