2015 MIDYEAR REPORT

NFLIS

NATIONAL FORENSIC LABORATORY INFORMATION SYSTEM

U.S. DEPARTMENT OF JUSTICE
DRUG ENFORCEMENT ADMINISTRATION

OFFICE OF DIVERSION CONTROL

Contents

Highlights

- From January 1, 2001, through June 30, 2015, an estimated 459,346 distinct drug cases were submitted to State and local laboratories in the United States and analyzed by September 30, 2015. From these cases, an estimated 767,679 drug reports were identified.
- Cannabis/THC was the most frequently reported drug (204,030), followed by methamphetamine (133,374), cocaine (105,479), and heroin (91,645). These four most frequently reported drugs accounted for approximately 70% of all drug reports.
- Nationally, alprazolam reports showed an upward S-shaped trend, with increases from 2001 to 2010 and again in 2014 and 2015 ($p < .05$).* Oxycodone reports increased from 2003 to 2011, decreased from 2011 through 2013, then fluctuated upward. Dramatic increases in reports of hydrocodone occurred from 2002 to 2010, followed by decreases from 2011 to 2015. Dramatic increases also occurred in reports of buprenorphine from 2005 through 2010, with increases slowing through 2011 until more pronounced increases occurred from the second half of 2013 through 2015. Amphetamine reports decreased slightly from 2001 to 2004, then steadily increased through 2015. Clonazepam reports increased from 2004 through 2015, with the rate of increase becoming more gradual in more recent years.
- Regionally, alprazolam reports in the West and Midwest regions showed linear-increasing trends, while the Northeast and South regions showed S-shaped trends, with decreases beginning in 2012. Oxycodone reports for all regions showed S-shaped trends, with dramatic increases occurring from 2002 to 2010 and decreases occurring from 2011 to 2015. Hydrocodone reports for all regions except the Northeast also showed S-shaped trends similar to those for oxycodone, while the Northeast region showed increases through 2009 and steady decreases through 2015. For buprenorphine reports, the West, Northeast, and South regions showed S-shaped trends, with steady increases from 2002 to 2012, while the Midwest region showed an even more consistent upward-curving trend. For amphetamine reports, the Midwest and South regions showed upward-curving trends, while the trend in the West region was U-shaped and the trend in the Northeast was S-shaped. For clonazepam, the West and Midwest regions showed linear-increasing trends, while the Northeast and South regions had S-shaped trends, with reports in the Northeast decreasing in more recent years and reports in the South continuing to increase through 2015.
- Nearly 55% of narcotic analgesic reports were for oxycodone and hydrocodone. Alprazolam accounted for nearly 57% of tranquilizer and depressant reports. Among identified synthetic cannabinoids, XLR11, AB-CHMINACA, and AB-PINACA accounted for approximately 55% of the reports.
- For cannabis/THC, the West, Midwest, and South regions had decreasing trends from 2001 through 2015, while the Northeast region showed an upside-down U-shaped trend, with decreases beginning in 2009. All regional trends for methamphetamine generally increased since 2010. For cocaine reports, all regions showed decreases from around 2006 through 2013. For heroin reports, all regions showed U-shaped trends, with the lowest point occurring in 2006 in the West and Northeast, in 2007 in the South, and in 2004 in the Midwest. All regions showed downward trends for MDMA reports.
- Cannabis/THC was the most frequently reported drug in the Midwest (37%), Northeast (29%), and South (23%), and methamphetamine was the most frequently reported drug in the West (42%).
- Nationwide, cannabis/THC reports showed a downward S-shaped trend, with reports decreasing from 2001 through 2005, followed by slight increases through 2008, and decreasing again through 2015. Methamphetamine reports increased from 2001 through 2004, decreased through 2010, then increased through 2015. Cocaine reports gradually increased from 2001 to 2005, then decreased between 2005 and 2015. Heroin reports decreased from 2001 to 2005, but increased between 2005 and 2015. MDMA reports decreased from 2001 through 2003, increased from 2003 through 2009, then steadily decreased until recent years.

* Curved trends are sometimes described as U-shaped (i.e., decreasing in earlier years and increasing in recent years) and S-shaped (i.e., two turns in the trend, roughly either increasing-decreasing-increasing or decreasing-increasing-decreasing). See Appendix A for a more detailed methodology discussion.

Introduction

The National Forensic Laboratory Information System (NFLIS) is a program of the Drug Enforcement Administration (DEA), Office of Diversion Control. NFLIS systematically collects results from drug analyses conducted by State and local forensic laboratories. These laboratories analyze controlled and noncontrolled substances secured in law enforcement operations across the country, making NFLIS an important resource for monitoring illicit drug use and trafficking, including the diversion of legally manufactured drugs into illegal markets. NFLIS includes information on the specific substance and the characteristics of drug evidence, such as purity, quantity, and drug combinations. These data are used to support drug scheduling efforts and to inform drug policy and drug enforcement initiatives.

NFLIS is a comprehensive information system that includes data from forensic laboratories that handle the Nation's drug analysis cases. The NFLIS participation rate, defined as the percentage of the national drug caseload represented by laboratories that have joined NFLIS, is currently over 97%. Currently, NFLIS includes 50 State systems and 101 local or municipal laboratories/laboratory systems, representing a total of 277 individual laboratories. The NFLIS database also includes Federal data from DEA and U.S. Customs and Border Protection (CBP) laboratories.

This publication presents results of drug cases *submitted* to State and local laboratories from January 1, 2015, through June 30, 2015, that were *analyzed* by September 30, 2015. Data from Federal laboratories are also included in this publication. All data presented in this publication include the first, second, and third drugs that were mentioned in laboratories' reported drug items.

Section 1 of this publication provides national and regional estimates for the most frequently identified drugs. National and regional trends are also presented. Section 2 presents estimates of specific drugs by drug category. All estimates are based on the NEAR approach (National Estimates Based on All Reports).

Appendix A provides details on the methodology used in preparing the data presented in this publication. Appendix B includes a list of NFLIS participating and reporting laboratories. The benefits and limitations of NFLIS are presented in Appendix C.

Participating Laboratories, by U.S. Census Region

Section 1: National and Regional Estimates

This section presents national and regional estimates of drugs *submitted* to State and local laboratories from January 1, 2015, through June 30, 2015, that were *analyzed* by September 30, 2015 (see Table 1.1). National and regional drug estimates include all drug reports (up to three) mentioned in laboratories' reported drug items. National drug case estimates are also presented (see Table 1.2). In addition, semiannual trends are presented for selected drugs from January 2001 through June 2015.

The NEAR approach (National Estimates Based on All Reports) was used to produce estimates for the Nation and for the U.S. census regions. The NEAR approach uses all NFLIS reporting laboratories. Appendix A provides a detailed description of the methods used in preparing these estimates.

Table 1.1 NATIONAL AND REGIONAL ESTIMATES FOR THE 25 MOST FREQUENTLY IDENTIFIED DRUGS[1]

Estimated number and percentage of total drug reports submitted to laboratories from January 1, 2015, through June 30, 2015, and analyzed by September 30, 2015

Drug	National		West		Midwest		Northeast		South	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Cannabis/THC	204,030	26.58%	24,670	18.33%	71,429	36.78%	37,399	28.77%	70,532	22.83%
Methamphetamine	133,374	17.37%	56,932	42.30%	22,996	11.84%	1,884	1.45%	51,563	16.69%
Cocaine	105,479	13.74%	9,231	6.86%	22,424	11.55%	25,303	19.47%	48,522	15.71%
Heroin	91,465	11.91%	15,941	11.84%	26,622	13.71%	28,334	21.80%	20,568	6.66%
Alprazolam	22,781	2.97%	2,173	1.61%	4,088	2.10%	2,944	2.27%	13,576	4.40%
Oxycodone	21,306	2.78%	2,343	1.74%	4,055	2.09%	4,313	3.32%	10,595	3.43%
Hydrocodone	13,981	1.82%	1,838	1.37%	3,288	1.69%	686	0.53%	8,170	2.64%
Buprenorphine	8,660	1.13%	683	0.51%	1,608	0.83%	2,179	1.68%	4,190	1.36%
Amphetamine	6,204	0.81%	654	0.49%	1,648	0.85%	710	0.55%	3,192	1.03%
Clonazepam	5,895	0.77%	540	0.40%	1,255	0.65%	1,016	0.78%	3,085	1.00%
Fentanyl	5,787	0.75%	113	0.08%	2,108	1.09%	2,186	1.68%	1,380	0.45%
Ethylone	4,894	0.64%	277	0.21%	523	0.27%	822	0.63%	3,272	1.06%
alpha-PVP	*	*	98	0.07%	453	0.23%	346	0.27%	*	*
XLR11	3,769	0.49%	393	0.29%	660	0.34%	922	0.71%	1,795	0.58%
AB-CHMINACA	3,678	0.48%	515	0.38%	584	0.30%	388	0.30%	2,191	0.71%
Morphine	3,596	0.47%	599	0.45%	883	0.45%	255	0.20%	1,859	0.60%
Diazepam	2,751	0.36%	450	0.33%	642	0.33%	305	0.23%	1,355	0.44%
Tramadol	2,641	0.34%	347	0.26%	792	0.41%	211	0.16%	1,292	0.42%
Methadone	2,617	0.34%	377	0.28%	525	0.27%	521	0.40%	1,193	0.39%
MDMA	2,421	0.32%	812	0.60%	835	0.43%	234	0.18%	539	0.17%
Phencyclidine (PCP)	2,318	0.30%	200	0.15%	486	0.25%	839	0.65%	794	0.26%
Noncontrolled, non-narcotic[2]	2,120	0.28%	917	0.68%	35	0.02%	329	0.25%	839	0.27%
Hydromorphone	2,045	0.27%	153	0.11%	240	0.12%	86	0.07%	1,566	0.51%
Psilocin/psilocibin	1,959	0.26%	767	0.57%	540	0.28%	137	0.11%	515	0.17%
AB-PINACA	1,893	0.25%	225	0.17%	641	0.33%	399	0.31%	629	0.20%
Top 25 Total	659,842	85.95%	121,246	90.09%	169,358	87.21%	112,744	86.74%	256,495	83.03%
All Other Drug Reports	107,836	14.05%	13,336	9.91%	24,847	12.79%	17,242	13.26%	52,411	16.97%
Total Drug Reports[3]	767,679	100.00%	134,582	100.00%	194,205	100.00%	129,986	100.00%	308,906	100.00%

alpha-PVP=alpha-Pyrrolidinopentiophenone

XLR11=[1-(5-Fluoro-pentyl)1H-indol-3-yl],(2,2,3,3-tetramethylcyclopropyl)methanone

AB-CHMINACA=(N-(1-Amino-3-methyl-1oxobutan-2-yl)-1-(cyclohexylmethyl)1H-indazole-3-carboxamide)

MDMA=3,4-Methylenedioxymethamphetamine

AB-PINACA=(N-(1-Amino-3-methyl1-oxobutan-2-yl)-1-pentyl-1H-indazole3-carboxamide)

* *The estimate for this drug does not meet the standards of precision and reliability. See Appendix A for a more detailed methodology discussion.*

[1] *Sample n's and 95% confidence intervals for all estimates are available on request.*

[2] *As reported by NFLIS laboratories, with no specific drug name provided.*

[3] *Numbers and percentages may not sum to totals because of rounding.*

Table 1.2 *National Case Estimates*

Top 25 estimated number of drug-specific cases and their percentage of distinct cases, January 1, 2015, through June 30, 2015

Drug	Number	Percent
Cannabis/THC	147,750	32.17%
Methamphetamine	102,157	22.24%
Cocaine	85,470	18.61%
Heroin	70,182	15.28%
Alprazolam	19,206	4.18%
Oxycodone	16,609	3.62%
Hydrocodone	12,100	2.63%
Buprenorphine	7,835	1.71%
Amphetamine	5,426	1.18%
Clonazepam	5,366	1.17%
Fentanyl	4,496	0.98%
Ethylone	3,957	0.86%
alpha-PVP	*	*
Morphine	3,130	0.68%
AB-CHMINACA	2,757	0.60%
XLR11	2,554	0.56%
Diazepam	2,464	0.54%
Tramadol	2,424	0.53%
Methadone	2,305	0.50%
Phencyclidine (PCP)	2,087	0.45%
MDMA	1,813	0.39%
Hydromorphone	1,790	0.39%
Psilocin/Psilocibin	1,690	0.37%
Codeine	1,521	0.33%
Naloxone	1,498	0.33%
Top 25 Total	509,781	110.98%
All Other Drugs	82,561	17.97%
Total All Drugs[1]	592,342	128.95%[2]

alpha-PVP=alpha-Pyrrolidinopentiophenone

AB-CHMINACA=(N-(1-Amino-3-methyl-1oxobutan-2-yl)-1-(cyclohexylmethyl)1H-indazole-3-carboxamide)

XLR11=[1-(5-Fluoro-pentyl)1H-indol-3-yl],(2,2,3,3-tetramethylcyclopropyl)methanone

MDMA=3,4-Methylenedioxymethamphetamine

* *The estimate for this drug does not meet the standards of precision and reliability. See Appendix A for a more detailed methodology discussion.*

[1] *Numbers and percentages may not sum to totals because of rounding.*

[2] *Multiple drugs can be reported within a single case, so the cumulative percentage exceeds 100%. The estimated national total of distinct case percentages is based on 459,346 distinct cases submitted to State and local laboratories from January 1, 2015, through June 30, 2015, and analyzed by September 30, 2015.*

Drugs Reported by Federal Laboratories

This section includes drug reports from the eight U.S. Drug Enforcement Administration (DEA) laboratories and seven U.S. Customs and Border Protection (CBP) laboratories. The data reflect results of evidence from drug seizures, undercover drug buys, operations targeting express consignment and international mail facilities, and other evidence analyzed at DEA and CBP laboratories across the country for drug cases submitted by Federal law enforcement agencies and select local police agencies. Although the DEA captures both domestic and international drug cases, the results presented in this section describe only those drugs obtained within the United States. Similarly, the CBP data represent seizures at U.S. points of entry and domestic drug cases.

