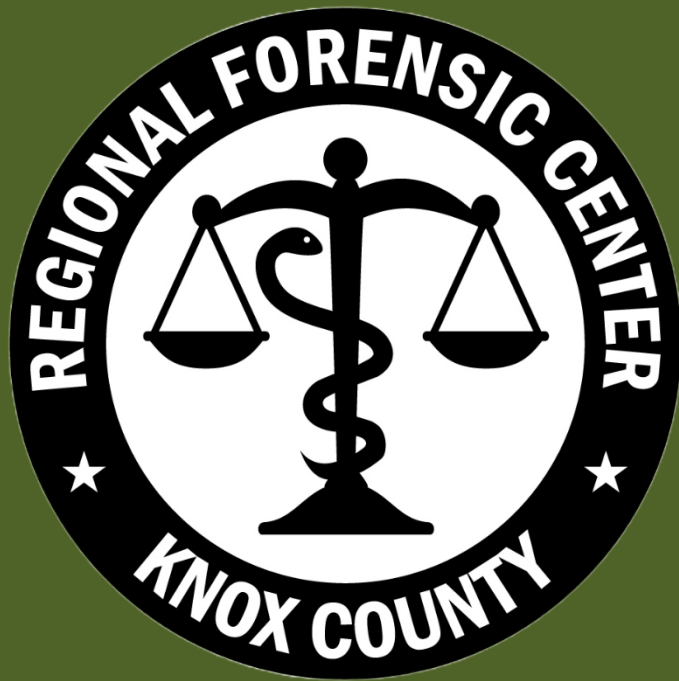


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Knox and Anderson Counties Drug-Related Death Report

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From the Desk of **The Chief Medical Examiner** of Knox and Anderson Counties

This year's drug-related death report contains bad news, fair news, and a little good news. In 2022, Knox County overdose deaths increased by only two percent compared to the 29% increase in 2021. Overdose deaths in Anderson County decreased by 22% which is significantly less than the 67% increase the previous year. The drug-related death toll and related trends are promising, but mixed drug intoxications continue to be the leading cause of death and fentanyl, fentanyl analogues, and some of the novel (new) synthetic opioids continue to be the most abused drugs. Methamphetamine, which is still the stimulant drug of choice, is frequently used in combination with opioids. Cocaine abuse has risen again, but trails behind methamphetamine abuse in frequency. Alcohol continues to be among the top five most frequently abused substances leading to either sudden unexpected death or death without medical attendance. Though, it is important to keep in mind that the latter category does not include numerous deaths due to sequelae of chronic alcohol abuse, which (unlike accidental drug overdose deaths) are classified as a natural manner of death.

Tragically, the sharpest increase in DRD of 2022 was in individuals aged 15 to 24. Moreover, raw data collected during the first quarter of 2023 projects the surge in drug-related deaths to continue. More information about the RFC's participation with the DEA in researching fentanyl and other novel substance-related deaths can be found [here](#).

In both Knox and Anderson counties, the lives of young and middle-aged men in the 35 to 44 age group continue to be disproportionately taken by drugs compared to women (65% men versus 35% women in Knox County and 71% men versus 29% women in 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.

Last year, I elaborated on novel drugs with tongue-twisting names. There are even more of them on the market this year, they are deadlier than ever when used alone or in combination with other drugs, and snorting and/or intravenous drug abuse continue to be the predominate modes of intake in drug-related deaths. As the combination of stronger drugs and direct modes of administration (such as injections directly into the blood stream), frequently render naloxone ineffective.

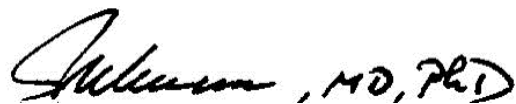
It may be time to reevaluate more seriously many of the programs and measures that have been instituted to combat drug-related deaths such as medication-assisted treatments, accessibility of naloxone, and needle exchange programs. All of these approaches appear to be ineffective bandages to deeper societal woes. It was incredibly disheartening to see that many of the deceased individuals investigated by the RFC had records of completion or multiple visits to different drug rehabilitation programs and facilities prior to death. We cannot continue to do the same thing and expect different results when it comes to combating drug-related deaths.

On the last pages of this report, the table summarizing the frequency of different substance representation in 2022 drug-related deaths over the last five years reveals a new top ten player: xylazine. Xylazine is a non-opioid tranquilizer used in veterinary medicine that is often mixed with other drugs of abuse (especially fentanyl and methamphetamine). It is incredibly potent, which does not respond to naloxone, and can cause tissue necrosis and wound infections that require debridement and extended medical follow-up. For more information on xylazine please refer to the listed resources.*

2022 Drug-Related Death Report

Deadly accidents, especially motor vehicle crashes, and homicides, are still frequently 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 the victims. After seven 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.



Darinka Mileusnic-Polchan, MD, PhD

*Xylazine Resources

- Outreach and Harm Reduction
- CDC—What You Should Know About Xylazine
- Xylazine | Substance Use Philly
- Harm Reduction: Xylazine | San Francisco AIDS Foundation
- Xylazine in the Drug Supply | National Harm Reduction Coalition
- Xylazine What Clinicians Need to Know | NY State Department of Health
- Xylazine, an emerging adulterant | American College of Emergency Physicians
- Xylazine—Medical and Public Health Imperatives | NEJM
- FDA Dear Colleague Letter regarding Xylazine | FDA
- Xylazine-Induced Skin Ulcers in a Person Who Injects Drugs in Philadelphia, Pennsylvania, USA | Cureus Case Report



2022 Drug-Related Death Report

2022 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, 544 people died from drug overdoses in Knox County compared to 533 in 2021, and 66 people died in Anderson County compared to 85 in 2021. Preliminary data for drug-related deaths in 2023 indicates Knox County could see a more severe upward 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.

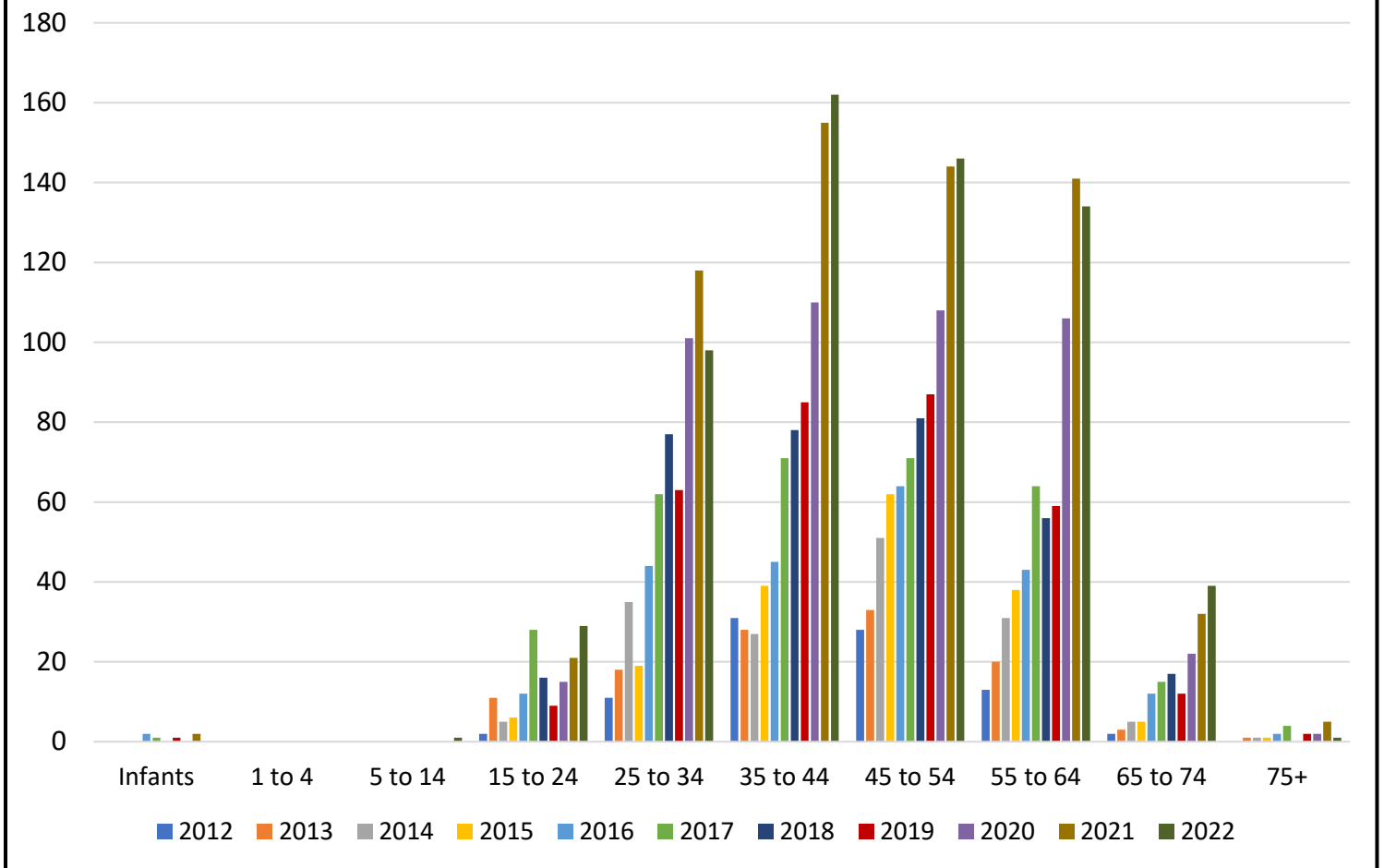
2022 Report Highlights for Knox and Anderson Counties:

- Knox County experienced a 2% increase in drug-related deaths between 2021 to 2022.
- Drug-related deaths in Anderson County decreased by 22% from 2021 to 2022.
- Fentanyl and fentanyl analogues (synthetic opioids) were the most frequently identified drugs in drug-related deaths in 2022.
- Polypharmacy, which is when more than one drug is responsible for death, was involved in 65% of drug-related deaths in Knox County and 62% in Anderson County.
- The five most common drugs identified in drug-related deaths in 2022 were synthetic opioids, methamphetamine, cocaine, alcohol/ethanol, and xylazine.
- 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 age 15 to 24-years-old.
- The presence of anxiety, anti-depressant, and anti-psychotic medication was found in 22% of all drug-related deaths in Knox County and 18% in Anderson County

