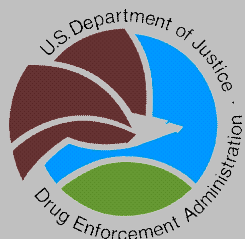


# Fentanyl Profiling Program Report



## First Half CY 2021

Drug Enforcement Administration  
Special Testing and Research Laboratory



## Summary and Key Findings

The Fentanyl Profiling Program (FPP) performs in-depth chemical analyses on fentanyl and fentanyl-related samples obtained from seizures submitted to the DEA Laboratory System. Analytical methodologies developed at the Special Testing and Research Laboratory (SFL1) through Operation Death Dragon, allow in-depth reporting on seizures. The Fentanyl Profiling Program Report summarizes the results and conclusions derived from these analyses on a bi-annual basis. FPP data is not intended to reflect U.S. market share, but is rather a sampling of exhibits submitted to this laboratory from the nine DEA regional and sub-regional chemistry laboratories.

For this reporting period, 538 fentanyl and fentanyl-related samples seized during the first half of CY 2021 (1H 2021) met the regional laboratories' sampling criteria and were submitted to and examined by the FPP. Of these samples, 492 contained only fentanyl and 46 contained both fentanyl and a fentanyl-related compound.

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- The Gupta Method was the primary synthetic route used in the synthesis of fentanyl samples examined by the FPP.
- The average purity of fentanyl in domestic powder samples was 13.6% with a range of 0.2% to 36.4%. Tablet samples contained an average of 2.2 mg of fentanyl with a range of 0.01 to 8.0 mg/tablet (median = 2.1 mg/tablet).
- Ninety of the tablet samples examined (45%) contained at least 2 mg of fentanyl.
- All samples containing fentanyl-related compounds also contained fentanyl.

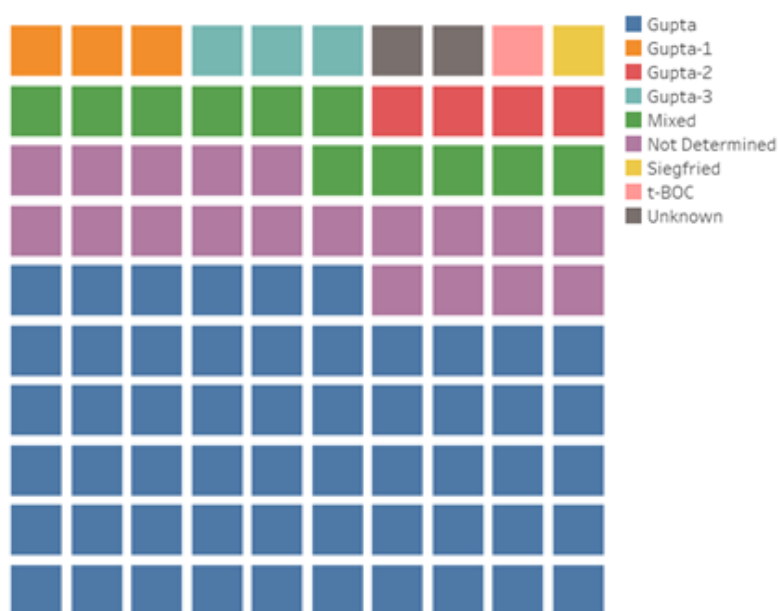
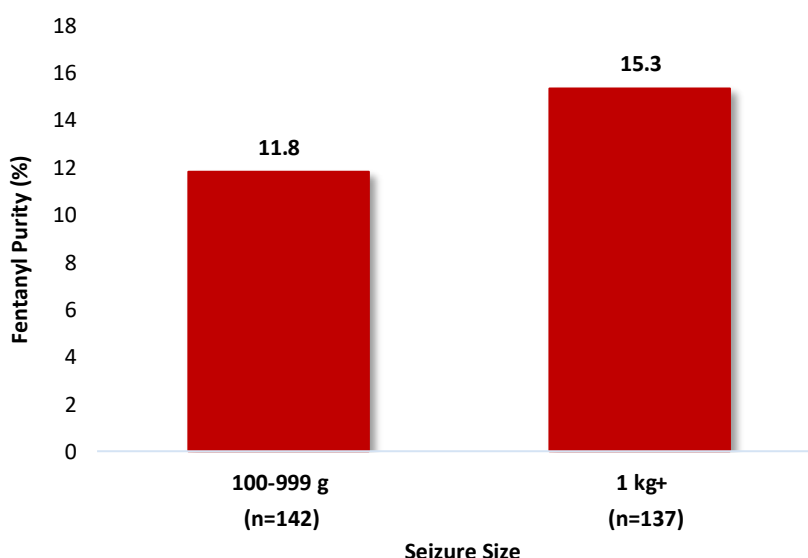
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## 1H CY 2021 Fentanyl Seizures—Powders

