Suspected Drug Overdose Deaths in Davidson County, TN, 2018-2024

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Key Findings

- The age-adjusted rate of suspected drug overdose deaths in Davidson County increased by 133.7% from 2018 through 2023 but decreased roughly 15% between 2023 and 2024.
- The racial profile of the overdose epidemic changed in 2020, from the highest death rates being among White residents between 2018 and 2019 to Black residents having the highest rates in 2021 through 2024. In 2024 the age-adjusted death rate among Black residents exceeded that among White residents by 30 deaths per 100,000 residents.
- The difference between male and female fatality rates widened notably from 2020 through 2023, i.e., compared to women's rates, male's rates increased from being 104.6% higher in 2020 to 138% higher in 2023. In 2024, the difference narrowed slightly because the rate for males declined while that for females remained relatively stable.
- The 45-54-year-old age group were consistently at highest risk of overdose deaths from 2019-2024, closely followed by the 55-64-year-old age group.
- Fentanyl detections in toxicology reports have increased by about 47.3% between 2018 and 2024.
- Since 2018, Cocaine has been identified as a cause of death in a greater proportion of Black than White persons. In contrast psychostimulants were identified in a greater proportion of White than Black persons.

Introduction

Overdose deaths among Davidson County residents dramatically increased between 2018 and 2024, from 264 to 513 fatalities, peaking in 2023 at 609 deaths. Overdose surveillance data from 2018 to 2024 are examined in this report to show trends in rates of drug overdose fatalities.

The Davidson County community, much like the rest of the United States, are experiencing the negative consequences of the deadly drug overdose epidemic. In 2013, a "third wave" of opioid-induced deaths was reported nationally with overdoses surging due to opioids like fentanyl, fentanyl analogs, and other illicit synthetic opioids. From 2013 to 2023, the national age-adjusted rate of drug overdose fatalities increased from 13.8 to 31.3 deaths per 100,000 population. Tennessee and Davidson County observed similar trends— in recent years fentanyl has been linked to over 77% of overdose fatalities among Davidson County residents. Verdose deaths are premature deaths as they often occur earlier than the expected length of life (roughly 75 years from birth), and so they increase the years of life lost (YLL) across the county. YLL are the number of years not lived by each person who dies prematurely; the younger the age at death the greater the number of years not lived. The annual YLL of the county is the sum of all the individual YLL of persons who died during a specific year.

The Overdose Monitoring and Response (OMAR) team at the Metro Public Health Department (MPHD) conducts ongoing surveillance of trends and keeps up-to-date information and additional context on the epidemic at https://www.nashville.gov/departments/health/drug-overdose-information or the story map here. This report examines deaths among Davidson County residents as documented in the Davidson County Medical Examiners database, and so the counts and rates will differ from other reports produced by the OMAR team or other sources that do not make this distinction. The focus on Davidson County residents aligns with the mission of the Metro

Public Health Department (MPHD), which is to protect, improve and sustain the health and well-being of all people in Nashville and Davidson County.

Overview of Suspected Drug Overdose Deaths

The age-adjusted rate of drug overdose deaths among Davidson County residents rose 98.9% from 2018 through 2024.

- In 2024, there were 513 suspected drug overdose deaths (**Figure 1**) among Davidson County residents (See technical notes for definition) yielding an age-adjusted rate of 71.4 drug overdose deaths per 100,000 persons (**Figure 2**).
- The age-adjusted rate of suspected fatal overdoses increased by 134% from 2018 through 2023 but decreased roughly 15% between 2023 and 2024.
- Between 2023 and 2024 the overdose-associated years of life lost (YLL) declined by 7.3% as the number of overdose fatalities declined (from 31.2 YLL in 2023 to 28.9 YLL in 2024)

Figure 1. Frequency of suspected drug overdose deaths among Davidson County residents, 2018-2024

