Drug Poisoning Deaths in Montana, 2007-2018

AT A GLANCE

4th Leading cause of death

Drug poisonings were the fourth leading cause of injury deaths in Montana, after suicides, motor vehicle crashes, and falls.

New trends

The number of opioid drug poisoning deaths in Montana has declined since peaking in 2009-2010, while deaths from psychostimulants have increased in the last few years.

Highest among Young- and Middle-aged adults

Persons aged 35-54 years had the highest rate of drug poisoning deaths in Montana.

Introduction

Drug poisonings were the fourth leading cause of injury deaths in Montana, accounting for 1,437 deaths between 2007-2018, after suicides (2,627 deaths), motor vehicle crashes (2,300 deaths), and falls (1,538 deaths). Drug poisoning deaths have been on the rise across the country, driven in large part to opioids.[1,2,3] This report describes drug poisoning deaths in Montana from 2007-2018 by demographics and drug type. Drugs chosen for analysis can be found on Table 1. This report is an update to a prior report published in 2016 by the Montana Department of Public Health and Human Services that described these trends from 2003-2014.[4] By continually monitoring emerging drug trends, proper interventions can be devised based on drug type.

Figure 1. US and Montana Drug and Prescription Opioid Poisoning Age-adjusted Death Rates 2007-2018
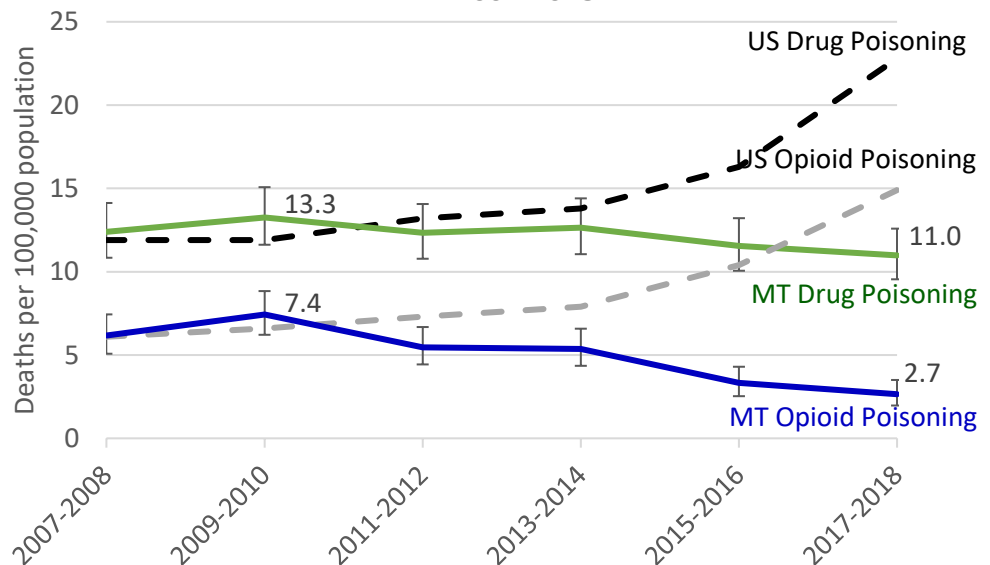
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Methods

Data used in this report are from the Montana Office of Vital Records and were restricted to drug poisoning deaths in Montana residents who died in Montana. Drug poisoning deaths were defined as having an ICD-10 underlying cause of death code of X40-X44 (unintentional poisoning), X60-X64 (suicide by drug poisoning), X85 (homicide by drug poisoning), or Y10-Y14 (undetermined intent by drug poisoning).[5] Among deaths with an underlying cause of death of drug poisoning, ICD-10 codes indicating the specific types of drugs involved were ascertained in the accompanying multiple cause of death fields.[6,7] Prescription opioids were defined as having an ICD-10 code of T40.2, T40.3, or T40.4. Montana residents who die out of state were excluded from this analysis because these records may be incomplete; often only the underlying cause of death is reported. National studies reporting state-level information may differ from the number and rates reported in this publication.