Three hundred eighteen samples, representing more than 323 kg of seized material, were examined. The average fentanyl purity was 13.6% with a range of 0.2% to 36.4%. No domestic samples had purities exceeding 90%. The overwhelming majority of samples were fentanyl HCl with the exception of three samples identified as fentanyl citrate. The salt form could not be determined for three samples due to low fentanyl concentration. The predominant synthetic route was determined to be the Gupta Method.

**Average Fentanyl Powder Purity  
by Seizure Size — 1H CY 2021**



**Synthetic Route Determined  
for Fentanyl Powders —  
1H CY 2021**

\*Gupta-1, Gupta-2, and Gupta-3 are suspected to be variations on the Gupta synthesis. SFL1 is performing additional research to evaluate these methods.

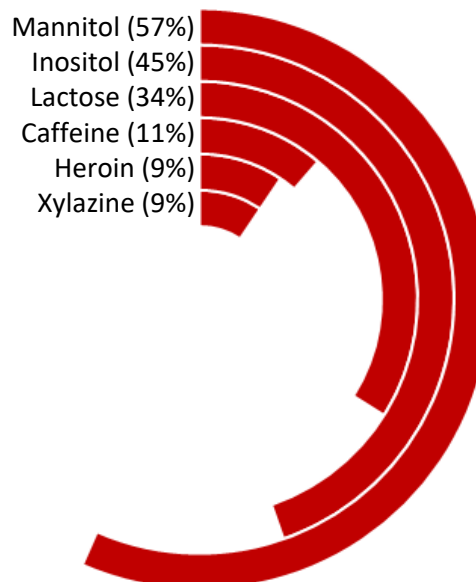
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## 1H CY 2021 Fentanyl Seizures—Powders, continued

### Adulteration and Dilution of Fentanyl Powders — 1H CY 2021

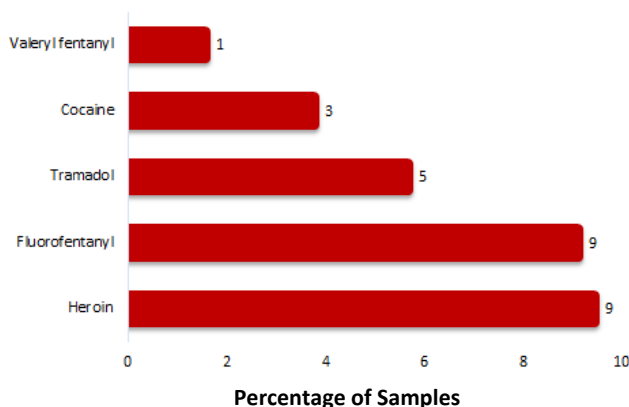
Xylazine was reported in 9% of samples analyzed by the FPP compared to 6% of samples in CY 2020.



### Top Secondary Controlled Substances Detected in Fentanyl Powders — 1H CY 2021

Tramadol, which was identified in 11% of samples analyzed by the FPP in CY 2020, was identified in 5% of samples in 1H 2021.

