THE MISSISSIPPI DRUG EPIDEMIC SURVEILLANCE SYSTEM

DRUG OVERDOSE DEATHS IN MISSISSIPPI, 2018

MISSISSIPPI STATE DEPARTMENT OF HEALTH

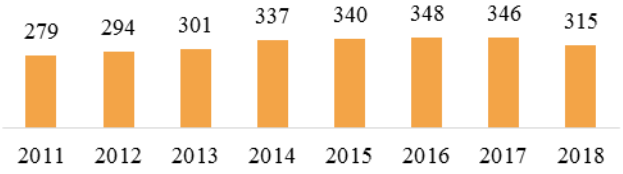
Epidemiological Report
2/18/2020

KEY FINDINGS

- The total number of drug overdose deaths declined sharply from 346 in 2017 to 315 in 2018. This 9.0% decrease resulted in 31 fewer deaths in 2018 compared to 2017.
- At the same time, however, the number of deaths involving heroin and amphetamines/methamphetamine increased—as did deaths resulting from multiple drug use.
- In terms of race, the overwhelming majority of drug-related fatalities during 2011-2018 occurred among Caucasians (87.8%). These individuals also tended to be single (70.5%), men (56.4%), and the vast majority (91.2%) did not have a college degree.
- All of Mississippi's counties reported drug overdose deaths from 2011 to 2018.

OVERVIEW OF DRUG OVERDOSE DEATHS: During 2018, there were 315 drug overdose deaths reported in Mississippi, which was 31 deaths less compared to 2017. This was the lowest number of recorded drug overdoses since 2013. Between 2017 and 2018, the age-adjusted rate decreased slightly from 11.9 to 11.0 overdose deaths per 100,000 standard population.

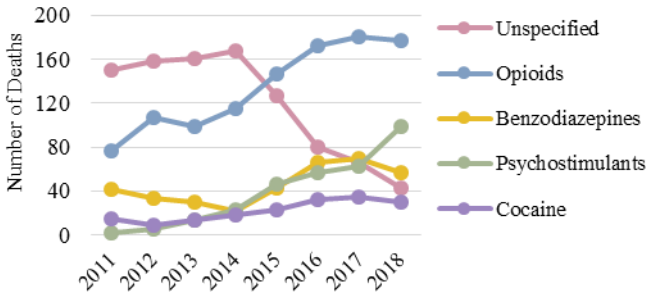
Figure 1. All Drug Overdose Deaths in MS, 2011-2018



OVERDOSE DEATHS BY TYPE OF DRUG INVOLVED, 2018: Opioids, including prescription opioids, fentanyl, heroin, and methadone, were involved in 177 (56.2%) cases. Benzodiazepines were recorded in almost one fifth (57 or 18.1%), psychostimulants with abusive potential (e.g., methamphetamine or prescription amphetamine-related drugs) in 31.4% (99 cases), and cocaine in 9.5% (30 cases) of all drug overdose deaths (Table 1).

MORTALITY TRENDS, 2011-2018: Deaths involving psychostimulants demonstrated the highest spike of 4,850.0%, from 2 deaths in 2011 to 99 deaths in 2018 (Table 1, Figure 2). During the same period, deaths involving opioids increased by 132.9%, deaths involving cocaine by 100.0%, and deaths involving benzodiazepines by 35.7%.

Figure 2. Overdose Deaths by Drug Type in MS, 2011-2018



MORTALITY CHANGE, 2017-2018: From 2017 to 2018, psychostimulant–related deaths were the only type of drug overdose deaths that continued to increase among the major drug groups. The 57.1% growth of such deaths in just one year is more than alarming (Table 1).

Fatalities with no drug recorded on the death certificate decreased from 150 (53.8% of all cases) in 2011 to 43 (13.7% of all cases) in 2018—a significant improvement of overdose data categorization in Mississippi.

