

# Kentucky's Drug Overdose Burden, 2016-2017



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## Overview

Injury surveillance and personal tragedies remind the nation of the ongoing struggle with the overdose epidemic. Drug use and distribution remain a persistent problem in Kentucky, a state ranking among the highest for poor drug overdose related outcomes. The prevention of drug overdoses is a core focus area in Kentucky's State and Strategic Plan for Violence and Injury Prevention, 2017-2021<sup>1</sup>. As drug overdose prevention and the mitigation of harm from drug use requires a multi-faceted approach, this report examines drug overdose related trends in Kentucky through the joint analysis of public health and public safety data sources, particularly death certificates, emergency department records, inpatient hospitalization records, and law enforcement arrests from 2016-2017. Drug related counts and rates from the data sources were calculated, and mapped to develop county level Drug Overdose Burden Index Scores. The Drug Overdose Burden Index Scores were analyzed using an ArcGIS geospatial tool to identify Hot Spots (high burden counties) across Kentucky. Public health, healthcare, and public safety professionals may use the data in this report and the identified high Drug Overdose Burden Index Scores and/or Hot Spot counties to prioritize and concentrate drug overdose prevention, treatment, and recovery efforts.

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<sup>1</sup> Kentucky Strategic Plan for Violence and Injury Prevention, 2017-2021. Retrieved from [http://www.mc.uky.edu/kiprc/programs/kvip/Kentucky State Injury Plan 2017-2021.pdf](http://www.mc.uky.edu/kiprc/programs/kvip/Kentucky%20State%20Injury%20Plan%202017-2021.pdf). Kentucky Injury Prevention and Research Center, Lexington, KY.

## Data

Multi-source drug related data were compiled for years 2016-2017 and aggregated at the county level. The drug related data include drug overdose fatalities, arrests, emergency department visits, and hospitalizations.

Drug overdose related fatalities, based on county of residence, were identified by ICD-10 codes with an underlying cause of death as X40-X44 (accidental/unintentional drug poisoning), X60-X64 (suicide by drug poisoning), X85 (homicide by drug poisoning), and Y10-Y14 (drug poisoning with undetermined intent). Data Source: Kentucky Death Certificate Database [2016-2017], Frankfort, KY: Kentucky Office of Vital Statistics, Cabinet for Health and Family Services.

Drug related arrest counts, based on county of occurrence, could be greater than the number of individuals arrested, as an individual may be arrested more than once. Data Source: Crime in Kentucky: Commonwealth of Kentucky 2016-2017 Crime Reports, Frankfort, KY: Kentucky State Police.

Drug overdose related emergency department visits, based on county of residence, represented encounters of care and could be greater than the number of individual patients treated. Emergency department visits were identified by an ICD-10-CM diagnosis code in the range T36-T50 with a 6<sup>th</sup> character of 1, 2, 3, or 4; or an ICD-10-CM diagnosis code of T369, T379, T399, T414, T427, T439, T459, T479, or T499 with a 5<sup>th</sup> character of 1, 2, 3, or 4. To avoid duplicate counts, emergency department visits excluded visits resulting in hospitalizations. Data Source: Kentucky Outpatient Hospitalization Claim Files [2016-2017], Frankfort, KY: Cabinet for Health and Family Services, Office of Health Policy.

Drug overdose related hospitalizations, based on county of residence, represented encounters of care and could be greater than the number of individual patients treated in acute care facilities. Drug

overdose related hospitalizations were identified by an ICD-10-CM diagnosis code in the range T36-T50 with a 6<sup>th</sup> character of 1, 2, 3, or 4; or an ICD-10-CM diagnosis code of T369, T379, T399, T414, T427, T439, T459, T479, or T499 with a 5<sup>th</sup> character of 1, 2, 3, or 4. Data sources: Kentucky Inpatient Hospitalization Claim Files [2016-2017], Frankfort, KY: Cabinet for Health and Family Services, Office of Health Policy.

