



## Key Findings

- The premature death rate was significantly higher in rural counties and significantly lower in micropolitan counties when compared to the state, overall.
- The five leading causes of premature death among Montana residents from 2011-2023 were:
  - Cancer
  - Heart Disease
  - Accidents
  - Chronic Lower Respiratory Diseases
  - Suicide.
- During 2021, there was a large increase of premature deaths across all Montana counties.

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# Leading Causes of Premature Death by Rural/Urban Classification of Counties in Montana, 2011-2023

## Introduction

For the past decade, the five leading causes of premature death (deaths prior to the age of 80) in the United States were accidents (i.e., unintentional injuries), heart disease, stroke, chronic lower respiratory disease, and cancer.<sup>1</sup> There has been an increase in the gap of all-cause mortality between nonmetropolitan and metropolitan areas of the United States.<sup>1</sup> Urbanization of areas has been associated with better access to health care and health education which can result in better quality of life.<sup>2</sup> In 2019, the rates for the ten leading causes of death were higher in rural areas than in urban areas in the United States.<sup>3</sup> In the state of Montana, it was found that the age-adjusted all-cause mortality rate among rural county residents was significantly higher than the rate for residents of the state as a whole.<sup>4</sup> This report describes the five leading causes of premature death among residents of metropolitan, micropolitan, and rural counties in Montana from 2011-2023 and compares them to state and nationwide leading causes of premature death.

## Methods

This report used data from Montana resident death certificates that were collected by the Montana Office of Vital Records. Deaths were analyzed and tabulated by the underlying causes of death using the International Classification of Diseases 10<sup>th</sup> Revision (ICD-10).<sup>5</sup> The leading causes of death were classified according to the National Center for Health Statistics Instruction Manual Part 9.<sup>6</sup>

The leading causes of death for Montana residents were tabulated and sorted separately by residence in metropolitan, micropolitan, and rural counties according to the 2013 NCHS Urban-Rural classification scheme. The counties that were classified as metropolitan consisted of Carbon, Cascade, Golden Valle, Missoula, and Yellowstone Counties. The micropolitan county classification consisted of Flathead, Gallatin, Jefferson, Lewis and Clark, and Silver Bow Counties. All other counties were classified as rural.

The age-adjusted death rates and 95% confidence intervals were calculated via the direct method using the 2000 U.S. standard population.<sup>7</sup> A rate would be considered significantly different than the statewide rate if its confidence interval did not include the statewide rate. Table 1 displays the leading causes of premature death in the state of Montana from 2011-2023, as well as the leading causes of premature death in metropolitan, micropolitan, and rural counties from 2011-2023. The table also includes the age adjusted mortality rate and the number of premature deaths that occurred from 2011-2023. Figure 1 displays the premature death trend of Montana residents by county classification from 2011-2023.





## Results

From 2011-2023, there were 74,959 premature deaths (<80 years) among Montana residents. The five leading causes of premature death for Montana residents ranked in order were cancer, heart disease, accidents, chronic lower respiratory disease, and suicide (Table 1). These leading causes of premature death were ranked in the same order across metropolitan, micropolitan, and rural counties.

The age-adjusted mortality rates for the five leading causes of premature death were significantly lower among residents of micropolitan counties compared to the state rate as a whole (Table 1). For residents of rural counties, the age-adjusted mortality rate was significantly higher than the state rate for cancer, heart disease, accidents, and suicides. The age-adjusted mortality rate of cancer, heart disease, and suicide among residents of metropolitan counties were statistically equal to the state rate. However, the age-adjusted mortality rate for accidents among metropolitan county residents was significantly lower than the state rate, whereas the rate for chronic lower respiratory disease was significantly higher than the state rate.

Rural counties had the highest number of premature deaths from the five leading causes of death, while micropolitan counties had the lowest number of premature deaths from 2011-2023. Premature death steadily increased from 2011-2019 for all county types (Figure 1). However, there was a large spike in premature deaths in 2021 for all county types, with rural counties experiencing the highest increase in premature deaths. COVID-19 deaths played a large role in the spike of premature deaths in 2021.

## Discussion

From 2010-2022, the occurrence of premature death in the United States had increased for accidents and stroke, decreased for cancer and chronic lower respiratory disease, and remained steady for heart disease.<sup>1</sup> In Montana, the occurrence of premature deaths increased for heart disease and accidents, but remained stable for cancer, chronic lower respiratory disease, and suicide (2011-2023). The leading cause of premature death in the United States from 2010-2022 was accidents.<sup>1</sup> In Montana, the leading cause of premature death from 2011-2023 was cancer. Additionally, the ranking of premature deaths in the United States changed from 2019-2022, while the ranking of premature deaths in Montana did not change from 2011-2023.

In the United States, metropolitan counties experienced the highest number of premature deaths from the five leading causes of death from 2010-2022.<sup>1</sup> In the state of Montana rural counties experienced the highest number of premature deaths from the five leading causes of death from 2011-2023. However, in both Montana and the United States, rural counties had the highest rates of premature deaths. The leading cause of premature death in U.S. rural counties was accidents, whereas the leading cause of premature death in Montana rural counties was cancer.<sup>1</sup> This indicates that there is a difference in the health outcomes of Montana residents in rural counties compared to United States residents in rural counties.

Rural residents in Montana had significantly higher age-adjusted mortality rates than residents of metropolitan and micropolitan counties for four out of the five leading causes of premature death from 2011-2023. Future research that examines the health disparities between different Montana county types can be utilized to inform interventions that aim to improve the health outcomes of Montana residents living in rural counties to prevent premature death.





