

# ILLICIT DRUG TRENDS AND THE TECHNOLOGY WE USE TO COMBAT THEM

NASCSA

National Association of State  
Controlled Substances Authorities

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- **ILLICIT DRUG TRENDS:**

- HOW DID WE GET HERE?

- **TODAY'S PROBLEMS**

- COUNTERFEIT PILLS
- INCREASING POTENCY
- BOOSTERS
- UNKNOWN WHITE POWDER EXPOSURE?
- INTERNET
- OVERDOSE VS. POISONING

- **COMBATting THE TRENDS WITH TECHNOLOGY:**

- FIELD TEST OR LAB ANALYSIS?
- SWGDRUG
- SPECTRA: MOLECULAR FINGERPRINTS
- COLOROMETRIC
- RAMAN
- GC MASS SPEC
- FTIR

# **PAIN IN AMERICA**

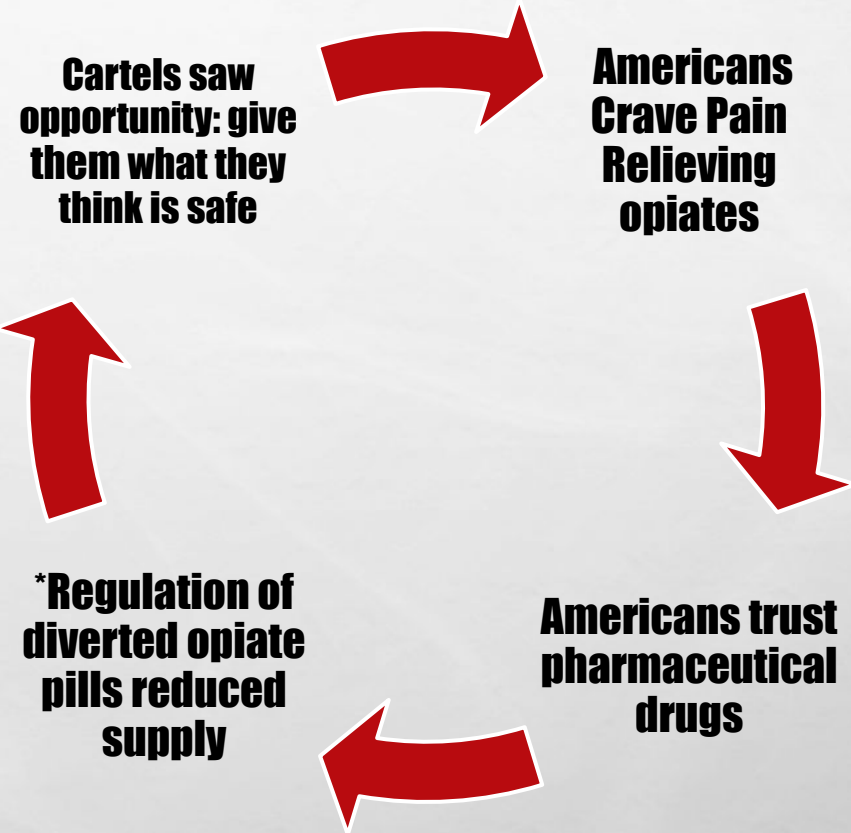


- **AMERICANS USE MORE PAIN MEDICATION THAN ANY OTHER COUNTRY IN THE WORLD**
- **THE UNITED STATES MAKES UP 4.4% OF THE WORLD'S POPULATION, AND CONSUMES OVER 80% OF THE WORLD'S OPIOIDS**
- **1 IN 10 (10.7%) U.S. ADULTS USED ONE OR MORE PRESCRIPTION PAIN MEDICATIONS IN THE PAST 30 DAYS**
- **US USES 30X THE AMOUNT OF PAIN MEDS THAN JAPAN, THE SECOND LARGEST USER**



