# Drug Overdose Fatality Surveillance System (DOFSS) 2016 Annual Report

Released: August 2018

Sarah L. Hargrove, MS
Patrick J. Ward, MPH
Lane G. Mitchell, BPH
Terry L. Bunn, PhD

Kentucky Injury Prevention and Research Center, bona fide agent for the Kentucky Department for Public Health
University of Kentucky
333 Waller Avenue, Suite 242
Lexington, Kentucky 40504-2915
(859) 257-4954
www.kiprc.uky.edu


# Table of Contents



KIPRC KENTUCKY INJURY PREVENTION AND RESEARCH CENTER

Kentucky Public Health
Prevent. Promote. Protect.

# DOFSS OVERVIEW

Kentucky's Drug Overdose Fatality Surveillance System (DOFSS) is a comprehensive database that utilizes multiple sources to enhance the Commonwealth's analytical capacity to identify and characterize drug overdose fatalities. Without a centralized death investigation system, Kentucky drug overdose fatality data are not collected by a single agency. DOFSS bridges the gaps by inputting drug overdose decedent data into one centralized database. A comprehensive multi-source database captures additional information on drug overdose fatalities and identifies emerging trends and patterns of drug use that may not be readily identified through analysis of data from a single source.

## Data Sources

DOFSS is comprised of:

- Vital statistics death certificates (with NCHS ICD-10 coding)
- Medical examiner autopsy reports
- Coroner investigation reports
- Post-mortem toxicology reports
    - Post-mortem toxicology reports were unavailable in 115 cases
- Kentucky All Schedule Prescription Electronic Reporting (KASPER) records
    - Year 2016 KASPER records were not available for this report

Data in DOFSS is provisional and subject to change. Data for this report was analyzed on March 15th, 2018.

## Funding

This report was supported by Cooperative Agreement Numbers 5 NU17CE002732-03-00 and NU17CE924880-02-01, both funded by the Centers for Disease Control and Prevention, and awarded to the Kentucky Injury Prevention and Research Center as the bona fide agent for the Kentucky Department for Public Health. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the Centers for Disease Control and Prevention or the Department of Health and Human Services.

The REDCap database used to enter DOFSS data is supported by the Center for Clinical and Translational Research grant support (NIH CTSA UL1TR000117).

## Acknowledgement

We would like to thank the Kentucky Department for Public Health, Office of Vital Statistics for access to death certificate records, Office of Inspector General for access to KASPER data, Office of the State Medical Examiner for access to autopsy reports and post-mortem toxicology reports, all county coroners for access to coroner report, and Michael Singleton and Dana Quesinberry, principal investigator and project manager (respectively) of the grants supporting this report for their guidance.

## Survey

Please take a moment to complete our brief survey regarding this report:
https://uky.az1.qualtrics.com/jfe/form/SV_2bDFg4NtmpaTVsN.

## Suggested Citation

Hargrove SL, Ward PJ, Mitchell LG, Bunn TL. "Kentucky Drug Overdose Fatality Surveillance System 2016 Annual Report." Kentucky Injury Prevention and Research Center. August, 2018.

# EXECUTIVE SUMMARY

The Kentucky Injury Prevention and Research Center (KIPRC) located at the University of Kentucky College of Public Health, bona fide agent for the Kentucky Department for Public Health, in collaboration with the Kentucky Office of the State Medical Examiner and county coroner offices, is pleased to present the 2016 Kentucky Drug Overdose Fatality Surveillance System (DOFSS) report.

The findings of the 2016 report illustrate the continuation and complexity of the drug overdose epidemic in Kentucky. The increase in the total number of drug overdose deaths involving prescription and illicit drugs highlights the continued need for enhanced and targeted substance use disorder prevention, treatment and recovery programs and supporting policies. Community substance use disorder prevention programs targeted to younger adults under 45 years of age are needed to enhance prevention of illicit drug use (59% of drug overdose decedents were under the age of 45; over one-half of all drug overdose deaths under the age of 45 involved morphine, a known metabolite of heroin, and over 40% involved fentanyl, which is commonly illegally sourced). Prevention programs targeted to older adults are needed to reduce prescription drug use (approximately one-half of drug overdose decedent deaths over the age of 45 involved gabapentin, and one-quarter involved oxycodone). Continued gabapentin involvement in overall female drug overdose deaths, and racial differences in substance use (such as cocaine being identified more frequently among black drug overdose decedents) offer other population-specific intervention opportunities. Drug-free workplace programs should also be considered in all industries, especially in the construction, restaurant, and other food services industries (15% of all drug overdose decedents were employed in the construction industry at time of death and 8% were employed in the restaurant and other food industries). Finally, public harm reduction education programs and naloxone programs can help reduce drug overdose deaths and increase bystander administration of naloxone when drug overdoses occur (bystanders were present at the scene of 37% of fatal drug overdoses, and most occurred at home (61%)).

Over one-half of drug overdose decedents in Kentucky had a reported history of substance use, while only 7% had a reported history of substance use disorder treatment. Enhanced treatment capacity, duration, and ability to pay is essential to increase the number of individuals admitted to and retained in substance use disorder treatment programs. In addition to treatment for opioid use disorders (one-quarter of all drug overdose decedents had diagnosed opioid use disorders, and opioids were involved in 90% of all drug overdose deaths), targeted treatment for methamphetamine use disorders (methamphetamine-involved deaths increased 125% from 2015-2016), and benzodiazepine use disorders is needed (benzodiazepines were involved in approximately one-half of all drug overdose deaths). Concurrent treatment for certain medical conditions, such as heart-related and mental disorders, should be available (14% of all drug overdose decedents had significant heart conditions that contributed to the cause of death; depression and anxiety disorders were diagnosed in 9% and 5% of all drug overdose deaths, respectively; only 1% of all drug overdose decedents had ever been treated for mental health conditions). An increase in the number of bridge clinics located in emergency department settings that provide medication-assisted treatment may help to increase timely substance use disorder treatment, as well as treatment availability for extended durations to reduce substance use relapse (11% of all drug overdose fatalities had suffered a substance use relapse at some point prior to the fatal overdose). www.FindHelpNowKY.org is a website developed by KIPRC as the bona fide agent for the Department for Public Health for use as a resource by healthcare professionals and the general public that provides near real-time availability of

substance use disorder treatment to link individuals in a timely fashion to substance use disorder treatment when they are at that critical stage of readiness. A resource section with information on questions related to substance use disorders and treatment is included in www.FindHelpNowKY.org.

An increase in the number of recovery ready communities is needed to enhance full integration of institutionalized individuals back into local communities (3% of all drug overdose decedents were recently released from residential substance use disorder treatment and 2% were under current treatment; 3% of all drug overdose decedents were recently released from incarceration; 3% were recently seen in an ER or released from a hospital stay).

Our sympathies are extended to the family, friends, and colleagues of those individuals who died from drug overdoses. Our hope is that enhanced, targeted, and evidence-based (and evidence-informed) state and local substance use disorder programs and policies that are community-centered, healthcare-centered, and workplace-centered, and provide recovery ready communities, will hasten reduction of the drug epidemic in Kentucky.

Sincerely,

Terry Bunn, Director

Kentucky Injury Prevention and Research Center

# HIGHLIGHTS

1. There were 1,457 drug overdose deaths overall for the state of Kentucky; 1,338 of the deaths were Kentucky residents whose death occurred in state, Table 1.
2. Of 1,342 deaths with toxicology results, the most common drug classes involved were opioids (90%), benzodiazepines (49%), and anticonvulsants (36%), Table 5.
3. The most frequently detected drugs among deaths with toxicology results were morphine (50%), fentanyl (41%), and gabapentin (36%), Table 6.
4. Deaths involving methamphetamine (+125%), fentanyl (+63%), and cocaine (+43%) significantly increased from 2015 to 2016, Table 6.
5. Opioids were the class of drugs most commonly identified in accidental drug overdose deaths (92%) whereas benzodiazepines were most commonly identified in drug overdose suicides (64%), Table 12.
6. Morphine was the most frequent drug detected in male drug overdose decedents (53%); Gabapentin was the most frequent drug detected in females (48%), Table 13.
7. The most common drug identified in drug overdose decedents under 45 years of age was morphine (54% of 0-24 years; 61% of 25-34 years; and 52% of 35-44 years), whereas, gabapentin was the most common detected in drug overdose decedents 45 years and older (51% of those 45-54 years; and 48% of those 55 and older), Table 14.
8. Cocaine was the most commonly detected drug in black drug overdose decedents (53%) but was only found in 15% of white drug overdose decedents, Table 15.
9. The most common industries among decedents were construction (15%), other non-classifiable or unspecified industry (15%), restaurants and other food services (8%), and manufacturing (4%). Those that did not work and homemakers each accounted for 10% of non-traditional sectors, Table 18.
10. Large changes in death counts from 2015-2016 included increases in Jefferson (+110), Campbell (+23), and Hardin (+17) counties and decreases in Kenton (-29) and Bell (-13) counties, Table 19.
11. The geographic spread of methamphetamine-involved deaths throughout Kentucky increased significantly from 2015-2016, Figures 24-25.
12. The most common identifiable prescription and over-the-counter (OTC) drugs found at the scene and/or autopsy were gabapentin (34%), oxycodone (23%), and alprazolam (19%), Table 34.
13. The most common other significant condition contributing to cause of death was heart-related conditions (14%). Half of heart-related conditions being hypertensive heart disease (7%), Figure 26.
14. The most common medical conditions diagnosed among drug overdose decedents were unspecified substance use disorder (33%), opioid-related substance use disorder (24%), hypertension (13%), alcohol use disorder (11%), depression (9%), nicotine dependence (8%), chronic obstructive pulmonary disease (6%), diabetes (5%), dorsalgia/back pain (5%), and anxiety disorder (5%), Table 35.
15. Fifty-five percent of decedents had a reported substance use problem, 11% of decedents had a reported history of substance use relapse, 7% of decedents had a reported previous drug overdose, and 7% of decedents had reportedly ever received treatment for their substance use disorder, Table 37.
16. Thirteen percent of drug overdose decedents had a reported mental health history, while 1% of all drug overdose decedents had reportedly ever received treatment for their mental health, Table 37.
17. Eleven percent of drug overdose decedents reported a major life change, crisis, or traumatic event occurring within the last month prior to the fatal event and 9% of decedents were recently released from residential substance use treatment, from hospital/ER, or from jail/prison, Table 37.

KIPRC KENTUCKY INJURY PREVENTION AND RESEARCH CENTER

Kentucky Public Health
Prevent. Promote. Protect.

# DEFINITIONS

Drug overdose fatalities were identified from Kentucky death certificates as any deaths with the following underlying cause of death ICD-10 codes: 1) X40-X44 (accidental/unintentional drug poisoning); 2) X60-X64 (suicide by drug poisoning); 3) X85 (homicide by drug poisoning); and 4) Y10-Y14 (drug poisoning with undetermined intent).

DOFSS cases include all drug overdose fatalities that occurred in Kentucky, regardless of decedent state of residence and all received Kentucky resident drug overdose fatalities that occurred out-of-state. Unless otherwise noted, both Kentucky residents and out-of-state residents who died of drug overdoses in Kentucky are included in DOFSS data counts.

**Chi-Squared Test:** A statistical test of the dependence of two categorical variables, under the null hypothesis that the two variables are independent. The alternative hypothesis is that the variables are dependent.

**Drug Paraphernalia**: Denotes any equipment, product, or accessory used for making, using, or concealing drugs for recreational purposes. Examples of drug paraphernalia include: pipes, syringes, scales, razors, spoons, rolled bills, etc.

**Fisher's Exact Test**: An "exact" statistical test of the dependence of two categorical variables, under the null hypothesis that the two variables are independent. The alternative hypothesis is that the variables are dependent. Exact tests are used when the sample size is too small to meet the assumptions of traditional statistical tests, such as the chi-square test of independence.

**Interquartile Range (IQR):** A measure of statistical dispersion between $75^{th}$ and $25^{th}$ percentiles, IQR = $Q_3$-$Q_1$

**Percentile:** The value that indicates the percentage of observations in a distribution that are below that value. For example, if the 95th percentile is 10, 95% of the distribution is below 10.

**P-Value:** The probability of finding the observed results under the assumption that the null hypothesis is true. P-values less than 0.05 are typically treated as "significant," that is, that there is sufficient evidence to reject the assumption that the null hypothesis is true in favor of the alternative hypothesis.

**Route of Administration:** Witness reports or evidence found at the scene or autopsy suggests how drugs were administered. Routes of administration are not mutually exclusive; a decedent may have more than one route of administration identified. Evidence identified is not unequivocal evidence that a specific route was use for the fatal event. Some types of evidence may be indicative of multiple routes of administration (i.e. filters are used for both injection and smoking).

> **Evidence of Injection** - Witness reports or evidence found at the scene or autopsy suggests drugs were injected by the decedent either intravenously, subcutaneously, or intramuscularly. Evidence of injection includes, but is not limited to: track marks, fresh needle puncture wounds, needles, syringes, tourniquets, cookers, filters, and witness reports.
>
> **Evidence of Ingestion**- Witness reports or evidence found at the scene or autopsy suggests drugs were taken orally by the decedent. Evidence of ingestion includes, but is not limited to: pills (marked or unmarked), pills found in stomach contents, pill bottles (empty or with pills), pill counts from scene, and witness reports. If pills or pill bottles are not closely associated with the scene or decedent, they will not be included as evidence of ingestion.

**Evidence of Snorting** - Witness reports or evidence found at the scene or autopsy suggests drugs were snorted by the decedent. Evidence of snorting includes, but is not limited to: crushed pills and powders, powder dust in or about nasal and oral cavities, straws, rolled up bills, razor blades or other cutting objects, or witness reports.

**Evidence of Smoking**- Witness reports or evidence found at the scene or autopsy suggests drugs were smoked by the decedent. Evidence of smoking includes, but is not limited to: pipes or stems, filters/screens, tin foil or cans, lighters, and witness reports.

**Evidence of Transdermal Application**- Witness reports or evidence found at the scene or autopsy suggests drugs were absorbed through the decedent's skin. Evidence of transdermal application includes, but is not limited to: transdermal patches, transdermal patch wrappings, leftover adhesive from patches on skin, and witness reports.

**Therapeutic Range:** A clinical reference range of blood plasma or serum concentration of a drug that is expected to achieve the desired therapeutic effects.

# 2016 KENTUCKY DRUG OVERDOSE FATALITY SURVEILLANCE DATA

## GENERAL DATA

### Table 1. Overall Kentucky Drug Overdose Fatality Data, 2016

| | |
|---|---|
| **DOFSS drug overdose deaths, overall** | 1,457 |
| Kentucky-resident drug overdose fatality occurring in Kentucky | 1,338 |
| Kentucky-resident drug overdose fatality occurring outside of Kentucky | 29 |
| *Kentucky-resident age-adjusted drug overdose fatality rate*[1] | 33.5 |
| Out-of-state resident drug overdose deaths occurring in Kentucky | 90 |
| **DOFSS drug overdose deaths with post-mortem toxicology results available** | 1,342 |

[1]Age-adjusted drug overdose fatality rate was calculated using Multiple Cause of Death 1999-2016 file on CDC WONDER Online Database.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. National data: Centers for Disease Control and Prevention, National Center for Health Statistics. Multiple Cause of Death 1999-2016 on CDC WONDER Online Database, released December, 2017. Data are from the Multiple Cause of Death Files, 1999-2016, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperation Program. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

## Table 2. Overall Demographic and Socio-Economic Factors Among Drug Overdose Decedents in Kentucky, 2016

| Category | Drug Overdose Decedent Count | Drug Overdose Decedent Percentage | Kentucky Population Estimate[1] | Kentucky Population Percentage |
|---|---|---|---|---|
| **Gender** | | | | |
| Male | 913 | 62.7% | 2,185,042 | 49.3% |
| Female | 544 | 37.3% | 2,251,071 | 50.7% |
| **Age** | | | | |
| 0-24 years | 100 | 6.9% | 1,432,182 | 32.3% |
| 25-34 years | 319 | 21.9% | 574,475 | 12.9% |
| 35-44 years | 440 | 30.2% | 552,347 | 12.5% |
| 45-54 years | 354 | 24.3% | 595,689 | 13.4% |
| 55+ years | 244 | 16.7% | 1,281,420 | 28.9% |
| **Race** | | | | |
| White | 1363 | 93.5% | 3,927,218 | 88.5% |
| Black | 83 | 5.7% | 380,726 | 8.6% |
| Other | 11 | 0.8% | 128,169 | 2.9% |
| **Marital Status[2]** | | | | |
| Single | 546 | 37.5% | 1,069,405 | 29.7% |
| Married[3] | 354 | 24.3% | 1,814,748 | 50.4% |
| Divorced | 435 | 29.9% | 475,291 | 13.2% |
| Widowed | 82 | 5.6% | 241,246 | 6.7% |
| Unknown Marital Status | 40 | 2.7% | 0 | 0.0% |
| **Education Level[4]** | | | | |
| Less than High School | 376 | 25.8% | 485,882 | 14.2% |
| High School / GED Equivalent | 690 | 47.4% | 1,112,624 | 32.5% |
| Some College / Associates Degree | 297 | 20.4% | 1,086,536 | 31.7% |
| Bachelor's Degree or Higher | 72 | 4.9% | 739,475 | 21.6% |
| Unknown Education | 22 | 1.5% | 0 | 0.0% |

[1]Kentucky population estimates for gender, age, and race are from the U.S. Census Bureau's 2016 Population Estimates. Kentucky population estimates for marital status and education level are from the U.S. Census Bureau's 2016 American Community Survey 1-year estimates.
[2]Kentucky population marital status estimates are for ages 15+.
[3]"Married," includes for both drug overdose decedent information and Kentucky population estimates, individuals who identify as separated but are not legally divorced.
[4]Kentucky population education level estimates are for ages 18+.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Kentucky population data: United States Census Bureau 2016 population estimates and 2016 American Community Survey 1-year estimates. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

## Table 3. Place of Injury Among Drug Overdose Decedents in Kentucky, 2016[1]

| Location of Injury | Count | Percentage |
|---|---|---|
| Home | 892 | 61.2% |
| Other Specified Place, Not Classifiable, or Unspecified | 515 | 35.3% |
| Residential Institution | 29 | 2.0% |
| Street/Highway | 10 | 0.7% |
| School, Other Institutions, Administrative Area | <5 | * |
| Sport and Recreational Area | <5 | * |
| Trade and Service Area | <5 | * |
| Industrial and Construction Area | <5 | * |
| Farm | <5 | * |

[1]According to state data release policy, counts less than 5 are suppressed. Any number associated with the suppressed count is labeled with an *.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

## Table 4. Place of Death Among Drug Overdose Decedents in Kentucky, 2016[1]

| Location of Death | Count | Percentage |
|---|---|---|
| Residence | 678 | 46.5% |
| Other Specified Place, Not Classifiable, or Unspecified | 298 | 20.5% |
| Hospital, ER/Outpatient | 285 | 19.6% |
| Hospital, Inpatient | 186 | 12.8% |
| Hospital, Dead on Arrival (DOA) | 7 | 0.5% |
| Hospice | <5 | * |
| Nursing Home/Long Term Care Facility | <5 | * |

[1]According to state data release policy, counts less than 5 are suppressed. Any number associated with the suppressed count is labeled with an *.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

# POST-MORTEM TOXICOLOGY RESULTS

## Table 5. Drug Classes Detected Among Drug Overdose Decedents in Kentucky, 2016[1]

| Drug Class[2-4] | 2016 Count | 2016 Percentage[5] | Percentage Change From 2015-2016[6] |
|---|---|---|---|
| **OPIOIDS[7]** | 1205 | 89.8% | 12.9% |
| **BENZODIAZEPINES** | 663 | 49.4% | 4.9% |
| **ANTICONVULSANTS** | 482 | 35.9% | 2.1% |
| **CANNABINOIDS** | 378 | 28.2% | 23.1% |
| **AMPHETAMINES** | 293 | 21.8% | 83.1% |
| **ALCOHOL** | 273 | 20.3% | 14.2% |
| **COCAINE** | 232 | 17.3% | 41.5% |
| **STIMULANTS** | 64 | 4.8% | -11.1% |
| **ANTIDEPRESSANTS** | 46 | 3.4% | -11.5% |
| **NON-OPIOID ANALGESICS** | 41 | 3.1% | 5.1% |
| **ANTIHISTAMINES** | 24 | 1.8% | 14.3% |
| **BARBITURATES** | 20 | 1.5% | -28.6% |
| **ANTIPSYCHOTICS** | 15 | 1.1% | 25.0% |
| **CARDIOVASCULAR AGENTS** | 13 | 1.0% | -40.9% |
| **SEDATIVES/HYPNOTICS** | 11 | 0.8% | -15.4% |
| **NARCOTICS** | 6 | 0.4% | - |
| **ANTIBIOTICS** | <5 | * | * |
| **NEUROLOGICAL AGENTS** | <5 | * | * |
| **UROLOGICAL AGENTS** | <5 | * | * |

[1]According to state data release policy, counts less than 5 are suppressed. Any number associated with the suppressed count is labeled with an *. A count greater than 5 or an associated number may not be reported if that value would disclose a suppressed value; these are labeled with an -.
[2]Drug testing of blood, urine, and/or vitreous fluids.
[3]Drug classes are not mutually exclusive; decedents may have multiple drug classes detected.
[4]Multiple drugs within the same drug class are counted as one drug class incident per decedent.
[5]Percentage is based on total number of DOFSS drug overdose fatalities with toxicology results available, n=1,342.
[6]Percent Change represents the change in individual drug frequency from 2015 to 2016.
[7]"Opioids" includes all opium-like substances (including natural opiates, semi-synthetic opioids, and synthetic opioids).

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

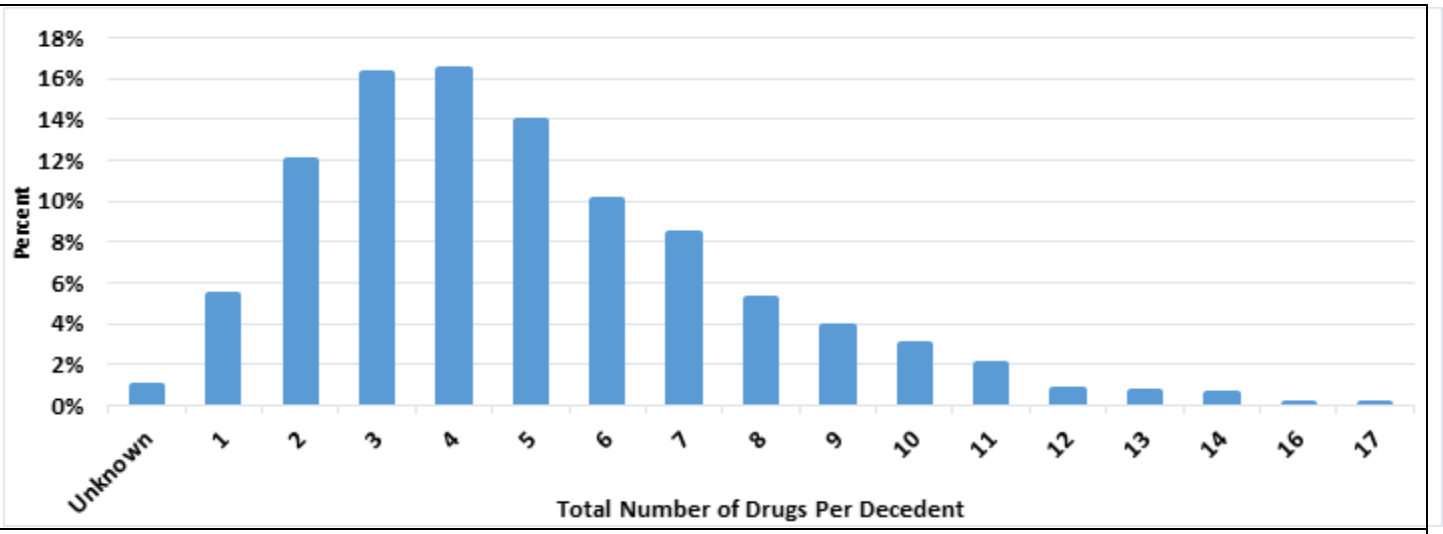
## Table 6. Most Frequent Drugs Detected Among Drug Overdose Decedents in Kentucky, 2016

| Drug[1-2] | 2016 Count | 2016 Percentage[3] | Percentage Change From 2015-2016[4] |
|---|---|---|---|
| MORPHINE[5] | 667 | 49.7% | 16.2% |
| FENTANYL[6] | 544 | 40.5% | 62.9% |
| GABAPENTIN | 480 | 35.8% | 3.0% |
| ALPRAZOLAM[7] | 374 | 27.9% | 6.6% |
| CARBOXY-TETRAHYDROCANNABINOL (THC-COOH) | 366 | 27.3% | 21.6% |
| HEROIN[8] | 363 | 27.0% | -0.8% |
| CODEINE | 304 | 22.7% | -1.6% |
| ETHANOL | 271 | 20.2% | 14.3% |
| OXYCODONE | 253 | 18.9% | -13.1% |
| METHAMPHETAMINE | 252 | 18.8% | 125.0% |
| CLONAZEPAM[9] | 241 | 18.0% | 3.4% |
| HYDROMORPHONE | 235 | 17.5% | 2.2% |
| COCAINE[10] | 234 | 17.4% | 42.7% |
| HYDROCODONE | 216 | 16.1% | -11.5% |
| OXYMORPHONE | 203 | 15.1% | -16.1% |
| AMPHETAMINE | 198 | 14.8% | 98.0% |
| TETRAHYDROCANNABINOL (THC) | 170 | 12.7% | 25.9% |
| NORDIAZEPAM | 149 | 11.1% | -14.9% |
| OXAZEPAM | 147 | 11.0% | -12.0% |
| TEMAZEPAM | 121 | 9.0% | -19.9% |
| DIAZEPAM | 109 | 8.1% | -9.2% |
| BUPRENORPHINE[11] | 102 | 7.6% | -17.1% |
| METHADONE[12] | 68 | 5.1% | -26.1% |

[1]Drug testing of blood, urine, and/or vitreous fluids.
[2]Drugs are not mutually exclusive; decedents may have more than one drug detected.
[3]Percentage is based on total number of DOFSS drug overdose fatalities with toxicology results available, n=1,342.
[4]Percent Change represents the change in individual drug frequency from 2015 to 2016.
[5]Morphine may represent pure morphine and/or a metabolite of heroin.
[6]"Fentanyl" was identified by positive toxicology results for fentanyl and/or norfentanyl.
[7]"Alprazolam" was identified by positive toxicology results for alprazolam and/or a-OH-alprazolam.
[8]"Heroin" was identified by positive toxicology results for 6-monoacetylmorphine.
[9]"Clonazepam" was identified by positive toxicology results for clonazepam and/or 7-aminoclonazepam.
[10]"Cocaine" was identified by positive toxicology results for cocaine, cocaethylene, and/or benzoylecgonine.
[11]"Buprenorphine" was identified by positive toxicology results for buprenorphine and/or norbuprenorphine.
[12]"Methadone" was identified by positive toxicology results for methadone and/or EDDP.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

## Figure 1. Total Number of Drugs Detected Per Drug Overdose Decedent in Kentucky, 2016[1-4]




[1]Drug testing of blood, urine, and/or vitreous fluids.
[2]Parent drugs with unique metabolites (alprazolam, buprenorphine, clonazepam, cocaine, fentanyl, methadone, and tramadol) were counted only once even if both parent and unique metabolite were both identified. Although THC-COOH is a unique metabolite of THC, these drugs were counted individually due to the lengthy metabolism of THC-COOH.
[3]Percentage is based on total number of DOFSS drug overdose fatalities with at least one drug present in toxicology results, n=1,336.
[4]Unknown number of drug is due to a decedent having a toxicology screening performed with drug class information only.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

