

## Key Findings

- In 2019, the MTVDRS identified 302 suicides among persons 10 years of age and older in Montana.
- Suicide rates were significantly higher among men compared to women and occurred more frequently among those with only a high school education or some college credit compared to those with an associate or higher degree.
- Life stressors, such as criminal problems, physical health issues, or job problems, were present in 56% of suicides.
- Nearly 75% of all deaths had a history of suicide,

## National Suicide Prevention Hotline

1-800-273-8255

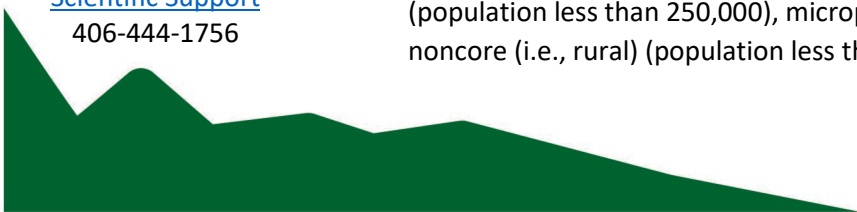
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Todd M. Koch, MPH

Lead Vital Statistics Epidemiologist

[Office of Epidemiology and Scientific Support](#)

406-444-1756



# Suicide in Montana: Initial Findings from the Montana Violent Death Reporting System, 2019

## Introduction

Suicide is a serious and persistent public health problem in Montana. The number of suicides has increased in the United States and Montana during the past two decades. Vital records data indicate that in 2019, the age-adjusted suicide death rate was 26.1 deaths per 100,000 in Montana compared to 13.9 deaths in the United States.<sup>1,2</sup> Suicide is the seventh leading cause of death in Montana with an average of 280 Montanans dying by suicide each year.<sup>2</sup>

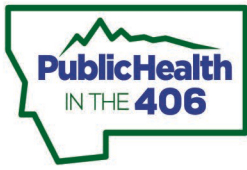
In 2018, Montana began participating in the National Violent Death Reporting System (NVDRS) through the Centers for Disease Control and Prevention.<sup>3</sup> NVDRS is a state-based surveillance system that pools data on violent deaths (i.e., homicides, suicides, legal interventions, unintentional deaths by firearm, or deaths of undetermined intent) and their circumstances from multiple sources in one anonymous database. Traditionally the analysis of suicide deaths was limited only to the information contained on the death certificate. NVDRS expands data collection to include other sources such as law enforcement reports, coroner and medical examiner findings, and toxicology results. Together these reports provide a comprehensive view of all violent deaths.

This report provides an exploratory analysis of the first year of data collection for suicides using data collected in 2019 from Montana's Violent Death Reporting System (MTVDRS).

## Methods

Data used in this report come from the Montana's Violent Death Reporting System (MTVDRS) and death certificates collected by the Montana Office of Vital Records. Only decedents aged 10 and older were analyzed because determining intent in children can be difficult.<sup>4</sup> Deaths collected by MTVDRS are by place of occurrence not state of residence, therefore only deaths occurring in Montana were included in this analysis. Ascertainment of suicide was by the manner of death reported by the MTVDRS data abstractor. Numbers and rates derived from the MTVDRS may differ from other published reports using Montana Vital Records.

Decedents' county in which the injury occurred as abstracted by the MTVDRS was classified into urban and rural designations using the 2013 National Center for Health Statistics (NCHS) Urban-Rural Classification Scheme for Counties: small metro (population less than 250,000), micropolitan (population 10,000 to 49,999), and noncore (i.e., rural) (population less than 10,000)).<sup>5</sup>



The decedents industry and occupation fields from the death certificate were coded using the NIOSH Industry and Occupation Computerized Coding System (NIOCCS).<sup>6</sup> The Census 2012 Industry classification scheme was used in this analysis. Coding was only performed on records where both the industry and occupation fields were known, and the decedent was 16 years or older (n=291). The death certificate lists the decedents lifetime career and industry in which they worked and may not necessarily reflect the decedents occupation at the time of their death.<sup>7</sup>

Data in this report are limited to single-suicides and exclude suicides that are part of a multiple suicide event or a homicide followed by suicide (“murder-suicide”) (n=1). Information on the circumstances surrounding the death were collected by the MTVDRS. Circumstances are those identified as contributing to the suicide in the law enforcement and/or coroner/medical examiners report which reflects information provided by the decedent’s friends and family at the time of death. Multiple circumstances and toxicology results can be experienced by the decedent.