Data and Methods

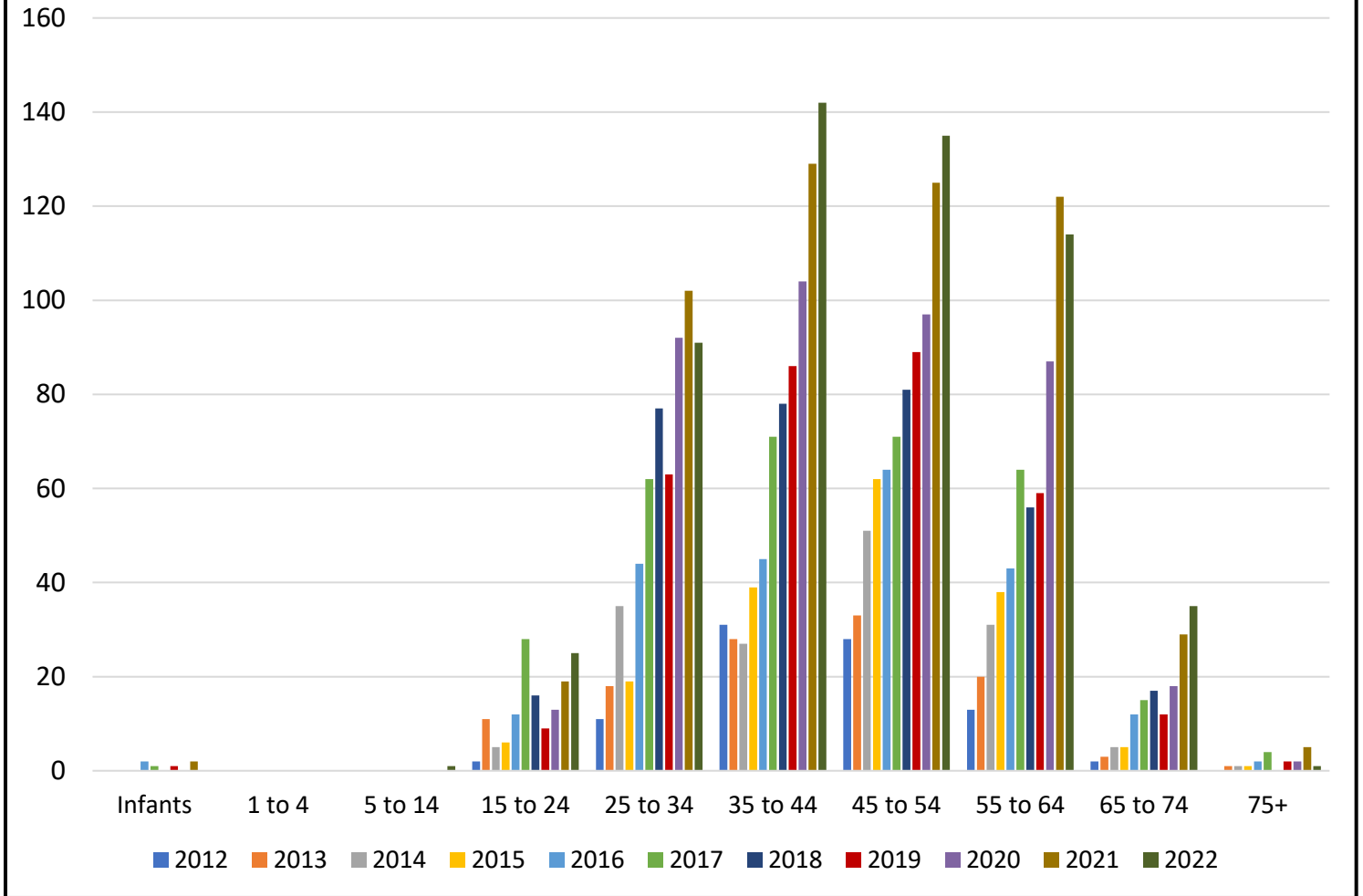
The Knox and Anderson County Medical Examiner database (MDILog) was queried for possible drug-related causes of death for cases accepted under medical examiner jurisdiction between January 1, 2022, and December 31, 2022. The initial query included non-motor vehicle accidents, undetermined, and suicide. 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.

Knox and Anderson Counties Age Distribution for Drug-Related Cases 2012-2022

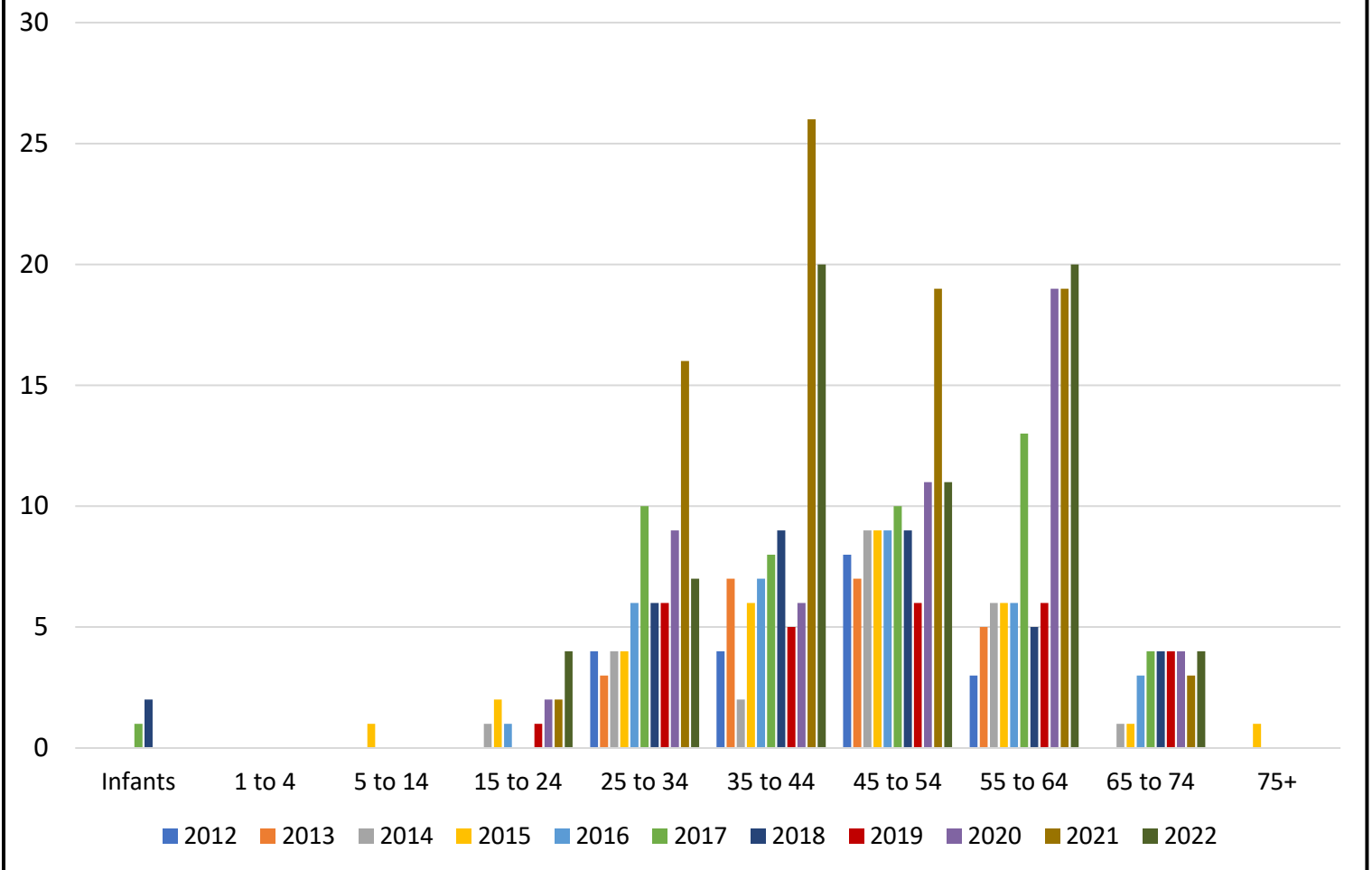


2022 Drug-Related Death Report

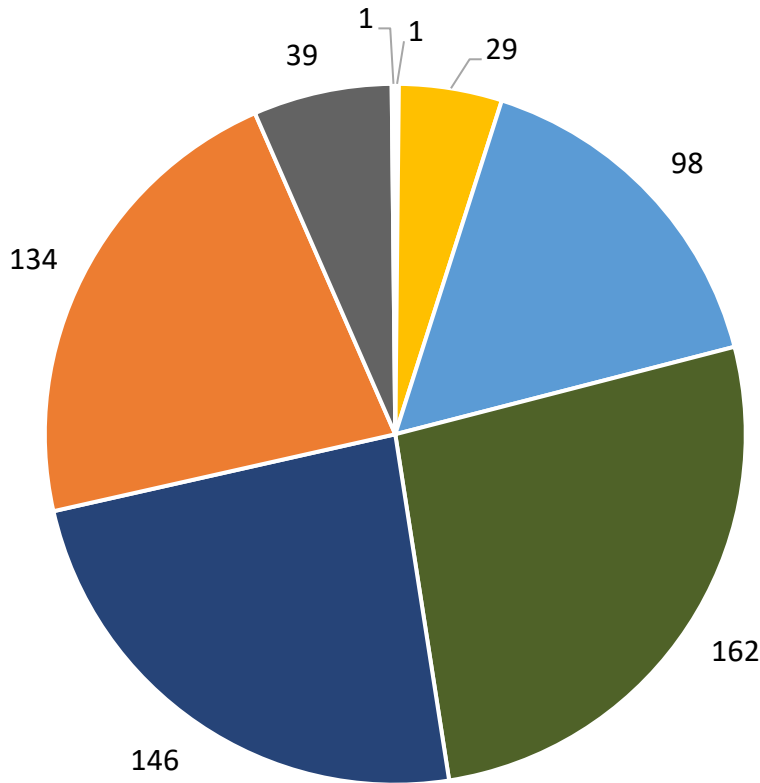
**Knox County
Age Distribution for Drug-Related Cases
2012-2022**



**Anderson County
Age Distribution for Drug-Related Cases
2012-2022**



**Knox and Anderson Counties
2022 Drug-Related Deaths
by Age Distribution**

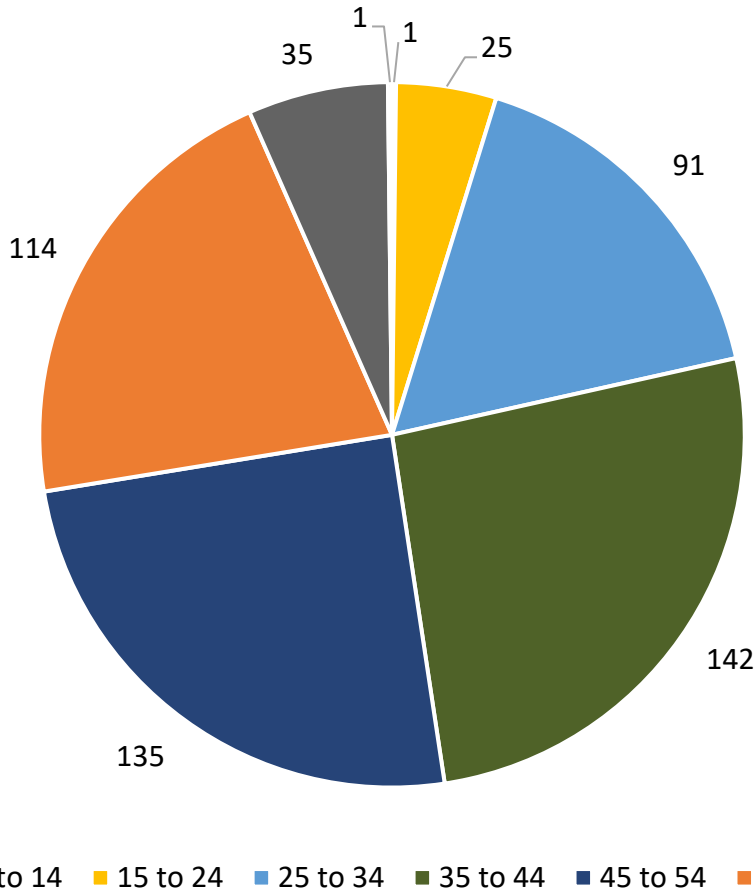


■ Infants ■ 1 to 4 ■ 5 to 14 ■ 15 to 24 ■ 25 to 34 ■ 35 to 44 ■ 45 to 54 ■ 55 to 64 ■ 65 to 74 ■ 75+