## Table 7. Percentile of Total Number of Drugs Detected Per Drug Overdose Decedents in Kentucky, 2016

| **Total Number of Drugs Per Decedent Percentiles** | | | | | | |
|---|---|---|---|---|---|---|
| **5th percentile** | **10th percentile** | **25th percentile** | **50th percentile** | **75th percentile** | **90th percentile** | **95th percentile** |
| 1 drug/per decedent | 2 drugs/per decedent | 3 drugs/per decedent | 4 drugs/per decedent | 6 drugs/per decedent | 9 drugs/per decedent | 10 drugs/per decedent |

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

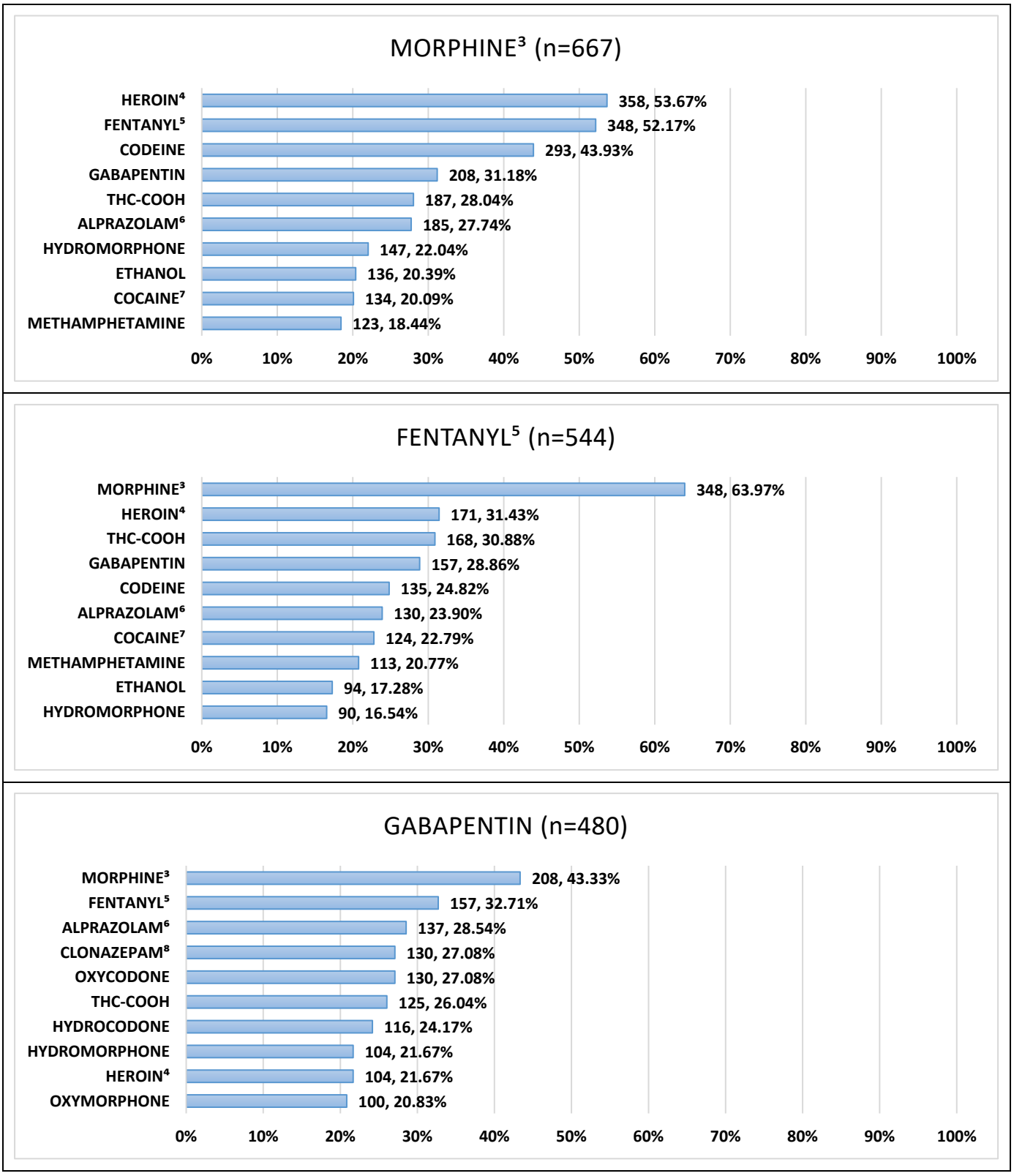
## Table 8. Most Frequent Drugs Detected Among Kentucky Drug Overdose Decedents with Less Than Four Total Drugs in Post-Mortem Toxicology, 2016

| Drug[1-3] | Count | Percentage[4] |
|---|---|---|
| Fentanyl[5] | 174 | 38.6% |
| Morphine[6] | 147 | 32.6% |
| Ethanol | 89 | 19.7% |
| Gabapentin | 88 | 19.5% |
| Alprazolam[7] | 64 | 14.2% |
| Cocaine[8] | 59 | 13.1% |
| Methamphetamine | 49 | 10.9% |
| Oxycodone | 47 | 10.4% |
| THC-COOH | 44 | 9.8% |
| Heroin[9] | 39 | 8.6% |
| Clonazepam[10] | 37 | 8.2% |
| Hydrocodone | 35 | 7.8% |
| Amphetamine | 29 | 6.4% |
| Codeine | 25 | 5.5% |
| Hydromorphone | 20 | 4.4% |
| Oxymorphone | 16 | 3.5% |
| THC | 16 | 3.5% |
| Methadone[11] | 14 | 3.1% |
| Buprenorphine[12] | 11 | 2.4% |

[1]Drug testing of blood, urine, and/or vitreous fluids.
[2]Drugs are not mutually exclusive; decedents may have more than one drug detected.
[3]Parent drugs with unique metabolites were counted once even if both parent and unique metabolite were identified. Although THC-COOH is a unique metabolite of THC, these drugs were counted individually due to the lengthy metabolism of THC-COOH.
[4]Percentage is based on total number of DOFSS drug overdose fatalities with less than four drugs identified in toxicology results, n=451.
[5]"Fentanyl" was identified by positive toxicology results for fentanyl and/or norfentanyl.
[6]Morphine may represent pure morphine and/or a metabolite of heroin.
[7]"Alprazolam" was identified by positive toxicology results for alprazolam and/or a-OH-alprazolam.
[8]"Cocaine" was identified by positive toxicology results for cocaine, cocaethylene, and/or benzoylecgonine.
[9]"Heroin" was identified by positive toxicology results for 6-monoacetylmorphine.
[10]"Clonazepam" was identified by positive toxicology results for clonazepam and/or 7-aminoclonazepam.
[11]"Methadone" was identified by positive toxicology results for methadone and/or EDDP.
[12]"Buprenorphine" was identified by positive toxicology results for buprenorphine and/or norbuprenorphine.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

Figure 2. Most Frequent Drugs Found in Combination with Commonly Detected Drugs Among Drug Overdose Decedents in Kentucky, 2016[1-2]




KIPRC KENTUCKY INJURY PREVENTION AND RESEARCH CENTER

Kentucky Public Health
Prevent. Promote. Protect.

Figure 2. Most Frequent Drugs Found in Combination with Commonly Detected Drugs Among Drug Overdose Decedents in Kentucky, 2016[1-2] –continued

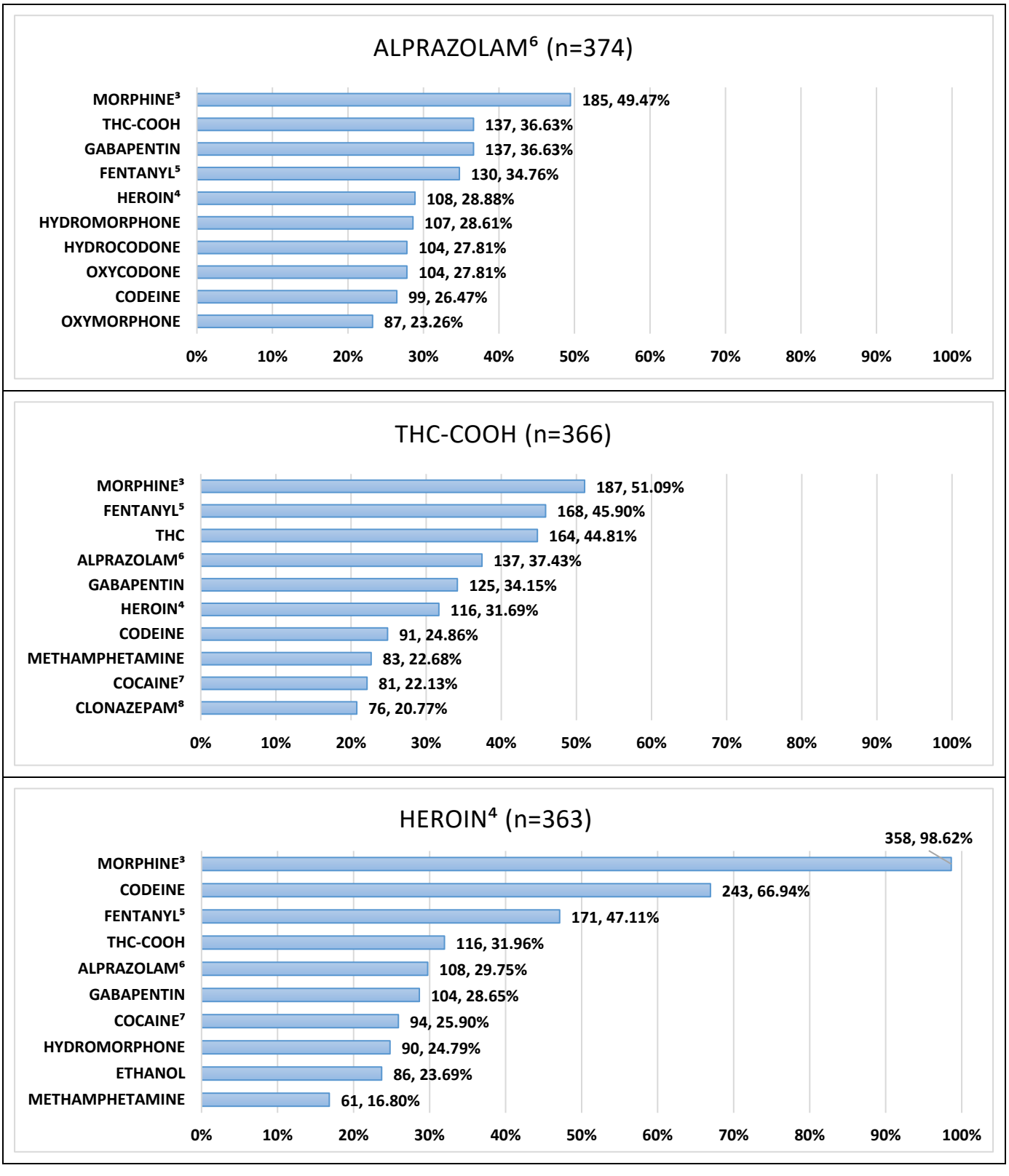


Figure 2. Most Frequent Drugs Found in Combination with Commonly Detected Drugs Among Drug Overdose Decedents in Kentucky, 2016[1-2] –continued

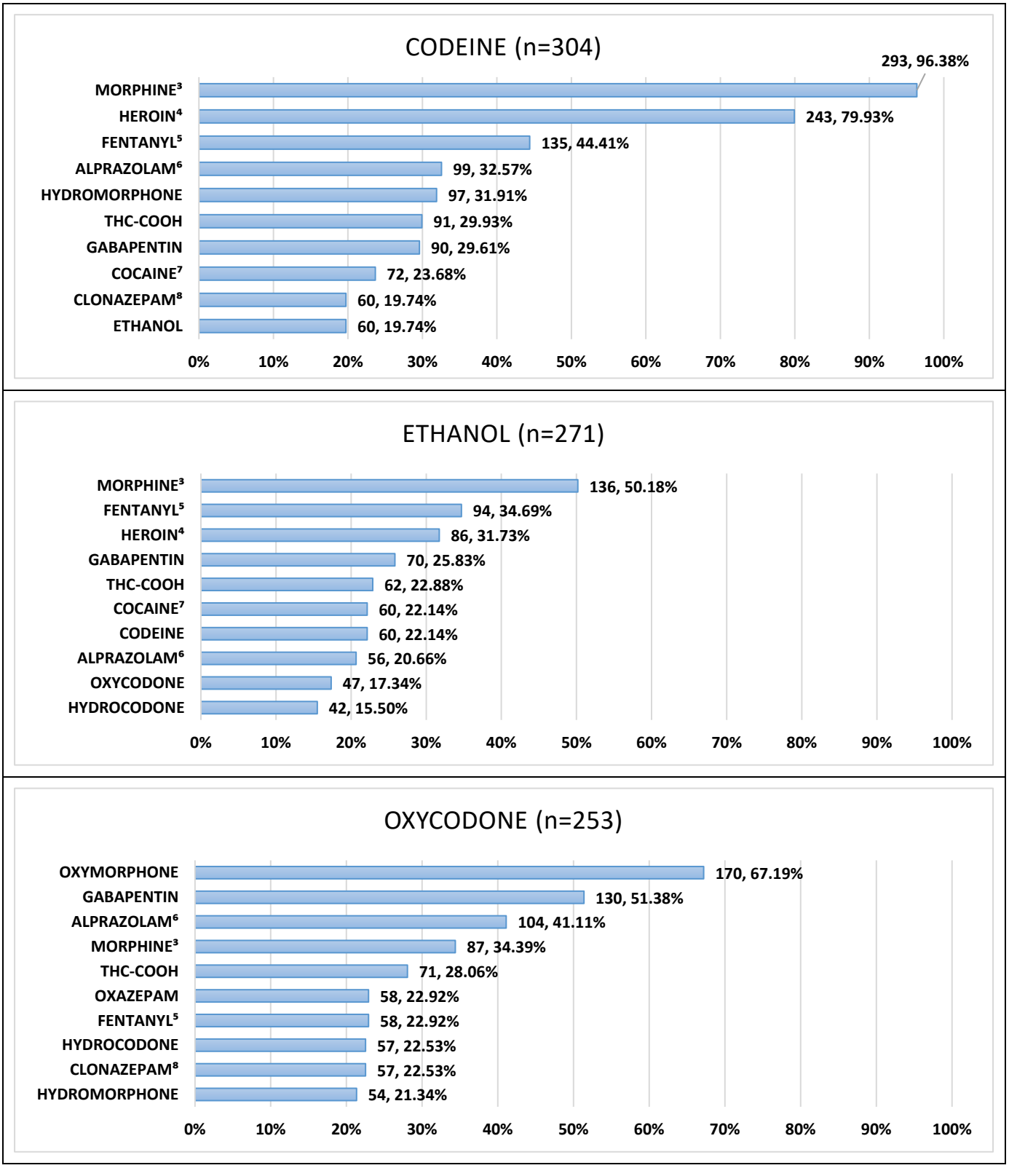
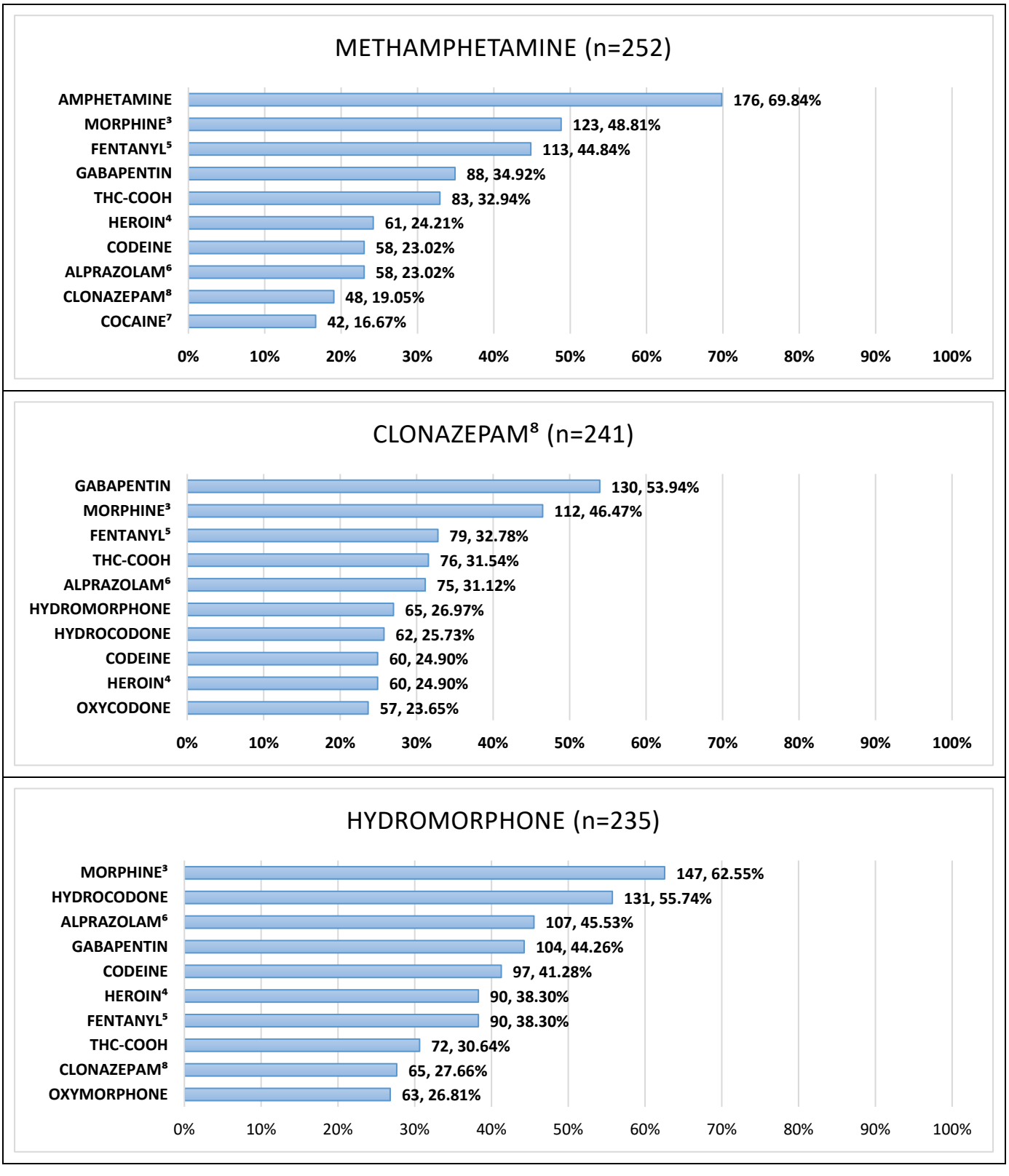


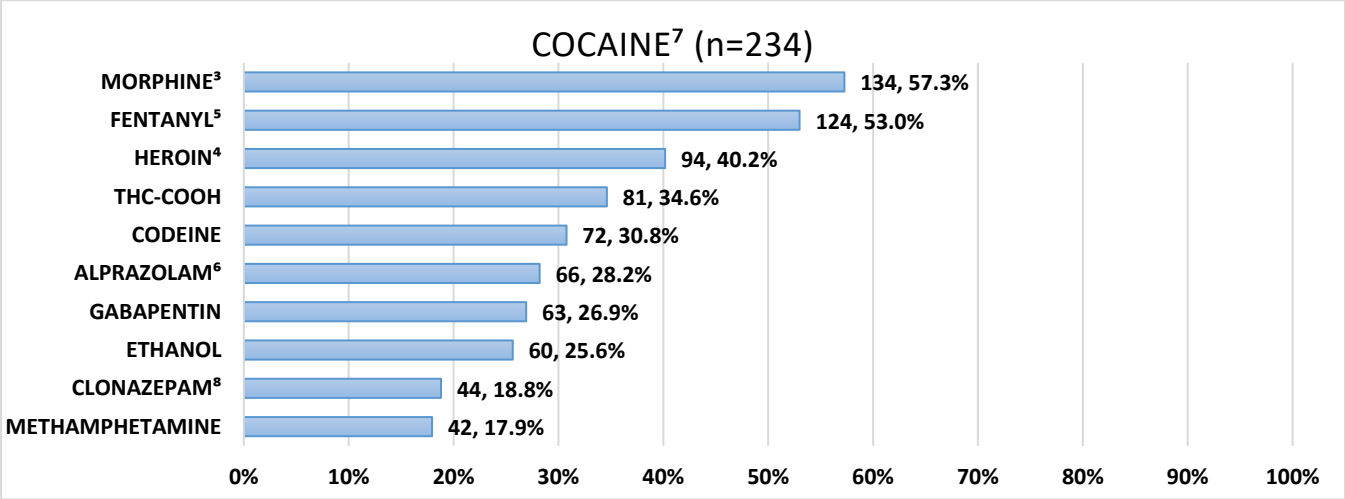
Figure 2. Most Frequent Drugs Found in Combination with Commonly Detected Drugs Among Drug Overdose Decedents in Kentucky, 2016[1-2] –continued




KIPRC KENTUCKY INJURY PREVENTION AND RESEARCH CENTER

Kentucky Public Health
Prevent. Promote. Protect.

## Figure 2. Most Frequent Drugs Found in Combination with Commonly Detected Drugs Among Drug Overdose Decedents in Kentucky, 2016[1-2] –continued




[1]Drug testing of blood, urine, and/or vitreous fluids.
[2]Drugs are not mutually exclusive; decedents may have more than one drug detected.
[3]Morphine may represent pure morphine and/or a metabolite of heroin.
[4]"Heroin" was identified by positive toxicology results for 6-monoacetylmorphine.
[5]"Fentanyl" was identified by positive toxicology results for fentanyl and/or norfentanyl.
[6]"Alprazolam" was identified by positive toxicology results for alprazolam and/or a-OH-alprazolam.
[7]"Cocaine" was identified by positive toxicology results for cocaine, cocaethylene and/or benzoylecgonine.
[8]"Clonazepam" was identified by positive toxicology results for clonazepam and/or 7-aminoclonazepam.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

## Table 9. Most Common Two-Drug Combinations Detected Among Drug Overdose Decedents in Kentucky, 2016

| Two-Drug Combination[1-3] | Count | Percentage[4] |
|---|---|---|
| Heroin[5] and Morphine[6] | 358 | 26.7% |
| Fentanyl[7] and Morphine[6] | 348 | 25.9% |
| Codeine and Morphine[6] | 293 | 21.8% |
| Codeine and Heroin[5] | 243 | 18.1% |
| Gabapentin and Morphine[6] | 208 | 15.5% |
| Morphine[6] and THC-COOH | 187 | 13.9% |
| Alprazolam[8] and Morphine[6] | 185 | 13.8% |
| Amphetamine and Methamphetamine | 176 | 13.1% |
| Fentanyl[7] and Heroin[5] | 171 | 12.7% |
| Oxycodone and Oxymorphone | 170 | 12.7% |

[1]Drug testing of blood, urine, and/or vitreous fluids.
[2]Drug combinations are not mutually exclusive; decedents may have had more than one drug combination detected.
[3]Drug combinations may represent a parent drug and a non-specific metabolite or adulterant.
[4]Percentage is based on total number of DOFSS drug overdose fatalities with toxicology results available, n=1,342.
[5]"Heroin" was identified by positive toxicology results for 6-monoacetylmorphine.
[6]Morphine may represent pure morphine and/or a metabolite of heroin.
[7]"Fentanyl" was identified by positive toxicology results for fentanyl and/or norfentanyl.
[8]"Alprazolam" was identified by positive toxicology results for alprazolam and/or a-OH-alprazolam.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

## Table 10. Most Common Three-Drug Combinations Detected Among Drug Overdose Decedents in Kentucky, 2016

| Three-Drug Combination[1-3] | Count | Percentage[4] |
|---|---|---|
| Codeine, Heroin[5], and Morphine[6] | 243 | 18.1% |
| Fentanyl[7], Heroin[5], and Morphine[6] | 169 | 12.6% |
| Codeine, Fentanyl[7], and Morphine[6] | 135 | 10.1% |
| Heroin[5], Morphine[6], and THC-COOH | 115 | 8.6% |
| Codeine, Fentanyl[7], and Heroin[5] | 111 | 8.3% |
| Alprazolam[7], Heroin[5], and Morphine[6] | 106 | 7.9% |
| Fentanyl[7], Morphine[6], and THC-COOH | 106 | 7.9% |
| Gabapentin, Heroin[5], and Morphine[6] | 104 | 7.7% |
| Fentanyl[7], Gabapentin, and Morphine[6] | 100 | 7.5% |
| Alprazolam[8], Codeine, and Morphine[6] | 96 | 7.2% |

[1]Drug testing of blood, urine, and/or vitreous fluids.
[2]Drug combinations are not mutually exclusive; decedents may have had more than one drug combination detected.
[3]Drug combinations may represent a parent drug and a non-specific metabolite or adulterant.
[4]Percentage is based on total number of DOFSS drug overdose fatalities with toxicology results available, n=1,342.
[5]"Heroin" was identified by positive toxicology results for 6-monoacetylmorphine.
[6]Morphine may represent pure morphine and/or a metabolite of heroin.
[7]"Fentanyl" was identified by positive toxicology results for fentanyl and/or norfentanyl.
[8]"Alprazolam" was identified by positive toxicology results for alprazolam and/or a-OH-alprazolam.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

## Table 11. Most Common Four-Drug Combinations Detected Among Drug Overdose Decedents in Kentucky, 2016

| Four-Drug Combination[1-3] | Count | Percentage[4] |
|---|---|---|
| Codeine, Fentanyl[5], Heroin[6], and Morphine[7] | 111 | 8.3% |
| Alprazolam[8], Codeine, Heroin[6], and Morphine[7] | 82 | 6.1% |
| Heroin[6], Codeine, Morphine[7], and THC-COOH | 80 | 6.0% |
| Codeine, Heroin[6], Hydromorphone, and Morphine[7] | 79 | 5.9% |
| Codeine, Gabapentin, Heroin[6], and Morphine[7] | 73 | 5.4% |
| Cocaine[9], Codeine, Heroin[6], and Morphine[7] | 64 | 4.8% |
| Fentanyl[5], Heroin[6], Morphine[7], and THC-COOH | 57 | 4.2% |
| Heroin[6], Morphine[7], THC, and THC-COOH | 56 | 4.2% |
| Codeine, Fentanyl[5], Hydromorphone, and Morphine[7] | 54 | 4.0% |
| Codeine, Ethanol, Heroin[6], and Morphine[7] | 51 | 3.8% |

[1]Drug testing of blood, urine, and/or vitreous fluids.
[2]Drug combinations are not mutually exclusive; decedents may have had more than one drug combination detected.
[3]Drug combinations may represent a parent drug and a non-specific metabolite or adulterant.
[4]Percentage is based on total number of DOFSS drug overdose fatalities with toxicology results available, n=1,342.
[5]"Fentanyl" was identified by positive toxicology results for fentanyl and/or norfentanyl.
[6]"Heroin" was identified by positive toxicology results for 6-monoacetylmorphine.
[7]Morphine may represent pure morphine and/or a metabolite of heroin.
[8]"Alprazolam " was identified by positive toxicology results for alprazolam and/or a-OH-alprazolam.
[9]"Cocaine" was identified by positive toxicology results for cocaine, cocaethylene, and/or benzoylecgonine.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