Most Frequently Reported Drugs by Federal Laboratories[1]

Number and percentage of drug reports submitted to laboratories from January 1, 2015, through June 30, 2015, and analyzed by September 30, 2015

Drug	Number	Percent
Methamphetamine	2,230	16.18%
Cocaine	1,728	12.54%
Heroin	1,312	9.52%
Cannabis/THC	1,238	8.98%
Ethylone	212	1.54%
XLR11	189	1.37%
AB-CHMINACA	174	1.26%
Oxycodone	165	1.20%
Testosterone	143	1.04%
Fentanyl	136	0.99%
All Other Drug Reports	6,255	45.39%
Total Drug Reports	13,782	100.00%[2]

XLR11=[1-(5-Fluoro-pentyl)1H-indol-3-yl],(2,2,3,3-tetramethylcyclopropyl)methanone

AB-CHMINACA=N-(1-Amino-3-methyl-1oxobutan-2-yl)-1-(cyclohexylmethyl)1H-indazole-3-carboxamide)

[1] *Federal drug reports in this table include 12,402 reports from Drug Enforcement Administration laboratories and 1,380 reports from U.S. Customs and Border Protection laboratories.*

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

National and Regional Drug Trends

The remainder of this section presents semiannual national and regional trends of selected drugs submitted to State and local laboratories during each six-month data reference period and analyzed within three months of the end of each six-month period. The trend analyses test the data for the presence of both linear and curved trends using statistical methods described in more detail in Appendix A. Curved trends are sometimes described as U-shaped (i.e., decreasing in earlier years and increasing in recent years) and S-shaped (i.e., two turns in the trend, roughly either increasing-decreasing-increasing or decreasing-increasing-decreasing). Because the trends are determined through regression modeling, the descriptions of the trends detailed in this section may differ slightly from the plotted lines of estimates featured in Figures 1.1 through 1.15. Estimates include all drug reports (up to three) identified among the NFLIS laboratories' reported drug reports. Between the first half of 2001 and the first half of 2015, the total estimated number of drug reports decreased approximately 14%, from 887,939 to 767,679.

National prescription drug trends

Figures 1.1 and 1.2 present national trends for the estimated number of prescription drug reports that were identified as alprazolam, oxycodone, hydrocodone, buprenorphine, amphetamine, and clonazepam. Significant ($p < .05$) results include the following:

- Alprazolam reports showed an S-shaped trend. Reports increased from 2001 to 2010, then rates decreased through 2013. From 2014 through the first half of 2015, reports increased significantly.
- Oxycodone, hydrocodone, and buprenorphine reports showed S-shaped trends. Dramatic increases in reports of hydrocodone occurred from 2002 to 2010, followed by decreases from 2011 to the first half of 2015. For oxycodone, increases in reports occurred from 2003 to 2011, with a decrease in reports similar to that for hydrocodone from 2011 through 2013. Oxycodone reports from 2014 through the first half of 2015 fluctuated upward. The upward trend for buprenorphine reports was similar to those for oxycodone and hydrocodone, but it occurred a few years later, with dramatic increases occurring from 2005 to 2010. The increase in buprenorphine reports slowed from 2011 until more pronounced increases occurred in the second half of 2013 through the first half of 2015.
- Amphetamine reports decreased from 2001 to 2004, but increased between 2004 and the first half of 2015.
- Clonazepam reports also showed S-shaped trends. Reports increased from 2001 to 2002, followed by marginal decreases in 2003. Reports of clonazepam steadily increased from 2004 through the first half of 2015, with rates of increase slowing down in more recent years.

Significance tests were also performed on differences from the first half of 2014 to the first half of 2015 in order to identify more recent changes. Across these two periods, reports of alprazolam (from 20,407 to 22,781 reports) and buprenorphine (from 7,261 to 8,660 reports) increased significantly ($p < .05$), while reports of hydrocodone (from 16,951 to 13,981 reports) decreased significantly. There were no significant changes in reports of oxycodone, amphetamine, and clonazepam.

Heroin fentanyl pills

Figure 1.1 National trend estimates for alprazolam, oxycodone, and hydrocodone, January 2001–June 2015

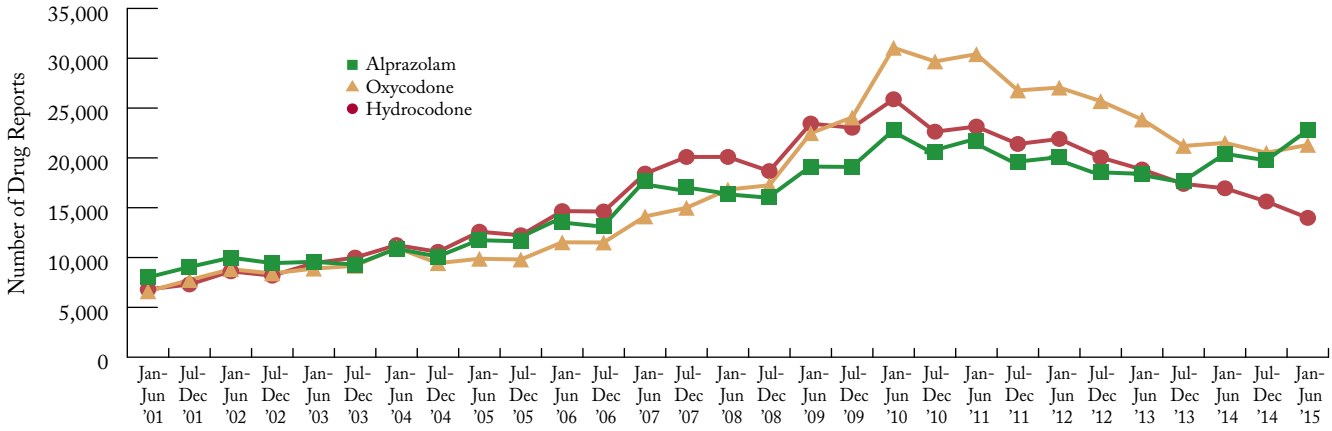
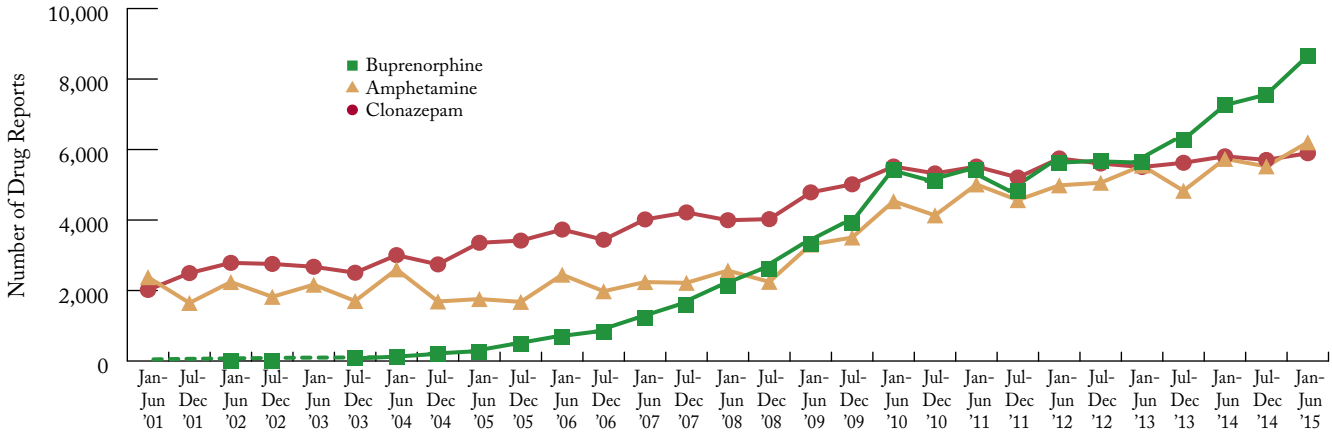


Figure 1.2 National trend estimates for buprenorphine, amphetamine, and clonazepam, January 2001–June 2015[1]



[1] *A dashed trend line indicates that estimates did not meet the criteria for precision or reliability. See Appendix A for a more detailed methodology discussion.*

Other national drug trends

Figures 1.3 and 1.4 present national trends for reports of cannabis/THC, methamphetamine, cocaine, heroin, and MDMA. Significant ($p < .05$) results include the following:

- Cannabis/THC reports showed a downward S-shaped trend, with continued rate fluctuations from 2001 to the first half of 2015. Cannabis/THC reports decreased from 2001 through 2005, increased slightly through 2008, then decreased more steadily through the first half of 2015.
- Methamphetamine and heroin showed S-shaped trends, with significant increases in recent years. Methamphetamine reports increased from 2001 through 2004, decreased from 2004 through 2010, and increased between 2010 and the first half of 2015. Heroin reports increased from 2001 to 2002, followed by a decrease through 2005, then a steady increase through the first half of 2015.
- Cocaine and MDMA reports both showed S-shaped trends, with slower rates of decrease in recent years. Cocaine reports gradually increased from 2001 to 2005, then dramatically decreased through 2012, with the rate of decrease slowing considerably from 2013 through the first half of 2015. MDMA reports decreased from 2001 through 2003, increased from 2003 through 2009, then decreased since 2009, with the rate of decrease slowing through the first half of 2015.

More recently, from the first half of 2014 to the first half of 2015, reports of methamphetamine (from 117,318 to 133,374 reports) and heroin (from 79,937 to 91,465 reports) increased significantly ($p < .05$), while reports of cannabis/THC (from 230,330 to 204,030 reports) decreased significantly. There were no significant changes in reports of cocaine and MDMA.

Figure 1.3 National trend estimates for cannabis/THC and methamphetamine, January 2001–June 2015

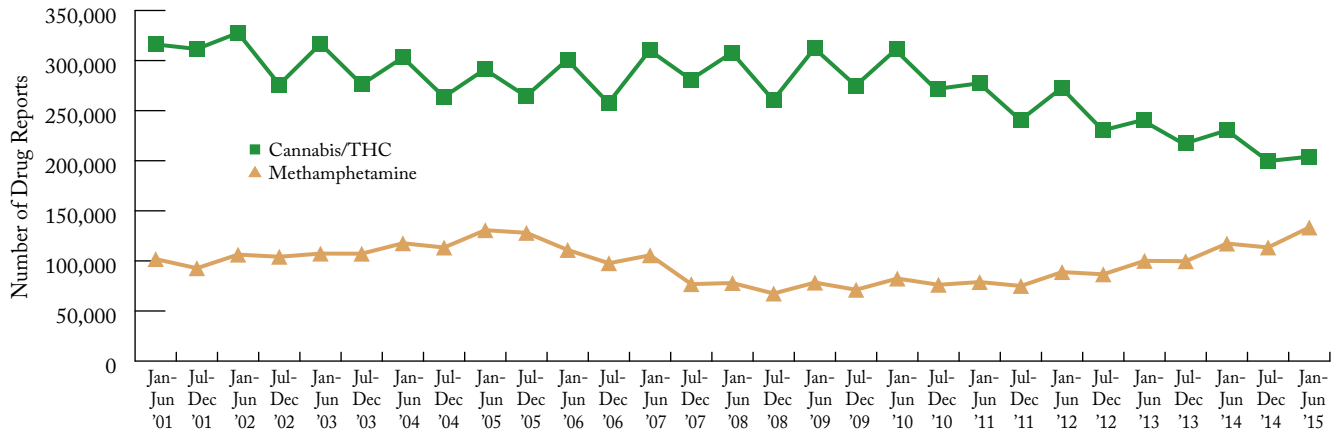
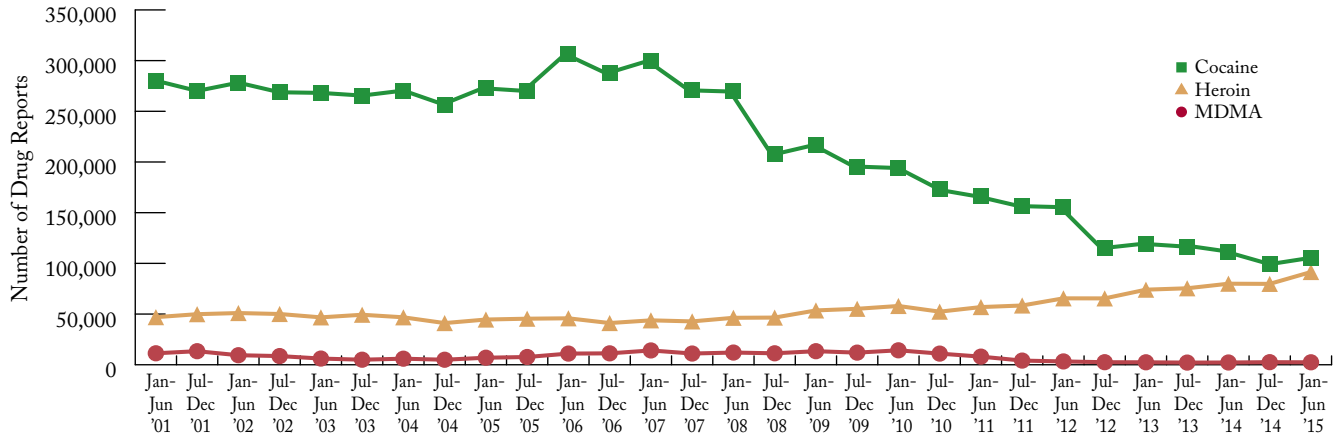