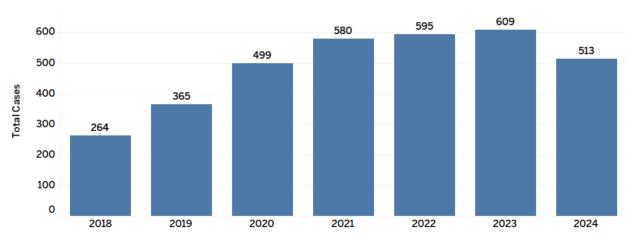
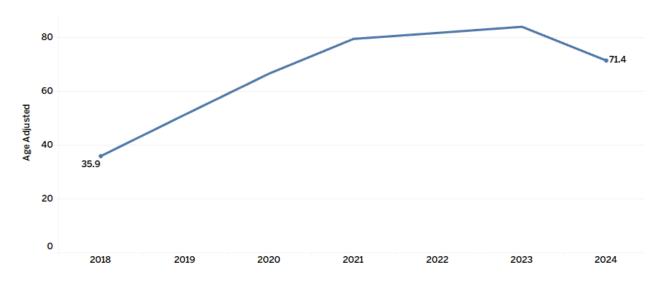


Figure 2. Age-adjusted suspected fatal overdose rate per 100,000 among Davidson County residents, 2018-2024



Fatal Overdoses by Age Group

The overall fatal overdose rate was consistently highest for the 45-54-year-old age group from 2018-2024 in Davidson County, closely followed by the 35-44-year-old age group.

- While fatal overdose rates have been highest for the 45-54-year-old age group (**Figure 3**), the 35-44-year-old age group accounted for the highest percentage of overdose fatalities in 2024 (**Figure 4**).
- Residents between the ages of 25 and 54 accounted for nearly 75% of fatal overdoses in 2024 (Figure 4).
- Nearly all age groups saw a reduction in mortality rates between 2023 and 2024 except the 65-74 age group, which increased by 28.5%.

Figure 3. Age-specific rate of drug overdose deaths per 100,000 Davidson County residents, 2018-2024

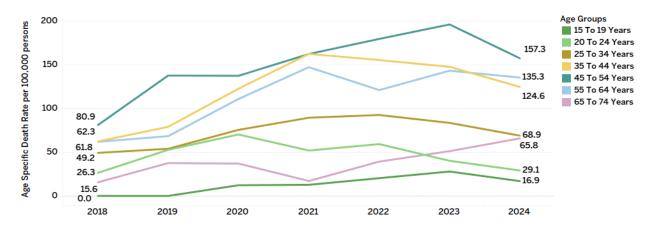


Figure 4. Percentage of drug overdose deaths by age group based on the Davidson County resident population between 15 and 64 years of age, 2018-2024

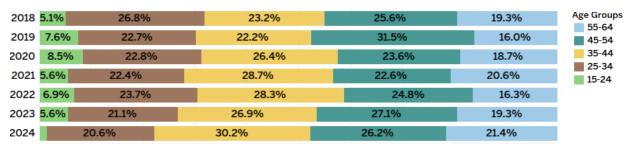


Table 1. Age-specific rate of overdose deaths per 100,000 Davidson County residents, 2023 and 2024

Age	Frequency		cy Rate per 100,000 (95% CI)		Relative	Rate Ratio	
Group	2023	2024	2023	2024	Change (%) *	2023	2024
15-24	32	22	35.1 (22.9-47.3)	23.7 (13.8-33.6)	-32.5	1(ref)	1(ref)
25-34	116	99	83.2 (68.3-98.1)	69.0 (55.4-82.6)	-17.1	2.37	2.91
35-44	144	132	147.8 (124.3-171.2)	124.6 (103.3-145.8)	-15.7	4.21	5.26
45-54	143	123	195.5 (164.6-226.4)	157.3 (129.5-185.1)	-19.5	5.57	6.64
55-64	103	101	141.5 (115.0-167.9)	135.3 (108.9-161.6)	-4.4	4.03	5.71

Abbreviations: CI: confidence interval; ref: referent group. * Absolute change is the difference in the rate between 2023 and 2024. Relative change is absolute change divided by the 2023 rate and multiplied by 100.

Table 1 shows that every single age group saw a decrease between 2023 and 2024. The largest decrease was seen in the age group 15-24 with a reduction of almost 33%, while the 55-64 age group saw the smallest decrease between the two years with approximately a 4% reduction.

Fatal Overdoses by Sex

The gender disparity in overdose death rates peaked in 2022 and has been narrowing since.

