



Tennessee State Unintentional Drug Overdose Reporting System (SUDORS) Report 2024

**Tennessee Department of Health
Office of Informatics and Analytics**

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1 Executive Summary

In Tennessee, 12,538 individuals died of an unintentional or undetermined drug overdose between 2019-2022. SUDORS deaths increased 90% from 2019 to 2022.

- The largest increase in age-specific death rate occurred for individuals aged 35-44 years between 2019 and 2022.
- The age-adjusted death rate for Black individuals increased 185% between 2019 and 2022.
- In 2022, illicit opioids and stimulants accounted for the highest proportions of deaths 75% and 59%, respectively. Fentanyl was the most frequently occurring substance on toxicology.
- In 2022, most decedents died at home and only 23% had a bystander present who could have intervened during the overdose.
- Only 24% of decedents had evidence of naloxone administration in 2022.
- Data linkage was conducted between SUDORS, Prescription Drug Monitoring Program (PDMP), Hospital Discharge Data System (HDDS) data, and Criminal Justice Arrest data to provide more comprehensive surveillance on fatal drug overdoses in the state of Tennessee.

With increased fentanyl involvement, naloxone training and distribution are critical to decreasing fatal overdoses. Family, friends, and the general public should know how to administer naloxone to assist an individual who uses drugs if an overdose occurs. Research on prevention and intervention strategies should continue to focus on minorities and culturally relevant treatment and prevention options. The SUDORS team plans to conduct future analyses to determine if treatment options are available near individuals who need it most.

2 Introduction: What is SUDORS?

Unintentional injuries are the leading cause of death for individuals under 45 years old in the United States. Drug overdoses comprise most of these deaths. Since 1999, there have been more than 1 million deaths from drug overdoses in the United States. With the number of drug overdoses rising each year, the Centers for Disease Control and Prevention (CDC) provided funding to states in 2016 under the Enhanced State Opioid Overdose Surveillance (ESOOS) grant to enhance surveillance and bolster prevention efforts for opioid overdoses. Tennessee began participating in ESOOS in 2018 and started collecting data on undetermined and unintentional opioid overdoses in Tennessee as part of the State Unintentional Drug Overdose Reporting System (SUDORS). SUDORS uses death certificate data, autopsies, toxicology reports, and Prescription Drug Monitoring Program data (PDMP) to collect over 600 variables relating to the overdose and the decedent.

SUDORS became a subset of the already established National Violent Death Reporting System (NVDRS), which collects similar data for all violent deaths. SUDORS and NVDRS share a web-based platform for collecting and storing the data as well as all undetermined drug overdose deaths. Despite these undetermined cases overlapping between both NVDRS and SUDORS, and their shared platform, SUDORS is a unique strategy under the Overdose Data to Action Grant (OD2A), which replaced ESOOS in January 2019. Through the OD2A grant, SUDORS expanded surveillance from opioid overdose deaths to all substance overdose deaths.

2.1 SUDORS Data

SUDORS data is collected in six-month periods from January to June, then July to December and is reported to the CDC biannually in February and August. Because SUDORS uses data from autopsy and toxicology reports, there is a delay in the availability of finalized data. Tennessee is a decentralized state with five regional forensic centers and the state agency serving as an advisor. Autopsies available for SUDORS abstraction are limited to those sent from the five centers to the state agency. SUDORS data is first abstracted into a platform called Research Electronic Data Capture (REDCap) which the Tennessee SUDORS team uses for data management. The data is then entered into the secured CDC NVDRS database.

2.2 Case Definition

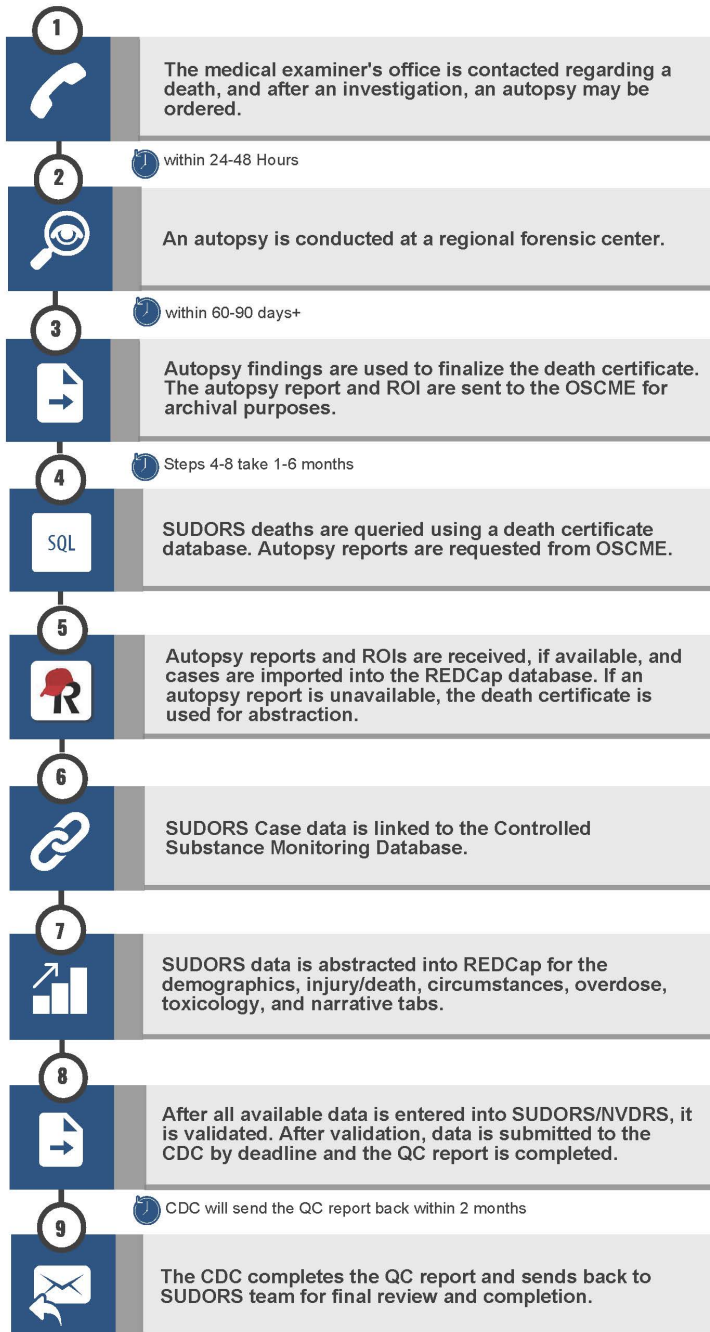
SUDORS cases are found using an algorithm that searches the death certificate database for ICD-10 poisoning and overdose codes (X40-X44, Y10-Y14, T36-T50) and drugs listed as a cause of death in the cause of death text fields. The algorithm was designed to maximize the sensitivity so that all possible cases would be identified. Abstractors manually go through each case using all available information to exclude any cases not meeting the case definition. SUDORS cases have an underlying cause of death of acute drug toxicity. The manner of death is usually unintentional or undetermined, although there are some natural manner of death in cases where a physician fills out the death certificate. A drug is defined in the

SUDORS coding manual as, “any chemical compound that is chiefly used by or administered to humans or animals as an aid in the diagnosis, treatment, or prevention of disease or injury, for the relief of pain or suffering, to control or improve any physiologic or pathologic condition, or for the feeling it causes.”

As we share undetermined cases with the TNVDRS team each year, the total number of cases is subject to change after our submission deadline at the discretion of the CDC.



SUDORS Data Collection Process



KEY

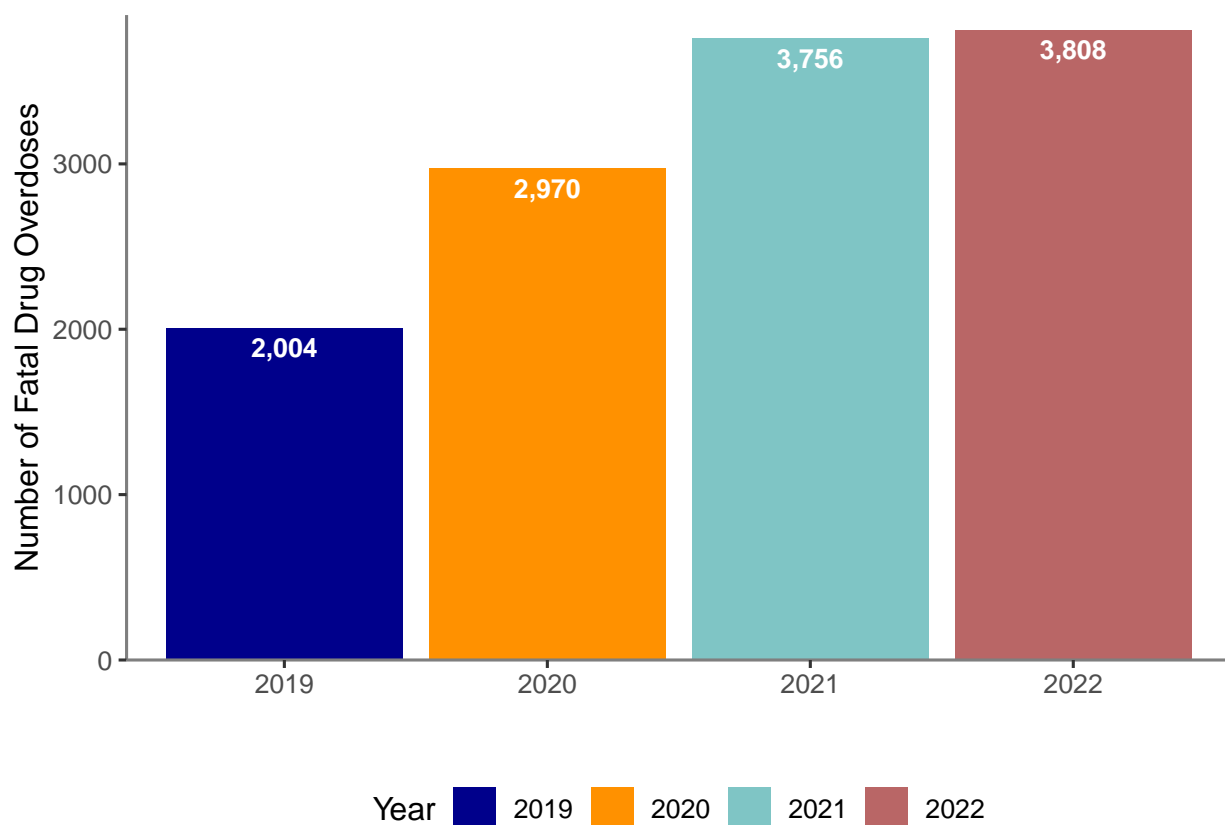
- QC - Quality Control
- SUDORS - State Unintentional Drug Overdose Reporting System
- ROI - Report of Investigation
- OSCME - Office of the State Chief Medical Examiner
- NVDRS - National Violent Death Reporting System
- REDCap- Research Electronic Data Capture