# FENTANYL: FILLING THE VACUUM

***“Today’s problems are often caused by yesterday’s solutions”***



# ILLICIT DRUG TRENDS: COUNTERFEIT PILLS

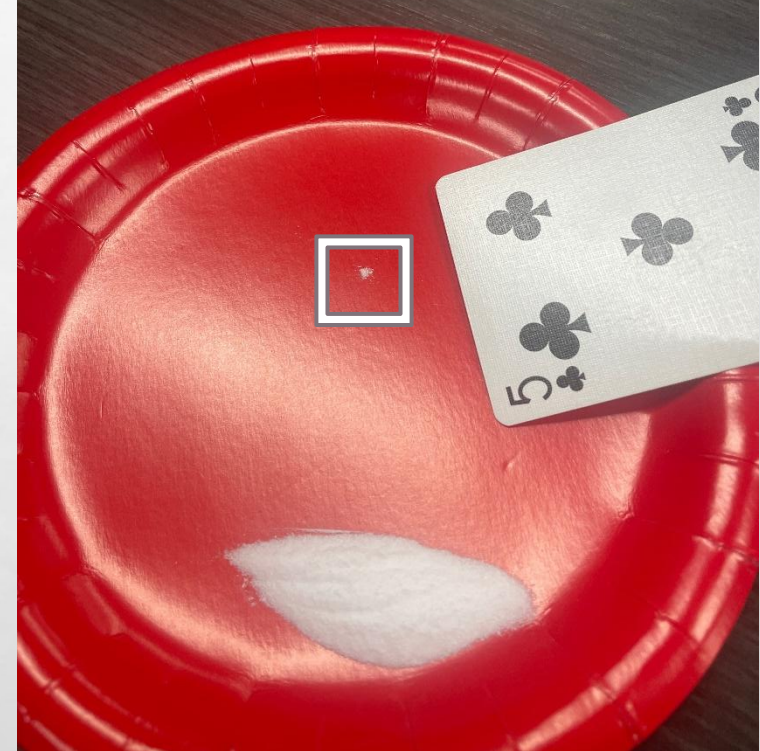
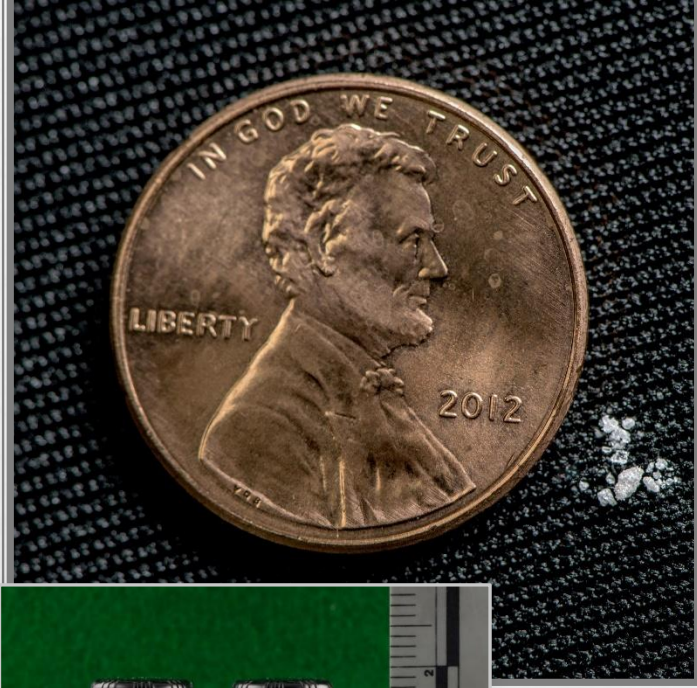


**50,600,000 fentanyl-laced pills seized in 2022**

**Counterfeit pills are a \$200 billion industry**

**Most countries have 40% counterfeit pill rate**

# ILLICIT DRUG TRENDS: INCREASING POTENCY



**Fentanyl-50x stronger than heroin**  
**100x more potent than morphine**  
**Carfentanyl-10,000x more potent than morphine**  
**(100x more potent than fentanyl)**