Age-adjusted rates were calculated using the direct method to the 2000 US Standard Population.<sup>8</sup> Rates between year groups were compared and considered statistically different if the 95% confidence intervals did not overlap.

## Results

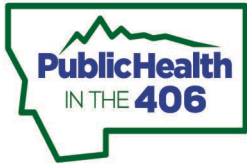
A total of 302 suicides occurred in Montana in 2019. Suicide occurred most frequently between the ages of 25 and 64 years, accounting for 62% of all suicides. While age-specific rates were highest among the 24–44 years age group, none of the age groups differed significantly. Rates among men were significantly higher than among women, 47.0 and 16.9 deaths per 100,000 population, respectively (Table 1). Suicide rates among American Indians/Alaska Natives (AI/AN) were higher than among whites, although not statistically significant. Ten percent of suicides occurred among AI/AN, despite AI/AN comprising only 7% of Montana’s population. Suicides occurred more frequently in rural counties (37%), followed by metropolitan (34%) and micropolitan (29%) counties (Table 1).

Over 41% of suicides were among decedents that were never married whereas the proportion of divorced and married decedents were similar, 27% and 22%, respectively. Suicide was highest among decedents with only a high school or equivalent degree (40%), followed by those with some college credit (23%) and those with a bachelor’s degree (14%). Sixty percent of all suicides involved the use of a firearm followed by 24% of deaths where the method of death was hanging, strangulation, or suffocation. Almost 75% of suicides occurred at a house or apartment (Table 1).

Twelve percent of all suicides involved decedents who worked in the construction industry, followed by those in retail trade (9%), healthcare and social assistance (7%), accommodation and food service (7%) (Table 2).

Toxicology was performed in 118 of 302 (40%) deaths. In 25% of these deaths, no substances were detected while 36% had one substance and 39% had two or more substances detected. Alcohol was reported most frequently at 36%, followed by antidepressants (25%) and marijuana (20%) (Table 3).

Information on the circumstances of the death was available for 284 of 302 (94%) suicides. One-third of suicides occurred among those with a diagnosed mental health condition. Of those conditions, depression was reported most often (26%). The decedent was in a (current) depressed mood at the time of injury was reported in 57% of suicides. Substance use (any) was reported in 36% of suicides. Problem alcohol and/or substance use was reported 22% and 20%, respectively. Twenty-five percent of all deaths reported a history of mental health or substance abuse treatment while 19% of decedents were currently being treated for a mental health condition. Relationship problems were reported in 33% of suicides with 23% occurring among an intimate partner. Forty-six percent of decedents experienced a life-stressor at the time of death. A physical health problem was reported most often at 26%, followed by a job/financial problem (13%), and a contributing criminal problem (12%).



Seventy-four percent of decedents had a history of suicide attempts, disclosed their intent of suicide, left a suicide note, or had a history of expressing suicide thoughts or plans (Table 4).

## Discussion

This report highlights many of the new characteristics and descriptive conditions collected by the MTVDRS as well as content previously available using death certificates. Montana shares several similar findings with US data; suicide rates are three times higher among men, occur most frequently between the ages of 25 and 64, and are higher among rural areas.<sup>9</sup> Overall, the suicide rate in Montana remains high and has increased compared to previously published reports.<sup>10</sup>

Suicides occurred more frequently among those with a high school education or had some college credit. Suicide risk has shown to decrease with increasing levels of education, highlighting the importance of addressing education and other social determinants of health in suicide prevention planning.<sup>11</sup>

Firearms accounted for 60% of all suicide deaths. Data on firearm storage and ownership was poorly ascertained with questions on whether the firearm was stored locked, stored loaded, and gun ownership unreported in 62%, 55%, and 57% of cases, respectively (data not shown). Storing firearms locked or unloaded has been shown to reduce firearm related suicides.<sup>12</sup> More complete data on firearms is needed to determine the best strategy for risk-reduction.