Table 1. Drug overdose deaths by category of involved drugs in MS, 2011-2018

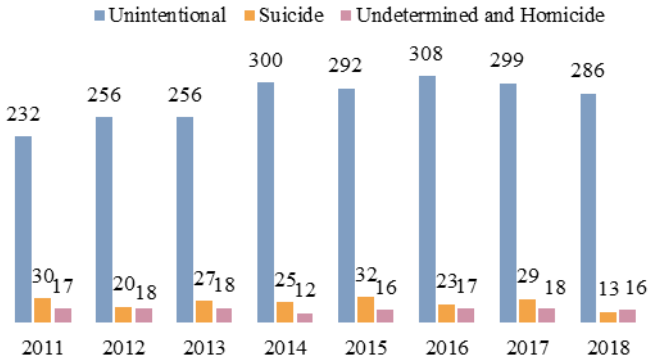
Type of drug	2011	2012	2013	2014	2015	2016	2017	2018	Change 2011-2018	Change 2017-2018 (number of deaths)
Opioids	76	107	99	115	146	172	180	177	+132.9%	-1.7% (-3)
Unspecified	150	158	160	168	127	80	66	43	-71.3%	-34.8% (-23)
Benzodiazepines	42	33	30	22	43	66	70	57	+35.7%	-18.6% (-13)
Psychostimulants	2	5	14	23	46	57	63	99	+4,850.0%	+57.1% (+36)
Cocaine	15	9	13	18	23	32	35	30	+100.0%	-14.3% (-5)

Note: Categories of deaths are not exclusive because deaths might involve more than one drug. Summing of categories will result in more than the total number of deaths in a year.

MANNER OF DEATH: Deaths are categorized as natural and non-natural based on the manner of death. Non-natural deaths are further classified into the following groups: accident (unintentional deaths), homicide, suicide, and undetermined. From 2011 to 2018, there were a total of 2,560 drug overdose deaths. Most of these deaths (2,229 or 87.1%) were unintentional; however, 199 cases (7.8%) were due to suicide, 2 (0.1%) were homicides, and the intention in 130 cases (5.0%) was not determined (Figure 3).

An important finding of our analysis is that the number of suicides involving controlled substances is in sharp decline. Such suicides decreased by more than half from 29 in 2017 to 13 in 2018. In fact, this decrease in overdose-related suicides was a major contributor to the decline in overdose deaths between 2017 and 2018.

Figure 3. Drug Overdose Deaths by Manner of Death, MS, 2011-2018



DEMOGRAPHICS: Between 2011 and 2018, the age group of 45-54 years had the highest occurrence of drug overdose deaths, followed by the age group of 35-44 years (Figure 4). Men accounted for 1,445 or 56.4% of the total deaths. The overwhelming majority of deaths (2,249 or 87.8%) occurred among Caucasians during the 2011-2018 period (Figure 5). In 2018, Caucasians had nearly four times higher age-adjusted mortality rates due to drug overdose than African Americans: 16.3 deaths versus 3.9 deaths per 100,000 standard population.

Figure 4. Age Distribution of Drug Overdose Deaths in MS, 2011-2018

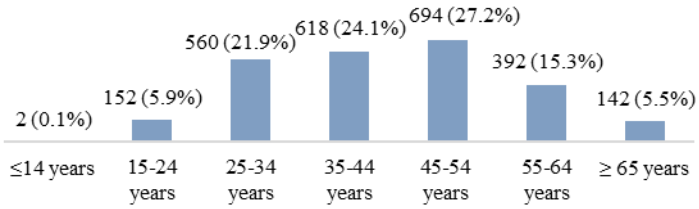
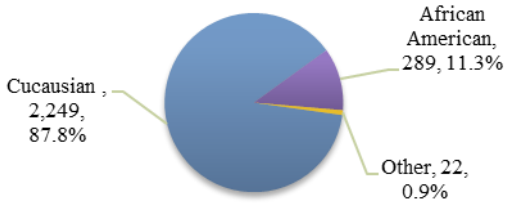


Figure 5. Racial Distribution of Drug Overdose Deaths in MS, 2011-2018



EDUCATIONAL AND MARITAL STATUS, 2011-2018: Education and family relations are some of the important social determinants of health. To illustrate how these factors are implicated in Mississippi's overdose deaths, we stratified the data by educational levels and marital status (Table 2).

Education: Only 200 (8.8%) of all decedents from opioid overdoses had a bachelor's degree or higher level of education. This finding may reflect Mississippi's poor educational rankings. In 2017, only 21.3% of the state population ≥ 25 years had a college education, which was 9.6 percentage points below the national average of 30.9%. Investing in Mississippi's system of higher education and improving educational performance, therefore, may be important steps for increasing the well-being of state residents and preventing drug addiction and deaths.

