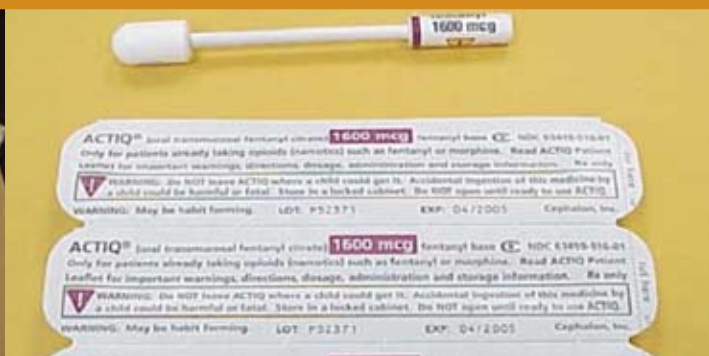


# Drug Enforcement Administration Office of Diversion Control



## National Forensic Laboratory Information System (NFLIS) Special Report **Fentanyl, 2003–2006**



The National Forensic Laboratory Information System (NFLIS) is a program sponsored by the Drug Enforcement Administration (DEA) Office of Diversion Control that systematically collects drug identification results and associated information from drug cases analyzed by federal, state, and local forensic laboratories. These laboratories analyze substances secured in law enforcement operations across the country and represent an important resource in monitoring drug abuse and trafficking.

This NFLIS Special Report presents findings on fentanyl drug items. Fentanyl is a powerful synthetic opiate approximately 50 times more potent than heroin and 100 times more powerful than morphine. It is typically prescribed to treat severe or chronic pain. In recent years, clandestinely produced fentanyl in combination with heroin or cocaine has been linked to hundreds of deaths and overdoses. Because fentanyl is an opiate and specialized testing is required to detect it in biological samples, many fentanyl overdoses were initially classified as heroin overdoses.<sup>1</sup>

This report presents findings on fentanyl drug items reported to NFLIS between 2003 and 2006. National and regional estimates for fentanyl are presented, as well as information on fentanyl combinations reported by state and local laboratories. Supplemental information for these years is also presented from DEA's System To Retrieve Information from Drug Evidence II (STRIDE), the IMS Health's National Prescription Audit *Plus* Retail database, and the compilation of medical examiner data on illicit fentanyl-related deaths.

<sup>1</sup> National Drug Intelligence Center, U.S. Department of Justice. (2006, June 5). *Fentanyl: Situation report* (SR-000001). Retrieved April 29, 2008, from <http://www.usdoj.gov/ndic/srs/20469/index.htm>

### Highlights

- Nationally, the estimated number of fentanyl items reported by state and local forensic laboratories significantly increased between 2003 and 2006, from 294 items in 2003 to 1,594 items in 2006 ( $\alpha = .05$ ). The change from 2005 to 2006 exhibited a fourfold increase in fentanyl items.
- From 2003 to 2006, significant increases in the number of analyzed fentanyl items were reported by laboratories in the Midwest, Northeast, and South. Fentanyl items in the Midwest increased 58% between 2004 and 2005 and nearly 500% from 2005 to 2006. In the Northeast, fentanyl items increased by more than 600% from 2003 to 2006, and in the South, the number of fentanyl items tripled during this time. The number of fentanyl drug items in the West decreased 5% between 2003 and 2006, although this decrease was not statistically significant.
- Similar to NFLIS, the number of fentanyl items reported in STRIDE increased substantially from 2003 to 2005, from 14 items to 30 items, and then more than tripled between 2005 and 2006, from 30 items to 97 items.
- During 2006, fentanyl was present in a total of 557 items, or about 2% of all drug combinations in 2006. More than 80% of fentanyl combinations were reported as heroin, and 8% were reported as cocaine.

# NATIONAL AND REGIONAL ESTIMATES

This section presents national and regional estimates for fentanyl items analyzed by state and local forensic laboratories from 2003 to 2006. National and regional trends are also presented. A ratio adjustment using case and item reports from all laboratories reporting to NFLIS was used to produce estimates for the nation and census regions. Appendix A describes the methods used in preparing these estimates.

According to NFLIS, during 2006 more than 1.9 million drug items were analyzed by state and local laboratories in the United States. Fentanyl represented 1,594 items or less than 1 percent of the overall drug caseload. However, the number of fentanyl items reported by state and local laboratories increased significantly between 2003 and 2006, from 294 items in 2003 to 1,594 items in 2006 ( $\alpha = .05$ ) (Table 1 and Figure 1). The change from 2005 to 2006 exhibited a fourfold increase in fentanyl items.