- Between 2018 and 2024, the age-adjusted fatality rate increased by 89.3% among males (52.4 to 99.2 deaths per 100,000) and 144% among females (20.2 to 49.3 per 100,000) (Figure 5).
- The greatest disparity was observed in 2022, with a gap of 79.2 deaths per 100,000 as male rates peaked at over 120.0 deaths per 100,000. By 2024, male rates declined sharply to 99.2 per 100,000, while female rates rose steadily, narrowing the gender gap (Figure 5).
- Males consistently accounted for a greater percentage of overdose fatalities compared to females (Figure 6).
- In 2024, there was a statistically significant decrease in the age-adjusted fatality rate for males from the previous year (**Table 2**).

Figure 5. Age-adjusted drug overdose death rate per 100,000 Davidson County residents by sex, 2018-2024

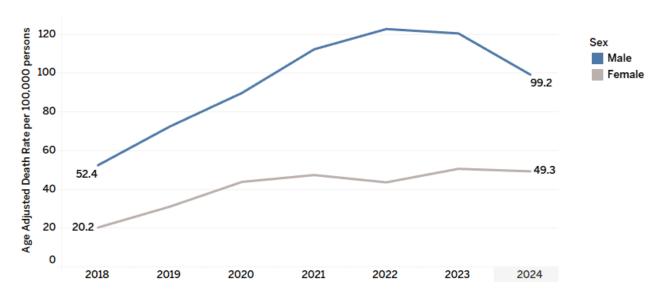


Figure 6. Percentage of fatal overdoses by sex, Davidson County, 2018-2024

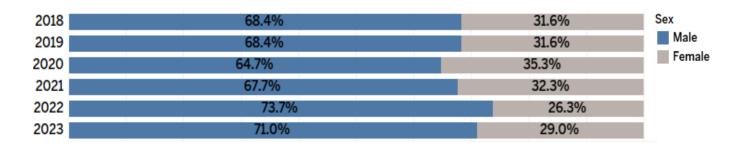


Table 2. Age-adjusted† drug overdose death rate by sex, Davidson County, 2020 & 2024

Frequency		Rate per 100	Rate per 100,000 (95% CI)		Rate Ratio		
Sex	2023	2024	2023	2024	Change (%) *	2023	2024
Female	178	177	48.8 (41.4-55.7)	49.3 (41.9-56.4)	1.0	1 (ref)	1 (ref)
Male	430	348	120.4 (113.9-137.7)	99.2 (91.4-112.9)	-17.6	2.47	2.01

Abbreviations: CI: confidence interval; ref: referent group. †Age-adjusted rates are calculated based on the 2000 U.S. standard population. For the age group, crude rates are given. * Absolute change is the difference in the rate between 2023 and 2024. Relative change is absolute change divided by the 2023 rate and multiplied by 100. Rate ratio <1 indicates that the comparison group has lower mortality than the reference group. Rate ratio >1 indicates that the comparison group has higher mortality than the reference group.

Fatal Overdoses by Race

The burden of fatal overdoses has significantly shifted, now overburdening Black communities despite White residents still comprising the largest proportion of fatalities.

- In 2024, the fatal overdose rate was greater among Black or African American residents (94.4 deaths per 100,000 population) than White residents (64.4 deaths per 100,000 population) (Figure 7).
- White residents have consistently had the largest proportion of fatal overdoses from 2018 to 2024. However, this proportion has declined from 82.8% in 2018 to 63.9% in 2024, highlighting a notable shift in racial distribution of fatal overdoses (Figure 8).
- In 2018, the Black to White rate ratio was 0.61, indicating a lower risk among Black residents and an increased risk for White residents. By 2024, the ratio had reversed to 1.47, indicating an increased risk for Black residents and a decreased risk for White residents (Table 3).