Marital Status: Less than one third (756 cases or 29.5%) 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 2. Number and percent of drug overdose deaths in MS

Educational level, 2012-2018*	Number of deaths	Percent of deaths	Percent of MS population**
8th grade or less	123	5.4%	5.6%
9th - 12th grade, no diploma	408	17.9%	11.0%
High school graduate or GED	906	39.7%	30.4%
Some college, no degree	407	17.8%	22.6%
Associate degree	206	9.0%	9.1%
Bachelor's degree	145	6.4%	13.3%
Graduate or professional degree	55	2.4%	8.0%
Unknown	31	1.3%	-
Marital status, 2011-2018	**Number of deaths**	**Percent of deaths**	**Percent of MS population*** **
Married	756	29.5%	44.8%
Married, but separated	127	5.0%	3.0%
Widowed	150	5.9%	7.0%
Divorced	775	30.3%	11.7%
Never married	728	28.4%	33.6%
Unknown	24	0.9%	-

*For educational level only data for 2012-2018 are available (2,281 total drug overdose deaths)
**Source: U.S. Census Bureau, 2017 American Community Survey 5-Year Estimates
***Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates

GEOGRAPHIC DISTRIBUTION OF DRUG OVERDOSE DEATHS IN MISSISSIPPI, 2011-2018: Although all counties are at risk for drug overdoses, the vast majority of Mississippi's 82 counties are sparsely populated. As a result of their small population size, many of these counties have reported a correspondingly small number of overdose-related death events. This low number of reported incidents complicates the task of calculating reliable overdose death rates, which requires a minimum number of at least 20 cases. To address this challenge, we combined data from 2011 through 2018.

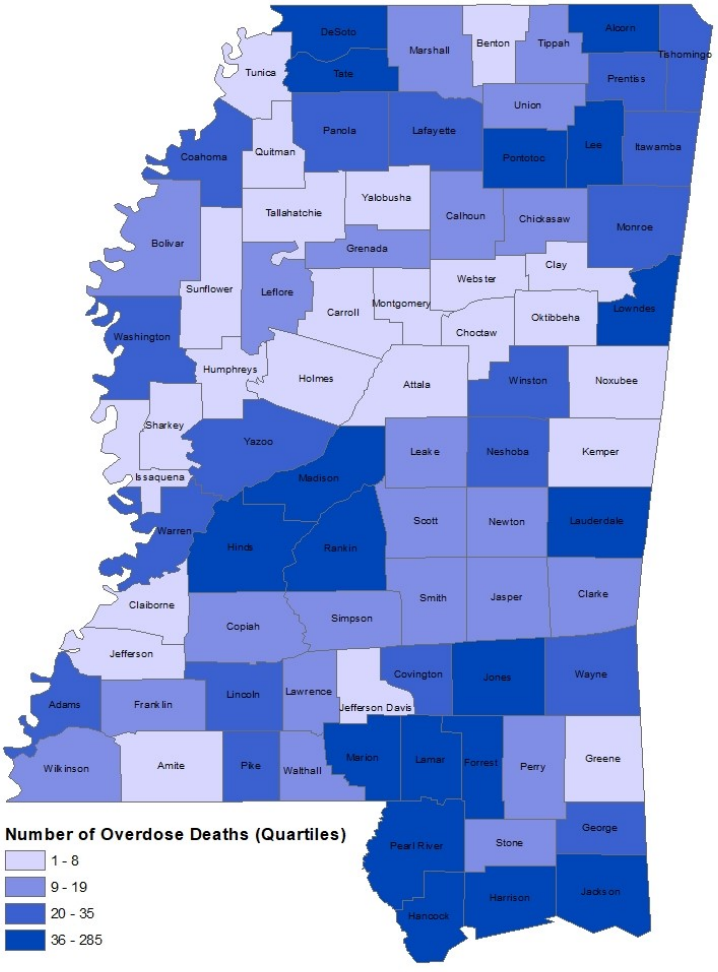
After aggregating our data longitudinally, 36 counties reported 20 or more overdose-related death cases during 2011 -2018. Displayed in Table 3 are the county-specific rates and absolute number of deaths for the 36 Mississippi counties that had 20 or more drug overdose deaths during the study period. To evaluate the geographic distribution of overdose fatalities, we used two metrics: the average (mean) number of deaths per county and the statewide rate of overdose fatalities. Between 2011 and 2018, on average, there were 31 fatal drug overdoses per county and the statewide overdose crude fatality rate was 10.7 deaths per 100,000 population. Based on this analysis, counties with a higher than average number and rate of overdose deaths were identified as geographical clusters. There were thirteen such counties in Mississippi during 2011-2018. These counties are marked with an asterisk in Table 3.