Figure 3. Median Blood Concentration, IQR, and Therapeutic Range of Top Therapeutic Drugs Identified Among Drug Overdose Decedents in Kentucky, 2016[1-3]

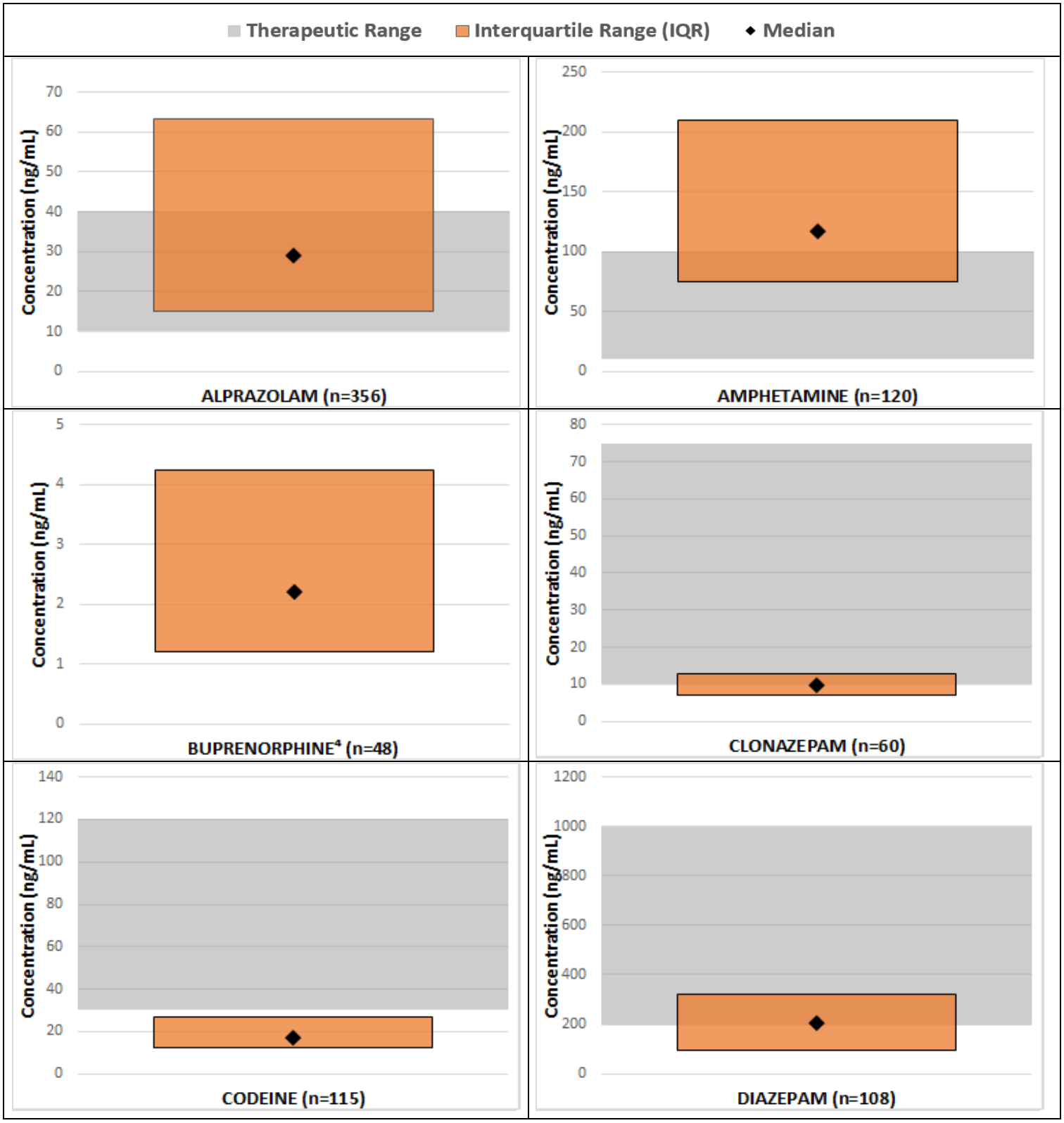


Figure 3. Median Blood Concentration, IQR, and Therapeutic Range of Top Therapeutic Drugs Identified Among Drug Overdose Decedents in Kentucky, 2016[1-3] –continued

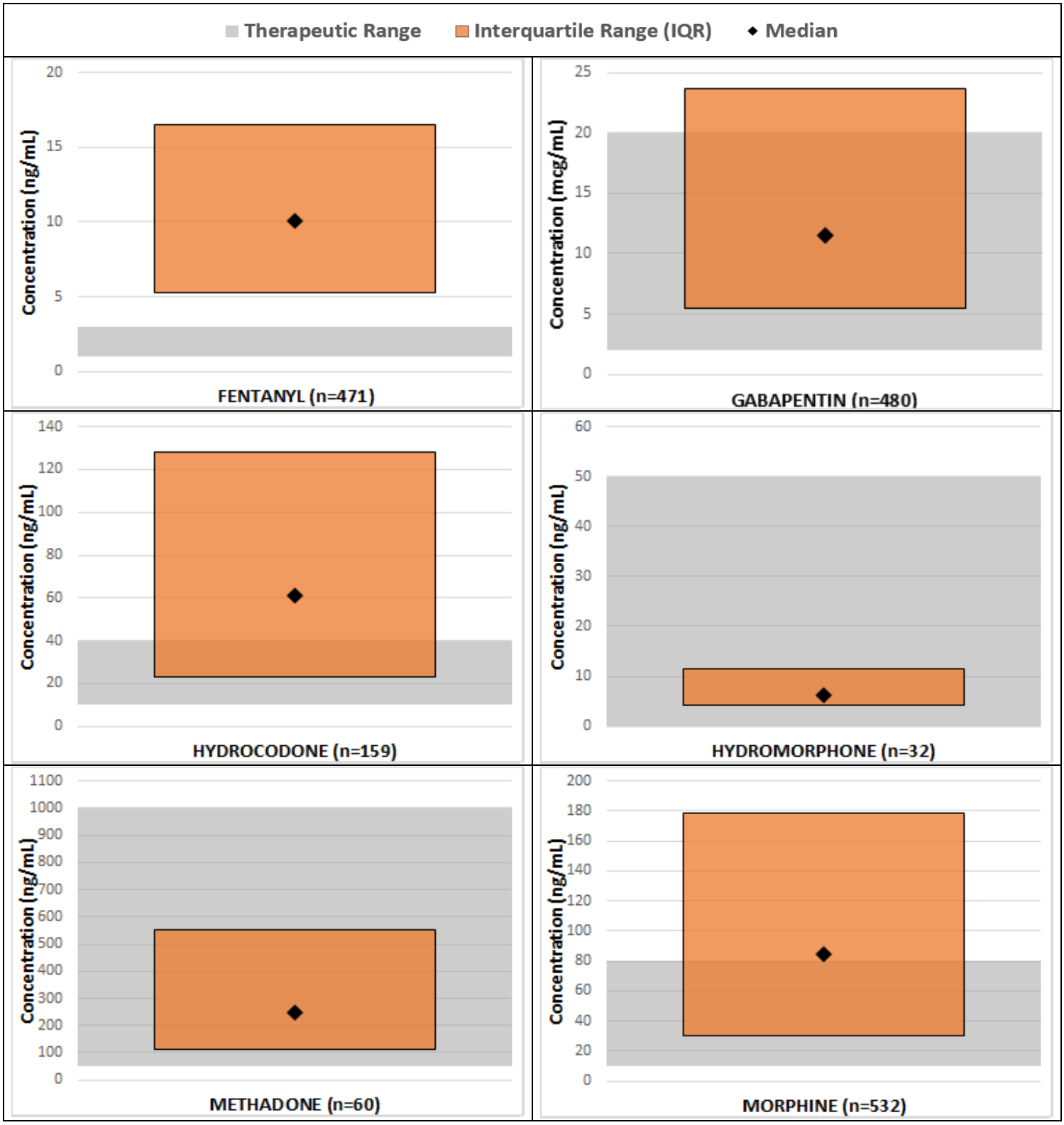
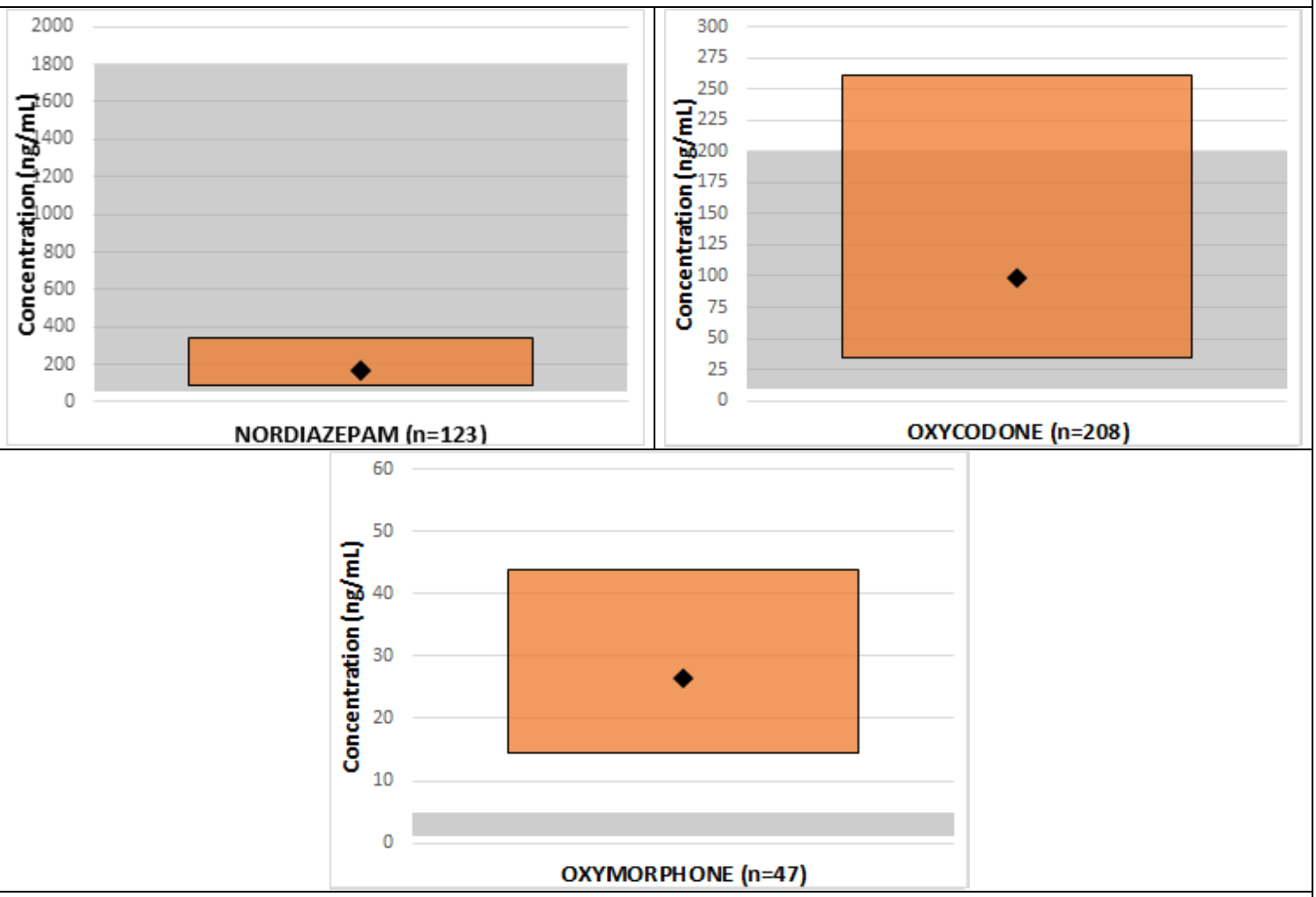


Figure 3. Median Blood Concentration, IQR, and Therapeutic Range of Top Therapeutic Drugs Identified Among Drug Overdose Decedents in Kentucky, 2016[1-3] –continued




[1]Drug testing of blood only due to lack of correlation of urine and vitreous concentrations with therapeutic range.
[2]Drugs are not mutually exclusive; decedents may have more than one drug detected.
[3]The Interquartile Range (IQR) is the statistical dispersion between the 75th and 25th percentiles of the blood concentration of all drug overdose decedents with the specified drug identified via toxicological analysis.
[4]A therapeutic range for buprenorphine has not been clearly established (https://www.ata-journal.org/articles/ata/pdf/2004/04/ata20044p275.pdf).

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

## Table 12. Drug Classes Identified Among Drug Overdose Decedents in Kentucky by Suicide and Accidental Manners of Death, 2016[1-3]

| Drug Class[4-5] | Suicide, n=50 (%) | Accidental, n=1,222 (%) | Chi-Square p-value[6] | Fisher's Exact p-value[7] |
|---|---|---|---|---|
| **OPIOIDS[8]** | 31 (62.0%) | 1121 (91.7%) | <.01 | <.01 |
| **BENZODIAZEPINES** | 32 (64.0%) | 595 (48.7%) | 0.03 | *nc* |
| **ANTICONVULSANTS** | 21 (42.0%) | 434 (35.5%) | 0.35 | *nc* |
| **CANNABINOIDS** | 9 (18.0%) | 356 (29.1%) | 0.09 | *nc* |
| **AMPHETAMINES** | 6 (12.0%) | 274 (22.4%) | 0.08 | *nc* |
| **ALCOHOL** | 7 (14.0%) | 255 (20.9%) | 0.24 | *nc* |
| **COCAINE** | <5 (*) | 223 (18.2%) | 0.03 | *nc* |
| **STIMULANTS** | 16 (32.0%) | 41 (3.4%) | <.01 | <.01 |
| **ANTIDEPRESSANTS** | 13 (26.0%) | 29 (2.4%) | <.01 | <.01 |
| **NON-OPIOID ANALGESICS** | 10 (20.0%) | 24 (2.0%) | <.01 | <.01 |
| **ANTIHISTAMINES** | 8 (16.0%) | 13 (1.1%) | <.01 | <.01 |
| **BARBITURATES** | <5 (*) | 18 (1.5%) | 0.76 | 0.54 |
| **ANTIPSYCHOTICS** | 6 (12.0%) | 7 (0.6%) | <.01 | <.01 |
| **SEDATIVES/HYPNOTICS** | <5 (*) | 8 (0.7%) | <.01 | <.01 |
| **CARDIOVASCULAR AGENTS** | 6 (12.0%) | 7 (0.6%) | <.01 | <.01 |
| **NARCOTICS** | 0 | 6 (0.5%) | 0.62 | 1.00 |
| **ANTIBIOTICS** | 0 | <5 (*) | 0.84 | 1.00 |
| **NEUROLOGICAL AGENTS** | <5 (*) | 0 | <.01 | 0.04 |
| **UROLOGICAL AGENTS** | <5 (*) | 0 | <.01 | 0.04 |

[1]Undetermined, Homicide, and Natural Manners of Death were excluded from this analysis.

[2]Counts are based on total number of DOFSS drug overdose fatalities with at least one drug present in toxicology results for each manner group.

[3]According to state data release policy, counts less than 5 are suppressed. Any number associated with the suppressed count is labeled with an *.

[4]Drug testing of blood, urine, and/or vitreous fluids.

[5]Drugs are not mutually exclusive; decedents may have more than one drug detected.

[6]*p*-value from chi-square test of independence, which tests if a statistical association exists between manner of death and a positive finding for the specified drug in post-mortem toxicology.

[7]*p*-value from Fisher-exact test included for instances where chi-square assumptions may be violated. Where no violation, Fisher-exact test not calculated and labeled with *nc*.

[8]"Opioids" includes all opium-like substances (including natural opiates, semi-synthetic opioids, and synthetic opioids).

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

# DRUG OVERDOSE FATALITY DEMOGRAPHICS

## Table 13. Most Frequent Drugs Identified Among Drug Overdose Decedents in Kentucky by Gender, 2016[1]

| Drug[2-3] | Female (%) N=493 | Male (%) N=843 | p-value[4] |
|---|---|---|---|
| Morphine[5] | 224 (45.4%) | 443 (52.6%) | 0.01 |
| Fentanyl[6] | 165 (33.5%) | 379 (45.0%) | <.01 |
| Gabapentin | 238 (48.3%) | 242 (28.7%) | <.01 |
| Alprazolam[7] | 147 (29.8%) | 227 (26.9%) | 0.26 |
| THC-COOH | 119 (24.1%) | 247 (29.3%) | 0.04 |
| Heroin[8] | 95 (19.3%) | 268 (31.8%) | <.01 |
| Codeine | 92 (18.7%) | 212 (25.1%) | 0.01 |
| Ethanol | 65 (13.2%) | 206 (24.4%) | <.01 |
| Oxycodone | 96 (19.5%) | 157 (18.6%) | 0.70 |
| Methamphetamine | 83 (16.8%) | 169 (20.0%) | 0.15 |
| Clonazepam[9] | 114 (23.1%) | 127 (15.1%) | <.01 |
| Hydromorphone | 89 (18.1%) | 146 (17.3%) | 0.73 |
| Cocaine[10] | 76 (15.4%) | 158 (18.7%) | 0.12 |

[1]Counts are based on total number of DOFSS drug overdose fatalities with at least one drug present in toxicology results for each gender.
[2]Drug testing of blood, urine, and/or vitreous fluids.
[3]Drugs are not mutually exclusive; decedents may have more than one drug detected.
[4]*p*-value from chi-square test of independence, which tests if a statistical association exists between gender and a positive finding for the specified drug in post-mortem toxicology.
[5]Morphine may represent pure morphine and/or a metabolite of heroin.
[6]"Fentanyl" was identified by positive toxicology results for fentanyl and/or norfentanyl.
[7]"Alprazolam" was identified by positive toxicology results for alprazolam and/or a-OH-alprazolam.
[8]"Heroin" was identified by positive toxicology results for 6-monoacetylmorphine.
[9]"Clonazepam" was identified by positive toxicology results for clonazepam and/or 7-aminoclonazepam.
[10]"Cocaine" was identified by positive toxicology results for cocaine, cocaethylene and/or benzoylecgonine.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

## Table 14. Most Frequent Drugs Identified Among Drug Overdose Decedents in Kentucky by Age Group, 2016[1]

| Drug[2-3] | 0-24 years (%) N=91 | 25-34 years (%) N=294 | 35-44 years (%) N=405 | 45-54 years (%) N=326 | 55+ years (%) N=220 |
|---|---|---|---|---|---|
| Morphine[4] | 49 (53.8%) | 179 (60.9%) | 212 (52.3%) | 153 (46.9%) | 74 (33.6%) |
| Fentanyl[5] | 48 (52.7%) | 158 (53.7%) | 173 (42.7%) | 121 (37.1%) | 44 (20.0%) |
| Gabapentin | 12 (13.2%) | 61 (20.7%) | 136 (33.6%) | 165 (50.6%) | 106 (48.2%) |
| Alprazolam[6] | 32 (35.2%) | 77 (26.2%) | 124 (30.6%) | 87 (26.7%) | 54 (24.5%) |
| THC-COOH | 38 (41.8%) | 102 (34.7%) | 114 (28.1%) | 74 (22.7%) | 38 (17.3%) |
| Heroin[7] | 26 (28.6%) | 108 (36.7%) | 120 (29.6%) | 78 (23.9%) | 31 (14.1%) |
| Codeine | 22 (24.2%) | 91 (31.0%) | 100 (24.7%) | 61 (18.7%) | 30 (13.6%) |
| Ethanol | 12 (13.2%) | 59 (20.1%) | 81 (20.0%) | 77 (23.6%) | 42 (19.1%) |
| Oxycodone | 7 (7.7%) | 28 (9.5%) | 78 (19.3%) | 78 (23.9%) | 62 (28.2%) |
| Methamphetamine | 11 (12.1%) | 69 (23.5%) | 86 (21.2%) | 57 (17.5%) | 29 (13.2%) |
| Clonazepam[8] | 10 (11.0%) | 43 (14.6%) | 76 (18.8%) | 68 (20.9%) | 44 (20.0%) |
| Hydromorphone | 11 (12.1%) | 48 (16.3%) | 67 (16.5%) | 68 (20.9%) | 41 (18.6%) |
| Cocaine[9] | 20 (22.0%) | 61 (20.7%) | 76 (18.8%) | 53 (16.3%) | 24 (10.9%) |

[1]Counts are based on total number of DOFSS drug overdose fatalities with at least one drug present in toxicology results for that age group.
[2]Drug testing of blood, urine, and/or vitreous fluids.
[3]Drugs are not mutually exclusive; decedents may have more than one drug detected.
[4]Morphine may represent pure morphine and/or a metabolite of heroin.
[5]"Fentanyl" was identified by positive toxicology results for fentanyl and/or norfentanyl.
[6]"Alprazolam" was identified by positive toxicology results for alprazolam and/or a-OH-alprazolam.
[7]"Heroin" was identified by positive toxicology results for 6-monoacetylmorphine.
[8]"Clonazepam" was identified by positive toxicology results for clonazepam and/or 7-aminoclonazepam.
[9]"Cocaine" was identified by positive toxicology results for cocaine, cocaethylene and/or benzoylecgonine.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

## Table 15. Most Frequent Drugs Identified Among Drug Overdose Decedents in Kentucky by Race, 2016[1-2]

| Drugs[3-4] | Black (%) N=79 | White (%) N=1246 | p-value[5] |
|---|---|---|---|
| Morphine[6] | 39 (49.4%) | 620 (49.8%) | 0.95 |
| Fentanyl[7] | 41 (51.9%) | 494 (39.6%) | 0.03 |
| Gabapentin | 13 (16.5%) | 466 (37.4%) | <.01 |
| Alprazolam[8] | 18 (22.8%) | 353 (28.3%) | 0.29 |
| THC-COOH | 27 (34.2%) | 334 (26.8%) | 0.15 |
| Heroin[9] | 27 (34.2%) | 332 (26.6%) | 0.14 |
| Codeine | 22 (27.8%) | 277 (22.2%) | 0.25 |
| Ethanol | 23 (29.1%) | 246 (19.7%) | 0.04 |
| Oxycodone | 6 (7.6%) | 247 (19.8%) | <.01 |
| Methamphetamine | 6 (7.6%) | 242 (19.4%) | <.01 |
| Clonazepam[10] | 5 (6.3%) | 234 (18.8%) | <.01 |
| Hydromorphone | 10 (12.7%) | 225 (18.1%) | 0.22 |
| Cocaine[11] | 42 (53.2%) | 189 (15.2%) | <.01 |

[1]Asian/PI, Indian, Other, and Unknown Race were excluded from these analyses due to low counts.
[2]Counts are based on total number of DOFSS drug overdose fatalities with at least one drug present in toxicology results for that race.
[3]Drug testing of blood, urine, and/or vitreous fluids.
[4]Drugs are not mutually exclusive; decedents may have more than one drug detected.
[5]*p*-value from chi-square test of independence, which tests if a statistical association exists between race and a positive finding for the specified drug in post-mortem toxicology.
[6]Morphine may represent pure morphine and/or a metabolite of heroin.
[7]"Fentanyl" was identified by positive toxicology results for fentanyl and/or norfentanyl.
[8]"Alprazolam" was identified by positive toxicology results for alprazolam and/or a-OH-alprazolam.
[9]"Heroin" was identified by positive toxicology results for 6-monoacetylmorphine.
[10]"Clonazepam" was identified by positive toxicology results for clonazepam and/or 7-aminoclonazepam.
[11]"Cocaine" was identified by positive toxicology results for cocaine, cocaethylene and/or benzoylecgonine.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

## DRUG OVERDOSE FATALITY SOCIO-ECONOMIC FACTORS

### Table 16. Most Frequent Drugs Identified Among Drug Overdose Decedents in Kentucky by Education Level, 2016[1-2]

| Drug[3-4] | Less than High School (%) N=345 | High School / GED Equivalent (%) N=635 | Some College / Associates Degree (%) N=273 | Bachelor's Degree or Higher (%) N=65 | Unknown Education (%) N=18 |
|---|---|---|---|---|---|
| Morphine[5] | 160 (46.4%) | 325 (51.2%) | 146 (53.5%) | 23 (35.4%) | 13 (72.2%) |
| Fentanyl[6] | 134 (38.8%) | 262 (41.3%) | 115 (42.1%) | 24 (36.9%) | 9 (50.0%) |
| Gabapentin | 158 (45.8%) | 202 (31.8%) | 84 (30.8%) | 25 (38.5%) | 11 (61.1%) |
| Alprazolam[7] | 93 (27.0%) | 169 (26.6%) | 90 (33.0%) | 20 (30.8%) | <5 (*) |
| THC-COOH | 103 (29.9%) | 177 (27.9%) | 71 (26.0%) | 10 (15.4%) | 5 (27.8%) |
| Heroin[8] | 80 (23.2%) | 187 (29.4%) | 74 (27.1%) | 16 (24.6%) | 6 (33.3%) |
| Codeine | 67 (19.4%) | 150 (23.6%) | 65 (23.8%) | 16 (24.6%) | 6 (33.3%) |
| Ethanol | 68 (19.7%) | 129 (20.3%) | 52 (19.0%) | 15 (23.1%) | 7 (38.9%) |
| Oxycodone | 62 (18.0%) | 118 (18.6%) | 59 (21.6%) | 14 (21.5%) | 0 (0.0%) |
| Methamphetamine | 77 (22.3%) | 125 (19.7%) | 38 (13.9%) | 8 (12.3%) | <5 (*) |
| Clonazepam[9] | 57 (16.5%) | 110 (17.3%) | 55 (20.1%) | 16 (24.6%) | <5 (*) |
| Hydromorphone | 67 (19.4%) | 120 (18.9%) | 39 (14.3%) | 8 (12.3%) | <5 (*) |
| Cocaine[10] | 58 (16.8%) | 110 (17.3%) | 49 (17.9%) | 12 (18.5%) | 5 (27.8%) |

[1]Counts are based on total number of DOFSS drug overdose fatalities with at least one drug present in toxicology results for that education group.
[2]According to state data release policy, counts less than 5 are suppressed. Any number associated with the suppressed count is labeled with an *.
[3]Drug testing of blood, urine, and/or vitreous fluids.
[4]Drugs are not mutually exclusive; decedents may have more than one drug detected.
[5]Morphine may represent pure morphine and/or a metabolite of heroin.
[6]"Fentanyl" was identified by positive toxicology results for fentanyl and/or norfentanyl.
[7]"Alprazolam" was identified by positive toxicology results for alprazolam and/or a-OH-alprazolam.
[8]"Heroin" was identified by positive toxicology results for 6-monoacetylmorphine.
[9]"Clonazepam" was identified by positive toxicology results for clonazepam and/or 7-aminoclonazepam.
[10]"Cocaine" was identified by positive toxicology results for cocaine, cocaethylene and/or benzoylecgonine.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

## Table 17. Most Frequent Drugs Identified Among Drug Overdose Decedents in Kentucky by Marital Status, 2016[1-2]

| Drug[3-4] | Single (%) N=504 | Married (%) N=323 | Divorced (%) N=394 | Widowed (%) N=76 | Unknown (%) N=39 |
|---|---|---|---|---|---|
| Morphine[5] | 302 (59.9%) | 133 (41.2%) | 182 (46.2%) | 30 (39.5%) | 20 (51.3%) |
| Fentanyl[6] | 253 (50.2%) | 122 (37.8%) | 136 (34.5%) | 23 (30.3%) | 10 (25.6%) |
| Gabapentin | 112 (22.2%) | 139 (43.0%) | 178 (45.2%) | 33 (43.4%) | 18 (46.2%) |
| Alprazolam[7] | 127 (25.2%) | 96 (29.7%) | 120 (30.5%) | 21 (27.6%) | 10 (25.6%) |
| THC-COOH | 171 (33.9%) | 71 (22.0%) | 99 (25.1%) | 17 (22.4%) | 8 (20.5%) |
| Heroin[8] | 173 (34.3%) | 66 (20.4%) | 101 (25.6%) | 15 (19.7%) | 8 (20.5%) |
| Codeine | 145 (28.8%) | 57 (17.6%) | 79 (20.1%) | 14 (18.4%) | 9 (23.1%) |
| Ethanol | 123 (24.4%) | 46 (14.2%) | 79 (20.1%) | 14 (18.4%) | 9 (23.1%) |
| Oxycodone | 54 (10.7%) | 82 (25.4%) | 92 (23.4%) | 21 (27.6%) | <5 (*) |
| Methamphetamine | 98 (19.4%) | 57 (17.6%) | 72 (18.3%) | 19 (25.0%) | 6 (15.4%) |
| Clonazepam[9] | 71 (14.1%) | 73 (22.6%) | 74 (18.8%) | 15 (19.7%) | 8 (20.5%) |
| Hydromorphone | 86 (17.1%) | 54 (16.7%) | 70 (17.8%) | 19 (25.0%) | 6 (15.4%) |
| Cocaine[10] | 109 (21.6%) | 46 (14.2%) | 64 (16.2%) | 9 (11.8%) | 6 (15.4%) |

[1]Counts are based on total number of DOFSS drug overdose fatalities with at least one drug present in toxicology results for that marital status.