Age-adjusted death rates were calculated using the direct method using the 2000 US standard population.[8] Frequency and rates were calculated separately for each drug of interest mentioned on the death certificate. Certifying physicians may list more than one drug on the death certificate; reporting counts of specific drug deaths may exceed the total number of poisoning deaths reported. Rates were not calculated for events with fewer than 20 observations. Joinpoint Regression Program software was used to determine significance of overall drug overdose trends.[9] A total of 1,437 drug poisoning deaths occurred between 2007-2018 in Montana and were included in this analysis. For Montana, data were combined into two-year intervals for reporting purposes. For national data, annual numbers and rates were used, and due to availability of data, years 2007-2017 were used.

Results

Since peaking in 2009-2010, Montana's death rate from all drug poisonings declined from 13.3 deaths per 100,000 residents to 11.0 in 2017--2018.[10] However, the decline from 2009-2010 to 2017-2018 was not statistically significant (Figure 1). Conversely, national drug overdose death rates have nearly doubled from 11.9 per 100,000 to 22.8 during the same time frame.[11] Opioid deaths have been the major driver of increased drug-overdoses nationally, while Montana's opioid-related mortality has seen a significant decline during the study period.

There were no significant declines in drug overdose death rates among any of the age groups in Montana from 2007-2018 (Table 2). The youngest and oldest age groups (less than 24 years and 65 years and older, respectively), did not have adequate data for death rate reporting throughout the 2007—2018 time period, and could not have a reliable trend determined. There were no significant differences in age-adjusted death rates among males compared to females (Table 2).

The Montana American Indian/Alaska Native (AI/AN) population consistently had higher drug poisoning death rates than whites over the study period. The average AI/AN death rate over the 10-year period was almost twice as high as the death rate for whites (22.4 vs. 11.6 per 100,000 people, respectively, data not shown).

When examining specific drugs using the multiple-cause approach, opioids were the drugs mentioned most frequently on the death certificate from 2007 to 2014. From 2015 to 2018, overdose deaths that listed benzodiazepines (T42.4), tricyclic, tetracyclic, and other antidepressants (T43.0, T43.2), and psychostimulants with abuse potential (T43.6) surpassed those that listed an opioid. Though they occurred infrequently throughout the study period, deaths due to illicit drugs such as heroin showed an increase. Deaths due to cocaine remained low from 2007-2018 (Table 3).

Figure 2. Montana Death Rates by Type of Drug, 2007-2018
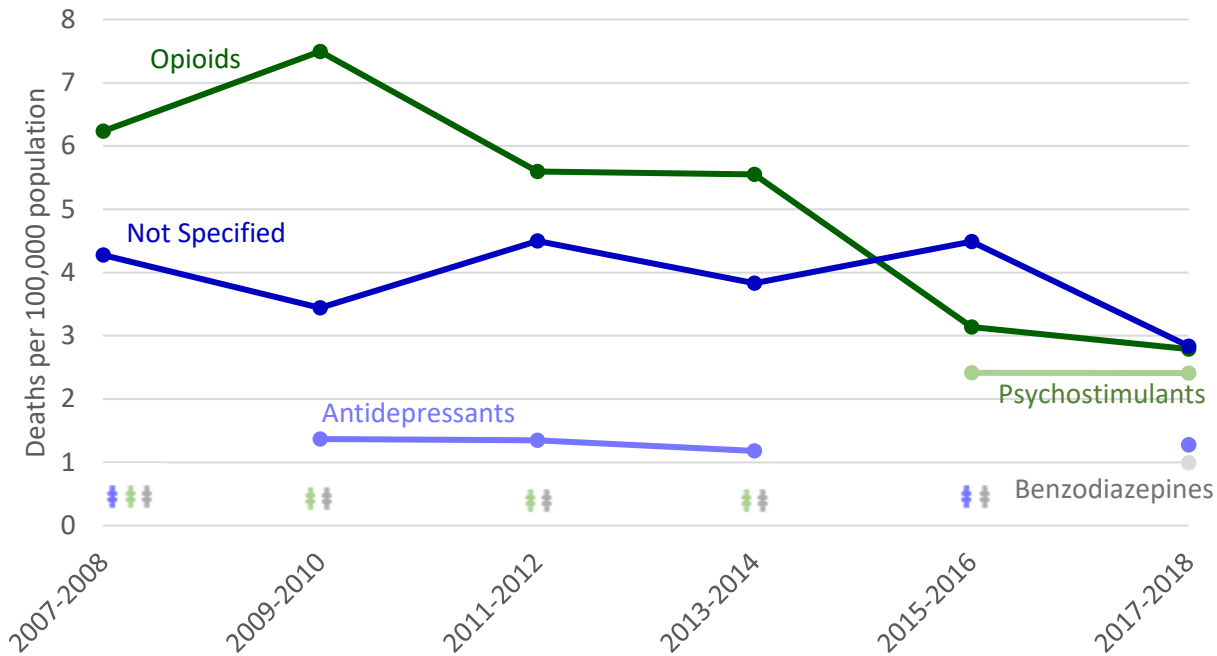
ǂRate could not be calculated due to low numbers