Figure 7. Age-adjusted trug overdose death rate per 100,000 Davidson County residents by race

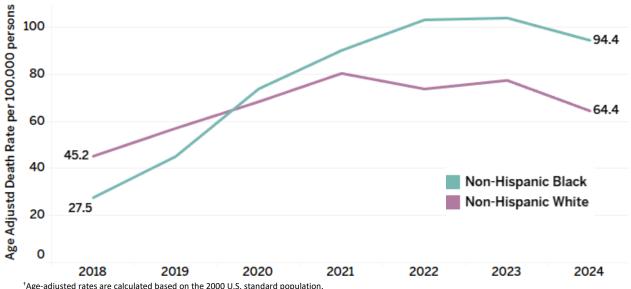


Figure 8. Percentage of fatal overdoses by race, Davidson County, 2018-2024

Non-Hispanic Black Non-Hispanic White

2018	82.8%	17.2%
2019	78.4%	21.6%
2020	72.7%	27.3%
2021	72.5%	27.5%
2022	67.2%	32.8%
2023	67.1%	32.9%
2024	63.9%	36.1%

Table 3. Age-adjusted rate[†] of suspected drug overdose fatalities by race group, Davidson County, 2023 & 2024

	Frequency		Rate per 100,000 (95% CI)		Relative	Rate Ratio	
Race	2023	2024	2023	2024	Change (%) *	2023	2024
White	370	316	77.4 (71.2-87.4)	64.4 (60.3-75.2)	-16.8	1 (ref)	1 (ref)
Black	204	180	103.9 (92.4-121.8)	94.4 (80.7-108.3)	-9.1	1.34	1.47

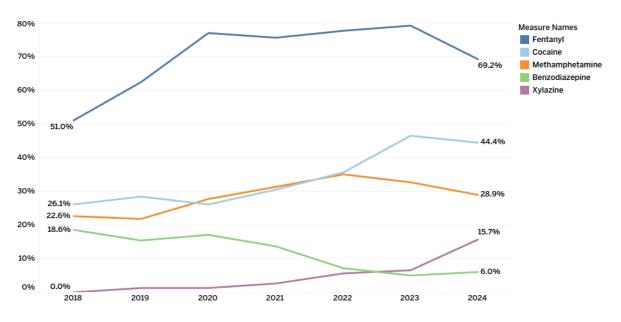
Abbreviations: CI: confidence interval; ref: referent group. †Age-adjusted rates are calculated based on the 2000 U.S. standard population. For age groups, crude rates are given. * Absolute change is the difference in the rate between 2023 and 2024. Relative change is absolute change divided by the 2023 rate and multiplied by 100. Rate ratio <1 indicates that the comparison group has lower mortality than the reference group. Rate ratio >1 indicates that the comparison group has higher mortality than the reference group.

The Toxicology of Fatal Overdoses

Since 2020, fentanyl has consistently been detected and identified as a cause of death (COD) in approximately three-quarters of all fatal suspected drug overdoses.

- In 2024, fentanyl was detected in roughly 70% of suspected drug overdose fatalities. This is a 12.4% decrease from 2023 (Figure 9).
- Following fentanyl, in 2024, cocaine and psychostimulants (like methamphetamines) were the most detected substances identified as a cause of death (COD) at 44% and 29% respectively.
- Compared to other substances, the percentage of toxicology reports that include xylazine detections is relatively small but increasing at a comparatively high rate. Xylazine detections increased by 124.3% from 2023 to 2024.

Figure 9. Percentage of the top 5 cause of death (COD) substances among fatal drug overdoses by year, Davidson County, 2018-2024.

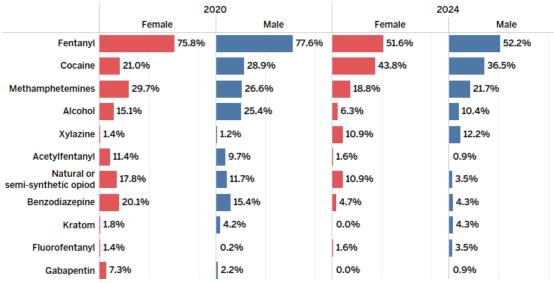


The Toxicology of Fatal Overdoses by Sex

The proportion of overdose deaths in which fentanyl was detected and identified as a cause of death (COD) has been similar between males and females from 2020 through 2024.

- Fentanyl identification as a COD has decreased among both male and female decedents (Figure 10).
- Cocaine has been identified as a COD in a greater proportion of females than males in 2024.
- From 2020 to 2024, the percentage of cocaine detections as a COD increased among males (26.3%) and females (108.5%).
- The identification of Xylazine as COD has increased by roughly 7-fold among females and 9-fold among males (**Figure 10**). In 2024 Xylazine was detected among 15.7% of all drug overdose deaths (**Figure 9**).
- From 2020 to 2024, identification of benzodiazepines as COD has decreased significantly among male (-72.1%) and female (-76.6%) decedents.