**Knox and Anderson Counties 2022 Drug-Related Deaths
by Age Distribution and the Percentage of Increase**

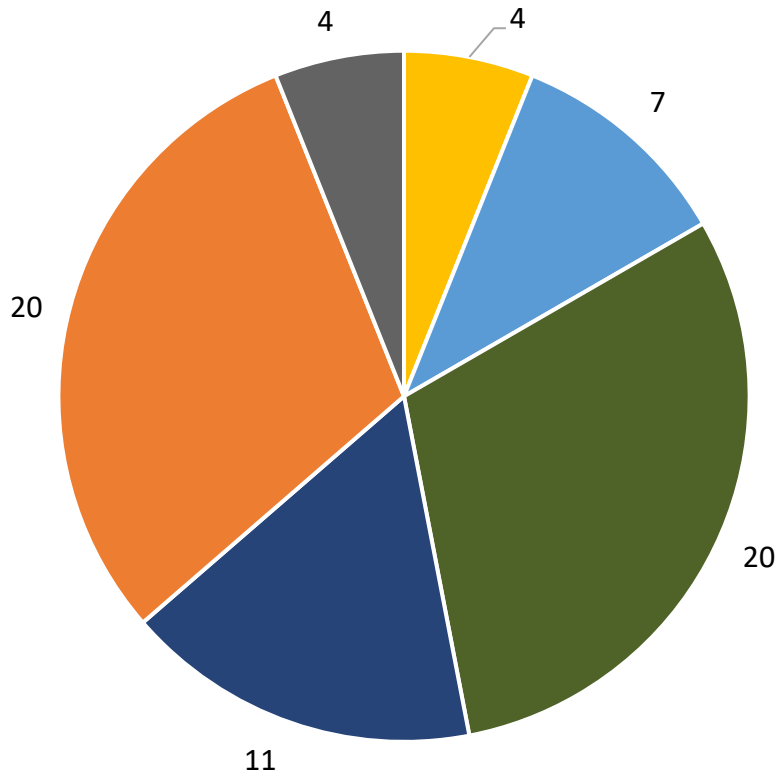
Age Group	1 to 4	5 to 14	15 to 24	25 to 34	35 to 44	45 to 54	55 to 64	65 to 74	75+
Infants	0%	100%	38%	20%	5%	1%	5%	22%	-80%

**Knox County
2022 Drug-Related Deaths
by Age Distribution**



Knox County 2022 Drug-Related Deaths by Age Distribution and the Percentage of Increase									
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%	32%	-11%	10%	8%	-7%	21%	-80%

**Anderson County
2022 Drug-Related Deaths
by Age Distribution**

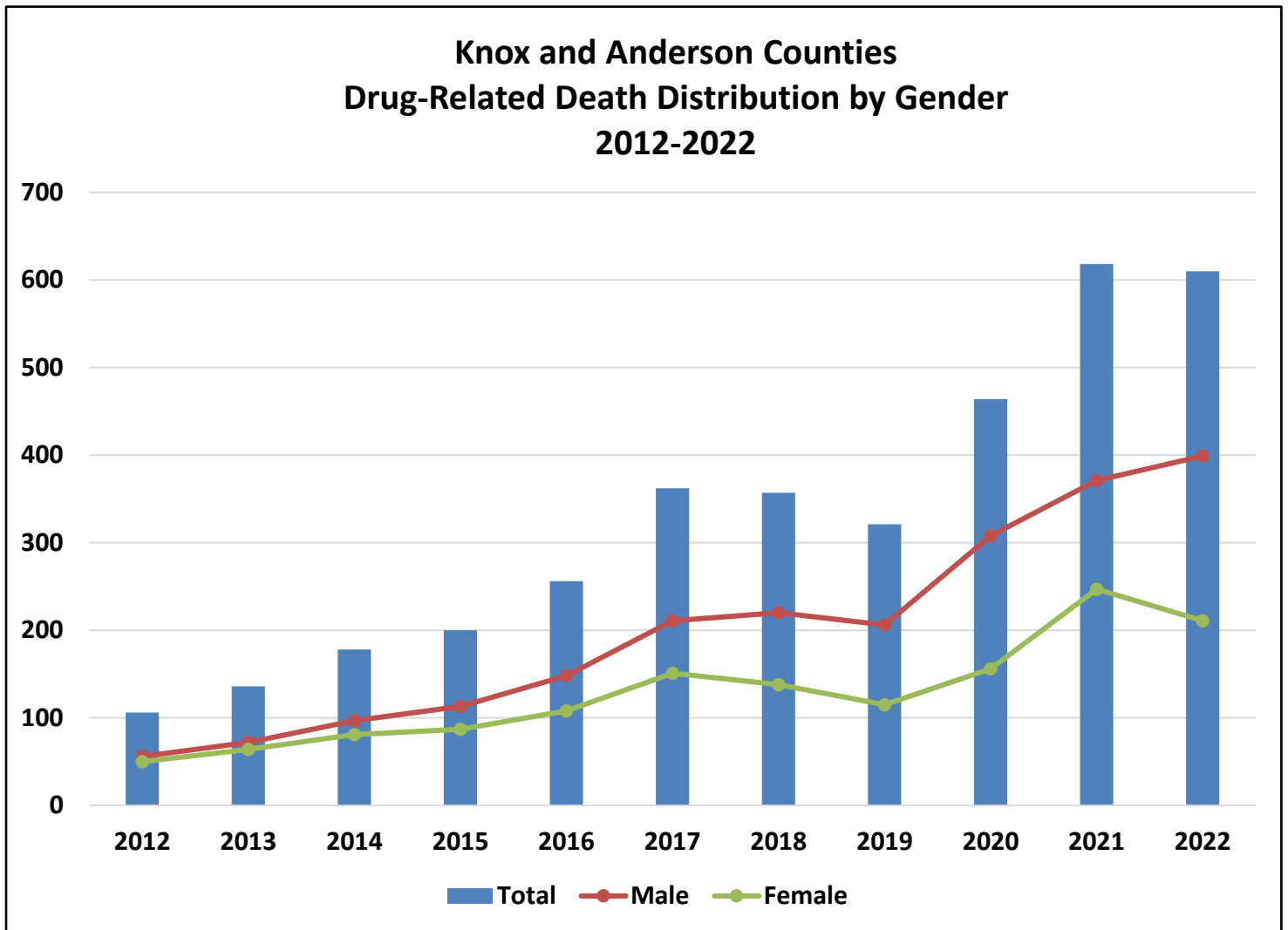


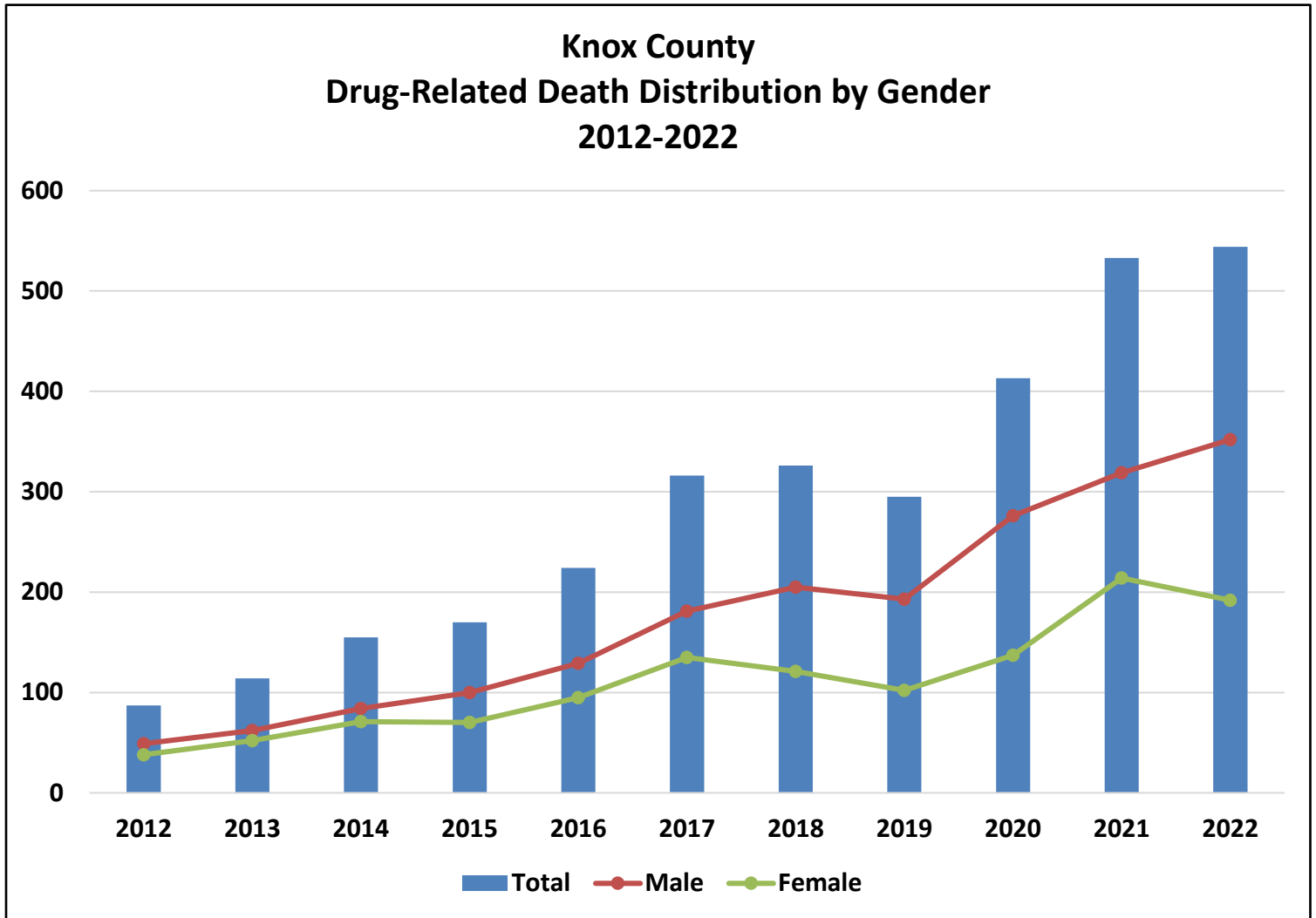
■ Infants ■ 1 to 4 ■ 5 to 14 ■ 15 to 24 ■ 25 to 34 ■ 35 to 44 ■ 45 to 54 ■ 55 to 64 ■ 65 to 74 ■ 75+

