



2023



Knox and Anderson Counties Drug-Related Death Report

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A Letter From The Chief Medical Examiner Of Knox and Anderson Counties

This year's drug-related death report is slightly optimistic despite a bit of unfavorable news. Some of the wording might be repetitive from last year's report, however, bringing awareness of what is happening in our community will ultimately lead to the appropriate preventative measures, behaviors, and actions, individual and community based.

Knox County overdose deaths decreased by 5 percent compared to the 2 percent increase in 2022. Overdose deaths in Anderson County decreased by 6 percent compared to the 22 percent decrease the previous year. The drug-related death toll and related trends are promising again, similar to 2019 or the pre-COVID year, however mixed drug intoxications continue to be the leading culprit. Fentanyl, fentanyl analogues, several novel synthetic opioids and other designer drugs including illicit benzodiazepines continue to be the most abused drugs. Methamphetamine, which is still the stimulant drug of choice in East Tennessee, is frequently used in combination with opioids. Cocaine is encountered occasionally, but trails significantly behind methamphetamine abuse. Alcohol continues to be among the top five most frequently abused substances and as such it usually contributes to combined drug intoxications. It is also important to keep in mind that many unattended deaths that fell under the Medical Examiner jurisdiction in 2023 were caused by sequelae of chronic alcohol abuse, which (unlike accidental acute drug overdose deaths) are classified as natural manner of death.

In Knox and Anderson counties, the lives of men in the 35 to 44 age group continue to be disproportionately taken by drugs compared to women (68 percent men versus 32 percent women in Knox County and Anderson County). In more urban areas, like the City of Knoxville, the ratio of black to white overdose deaths continued to be approximately 1:9, which is reflective of the community's demographic composition. Tragically, the sharpest increase in drug induced deaths in 2023 was in individuals aged 15 to 24.

When society discusses preventative measures to reduce risks of bad life outcomes, we frequently focus on objects instead of people. Most drug overdose deaths are mannered as accidents and in many communities are the number one reason for accidental deaths-surpassing motor vehicle accidents. That means that in most jurisdictions including ours, most accidents, especially among young folks, are avoidable. It takes a lot of effort, from parents to educators, to raise and properly educate our children to become productive members of a society that is free of drugs. Nevertheless, that sort of approach and world view will save their lives and is worth the effort.

This year, there are even more tongue twisting drugs on the illicit market. They are deadlier than ever when used alone let alone in combination with other drugs. Snorting and/or intravenous drug abuse continue to be the predominant modes of intake in drug-related deaths. The combination of stronger drugs and direct modes of administration (such as injections directly into the blood stream or the muscle), continue to render naloxone ineffective.

Knox County Regional Forensic Center (RFC) continues to be at the forefront of the antidrug abuse

effort by providing real time insight into the trends and spikes or unusual occurrences in drug-related deaths. Some of the unusual and unexpected toxic substances have been detected early on in our jurisdictional area due to our tireless efforts to be on top of the dangerous and reportable toxicologic trends.

That brings me to the topic of xylazine and Bromazolam, two of the most frequently encountered substances that used to be detected by our reference toxicology laboratory as “out of scope” drugs. They used to be rare and unusual, however, both are now in the top six most detected intoxicants that contributed to the drug-related mortality in 2023 (the table summarizing the frequency of different substance representation in 2023 drug-related deaths and over the last five years is on the last page of the report). Xylazine is a veterinary sedative that has shown up in toxicology results frequently throughout the United States. Acute intoxication resembles opioid toxicity, however chronic side effects can be even more devastating such as soft tissue necrosis resulting in widespread skin ulcers, bone marrow infection and sepsis. Bromazolam is a benzodiazepine that was originally developed as a candidate medication but was never approved for use. The reported effects of intentional use include “hypnotic” and “sedative” sensations in addition to muscle relaxation and analgesia. Most often these drugs are combined with more potent substances as fillers or adulterants. Their detection is important in terms of quantifying their interaction with both potent opioids and stimulants that makes them more dangerous together. Moreover, tracking their occurrences in our community may assist the local law enforcement agencies and Drug Enforcement Administration (DEA) in identifying the sources and pathways of distribution by the major illicit substance suppliers in the country. More information about the RFC’s participation with the DEA in researching fentanyl and other novel substance-related deaths can be found [here](#).

On a positive note, raw data collected during the first quarter of 2024 projects continuous decrease in drug-related deaths. Deadly accidents, especially motor vehicle crashes, and homicides, can frequently be tragic secondary effects of illicit drug use. That specific data can be found in the [KCRFC Annual Report](#).

The list of questions about why opioid and other drug problems continue to plague our communities is unending and as diverse as the victims. After several years of drug-related death reporting, one fact remains unchanged: If the trend continues, the life expectancy of our residents will continue to decrease in comparison to other developed modern nations either due to acute short term toxic effects of drugs or their chronic long term effects on all organ systems leading to serious life threatening comorbidities.



Darinka Mileusnic-Polchan, MD, PhD

2023 Key Findings

The overdose epidemic in Knox County mirrors the rest of the nation and is growing in magnitude but also changing in character. Last year, 519 people died from drug overdoses in Knox County compared to 544 in 2022; and 62 people died in Anderson County compared to 66 in 2022. Preliminary data for drug-related deaths in 2024 indicates Knox County could see a decreasing trend for drug-related death cases. Drug-related deaths increasingly involve synthetic opioids (fentanyl and fentanyl analogs), while those caused by prescription opioids (oxycodone, oxymorphone, hydrocodone, etc.) are decreasing.