This infographic was prepared by the Office of Informatics and Analytics and OSCME in October 2022.

Demographic Distribution among SUDORS Deaths in Tennessee, 2019 - 2022

SUDORS collects demographic information for each decedent, including age, race, sex, marital status, and education level. This information is important for tailoring prevention strategies to the populations most impacted. The rate data presented is calculated per 100,000 Tennessee residents.

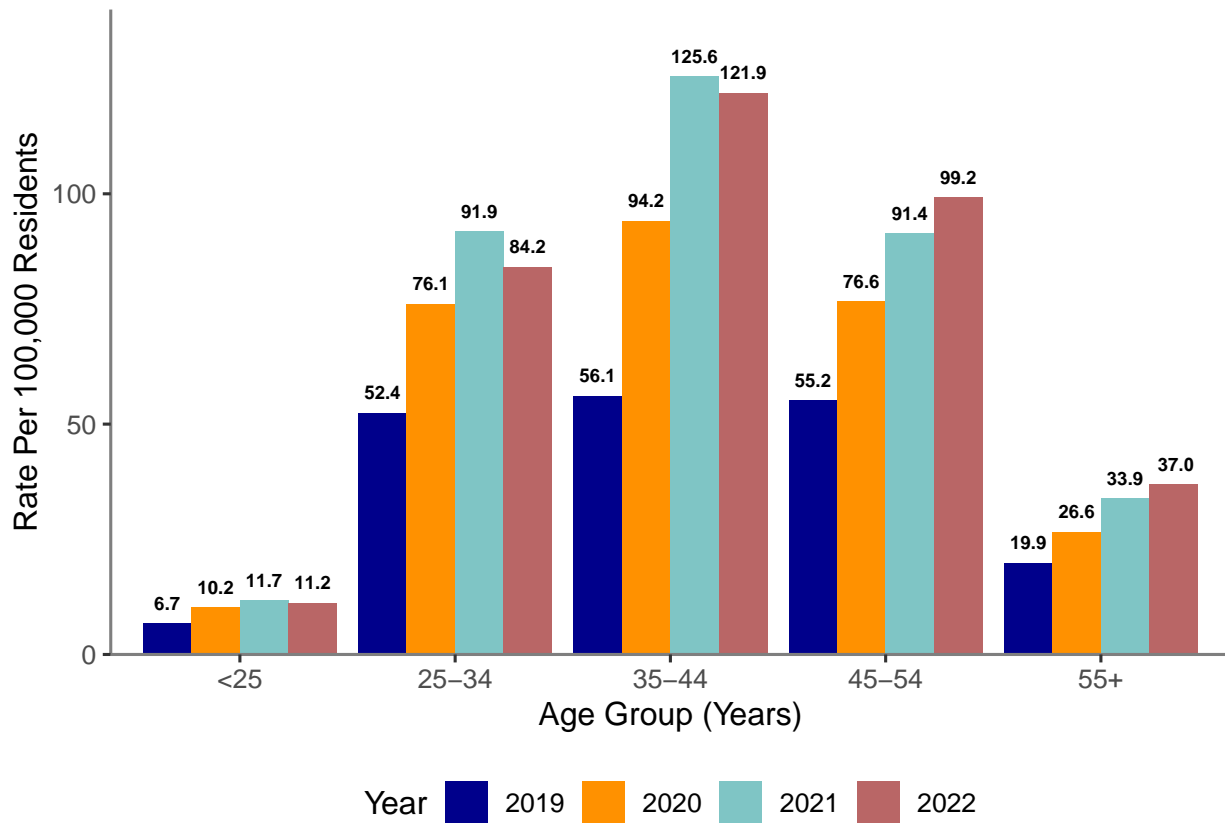
2.3 Total SUDORS Overdoses in Tennessee



Analysis by the Office of Informatics and Analytics, TDH (last updated November 7, 2023). Data Source: TN SUDORS, 2019-2022.

Between 2019 and 2022, 12,538 deaths met the the SUDORS case definition. Compared to the 3,756 overdose deaths reported in 2021, Tennessee only saw a slight increase (<2%) for SUDORS deaths reported in 2022. This will be the first year since SUDORS began tracking overdose deaths where the number of deaths have not increased significantly from year to year.

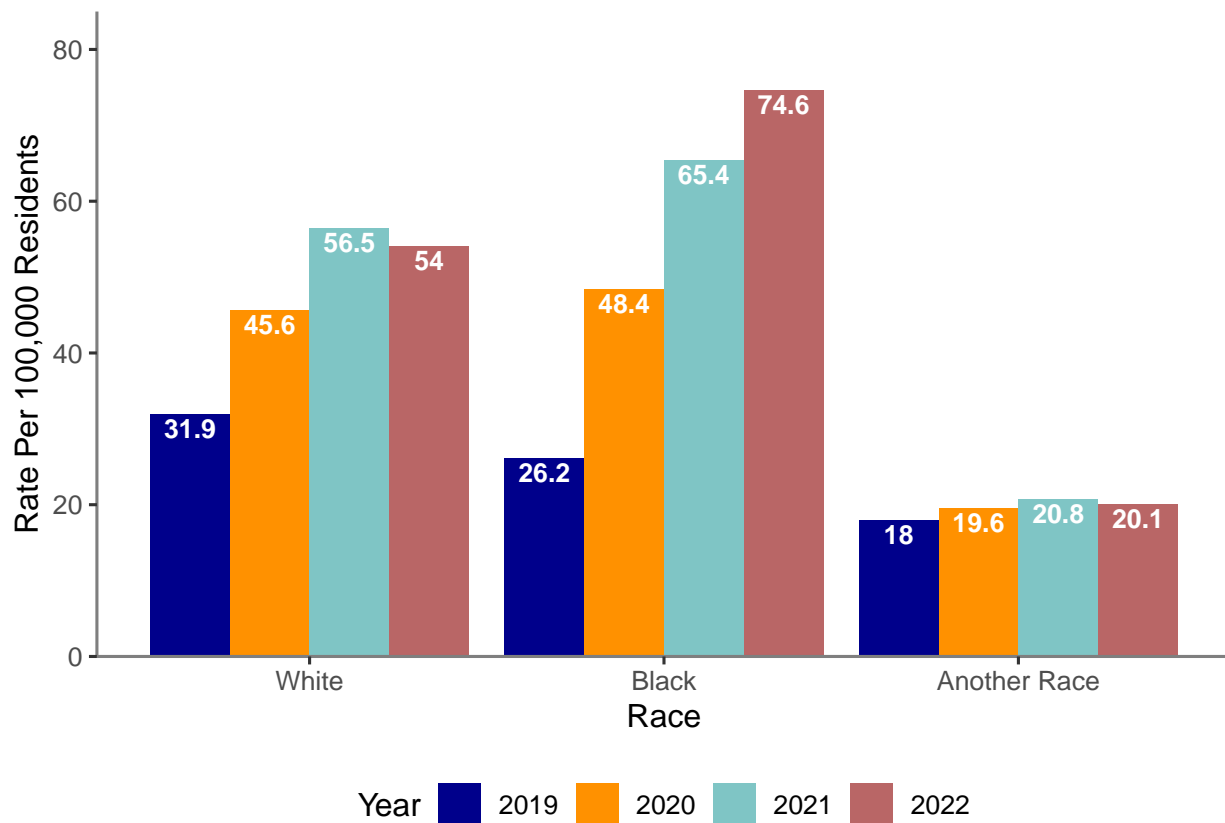
2.4 Age-Specific SUDORS Death Rate in Tennessee



Analysis by the Office of Informatics and Analytics, TDH (last updated November 7, 2023). Data Source: TN SUDORS, 2019-2022.

While the most striking rate increases occurred for individuals aged 35-44 from 2019 to 2021, there was a slight decrease in this age group from 2021 to 2022. From 2021 to 2022, the largest increase seen was in those aged 45-54.