**Anderson County 2022 Drug-Related Deaths
by Age Distribution and the Percentage of Increase**

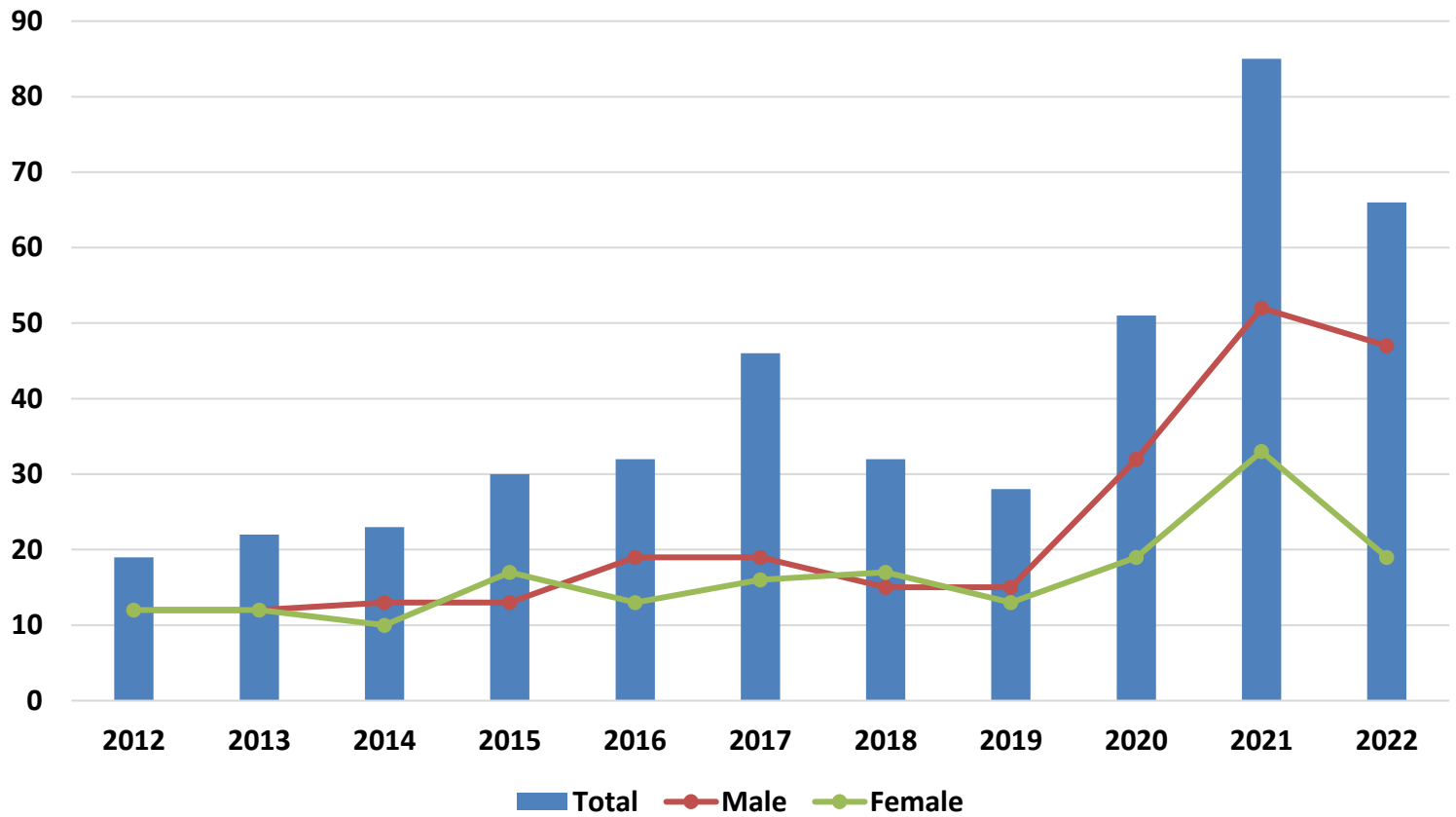
Age Group	1 to 4	5 to 14	15 to 24	25 to 34	35 to 44	45 to 54	55 to 64	65 to 74	75+
Percentage of Increase	0%	0%	100%	-56%	-23%	-31%	5%	25%	0%

Knox and Anderson Counties Drug-Related Death Distribution by Gender 2012-2022

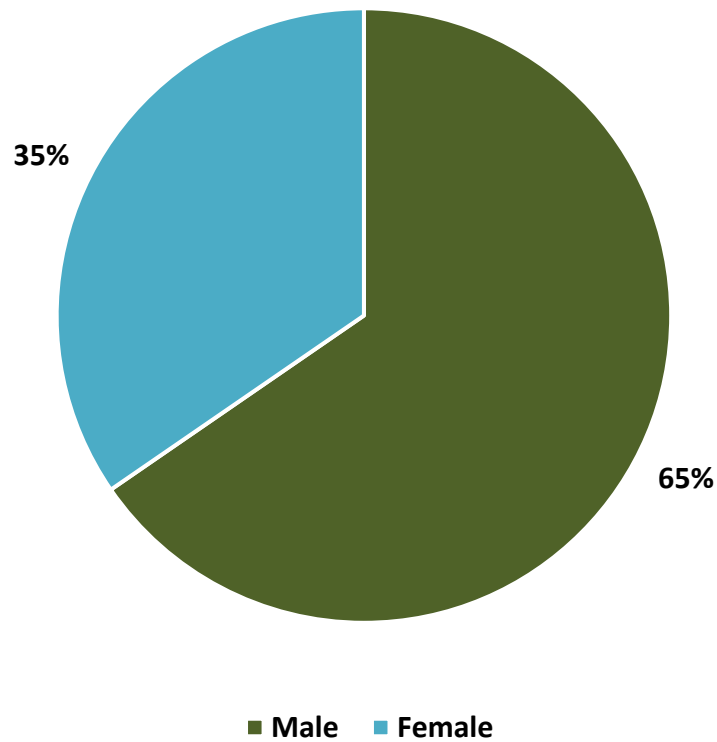




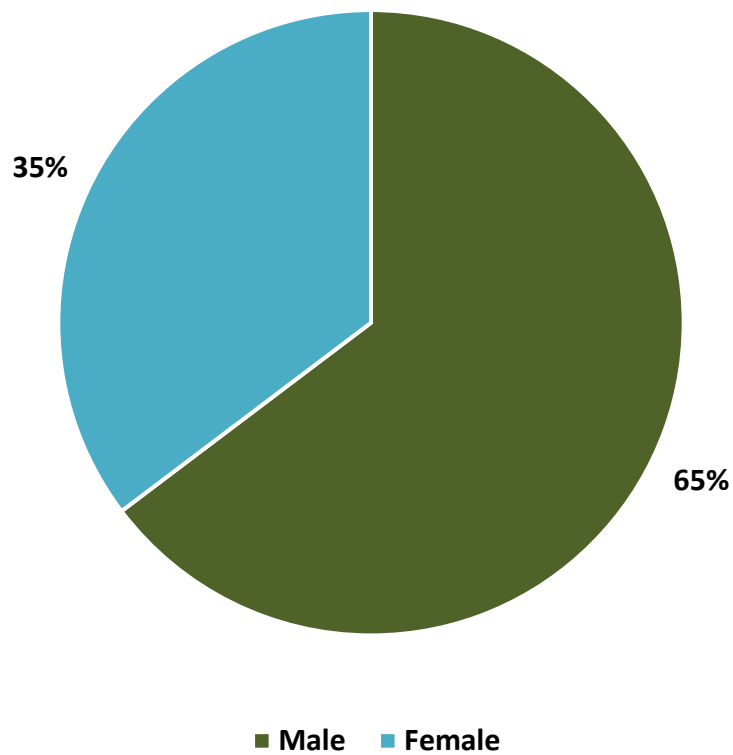
Anderson County Drug-Related Death Distribution by Gender 2012-2022



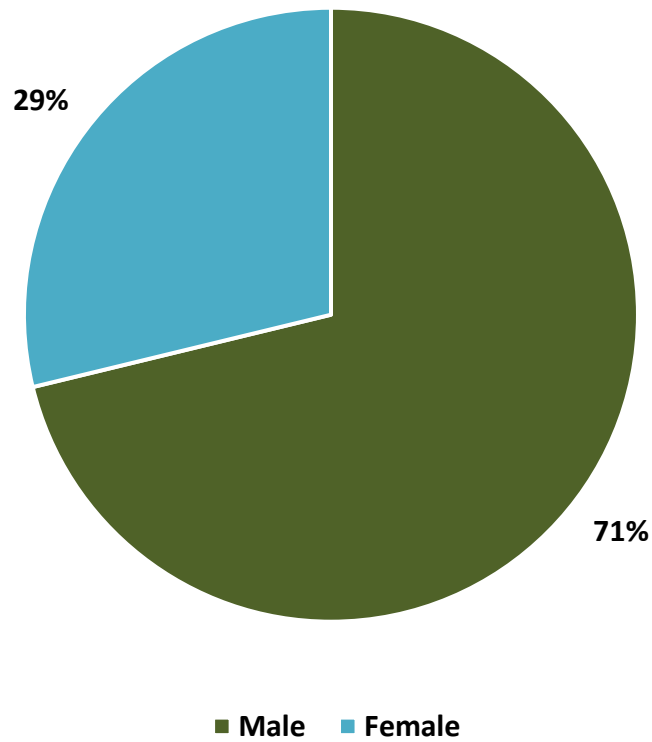
Knox and Anderson Counties 2022 Drug-Related Death Distribution By Gender



