



Special Report: Opiates and Related Drugs Reported in NFLIS, 2009–2014

Revised February 2017

Highlights

From January 2009 to June 2014, an estimated 1,438,898 opiates and related drugs were reported to the National Forensic Laboratory Information System (NFLIS). The number of reports increased by 28% over this period, from 116,688 drug reports during the first half of 2009 to 149,516 during the first half of 2014.

From the first half of 2009 to the first half of 2014, hydromorphone reports more than doubled in the South from a rate of 0.75 to 1.93 reports per 100,000 persons (679 to 1,847 reports). All other regions fluctuated between minor increases and decreases in hydromorphone reports within the six-month reporting periods.

Fentanyl reports increased by 247% from the second half of 2013 to the first half of 2014. This increase was especially pronounced in the Northeast (550 reports), Midwest (475 reports), and South (404 reports).

Acetyl fentanyl, AH-7921, and MT-45 were first reported to NFLIS in 2013, whereas mitragynine was first reported in 2010. Acetyl fentanyl increased from 6 reports during the second half of 2013 to 43 reports during the first half of 2014.

According to data compiled by the Centers for Disease Control and Prevention, 202,157 deaths were the result of a drug poisoning or overdose between 2009 and 2013. Of these deaths, 57% involved heroin and natural, semisynthetic, and synthetic opiates.



Introduction

The National Forensic Laboratory Information System (NFLIS) is a program of the Drug Enforcement Administration (DEA), Office of Diversion Control, that collects drug identification results and associated information from drug cases submitted to and analyzed by Federal, State, and local forensic laboratories. This publication includes findings on opiates and related drugs in NFLIS. Semiannual national estimates from January 2009 to June 2014 are presented, as are reports of fentanyl identified with other drugs in the same item. Maps showing State- and county-level reports of oxycodone, hydromorphone, and fentanyl are also shown. NFLIS results for emerging opiate-related drugs are also included. Federal data from DEA and U.S. Customs and Border Protection laboratories are presented, along with data from IMS Health's National Prescription Audit *Plus* Retail database, the DEA's Automation of Reports and Consolidated Orders System (ARCOS), and Centers for Disease Control and Prevention (CDC) data on deaths associated with opiates and related drugs.

Many of the opiate-related substances presented in this publication are prescribed for the treatment of pain, such as hydromorphone (e.g., Dilaudid®), oxycodone (e.g., Opana®), and fentanyl (e.g., Duragesic®, Sublimaze®), which are Schedule II drugs under the Controlled Substances Act (CSA) and can be abused. The 2013 National Survey on Drug Use and Health shows that 4.5 million Americans used such opiates and related substances nonmedically in 2013.¹ Misuse and abuse of opiates and related substances can be deadly, particularly when these drugs are combined with other substances. For example, fentanyl has been observed being mixed with other commonly abused drugs, such as heroin, resulting in increased deaths between 2005 and 2007, and it seems to be reemerging in the United States.² Notably, although pharmaceutical fentanyl is diverted for abuse in the United States, the majority of fentanyl drug reports and fentanyl reported with other drugs result from clandestinely produced and trafficked fentanyl, not diverted pharmaceutical fentanyl.³

The opiates and related substances presented in this publication are regulated by the CSA or may be considered controlled substance analogues. Some of the newly reported substances include acetyl fentanyl, AH-7921, and MT-45. Acetyl fentanyl has been confirmed in at least 25 deaths combined from different States between 2013 and 2014.⁴ The European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) Early Warning System reported 15 deaths associated with AH-7921 between December 2012 and September 2013.⁵ One death associated with AH-7921 was reported in the United States in 2014.⁶ MT-45 was first reported to the Early Warning System in December 2013; since the last half of 2013, 28 deaths associated with MT-45 have been reported by the EMCDDA, and 2 deaths have been reported in the United States.⁷