Figure 10. Percentage of cause of death substances among fatal drug overdoses by sex, Davidson County, 2020 & 2024



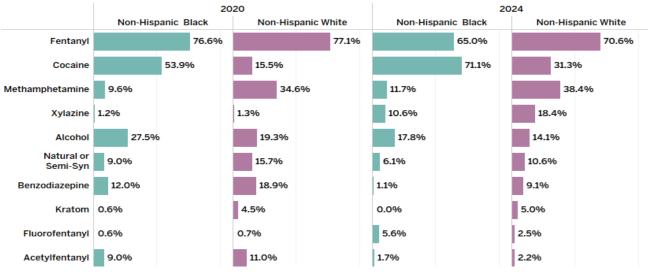
Note: Percentages may vary due to missing values for sex, and to multi-substance detections per overdose event.

The Toxicology of Fatal Overdoses by Race

The proportion of overdose deaths in which fentanyl was detected and identified as a cause of death (COD) is similar between Black and White Persons.

- Fentanyl detections have decreased across all race/ethnicities, and each year the level of detections among Black vs. White persons have been comparable (Figure 11).
- In 2024, cocaine was identified as a COD in approximately 71.1% of overdose deaths among Black persons compared to among 31% of White persons. Compared to 2020, this represented an increase in cocaine detection of 31.9% and 101.9% among Black and White persons, respectively.
- In 2024, psychostimulants were identified in approximately 38% of overdose deaths among White persons compared to among 12% of Black persons.
- Xylazine was detected more in White persons (approx. 18%) than in Black persons (approx. 11%).

Figure 11. Percentage of cause of death substances among fatal drug overdoses by race, Davidson County, 2020 & 2024



Note: Percentages may vary due to missing values for race/ethnicity and to multi-substance detections per overdose event.

Polysubstance Use

The proportion of overdose deaths involving both fentanyl and stimulants has increased from 2018 through 2024.

- From 2023 to 2024, the proportion of overdose fatalities involving the combination of fentanyl and a stimulant (cocaine or psychostimulant) decreased from 68.6% to 64.8% (Table 4).
- Detections of fentanyl and psychostimulants combinations have remained relatively stable between 20% and 21% between the two years.

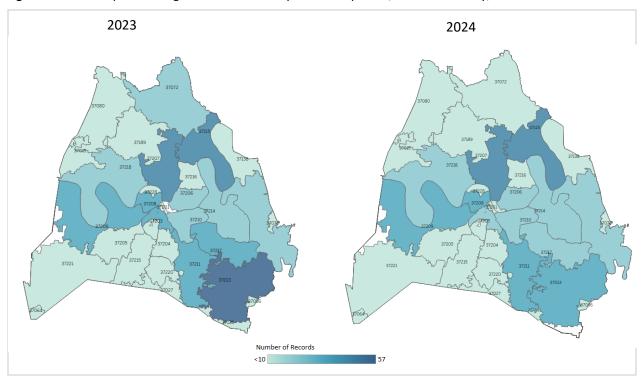
Table 4. Percentage of suspected fatal drug overdoses involving fentanyl in which stimulants were detected, Davidson County, 2023-2024

	2023	2024
Fentanyl	558	369
% Fentanyl Cases with Cocaine and/or Pyschostimulant	68.6	64.8
% Fentanyl Cases with Cocaine Only	48.0	44.7
% Fentanyl Cases with Pyschostimulants Only	20.6	20.1
% Fentanyl Cases with Both Cocaine and Pyschostimulants	10.6	7.3

Note: These categories are not mutually exclusive, so percentages may not add up to 100.

Zip Code Distribution 2023 and 2024

Figure 12. Total Suspected Drug Overdose Deaths by Incident Zip Code, Davidson County, 2023-2024



The top 5 zip codes for the total number of suspected drug overdose deaths in 2023 were 37013, 37207, 37115, 37209, and 37211 (Figure 12). The only zip code to see an increase in fatalities in 2024 was 37211 (9.6% increase). 37013 saw a reduction of nearly 58% in 2024 and did not make it onto the top 5 zip codes for that year. Based on socio-economics data and community vulnerability assessments, these zip codes are traditionally low-income and relatively deprived areas in Davidson County and surrounding counties. ^{5,6} The data-driven responses to the local drug overdose crisis, including community outreach and distribution of harm reduction tools, also tend to concentrate in these areas.