With few exceptions (e.g., in custody deaths), Montana coroners bear the expense of autopsies which may explain why only 1 out of 3 suicide deaths received the benefit of an autopsy (data not shown). While toxicology is free and can be ordered without an autopsy, toxicology testing was performed in fewer than half of all suicides. Despite these limitations, three-quarters of those decedents tested did have one or substances detected. Expanding toxicology testing would help to better understand the role substance use has in suicide—especially with respect to alcohol which was the most frequently reported substance.

Decedents worked most often in the construction, retail trade, and the accommodation and food service industries. These findings are similar to those published nationally and suggest that workers across many different industries are at risk of suicide.<sup>13</sup>

A diagnosed mental illness was reported in a third of decedents with depression being reported most often. Almost two-thirds of decedents were in a “depressed mood” at the time their death. Nearly 75% of all deaths had history of suicide, either by expressing suicidal thoughts or actions. This would seem to suggest an unmet need for mental health services in some and continued prevention work for those with known mental health conditions.

More than half of decedents experienced at least one life stressor with a physical health problem being reported among 1 in 4 suicides. Suicide risk has been shown to be elevated among those in poor physical health. Further study is needed to determine the factors involved with the conditions experienced by those in ill health.

This analysis is limited to a single year’s worth of data and events containing small numbers are sensitive to random fluctuations. It provides a starting point to engage in new opportunities in suicide research and prevention.

If you are in crisis and want help, call the Montana Suicide Prevention Lifeline, 24/7, at 1-800-273-8255 or text “MT” to 741 741. For additional resources, please visit Montana’s Department of Public Health and Human Services Suicide Prevention website: <https://dphhs.mt.gov/suicideprevention/index>.

**Table 1: Number and Age-adjusted Death Rates from Suicide for Select Demographic, Montana Occurrences, 2019**

Characteristics	Number (%)	Rate [95% CI]†		Number (%)		Number (%)
<b>Total</b>	302 (100)	32.0 [28.4-36.0]	<b>Marital status*</b>		<b>Method of Death</b>	
<b>Age Group</b>			Never Married	120 (41.4)	Firearm	180 (60.0)
10-24	51 (16.9)	25.3 [18.8-33.3]	Divorced	77 (26.6)	Hanging, Strangulation, or Suffocation	72 (24.0)
25-44	98 (32.5)	36.5 [29.6-44.5]	Married	63 (21.7)	Poisoning	37 (12.0)
45-64	88 (29.1)	32.8 [26.3-40.4]	Widowed	19 (6.6)	Sharp Instrument	5 (1.7)
65+	65 (21.5)	31.4 [24.3-40.1]	Married, but separated	9 (3.1)	Other and Unknown	8 (2.6)
<b>Sex</b>			<b>Educational level**</b>		<b>Type of place at which the injury occurred</b>	
Male	224 (74.2)	47.0 [40.9-53.7]	<= 8th grade	6 (2.4)	House, apartment	222 (73.5)
Female	78 (25.8)	16.9 [13.3-21.2]	9th - 12th grade	14 (5.6)	Natural area (e.g., field, river, beaches, woods)	16 (5.3)
<b>Race</b>			High school or GED grad	99 (39.4)	Hotel/motel	12 (4.0)
White Alone	266 (88.1)	30.6 [26.9-34.7]	Some college credit	57 (22.7)	Highway, freeway	9 (3.0)
AI/AN Alone	29 (9.6)	45.7 [30.4-67.2]	Associate	16 (6.4)	Park, playground, public use area	9 (3.0)
Other	7 (2.3)	‡	Bachelor	36 (14.3)	Street/road, sidewalk, alley	8 (2.6)
<b>Geography</b>			Master or Doctorate	19 (7.6)	Other and Unknown§	26 (8.6)
Rural	113 (37.4)	38.2 [31.2-46.3]				
Metropolitan	102 (33.8)	29.6 [24.1-36.1]				
Micropolitan	87 (28.8)	29.7 [23.7-36.8]				