# ILLICIT DRUG TRENDS: BOOSTERS

- **XYLAZINE**

- **NITAZENES**

- **BROMAZALAM**

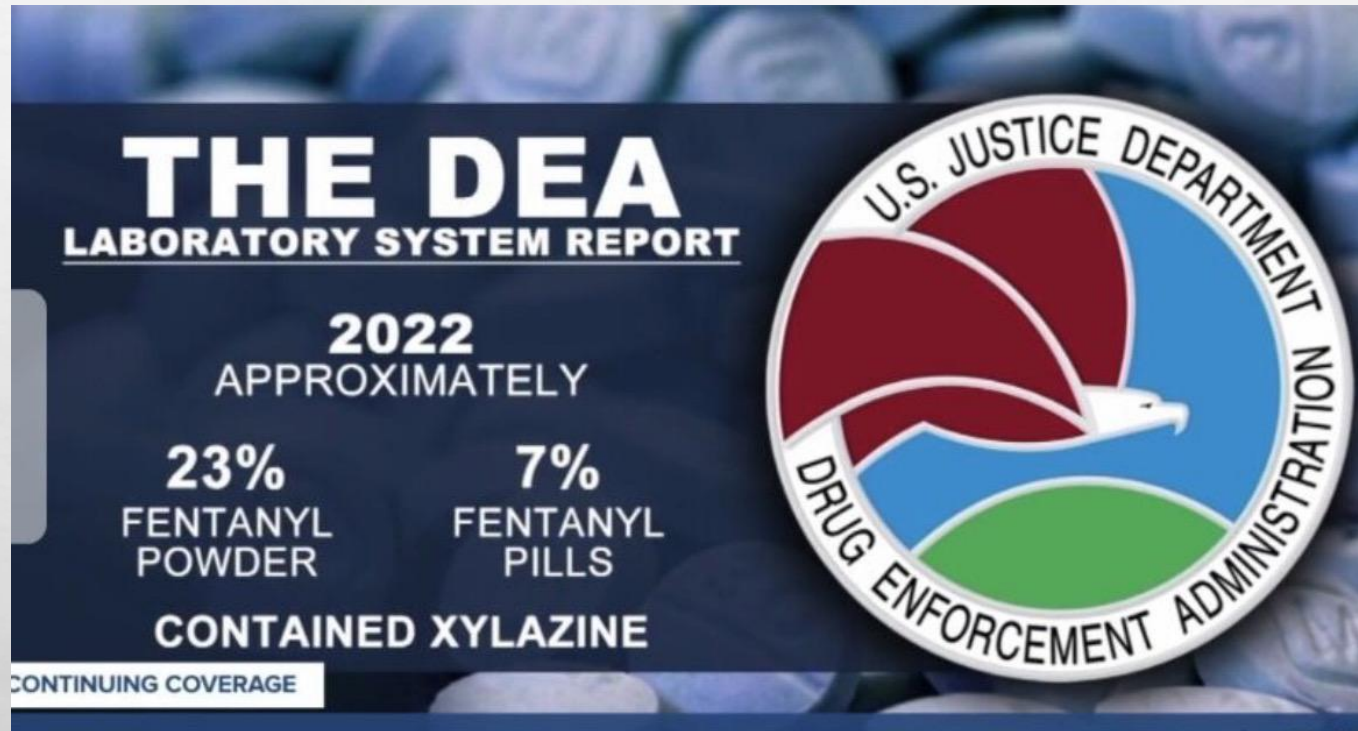
- **“PATENT PIRATES”**

- **OF THE 50,600,000 FENTANYL LACED PILLS SEIZED IN 2022,**

- **30 MILLION CONTAINED 2MG OR MORE OF FENTANYL, ~3.5 MILLION CONTAINED XYLAZINE**



# FENTANYL CONTAINING XYLAZINE





# ILLICIT DRUG TRENDS: “UNKNOWN POWDER”

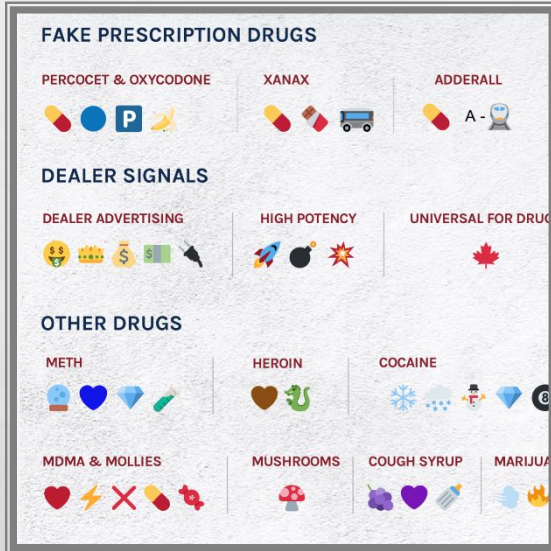
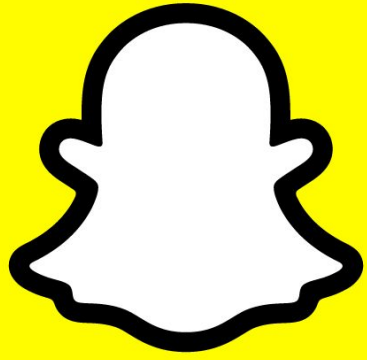
- **DRUG DEALERS DON'T EVEN KNOW WHAT THEY ARE SELLING**
- **CAN'T DIFFERENTIATE BETWEEN POWDERS (COCAINE VS. FENTANYL, COMMERCE CITY, CO)**



# ILLICIT DRUG TRENDS: EXPOSURE RISK?

- **MEDICAL COMMUNITY VS. LAW ENFORCEMENT EXPOSURE REPORTING**
- **“NOCEBO”**
- **”FENTANYL PANIC,” “MASS HYSTERIA,”**
- **VASOVAGAL SYNCOPE**
- **ANXIETY REACTION CAUSED BY “OVER WARNING”**
- **NOT CONSISTENT WITH OVERDOSE REACTION**





# ILLICIT DRUG TRENDS: INTERNET

- **THE INTERNET PROVIDES ANONYMOUS SHOPPING, PURCHASE, AND DELIVERY OF COUNTERFEIT PILLS**
- **CIRCUMVENTS CLOSED SYSTEM OF DELIVERY**

# **ILLICIT DRUG TRENDS: OVERDOSE V. POISONING**

- **107,000 US OVERDOSE DEATHS IN 2022**
- **70,000 ACCIDENTAL DEATHS DUE TO FENTANYL POISONING**
- **65% OF FENTANYL FATALITIES IN 2022 DIDN'T INTEND TO INGEST FENTANYL**



