

Prescriptions for Opioids in Mississippi: Numbers, Rates and Trend Analysis, 2011-2016



Epidemiological
Report
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KEY FINDINGS

Between 2011 and 2016, the number and rate of prescriptions for opioids were alarmingly high in Mississippi.

Although the overall trend in prescribing opioids showed a slight downward movement during the study period, the number of prescriptions for stronger opioids such as oxycodone, morphine, and fentanyl increased considerably since 2011. There were over 200,000 more prescriptions for oxycodone in 2016 compared to 2011.

The number of prescriptions for opioids used as addiction-treatment medications rose significantly since 2011, a finding suggestive of an increased number of opioid substance use disorders in Mississippi.

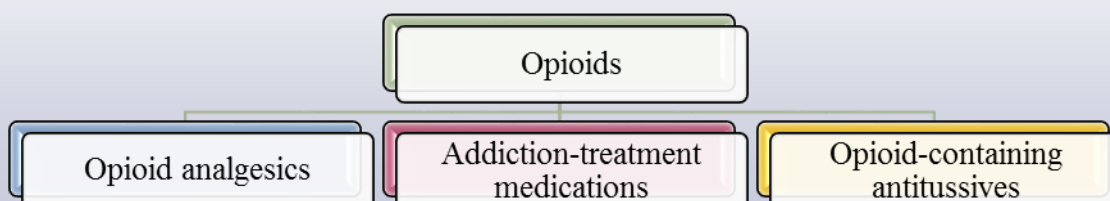
Background: Nationally, there were 63,632 drug overdose deaths in 2016; of which 66.4% (42,249) involved opioids.¹ During the same year, a total of 348 drug overdose deaths were reported in Mississippi. Opioids, including prescription opioids, illicit fentanyl, heroin, and methadone, were involved in 172 (49.4%) cases.² As an escalating public health crisis, the opioid epidemic requires statewide efforts to track prescription practices and establish evidence-based preventive measures. A comprehensive and population-level source, the prescription monitoring program (PMP) data is emerging as one of the most-effective tools for monitoring the epidemic of opioid misuse.

Objectives: We used Mississippi PMP data to determine the statewide number and rate of prescriptions for opioid analgesics and other opioids during 2016. In addition, we evaluated trends in the prescription of major opioid categories and individual opioid analgesics between 2011 and 2016. Data analyses included only Mississippi residents.

Opioids: Opioids are natural or synthetic substances with morphine-like properties that can cause analgesia and a sense of euphoria. These substances are mainly prescribed for their pain-relieving effect but other clinical uses include maintenance during opioid-addiction treatment, cough and diarrhea suppression, management of acute pulmonary edema, and adjunctive therapy in anesthesia. All opioids have a potential for abuse and could lead to tolerance (the need of increasingly higher doses to achieve analgesia or pleasurable effects), physical dependence (withdrawal symptoms after the abrupt discontinuation of drug use), and psychological dependence (addiction). Different opioid substances exhibit variations in their analgesic efficacy and potential for abuse.

Major Drug Categories: For this analysis, all controlled substances within the PMP database were identified and categorized. Opioids were further subdivided into opioid analgesics (pain relievers), addiction-treatment medications, and opioid-containing antitussive formulations (cough suppressant medications) to evaluate whether distribution and other trends varied across major opioid categories or according to clinical usage.

Figure 1. Opioids: Major Categories

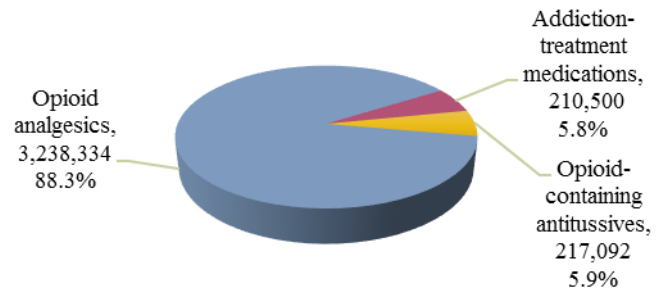


Major Opioid Categories

Numbers and Rates: During 2016, opioid analgesics were the most prescribed opioid category in Mississippi, accounting for 88.3% of all opioid prescriptions. Addiction-treatment medications accounted for 5.8% and cough suppressants containing hydrocodone or codeine accounted for 5.9% of all opioid prescriptions (Figure 2). On average, for every 100 Mississippi residents in 2016, there were 108.4 prescriptions for opioid analgesics, 7.0 prescriptions for addiction-treatment medications, and 7.2 prescriptions for opioid-containing cough medications.