Figure 1.4 National trend estimates for cocaine, heroin, and MDMA, January 2001–June 2015

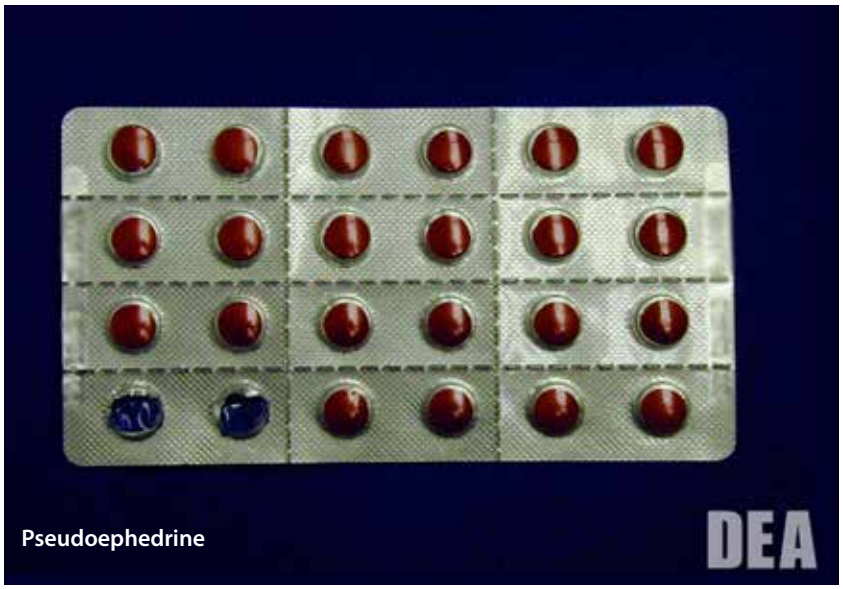


Regional prescription drug trends

Figures 1.5 through 1.10 show regional trends per 100,000 persons aged 15 or older for reports of alprazolam, oxycodone, hydrocodone, buprenorphine, amphetamine, and clonazepam from the first half of 2001 through the first half of 2015. These figures illustrate changes in prescription drugs reported over time, taking into account the population aged 15 or older within each U.S. census region. Significant ($p < .05$) trend results include the following:

- For alprazolam, the West and Midwest regions showed linear-increasing trends. In the Northeast region, the rate of increase slowed after 2010 and began to reverse in 2012. The South region followed the same trend as the Northeast, with a greater rate of increase in 2014 and 2015.
- For oxycodone, all regions showed S-shaped trends that were similar to the national trend. Dramatic increases generally occurred from 2002 to 2010, then reports decreased from 2011 to the first half of 2015.
- For hydrocodone, all regions except the Northeast showed S-shaped trends. In the Northeast region, reports showed an upside-down U-shaped trend, with increases in reports through 2009, then reports steadily decreased through the first half of 2015. In the West, Midwest, and South regions, increases generally occurred from 2002 to 2010, then reports decreased from 2011 to the first half of 2015.
- For buprenorphine, the West, Northeast, and South regions showed S-shaped trends. In these three regions, reports decreased slightly between 2001 and 2002, then steadily increased through 2012 until the rate of increase slowed, most noticeably in the Northeast. The Midwest region had an upward-curving trend, with a similar number of reports from 2001 through 2005, followed by a continued increase in reports through the first half of 2015.
- For amphetamine, the Midwest and South regions showed upward-curving trends, especially since 2007. The trend in the West region was more U-shaped, with a decrease from 2001 to 2007, followed by a higher rate of increase through the first half of 2015. In the Northeast region, reports showed an S-shaped trend, with the most dramatic increase occurring from 2008 to 2010.
- For clonazepam, the West and Midwest regions showed linear-increasing trends. The Northeast and South regions had S-shaped trends, with a similar pattern of increase from 2005 through 2012. Reports in the Northeast then decreased, while clonazepam reports in the South region continued to increase through the first half of 2015.

More recently, from the first half of 2014 to the first half of 2015, alprazolam reports increased significantly ($p = .05$) in the South and West regions. Hydrocodone reports decreased significantly in all regions, while buprenorphine increased significantly in all regions, except the Northeast. Amphetamine reports increased significantly in the Midwest region, and oxycodone reports increased significantly in the West. Clonazepam reports increased significantly in the Midwest region, but decreased significantly in the West and Northeast regions.



Pseudoephedrine

Figure 1.5 Regional trends in alprazolam reported per 100,000 persons aged 15 or older, January 2001–June 2015[1]

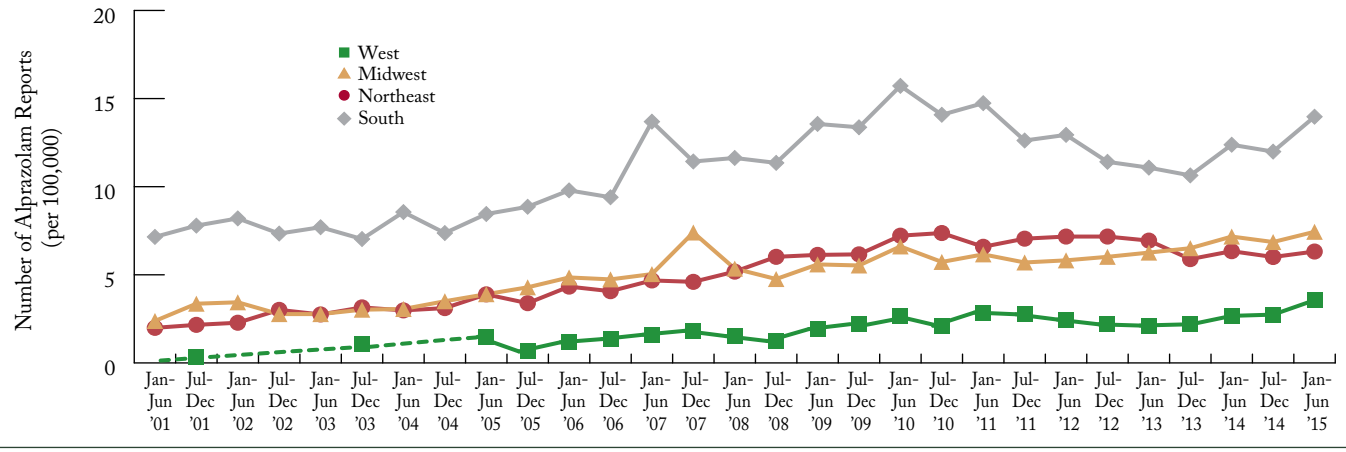


Figure 1.6 Regional trends in oxycodone reported per 100,000 persons aged 15 or older, January 2001–June 2015[1]

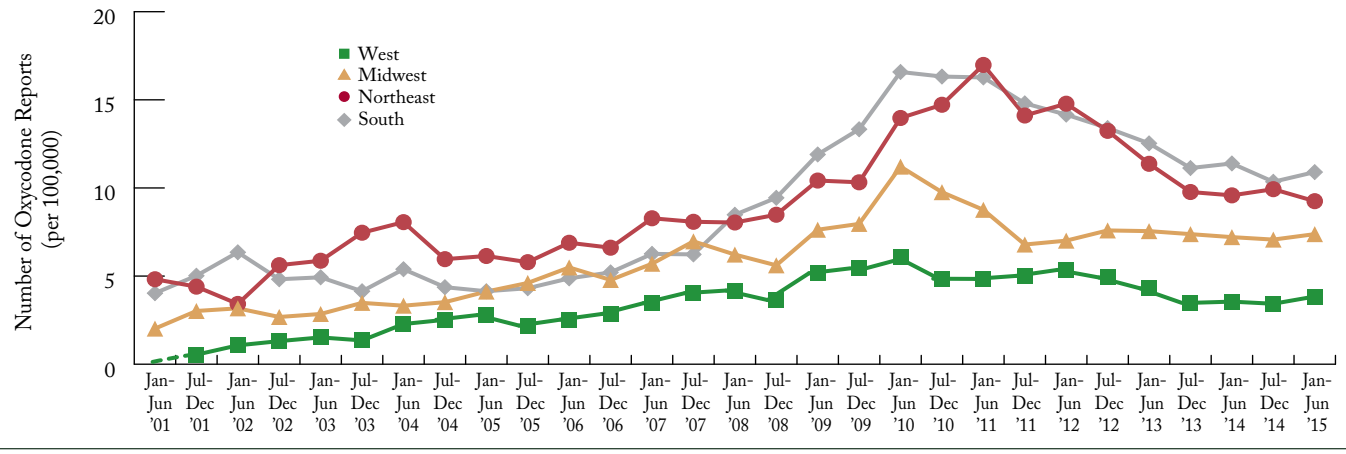
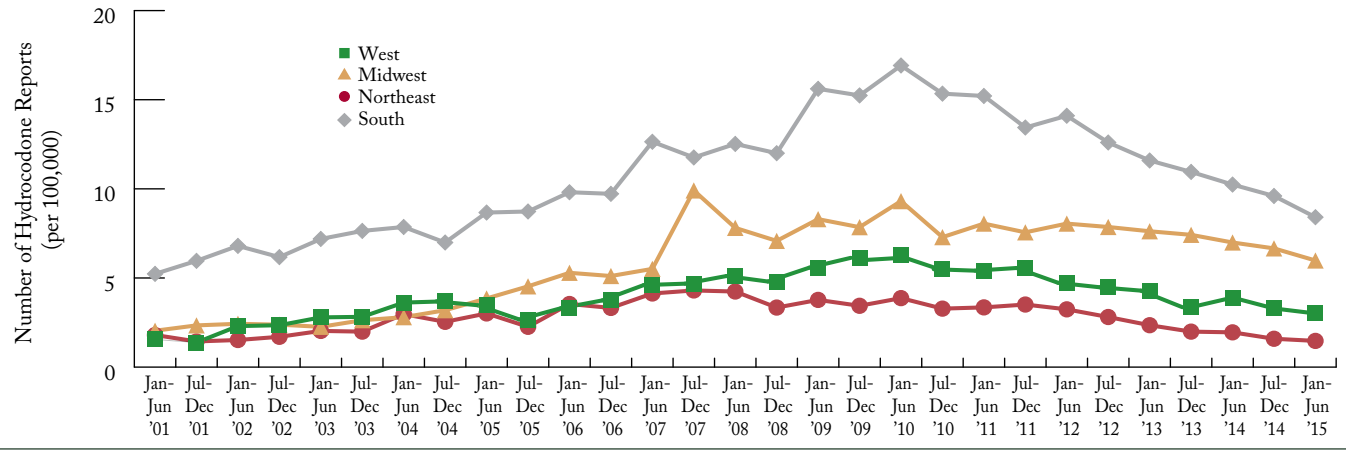


Figure 1.7 Regional trends in hydrocodone reported per 100,000 persons aged 15 or older, January 2001–June 2015



Note: U.S. census 2015 population data by age were not available for this publication. Population data for 2015 were imputed.

[1] A dashed trend line indicates that estimates did not meet the criteria for precision or reliability. See Appendix A for a more detailed methodology discussion.