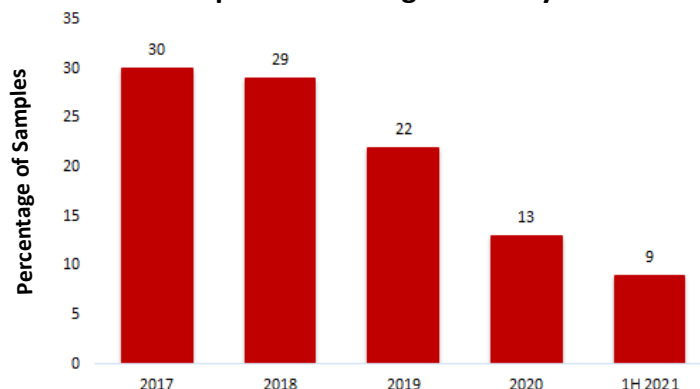
Cocaine was identified in 0.5% of samples in CY 2020. Reporting of cocaine in 3% of samples in 1H CY 2021 constitutes a 6 fold increase.



### Fentanyl/Heroin Mixtures

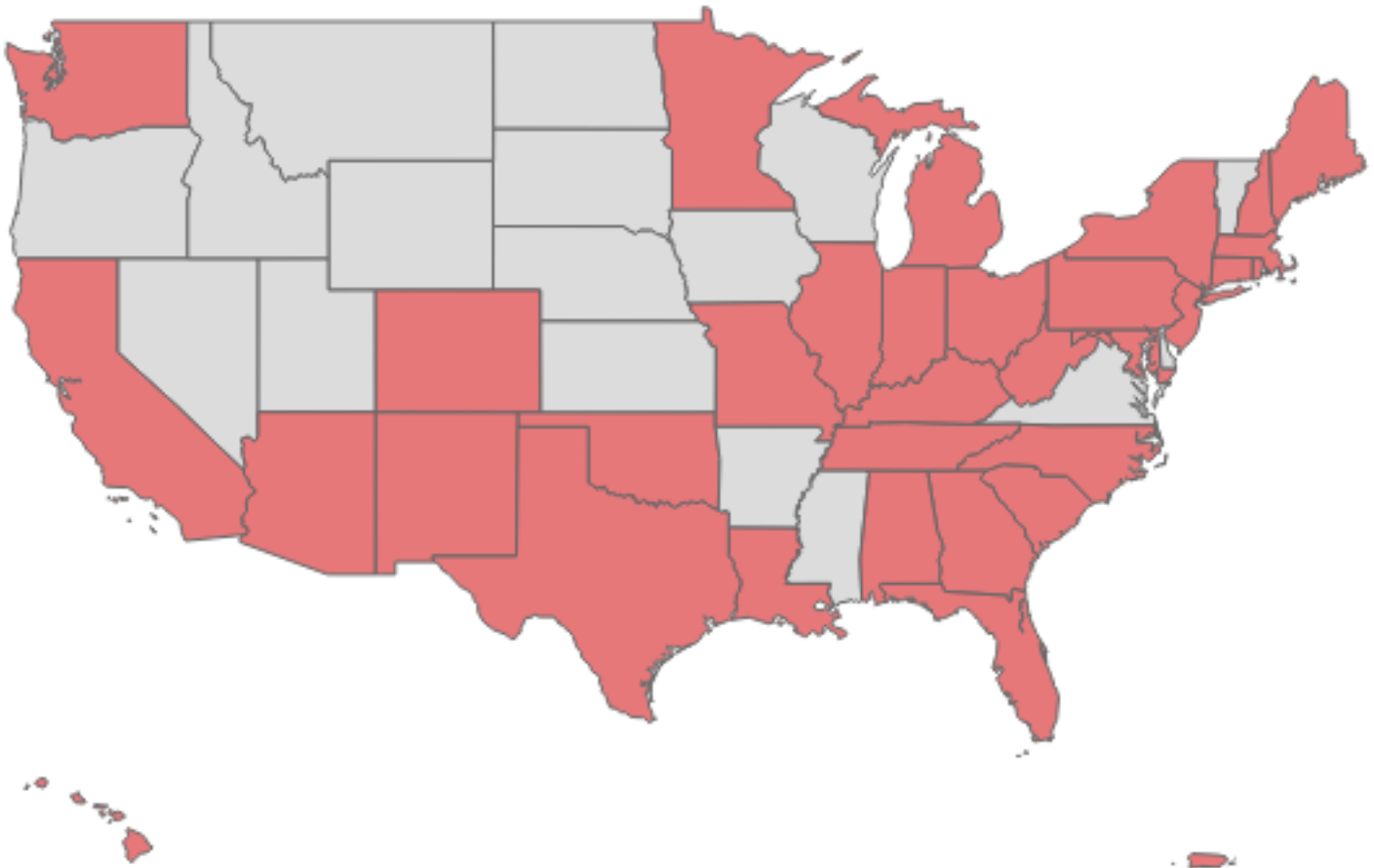
Fentanyl was mixed with heroin in 9% of the 318 samples examined. Wholesale fentanyl/heroin seizures within the continental U.S. (typically >1 kg) accounted for 6.1 kg of the 323 kg of powders examined (2% by weight). Heroin was quantitated in five samples where the average fentanyl and heroin purities were 2.2% and 4.8%, respectively.

