

Epidemiological Report

**Drug Overdose Deaths
Involving Opioids
2011-2016**

Mississippi State Department of Health

DRUG OVERDOSE DEATHS INVOLVING OPIOIDS IN MISSISSIPPI, 2011-2016



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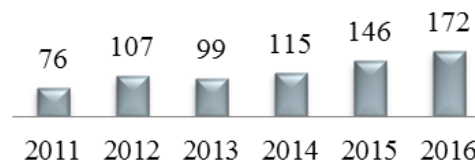
During 2016, Mississippi had the fourth highest opioid prescription rate in the nation with 105.6 opioid prescriptions per 100 persons.¹ In addition to such prescription rates, the growing popularity of highly toxic synthetic opioid substances and availability of cheap heroin are also contributing to rapidly increasing opioid mortality nationwide.² To evaluate the impact of opioid misuse, we analyzed mortality data from the Mississippi State Department of Health. This report presents data on numbers, trends, rates, and demographics associated with opioid-related deaths in Mississippi from 2011 through 2016.

OVERALL OPIOID DEATHS

During 2016 there were 172 opioid-related deaths in Mississippi. This represents an increase of 17.8% compared to 2015 and an increase of 126.3% compared to 2011. The age-adjusted death rate in 2016 was 5.9 deaths per 100,000 standard population, an increase of 110.7% from the 2011 rate of 2.8.

From 2011 through 2016, there were a total of 715 opioid-related deaths: Most of these deaths (643 or 89.9%) were unintentional; however, 34 cases (4.8%) were due to suicide. Among the 715 opioid overdose deaths, 11.7% (84 cases) involved at least one more opioid and 43.6% (312 cases) involved at least one more non-opioid drug of abuse.

Figure 1. Overdose Deaths Involving Opioids, MS, 2011-2016



OPIOID DEATHS BY TYPE OF OPIOID INVOLVED

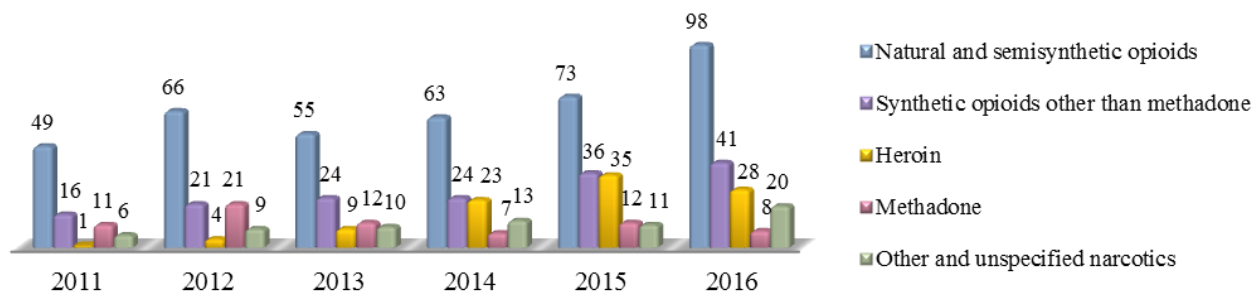
During 2016

- Natural or semisynthetic opioids such as hydrocodone were involved in the majority of opioid deaths (98 cases or 57.0%).
- Synthetic opioids, including illicit or prescription fentanyl, were documented in 41 deaths (23.8%).
- Methadone, a medication used mostly for treatment of opioid addiction, was recorded in 8 deaths.

Mortality Trends, 2011-2016

- Deaths involving natural or semisynthetic opioids doubled from 49 in 2011 to 98 in 2016.
- Deaths due to synthetic opioids increased by 156.3% from 16 in 2011 to 41 in 2016.
- The number of heroin overdose deaths demonstrated a steep and steady increase from 2011 until 2015. Heroin deaths, however, decreased by 7 cases from 2015 to 2016.

Figure 2. Number of Overdose Deaths by Type of Opioid, MS, 2011-2016



Note: Death certificates may have more than one opioid recorded. Therefore, the categories presented in Figure 2 are not mutually exclusive.