National Estimates

Table 1 presents national semiannual estimates of selected opiate and related drug reports that were submitted to State and local laboratories from January 2009 through June 2014 and analyzed within three months of the end of each six-month period. During the first half of 2009, a total of 116,688 of these reports were identified by State and local forensic laboratories in the United States. This estimate increased by 28% to 149,516 reports during the first half of 2014. Heroin, oxycodone, and hydrocodone were the top three compounds reported during each six-month period. Tramadol and hydromorphone generally showed an increase in drug reports from the first half of 2009 through the first half of 2014, while propoxyphene drug reports consistently declined. Fentanyl gradually increased from

the first half of 2009 through the second half of 2013, then sharply rose by 247% from the second half of 2013 to the first half of 2014. A spike in oxymorphone reports was observed during the first half of 2011 and peaked at 1,591 drug reports during the first half of 2012, representing a 740% increase from the first half of 2009. A 48% decrease in oxymorphone reports was observed during the first half of 2013, followed by a slight increase through the first half of 2014.

A total of 448 reports of mitragynine were reported to NFLIS from the second half of 2011 to the first half of 2014. Acetyl fentanyl increased from 6 reports during the second half of 2013 to 43 reports during the first half of 2014.

Table 1 NATIONAL SEMIANNUAL ESTIMATES OF SELECTED OPIATE AND RELATED DRUG REPORTS IN NFLIS, 2009–2014¹

Selected Drug	2009				2010				2011			
	Jan-Jun		Jul-Dec		Jan-Jun		Jul-Dec		Jan-Jun		Jul-Dec	
	Number	Percent										
Heroin	53,584	45.92%	55,194	46.11%	57,969	42.93%	52,361	42.59%	56,892	43.57%	58,444	46.36%
Oxycodone	22,483	19.27%	24,058	20.10%	31,050	22.99%	29,681	24.15%	30,406	23.28%	26,769	21.24%
Hydrocodone	23,444	20.09%	23,027	19.24%	25,885	19.17%	22,631	18.41%	23,144	17.72%	21,398	16.97%
Buprenorphine	3,313	2.84%	3,911	3.27%	5,422	4.02%	5,107	4.15%	5,427	4.16%	4,831	3.83%
Methadone	4,925	4.22%	4,898	4.09%	5,007	3.71%	4,295	3.49%	4,460	3.42%	4,136	3.28%
Morphine	3,519	3.02%	3,631	3.03%	3,898	2.89%	3,548	2.89%	3,973	3.04%	4,017	3.19%
Codeine	2,194	1.88%	1,848	1.54%	2,110	1.56%	1,771	1.44%	2,007	1.54%	1,970	1.56%
Hydromorphone	1,157	0.99%	1,109	0.93%	1,332	0.99%	1,205	0.98%	1,503	1.15%	1,421	1.13%
Tramadol	635	0.54%	728	0.61%	887	0.66%	807	0.66%	842	0.64%	885	0.70%
Oxymorphone	189	0.16%	172	0.14%	359	0.27%	473	0.38%	1,176	0.90%	1,551	1.23%
Fentanyl	311	0.27%	334	0.28%	340	0.25%	334	0.27%	339	0.26%	306	0.24%
Propoxyphene	751	0.64%	698	0.58%	636	0.47%	641	0.52%	336	0.26%	203	0.16%
Meperidine	184	0.16%	100	0.08%	136	0.10%	74	0.06%	83	0.06%	83	0.07%
Mitragynine	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	42	0.03%
Acetyl fentanyl	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Sufentanil	0	0.00%	0	0.00%	1	0.00%	0	0.00%	0	0.00%	0	0.00%
Total²	116,688	100.00%	119,709	100.00%	135,032	100.00%	122,929	100.00%	130,589	100.00%	126,055	100.00%

