



# Demographic Factors that Define the Population of Deaths that Occurred in the State of Minnesota from 2013-2018

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## Abstract

Death can be an uncomfortable thing to talk about and explore due to its somber mood. However, national data analysis has been done to conclude different trends within multiple transition choices after death. This individual research project looks at various demographics within the state of Minnesota from 2013 to 2018 and analyzes the correlations between them along with distributions within the population. A few findings of this project are that people who never married had the lowest ages of death of all the marital statuses and people who didn't attain a high school diploma died at an older age compared to people with higher levels of education. Alongside this, as the median income of the county of residence increased, the age of death decreased. People in the rural south were seen to live longer while residents of suburban central Minnesota died younger. With a further understanding of how specific demographics could impact where and when a person dies, scientists can analyze why these connections occur.

## Background

The Minnesota Department of Health (MDH) collects demographic data on decedents from Funeral Directors; our research team from the University Of Minnesota Retirees (UMRA) Grant entitled "Death and Transition in the State of Minnesota" (Dr. Ravdin as P.I.) in collaboration with MDH Nosologists transferred information to our team on all of the deaths in the State from 2013-2018 encompassing 244,867 deaths; the demographics collected for analysis included age at death, ethnicity, gender, prior level of education, industry worked, marital status at death and county income data. Our goal was to analyze all of the demographics in this large population over 6 years and summarize them in a manner that could be used by our research team to determine the correlation of population demographics with transition choices. Analysis of the demographics was performed in collaboration with the Biostatistics Design and Analysis Center (BDAC). This is a project that is entering a new realm of biostatistical analysis in terms of looking at demographics and analyzing correlations between them in a specific population.

## Methods

The Minnesota Department of Health data contained information on 244,867 individuals who died in that 6 year period.<sup>4</sup> All individuals were of 18 years or older. A first pass was done with the help of Michael Shyne from BDAC which helped identify key demographics to focus on. To encompass the large area of the state, counties were grouped together in terms of their location within the state. These county types were rural central, rural north, rural south, suburban central, suburban north, suburban south, urban central, and urban south. Other grouping measures were taken with the demographic categories of marital status and education to compact similar data. Income analysis was done using household income data from the 2017 US Census Bureau. Income levels were defined so that 1/3 of the population would be in each level. Low income counties had median incomes ranging from \$52,019-\$72,983. Medium income counties had incomes between \$73,031-\$90,880 and high income counties had incomes between \$95,062-\$109,974. The demographic data was then broken down in different ways and tied together with other URS' students projects.

## Acknowledgments

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## References

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## Results

	Total Deaths	Male Deaths	Female Deaths	Caucasian Deaths	African American Deaths
2013	38960	19135	19824	36081	1035
2014	39433	19312	20121	36356	1041
2015	40619	19804	20815	37839	1164
2016	41032	20401	20631	38255	1218
2017	42200	21008	21192	39189	1298
2018	42622	21217	21405	39522	1418
<b>Total</b>	<b>244866</b>	<b>120877</b>	<b>123988</b>	<b>227242</b>	<b>7174</b>

Table 1. Distribution of Deaths within Population that is 18+ by Year, Gender and Ethnicity