### Samples containing Heroin by Year



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The following map summarizes the number of powder samples, total kg seized, and purity by state. States shaded in color indicate samples were analyzed by the FPP. Place your cursor on a state to preview the information.



Four tar samples met the sampling criteria this reporting period and were submitted to the FPP.

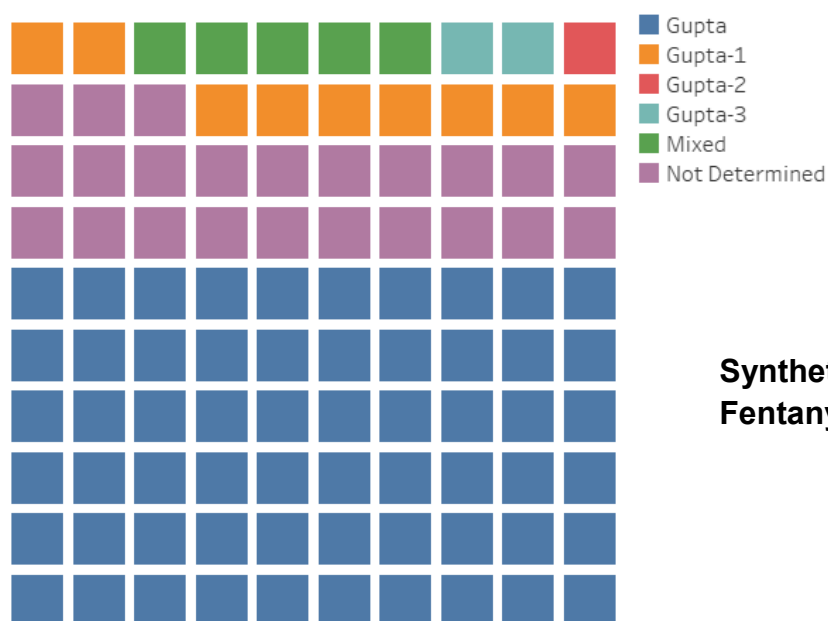
Primary Fentanyl	Purity (%)	Description	Route
Fentanyl	0.9 - 4.4%	Black or Brown Tar	Not Determined = 2 Gupta = 1 Mixed = 1

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## 1H CY 2021 Fentanyl Seizures—Tablets