- SWGDRUG ASSESSMENT LEVEL

# TECHNOLOGY CONSIDERATIONS

- SCAN TECHNOLOGY (SPECTROSCOPY VS. COLORIMETRIC)

- OFFICER SAFETY (DEGREE OF SAMPLE EXPOSURE)
- SPEED
- COST OF DEVICE
- USER SIMPLICITY VS. COMPLEXITY
- RATE OF FALSE NEGATIVE/POSITIVE
- LIBRARY SIZE AND UPDATE COST
- PORTABILITY OF DEVICE
- DIVERSITY OF LEO ASSIGNMENT (DRUGS, HAZMAT, EOD, ETC.)
- RESULTS DOCUMENTATION
- RANGE OF SAMPLE SIZE, CONCENTRATION, AND TESTING PREPARATION

**FIELD TRIAL/TEST DRIVE**

# SWGDRUG

Table 1: Categories of Analytical Techniques

Category A	Category B	Category C
Infrared Spectroscopy	Capillary Electrophoresis	Color Tests
Mass Spectrometry	Gas Chromatography	Fluorescence Spectroscopy
Nuclear Magnetic Resonance Spectroscopy	Ion Mobility Spectrometry	Immunoassay
Raman Spectroscopy	Liquid Chromatography	Melting Point
X-ray Diffractometry	Microcrystalline Tests	Ultraviolet Spectroscopy
	Pharmaceutical Identifiers	
	Thin Layer Chromatography	
	Cannabis only:	
	Macroscopic Examination	
	Microscopic Examination	



**Colorometric**

**Raman**

# **PRESUMPTIVE TESTING TECHNOLOGY**

**FTIR**

**Mass Spec**

- **OFFICER SAFETY**
- **FAST IDENTIFICATION FOR INVESTIGATIVE DECISION-MAKING**
- **EXPEDITED ADJUDICATION (50% PLEA RATE)**
- **REDUCTION OF FUGITIVE DEFENDANTS**

# TECHNOLOGY AVAILABLE TO LEO

COLORIMETRIC TESTING SWGDRUG CATEGORY C FIRST USE 1970'S

## Advantages:

- **Low Cost (\$3.50 or less each)**

## Disadvantages:

- **High False Positive Rate**
- **Must use a new pouch for each different suspected narcotic**
- **Limited Number of possible Narcotics (approx. 25)**
- **Must take unknown out of its container**



The NIK Duquenois-Levine rendering a false positive after testing a chocolate bar.



The NarcoPouch 928 GHB Reagent Test rendering a false positive after testing Dr. Bronner's Magic Soap.

