

Drug Overdose Fatality Surveillance System (DOFSS) 2017 Annual Technical Report

Released: June 2020

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



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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 has no single agency that is responsible for collecting drug overdose fatality data. DOFSS bridges the gaps by inputting drug overdose decedent data into a centralized database—a comprehensive multi-source database that 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 utilizes the following data sources:

- Vital statistics death certificates (with National Center for Health Statistics ICD-10 coding)
- Medical examiner autopsy reports
- Coroner investigation reports
- Post-mortem toxicology reports
 - Post-mortem toxicology reports were not identified in 106 cases
- Kentucky All Schedule Prescription Electronic Reporting (KASPER) records
 - KASPER reports were identified in 1,015 cases

Data in DOFSS is provisional and subject to change. Data for this report was analyzed on March 12, 2019.

Funding

This report was supported by Cooperative Agreement Number 1 NU17CE924971-01-00, 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 a grant from the Center for Clinical and Translational Research (NIH CTSA UL1TR000117).

Acknowledgments

We would like to thank the Kentucky Department for Public Health, Office of Vital Statistics for access to death certificate records, the Office of Inspector General for access to KASPER data, the Office of the State Medical Examiner for access to autopsy reports and post-mortem toxicology reports, all county coroners for access to coroner reports, and the project managers of the grant 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_0DsbnMuz3oqGKqN.

Suggested Citation

Hargrove SL, Ward PJ, Mitchell LG, Bunn TL. "Kentucky Drug Overdose Fatality Surveillance System 2017 Annual Technical Report." Kentucky Injury Prevention and Research Center. June, 2020.

EXECUTIVE SUMMARY

The Kentucky Injury Prevention and Research Center (KIPRC), located at the University of Kentucky College of Public Health and a 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 2017 Kentucky Drug Overdose Fatality Surveillance System (DOFSS) annual technical report.

The findings of the 2017 report indicate progress in the prevention of drug overdose deaths in Kentucky. There was a 15% decrease in drug overdose fatalities involving oxycodone, a 15% decrease in hydromorphone-involved deaths, a 7% decrease in deaths involving alprazolam, a 5% decrease in those involving heroin, and a 3% decrease in those involving gabapentin. Concurrent with these decreases was a 50% increase in drug overdose deaths involving fentanyl. While major strides were achieved in preventing drug overdose deaths in 2017, sustained substance use disorder prevention, treatment, and recovery programs are still critically needed at the state and community levels.

Opioid prescribing stewardship programs in emergency departments, reduced availability of prescription opioids, timely access to substance use disorder treatment, and other primary drug overdose prevention programs in both the general community and in the workplace have helped reduce the number of drug overdose deaths.

To reduce the number of drug overdose deaths involving fentanyl, community secondary prevention programs, such as fentanyl testing strip distribution programs and naloxone distribution programs, may help save lives and prevent drug overdose fatalities.

Tertiary prevention strategies, such as high-quality sustained recovery residence availability and full integration of institutionalized individuals back into local communities, are also needed to help reduce relapse of individuals with substance use disorders.

www.FindHelpNowKY.org, developed by KIPRC as the bona fide agent for the Department for Public Health, is a resource for health professionals, public safety professionals, and for the general public that provides a directory of substance use disorder treatment facilities with available openings. A resource section with information on substance use disorders and treatment is also included in www.FindHelpNowKY.org.

Our heartfelt sympathies are tendered to the families, friends, and colleagues of those individuals with substance use disorders and others who have died from drug overdoses. Our hope is that primary, secondary, and tertiary drug overdose prevention programs, along with substance use disorder treatment and recovery strategies, will hasten a reduction in the number of individuals with substance use disorders and in the number of drug overdose fatalities in Kentucky.

Sincerely,

Terry Bunn, Director

Kentucky Injury Prevention and Research Center



HIGHLIGHTS

1. There were 1,561 drug overdose deaths overall for the state of Kentucky; 1,456 of the deaths were Kentucky residents whose death occurred in state, [Table 1](#).
2. Of 1,455 deaths with toxicology results, the most common drug classes involved were opioids (88%), benzodiazepines (43%), and amphetamines (33%), [Table 5](#).
3. The most frequently detected drugs among deaths with toxicology results were fentanyl (56%), morphine (46%), and gabapentin (32%), [Table 6](#).
4. The number of deaths involving amphetamine (+86%), methamphetamine (+75%), and fentanyl (+51%) largely increased from 2016 to 2017, [Table 6](#).
5. Mean blood concentration of fentanyl decreased from 2016 to 2017 despite the significant increase in deaths involving fentanyl, [Figure 3](#).
6. Opioids were the class of drugs most commonly identified in accidental drug overdose deaths (90%), whereas antidepressants were most commonly identified in drug overdose suicides (43%), [Table 12](#).
7. Fentanyl was the most common drug detected in all demographic and socioeconomic groups, except among those 55 years and up and widowed decedents, where gabapentin was the most common detected drug (51%, 48% respectively), [Tables 13-16](#).
8. Black decedents had THC-COOH (33%) and cocaine (53%) detected significantly more often than white decedents (THC-COOH 20%, cocaine 17%), whereas gabapentin was more prevalent in white decedents (33%) over black decedents (19%), [Table 15](#).
9. Ethanol and cocaine detection increased with level of education completed; all other drugs were detected less as education level increased, [Table 16](#).
10. The most common industries among decedents were construction (17%), other nonclassifiable or unspecified industry (10%), restaurants and other food services (9%), and healthcare (6%).
Homemakers and those that did not work accounted for 11% and 8%, respectively, of nontraditional sectors, [Table 18](#).
11. Large changes in death counts from 2016–2017 included increases in Kenton (+33), Jefferson (+29), Bullitt (+19), and Madison (+19) counties and a decrease in Harrison County (-13), [Table 19](#).
12. The most common identifiable prescription and over-the-counter drugs found at the scene and/or autopsy were gabapentin (26%), hydrocodone (14%), and alprazolam (14%), [Table 34](#).
13. The most common significant condition contributing to cause of death was heart-related conditions (16%), with just under half of the heart-related conditions being hypertension (7%), [Figure 26](#).
14. Common medical conditions diagnosed among drug overdose decedents were unspecified substance use disorder (31%), opioid-related substance use disorder (25%), hypertension (13%), alcohol use disorder (10%), and depression (8%), [Table 35](#).
15. Sixty-two percent of decedents had a reported substance use problem, 13% had a reported history of substance use relapse, 8% had a reported previous drug overdose, and 8% had reported ever receiving substance use treatment, [Table 37](#).
16. Twelve percent of drug overdose decedents had a reported mental health history, while 2% of all drug overdose decedents had reported ever receiving treatment for their mental health, [Table 37](#).
17. Fifteen 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 10% of decedents were recently released from residential substance use treatment, from hospital/ER, or from jail/prison, [Table 37](#).
18. Decedents with illicit opioids identified in toxicology at death had a large decrease in active legal opioid prescriptions from 180 days prior to death (39%) to the day of death (10%), [Table 45](#).

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-Square 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 75th and 25th 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, meaning the assumption that the null hypothesis is true can be rejected in favor of the alternative hypothesis.

Route of Administration: Witness reports or evidence found at the scene or autopsy that suggest 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 used 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 that suggest 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 that suggest 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 that suggest 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 that suggest 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 that suggest 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.

Unique Metabolite: A byproduct of the parent drug metabolizing and breaking down in the body that has been identified only in the parent drug. Non-unique metabolites are byproducts that are found in more than one metabolism process or that may act as both a parent drug and a metabolite of another drug.

For the purpose of this report, unique metabolites are classified and represented as the parent drug only. If a decedent has both the parent drug and the unique metabolite, the two separate drugs will be counted only once and labeled as the parent drug. This is true for all drugs with unique metabolites except for the unique metabolite of THC, due to the lengthy metabolism of THC-COOH. The list of the possible parent drugs and the included unique metabolites are listed below.

Alprazolam is identified by positive toxicology results for alprazolam and/or a-OH-alprazolam.

Amiodarone is identified by positive toxicology results for amiodarone and/or desethylamiodarone.

Aripiprazole is identified by positive toxicology results for aripiprazole and/or dehydroaripiprazole.

Buprenorphine is identified by positive toxicology results for buprenorphine and/or norbuprenorphine.

Carbamazepine is identified by positive toxicology results for carbamazepine and/or carbamazepine-10,11-epoxide.

Chlordiazepoxide is identified by positive toxicology results for chlordiazepoxide and/or demoxepam.

Clomipramine is identified by positive toxicology results for clomipramine and/or norclomipramine (n-desmethylclomipramine).

Clonazepam is identified by positive toxicology results for clonazepam and/or 7-aminoclonazepam.

Clozapine is identified by positive toxicology results for clozapine and/or norclozapine.

Cocaine is identified by positive toxicology results for cocaine, cocaethylene, and/or benzoylecgonine.

Doxepin is identified by positive toxicology results for doxepin and/or nordoxepin.

Fentanyl is identified by positive toxicology results for fentanyl and/or norfentanyl.

Flunitrazepam is identified by positive toxicology results for flunitrazepam, 7-aminoflunitrazepam, and/or norflunitrazepam (n-desmethylflunitrazepam).

Fluoxetine is identified by positive toxicology results for fluoxetine and/or norfluoxetine.

Flurazepam is identified by positive toxicology results for flurazepam, desalkylflurazepam, and/or 2-hydroxyethylflurazepam.

Heroin is identified by positive toxicology results for diacetylmorphine and/or 6-monoacetylmorphine.

Ketamine is identified by positive toxicology results for ketamine and/or norketamine.

Methadone is identified by positive toxicology results for methadone, EDDP, and/or EMDP.

Meperidine is identified by positive toxicology results for meperidine and/or normeperidine.

Oxcarbazepine is identified by positive toxicology results for 10-monohydroxy oxcarbazepine.

Papaverine is identified by positive toxicology results for papaverine and/or desmethylpapaverine.

Propoxyphene is identified by positive toxicology results for propoxyphene and/or norpropoxyphene.

Risperidone is identified by positive toxicology result for risperidone and/or 9-hydroxyrisperidone.

Sertraline is identified by positive toxicology results for sertraline and/or norsertraline.

Tramadol is identified by positive toxicology results for tramadol, nortramadol (n-desmethyltramadol), and/or desmetramadol (o-desmethyltramadol).

Triazolam is identified by positive toxicology results from triazolam and/or hydroxytriazolam.

Venlafaxine is identified by positive toxicology results for venlafaxine, norvenlafaxine (n-desmethylvenlafaxine), and/or desvenlafaxine (o- desmethylvenlafaxine).

2017 KENTUCKY DRUG OVERDOSE FATALITY SURVEILLANCE DATA

OVERALL DATA

Table 1. Overall Kentucky Drug Overdose Fatality Data, 2017

| | |
|--|--------------|
| DOFSS drug overdose deaths, overall | 1,561 |
| Kentucky resident drug overdose fatalities occurring in Kentucky | 1,456 |
| Kentucky resident drug overdose fatalities occurring outside of Kentucky | 8 |
| <i>Kentucky resident age-adjusted drug overdose fatality rate¹</i> | <i>37.2</i> |
| Out-of-state resident drug overdose deaths occurring in Kentucky | 97 |
| DOFSS drug overdose deaths with post-mortem toxicology results available | 1,455 |
| ¹ Age-adjusted drug overdose fatality rate was calculated using Multiple Cause of Death 1999–2017 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. June 2020. 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 1999–2017 on CDC WONDER online database, released December 2018. Data are from the Multiple Cause of Death Files, 1999–2017, 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 Socioeconomic Factors Among Drug Overdose Decedents in Kentucky, 2017

| Category | Drug Overdose Decedent Count | Drug Overdose Decedent Percentage | Kentucky Population Estimate ¹ | Kentucky Population Percentage |
|------------------------------------|------------------------------|-----------------------------------|---|--------------------------------|
| Gender | | | | |
| Male | 957 | 61.3% | 2,194,850 | 49.3% |
| Female | 604 | 38.7% | 2,259,339 | 50.7% |
| Age | | | | |
| 0–24 years | 93 | 6.0% | 1,435,236 | 32.2% |
| 25–34 years | 402 | 25.8% | 573,771 | 12.9% |
| 35–44 years | 446 | 28.6% | 555,670 | 12.5% |
| 45–54 years | 391 | 25.0% | 584,245 | 13.1% |
| 55+ years | 229 | 14.7% | 1,305,267 | 29.3% |
| Race | | | | |
| White | 1446 | 92.6% | 3,989,894 | 87.8% |
| Black | 100 | 6.4% | 423,805 | 9.3% |
| Other | 15 | 1.0% | 131,424 | 2.9% |
| Marital Status² | | | | |
| Single | 652 | 41.8% | 1,040,408 | 28.8% |
| Married ³ | 338 | 21.7% | 1,864,065 | 51.6% |
| Divorced | 447 | 28.6% | 473,241 | 13.1% |
| Widowed | 77 | 4.9% | 234,814 | 6.5% |
| Unknown Marital Status | 47 | 3.0% | 0 | 0.0% |
| Education Level⁴ | | | | |
| Less than High School | 374 | 24.0% | 461,216 | 13.4% |
| High School /GED Equivalent | 781 | 50.0% | 1,155,278 | 33.6% |
| Some College /Associates Degree | 295 | 18.9% | 1,062,272 | 30.9% |
| Bachelor's Degree or Higher | 85 | 5.4% | 760,819 | 22.1% |
| Unknown Education | 26 | 1.7% | 0 | 0.0% |

¹Kentucky population estimates for gender, age, race, marital status, and education level are from the U.S. Census Bureau's 2017 American Community Survey one-year estimates.

²Kentucky 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.

⁴Kentucky 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. June 2020. 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 2017 American Community Survey one-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, 2017¹

| Location of Injury | Count | Percentage |
|---|-------|------------|
| Home | 987 | 63.2% |
| Other Specified Place, Not Classifiable, or Unspecified | 500 | 32.0% |
| Residential Institution | 30 | 1.9% |
| Street/Highway | 26 | 1.7% |
| Trade and Service Area | 7 | 0.4% |
| Industrial and Construction Area | <5 | * |
| Farm | <5 | * |
| School, Other Institutions, Administrative Area | <5 | * |
| Sport and Recreational Area | <5 | * |
| ¹ In accordance with state data release policy, counts less than five 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. June 2020. 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, 2017¹

| Location of Death | Count | Percentage |
|---|-------|------------|
| Residence | 710 | 45.5% |
| Hospital, ER/Outpatient | 326 | 20.9% |
| Other Specified Place, Not Classifiable, or Unspecified | 315 | 20.2% |
| Hospital, Inpatient | 197 | 12.6% |
| Hospital, Dead on Arrival | 9 | 0.6% |
| Hospice | <5 | * |
| Nursing Home/Long-Term Care Facility | <5 | * |
| ¹ In accordance with state data release policy, counts less than five 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. June 2020. 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, 2017¹

| Drug Class ²⁻⁴ | 2017 Count | 2017 Percentage ⁵ | Percent Change From 2016–2017 ⁶ |
|---------------------------|------------|------------------------------|--|
| Opioids ⁷ | 1,273 | 87.49% | 5.6% |
| Benzodiazepines | 619 | 42.54% | -6.6% |
| Amphetamines | 484 | 33.26% | 65.2% |
| Anticonvulsants | 475 | 32.65% | -1.5% |
| Cannabinoids | 319 | 21.92% | -15.6% |
| Cocaine | 281 | 19.31% | 21.1% |
| Alcohol | 244 | 16.77% | -10.6% |
| Stimulants | 57 | 3.92% | -10.9% |
| Antidepressants | 49 | 3.37% | 6.5% |
| Non-Opioid Analgesics | 39 | 2.68% | -4.9% |
| Cardiovascular | 23 | 1.58% | 76.9% |
| Antihistamines | 21 | 1.44% | -12.5% |
| Antipsychotics | 12 | 0.82% | -20.0% |
| Sedatives/Hypnotics | 7 | 0.48% | -36.4% |
| Anesthetics | 5 | 0.34% | - |
| Barbiturates | <5 | * | * |
| Narcotics | <5 | * | * |
| Miscellaneous | <5 | * | * |
| Antibiotics | 0 | 0.00% | * |
| Bath Salts | 0 | 0.00% | - |
| Endocrine | 0 | 0.00% | - |
| Gastrointestinal Agents | 0 | 0.00% | - |
| Neurological Agents | 0 | 0.00% | * |

¹In accordance with state data release policy, counts less than five are suppressed. Any number directly associated with the suppressed count is labeled with an *. A count greater than five or an associated number may not be reported if that value would disclose a suppressed value; these are labeled with a -.

²Drug testing of blood, urine, and/or vitreous fluids.

³Drug classes are not mutually exclusive; decedents may have multiple drug classes detected.

⁴Multiple drugs within the same drug class are counted as one drug class incident per decedent.

⁵Percentage is based on total number of DOFSS drug overdose fatalities with toxicology results available, n=1,455.

⁶Percent Change represents the change in individual drug frequency from 2016 to 2017.

⁷"Opioids" includes all opium-like substances (including natural opiates, semi-synthetic opioids, and synthetic opioids).

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Table 6. Most Frequent Drugs Detected Among Drug Overdose Decedents in Kentucky, 2017¹

| Drug ²⁻⁴ | 2017 Count | 2017 Percentage ⁵ | Percent Change From 2016–2017 ⁶ |
|----------------------------|------------|------------------------------|--|
| Fentanyl ⁴ | 819 | 56.3% | 50.6% |
| Morphine ⁷ | 672 | 46.2% | 0.7% |
| Gabapentin | 466 | 32.0% | -2.9% |
| Methamphetamine | 440 | 30.2% | 74.6% |
| Amphetamine | 369 | 25.4% | 86.4% |
| Alprazolam ⁴ | 347 | 23.8% | -7.2% |
| Heroin ⁴ | 344 | 23.6% | -5.2% |
| THC-COOH ⁴ | 304 | 20.9% | -16.9% |
| Cocaine ⁴ | 282 | 19.4% | 20.5% |
| Codeine | 271 | 18.6% | -10.9% |
| Ethanol | 239 | 16.4% | -11.8% |
| Clonazepam ⁴ | 233 | 16.0% | -3.3% |
| Oxycodone | 216 | 14.8% | -14.6% |
| Hydromorphone | 201 | 13.8% | -14.5% |
| Hydrocodone | 187 | 12.9% | -13.4% |
| THC ⁴ | 166 | 11.4% | -2.4% |
| Oxymorphone | 156 | 10.7% | -23.2% |
| Oxazepam | 128 | 8.8% | -12.9% |
| Nordiazepam | 116 | 8.0% | -22.1% |
| Buprenorphine ⁴ | 106 | 7.3% | 3.9% |
| Temazepam | 101 | 6.9% | -16.5% |
| Diazepam | 65 | 4.5% | -40.4% |
| Methadone ⁴ | 60 | 4.1% | -11.8% |
| Tramadol ⁴ | 48 | 3.3% | 2.1% |
| Cotinine | 48 | 3.3% | -2.0% |
| Nicotine | 39 | 2.7% | -7.1% |
| Lorazepam | 34 | 2.3% | 21.4% |
| Caffeine | 32 | 2.2% | -13.5% |
| Citalopram | 15 | 1.0% | 87.5% |
| Diphenhydramine | 15 | 1.0% | -11.8% |
| Carfentanil | 14 | 1.0% | 55.6% |
| Pseudoephedrine | 14 | 1.0% | -30.0% |
| Acetaminophen | 13 | 0.9% | * |
| Bupropion | 12 | 0.8% | 50.0% |

Table 6. Most Frequent Drugs Detected Among Drug Overdose Decedents in Kentucky, 2017¹—continued

| Drug ²⁻⁴ | 2017 Count | 2017 Percentage ⁵ | Percent Change From 2016–2017 ⁶ |
|-------------------------------|------------|------------------------------|--|
| Naloxone | 12 | 0.8% | 0.0% |
| Fentanyl | 9 | 0.6% | * |
| Nortriptyline | 9 | 0.6% | 28.6% |
| Propanolol | 8 | 0.5% | * |
| MDMA | 8 | 0.5% | * |
| Fluoxetine ⁴ | 7 | 0.5% | 16.7% |
| Venlafaxine ⁴ | 7 | 0.5% | 16.7% |
| Metoprolol | 7 | 0.5% | * |
| Amitriptyline | 7 | 0.5% | 0.0% |
| Cyclobenzaprine | 7 | 0.5% | -22.2% |
| Quetiapine | 7 | 0.5% | -36.4% |
| Chlordiazepoxide ⁴ | 6 | 0.4% | -14.3% |
| Zolpidem | 5 | 0.3% | * |
| Trazodone | 5 | 0.3% | -44.4% |
| Meprobamate | 5 | 0.3% | -54.5% |

¹In accordance with state data release policy, counts less than five are suppressed. Any number directly associated with the suppressed count is labeled with an *. A count greater than five or an associated number may not be reported if that value would disclose a suppressed value; these are labeled with a -.

²Drug testing of blood, urine, and/or vitreous fluids.

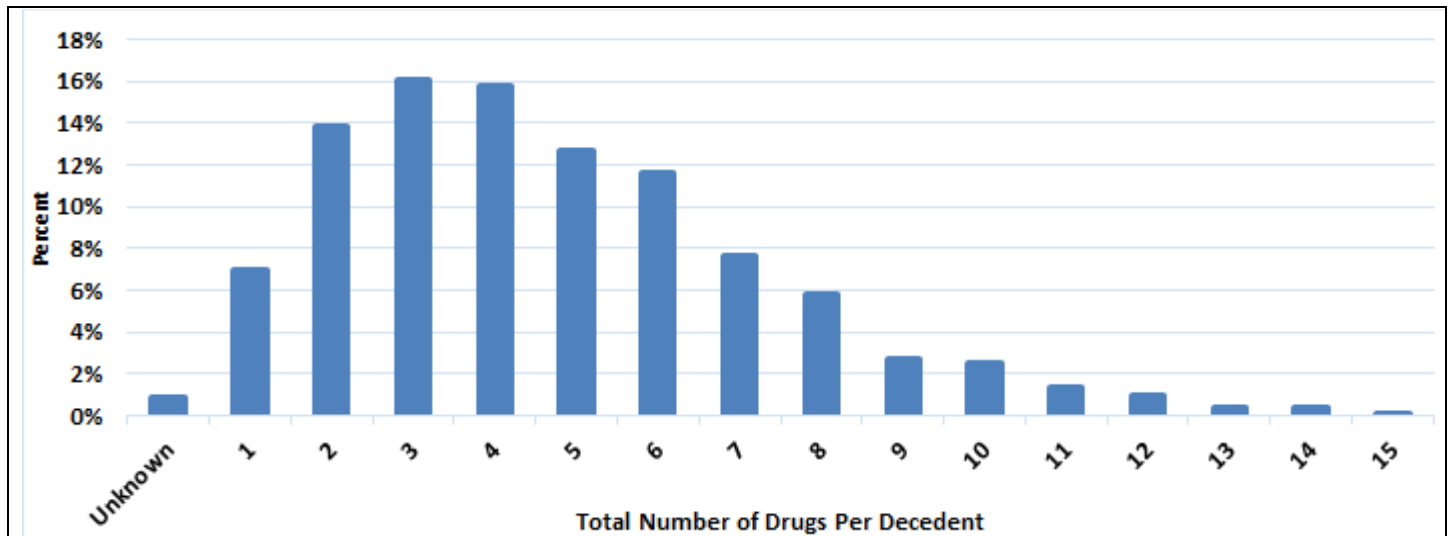
³Drugs are not mutually exclusive; decedents may have more than one drug detected.

⁴Parent drugs with unique metabolites are classified and represented by the parent drug only. All instances of the parent drug and unique metabolite(s) are counted once per decedent and labeled as the parent drug. This is true for all drugs with unique metabolites except for THC due to the lengthy metabolism of THC-COOH. A list of unique metabolites for each parent drug is found in Definitions.

⁵Percentage is based on total number of DOFSS drug overdose fatalities with toxicology results available, n=1,455.

⁶Percent Change represents the change in individual drug frequency from 2016 to 2017.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. June 2020. 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, 2017¹⁻⁴


¹Drug testing of blood, urine, and/or vitreous fluids.

²Parent drugs with unique metabolites are classified and represented by the parent drug only. All instances of the parent drug and unique metabolite(s) are counted once per decedent and labeled as the parent drug. This is true for all drugs with unique metabolites except for THC due to the lengthy metabolism of THC-COOH. A list of unique metabolites for each parent drug is found in Definitions.

³Percentage is based on total number of DOFSS drug overdose fatalities with at least one drug present in toxicology results, n=1,453.

⁴An unknown number of drugs is due to a decedent having a toxicology screening performed with drug class information only.

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Table 7. Percentile of Total Number of Drugs Detected Per Drug Overdose Decedents in Kentucky, 2017¹⁻²

| 5 th percentile | 10 th percentile | 25 th percentile | 50 th percentile | 75 th percentile | 90 th percentile | 95 th percentile |
|-------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| 1 drug per decedent | 2 drugs per decedent | 3 drugs per decedent | 4 drugs per decedent | 6 drugs per decedent | 8 drugs per decedent | 10 drugs per decedent |

¹Drug testing of blood, urine, and/or vitreous fluids.

²Parent drugs with unique metabolites are classified and represented by the parent drug only. All instances of the parent drug and unique metabolite(s) are counted once per decedent and labeled as the parent drug. This is true for all drugs with unique metabolites except for THC due to the lengthy metabolism of THC-COOH. A list of unique metabolites for each parent drug is found in Definitions.

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Table 8. Most Frequent Drugs Detected Among Kentucky Drug Overdose Decedents with Less Than Four Total Drugs in Post-Mortem Toxicology, 2017

| Drug ¹⁻³ | Count | Percentage ⁴ |
|----------------------------|-------|-------------------------|
| Fentanyl ³ | 269 | 48.82% |
| Gabapentin | 129 | 23.41% |
| Morphine ⁵ | 119 | 21.60% |
| Methamphetamine | 95 | 17.24% |
| Cocaine ³ | 76 | 13.79% |
| Ethanol | 75 | 13.61% |
| Amphetamine | 58 | 10.53% |
| THC-COOH ³ | 56 | 10.16% |
| Alprazolam ³ | 53 | 9.62% |
| Oxycodone | 43 | 7.80% |
| Hydrocodone | 31 | 5.63% |
| Clonazepam ³ | 29 | 5.26% |
| Heroin ³ | 22 | 3.99% |
| THC ³ | 21 | 3.81% |
| Buprenorphine ³ | 16 | 2.90% |
| Oxymorphone | 16 | 2.90% |
| Methadone ³ | 12 | 2.18% |
| Carfentanil | 9 | 1.63% |
| Lorazepam | 9 | 1.63% |
| Tramadol ³ | 8 | 1.45% |
| Codeine | 7 | 1.27% |
| Acetaminophen | 6 | 1.09% |
| Hydromorphone | 6 | 1.09% |

¹Drug testing of blood, urine, and/or vitreous fluids.

²Drugs are not mutually exclusive; decedents may have more than one drug detected.

³Parent drugs with unique metabolites are classified and represented by the parent drug only. All instances of the parent drug and unique metabolite(s) are counted once per decedent and labeled as the parent drug. This is true for all drugs with unique metabolites except for THC due to the lengthy metabolism of THC-COOH. A list of unique metabolites for each parent drug is found in Definitions.