[2]According to state data release policy, counts less than 5 are suppressed. Any number associated with the suppressed count is labeled with an *.

[3]Drug testing of blood, urine, and/or vitreous fluids.

[4]Drugs are not mutually exclusive; decedents may have more than one drug detected.

[5]Morphine may represent pure morphine and/or a metabolite of heroin.

[6]"Fentanyl" was identified by positive toxicology results for fentanyl and/or norfentanyl.

[7]"Alprazolam" was identified by positive toxicology results for alprazolam and/or a-OH-alprazolam.

[8]"Heroin" was identified by positive toxicology results for 6-monoacetylmorphine.

[9]"Clonazepam" was identified by positive toxicology results for clonazepam and/or 7-aminoclonazepam.

[10]"Cocaine" was identified by positive toxicology results for cocaine, cocaethylene and/or benzoylecgonine.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

## Table 18. Most Frequent Industries Identified Among Drug Overdose Decedents in Kentucky, 2016

| Industry[1] | Count | Percentage[2] |
|---|---|---|
| Construction | 221 | 15.2% |
| Other Industry, Not Classifiable, or Unspecified | 212 | 14.6% |
| Did Not Work | 151 | 10.4% |
| Homemaker | 151 | 10.4% |
| Restaurants and Other Food Services | 115 | 7.9% |
| Not Specified Manufacturing Industries | 53 | 3.6% |
| Landscaping Services | 39 | 2.7% |
| Automotive Repair and Maintenance | 38 | 2.6% |
| Students | 34 | 2.3% |
| Not Specified Retail Trade | 28 | 1.9% |
| Hospitals | 27 | 1.9% |
| Truck Transportation | 23 | 1.6% |
| Coal Mining | 21 | 1.4% |
| Beauty Salons | 16 | 1.1% |
| Independent Artists, Performing Arts, Spectator Sports, and Related Industries | 16 | 1.1% |
| Nursing Care Facilities | 15 | 1.0% |
| Crop Production | 14 | 1.0% |
| Grocery Stores | 14 | 1.0% |
| Commercial and Industrial Machinery and Equipment Repair and Maintenance | 11 | 0.8% |
| Real Estate | 11 | 0.8% |
| Outpatient Care Centers | 10 | 0.7% |
| Warehousing and Storage | 10 | 0.7% |

[1]Industry was determined using death certificate data and the NIOSH NIOCCS 3 auto-coder program.
[2]Percentage is based on total number of DOFSS drug overdose fatalities, n=1457.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

## KENTUCKY RESIDENT DRUG OVERDOSE FATALITY COUNTS AND RATES

Table 19. Kentucky Resident Drug Overdose Fatality Counts and Rates by County, 2015-2016[1-2]

| County | 2015 Count | 2015 Rate (per 100,000 population) | 2016 Count | 2016 Rate (per 100,000 population) | Alert[3] |
|---|---|---|---|---|---|
| Adair | <5 | * | <5 | * | |
| Allen | <5 | * | 5 | * | |
| Anderson | 7 | * | 9 | * | |
| Ballard | <5 | * | <5 | * | |
| Barren | 5 | * | 5 | * | |
| Bath | <5 | * | <5 | * | |
| Bell | 23 | 82.3 | 10 | 36.9 | ! (↓) |
| Boone | 49 | 39.3 | 42 | 32.7 | |
| Bourbon | 5 | * | <5 | * | |
| Boyd | 21 | 42.9 | 25 | 51.9 | |
| Boyle | 9 | * | 16 | 53.3 | |
| Bracken | 5 | * | <5 | * | |
| Breathitt | <5 | * | 6 | * | |
| Breckinridge | <5 | * | <5 | * | |
| Bullitt | 14 | 18.2 | 19 | 24.0 | |
| Butler | 10 | 77.9 | <5 | * | |
| Caldwell | <5 | * | <5 | * | |
| Calloway | 5 | * | 5 | * | |
| Campbell | 44 | 48.1 | 67 | 72.7 | ! (↑) |
| Carlisle | 0 | * | 0 | 0.0 | |
| Carroll | <5 | * | <5 | * | |
| Carter | 9 | * | 9 | * | |
| Casey | 5 | * | 5 | * | |
| Christian | <5 | * | <5 | * | |
| Clark | 13 | 36.5 | 9 | * | |
| Clay | 6 | * | 5 | * | |
| Clinton | 6 | * | <5 | * | |
| Crittenden | <5 | * | <5 | * | |
| Cumberland | <5 | * | <5 | * | |
| Daviess | 13 | 13.2 | 13 | 13.0 | |
| Edmonson | 7 | * | <5 | * | |
| Elliott | <5 | * | <5 | * | |
| Estill | 6 | * | 9 | * | |
| Fayette | 106 | 34.4 | 115 | 36.1 | |

Table 19. Kentucky Resident Drug Overdose Fatality Counts and Rates by County, 2015-2016[1-2] continued

| County | 2015 Count | 2015 Rate (per 100,000 population) | 2016 Count | 2016 Rate (per 100,000 population) | Alert[3] |
|---|---|---|---|---|---|
| Fleming | 6 | * | <5 | * | |
| Floyd | 17 | 44.0 | 16 | 43.1 | |
| Franklin | 12 | 24.1 | 15 | 29.7 | |
| Fulton | 0 | * | 0 | 0.0 | |
| Gallatin | 8 | * | 6 | * | |
| Garrard | <5 | * | 8 | * | |
| Grant | 8 | * | 15 | 60.2 | |
| Graves | 5 | * | 5 | * | |
| Grayson | 6 | * | 12 | 45.8 | |
| Green | <5 | * | <5 | * | |
| Greenup | 10 | 27.4 | 7 | * | |
| Hancock | <5 | * | <5 | * | |
| Hardin | 9 | * | 26 | 24.2 | ! (↑) |
| Harlan | 9 | * | 8 | * | |
| Harrison | 8 | * | 23 | 123.4 | ! (↑) |
| Hart | <5 | * | <5 | * | |
| Henderson | <5 | * | 5 | * | |
| Henry | 7 | * | <5 | * | |
| Hickman | <5 | * | <5 | * | |
| Hopkins | 6 | * | 9 | * | |
| Jackson | <5 | * | <5 | * | |
| Jefferson | 211 | 27.9 | 321 | 41.9 | ! (↑) |
| Jessamine | 13 | 25.8 | 16 | 30.6 | |
| Johnson | 6 | * | <5 | * | |
| Kenton | 111 | 68.1 | 82 | 49.7 | ! (↓) |
| Knott | <5 | * | <5 | * | |
| Knox | 19 | 59.7 | 10 | 31.6 | |
| Larue | 0 | * | 0 | 0.0 | |
| Laurel | 12 | 20.1 | 9 | * | |
| Lawrence | <5 | * | 5 | * | |
| Lee | 6 | * | <5 | * | |
| Leslie | <5 | * | 6 | * | |
| Letcher | 7 | * | <5 | * | |
| Lewis | 6 | * | 0 | 0.0 | |
| Lincoln | <5 | * | 9 | * | |
| Livingston | <5 | * | <5 | * | |

Table 19. Kentucky Resident Drug Overdose Fatality Counts and Rates by County, 2015-2016[1-2] continued

| County | 2015 Count | 2015 Rate (per 100,000 population) | 2016 Count | 2016 Rate (per 100,000 population) | Alert[3] |
|---|---|---|---|---|---|
| Logan | <5 | * | 5 | * | |
| Lyon | <5 | * | 0 | 0.0 | |
| Madison | 29 | 33.8 | 25 | 27.9 | |
| Magoffin | <5 | * | <5 | * | |
| Marion | <5 | * | <5 | * | |
| Marshall | <5 | * | 10 | 31.9 | |
| Martin | 9 | * | <5 | * | |
| Mason | <5 | * | 11 | 64.0 | |
| McCracken | 7 | * | 12 | 18.4 | |
| McCreary | <5 | * | <5 | * | |
| McLean | 0 | * | <5 | * | |
| Meade | 5 | * | 10 | 35.6 | |
| Menifee | 0 | * | <5 | * | |
| Mercer | 5 | * | 10 | 46.6 | |
| Metcalfe | <5 | * | <5 | * | |
| Monroe | <5 | * | <5 | * | |
| Montgomery | 9 | * | 10 | 36.0 | |
| Morgan | 0 | * | <5 | * | |
| Muhlenberg | <5 | * | <5 | * | |
| Nelson | 7 | * | 11 | 24.1 | |
| Nicholas | <5 | * | <5 | * | |
| Ohio | 8 | * | <5 | * | |
| Oldham | 15 | 23.8 | 11 | 16.8 | |
| Owen | <5 | * | 7 | * | |
| Owsley | <5 | * | <5 | * | |
| Pendleton | 5 | * | 7 | * | |
| Perry | 11 | 39.2 | 9 | * | |
| Pike | 21 | 33.1 | 16 | 26.4 | |
| Powell | 6 | * | 6 | * | |
| Pulaski | 11 | 17.3 | 13 | 20.3 | |
| Robertson | 0 | * | <5 | * | |
| Rockcastle | <5 | * | 6 | * | |
| Rowan | 5 | * | 7 | * | |
| Russell | 7 | * | 6 | * | |
| Scott | 13 | 25.9 | 20 | 37.1 | |
| Shelby | 16 | 36.1 | 15 | 32.3 | |

Table 19. Kentucky Resident Drug Overdose Fatality Counts and Rates by County, 2015-2016[1-2] continued

| County | 2015 Count | 2015 Rate (per 100,000 population) | 2016 Count | 2016 Rate (per 100,000 population) | Alert[3] |
|---|---|---|---|---|---|
| Simpson | 7 | * | <5 | * | |
| Spencer | 6 | * | 5 | * | |
| Taylor | 5 | * | 5 | * | |
| Todd | <5 | * | <5 | * | |
| Trigg | 5 | * | <5 | * | |
| Trimble | <5 | * | <5 | * | |
| Union | 5 | * | <5 | * | |
| Warren | 15 | 12.6 | 16 | 12.8 | |
| Washington | <5 | * | <5 | * | |
| Wayne | <5 | * | <5 | * | |
| Webster | <5 | * | <5 | * | |
| Whitley | 16 | 44.7 | 7 | * | |
| Wolfe | <5 | * | 0 | 0.0 | |
| Woodford | 9 | * | <5 | * | |

[1]According to state data release policy, counts less than 5 and rates based on counts less than 10 are suppressed. Any number associated with the suppressed count or rate is labeled with an *.

[2]Rates based on counts less than 20 are unstable, and should be interpreted with caution.

[3]Alerts indicate an increase or decrease in count from year-to-year greater than or equal to 10.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

Figure 4. Kentucky Resident Drug Overdose Fatality Rates per 100,000 Population by County, 2015[1-2]

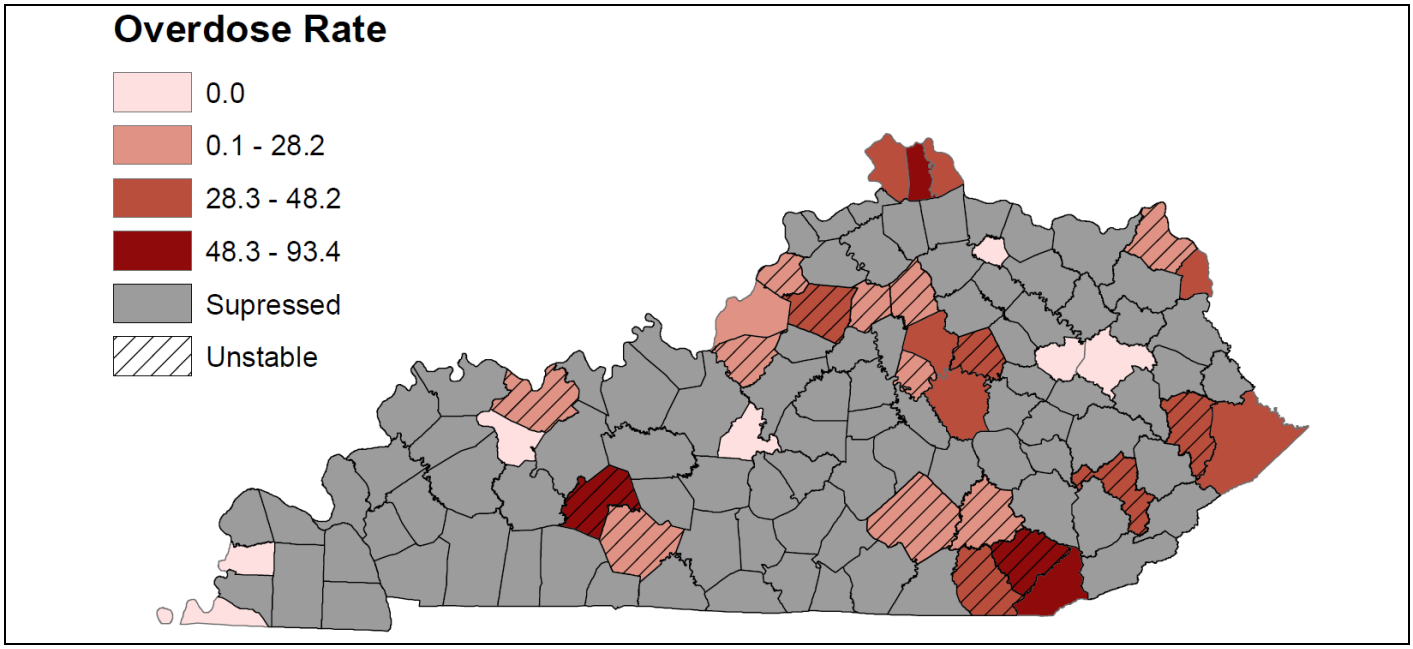
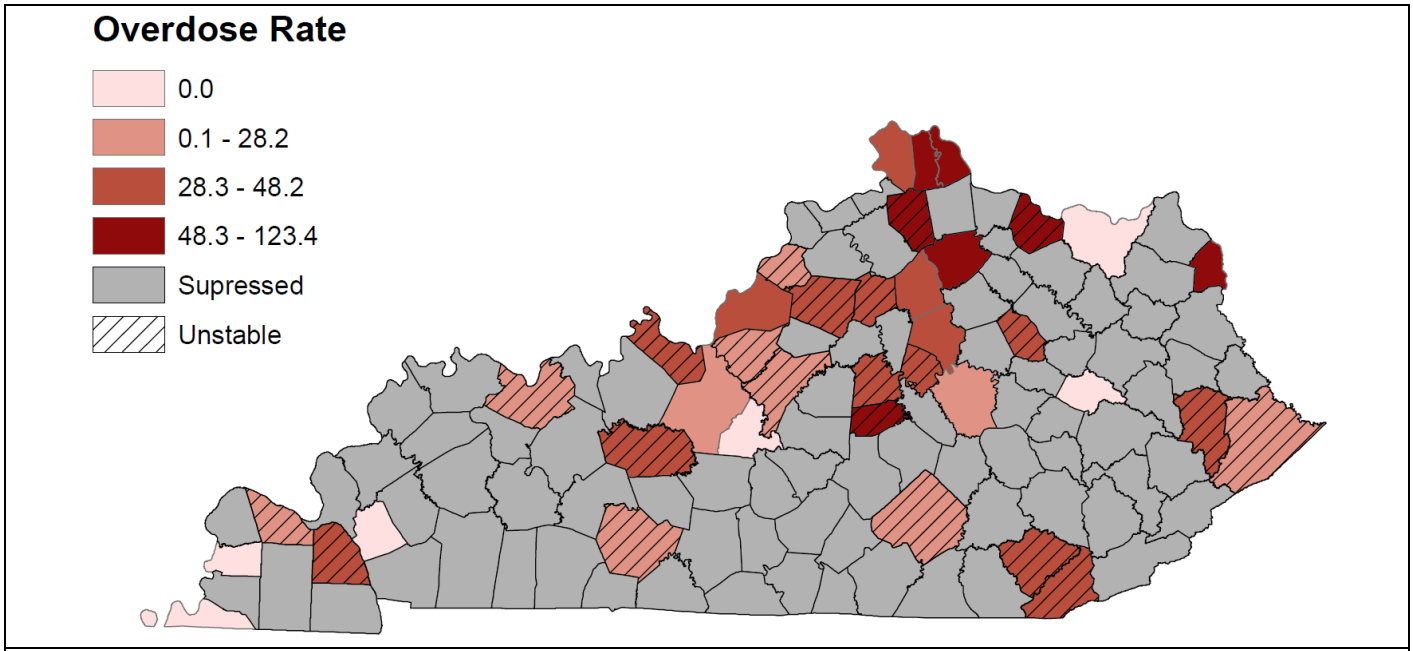



Figure 5. Kentucky Resident Drug Overdose Fatality Rates per 100,000 Population by County, 2016[1-2]




[1]According to state data release policy, rates based on counts less than 10 are suppressed.
[2]Rates based on counts less than 20 are unstable, and should be interpreted with caution.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

## Table 20. Kentucky Resident Drug Overdose Fatality Counts and Rates by Kentucky Area Development District (ADD), 2015-2016[1]

| ADD District | 2015 Count | 2015 Rate (per 100,000 population) | 2016 Count | 2016 Rate (per 100,000 population) | Alert[2] |
|---|---|---|---|---|---|
| Barren River | 56 | 19.2 | 45 | 15.0 | |
| Big Sandy | 55 | 36.4 | 41 | 28.2 | |
| Bluegrass | 249 | 31.4 | 298 | 36.6 | ! (↑) |
| Buffalo Trace | 21 | 37.3 | 18 | 32.3 | |
| Cumberland Valley | 91 | 38.7 | 56 | 24.0 | ! (↓) |
| FIVCO | 46 | 33.8 | 49 | 36.4 | |
| Gateway | 18 | 21.8 | 25 | 29.7 | |
| Green River | 33 | 15.3 | 35 | 16.1 | |
| Kentucky River | 270 | 27.5 | 375 | 37.5 | ! (↑) |
| KIPDA | 39 | 35.0 | 30 | 27.9 | |
| Lake Cumberland | 50 | 24.0 | 40 | 19.2 | |
| Lincoln Trail | 36 | 13.2 | 66 | 24.2 | ! (↑) |
| Northern Kentucky | 229 | 51.1 | 229 | 50.3 | |
| Pennyrile | 24 | 11.0 | 24 | 11.2 | |
| Purchase | 24 | 12.2 | 36 | 18.4 | |

[1]Rates based on counts less than 20 are unstable, and should be interpreted with caution.
[2]Alerts indicate an increase or decrease in count from year-to-year greater than or equal to 30.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

## Table 21. Kentucky Resident Drug Overdose Fatality Counts Involving Scheduled Controlled Substances and Non-Scheduled Drugs by Kentucky Area Development District (ADD), 2016[1-4]

| ADD District | Schedule I | Schedule II | Schedule III | Schedule IV | Non-Scheduled |
|---|---|---|---|---|---|
| Barren River | 12 | 37 | <5 | 20 | 28 |
| Big Sandy | 7 | 35 | 13 | 32 | 29 |
| Bluegrass | 131 | 266 | 15 | 122 | 138 |
| Buffalo Trace | <5 | 12 | <5 | 8 | 8 |
| Cumberland Valley | 14 | 44 | 15 | 33 | 35 |
| Fivco | 25 | 42 | 5 | 24 | 24 |
| Gateway | 9 | 19 | <5 | 11 | 10 |
| Green River | 6 | 29 | <5 | 25 | 21 |
| Kentucky River | 11 | 24 | 7 | 18 | 23 |
| KIPDA | 197 | 338 | 16 | 175 | 177 |
| Lake Cumberland | 14 | 32 | 6 | 22 | 20 |
| Lincoln Trail | 28 | 55 | 5 | 37 | 31 |
| Northern Kentucky | 103 | 188 | 12 | 81 | 107 |
| Pennyrile | 6 | 20 | <5 | 17 | 17 |
| Purchase | 9 | 26 | <5 | 21 | 18 |

[1]Schedule V controlled-substances were not included due to low counts.
[2]According to state data release policy, counts less than 5 are suppressed.
[3]Drug testing of blood, urine, and/or vitreous fluids.
[4]Drug schedules are not mutually exclusive; decedents may have more than one drug schedule detected.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

## Table 22. Kentucky Resident Drug Overdose Fatality Counts Involving Specific Drugs by Kentucky Area Development District (ADD), 2016[1-3]

| ADD District | Heroin[4] | Fentanyl[5] | Heroin[4] with Fentanyl[5] | Methamphetamine |
|---|---|---|---|---|
| Barren River | 5 | 6 | <5 | 14 |
| Big Sandy | 0 | <5 | 0 | <5 |
| Bluegrass | 87 | 133 | 38 | 31 |
| Buffalo Trace | <5 | 7 | <5 | <5 |
| Cumberland Valley | 0 | 5 | 0 | 20 |
| Fivco | 14 | 18 | 6 | 8 |
| Gateway | 6 | 9 | <5 | <5 |
| Green River | <5 | <5 | 0 | 9 |
| Kentucky River | <5 | <5 | 0 | 9 |
| KIPDA | 128 | 182 | 60 | 88 |
| Lake Cumberland | 5 | 13 | <5 | 13 |
| Lincoln Trail | 15 | 26 | 10 | 23 |
| Northern Kentucky | 73 | 99 | 37 | 12 |
| Pennyrile | 0 | <5 | 0 | <5 |
| Purchase | <5 | 6 | <5 | 5 |

[1]According to state data release policy, counts less than 5 are suppressed.
[2]Drug testing of blood, urine, and/or vitreous fluids.
[3]Drug schedules are not mutually exclusive; decedents may have more than one drug schedule detected.
[4]"Heroin" was identified by positive toxicology results for 6-monoacetylmorphine.
[5]"Fentanyl" was identified by positive toxicology results for fentanyl and/or norfentanyl.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

Figure 6. Kentucky Resident Drug Overdose Fatality Rates per 100,000 Population by Area Development District, 2015[1-2]

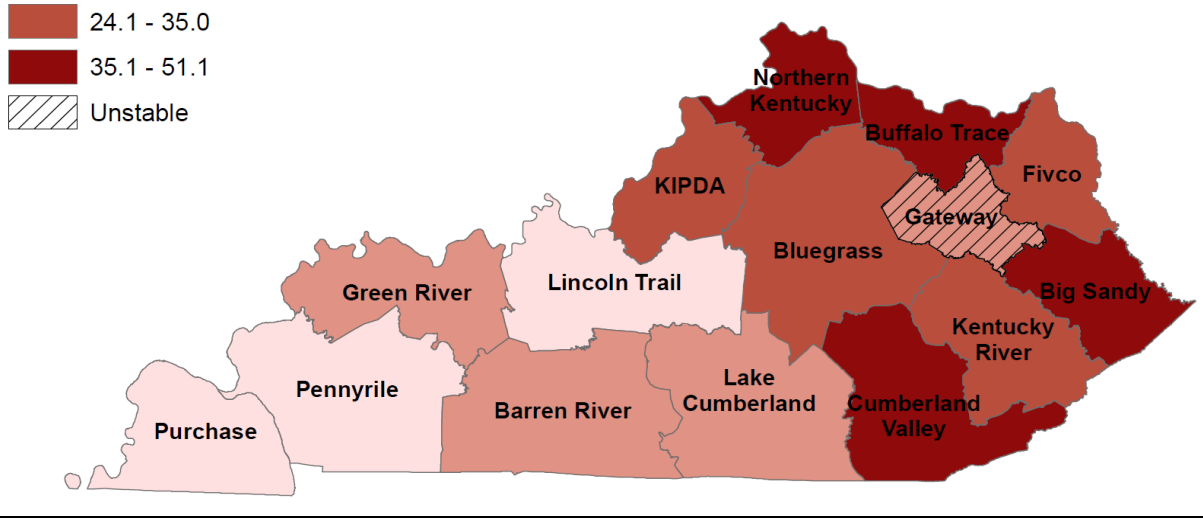
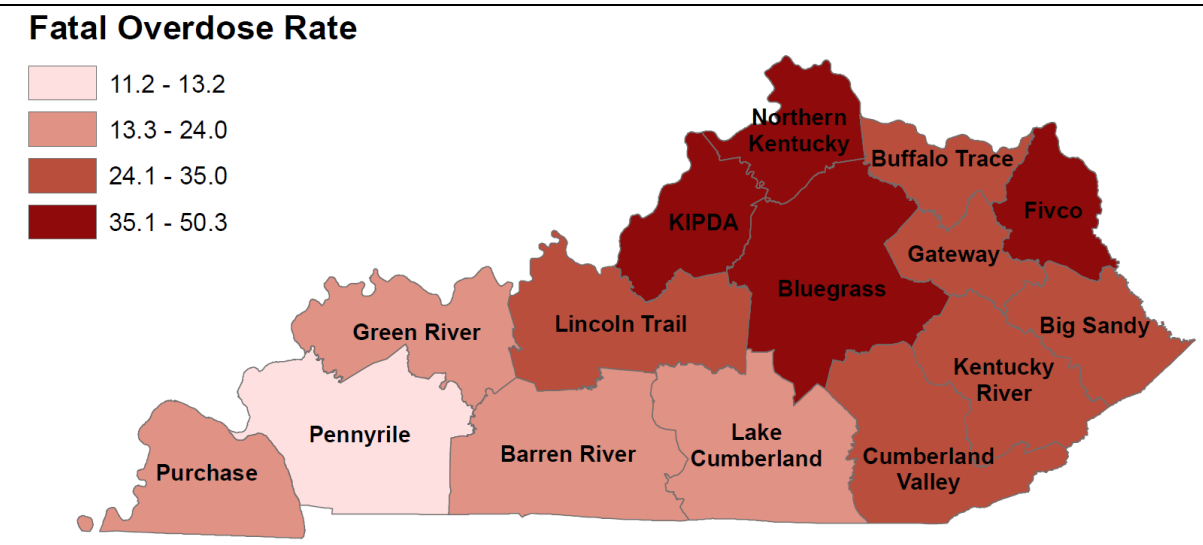



Figure 7. Kentucky Resident Drug Overdose Fatality Rates per 100,000 Population by Area Development District, 2016[1-2]




[1]According to state data release policy, rates based on counts less than 10 are suppressed.
[2]Rates based on counts less than 20 are unstable, and should be interpreted with caution.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