Selected Drug	2012				2013				2014		Total	
	Jan-Jun		Jul-Dec		Jan-Jun		Jul-Dec		Jan-Jun		Number	Percent
	Number	Percent										
Heroin	65,510	48.17%	65,453	49.83%	74,049	54.04%	75,430	56.29%	79,937	56.82%	694,822	48.64%
Oxycodone	27,053	19.89%	25,695	19.56%	23,854	17.41%	21,199	15.82%	21,507	15.47%	283,756	19.83%
Hydrocodone	21,901	16.10%	20,042	15.26%	18,834	13.75%	17,389	12.98%	16,951	11.85%	234,647	16.36%
Buprenorphine	5,614	4.13%	5,672	4.32%	5,635	4.11%	6,281	4.69%	7,261	5.16%	58,474	4.09%
Methadone	4,199	3.09%	3,657	2.78%	3,539	2.58%	3,014	2.25%	2,931	2.06%	45,062	3.14%
Morphine	4,467	3.28%	4,336	3.30%	4,123	3.01%	3,743	2.79%	3,976	2.80%	43,231	3.02%
Codeine	1,908	1.40%	1,729	1.32%	1,628	1.19%	1,715	1.28%	1,520	1.08%	20,400	1.42%
Hydromorphone	1,988	1.46%	2,273	1.73%	2,600	1.90%	2,383	1.78%	2,351	1.66%	19,321	1.35%
Tramadol	1,134	0.83%	977	0.74%	1,279	0.93%	1,135	0.85%	1,346	0.95%	10,653	0.75%
Oxymorphone	1,591	1.17%	889	0.68%	823	0.60%	904	0.67%	901	0.62%	9,029	0.63%
Fentanyl	325	0.24%	340	0.26%	387	0.28%	580	0.43%	2,014	1.43%	5,609	0.39%
Propoxyphene	198	0.15%	127	0.10%	105	0.08%	102	0.08%	77	0.05%	3,874	0.27%
Meperidine	76	0.06%	55	0.04%	63	0.05%	44	0.03%	41	0.03%	940	0.07%
Mitragynine	46	0.03%	110	0.08%	105	0.08%	68	0.05%	77	0.06%	448	0.03%
Acetyl fentanyl	0	0.00%	0	0.00%	0	0.00%	6	0.00%	43	0.04%	49	0.00%
Sufentanil	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	0.00%
Total²	136,011	100.00%	131,354	100.00%	137,022	100.00%	133,992	100.00%	149,516	100.08%	1,438,898	100.00%

¹ Includes drug reports submitted to laboratories from January 1, 2009, through June 30, 2014, that were analyzed within three months of the end of each six-month period.

² Numbers and percentages may not sum to totals because of rounding.

Regional Hydromorphone, Oxymorphone, and Fentanyl Trends

This section presents NFLIS data for semiannual regional trends for hydromorphone, oxymorphone, and fentanyl per 100,000 persons aged 15 or older. By region, the highest rates of hydromorphone continued to be reported in the South from the first half of 2009 to the first half of 2014 (Figure 1). The estimated number of hydromorphone reports in the South spiked during the first half of 2012, peaked at a rate of 2.17 reports per 100,000 persons (2,066 reports) during the first half of 2013, then gradually decreased. From the first half of 2009 to the first half of 2014, hydromorphone more than doubled from a rate of 0.75 to 1.93 reports per 100,000 persons (679 to 1,847 reports) in the South. All other regions fluctuated between slight increases and decreases in hydromorphone reports per six-month reporting period.

Peak numbers of oxymorphone reports were observed during the first half of 2012 for the West, Northeast, and South, whereas in the Midwest, the peak number of reports was observed during the

second half of 2011, followed by a decrease in reports for each region (Figure 2). A second wave of increased numbers of oxymorphone reports was observed during the second half of 2013 for the West and Northeast, followed by a decrease during the first half of 2014.

An increase in the number of fentanyl reports was observed in all four regions during the first half of 2014 compared with the first half of 2009 (Figure 3). From the first half of 2009 to the first half of 2014, fentanyl drug reports increased dramatically in the Midwest from a rate of 0.25 to 1.21 reports per 100,000 persons (131 to 662 reports), in the Northeast from a rate of 0.12 to 1.40 reports per 100,000 persons (53 to 649 reports), and in the South from a rate of 0.11 to 0.67 reports per 100,000 persons (96 to 650 reports). During this same period, the West had the lowest number of fentanyl reports, which increased from a rate of 0.05 to 0.09 reports per 100,000 persons (30 to 53 reports).