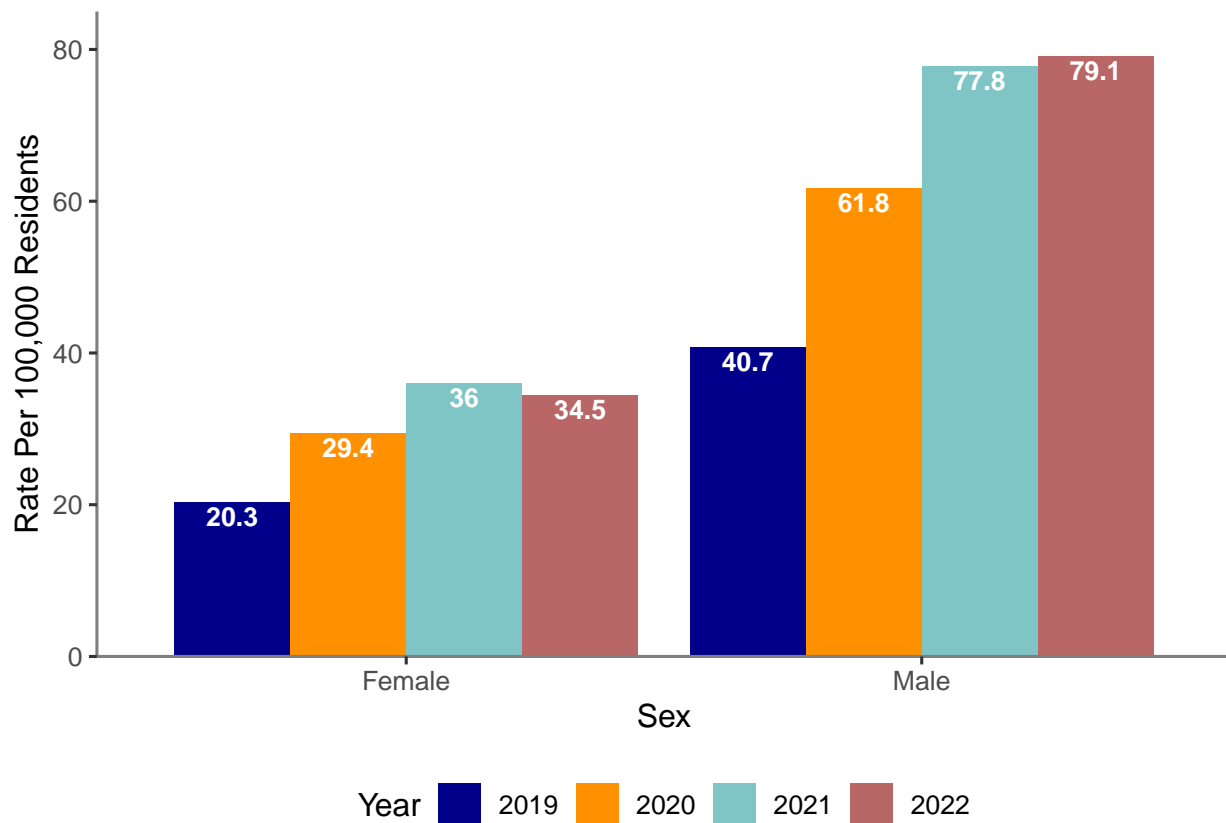
2.5 Age-Adjusted SUDORS Death Rate by Race in Tennessee



Analysis by the Office of Informatics and Analytics, TDH (last updated November 7, 2023). Data Source: TN SUDORS, 2019-2022.

While age-adjusted death rates for individuals of all races consistently increased from 2019 to 2021, only Black Tennesseans showed a rate increase from 2021 to 2022. The age-adjusted rates for both White and Other race individuals showed slight decreases from 2021 to 2022. Black Tennesseans experienced a 185% increase in death rate between 2019 and 2022. Despite the slight decrease seen from 2021 to 2022, White Tennesseans experienced a 69% rate increase from 2019 to 2022.

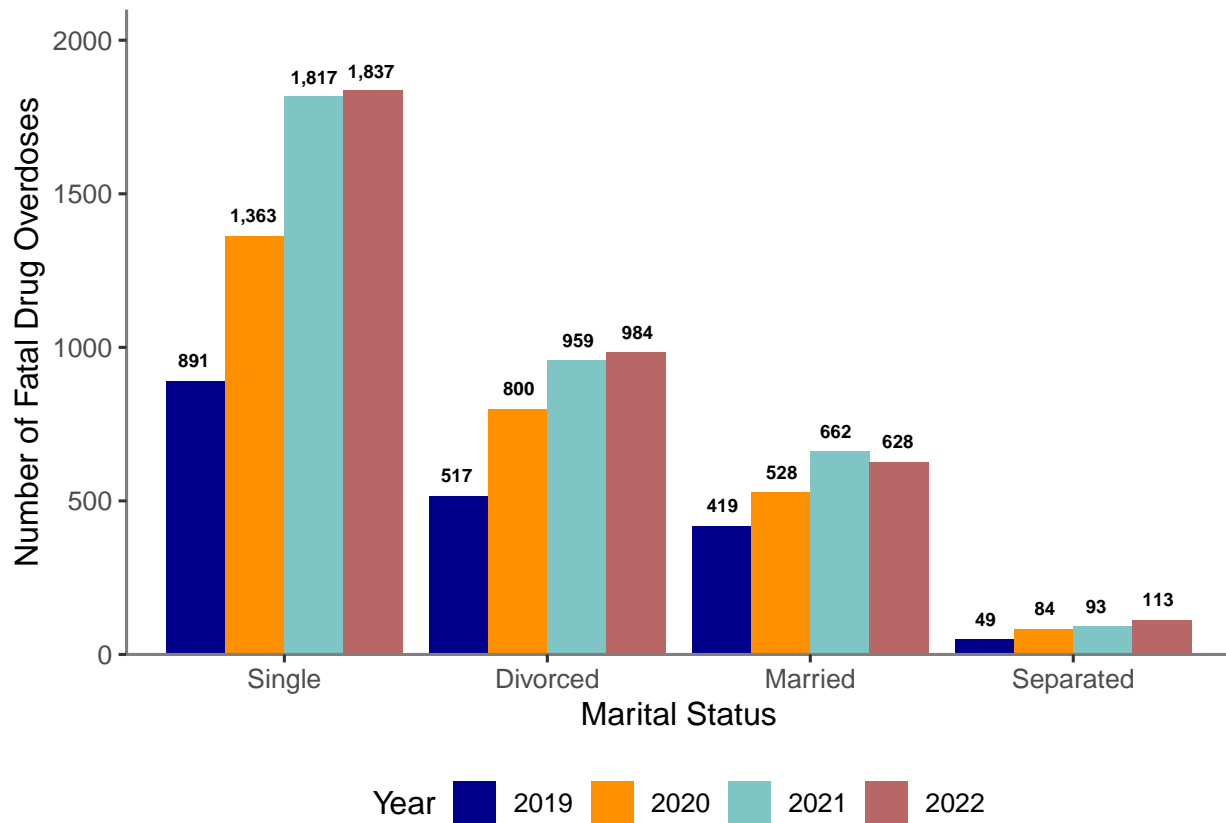
2.6 Age-Adjusted SUDORS Death Rate by Sex in Tennessee



Analysis by the Office of Informatics and Analytics, TDH (last updated November 7, 2023). Data Source: TN SUDORS, 2019-2022.

Males experienced a higher age-adjusted death rate compared to females for all years. While males rates increased from 2021 to 2022, females rates decreased. Males also experienced a greater percent change between 2019 and 2022 compared to females (94% vs. 70%).

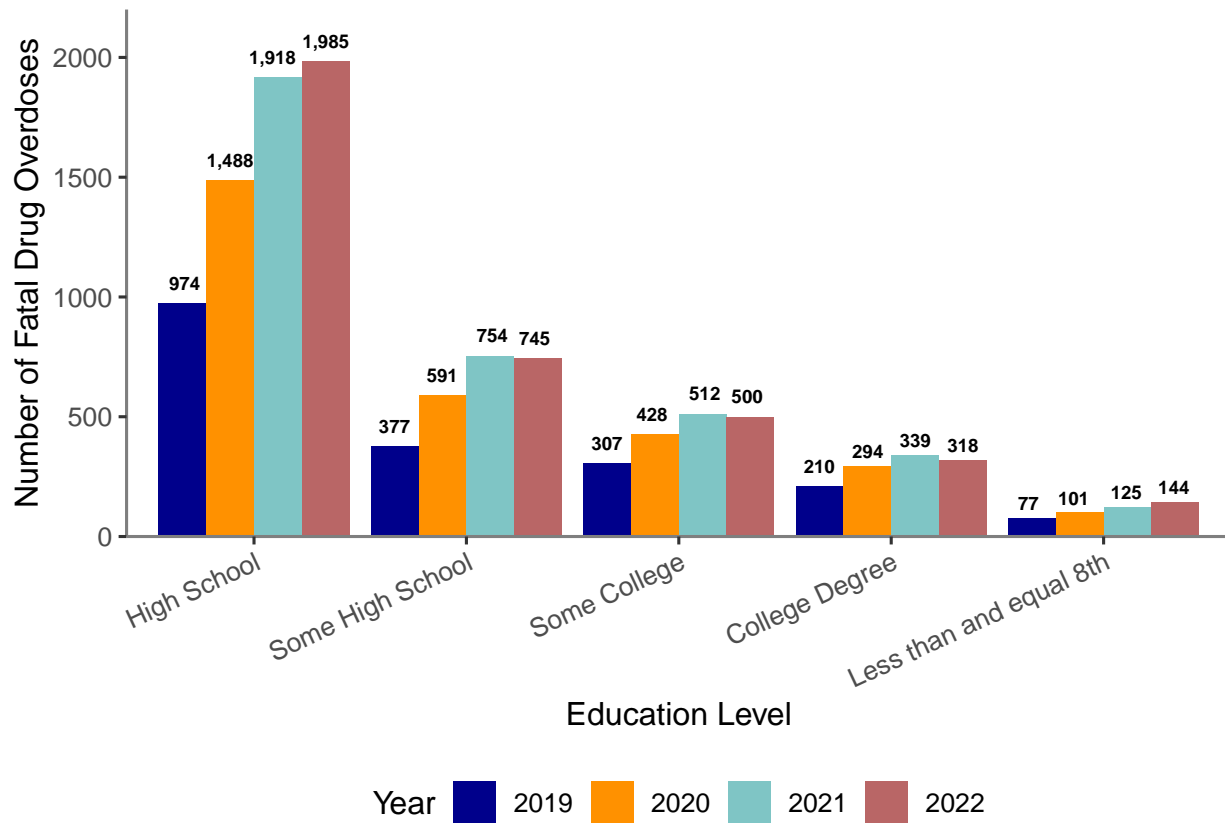
2.7 Marital Status among SUDORS Deaths in Tennessee



Analysis by the Office of Informatics and Analytics, TDH (last updated November 7, 2023). Data Source: TN SUDORS, 2019-2022.

