



## Key Findings

- Mortality rates from alcohol-induced deaths significantly increased by 75% from 2000-2004 to 2015-2019.
- The mortality rate among women significantly increased by 92% while rates among men increased 65% from 2000-2004 to 2015-2019.
- Mortality rates among American Indians/Alaska Natives were six times greater than whites in all time periods but the percent increase from 2000-2004 compared to 2015-2019 was nearly the same.
- Alcohol-induced mortality rates were highest among residents of rural counties.

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## Alcohol-induced Deaths Among Montanan's Aged 25 years and Over, 2000–2019

### Introduction

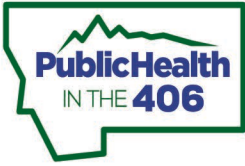
Deaths due to alcohol consumption are the third actual cause of preventable deaths in the United States behind tobacco and a poor diet and physical activity.<sup>1</sup> Alcohol-induced deaths, or deaths from dependent or nondependent use of alcohol, as well as accidental poisoning by alcohol, have been increasing nationally for the past two decades.<sup>2</sup> Alcohol mortality and morbidity is responsible for a large number of acute conditions, like motor vehicle crashes and falls, and chronic diseases such as cancer and heart disease.<sup>3</sup> While some evidence exists for the beneficial aspects of moderate alcohol consumption, a substantial body of research now indicates the opposite.<sup>4,5</sup> This report examines the alcohol-induced deaths among Montanan's aged 25 years and over by age group, sex, race, and urbanization level of county of residence from 2000 to 2019.

### Methods

Data used in this report come from the Montana death certificates collected by the Montana Office of Vital Records for deaths occurring from 2000 through 2019 and were limited to Montana residents. An alcohol induced death was defined using the *International Classification of Diseases-10th revision* with the following underlying cause of death codes: E24.4, Alcohol-induced pseudo-Cushing syndrome; F10, Mental and behavioral disorders due to alcohol use; G31.2, Degeneration of nervous system due to alcohol; G62.1, Alcoholic polyneuropathy; G72.1, Alcoholic myopathy; I42.6, Alcoholic cardiomyopathy; K29.2, Alcoholic gastritis; K70, Alcoholic liver disease; K85.2, Alcohol-induced acute pancreatitis; K86.0, Alcohol-induced chronic pancreatitis; R78.0, Finding of alcohol in blood; X45, Accidental poisoning by and exposure to alcohol; X65, Intentional self-poisoning by and exposure to alcohol; and Y15, Poisoning by and exposure to alcohol, undetermined intent. A total of 3,035 deaths between 2000 and 2019 were included in this analysis.

Decedents' county of residence 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>6</sup>

Age-adjusted rates were calculated using the direct method to the 2000 US Standard Population.<sup>7</sup> Rates between year groups were compared and considered statistically different if the 95% confidence intervals did not overlap.



## Results

The age-adjusted alcohol-induced death rate significantly increased 75% from the first five-year period (2000–2004) compared the most recent 5-year interval (2015–2019)—15.4 deaths per 100,000 population to 26.9 deaths, respectively (Figure). A significant increase was observed from 2000–2004 to 2015–2019 for nearly all demographic groups examined.

From 2000–2019, alcohol-induced death rates increased for both men and women, with the rate among men being at least twice that of women over the entire study period. However, the difference between their rates narrowed over the study period. Death rates among women increased 92% while rates among men increased 65% from 2000–2004 to 2015–2019 (Table).

Alcohol-induced death rates among American Indian or Alaska Natives (AI/AN) were approximately six times that among white persons over the 20-year period. Death rates among AI/AN increased 73% while rates among whites increased 67% from 2000–2004 to 2015–2019 (Table).

Alcohol induced death rates were highest among middle aged adults (45–54 and 55–64 years age groups) and were the lowest among the youngest and oldest age groups (25–34 years and 75 years and older, respectively). However, residents aged 25–34 and 45–54 years had the greatest increase in alcohol induced death rates over the study period (2000–2004 to 2015–2019), increasing 114% and 102%, respectively (Table).

Rates among residents of rural counties were highest, followed by small metropolitan and micropolitan residents in each of the four 5-year time periods. Rates increased significantly for each geographical area over the study period, with residents of rural counties having the largest percent increase of 92% (Table).