DEMOGRAPHIC PROFILE, 2011-2016

Race: Mirroring national trends, the overwhelming majority (649 or 90.8%) of opioid-related deaths between 2011 and 2016 occurred among Caucasians (Figure 3). When examined by rates, Caucasians had considerably higher rates of opioid-related deaths than African Americans (6.1 deaths versus 0.9 deaths per 100,000 persons).

Sex: During 2011-2016, more male (402 deaths or 56.2%) than female deaths (313 cases or 43.8%) were reported (Figure 4). Males also had higher opioid-related death rates than females (4.6 deaths versus 3.4 deaths per 100,000 persons) during the same period.

Age: The age groups 25-34 years, 35-44 years, and 45-54 years were almost equally affected. Although each of these age groups accounted for approximately one quarter of all 715 opioid-related deaths during 2011-2016, the 45-54 age group had a slightly higher opioid mortality rate of 8.4 deaths per 100,000 persons (Figure 5).

Figure 3. Overdose Deaths Involving Opioids by Race, MS, 2011-2016

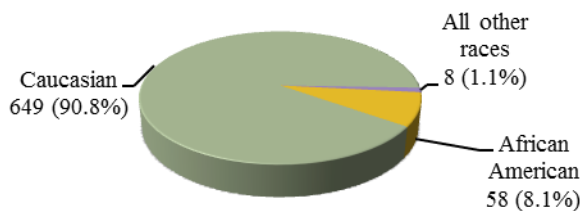
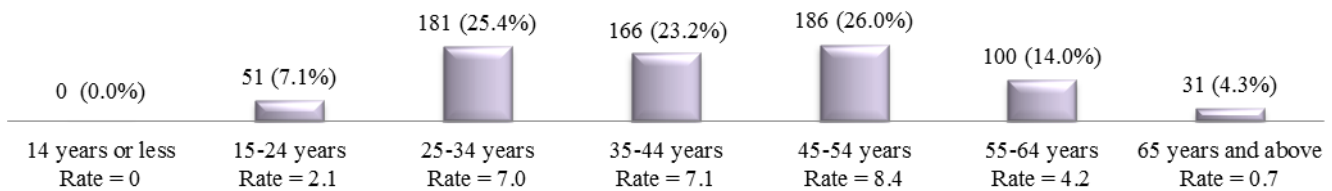


Figure 4. Overdose Deaths Involving Opioids by Sex, MS, 2011-2016



Figure 5. Overdose Deaths Involving Opioids by Age Group, MS, 2011-2016



Note: Presented in Figure 5 are crude rates per 100,000 Mississippi population.

EDUCATIONAL AND MARITAL STATUS, 2011-2016

Education and family relations are some of the social determinants of health. To illustrate how these factors are implicated in Mississippi's opioid overdoses deaths, we stratified the data by educational levels and marital status.

Education: Only 49 (6.9%) of all decedents from opioid overdoses had a college degree or higher level of education. This finding may reflect Mississippi's poor educational rankings. In 2016, only 21.0% of the state population of ≥ 25 years had a college education, which was 9.3 percentage points below the national average of 30.3%.³ Investing in Mississippi's system of higher education and improving educational performance may be important steps for increasing the well-being of state residents and preventing drug addiction and deaths.

Marital Status: Less than one third (217 cases or 30.3%) of all decedents were married or not separated at the time of their death. Researching and implementing strategies to combat social isolation may help to provide essential social support to persons with opioid addiction.

Table 1. Overdose deaths involving opioids by education and marital status

Educational level	Number of deaths	Percent of deaths	Percent of population*
8th grade or less	33	4.6%	5.8%
9th - 12th grade, no diploma	118	16.5%	11.2%
High school graduate or GED	260	36.4%	30.4%
Some college, no degree	120	16.8%	22.8%
Associate degree	49	6.9%	8.7%
Bachelor's degree	32	4.5%	13.1%
Graduate or professional degree	17	2.3%	7.9%
Unknown	86	12.0%	-
Marital Status	Number of deaths	Percent of deaths	Percent of population**
Married	217	30.3%	44.6%
Married, but separated	22	3.1%	3.0%
Widowed	39	5.5%	7.1%
Divorced	216	30.2%	11.8%
Never married	218	30.5%	33.5%
Unknown	3	0.4%	-