This analytical approach revealed that counties with high overdose concentrations were clustered in the southern region of the state. More than half of the thirteen counties identified as "hot spots" of drug overdose deaths were concentrated in this geographical "drug belt." The counties in this danger zone included Pearl River, Hancock, Harrison, Jackson, George, Marion, and Lamar. Aside from the southern drug belt, there were four additional areas with high rates of overdose deaths: the northeastern corner of the state (Tishomingo and Alcorn); two counties adjacent to Memphis, TN (DeSoto, Tate); one county near Tupelo; and one county near the state capital (Rankin).

Table 3. Counties with twenty or more drug overdose deaths in MS, 2011-2018: Ranked by rate per 100,000 population

Rank	County of Residence	No of Deaths	Rate per 100,000
1	Pearl River*	116	26.2
2	Hancock*	86	23.3
3	Marion*	47	22.8
4	Tishomingo*	35	22.4
5	Tate*	41	18.0
6	Harrison*	285	17.8
7	George*	33	17.6
8	Jackson*	199	17.6
9	Wayne	27	16.5
10	Pontotoc*	39	15.7
11	Coahoma	30	15.3
12	Alcorn*	45	15.1
13	Itawamba	28	14.9
14	Winston	22	14.8
15	Covington	22	14.2
16	Desoto*	189	13.7
17	Rankin*	152	12.8
18	Lamar*	60	12.5
19	Neshoba	28	11.9
20	Panola	31	11.3
21	Prentiss	22	10.8
22	Yazoo	24	10.8
23	Jones	55	10.1
24	Forrest	58	9.5
25	Adams	23	9.1
26	Lowndes	40	8.4
27	Lee	57	8.4
28	Monroe	24	8.3
29	Lincoln	22	7.9
30	Lauderdale	44	7.0
31	Pike	22	6.9
32	Hinds	126	6.5
33	Madison	52	6.4
34	Warren	22	5.8
35	Washington	20	5.2
36	Lafayette	21	5.0

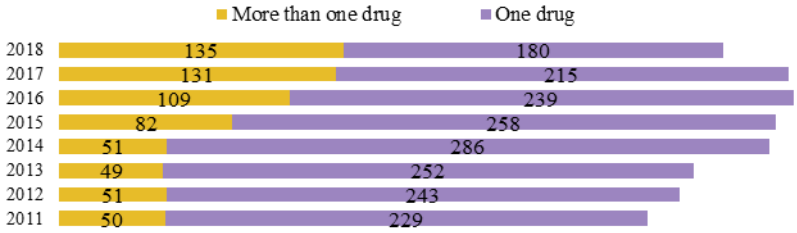
Number of Overdose Deaths in MS By County of Residence, 2011-2018



Source: Mississippi State Department of Health

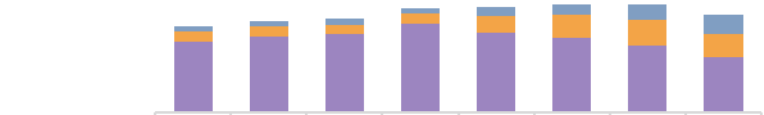
MULTIDRUG USE: Across the United States and in Mississippi, polysubstance use has become a major public health concern. Research suggests that the strongest predictor of overdose is polydrug use.[1] To study polysubstance use, we included in our analysis the following drug categories: opioids, psychostimulants, cocaine, cannabis, hallucinogens, benzodiazepines, and other sedatives. The number of multidrug overdose deaths was stable until 2014; however, these deaths nearly tripled between 2014 and 2018 (Figure 6). Such deaths increased by 3.1% between 2017 and 2018, but soared by 170.0% between 2011 and 2018. During 2017, more than one drug was recorded in 131 (37.9%) of all deadly overdoses. Alarmingly, this trend has continued its rapid growth. In 2018, for example, almost half of all overdose deaths (42.9%) involved polysubstance use.

Figure 6. Multidrug Overdose Deaths in MS, 2011-2018



Stratification by Number of Drugs: A 2018 analysis of polydrug use revealed that two drugs were involved in 22.5% (71 cases), three drugs were involved in 13.7% (43 cases), and four or more drugs were involved in 6.7% (21 cases) of all drug-related overdose deaths. Since 2014, there has been a continuous increase in the number of deaths involving three or more controlled substances in Mississippi (Figure 7).