⁴Percentage is based on total number of DOFSS drug overdose fatalities with less than four drugs identified in toxicology results, n=551.

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

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Figure 2. Most Frequent Drugs Found in Combination with Commonly Detected Drugs Among Drug Overdose Decedents in Kentucky, 2017¹⁻³

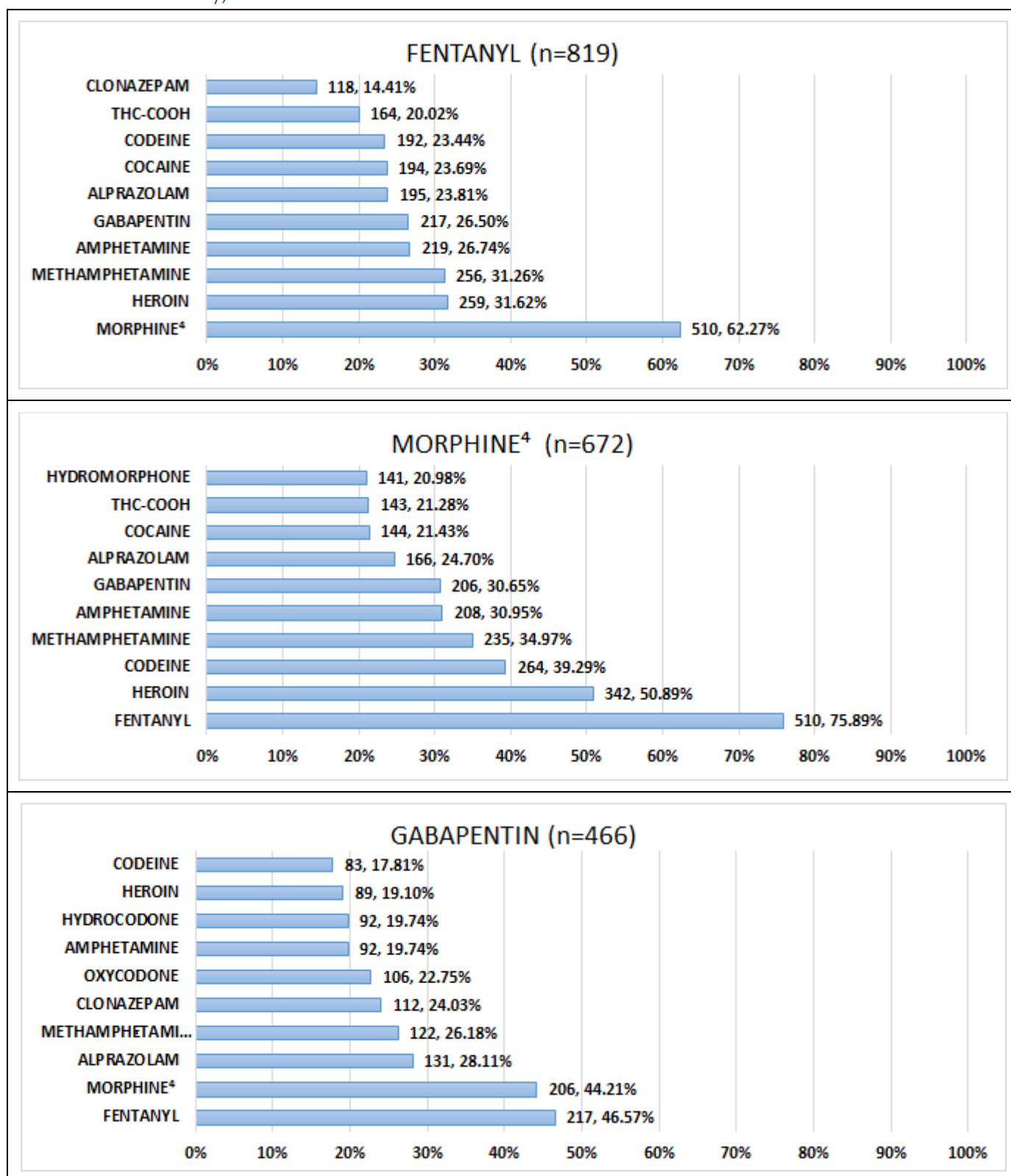


Figure 2. Most Frequent Drugs Found in Combination with Commonly Detected Drugs Among Drug Overdose Decedents in Kentucky, 2017¹⁻³—continued

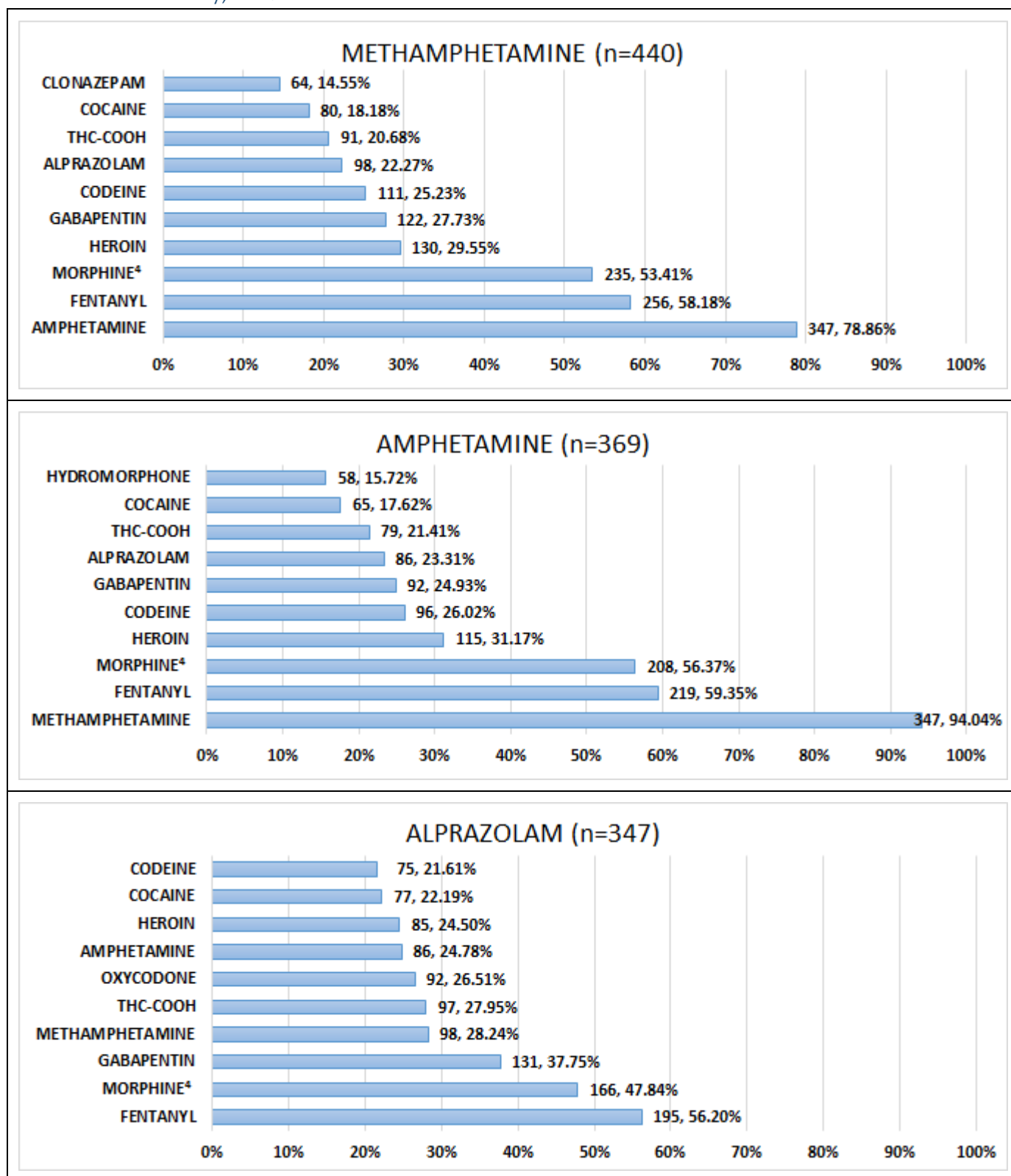


Figure 2. Most Frequent Drugs Found in Combination with Commonly Detected Drugs Among Drug Overdose Decedents in Kentucky, 2017¹⁻³—continued

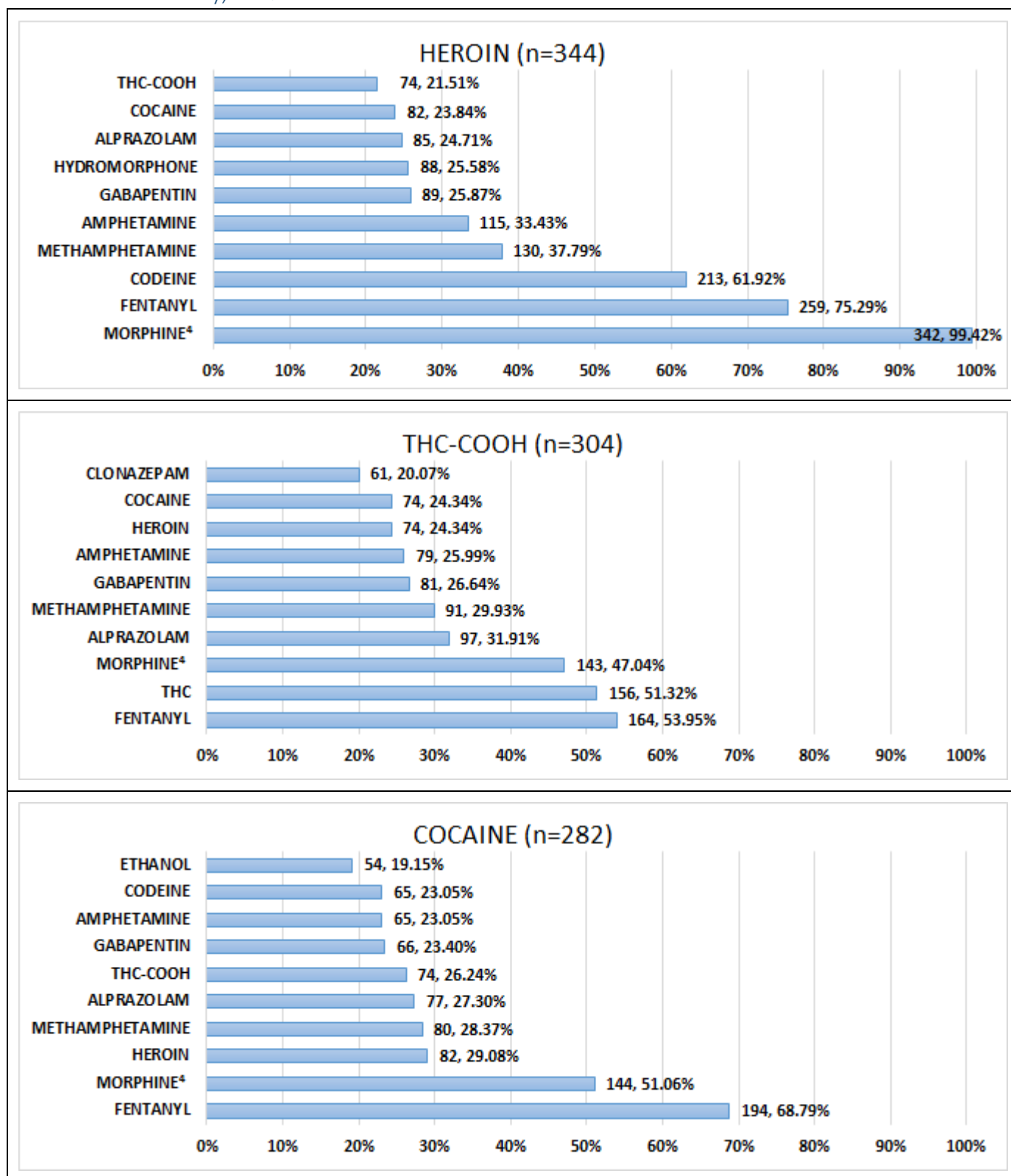


Figure 2. Most Frequent Drugs Found in Combination with Commonly Detected Drugs Among Drug Overdose Decedents in Kentucky, 2017¹⁻³—continued

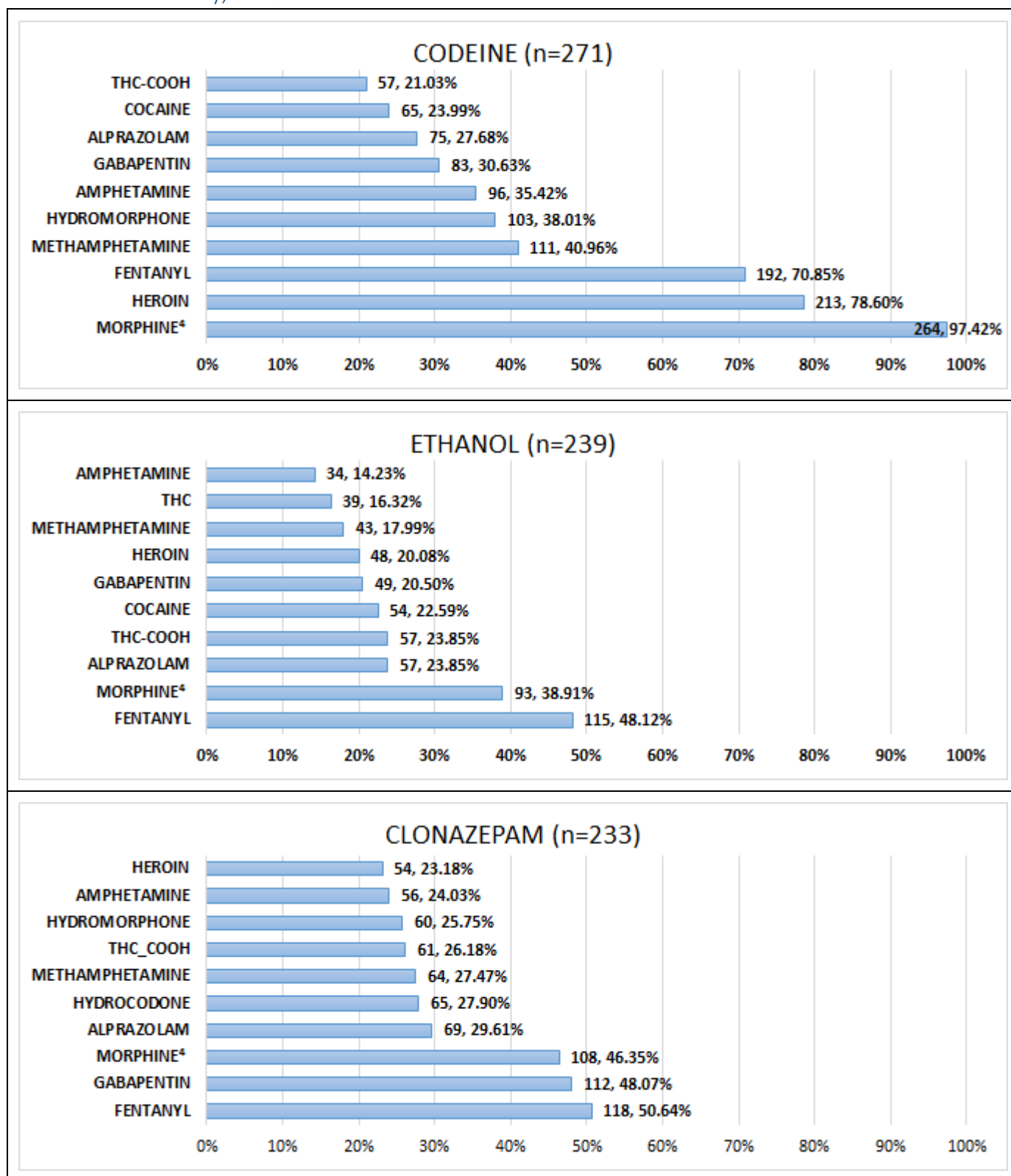
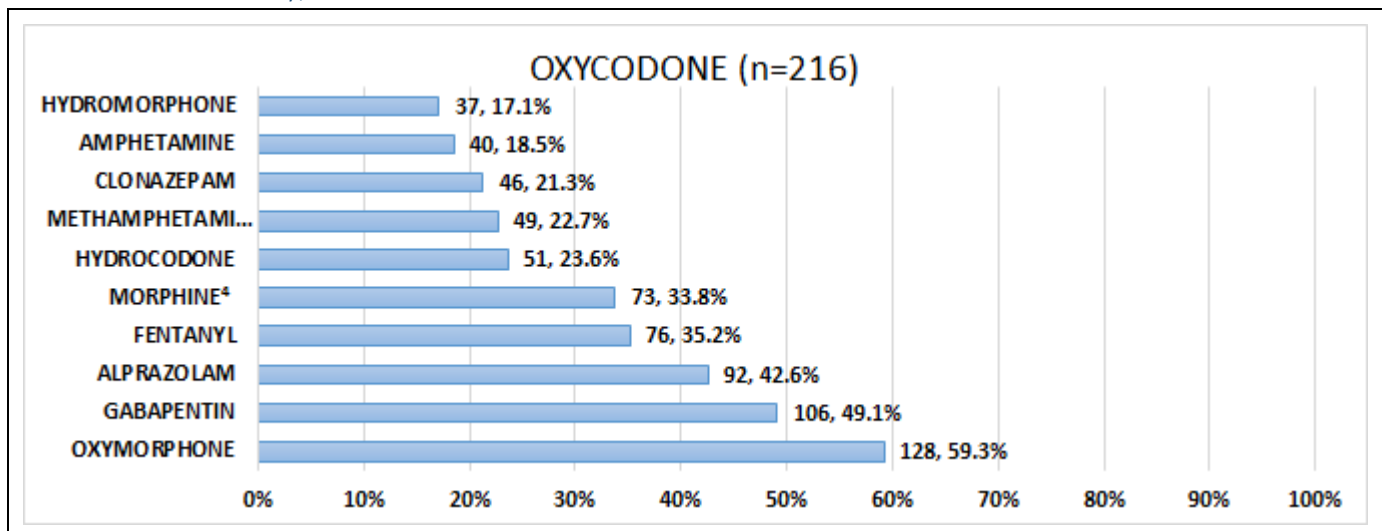


Figure 2. Most Frequent Drugs Found in Combination with Commonly Detected Drugs Among Drug Overdose Decedents in Kentucky, 2017¹⁻³—continued



¹Drug testing of blood, urine, and/or vitreous fluids.

²Drugs are not mutually exclusive; decedents may have more than one drug detected.

³Parent drugs with unique metabolites are classified and represented by the parent drug only. All instances of the parent drug and unique metabolite(s) are counted once per decedent and labeled as the parent drug. This is true for all drugs with unique metabolites except for THC due to the lengthy metabolism of THC-COOH. A list of unique metabolites for each parent drug is found in Definitions.

⁴Morphine may represent pure morphine and/or a metabolite of heroin.

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Table 9. Most Common Two-Drug Combinations Detected Among Drug Overdose Decedents in Kentucky, 2017

| Two-Drug Combination ¹⁻⁴ | Count | Percentage ⁵ |
|---|-------|-------------------------|
| Fentanyl and Morphine ⁶ | 510 | 35.1% |
| Amphetamine and Methamphetamine | 347 | 23.8% |
| Heroin and Morphine ⁶ | 342 | 23.5% |
| Codeine and Morphine ⁶ | 264 | 18.1% |
| Fentanyl and Heroin | 259 | 17.8% |
| Fentanyl and Methamphetamine | 256 | 17.6% |
| Methamphetamine and Morphine ⁶ | 235 | 16.2% |
| Amphetamine and Fentanyl | 219 | 15.1% |
| Fentanyl and Gabapentin | 217 | 14.9% |
| Codeine and Heroin | 213 | 14.6% |

¹Drug testing of blood, urine, and/or vitreous fluids.

²Drug combinations are not mutually exclusive; decedents may have had more than one drug combination detected.

³Parent drugs with unique metabolites are classified and represented by the parent drug only. All instances of the parent drug and unique metabolite(s) are counted once per decedent and labeled as the parent drug. This is true for all drugs with unique metabolites except for THC due to the lengthy metabolism of THC-COOH. A list of unique metabolites for each parent drug is found in Definitions.

⁴Drug combinations may represent a parent drug and a nonspecific metabolite or adulterant.

⁵Percentage is based on total number of DOFSS drug overdose fatalities with toxicology results available, n=1,455.

⁶Morphine may represent pure morphine and/or a metabolite of heroin.

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Table 10. Most Common Three-Drug Combinations Detected Among Drug Overdose Decedents in Kentucky, 2017

| Three-Drug Combination ¹⁻⁴ | Count | Percentage ⁵ |
|---|-------|-------------------------|
| Fentanyl, Heroin, and Morphine ⁶ | 257 | 17.7% |
| Codeine, Heroin, and Morphine ⁶ | 213 | 14.6% |
| Amphetamine, Fentanyl, and Methamphetamine | 205 | 14.1% |
| Amphetamine, Methamphetamine, and Morphine ⁶ | 199 | 13.7% |
| Codeine, Fentanyl, and Morphine ⁶ | 191 | 13.1% |
| Fentanyl, Methamphetamine, and Morphine ⁶ | 185 | 12.7% |
| Amphetamine, Fentanyl, and Morphine ⁶ | 164 | 11.3% |
| Codeine, Fentanyl, and Heroin | 158 | 10.9% |
| Fentanyl, Gabapentin, and Morphine ⁶ | 141 | 9.7% |
| Heroin, Methamphetamine, and Morphine ⁶ | 129 | 8.9% |

¹Drug testing of blood, urine, and/or vitreous fluids.

²Drug combinations are not mutually exclusive; decedents may have had more than one drug combination detected.

³Parent drugs with unique metabolites are classified and represented by the parent drug only. All instances of the parent drug and unique metabolite(s) are counted once per decedent and labeled as the parent drug. This is true for all drugs with unique metabolites except for THC due to the lengthy metabolism of THC-COOH. A list of unique metabolites for each parent drug is found in Definitions.

⁴Drug combinations may represent a parent drug and a nonspecific metabolite or adulterant.

⁵Percentage is based on total number of DOFSS drug overdose fatalities with toxicology results available, n=1,455.

⁶Morphine may represent pure morphine and/or a metabolite of heroin.

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Table 11. Most Common Four-Drug Combinations Detected Among Drug Overdose Decedents in Kentucky, 2017

| Four-Drug Combination ¹⁻⁴ | Count | Percentage ⁵ |
|---|-------|-------------------------|
| Codeine, Fentanyl, Heroin, and Morphine ⁶ | 158 | 10.9% |
| Amphetamine, Fentanyl, Methamphetamine, and Morphine ⁶ | 156 | 10.7% |
| Amphetamine, Heroin, Methamphetamine, and Morphine ⁶ | 109 | 7.5% |
| Fentanyl, Heroin, Methamphetamine, and Morphine ⁶ | 101 | 6.9% |
| Amphetamine, Codeine, Methamphetamine, and Morphine ⁶ | 92 | 6.3% |
| Codeine, Heroin, Methamphetamine, and Morphine ⁶ | 91 | 6.3% |
| Amphetamine, Fentanyl, Heroin, and Morphine ⁶ | 88 | 6.0% |
| Codeine, Fentanyl, Methamphetamine, and Morphine ⁶ | 84 | 5.8% |
| Amphetamine, Fentanyl, Heroin, and Methamphetamine | 84 | 5.8% |
| Codeine, Heroin, Hydromorphone, and Morphine ⁶ | 79 | 5.4% |

¹Drug testing of blood, urine, and/or vitreous fluids.

²Drug combinations are not mutually exclusive; decedents may have had more than one drug combination detected.

³Parent drugs with unique metabolites are classified and represented by the parent drug only. All instances of the parent drug and unique metabolite(s) are counted once per decedent and labeled as the parent drug. This is true for all drugs with unique metabolites except for THC due to the lengthy metabolism of THC-COOH. A list of unique metabolites for each parent drug is found in Definitions.

⁴Drug combinations may represent a parent drug and a nonspecific metabolite or adulterant.

⁵Percentage is based on total number of DOFSS drug overdose fatalities with toxicology results available, n=1,455.

⁶Morphine may represent pure morphine and/or a metabolite of heroin.