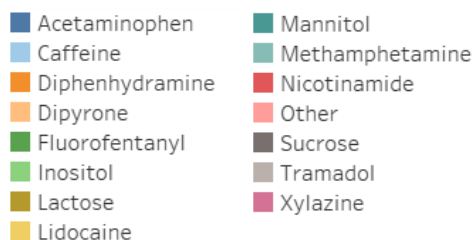
One hundred ninety-seven tablet samples, representing approximately 182 kg of seized material, were examined. The tablet samples contained an average of 2.2 mg of fentanyl with a range of 0.01 to 8.0 mg/tablet (median = 2.1 mg/tablet). All exhibits were fentanyl HCl. Approximately 30% of tablet samples contained a combination of acetaminophen, dipyrrone, and mannitol. The accompanying graphic illustrates the synthetic route determinations for fentanyl found in tablet samples.



**Synthetic Route Determined for Fentanyl Tablets — 1H CY 2021**

\*Gupta-1, Gupta-2, and Gupta-3 are suspected to be variations on the Gupta synthesis. SFL1 is performing additional research to evaluate these methods.

## Count of Most Common Adulterants and Diluents in Fentanyl Tablets — 1H CY 2021



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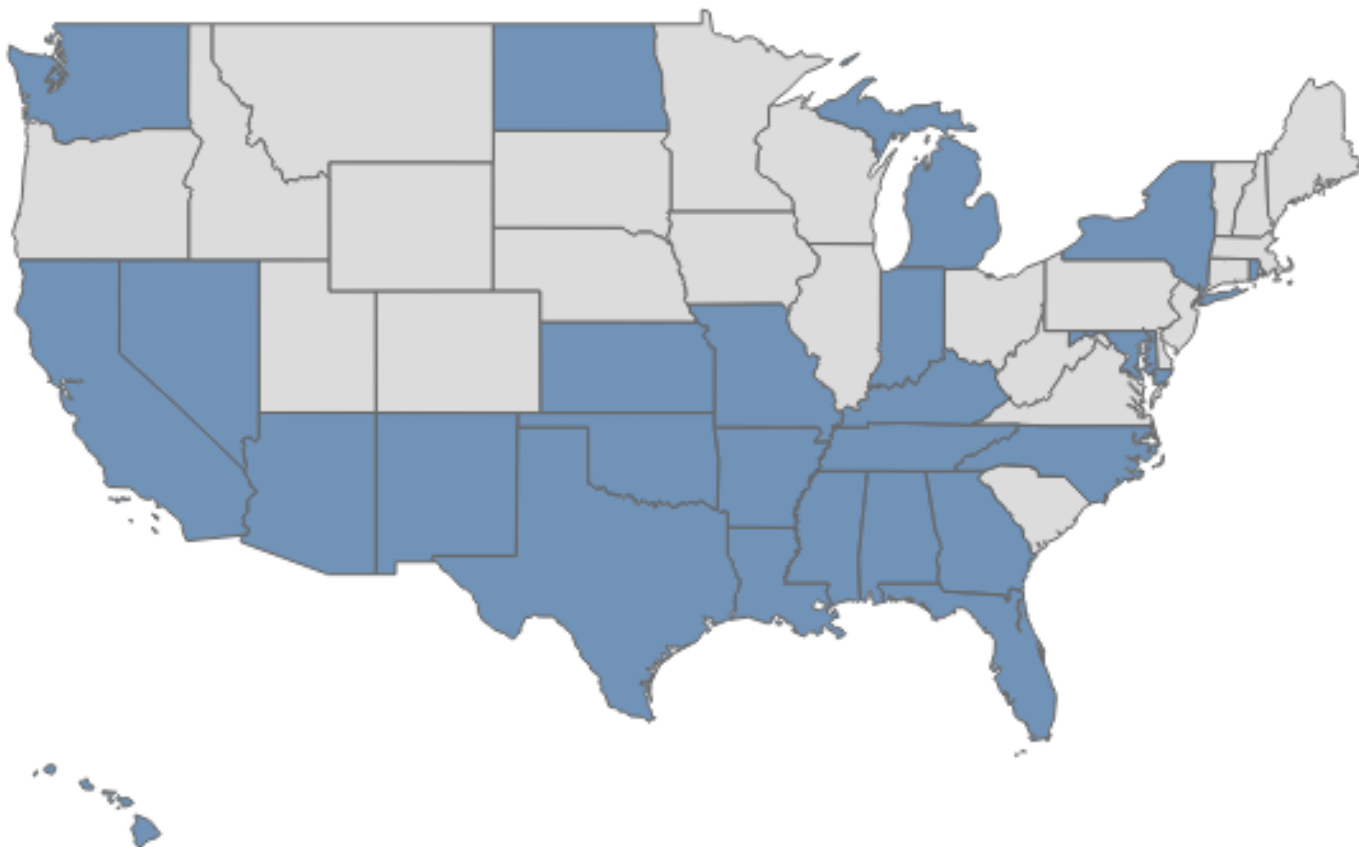