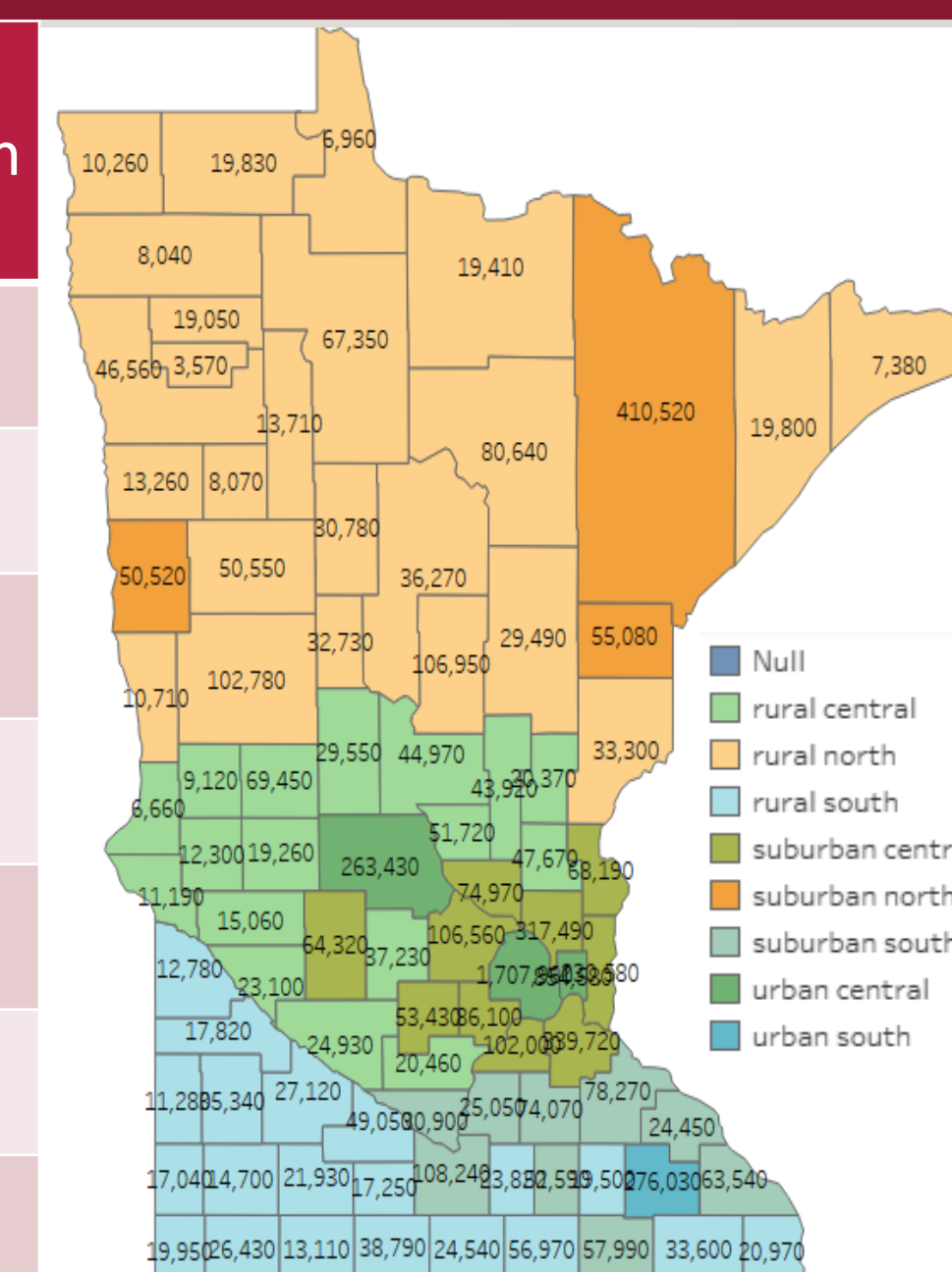


Figure 1. Minnesota County Map With Geographic Regions and Death Numbers. Made by Anna Gaichas.

## Results

	Mean Age At Death (Male/Female)			Mean Age At Death (Male/Female)	
Rural Central	74.9	81.2	Low Income County	74.8	81.1
Rural North	74.0	80.3		Medium Income County	73.1
Rural South	76.7	82.9	High Income County		73.0
Suburban Central	72.5	78.6	African Americans	59.6	65.7
Suburban North	73.0	80.1		Native Americans	58.3
Suburban South	75.2	81.7	Hispanics	58.3	67.2
Urban Central	73.0	79.5	Caucasians	74.7	80.9
Urban South	74.1	81.1			

Table 4. Average Age of Death by Gender in Different Regions of the State

Table 5. Average Age of Death by Gender within Various Income Levels and Ethnicities

## Summary

The overall number of deaths in Minnesota increased yearly. As shown in Table 2, the majority of males died married while the majority of females died as widows. Widowed males are living the longest which contrasts with the national trend.<sup>2</sup> People who never married had sharply lower ages of death compared to other marital statuses. This group also had the most people who died in a high income county while the widowed population prevalently died in low income counties. Turning to education, there were more males attaining advanced degrees compared to females by about 2% on average. As the education level of the population increased, the more likely they were to die in an urban county. Age of death decreased inversely to median county income level and the age of death for females decreased as education level increased. Both of these trends are opposite of national trends.<sup>1,3</sup> Age of death also decreased for people who didn't have a diploma or had an advanced degree as the income of the county of residence increased. The rural south and the suburban central had the highest and smallest average ages of death respectfully.