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Figure 3. Median Blood Concentration, Interquartile Range, and Therapeutic Range of Top Therapeutic Drugs Identified Among Drug Overdose Decedents in Kentucky, 2017¹⁻³

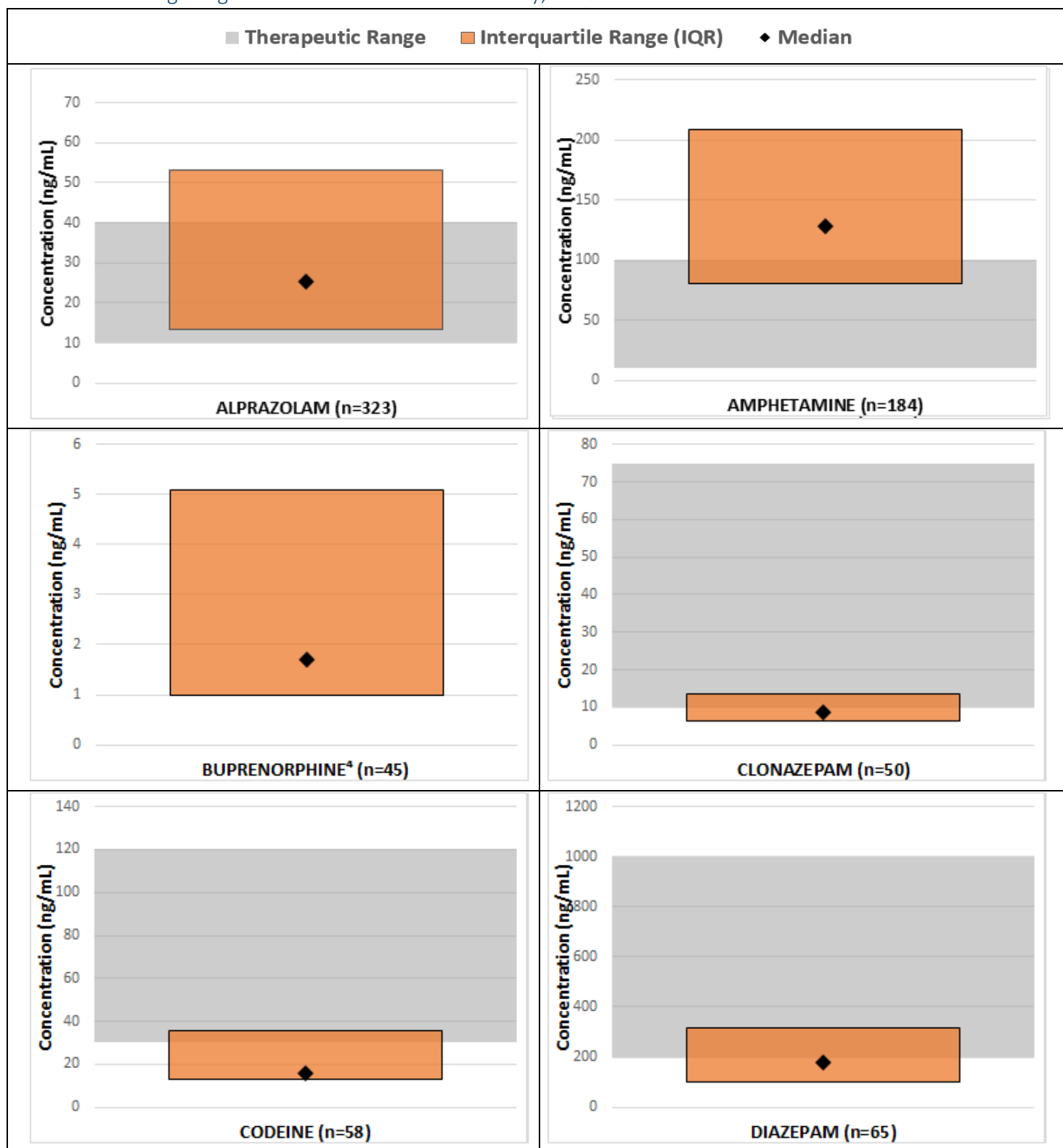


Figure 3. Median Blood Concentration, Interquartile Range, and Therapeutic Range of Top Therapeutic Drugs Identified Among Drug Overdose Decedents in Kentucky, 2017¹⁻³ –continued

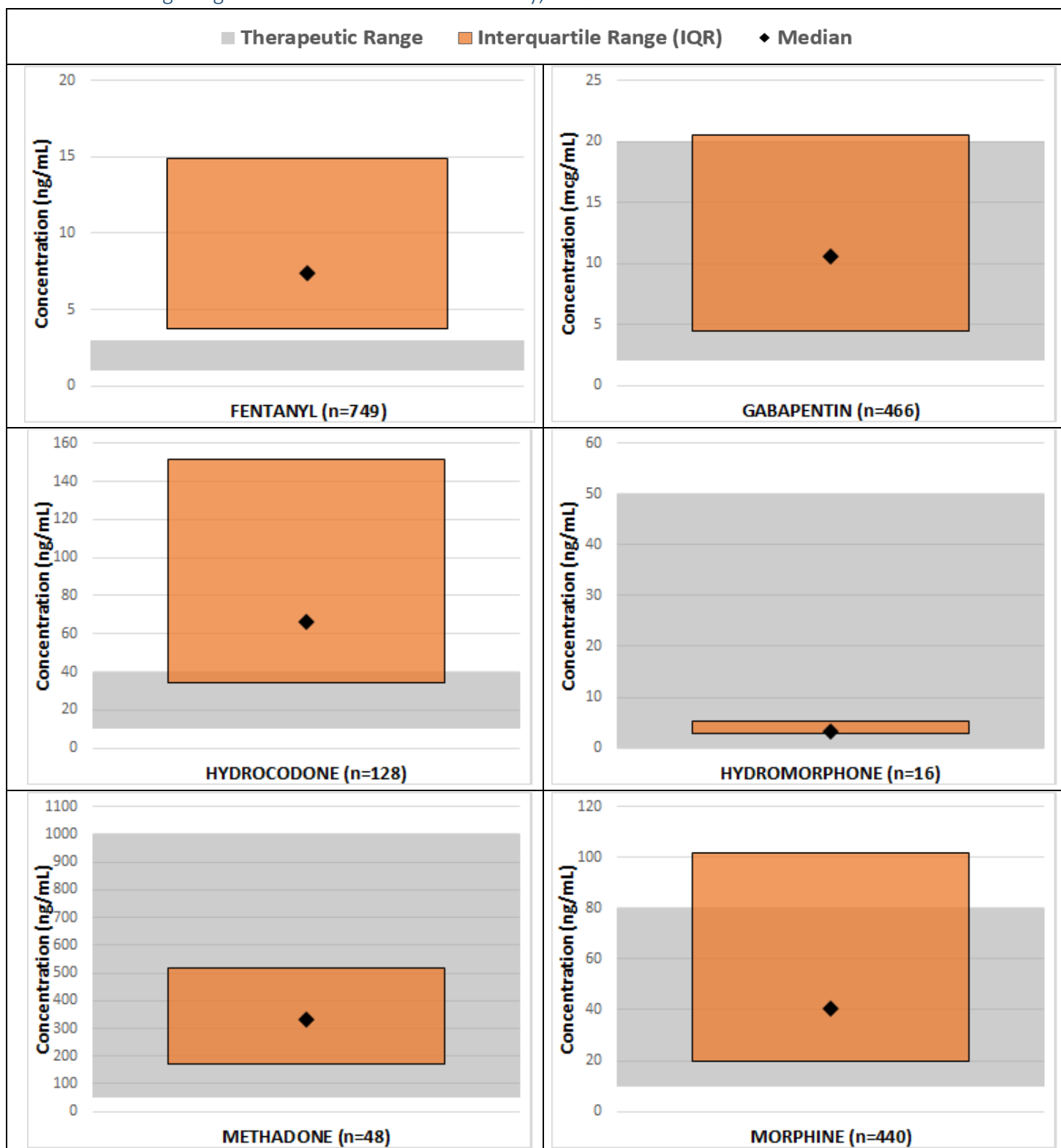
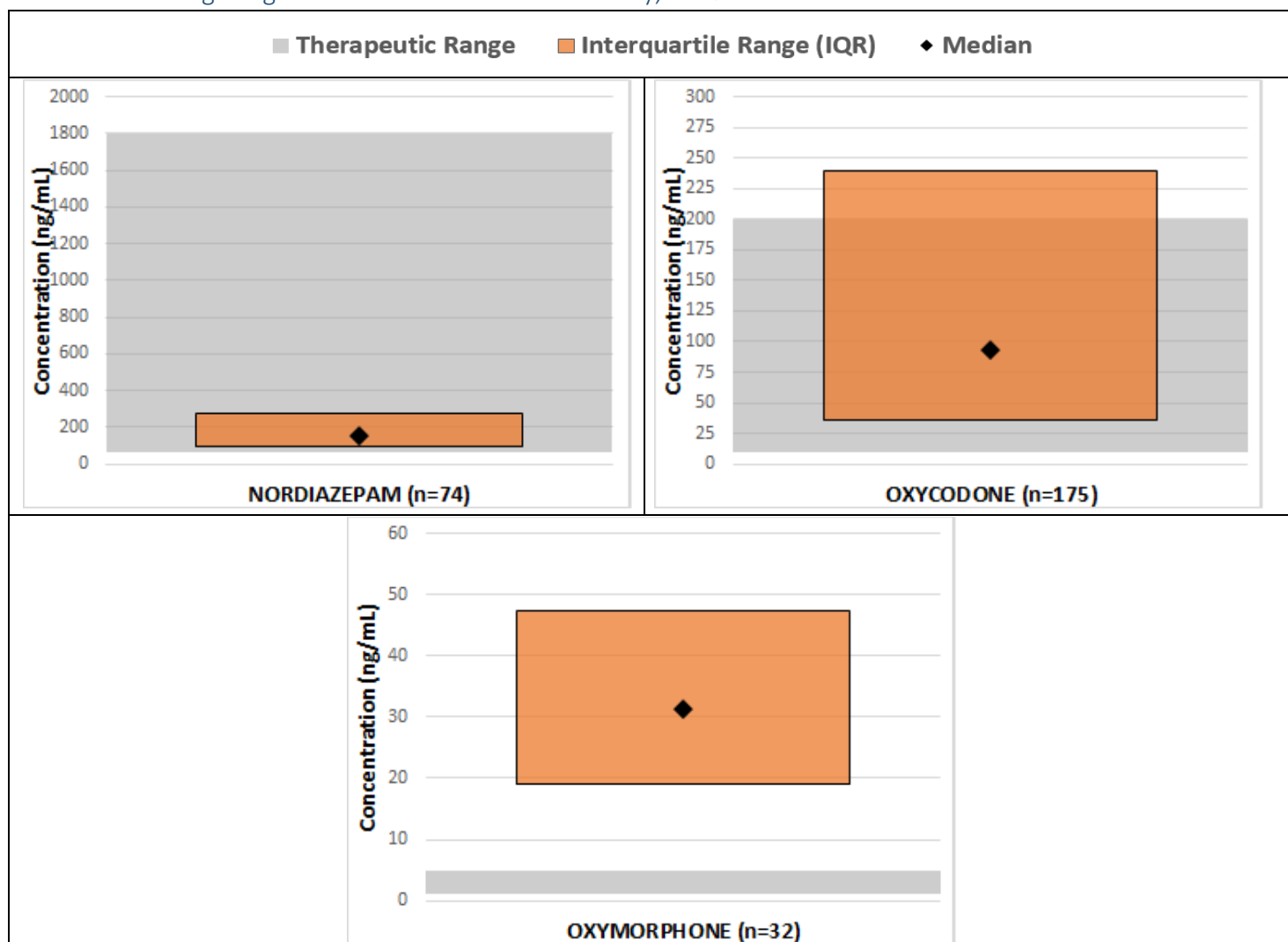


Figure 3. Median Blood Concentration, Interquartile Range, and Therapeutic Range of Top Therapeutic Drugs Identified Among Drug Overdose Decedents in Kentucky, 2017¹⁻³ –continued



¹Drug testing of blood only, due to lack of correlation of urine and vitreous concentrations with therapeutic range.

²Drugs are not mutually exclusive; decedents may have more than one drug detected.

³The Interquartile Range 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.

⁴A therapeutic range for buprenorphine has not been clearly established (<https://www.ata-journal.org/articles/ata/pdf/2004/04/ata20044p275.pdf>).

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Table 12. Drug Classes Identified Among Drug Overdose Decedents in Kentucky by Suicide and Accidental Manners of Death, 2017¹⁻³

| Drug Class ⁴⁻⁵ | Suicide, n=51 (%) | Accidental, n=1,355 (%) | Chi-Square p-value ⁶ | Fisher's Exact p-value ⁷ |
|---------------------------|-------------------|-------------------------|---------------------------------|-------------------------------------|
| Opioids ⁸ | 21 (41.2%) | 1,218 (89.9%) | <.01 | <i>nc</i> |
| Benzodiazepines | 19 (37.3%) | 579 (42.7%) | 0.44 | <i>nc</i> |
| Amphetamines | 12 (23.5%) | 458 (33.8%) | 0.13 | <i>nc</i> |
| Anticonvulsants | 15 (29.4%) | 435 (32.1%) | 0.69 | <i>nc</i> |
| Cannabinoids | <5 (*) | 309 (22.8%) | <.01 | <i>nc</i> |
| Cocaine | <5 (*) | 273 (20.1%) | 0.03 | <i>nc</i> |
| Alcohol | 15 (29.4%) | 223 (16.5%) | 0.02 | <i>nc</i> |
| Stimulants | 19 (37.3%) | 32 (2.4%) | <.01 | <.01 |
| Antidepressants | 22 (43.1%) | 24 (1.8%) | <.01 | <.01 |
| Non-Opioid Analgesics | 12 (23.5%) | 23 (1.7%) | <.01 | <.01 |
| Cardiovascular Agents | 12 (23.5%) | 11 (0.8%) | <.01 | <.01 |
| Antihistamines | 11 (21.6%) | 7 (0.5%) | <.01 | <.01 |
| Antipsychotics | <5 (*) | 6 (0.4%) | <.01 | <.01 |
| Barbiturates | <5 (*) | <5 (*) | <.01 | <.01 |
| Anesthetics | <5 (*) | <5 (*) | <.01 | <.01 |
| Sedatives/Hypnotics | <5 (*) | <5 (*) | <.01 | <.01 |
| Narcotics | <5 (*) | 0 | <.01 | 0.04 |
| Miscellaneous | 0 | <5 (*) | 0.74 | 1.00 |

¹Undetermined, homicide, and natural manners of death were excluded from this analysis.

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

³In accordance with state data release policy, counts less than five are suppressed. Any number associated with the suppressed count is labeled with an *.

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

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

⁶p-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.

⁷p-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. June 2020. 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, 2017¹

| Drug ²⁻⁴ | Female (%) N=564 | Male (%) N=889 | p-value ⁵ |
|-------------------------|---------------------|-------------------|----------------------|
| Fentanyl ⁴ | 270 (47.9%) | 549 (61.8%) | <.01 |
| Morphine ⁶ | 215 (38.1%) | 457 (51.4%) | <.01 |
| Gabapentin | 229 (40.6%) | 237 (26.7%) | <.01 |
| Methamphetamine | 149 (26.4%) | 291 (32.7%) | 0.01 |
| Amphetamine | 113 (20.0%) | 256 (28.8%) | <.01 |
| Alprazolam ⁴ | 146 (25.9%) | 192 (21.6%) | 0.06 |
| Heroin ⁴ | 92 (16.3%) | 252 (28.3%) | <.01 |
| THC-COOH ⁴ | 102 (18.1%) | 202 (22.7%) | 0.03 |
| Cocaine ⁴ | 103 (18.3%) | 180 (20.2%) | 0.35 |
| Codeine | 86 (15.2%) | 185 (20.8%) | <.01 |
| Ethanol | 76 (13.5%) | 162 (18.2%) | 0.02 |
| Clonazepam ⁴ | 108 (19.1%) | 125 (14.1%) | 0.01 |
| Oxycodone | 87 (15.4%) | 129 (14.5%) | 0.63 |

¹Counts are based on total number of DOFSS drug overdose fatalities with at least one drug present in toxicology results for each gender.

²Drug testing of blood, urine, and/or vitreous fluids.

³Drugs are not mutually exclusive; decedents may have more than one drug detected.

⁴Parent drugs with unique metabolites are classified and represented by the parent drug only. All instances of the parent drug and unique metabolite(s) are counted once per decedent and labeled as the parent drug. This is true for all drugs with unique metabolites except for THC due to the lengthy metabolism of THC-COOH. A list of unique metabolites for each parent drug is found in Definitions.

⁵p-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.

⁶Morphine may represent pure morphine and/or a metabolite of heroin.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. June 2020. 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, 2017¹

| Drug ²⁻⁴ | 0–24 years (%) N=87 | 25–34 years (%) N=382 | 35–44 years (%) N=422 | 45–54 years (%) N=359 | 55+ years (%) N=203 |
|-------------------------|------------------------|--------------------------|--------------------------|--------------------------|------------------------|
| Fentanyl ⁴ | 59 (67.8%) | 260 (68.1%) | 261 (61.8%) | 162 (45.1%) | 77 (37.9%) |
| Morphine ⁵ | 51 (58.6%) | 214 (56.0%) | 210 (49.8%) | 127 (35.4%) | 70 (34.5%) |
| Gabapentin | 8 (9.2%) | 87 (22.8%) | 124 (29.4%) | 143 (39.8%) | 104 (51.2%) |
| Methamphetamine | 21 (24.1%) | 142 (37.2%) | 139 (32.9%) | 100 (27.9%) | 38 (18.7%) |
| Amphetamine | 20 (23.0%) | 121 (31.7%) | 117 (27.7%) | 83 (23.1%) | 28 (13.8%) |
| Alprazolam ⁴ | 14 (16.1%) | 91 (23.8%) | 87 (20.6%) | 94 (26.2%) | 52 (25.6%) |
| Heroin ⁴ | 27 (31.0%) | 119 (31.2%) | 105 (24.9%) | 60 (16.7%) | 33 (16.3%) |
| THC-COOH ⁴ | 22 (25.3%) | 97 (25.4%) | 100 (23.7%) | 64 (17.8%) | 21 (10.3%) |
| Cocaine ⁴ | 13 (14.9%) | 80 (20.9%) | 89 (21.1%) | 62 (17.3%) | 39 (19.2%) |
| Codeine | 23 (26.4%) | 95 (24.9%) | 81 (19.2%) | 43 (12.0%) | 29 (14.3%) |
| Ethanol | 9 (10.3%) | 45 (11.8%) | 80 (19.0%) | 67 (18.7%) | 37 (18.2%) |
| Clonazepam ⁴ | 9 (10.3%) | 55 (14.4%) | 67 (15.9%) | 65 (18.1%) | 37 (18.2%) |
| Oxycodone | 7 (8.0%) | 31 (8.1%) | 52 (12.3%) | 81 (22.6%) | 45 (22.2%) |

¹Counts are based on total number of DOFSS drug overdose fatalities with at least one drug present in toxicology results for that age group.

²Drug testing of blood, urine, and/or vitreous fluids.

³Drugs are not mutually exclusive; decedents may have more than one drug detected.

⁴Parent drugs with unique metabolites are classified and represented by the parent drug only. All instances of the parent drug and unique metabolite(s) are counted once per decedent and labeled as the parent drug. This is true for all drugs with unique metabolites except for THC due to the lengthy metabolism of THC-COOH. A list of unique metabolites for each parent drug is found in Definitions.

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

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Table 15. Most Frequent Drugs Identified Among Drug Overdose Decedents in Kentucky by Race, 2017¹⁻²

| Drug ³⁻⁵ | Black (%) N=95 | White (%) N=1344 | p-value ⁶ |
|-------------------------|-------------------|---------------------|----------------------|
| Fentanyl ⁵ | 60 (63.2%) | 749 (55.7%) | 0.16 |
| Morphine ⁷ | 40 (42.1%) | 626 (46.6%) | 0.40 |
| Gabapentin | 18 (18.9%) | 446 (33.2%) | <.01 |
| Methamphetamine | 21 (22.1%) | 415 (30.9%) | 0.07 |
| Amphetamine | 16 (16.8%) | 349 (26.0%) | 0.05 |
| Alprazolam ⁵ | 17 (17.9%) | 318 (23.7%) | 0.20 |
| Heroin ⁵ | 19 (20.0%) | 320 (23.8%) | 0.40 |
| THC-COOH ⁵ | 31 (32.6%) | 270 (20.1%) | <.01 |
| Cocaine ⁵ | 50 (52.6%) | 229 (17.0%) | <.01 |
| Codeine | 18 (18.9%) | 249 (18.5%) | 0.92 |
| Ethanol | 20 (21.1%) | 212 (15.8%) | 0.18 |
| Clonazepam ⁵ | 7 (7.4%) | 225 (16.7%) | 0.02 |
| Oxycodone | 6 (6.3%) | 209 (15.6%) | 0.01 |

¹Asian/Pacific Islander, Indian, Other, and Unknown Race were excluded from these analyses due to low counts.

²Counts are based on total number of DOFSS drug overdose fatalities with at least one drug present in toxicology results for that race.

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

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

⁵Parent drugs with unique metabolites are classified and represented by the parent drug only. All instances of the parent drug and unique metabolite(s) are counted once per decedent and labeled as the parent drug. This is true for all drugs with unique metabolites except for THC due to the lengthy metabolism of THC-COOH. A list of unique metabolites for each parent drug is found in Definitions.

⁶p-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.

⁷Morphine may represent pure morphine and/or a metabolite of heroin.

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DRUG OVERDOSE FATALITY SOCIOECONOMIC FACTORS

Table 16. Most Frequent Drugs Identified Among Drug Overdose Decedents in Kentucky by Education Level, 2017¹⁻²

| Drug ³⁻⁵ | Less than High School (%) N=337 | High School /GED Equivalent (%) N=732 | Some College/Associates Degree (%) N=282 | Bachelor's Degree or Higher (%) N=79 | Unknown Education (%) N=23 |
|-------------------------|------------------------------------|--|---|---|-------------------------------|
| Fentanyl ⁵ | 182 (54.0%) | 422 (57.7%) | 170 (60.3%) | 32 (40.5%) | 13 (56.5%) |
| Morphine ⁶ | 162 (48.1%) | 346 (47.3%) | 129 (45.7%) | 25 (31.6%) | 10 (43.5%) |
| Gabapentin | 144 (42.7%) | 213 (29.1%) | 70 (24.8%) | 26 (32.9%) | 13 (56.5%) |
| Methamphetamine | 116 (34.4%) | 238 (32.5%) | 65 (23.0%) | 14 (17.7%) | 7 (30.4%) |
| Amphetamine | 90 (26.7%) | 205 (28.0%) | 56 (19.9%) | 13 (16.5%) | 5 (21.7%) |
| Alprazolam ⁵ | 85 (25.2%) | 162 (22.1%) | 70 (24.8%) | 15 (19.0%) | 6 (26.1%) |
| Heroin ⁵ | 79 (23.4%) | 180 (24.6%) | 66 (23.4%) | 14 (17.7%) | 5 (21.7%) |
| THC-COOH ⁵ | 84 (24.9%) | 158 (21.6%) | 49 (17.4%) | 8 (10.1%) | 5 (21.7%) |
| Cocaine ⁵ | 61 (18.1%) | 135 (18.4%) | 63 (22.3%) | 19 (24.1%) | 5 (21.7%) |
| Codeine | 65 (19.3%) | 140 (19.1%) | 52 (18.4%) | 10 (12.7%) | <5 (*) |
| Ethanol | 50 (14.8%) | 114 (15.6%) | 50 (17.7%) | 19 (24.1%) | 5 (21.7%) |
| Clonazepam ⁵ | 55 (16.3%) | 123 (16.8%) | 42 (14.9%) | 10 (12.7%) | <5 (*) |
| Oxycodone | 58 (17.2%) | 101 (13.8%) | 43 (15.2%) | 12 (15.2%) | <5 (*) |

¹Counts are based on total number of DOFSS drug overdose fatalities with at least one drug present in toxicology results for that education group.

²In accordance with state data release policy, counts less than five are suppressed. Any number associated with the suppressed count is labeled with an *.

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

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

⁵Parent drugs with unique metabolites are classified and represented by the parent drug only. All instances of the parent drug and unique metabolite(s) are counted once per decedent and labeled as the parent drug. This is true for all drugs with unique metabolites except for THC due to the lengthy metabolism of THC-COOH. A list of unique metabolites for each parent drug is found in Definitions.

⁶Morphine may represent pure morphine and/or a metabolite of heroin.

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Table 17. Most Frequent Drugs Identified Among Drug Overdose Decedents in Kentucky by Marital Status, 2017¹⁻²

| Drug ³⁻⁵ | Single (%) N=617 | Married (%) N=317 | Divorced (%) N=411 | Widowed (%) N=66 | Unknown (%) N=42 |
|-------------------------|---------------------|----------------------|-----------------------|---------------------|---------------------|
| Fentanyl ⁵ | 409 (66.3%) | 136 (42.9%) | 221 (53.8%) | 28 (42.4%) | 25 (59.5%) |
| Morphine ⁶ | 326 (52.8%) | 122 (38.5%) | 179 (43.6%) | 23 (34.8%) | 22 (52.4%) |
| Gabapentin | 134 (21.7%) | 122 (38.5%) | 159 (38.7%) | 32 (48.5%) | 19 (45.2%) |
| Methamphetamine | 193 (31.3%) | 92 (29.0%) | 122 (29.7%) | 13 (19.7%) | 20 (47.6%) |
| Amphetamine | 168 (27.2%) | 72 (22.7%) | 104 (25.3%) | 9 (13.6%) | 16 (38.1%) |
| Alprazolam ⁵ | 134 (21.7%) | 77 (24.3%) | 99 (24.1%) | 14 (21.2%) | 14 (33.3%) |
| Heroin ⁵ | 181 (29.3%) | 60 (18.9%) | 81 (19.7%) | 8 (12.1%) | 14 (33.3%) |
| THC-COOH ⁵ | 138 (22.4%) | 65 (20.5%) | 89 (21.7%) | <5 (*) | 9 (21.4%) |
| Cocaine ⁵ | 130 (21.1%) | 43 (13.6%) | 85 (20.7%) | 16 (24.2%) | 9 (21.4%) |
| Codeine | 136 (22.0%) | 45 (14.2%) | 72 (17.5%) | 6 (9.1%) | 12 (28.6%) |
| Ethanol | 96 (15.6%) | 55 (17.4%) | 69 (16.8%) | 13 (19.7%) | 5 (11.9%) |
| Clonazepam ⁵ | 88 (14.3%) | 53 (16.7%) | 67 (16.3%) | 17 (25.8%) | 8 (19.0%) |
| Oxycodone | 68 (11.0%) | 62 (19.6%) | 68 (16.5%) | 16 (24.2%) | <5 (*) |

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

²In accordance with state data release policy, counts less than five are suppressed. Any number associated with the suppressed count is labeled with an *.

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

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

⁵Parent drugs with unique metabolites are classified and represented by the parent drug only. All instances of the parent drug and unique metabolite(s) are counted once per decedent and labeled as the parent drug. This is true for all drugs with unique metabolites except for THC due to the lengthy metabolism of THC-COOH. A list of unique metabolites for each parent drug is found in Definitions.

⁶Morphine may represent pure morphine and/or a metabolite of heroin.