Figure 7. Drug Overdose Deaths by the Number of Drugs Involved, MS, 2011-2018



	2011	2012	2013	2014	2015	2016	2017	2018
3 or more drugs	17	18	18	17	30	34	49	64
2 drugs	33	33	31	34	52	75	82	71
1 drug	229	243	252	286	258	239	215	180

Multiple Drug Use by Drug Type of Drugs Involved:

- **Opioid-Involved Deaths:** During 2018, 69.5% of Mississippi's opioid-related deaths were due to polydrug use (Figure 8).
- **Psychostimulant-Involved Deaths** Likewise, more than half of all overdose deaths related to the use of amphetamines or methamphetamine (50.5%) had multiple drug use recorded on the death certificate. Still 49 deaths of these deaths involved only stimulants (Figure 9).
- **Cocaine-Involved Deaths:** In addition, two thirds (66.7%) of fatal overdoses involving cocaine also had documented multiple drug use during 2018 (Figure 10).
- **Benzodiazepine-Involved Deaths:** Most troublingly of all, virtually all of the drug overdose deaths involving benzodiazepines—52 out of the 57 deaths (91.2%)— exhibited multidrug usage (Figure 11).

Figure 8. Opioid-Involved Overdose Fatalities: Multiple Drugs, MS, 2011-2018

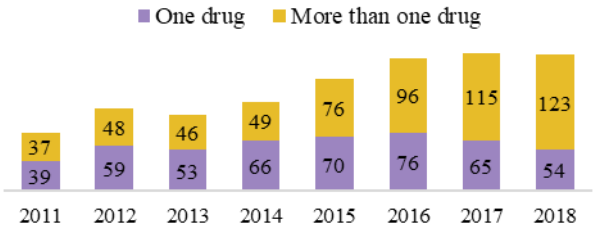


Figure 9. Psychostimulant-Involved Overdose Fatalities: Multiple Drugs, MS, 2011-2018

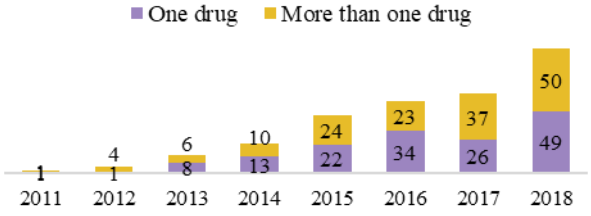


Figure 10. Cocaine-Involved Overdose Fatalities: Multiple Drugs, MS, 2011-2018

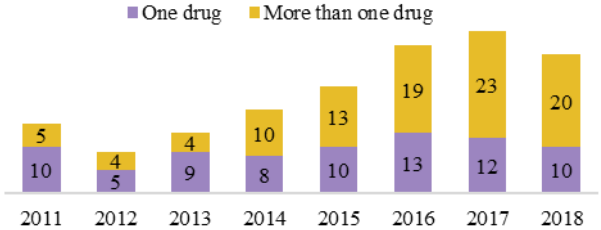
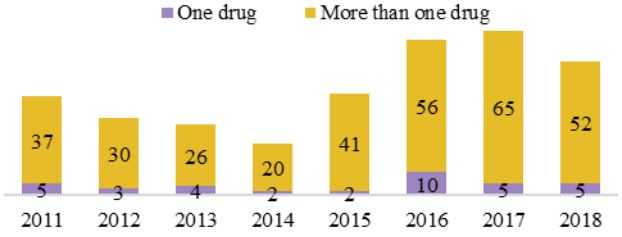


Figure 11. Benzodiazepine-Involved Overdose Fatalities: Multiple Drugs, MS, 2011-2018



OVERVIEW OF OVERDOSE DEATHS INVOLVING OPIOIDS: During 2018, there were 177 opioid-involved deaths in Mississippi. The age-adjusted death rate in 2018 was 6.2 deaths per 100,000 standard population, a similar to the 2017 rate of 6.3. From 2011 through 2018, there were a total of 1,072 opioid-related deaths and most of these deaths (975 or 91.0%) were unintentional; however 47 cases (4.4%) were due to suicides and there was one case of homicide. The manner of death remained undetermined for the rest of the cases. Caucasian race was reported in 977 cases (91.1%) and male gender in 616 (57.5%) of all opioid-related fatalities since 2011.