Figure 2 further shows the change in trends seen in the number of deaths associated with each drug category. While opioids have been in decline since 2009-2010, psychostimulants with abuse potential, which include drugs such as methamphetamine, amphetamine, methylphenidate (Ritalin), and 3,4-methylenedioxy-methamphetamine (MDMA, Ecstasy),[12] have shown a dramatic increase since 2015-2016 in which they surpassed antidepressants (Figure 2 and Table 3). Deaths due to psychostimulants with abuse potential showed over a 900% increase from 5 deaths in 2007-2008 to 51 deaths in 2017-2018 (Table 3). This was the greatest increase in any drug type recorded during the study time period.

Discussion

Unlike national trends, the overall burden of drug overdose in Montana declined since 2009-2010 (Figure 1). This is a change from what was seen in earlier years, where Montana's drug overdose death rates remained relatively stable and in line with the national average.[4] Steady declines in opioid overdoses have driven Montana's slight decrease on overall drug overdose rates in the past decade. However, these declines have masked the increases seen in deaths due to psychostimulants with abuse potential, and to a lesser extent, increased deaths due to antidepressants and benzodiazepines (Figure 2). Though not to the extent of the rest of the nation, Montana has also experienced an increase the number of deaths associated with heroin (Table 2).

While using death certificates to provide drug poisoning data is useful, there are some limitations. ICD-10 codes only list certain drugs like opium, heroin, and cocaine by name. Other drugs are coded by classification instead of name, except for methadone.[13] In addition, autopsies are not routinely performed on all decedents suspected of a drug overdose at this time, nor are all findings available at the time the death is certified.

Between 2007 and 2018, an average of 32% of overdose deaths did not have a causative drug identified. Without this information, it is difficult to target interventions aimed at preventing future overdoses. More toxicological testing of suspected overdoses through autopsies will help close the knowledge gap surrounding causative drugs in overdoses. Montana coroners submit fewer autopsies than the national average, at 0.5 autopsies performed per 1,000 population (a rate of 1 per 1,000 is recommended to meet public health needs by the Scientific Working Group on Medicolegal Death Investigation).[14]The cost and logistics behind having an autopsy performed by the State Medical Examiner for suspected overdoses may prove prohibitive to many counties. In order to address these issues, some funds from the CDC Overdose Data to Action Grant awarded to DPHHS in 2019 are set aside to reimburse the cost for up to 100 drug overdose-related autopsies across the state per year. The State Crime Lab expects to see an increase in drug-related autopsies if fees can be refunded, which will give them the ability to provide more thorough and accurate data to both law enforcement and public health agencies. By increasing autopsy numbers in the state among potential drug overdoses, more complete cause-of-death information can be gathered and contribute to further public health interventions.

Resources

Substance Use Disorder Services and Resources

Information on substance use in Montana and treatment information:
https://dphhs.mt.gov/amdd/substanceabuse

Behavioral health Treatment Services Locator

A confidential and anonymous source of information for persons seeking treatment facilities in the United States for substance use and/or mental health problems:
https://findtreatment.samhsa.gov/

Montana Suicide Prevention Lifeline

Call the 24/7 crisis hotline 1-800-273-8255 or text 'MT' to 741 741

Montana Implementation Guide for Naloxone

Information on use of Naloxone, who can prescribe and use Naloxone, and other guidance:
https://dphhs.mt.gov/Portals/85/publichealth/documents/EMSTS/opioids/MontanaImplementationGuideforIncreasedNaloxone.pdf?