## Analysis

Drug overdose fatality counts abided by state data suppression agreements and counts were calculated at the county level. Arrest, emergency department visit, and hospitalization counts were used to calculate rates per 10,000 population<sup>2</sup> at the county level.

Drug related arrest, emergency department, and hospitalization rates as well as fatality counts were mapped at the county level using ArcGIS/ArcMap. Each drug related count and rate was used to calculate a Drug Overdose Burden Index Score.<sup>3</sup> Drug Overdose Burden Index Scores were then analyzed using a geospatial tool in ArcGIS/ArcMap. Part of this analysis involved the autocorrelation testing of the Drug Overdose Burden Index Score using cluster and outlier analysis (Anselin Local Morans I). Second, statistically significant Hot Spots were identified using Getis-Ord Gi\* statistics. Statistically significant (Hot Spots) counties are contingent on the index scores of adjacent counties. For example, county clusters of high Drug Overdose Burden Index Scores would produce Hot Spots. Statistical significance was indicated by p-values of 0.10 (90% Confidence), 0.05 (95% Confidence), and 0.01 (99% Confidence).

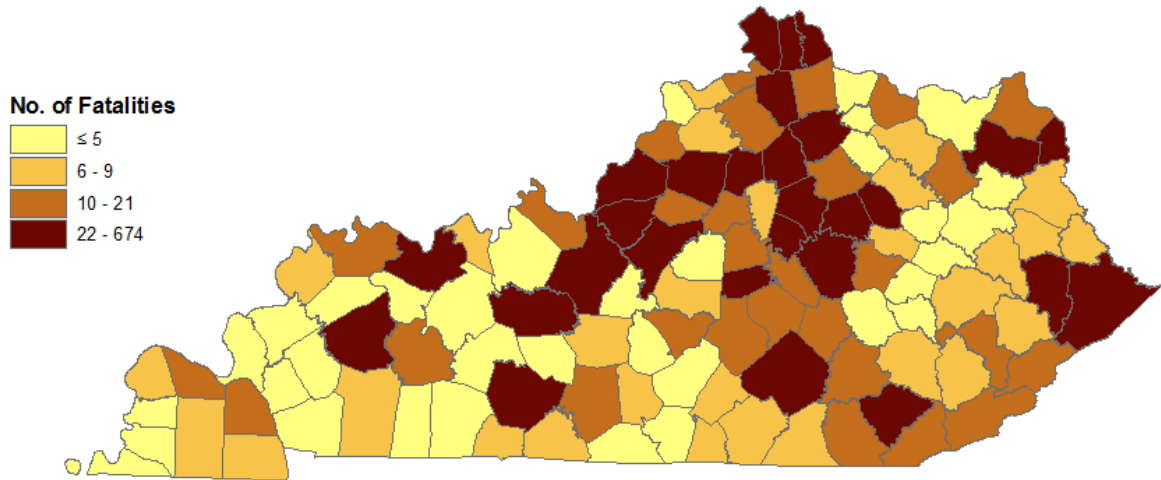
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<sup>2</sup> County population counts were derived from the United States Census Bureau, Population Division. Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2017.

<sup>3</sup> Ward, P., & Bunn, T. (2017). Development of an opioid overdose index score. *University of Kentucky College of Public Health Research Day*, Lexington, KY, March 30, 2017.