Figure 1 NFLIS regional trends in hydromorphone reported per 100,000 persons aged 15 or older, January 2009–June 2014

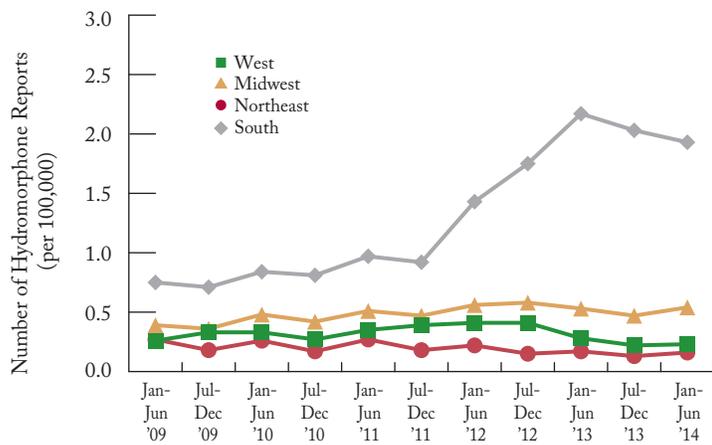


Figure 2 NFLIS regional trends in oxymorphone reported per 100,000 persons aged 15 or older, January 2009–June 2014

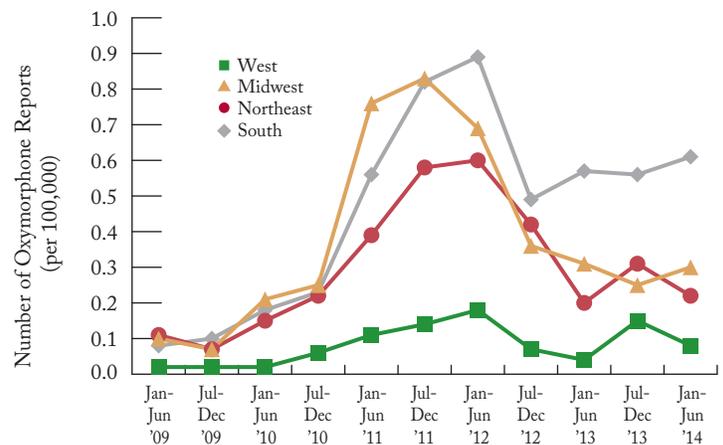
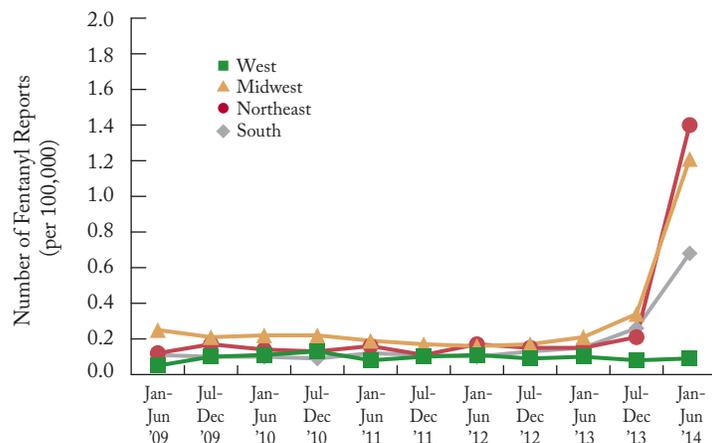


Figure 3 NFLIS regional trends in fentanyl reported per 100,000 persons aged 15 or older, January 2009–June 2014



Selected Opiates and Related Drugs Reported by Federal Laboratories

NFLIS collects the results of drug evidence from DEA and U.S. Customs and Border Protection (CBP) laboratories. DEA data reflect the results of evidence from drug seizures, undercover drug buys, and other evidence analyzed at DEA laboratories across the country. Although DEA data capture both domestic and international drug cases, the results presented in this section describe only those drugs obtained within the United States.