Table 1. ICD-10 Codes and Labels for Select Drugs[§]

ICD-10 Code	Literal text label and examples from ICD-10 manual*	Generic and brand name examples
T40.0	**Opium**	
T40.1	**Heroin**	
T40.2	**Other opioids[ǂ]** Codeine Morphine	Hydrocodone MS Contin™ Roxanol™ Percocet™ OxyContin™ Vicodin™
T40.3	**Methadone**	Methadose™
T40.4	**Other synthetic narcotics[¤]** Pethidine	Fentanyl Propoxyphene Meperidine Duragesic™ Darvan™ Demerol™
T40.5	**Cocaine**	
T40.6	**Other and unspecified narcotics**	
T40.7	**Cannabis (derivatives)**	
T40.8	**Lysergide (LSD)**	LSD
T40.9	**Other and unspecified psychodysleptics**	Mescaline Psilocin Psilocybine
T42.4	**Benzodiazepines**	Alprazolam Ativan Valium Xanax™
T43.0	**Tricyclic and tetracyclic antidepressants**	Amitriptyline Doxepin Tofranil™
T43.2	**Other and unspecified antidepressants**	SSRIs Zoloft™ Prozac™
T43.6	**Psychostimulants with abuse potential** (Excludes cocaine)	Methamphetamines Dexedrine Adderall™
T50.9	**No specific drug listed; Other and unspecified drugs, medicaments and biological substances**	

[§]Adapted from table by the CSTE Overdose Subcommittee. Available from URL:
    https://cdn.ymaws.com/www.cste.org/resource/resmgr/Injury/2012-Drug-Deaths-SER-Instruc.pdf
*World Health Organization. International classification of diseases. Available from URL: http://www.who.int/classifications/icd/en/
[ǂ]T40.2 "Other opioids" indicates opioids other than heroin or opium.
[¤] t40.4 "Other synthetic narcotics" indicates opioids other than methadone, which is also synthetic.

Table 2. Number and Age-adjusted Rates of Drug Poisoning Deaths by Selected Characteristics and Intent among Montana Resident Occurrences, 2007-2018