When looking at 2019 to 2022 data together, only 18% of SUDORS decedents were married at the time of death. A similar pattern occurred between 2019 and 2022 for all types of marital status. We did not include the category “Unknown” (2%) in the graph.

2.8 Highest Education Level among SUDORS Deaths in Tennessee



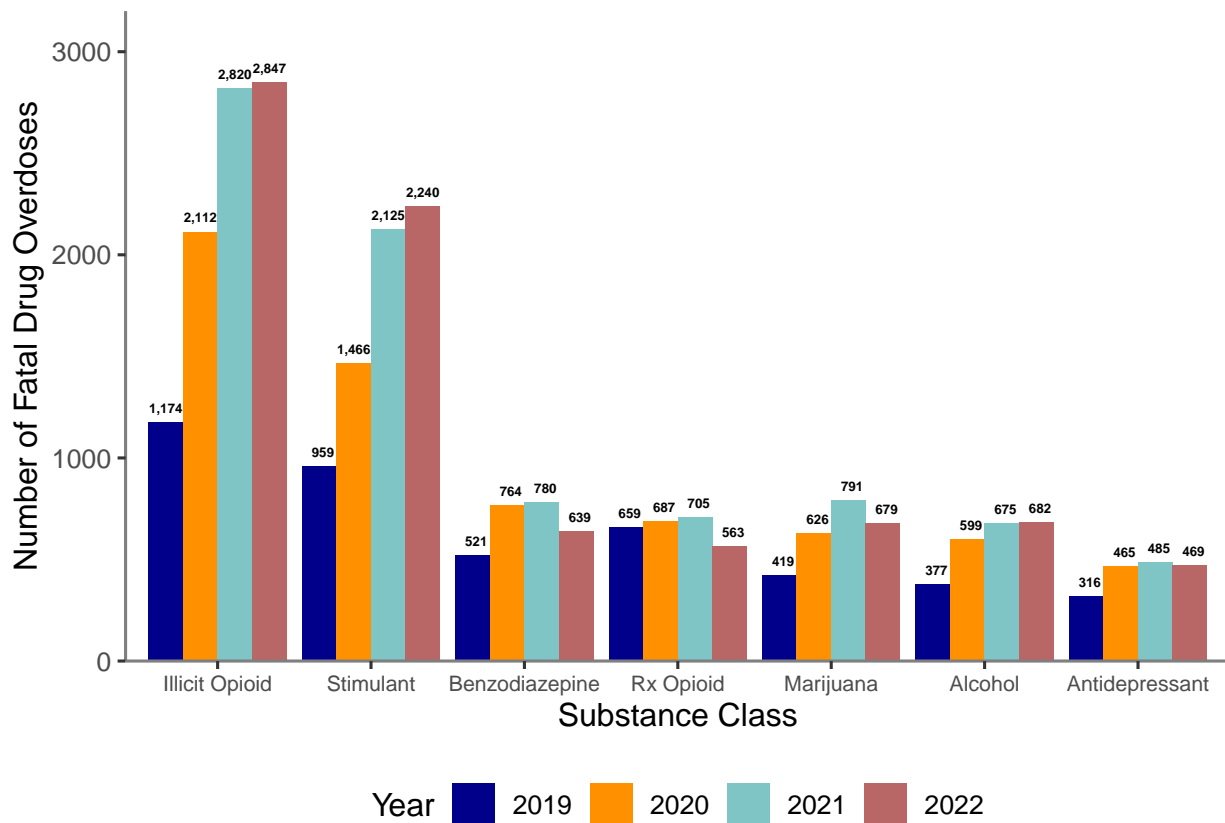
Analysis by the Office of Informatics and Analytics, TDH (last updated November 7, 2023). Data Source: TN SUDORS, 2019-2022.

Most SUDORS decedents had at least a high school education or General Educational Development (GED) equivalent for deaths from 2019 to 2022. A similar pattern occurred between 2019 and 2022 for all education levels. We did not include the category “Unknown” (3%) in the graph.

3 Toxicology among SUDORS Deaths in Tennessee, 2019 - 2022

Toxicology reports are a key component of data collected for SUDORS. Toxicology reports generally accompany an autopsy report and give detailed information about all substances an individual had in their system at the time of death. If a toxicology report is not available, substances from the death certificate are used to determine substances involved in a death. The following figures show the most common drug classes and individual substances present in SUDORS data from 2019 to 2022.

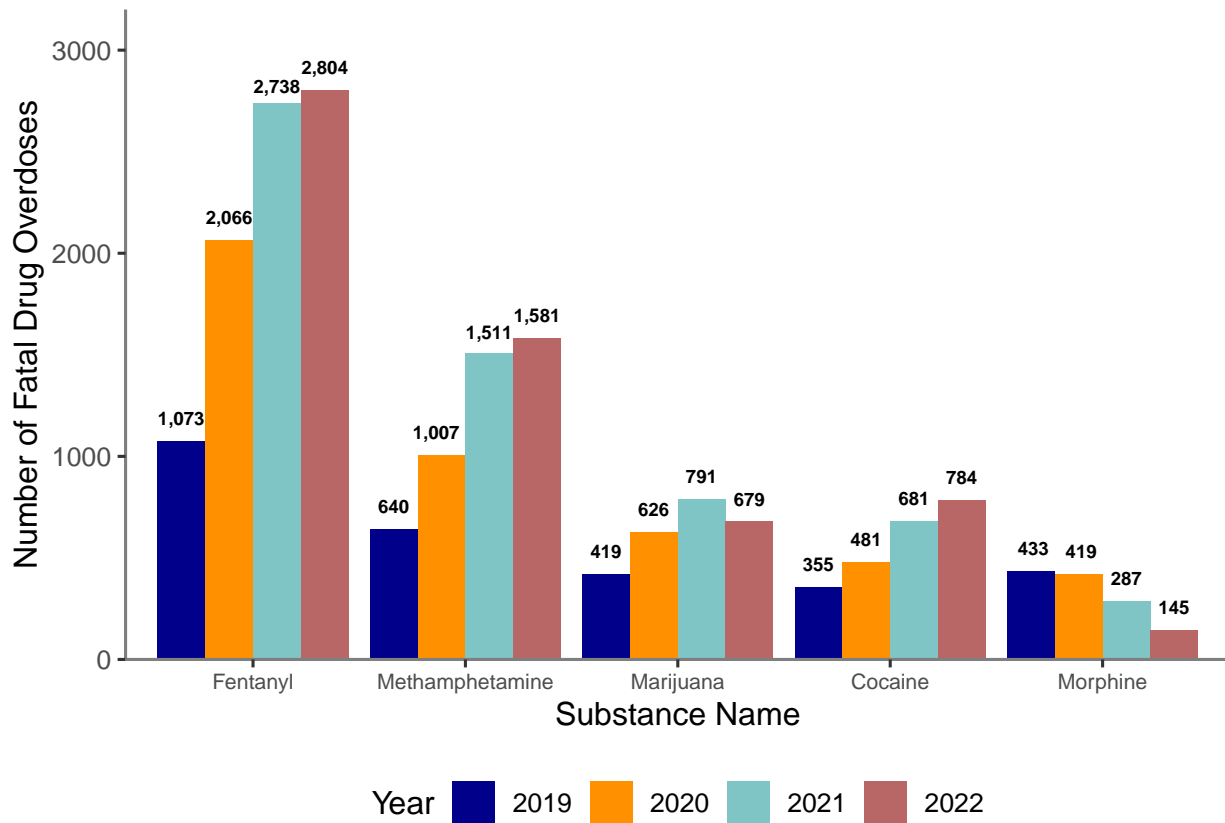
3.1 Drug Classes among SUDORS Decedents in Tennessee



Analysis by the Office of Informatics and Analytics, TDH (last updated November 7, 2023). Data Source: TN SUDORS, 2019-2022.

The graph above shows the most common drug classes for substances found in toxicology reports for Tennessee SUDORS deaths between 2019 and 2022. The most common drug class seen was illicit opioids. The pattern from the most common drug class found in SUDORS decedents to the least common remained relatively consistent throughout these years.