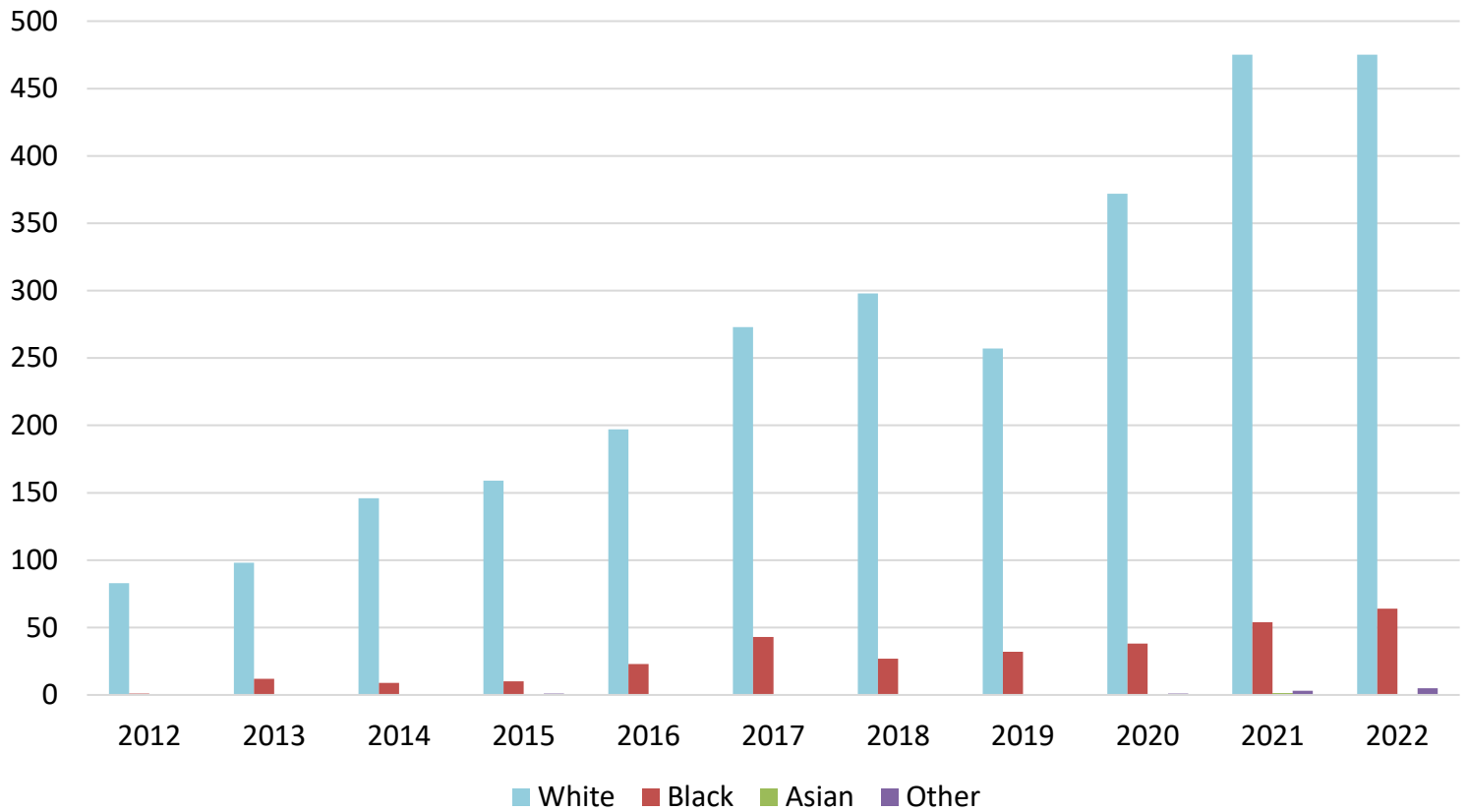
Knox County 2022 Drug-Related Death Distribution By Gender



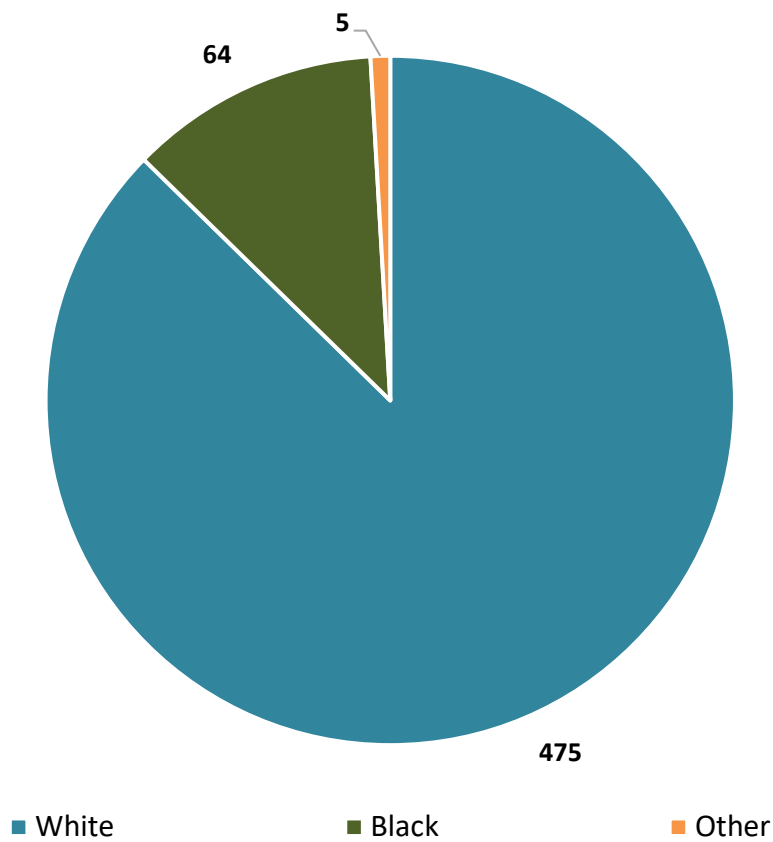
Anderson County 2022 Drug-Related Death Distribution by Gender



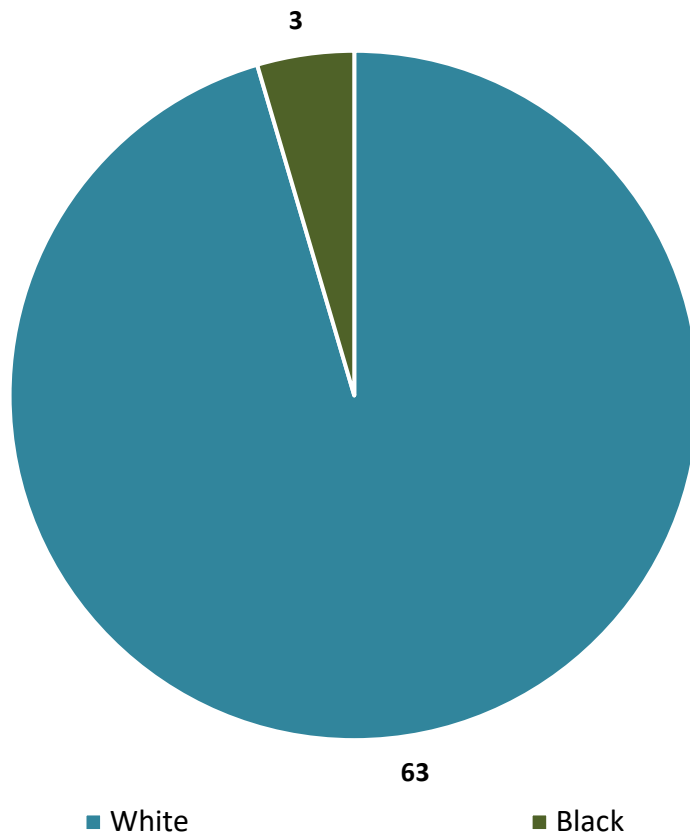
Knox County Race Distributions for Drug-Related Deaths 2012-2022



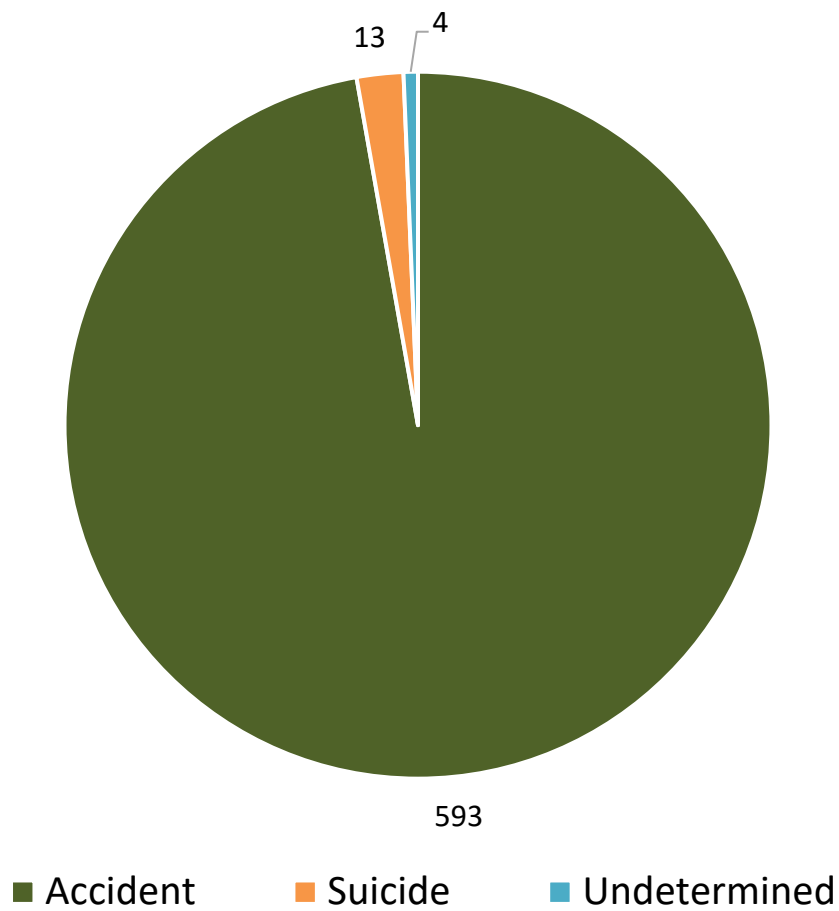
Knox County 2022 Drug-Related Death Distribution by Race



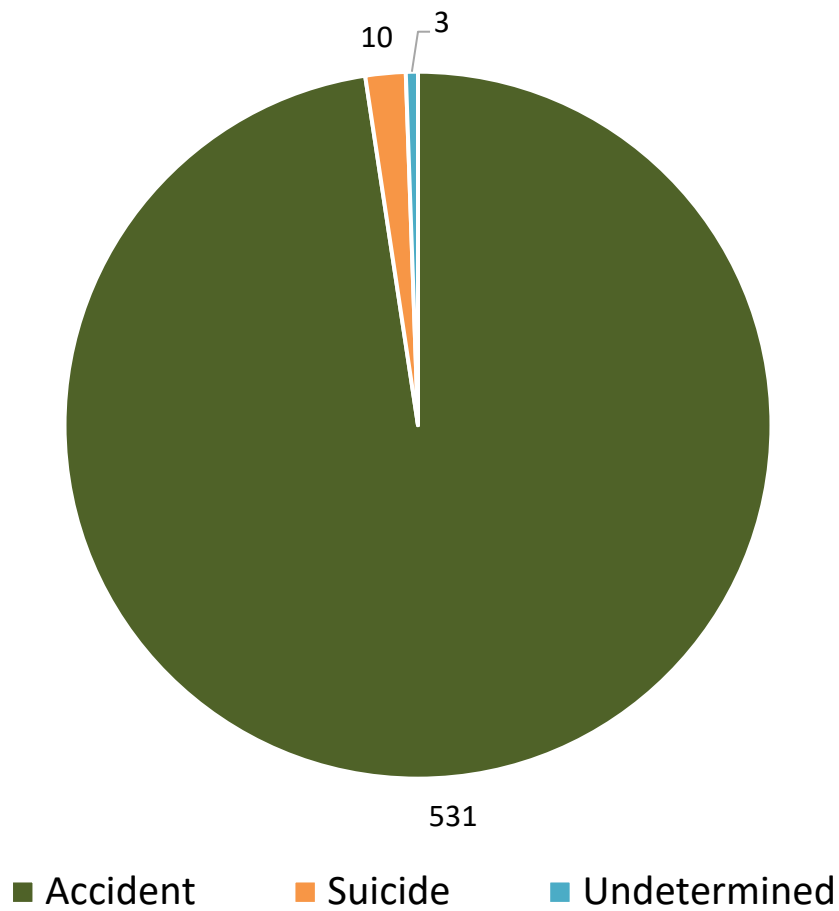
Anderson County
2022 Drug-Related Death
Distribution by Race