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Table 18. Most Frequent Industries Identified Among Drug Overdose Decedents in Kentucky, 2017

| Industry ¹ | Count | Percentage ² |
|---|-------|-------------------------|
| Construction | 267 | 17.1% |
| Homemaker | 177 | 11.3% |
| Other industry, not classifiable, or unspecified | 162 | 10.4% |
| Restaurants and other food services | 136 | 8.7% |
| Did not work | 124 | 7.9% |
| Healthcare facilities | 89 | 5.7% |
| Not specified manufacturing industries | 87 | 5.6% |
| Landscaping services | 36 | 2.3% |
| Not specified retail trade | 33 | 2.1% |
| Truck transportation | 26 | 1.7% |
| Automotive repair and maintenance | 25 | 1.6% |
| Student | 20 | 1.3% |
| Crop production | 15 | 1.0% |
| Warehousing and storage | 15 | 1.0% |
| Coal mining | 14 | 0.9% |
| Grocery stores | 13 | 0.8% |
| Motor vehicles and motor vehicle equipment manufacturing | 12 | 0.8% |
| Justice, public order, and safety activities | 11 | 0.7% |
| Traveler accommodation | 11 | 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=1,561. | | |
| Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. June 2020. 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, 2016–2017¹⁻²

| County | 2016 Count | 2016 Rate (per 100,000 population) | 2017 Count | 2017 Rate (per 100,000 population) | Alert ³ |
|--------------|------------|--|------------|--|--------------------|
| Adair | <5 | * | <5 | * | |
| Allen | 5 | * | <5 | * | |
| Anderson | 9 | * | 11 | 48.79 | |
| Ballard | <5 | * | <5 | * | |
| Barren | 5 | * | 11 | 25.11 | |
| Bath | <5 | * | <5 | * | |
| Bell | 10 | 36.9 | 8 | * | |
| Boone | 42 | 32.7 | 44 | 33.66 | |
| Bourbon | <5 | * | 7 | * | |
| Boyd | 25 | 51.9 | 31 | 64.61 | |
| Boyle | 16 | 53.3 | 8 | * | |
| Bracken | <5 | * | <5 | * | |
| Breathitt | 6 | * | <5 | * | |
| Breckinridge | <5 | * | <5 | * | |
| Bullitt | 19 | 24.0 | 38 | 47.35 | !(↑) |
| Butler | <5 | * | <5 | * | |
| Caldwell | <5 | * | <5 | * | |
| Calloway | 5 | * | <5 | * | |
| Campbell | 67 | 72.7 | 60 | 64.87 | |
| Carlisle | 0 | 0.0 | 0 | 0 | |
| Carroll | <5 | * | <5 | * | |
| Carter | 9 | * | 14 | 51.58 | |
| Casey | 5 | * | 6 | * | |
| Christian | <5 | * | 7 | * | |
| Clark | 9 | * | 17 | 47.16 | |
| Clay | 5 | * | <5 | * | |
| Clinton | <5 | * | <5 | * | |
| Crittenden | <5 | * | <5 | * | |
| Cumberland | <5 | * | <5 | * | |
| Daviess | 13 | 13.0 | 11 | 10.96 | |
| Edmonson | <5 | * | <5 | * | |
| Elliott | <5 | * | <5 | * | |
| Estill | 9 | * | 10 | 70.04 | |
| Fayette | 115 | 36.1 | 125 | 38.82 | !(↑) |

Table 19. Kentucky Resident Drug Overdose Fatality Counts and Rates by County, 2016–2017¹⁻² –continued

| County | 2016 Count | 2016 Rate (per 100,000 population) | 2017 Count | 2017 Rate (per 100,000 population) | Alert ³ |
|------------|------------|--|------------|--|--------------------|
| Fleming | <5 | * | <5 | * | |
| Floyd | 16 | 43.1 | 12 | 33.08 | |
| Franklin | 15 | 29.7 | 25 | 49.52 | !(↑) |
| Fulton | 0 | 0.0 | <5 | * | |
| Gallatin | 6 | * | 8 | * | |
| Garrard | 8 | * | 5 | * | |
| Grant | 15 | 60.2 | 8 | * | |
| Graves | 5 | * | <5 | * | |
| Grayson | 12 | 45.8 | 11 | 41.73 | |
| Green | <5 | * | <5 | * | |
| Greenup | 7 | * | 13 | 36.6 | |
| Hancock | <5 | * | <5 | * | |
| Hardin | 26 | 24.2 | 17 | 15.73 | |
| Harlan | 8 | * | 9 | * | |
| Harrison | 23 | 123.4 | 10 | 53.25 | !(↓) |
| Hart | <5 | * | <5 | * | |
| Henderson | 5 | * | 8 | * | |
| Henry | <5 | * | <5 | * | |
| Hickman | <5 | * | 0 | 0 | |
| Hopkins | 9 | * | 13 | 28.54 | |
| Jackson | <5 | * | <5 | * | |
| Jefferson | 321 | 41.9 | 350 | 45.39 | !(↑) |
| Jessamine | 16 | 30.6 | 30 | 56.21 | !(↑) |
| Johnson | <5 | * | <5 | * | |
| Kenton | 82 | 49.7 | 115 | 69.53 | !(↑) |
| Knott | <5 | * | <5 | * | |
| Knox | 10 | 31.6 | 13 | 41.63 | |
| Larue | 0 | 0.0 | <5 | * | |
| Laurel | 9 | * | 12 | 19.94 | |
| Lawrence | 5 | * | <5 | * | |
| Lee | <5 | * | <5 | * | |
| Leslie | 6 | * | <5 | * | |
| Letcher | <5 | * | 7 | * | |
| Lewis | 0 | 0.0 | <5 | * | |
| Lincoln | 9 | * | 7 | * | |
| Livingston | <5 | * | <5 | * | |

Table 19. Kentucky Resident Drug Overdose Fatality Counts and Rates by County, 2016–2017¹⁻² –continued

| County | 2016 Count | 2016 Rate (per 100,000 population) | 2017 Count | 2017 Rate (per 100,000 population) | Alert ³ |
|------------|------------|--|------------|--|--------------------|
| Logan | 5 | * | 0 | 0 | |
| Lyon | 0 | 0.0 | <5 | * | |
| Madison | 25 | 27.9 | 44 | 48.23 | !(↑) |
| Magoffin | <5 | * | <5 | * | |
| Marion | <5 | * | 5 | * | |
| Marshall | 10 | 31.9 | <5 | * | |
| Martin | <5 | * | <5 | * | |
| Mason | 11 | 64.0 | 10 | 58.23 | |
| McCracken | 12 | 18.4 | 8 | * | |
| McCreary | <5 | * | <5 | * | |
| McLean | <5 | * | 0 | 0 | |
| Meade | 10 | 35.6 | 9 | * | |
| Menifee | <5 | * | <5 | * | |
| Mercer | 10 | 46.6 | <5 | * | |
| Metcalfe | <5 | * | <5 | * | |
| Monroe | <5 | * | <5 | * | |
| Montgomery | 10 | 36.0 | 15 | 53.71 | |
| Morgan | <5 | * | <5 | * | |
| Muhlenberg | <5 | * | 6 | * | |
| Nelson | 11 | 24.1 | 19 | 41.63 | |
| Nicholas | <5 | * | 0 | 0 | |
| Ohio | <5 | * | <5 | * | |
| Oldham | 11 | 16.8 | 7 | * | |
| Owen | 7 | * | <5 | * | |
| Owsley | <5 | * | <5 | * | |
| Pendleton | 7 | * | 8 | * | |
| Perry | 9 | * | 7 | * | |
| Pike | 16 | 26.4 | 11 | 18.68 | |
| Powell | 6 | * | <5 | * | |
| Pulaski | 13 | 20.3 | 13 | 20.17 | |
| Robertson | <5 | * | <5 | * | |
| Rockcastle | 6 | * | 6 | * | |
| Rowan | 7 | * | 6 | * | |
| Russell | 6 | * | <5 | * | |
| Scott | 20 | 37.1 | 13 | 23.69 | |
| Shelby | 15 | 32.3 | 11 | 23.2 | |

Table 19. Kentucky Resident Drug Overdose Fatality Counts and Rates by County, 2016–2017¹⁻² –continued

| County | 2016 Count | 2016 Rate (per 100,000 population) | 2017 Count | 2017 Rate (per 100,000 population) | Alert ³ |
|------------|------------|--|------------|--|--------------------|
| Simpson | <5 | * | <5 | * | |
| Spencer | 5 | * | 6 | * | |
| Taylor | 5 | * | 8 | * | |
| Todd | <5 | * | 0 | 0 | |
| Trigg | <5 | * | <5 | * | |
| Trimble | <5 | * | <5 | * | |
| Union | <5 | * | <5 | * | |
| Warren | 16 | 12.8 | 13 | 10.09 | |
| Washington | <5 | * | <5 | * | |
| Wayne | <5 | * | 5 | * | |
| Webster | <5 | * | <5 | * | |
| Whitley | 7 | * | 11 | 30.37 | |
| Wolfe | 0 | 0.0 | 0 | 0 | |
| Woodford | <5 | * | 5 | * | |

¹In accordance with state data release policy, counts less than five and rates based on counts less than 10 are suppressed. Any number associated with the suppressed count or rate is labeled with an *.

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

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

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Figure 4. Kentucky Resident Drug Overdose Fatality Rates per 100,000 Population by County, 2016¹⁻²

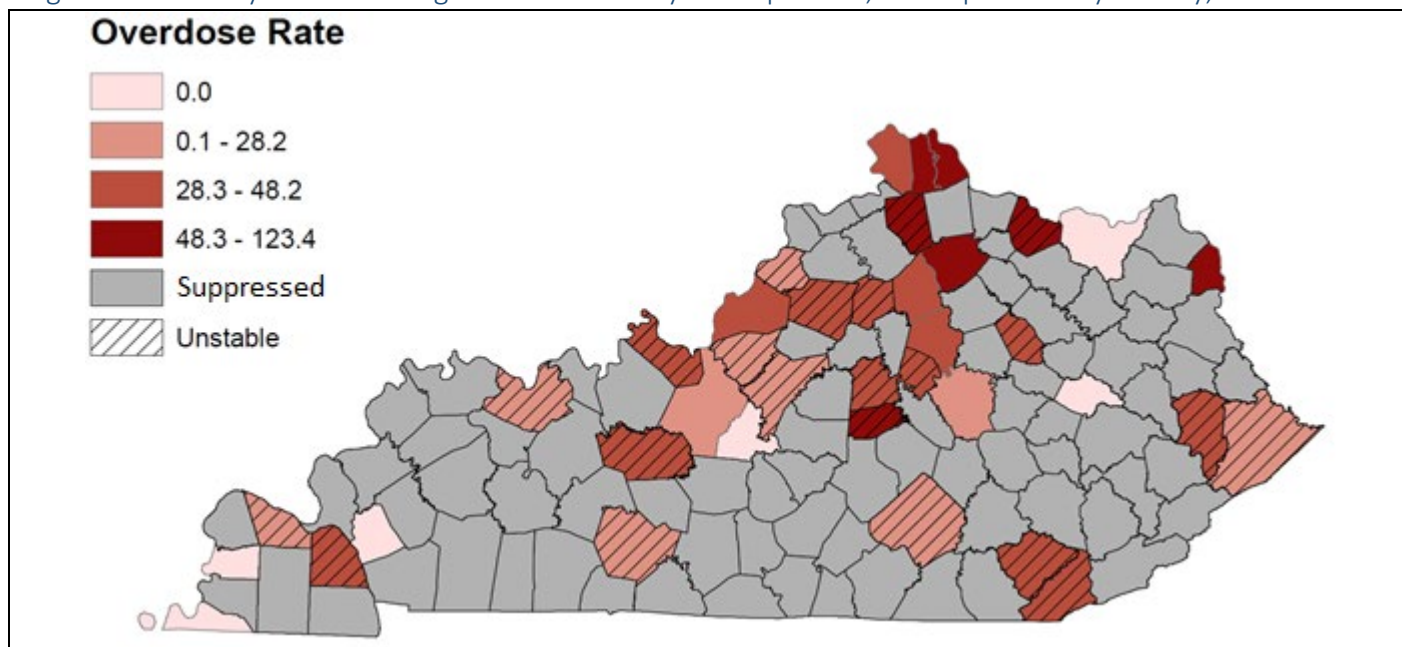
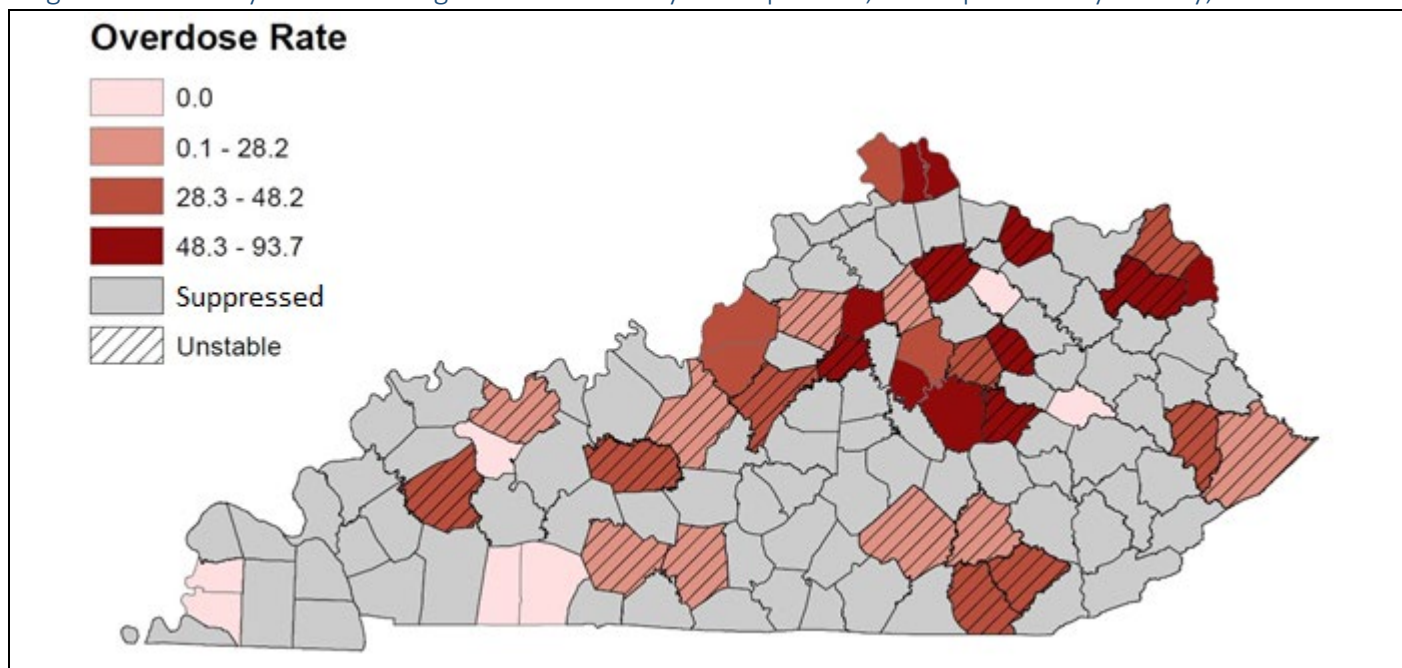


Figure 5. Kentucky Resident Drug Overdose Fatality Rates per 100,000 Population by County, 2017¹⁻²



¹In accordance with state data release policy, rates based on counts less than 10 are suppressed.

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

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Table 20. Kentucky Resident Drug Overdose Fatality Counts and Rates by Kentucky Area Development District (ADD), 2016–2017¹

| ADD District | 2016 Count | 2016 Rate (per 100,000 population) | 2017 Count | 2017 Rate (per 100,000 population) | Alert ² |
|-------------------|------------|--|------------|--|--------------------|
| Barren River | 45 | 15.0 | 39 | 12.9 | |
| Big Sandy | 41 | 28.2 | 33 | 23.3 | |
| Bluegrass | 298 | 36.6 | 322 | 39.1 | |
| Buffalo Trace | 18 | 32.3 | 21 | 37.9 | |
| Cumberland Valley | 56 | 24.0 | 64 | 27.6 | |
| FIVCO | 49 | 36.4 | 62 | 46.3 | |
| Gateway | 25 | 29.7 | 29 | 34.3 | |
| Green River | 35 | 16.1 | 29 | 13.4 | |
| KIPDA | 375 | 37.5 | 417 | 41.4 | ! (↑) |
| Kentucky River | 30 | 27.9 | 25 | 23.6 | |
| Lake Cumberland | 40 | 19.2 | 49 | 23.4 | |
| Lincoln Trail | 66 | 24.2 | 67 | 24.4 | |
| Northern Kentucky | 229 | 50.3 | 251 | 54.8 | |
| Pennyrile | 24 | 11.2 | 36 | 16.9 | |
| Purchase | 36 | 18.4 | 20 | 10.2 | |

¹Rates based on counts less than 20 are unstable and should be interpreted with caution.

²Alerts indicate an increase or decrease in count from year to year greater than or equal to 30.

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Table 21. Kentucky Resident Drug Overdose Fatality Counts Involving Scheduled Controlled Substances and Unscheduled Drugs by Kentucky Area Development District (ADD), 2017¹⁻⁴

| ADD District | Schedule I | Schedule II | Schedule III | Schedule IV | Unscheduled |
|-------------------|------------|-------------|--------------|-------------|-------------|
| Barren River | 13 | 28 | <5 | 17 | 22 |
| Big Sandy | 11 | 28 | 10 | 26 | 27 |
| Bluegrass | 130 | 299 | 20 | 142 | 144 |
| Buffalo Trace | 7 | 19 | 0 | 7 | 7 |
| Cumberland Valley | 11 | 51 | 10 | 36 | 37 |
| FIVCO | 24 | 51 | 9 | 29 | 31 |
| Gateway | 8 | 25 | <5 | 12 | 15 |
| Green River | 7 | 24 | <5 | 14 | 17 |
| KIPDA | 183 | 371 | 15 | 159 | 171 |
| Kentucky River | 10 | 19 | 6 | 14 | 15 |
| Lake Cumberland | 10 | 47 | 11 | 23 | 28 |
| Lincoln Trail | 25 | 58 | <5 | 29 | 26 |
| Northern Kentucky | 95 | 224 | 13 | 81 | 99 |
| Pennyrile | <5 | 19 | <5 | 15 | 14 |
| Purchase | <5 | 18 | <5 | 14 | 11 |

¹Schedule V controlled substances were not included due to low counts.

²In accordance with state data release policy, counts less than five are suppressed.

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

⁴Drug schedules are not mutually exclusive; decedents may have more than one drug schedule detected.

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Table 22. Kentucky Resident Drug Overdose Fatality Counts Involving Specific Drugs by Kentucky Area Development District (ADD), 2017¹⁻³

| ADD District | Heroin ⁴ | Fentanyl ⁴ | Heroin ⁴ with Fentanyl ⁴ | Methamphetamine |
|-------------------|---------------------|-----------------------|--|-----------------|
| Barren River | <5 | <5 | <5 | 10 |
| Big Sandy | 0 | <5 | 0 | 5 |
| Bluegrass | 70 | 204 | 54 | 79 |
| Buffalo Trace | 6 | 16 | 6 | <5 |
| Cumberland Valley | <5 | 12 | <5 | 28 |
| FIVCO | 13 | 28 | 12 | 17 |
| Gateway | <5 | 15 | <5 | 8 |
| Green River | <5 | 8 | <5 | 11 |
| KIPDA | 131 | 256 | 92 | 140 |
| Kentucky River | <5 | <5 | <5 | 8 |
| Lake Cumberland | 7 | 12 | <5 | 25 |
| Lincoln Trail | 17 | 41 | 16 | 30 |
| Northern Kentucky | 64 | 161 | 50 | 46 |
| Pennyrile | <5 | <5 | 0 | 6 |
| Purchase | 0 | <5 | 0 | 5 |

¹In accordance with state data release policy, counts less than five are suppressed.

²Drug testing of blood, urine, and/or vitreous fluids.

³Drugs are not mutually exclusive; decedents may have more than one drug detected.

⁴Parent drugs with unique metabolites are classified and represented by the parent drug only. All instances of the parent drug and unique metabolite(s) are counted once per decedent and labeled as the parent drug. This is true for all drugs with unique metabolites except for THC due to the lengthy metabolism of THC-COOH. A list of unique metabolites for each parent drug is found in Definitions.

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Figure 6. Kentucky Resident Drug Overdose Fatality Rates per 100,000 Population by Area Development District, 2016¹⁻²

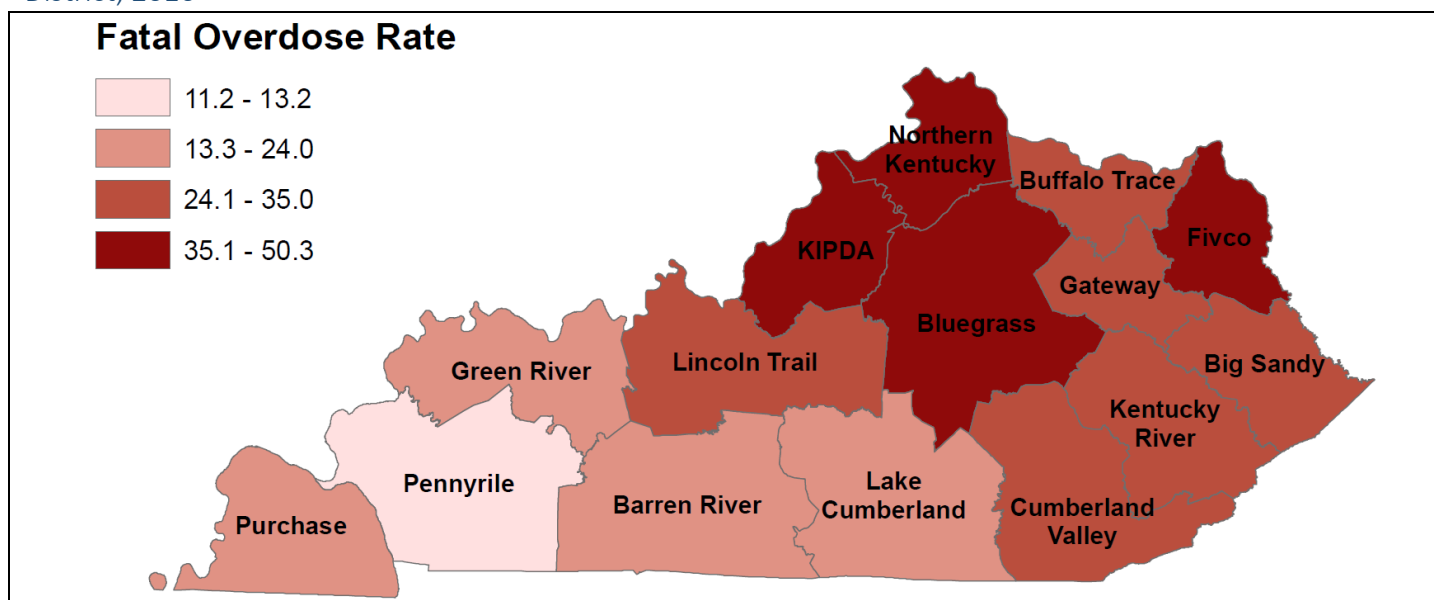
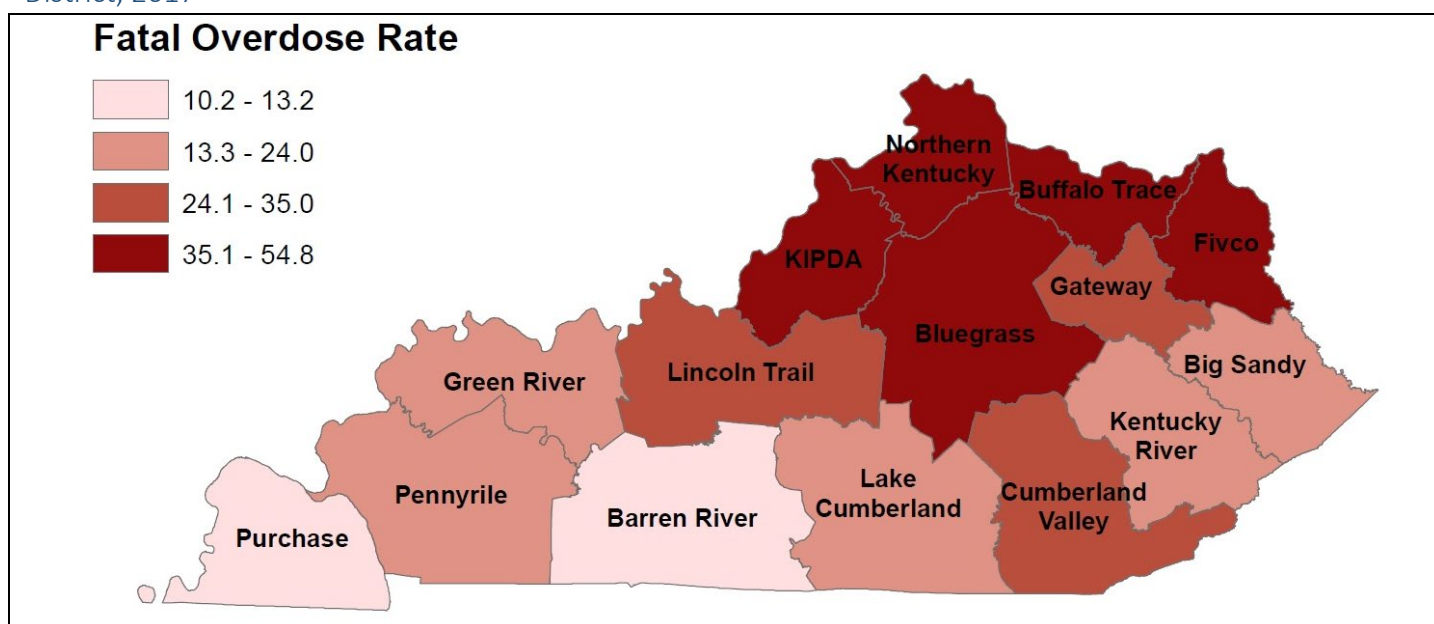


Figure 7. Kentucky Resident Drug Overdose Fatality Rates per 100,000 Population by Area Development District, 2017¹⁻²



¹In accordance with state data release policy, rates based on counts less than 10 are suppressed.

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

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Figure 8. Kentucky Resident Schedule I-Involved Drug Overdose Fatality Rates per 100,000 Population by Area Development District, 2016¹⁻²

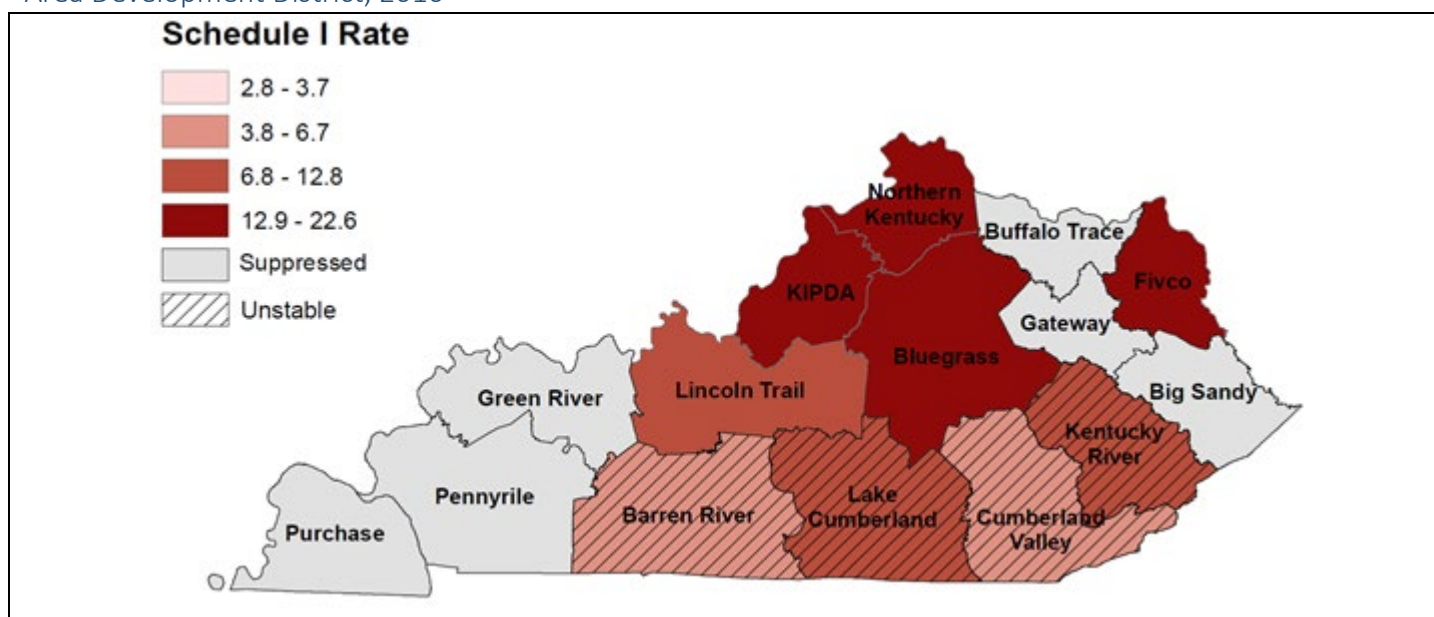
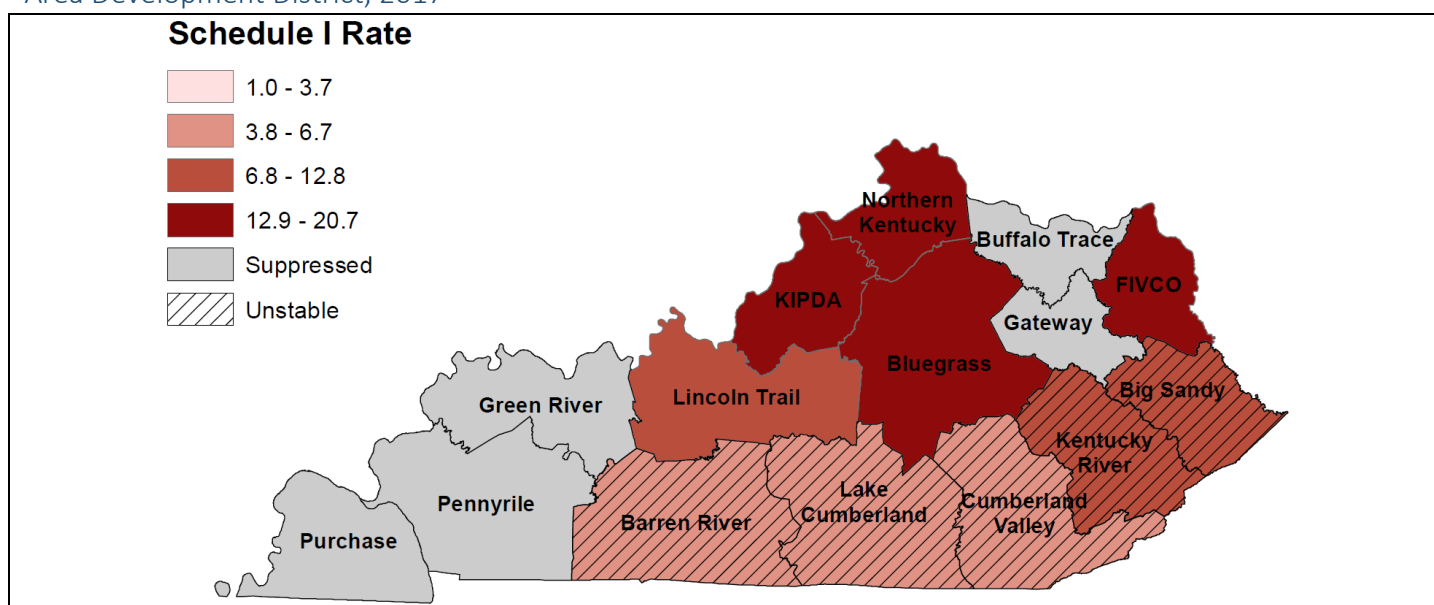


Figure 9. Kentucky Resident Schedule I-Involved Drug Overdose Fatality Rates per 100,000 Population by Area Development District, 2017¹⁻²



¹In accordance with state data release policy, rates based on counts less than 10 are suppressed.