*Source: U.S. Census Bureau, 2016 American Community Survey

**Source: U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates

RESIDENCE PATTERNS

Sixty nine out of the eighty two Mississippi counties reported opioid-related deaths between 2011 and 2016. On average, there were 4.0 opioid-related deaths per 100,000 residents between 2011 and 2016. During this period, the mortality rate was slightly higher for metropolitan counties (4.3 per 100,000 persons) compared to non-metropolitan counties (3.7 per 100,000 population). Of the state's four metropolitan areas, the Mississippi counties which are located within the Memphis (TN) metropolitan area, had the highest opioid mortality rate with 8.2 deaths per 100,000 persons (Table 2).

Table 2. Overdose Deaths Involving Opioids: Residence Patterns, MS, 2011-2016

Metropolitan and non-metropolitan counties	Number of deaths (percent of total)	Average (2011-2016) rate per 100, 000 persons
Non-metropolitan counties	361 (50.5%)	3.7
Metropolitan counties	354 (49.5%)	4.3
Metropolitan areas (included counties)	Number of deaths (percent of total)	Average (2011-2016) rate per 100,000 persons
Jackson (Copiah, Hinds, Madison, Rankin Simpson, Yazoo)	127 (17.8%)	3.7
Memphis (Benton, DeSoto, Marshall, Tate, Tunica)	125 (17.5%)	8.2
Gulfport-Biloxi-Pascagoula (Hancock, Harrison, Jackson)	71 (9.9%)	3.1
Hattiesburg (Forrest, Lamar, Perry)	31 (4.3%)	3.5