During the 4-year period, significant increases in the number of fentanyl items were reported in the Midwest, Northeast,

and South. In the Midwest, the number of reported fentanyl items increased from 79 items in 2003 to 686 items in 2006 (Figure 2). Fentanyl items in the Midwest increased 58% between 2004 and 2005 (from 72 items to 115 items), and they increased nearly 500% from 2005 to 2006 (from 115 items to 686 items).

In the Northeast, fentanyl items increased by more than 600%, increasing from 80 items in 2003 to 584 items in 2006. It is important to note that this increase is due in part to the Pennsylvania State Crime Laboratory reporting data to NFLIS for the first time in 2006.

In the South, the number of fentanyl items tripled from 94 items in 2003 to 286 items in 2006. The number of fentanyl drug items in the West decreased 5% from 2003 to 2006 (although not statistically significant at the  $\alpha = .05$  level), from 41 items to 38 items.

**Table 1** NATIONAL AND REGIONAL ESTIMATES FOR FENTANYL DRUG ITEMS, 2003–2006

*Estimated number of total analyzed fentanyl items.*

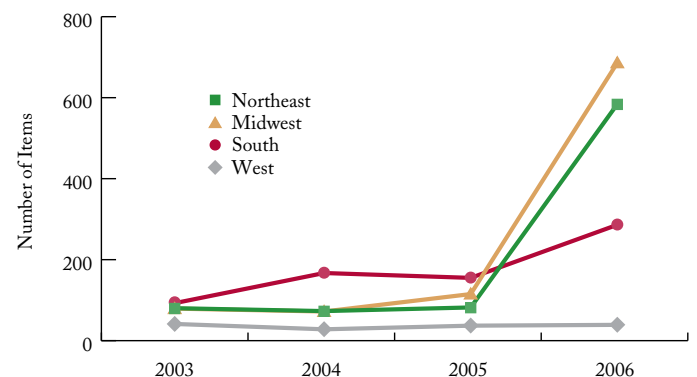
	TOTAL	2003	2004	2005	2006
<b>National</b>	2,617	294	340	389	1,594
<b>Northeast*</b>	819	80	73	82	584
<b>Midwest</b>	952	79	72	115	686
<b>South</b>	702	94	167	155	286
<b>West</b>	144	41	28	37	38

\*The increased number of fentanyl items in the Northeast in 2006 is due in part to the participation of the Pennsylvania State Crime Laboratory, which began reporting to NFLIS in 2006 and was unable to provide data for prior years.

**Figure 1.** National trend estimates for fentanyl, by year, 2003–2006.



**Figure 2.** Regional trend estimates for fentanyl, by year, 2003–2006.



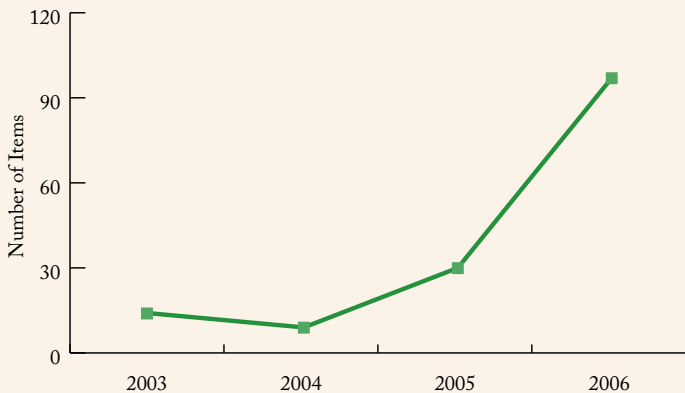
# FENTANYL COMBINATIONS

## System To Retrieve Information from Drug Evidence II (STRIDE)

The DEA's System to Retrieve Information from Drug Evidence II (STRIDE) collects the results of drug evidence analyzed at DEA laboratories across the country. STRIDE reflects evidence submitted by the DEA, other federal law enforcement agencies, and some local police agencies that was obtained during drug seizures, undercover drug buys, and other activities. STRIDE captures data on both domestic and international drug cases; however, the following results describe only those drugs obtained in the United States.

Between 2003 and 2005, the number of fentanyl items reported in STRIDE more than doubled, from 14 items in 2003 to 30 items in 2005. Similar to NFLIS, the number of fentanyl items reported in STRIDE more than tripled between 2005 and 2006, increasing from 30 items to 97 items.