Figure 1.8 Regional trends in buprenorphine reported per 100,000 persons aged 15 or older, January 2001–June 2015[1]

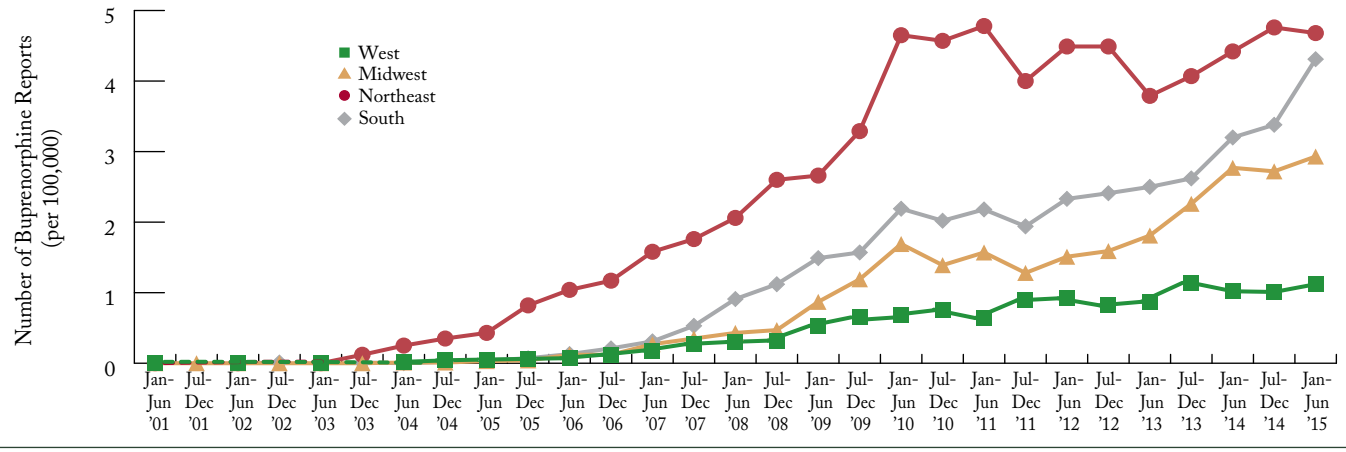


Figure 1.9 Regional trends in amphetamine reported per 100,000 persons aged 15 or older, January 2001–June 2015

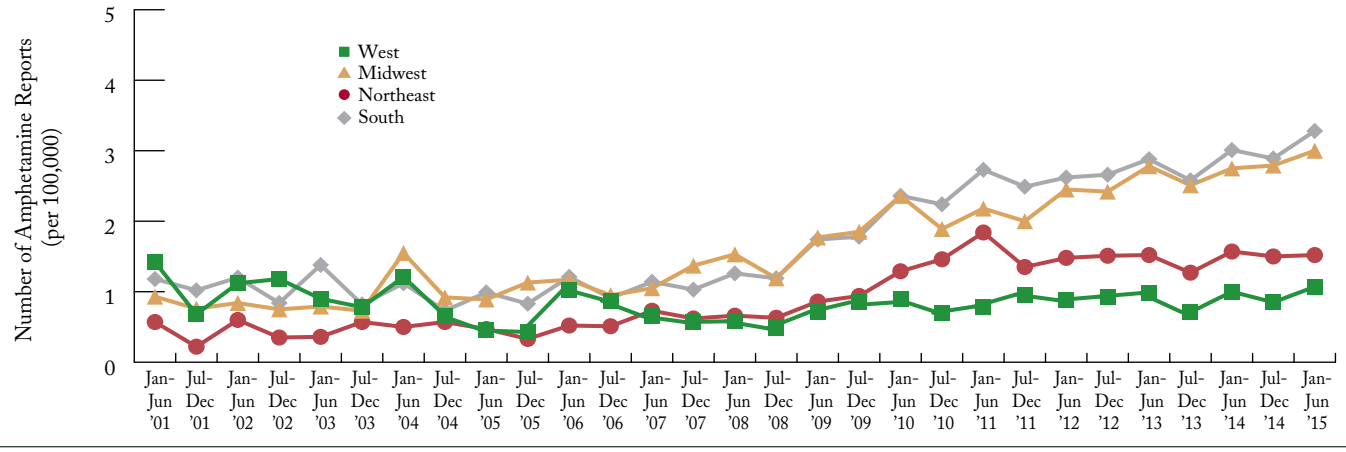
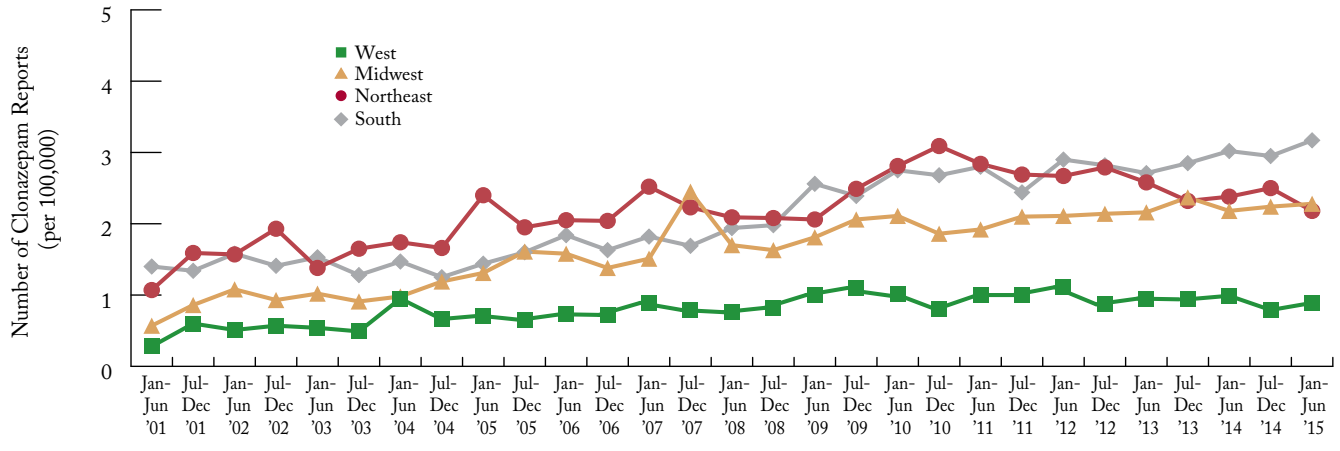


Figure 1.10 Regional trends in clonazepam reported per 100,000 persons aged 15 or older, January 2001–June 2015



Note: U.S. census 2015 population data by age were not available for this publication. Population data for 2015 were imputed.

[1] *A dashed trend line indicates that estimates did not meet the criteria for precision or reliability. See Appendix A for a more detailed methodology discussion.*

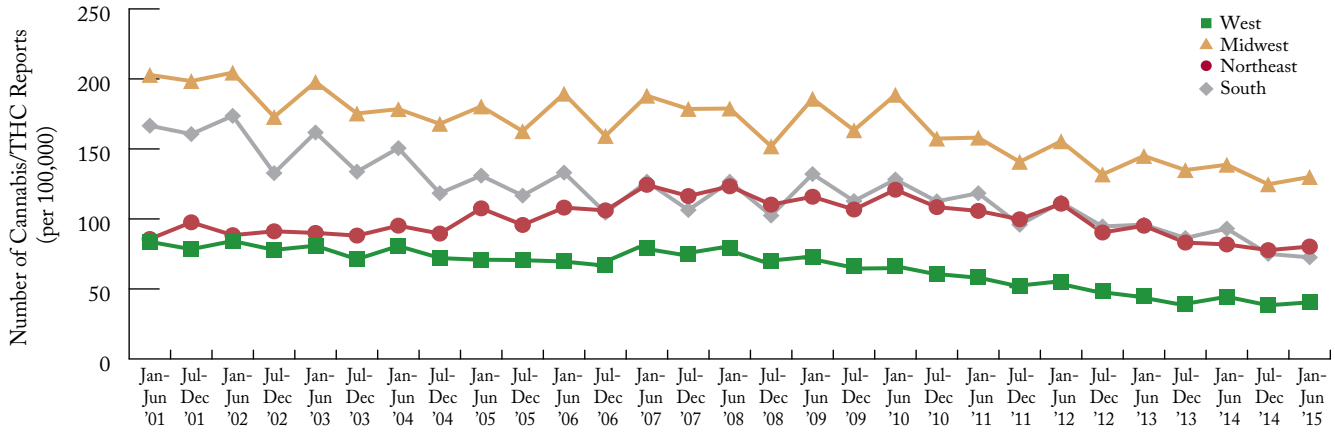
Other regional drug trends

Figures 1.11 through 1.15 present regional trends per 100,000 persons aged 15 or older for cannabis/THC, methamphetamine, cocaine, heroin, and MDMA reports from the first half of 2001 through the first half of 2015. Significant ($p < .05$) trends include the following:

- For cannabis/THC, the Midwest region showed a linear-decreasing trend, while the West region showed a downward-curving trend. In the Northeast, the trend was U-shaped, with reports increasing from 2001 through 2008, followed by a steady decrease in reports through the first half of 2015. In the South, the trend was S-shaped downward, with a decrease in reports from 2001 through 2005 and a more steady decrease in reports from 2012 through the first half of 2015.
- For methamphetamine, the regional trends were all S-shaped as was the corresponding national trend. All regions showed increases between 2010 and the first half of 2015.
- For cocaine, the West, Midwest, and Northeast regions showed S-shaped trends with the most dramatic decrease in reports occurring from 2006 through 2013. The South region showed a downward-curving trend.
- For heroin, all regions showed U-shaped trends. The lowest point of the curve occurred in about 2006 for the West and Northeast, in 2007 for the South, and in 2004 for the Midwest.
- For MDMA, the West and Midwest regions showed upside-down U-shaped trends, with reports increasing through 2008, then steadily decreasing through 2011. The South region showed a downward-curving trend, while the Northeast region showed a downward S-shaped trend. All regions showed slower rates of decrease between the second half of 2012 and the first half of 2015.

Between the first half of 2014 and the first half of 2015, cannabis/THC reports decreased significantly in all regions except the Northeast ($p < .05$), while cocaine reports decreased significantly only in the West. Methamphetamine reports increased significantly in all regions except the Northeast, while heroin reports increased significantly in all regions except the South. MDMA reports increased significantly in the Midwest region only.

Figure 1.11 Regional trends in cannabis/THC reported per 100,000 persons aged 15 or older, January 2001–June 2015



Note: U.S. census 2015 population data by age were not available for this publication. Population data for 2015 were imputed.

Figure 1.12 Regional trends in methamphetamine reported per 100,000 persons aged 15 or older, January 2001–June 2015[1]

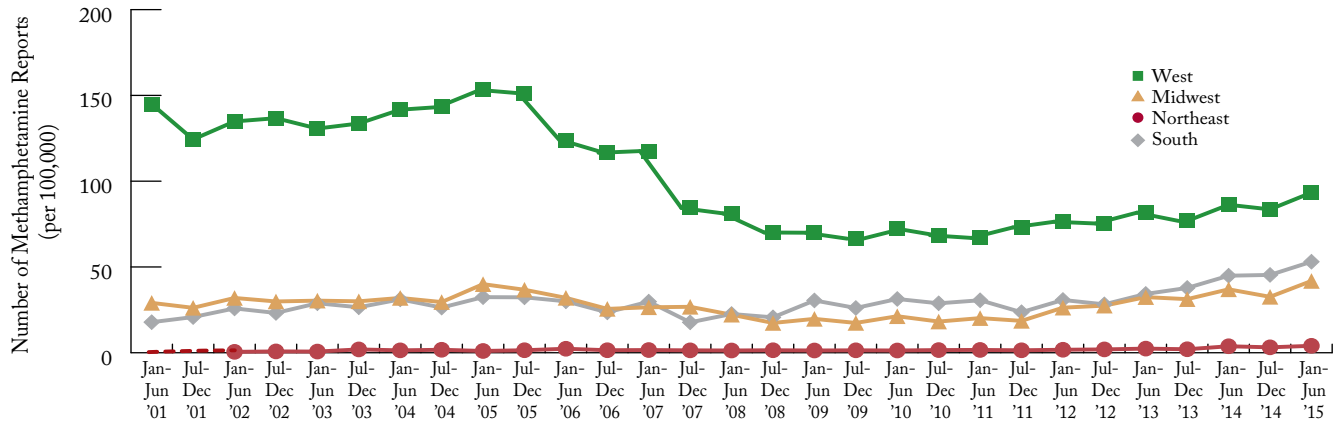
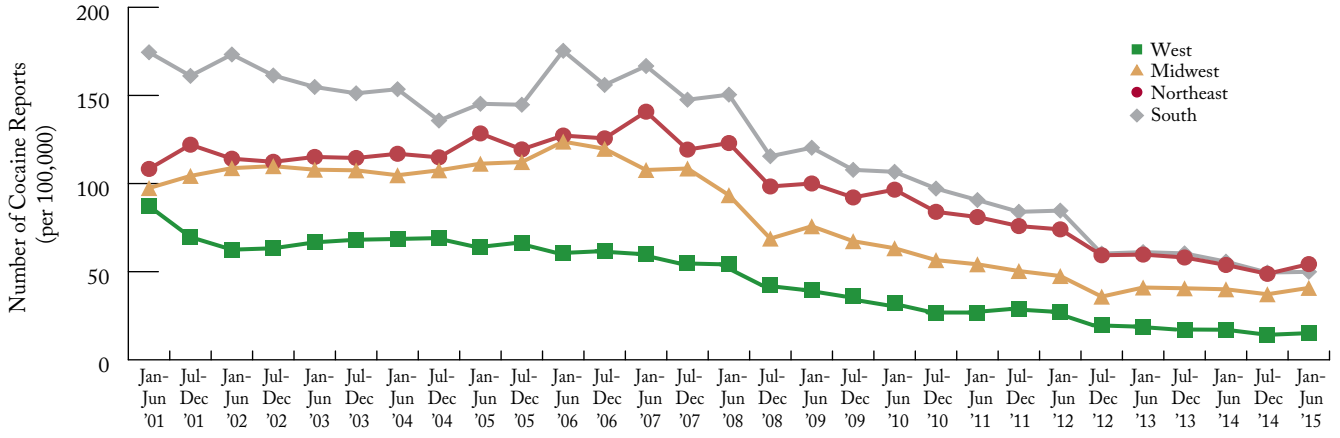


Figure 1.13 Regional trends in cocaine reported per 100,000 persons aged 15 or older, January 2001–June 2015



Note: U.S. census 2015 population data by age were not available for this publication. Population data for 2015 were imputed.