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Figure 10. Kentucky Resident Schedule II-Involved Drug Overdose Fatality Rates per 100,000 Population by Area Development District, 2016¹⁻²

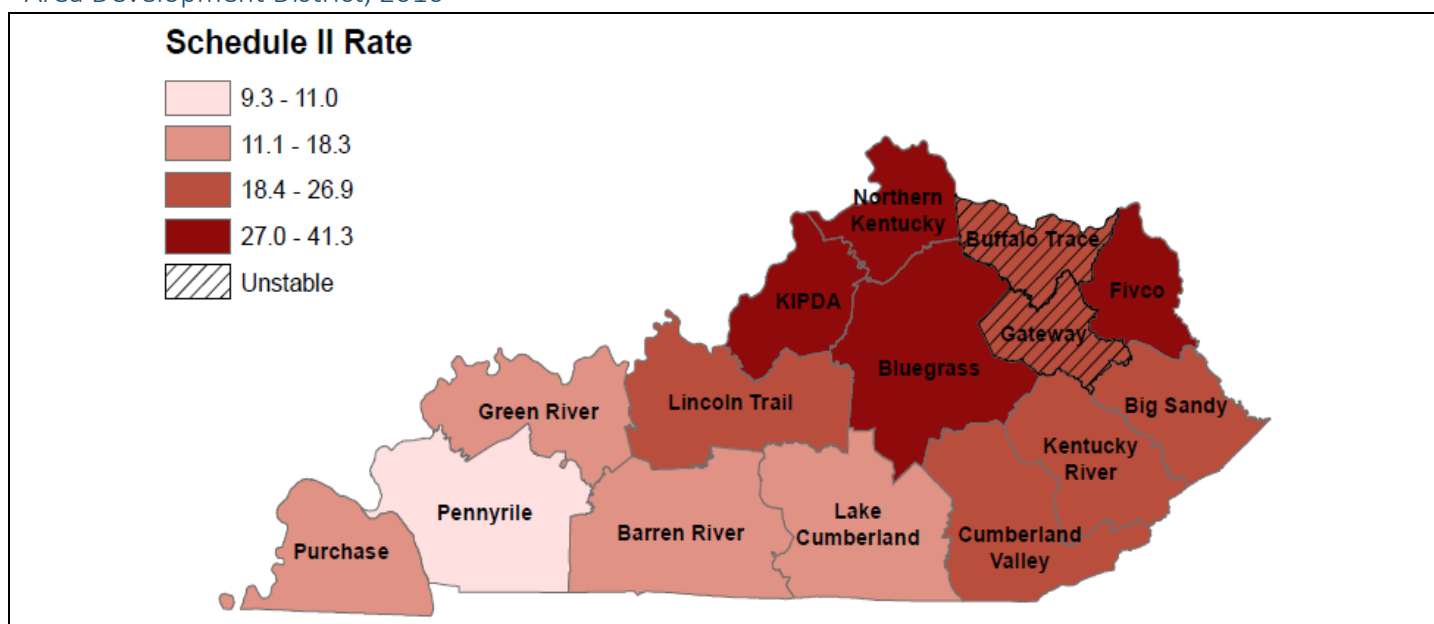
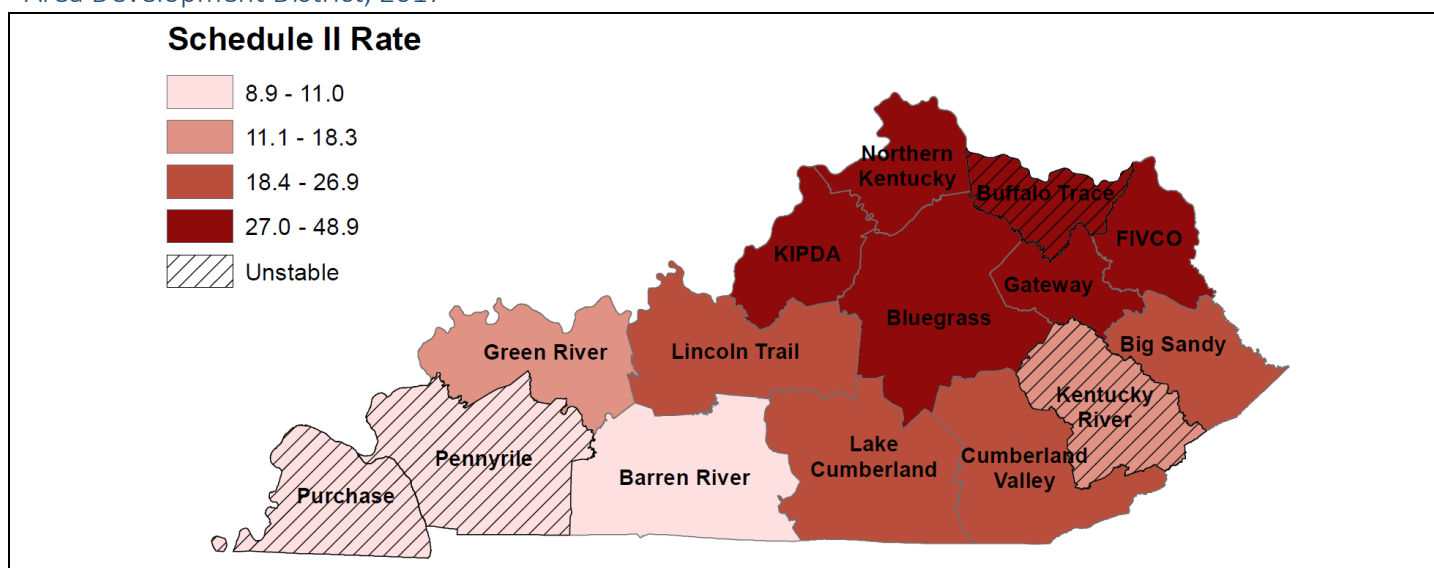


Figure 11. Kentucky Resident Schedule II-Involved Drug Overdose Fatality Rates per 100,000 Population by Area Development District, 2017¹⁻²



¹In accordance with state data release policy, rates based on counts less than 10 are suppressed.

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Figure 12. Kentucky Resident Schedule III-Involved Drug Overdose Fatality Rates per 100,000 Population by Area Development District, 2016¹⁻²

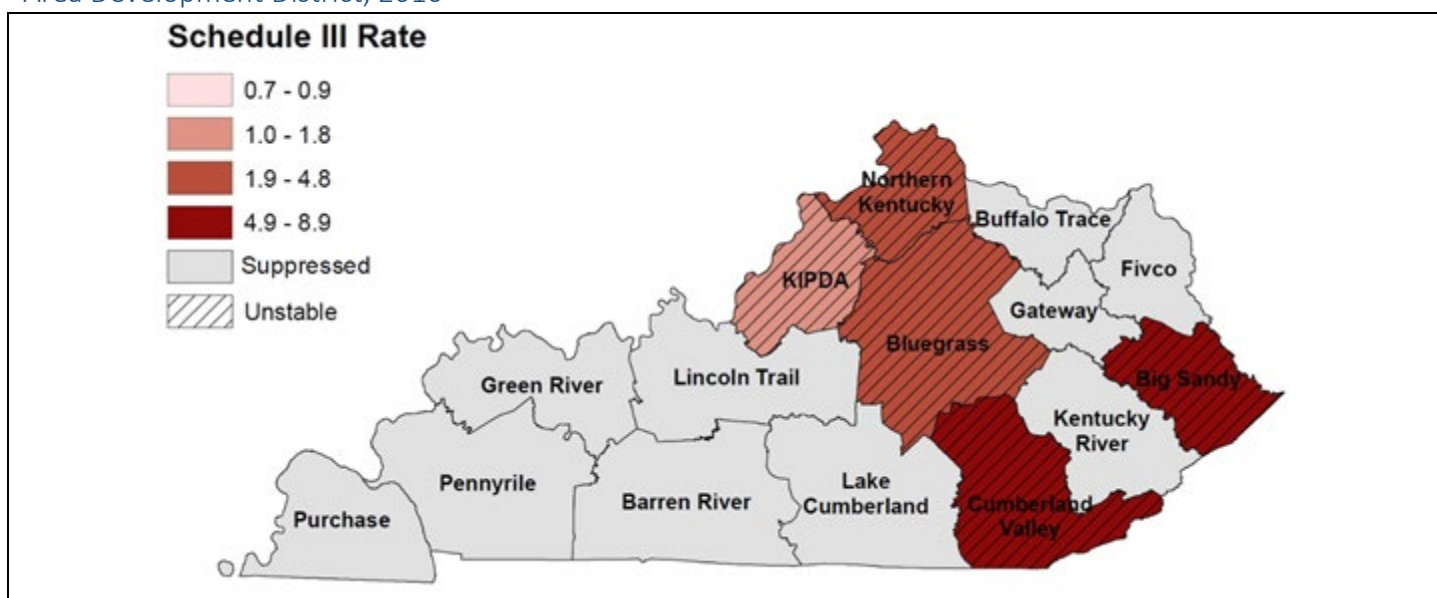
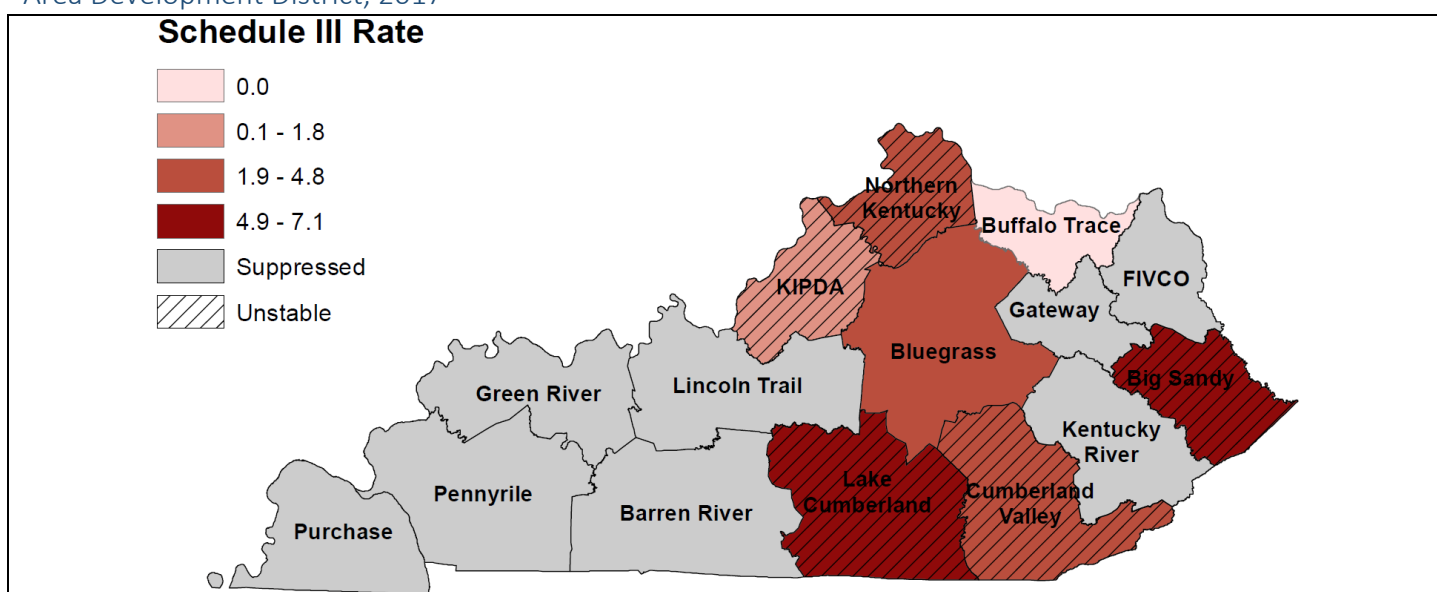


Figure 13. Kentucky Resident Schedule III-Involved Drug Overdose Fatality Rates per 100,000 Population by Area Development District, 2017¹⁻²



¹In accordance with state data release policy, rates based on counts less than 10 are suppressed.

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

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Figure 14. Kentucky Resident Schedule IV-Involved Drug Overdose Fatality Rates per 100,000 Population by Area Development District, 2016¹⁻²

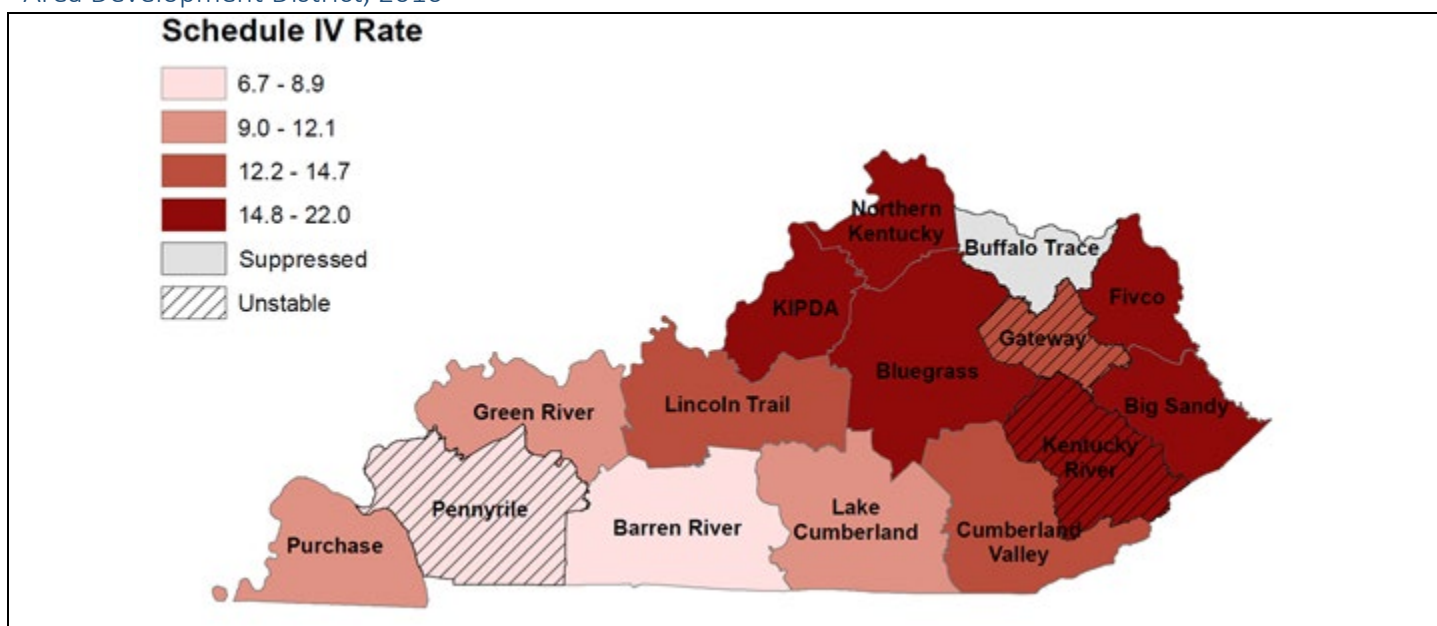
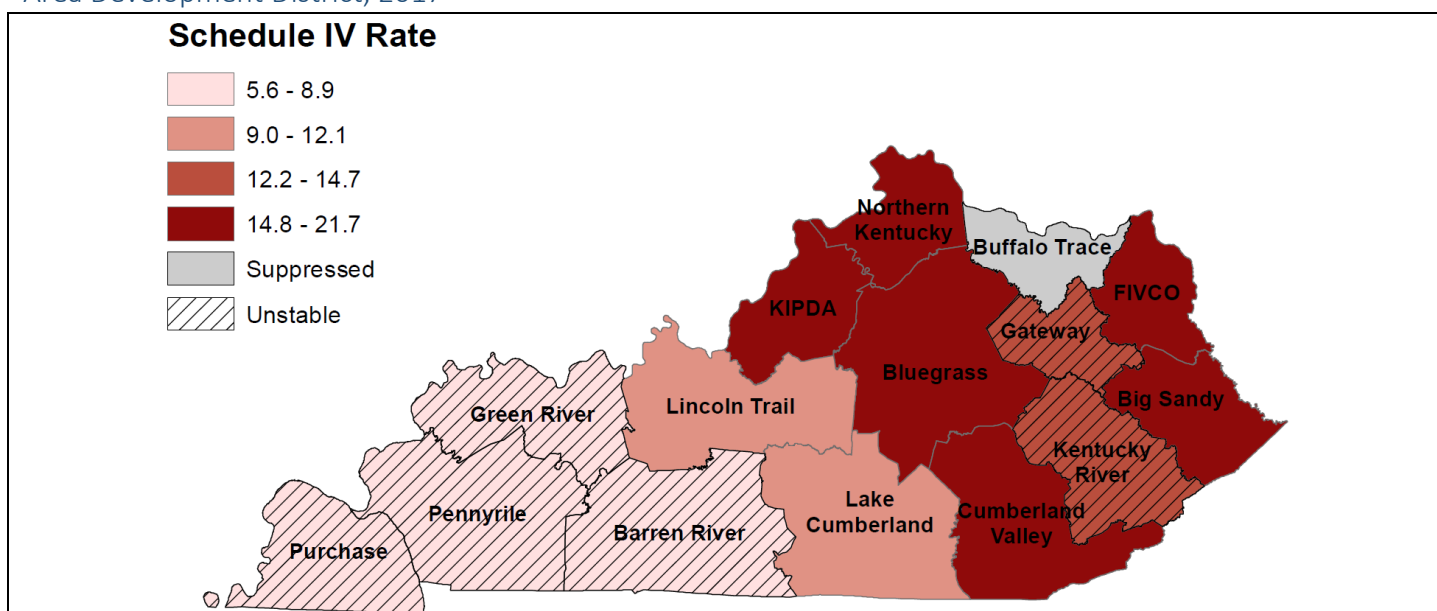


Figure 15. Kentucky Resident Schedule IV-Involved Drug Overdose Fatality Rates per 100,000 Population by Area Development District, 2017¹⁻²



¹In accordance with state data release policy, rates based on counts less than 10 are suppressed.

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

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Figure 16. Kentucky Resident Unscheduled-Involved Drug Overdose Fatality Rates per 100,000 Population by Area Development District, 2016¹⁻²

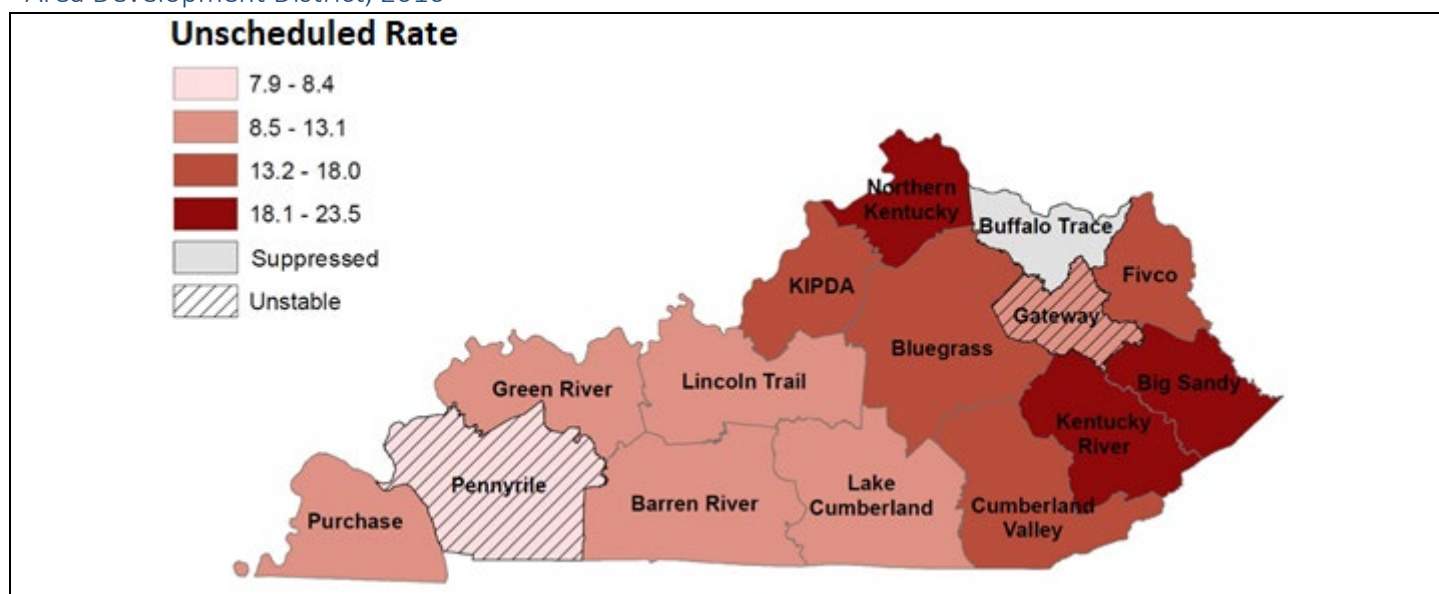
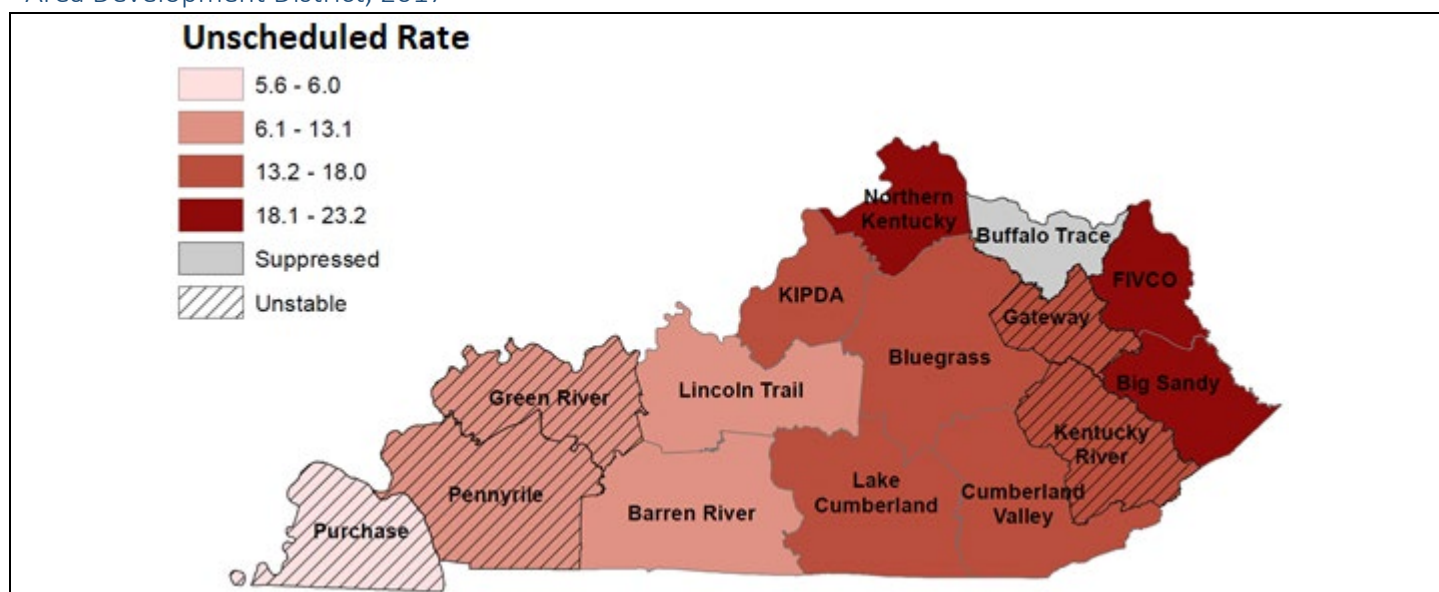


Figure 17. Kentucky Resident Unscheduled-Involved Drug Overdose Fatality Rates per 100,000 Population by Area Development District, 2017¹⁻²



¹In accordance with state data release policy, rates based on counts less than 10 are suppressed.