MULTIPLE DRUG USE

Two or more opioids: The concomitant use of at least two different opioids was recorded in 20 opioid-related deaths (11.6%) during 2016. Deaths involving two or more opioids further increased to 36 cases —20.0% or one out of every five opioid-involved deaths in 2017. Overdosing on more than one opioid further increased in 2018: during that year multidrug use was recorded in 45 cases (25.4%) or one out of every four opioid-involved deaths.
Opioids and other drugs of abuse: Similarly, deaths involving the simultaneous use of opioids and non-opioids continue to climb in Mississippi. In 2016, half of all opioid-related overdose deaths (50.6% or 87 cases) had a coexisting non-opioid drug of abuse listed in the death certificate. In 2017, 100 out of the total 180 opioid-related overdose deaths (55.6%) had another non-opioid drug recorded; while in 2018, 107 out of the 177 (60.5%) opioid-involved deaths had another non-opioid drug documented. The following substances were included in this analysis: psychostimulants, cocaine, cannabis, hallucinogens, benzodiazepines and other sedatives.

OPIOID DEATHS BY TYPE OF OPIOID INVOLVED

During 2018

- Natural or semisynthetic opioids such as hydrocodone and oxycodone were involved in 86 cases (48.6%).
- Synthetic opioids, including illicit or prescription fentanyl, were documented in 76 deaths (42.9%).
- Heroin was recorded in 39 deaths (22.0%).
- Methadone, a medication used mostly for treatment of opioid addiction, was recorded in 12 (6.8%) deaths.

Mortality Trends

- Deaths involving natural or semisynthetic opioids, a category that includes prescription opioid medications, increased, from 49 deaths in 2011 to 98 deaths in 2016. This trend reversed between 2016 and 2017, however. Compared to 2017, there was one more death involving prescription opioids in 2018.
- Deaths due to synthetic opioids (e.g., fentanyl) more than quadrupled in eight years, from 16 deaths in 2011 to 76 deaths in 2018. This increase was especially pronounced during the last two years of the time-series analysis: the number of synthetic opioid deaths almost doubled from 41 in 2016 to 76 in 2018.
- The number of heroin overdose deaths demonstrated a steep and steady increase from 2011 until 2015. Then, heroin deaths decreased by 7 cases from 2015 to 2016, but this was a temporary dip in the number of reported cases. Heroin deaths increased to 39 cases in 2018 (Figure 12 and Table 4).

Figure 12. Drug Overdose Deaths Involving Opioids in MS, 2011-2017

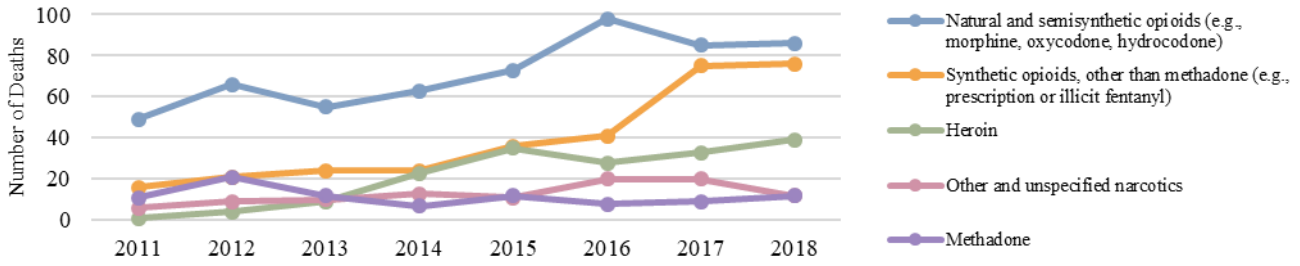


Table 4. Overdose deaths involving opioids in MS, 2011-2018

Type of opioid	2011	2012	2013	2014	2015	2016	2017	2018	Change 2011-2018	Change 2017-2018
Natural and semisynthetic opioids	49	66	55	63	73	98	85	86	+75.5%	+1.2%
Synthetic opioids, other than methadone	16	21	24	24	36	41	75	76	+375.0%	+1.3%
Heroin	1	4	9	23	35	28	33	39	+3,800.0%	+18.2%
Methadone	11	21	12	7	12	8	9	12	+9.1%	+33.3%
Other and unspecified narcotics	6	9	10	13	11	20	20	12	+100.0%	-40.0%