[1] *A dashed trend line indicates that estimates did not meet the criteria for precision or reliability. See Appendix A for a more detailed methodology discussion.*

Figure 1.14 Regional trends in heroin reported per 100,000 persons aged 15 or older, January 2001–June 2015

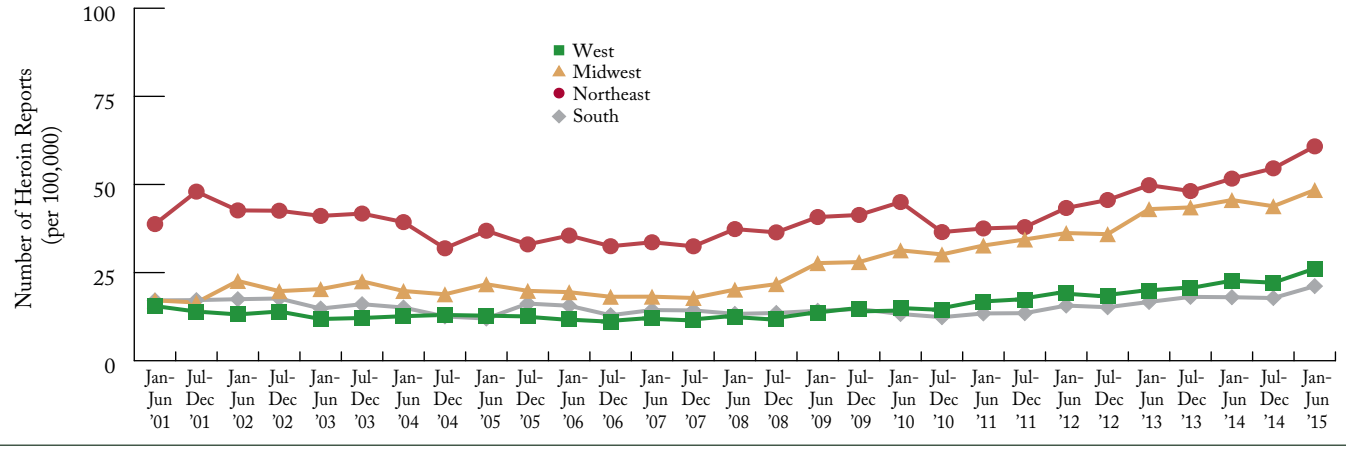
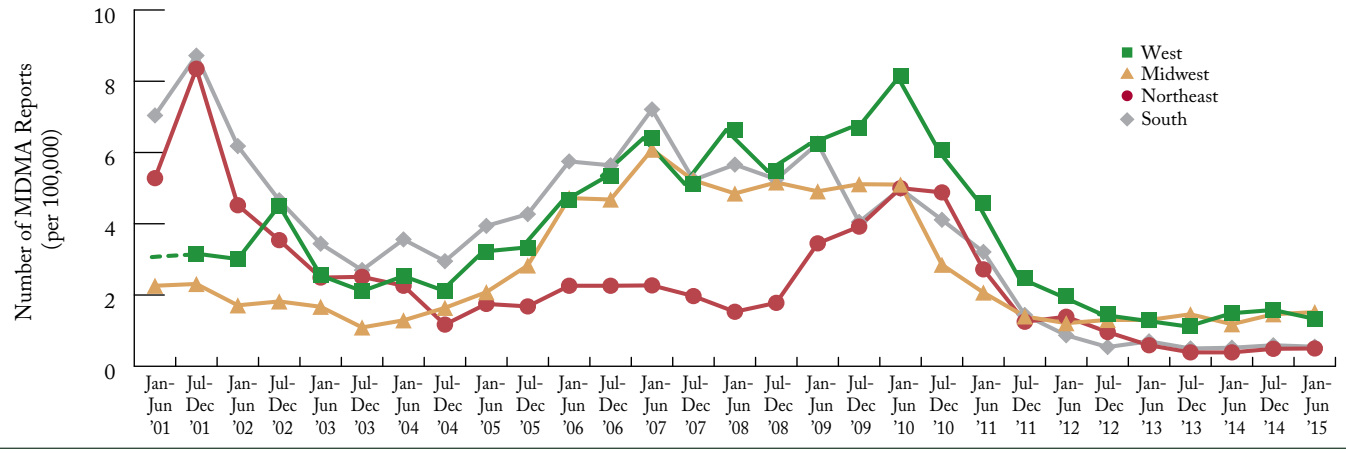


Figure 1.15 Regional trends in MDMA reported per 100,000 persons aged 15 or older, January 2001–June 2015[1]



Note: U.S. census 2015 population data by age were not available for this publication. Population data for 2015 were imputed.

[1] *A dashed trend line indicates that estimates did not meet the criteria for precision or reliability. See Appendix A for a more detailed methodology discussion.*

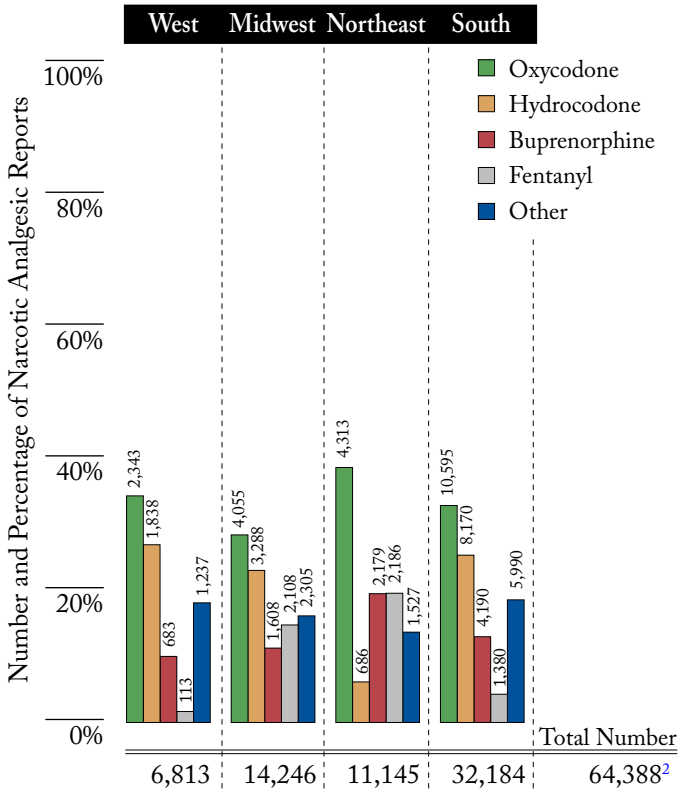
Section 2: Major Drug Categories

This section presents results for major drug categories. Specifically, this section presents estimates of specific drugs by drug category using the NEAR approach. The first, second, and third drugs mentioned in laboratories' drug items are included in the counts. Drug categories presented in this section include narcotic analgesics, tranquilizers and depressants, anabolic steroids, phenethylamines, and synthetic cannabinoids. A total of 767,679 drug reports were submitted to State and local laboratories from January 1, 2015, through June 30, 2015, and analyzed by September 30, 2015.

Table 2.1 *NARCOTIC ANALGESICS*
Number and percentage of narcotic analgesic reports in the United States, January 2015–June 2015[1]

Narcotic Analgesic Reports	Number	Percent
Oxycodone	21,306	33.09%
Hydrocodone	13,981	21.71%
Buprenorphine	8,660	13.45%
Fentanyl	5,787	8.99%
Morphine	3,596	5.58%
Tramadol	2,641	4.10%
Methadone	2,617	4.06%
Hydromorphone	2,045	3.18%
Codeine	1,716	2.67%
Oxymorphone	1,188	1.85%
Acetylfentanyl	504	0.78%
Mitragynine	93	0.15%
Meperidine	56	0.09%
Propoxyphene	53	0.08%
Pentazocine	45	0.07%
Other narcotic analgesics	101	0.16%
Total Narcotic Analgesic Reports[2]	64,388	100.00%
Total Drug Reports	767,679	

Figure 2.1 Distribution of narcotic analgesic reports within region, January 2015–June 2015[1]



[1] *Includes drug reports submitted to laboratories from January 1, 2015, through June 30, 2015, that were analyzed by September 30, 2015.*
[2] *Numbers and percentages may not sum to totals because of rounding.*

Table 2.2 *TRANQUILIZERS AND DEPRESSANTS*
Number and percentage of tranquilizer and depressant reports in the United States, January 2015–June 2015[1]

Tranquilizer and Depressant Reports	Number	Percent
Alprazolam	22,781	56.92%
Clonazepam	5,895	14.73%
Diazepam	2,751	6.87%
Phencyclidine (PCP)	2,318	5.79%
Carisoprodol	1,306	3.26%
Lorazepam	1,254	3.13%
Ketamine	846	2.11%
Zolpidem	833	2.08%
Cyclobenzaprine	568	1.42%
Hydroxyzine	176	0.44%
Pregabalin	170	0.43%
Temazepam	165	0.41%
Butalbital	147	0.37%
Gamma-hydroxybutyrate (GHB)	124	0.31%
Etizolam	116	0.29%
Other tranquilizers and depressants	576	1.44%
Total Tranquilizer and Depressant Reports[2]	40,026	100.00%
Total Drug Reports	767,679	

Figure 2.2 Distribution of tranquilizer and depressant reports within region, January 2015–June 2015[1]

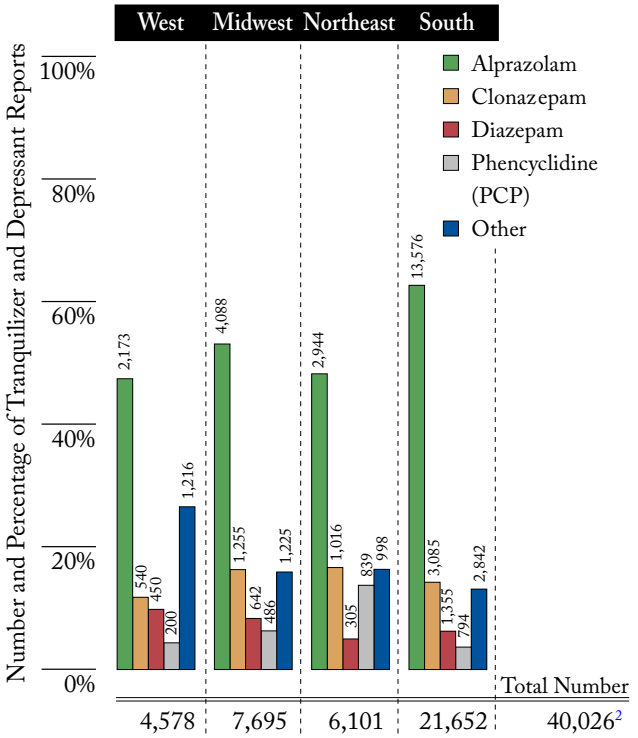
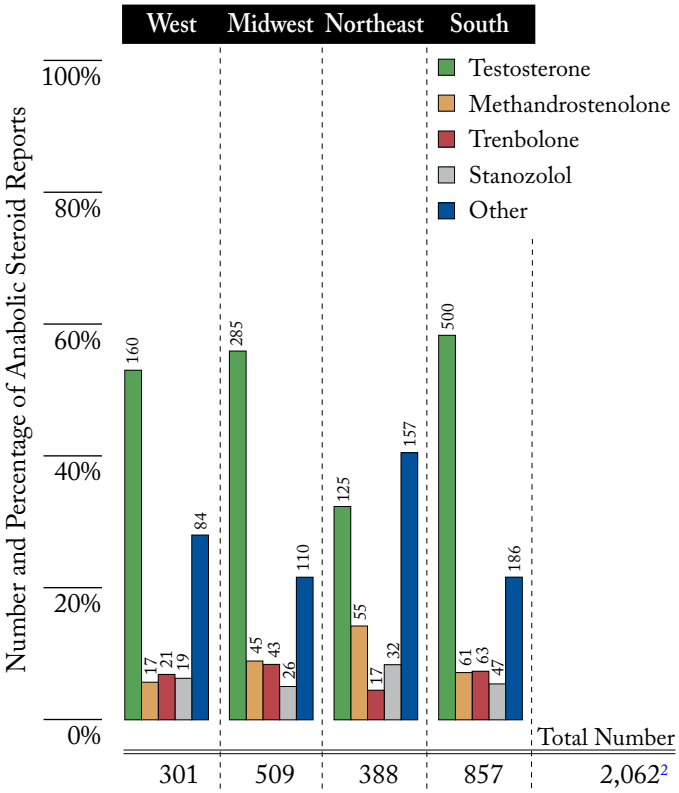