Trends for fentanyl items analyzed in STRIDE, 2003-2006.



Combinations reported in NFLIS are both mixtures of substances and separately packaged substances within the same item or exhibit. The results presented in this section are based on all laboratories reporting 6 or more months of data in 2006.

During 2006, 29,842 items analyzed by state and local laboratories contained two or more substances, representing 2% of all reported items in NFLIS. Fentanyl was present in a total of 557 items, or about 2% of all drug combinations in 2006 (Table 2). More than 80% of fentanyl combinations were reported as heroin, and 8% were reported as cocaine. Other substances combined with fentanyl included other narcotic analgesics, precursors or contaminants, and excipients used to dilute or adulterate fentanyl.

**Table 2** FENTANYL COMBINATIONS  
*Number and percentage of items identified as fentanyl combinations, 2006.*

Substance in Combination with Fentanyl	Number	Percent of Fentanyl Combinations
Heroin	456	81.87%
Cocaine	47	8.44%
Diphenhydramine	12	2.15%
Benzylfentanyl	10	1.80%
Controlled substance, not identified*	5	0.90%
Procaine	5	0.90%
Acetaminophen	3	0.54%
Hydrocodone	3	0.54%
Oxycodone	3	0.54%
4-anilino-N-phenethyl-4-piperidine (ANPP)	2	0.36%
Alprazolam	2	0.36%
Methylphenidate	2	0.36%
Morphine	2	0.36%
Cannabis/THC	1	0.18%
Alpha-methylfentanyl	1	0.18%
Promethazine	1	0.18%
Methadone	1	0.18%
Propoxyphene	1	0.18%
<b>Total fentanyl combinations</b>	<b>557</b>	<b>100.00%</b>

\* As reported by the NFLIS laboratories, with no specific drug names provided.



# FENTANYL-RELATED DEATHS

According to medical examiner data compiled by the Centers for Disease Control and Prevention (CDC) and DEA, there were 1,005 confirmed and 162 suspected deaths related to the use of illicit fentanyl in 2005 and 2006. The CDC defined an illicit fentanyl-related death as a death where fentanyl caused or contributed to the death, there was no evidence of involvement of pharmaceutical fentanyl products, and toxicology testing confirmed the presence of fentanyl. Confirmed illicit fentanyl-related deaths were reported in six cities and states.

From the information and data collected, there is a strong indication that the fentanyl in these confirmed fentanyl-related deaths is the result of illicitly manufactured fentanyl rather than from fentanyl diverted from legal pharmaceutical manufacturers. Based on the fentanyl manufacture procedure markers, such as benzylfentanyl and 4-anilino-N-phenethyl-4-piperidine (ANPP), results from the forensic testing of fentanyl seizure suggest that most of these deaths have resulted from the distribution of illicit fentanyl made by the Siegfried method, which has been used

in four of the five most recently seized fentanyl clandestine laboratories.

Table 3 presents the number of confirmed deaths related to illicit fentanyl use by city or state with the number of fentanyl items reported to NFLIS. Cities and states with confirmed fentanyl-related deaths accounted for 16% of fentanyl items reported in NFLIS in 2005 and 61% of fentanyl items reported in NFLIS in 2006. The number of reported fentanyl-related deaths increased substantially from 2005 to 2006, from 66 deaths to 939 deaths. This increase in reporting was due in part to illicit fentanyl distributed across the United States that was produced at a clandestine laboratory in Mexico and increased testing for fentanyl by coroners and medical examiners beginning in 2005. Coroners and medical examiners began testing more frequently for fentanyl due to DEA intelligence regarding the Mexican laboratory. It is important to note that the data presented in Table 3 represent only a subset of fentanyl-related deaths.

**Table 3** CONFIRMED FENTANYL-RELATED DEATHS, BY STATE AND CITY, 2005-2006\*

*Number of confirmed fentanyl-related deaths and fentanyl items analyzed by state and local laboratories, 2005-2006.*

State/City	2005		2006	
	Fentanyl-Related Deaths	Analyzed Fentanyl Items in NFLIS	Fentanyl-Related Deaths	Analyzed Fentanyl Items in NFLIS
Chicago	21	1	321	6
Delaware	0	0	19	0
Detroit	41	0	189	54
New Jersey	0	11	86	182
Pennsylvania	0	5	268	238
St. Louis	4	4	56	101
<i>Total</i>	66	21	939	581

\* Death data were compiled by the CDC and DEA.