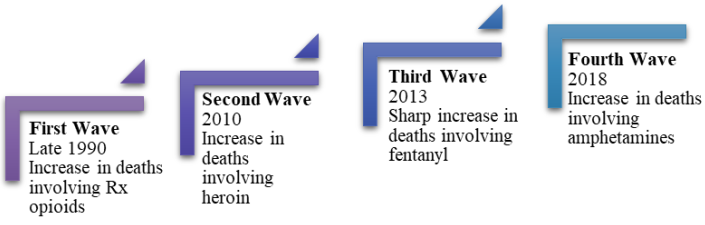
Notes: Synthetic opioids include drugs such as fentanyl, fentanyl analogues, and tramadol.
Categories of deaths are not exclusive because deaths might involve more than one drug. Summing of categories will result in more than the total number of deaths in a year.

CONCLUSIONS

A MAJOR MILESTONE: For the second consecutive year, *overall* drug overdose deaths have declined in Mississippi. While the decrease between 2016 and 2017 was minimal (two deaths), the nine-percent decline (31 deaths) in overdose fatalities in the following year (2017-2018) represents a major public health achievement. Despite these encouraging statistics, however, we must ask ourselves whether this recent reversal marks the beginning of a long-term downward trend in our state's overdose mortality rates. Because the drug epidemic is complex and involves a myriad of abused substances, the answer to this question is mixed and varies according to the drugs involved. In relation to prescription opioids, for instance, overdose deaths have plateaued since 2017. By contrast, overdose deaths linked to heroin and amphetamine/methamphetamine have continued to rise — a trend that imposes new challenges and demands a quick response from public health structures and law enforcement.

EMERGING TRENDS: Since 2016, there have been three emerging and troubling trends in drug overdose mortality in Mississippi. The first trend involves a dangerous increase in deaths involving heroin and fentanyl. The second trend is an alarming spike in overdose deaths involving psychostimulants. The third trend is the rising number of multidrug overdose deaths. If these trends continue to worsen, the state may expect another wave of increased drug overdose deaths.

Figure 13. The Drug Abuse Epidemic in the United States: Stages



THE CAUSES: Understanding the intertwined nature of the drug abuse epidemic is a key step toward solving it. Substance use disorder is a chronic disease fueled by a number of factors, such as pleasure-seeking behaviors, the self-medication of untreated mental health conditions, growing economic despair, and widespread social isolation.[2] As our analysis has discovered, the most vulnerable population for drug overdose in Mississippi is single men with low levels of educational attainment.

SOLUTIONS: While there is no simple solution for this complex public health crisis, there are well-established strategies that can reduce the number of overdose deaths. Successful public health strategies include increasing public awareness of the risks associated with drug use, judicious prescribing of controlled substances, providing addiction treatment for all in need, and increasing access to naloxone.

FROM DATA TO ACTION: The Mississippi State Department of Health (MSDH) has undertaken several major actions aimed at curbing drug overdoses, monitoring the drug epidemic, and reducing its negative consequences through information dissemination and education.

- **Data and Surveillance:** At the end of 2014, MSDH established the framework for creating a comprehensive drug abuse surveillance system. The goals of this system are to provide timely data reporting and in-depth epidemiological analyses. For more information and to view reports, please visit: www.healthyms.com/MS drug epidemic reports.

- **Education:** In the beginning of 2017, MSDH initiated an educational campaign among Mississippi's medical community on the scope of the state's opioid epidemic, the latest opioid treatment guidelines, and prevention strategies

- **Naloxone:** Naloxone, an opioid antidote that can reverse opioid overdose, was made available without prescription in May 2018, following a standing order issued by the Mississippi State Department of Health.

Data Analysis: The data for this report were obtained from the Office of Vital Records at the Mississippi State Department of Health. Only Mississippi residents were included in the analyses. Drug overdose deaths were identified by International Classification of Diseases, Tenth Revision (ICD-10) undelaying 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). Specific drug categories and multidrug use was identified by: T40.0-T40.4, and T40.6 (opioids), cocaine (T40.5), T40.7 (cannabis), T40.8 (lysergide), T40.9 (other and unspecified psychodysleptics), T43.6 (psychostimulants with abuse potential), T42.2-42.8 (antiepileptic, sedative-hypnotic and antiparkinsonism), and T50.9 (unspecified). Age-adjusted death rates were calculated using the direct method and adjusted to the 2000 U. S. population.

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