Figure 8. Kentucky Resident Schedule I Involved Drug Overdose Fatality Rates per 100,000 Population by Area Development District (ADD), 2015[1-2]

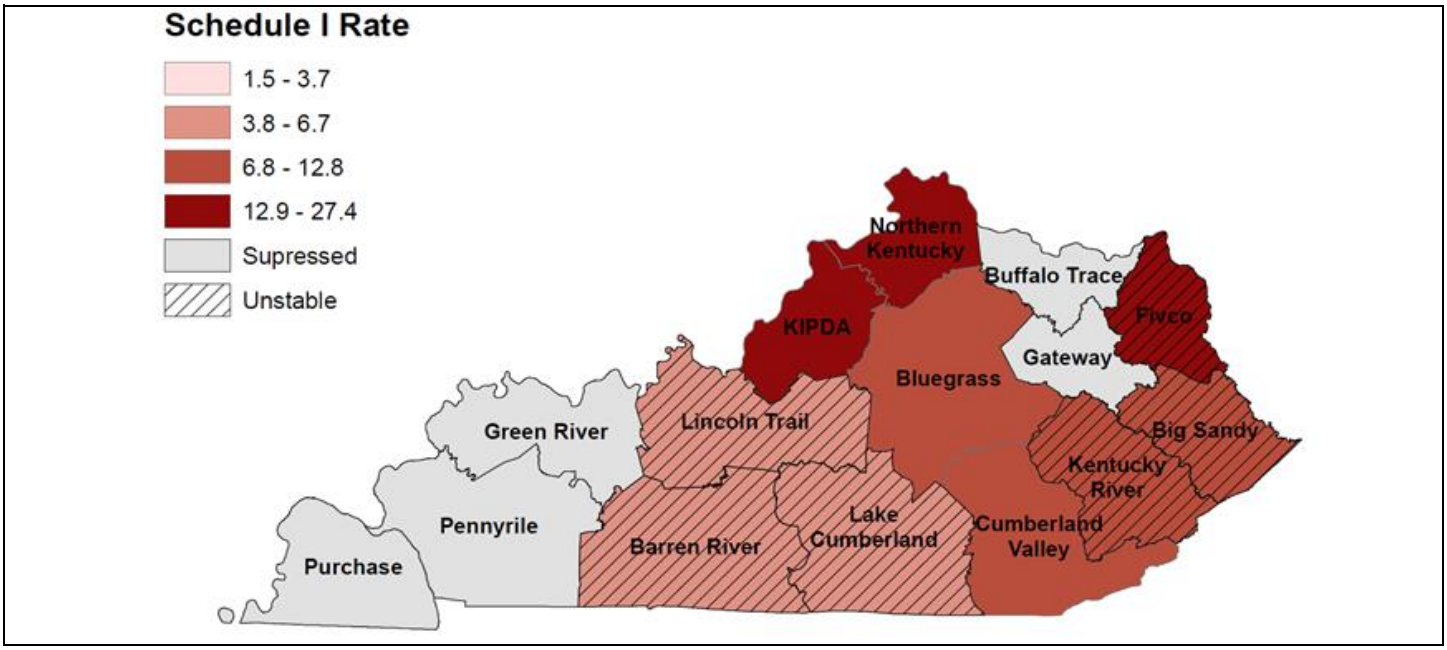
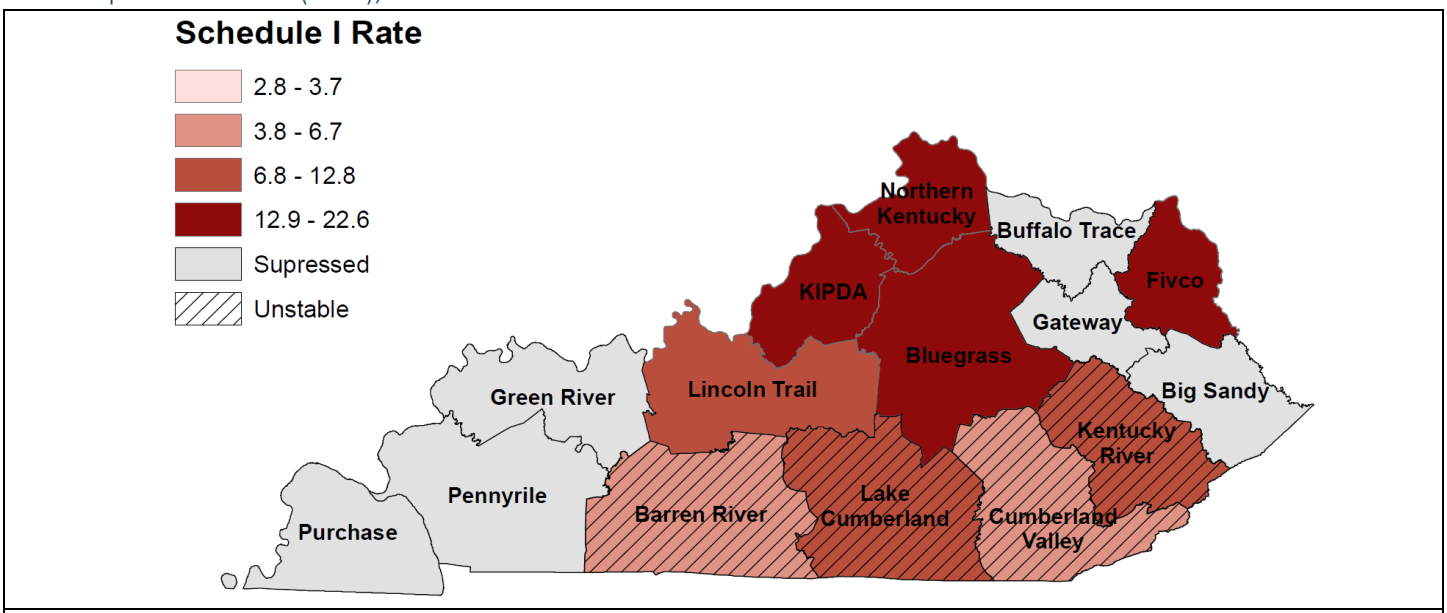



Figure 9. Kentucky Resident Schedule I Involved Drug Overdose Fatality Rates per 100,000 Population by Area Development District (ADD), 2016[1-2]




[1]According to state data release policy, rates based on counts less than 10 are suppressed.
[2]Rates based on counts less than 20 are unstable, and should be interpreted with caution.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and

Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

Figure 10. Kentucky Resident Schedule II Involved Drug Overdose Fatality Rates per 100,000 Population by Area Development District (ADD), 2015[1-2]

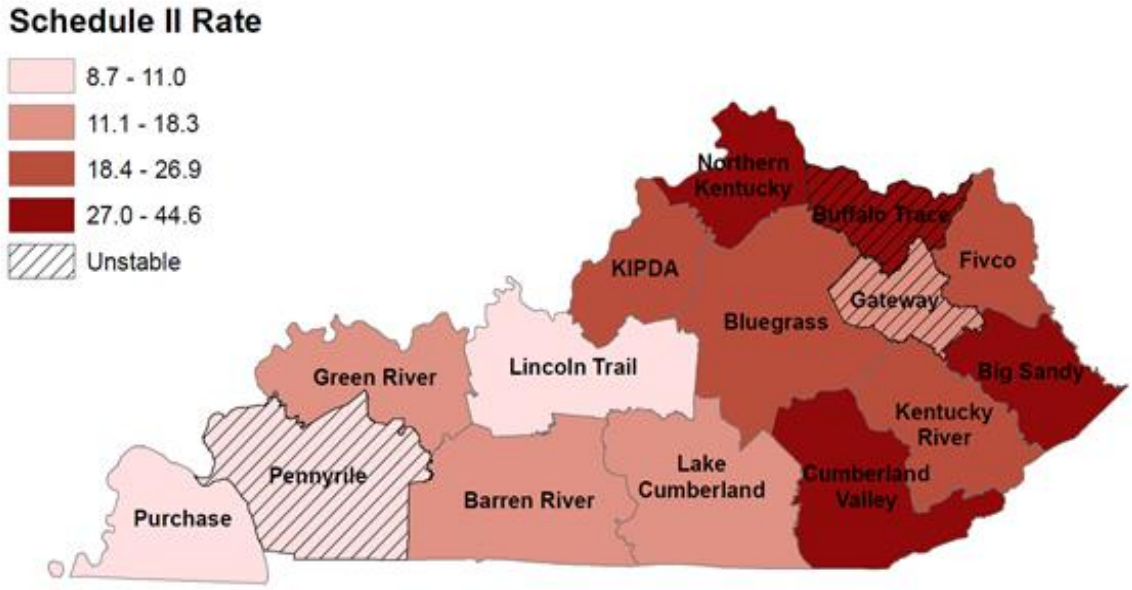
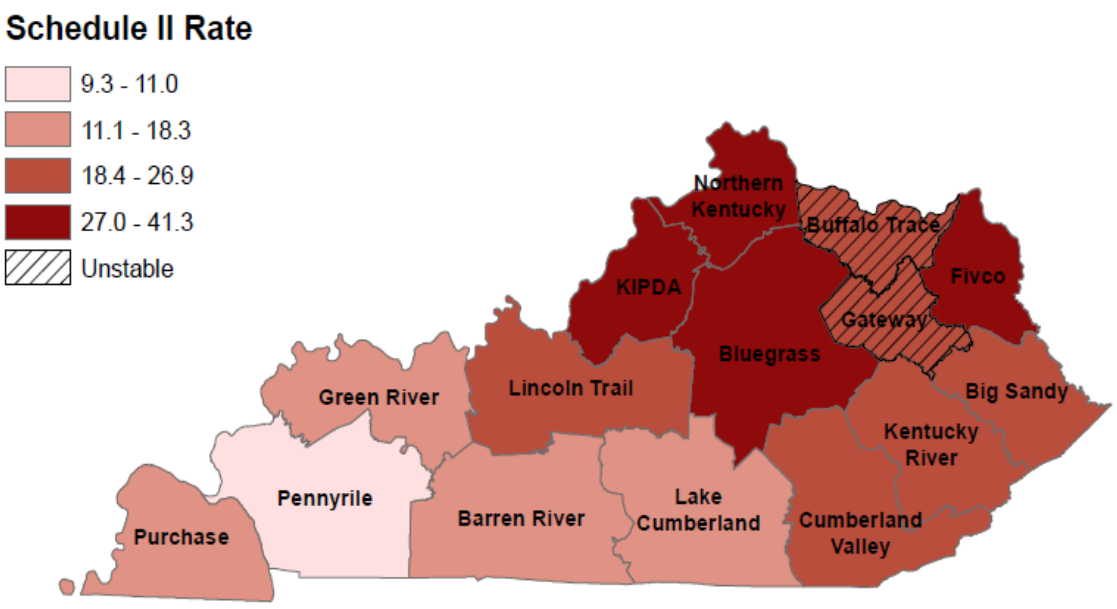



Figure 11. Kentucky Resident Schedule II Involved Drug Overdose Fatality Rates per 100,000 Population by Area Development District (ADD), 2016[1-2]




[1]According to state data release policy, rates based on counts less than 10 are suppressed.
[2]Rates based on counts less than 20 are unstable, and should be interpreted with caution.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public

Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

Figure 12. Kentucky Resident Schedule III Involved Drug Overdose Fatality Rates per 100,000 Population by Area Development District (ADD), 2015[1-2]

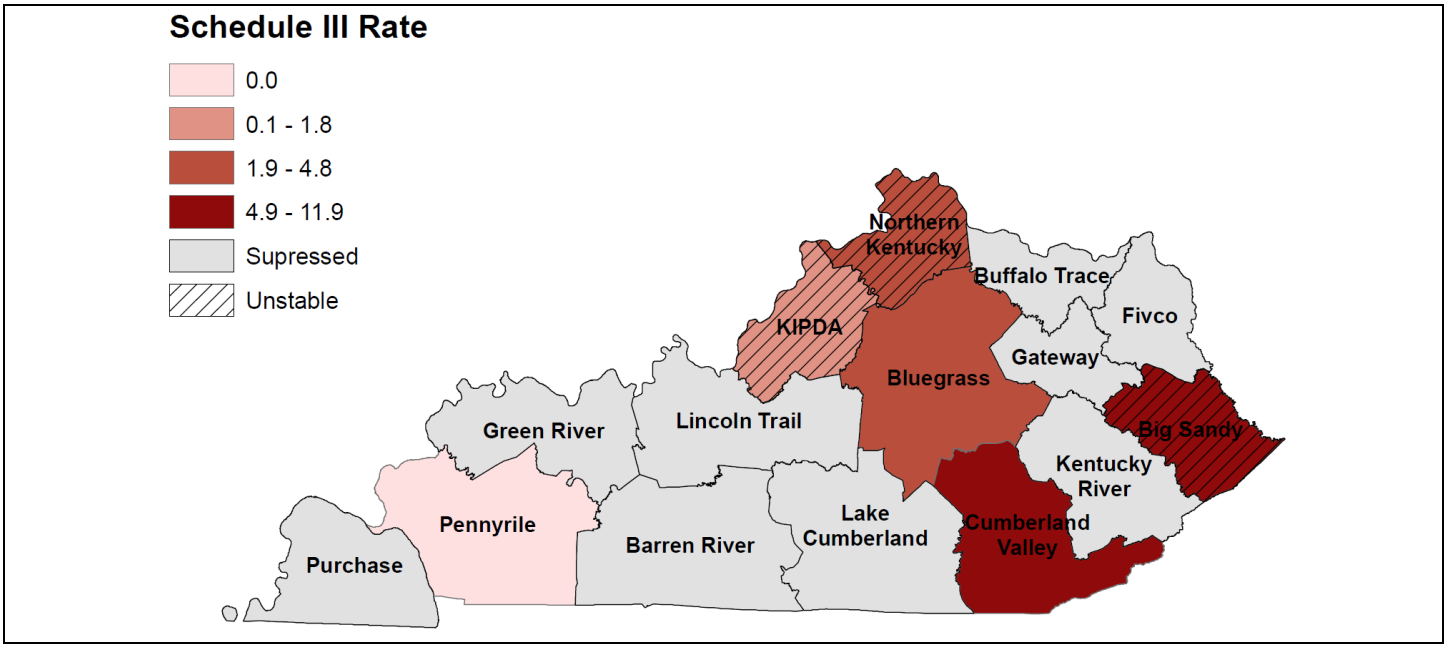
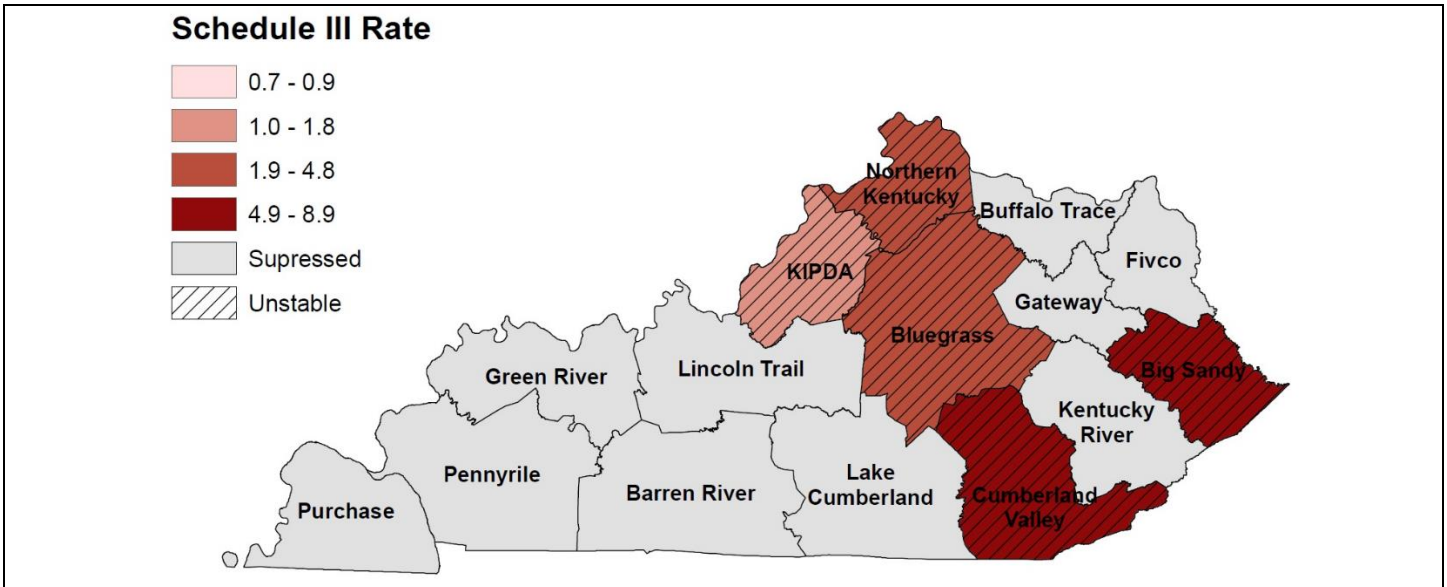



Figure 13. Kentucky Resident Schedule III Involved Drug Overdose Fatality Rates per 100,000 Population by Area Development District (ADD), 2016[1-2]




[1]According to state data release policy, rates based on counts less than 10 are suppressed.
[2]Rates based on counts less than 20 are unstable, and should be interpreted with caution.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public

Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

Figure 14. Kentucky Resident Schedule IV Involved Drug Overdose Fatality Rates per 100,000 Population by Area Development District (ADD), 2015[1-2]

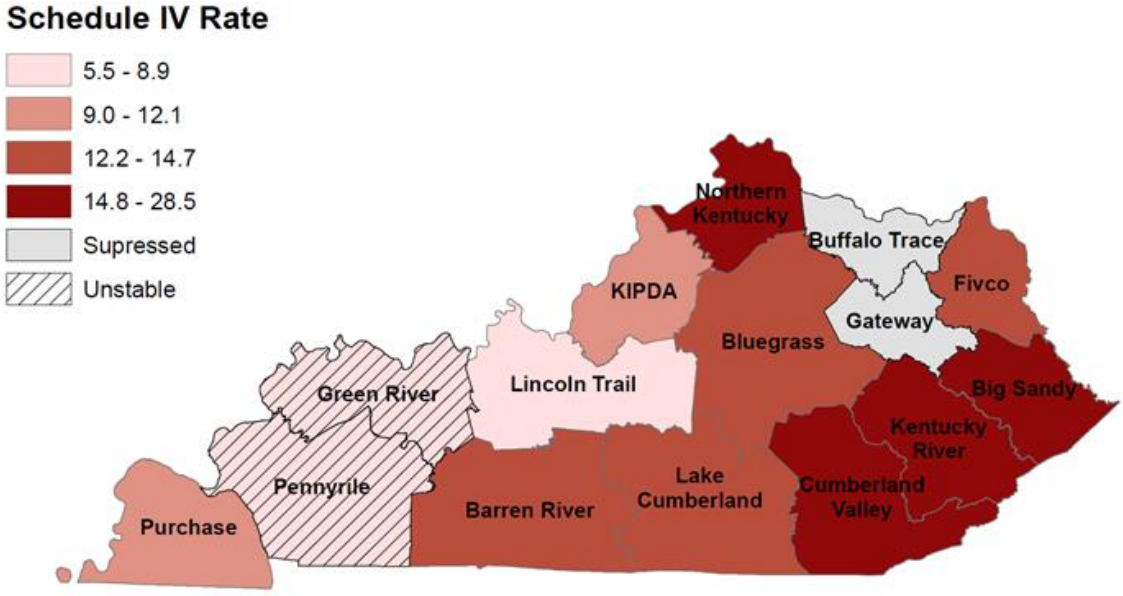
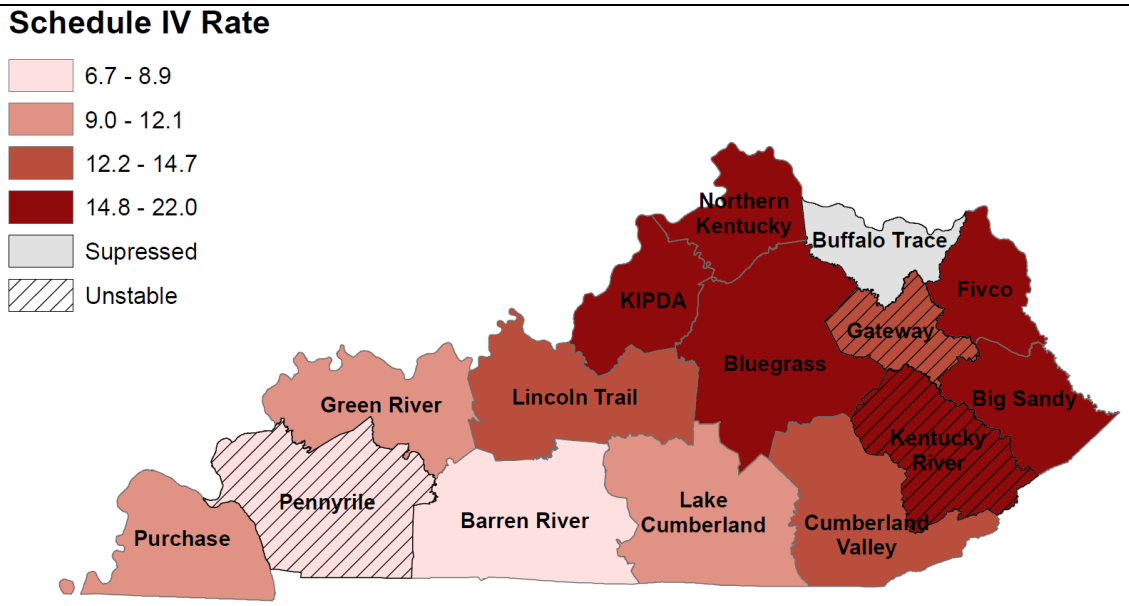



Figure 15. Kentucky Resident Schedule IV Involved Drug Overdose Fatality Rates per 100,000 Population by Area Development District (ADD), 2016[1-2]




[1]According to state data release policy, rates based on counts less than 10 are suppressed.
[2]Rates based on counts less than 20 are unstable, and should be interpreted with caution.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public

Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

Figure 16. Kentucky Resident Non-Scheduled Involved Drug Overdose Fatality Rates per 100,000 Population by Area Development District (ADD), 2015[1-2]

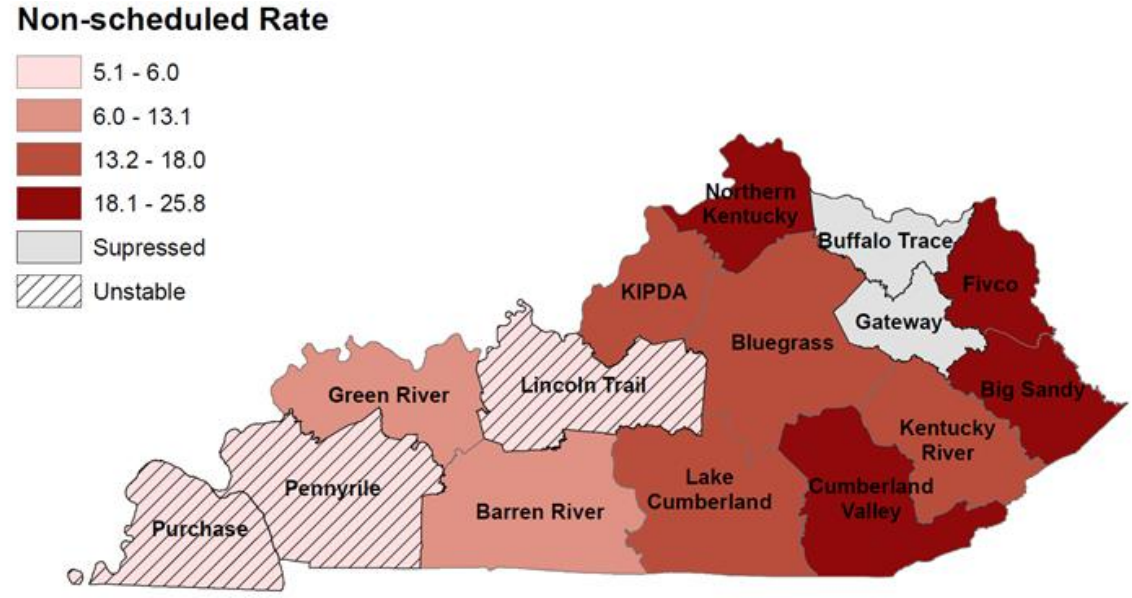
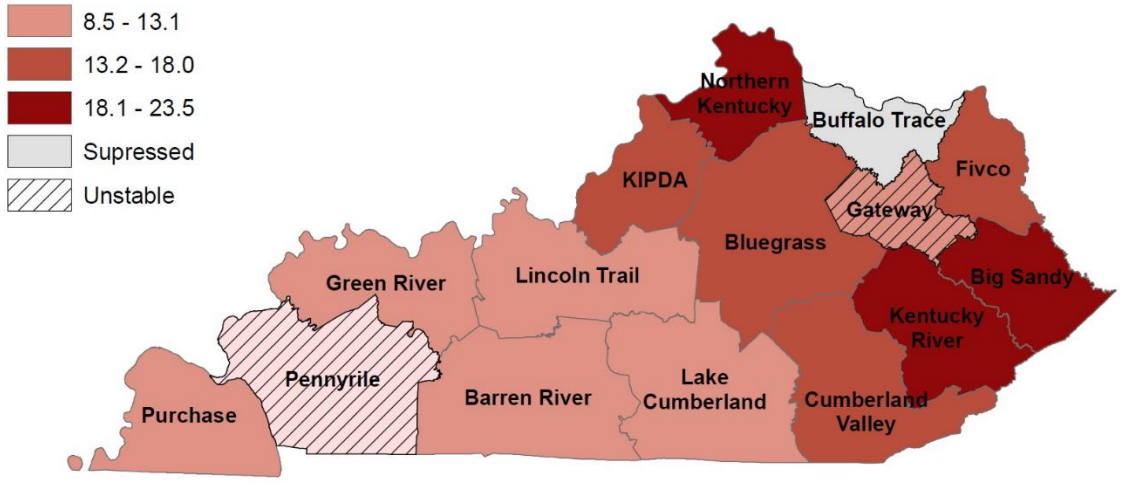



Figure 17. Kentucky Resident Non-Scheduled Involved Drug Overdose Fatality Rates per 100,000 Population by Area Development District (ADD), 2016[1-2]




[1]According to state data release policy, rates based on counts less than 10 are suppressed.
[2]Rates based on counts less than 20 are unstable, and should be interpreted with caution.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and

Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

Figure 18. Kentucky Resident Heroin Involved Drug Overdose Fatality Rates per 100,000 Population by Area Development District (ADD), 2015[1-2]