Overdose Deaths Involving Opioids by County, MS, 2011-2016

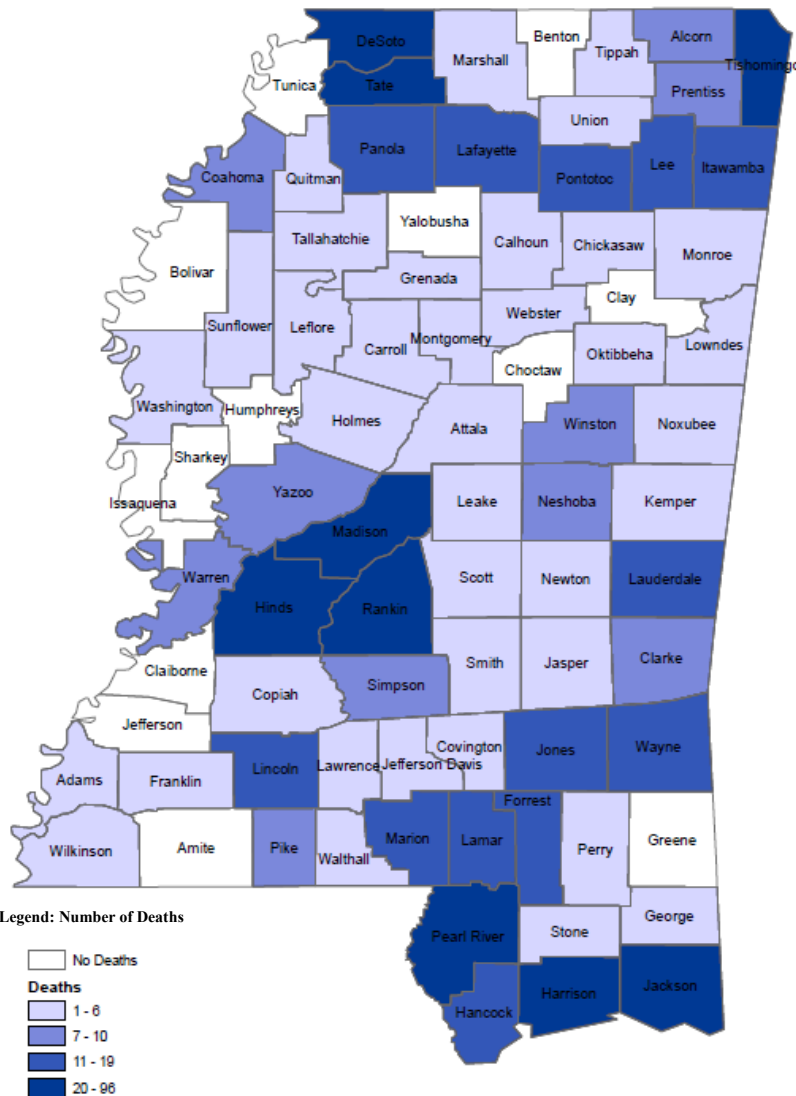


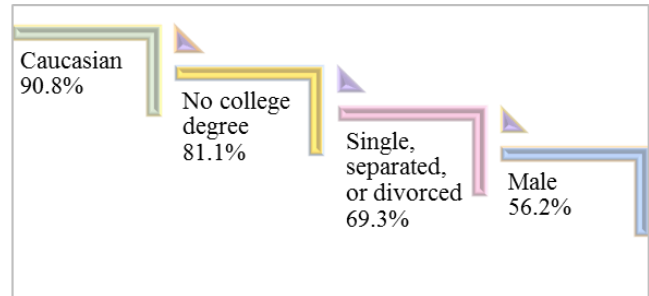
Table 3. Counties with seven or more overdose deaths involving opioids, MS, 2011-2016

County	Number of deaths
DeSoto	96
Rankin	61
Harrison	30
Jackson	27
Hinds	25
Tate	23
Tishomingo	22
Pearl River	21
Madison	20
Marion	19
Jones	18
Lamar	15
Wayne	15
Hancock	14
Lee	14
Pontotoc	14
Forrest	13
Lincoln	13
Lauderdale	12
Panola	12
Itawamba	11
Lafayette	11
Neshoba	10
Pike	10
Warren	10
Yazoo	10
Clarke	9
Coahoma	9
Prentiss	9
Simpson	8
Winston	8
Alcorn	7

CONCLUSIONS

Our study demonstrated that the number of opioid-related deaths has escalated in Mississippi. Between 2011 and 2016, overdose deaths involving opioids more than doubled in our state. During 2016, prescription opioids were documented in more than half, while synthetic prescription or illicit opioids were implicated in nearly one quarter of all deaths. Between 2015 and 2016, deaths involving natural, semisynthetic, or synthetic opioids continued to climb, but heroin-related deaths decreased. Nonetheless, heroin was involved in 100 (14.0%) of all opioid deaths during the six-year period. Multiple drug use is an overdose risk factor.⁴ During 2011-2016, the coexistence of opioid and non-opioid substances was recorded in well over one third of all opioid-related fatalities in Mississippi. The high rates of multiple drug use emphasizes the need of building comprehensive surveillance systems monitoring trends and patterns of all types of drug abuse.

The demographic breakdown revealed that Caucasian race, low educational achievement, single status, and male sex were highly prevalent among opioid-related fatalities. The geographic analysis uncovered that the opioid epidemic is widespread in our state: Nearly all Mississippi counties have suffered an opioid-related death between 2011 and 2016. These findings highlight the importance of statewide measures to curb Mississippi's opioid epidemic.



Addressing the Opioid Epidemic: Centers for Disease Control and Prevention's Pillars of Preventive Work

Improve data quality and timeliness of reporting

Scale up promising and effective public health interventions

Supply health care providers with data, tools, and guidance for evidence-based decision making

The Mississippi Opioid Epidemic Project is a collaborative effort between the Public Health Pharmacy, Office of Epidemiology, and Office of Preventive Health at the Mississippi State Department of Health. The project's mission is to use evidence-based research methods to evaluate the scope of the opioid epidemic in Mississippi and build statewide surveillance systems utilizing different data sources. For additional information on opioid drug abuse statistics as well as state and national initiatives targeting this epidemic, please visit the Mississippi State Department of Health's website at: <http://msdh.ms.gov>.