3.2 Individual Substances among SUDORS Decedents in Tennessee



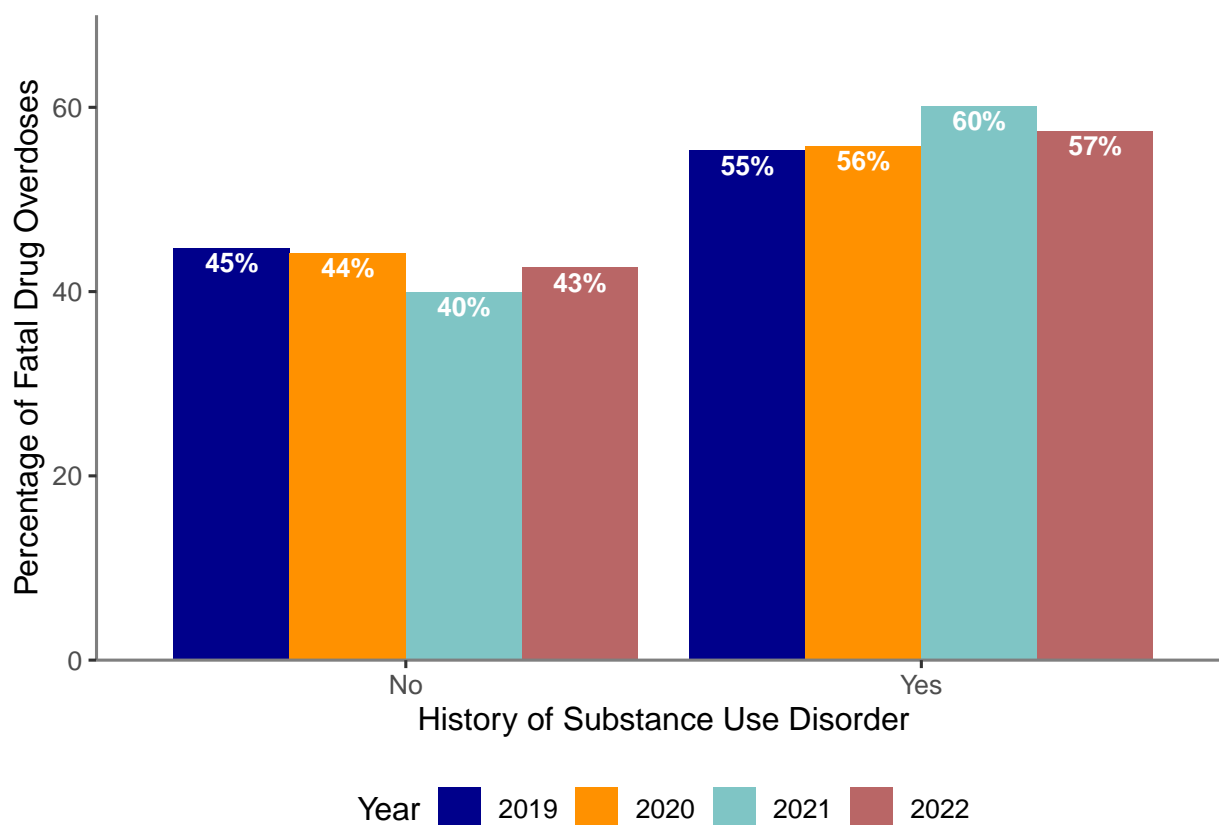
Analysis by the Office of Informatics and Analytics, TDH (last updated November 7, 2023). Data Source: TN SUDORS, 2019-2022.

The graph above shows the most prevalent substances found in toxicology reports for Tennessee SUDORS deaths between 2019 and 2022. Fentanyl was the most common substance involved in SUDORS deaths. Morphine involvement decreased in 2022 likely due to the decrease in heroin involvement.

4 Circumstances among SUDORS Deaths in Tennessee, 2019 - 2022

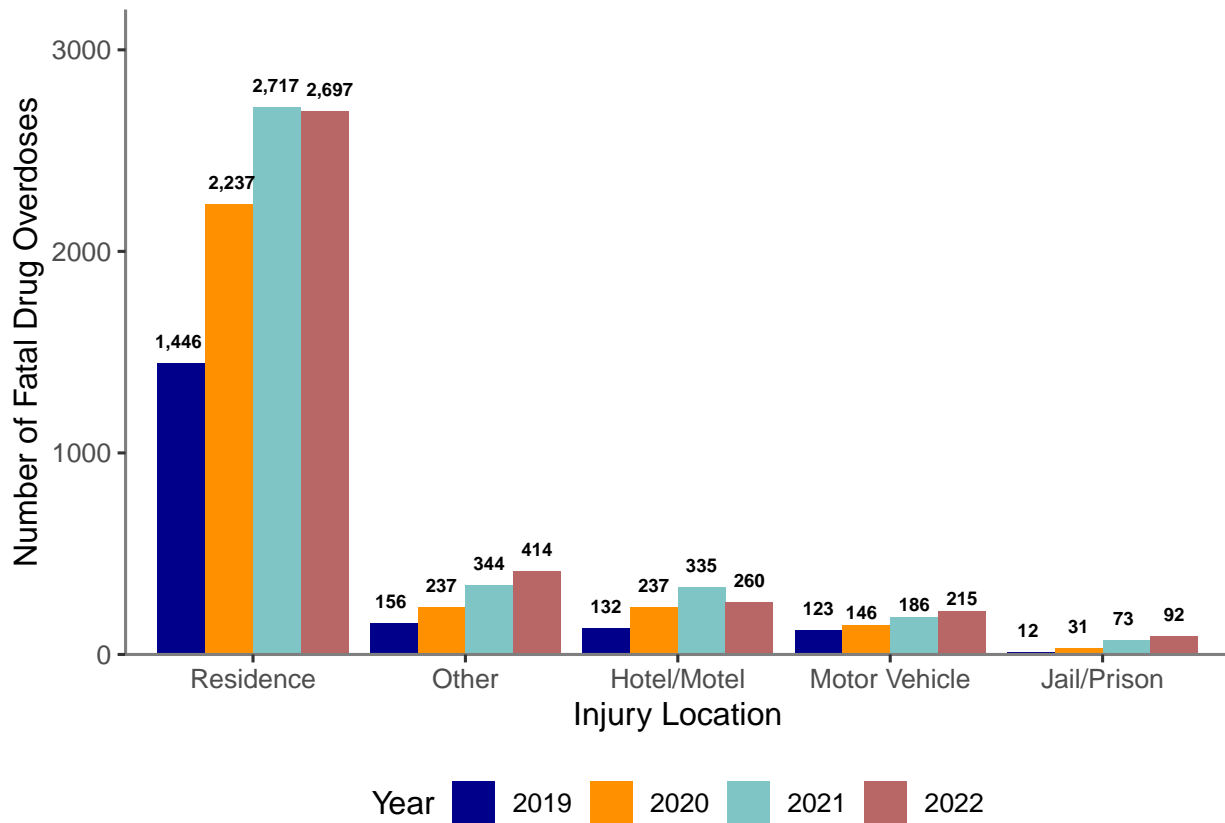
SUDORS collects information on numerous variables describing the circumstances surrounding an overdose death. This section highlights key variables to provide more insight into fatal overdoses in Tennessee. Circumstantial data come primarily from investigative summaries found within autopsy reports and reports of investigation for cases that were not autopsied. Due to the lack of detailed information in some autopsies and reports of investigation, these data can be underestimated or limited for some decedents. The SUDORS team generally receives autopsies for 70-80% of cases.

4.1 Evidence of Substance Use Disorder History among SUDORS Decedents in Tennessee



SUDORS defines substance use disorder as previous history of substance use, relapse after abstinence, current or past treatment for substance use, previous overdose, and/or recent emergency department visits related to substance use. Among the 12,538 overdose deaths in Tennessee between 2019 and 2022, 57% of decedents had a history of substance use disorder. Annual percentages and the proportion of history of substance use disorder versus none remained relatively consistent between these years.

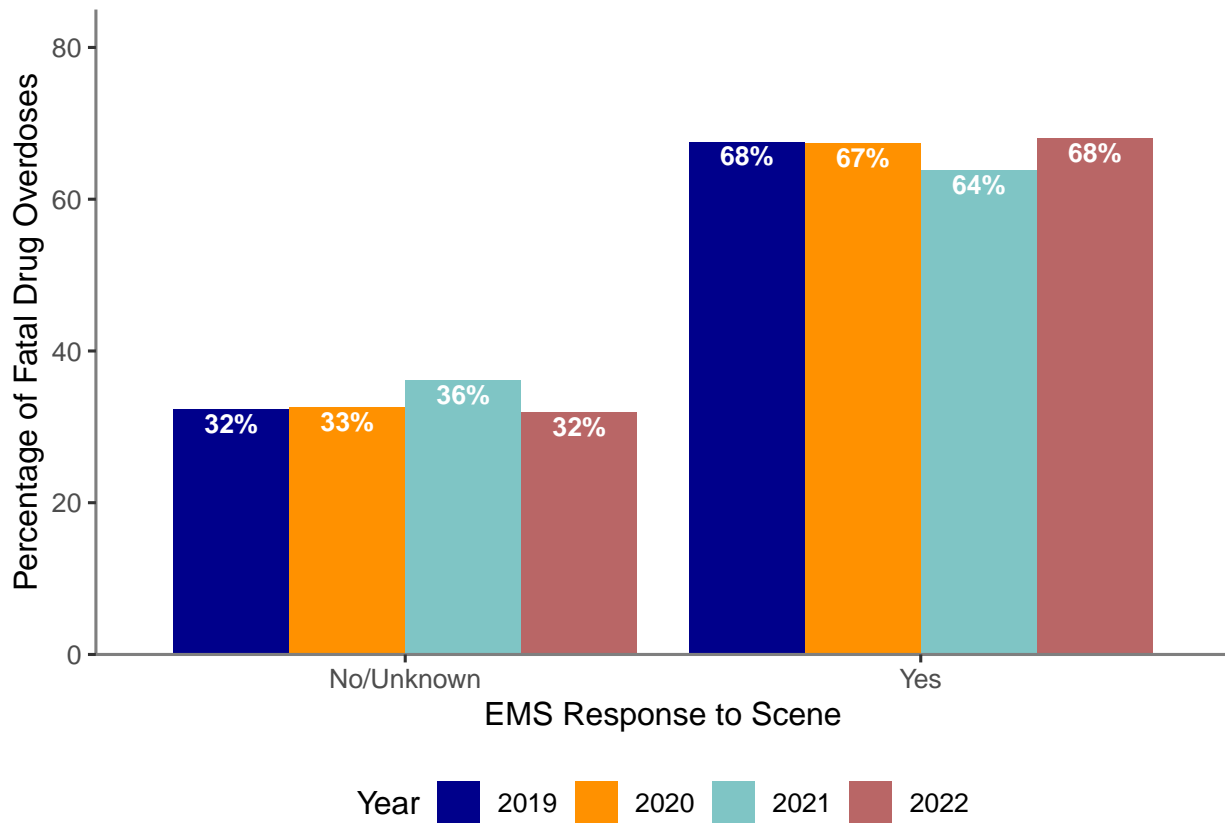
4.2 Injury Location of SUDORS Decedents in Tennessee



Analysis by the Office of Informatics and Analytics, TDH (last updated November 7, 2023). Data Source: TN SUDORS, 2019-2022.