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

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Figure 18. Kentucky Resident Heroin-Involved Drug Overdose Fatality Rates per 100,000 Population by Area Development District, 2016¹⁻²

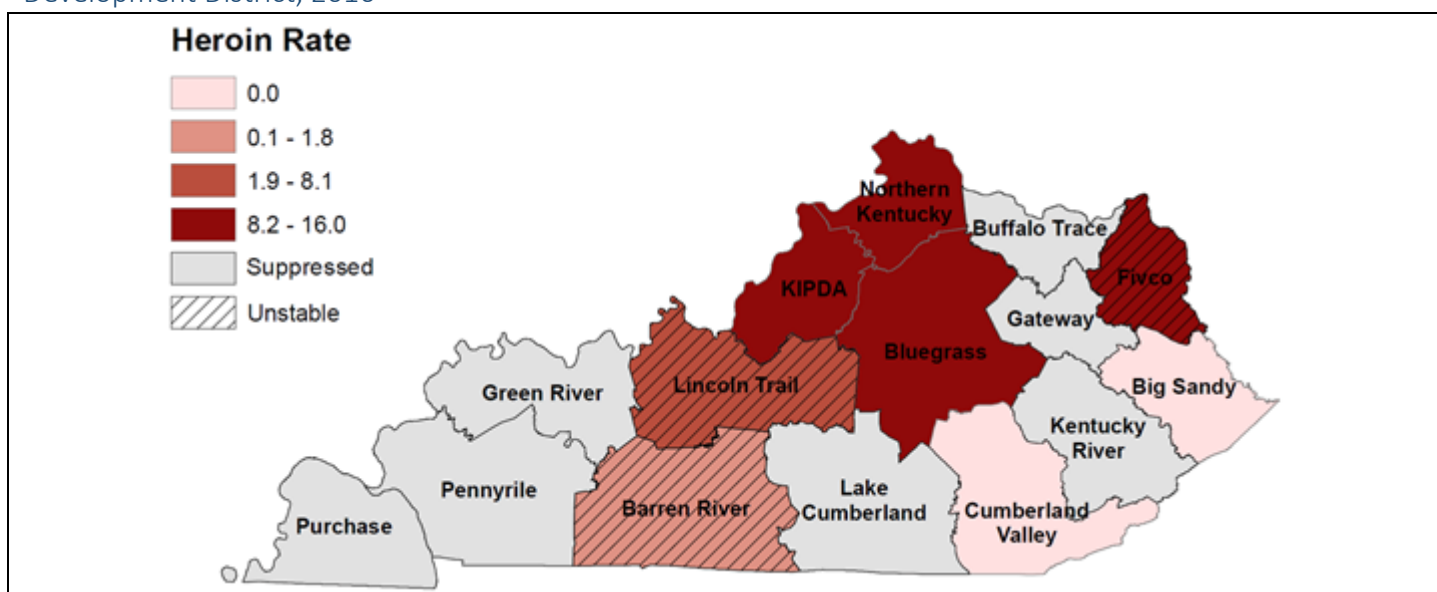
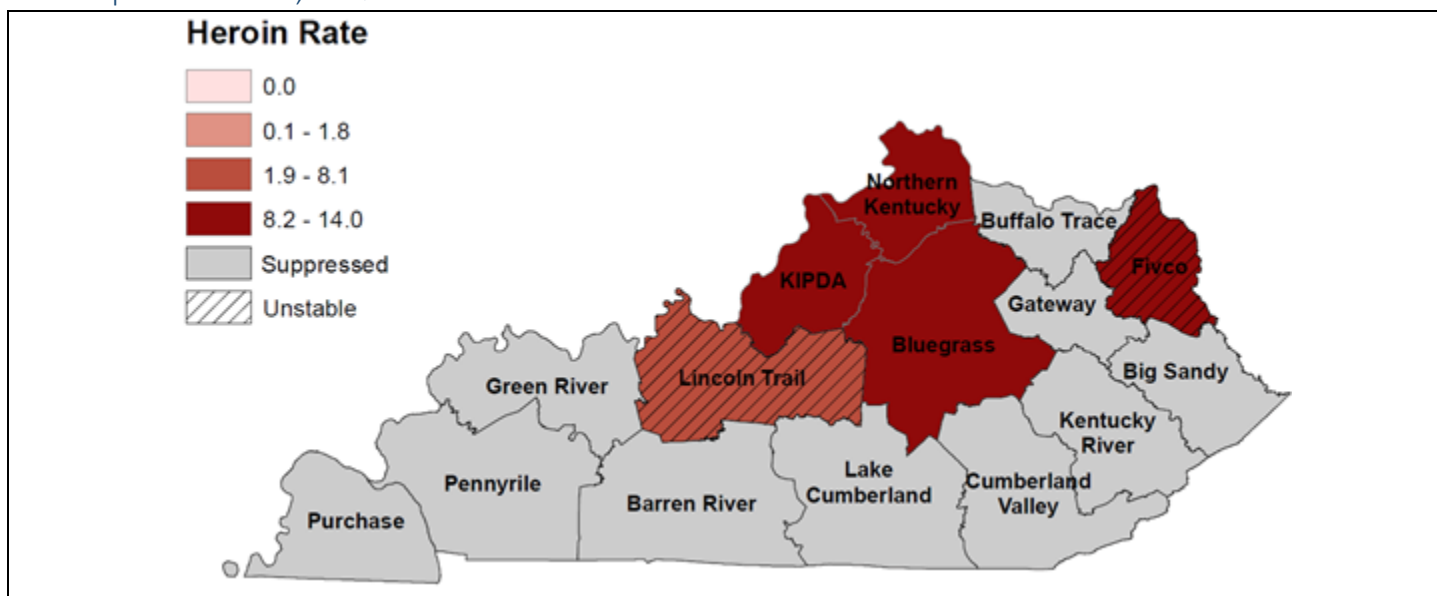


Figure 19. Kentucky Resident Heroin-Involved Drug Overdose Fatality Rates per 100,000 Population by Area Development District, 2017¹⁻²



¹In accordance with state data release policy, rates based on counts less than 10 are suppressed.

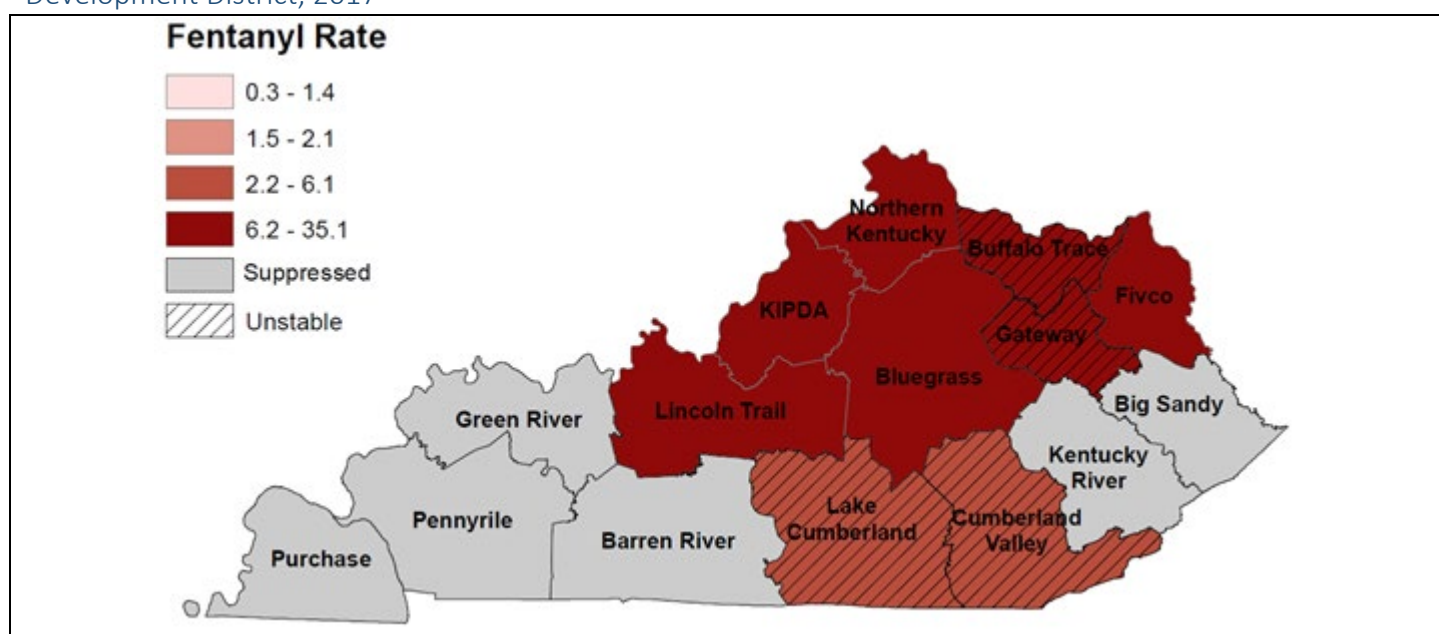
²Rates based on counts less than 20 are unstable and should be interpreted with caution.

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Figure 20. Kentucky Resident Fentanyl-Involved Drug Overdose Fatality Rates per 100,000 Population by Area Development District, 2016¹⁻²



Figure 21. Kentucky Resident Fentanyl-Involved Drug Overdose Fatality Rates per 100,000 Population by Area Development District, 2017¹⁻²



¹In accordance with state data release policy, rates based on counts less than 10 are suppressed.

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

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Figure 22. Kentucky Resident Heroin and Fentanyl-Involved Drug Overdose Fatality Rates per 100,000 Population by Area Development District, 2016¹⁻²

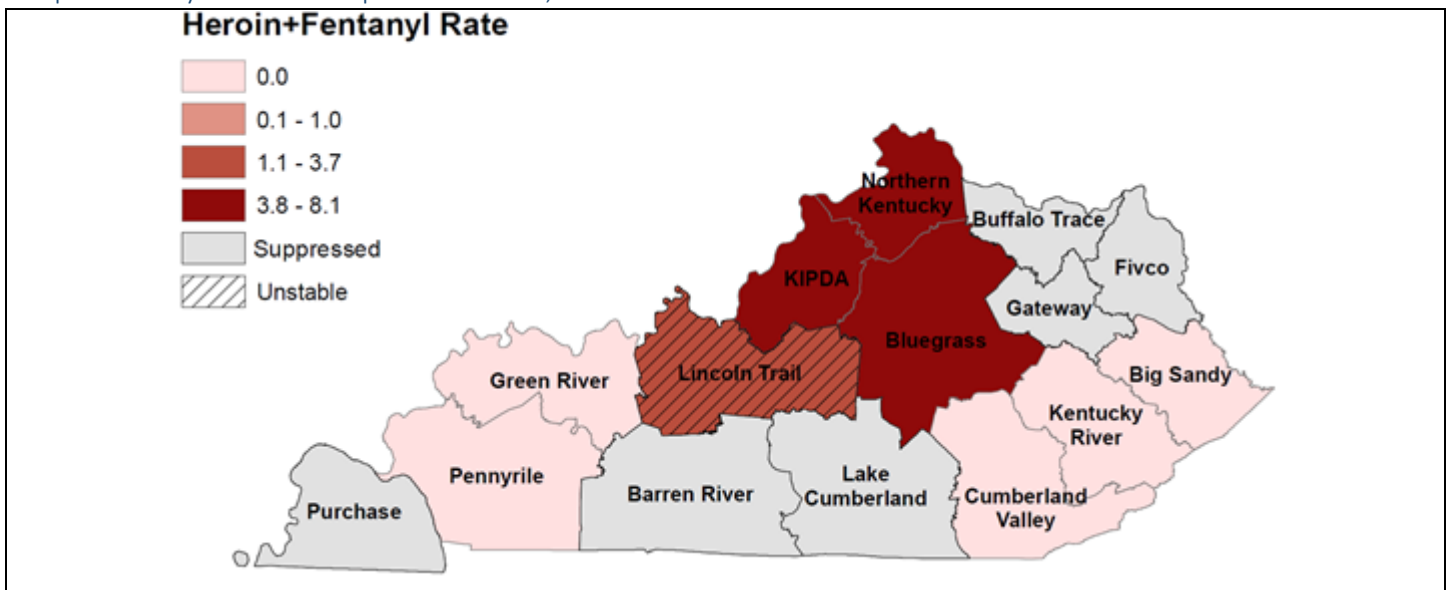
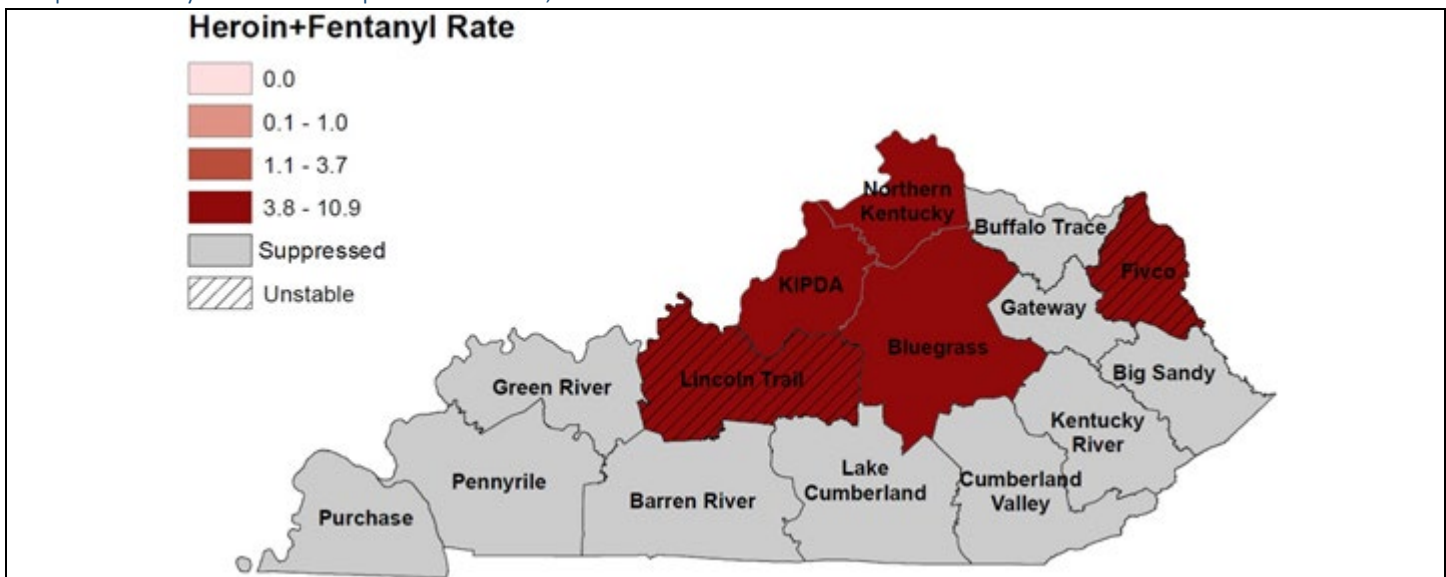


Figure 23. Kentucky Resident Heroin and Fentanyl-Involved Drug Overdose Fatality Rates per 100,000 Population by Area Development District, 2017¹⁻²



¹In accordance with state data release policy, rates based on counts less than 10 are suppressed.

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

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Figure 24. Kentucky Resident Methamphetamine-Involved Drug Overdose Fatality Rates per 100,000 Population by Area Development District, 2016¹⁻²

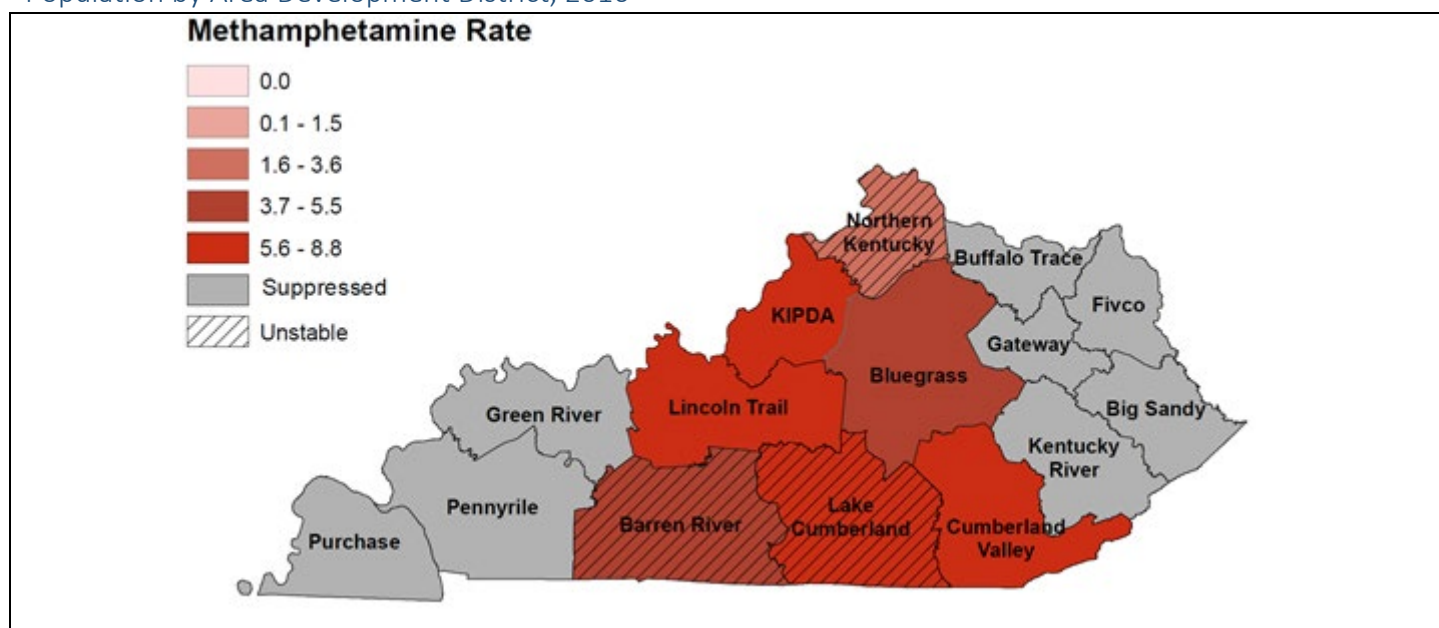
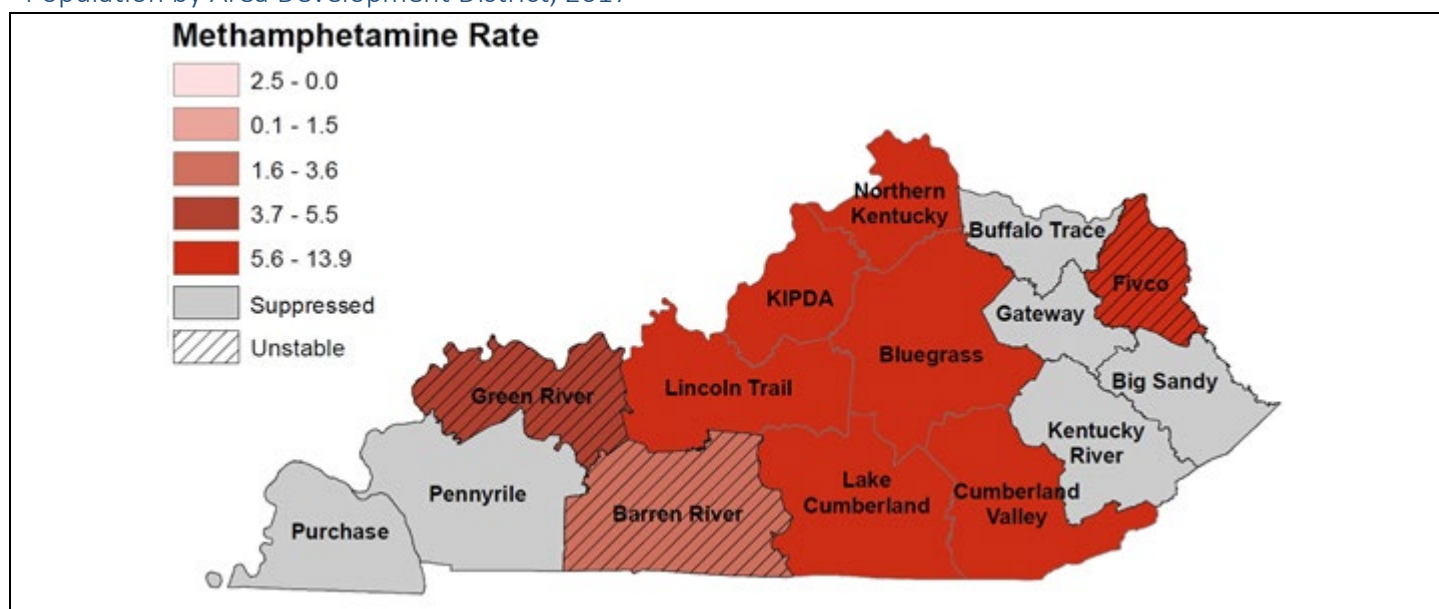


Figure 25. Kentucky Resident Methamphetamine-Involved Drug Overdose Fatality Rates per 100,000 Population by Area Development District, 2017¹⁻²



¹In accordance with state data release policy, rates based on counts less than 10 are suppressed.

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

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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, 2017¹

| Drug ²⁻⁴ | Drug Paraphernalia Found? ⁵ | | p-value ⁶ |
|-----------------------|--|---------------------------|----------------------|
| | Yes (%) N=401 | No/Unknown (%) N=1,052 | |
| Fentanyl | 303 (75.6%) | 516 (49.0%) | <.01 |
| Morphine ⁷ | 265 (66.1%) | 407 (38.7%) | <.01 |
| Heroin | 147 (36.7%) | 197 (18.7%) | <.01 |
| Methamphetamine | 144 (35.9%) | 296 (28.1%) | <.01 |
| Amphetamine | 125 (31.2%) | 244 (23.2%) | <.01 |
| Codeine | 116 (28.9%) | 155 (14.7%) | <.01 |
| Gabapentin | 110 (27.4%) | 356 (33.8%) | 0.02 |
| Alprazolam | 88 (21.9%) | 259 (24.6%) | 0.29 |
| Cocaine | 84 (20.9%) | 199 (18.9%) | 0.38 |
| THC-COOH | 62 (15.5%) | 242 (23.0%) | <.01 |
| Clonazepam | 57 (14.2%) | 176 (16.7%) | 0.24 |
| Ethanol | 52 (13.0%) | 186 (17.7%) | 0.03 |
| Oxycodone | 30 (7.5%) | 186 (17.7%) | <.01 |

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

²Detected drugs identified in blood, urine, and/or vitreous fluids.

³Drugs are not mutually exclusive; decedents may have more than one drug detected.

⁴Parent drugs with unique metabolites are classified and represented by the parent drug only. All instances of the parent drug and unique metabolite(s) are counted once per decedent and labeled as the parent drug. This is true for all drugs with unique metabolites except for THC due to the lengthy metabolism of THC-COOH. A list of unique metabolites for each parent drug is found in Definitions.

⁵Any reported drug paraphernalia identified from autopsy, coroner investigation, or medical records.

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

⁷Morphine may represent pure morphine and/or a metabolite of heroin.

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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, 2017¹

| Drug ²⁻⁴ | Illicit Drugs Found? ⁵ | | p-value ⁶ |
|-----------------------|-----------------------------------|---------------------------|----------------------|
| | Yes (%) N=286 | No/Unknown (%) N=1,167 | |
| Fentanyl | 210 (73.4%) | 609 (52.2%) | <.01 |
| Morphine ⁷ | 181 (63.3%) | 491 (42.1%) | <.01 |
| Methamphetamine | 103 (36.0%) | 337 (28.9%) | 0.02 |
| Heroin | 102 (35.7%) | 242 (20.7%) | <.01 |
| Amphetamine | 84 (29.4%) | 285 (24.4%) | 0.08 |
| Codeine | 80 (28.0%) | 191 (16.4%) | <.01 |
| Alprazolam | 72 (25.2%) | 275 (23.6%) | 0.57 |
| Cocaine | 70 (24.5%) | 213 (18.3%) | 0.02 |
| Gabapentin | 68 (23.8%) | 398 (34.1%) | <.01 |
| THC-COOH | 56 (19.6%) | 248 (21.3%) | 0.53 |
| Clonazepam | 45 (15.7%) | 188 (16.1%) | 0.88 |
| Ethanol | 44 (15.4%) | 194 (16.6%) | 0.61 |
| Oxycodone | 24 (8.4%) | 192 (16.5%) | <.01 |

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

²Detected drugs identified in blood, urine, and/or vitreous fluids.

³Drugs are not mutually exclusive; decedents may have more than one drug detected.

⁴Parent drugs with unique metabolites are classified and represented by the parent drug only. All instances of the parent drug and unique metabolite(s) are counted once per decedent and labeled as the parent drug. This is true for all drugs with unique metabolites except for THC due to the lengthy metabolism of THC-COOH. A list of unique metabolites for each parent drug is found in Definitions.

⁵Any reported illicit drugs identified from autopsy, coroner investigation, or medical records.

⁶p-value from chi-square test of independence, which tests if a statistical association exists between the presence of illicit drugs and a positive finding for the specified drug in post-mortem toxicology.

⁷Morphine may represent pure morphine and/or a metabolite of heroin.

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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, 2017¹

| Drug ²⁻⁴ | Prescription Drugs Found? ⁵ | | p-value ⁶ |
|-----------------------|--|---------------------------|----------------------|
| | Yes (%) N=286 | No/Unknown (%) N=1,167 | |
| Fentanyl | 129 (45.1%) | 690 (59.1%) | <.01 |
| Gabapentin | 116 (40.6%) | 350 (30.0%) | <.01 |
| Morphine ⁷ | 113 (39.5%) | 559 (47.9%) | <.01 |
| Methamphetamine | 78 (27.3%) | 362 (31.0%) | 0.22 |
| Alprazolam | 75 (26.2%) | 272 (23.3%) | 0.30 |
| Amphetamine | 67 (23.4%) | 302 (25.9%) | 0.39 |
| Clonazepam | 58 (20.3%) | 175 (15.0%) | 0.03 |
| Oxycodone | 53 (18.5%) | 163 (14.0%) | 0.05 |
| Ethanol | 51 (17.8%) | 187 (16.0%) | 0.46 |
| Heroin | 50 (17.5%) | 294 (25.2%) | <.01 |
| Codeine | 49 (17.1%) | 222 (19.0%) | 0.46 |
| THC-COOH | 48 (16.8%) | 256 (21.9%) | 0.55 |
| Cocaine | 45 (15.7%) | 238 (20.4%) | 0.07 |

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

²Detected drugs identified in blood, urine, and/or vitreous fluids.

³Drugs are not mutually exclusive; decedents may have more than one drug detected.

⁴Parent drugs with unique metabolites are classified and represented by the parent drug only. All instances of the parent drug and unique metabolite(s) are counted once per decedent and labeled as the parent drug. This is true for all drugs with unique metabolites except for THC due to the lengthy metabolism of THC-COOH. A list of unique metabolites for each parent drug is found in Definitions.

⁵Any reported prescription drugs identified from autopsy, coroner investigation, or medical records.

⁶p-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.

⁷Morphine may represent pure morphine and/or a metabolite of heroin.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. June 2020. 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 Nonmedical-Related Needle or Track Marks Identified and the Body Location of the Marks, 2017¹

| Body Location ²⁻³ | Count | Percentage of Decedents with Identified Needle or Track Marks (N=301) | Percentage of All Decedents (N=1,561) |
|--------------------------------|-------|---|---------------------------------------|
| Head | <5 | * | * |
| Neck | <5 | * | * |
| Arm | 35 | 11.6% | 2.2% |
| Antecubital Fossa ⁴ | 197 | 65.4% | 12.6% |
| Forearm | 54 | 17.9% | 3.5% |
| Wrist | 28 | 9.3% | 1.8% |
| Hand | 42 | 14.0% | 2.7% |
| Breast | 0 | 0.0% | 0.0% |
| Abdomen | <5 | * | * |
| Back | 0 | 0.0% | 0.0% |
| Buttocks | 0 | 0.0% | 0.0% |
| Thigh | 5 | 1.7% | 0.3% |
| Leg | 0 | 0.0% | 0.0% |
| Ankle | <5 | * | * |
| Foot | 5 | 1.7% | 0.3% |
| Other | <5 | * | * |
| Unknown Location | 22 | 7.3% | 1.4% |

¹In accordance with state data release policy, counts less than five are suppressed. Any number associated with the suppressed count is labeled with an *.

²Body locations of needle/track marks are not mutually exclusive; decedents may have more than one location identified.