Table 2.3 *ANABOLIC STEROIDS*
Number and percentage of anabolic steroid reports in the United States, January 2015–June 2015[1]

Anabolic Steroid Reports	Number	Percent
Testosterone	1,070	51.89%
Methandrostenolone	179	8.69%
Trenbolone	144	7.00%
Stanozolol	124	6.01%
Nandrolone	105	5.10%
Oxandrolone	99	4.82%
Boldenone	89	4.30%
Oxymetholone	72	3.48%
Mestanolone	29	1.40%
Drostanolone	27	1.32%
Mesterolone	15	0.72%
Dehydroepiandrosterone	14	0.69%
Methenolone	10	0.47%
4-Hydroxy-19-Nortestosterone	9	0.42%
Other steroids	76	3.69%
Total Anabolic Steroid Reports[2]	2,062	100.00%
Total Drug Reports	767,679	

Figure 2.3 Distribution of anabolic steroid reports within region, January 2015–June 2015[1]



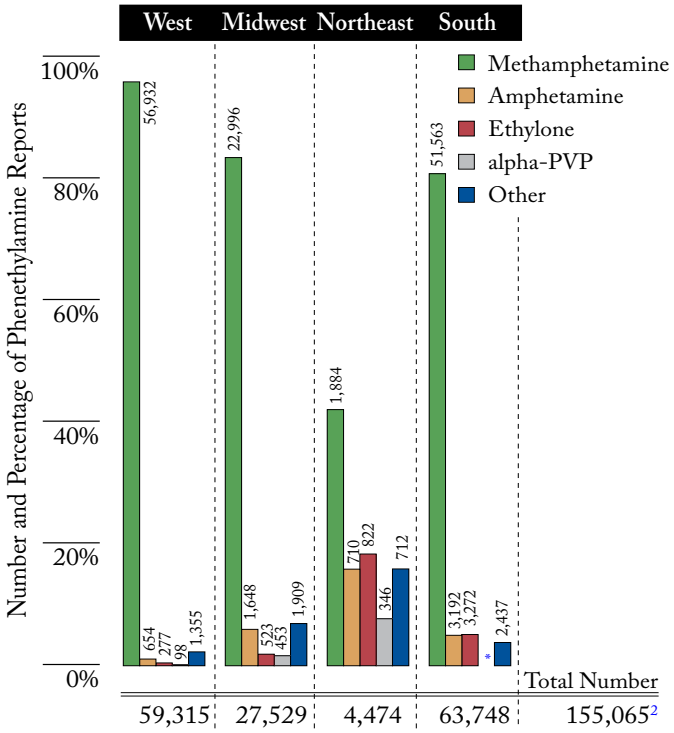
[1] *Includes drug reports submitted to laboratories from January 1, 2015, through June 30, 2015, that were analyzed by September 30, 2015.*
[2] *Numbers and percentages may not sum to totals because of rounding.*

Table 2.4 *PHENETHYLAMINES*
Number and percentage of phenethylamine reports in the United States, January 2015–June 2015[1]

Phenethylamine Reports	Number	Percent
Methamphetamine	133,374	86.01%
Amphetamine	6,204	4.00%
Ethylone	4,894	3.16%
alpha-PVP	*	*
MDMA	2,421	1.56%
Lisdexamfetamine	1,048	0.68%
25I-NBOMe	462	0.30%
MDA	389	0.25%
Methylone	295	0.19%
Phentermine	272	0.18%
25C-NBOMe	171	0.11%
25B-NBOMe	163	0.11%
Ephedrine	94	0.06%
MDPV	92	0.06%
alpha-PHP	83	0.05%
Other phenethylamines	923	0.60%
Total Phenethylamine Reports[2]	155,065	100.00%
Total Drug Reports	767,679	

alpha-PVP=alpha-Pyrrolidinopentiophenone
MDMA=3,4-Methylenedioxymethamphetamine
25I-NBOMe=2-(4-Iodo-2,5-dimethoxyphenyl)-N-(2-methoxybenzyl)ethanamine
MDA=3,4-Methylenedioxyamphetamine
25C-NBOMe=2-(4-Chloro-2,5-dimethoxyphenyl)-N-(2-methoxybenzyl) ethanamine
25B-NBOMe=2-(4-Bromo-2,5-dimethoxyphenyl)-N-(2-methoxybenzyl) ethanamine
MDPV=3,4-Methylenedioxypyrovalerone
alpha-PHP=alpha-Pyrrolidinohexanophenone

Figure 2.4 Distribution of phenethylamine reports within region, January 2015–June 2015[1]



** The estimate for this drug does not meet the standards of precision and reliability. See Appendix A for a more detailed methodology discussion.*
1 Includes drug reports submitted to laboratories from January 1, 2015, through June 30, 2015, that were analyzed by September 30, 2015.
2 Numbers and percentages may not sum to totals because of rounding.

Table 2.5 ***SYNTHETIC CANNABINOIDS***
Number and percentage of synthetic cannabinoid reports in the United States, January 2015–June 2015[1]

Synthetic Cannabinoid Reports	Number	Percent
XLR11	3,769	22.10%
AB-CHMINACA	3,678	21.57%
AB-PINACA	1,893	11.10%
AB-FUBINACA	1,429	8.38%
MAB-CHMINACA	835	4.90%
5-fluoro AMB	754	4.42%
NM2201	652	3.82%
5-fluoro ADB	330	1.93%
FUB-AMB	242	1.42%
5F-AB-PINACA	210	1.23%
FUB-PB-22	184	1.08%
5F-PB-22	184	1.08%
ADB-FUBINACA	171	1.00%
UR-144	152	0.89%
PB-22	149	0.87%
Other synthetic cannabinoids	2,421	14.20%
Total Synthetic Cannabinoid Reports[2]	17,053	100.00%
Total Drug Reports	767,679	

XLR11=[1-(5-Fluoro-pentyl)1H-indol-3-yl],(2,2,3,3-tetramethylcyclopropyl) methanone

AB-CHMINACA=(N-(1-Amino-3-methyl-1oxobutan-2-yl)-1-(cyclohexylmethyl)1H-indazole-3-carboxamide)

AB-PINACA=(N-(1-Amino-3-methyl1-oxobutan-2-yl)-1-pentyl-1H-indazole3-carboxamide)

AB-FUBINACA=(N-(1-Amino-3-methyl-1-oxobutan-2-yl)-1-(4-fluorobenzyl)-1H-indazole-3-carboxamide)

MAB-CHMINACA=N-(1-Amino-3,3-dimethyl-1-oxobutan-2-yl)-1-(cyclohexylmethyl)-1H-indazole-3-carboxamide

5-fluoro AMB=methylN-{[1-(5-fluoropentyl)-1H-indazol-3-yl]carbonyl}valinate

NM2201=Naphthalene-1-yl 1-(5-fluoropentyl)-1H-indole-3-carboxylate

5-fluoro ADB=Methyl (R)-2-(1-(5-Fluoropentyl)-1H-indazole-3-carboxamido)-3,3-dimethylbutanoate

FUB-AMB=Methyl 2-({1-[(4-fluorophenyl)methyl]-1H-indazole-3-carbonyl} amino)-3-methylbutanoate

5F-AB-PINACA=N-(1-Amino-3-methyl-1-oxobutan-2-yl)-1-(5-fluoropentyl)-1H-indazole-3-carboxamide

FUB-PB-22=Quinolin-8-yl 1-(4-fluorobenzyl)-1H-indole-3-carboxylate

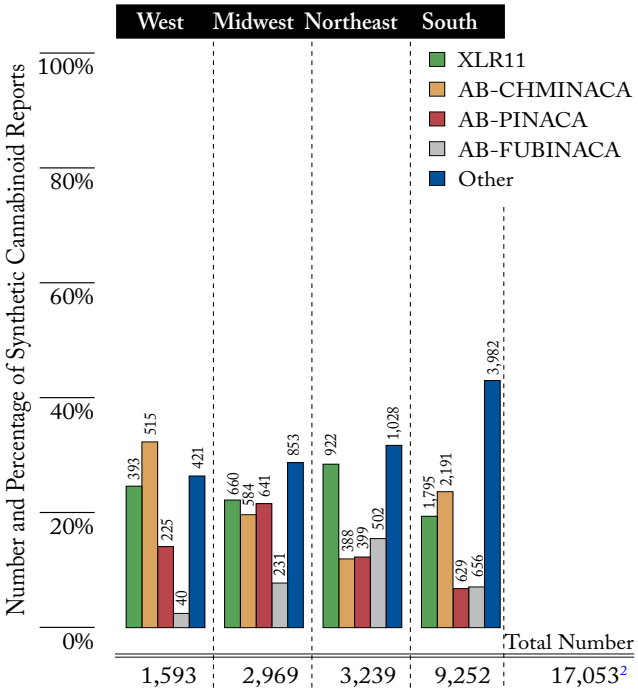
5F-PB-22=(Quinolin-8-yl 1-(5-fluoropentyl)-1H-indole-3-carboxylate)

ADB-FUBINACA=N-(1-Amino-3,3-dimethyl-1-oxobutan-2-yl)-1-(4-fluorobenzyl)-1H-indazole-3-carboxamide

UR-144=(1-Pentyl-1H-indol-3-yl)(2,2,3,3-tetramethylcyclopropyl)methanone

PB-22=(Quinolin-8-yl 1-pentyl-1H-indole-3-carboxylate)

Figure 2.5 Distribution of synthetic cannabinoid reports within region, January 2015–June 2015[1]



[1] *Includes drug reports submitted to laboratories from January 1, 2015, through June 30, 2015, that were analyzed by September 30, 2015.*
[2] *Numbers and percentages may not sum to totals because of rounding.*

Appendix A STATISTICAL METHODOLOGY

Overview

Since 2001, NFLIS publications have included national and regional estimates for the number of drug reports and drug cases analyzed by State and local forensic laboratories in the United States. This appendix discusses the methods used for producing these estimates, including sample selection, weighting, imputation, and trend analysis procedures. RTI International, under contract to the DEA, began implementing NFLIS in 1997. Results from a 1998 survey (updated in 2002, 2004, 2008, and 2013) provided laboratory-specific information, including annual caseloads, which was used to establish a national sampling frame of all State and local forensic laboratories that routinely perform drug chemistry analyses. A probability proportional to size (PPS) sample was drawn on the basis of annual cases analyzed per laboratory, resulting in a NFLIS national sample of 29 State laboratory systems and 31 local or municipal laboratories, and a total of 168 individual laboratories (see Appendix B for a list of sampled NFLIS laboratories).

Estimates appearing in this publication are based on cases and items *submitted* to laboratories between January 1, 2015, and June 30, 2015, and *analyzed* by September 30, 2015. Analysis has shown that approximately 95% of cases submitted during an annual period are analyzed within three months of the end of the annual period (not including the approximately 30% of cases that are never analyzed).

For each drug item (or exhibit) analyzed by a laboratory in the NFLIS program, up to three drugs can be reported to NFLIS and counted in the estimation process. A drug-specific case is one for which the specific drug was identified as the first, second, or third drug report for any item associated with the case. A drug-specific report is the total number of reports of the specific drug.

Currently, laboratories representing more than 97% of the national drug caseload participate in NFLIS, with about 94% of the national caseload reported during the current reporting period. Because of the continued high level of reporting among laboratories, the NEAR (National Estimates Based on All Reports) method, which has strong statistical advantages for producing national and regional estimates, continues to be implemented.

NEAR Methodology

In NFLIS publications before 2011, data reported by nonsampled laboratories were not used in national or regional estimates.[i] However, as the number of nonsampled laboratories reporting to NFLIS increased,[ii] it began to make sense to consider ways to utilize the data they submitted. Under NEAR, the "volunteer" laboratories (i.e., the reporting nonsampled laboratories) represent themselves and are no longer represented by the reporting sampled laboratories. The volunteer laboratories are assigned weights of one, and hence the weights of the sampled and responding laboratories are appropriately adjusted downward. The outcome is that the estimates are more precise, especially for recent years, which include a large number of volunteer laboratories. More precision allows for more power to detect trends and fewer suppressed estimates in Tables 1.1 and 1.2 of the NFLIS annual and midyear reports.