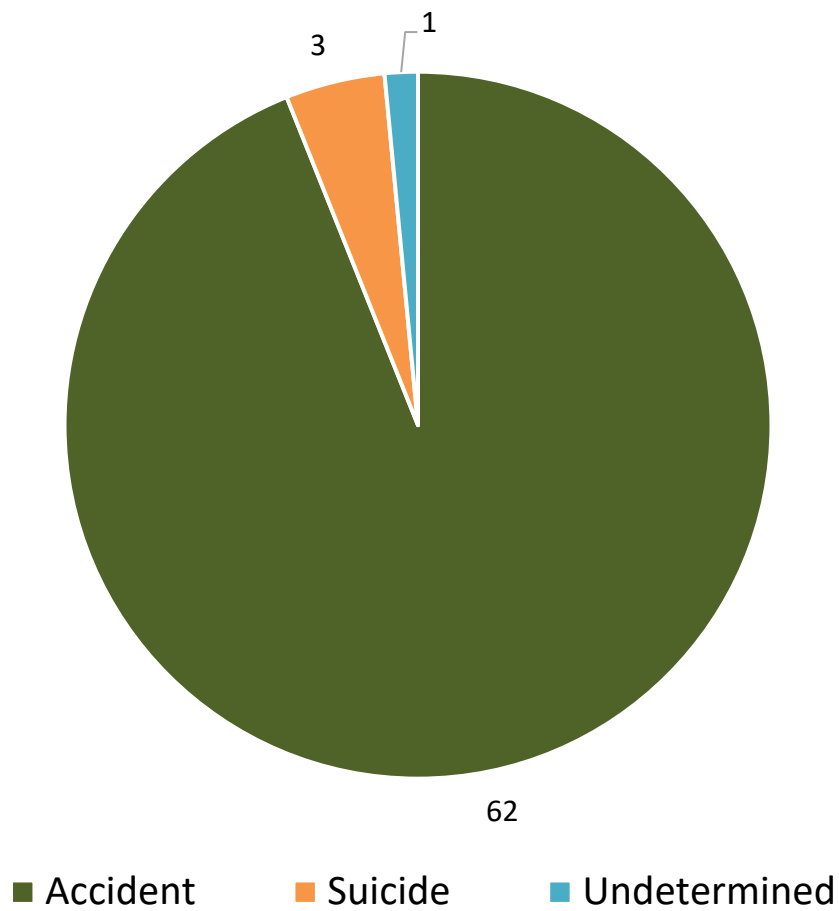
Knox and Anderson Counties 2022 Drug-Related Deaths by Manner of Death



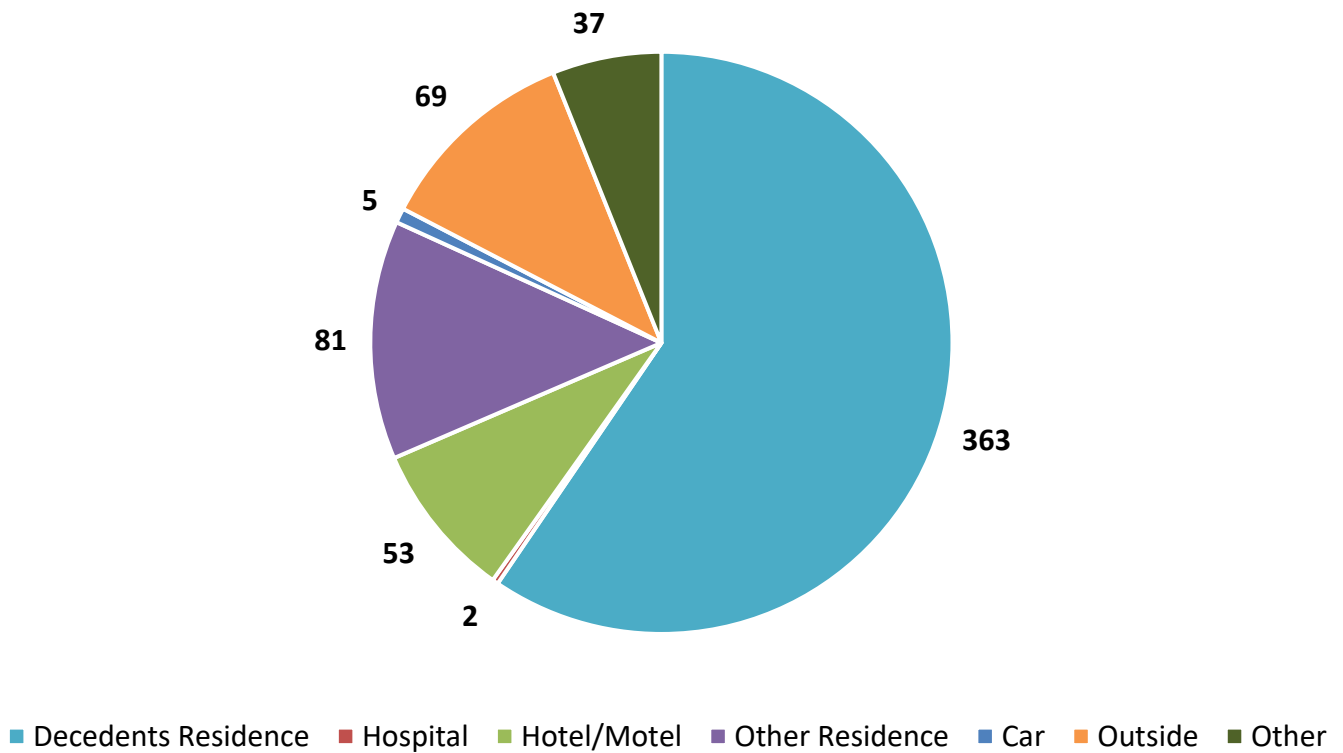
Knox County 2022 Drug-Related Deaths by Manner of Death



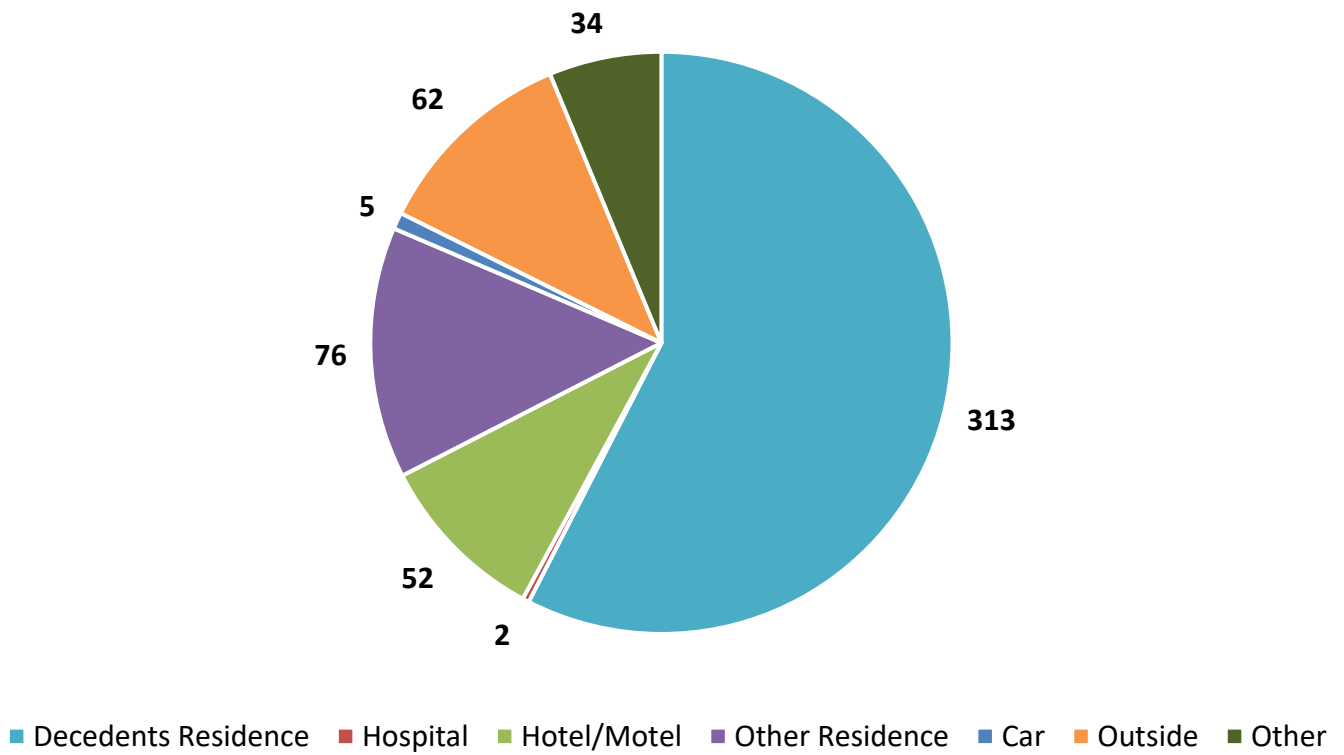
Anderson County 2022 Drug-Related Deaths by Manner of Death



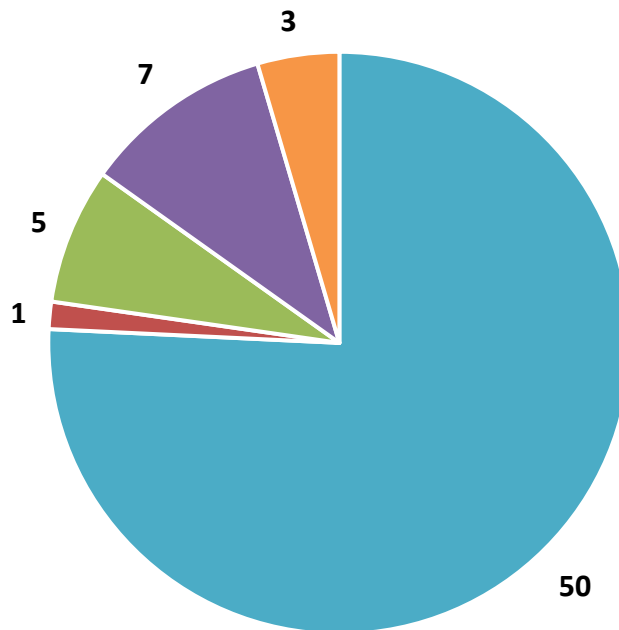
Knox and Anderson Counties Location Types Where 2022 Drug-Related Death Injuries Occurred



**Knox County
Location Types
Where 2022 Drug-Related Deaths Occurred**



Anderson County Location Types Where 2022 Drug-Related Deaths Occurred



■ Decedents Residence ■ Hotel/Motel ■ Other Residence ■ Outside ■ Other

2022 Drug-Related Death Report

Zip Code Distribution and Heat Maps by Year and County

The following zip code data represents location of injury and death locations for 2022 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.