## 1H CY 2021 Fentanyl Seizures—Tablets, continued

### Tablets Containing at Least 2 mg of Fentanyl

A lethal dose of fentanyl is postulated to be approximately 2 mg (0.002 grams); however in opioid-naïve users, a much lower amount of fentanyl could result in serious adverse effects, including death. Ninety of the tablet samples examined (45%) contained at least 2 mg of fentanyl.

The following map summarizes the number of tablet samples and amount of fentanyl by state. States shaded in color indicate samples were analyzed by the FPP. Place your cursor on a state to preview the information.





## 1H CY 2021 Foreign Submissions

The FPP continues to analyze samples seized in foreign countries. The results are summarized in the following tables.

### Country #1

Primary Fentanyl	Purity (%)	Description	Route
Fentanyl	2.3	Tablets = 1	Gupta = 1

### Country #2

Primary Fentanyl	Purity (%)	Description	Route
Fentanyl	3.2-21.9	Powder = 8 (HCl = 4, Citrate = 4)	ND = 5 Janssen = 2 Mixed = 1

## 1H CY 2021 Fentanyl-Related Compound Submissions

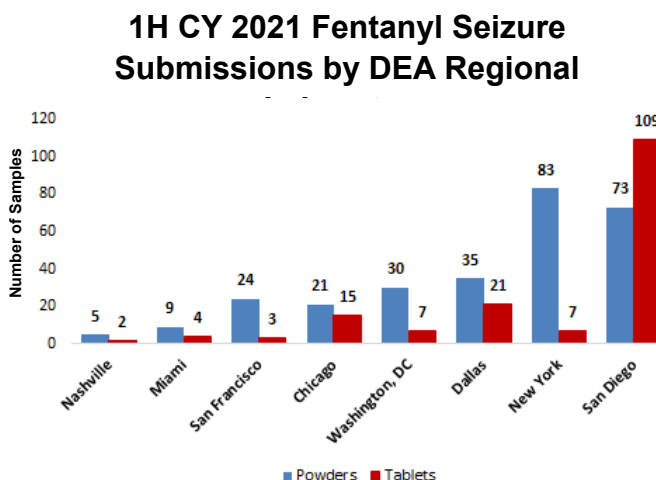
Fifty-one samples containing fentanyl-related compounds were examined. The following table summarizes data obtained from the analyses.

Fentanyl-Related Compound	# Exhibits	Description
Fluorofentanyl	47	Powder = 22 Tablets = 24 Tar = 1
Valeryl fentanyl	5	Powder = 4

\*One sample contained both fluorofentanyl and valeryl fentanyl

## DEA Laboratory Submissions

The majority of submissions to the FPP are from the eight DEA chemistry laboratories. The following graphic illustrates these submissions to SFL1 from DEA regional laboratories and is intended to show the distribution of examined samples throughout the U.S.