In Tennessee, 73% of all fatal overdoses begin at a residential location, such as a house or apartment. Other injury locations, including hospital, street or alley, outside in a natural area or commercial establishments, such as grocery stores, laundromats, or parking lots, accounted for the second most common area found. Overdoses occurring at a hotel or motel were the third highest among injury locations reported in Tennessee. The “Unknown” category is not shown in the graph.

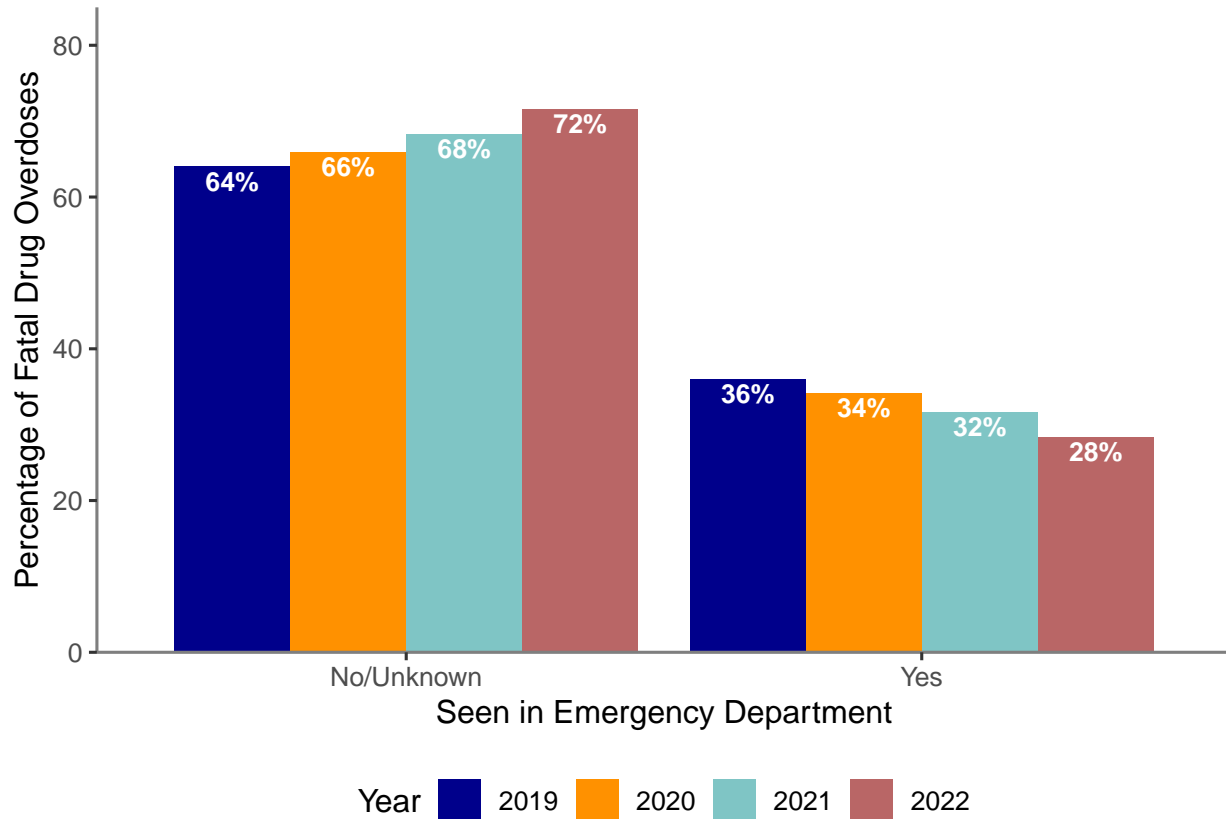
4.3 EMS Present at Scene for SUDORS Deaths in Tennessee



Analysis by the Office of Informatics and Analytics, TDH (last updated November 7, 2023). Data Source: TN SUDORS, 2019-2022.

Emergency medical personnel, including EMS and fire departments, responded to 68% of SUDORS deaths in 2022. Annual percentages and the proportion of EMS response versus no response or unknown remained relatively consistent between 2019 and 2022. These numbers could be underestimated due to lack of autopsy report or details describing the scene.

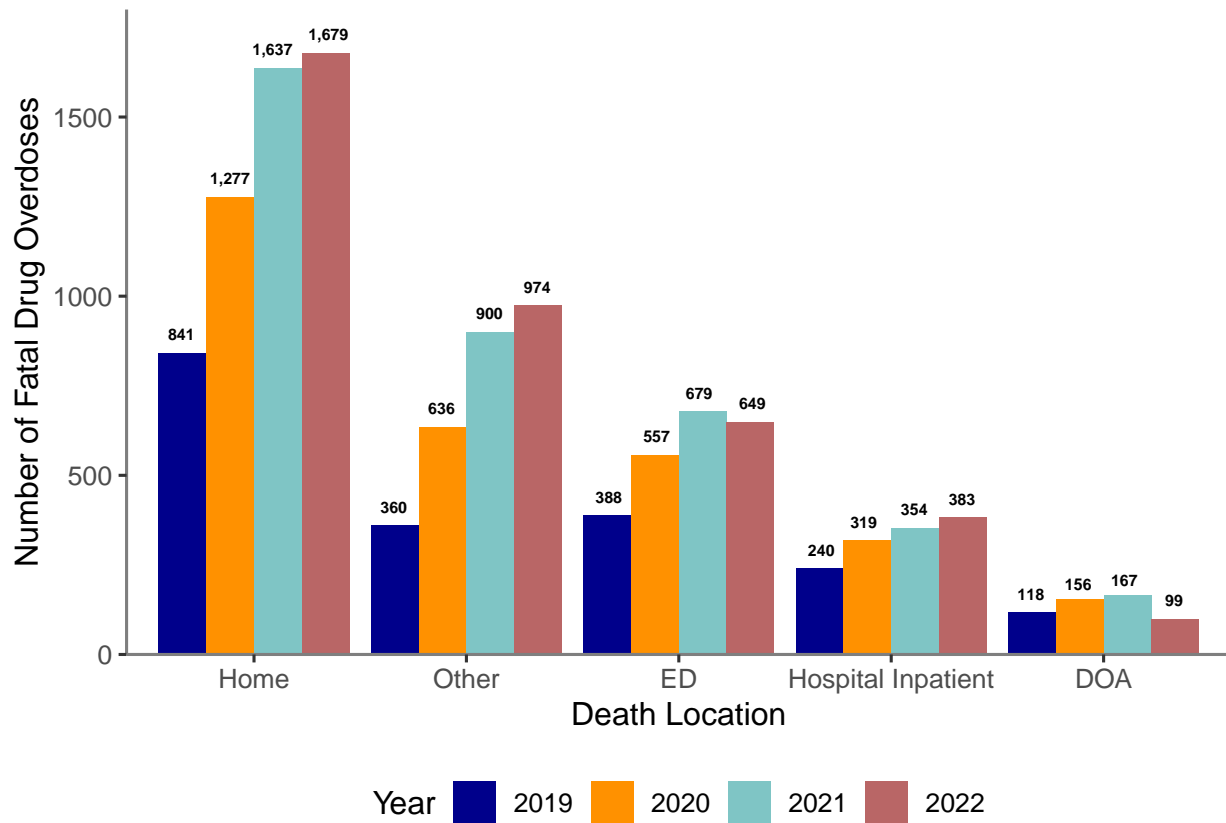
4.4 Percent of SUDORS Decedents Treated in the Emergency Department in Tennessee



Analysis by the Office of Informatics and Analytics, TDH (last updated November 7, 2023). Data Source: TN SUDORS, 2019-2022.

Between 2019 and 2022, on average, only 32% of decedents in Tennessee were seen in an emergency department (ED) for their fatal overdose. This includes decedents taken to the ED by EMS or a private vehicle. Decedents that are taken to the ED, but are dead on arrival (DOA), were also included in this percentage (13%).