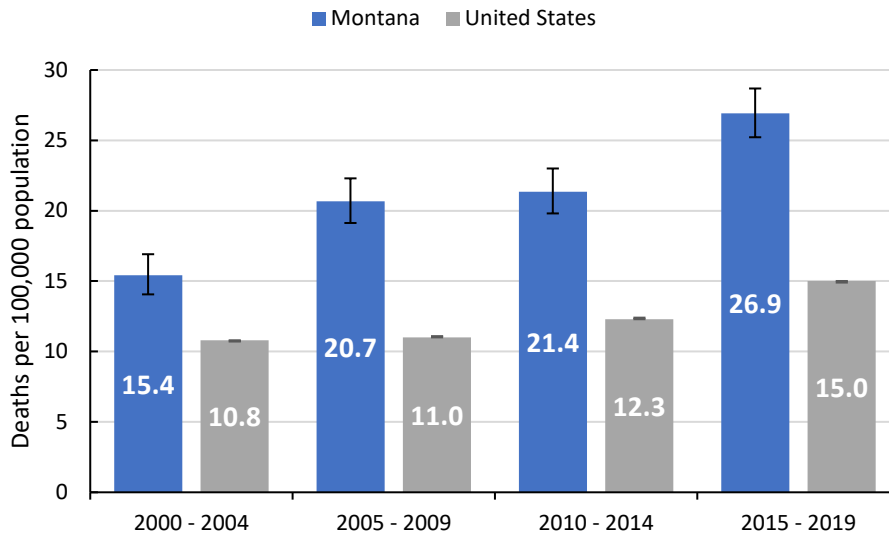
## Discussion

Deaths from excessive alcohol use is a substantial public health burden in Montana. The age-adjusted alcohol-induced death rate significantly increased by 75% from 2000–2004 to 2015–2019; nearly twice as high as the 39% increase observed in the United States during the same period. Over the last two decades (2000–2019), rates significantly increased among all categories of sex, age group, race, and geography except for deaths among Montanans 75 years and older. Alcohol-induced deaths were higher among men, middle aged adults (45–64 years), AI/AN, and residents of rural counties compared to their counterparts. Similar increases have been reported nationally over the past two decades.<sup>2,8,9</sup>

Increased consumption of alcohol in the United States during the past two decades may explain some of the increases in alcohol-induced deaths.<sup>10</sup> Deaths from excessive alcohol use are preventable and evidence-based practices and recommendations exist for both policy makers and public health officials.<sup>11</sup> Specifically, the CDC's Community Preventive Services Task Force suggests regulating alcohol retail density, increasing alcohol taxes, maintaining limits on hours and days of sale, and enhanced enforcement of laws prohibiting sales to minors.<sup>12</sup> Implementation of these and other practices may reduce alcohol-induced deaths among all Montanans.



**Figure: Age-adjusted Alcohol Induced Death Rates among Montana and United States Residents Aged 25 years and Over, 2000-2019**

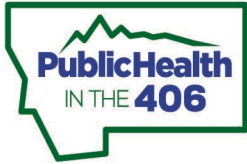


**Table: Number and Age-adjusted Alcohol Induced Death Rates among Montana Residents Aged 25 years and Over, 2000-2019**

	2000-2004	2005-2009	2010-2014	2015-2019
	Num (Rate [95% CI])	Num (Rate [95% CI])	Num (Rate [95% CI])	Num (Rate [95% CI])
<b>Total Deaths<sup>1</sup></b>	488 (15.4 [14.1 - 16.9])	712 (20.7 [19.1 - 22.3])	792 (21.4 [19.8 - 23.0])	1,043 (26.9 [25.2 - 28.7])
<b>Sex<sup>1</sup></b>				
Male	335 (21.4 [19.1 - 23.9])	481 (27.9 [25.4 - 30.6])	558 (29.7 [27.1 - 32.4])	710 (35.3 [32.7 - 38.2])
Female	153 (9.8 [8.3 - 11.5])	231 (13.8 [12.0 - 15.7])	234 (13.2 [11.5 - 15.1])	333 (18.8 [16.7 - 21.1])
<b>Race<sup>1</sup></b>				
White	375 (12.3 [11.1 - 13.7])	533 (15.9 [14.5 - 17.3])	588 (16.2 [14.9 - 17.7])	784 (20.6 [19.1 - 22.2])
AI/AN	110 (72.8 [59.5 - 89.8])	175 (105.7 [90.0 - 124.5])	202 (109.6 [94.5 - 127.1])	252 (125.8 [110.4 - 143.3])
<b>Age in years<sup>2</sup></b>				
25-34	22 (4.3 [2.7 - 6.5])	27 (4.8 [3.2 - 7.0])	34 (5.4 [3.7 - 7.5])	62 (9.2 [7.0 - 11.8])
35-44	87 (13.0 [10.4 - 16.1])	124 (20.9 [17.4 - 24.9])	94 (16.5 [13.4 - 20.2])	141 (22.9 [19.2 - 27.0])
45-54	141 (19.7 [16.6 - 23.2])	228 (29.9 [26.1 - 34.0])	259 (37.1 [32.7 - 41.9])	244 (39.7 [34.9 - 45.0])
55-64	136 (28.9 [24.2 - 34.1])	203 (33.0 [28.6 - 37.9])	258 (35.3 [31.1 - 39.9])	354 (46.8 [42.0 - 51.9])
65-74	65 (20.3 [15.7 - 25.9])	80 (22.1 [17.5 - 27.5])	101 (22.6 [18.4 - 27.4])	189 (33.0 [28.5 - 38.1])
≥75	37 (12.3 [8.7 - 17.0])	50 (15.6 [11.6 - 20.5])	46 (13.5 [9.9 - 18.0])	53 (13.9 [10.4 - 18.1])
<b>County of Residence (Urban-Rural Classification)<sup>1</sup></b>				
Rural (Noncore)	223 (18.0 [15.7 - 20.7])	334 (27.5 [24.5 - 30.8])	400 (30.2 [27.1 - 33.6])	441 (34.5 [31.1 - 38.3])
Micropolitan	100 (11.8 [9.6 - 14.4])	154 (15.3 [12.9 - 18.0])	162 (14.7 [12.4 - 17.3])	223 (18.9 [16.4 - 21.7])
Small Metro	165 (15.4 [13.1 - 17.9])	213 (18.0 [15.7 - 20.7])	227 (17.9 [15.6 - 20.5])	379 (27.4 [24.6 - 30.5])