NEAR imputations and adjusting for missing monthly data in reporting laboratories

Because of technical and other reporting issues, some laboratories do not report data for every month during a given reporting period, resulting in missing monthly data. If a laboratory reports fewer than six months of data for the annual estimates (fewer than three months for the semiannual estimates), it is considered nonreporting, and its reported data are not included in the estimates. Otherwise, imputations are performed separately by drug for laboratories that are missing monthly data, using drug-specific proportions generated from laboratories that are reporting all months of data. This imputation method is used for cases, items, and drug-specific reports and accounts for both the typical month-to-month variation and the size of the laboratory requiring imputation. The general idea is to use the nonmissing months to assess the size of the laboratory requiring imputation and then to apply the seasonal pattern exhibited by all laboratories with no missing data. Imputation of monthly case counts are created using the following ratio (r_L):

$$r_L = \frac{\sum_{m \in R_L} c_{L,m}}{\sum_{m \in R_L} c_{.,m}},$$

where

R_L = set of all nonmissing months in laboratory L,
$c_{L,m}$ = case count for laboratory L in month m, and
$c_{.,m}$ = mean case counts for all laboratories reporting complete data.

Monthly item counts are imputed for each laboratory using

[i] The case and item loads for the nonsampled laboratories were used in calculating the weights.

[ii] In the current reporting period, for example, out of 111 nonsampled laboratories and laboratory systems, 79 (or 71%) reported.

an estimated item-to-case ratio (s_L) for nonmissing monthly item counts within the laboratory. The imputed value for the missing monthly number of items in each laboratory is calculated by multiplying $c_{L,m}$ by s_L.

$$s_L = \frac{\sum_{m \in R_L} i_{L,m}}{\sum_{m \in R_L} c_{L,m}},$$

where

R_L = set of all nonmissing months in laboratory L,
$i_{L,m}$ = item count for laboratory L in month m, and
$c_{L,m}$ = case count for laboratory L in month m.

Drug-specific case and report counts are imputed using the same imputation techniques presented above for the case and item counts. The total drug, item, and case counts are calculated by aggregating the laboratory and laboratory system counts for those with complete reporting and those that require imputation.

NEAR imputations and drug report-level adjustments

Most forensic laboratories classify and report case-level analyses in a consistent manner in terms of the number of vials of a particular pill. A small number, however, do not produce drug report-level counts in the same way as those submitted by the vast majority. Instead, they report as items the count of the individual pills themselves. Laboratories that consider items in this manner also consider drug report-level counts in this same manner. Drug report-to-case ratios for each drug were produced for the similarly sized laboratories, and these drug-specific ratios were then used to adjust the drug report counts for the relevant laboratories.

NEAR weighting procedures

Each NFLIS reporting laboratory was assigned a weight to be used in the calculation of design-consistent, nonresponse-adjusted estimates. Two weights were created: one for estimating cases and one for estimating drug reports. The weight used for case estimation was based on the caseload for every laboratory in the NFLIS population, and the weight used for drug reports' estimation was based on the item load for every laboratory in the NFLIS population. For reporting laboratories, the caseload and item load used in weighting were the reported totals. For nonreporting laboratories, the caseload and item load used in weighting were obtained from an updated laboratory survey administered in 2013.

When the NFLIS sample was originally drawn, two stratifying variables were used: (1) type of laboratory (State system or municipal or county laboratory) and (2) determination of "certainty" laboratory status. To ensure that the NFLIS sample had strong regional representation, U.S. census regions were used as the geographical divisions to guide the selection of certainty laboratories and systems. Some large laboratories were automatically part of the original NFLIS sample because they were deemed critically important to the calculation of reliable estimates. These laboratories are called "certainty laboratories." The criteria used in selecting the certainty laboratories included (1) size, (2) region, (3) geographical location, and (4) other special considerations (e.g., strategic importance of the laboratory).

Each weight has two components, the design weight and the nonresponse adjustment factor, the product of which is the final weight used in estimation. After imputation, the final item weight is based on the item count, and the final case weight is based on the case count of each laboratory or laboratory system. The final weights are used to calculate national and regional estimates. The first component, the design weight, is based on the proportion of the caseload and item load of the NFLIS universe[iii] represented by the individual laboratory or laboratory system. This step takes advantage of the original PPS sample design and provides precise estimates as long as the drug-specific case and report counts are correlated with the overall caseload and item load.[iv]

For noncertainty reporting laboratories in the sample (and reporting laboratories in the certainty strata with nonreporting laboratories), the design-based weight for each laboratory is calculated as follows:

$$\text{Design Weight}_i = A/(B \times \text{Case [item] Count for Laboratory or Laboratory System } i),$$

where

i = ith laboratory or laboratory system;
A = sum of the case (item) counts for all of the laboratories and laboratory systems (sampled and nonsampled) within a specific stratum, excluding certainty strata and the volunteer stratum; and
B = number of sampled laboratories and laboratory systems within the same stratum, excluding certainty strata and the volunteer stratum.

Certainty laboratories were assigned a design weight of one.[v]

[iii] See the Introduction of this publication for a description of the NFLIS universe.

[iv] Lohr, S. L. (2010). *Sampling: Design and analysis* (2nd ed., pp. 231-234). Boston, MA: Brooks/Cole.

[v] With respect to the design weight, reporting laboratories and laboratory systems in certainty strata with nonreporting laboratories and laboratory systems are treated the same way as reporting noncertainty sampled laboratories and laboratory systems. This is done to reduce the variance; otherwise, all reporting laboratories and laboratory systems in these strata would get the same weight regardless of their size.

The second component, the nonresponse adjustment factor, adjusts the weights of the reporting and sampled laboratories to account for the nonreporting and sampled laboratories. The nonresponse (*NR*) adjustment, for both certainty and noncertainty laboratories, is calculated as follows:

$$NR_j = C/D,$$

where

- j = stratum;
- C = number of sampled laboratories and laboratory systems in the stratum, excluding the volunteer stratum; and
- D = number of laboratories and laboratory systems in the stratum that were both sampled and reporting.

Because volunteer laboratories represent only themselves, they were automatically assigned a final weight of one.

NEAR estimation

The estimates in this publication are the weighted sum of the counts from each laboratory. The weighting procedures make the estimates more precise by assigning large weights to small laboratories and small weights to large laboratories.[vi] Because most of the values being estimated tend to be related to laboratory size, the product of the weight and the value to be estimated tend to be relatively stable across laboratories, resulting in precise estimates.

A finite population correction is also applied to account for the high sampling rate. In a sample-based design, the sampling fraction, which is used to create the weights, equals the number of sampled laboratories divided by the number of laboratories in the NFLIS universe. Under NEAR, the sampling fraction equals the number of sampled laboratories divided by the sum of the number of sampled laboratories and the number of nonreporting, unsampled laboratories. Volunteer laboratories are not included in the sampling fraction calculation. Thus, the NEAR approach makes the sampling rate even higher because volunteer laboratories do not count as nonsampled laboratories.

Suppression of Unreliable Estimates

For some drugs, such as cannabis/THC and cocaine, thousands of reports occur annually, allowing for reliable national prevalence estimates to be computed. For other drugs, reliable and precise estimates cannot be computed because of a combination of low report counts and substantial variability in report counts between laboratories. Thus, a suppression rule was established. Precision and reliability of estimates are evaluated using the relative standard error (RSE), which is the ratio between the standard error of an estimate and the estimate. Drug estimates with an RSE > 50% are suppressed and not shown in the tables.

[vi] See footnote iv.

Statistical Techniques for Trend Analysis

Two types of analyses to compare estimates across years were used. The first is called *prior-year comparisons* and compared national and regional estimates from January 2014 through June 2014 with those from January 2015 through June 2015. The second is called *long-term trends* and examined trends in the semiannual national and regional estimates from January 2001 through June 2015. The long-term trends method described below was implemented beginning with the 2012 Midyear Report. The new method offers the ability to identify both linear and curved trends, unlike the method used in previous NFLIS publications. Both types of trend analyses are described below. For the region-level prior-year comparisons and long-term trends, the estimated drug reports were standardized to the most recent regional population totals for persons aged 15 years or older.

Prior-year comparisons

For selected drugs, the prior-year comparisons statistically compared estimates in Table 1.1 of this publication with estimates in Table 1.1 of the 2014 Midyear Report. The specific test examined whether the difference between any two estimates was significantly different from zero. A standard *t*-test was completed using the statistic,

$$t_{df} = \frac{a\hat{T}_{2015} - b\hat{T}_{2014}}{\sqrt{a^2 \operatorname{var}(\hat{T}_{2015}) + b^2 \operatorname{var}(\hat{T}_{2014}) - 2ab \operatorname{cov}(\hat{T}_{2014,}\hat{T}_{2015})}}$$

where

- df = appropriate degrees of freedom (number of laboratories minus number of strata);
- $\hat{T}_{2015}$ = estimated total number of reports for the given drug for January 2015 through June 2015;
- $\hat{T}_{2014}$ = estimated total number of reports for the given drug for January 2014 through June 2014;
- $\operatorname{var}(\hat{T}_{2015})$ = variance of $\hat{T}_{2015}$;
- $\operatorname{var}(\hat{T}_{2014})$ = variance of $\hat{T}_{2014}$; and
- $\operatorname{cov}(\hat{T}_{2014}, \hat{T}_{2015})$ = covariance between $\hat{T}_{2014}$ and $\hat{T}_{2015}$.

For the national prior-year comparisons, $a = b = 1$. For the regional prior-year comparisons, a = 100,000 divided by the regional population total for 2015, and b = 100,000 divided by the regional population total for 2014.

The percentile of the test statistic in the t distribution determined whether the prior-year comparison was statistically significant (a two-tailed test at $\alpha = .05$).

Long-term trends

A long-term regression trends analysis was performed on the January 2001 through June 2015 semiannual national estimates of totals and regional estimates of rates for selected drug reports. The models allow for randomness in the totals and rates due to both the sample and the population. That is, for the vector of time period totals over that time,

$$\mathbf{Y}^T \equiv (Y_1, Y_2, \ldots, Y_{29}),$$

and for the estimates,

$$\hat{\mathbf{Y}}^T \equiv (\hat{Y}_1, \hat{Y}_2, \ldots, \hat{Y}_{29})$$

the regression model is

$$\hat{\mathbf{Y}} = \mathbf{X}\beta + \eta + \varepsilon,$$

where

$\eta = \hat{\mathbf{Y}} - \mathbf{Y}$ is a 29 × 1 vector of errors due to the probability sample, and

ε = 29 × 1 vector of errors due to the underlying model.

Randomness due to the sample exists because only a sample of all eligible laboratories has been randomly selected to be included. Randomness due to the population exists because many factors that can be viewed as random contribute to the specific total reported by a laboratory in a time period. For example, not all drug seizures that could have been made were actually made, and there may have been some reporting errors. If rates (per 100,000 persons aged 15 years or older) and not totals are of interest, the above model can be applied to $\hat{\mathbf{Y}}^* = c\hat{\mathbf{Y}}$, where c equals 100,000 divided by the 15-or-older regional population size as given by the U.S. Census Bureau.

The regression model used to perform the analysis is

$$Y_t = \alpha_0 + \alpha_1 t + \alpha_2 t^2 + \alpha_3 t^3 + \varepsilon_t \qquad t = 1, \ldots, T,$$

where

Y_t = the population total value, considered to be a realization of the underlying model; and

ε_t = one of a set of 29 independent normal variates with a mean of zero and a variance of σ^2.

The model allows for a variety of trend types: linear (straight-line), quadratic (U-shaped), and cubic (S-shaped). Because it is a model for Y_t but the sample estimates $\hat{Y}_t$ differ by the sampling error, estimation was performed by restricted maximum likelihood (REML), allowing for the two sources of error.

To implement the regression model, point estimates of totals $\hat{Y}_t$ and their standard errors were obtained for all 29 semiannual periods beginning with the January to June 2001 period and ending with the January to June 2015 period. Sampling standard errors were estimated as the full sampling variance-covariance matrix $\mathbf{S}$ over these 29 time periods. The $\mathbf{S}$ matrix contains variances in totals at any time period and covariances in totals between any two time periods, thus giving a very general modeling of the sampling variance structure. The variance-covariance matrix of the totals is then $V[\hat{\mathbf{Y}}] = \sigma^2 \boldsymbol{I} + \mathbf{S}$, where $\boldsymbol{I}$ is the identity matrix.

Regression coefficients were estimated using the REML method. Because higher-order polynomial regression models generally show strong collinearity among predictor variables, the model was reparameterized using orthogonal polynomials. The reparameterized model is

$$Y_t = \beta_0 X_0(t) + \beta_1 X_1(t) + \beta_2 X_2(t) + \beta_3 X_3(t) + \varepsilon_t,$$

where

$X_0(t) = 1/\sqrt{T}$ for all t, and

$X_1(t), X_2(t), X_3(t)$ provide contributions for the first-order (linear), second-order (quadratic), and third-order (cubic) polynomials, respectively.

Note that the error term is the same in both the original model and the reparameterized model because the fitted surface is the same for both models. The model was further constrained to have regression residuals sum to zero, a constraint that is not guaranteed by theory for these models, but was considered to improve model fit due to an approximation required to estimate $\mathbf{S}$. Standard errors of the regression trend estimates were obtained by simulation.