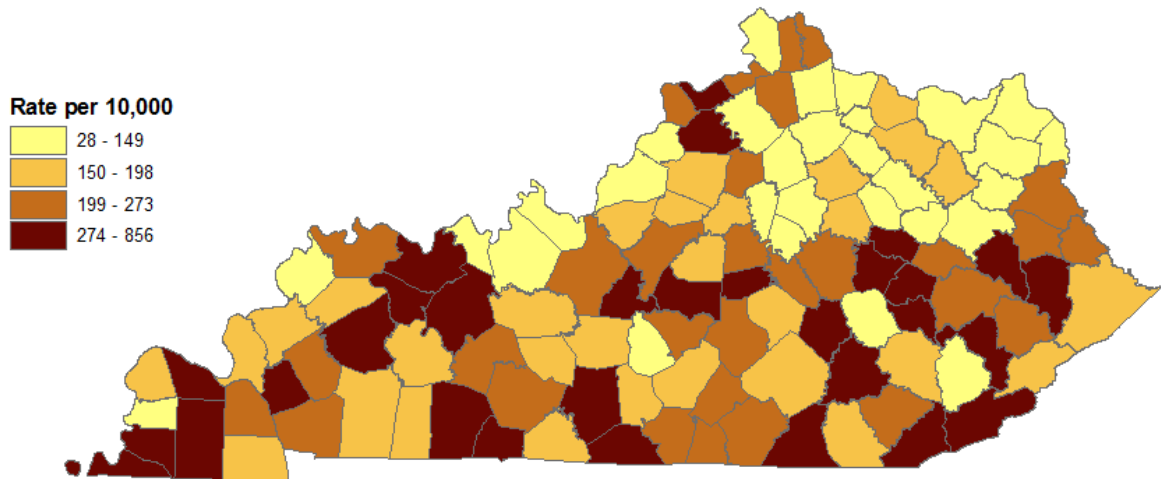
# Results

## Kentucky Resident Drug Overdose Fatality Counts, 2016-2017



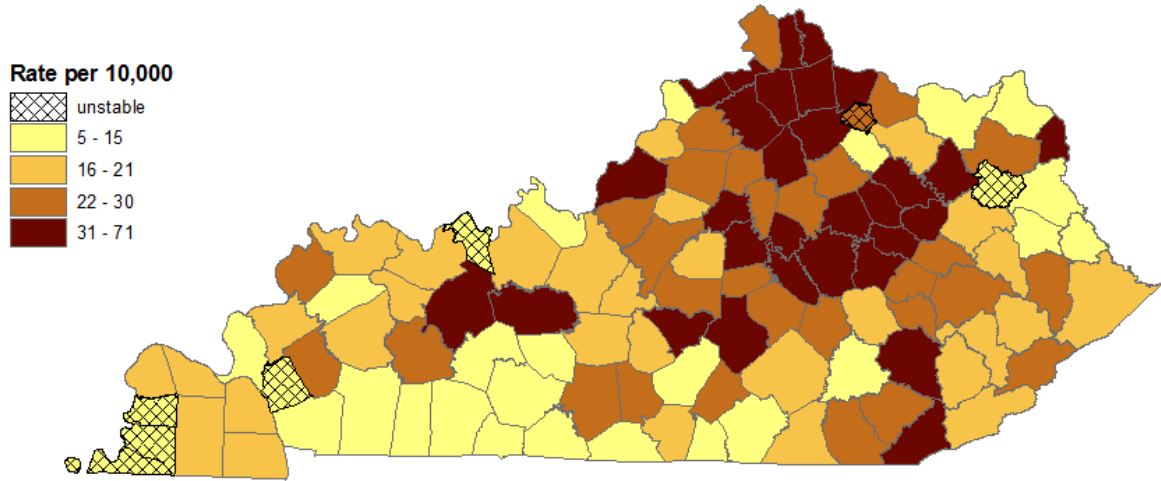
Count is the number of drug overdose fatalities by county of residence. Produced by the Kentucky Injury Prevention and Research Center, as a bona fide agent for the Kentucky Department for Public Health. September 2018. Data source: Kentucky Death Certificate Database [2016-2017], Frankfort, KY: Kentucky Office of Vital Statistics, Cabinet for Health and Family Services. Data are provisional and subject to change.