	2007 - 2008		2009 - 2010		2011 -2012		2013 -2014		2015 -2016		2017 -2018	
Total[1]	N	Rate (95% CI)	N	Rate (95% CI)	N	Rate (95% CI)	N	Rate (95% CI)	N	Rate (95% CI)	N	Rate (95% CI)
Total Deaths	240	**12.4** (10.8-14.1)	251	**13.3** (11.6-15.1)	243	**12.3** (10.8-14.1)	245	**12.6** (11.1-14.4)	233	**11.5** (10.1-13.2)	225	**11.0** (9.5-12.6)
Sex[1]												
Male	130	**13.4** (11.2-16.1)	131	**14.0** (11.6-16.7)	116	**11.7** (9.6-14.1)	121	**12.5** (10.3-15.0)	118	**11.5** (9.4-13.8)	128	**12.5** (10.4-15)
Female	110	**11.3** (9.2-13.7)	120	**12.4** (10.2-15.0)	127	**13.0** (10.7-15.6)	124	**12.8** (10.5-15.4)	115	**11.6** (9.5-14.1)	97	**9.3** (7.5-11.5)
Race[1]												
White	216	**12.1** (10.5-13.8)	212	**12.2** (10.5-14.0)	212	**11.7** (10.1-13.4)	215	**12.0** (10.4-13.8)	208	**11.3** (9.8-13.0)	196	**10.3** (8.8-11.9)
AI/AN	23	**19.6** (12.3-34.3)	37	**32.5** (21.9-50.3)	27	**22.0** (14.3-35.9)	27	**23.4** (15.2-37.2)	23	**17.1** (10.7-28.6)	23	**19.5** (12.3-31.1)
Age (years)[2]												
24 and younger	19	‡	21	**7.8** (4.8-11.9)	20	**7.4** (4.5-11.4)	16	‡	15	‡	24	**8.8** (5.6-13)
25 - 34	43	**18.8** (13.6-25.3)	46	**18.9** (13.8-25.2)	43	**17.1** (12.4-23.1)	40	**15.5** (11.1-21.2)	44	**16.7** (12.1-22.4)	43	**15.7** (11.4-21.2)
35 - 44	52	**22.1** (16.5-28.9)	65	**28.7** (22.1-36.6)	50	**22.2** (16.5-29.2)	60	**26.0** (19.9-33.5)	51	**21.5** (16.0-28.3)	50	**20.0** (14.9-26.4)
45 - 54	89	**29.0** (23.3-35.7)	77	**25.6** (20.2-32.0)	68	**24.0** (18.6-30.4)	70	**26.3** (20.5-33.3)	59	**23.3** (17.7-30.0)	44	**18.1** (13.1-24.3)
55 - 64	27	**10.7** (7.1-15.6)	29	**10.6** (7.1-15.2)	38	**13.0** (9.2-17.9)	43	**14.4** (10.4-19.4)	52	**17.2** (12.8-22.5)	42	**13.8** (10.0-18.7)
65 and older	10	‡	11	‡	22	**7.1** (4.5-10.8)	12	‡	12	‡	22	**5.6** (3.5-8.5)
Intent[1]												
Unintentional	151	**7.9** (6.7-9.3)	148	**7.9** (6.7-9.4)	158	**8.2** (6.9-9.6)	140	**7.3** (6.1-8.7)	149	**7.3** (6.2-8.7)	166	**8.2** (7.0-9.6)
Intentional	56	**2.8** (2.1-3.7)	62	**3.1** (2.4-4.1)	40	**1.9** (1.3-2.6)	58	**2.9** (2.2-3.8)	35	**1.7** (1.1-2.4)	46	**2.1** (1.5-2.9)
Undetermined	33	**1.7** (1.2-2.4)	41	**2.2** (1.5-3.0)	45	**2.3** (1.6-3.1)	47	**2.4** (1.7-3.2)	47	**2.4** (1.8-3.3)	13	‡

[1]Age-adjusted rates per 100,000 population

[2]Age-specific rates per 100,000 population

‡ Figure does not meet standards of reliability or precision

Table 3. Number of Drug Poisoning Deaths by Drug Type Mentioned, Montana Resident Occurrences, 2007-2018

Drug type		Year						Total Deaths 2007-2018	Change from 2007-2018
ICD-10 Code	Substance	2007-2008	2009-2010	2011-2012	2013-2014	2015-2016	2017-2018	(n)	(%)
T40.0	Opium	0	0	0	0	0	0	0	**
T40.1	Heroin	4	0	3	5	10	27	49	+575.0
T40.2	Codeine, morphine, and other opioids	46	72	54	62	34	37	305	-19.5
T40.3	Methadone	52	48	31	30	14	6	181	-88.4
T40.4	Other synthetic narcotics	23	28	27	21	17	16	132	-30.4
T40.5	Cocaine	3	3	2	1	1	2	12	**
T40.6	Other and unspecified narcotics	3	0	2	7	9	16	37	+433.3
T40.7	Cannabis (derivatives)	0	3	2	3	3	2	13	**
T40.8	Lysergide (LSD)	0	0	0	0	0	0	0	**
T40.9	Other and unspecified psychodysleptics	0	0	0	0	0	0	0	**
T42.4	Benzodiazepines	7	12	12	12	10	21	74	+200.0
T43.0	Tricyclic and tetracyclic antidepressants	7	10	10	7	4	7	45	0
T43.2	Other and unspecified antidepressants	8	17	17	17	13	20	92	+150.0
T43.6	Psychostimulants with abuse potential	5	9	6	18	50	51	139	+920.0
T50.9	No specific drug listed	83	68	90	78	93	60	472	-27.7

**Percent change suppressed for drug types where aggregate deaths from 2007-2018 were less than 20

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