During the first half of 2014, a total of 15,483 drug reports were submitted to the DEA and CBP. The most commonly identified opiate or related drug was heroin, which accounted for 10% or 1,574 reports, followed by oxycodone (305 reports), fentanyl (122 reports), and hydrocodone (65 reports). In addition, there were 42 reports of morphine, 38 reports of buprenorphine, 28 reports of hydromorphone, and 22 reports of codeine. Tramadol (19 reports), oxymorphone (15 reports), methadone (12 reports), mitragynine (8 reports), acetyl fentanyl (1 report), and meperidine (1 report) were also submitted to DEA and CBP laboratories during the first half of 2014.

Emerging Opiate-Related Drugs

The Data Query System (DQS) is an interactive tool provided by NFLIS that allows participating laboratories the ability to search NFLIS data at the national, regional, State, or local level. The Alert System component of the DQS is available to DEA and NFLIS staff and provides information on emerging drugs that were newly reported to NFLIS by Federal, State, or local laboratories during specific periods. Table 2 lists the first year that acetyl fentanyl, AH-7921, MT-45, desomorphine, and mitragynine were reported to NFLIS and the counts for each drug from January 2009 to June 2014. Mitragynine was first reported in 2010 and had a total count of 488 reports between January 2009 and June 2014. Acetyl fentanyl (26 reports), AH-7921 (2 reports), and MT-45 (1 report) were first reported to NFLIS in 2013. Desomorphine was first reported to NFLIS in 2004 and has not been reported again since.

Table 2 *SELECTED EMERGING OPIATE-RELATED DRUGS, BY YEAR FIRST REPORTED AND COUNT IN THE NFLIS ALERT SYSTEM, JANUARY 2009–JUNE 2014*

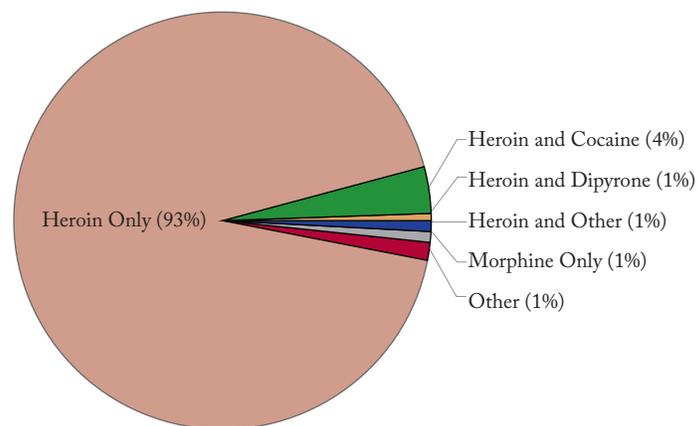
Selected Drug	Year First Reported to NFLIS	Total Count (January 2009–June 2014)
Mitragynine	2010	488
Acetyl fentanyl	2013	26
AH-7921	2013	2
MT-45	2013	1
Desomorphine	2004	0

Counts of Fentanyl Reported with Other Drugs

This section examines State and local laboratory counts of fentanyl reported with other drugs within the same item. The NFLIS data presented in this section are not counts of true combinations (e.g., powders mixed together) but instead are counts of separate drugs reported together in the same item. For example, a bag of pills containing fentanyl and oxycodone may be considered as one item by a laboratory. As a result, both drugs would be reported as substances within that single item. A bag of heroin packaged with a bag of fentanyl may be considered a single item, and both would be reported as substances within that item. Policies for identifying what an item is vary by laboratory.

During 2009, 29 reports of fentanyl and other drugs were identified within the same item. In 2013, the number of reports of fentanyl and other drugs within the same item increased to 108, and by the first half of 2014, the number increased to 649. As shown in Figure 4, of the 649 counts of fentanyl and other drugs within the same item, most were reports of fentanyl and heroin (603 reports or 93%), followed by reports of fentanyl, heroin, and cocaine (23 reports or 4%).