2023 Report Highlights for Knox and Anderson Counties:

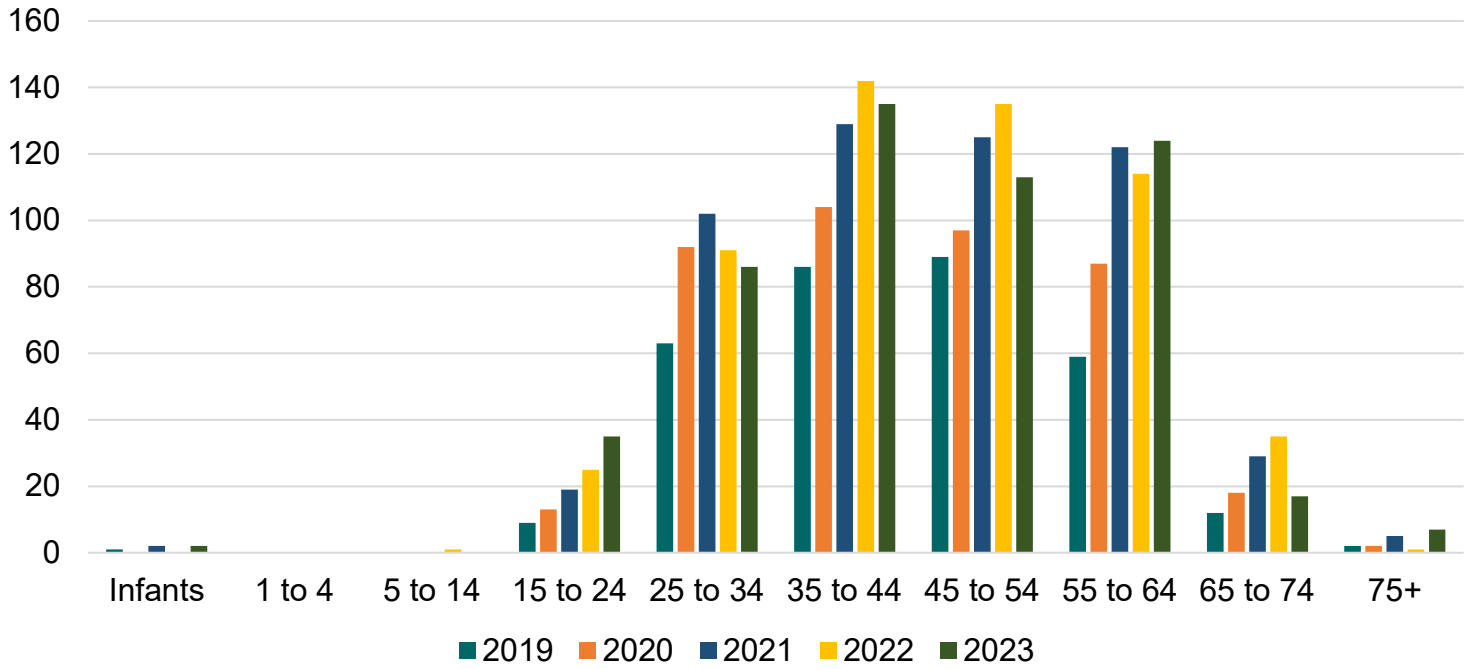
- Knox County experienced a 5 percent decrease in drug-related deaths between 2022 to 2023.
- Drug-related deaths in Anderson County decreased by 6 percent from 2022 to 2023.
- Fentanyl and fentanyl analogues (synthetic opioids) were the most frequently identified drugs in drug-related deaths in 2023.
- Polypharmacy, which is when more than one drug is responsible for death, was involved in 71 percent of drug-related deaths in Knox County and 74 percent in Anderson County.
- The five most common drugs identified in drug-related deaths in 2023 were synthetic opioids, methamphetamine, cocaine, xylazine, and alcohol/ethanol.
- Prescription opioid-related deaths continue to decrease in our jurisdictions.
- People 35 to 44-years-old experienced the most drug deaths in Knox County, but the sharpest increase was in individuals aged 15 to 24-years-old and ages 75+.
- The presence of anxiolytic, anti-depressant, and anti-psychotic medication was found in 22 percent of all drug-related deaths in Knox County and 16 percent in Anderson County

Data and Methods

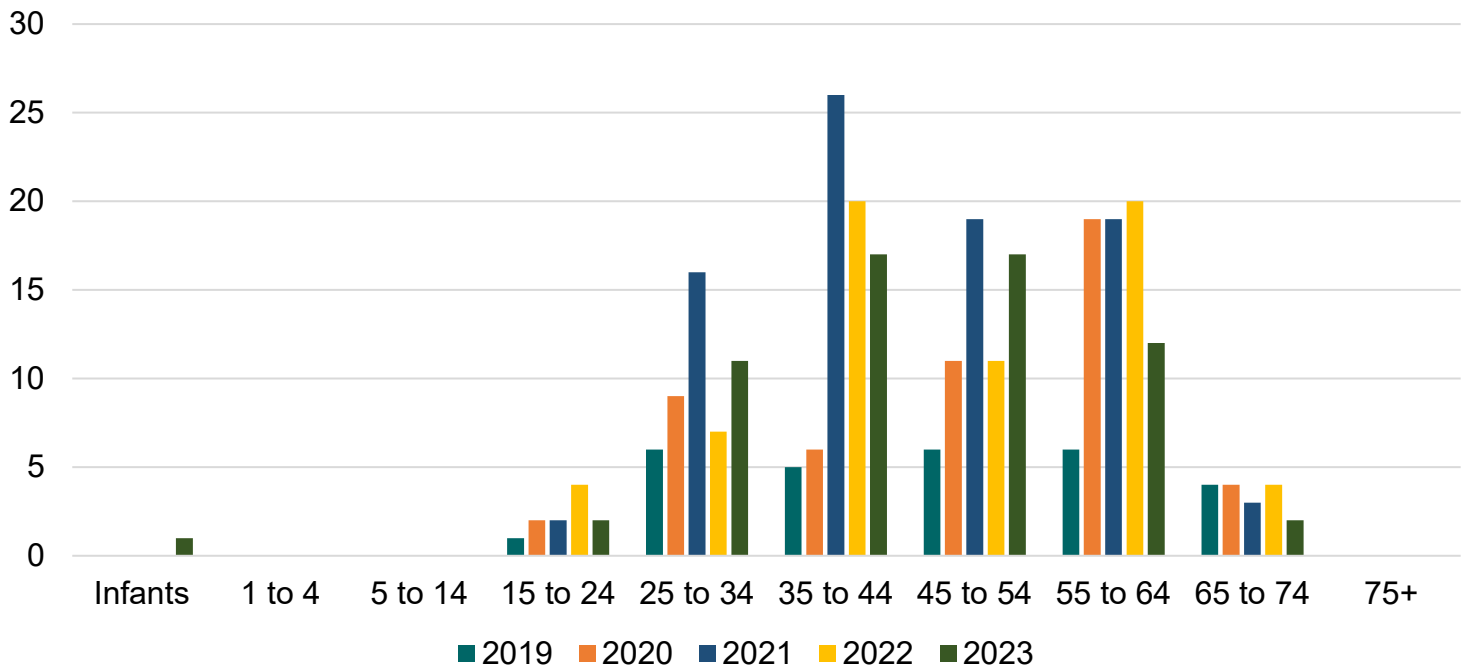
The Knox and Anderson County Medical Examiner database (MDILog) was queried for possible drug-related causes of death for cases accepted under medical examiner jurisdiction between January 1, 2023, and December 31, 2023. The initial query included non-motor vehicle accidents, undetermined, and suicide manners of death. The initial data set was examined to ensure all included cases were drug-related deaths (as determined by the forensic pathologist of record). Causes of death related to the chronic effects of drugs and alcohol abuse (bacterial endocarditis, chronic ethanol use, etc.) were excluded from the dataset.