Opioid addiction treatment includes detoxification and maintenance therapy. Methadone and buprenorphine are two opioids approved for such treatment. Methadone used as an addiction treatment medication can only be dispensed by certified addiction medicine specialists to patients treated in specially designated methadone treatment facilities. Methadone used as an analgesic, however, can be prescribed by any medical provider. Since methadone treatment facilities are excluded from PMP reporting requirements, all prescriptions for methadone in the database were excluded from the category of addiction-treatment medications but were included in the group of opioid analgesics.

Figure 2. Prescriptions for Major Opioid Categories: Number and Percentage, MS, 2016



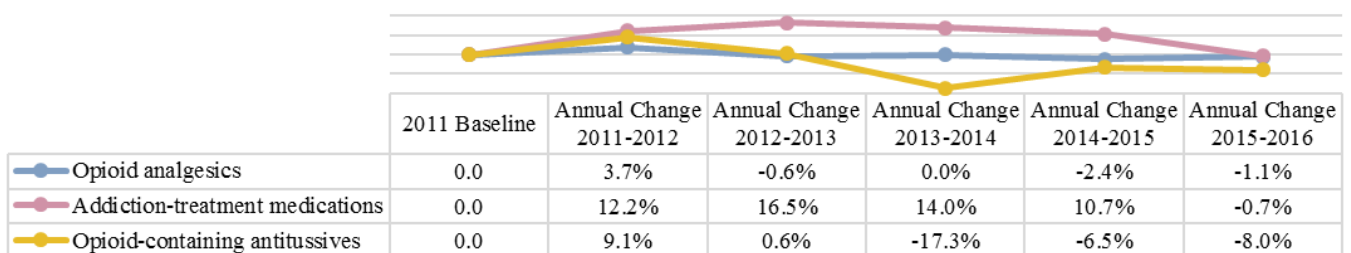
Trend Analysis: The overall number of prescriptions for opioid substances increased from 2011 to 2014, but this number decreased afterwards. In addition, the major groups of opioid categories demonstrated different trends (Table 1 and Figure 2).

- During the first two years of the time series, the number of prescriptions for opioid analgesics in Mississippi jumped sharply, increasing 3.7% between 2011 and 2012. After this initial increase, the number of prescriptions for opioid analgesics exhibited a slight downward movement, but the overall trend remained flat.
- The number of prescriptions for opioid-containing cough medicines demonstrated an upward trend from 2011 through 2013, but this number decreased abruptly during the last three years of the time series.
- The number of prescriptions for addiction-treatment medications steadily increased during the study period, except for a minuscule decrease of less than one percentage point, from 2015 to 2016. While further research is needed, the significant uptrend in the number of prescriptions for addiction-treatment medications may signify a spike in the prevalence of opioid use disorders in our state.

Table 1. Major Opioid Categories: Number of Prescriptions, MS, from 2011 to 2016

Drug Classification Description	2011	2012	2013	2014	2015	2016	% Change 2011-2016
Opioid analgesics	3,253,380	3,375,323	3,356,430	3,356,455	3,274,480	3,238,334	-0.5%
Addiction-treatment medications	128,398	144,047	167,885	191,451	212,020	210,500	+63.9%
Opioid-containing antitussives	278,015	303,312	305,151	252,346	235,963	217,092	-21.9%
All opioid-containing substances	3,659,793	3,822,682	3,829,466	3,800,252	3,722,463	3,665,926	+0.2%

Figure 3. Prescriptions for Major Opioid Categories: Annual Change, MS, from 2011 through 2016



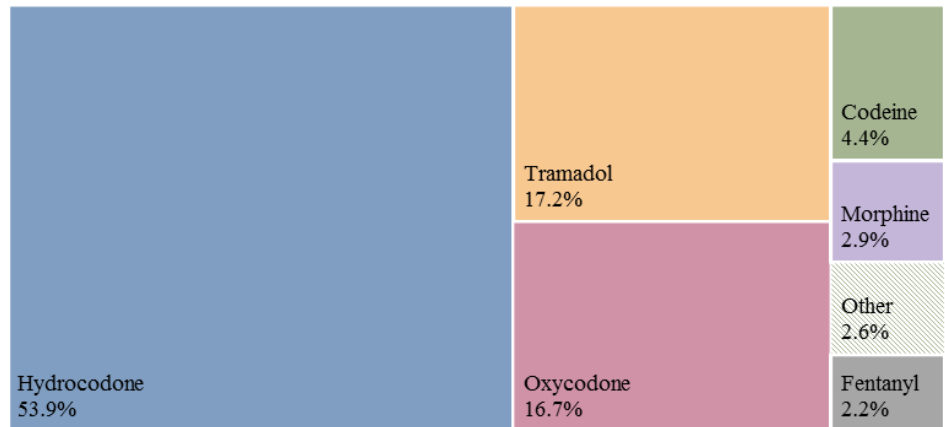
Top Prescribed Analgesics: Numbers and Trends

Analgesic Potency: Opioids vary in their analgesic potency (the power of the medication to achieve the desired effect) and potential for addiction. Morphine milligram equivalents (MMEs) are used to estimate the analgesic potency of opioids, while the potential for addiction is evaluated by drug schedule classes. The morphine milligram equivalent for hydrocodone and morphine equals one. The value is higher than one for oxycodone (1.5 MME). The equivalent value for fentanyl, however, is significantly higher (7.2 MME), reflecting the tremendous strength and danger of this opioid. In contrast, tramadol and codeine are less potent analgesics with MME of less than one.