## Drug Related Arrest Rates by Kentucky County of Occurrence, 2016-2017



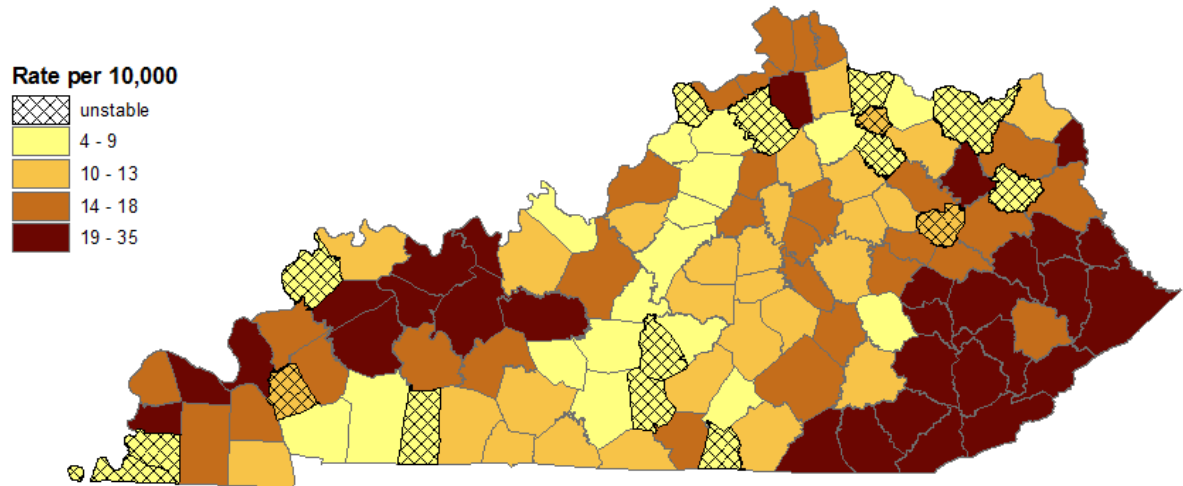
Rates are based on the number of drug related arrests per 10,000 population. Counts are based on county of occurrence. Produced by the Kentucky Injury Prevention and Research Center, as a bona fide agent for the Kentucky Department for Public Health. September 2018. Data source: Crime in Kentucky: Commonwealth of Kentucky 2016-2017 Crime Reports, Frankfort, KY: Kentucky State Police. Data are provisional and subject to change.

## Kentucky Resident Drug Overdose Related Emergency Department Visit Rates, 2016-2017



Rates are based on the number of drug overdose related events resulting in emergency department visits per 10,000 Kentucky residents. Emergency department visits resulting in inpatient hospitalizations were not included in emergency department visits counts. Rates based on counts less than 20 may be unstable. Counts are based on county of residence. Produced by the Kentucky Injury Prevention and Research Center, as a bona fide agent for the Kentucky Department for Public Health. September 2018. Data source: Kentucky Outpatient Hospitalization Claim Files [2016-2017], Frankfort, KY: Cabinet for Health and Family Services, Office of Health Policy. Data are provisional and subject to change.