<sup>1</sup>Age-adjusted rate per 100,000 population

<sup>2</sup>Age-specific rate per 100,000 population



- <sup>1</sup> Mokdad AH, Marks JS, Stroup DF, Gerberding JL. 2004. Actual Causes of Death in the United States, 2000. *JAMA* 291:1238–1245.
- <sup>2</sup> Spence, MR, Curtin, SC, Hedegaard, H. 2020. Rates of Alcohol-induced Deaths Among Adults Aged 25 and Over in Urban and Rural Areas: United States, 2000-2018. *NCHS Data Brief*. 383.
- <sup>3</sup> Rehm J, Gmel G, Sempos CT, Trevisan M. 2003. Alcohol-related morbidity and mortality. *Alcohol Res. Health* 27:39–51.
- <sup>4</sup> Stockwell T, Zhao J, Panwar S, Roemer A, Naimi T, Chikritzhs T. 2015. Do “Moderate” Drinkers Have Reduced Mortality Risk ? A Systematic Review and Meta-Analysis of Alcohol Consumption and All-Cause Mortality. *J. Stud. Alcohol Drugs* 77:185–198.
- <sup>5</sup> Wood AM, Kaptoge S, Butterworth AS, Willeit P, Warnakula S, Bolton T, Paige E, Paul DS, Sweeting M, Burgess S, et al. 2018. Risk thresholds for alcohol consumption: combined analysis of individual-participant data for 599 912 current drinkers in 83 prospective studies. *Lancet* 391:1513–1523.
- <sup>6</sup> Ingram D, Franco S. 2014. 2013 NCHS Urban – Rural Classification Scheme for Counties. *Natl. Cent. Heal. Stat.* 2.
- <sup>7</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>8</sup> Spillane S, et al. 2020. Trends in Alcohol-induced Deaths in the United States, 2000-2016. *JAMA Network Open* 3(2):e1921451.
- <sup>9</sup> White, AM, Castle, IJP, Hingson, RW, Powell, PA. 2020. Using Death Certificates to Explore Changes in Alcohol-Related Mortality in the United States, 1999 to 2017. *Alcohol Clin Exp Res* 44: 178-187.
- <sup>10</sup> Dawson DA, Goldstein RB, Saha TD, Grant BF. 2015. Changes in alcohol consumption: United States, 2001-2002 to 2012-2013. *Drug Alcohol Depend.* 148:56-61.
- <sup>11</sup> Grossman ER, Kerr WC, Toomey TL. 2020. The Role of Law and Policy in Achieving Healthy People 2020 Goals of Reducing Deaths Attributable to Alcohol in the United States. HHS, Office of Disease Prevention and Health  
Available from: <https://www.healthypeople.gov/2020/law-andhealth-policy/topic/substance-abuse>.
- <sup>12</sup> CDC. The Community Preventive Services Task Force Recommendations. Accessed April 21, 2021.  
<https://www.cdc.gov/alcohol/fact-sheets/prevention.htm>