**Table 1:** Age-Adjusted Mortality Rate Among Montana Residents by Metropolitan, Micropolitan, and Rural Counties and Underlying Cause of Premature Death (Aged <80 years), 2011-2023.

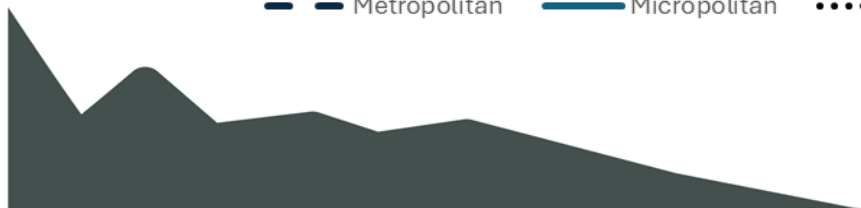
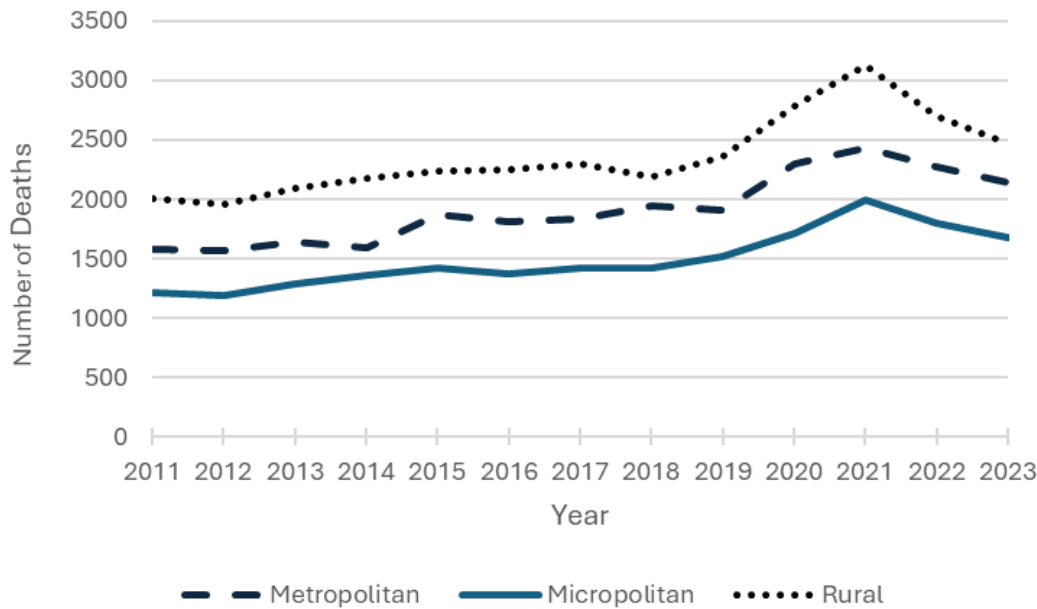
Underlying Cause of Death	Montana		County of Residence Urban/Rural Classification								
			Metropolitan			Micropolitan			Rural		
	N <sup>^</sup>	Rate†	N <sup>^</sup>	Rate†	*	N <sup>^</sup>	Rate†	*	N <sup>^</sup>	Rate†	*
Cancer	18675	98.6 (97.1-100.1)	6045	98.6 (96.0-101.1)	=	5112	93.1 (90.5-95.8)	-	7508	102.9 (100.5-105.4)	+
Heart Disease	13915	74.9 (73.6-76.2)	4455	73.6 (71.4-75.8)	=	3743	69.8 (67.5-72.1)	-	5707	80.5 (78.3-82.7)	+
Accidents	6308	44.4 (43.3-45.6)	1964	39.4 (37.6-41.2)	-	1564	35.4 (33.6-37.3)	-	2767	59.2 (56.8-61.6)	+
Chronic Lower Respiratory Disease	4799	25.0 (24.3-25.7)	1749	28.3 (27.0-29.7)	+	1249	22.9 (21.6-24.2)	-	1801	23.8 (22.7-25.0)	=
Suicide	3396	24.5 (23.7-25.4)	1140	23.2 (21.8-24.6)	=	972	22.5 (21.1-24.1)	-	1278	28.1 (26.4-29.7)	+

<sup>^</sup>Number of premature deaths

†Age-adjusted rate displayed as deaths per 100,000 person-years

\*Comparison to Statewide Rate: + significantly higher, - significantly lower, = statistically equal

**Figure 1:** Montana Resident Premature Deaths by County Type, 2011-2023





## References

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- <sup>2</sup>Neiderud CJ. How Urbanization Affects the Epidemiology of Emerging Infectious Diseases. *Infection Ecology & Epidemiology* 2015; 5(1): 1-9.
- <sup>3</sup>Curtin SC, Spencer MR. Trends in death rates in urban and rural areas: United States, 1999–2019. NCHS data brief no. 417, September 2021. Hyattsville, MD: US Department of Health and Human Services, CDC, National Center for Health Statistics; September 2021.
- <sup>4</sup>Ringel, M. Leading Causes of Death among Montana Residents in 2020 by Urban/Rural County Classification. Montana Department of Public Health and Human Services. January 2023.
- <sup>5</sup>World Health Organization. *International Statistical Classification of Diseases and Related Health Problems-10th Revision 5th ed.* Geneva, (CH): WHO Press; 2016.
- <sup>6</sup>National Center for Health Statistics. List of 113 Selected Causes of Death, Enterocolitis due to *Clostridium difficile*, and COVID-19. In: NCHS Instruction Manual Part 9. 2020.
- <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. Statistics.