Addiction Liability: The Drug Enforcement Agency (FDA) classifies controlled substances into five schedules based on their addiction potential: no medical use (I), high addiction potential (II), moderate addiction potential (III), and low abuse potential (IV and V). Hydrocodone, oxycodone, morphine, and fentanyl are schedule II with high abuse potential. Tramadol is schedule IV and the different codeine formulations vary in their schedules from II to V.

Distribution: During 2016, hydrocodone was the leading prescribed opioid analgesic accounting for 53.9% (1,746,082) prescriptions, followed by tramadol (557,563), oxycodone (541,424), codeine (143,123), morphine (94,454), and fentanyl (71,549). All other opioids accounted for 2.6% of prescribed opioid analgesics in 2016 (Figure 4).

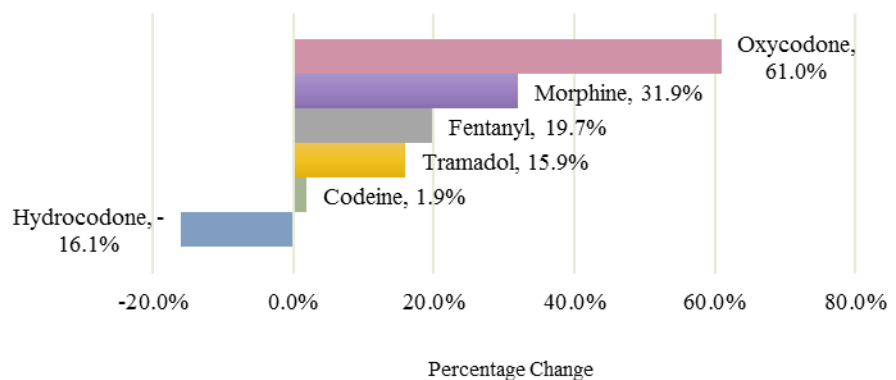
Figure 4. Major Opioid Analgesics: Distribution, MS, 2016



Trends of Major Opioid Analgesics: When analyzed individually, not all opioid analgesics followed the same positive trend of the group as a whole. In fact, the slight recent decrease in the total number of opioid analgesics prescribed may be masking or hiding a considerable increase in the prescription of several strong opioids such as oxycodone, fentanyl, and morphine (Figure 5). Compared to 2011, in 2016 the number of prescriptions for hydrocodone declined by 16.1%. At the same time, the number of prescriptions for several strong opioid pain relievers increased considerably: fentanyl by 19.7%, morphine by 31.9%, and oxycodone by 61.0%. The number of prescriptions for the weaker opioids, tramadol and codeine, increased by 15.9 and 1.9%, respectively.

Alarming Findings: During 2011, oxycodone prescriptions accounted for 10.3% of all opioid prescriptions. Five years later, in the midst of a nationwide prevention campaign, the number of prescriptions for this potent opioid increased to 16.7% of all opioid prescriptions. Such a spike is indicative of high demand for strong opioids and worrisome prescribing practices in Mississippi.

Figure 4. Major Opioid Analgesics: Percentage Change, MS, 2011-2016



Opioid Analgesics: Numbers of Prescriptions and Annual Change, from 2011 through 2016

HYDROCODONE (MME = 1 and Schedule = II)

	2011	2012	2013	2014	2015	2016
Prescriptions	2,082,368	2,165,807	2,131,681	2,020,974	1,805,863	1,746,082
Change	Base year	4.0%	-1.6%	-5.2%	-10.6%	-3.3%

Nationwide, hydrocodone is the most prescribed opioid since this drug is relatively inexpensive. In 2014, the FDA moved hydrocodone from schedule III to schedule II, which has imposed stricter prescribing regulations and resulted in decreasing dispensing

TRAMADOL (MME = 0.1 and Schedule= IV)

	2011	2012	2013	2014	2015	2016
Prescriptions	481,156	486,440	484,118	521,093	555,560	557,563
Change		1.1%	-0.5%	7.6%	6.6%	0.4%

The number of prescriptions for tramadol showed some variations over the study period, but increased since 2014. Tramadol is a weaker analgesic and is considered as an opioid with a low potential for addiction. Nevertheless, dependence may occur.