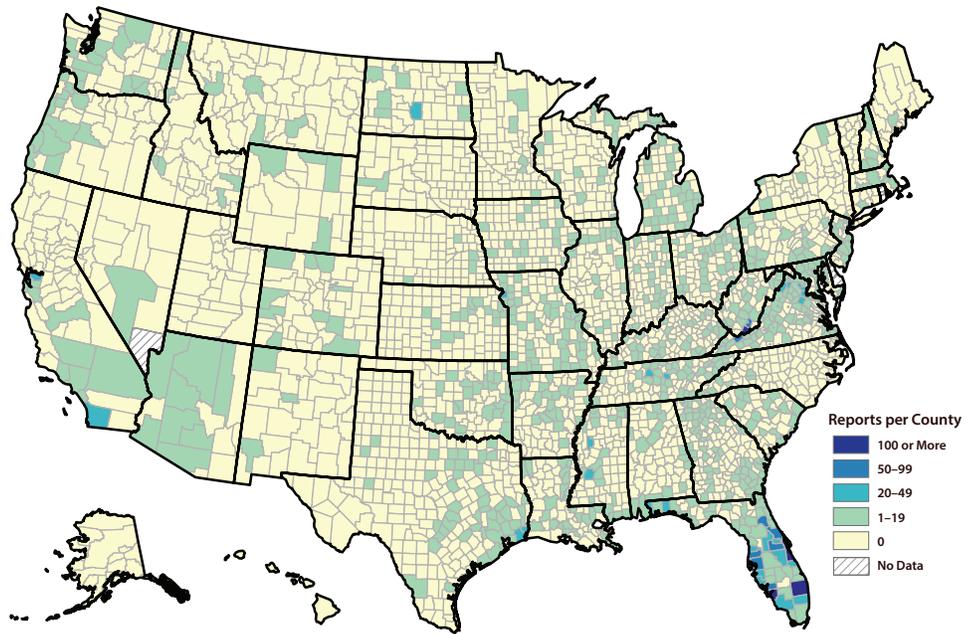
Figure 4 NFLIS counts of fentanyl reported with other drugs within the same item, January–June 2014



Note: Percentages may not sum to total because of rounding.

Figure 9 shows hydromorphone reports by county for 2013. Notable is the higher number of reports across counties in Florida relative to other U.S. counties. Higher numbers were also reported in pockets of counties in northern Virginia and southern West Virginia, crossing the border into Virginia, as well as in individual counties in California, Mississippi, Missouri, North Dakota, Tennessee, and Texas.

Figure 9 Hydromorphone reports in NFLIS, by county, January–December 2013



Opiate and Related Drug Prescriptions Dispensed

IMS Health’s National Prescription Audit *Plus* Retail database provides data on the number of prescriptions that have been legally dispensed for legitimate use. Nationally, the number of prescriptions for opiates and related drugs increased by 7% overall between 2009 (273.0 million) and 2014 (292.8 million) (Table 3). The number of dispensed prescriptions (in millions) for hydrocodone, the most commonly prescribed opiate-related drug across all years, remained stable from 2009 to 2014. The second most commonly dispensed

drug was oxycodone, which increased by 21% from 2009 to 2014. However, the numbers of prescriptions dispensed for five other drugs had larger increases from 2009 to 2014, including morphine (33%), hydromorphone (45%), oxymorphone (69%), tramadol (77%), and buprenorphine (144%). Conversely, the number of dihydrocodeine prescriptions declined sharply (99%), with fewer than 5,000 prescriptions dispensed during 2014. In addition, the number of meperidine prescriptions decreased by 49%.