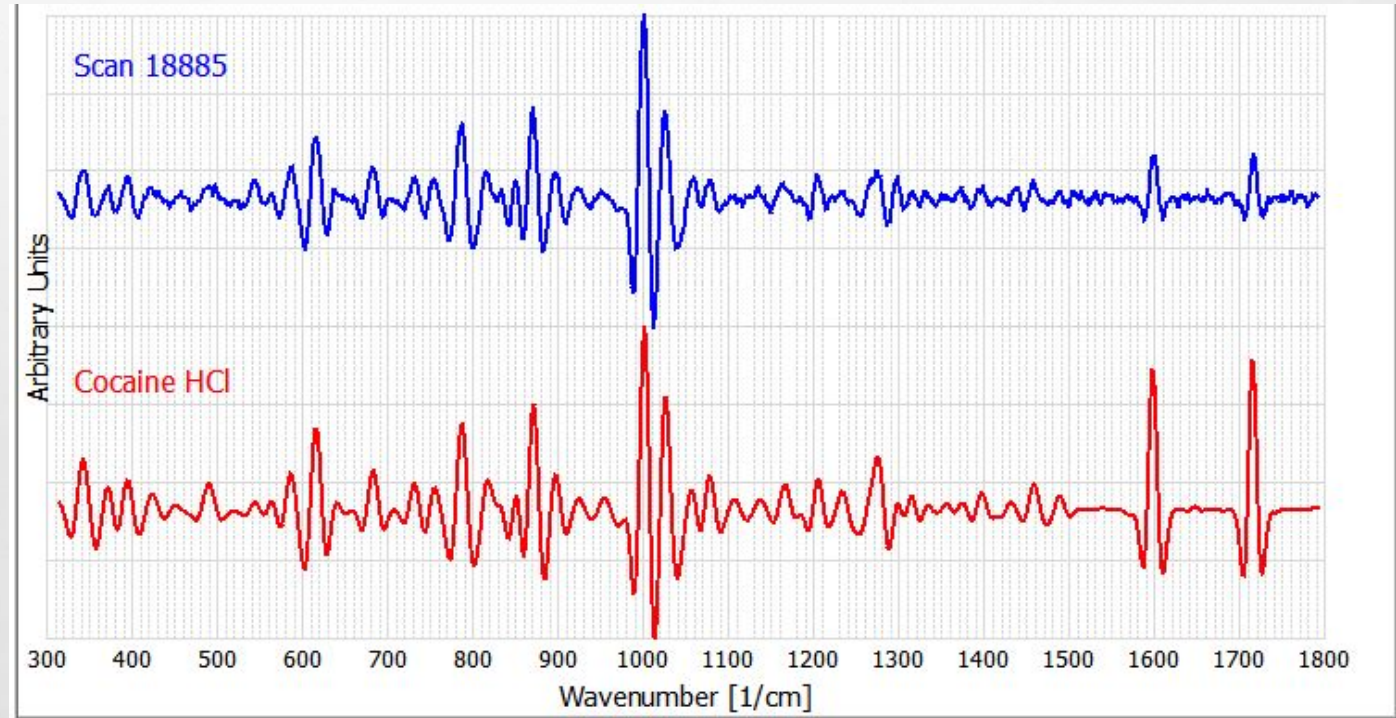


The NarcoPouch 928 GHB Reagent Test rendering a negative result.



# WHAT IS A SPECTRUM?

- **DEVICE'S COMPUTER ANALYZES UNKNOWN SUBSTANCE**
- **GENERATES A SPECTRUM (MOLECULAR FINGERPRINT)**
- **COMPARES THAT SPECTRUM WITH KNOWN SPECTRA IN THE DEVICE LIBRARY**
- **GENERATES A SCAN RESULT**



# DEVICE LIBRARIES

• HOW MANY SUBSTANCES

• FOCUS (DRUGS, HAZMAT, EXPLOSIVES, ETC.)

• UPDATES

• COST OF UPDATES

• RESULTS SUPPORT (REACHBACK)