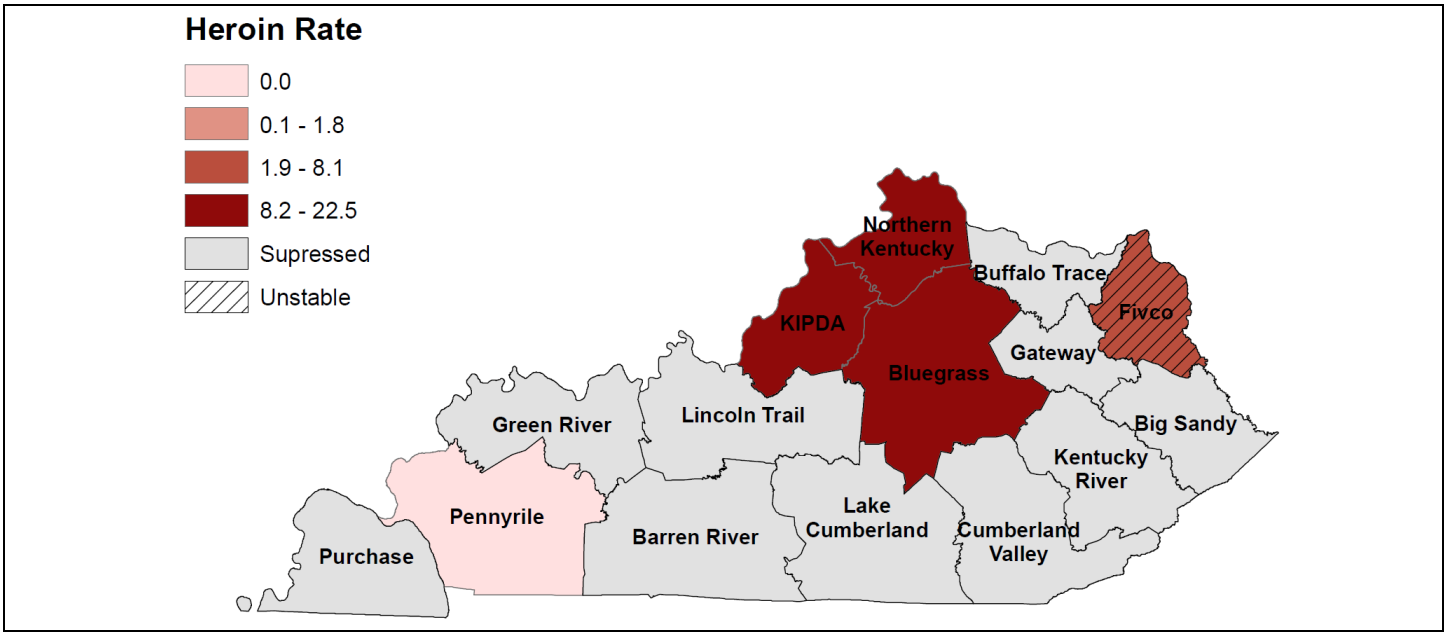
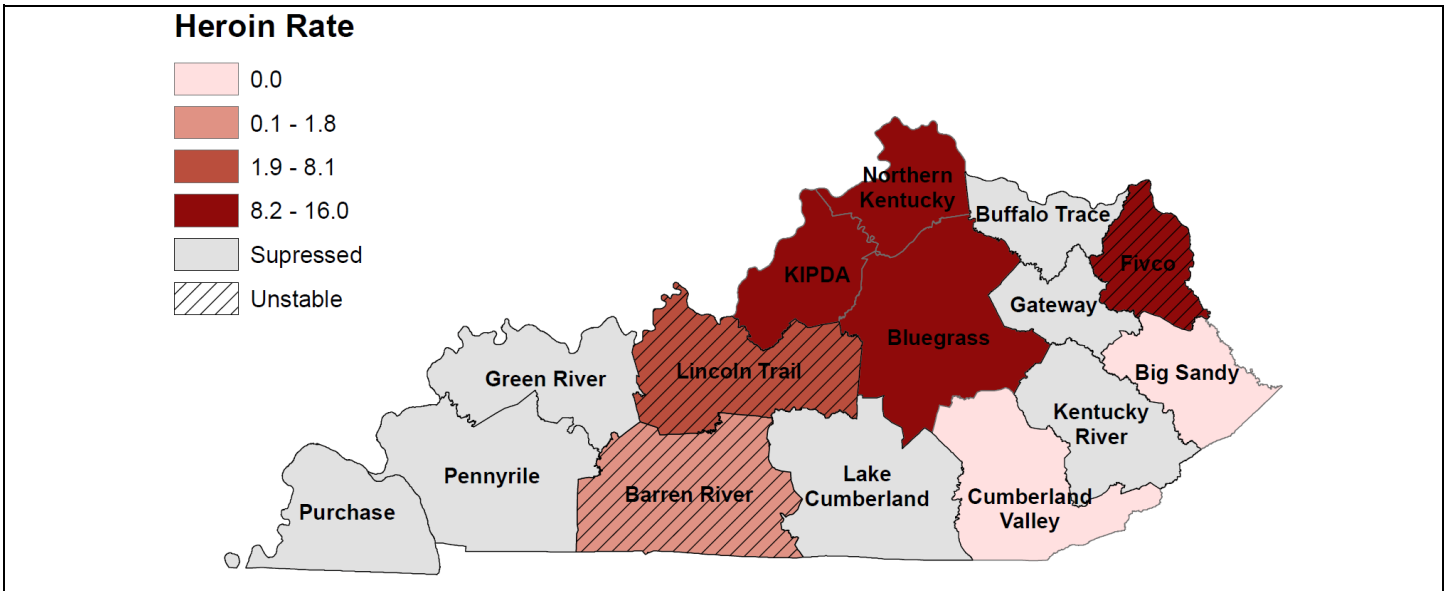



Figure 19. Kentucky Resident Heroin Involved Drug Overdose Fatality Rates per 100,000 Population by Area Development District (ADD), 2016[1-2]




[1]According to state data release policy, rates based on counts less than 10 are suppressed.
[2]Rates based on counts less than 20 are unstable, and should be interpreted with caution.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and

Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

Figure 20. Kentucky Resident Fentanyl Involved Drug Overdose Fatality Rates per 100,000 Population by Area Development District (ADD), 2015[1-2]

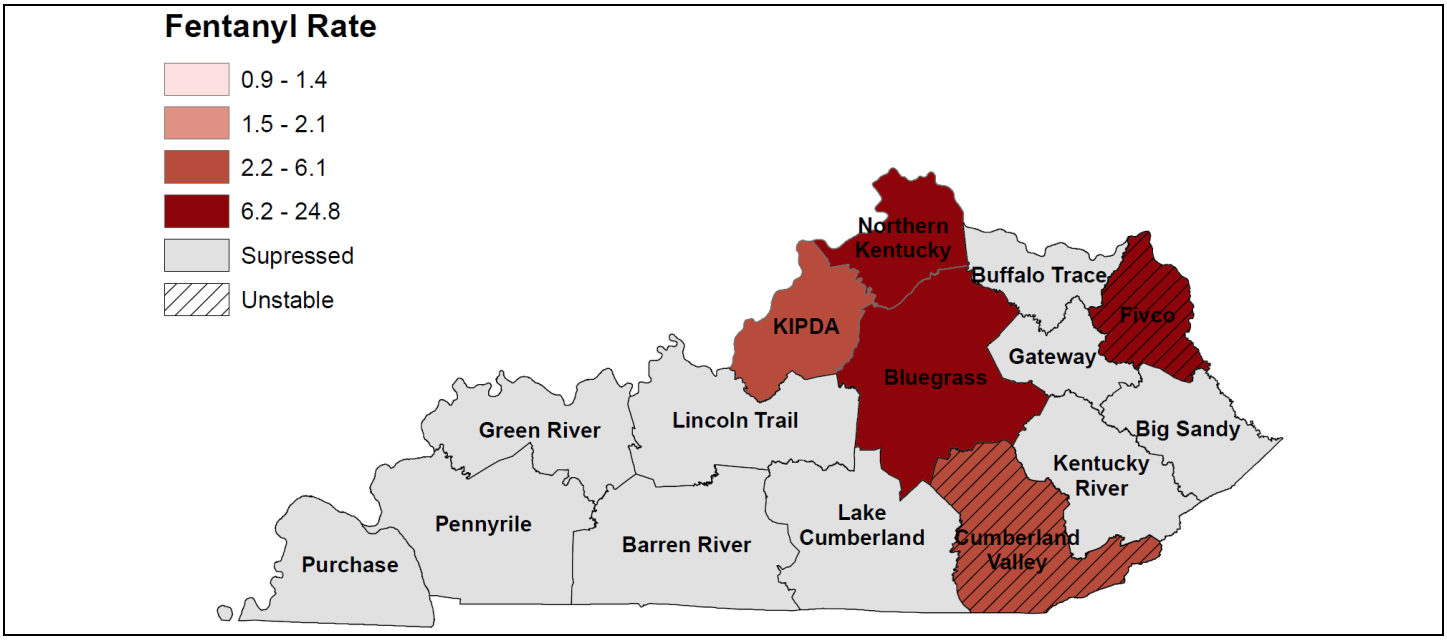
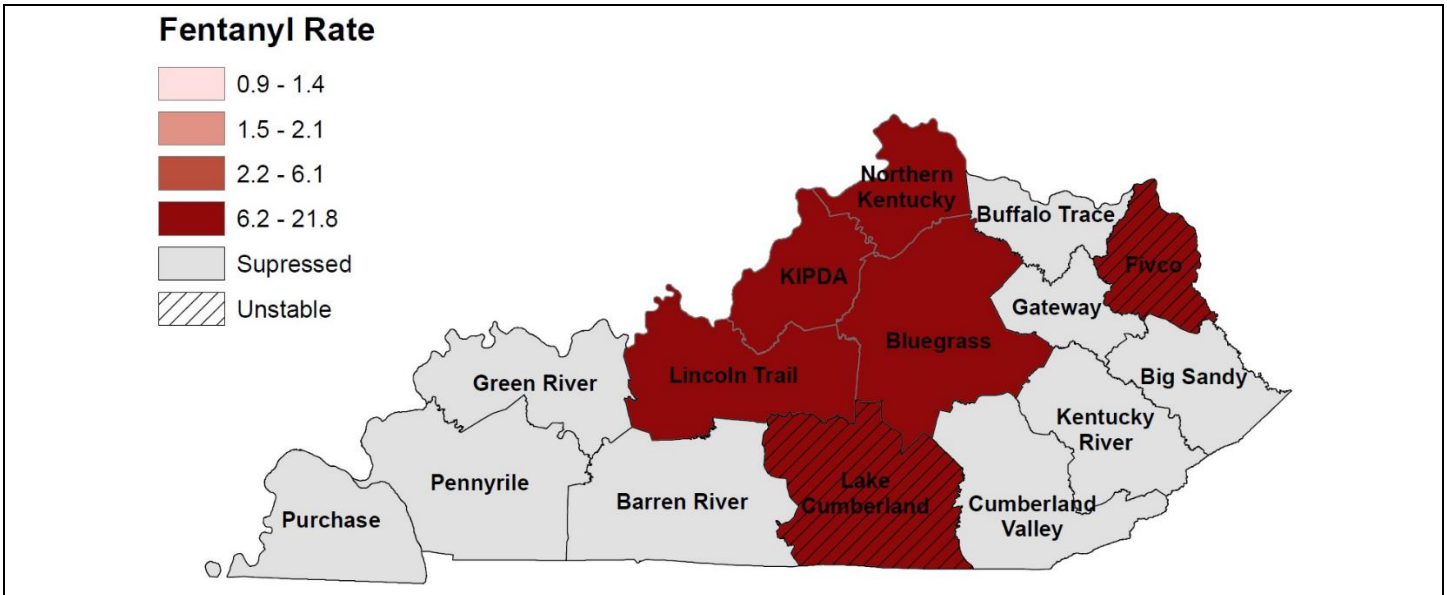



Figure 21. Kentucky Resident Fentanyl Involved Drug Overdose Fatality Rates per 100,000 Population by Area Development District (ADD), 2016[1-2]




[1]According to state data release policy, rates based on counts less than 10 are suppressed.
[2]Rates based on counts less than 20 are unstable, and should be interpreted with caution.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and

Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

Figure 22. Kentucky Resident Heroin and Fentanyl Involved Drug Overdose Fatality Rates per 100,000 Population by Area Development District (ADD), 2015[1-2]

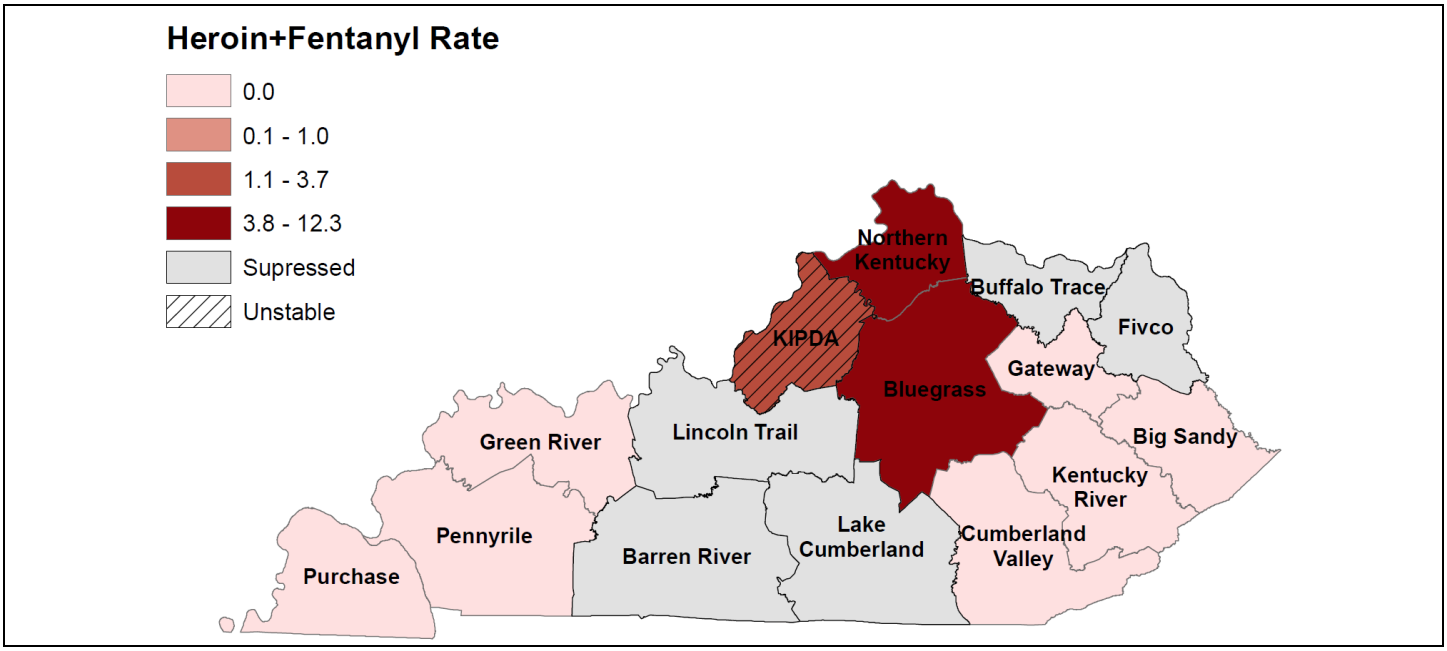
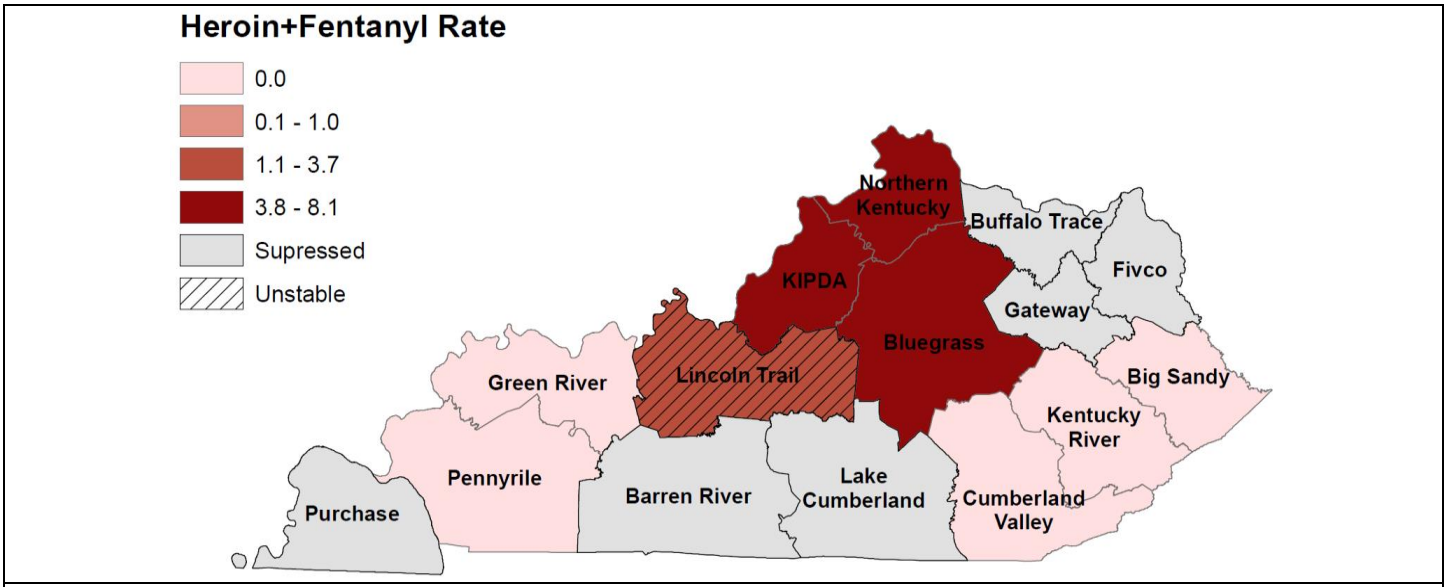



Figure 23. Kentucky Resident Heroin and Fentanyl Involved Drug Overdose Fatality Rates per 100,000 Population by Area Development District (ADD), 2016[1-2]




[1]According to state data release policy, rates based on counts less than 10 are suppressed.
[2]Rates based on counts less than 20 are unstable, and should be interpreted with caution.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and

Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

Figure 24. Kentucky Resident Methamphetamine Involved Drug Overdose Fatality Rates per 100,000 Population by Area Development District (ADD), 2015[1-2]

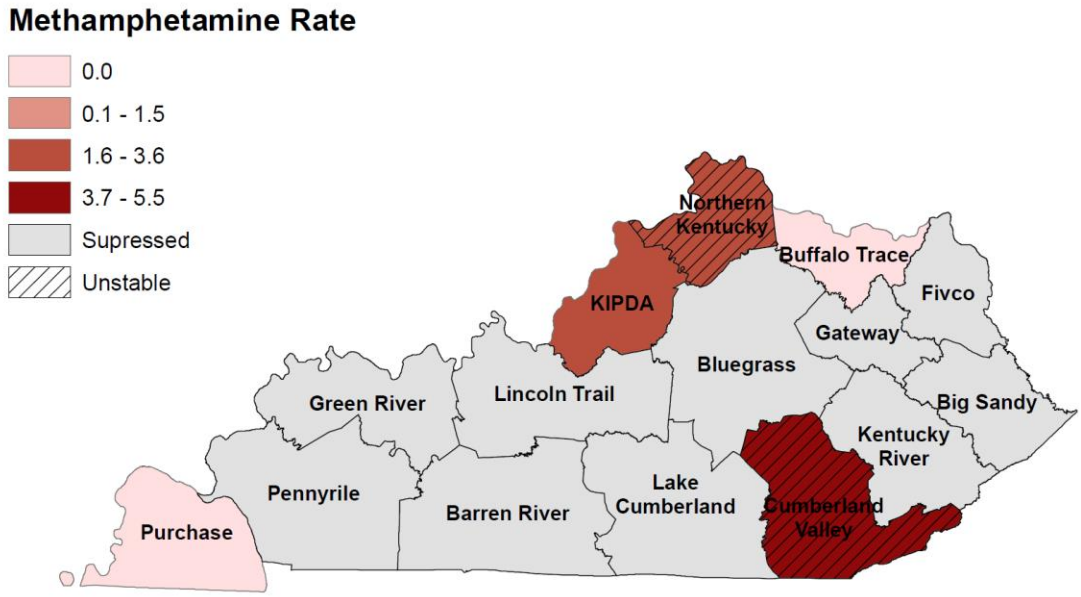
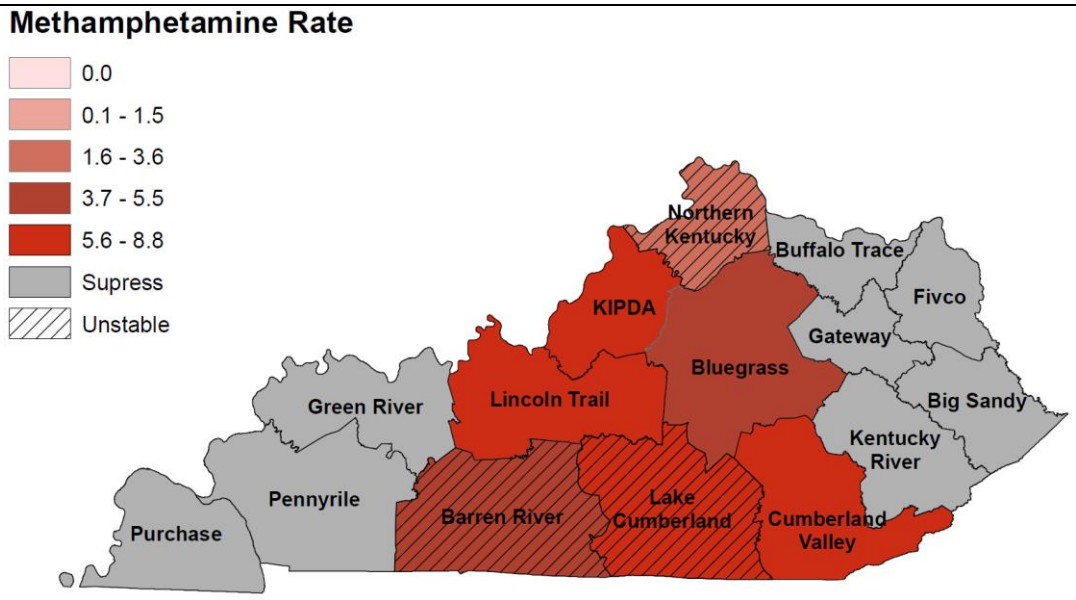



Figure 25. Kentucky Resident Methamphetamine Involved Drug Overdose Fatality Rates per 100,000 Population by Area Development District (ADD), 2016[1-2]




[1]According to state data release policy, rates based on counts less than 10 are suppressed.
[2]Rates based on counts less than 20 are unstable, and should be interpreted with caution.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and

Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

## EVIDENCE FOUND AT SCENE AND/OR AUTOPSY OF DRUG OVERDOSE DECEDENTS

### Table 23. Most Frequent Drugs Detected in Post-Mortem Toxicology Test Results of Drug Overdose Decedents in Kentucky with Drug Paraphernalia Recovered at Scene and/or Autopsy, 2016[1]

| Drugs[2-3] | Drug Paraphernalia Found?[4] Yes (%) N=322 | No/Unknown (%) N=1014 | p-value[5] |
|---|---|---|---|
| Morphine[6] | 239 (74.2%) | 428 (42.2%) | <.01 |
| Fentanyl[7] | 205 (63.7%) | 339 (33.4%) | <.01 |
| Heroin[8] | 135 (41.9%) | 228 (22.5%) | <.01 |
| Codeine | 110 (34.2%) | 194 (19.1%) | <.01 |
| THC-COOH | 93 (28.9%) | 273 (26.9%) | 0.49 |
| Gabapentin | 81 (25.2%) | 399 (39.3%) | <.01 |
| Alprazolam[9] | 81 (25.2%) | 293 (28.9%) | 0.19 |
| Cocaine[10] | 78 (24.2%) | 156 (15.4%) | <.01 |
| Ethanol | 63 (19.6%) | 208 (20.5%) | 0.71 |
| Hydromorphone | 59 (18.3%) | 176 (17.4%) | 0.69 |
| Methamphetamine | 58 (18.0%) | 194 (19.1%) | 0.65 |
| Clonazepam[11] | 51 (15.8%) | 190 (18.7%) | 0.24 |
| Oxycodone | 31 (9.6%) | 222 (21.9%) | <.01 |

[1]Counts are based on total number of DOFSS drug overdose fatalities with at least one drug present in toxicology results for that group.
[2]Detected drugs identified in blood, urine, and/or vitreous fluids.
[3]Drugs are not mutually exclusive; decedents may have more than one drug detected.
[4]Any reported drug paraphernalia identified from autopsy, coroner investigation, or medical records.
[5]*p*-value from chi-square test of independence, which tests if a statistical association exists between the presence of drug paraphernalia found and a positive finding for the specified drug in post-mortem toxicology.
[6]Morphine may represent pure morphine and/or a metabolite of heroin.
[7]"Fentanyl" was identified by positive toxicology results for fentanyl and/or norfentanyl.
[8]"Heroin" was identified by positive toxicology results for 6-monoacetylmorphine.
[9]"Alprazolam" was identified by positive toxicology results for alprazolam and/or a-OH-alprazolam.
[10]"Cocaine" was identified by positive toxicology results for cocaine, cocaethylene and/or benzoylecgonine.
[11]"Clonazepam" was identified by positive toxicology results for clonazepam and/or 7-aminoclonazepam.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

Table 24. Most Frequent Drugs Detected in Post-Mortem Toxicology Test Results of Drug Overdose Decedents in Kentucky with Illicit Drugs Recovered at Scene and/or Autopsy, 2016[1]

| Drugs[2-3] | Illicit Drugs Found?[4] Yes (%) N=219 | Illicit Drugs Found?[4] No/Unknown (%) N=1117 | p-value[5] |
|---|---|---|---|
| Morphine[6] | 150 (68.5%) | 517 (46.3%) | <.01 |
| Fentanyl[7] | 132 (60.3%) | 412 (36.9%) | <.01 |
| Heroin[8] | 91 (41.6%) | 272 (24.4%) | <.01 |
| Codeine | 77 (35.2%) | 227 (20.3%) | <.01 |
| THC-COOH | 74 (33.8%) | 292 (26.1%) | 0.02 |
| Alprazolam[9] | 64 (29.2%) | 310 (27.8%) | 0.66 |
| Cocaine[10] | 62 (28.3%) | 172 (15.4%) | <.01 |
| Gabapentin | 53 (24.2%) | 427 (38.2%) | <.01 |
| Ethanol | 49 (22.4%) | 222 (19.9%) | 0.40 |
| Methamphetamine | 45 (20.5%) | 207 (18.5%) | 0.49 |
| Hydromorphone | 45 (20.5%) | 190 (17.0%) | 0.21 |
| Clonazepam[11] | 37 (16.9%) | 204 (18.3%) | 0.63 |
| Oxycodone | 20 (9.1%) | 233 (20.9%) | <.01 |

[1]Counts are based on total number of DOFSS drug overdose fatalities with at least one drug present in toxicology results for that group.
[2]Detected drugs identified in blood, urine, and/or vitreous fluids.
[3]Drugs are not mutually exclusive; decedents may have more than one drug detected.
[4]Any reported illicit drugs identified from autopsy, coroner investigation, or medical records.
[5]*p*-value from chi-square test of independence, which tests if a statistical association exists between the presence of illicit drugs found and a positive finding for the specified drug in post-mortem toxicology.
[6]Morphine may represent pure morphine and/or a metabolite of heroin.
[7]"Fentanyl" was identified by positive toxicology results for fentanyl and/or norfentanyl.
[8]"Heroin" was identified by positive toxicology results for 6-monoacetylmorphine.
[9]"Alprazolam" was identified by positive toxicology results for alprazolam and/or a-OH-alprazolam.
[10]"Cocaine" was identified by positive toxicology results for cocaine, cocaethylene and/or benzoylecgonine.
[11]"Clonazepam" was identified by positive toxicology results for clonazepam and/or 7-aminoclonazepam.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