Final models were selected after testing for the significance of coefficients at the $\alpha = 0.05$ level ($p < .05$), which means that if the trend of interest (linear, quadratic, cubic) was in fact zero, then there would be a 5% chance that the trend would be detected as statistically significant when in fact it is not. Final fitted models are most easily interpreted using graphical plots.

Appendix B *Participating and Reporting Forensic Laboratories*

State	Lab Type	Laboratory Name	Reporting
AK	State	Alaska Department of Public Safety	✓
AL	State	Alabama Department of Forensic Sciences (5 sites)	✓
AR	State	Arkansas State Crime Laboratory (2 sites)	✓
AZ	State	Arizona Department of Public Safety, Scientific Analysis Bureau (4 sites)	✓
	Local	Mesa Police Department	✓
	Local	Phoenix Police Department	✓
	Local	Scottsdale Police Department	✓
	Local	Tucson Police Department Crime Laboratory	✓
CA	State	California Department of Justice (10 sites)	✓
	Local	Alameda County Sheriff's Office Crime Laboratory (San Leandro)	✓
	Local	Contra Costa County Sheriff's Office (Martinez)	✓
	Local	Fresno County Sheriff's Forensic Laboratory	✓
	Local	Kern County District Attorney's Office (Bakersfield)*	
	Local	Long Beach Police Department	✓
	Local	Los Angeles County Sheriff's Department (4 sites)	✓
	Local	Los Angeles Police Department (2 sites)	✓
	Local	Oakland Police Department Crime Laboratory	
	Local	Orange County Sheriff's Department (Santa Ana)	✓
	Local	Sacramento County District Attorney's Office	✓
	Local	San Bernardino County Sheriff's Department	✓
	Local	San Diego County Sheriff's Department	✓
	Local	San Diego Police Department	✓
	Local	San Francisco Police Department*	✓
	Local	San Mateo County Sheriff's Office (San Mateo)	✓
	Local	Santa Clara District Attorney's Office (San Jose)	✓
	Local	Ventura County Sheriff's Department	✓
CO	State	Colorado Bureau of Investigation (4 sites)	✓
	Local	Aurora Police Department	✓
	Local	Colorado Springs Police Department	✓
	Local	Denver Police Department Crime Laboratory	✓
	Local	Jefferson County Sheriff's Office (Golden)	✓
CT	State	Connecticut Department of Public Safety	✓
DE	State	Chief Medical Examiner's Office*	
FL	State	Florida Department of Law Enforcement (7 sites)	✓
	Local	Broward County Sheriff's Office (Fort Lauderdale)	✓
	Local	Indian River Crime Laboratory (Fort Pierce)	✓
	Local	Manatee County Sheriff's Office (Bradenton)	✓
	Local	Miami-Dade Police Department Crime Laboratory	✓
	Local	Palm Beach County Sheriff's Office Crime Laboratory (West Palm Beach)	✓
	Local	Pinellas County Forensic Laboratory (Largo)	✓
	Local	Sarasota County Sheriff's Office	✓
GA	State	Georgia State Bureau of Investigation (7 sites)	✓
HI	Local	Honolulu Police Department	✓
IA	State	Iowa Division of Criminal Investigations	✓
ID	State	Idaho State Police (3 sites)	✓
IL	State	Illinois State Police (7 sites)	✓
	Local	DuPage County Forensic Science Center (Wheaton)	✓
	Local	Northern Illinois Police Crime Laboratory (Chicago)	✓
IN	State	Indiana State Police Laboratory (4 sites)	✓
	Local	Indianapolis-Marion County Forensic Laboratory (Indianapolis)	✓
KS	State	Kansas Bureau of Investigation (3 sites)	✓
	Local	Johnson County Sheriff's Office (Mission)	✓
	Local	Sedgwick County Regional Forensic Science Center (Wichita)	✓
KY	State	Kentucky State Police (6 sites)	✓
LA	State	Louisiana State Police	✓
	Local	Acadiana Criminalistics Laboratory (New Iberia)	✓
	Local	Jefferson Parish Sheriff's Office (Metairie)	✓
	Local	New Orleans Police Department Crime Laboratory	
	Local	North Louisiana Criminalistics Laboratory System (3 sites)	✓
	Local	Southwest Louisiana Criminalistics Laboratory (Lake Charles)	✓
MA	State	Massachusetts State Police	✓
	Local	University of Massachusetts Medical School (Worcester)	✓
MD	State	Maryland State Police Forensic Sciences Division (3 sites)	✓
	Local	Anne Arundel County Police Department (Millersville)	✓
	Local	Baltimore City Police Department	✓
	Local	Baltimore County Police Department (Towson)	✓
	Local	Montgomery County Police Department Crime Laboratory (Rockville)	
	Local	Prince George's County Police Department (Landover)	
ME	State	Maine Department of Health and Human Services	✓
MI	State	Michigan State Police (7 sites)*	✓
MN	State	Minnesota Bureau of Criminal Apprehension (2 sites)	✓
MO	State	Missouri State Highway Patrol (8 sites)	✓
	Local	Independence Police Department	
	Local	KCMO Regional Crime Laboratory (Kansas City)	✓
	Local	St. Charles County Police Department Criminalistics Laboratory (O'Fallon)	✓
	Local	St. Louis County Police Department Crime Laboratory (Clayton)	✓
	Local	St. Louis Police Department	✓
MS	State	Mississippi Department of Public Safety (4 sites)	✓
	Local	Jackson Police Department Crime Laboratory	✓
	Local	Tupelo Police Department	✓
MT	State	Montana Forensic Science Division	✓
NC	State	North Carolina State Bureau of Investigation (3 sites)	✓
	Local	Charlotte-Mecklenburg Police Department	✓
	Local	Iredell County Sheriff's Office Crime Laboratory (Statesville)	✓
ND	State	North Dakota Crime Laboratory Division	✓
NE	State	Nebraska State Patrol Criminalistics Laboratory (2 sites)	✓
NH	State	New Hampshire State Police Forensic Laboratory	✓
NJ	State	New Jersey State Police (4 sites)	✓
	Local	Burlington County Forensic Laboratory (Mt. Holly)	✓
	Local	Cape May County Prosecutor's Office	✓
	Local	Hudson County Prosecutor's Office (Jersey City)	✓
	Local	Ocean County Sheriff's Department (Toms River)	✓
	Local	Union County Prosecutor's Office (Westfield)	✓
NM	State	New Mexico Department of Public Safety (3 sites)	✓
	Local	Albuquerque Police Department	✓
NV	Local	Henderson City Crime Laboratory	
	Local	Las Vegas Metropolitan Police Crime Laboratory	✓
	Local	Washoe County Sheriff's Office Crime Laboratory (Reno)	✓
NY	State	New York State Police (4 sites)	✓
	Local	Erie County Central Police Services Laboratory (Buffalo)	✓
	Local	Nassau County Office of Medical Examiner (East Meadow)	
	Local	New York City Police Department Crime Laboratory**	✓
	Local	Niagara County Sheriff's Office Forensic Laboratory (Lockport)	✓
	Local	Onondaga County Center for Forensic Sciences (Syracuse)	✓
	Local	Suffolk County Crime Laboratory (Hauppauge)	✓
	Local	Westchester County Forensic Sciences Laboratory (Valhalla)	✓
	Local	Yonkers Police Department Forensic Science Laboratory	✓
OH	State	Ohio Bureau of Criminal Identification & Investigation (3 sites)	✓
	State	Ohio State Highway Patrol	✓
	Local	Canton-Stark County Crime Laboratory (Canton)	✓
	Local	Columbus Police Department	✓
	Local	Cuyahoga County Regional Forensic Science Laboratory (Cleveland)	✓
	Local	Hamilton County Coroner's Office (Cincinnati)	✓
	Local	Lake County Regional Forensic Laboratory (Painesville)	✓
	Local	Lorain County Crime Laboratory (Elyria)	✓
	Local	Mansfield Police Department	✓
	Local	Miami Valley Regional Crime Laboratory (Dayton)	✓
	Local	Newark Police Department Forensic Services	✓
	Local	Toledo Police Forensic Laboratory	✓
OK	State	Oklahoma State Bureau of Investigation (5 sites)	✓
	Local	Tulsa Police Department Forensic Laboratory	✓
OR	State	Oregon State Police Forensic Services Division (5 sites)	✓
PA	State	Pennsylvania State Police Crime Laboratory (6 sites)	✓
	Local	Allegheny Office of the Medical Examiner Forensic Laboratory (Pittsburgh)	✓
	Local	Philadelphia Police Department Forensic Science Laboratory	✓
RI	State	Rhode Island Forensic Sciences Laboratory	
SC	State	South Carolina Law Enforcement Division	✓
	Local	Anderson/Oconee Regional Forensics Laboratory	✓
	Local	Charleston Police Department	✓
	Local	Richland County Sheriff's Department Forensic Sciences Laboratory (Columbia)	✓
	Local	Spartanburg Police Department	✓
SD	State	South Dakota Department of Public Health Laboratory	
	Local	Rapid City Police Department	✓
TN	State	Tennessee Bureau of Investigation (3 sites)	✓
TX	State	Texas Department of Public Safety (13 sites)	✓
	Local	Austin Police Department	
	Local	Bexar County Criminal Investigations Laboratory (San Antonio)	✓
	Local	Brazoria County Sheriff's Office Crime Laboratory (Angleton)	✓
	Local	Fort Worth Police Department Criminalistics Laboratory	✓
	Local	Harris County Institute of Forensic Sciences Crime Laboratory (Houston)	✓
	Local	Houston Forensic Science Local Governance Corporation	✓
	Local	Jefferson County Sheriff's Regional Crime Laboratory (Beaumont)	✓
UT	State	Utah Department of Public Safety (3 sites)	✓
VA	State	Virginia Department of Forensic Science (4 sites)	✓
VT	State	Vermont Forensic Laboratory	✓
WA	State	Washington State Patrol (6 sites)	✓
WI	State	Wisconsin Department of Justice (3 sites)	✓
	Local	Kenosha County Division of Health Services	✓
WV	State	West Virginia State Police	✓
WY	State	Wyoming State Crime Laboratory	✓
PR	Territory	Institute of Forensic Science of Puerto Rico Criminalistics Laboratory (3 sites)	✓

This list identifies laboratories that are participating in and reporting to NFLIS as of January 31, 2016.

*This laboratory is not currently conducting drug chemistry analysis. Cases for the agencies they serve are being analyzed via contracts or agreements with other laboratories.

**The New York City Police Department Crime Laboratory currently reports summary data.

Appendix C NFLIS Benefits and Limitations

Benefits

The systematic collection and analysis of drug analysis data aid our understanding of the Nation's illicit drug problem. NFLIS serves as a resource for supporting drug scheduling policy and drug enforcement initiatives both nationally and in specific communities around the country.

Specifically, NFLIS helps the drug control community achieve its mission by

- providing detailed information on the prevalence and types of controlled substances secured in law enforcement operations;
- identifying variations in controlled and noncontrolled substances at the national, State, and local levels;
- identifying emerging drug problems and changes in drug availability in a timely fashion;
- monitoring the diversion of legitimately marketed drugs into illicit channels;
- providing information on the characteristics of drugs, including quantity, purity, and drug combinations; and
- supplementing information from other drug sources, including the National Survey on Drug Use and Health (NSDUH) and the Monitoring the Future (MTF) study.

NFLIS is an opportunity for State and local laboratories to participate in a useful, high-visibility initiative. Participating laboratories regularly receive reports that summarize national and regional data. In addition, the Data Query System (DQS) is a secure website that allows NFLIS participants—including State and local laboratories, the DEA, and other Federal drug control agencies—to run customized queries on the NFLIS data. Enhancements to the DQS provide a new interagency exchange forum that will allow the DEA, forensic laboratories, and other members of the drug control community to post and respond to current information.

Limitations

NFLIS has limitations that must be considered when interpreting findings generated from the database.

- Currently, NFLIS includes data from Federal, State, and local forensic laboratories. Federal data are shown separately in this publication. Efforts are under way to enroll additional Federal laboratories.
- NFLIS includes drug chemistry results from completed analyses only. Drug evidence secured by law enforcement but not analyzed by laboratories is not included in the database.
- National and regional estimates may be subject to variation associated with sample estimates, including nonresponse bias.
- State and local policies related to the enforcement and prosecution of specific drugs may affect drug evidence submissions to laboratories for analysis.
- Laboratory policies and procedures for handling drug evidence vary. Some laboratories analyze all evidence submitted to them, while others analyze only selected case items. Many laboratories do not analyze drug evidence if the criminal case was dismissed from court or if no defendant could be linked to the case.
- Laboratories vary with respect to the records they maintain. For example, some laboratories' automated records include the weight of the sample selected for analysis (e.g., the weight of one of five bags of powder), while others record total weight.

Public Domain Notice

Obtaining Copies of This Publication

Electronic copies of this publication can be downloaded from the NFLIS website at **https://www.nflis.deadiversion.usdoj.gov**.

U.S. Drug Enforcement Administration
Office of Diversion Control
8701 Morrissette Drive
Springfield, VA 22152

March 2016