NIHCM 2021 <https://nihcm.org/publications/the-evolution-of-the-opioid-crisis-2000-2018>

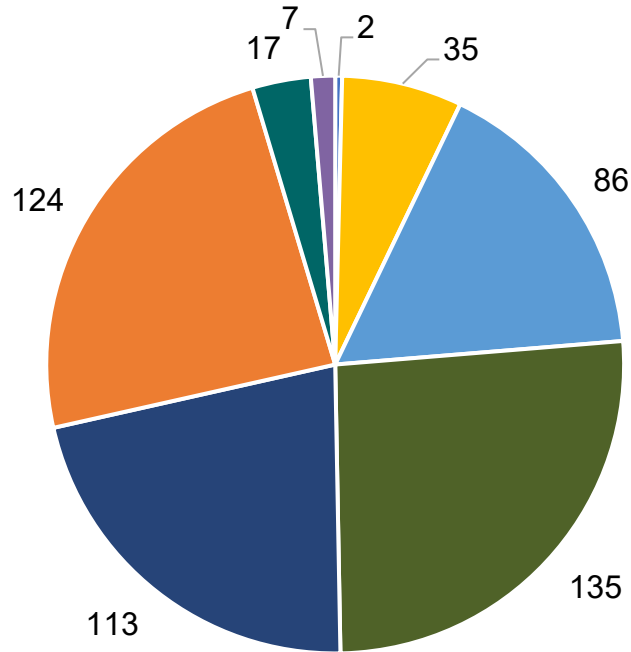
Knox County
Age Distribution for Drug-Related Cases
2019-2023



Anderson County
Age Distribution for Drug-Related Cases
2019-2023



Knox County
2023 Drug-Related Deaths
by Age Distribution

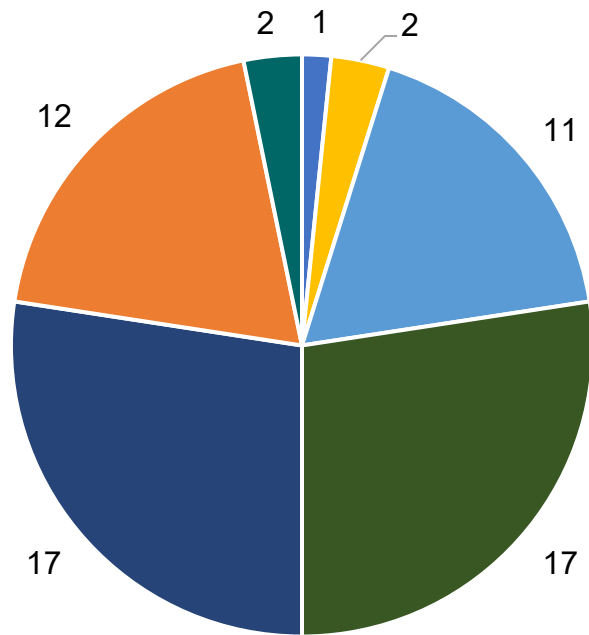


■ Infants ■ 1 to 4 ■ 5 to 14 ■ 15 to 24 ■ 25 to 34 ■ 35 to 44 ■ 45 to 54 ■ 55 to 64 ■ 65 to 74 ■ 75+

Knox County 2023 Drug-Related Deaths
by Age Distribution and the Percentage of Change

Infants	1 to 4	5 to 14	15 to 24	25 to 34	35 to 44	45 to 54	55 to 64	65 to 74	75+
100%	0%	-100%	40%	-5%	-5%	-16%	9%	-51%	600%