## Kentucky Resident Drug Overdose Related Hospitalization Rates, 2016-2017



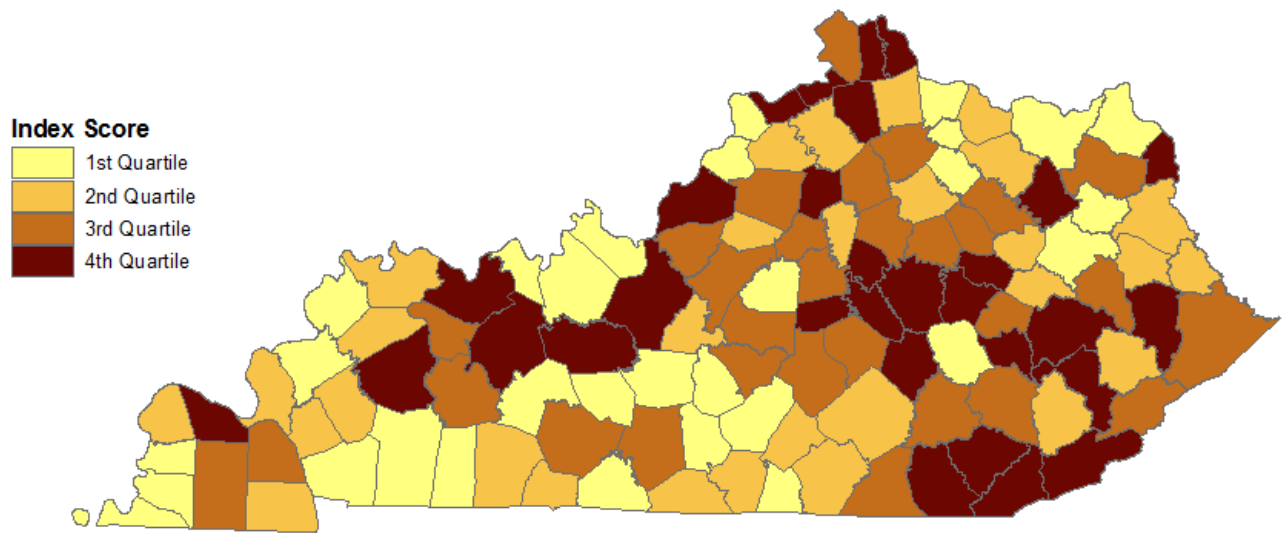
Rates are based on the number of drug overdose related events resulting in inpatient hospitalizations per 10,000 Kentucky residents among acute care facilities. Rates based on counts less than 20 may be unstable. Counts are based on county of residence. Produced by the Kentucky Injury Prevention and Research Center, as a bona fide agent for the Kentucky Department for Public Health. September 2018. Data source: Kentucky Inpatient Hospitalization Claim Files [2016-2017], Frankfort, KY: Cabinet for Health and Family Services, Office of Health Policy. Data are provisional and subject to change.

**The Top 10 Counties for Drug Overdose Related Fatalities<sup>1</sup>, Drug Arrest Rates<sup>2</sup>, Drug Overdose Related Hospitalization<sup>1</sup> and Emergency Department<sup>1</sup> Rates, 2016-2017**

	<b>Drug Overdose Related Fatalities</b>	<b>Drug Related Arrest Rate</b>	<b>Drug Overdose Related Hospitalization Rate</b>	<b>Drug Overdose Emergency Department Visit Rate</b>
<b>1.</b>	Jefferson	Lyon	Perry	Grant
<b>2.</b>	Fayette	Carroll	Owsley	Kenton
<b>3.</b>	Kenton	Ohio	Magoffin	Harrison
<b>4.</b>	Campbell	Fulton	Clay	Carroll
<b>5.</b>	Boone	Bell	Letcher	Clay
<b>6.</b>	Madison	Rockcastle	Carlisle	Campbell
<b>7.</b>	Boyd, Bullitt	Owsley	Breathitt	Jessamine
<b>8.</b>	<i>(tied)</i>	Magoffin	Rowan	Gallatin
<b>9.</b>	Jessamine	Larue	Harlan	Boyd
<b>10.</b>	Hardin	Graves	McCracken	Jefferson

Note: <sup>1</sup>Based on the county of residence; <sup>2</sup>Based on the county of occurrence. Produced by Kentucky Injury Prevention and Research Center, as a bona fide agent for the Kentucky Department for Public Health. September 2018. Data Sources: Kentucky Death Certificate Database, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Crime in Kentucky: Commonwealth of Kentucky Crime Reports, Kentucky State Police (KSP); Kentucky Outpatient Services Database, Office of Health Policy; Kentucky Inpatient Hospitalization Claims Files; Cabinet for Health and Family Services, Office of Health Policy. Data are provisional and subject to change.