†Rates were calculated and weighted for decedents ≥10 years of age

‡ Rates are not calculated for frequencies <20

\*Denominator 18 years or older (n=290), excludes unknown status

\*\*Denominator 25 years or older (n=251), excludes unknown level

§ Other locations include, in descending order, motor vehicle, unknown location, hospital/medical facility, jail/prison, other commercial establishment, farm, sports or athletic area, child/daycare center or pre-school, college/University, railroad tracks, bridge, abandoned house/building

**Table 2: Usual Industry of the Decedent, Montana Occurrences, 2019**

<b>Industry</b>	<b>Number (%)</b>
Total Coded Industries	291 (100)
<b>Industry Type</b>	
Construction	35 (12.0)
Retail Trade	25 (8.6)
Healthcare and Social Assistance	20 (6.9)
Accommodation and Food Service	19 (6.5)
Other Services, except public administration	19 (6.5)
Other <sup>¶</sup>	17 (5.8)
Public Administration	16 (5.5)
Agriculture, Forestry, fishing & hunting ind.	15 (5.2)
Manufacturing	15 (5.2)
Transportation and Warehousing	15 (5.2)
Education Services	12 (4.1)
Arts, Entertainment, and Recreation	11 (3.8)
Professional, Scientific, and Technical Services	8 (2.7)
Administration, Waste and Remediation Services	6 (2.1)
Finance and Insurance	5 (1.7)
Utilities	5 (1.7)
Miscellaneous*	48 (16.5)

¶ Other industries include military, information, real estate/rental and leasing, mining, and wholesale trade.

**Table 3: Toxicology Results, Montana Occurrences, 2019**

<b>Toxicology results</b>	<b>Number (%)</b>
Any toxicology performed	118 (100)
<b>Number of substances detected</b>	
0	29 (24.6)
1	43 (36.4)
2 or more	46 (39.0)
<b>Substances detected<sup>‡</sup></b>	
Alcohol	42 (35.6)
Antidepressants	29 (24.6)
Marijuana	23 (19.5)
Amphetamines	16 (13.6)
Opiate	14 (11.9)
Anticonvulsants	13 (11.0)
Benzodiazepines	12 (10.2)
Antipsychotics	6 (5.1)
Muscle relaxant	5 (4.2)
Other substance <sup>†</sup>	<5 (0.8)

†Other substances include barbiturates and cocaine.

‡ Decedents may have more than one substance present; therefore, the total may exceed 118.

**Table 4: Circumstances Preceding Death, Montana Occurrences, 2019**

<b>Total</b>	<b>Number (%)</b>
Suicide with known circumstances	284 (100)
Diagnosed mental health conditions	
<b>Any diagnosed mental health condition**†</b>	94 (33.1)
Depression	74 (26.1)
Anxiety disorder	20 (7.0)
Bipolar disorder	11 (3.9)
Post-traumatic stress disorder	7 (2.5)
Schizophrenia	6 (2.1)
Other disorder	11 (3.9)
Current depressed mood <sup>§§</sup>	162 (57.0)
<b>Problem substance use</b>	
Any substance use <sup>†</sup>	103 (36.3)
Alcohol	63 (22.2)
Substance abuse	56 (19.7)
Other addictions	12 (4.2)
<b>Treatment</b>	
Current mental health treatment	54 (19.1)
History of mental health or substance abuse treatment	71 (25.1)
<b>Relationship problems</b>	
Any relationship problem <sup>†</sup>	92 (32.5)
Intimate partner problem	65 (23.0)
Family relationship	27 (9.5)
Relationship problem other	6 (2.1)
<b>Life stressors**</b>	
Any life stressors <sup>†</sup>	130 (45.9)
Contributing criminal problem	33 (11.7)
Civil legal problem	6 (2.1)
Physical health problem	75 (26.5)
Job/Financial problem <sup>¶¶</sup>	35 (16.7)
Eviction or loss of home	13 (4.6)
Recent suicide of friend or family member	8 (2.8)
Death friend or family other	16 (5.7)
<b>Suicide event history</b>	
Any suicide event history <sup>†</sup>	209 (73.9)
History of suicide attempts	58 (20.5)
Disclosed intent of suicide	122 (43.1)
Left a suicide note	113 (39.5)
History of expressing suicide thoughts or plans	124 (43.8)