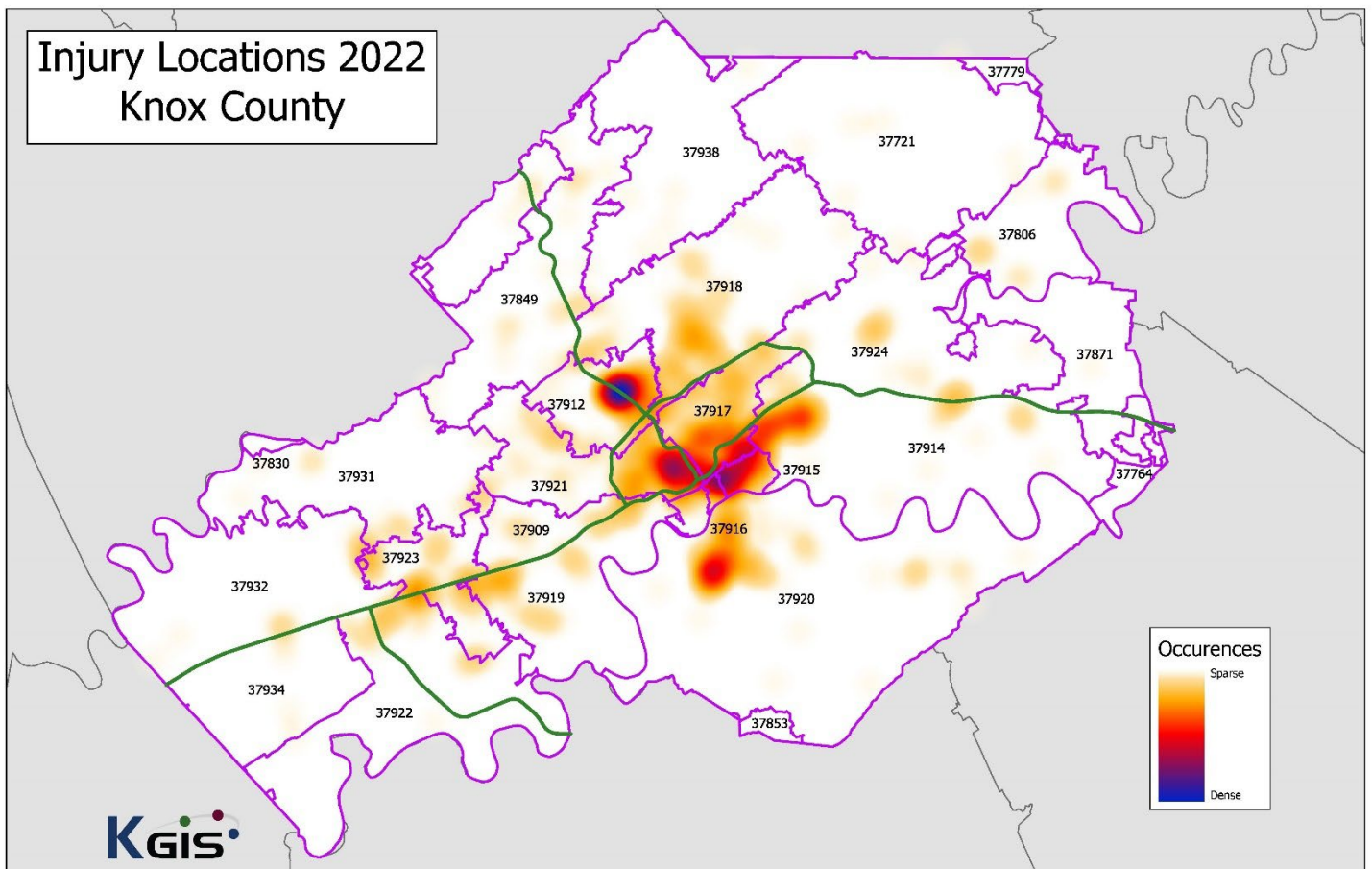
KGIS assisted by creating heat maps. The heat maps represent drug-related deaths based on home address, location of injury, and location of death.

DATA SOURCE:

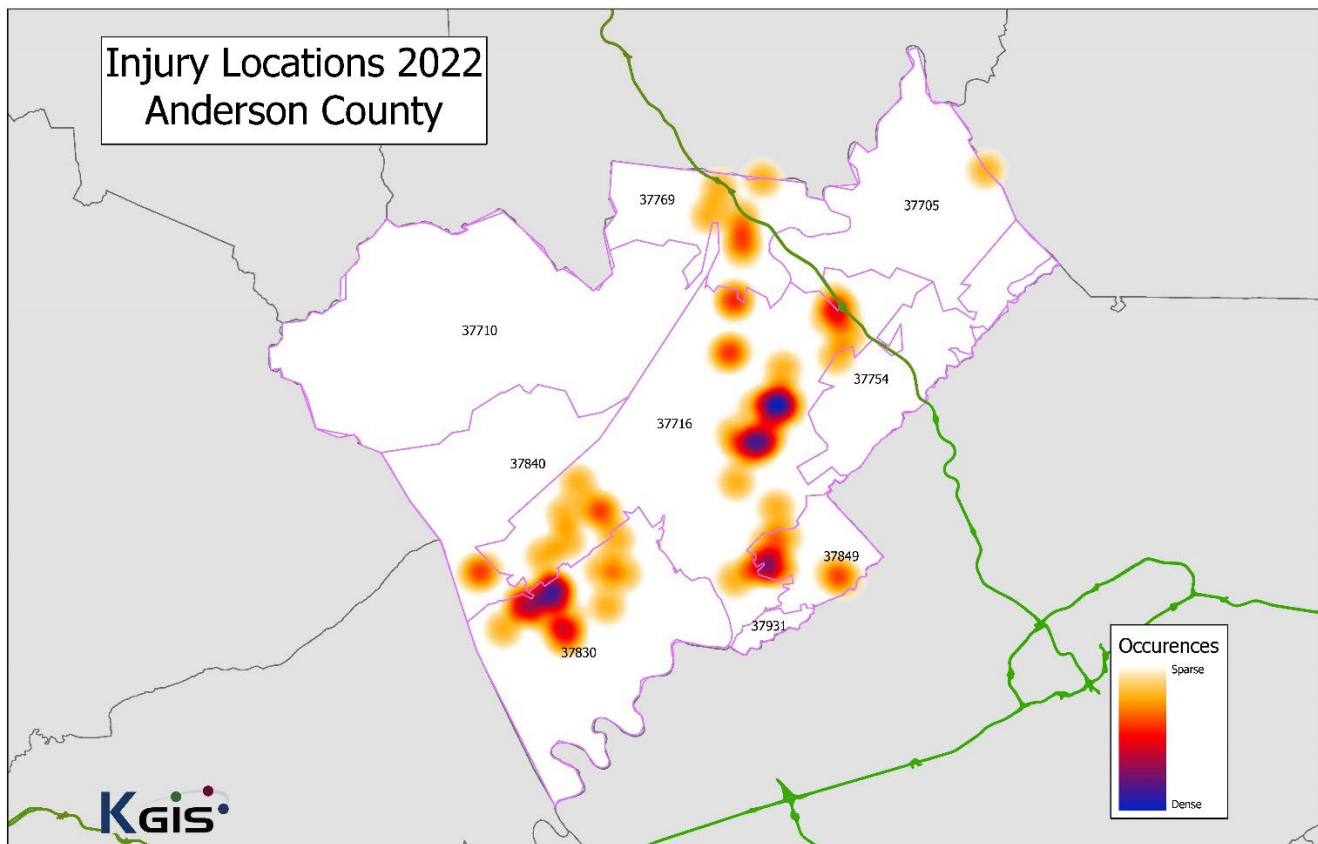
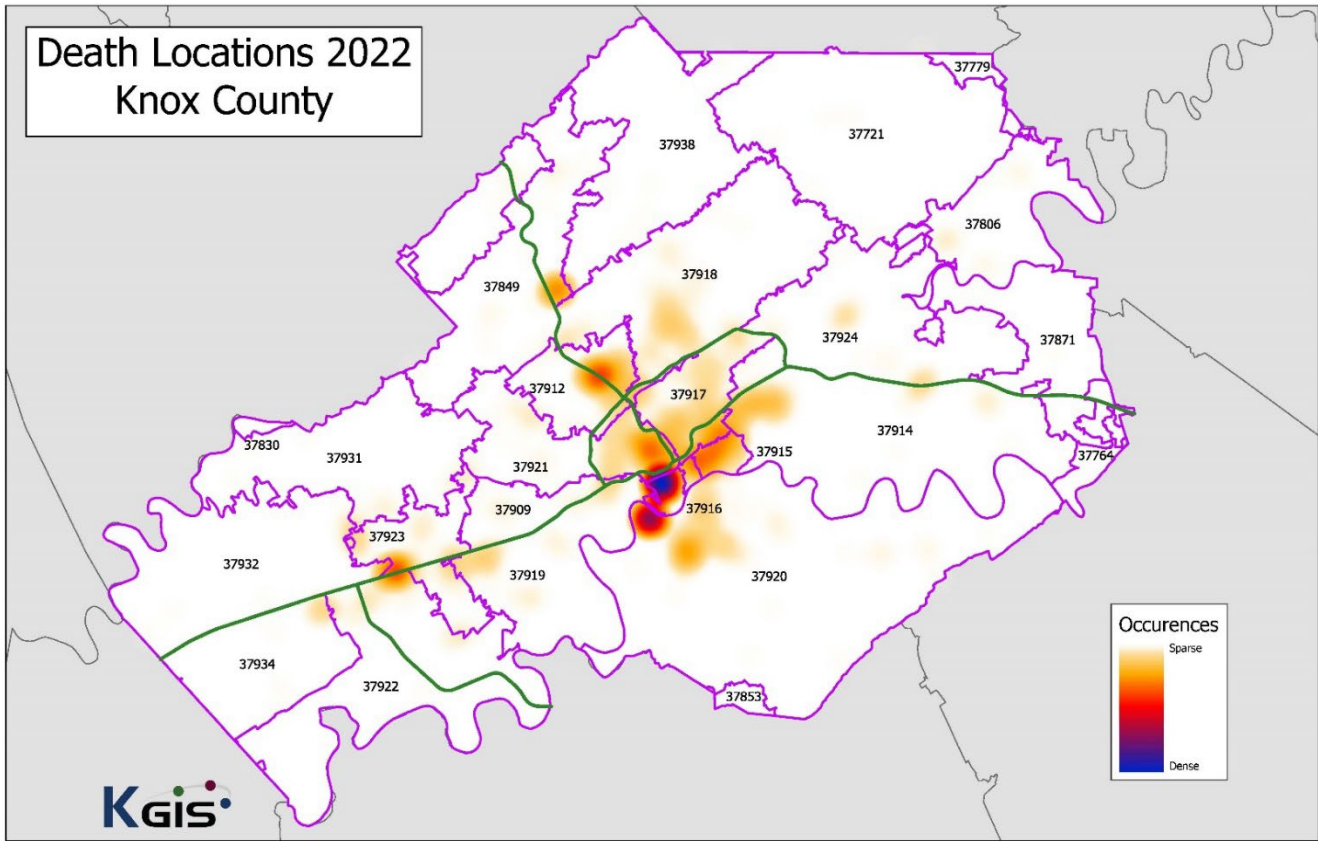
2022 Maps: MDILog Database and Knox County RFC Medical Examiner Database, 2022, Knoxville, TN.