## Kentucky Drug Overdose Burden Index Score, 2016-2017



Index Score is calculated by averaging county ranks in the 1) drug overdose related fatalities; 2) drug arrest rates; 3) drug overdose related emergency department rates; and, 4) drug overdose related hospitalization rates. Produced by the Kentucky Injury Prevention and Research Center, as a bona fide agent for the Kentucky Department for Public Health. September 2018. Data Sources: Kentucky Death Certificate Database, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Crime in Kentucky: Commonwealth of Kentucky Crime Reports, Kentucky State Police (KSP); Kentucky Outpatient Services Database, Office of Health Policy; Kentucky Inpatient Hospitalization Claims Files; Cabinet for Health and Family Services, Office of Health Policy. Data are provisional and subject to change.

### **Top 15 Kentucky Counties with the Highest Drug Overdose Burden Index Scores, 2016-2017**

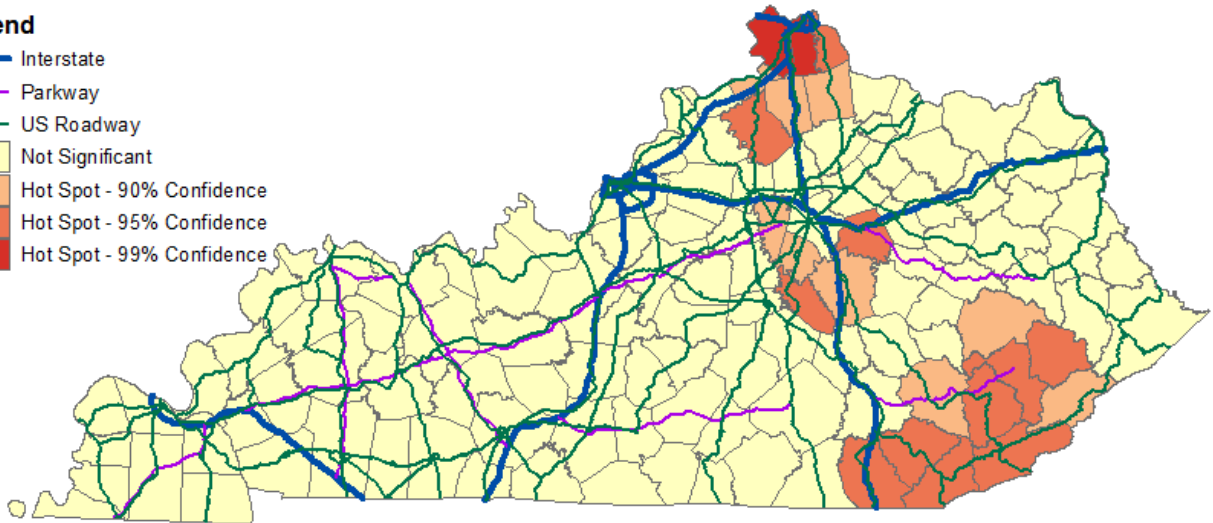
<b>1)</b>	Bell
<b>2-3)</b>	Campbell, Grant
<b>4)</b>	Kenton
<b>5)</b>	Floyd
<b>6)</b>	Perry
<b>7)</b>	Boyd
<b>8-9)</b>	Estill, Powell
<b>10)</b>	Daviess
<b>11)</b>	Franklin
<b>12)</b>	McCracken
<b>13-14)</b>	Gallatin, Harlan
<b>15)</b>	Grayson



## Kentucky Drug Overdose Burden Hot Spots, 2016-2017

### Legend

- Interstate
- Parkway
- US Roadway
- Not Significant
- Hot Spot - 90% Confidence
- Hot Spot - 95% Confidence
- Hot Spot - 99% Confidence