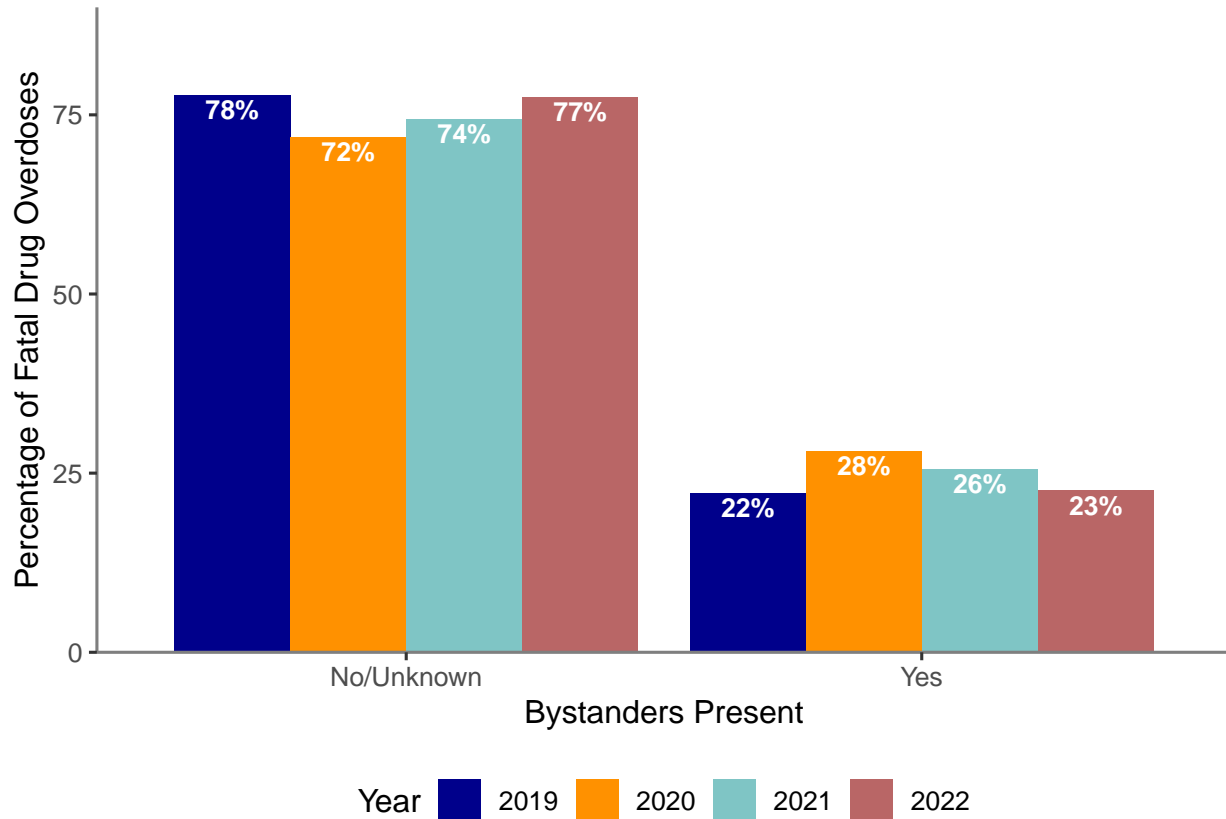
4.5 Death Location of SUDORS Decedents in Tennessee



Analysis by the Office of Informatics and Analytics, TDH (last updated November 7, 2023). Data Source: TN SUDORS, 2019-2022.

Death location is defined as the place where the death was pronounced. Most fatal overdoses between 2019 and 2022 occurred at the decedent's home. 'Other' location predominately refers to another residence.

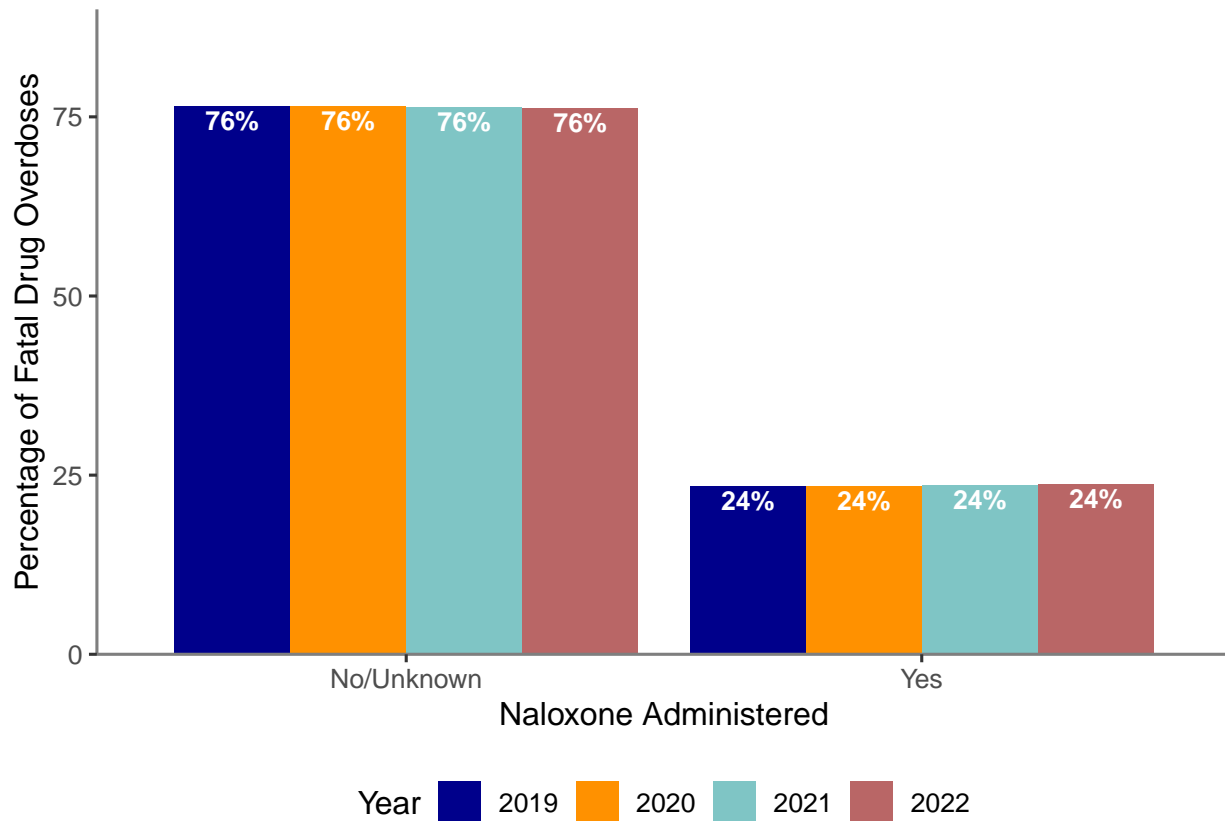
4.6 Bystander Present at Time of Overdose for SUDORS Deaths in Tennessee



Analysis by the Office of Informatics and Analytics, TDH (last updated November 7, 2023). Data Source: TN SUDORS, 2019-2022.

A bystander is a person who was in the same location as the decedent and could have potentially intervened during an overdose. Between 2019 and 2022, on average, a bystander was confirmed to be present in only 25% of overdose deaths.

4.7 Percent of SUDORS Deaths with Evidence of Naloxone Administration in Tennessee



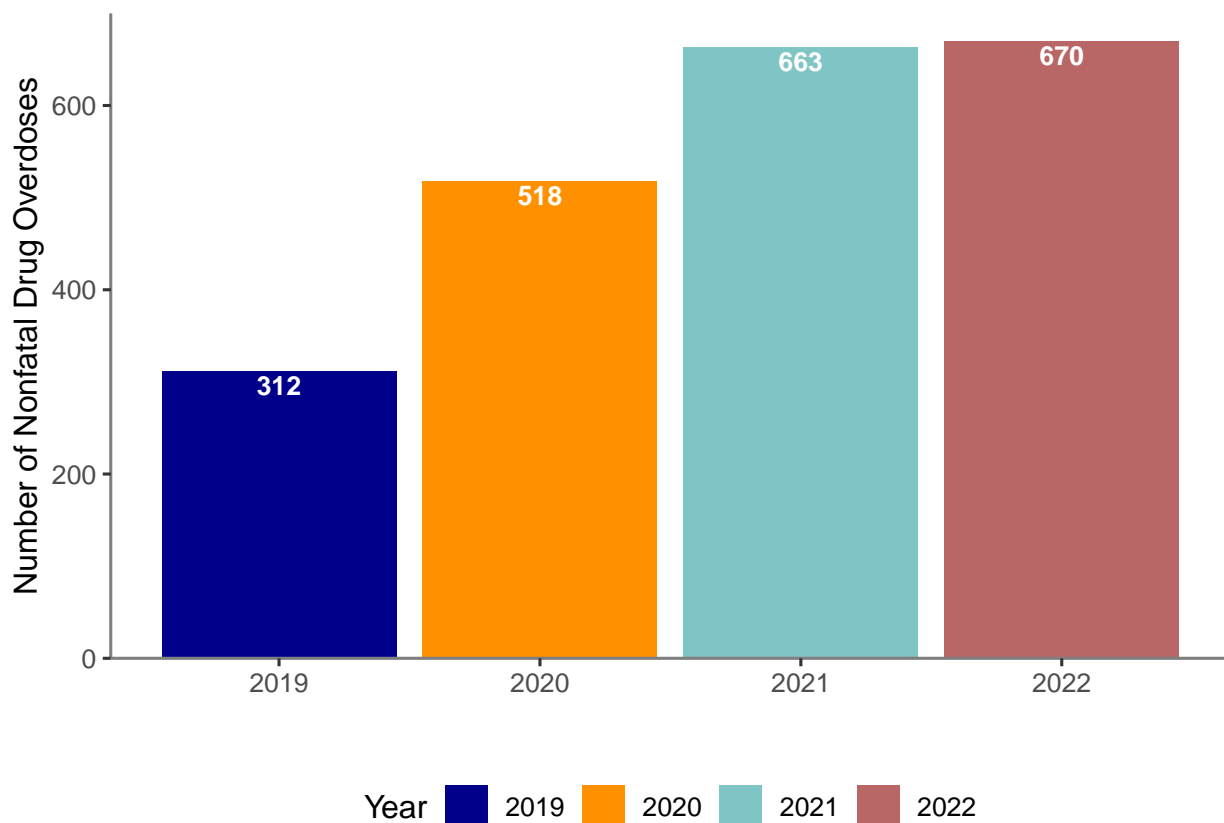
Analysis by the Office of Informatics and Analytics, TDH (last updated November 7, 2023). Data Source: TN SUDORS, 2019-2022.