Table 3 *IMS TOTAL PRESCRIPTIONS DISPENSED (IN MILLIONS), BY SELECTED OPIATES AND RELATED DRUGS, 2009–2014*

Selected Drug	2009	2010	2011	2012	2013	2014	Percent Change (2009–2014)	Percent of Total (2014)
Hydrocodone	126.9	139.8	144.5	144.0	136.7	125.3	-1.2	42.8
Oxycodone	49.0	58.2	60.6	59.8	58.3	59.5	21.4	20.3
Tramadol	26.1	30.6	36.8	41.9	44.2	46.2	77.1	15.8
Codeine	26.5	26.7	27.6	26.0	24.7	24.1	-8.9	8.2
Buprenorphine	4.7	6.3	7.7	9.1	10.2	11.5	144.3	3.9
Morphine	7.7	8.9	9.4	9.8	10.0	10.3	33.3	3.5
Fentanyl	6.4	6.9	6.9	6.8	6.8	6.7	5.4	2.3
Hydromorphone	2.6	3.1	3.5	3.8	3.9	3.8	44.9	1.3
Methadone	3.9	4.4	4.3	4.1	3.9	3.6	-7.4	1.2
Oxymorphone	0.7	1.0	1.5	1.6	1.1	1.2	69.0	0.4
Meperidine	0.7	0.7	0.6	0.5	0.4	0.4	-48.9	0.1
Dihydrocodeine	0.3	0.3	0.2	0.1	0.0	0.0	-98.7	0.0
Total¹	273.0	203.0	303.7	307.0	300.4	292.8	7.2	99.9

¹ Percentages may not sum to total because of rounding.

Source: IMS Health’s National Prescription Audit *Plus* Retail database.

Retail Distribution of Selected Opiates and Related Drugs

Selected annual DEA data from ARCOS show that the national legal distribution of selected opiates and related drugs to practitioners, pharmacies, and other businesses increased by 6% overall, from 2,614 kilograms per 100,000 persons in 2009 to 2,761 kilograms per 100,000 persons in 2013 (Table 4). Of the selected drugs, oxycodone, hydrocodone, and morphine represented roughly 75% of the distribution in 2009 and 2013. Oxycodone showed the greatest percentage increase of these three drugs, increasing 12% from 2009 to 2013. Oxycodone represented more than one-third of the national distribution of legal opiate-related drugs in 2013 (38%) and had a national average distribution of about 21 kilograms per 100,000 population.

Although the overall percentages of buprenorphine, hydromorphone, oxymorphone, and fentanyl were each represented by less than 2% of the national distribution in 2013, these drugs had

the highest percentage increases in legal distribution between 2009 and 2013 (buprenorphine, 82%; oxymorphone, 53%; hydromorphone, 39%; and fentanyl, 18%). Further analyses showed that for these four emerging compounds, some States had at least double the national average for kilograms per 100,000 population. In 2013, five States had buprenorphine distributions of at least 1.8 kilograms per 100,000 population (Kentucky, Massachusetts, Rhode Island, Vermont, and West Virginia). Only Florida had a hydromorphone distribution that was more than double the national average at 1.4 kilograms per 100,000 population. Ranging from 1.0 to 2.3 kilograms per 100,000 population, North Carolina, Tennessee, and West Virginia each had more than double the national average of oxymorphone distributions. Finally, only South Carolina had a fentanyl distribution that was at least twice the national average. In fact, South Carolina's legal fentanyl distribution was nine times that of the national average at 1.8 kilograms per 100,000 population.

Table 4 SELECTED OPIATE AND RELATED DRUG DISTRIBUTION IN KILOGRAMS PER 100,000 POPULATION, 2009 AND 2013

Selected Drug ¹	2009		2013		Percent Change (2009–2013)	National Average kg per 100,000 Population (2013)
	kg	% of Total	kg	% of Total		
Dihydrocodeine	1.5	0.1	0.5	0.0	-68.6	0.0
Meperidine	50.1	1.9	27.6	1.0	-44.9	0.5
Codeine	273.3	10.5	227.2	8.2	-16.9	4.5
Methadone	257.9	9.9	265.4	9.6	2.9	5.2
Morphine	397.7	15.2	409.8	14.8	3.0	8.0
Hydrocodone	618.1	23.6	661.4	24.0	7.0	13.0
Oxycodone	944.4	36.1	1,059.6	38.4	12.2	20.8
Fentanyl	8.3	0.3	9.8	0.4	17.9	0.2
Hydromorphone	21.4	0.8	29.7	1.1	38.8	0.6
Oxymorphone	17.0	0.7	26.0	0.9	52.5	0.5
Buprenorphine	24.2	0.9	44.0	1.6	81.7	0.9
Total	2,613.9	100.0	2,760.9	100.0	5.6	54.1