Anderson County
2023 Drug-Related Deaths
by Age Distribution

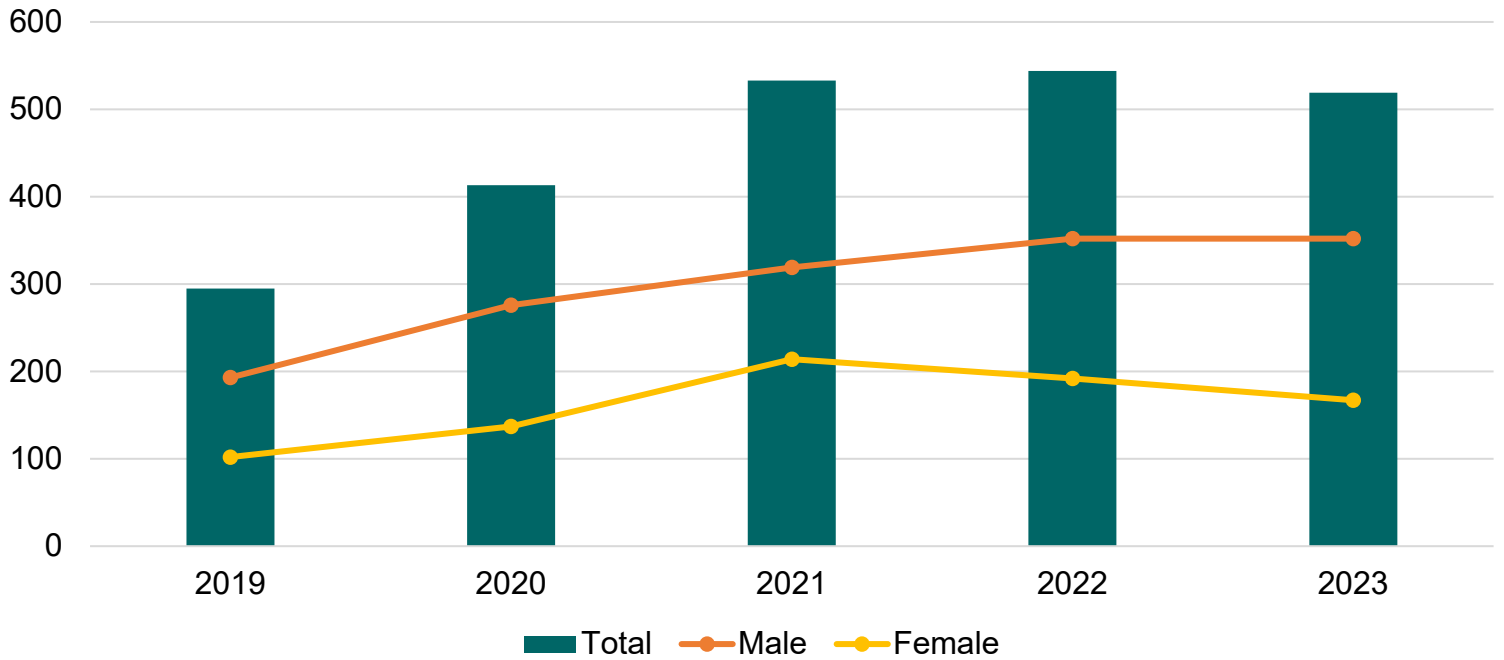


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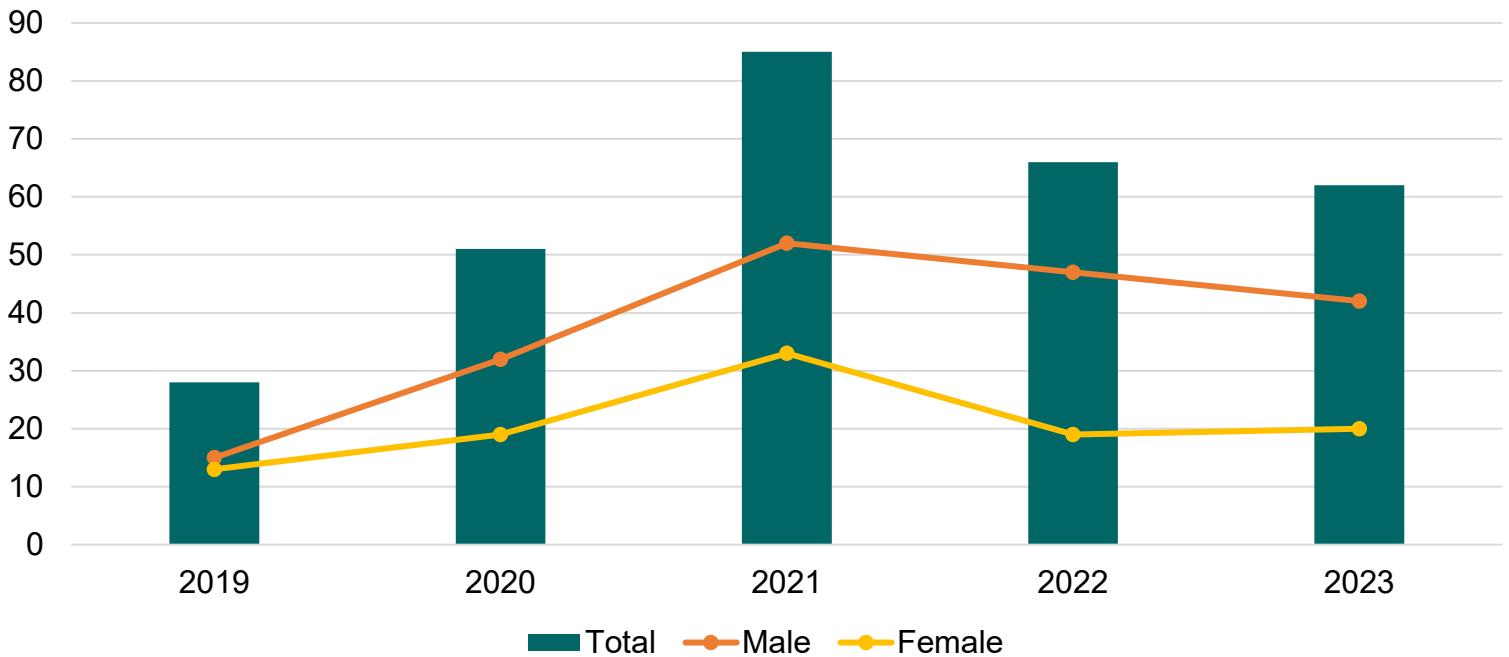
Anderson County 2023 Drug-Related Deaths
by Age Distribution and the Percentage of Change

Infants	1 to 4	5 to 14	15 to 24	25 to 34	35 to 44	45 to 54	55 to 64	65 to 74	75+
100%	0%	0%	-100%	57%	-15%	55%	-40%	-100%	0%

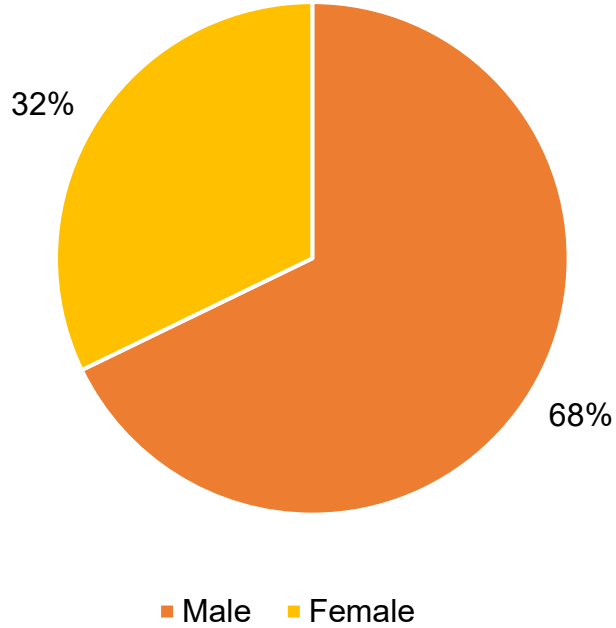
Knox County Drug-Related Death Distribution by Gender 2019-2023



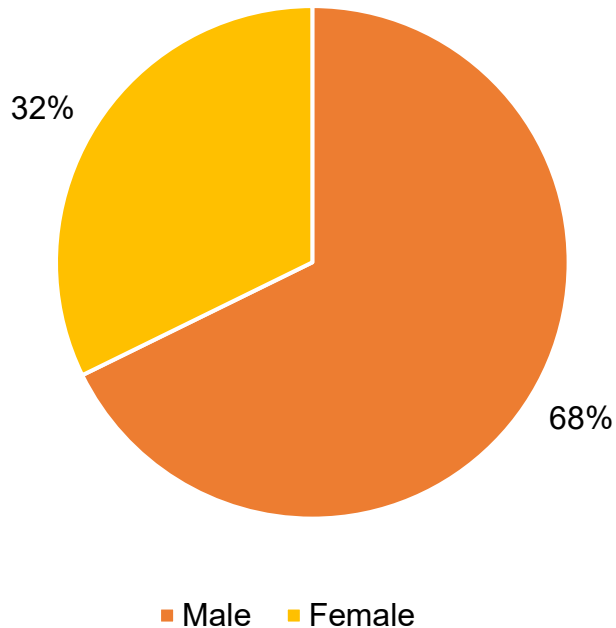
Anderson County Drug-Related Death Distribution by Gender 2019-2023