## FPP Spotlight—Fluorofentanyl (FF)

### The Science of Fluorofentanyl

FF was originally developed by Janssen Pharmaceutica in the 1960s. FF is synthesized using the same routes used to produce fentanyl, replacing the aniline with fluoroaniline. It is currently a Schedule I controlled substance under the fentanyl class scheduling action dated February 6, 2018.

### Fluorofentanyl Trends

FF was first identified by a DEA laboratory in September 2020 at the Southwest Border (SWB). The sample consisted of 1.0 kg of powder in which para-fluorofentanyl (p-FF) was the only controlled substance. Regardless of whether the samples were powder or tablets, approximately 75% of the samples submitted to the DEA laboratory system that contained FF also contained fentanyl. For powder samples containing FF, xylazine and heroin were also identified in about 20% of the samples. For tablet samples containing FF, acetaminophen was also identified in approximately 70% of the samples and xylazine was identified in approximately 10% of the samples. FPP does not currently report synthetic route for fentanyl-related compounds.

FF data retrieved January 18, 2022

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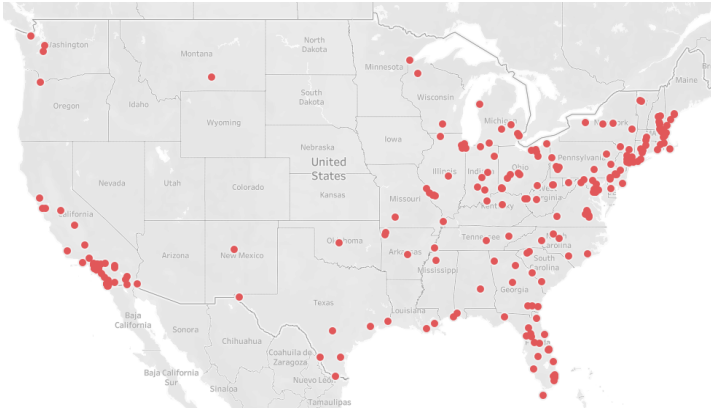