Table 25. Most Frequent Drugs Detected in Post-Mortem Toxicology Test Results of Drug Overdose Decedents in Kentucky with Prescription Drugs Recovered at Scene and/or Autopsy, 2016[1]

| Drugs[2-3] | Prescription Drugs Found?[4] Yes (%) N=311 | No/Unknown (%) N=1025 | p-value[5] |
|---|---|---|---|
| Gabapentin | 157 (50.5%) | 323 (31.5%) | <.01 |
| Morphine[6] | 127 (40.8%) | 540 (52.7%) | <.01 |
| Alprazolam[7] | 108 (34.7%) | 266 (26.0%) | <.01 |
| Fentanyl[8] | 102 (32.8%) | 442 (43.1%) | <.01 |
| Oxycodone | 80 (25.7%) | 173 (16.9%) | <.01 |
| THC-COOH | 76 (24.4%) | 290 (28.3%) | 0.18 |
| Clonazepam[9] | 76 (24.4%) | 165 (16.1%) | <.01 |
| Heroin[10] | 65 (20.9%) | 298 (29.1%) | <.01 |
| Ethanol | 63 (20.3%) | 208 (20.3%) | 0.99 |
| Hydromorphone | 63 (20.3%) | 172 (16.8%) | 0.16 |
| Codeine | 63 (20.3%) | 241 (23.5%) | 0.23 |
| Methamphetamine | 40 (12.9%) | 212 (20.7%) | <.01 |
| Cocaine[11] | 35 (11.3%) | 199 (19.4%) | <.01 |

[1]Counts are based on total number of DOFSS drug overdose fatalities with at least one drug present in toxicology results for that group.
[2]Detected drugs identified in blood, urine, and/or vitreous fluids.
[3]Drugs are not mutually exclusive; decedents may have more than one drug detected.
[4]Any reported prescription drugs identified from autopsy, coroner investigation, or medical records.
[5]*p*-value from chi-square test of independence, which tests if a statistical association exists between the presence of prescription drugs found and a positive finding for the specified drug in post-mortem toxicology.
[6]Morphine may represent pure morphine and/or a metabolite of heroin.
[7]"Alprazolam" was identified by positive toxicology results for alprazolam and/or a-OH-alprazolam.
[8]"Fentanyl" was identified by positive toxicology results for fentanyl and/or norfentanyl.
[9]"Clonazepam" was identified by positive toxicology results for clonazepam and/or 7-aminoclonazepam.
[10]"Heroin" was identified by positive toxicology results for 6-monoacetylmorphine.
[11]"Cocaine" was identified by positive toxicology results for cocaine, cocaethylene and/or benzoylecgonine.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

Table 26. Drug Overdose Decedents in Kentucky with Non-Medical Related Needle or Track Marks Identified and the Body Location of the Marks, 2016[1]

| Body Location[2-3] | Count | Percentage of Decedents with Identified Needle or Track Marks (N=276) | Percentage of All Decedents (N=1,457) |
|---|---|---|---|
| Head | <5 | * | * |
| Neck | 0 | 0.0% | 0.0% |
| Arm | 34 | 12.3% | 2.3% |
| Antecubital Fossa[4] | 186 | 67.4% | 12.8% |
| Forearm | 57 | 20.7% | 3.9% |
| Wrist | 34 | 12.3% | 2.3% |
| Hand | 37 | 13.4% | 2.5% |
| Breast | <5 | * | * |
| Abdomen | 5 | 1.8% | 0.3% |
| Back | 0 | 0.0% | 0.0% |
| Buttocks | <5 | * | * |
| Thigh | 7 | 2.5% | 0.5% |
| Leg | 6 | 2.2% | 0.4% |
| Ankle | <5 | * | * |
| Foot | 8 | 2.9% | 0.5% |
| Other | 5 | 1.8% | 0.3% |
| Unknown Location | 9 | 3.3% | 0.6% |

[1]According to state data release policy, counts less than 5 are suppressed. Any number associated with the suppressed count is labeled with an *.
[2]Body Location of Needle/Track Marks are not mutually exclusive; decedents may have more than one location identified.
[3]Any reported non-medical related needle marks or track marks identified from autopsy, coroner investigation, or medical records.
[4]Antecubital fossa is the triangular cavity between the upper arm and forearm located on the anterior surface of the elbow.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

## Table 27. Decedent History of Substance Use by Evidence Recovered at Scene and/or Autopsy, 2016

| Evidence Recovered[1-2] | Decedent History of Substance Use?[3] | |
|---|---|---|
| | Yes (%) N=805 | No/Unknown (%) N=652 |
| Drug Paraphernalia Recovered | 250 (31.1%) | 76 (11.7%) |
| Illicit Drugs Recovered | 170 (21.1%) | 52 (8.0%) |
| Prescription Drugs Recovered | 132 (16.4%) | 83 (12.7%) |

[1]Any reported evidence recovered at scene and/or autopsy identified from autopsy, coroner investigation, or medical records.
[2]Types of evidence recovered are not mutually exclusive; decedents may have more than one type of evidence recovered.
[3]Any reported history of substance use identified from autopsy, coroner investigation, or medical records.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

## Table 28. Evidence Recovered at Scene and/or Autopsy Indicates Route of Administration, 2016[1]

| Route of Administration[2-3] | Count | Percentage[4] |
|---|---|---|
| Evidence of Injection | 379 | 63.0% |
| Evidence of Ingestion | 191 | 31.7% |
| Evidence of Snorting | 59 | 9.8% |
| Evidence of Smoking | 36 | 6.0% |
| Evidence of Transdermal Application | 7 | 1.2% |

[1]Any reported evidence recovered at scene and/or autopsy identified from autopsy, coroner investigation, or medical records.
[2]Evidence of a route of administration is not unequivocal evidence that a specific route of administration was used for fatal event.
[3]Route of administrations are not mutually exclusive; decedents may have more than one route of administration identified.
[4]Percentage is based on total number of DOFSS drug overdose fatalities with evidence recovered at scene and/or autopsy indicating route of administration, n=602.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

## Table 29. Most Frequent Drugs Detected in Post-mortem Toxicology Testing Results of Drug Overdose Decedents in Kentucky with Evidence of Injection, 2016[1]

| Drugs[2-3] | Evidence of Injection?[4] Yes (%) N=374 | No/Unknown (%) N=962 | p-value[5] |
|---|---|---|---|
| Morphine[6] | 284 (75.9%) | 383 (39.8%) | <.01 |
| Fentanyl[7] | 228 (61.0%) | 316 (32.8%) | <.01 |
| Heroin[8] | 163 (43.6%) | 200 (20.8%) | <.01 |
| Codeine | 127 (34.0%) | 177 (18.4%) | <.01 |
| Gabapentin | 102 (27.3%) | 378 (39.3%) | <.01 |
| THC-COOH | 99 (26.5%) | 267 (27.8%) | 0.64 |
| Alprazolam[9] | 82 (21.9%) | 292 (30.4%) | <.01 |
| Methamphetamine | 81 (21.7%) | 171 (17.8%) | 0.10 |
| Hydromorphone | 66 (17.6%) | 169 (17.6%) | 0.97 |
| Cocaine[10] | 65 (17.4%) | 169 (17.6%) | 0.94 |
| Ethanol | 64 (17.1%) | 207 (21.5%) | 0.07 |
| Clonazepam[11] | 50 (13.4%) | 191 (19.9%) | <.01 |
| Oxycodone | 45 (12.0%) | 208 (21.6%) | <.01 |

[1]Counts are based on total number of DOFSS drug overdose fatalities with at least one drug present in toxicology results for that group.
[2]Detected drugs identified in blood, urine, and/or vitreous fluids.
[3]Drugs are not mutually exclusive; decedents may have more than one drug detected.
[4]Any reported injection evidence identified from autopsy, coroner investigation, or medical records.
[5]*p*-value from chi-square test of independence, which tests if a statistical association exists between evidence of injection and a positive finding for the specified drug in post-mortem toxicology.
[6]Morphine may represent pure morphine and/or a metabolite of heroin.
[7]"Fentanyl" was identified by positive toxicology results for fentanyl and/or norfentanyl.
[8]"Heroin" was identified by positive toxicology results for 6-monoacetylmorphine.
[9]"Alprazolam" was identified by positive toxicology results for alprazolam and/or a-OH-alprazolam.
[10]"Cocaine" was identified by positive toxicology results for cocaine, cocaethylene and/or benzoylecgonine.
[11]"Clonazepam" was identified by positive toxicology results for clonazepam and/or 7-aminoclonazepam.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

## Table 30. Most Frequent Drugs Detected in Post-mortem Toxicology Testing Results of Drug Overdose Decedents in Kentucky with Evidence of Ingestion, 2016[1]

| Drugs[2-3] | Evidence of Ingestion?[4] Yes (%) N=187 | No/Unknown (%) N=1149 | p-value[5] |
|---|---|---|---|
| Gabapentin | 89 (47.6%) | 391 (34.0%) | <.01 |
| Morphine[6] | 70 (37.4%) | 597 (52.0%) | <.01 |
| Alprazolam[7] | 65 (34.8%) | 309 (26.9%) | 0.03 |
| Fentanyl[8] | 57 (30.5%) | 487 (42.4%) | <.01 |
| Oxycodone | 48 (25.7%) | 205 (17.8%) | 0.01 |
| Clonazepam[9] | 47 (25.1%) | 194 (16.9%) | <.01 |
| THC-COOH | 46 (24.6%) | 320 (27.9%) | 0.36 |
| Ethanol | 40 (21.4%) | 231 (20.1%) | 0.69 |
| Hydromorphone | 37 (19.8%) | 198 (17.2%) | 0.40 |
| Codeine | 32 (17.1%) | 272 (23.7%) | 0.05 |
| Heroin[10] | 27 (14.4%) | 363 (31.6%) | <.01 |
| Cocaine[11] | 22 (11.8%) | 212 (18.5%) | 0.03 |
| Methamphetamine | 19 (10.2%) | 233 (20.3%) | <.01 |

[1]Counts are based on total number of DOFSS drug overdose fatalities with at least one drug present in toxicology results for that group.
[2]Detected drugs identified in blood, urine, and/or vitreous fluids.
[3]Drugs are not mutually exclusive; decedents may have more than one drug detected.
[4]Any reported ingestion evidence identified from autopsy, coroner investigation, or medical records.
[5]*p*-value from chi-square test of independence, which tests if a statistical association exists between evidence of ingestion and a positive finding for the specified drug in post-mortem toxicology.
[6]Morphine may represent pure morphine and/or a metabolite of heroin.
[7]"Alprazolam" was identified by positive toxicology results for alprazolam and/or a-OH-alprazolam.
[8]"Fentanyl" was identified by positive toxicology results for fentanyl and/or norfentanyl.
[9]"Clonazepam" was identified by positive toxicology results for clonazepam and/or 7-aminoclonazepam.
[10]"Heroin" was identified by positive toxicology results for 6-monoacetylmorphine.
[11]"Cocaine" was identified by positive toxicology results for cocaine, cocaethylene and/or benzoylecgonine.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

## Table 31. Most Frequent Drugs Detected in Post-mortem Toxicology Testing Results of Drug Overdose Decedents in Kentucky with Evidence of Snorting, 2016[1]

| Drugs[2-3] | Evidence of Snorting?[4] Yes (%) N=59 | Evidence of Snorting?[4] No/Unknown (%) N=1277 | p-value[5] |
|---|---|---|---|
| Morphine[6] | 35 (59.3%) | 632 (49.5%) | 0.14 |
| Fentanyl[7] | 33 (55.9%) | 511 (40.0%) | 0.02 |
| Alprazolam[8] | 22 (37.3%) | 352 (27.6%) | 0.10 |
| Heroin[9] | 20 (33.9%) | 343 (26.9%) | 0.23 |
| Ethanol | 17 (28.8%) | 254 (19.9%) | 0.10 |
| Gabapentin | 16 (27.1%) | 464 (36.3%) | 0.15 |
| THC-COOH | 15 (25.4%) | 351 (27.5%) | 0.73 |
| Cocaine[10] | 14 (23.7%) | 220 (17.2%) | 0.20 |
| Codeine | 13 (22.0%) | 291 (22.8%) | 0.89 |
| Methamphetamine | 10 (16.9%) | 242 (19.0%) | 0.70 |
| Oxycodone | 9 (15.3%) | 244 (19.1%) | 0.46 |
| Clonazepam[11] | 8 (13.6%) | 233 (18.2%) | 0.36 |
| Hydromorphone | 8 (13.6%) | 227 (17.8%) | 0.41 |

[1]Counts are based on total number of DOFSS drug overdose fatalities with at least one drug present in toxicology results for that group.
[2]Detected drugs identified in blood, urine, and/or vitreous fluids.
[3]Drugs are not mutually exclusive; decedents may have more than one drug detected.
[4]Any reported snorting evidence identified from autopsy, coroner investigation, or medical records.
[5]*p*-value from chi-square test of independence, which tests if a statistical association exists between evidence of snorting and a positive finding for the specified drug in post-mortem toxicology.
[6]Morphine may represent pure morphine and/or a metabolite of heroin.
[7]"Fentanyl" was identified by positive toxicology results for fentanyl and/or norfentanyl.
[8]"Alprazolam" was identified by positive toxicology results for alprazolam and/or a-OH-alprazolam.
[9]"Heroin" was identified by positive toxicology results for 6-monoacetylmorphine.
[10]"Cocaine" was identified by positive toxicology results for cocaine, cocaethylene and/or benzoylecgonine.
[11]"Clonazepam" was identified by positive toxicology results for clonazepam and/or 7-aminoclonazepam.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

## Table 32. Most Frequent Drugs Detected in Post-mortem Toxicology Testing Results of Drug Overdose Decedents in Kentucky with Evidence of Smoking, 2016[1-2]

| Drugs[3-4] | Evidence of Smoking?[5] Yes (%) N=36 | No/Unknown (%) N=1300 | p-value[6] |
|---|---|---|---|
| Morphine[7] | 21 (58.3%) | 646 (49.7%) | 0.31 |
| Cocaine[8] | 19 (52.8%) | 215 (16.5%) | <.01 |
| Fentanyl[9] | 15 (41.7%) | 529 (40.7%) | 0.90 |
| Heroin[10] | 14 (38.9%) | 349 (26.8%) | 0.11 |
| THC-COOH | 12 (33.3%) | 354 (27.2%) | 0.42 |
| Codeine | 10 (27.8%) | 294 (22.6%) | 0.47 |
| Methamphetamine | 10 (27.8%) | 242 (18.6%) | 0.17 |
| Clonazepam[11] | 7 (19.4%) | 234 (18.0%) | 0.82 |
| Gabapentin | 6 (16.7%) | 474 (36.5%) | 0.02 |
| Ethanol | 6 (16.7%) | 265 (20.4%) | 0.58 |
| Alprazolam[12] | 5 (13.9%) | 369 (28.4%) | 0.06 |
| Hydromorphone | <5 (*) | * | 0.30 |
| Oxycodone | <5 (*) | * | 0.01 |

[1]Counts are based on total number of DOFSS drug overdose fatalities with at least one drug present in toxicology results for that group.
[2]According to state data release policy, counts less than 5 are suppressed. Any number associated with the suppressed count is labeled with an *.
[3]Detected drugs identified in blood, urine, and/or vitreous fluids.
[4]Drugs are not mutually exclusive; decedents may have more than one drug detected.
[5]Any reported smoking evidence identified from autopsy, coroner investigation, or medical records.
[6]*p*-value from chi-square test of independence, which tests if a statistical association exists between evidence of smoking and a positive finding for the specified drug in post-mortem toxicology.
[7]Morphine may represent pure morphine and/or a metabolite of heroin.
[8]"Cocaine" was identified by positive toxicology results for cocaine, cocaethylene and/or benzoylecgonine.
[9]"Fentanyl" was identified by positive toxicology results for fentanyl and/or norfentanyl.
[10]"Heroin" was identified by positive toxicology results for 6-monoacetylmorphine.
[11]"Clonazepam" was identified by positive toxicology results for clonazepam and/or 7-aminoclonazepam.
[12]"Alprazolam" was identified by positive toxicology results for alprazolam and/or a-OH-alprazolam.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

## Table 33. Most Frequent Drugs Detected in Post-mortem Toxicology Testing Results of Drug Overdose Decedents in Kentucky with Evidence of Transdermal Application, 2016[1-2]

| Drugs[3-4] | Evidence of Transdermal?[5] Yes (%) N=7 | Evidence of Transdermal?[5] No/Unknown (%) N=1329 | Chi-Square p-value[6] | Fisher's Exact p-value[7] |
|---|---|---|---|---|
| Fentanyl[8] | 7 (100.0%) | 537 (40.4%) | <.01 | <.01 |
| Gabapentin | 5 (71.4%) | 475 (35.7%) | 0.05 | 0.11 |
| Alprazolam[9] | <5 (*) | * | 0.42 | 0.68 |
| Clonazepam[10] | <5 (*) | * | 0.09 | 0.12 |
| Ethanol | <5 (*) | * | 0.58 | 0.64 |
| Methamphetamine | <5 (*) | * | 0.10 | 0.13 |
| Morphine[11] | <5 (*) | * | 0.26 | 0.45 |
| Oxycodone | <5 (*) | * | 0.75 | 1 |
| THC-COOH | <5 (*) | * | 0.94 | 1 |
| Cocaine[12] | 0 (0.0%) | 234 (17.6%) | 0.22 | 0.61 |
| Codeine | 0 (0.0%) | 304 (22.9%) | 0.15 | 0.36 |
| Heroin[13] | 0 (0.0%) | 363 (27.3%) | 0.11 | 0.2 |
| Hydromorphone | 0 (0.0%) | 235 (17.7%) | 0.22 | 0.61 |

[1]Counts are based on total number of DOFSS drug overdose fatalities with at least one drug present in toxicology results for that group.
[2]According to state data release policy, counts less than 5 are suppressed. Any number associated with the suppressed count is labeled with an *.
[3]Detected drugs identified in blood, urine, and/or vitreous fluids.
[4]Drugs are not mutually exclusive; decedents may have more than one drug detected.
[5]Any reported transdermal evidence identified from autopsy, coroner investigation, or medical records.
[6]*p*-value from chi-square test of independence, which tests if a statistical association exists between evidence of transdermal and a positive finding for the specified drug in post-mortem toxicology.
[7]*p*-value from Fisher-exact test included for instances where chi-square assumptions may be violated.
[8]"Fentanyl" was identified by positive toxicology results for fentanyl and/or norfentanyl.
[9]"Alprazolam" was identified by positive toxicology results for alprazolam and/or a-OH-alprazolam.
[10]"Clonazepam" was identified by positive toxicology results for clonazepam and/or 7-aminoclonazepam.
[11]Morphine may represent pure morphine and/or a metabolite of heroin.
[12]"Cocaine" was identified by positive toxicology results for cocaine, cocaethylene and/or benzoylecgonine.
[13]"Heroin" was identified by positive toxicology results for 6-monoacetylmorphine.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

## Table 34. Top Identifiable Prescription and Over-the-Counter (OTC) Drugs Found at Scene and/or at Autopsy Among Drug Overdose Decedents in Kentucky, 2016

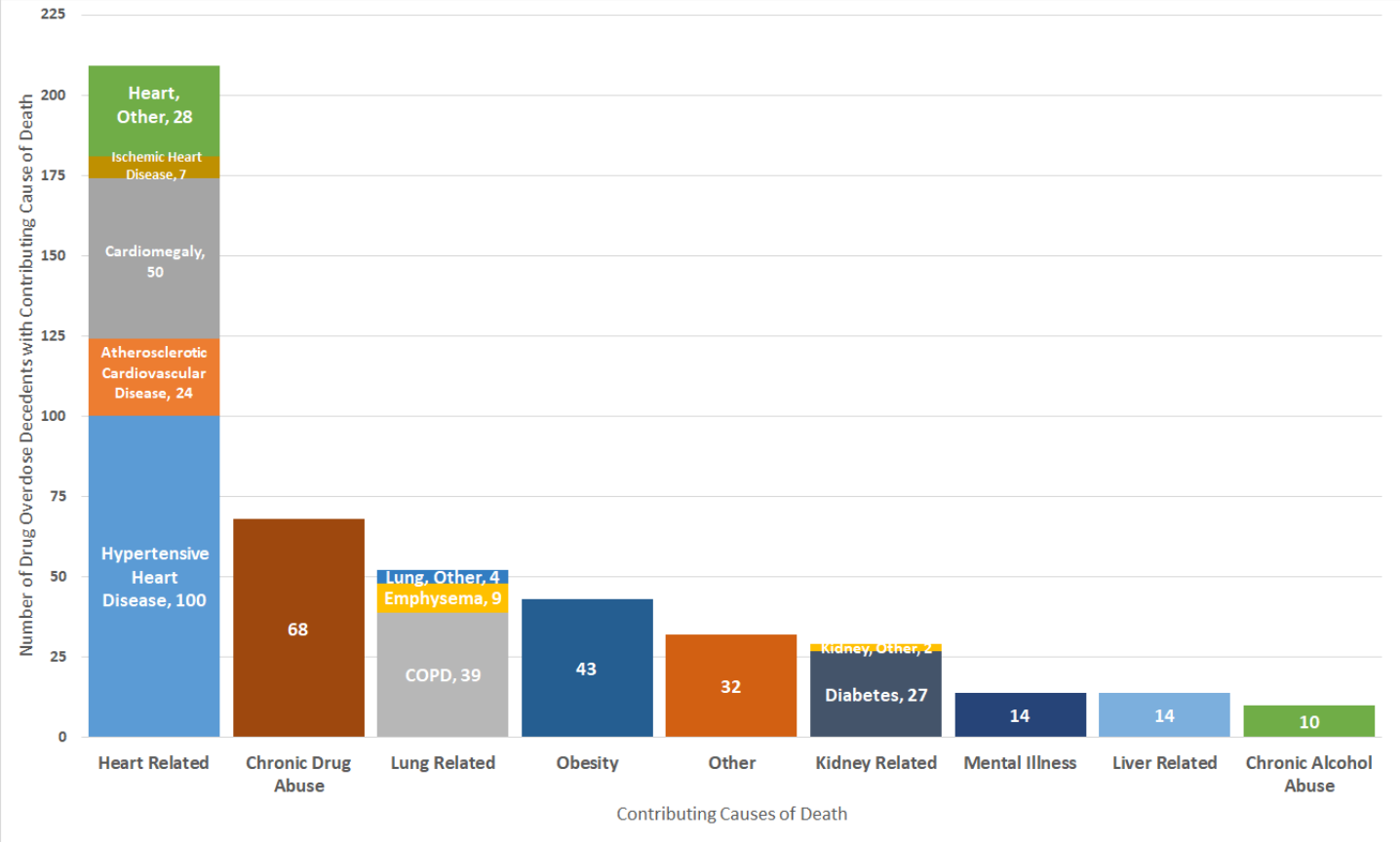
| Prescription/OTC[1-3] | 2016 Count | 2016 Percentage[4] | Percentage Change From 2015-2016[5] |
|---|---|---|---|
| Gabapentin | 75 | 33.9% | -10.71% |
| Oxycodone | 50 | 22.6% | -5.66% |
| Alprazolam | 42 | 19.0% | 23.53% |
| Hydrocodone | 38 | 17.2% | -5.00% |
| Lisinopril | 34 | 15.4% | -17.07% |
| Clonazepam | 30 | 13.6% | -3.23% |
| Quetiapine | 30 | 13.6% | 36.36% |
| Metoprolol | 18 | 8.1% | 50.00% |
| Trazodone | 18 | 8.1% | -10.00% |
| Omeprazole | 18 | 8.1% | -14.29% |
| Venlafaxine | 14 | 6.3% | 16.67% |
| Amitriptyline | 14 | 6.3% | 0.00% |
| Citalopram | 13 | 5.9% | -23.53% |
| Diazepam | 12 | 5.4% | -25.00% |
| Morphine | 12 | 5.4% | 20.00% |
| Zolpidem | 12 | 5.4% | 20.00% |
| Fluoxetine | 11 | 5.0% | -15.38% |
| Ibuprofen | 11 | 5.0% | 37.50% |
| Duloxetine | 11 | 5.0% | 22.22% |
| Tizanidine | 11 | 5.0% | -21.43% |

[1]Prescriptions and OTC drugs are not mutually exclusive; decedents may have more than one prescription drug found at scene and/or autopsy.
[2]Any reported prescription and OTC drugs at scene and/or autopsy identified from autopsy, coroner investigation, or medical records.
[3]Prescription and OTC drugs found at scene and/or autopsy do not signify if the decedent's postmortem toxicology was positive for said drug or that said drug was tested for.
[4]Percentage is based on total number of DOFSS drug overdose fatalities with a named prescription/OTC drug found at scene and/or autopsy, n=221. Reports of evidence of pills or pill bottles without any identifying feature were excluded from this analysis.
[5]Percent Change represents the change in individual drug frequency from 2015 to 2016.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

# MEDICAL AND SOCIAL HISTORY OF DRUG OVERDOSE DECEDENTS

## Figure 26. Other Significant Medical Conditions Contributing to Death for Drug Overdose Decedents in Kentucky, 2016[1-4]




[1]Other significant conditions contributing to death are not mutually exclusive, death may be counted in more than one applicable category.
[2]Of 1,457 Kentucky drug overdose decedents, 283 decedents had other significant condition(s) contributing to death listed on death certificate and/or autopsy report.
[3]Mechanisms of death recorded on death certificate as a significant condition contributing to death were not included.
[4]"Other" category refers to all low-count significant conditions contributing to death.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

## Table 35. Medical Conditions of Drug Overdose Decedents in Kentucky, 2016

| Medical Condition[1-3] | Count | Percentage[4] |
|---|---|---|
| **Diseases of the Circulatory System** | | |
| Heart Disease | | |
| *Essential (Primary) Hypertension* | 192 | 13.2% |
| *Cardiomegaly* | 53 | 3.6% |
| *High Blood Pressure, Without Diagnosis of Hypertension* | 28 | 1.9% |
| *Atherosclerosis* | 27 | 1.9% |
| *Previous Myocardial Infarction* | 17 | 1.2% |
| *Heart Failure* | 14 | 1.0% |
| *Ischemic Heart Disease* | 11 | 0.8% |
| *Other and Unspecified Heart Diseases* | 65 | 4.5% |
| Cerebral Infarction | 22 | 1.5% |
| Venous Embolism and Thrombosis | 12 | 0.8% |
| Other and Unspecified Circulatory System Diseases | 10 | 0.7% |
| **Diseases of the Respiratory System** | | |
| Chronic Obstructive Pulmonary Disease | 86 | 5.9% |
| Asthma | 35 | 2.4% |
| Other and Unspecified Respiratory Disorders | 20 | 1.4% |
| Bronchitis, Pneumonia, and Upper Respiratory Infection | 17 | 1.2% |
| Emphysema | 13 | 0.9% |
| **Diseases of the Digestive System** | | |
| Diseases of Esophagus, Stomach and Duodenum | | |
| *Gastro-Esophageal Reflux Disease* | 20 | 1.4% |
| *Other and Unspecified Diseases of the Esophagus, Stomach and Duodenum* | 6 | 0.4% |
| Liver Disease | | |
| *Cirrhosis of the Liver* | 8 | 0.5% |
| *Other and Unspecified Diseases of the Liver* | 12 | 0.8% |
| Diseases of the Intestines | 10 | 0.7% |
| Nausea, Heartburn, Vomiting, and Diarrhea | 9 | 0.6% |
| Hernia | 6 | 0.4% |
| Other and Unspecified Diseases of the Digestive System | 13 | 0.9% |
| **Diseases of the Genitourinary System** | 27 | 1.9% |
| **Diseases of the Skin and Subcutaneous Tissue** | 10 | 0.7% |
| **Diseases of the Blood and Blood-Forming Organs** | 9 | 0.6% |