**Alarm**

Scan Result Jul 22, 2019 10:08

**Carfentaniil**

1. 1,4-Dibenzylpiperazine (DBZP)	59. 4-Fluoro cyclopropyl fentanyl	127. alpha-Methyl acetyl fentanyl	195. Ethylphenidate	261. Mexedrone (cathinone)
2. 25B-NBOMe	60. 4-Fluoro methoxyacetyl fentanyl	128. alpha-Methyl tyramine (AMT)	196. Etoclorin	262. MM2201 (cannabinoid)
3. 25C-NBOMe	61. 4-Fluoro PVB	129. alpha-PVP (cathinone)	197. Euphonia (cathinone)	263. MM8-CHMCA (cannabinoid)
4. 25D-NBOMe	62. 4-Fluoro alpha-PVP	130. alpha-PVP (cathinone)	198. FDU-PB-22 (cannabinoid)	264. MN-18 (cannabinoid)
5. 25E-NBOMe	63. 4-Fluorocampfetamine	131. Alprazolam	199. Fenethylamine	265. MN-24 (INEI) (cannabinoid)
6. 25F-NBOMe	64. 4-Fluorobuphrene (cathinone)	132. AM1220 (cannabinoid)	200. Fentanyl	266. MN-25 (cannabinoid)
7. 25N-NBOMe	65. 4-Fluorobutyl fentanyl	133. AM1235 (cannabinoid)	201. Flurazepam	267. MO-CHMINACA (cannabinoid)
8. 25P-NBOMe	66. 4-Fluorofentanyl	134. AM1241 (cannabinoid)	202. Flurazepam	268. Morphine
9. 25T4-NBOMe	67. 4-Fluoroisobutylfentanyl (FBF)	135. AM1248 (cannabinoid)	203. Flunitrazepam	269. MPPH (cathinone)
10. 25T7-NBOMe	68. 4-Fluoromethamphetamine	136. AM2201 (cannabinoid)	204. Fluoxetine	270. N,N-Diethylpentone (cathinone)
11. 2-AI Bromoindan	69. 4-Fluoromethcathinone (4-FMC)	137. AM2233 (cannabinoid)	205. FUB-144 (cannabinoid)	271. Naphtone (cathinone)
12. 2C-B (phenethylamine)	70. 4-Fluoropentadecane (cathinone)	138. AM630 (cannabinoid)	206. FUB-AMB (cannabinoid)	272. N-Ethylbuphedrone (cathinone)
13. 2C-G (phenethylamine)	71. 4-MeO-alpha-PVP (cathinone)	139. AM694 (cannabinoid)	207. FUB-JWH-018 (cannabinoid)	273. N-Ethylhexedrone (cathinone)
14. 2C-D (phenethylamine)	72. 4-MeO-DMT	140. Amphetamine	208. FUB-PB-22 (cannabinoid)	274. N-Ethylmethamphetamine
15. 2C-E (phenethylamine)	73. 4-MeO-PCP	141. APICA (cannabinoid)	209. Furanyl fentanyl	275. N-Ethylpentadecane (cathinone)
16. 2C-H (phenethylamine)	74. 4-Methoxy PVB	142. APP-CHMINACA (cannabinoid)	210. Gabapentin	276. N-Ethylpentone (cathinone)
17. 2-Chloromethcathinone (2-CMC)	75. 4-Methoxyacetyl fentanyl	143. APP-FUBINACA (cannabinoid)	211. GBL	277. Nemetasam
18. 2C-I (phenethylamine)	76. 4-Methyl acetyl fentanyl	144. APP-PICA (cannabinoid)	212. GHB	278. Nitazene
19. 2C-N (phenethylamine)	77. 4-Methyl furanyl fentanyl	145. BB-22 (cannabinoid)	213. Heroin	279. NPB-22 (cannabinoid)
20. 2C-P (phenethylamine)	78. 4-Methylaminorex	146. Benzodrone (cathinone)	214. HU-210 (cannabinoid)	280. NRG-3 (cathinone)
21. 2C-T-2 (phenethylamine)	79. 4-Methylbuphedrone (cathinone)	147. Benzodioxole fentanyl	215. HU-211 (cannabinoid)	281. Oxentani
22. 2C-T7 (phenethylamine)	80. 4-Methylcathinone (4-MED)	148. Benzyl fentanyl	216. Hydropropione	282. Osazepam
23. 2-Ethylmethcathinone (2-EMC)	81. 4-Methylpentadecane (cathinone)	149. bk-2C-B	217. beta-Hydroxythiofentanyl	283. Oxycodone
24. 2-Fluorofentanyl	82. 5-APB	150. Bromadiol	218. Isobutyl fentanyl	284. Oxymorphone
25. 2-Fluoromethamphetamine	83. 5-APDB	151. Bromo-diagonFLY (phenethylamine)	219. Isoquinoline U-47700	285. PB-22 (cannabinoid)
26. 2-MAPP	84. 5-Chloro AB-PINACA (cannabinoid)	152. Bughedrone (cathinone)	220. JWH-015 (cannabinoid)	286. PCP
27. 2-Methyl furanyl fentanyl	85. 5-Chloro AKB49 (cannabinoid)	153. Buphedrone (cathinone)	221. JWH-018 (cannabinoid)	287. Pentadecane (cathinone)
28. 2-Methylmethcathinone (2-MMAC)	86. 5-Chloro UR-144 (cannabinoid)	154. Busperone	222. JWH-019 (cannabinoid)	288. Pentyllone (cathinone)
29. 3,4-Dichloromethylpiperidate	87. 5-DBPV	155. Butylone (cathinone)	223. JWH-020 (cannabinoid)	289. Phazepam
30. 3,4-Dimethoxymethcathinone	88. 5-EAPB	156. Butyl fentanyl	224. JWH-073 (cannabinoid)	290. Phentermine
31. 3-Bromoamphetamine	89. 5-Fluoro ABICA (cannabinoid)	157. BOP	225. JWH-081 (cannabinoid)	291. Phenyl fentanyl
32. 3-Bromomethcathinone (3-BMC)	90. 5-Fluoro AB-PINACA (cannabinoid)	158. Carisoprodol	226. JWH-122 (cannabinoid)	292. PMA