83% Fentanyl Hydrochloride and 4-anilino-N-phenethyl-4-piperidine (ANPP)

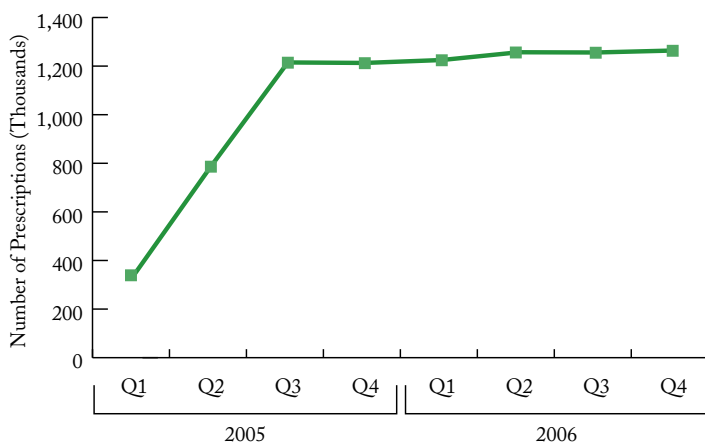
# FENTANYL PRESCRIPTIONS DISPENSED

Similar to other controlled prescription drugs, the abuse and trafficking of fentanyl fluctuate across the county. In addition to manufacturing it in clandestine laboratories, fentanyl may be diverted into illicit markets through doctor shopping, prescription forgery, pharmacy theft, and other methods.

Fentanyl prescription data indicate how often it has been legally dispensed for medical purposes. Nationally, the number of fentanyl prescriptions dispensed increased 257% from the first quarter (340,000 prescriptions) to the third quarter of 2005 (1.21 million prescriptions) and continued on a slight upward trend through the fourth quarter of 2006 (1.26 million prescriptions) (Figure 3). This same pattern was present across all regions (see Figure 4).

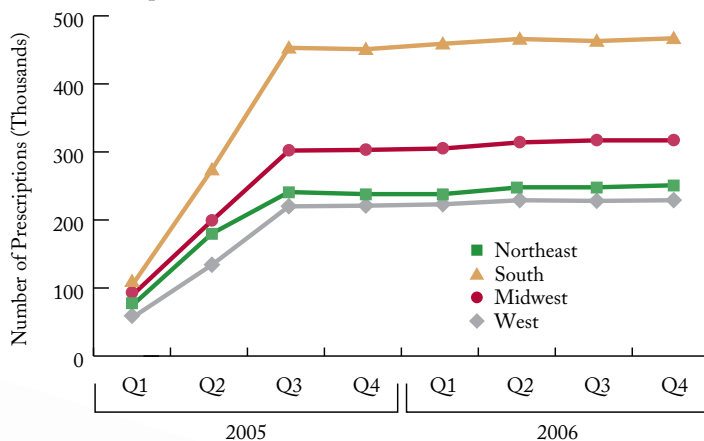
From 2005 to 2006, fentanyl prescriptions increased by 41% nationally, from nearly 3.6 million to approximately 5.0 million. The largest increases occurred in the South (44%) and West (44%), followed by the Midwest (40%) and Northeast (34%). In 2006, more than one third of all fentanyl prescriptions were dispensed in the South, while one quarter were dispensed in the Midwest.

**Figure 3.** Fentanyl prescriptions dispensed nationally, by quarter, 2005-2006.\*



\* Prescription data are from the IMS Health's National Prescription Audit Plus Retail database (2005-2006) and were extracted on August 30, 2007.

**Figure 4.** Fentanyl prescriptions dispensed regionally, by quarter, 2005-2006.\*



\* Prescription data are from the IMS Health's National Prescription Audit Plus Retail database (2005-2006) and were extracted on August 30, 2007.



# APPENDIX A

The national and regional estimates of fentanyl for this report are based on case and item reports from all laboratories reporting to NFLIS. In 2006, these represented approximately 84.5%<sup>1</sup> of all reported items.