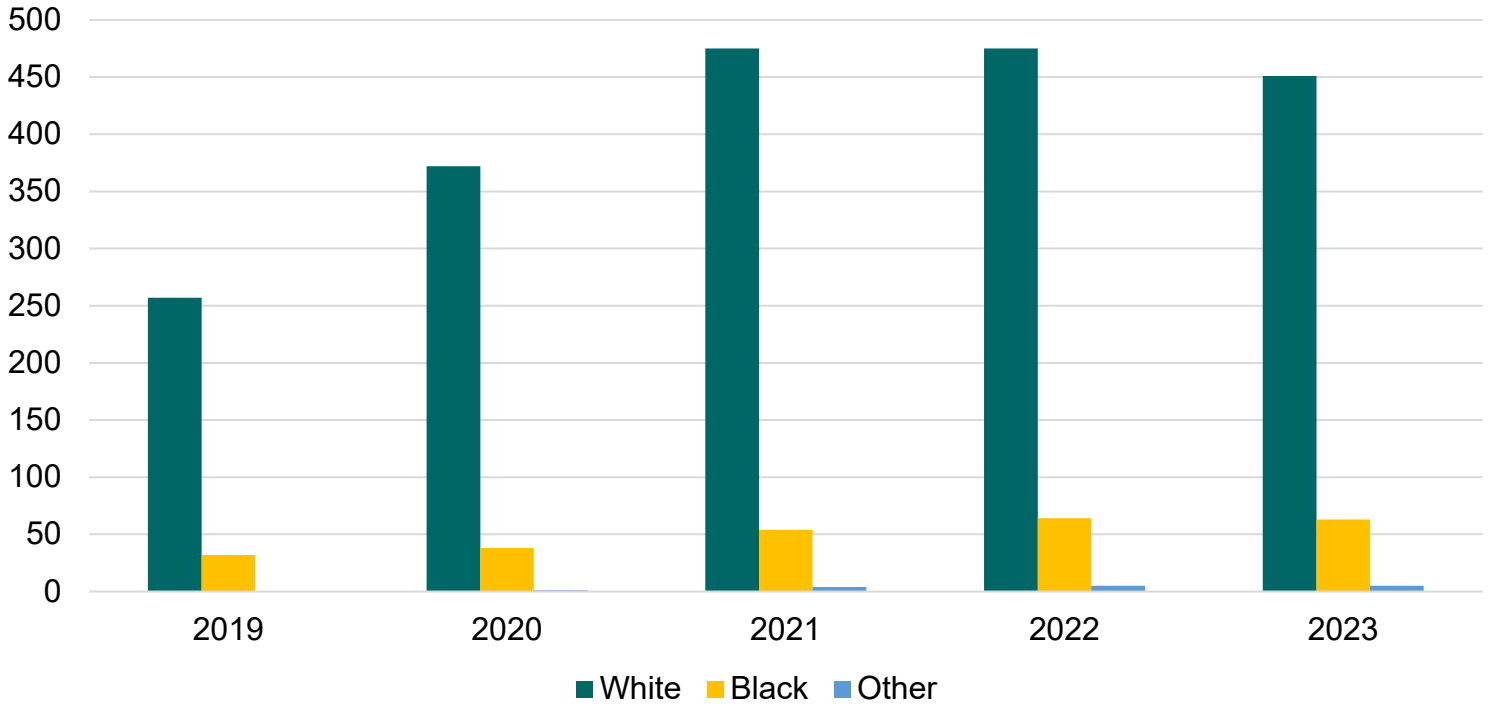
Knox County
2023 Drug-Related Death
Distribution By Gender



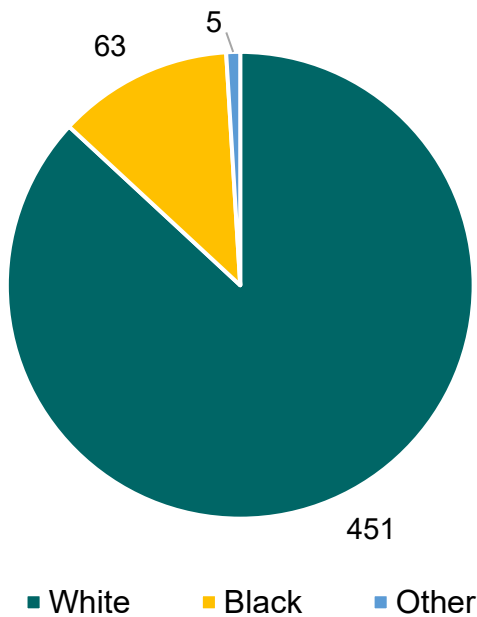
Anderson County
2023 Drug-Related Death
Distribution By Gender



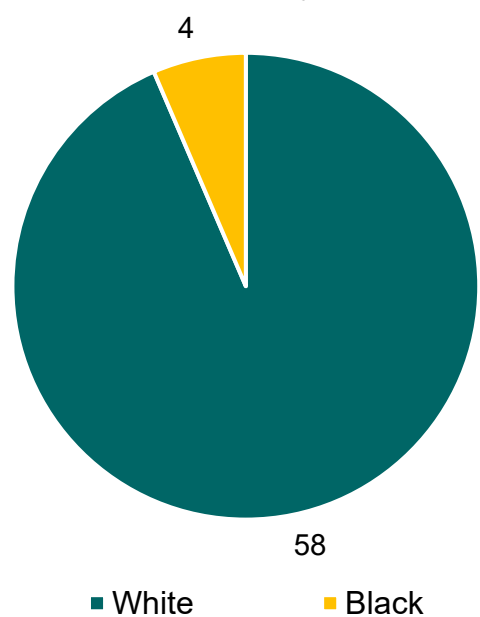
Knox County Race Distributions for Drug-Related Deaths 2019-2023



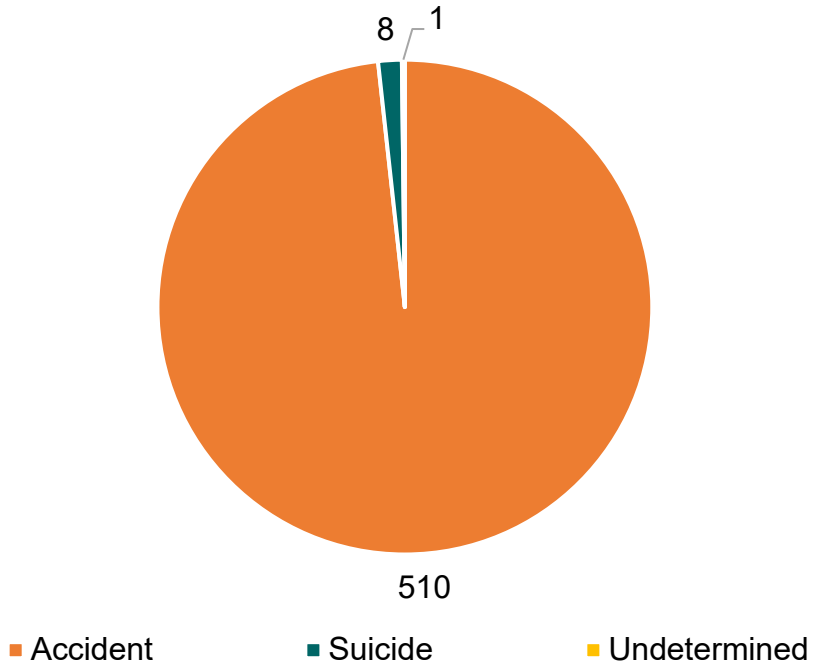
Knox County 2023 Drug-Related Death Distribution by Race