³Any reported nonmedical-related needle marks or track marks identified from autopsy, coroner investigation, or medical records. Specific location of the needle and/or track mark(s) are not always provided in the records.

⁴Antecubital 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. June 2020. 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, 2017

| Evidence Recovered ¹⁻² | Decedent History of Substance Use? ³ | |
|---|---|-------------------------|
| | Yes (%) N=962 | No/Unknown (%) N=599 |
| Drug Paraphernalia Recovered | 331 (34.4%) | 73 (12.2%) |
| Illicit Drugs Recovered | 183 (19.0%) | 106 (17.7%) |
| Prescription Drugs Recovered | 226 (23.5%) | 62 (10.4%) |
| 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. June 2020. 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 that Indicates Route of Administration, 2017¹

| Route of Administration ²⁻⁴ | Count | Percentage ⁵ |
|---|-------|-------------------------|
| Evidence of Injection | 434 | 61.82% |
| Evidence of Ingestion | 244 | 34.76% |
| Evidence of Snorting | 90 | 12.82% |
| Evidence of Smoking | 37 | 5.27% |
| Evidence of Transdermal Application ⁶ | <5 | * |
| ¹ In accordance with state data release policy, counts less than five are suppressed. Any number associated with the suppressed count is labeled with an *. | | |
| ² Any reported evidence recovered at scene and/or autopsy identified from autopsy, coroner investigation, or medical records. | | |
| ³ Evidence of a route of administration is not unequivocal evidence that a specific route of administration was used for fatal event. | | |
| ⁴ Route of administrations are not mutually exclusive; decedents may have more than one route of administration identified. | | |
| ⁵ Percentage is based on total number of DOFSS drug overdose fatalities with evidence recovered at scene and/or autopsy indicating route of administration, n=702. | | |
| ⁶ Most frequent drugs detected in post-mortem toxicology testing results of drug overdose decedents with evidence of transdermal application were not included due to low count. | | |
| Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. June 2020. 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, 2017¹

| Drug ²⁻⁴ | Evidence of Injection? ⁵ | | p-value ⁶ |
|-----------------------|-------------------------------------|---------------------------|----------------------|
| | Yes (%) N=430 | No/Unknown (%) N=1,023 | |
| Fentanyl | 326 (75.8%) | 493 (48.2%) | <.01 |
| Morphine ⁷ | 292 (67.9%) | 380 (37.1%) | <.01 |
| Methamphetamine | 162 (37.7%) | 278 (27.2%) | <.01 |
| Heroin | 150 (34.9%) | 194 (19.0%) | <.01 |
| Amphetamine | 143 (33.3%) | 226 (22.1%) | <.01 |
| Gabapentin | 132 (30.7%) | 334 (32.6%) | 0.47 |
| Codeine | 127 (29.5%) | 144 (14.1%) | <.01 |
| Alprazolam | 87 (20.2%) | 260 (25.4%) | 0.03 |
| Cocaine | 86 (20.0%) | 197 (19.3%) | 0.74 |
| THC-COOH | 71 (16.5%) | 233 (22.8%) | <.01 |
| Clonazepam | 62 (14.4%) | 171 (16.7%) | 0.28 |
| Ethanol | 46 (10.7%) | 192 (18.8%) | <.01 |
| Oxycodone | 35 (8.1%) | 181 (17.7%) | <.01 |

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

²Detected drugs identified in blood, urine, and/or vitreous fluids.

³Drugs are not mutually exclusive; decedents may have more than one drug detected.

⁴Parent drugs with unique metabolites are classified and represented by the parent drug only. All instances of the parent drug and unique metabolite(s) are counted once per decedent and labeled as the parent drug. This is true for all drugs with unique metabolites except for THC due to the lengthy metabolism of THC-COOH. A list of unique metabolites for each parent drug is found in Definitions.

⁵Any reported injection evidence identified from autopsy, coroner investigation, or medical records.

⁶p-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.

⁷Morphine may represent pure morphine and/or a metabolite of heroin.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. June 2020. 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, 2017¹

| Drug ²⁻⁴ | Evidence of Ingestion? ⁵ | | p-value ⁶ |
|-----------------------|-------------------------------------|---------------------------|----------------------|
| | Yes (%) N=239 | No/Unknown (%) N=1,214 | |
| Fentanyl | 101 (42.3%) | 718 (59.1%) | <.01 |
| Gabapentin | 93 (38.9%) | 373 (30.7%) | 0.01 |
| Morphine ⁷ | 91 (38.1%) | 581 (47.9%) | <.01 |
| Methamphetamine | 67 (28.0%) | 373 (30.7%) | 0.41 |
| Alprazolam | 65 (27.2%) | 282 (23.2%) | 0.19 |
| Amphetamine | 55 (23.0%) | 314 (25.9%) | 0.35 |
| Oxycodone | 49 (20.5%) | 167 (13.8%) | <.01 |
| Clonazepam | 47 (19.7%) | 186 (15.3%) | 0.09 |
| Heroin | 42 (17.6%) | 302 (24.9%) | 0.02 |
| Codeine | 41 (17.2%) | 230 (18.9%) | 0.52 |
| Ethanol | 40 (16.7%) | 198 (16.3%) | 0.87 |
| THC-COOH | 37 (15.5%) | 267 (22.0%) | 0.02 |
| Cocaine | 35 (14.6%) | 248 (20.4%) | 0.04 |

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

²Detected drugs identified in blood, urine, and/or vitreous fluids.

³Drugs are not mutually exclusive; decedents may have more than one drug detected.

⁴Parent drugs with unique metabolites are classified and represented by the parent drug only. All instances of the parent drug and unique metabolite(s) are counted once per decedent and labeled as the parent drug. This is true for all drugs with unique metabolites except for THC due to the lengthy metabolism of THC-COOH. A list of unique metabolites for each parent drug is found in Definitions.

⁵Any reported ingestion evidence identified from autopsy, coroner investigation, or medical records.

⁶p-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.

⁷Morphine may represent pure morphine and/or a metabolite of heroin.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. June 2020. 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, 2017¹

| Drug ²⁻⁴ | Evidence of Snorting? ⁵ | | p-value ⁶ |
|-----------------------|------------------------------------|---------------------------|----------------------|
| | Yes (%) N=89 | No/Unknown (%) N=1,364 | |
| Fentanyl | 63 (70.8%) | 756 (55.4%) | <.01 |
| Morphine ⁷ | 50 (56.2%) | 622 (45.6%) | 0.05 |
| Alprazolam | 30 (33.7%) | 317 (23.2%) | 0.02 |
| Gabapentin | 27 (30.3%) | 439 (32.2%) | 0.72 |
| Heroin | 27 (30.3%) | 317 (23.2%) | 0.13 |
| Methamphetamine | 25 (28.1%) | 415 (30.4%) | 0.64 |
| Cocaine | 25 (28.1%) | 258 (18.9%) | 0.03 |
| Codeine | 23 (25.8%) | 248 (18.2%) | 0.07 |
| Ethanol | 21 (23.6%) | 217 (15.9%) | 0.06 |
| THC-COOH | 18 (20.2%) | 286 (21.0%) | 0.87 |
| Amphetamine | 16 (18.0%) | 353 (25.9%) | 0.10 |
| Clonazepam | 14 (15.7%) | 219 (16.1%) | 0.94 |
| Oxycodone | 9 (10.1%) | 207 (15.2%) | 0.19 |

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

²Detected drugs identified in blood, urine, and/or vitreous fluids.

³Drugs are not mutually exclusive; decedents may have more than one drug detected.

⁴Parent drugs with unique metabolites are classified and represented by the parent drug only. All instances of the parent drug and unique metabolite(s) are counted once per decedent and labeled as the parent drug. This is true for all drugs with unique metabolites except for THC due to the lengthy metabolism of THC-COOH. A list of unique metabolites for each parent drug is found in Definitions.

⁵Any reported snorting evidence identified from autopsy, coroner investigation, or medical records.

⁶p-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.

⁷Morphine may represent pure morphine and/or a metabolite of heroin.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. June 2020. 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, 2017¹⁻²

| Drug ³⁻⁵ | Evidence of Smoking? ⁶ | | p-value ⁷ |
|-----------------------|-----------------------------------|---------------------------|----------------------|
| | Yes (%) N=37 | No/Unknown (%) N=1,416 | |
| Fentanyl | 21 (56.8%) | 798 (56.4%) | 0.96 |
| Cocaine | 18 (48.6%) | 265 (18.7%) | <.01 |
| Methamphetamine | 12 (32.4%) | 428 (30.2%) | 0.77 |
| Gabapentin | 10 (27.0%) | 456 (32.2%) | 0.51 |
| Morphine ⁷ | 9 (24.3%) | 663 (46.8%) | <.01 |
| Amphetamine | 8 (21.6%) | 361 (25.5%) | 0.59 |
| Clonazepam | 8 (21.6%) | 225 (15.9%) | 0.35 |
| THC-COOH | 7 (18.9%) | 297 (21.0%) | 0.76 |
| Alprazolam | 6 (16.2%) | 341 (24.1%) | 0.27 |
| Heroin | 6 (16.2%) | 338 (23.9%) | 0.28 |
| Codeine | <5 (*) | * | 0.21 |
| Ethanol | <5 (*) | * | 0.07 |
| Oxycodone | <5 (*) | * | 0.10 |

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

²In accordance with state data release policy, counts less than five are suppressed. Any number associated with the suppressed count is labeled with an *.

³Detected drugs identified in blood, urine, and/or vitreous fluids.

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

⁵Parent drugs with unique metabolites are classified and represented by the parent drug only. All instances of the parent drug and unique metabolite(s) are counted once per decedent and labeled as the parent drug. This is true for all drugs with unique metabolites except for THC due to the lengthy metabolism of THC-COOH. A list of unique metabolites for each parent drug is found in Definitions.

⁶Any reported smoking evidence identified from autopsy, coroner investigation, or medical records.

⁷p-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.

⁸Morphine may represent pure morphine and/or a metabolite of heroin.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. June 2020. 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. Top Identifiable Prescription and Over-the-Counter (OTC) Drugs Found at Scene and/or at Autopsy Among Drug Overdose Decedents in Kentucky, 2017

| Prescription/OTC ¹⁻³ | 2017 Count | 2017 Percentage ⁴ | Percent Change From 2016–2017 ⁵ |
|---------------------------------|------------|------------------------------|--|
| Gabapentin | 55 | 26.44% | -26.67% |
| Hydrocodone | 30 | 14.42% | -21.05% |
| Alprazolam | 30 | 14.42% | -28.57% |
| Oxycodone | 26 | 12.50% | -48.00% |
| Lisinopril | 23 | 11.06% | -32.35% |
| Promethazine | 15 | 7.21% | 66.67% |
| Amitriptyline | 15 | 7.21% | 7.14% |
| Omeprazole | 15 | 7.21% | -16.67% |
| Trazodone | 15 | 7.21% | -16.67% |
| Bupropion | 14 | 6.73% | 250.00% |
| Metoprolol | 14 | 6.73% | -22.22% |
| Tizanidine | 13 | 6.25% | 18.18% |
| Clonazepam | 13 | 6.25% | -56.67% |
| Fluoxetine | 12 | 5.77% | 9.09% |
| Amlodipine | 11 | 5.29% | 83.33% |
| Quetiapine | 11 | 5.29% | -63.33% |
| Levothyroxine | 10 | 4.81% | 100.00% |
| Cyclobenzaprine | 10 | 4.81% | -9.09% |
| Citalopram | 10 | 4.81% | -23.08% |
| Venlafaxine | 10 | 4.81% | -28.57% |

¹Prescriptions and OTC drugs are not mutually exclusive; decedents may have more than one prescription drug found at scene and/or autopsy.

²Any reported prescription and OTC drugs at scene and/or autopsy identified from autopsy, coroner investigation, or medical records.

³Prescription and OTC drugs found at scene and/or autopsy do not signify if the decedent's post-mortem toxicology was positive for said drug or if said drug was tested for.

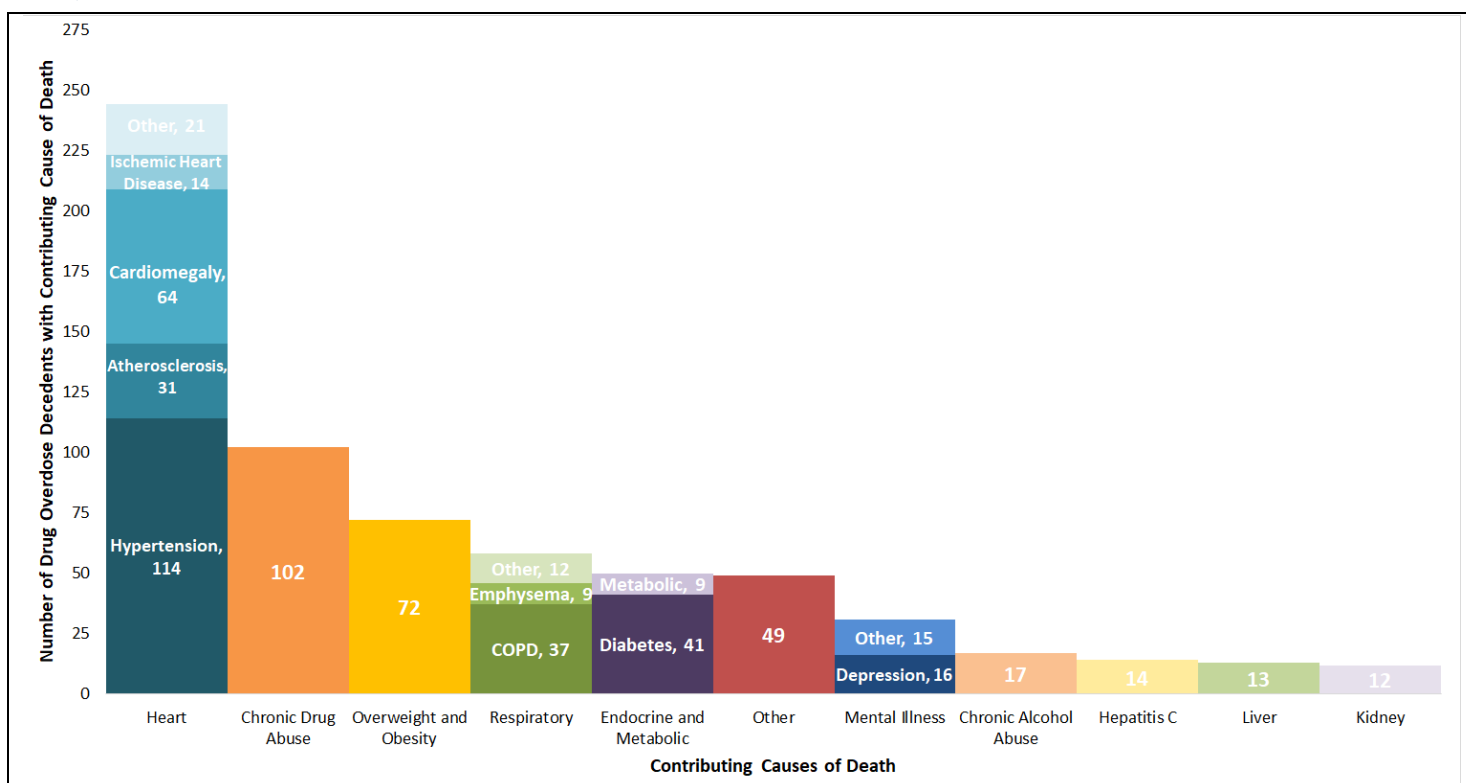
⁴Percentage is based on total number of DOFSS drug overdose fatalities with a named prescription/OTC drug found at scene and/or autopsy, n=208. Reports of evidence of pills or pill bottles without any identifying feature were excluded from this analysis.

⁵Percent Change represents the change in individual drug frequency from 2016 to 2017.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. June 2020. 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 of Drug Overdose Decedents in Kentucky, 2017¹⁻⁴



¹Other significant conditions contributing to death are not mutually exclusive; deaths may be counted in more than one applicable category.

²Of 1,561 Kentucky drug overdose decedents, 381 decedents had other significant condition(s) contributing to death listed on death certificate and/or autopsy report.

³Mechanisms 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. June 2020. 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. Medical Conditions of Drug Overdose Decedents in Kentucky, 2017

| Medical Condition ¹⁻³ | Count | Percentage ⁴ |
|---|-------|-------------------------|
| Diseases of the Circulatory System | | |
| Heart Disease | | |
| <i>Essential (Primary) Hypertension</i> | 195 | 12.5% |
| <i>Cardiomegaly</i> | 68 | 4.4% |
| <i>Atherosclerosis</i> | 39 | 2.5% |
| <i>Heart Failure</i> | 33 | 2.1% |
| <i>High Blood Pressure, Without Diagnosis of Hypertension</i> | 22 | 1.4% |
| <i>Ischemic Heart Disease</i> | 14 | 0.9% |
| <i>Previous Myocardial Infarction</i> | 9 | 0.6% |
| <i>Atrial Fibrillation and Flutter</i> | 9 | 0.6% |
| <i>Heart Valve Disorders</i> | 9 | 0.6% |
| <i>Other and Unspecified Heart Diseases</i> | 38 | 2.4% |
| Cerebral Infarction | 12 | 0.8% |
| Venous and Arterial Embolism and Thrombosis | 7 | 0.4% |
| Other and Unspecified Circulatory System Diseases | 13 | 0.8% |
| Diseases of the Respiratory System | | |
| Chronic Obstructive Pulmonary Disease | 81 | 5.2% |
| Asthma | 34 | 2.2% |
| Bronchitis, Pneumonia, and Upper Respiratory Infection | 19 | 1.2% |
| Emphysema | 17 | 1.1% |
| Shortness of Breath | 11 | 0.7% |
| Other and Unspecified Respiratory Disorders | 14 | 0.9% |
| Diseases of the Digestive System | | |
| Diseases of the Esophagus, Stomach, and Duodenum | | |
| <i>Gastro-Esophageal Reflux Disease</i> | 25 | 1.6% |
| <i>Other and Unspecified Diseases of the Esophagus, Stomach, and Duodenum</i> | 8 | 0.5% |
| Liver Disease | | |
| <i>Cirrhosis of the Liver</i> | 8 | 0.5% |
| <i>Other and Unspecified Diseases of the Liver</i> | 22 | 1.4% |
| Disorders of the Gallbladder, Biliary Tract, and Pancreas | 19 | 1.2% |
| Diseases of the Intestines | 14 | 0.9% |
| Nausea, Heartburn, Vomiting, Constipation, and Diarrhea | 8 | 0.5% |
| Other and Unspecified Diseases of the Digestive System | 6 | 0.4% |
| Diseases of the Skin and Subcutaneous Tissue | 9 | 0.6% |
| Diseases of the Blood and Blood-Forming Organs | 10 | 0.6% |

Table 34. Medical Conditions of Drug Overdose Decedents in Kentucky, 2017–continued

| Medical Condition ¹⁻³ | Count | Percentage ⁴ |
|--|-------|-------------------------|
| Diseases of the Genitourinary System | | |
| Kidney Disease | | |
| <i>Chronic Kidney Disease</i> | 24 | 1.5% |
| <i>Other and Unspecified Diseases of the Kidney</i> | 10 | 0.7% |
| Other and Unspecified Diseases of the Genitourinary System | 11 | 0.7% |
| Endocrine, Nutritional, and Metabolic Diseases | | |
| Diabetes Mellitus | 102 | 6.5% |
| Overweight and Obesity | 98 | 6.3% |
| Metabolic Diseases | | |
| <i>Hyperlipidemia</i> | 22 | 1.4% |
| <i>Hypercholesterolemia</i> | 5 | 0.3% |
| Disorders of the Thyroid Gland | 14 | 0.9% |
| Other and Unspecified Endocrine, Nutritional, and Metabolic Disorders | 13 | 0.8% |
| Diseases of the Musculoskeletal System, Connective Tissue, and Nervous System | | |
| Nervous System | | |
| <i>Epilepsy and Recurrent Seizures</i> | 51 | 3.3% |
| <i>Migraine and Headache</i> | 18 | 1.2% |
| <i>Sleep Apnea</i> | 16 | 1.0% |
| <i>Insomnia</i> | 13 | 0.8% |
| <i>Neuropathies</i> | 8 | 0.5% |
| <i>Other and Unspecified Disorders of the Nervous System</i> | 13 | 0.8% |
| Musculoskeletal System and Connective Tissue | | |
| <i>Dorsalgia</i> | 60 | 3.8% |
| <i>Pain in Joints and Soft Tissue</i> | 48 | 3.1% |
| <i>Osteoarthritis</i> | 16 | 1.0% |
| <i>Diseases of Vertebrae and Intervertebral Discs</i> | 13 | 0.8% |
| <i>Other and Unspecified Disorders of the Musculoskeletal System and Connective Tissue</i> | 11 | 0.7% |
| Acute Pain, Not Elsewhere Classified | 26 | 1.7% |
| Chronic Pain, Not Elsewhere Classified | 19 | 1.2% |
| Chronic Pain Syndrome | 12 | 0.8% |
| Mental, Behavioral, and Neurodevelopmental Disorders | | |
| Substance Use Disorders | | |
| <i>Opioid-Related Disorders</i> | 393 | 25.2% |
| <i>Alcohol-Related Disorders</i> | 153 | 9.8% |
| <i>Nicotine Dependence</i> | 115 | 7.4% |
| <i>Other Stimulant-Related Disorders (Excludes Cocaine)</i> | 79 | 5.1% |
| <i>Cocaine-Related Disorders</i> | 56 | 3.6% |

Table 34. Medical Conditions of Drug Overdose Decedents in Kentucky, 2017–continued

| Medical Condition ¹⁻³ | Count | Percentage ⁴ |
|--|-------|-------------------------|
| <i>Cannabis-Related Disorders</i> | 45 | 2.9% |
| <i>Sedative-, Hypnotic-, or Anxiolytic-Related Disorders</i> | 30 | 1.9% |
| <i>Other and Unspecified Substance Use Disorders</i> | 490 | 31.4% |
| Depression | 127 | 8.1% |
| Anxiety Disorder | 61 | 3.9% |
| Bipolar Disorder | 36 | 2.3% |
| Post-Traumatic Stress Disorder (PTSD) | 13 | 0.8% |
| Schizophrenia | 8 | 0.5% |
| Other and Unspecified Mental, Behavioral, and Neurodevelopment Disorders | 48 | 3.1% |
| Congenital Malformations, Deformations, and Chromosomal Abnormalities | 5 | 0.3% |
| Neoplasms | 34 | 2.2% |
| Certain Infectious and Parasitic Diseases | | |
| Hepatitis C | 76 | 4.9% |
| Streptococcus, Staphylococcus, and Enterococcus | 13 | 0.8% |
| Human Immunodeficiency Virus (HIV) Disease | 6 | 0.4% |
| Other and Unspecified Infectious and Parasitic Diseases | 23 | 1.5% |
| Injury and External Factors Influencing Health | | |
| Procedures and Surgeries | | |
| <i>Presence of Cardiac and Vascular Implants and Grafts</i> | 25 | 1.6% |
| <i>Acquired Absence of Limb or Organ</i> | 16 | 1.0% |
| <i>Fusion of Spine</i> | 11 | 0.7% |
| <i>Other Surgical Procedures</i> | 22 | 1.4% |
| Fractures, Traumatic Injuries, and Open Wounds | 28 | 1.8% |
| Injury from Previous Vehicle Accident | 17 | 1.1% |
| Dependence on Enabling Machines and Devices | 8 | 0.5% |
| Slipping, Tripping, and Falls | 6 | 0.4% |
| Other External Factors Influencing Health | 10 | 0.6% |
| Other and Unspecified Illness | 16 | 1.0% |

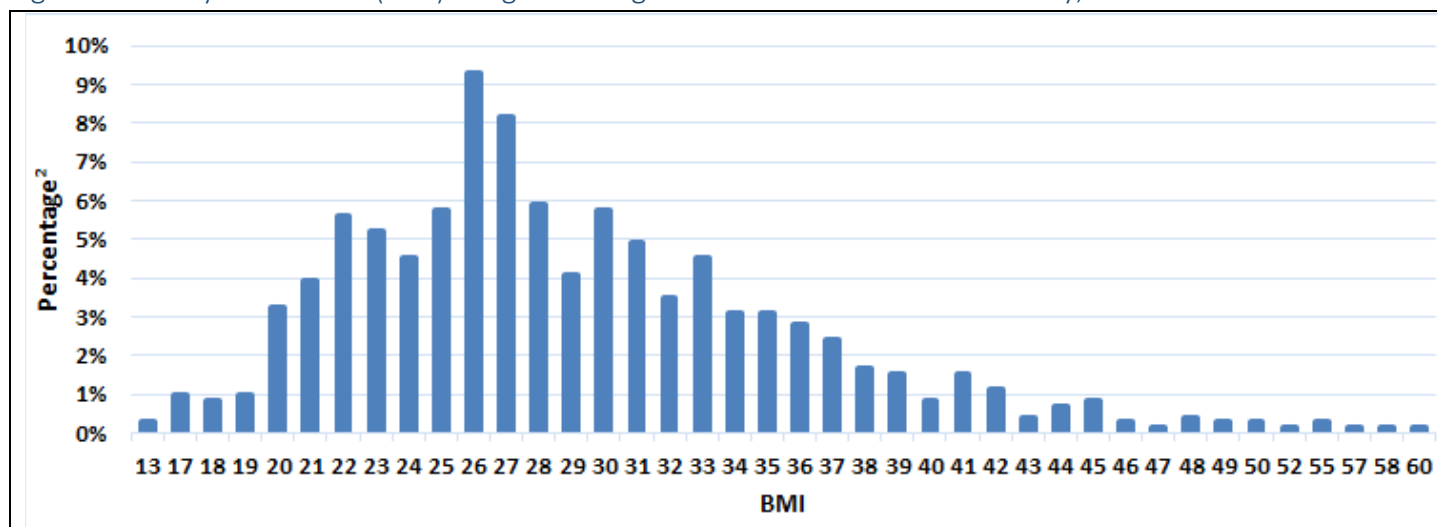
¹Any reported medical condition identified from death certificate, autopsy, coroner investigation, or medical records.

²Medical conditions were classified using ICD-10-CM diagnoses codes and later organized into concise categories.

³Medical conditions are not mutually exclusive; death may be counted in more than one applicable category.

⁴Percentage is based on total number of DOFSS drug overdose fatalities, n=1,561.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. June 2020. 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, 2017¹

¹BMI information was available for 45.8% of total drug overdose decedent cases (715/1,561). BMI information was unavailable for most cases that did not have an autopsy performed.

²Percentages based on total number of drug overdose decedents with BMI information available (n=715).