Table 35. Medical Conditions of Drug Overdose Decedents in Kentucky, 2016 - continued

| Medical Condition[1-3] | Count | Percentage[4] |
|---|---|---|
| **Endocrine, Nutritional and Metabolic Diseases** | | |
| Metabolic Diseases | | |
| *Hyperlipidemia* | 17 | 1.2% |
| *Hypercholesterolemia* | 10 | 0.7% |
| Diabetes Mellitus | 79 | 5.4% |
| Overweight and Obesity | 63 | 4.3% |
| Disorders of the Thyroid Gland | 12 | 0.8% |
| Other and Unspecified Endocrine, Nutritional, and Metabolic Disorders | 8 | 0.5% |
| **Diseases of the Musculoskeletal System, Connective Tissue, and Nervous System** | | |
| Central Nervous System | | |
| *Epilepsy and Recurrent Seizures* | 39 | 2.7% |
| *Migraine and Headache* | 25 | 1.7% |
| *Sleep Apnea* | 17 | 1.2% |
| *Polyneuropathy* | 10 | 0.7% |
| *Insomnia* | 9 | 0.6% |
| *Other and Unspecified Disorders of the Central Nervous System* | 16 | 1.1% |
| Musculoskeletal System and Connective Tissue | | |
| *Dorsalgia* | 77 | 5.3% |
| *Osteoarthritis* | 13 | 0.9% |
| *Pain in Joints and Soft Tissue* | 10 | 0.7% |
| *Fibromyalgia* | 8 | 0.5% |
| *Lupus* | 6 | 0.4% |
| *Rheumatoid Arthritis* | 5 | 0.3% |
| *Other and Unspecified Disorders of the Musculoskeletal System and Connective Tissue* | 13 | 0.9% |
| Chronic Pain, Not Elsewhere Classified | 34 | 2.3% |
| Acute Pain, Not Elsewhere Classified | 15 | 1.0% |
| **Mental, Behavioral and Neurodevelopmental Disorders** | | |
| Substance Use Disorders | | |
| *Opioid Related Disorders* | 355 | 24.4% |
| *Alcohol Related Disorders* | 155 | 10.6% |
| *Nicotine Dependence* | 111 | 7.6% |
| *Cocaine Related Disorders* | 37 | 2.5% |
| *Sedative, Hypnotic, or Anxiolytic Related Disorders* | 26 | 1.8% |
| *Other Stimulant Related Disorders (Excludes Cocaine)* | 26 | 1.8% |
| *Cannabis Related Disorders* | 16 | 1.1% |
| *Other and Unspecified Substance Use Disorders* | 481 | 33.0% |

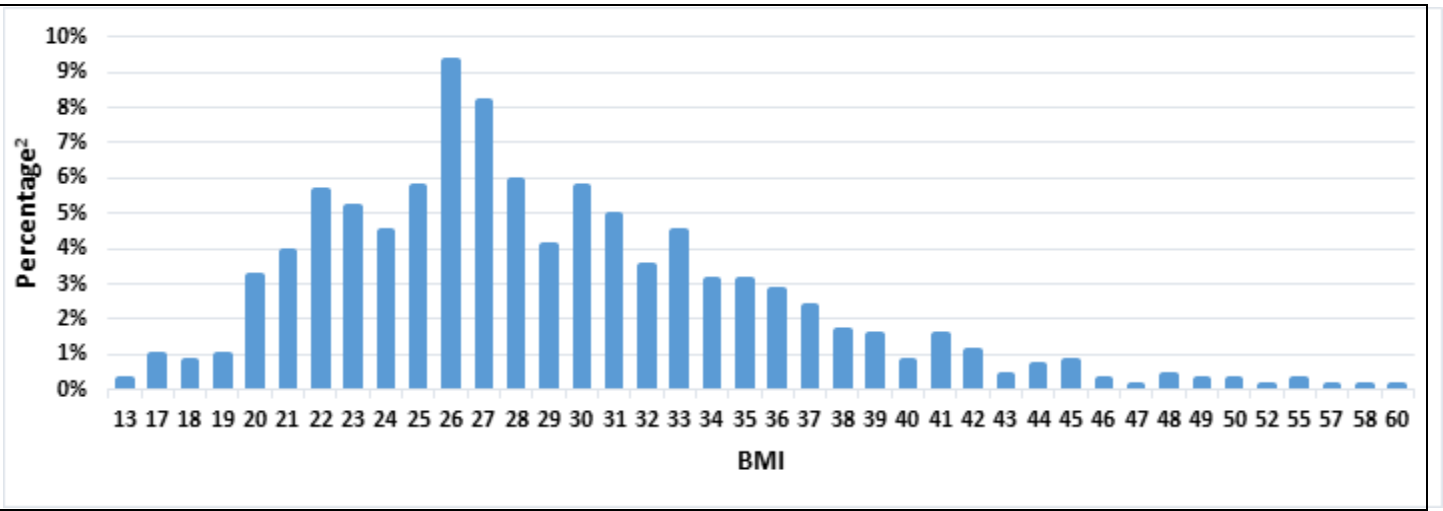
Table 35. Medical Conditions of Drug Overdose Decedents in Kentucky, 2016 - continued

| **Medical Condition**[1-3] | **Count** | **Percentage**[4] |
|---|---|---|
| Depression | 126 | 8.6% |
| Anxiety Disorder | 70 | 4.8% |
| Bipolar Disorder | 41 | 2.8% |
| Post-Traumatic Stress Disorder (PTSD) | 14 | 1.0% |
| Panic Disorder | 10 | 0.7% |
| Attention-Deficit Hyperactivity Disorders | 8 | 0.5% |
| Other and Unspecified Mental, Behavioral, and Neurodevelopment Disorders | 33 | 2.3% |
| **Congenital Malformations, Deformations and Chromosomal Abnormalities** | 5 | 0.3% |
| **Neoplasms** | 43 | 3.0% |
| **Certain Infectious and Parasitic Diseases** | | |
| Hepatitis C | 54 | 3.7% |
| Human Immunodeficiency Virus (HIV) Disease | 6 | 0.4% |
| Other and Unspecified Infectious and Parasitic Diseases | 17 | 1.2% |
| **Injury and External Factors Influencing Health** | | |
| Procedures and Surgeries | | |
| *Presence of Cardiac and Vascular Implants and Grafts* | 21 | 1.4% |
| *Acquired Absence of Limb or Organ* | 14 | 1.0% |
| *Presence of Other Implants or Devices* | 6 | 0.4% |
| *Bariatric Surgery* | 6 | 0.4% |
| *Other Surgical Procedures* | 19 | 1.3% |
| Fractures, Traumatic Injuries, and Open Wounds | 18 | 1.2% |
| Repeated Falls | 16 | 1.1% |
| Injury from Previous Vehicle Accident | 11 | 0.8% |
| Dependence on Enabling Machines and Devices | 9 | 0.6% |
| Other External Factors Influencing Health | 12 | 0.8% |
| **Other and Unspecified Illness** | 9 | 0.6% |

[1]Any reported medical condition identified from death certificate, autopsy, coroner investigation, or medical records.
[2]Medical conditions were classified using ICD-10-CM diagnoses codes and later organized into concise categories.
[3]Medical conditions are not mutually exclusive, death may be counted in more than one applicable category.
[4]Percentage is based on total number of DOFSS drug overdose fatalities, n=1457.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

## Figure 27. Body Mass Index (BMI) Range for Drug Overdose Decedents in Kentucky, 2016[1]




[1]BMI information was available for 48.73% of total drug overdose decedent cases (710/1,457). BMI information was unavailable for most cases that did not have an autopsy performed.
[2]Percentages based on total number of drug overdose decedents with BMI information available (n=710).

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

## Table 36. Drug Overdose Decedent Body Mass Index Percentiles

| BMI Percentiles | | | | | | |
|---|---|---|---|---|---|---|
| **5th percentile** | **10th percentile** | **25th percentile** | **50th percentile** | **75th percentile** | **90th percentile** | **95th percentile** |
| 20 | 21 | 24 | 28 | 33 | 38 | 42 |

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

Table 37. Circumstances and History of Drug Overdose Decedents in Kentucky, 2016

| Circumstance[1] | Count | Percentage |
|---|---|---|
| **Fatal Overdose Event** | | |
| Bystander(s) Present at Time of Overdose[2] | 532 | 36.5% |
| *1 bystander present* | 270 | 18.5% |
| *Multiple bystanders present* | 111 | 7.6% |
| *Bystanders present, unknown number* | 151 | 10.4% |
| Naloxone Administered | 91 | 6.2% |
| Evidence of Rapid Overdose[3] | 83 | 5.7% |
| **Treatment** | | |
| Ever Treated for Substance Use | 100 | 6.9% |
| Current Substance Use Treatment | 26 | 1.8% |
| Ever Treated for Mental Health | 15 | 1.0% |
| Current Mental Health Treatment | 9 | 0.6% |
| Recent Release[4] from Residential Substance Use Treatment | 39 | 2.7% |
| Recent Release[4] from Hospital/ER[5] | 36 | 2.5% |
| Substance Use Relapse | 163 | 11.2% |
| *Relapse occurred < 2 weeks prior to fatal overdose* | 55 | 3.8% |
| *Relapse occurred > 2 weeks to < 3 months prior to fatal overdose* | 9 | 0.6% |
| *Relapse mentioned, timing unclear* | 99 | 6.8% |
| **Incarceration** | | |
| Previous Incarceration | 78 | 5.4% |
| Currently Incarcerated or on House Arrest | 19 | 1.3% |
| Recent Release[4] from Jail, Prison | 50 | 3.4% |
| **History** | | |
| History of Substance Use | 805 | 55.3% |
| History of Mental Illness | 193 | 13.2% |
| History of Life Change, Crisis, or Traumatic Event Within Last Month[6] | 154 | 10.6% |
| History of Chronic Pain | 111 | 7.6% |
| History of Previous Overdose | 105 | 7.2% |
| *Previous OD within the last month* | 32 | 2.2% |
| *Previous OD occurred between a month and a year ago* | 20 | 1.4% |
| *Previous OD occurred more than a year ago* | 10 | 0.7% |
| *Previous OD, timing unknown* | 43 | 3.0% |

Table 37. Circumstances and History of Drug Overdose Decedents in Kentucky, 2016 –continued

| Circumstance[1] | Count | Percentage |
|---|---|---|
| **Suicide Related** | | |
| History of Suicidal Ideations | 41 | 2.8% |
| Previous Suicide Attempts | 31 | 2.1% |
| Suicide Intent Disclosed to Another Person | 29 | 2.0% |
| Suicide Note Found at Time of Fatal Overdose | 22 | 1.5% |

[1]Any reported circumstance history identified from autopsy, coroner investigation, or medical records.
[2]"Bystander" is a person or persons present at the same location as decedent at the time of the fatal overdose. That person may have not witnessed drug use or been in the same room as the decedent at the time of death.
[3]"Rapid overdose" indicates an overdose occurring within a short timeframe after drug use.
[4]"Recent release" is defined as having been released from the institution within the last month or if no date of admission or release is provided yet phrasing of language within documentation indicates release was comparatively close to present.
[5]Hospital or ER visit may have been related to any medical condition or event, it is not limited to overdose/substance use.
[6]"Crisis" is any event, life change, or traumatic event that occurred within the last month prior to fatal drug overdose. This may include: substance use relapse, job changes, housing issues, victim of a crime, death of friend or family, etc.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

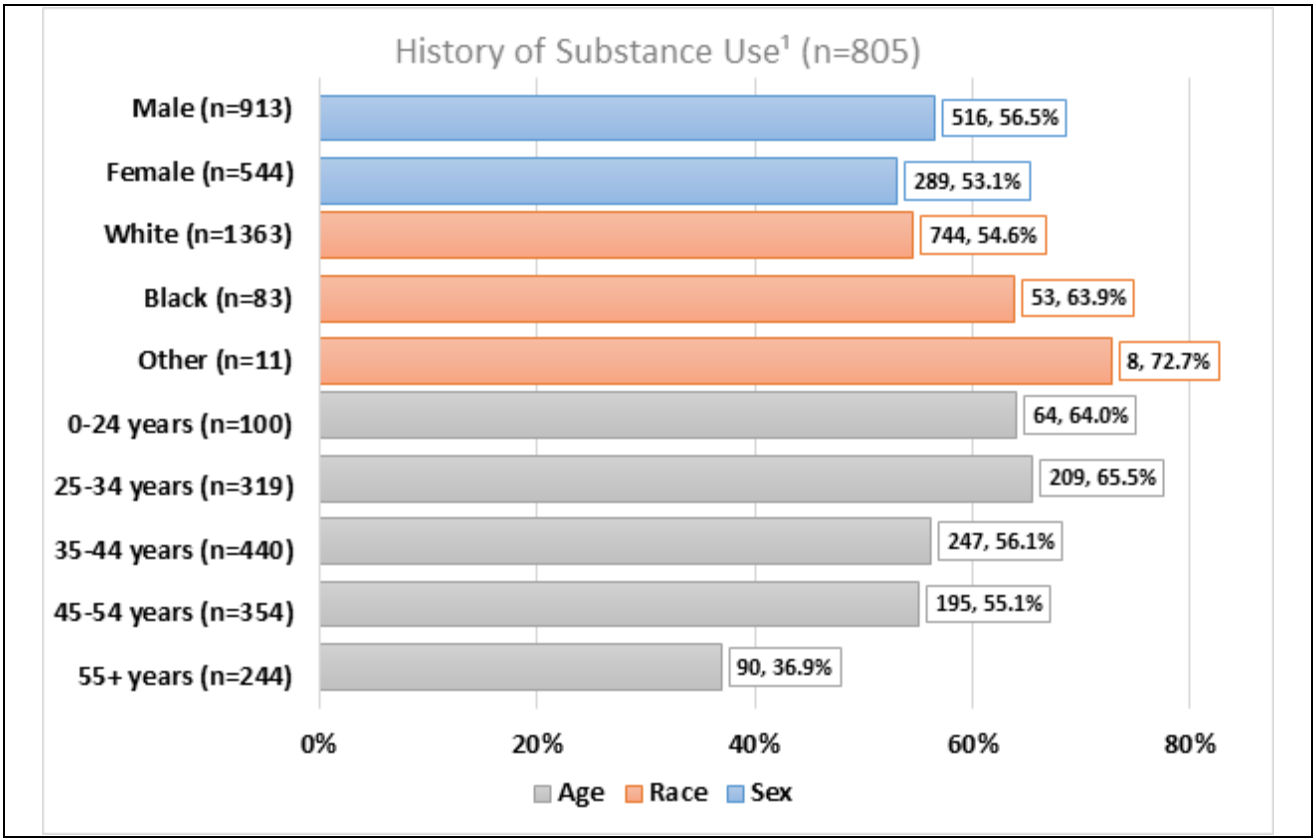
## Table 38. Most Frequent Drugs Detected in Post-mortem Toxicology Test Results of Drug Overdose Decedents in Kentucky with History of Substance Use, 2016[1]

| Drug[2-3] | Decedent History of Substance Use?[4] Yes (%) N=790 | No/Unknown (%) N=546 | p-value[5] |
|---|---|---|---|
| Morphine[6] | 471 (59.6%) | 196 (35.9%) | <.01 |
| Fentanyl[7] | 393 (49.7%) | 151 (27.7%) | <.01 |
| Heroin[8] | 267 (33.8%) | 96 (17.6%) | <.01 |
| Gabapentin | 264 (33.4%) | 216 (39.6%) | 0.02 |
| THC-COOH | 235 (29.7%) | 131 (24.0%) | 0.02 |
| Alprazolam[9] | 228 (28.9%) | 146 (26.7%) | 0.40 |
| Codeine | 217 (27.5%) | 87 (15.9%) | <.01 |
| Methamphetamine | 165 (20.9%) | 87 (15.9%) | 0.02 |
| Cocaine[10] | 159 (20.1%) | 75 (13.7%) | <.01 |
| Ethanol | 147 (18.6%) | 124 (22.7%) | 0.07 |
| Hydromorphone | 145 (18.4%) | 90 (16.5%) | 0.38 |
| Oxycodone | 125 (15.8%) | 128 (23.4%) | <.01 |
| Clonazepam[11] | 125 (15.8%) | 116 (21.2%) | 0.01 |

[1]Counts are based on total number of DOFSS drug overdose fatalities with at least one drug present in toxicology results for each group.
[2]Detected drugs identified in blood, urine, and/or vitreous fluids.
[3]Drugs are not mutually exclusive; decedents may have more than one drug detected.
[4]Any reported history of substance use identified from autopsy, coroner investigation, or medical records.
[5]*p*-value from chi-square test of independence, which tests if a statistical association exists between decedent history of substance use and a positive finding for the specified drug in post-mortem toxicology.
[6]Morphine may represent pure morphine and/or a metabolite of heroin.
[7]"Fentanyl" was identified by positive toxicology results for fentanyl and/or norfentanyl.
[8]"Heroin" was identified by positive toxicology results for 6-monoacetylmorphine.
[9]"Alprazolam" was identified by positive toxicology results for alprazolam and/or a-OH-alprazolam.
[10]"Cocaine" was identified by positive toxicology results for cocaine, cocaethylene and/or benzoylecgonine.
[11]"Clonazepam" was identified by positive toxicology results for clonazepam and/or 7-aminoclonazepam.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

Figure 28. Demographics of Drug Overdose Decedents in Kentucky with History of Substance Use, 2016




[1]Any reported history of substance use identified from autopsy, coroner investigation, or medical records.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

## Table 39. Suicide and Accidental Manners of Death Among Drug Overdose Decedents in Kentucky with History of Substance Use, 2016

| Manner of Death | Decedent History of Substance Use?[1] | |
|---|---|---|
| | Yes (%) | No/Unknown (%) |
| Suicide (n=59) | 14 (23.7%) | 45 (76.3%) |
| Accidental (n=1,270) | 751 (59.1%) | 519 (40.9%) |

[1]Any reported history of substance use identified from autopsy, coroner investigation, or medical records.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

## Table 40. Opioid-Involved Drug Overdoses Among Drug Overdose Decedents in Kentucky with History of Pain, 2016[1-2]

| Type Pain[3-4] | Type of Overdose | |
|---|---|---|
| | Opioid-involved Fatal Overdose (n=1,205) | Other Fatal Overdose (n=131) |
| **Chronic Pain** | 103 (8.5%) | 7 (5.3%) |
| **Acute Pain** | 20 (1.7%) | 0 (0.0%) |
| **Pain, Not Otherwise Specified** | 54 (4.5%) | <5 (*) |

[1]Counts are based on total number of DOFSS drug overdose fatalities with at least one drug present in toxicology results, n=1,336.
[2]According to state data release policy, counts less than 5 are suppressed.
[3]Any reported history of pain identified by autopsy, coroner investigation, or medical records.
[4]Types of pain are not mutually exclusive; decedents may have more than one type of pain diagnosed.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

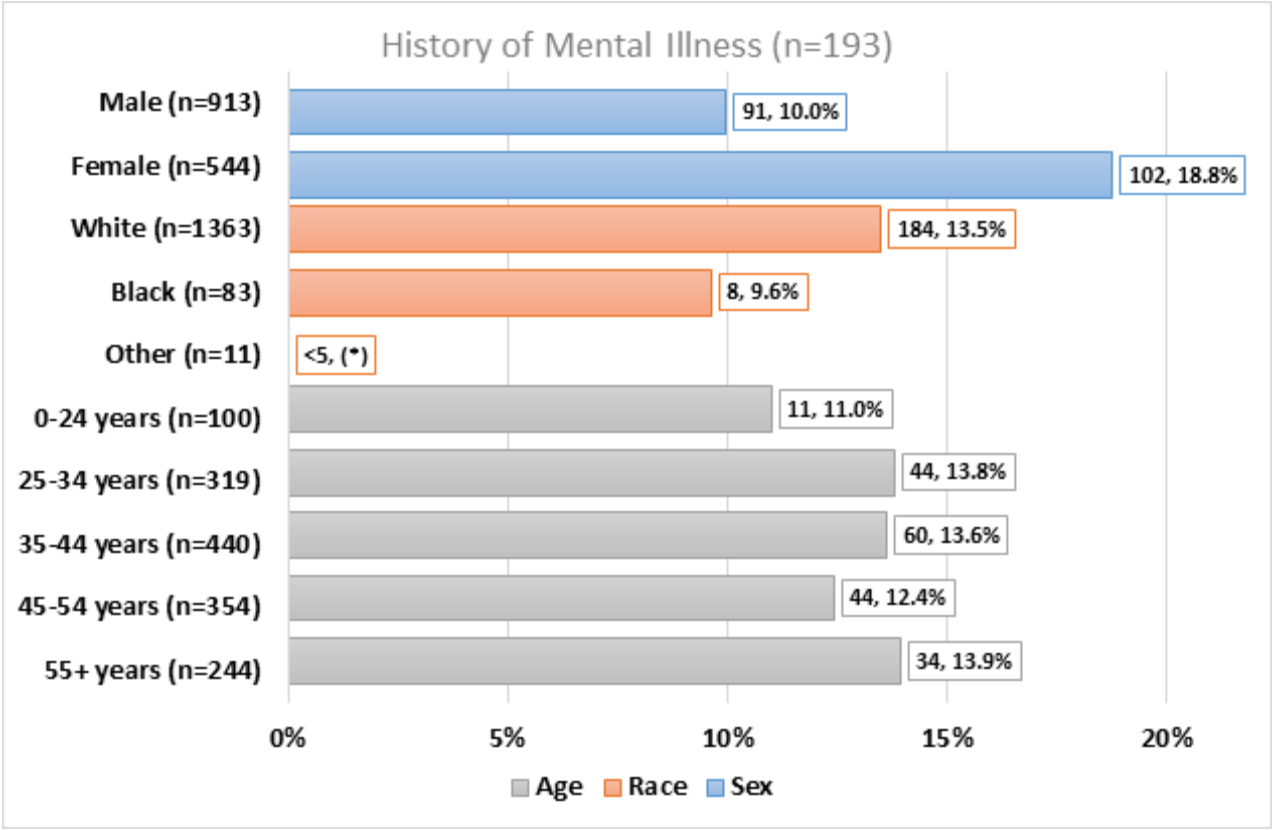
## Table 41. Most Frequent Drugs Detected in Post-mortem Toxicology Test Results of Drug Overdose Decedents in Kentucky with History of Mental Illness, 2016[1]

| Drug[2-3] | Decedent History of Mental Illness?[4] Yes (%) N=189 | No/Unknown (%) N=1147 | p-value[5] |
|---|---|---|---|
| Morphine[6] | 80 (42.3%) | 587 (51.2%) | 0.02 |
| Gabapentin | 73 (38.6%) | 407 (35.5%) | 0.40 |
| Fentanyl[7] | 60 (31.7%) | 484 (42.2%) | 0.01 |
| Alprazolam[8] | 54 (28.6%) | 320 (27.9%) | 0.85 |
| Clonazepam[9] | 51 (27.0%) | 190 (16.6%) | <.01 |
| Oxycodone | 47 (24.9%) | 206 (18.0%) | 0.03 |
| Heroin[10] | 45 (23.8%) | 318 (27.7%) | 0.26 |
| Codeine | 45 (23.8%) | 259 (22.6%) | 0.71 |
| THC-COOH | 42 (22.2%) | 324 (28.2%) | 0.09 |
| Hydromorphone | 37 (19.6%) | 198 (17.3%) | 0.44 |
| Ethanol | 33 (17.5%) | 238 (20.7%) | 0.30 |
| Methamphetamine | 31 (16.4%) | 221 (19.3%) | 0.35 |
| Cocaine[11] | 23 (12.2%) | 211 (18.4%) | 0.04 |

[1]Counts are based on total number of DOFSS drug overdose fatalities with at least one drug present in toxicology results for each group.
[2]Detected drugs identified in blood, urine, and/or vitreous fluids.
[3]Drugs are not mutually exclusive; decedents may have more than one drug detected.
[4]Any reported history of mental illness identified by autopsy, coroner investigation, or medical records.
[5]*p*-value from chi-square test of independence, which tests if a statistical association exists between decedent history of mental illness and a positive finding for the specified drug in post-mortem toxicology.
[6]Morphine may represent pure morphine and/or a metabolite of heroin.
[7]"Fentanyl" was identified by positive toxicology results for fentanyl and/or norfentanyl.
[8]"Alprazolam" was identified by positive toxicology results for alprazolam and/or a-OH-alprazolam.
[9]"Clonazepam" was identified by positive toxicology results for clonazepam and/or 7-aminoclonazepam.
[10]"Heroin" was identified by positive toxicology results for 6-monoacetylmorphine.
[11]"Cocaine" was identified by positive toxicology results for cocaine, cocaethylene and/or benzoylecgonine.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

Figure 29. Demographics of Drug Overdose Decedents in Kentucky with History of Mental Illness, 2016[1-2]




[1]Any reported history of mental illness identified by autopsy, coroner investigation, or medical records.
[2]According to state data release policy, counts less than 5 are suppressed. Any number associated with the suppressed count is labeled with an *.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

## Table 42. Suicide and Accidental Manners of Death Among Drug Overdose Decedents in Kentucky with History of Mental Illness, 2016

| | Decedent History of Mental Illness?[1] | |
|---|---|---|
| **Manner of Death** | **Yes (%)** | **No/Unknown (%)** |
| Accidental (n=1,270) | 148 (11.7%) | 1122 (88.3%) |
| Suicide (n=59) | 30 (50.8%) | 29 (49.2%) |
| [1]Any reported history of mental illness identified by autopsy, coroner investigation, or medical records. | | |
| Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change. | | |

# DOFSS QUALITY CONTROL MEASURES

## Table 43. Number and Percentage of Drug Overdose Fatality Coroner Investigation Reports Received for DOFSS, 2015-2016

| Investigative Report Received? | Yes (%)[1] | No (%) |
|---|---|---|
| 2015 | 995 (79.4%) | 258 (20.6%) |
| 2016 | 1,172 (81.3%) | 269 (18.7%) |

[1]Kentucky residents who died out-of-state were excluded from coroner request analysis.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.

## Table 44. Identification of Specific Drug Involvement Using a Multi-Source Surveillance System, 2015-2016[1]

| Data Source(s) Used | Number of Drug Overdose Fatalities with Specific Drugs Identified, 2015, N=1,295 (%) | Number of Drug Overdose Fatalities with Specific Drugs Identified, 2016, N=1,457 (%) | % Change from 2015 |
|---|---|---|---|
| • **Death Certificate** | 1,029 (79.5%) | 1,190 (81.7%) | 15.6% |
| • **Death Certificate**<br>• **Autopsy Report** | 1,134 (87.6%) | 1,310 (89.9%) | 15.5% |
| • **Death Certificate**<br>• **Autopsy Report**<br>• **Toxicology Report** | 1,264 (97.6%) | 1,418 (97.3%) | 12.2% |
| • **Death Certificate**<br>• **Autopsy Report**<br>• **Toxicology Report**<br>• **Coroner Report** | 1,266 (97.8%) | 1,419 (97.4%) | 12.1% |

[1]The additive value of using a comprehensive surveillance system with multiple data sources, such as the Kentucky Drug Overdose Fatality Surveillance System, to identify specific drug involvement in overdose fatalities.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. August 2018. Kentucky data sources: Death Certificates, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Post-mortem Toxicology Records and Autopsy Reports, Kentucky State Medical Examiner's Office, Justice and Public Safety Cabinet; Kentucky All Schedule Prescription Electronic Reporting, Office of Inspector General, Cabinet for Health and Family Services; and Kentucky Coroner Investigation Reports, County Coroners' Offices. Data outputs draw from selected DOFSS data sources. Data are provisional and subject to change.