33. 3-Chloromethcathinone (3-CEC)	91. 5-Fluoro ADB (cannabinoid)	159. Cathinone	227. JWH-182 (cannabinoid)	293. PMAA
34. 3-Chloromethcathinone (3-CMC)	92. 5-Fluoro ADBICA (cannabinoid)	160. CB-13	228. JWH-200 (cannabinoid)	294. PMMA
35. 3-Ethylmethcathinone (3-EMC)	93. 5-Fluoro AEB (cannabinoid)	161. Clozapem	229. JWH-203 (cannabinoid)	295. Pravastatin
36. 3-Fluoro methoxyacetyl fentanyl	94. 5-Fluoro AKB49 (cannabinoid)	162. Cocaine	230. JWH-210 (cannabinoid)	296. FX-1 (cannabinoid)
37. 3-Fluorocampfetamine	95. 5-Fluoro AMB (cannabinoid)	163. Cocaine base	231. JWH-250 (cannabinoid)	297. FX-2 (cannabinoid)
38. 3-Fluorofentanyl	96. 5-Fluoro CUMYL-P7ACA (cannabinoid)	164. Cocaine HCl	232. JWH-412 (cannabinoid)	298. RCS-4 (cannabinoid)
39. 3-Fluoromethcathinone (3-FMC)	97. 5-Fluoro EDMB-PINACA (cannabinoid)	165. Codeine	233. Ketamine	299. RCS-8 (cannabinoid)
40. 3-Fluorophenmetrazine	98. 5-Fluoro MDMB-PICA (cannabinoid)	166. CP-47 497 (cannabinoid)	234. Lidocaine	300. Remifentanyl
41. 3-MeO-PCP	99. 5-Fluoro MN-18 (cannabinoid)	167. Cratyl fentanyl	235. MAB-CHMINACA (cannabinoid)	301. SDB-005 (cannabinoid)
42. 3-Methoxymethcathinone	100. 5-Fluoro NNEI (cannabinoid)	168. Cyclobenzaprine	236. MAM-2201 (cannabinoid)	302. STS-195
43. 3-Methylmethcathinone (3-MMAC)	101. 5-Fluoro NPB-22 (cannabinoid)	169. Cyclobutyl fentanyl	237. mCPP	303. Sulfentanil
44. 4-APB	102. 5-Fluoro PB-22 (cannabinoid)	170. Cyclohexyl fentanyl	238. MDA	304. 18OC MDMA
45. 4-Bromoethcathinone (4-BEC)	103. 5-Fluoro SDB-006 (cannabinoid)	171. Cyclopropyl fentanyl	239. MDAI	305. 18OC Methamphetamine
46. 4-Bromomethcathinone (4-BMC)	104. 5-JAI	172. Despropionyl para-fluorofentanyl	240. MDEA	306. Temazepam
47. 4-Chloro 2,5-DMA	105. 5-MPT	173. Despropionyl para-fluorofentanyl	241. MDMA	307. Tetrahydrofuran fentanyl
48. 4-Chlorocampfetamine	106. 5-NAPP	174. Dextromethorphan (DXM)	242. MDMB-CHMCA (cannabinoid)	308. TRAPP
49. 4-Chloromethcathinone (4-CEC)	107. 5-MeO-DALT	175. Diazepam	243. MDMB-FUBINACA (cannabinoid)	309. THU-018 (cannabinoid)
50. 4-Chlorofentanyl	108. 5-MeO-DIPT	176. Diethylcathinone	244. MDPHP (cathinone)	310. THU-2201 (cannabinoid)
51. 4-Chloroisobutyl fentanyl	109. 5-MeO-MPT	177. Diethylphenidate	245. MDPHP (cathinone)	311. Tramadol
52. 4-Chloromethcathinone (4-CMC)	110. 6-FPB	178. Diethylphenidate	246. MDPHP (cathinone)	312. Trihexphenidyl (THP)
53. 4-Chloro-N-isopropylcathinone	111. 6-Bromo-MDMA	179. Diethylphenidate	247. MDPV (cathinone)	313. U-47700
54. 4-Chloropentadecane (cathinone)	112. 6-Chloro-MDMA	180. Diethylphenidate	248. Mephedrone (cathinone)	314. U-48800
55. 4-Cyano CUMYL-BUTTAICA (cannabinoid)	113. 6-EAPB	181. Dimethylamine (DMAR) (cathinone)	249. Mephentermine (MTA)	315. U-49900
56. 4-Cyano CUMYL-BUTNACA (cannabinoid)	114. 7-APB	182. Dimethylamine (DMAR) (cathinone)	250. Mescaline-NBOMe	316. U-50488
57. 4-Ethylcathinone	115. A-834735 (cannabinoid)	183. Dimethylmethcathinone	251. Methadone	317. U-51754
58. 4-Ethylmethcathinone	116. AB-001 (cannabinoid)	184. Dimethylmethcathinone	252. Methamphetamine	318. UR-144 (cannabinoid)
	117. AB-CHMINACA (cannabinoid)	185. Dimethylmethcathinone	253. Methamphetamine (MMA) (cathinone)	319. UR-144 N-propyl (cannabinoid)
	118. AB-FUBINACA (cannabinoid)	186. Dimethylmethcathinone	254. Methcathinone	320. Valeryl fentanyl
	119. AB-PINACA (cannabinoid)	187. Dimethylmethcathinone	255. Methedrone (cathinone)	321. W-18
	120. Acetyl fentanyl	188. Diphenidine	256. Methoxetamine (MXE) (cathinone)	322. XLR-11 (cannabinoid)
	121. Acrylfentanyl	189. Diphenidine (D2PM)	257. Methoxyphenidine (MOP) (cathinone)	323. XLR-11 N-(4-pentyl)
	122. ADB-FUBINACA (cannabinoid)	190. EADB-FUBINACA (cannabinoid)	258. Methoxyacetyl fentanyl	324. Zolpidem
	123. ADB-PINACA (cannabinoid)	191. EAM-2201 (cannabinoid)	259. Methylene (cathinone)	
	124. AH-7921	192. EMB-FUBINACA (cannabinoid)	260. Methylphenidate	
	125. AKB49-PINACA (cannabinoid)	193. Ethcathinone		
	126. Alfentanil	194. Ethylone (cathinone)		