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. June 2020. 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. Drug Overdose Decedent Body Mass Index (BMI) Percentiles

| BMI Percentiles | | | | | | |
|-------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| 5 th percentile | 10 th percentile | 25 th percentile | 50 th percentile | 75 th percentile | 90 th percentile | 95 th percentile |
| 20 | 21 | 24 | 28 | 32 | 37 | 39 |

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. June 2020. 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. Circumstances and History of Drug Overdose Decedents in Kentucky, 2017

| Circumstance ¹ | Count | Percentage |
|---|-------|------------|
| Fatal Overdose Event | | |
| Bystander(s) Present at Time of Overdose ² | 451 | 28.9% |
| <i>1 bystander present</i> | 195 | 12.5% |
| <i>Multiple bystanders present</i> | 119 | 7.6% |
| <i>Bystanders present, unknown number</i> | 137 | 8.8% |
| Evidence of Rapid Overdose ³ | 139 | 8.9% |
| Naloxone Administered | 136 | 8.7% |
| Treatment | | |
| Ever Treated for Substance Use | 127 | 8.1% |
| Current Substance Use Treatment | 36 | 2.3% |
| Ever Treated for Mental Health Issues | 25 | 1.6% |
| Current Mental Health Treatment | 18 | 1.2% |
| Recent Release ⁴ from Residential Substance Use Treatment | 43 | 2.8% |
| Recent Release ⁴ from Hospital/Emergency Room ⁵ | 61 | 3.9% |
| Substance Use Relapse | 199 | 12.7% |
| <i>Relapse occurred < 2 weeks prior to fatal overdose</i> | 45 | 2.9% |
| <i>Relapse occurred > 2 weeks to < 3 months prior to fatal overdose</i> | 7 | 0.4% |
| <i>Relapse mentioned, timing unclear</i> | 147 | 9.4% |
| Incarceration | | |
| Previous Incarceration | 76 | 4.9% |
| Recent Release ⁴ from Jail, Prison | 48 | 3.1% |
| Currently Incarcerated or on House Arrest | 29 | 1.9% |
| History | | |
| History of Substance Use | 962 | 61.6% |
| History of Life Change, Crisis, or Traumatic Event Within Last Month ⁶ | 227 | 14.5% |
| History of Mental Illness | 193 | 12.4% |
| History of Previous Overdose | 126 | 8.1% |
| <i>Previous OD within the last month</i> | 40 | 2.6% |
| <i>Previous OD occurred between a month and a year ago</i> | 25 | 1.6% |
| <i>Previous OD occurred more than a year ago</i> | 7 | 0.4% |
| <i>Previous OD, timing unknown</i> | 54 | 3.5% |
| History of Chronic Pain | 124 | 7.9% |

Table 36. Circumstances and History of Drug Overdose Decedents in Kentucky, 2017–continued

| Circumstance ¹ | Count | Percentage |
|--|-------|------------|
| Suicide-Related | | |
| History of Suicidal Ideations | 34 | 2.2% |
| Previous Suicide Attempts | 22 | 1.4% |
| Suicide Intent Disclosed to Another Person | 21 | 1.3% |
| Suicide Note Found at Time of Fatal Overdose | 15 | 1.0% |

¹Any 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.

⁵Hospital 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. June 2020. 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. Most Frequent Drugs Detected in Post-Mortem Toxicology Test Results of Drug Overdose Decedents in Kentucky with History of Substance Use, 2017¹

| Drug ²⁻⁴ | Decedent History of Substance Use ⁵ | | p-value ⁶ |
|-----------------------|--|-------------------------|----------------------|
| | Yes (%) N=935 | No/Unknown (%) N=518 | |
| Fentanyl | 608 (65.0%) | 211 (40.7%) | <.01 |
| Morphine ⁷ | 510 (54.5%) | 162 (31.3%) | <.01 |
| Methamphetamine | 290 (31.0%) | 150 (29.0%) | 0.40 |
| Gabapentin | 280 (29.9%) | 186 (35.9%) | 0.02 |
| Heroin | 262 (28.0%) | 82 (15.8%) | <.01 |
| Amphetamine | 247 (26.4%) | 122 (23.6%) | 0.23 |
| Alprazolam | 217 (23.2%) | 130 (25.1%) | 0.42 |
| Codeine | 204 (21.8%) | 67 (12.9%) | <.01 |
| Cocaine | 202 (21.6%) | 80 (15.4%) | <.01 |
| THC-COOH | 196 (21.0%) | 108 (20.8%) | 0.96 |
| Ethanol | 136 (14.5%) | 102 (19.7%) | <.01 |
| Clonazepam | 135 (14.4%) | 98 (18.9%) | 0.03 |
| Oxycodone | 103 (11.0%) | 113 (21.8%) | <.01 |

¹Counts are based on total number of DOFSS drug overdose fatalities with at least one drug present in toxicology results for each group.

²Detected drugs identified in blood, urine, and/or vitreous fluids.

³Drugs are not mutually exclusive; decedents may have more than one drug detected.

⁴Parent drugs with unique metabolites are classified and represented by the parent drug only. All instances of the parent drug and unique metabolite(s) are counted once per decedent and labeled as the parent drug. This is true for all drugs with unique metabolites except for THC due to the lengthy metabolism of THC-COOH. A list of unique metabolites for each parent drug is found in Definitions.

⁵Any reported history of substance use identified from autopsy, coroner investigation, or medical records.

⁶p-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.

⁷Morphine may represent pure morphine and/or a metabolite of heroin.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. June 2020. 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, 2017

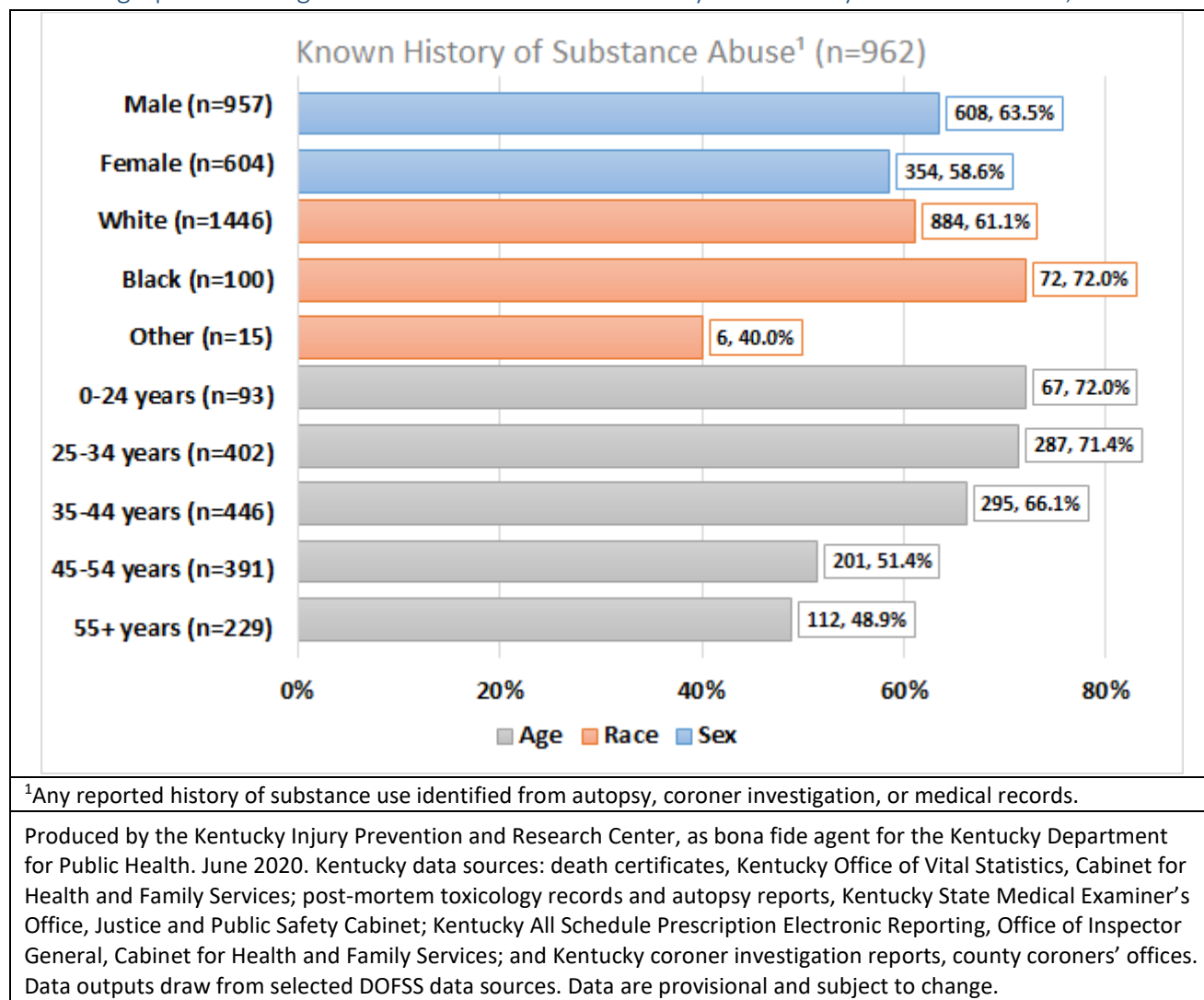


Table 38. Suicide and Accidental Manners of Death Among Drug Overdose Decedents in Kentucky with History of Substance Use, 2017

| Manner of Death | Decedent History of Substance Use? ¹ | |
|---|---|----------------|
| | Yes (%) | No/Unknown (%) |
| Suicide (n=60) | 14 (23.3%) | 46 (76.7%) |
| Accidental (n=1,397) | 902 (64.6%) | 495 (35.4%) |
| 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. June 2020. 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. Opioid-Involved Drug Overdoses Among Drug Overdose Decedents in Kentucky with History of Pain, 2017¹⁻²

| Type of Pain ³⁻⁴ | Type of Overdose | |
|---|--|------------------------------|
| | Opioid-involved Fatal Overdose (n=1,273) | Other Fatal Overdose (n=180) |
| Chronic Pain | 110 (8.6%) | 11 (6.11%) |
| Acute Pain | 30 (2.4%) | 6 (3.3%) |
| Pain, Not Otherwise Specified | 44 (3.5%) | <5 (*) |
| ¹ Counts are based on total number of DOFSS drug overdose fatalities with at least one drug present in toxicology results, n=1,453. | | |
| ² In accordance with state data release policy, counts less than five are suppressed. Any number associated with the suppressed count is labeled with an *. | | |
| 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. June 2020. 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. Most Frequent Drugs Detected in Post-Mortem Toxicology Test Results of Drug Overdose Decedents in Kentucky with History of Mental Illness, 2017¹

| Drug ²⁻⁴ | Decedent History of Mental Illness? ⁵ | | p-value ⁶ |
|-----------------------|--|---------------------------|----------------------|
| | Yes (%) N=181 | No/Unknown (%) N=1,272 | |
| Fentanyl | 74 (40.9%) | 745 (58.6%) | <.01 |
| Gabapentin | 62 (34.3%) | 404 (31.8%) | 0.50 |
| Morphine ⁷ | 55 (30.4%) | 617 (48.5%) | <.01 |
| Alprazolam | 48 (26.5%) | 299 (23.5%) | 0.37 |
| Clonazepam | 47 (26.0%) | 186 (14.6%) | <.01 |
| Cocaine | 33 (18.2%) | 250 (19.7%) | 0.65 |
| Codeine | 33 (18.2%) | 249 (19.6%) | 0.02 |
| Ethanol | 32 (17.7%) | 206 (16.2%) | 0.61 |
| Methamphetamine | 31 (17.1%) | 409 (32.2%) | <.01 |
| THC-COOH | 28 (15.5%) | 276 (21.7%) | 0.05 |
| Amphetamine | 26 (14.4%) | 343 (27.0%) | <.01 |
| Heroin | 26 (14.4%) | 318 (25.0%) | <.01 |
| Oxycodone | 23 (12.7%) | 193 (15.2%) | 0.38 |

¹Counts are based on total number of DOFSS drug overdose fatalities with at least one drug present in toxicology results for each group.

²Detected drugs identified in blood, urine, and/or vitreous fluids.

³Drugs are not mutually exclusive; decedents may have more than one drug detected.

⁴Parent drugs with unique metabolites are classified and represented by the parent drug only. All instances of the parent drug and unique metabolite(s) are counted once per decedent and labeled as the parent drug. This is true for all drugs with unique metabolites except for THC due to the lengthy metabolism of THC-COOH. A list of unique metabolites for each parent drug is found in Definitions.

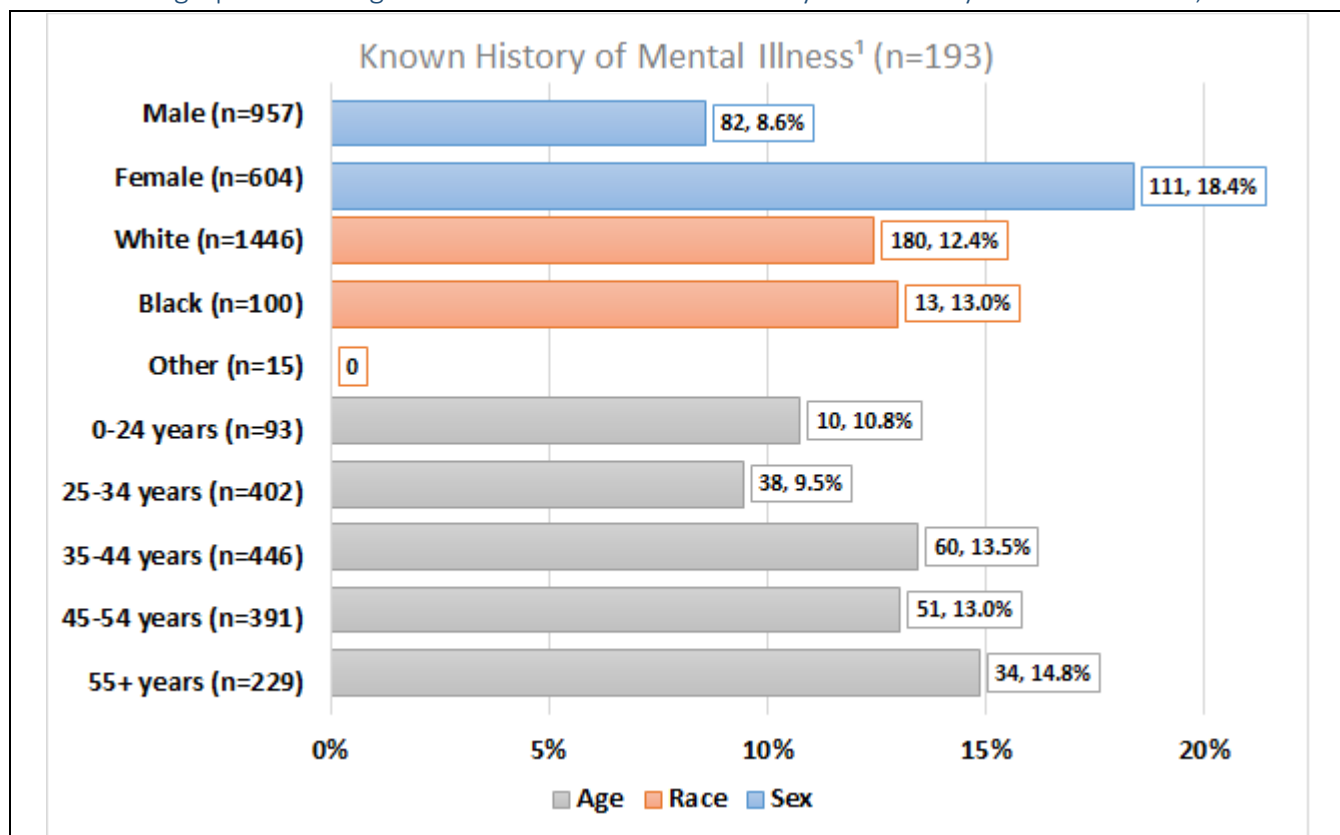
⁵Any reported history of mental illness identified by autopsy, coroner investigation, or medical records.

⁶p-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.

⁷Morphine may represent pure morphine and/or a metabolite of heroin.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. June 2020. 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, 2017¹⁻²



¹Any reported history of mental illness identified by autopsy, coroner investigation, or medical records.

²In accordance with state data release policy, counts less than five 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. June 2020. 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. Suicide and Accidental Manners of Death Among Drug Overdose Decedents in Kentucky with History of Mental Illness, 2017

| Manner of Death | Decedent History of Mental Illness? ¹ | |
|---|--|----------------|
| | Yes (%) | No/Unknown (%) |
| Accidental (n=1,397) | 143 (10.2%) | 1,254 (89.8%) |
| Suicide (n=60) | 34 (56.7%) | 26 (43.3%) |
| 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. June 2020. 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. | | |

PRESCRIPTION DRUG MONITORING PROGRAM (PDMP) HISTORY OF DRUG OVERDOSE DECEDENTS

Table 42. Most Frequent Schedule II–V Controlled Substances Dispensed to 2017 Drug Overdose Decedents in Kentucky, Three-Year Period Prior to Death Year (1/1/2015–12/31/2017)

| Generic Drug Name ¹ | Total Number of Prescriptions Dispensed Within Three-Year Period Prior to Death ² | Number of Decedents with Prescription Dispensed Within Three-Year Period Prior to Death ³ | Average Number of Prescriptions Dispensed to 2017 Drug Overdose Decedents Within Three-Year Period Prior to Death |
|--------------------------------|--|--|---|
| Hydrocodone | 5,127 (19.3%) | 691 (68.1%) | 7.4 |
| Oxycodone | 4,456 (16.8%) | 488 (48.1%) | 9.1 |
| Buprenorphine | 3,864 (14.5%) | 223 (22.0%) | 17.3 |
| Alprazolam | 2,491 (9.4%) | 168 (16.6%) | 14.8 |
| Clonazepam | 2,412 (9.1%) | 179 (17.6%) | 13.5 |
| Zolpidem | 1,108 (4.2%) | 89 (8.8%) | 12.4 |
| Diazepam | 1,076 (4.0%) | 122 (12.0%) | 8.8 |
| Tramadol | 908 (3.4%) | 233 (23.0%) | 3.9 |
| Pregabalin | 741 (2.8%) | 65 (6.4%) | 11.4 |
| Amphetamine | 500 (1.9%) | 33 (3.3%) | 15.2 |
| Morphine | 462 (1.7%) | 50 (4.9%) | 9.2 |
| Lorazepam | 449 (1.7%) | 73 (7.2%) | 6.2 |
| Gabapentin | 428 (1.6%) | 152 (15.0%) | 2.8 |
| Butalbital | 383 (1.4%) | 56 (5.5%) | 6.8 |
| Codeine | 353 (1.3%) | 158 (15.6%) | 2.2 |
| Methadone | 301 (1.1%) | 26 (2.6%) | 11.6 |
| Fentanyl | 220 (0.8%) | 23 (2.3%) | 9.6 |
| Carisoprodol | 197 (0.7%) | 16 (1.6%) | 12.3 |
| Temazepam | 128 (0.5%) | 12 (1.2%) | 10.7 |
| Testosterone | 114 (0.4%) | 14 (1.4%) | 8.1 |

¹Prescription may be for any formulation of the drug listed, including combination products that include non-controlled substances. Prescriptions may be for generic, name brand, or specialized release version of the drug. Prescriptions are not mutually exclusive; decedents may have prescriptions for multiple drugs.

²Includes every occurrence of the prescribed drug for each decedent within the stated timeframe; decedents may have multiple prescriptions dispensed for a single drug. Percentage is based on the total number of prescriptions dispensed to DOFSS drug overdose fatalities within three-year period, n=26,584.

³Multiple prescriptions for the same drug are counted as one prescription drug incident per decedent. Percentage is based on total number of DOFSS drug overdose fatalities with KASPER PDMP data available, n=1,015.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. June 2020. 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 43. Number of Drug Overdose Decedents with an Active Schedule II–V Prescription Dispensed for Drug(s) Detected in Post-Mortem Toxicology, Prescription Active 180 Days Prior to Death, 30 Days Prior to Death, and Day of Death^{1–2}

| Selected Drug Types Detected in Toxicology^{3–4} | Number of Drug Overdose Decedents with Prescription Active Within 180 Days Prior to Death | Number of Drug Overdose Decedents with Prescription Active Within 30 Days Prior to Death | Number of Drug Overdose Decedents with Prescription Active on Day of Death |
|---|--|---|---|
| Overall | 356 (35.1%) | 305 (30.0%) | 271 (26.7%) |
| Opioids (Excluding Buprenorphine/Naloxone) | 226 (22.3%) | 181 (17.8%) | 146 (14.4%) |
| Benzodiazepines | 173 (17.0%) | 156 (15.4%) | 139 (13.7%) |
| Stimulants | 9 (0.9%) | 7 (0.7%) | 5 (0.5%) |
| Gabapentin | 81 (8.0%) | 73 (7.2%) | 69 (6.8%) |

¹This analyses is unable to determine if the drug detected in the post-mortem toxicology result is in fact the drug dispensed to the decedent.

²Percentages are based on total number of DOFSS drug overdose fatalities with KASPER PDMP data available, n=1,015.

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

⁴Drug types are not mutually exclusive; decedents may have multiple drug types detected with an active prescription.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. June 2020. 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. Most Frequent Schedule II–V Opioids (Excluding Buprenorphine/Naloxone) Dispensed to 2017 Drug Overdose Decedents with Illicit Opioids Detected in Post-Mortem Toxicology, Three-Year Period (1/1/2015–12/31/2017)¹

| Generic Drug Name ² | Total Number of Prescriptions Dispensed to Illicit Opioid Overdose Decedents Within Three-Year Period Prior to Death ³ | Number of Illicit Opioid Overdose Decedents with Prescription Within Three-Year Period Prior to Death ⁴ | Average Number of Prescriptions Dispensed to Illicit Opioid Overdose Decedents with Prescription Within Three-Year Period Prior to Death |
|--------------------------------|---|--|--|
| Hydrocodone | 1,975 (44.0%) | 361 (66.0%) | 5.5 |
| Oxycodone | 1,704 (37.9%) | 261 (47.7%) | 6.5 |
| Tramadol | 309 (6.9%) | 105 (19.2%) | 2.9 |
| Methadone | 125 (2.8%) | 10 (1.8%) | 12.5 |
| Codeine | 124 (2.8%) | 69 (12.6%) | 1.8 |
| Morphine | 123 (2.7%) | 20 (3.7%) | 6.2 |
| Fentanyl | 66 (1.5%) | 8 (1.5%) | 8.3 |
| Oxymorphone | 37 (0.8%) | <5 (*) | - |
| Meperidine | 16 (0.4%) | <5 (*) | - |
| Hydromorphone | 10 (0.2%) | 5 (0.9%) | 2.0 |
| Pentazocine | <5 (*) | <5 (*) | - |

¹In accordance with state data release policy, counts less than five are suppressed. Any number directly associated with the suppressed count is labeled with an *. A count greater than five or an associated number may not be reported if that value would disclose a suppressed value; these are labeled with a -.

²Prescriptions may be for any formulation of the drug listed, including combination products that include non-controlled substances. Prescriptions may be for generic, name brand, or specialized release version of the drug. Prescriptions are not mutually exclusive; decedents may have prescriptions for multiple drugs.

³Includes every occurrence of the prescribed drug for each decedent within the stated timeframe; decedents may have multiple prescriptions dispensed for a single drug. Percentage is based on the total number of opioid prescriptions dispensed to DOFSS drug overdose fatalities with illicit opioids detected in post-mortem toxicology within three-year period, n=4,491.

⁴Multiple prescriptions for the same drug are counted as one prescription drug incident per decedent. Percentage is based on total number of DOFSS drug overdose fatalities with illicit opioids detected in post-mortem toxicology with KASPER PDMP data available, n=547.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. June 2020. 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 45. Number of Drug Overdose Decedents with Illicit Opioids Detected in Post-Mortem Toxicology with an Active Schedule II–V Opioid Prescription (Excluding Buprenorphine/Naloxone), Prescription Active 180 Days Prior to Death, 30 Days Prior to Death, and Day of Death^{1–2}

| | Number of Illicit Opioid Overdose Decedents with Opioid Prescription^{3–5} |
|---|---|
| Opioid Prescription Active Within 180 Days Prior to Death | 212 (38.5%) |
| Opioid Prescription Active Within 30 Days Prior to Death | 102 (18.5 %) |
| Opioid Prescription Active on Day of Death | 55 (10.0%) |
| ¹ This analyses is unable to determine if the drug detected in the post-mortem toxicology result is in fact the drug dispensed to the decedent. ² Opioid prescriptions excluded naloxone and buprenorphine. ³ Percentage is based on total number of DOFSS drug overdose fatalities with illicit opioids detected in post-mortem toxicology with KASPER PDMP data available, n=547. ⁴ Drug testing of blood, urine, and/or vitreous fluids. ⁵ Drug types are not mutually exclusive; decedents may have multiple drug types detected with an active prescription. | |
| Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. June 2020. 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 46. Most Frequent Schedule II–V Controlled Substances Detected in Post-Mortem Toxicology of 2017 Drug Overdose Decedents in Kentucky Without a Prescription Identified, Three-Year Period Prior to Death Year (1/1/2015–12/31/2017)¹

| Drug ²⁻³ | Count | Percentage ⁴ |
|---------------------|-------|-------------------------|
| Fentanyl | 493 | 48.6% |
| Morphine | 382 | 37.6% |
| Gabapentin | 266 | 26.2% |
| Amphetamine | 217 | 21.4% |
| Alprazolam | 154 | 15.2% |
| Nordiazepam | 55 | 5.4% |
| Temazepam | 50 | 4.9% |
| Methadone | 36 | 3.5% |
| Buprenorphine | 35 | 3.4% |
| Oxymorphone | 34 | 3.3% |
| Hydromorphone | 28 | 2.8% |
| Diazepam | 27 | 2.7% |
| Hydrocodone | 21 | 2.1% |
| Tramadol | 21 | 2.1% |
| Lorazepam | 15 | 1.5% |

¹This analyses is unable to determine the original source of the drug detected in the post-mortem toxicology result. The drug may be legally dispensed, diverted, and/or clandestinely produced.

²Drug testing of blood, urine, and/or vitreous fluids.

³Drug types are not mutually exclusive; decedents may have multiple drug types detected with an active prescription.

⁴Percentage is based on total number of DOFSS drug overdose fatalities with KASPER PDMP data available, n=1,015.

Produced by the Kentucky Injury Prevention and Research Center, as bona fide agent for the Kentucky Department for Public Health. June 2020. 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 47. Number and Percentage of Drug Overdose Fatality Coroner Investigation Reports Received for DOFSS, 2015–2017

| Investigation Report Received? | Yes (%) ¹ | No (%) |
|---|----------------------|-------------|
| 2015 | 995 (79.4%) | 258 (20.6%) |
| 2016 | 1,172 (81.3%) | 269 (18.7%) |
| 2017 | 1,234 (79.5%) | 318 (20.5%) |
| ¹ Kentucky residents who died out of state were excluded from coroner request analysis. | | |
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Table 48. Identification of Specific Drug Involvement Using a Multi-Source Surveillance System, 2016–2017¹

| Data Source(s) Used | Number of Drug Overdose Fatalities with Specific Drugs Identified, 2016, N=1,457 (%) | Number of Drug Overdose Fatalities with Specific Drugs Identified, 2017, N=1,561 (%) | % Change from 2016 |
|---|--|--|--------------------|
| • Death Certificate | 1,190 (81.7%) | 1,389 (89.0%) | 16.7% |
| • Death Certificate • Autopsy Report | 1,310 (89.9%) | 1,444 (92.5%) | 10.2% |
| • Death Certificate • Autopsy Report • Toxicology Report | 1,418 (97.3%) | 1,518 (97.2%) | 7.1% |
| • Death Certificate • Autopsy Report • Toxicology Report • Coroner Report | 1,419 (97.4%) | 1,521 (97.4%) | 7.2% |
| 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. June 2020. 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. | | | |