Data Analysis:

To analyze opioid overdose deaths, we implemented the Center for Disease Control and Prevention's coding algorithm for capturing such deaths.⁴ First, we identified all deaths with underlying cause of death codes: X40-44 (accidental drug poisoning), X60-X64 (intentional self-drug poisoning), X85 (assault by drug poisoning), Y10-Y14 (drug poisoning by undetermined intent). Then, we selected the following ICD-10 (International Classification of Diseases, Tenth Revisions) codes: T40.0 (opium), T40.1 (heroin), T40.2 (natural and semisynthetic opioids), T40.3 (methadone), T40.4 (synthetic opioids other than methadone), and T40.6 (other and unspecified opioids).⁵ The following ICD-10 codes were used for capturing multidrug use: T40.5 (cocaine), T40.7 (cannabis), T40.8 (lysergide), T40.9 (other and unspecified psychodysleptics), T42.2-T42.8 (antiepileptic, sedative-hypnotic and antiparkinsonism drugs), T43.0-T43.6 (antidepressants). Crude rates for 2016 were calculated using the 2016 Mississippi population data set, while the average rates for the period 2011-2016 were calculated using the sum of the 2011-2016 population data sets. Age-adjusted death rates were calculated using the direct method and adjusted to the 2000 U. S. standard population.⁶ Patient residence was determined according to categories of 2013 National Center for Health Statistics Urban-Rural Classification.⁷

Data Limitations:

The accurate assessment of drug-related fatalities depends on complete and good quality data.⁸ The reliability of mortality data in our state, however, has been impacted by several constraints such as insufficient resources, training, or time for performing thorough death investigations. In addition, the ICD-10 coded data does not distinguish between illicit and prescription fentanyl.

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References:

- U.S. Prescribing Rates. 2016. Centers for Disease Control and Prevention://www.cdc.gov/drugoverdose/maps/rxstate2016.html.
- O'Donnell JK, Gladden RM, Seth P. Trends in Deaths Involving Heroin and Synthetic Opioids Excluding Methadone, and Law Enforcement Drug Product Reports, by Census Region — United States, 2006–2015. *MMWR Morb Mortal Wkly Rep* 2017;66:897–903. DOI: <http://dx.doi.org/10.15585/mmwr.mm6634>.
- Quick Facts. U.S. Census Bureau: <https://www.census.gov/quickfacts/fact/table/US/PST045216>.
- A Longitudinal Study of Multiple Drug Use and Overdose Among Young People Who Inject Drugs. Elise D. Riley, Jennifer L. Evans, Judith A. Hahn, Alya Briceno, Peter J. Davidson, Paula J. Lum, Kimberly Page *Am J Public Health*. 2016 May; 106(5): 915–917. doi: 10.2105/AJPH.2016.303084: <http://ajph.aphapublications.org/doi/10.2105/AJPH.2016.303084>.
- Centers for Disease Control and Prevention. Annual Surveillance Report of Drug-Related Risks and Outcomes.—United States, 2017. Surveillance Report 1. Centers for Disease Control and Prevention. US. Department of Health and Human Services. Published August 31: <https://www.cdc.gov/drugoverdose/pdf/pubs/2017-cdc-drug-surveillance-report.pdf>.
- Murphy SL, Xu JQ, Kochanek KD, Curtin SC, Arias E. Final Data for 2015. *National Vital Statistics Reports*; vol 66 no 6. Hyattsville, MD: National Center for Health Statistics. 2017: https://www.cdc.gov/nchs/data/nvsr/nvsr66/nvsr66_06.pdf.
- Ingram D, Franco S. 2013. NCHS urban-rural classification scheme for counties. National Center for Health Statistics. Accessed on 12/10/2017 from https://www.cdc.gov/nchs/data/series/sr_02/sr02_166.pdf.
- Slavova et al. Drug Overdose Deaths: Let's Get Specific. *Public Health Reports*. 2015 Jul-Aug; 130(4): 339–342. <http://ai2-s2-pdfs.s3.amazonaws.com/9555/b4c0ea72cd906bd9e12f6a0834465867f9c3.pdf>.



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