Limitations

Racial/ethnic designations are generally subject to classification errors. Therefore, there is the potential for misclassification of the race variable even if, as in this brief, the race variable is restricted to White and Black/African American races due to the paucity of data in reference sources. The demographic categories of "other" race groups, and the <15 and over 65-year-old age groups were excluded from this brief because they contained too few observations for presentation or rate calculations. These restrictions limit the scope of disparity analysis as it excludes mortality involving other racial/ethnic, cultural, or linguistic minorities. Secondly, the Medical Examiner (ME) data contained observations for individuals whose residency status was unknown, and these were excluded from subcounty analysis. While every effort is made to distinguish overdoses involving illicit drugs or illicit drug use, the fatal overdoses reported in this brief may include overdoses with non-illicit substances.

Conclusion

Suspected overdose fatalities have had a persistent impact on people across Davidson County. Countywide, the rate of overdose fatalities more than doubled between 2018 and 2024, and rates increased in almost all zip codes. Consistently, however, the highest rates were in the traditionally low-income and relatively deprived areas in

Davidson County and surrounding counties. Males, those in the 45-to-54-year-old age group, and Black persons experienced the highest age-adjusted fatality rates. Fentanyl continues to be detected and identified as a cause of death (COD) in most overdose deaths. However, co-detection of fentanyl and stimulants (cocaine and psychostimulants) has become increasingly common. It is unclear if this polysubstance use is intentional or unintentional. The role of race in determining the substances taken together with fentanyl and the implications of these patterns of drug use/exposure, will need further investigation.

Overall, our data indicate that drug overdose fatalities may be disproportionately affecting Black persons and males in the 45-54 years age range. Similar trends have been reported at the national level and involve other racial/ethnic minorities. A recent CDC report indicates that between 2021 and 2022, rates were highest among American Indian or Alaska Native people. Gleaning from national trends, other racial/ethnic, cultural and/or linguistic and minority communities that are not reported in this brief (due to small numbers) are likely impacted disproportionately in Davidson County as well. Further exploration and analysis of this data is necessary and ongoing. Specifically, the additional evaluation is focused on social determinants of health to inform county-specific, multisectoral, and culturally responsive surveillance and prevention efforts. With additional analysis, this information can support the development of equitable public health interventions in collaboration with community partners. Given the history of housing segregation, the incorporation of geospatial analytics, particularly of fatality hotspots further informs the targeting of prevention and harm reduction interventions to high-risk communities in Davidson County.

Local Responses

Since 2019, the Metro Public Health Department has led a collective impact strategy to address the overdose crisis in Davidson County and surrounding High Impact Area (HIA) counties (Cheatham, Dickson, Montgomery, Rutherford and Wilson Counties). The collaborative partners with public health and public safety agencies, healthcare providers, and community stakeholders. The strategy focuses on real-time overdose surveillance and harm reduction, particularly through near-real time data sharing, increased Naloxone availability and public education on overdose response. The primary goal of the strategy is to save as many lives as possible.

A team of epidemiologists manages data collection and analysis, sharing insights with prevention specialists, emergency responders, community outreach workers, treatment providers, and local officials – such as policymakers and council members. This data-driven approach allows for dynamic responses to changing hotspots and risk patterns across the HIA region.

The strategy's success is evident in declining overdose death statistics. In Davidson County, overdose deaths decreased from 609 in 2023 to 513 in 2024, a continuation of reductions observed since 2022. The overdose-associated Years of Life Lost (YLL) dropped from 31.2 years in 2023 to 28.9 years in 2024, representing approximately 3 years of life saved per prevented overdose. Community outreach efforts and the distribution of harm reduction tools are increasingly concentrated in areas with high mortality rates. Therefore, this collective impact strategy to address the overdose crisis needs to be sustained by increasing the level of investments in harm reduction tools and interventions that link individuals with substance use disorders to evidence-based treatments and remove access barriers.