# Fentanyl Profiling Program Report 1st Half CY 2021

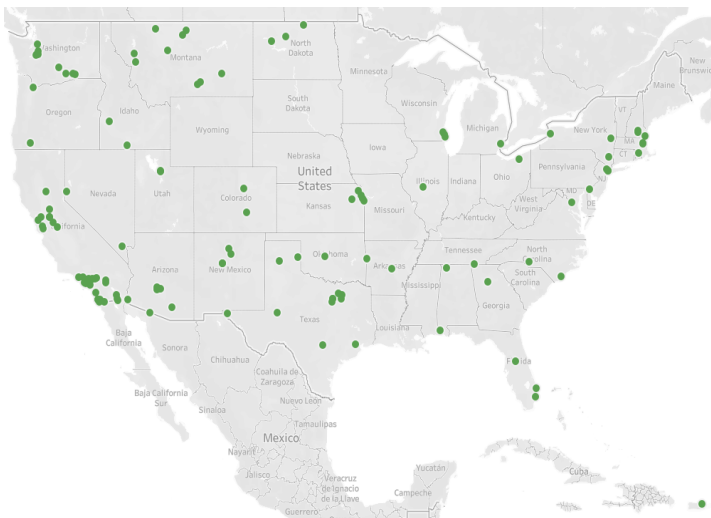


## DEA p-FF Seizures by Form 2020-2021

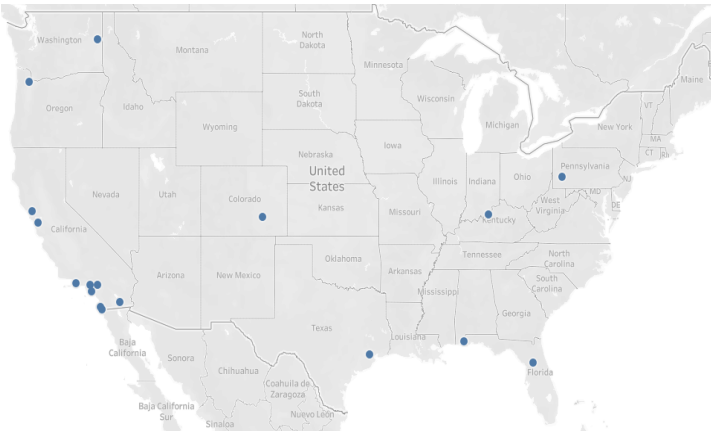
### Powder



### Tablet



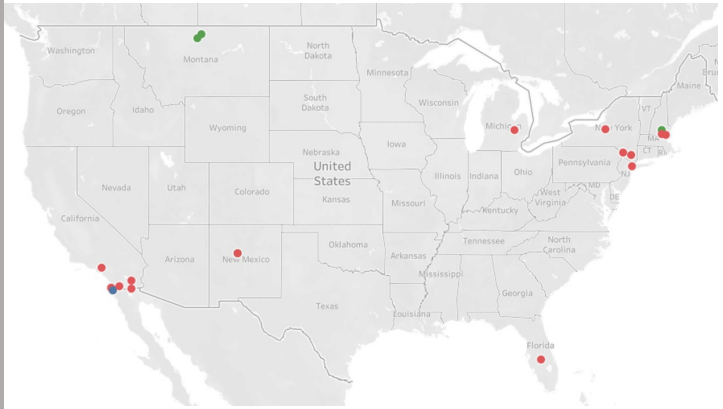
### Gum-Like



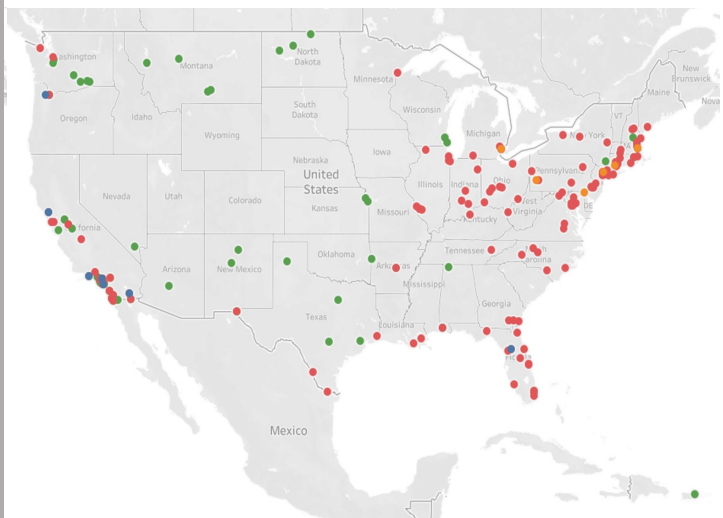
## DEA p-FF Seizures Over Time 2020-2021

■ Powder ■ Tablet ■ Gum-Like ■ Other

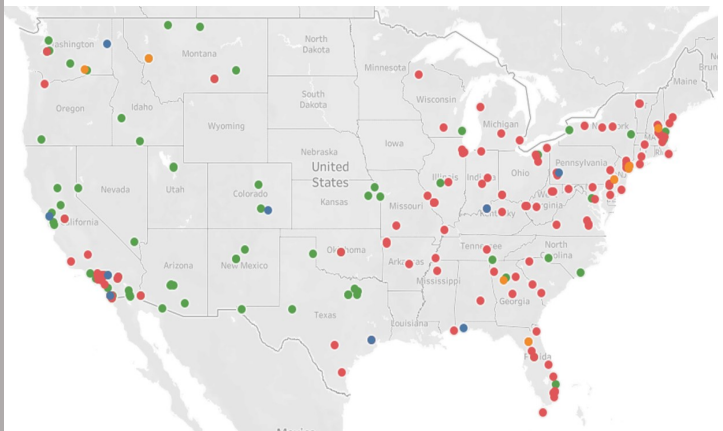
2H 2020



1H 2021



2H 2021



Data retrieved January 18, 2022

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