**ThermoFisher**  
SCIENTIFIC

# TRUNARC UPDAED LIBRARY RELEASE:

- **Library Updates**
  - 33 new substances
  - Total 531 display names
  - 10 more fentanyl analogs
    - Plus 6 more Fentanyl precursors (norfentanyl)
  - 8 Nitazenes analogs
  - Xylazine
  - 3 AP-237s (Bucinnazines)



\*\*\*\*\*TruNarc Library Update 10.1-Released May  
2023\*\*\*\*\*

# IDEAL SCANNING DEVICE

- **INEXPENSIVE, PORTABLE, QUICK, AND SIMPLE TO USE, PROVIDING PROFESSIONAL REPORT OF DEFINITIVE RESULTS RECOGNIZED IN COURT. TESTING REQUIRES NO PRECONCEPTION OF THE SUBSTANCE THAT CAN TAKE ANY FORM, INCLUDING PILL, POWDER, LIQUID, AND INCLUDES BULK, AS WELL AS TRACE AMOUNTS. TESTING FULLY PROTECTS THE USER FROM EXPOSURE AND HAS AN ENDLESS LIBRARY OF SUBSTANCES (DRUGS, EXPLOSIVES, ORGANICS, ETC.). LIBRARY UPDATES ARE CONSTANT, AUTOMATIC, AND FREE OF CHARGE.**
- **THIS DEVICE DOES NOT EXIST. DEVICES CURRENTLY ON THE MARKET ALL INVOLVE UNDERSTANDING PROS, CONS, AND TRADEOFFS.**



# RAMAN SPECTROSCOPY





# ABUSED PRESCRIPTION PILLS



## RAMAN SPECTROSCOPY SWGDRG CATEGORY A -- THERMO SCIENTIFIC TRUNARC

# TECHNOLOGY AVAILABLE TO LEO

- **Advantages:**

- **Extremely Low False Positive Rate**
- **One scan, simultaneous searches of the entire on-board database**
- **Ease of use**
- **High Reliability**
- **Large on-board database (475 items)**
- **Scan thru glass and plastic containers**

- **Disadvantages:**

- **Cost: ~ \$35,000**
- **Must remove a very few items from their container (street doses of Fentanyl)**



# TECHNOLOGY AVAILABLE TO LEO

## RAMAN SPECTROSCOPY SWGDRG CATEGORY A -- THERMO GEMINI LOW DOSE

- **Advantages:**

- **Extremely Low False Positive Rate**
- **One scan, simultaneous searches of the entire on-board database**
- **Two Confirmatory Technologies (Raman & FTIR)**
- **Ease of use**
- **High Reliability**
- **Large on-board database (over 14,000 unique items)**
- **Scan thru glass and plastic containers**

- **Disadvantages:**

- **Cost ~ \$110,000**





**MASS SPEC/MASS SPEC SWGDRG CATEGORY A -- MX908**

# **TECHNOLOGY AVAILABLE TO LEO**

- **Advantages:**

- **Extremely Low False Positive Rate**
- **One scan, simultaneous searches of the entire on-board database**

- **Disadvantages:**

- **Cost Approximately \$75,000**
- **Low Number of Chemical items in the on-board database (~100)**
- **More complexity requires more consistent training**



# 1064DEFENDER

- **ANTI-FLUORESCENT - DRAMATICALLY INCREASES THE ABILITY TO IDENTIFY STREET HEROIN**
- **WIFI CONNECTIVITY**
- **2 DIFFERENT SCAN MODES FOR ADVANCED USERS – DIRECT ID AND SCREENER MODES**
- **GPS**
- **DIGITAL CAMERA**
- **WEBUI (USER INTERFACE)**



# GEMINI LOWDOSE ID – FOR LOW CONCENTRATION SUBSTANCES



Software package with Screener capabilities



Gemini analyzer

Gemini with LowDoseID



Type-H stick and methanol solution

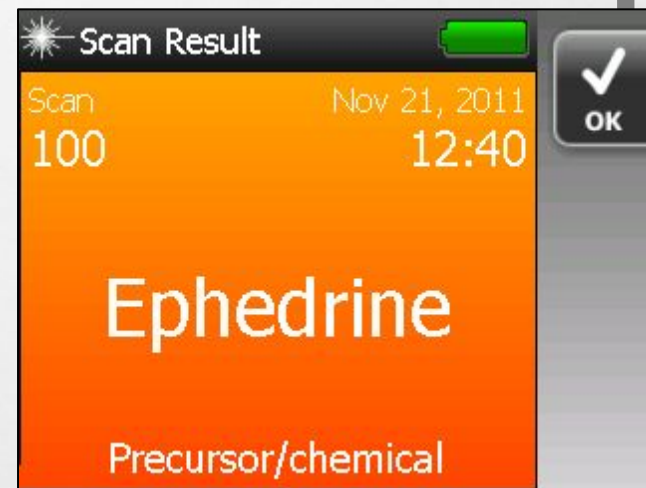


H-stick adapter for connection to Gemini via the Raman probe

# DEFINITIVE RESULTS

- **TRUNARC RESULTS ARE DISPLAYED BY COLOR DEPENDING ON THEIR LIBRARY CLASSIFICATION**

- **RED**
- **ORANGE**
- **GREEN**
- **GRAY**





# ThermoFisher

SCIENTIFIC

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