Naloxone is a life-saving medication that can reverse the effects of an opioid-involved overdose. In 2022, among SUDORS deaths in Tennessee, only 24% of decedents had evidence of naloxone administration. This evidence comes from witness reports, medical records, scene evidence, or toxicology results.

5 Circumstances in the Year before SUDORS Deaths in Tennessee, 2019 - 2022

This section highlights linkage of Hospital Discharge Data System (HDDS) data, Criminal Justice Arrest data, and Controlled Substances Monitoring Program Data (CSMD) with SUDORS data to enhance the quality of surveillance data.

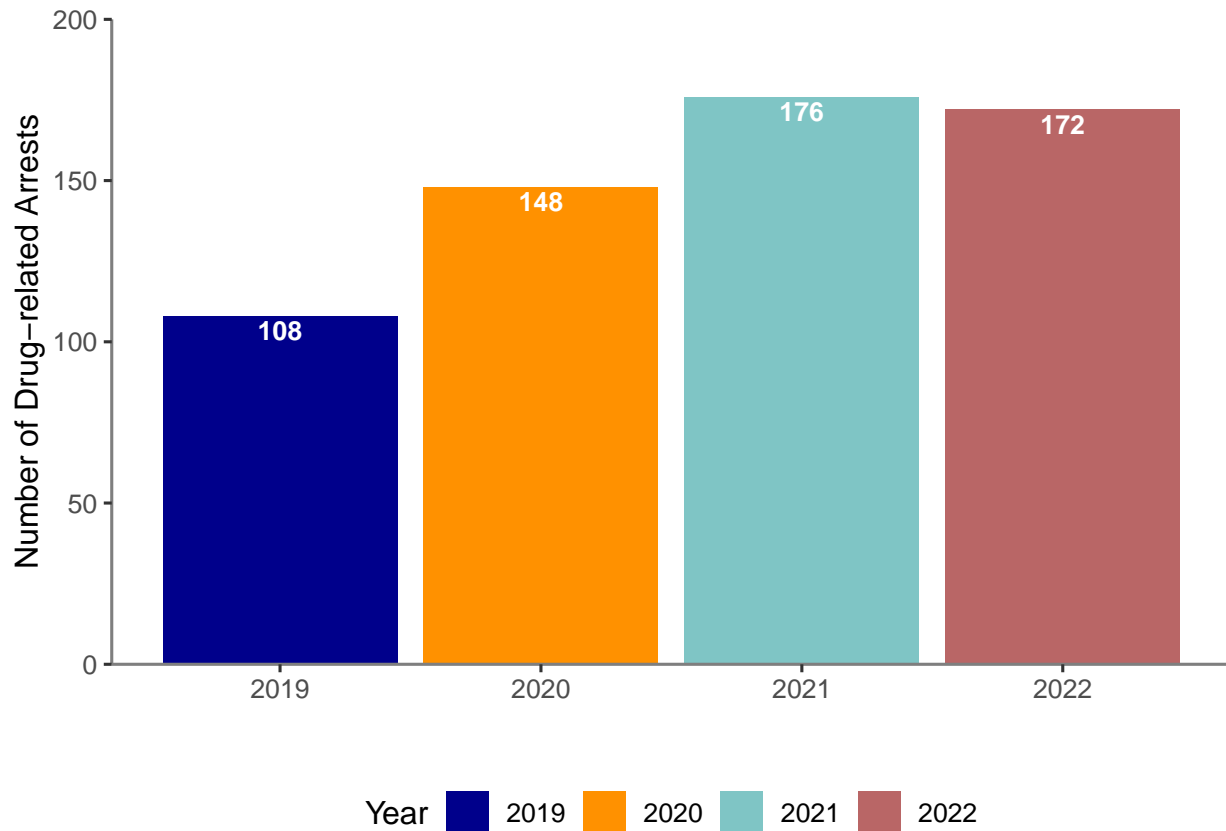
5.1 Previous Overdoses in the Year Prior to Death among SUDORS Decedents in Tennessee



Analysis by the Office of Informatics and Analytics, TDH (last updated November 7, 2023). Data Source: TN SUDORS, 2019-2022, HDDS data.

The graph above shows counts of overdose decedents who experienced a nonfatal overdose treated in a hospital setting in the year prior to death. Since 2019, the number of previous nonfatal overdoses has increased, but remained consistent from 2021 to 2022.

5.2 Previous Arrest in the Year Prior to Death among SUDORS Decedents in Tennessee



Analysis by the Office of Informatics and Analytics, TDH (last updated November 7, 2023). Data Source: TN SUDORS, 2019-2022, Criminal Justice Arrest Data.

The above graph shows counts overdose decedents who experienced a drug-related arrest in the year prior to death. Counts of drug-related arrests increased from 2019 to 2021 but remained consistent from 2021 to 2022.

5.3 Prescription History in the Year Prior to Death among SUDORS Decedents in Tennessee

Number of decedents who filled a prescription in the TN CSMD within 365 days of death					
Year	Opioids	Benzodiazepines	Gabapentin	MAT	Stimulants
2019	826	416	384	209	114
2020	1,079	545	484	287	133
2021	1,231	582	534	370	186
2022	1,123	577	446	374	165

Analysis by the Office of Informatics and Analytics, TDH (last updated November 7, 2023). Data Source: TN SUDORS, 2019-2022, CSMD data.

The table above shows counts of overdose decedents who filled a prescription at any time within the 365 days prior to their death. Counts of opioid, benzodiazepine, gabapentin, and stimulant prescriptions increased from 2019 to 2021 and then decreased in 2022. Counts of prescriptions for buprenorphine for medication assisted treatment (MAT) have increased from 2019 to 2022.

6 Conclusion

SUDORS is a powerful surveillance system that captures many details surrounding a decedent's fatal drug overdose. Between 2019 and 2022, 12,538 fatal drug overdoses in Tennessee met the SUDORS case definition. SUDORS deaths increased 90% from 2019 to 2022, indicating the drug overdose epidemic is not subsiding in Tennessee. Increases in the age-adjusted rate of overdose deaths in Black individuals and number of overdose cases with fentanyl involvement are of particular concern.

Additionally, a bystander had the potential to intervene in 23% of overdose deaths in 2022, a decrease from 26% in 2021. On average, between 2019 and 2022, naloxone was administered 24% of deaths. With the increase in fentanyl involvement, naloxone administration training and fentanyl test strip distribution are critical to decrease fatal overdoses. Family, friends, and the general public should know how to administer naloxone to better help individuals during a drug overdose. Research on prevention and intervention strategies should continue to focus on minorities and culturally relevant treatment and prevention options. The SUDORS team plans to conduct future analyses to determine if treatment options are available individuals who need it most.

6.1 Additional Data Resources

The Office of Informatics and Analytics offers a variety of reports on its Facts & Figures page on the TDH website (<https://www.tn.gov/health/health-program-areas/pdo/pdo/facts-figures.html>)

For data not available in this report or on the TDH website, please submit a request through the TDH Data Request System (<https://www.surveygizmo.com/s3/5819792/TDH-Data-Request-Form>)

6.2 Resources for Treatment and Prevention

- Find Help Now is a national platform where individuals can locate substance use disorder treatment options in their communities, see <https://findhelpnow.org/tn>
- The Tennessee REDLINE is a 24/7/365 resource for substance use disorder treatment referrals. Anyone can call or text 800-889-9789 for confidential referrals.
- The Tennessee Statewide Crisis Line, available 24 hours a day/365 days a year, is a free resource for anyone experiencing a mental health crisis. All calls are routed to a trained local crisis counselor who provides support and guidance and will work to connect the caller with appropriate community support. Call 855-CRISIS-1 (855-274-7471).
- For Tennesseans actively in recovery from substance use disorder or for those looking for more information about its prevention, the Tennessee Department of Mental Health and Substance Abuse Services (TDMHSAS) offers the TN Recover App. This app is

available for download in the Apple Store, the Google Play store, or by texting 'SAVE' to 30678.

- For naloxone training, the Regional Overdose Prevention Specialists (ROPS) are located throughout the state as a point of contact for overdose prevention and education. To learn more about the ROPS work or to contact your local ROPS, see <https://www.tn.gov/behavioral-health/substance-abuse-services/prevention/rops.html>
- In counties and communities across Tennessee, substance use prevention coalitions are working to reduce dependence on harmful and potentially lethal substances, such as prescription drugs, alcohol, and tobacco. These local efforts, funded by the State of Tennessee since 2008, help spread the word about the dangers and consequences of substance use. To connect with a local coalition, see <https://www.tn.gov/behavioral-health/substance-abuse-services/prevention/anti-drug-coalition.html>.
- Fentanyl and fentanyl-involved overdoses are of growing concern across the state of Tennessee. While fentanyl is dangerous, overdoses involving fentanyl are preventable with the right knowledge and tools. To learn about fentanyl, TDMHSAS has created fentanyl specific resources and trainings available for all Tennesseans. Find these at <https://www.tn.gov/behavioral-health/substance-abuse-services/prevention/fentanyl.html>.
- TN Together is a system designed specifically to engage and empower Tennesseans to combat substance use in their community. It is an interactive online resource hub with a 3-part goal: to provide examples of prevention activities, to showcase how other communities have been successful in prevention, and to access up-to-date addiction and recovery resources. To access this online hub: <https://tntogether.com/>.