Hot Spots are derived from the Index Score. Index Score is calculated by averaging county ranks in the 1) drug overdose related fatalities; 2) drug arrest rates; 3) drug overdose related emergency department rates; and, 4) drug overdose related hospitalization rates. Produced by the Kentucky Injury Prevention and Research Center, as a bona fide agent for the Kentucky Department for Public Health. September 2018. Data Sources: Kentucky Death Certificate Database, Kentucky Office of Vital Statistics, Cabinet for Health and Family Services; Crime in Kentucky: Commonwealth of Kentucky Crime Reports, Kentucky State Police (KSP); Kentucky Outpatient Services Database, Office of Health Policy; Kentucky Inpatient Hospitalization Claims Files; Cabinet for Health and Family Services, Office of Health Policy. Data are provisional and subject to change.

### Statistically Significant Kentucky Drug Overdose Burden Hot Spots (Counties), 2016-2017<sup>1</sup>

#### Highest Burden (99% Confidence):

Boone, Kenton

#### Second Highest Burden (95% Confidence):

Bell, Campbell, Clark, Garrard, Harlan, Knott, Knox, Leslie, Owen, Perry, Whitley

#### Third Highest Burden (90% Confidence):

Breathitt, Clay, Gallatin, Grant, Jessamine, Letcher, Madison, Pendleton, Woodford

Note: <sup>1</sup>Counties are presented in alphabetical order.

## Summary

The northern, central, and southeastern regions of Kentucky had elevated drug overdose related morbidity and mortality, as well as drug related arrests. The top ten highest combined Drug Overdose Burden Index Scores were (in hierarchical order) 1) Bell, 2-3) Campbell and Grant, 4) Kenton, 5) Floyd, 6) Perry, 7) Boyd, 8-9) Estill and Powell, and 10) Daviess Counties. The statistically significant Hot Spots identified (in alphabetical order): were Bell, Boone, Breathitt, Campbell, Clark, Clay, Gallatin, Garrard, Grant, Harlan, Jessamine, Kenton, Knott, Knox, Leslie, Letcher, Madison, Owen, Pendleton, Perry, Whitley, and Woodford Counties.

Injury surveillance and the incorporation of various analytic tools allow for the prioritization of drug related prevention and intervention efforts, and the leveraging of resources across Kentucky. For example, law enforcement professionals can request additional resources (e.g., naloxone, drug enforcement investigations, and personal protective equipment) and staff to support prevention efforts in these high burden areas. Public health agencies can maintain the Core Functions of Public Health<sup>4</sup>: 1) assessment (e.g., surveillance to inform interventions, and evaluation); 2) policy development (i.e., ensure adequate laws and protections are in place to protect the public and professionals serving the public); and, 3) assurance (e.g., sustaining naloxone access and harm reduction, mobilizing community partnerships, and assuring a competent public health and healthcare workforce). Healthcare can ensure providers recognize opioid use and risk factors, practice safe opioid prescribing (including other non-opioid pain management therapies), and administer naloxone. Public safety, public health, and healthcare professionals can link individuals

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<sup>4</sup> Centers for Disease Control and Prevention. (2018). The Public Health System & the 10 Essential Public Health Services. Retrieved from <https://www.cdc.gov/stltpublichealth/publichealthservices/essentialhealthservices.html>. Last updated June 26, 2018.

to needed healthcare services in their respective counties using Kentucky's near real-time substance use disorder treatment availability locator [FindHelpNowKY.org](https://www.findhelpnowky.org).<sup>5</sup> Injury surveillance data (e.g., unintentional and intentional poisonings) and other drug-related data (e.g., law enforcement data) will continue to be of value to the dynamics of the drug overdose epidemic, and inform public health and public safety efforts and resource allocations.

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<sup>5</sup> FindHelpNowKY.org was created by the Kentucky Injury Prevention and Research Center (KIPRC) as a bona fide agent for the Kentucky Department for Public Health in partnership with the Kentucky Office of Drug Control Policy, the Kentucky Department for Behavioral Health, Developmental and Intellectual Disabilities, and Operation UNITE.