To account for the missing case and item reports, the reporting results were ratio adjusted upward. Separate ratio adjustments were made to reflect the percentage missing for each region and laboratory type. In 2006, for example, 96,575 items out of an estimated 137,624<sup>2</sup> were reported to NFLIS by state laboratories located in the West. To account for the estimated 41,049 missing items, each reporting state laboratory in the West was weighted by 1.425. Similar weights were calculated for municipal laboratories in the West, as well as state and municipal

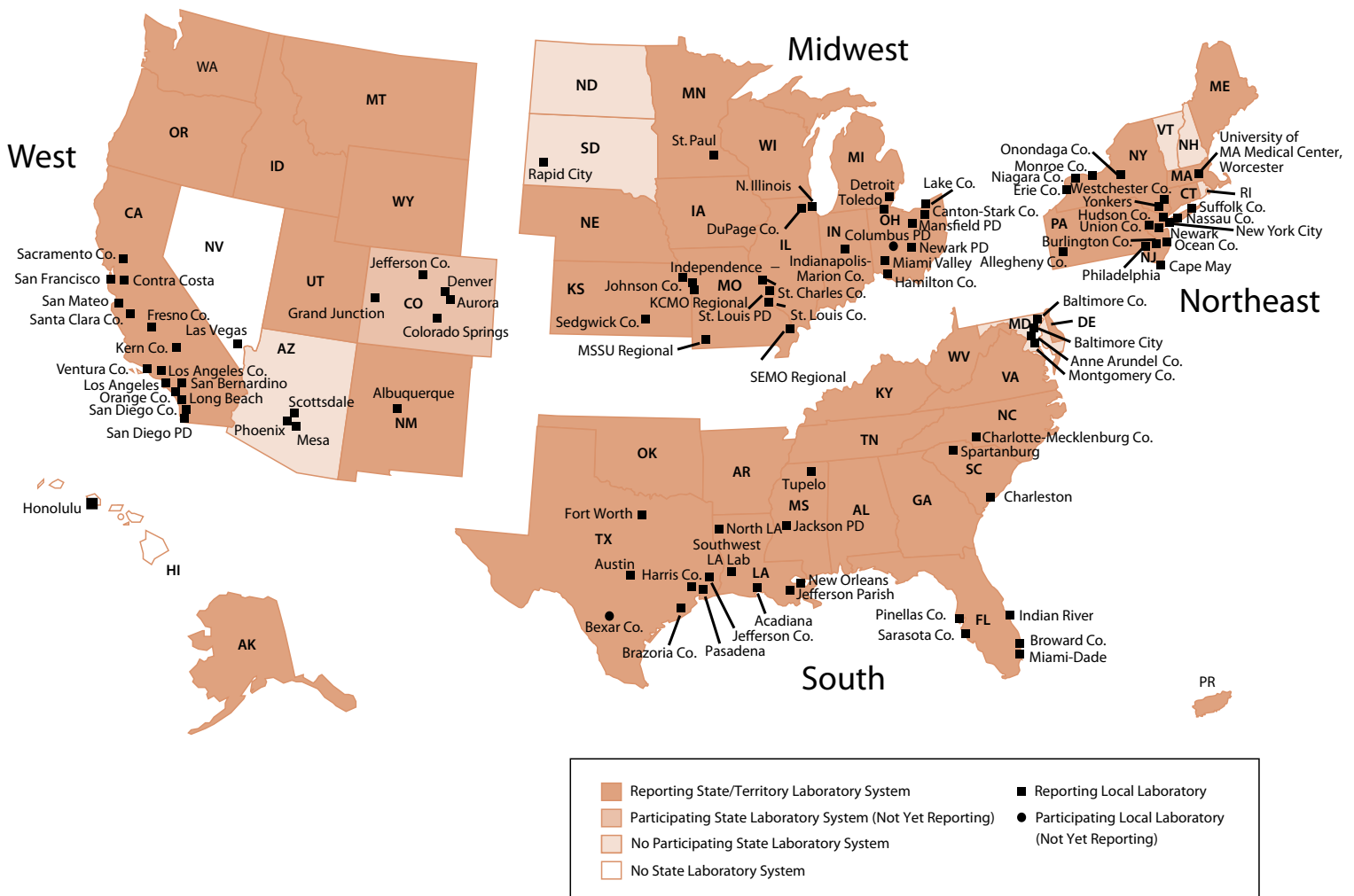
laboratories in the Northeast, South, and Midwest. Missing monthly data for laboratories reporting at least 6 months of data were imputed based on the monthly distributions of laboratories with nonmissing data by drug.

Since 2001, NFLIS reports have presented sample-based estimates. However, because of the larger proportion of laboratories now reporting to NFLIS, the ratio-based estimates for fentanyl are more stable and may be slightly different, though not significantly different, from the sample-based estimates.

<sup>1</sup>The percentage of items reported was 83.0%, 69.7%, and 63.1% in 2005, 2004, and 2003, respectively.

<sup>2</sup>Estimated item and case totals from nonreporting laboratories are from a survey conducted in 2004.

## Participating Laboratories, by Census Region



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