\*Decedent had been identified as having a current diagnosis of a mental health condition in coroner/medical examiner or law enforcement reports.

†Subtotals include any mention of their respective circumstances listed. Decedents can experience more than one circumstance; therefore, their sum may exceed the reported subtotal.

\*\*Life stressors also included in 2019, school problem (10-18 year of age) and disaster exposure.

§§ Not a diagnosis

¶¶ Denominator is decedents aged ≥18 years.

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<sup>1</sup> Centers for Disease Control and Prevention, National Center for Health Statistics. Underlying Cause of Death 1999-2019 on CDC WONDER Online Database, released in 2020. Data are from the Multiple Cause of Death Files, 1999-2019, as

compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Accessed

at <http://wonder.cdc.gov/ucd-icd10.html> on Mar 10, 2021

<sup>2</sup> Montana Department of Public Health and Human Services. 2019 Montana Vital Statistics Annual Report.

Available at: <http://dphhs.mt.gov/publichealth/Epidemiology/OESS-VS>

<sup>3</sup> Centers for Disease Control and Prevention. (2021, March 31). *National Violent Death Reporting System (NVDRS)*.

<https://www.cdc.gov/violenceprevention/datasources/nvdrs/index.html>

<sup>4</sup> Crepeau-Hobson F. 2010. The psychological autopsy and determination of child suicides: A survey of medical examiners. *Arch Suicide Res.* 14: 24-34.

<sup>5</sup> Ingram D, Franco S. 2014. 2013 NCHS Urban – Rural Classification Scheme for Counties. *Natl. Cent. Heal. Stat.* 2.

<sup>6</sup> NIOSH (2021). NIOSH Industry and Occupation Computerized Coding System (NIOCCS). U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, Division of Field Studies & Engineering, Health Informatics Branch. <https://csams.cdc.gov/nioccs/> Date accessed. Mar 16, 2021.

<sup>7</sup> NIOSH. (2021). Guidelines for reporting occupation and industry on death certificates. By Robinson C, Schumacher P, Sweeney HM, Steege A, Free H, Lainez J. Cincinnati, OH: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 2012-149 (revised 01/2021).

<sup>8</sup> Klein RJ, Schoenborn CA. 2001. Age Adjustment Using the 2000 Projected U.S. Population. *U.S. Dep. Heal. Hum. Serv. Natl. Cent. Heal. Stat.*

<sup>9</sup> Hedegaard H, Curtin SC, Warner M. Increase in suicide mortality in the United States, 1999–2018. *NCHS Data Brief*, no 362. Hyattsville, MD: National Center for Health Statistics. 2020.

<sup>10</sup> Koch T. 2015 Suicide in Montana: Evidence from Death Certificates 2004-2013. Montana Department of Health and Human Services.

<sup>11</sup> Phillips J, Hemstead K. 2017. Differences in US suicide rates by educational attainment, 2000-2014. *American Journal of Preventive Medicine.* 53(4).

<sup>12</sup> Shenassa E, Rogers M, Spalding K, Roberts M. 2004. Safer storage of firearms at home and risk of suicide: a study of protective factors in a nationally representative sample. *J Epidemiol Community Health.* 58:841-848.

<sup>13</sup> Peterson C, et al. 2020. Suicide rates by industry and occupation—National Violent Death Reporting System, 32 States, 2016. *MMWR* 69(3): 57-62.