¹ Because of small numbers, data for propoxyphene, sufentanil, and dextropropoxyphene are not presented.

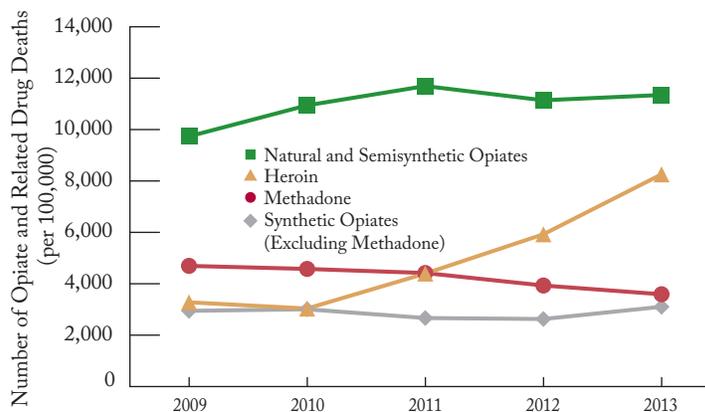
Source: DEA ARCOS.

Deaths Associated with Opiates and Related Drugs

According to data compiled for this publication by CDC, 202,157 deaths were the result of a drug poisoning or overdose between 2009 and 2013. Of these, 57% involved heroin and natural, semisynthetic, and synthetic opiates.

Overall, trend data show a 19% increase in the total number of drug poisoning or overdose deaths between 2009 and 2013. Heroin-related drug poisoning or overdose deaths increased by 152%, more than doubling from 3,278 deaths in 2009 to 8,257 deaths in 2013 (Figure 10). During this same time, deaths related to natural and semisynthetic opiates (e.g., morphine, codeine, hydrocodone, oxycodone) increased by 17% (9,735 to 11,346 deaths), and deaths related to synthetic opiates (which excluded methadone but included fentanyl and tramadol) increased by 5% (2,946 to 3,105 deaths). Conversely, the number of methadone-related poisoning or overdose deaths dropped by 24% (4,696 to 3,591 deaths) between 2009 and 2013.

Figure 10 Opiate and Related Drug Poisoning and Overdose Death Data Compiled by CDC, 2009–2013



Source: CDC/NCHS, National Vital Statistics System, Mortality File.

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- ⁶ Vorce, S. P., Knittel, J. L., Holler, J. M., Magluilo, J., Jr., Levine, B., Berran, P., & Bosy, T. Z. (2014). A fatality involving AH-7921. *Journal of Analytical Toxicology*, *38*, 226–230.
- ⁷ European Monitoring Centre for Drugs and Drug Addiction. (2014, November). *Risk Assessment Report of a new psychoactive substance: 1-cyclohexyl-4-(1,2-diphenylethyl)piperazine (MT-45)*. Retrieved from <http://www.emcdda.europa.eu/publications/risk-assessment/mt-45>

Methodology: A summary of the NFLIS estimation methodology can be found in the *NFLIS Statistical Methodology* publication at <https://www.nflis.deadiversion.usdoj.gov/Reports.aspx>.

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Errata: Previous versions of this publication included national estimate errors. The Drug Enforcement Administration has corrected these errors within the updated version of this publication.

Obtaining Copies of This Publication: Electronic copies of this publication can be downloaded from the NFLIS website at <https://www.nflis.deadiversion.usdoj.gov>.

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