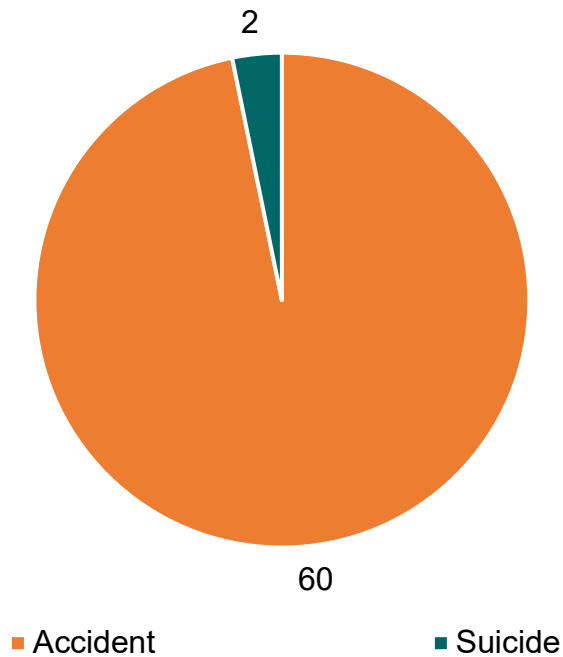
Anderson County 2023 Drug-Related Death Distribution by Race



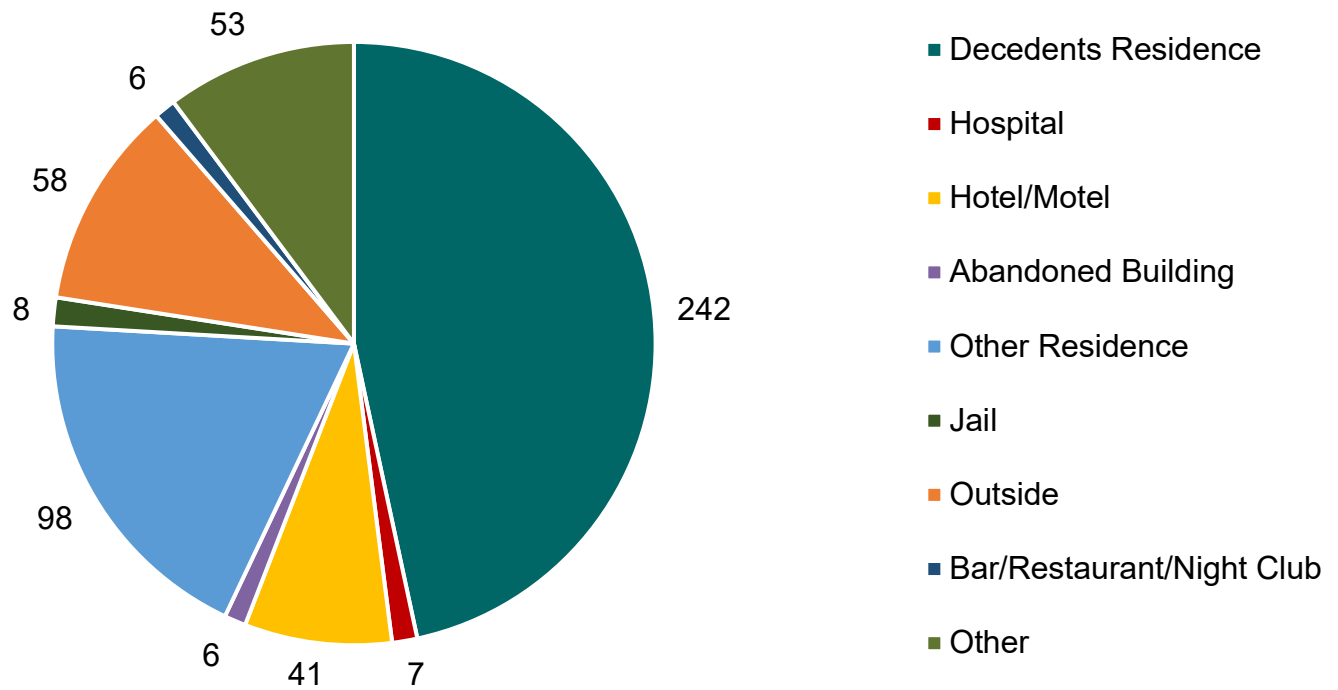
Knox County
2023 Drug-Related Deaths
by Manner of Death



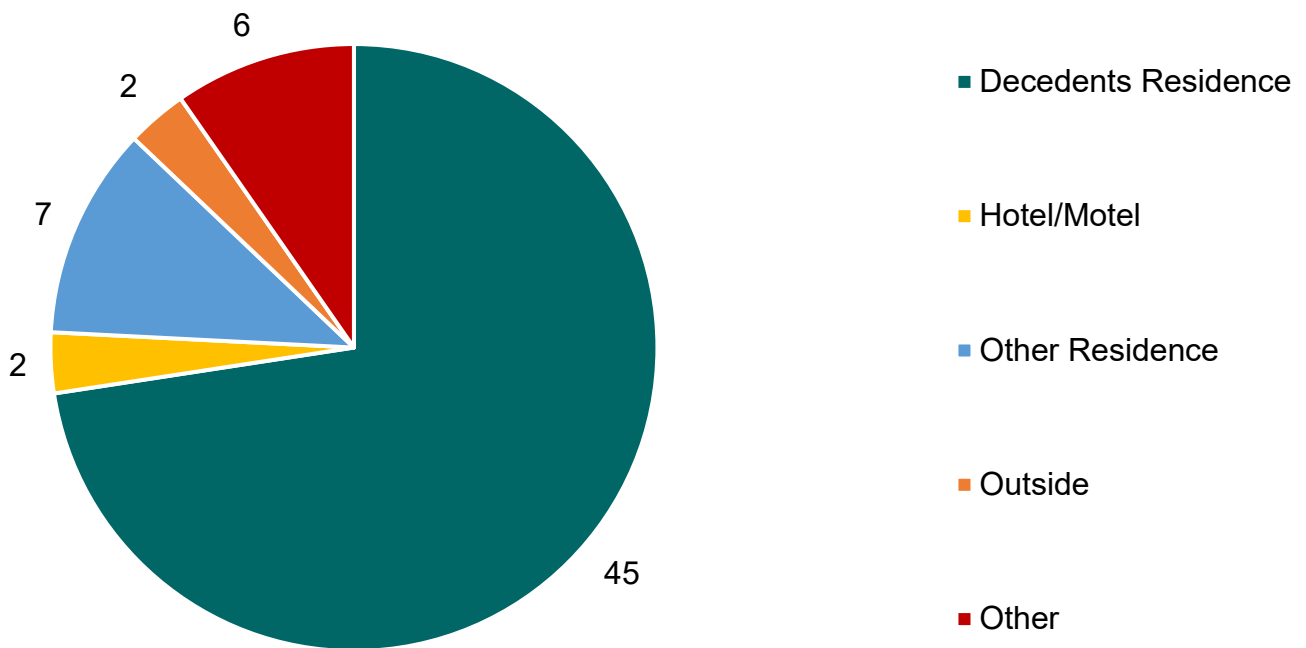
Anderson County
2023 Drug-Related Deaths
by Manner of Death



Knox County
Location 2023 Drug-Related Deaths Occurred



Anderson County
Location 2023 Drug-Related Deaths Occurred



Zip Code Distribution and Heat Maps by Year and County

The following zip code data represents location of injury locations for 2023 drug-related deaths for which an autopsy or examination for Knox and Anderson Counties was performed at the Knox County Regional Forensic Center. The data source and notes are listed here for the zip code related pages.