OXYCODONE (MME = 1.5 and Schedule II)

	2011	2012	2013	2014	2015	2016
Prescriptions	336,237	370,355	392,206	449,243	518,832	541,424
Change		10.1%	5.9%	14.5%	15.5%	4.4%

Both, hydrocodone and oxycodone have a high abuse potential. Oxycodone tends to have fewer side effects and cause higher euphoric experiences than hydrocodone. For these reasons, oxycodone is the preferred opioid among opioid-dependent patients.⁴

CODEINE (MME = 0.15 and Schedule = II, III, IV or V)

	2011	2012	2013	2014	2015	2016
Prescriptions	140,410	132,504	127,066	126,016	145,657	143,123
Change		-5.6%	-4.1%	-0.8%	15.6%	-1.7%

The number of prescriptions for codeine, a less potent analgesic than morphine, declined from 2011 to 2014, but this number increased by 15.6% from 2014 and 2015. During the last two years of the study period, prescriptions for codeine declined slightly.

MORPHINE (MME = 1 and Schedule = II)

	2011	2012	2013	2014	2015	2016
Prescriptions	71,621	75,599	76,593	83,828	90,404	94,454
Change		5.6%	1.3%	9.4%	7.8%	4.5%

Morphine is used for severe and/or difficult to control pain (e.g., cancer-related or post-surgical pain). Morphine prescriptions demonstrated a steady uptrend of 22,833 more prescriptions in 2016 compared to 2011.

FENTANYL (MME = 7.2 and Schedule = II)

	2011	2012	2013	2014	2015	2016
Prescriptions	59,757	62,535	64,106	68,860	72,166	71,549
Change		4.6%	2.5%	7.4%	4.8%	-0.9%

From 2011 to 2015, fentanyl prescriptions raised at a steady rate. Fentanyl is a very potent opioid and its abuse is a serious public health concern. Beginning 2016, there has been a minuscular but encouraging down movement in fentanyl prescribing.

METHADONE (MME = 3 and Schedule = II)

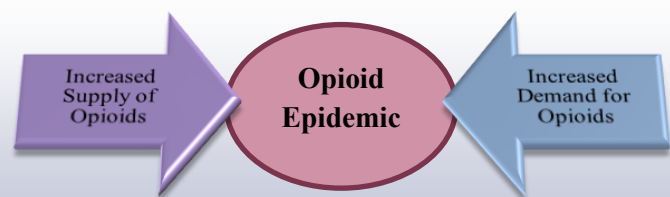
	2011	2012	2013	2014	2015	2016
Prescriptions	19,180	20,024	20,886	22,183	20,490	17,967
Change		4.4%	4.3%	6.2%	-7.6%	-12.3%

While methadone is not commonly used as a pain reliever, the number of prescriptions for this opioid showed an uptrend from 2011 to 2014, but this trend reversed in 2015. Caution should be exercised when methadone is prescribed as a pain reliever.

PUBLIC HEALTH PREVENTION STRATEGIES

1. Maintaining a comprehensive data surveillance system incorporating such sources as the prescription monitoring program as well as mortality and hospital discharge data.
2. Guiding statewide preventive policies addressing prescribing practices, educational strategies, and chronic pain treatment.
3. Engaging the Mississippi medical professionals: Mississippi physicians and other health care providers should lead the statewide efforts for combating this escalating public health crisis by following three main tracks of prevention:
 - ⇒ Non-medical use of opioids: Limiting the non-medical use of opioid analgesics by identifying patients at risk for opioid drug misuse through systematic utilization of the state web-based PMP data system.
 - ⇒ Iatrogenic opioid addiction: Preventing the development of addiction among patients with chronic pain conditions by minimizing opioid prescriptions and considering alternative forms of chronic pain management.
 - ⇒ Mental health and drug abuse: Actively screening patients with chronic pain conditions for underlying mental health and substance use disorders and exploring mental health treatment options for such patients.
4. Establishing achievable goals and performance measures such as a reduction in the number of opioid prescriptions and an increased utilization of Mississippi PMP data by healthcare providers.
5. Mobilizing communities to build supportive networks for people with substance use disorders and their families.
6. Expanding addiction treatment programs and access to mental health care for those in need.

The vicious cycle of the opioid epidemic: Successful prevention strategies are based on understanding the underlying causes and driving factors of the opioid epidemic. The skyrocketing use of opioid analgesics has two sides interlocked in a vicious cycle: increased demand and increased supply. The two sides of the problem should be targeted simultaneously.



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> and search Prescription Drug Abuse.

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