Technical Notes

Data presented in this report are provisional. Annual rates are calculated per 100,000 Davidson County residents and utilize the 2018-2023 ACS 5-year population estimates as the denominator. The numerator is the total number of deaths suspected to be caused by drug overdose. For age-stratified rates, crude rates are provided. For total overdose deaths and stratification by sex and race, rates were age-adjusted based on the 2000 U.S. standard population using the direct method. Confidence intervals were used to conservatively evaluate statistical

significance (p-value <0.05). SAS 9.4 was used to clean, categorize, and analyze data. Tableau was used for data visualization.

Data on suspected fatal overdoses was obtained from the Davidson County Medical Examiner. The medical examiner database (DIDI) was searched for diagnosis codes indicating a drug overdose with illicit drugs, prescription drugs, or a not otherwise specified (NOS) substance among decedents assigned a Davidson County injury location. ¹³ Cases included both accidental and intentional overdoses. We did not delineate between illicit versus prescribed substances. Davidson County residency was determined based on the zip code of residence and injury location. Inclusion criteria selected records with a Davidson County zip code or an injury location in Davidson County. The list of Davidson County zip codes is available from the Metropolitan Government of Nashville and Davidson County, Planning Department. ⁵ However, some cases were missing residential information, and these cases were included in the county-wide rate but excluded from subcounty (zip code) rate calculations. Therefore, the counts and rates in this report will differ from those reported in the weekly and quarterly surveillance reports or elsewhere, ⁴ because this report reflects all deaths occurring in Davidson County regardless of the decedents' residency status.

For subcounty analysis, cases missing residential information necessary to determine residency status were excluded, but included for county-level estimation and analysis. The demographic categories of "other" race groups, and the <15 and >65-year-old age groups contained too few observations for presentation or rate calculations. Gender identity and ethnicity were not provided in this data set. Finally, there is potential for misclassification of race.

References

- 1. Understanding the Opioid Overdose Epidemic | Overdose Prevention | CDC. Accessed August 1, 2025
- 2. Garnett MF, Miniño AM. Drug overdose deaths in the United States, 2003–2023. NCHS Data Brief, no 522. Hyattsville, MD: National Center for Health Statistics. 2024. DOI: https://dx.doi.org/10.15620/cdc/170565.
- 3. Overdose Monitoring and Response Team. (2023). *The Overdose Epidemic in Nashville-Davidson County*. Metro Public Health Department. https://arcg.is/iSeDv0
- 4. Tennessee Department of Health. Tennessee Drug Overdose Dashboard. https://www.tn.gov/health/health-program-areas/pdo/pdo/data-dashboard.html. Last updated: NA.
- 5. NashvilleMaps | Nashville.gov, Zip Codes.pdf. Accessed August 1, 2025.
- 6. Tennessee2022 Davidson County.pdf. Accessed August 1, 2025.
- 7. Spencer MR, Garnett MF, Miniño AM. Drug overdose deaths in the United States, 2002–2022. NCHS Data Brief, no 491. Hyattsville, MD: National Center for Health Statistics. 2024. DOI: https://dx.doi.org/10.15620/cdc:135849.
- 8. Kariisa M, Davis NL, Kumar S, Seth P, Mattson CL, Chowdhury F, Jones CM. Vital Signs: Drug Overdose Deaths, by Selected Sociodemographic and Social Determinants of Health Characteristics 25 States and the District of Columbia, 2019-2020. MMWR Morb Mortal Wkly Rep. 2022 Jul 22;71(29):940-947. doi: 10.15585/mmwr.mm7129e2.
- Larochelle MR, Slavova S, Root ED, Feaster DJ, Ward PJ, Selk SC, Knott C, Villani J, Samet JH. Disparities in Opioid Overdose Death Trends by Race/Ethnicity, 2018-2019, From the HEALing Communities Study. Am J Public Health. 2023 Oct;111(10):1851-1854. doi: 10.2105/AJPH.2023.306431.
- 10. Products Data Briefs Number 457 December 2022 (cdc.gov). Accessed November 8, 2023.
- 11. Metro Human Relations Commission, Understanding Nashville Housing Crisis: Part 3. Accessed August 1, 2025
- 12. American Community Survey 5-Year Estimates, 2018-2023, U.S. Census Bureau. Accessed October 13, 2023.
- 13. Davidson County Medical Examiner, DIDI, Davidson County, TN. Accessed April 1, 2025 [restricted access dataset].

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