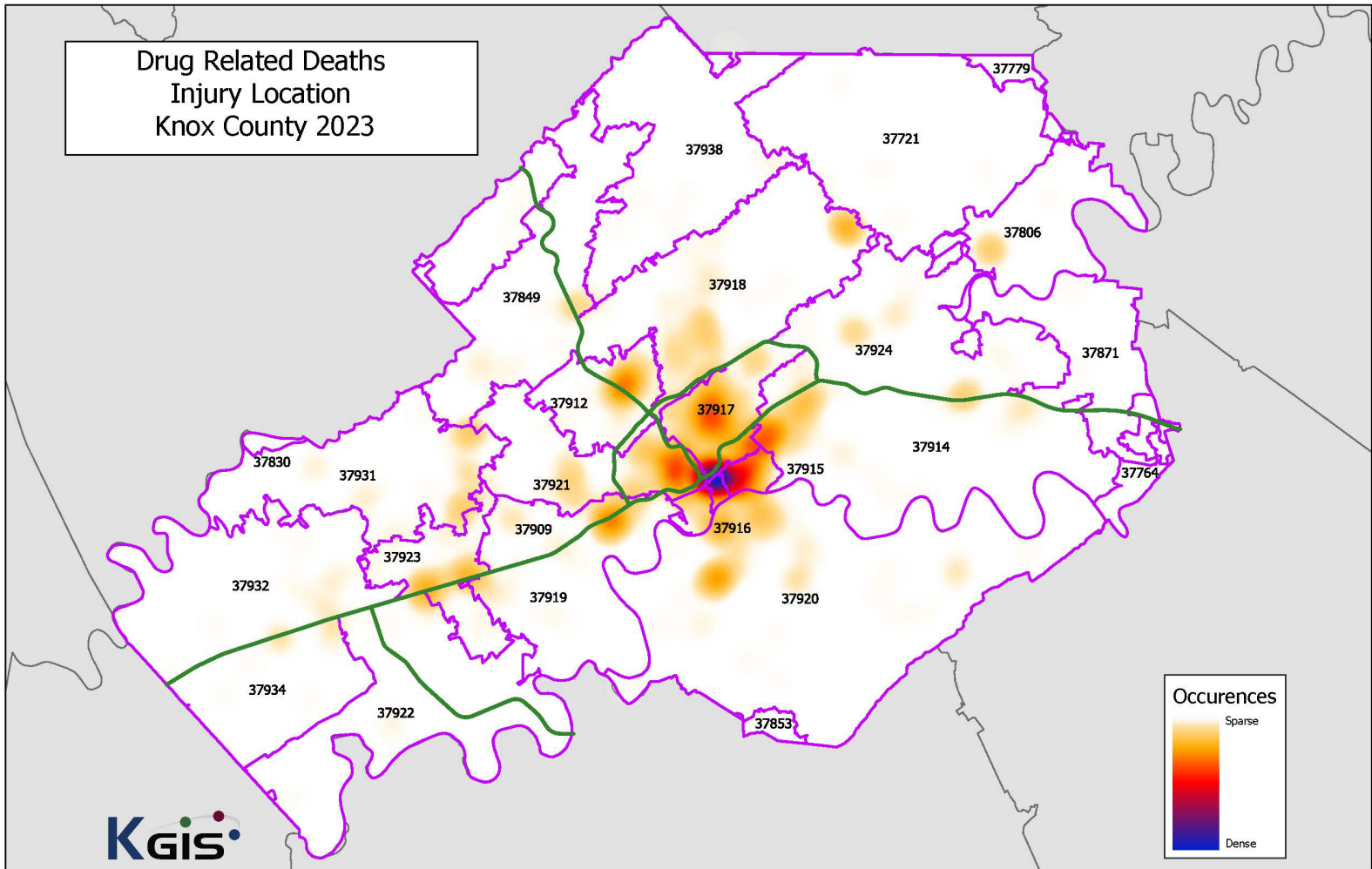
KGIS assisted by creating heat maps. The heat maps represent drug-related deaths based on home address, location of injury, and location of death.

Data Source:

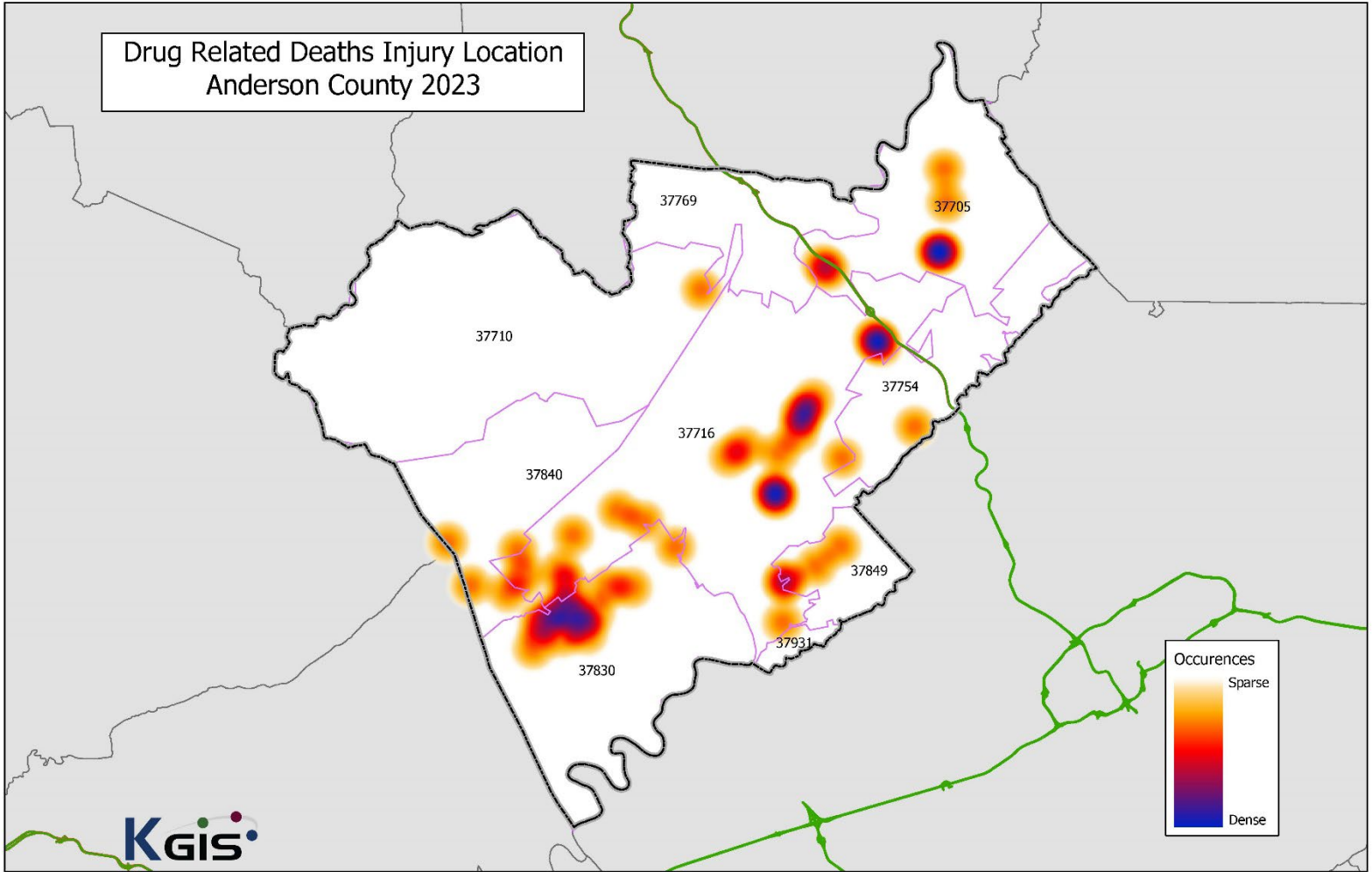
2023 Maps: MDILog Database and Knox County RFC Medical Examiner Database, 2023, Knoxville, TN.

Notes:

The Location of Injury Address maps represent where the decedent was discovered and presumably where the injury occurred.



2023 Drug-Related Death Report



Knox and Anderson Counties Analytes Found and Number of Cases 2021-2023

Analyte name	2021	2022	2023
Fentanyl	463	463	437
4-ANPP	417	423	398
Norfentanyl	391	355	345
Methamphetamine	290	295	282
Amphetamine	279	278	267
Naloxone	198	183	194
Delta-9 THC	133	139	130
Benzoyllecgonine	94	109	130
Cocaine	52	62	100
Delta-9 Carboxy THC	94	105	98
Ethanol	102	104	98
Xylazine	25	40	85
Gabapentin	83	86	80
Diphenhydramine	108	75	76
Quinine	47	11	58
11-Hydroxy Delta-9 THC	41	33	55
Acetyl Fentanyl	51	19	42
Bromazolam	1	11	34
para-Fluorofentanyl	33	25	33
Alprazolam	45	37	31
Oxycodone - Free	44	28	28
Morphine - Free	71	39	27
Hydroxyzine	24	25	26
Cocaethylene	13	20	26
Amlodipine	1	33	25
Trazodone	20	28	25
Mitragynine	14	13	21
Citalopram / Escitalopram	22	26	20
Methadone	10	18	17
Desmethylsertraline	27	29	16
Acetaminophen	19	18	16
Oxymorphone - Free	30	17	16
7-Amino Clonazepam	28	26	15
Metoprolol	19	16	15
O-Desmethylvenlafaxine	12	10	15

2023 Drug-Related Death Report

Norbuprenorphine - Free	21	32	14
Mirtazapine	17	10	14
Buprenorphine - Free	16	27	13
Nordiazepam	25	19	13
EDDP	6	11	13
Cyclobenzaprine	15	10	13
Venlafaxine	11	9	13
8-Aminoclonazepam	2	9	12
Beta-hydroxy fentanyls	1	8	12
Ecgonine Methyl Ester	0	2	12
Sertraline	21	26	11
Hydrocodone - Free	17	22	11
Promethazine	22	15	11
Metonitazene	27	12	11
Duloxetine	9	7	11
Hydroxybupropion	14	6	11
Norfluoxetine	20	26	10
Diazepam	20	11	10
Midazolam	12	10	10

- These drugs were not necessarily related to the drugs that caused the death but are listed to show a true picture of what combinations were found among all drug-related deaths and to illustrate changes in character of drugs taken in combination with deadly illicit drugs.
- The substances listed above represent those drugs found in ten or more drug-related deaths.

Knox and Anderson Counties Top 10 Drugs Found in Drug-Related Deaths 2019-2023

	2019	2020	2021	2022	2023
1	Fentanyl & Analogues*	Fentanyl & Analogues*	Fentanyl & Analogues*	Fentanyl & Analogues*	Fentanyl & Analogues*
2	Methamphetamine	Methamphetamine	Methamphetamine	Methamphetamine	Methamphetamine
3	Alcohol/Ethanol	Heroin	Diphenhydramine	Cocaine	Cocaine
4	Heroin	Alcohol/Ethanol	Alcohol/Ethanol	Alcohol/Ethanol	Xylazine
5	Cocaine	Cocaine	Cocaine	Xylazine	Alcohol/Ethanol
6	Oxymorphone	Gabapentin	Gabapentin	Alprazolam	Bromazolam
7	Alprazolam	Diphenhydramine	Heroin	Diphenhydramine	Diphenhydramine
8	Oxycodone	Oxycodone	Alprazolam	Oxycodone	Alprazolam
9	Gabapentin	Alprazolam	Oxycodone	Gabapentin	Oxycodone
10	Diphenhydramine	Oxymorphone	Oxymorphone	Morphine	Gabapentin

*Includes Fentanyl, Acetyl Fentanyl, norfentanyl, para-Fluorofentanyl, Beta-Hydroxy Fentanyl, Despropionyl-para-fluorofentanyl, Cyclopropyl-fentanyl, and Valeryl Fentanyl

Data Source: MDILog Database 2019-2023 Knoxville, TN

Note:

1. This report only notes the presence of the drugs contributing to death but does not indicate the appropriate or legal use of a drug.
2. Drug poisoning deaths may involve more than one specific substance.
3. Some drugs are listed as Not Otherwise Specified (NOS) because information was obtained from sources that did not define the drug type.

2023 DRD Cases with Naloxone Use and Drug Type

	Naloxone-Rx Drug Only	Naloxone-Illicit Drug Only	Naloxone-Rx and Illicit Drug	Total
Knox	4	100	68	172
Anderson	1	5	16	22
Total	5	105	84	194

This report is also available [online](#).