NOTES:

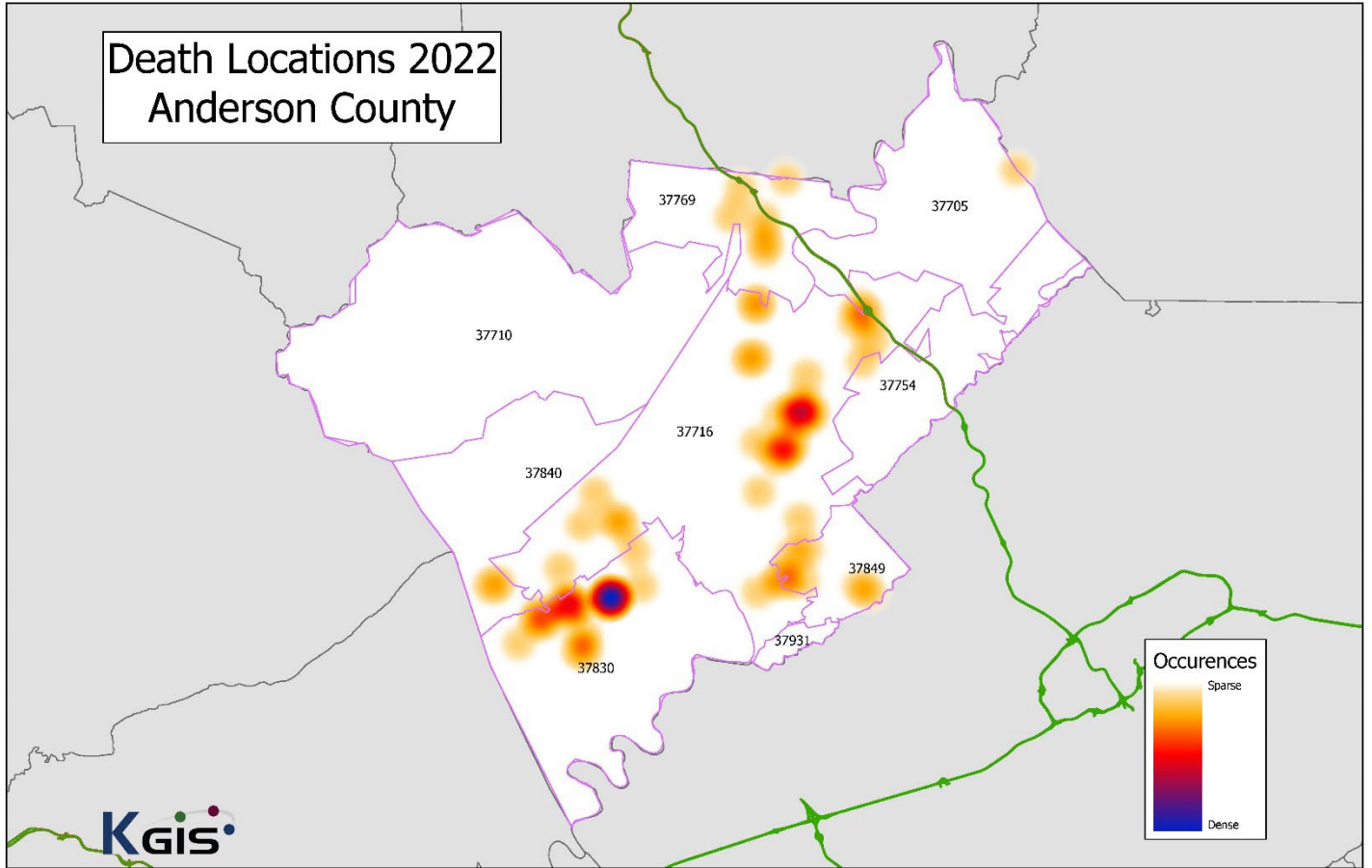
- The Location of Injury Address maps represent where drug-related injury occurred.
- The Death Location maps represent where the people died from the drug-related death.



2022 Drug-Related Death Report



2022 Drug-Related Death Report



2022 Drug-Related Death Report

Knox and Anderson Counties Analytes Found and Number of Cases 2020-2022

Analyte name	2022	2021	2020
Fentanyl	463	463	308
4-ANPP	423	417	249
Norfentanyl	355	391	262
Methamphetamine	295	290	164
Amphetamine	278	279	148
Naloxone	183	198	109
Delta-9 THC	139	133	110
Benzoyllecgonine	109	94	70
Delta-9 Carboxy THC	105	94	71
Ethanol	104	102	92
Gabapentin	86	83	69
Diphenhydramine	75	108	64
Cocaine	62	52	39
Xylazine	40	25	15
Morphine - Free	39	71	100
Alprazolam	37	45	28
11-Hydroxy Delta-9 THC	33	41	38
Amlodipine	33	1	1
Norbuprenorphine - Free	32	21	11
Desmethylsertraline	29	27	11
Oxycodone - Free	28	44	31
Trazodone	28	20	26
Buprenorphine - Free	27	16	12
7-Amino Clonazepam	26	28	29
Citalopram / Escitalopram	26	22	13
Sertraline	26	21	10
Norfluoxetine	26	20	16
para-Fluorofentanyl	25	33	6
Hydroxyzine	25	24	29
Fluoxetine	22	19	15
Hydrocodone - Free	22	17	14
Cocaethylene	20	13	10
Acetyl Fentanyl	19	51	87
Nordiazepam	19	25	17
Acetaminophen	18	19	11



2022 Drug-Related Death Report

Methadone	18	10	15
Oxymorphone - Free	17	30	27
Metoprolol	16	19	12
Aripiprazole	16	5	7
Promethazine	15	22	25
Ephedrine	15	14	4
Mitragynine	13	14	22
Clonazepam	13	5	15
6-MAM - Free	12	29	53
Metonitazene	12	27	1
Desmethyloperamide	12	14	9
Dihydrocodeine / Hydrocodol - Free	12	8	3
Quinine	11	47	43
Diazepam	11	20	11
Tramadol	11	18	22
Hydromorphone - Free	11	13	9
EDDP	11	6	10
Bromazolam	11	1	0
Mirtazapine	10	17	5
Cyclobenzaprine	10	15	11
Midazolam	10	12	9
O-Desmethylvenlafaxine	10	12	8
Lorazepam	9	16	8
Dextro / Levo Methorphan	9	14	5
Lamotrigine	9	11	7
Venlafaxine	9	11	8
Levetiracetam	9	8	8
Phentermine	9	7	4
8-Aminoclonazepam	9	2	0
Bupropion	8	15	13
Lidocaine	8	12	9
Topiramate	8	4	2
10-Hydroxycarbazepine	8	3	6
mCPP	8	3	4
Beta-hydroxy fentanys	8	1	0
Olanzapine	7	15	8
Duloxetine	7	9	9
Quetiapine	7	9	3



2022 Drug-Related Death Report

Hydroxybupropion	6	14	10
Dextrophan / Levorphanol	6	8	5
Phenylpropanolamine	6	8	3
Nortriptyline	6	6	12
Acetone	6	4	7
Carboxyhemoglobin	6	3	6
Despropionyl-para-fluorofentanyl	6	0	0
Doxylamine	5	7	5
Amitriptyline	5	6	11
Pseudoephedrine	5	2	1
6-Beta-Naltrexol – Free	5	1	2
Chlorpheniramine	4	10	7
MDMA	4	6	6
Ketamine	4	5	1
MDA	4	3	3
Desmethyldoxepin	4	1	2
Diltiazem	4	1	3
Carbamazepine	4	0	1
LSD	3	16	33
Zolpidem	3	6	4
Alpha-Hydroxyalprazolam	3	5	2
O-Desmethyltramadol	3	4	4
Butalbital	3	3	4
MDEA	3	3	0
Desalkylflurazepam	3	2	4
Donepezil	3	1	0
Doxepin	3	1	3
Etomidate	3	0	0
Paroxetine	2	10	8
9-Hydroxyrisperidone	2	7	6
Codeine - Free	2	4	13
Dicyclomine	2	2	1
Haloperidol	2	2	0
Norketamine	2	2	1
Norpseudoephedrine	2	2	1
Phenytoin	2	2	2
Warfarin	2	2	0
Naltrexone - Free	2	1	1



2022 Drug-Related Death Report

Carbamazepine-10,11-Epoxyde	2	0	1
Ecgonie Methyl Ester	2	0	0
Guaifenesin	2	0	1
Isopropanol	2	0	2
N, N-Dimethylamphetamine	2	0	0
Propranolol	2	0	0
Alpha-Hydroxyetizolam	1	7	2
Temazepam	1	6	1
Ziprasidone	1	4	0
Etonitazene	1	3	0
Meprobamate	1	3	1
Tadalafil	1	3	4
Butorphanol - Free	1	2	0
Carisoprodol	1	2	0
Clobazam	1	2	0
Levamisole	1	2	4
Protonitazene	1	2	0
Buspirone	1	1	1
Chlordiazepoxide	1	1	1
Clonidine	1	1	0
Eszopiclone / Zopiclone	1	1	0
Etizolam	1	1	14
Flualprazolam	1	1	19
Flubromazepam	1	1	0
Isotonitazene	1	1	5
Monoethylglycinexylidide (MEGX)	1	1	2
Phenobarbital	1	1	0
5 Amino Isotonitazene	1	0	0
Alpha-Hydroxyalprazolam	1	5	2
Estazolam	1	0	0
Iloperidone	1	0	0
Memantine	1	0	1
Methanol	1	0	0
Methocarbamol	1	0	2
Nalbuphine-Free	1	0	0
Prochlorperazine	1	0	0
Ritalinic Acid	1	0	2
Theobromine	1	0	0
Yonimbine	1	0	0



2022 Drug-Related Death Report

6 Beta Naltrexol Free	1	0	0
Trihexyphenidyl	1	0	0
Mexiletine	1	0	0

Note: 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.



2022 Drug-Related Death Report

Knox and Anderson Counties Top 10 Drugs Found in Drug-Related Deaths 2018-2022

	2018	2019	2020	2021	2022
1	Fentanyl & Analogues	Fentanyl & Analogues*	Fentanyl & Analogues*	Fentanyl & Analogues*	Fentanyl & Analogues*
2	Methamphetamine	Methamphetamine	Methamphetamine	Methamphetamine	Methamphetamine
3	Heroin	Alcohol/Ethanol	Heroin	Diphenhydramine	Cocaine
4	Cocaine	Heroin	Alcohol/Ethanol	Alcohol/Ethanol	Alcohol/Ethanol
5	Alcohol/Ethanol	Cocaine	Cocaine	Cocaine	Xylazine
6	Alprazolam	Oxymorphone	Gabapentin	Gabapentin	Alprazolam
7	Oxycodone	Alprazolam	Diphenhydramine	Heroin	Diphenhydramine
8	Oxymorphone	Oxycodone	Oxycodone	Alprazolam	Oxycodone
9	Morphine	Gabapentin	Alprazolam	Oxycodone	Gabapentin
10	Methadone	Diphenhydramine	Oxymorphone	Oxymorphone	Morphine

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

Data Source: MDILog Database 2018-2022 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.



2022 Drug-Related Death Report

2022 DRD Cases with Naloxone Use and Drug Type

	Naloxone-Rx Drug Only	Naloxone-Illicit Drug Only	Naloxone-Rx and Illicit Drug	Total
Knox	8	68	89	165
Anderson	2	9	8	19
Total	10	77	97	184

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

Special thanks to Executive Administrative Assistant Anna Hoekstra for the creation of this report.