## Conclusion

As a whole, different demographics are seen to correlate with each other and most correlations are gender specific. Marital status is seen to impact the age of death and the county of residence. Education level impacts the region of the state where a person dies along with the age of death for females. There is a great disparity in the number of males and females attaining higher level degrees like MD or PhD. Different regions of the state show varying ages of death for each gender and county income levels are seen to inversely vary with ages of death. The findings in this project are unique as there has not been any research done on Minnesota regarding the link between demographics and death. Along with this, there are several trends seen in this project that are opposite of related national trends. Looking forward, analysis should be done to see why this is the case. Furthermore, demographics could be analyzed in every state to see how they connect with one and another at death. Comparisons to data presented in this poster for Minnesota can provide further understanding as to whether trends vary between states and also as to whether trends translate to a national and international scale.

	Never Married (Male/Female)		Married (Male/Female)		Divorced (Male/Female)		Widowed (Male/Female)	
2013 (% Makeup within Year Total)	6.7%	4.1%	25.1%	12.7%	7.3%	6.2%	10.0%	28.0%
2014	6.4%	4.2%	25.1%	12.3%	7.4%	6.5%	10.1%	28.0%
2015	7.0%	4.2%	24.7%	12.4%	7.2%	6.7%	9.9%	28.0%
2016	7.3%	4.3%	24.9%	12.2%	7.8%	6.7%	9.8%	27.1%
2017	7.6%	4.5%	24.5%	12.1%	7.9%	6.9%	9.8%	26.7%
2018	7.5%	4.5%	24.5%	12.3%	8.1%	7.3%	9.7%	26.1%
Total	17296 (7.1%)	10560 (4.3%)	60615 (24.8%)	30139 (12.3%)	18600 (7.6%)	16452 (6.7%)	24113 (9.9%)	66725 (27.3%)
Mean Age At Death	56.2	65.0	75.5	72.4	67.4	72.3	86.2	87.8
County Income Category with Highest Percentage	High	High	Medium	Medium	Medium	High	Low	Low

Table 2. Marital Status Distribution by Year and Gender with corresponding Average Age at Death and Income Level. Data from 2017 US Census Bureau using Household Income. Levels were defined so a third of population would be included in each. Low Income Level: \$52019-72983 with \$66429 mean. Medium Income Level: \$73031-90880 with \$81920 mean. High Income Level: \$95062-109974 with \$97630 mean. Percentage total for each row equals 100.

	No High School Diploma (Male/Female)		Diploma & Some College (Male/Female)		Associates/ Bachelors Degree (Male/Female)		Advanced Degree (Male/Female)	
2013 (% Makeup within Year Total)	10.2%	10.4%	25.2%	28.5%	10.3%	10.3%	3.4%	1.6%
2014	9.7%	9.8%	25.1%	29.3%	10.5%	10.2%	3.6%	1.8%
2015	9.5%	9.4%	25.1%	29.6%	10.6%	10.5%	3.5%	1.8%
2016	8.8%	8.6%	26.3%	29.1%	11.0%	10.8%	3.6%	1.8%
2017	8.4%	8.3%	26.2%	29.0%	11.4%	11.0%	3.7%	1.9%
2018	8.1%	7.8%	26.5%	29.3%	11.2%	11.1%	3.9%	2.1%
Total	22147 (9.1%)	21987 (9.0%)	62750 (25.8%)	70944 (29.1%)	26459 (10.9%)	26005 (10.7%)	8816 (3.6%)	4499 (1.9%)
Region of Death with Highest Percentage	Rural	Rural	Suburban	Suburban	Urban	Urban	Urban	Urban
Mean Age At Death	78.5	84.4	71.7	79.9	72.6	77.5	78.4	76.4
Low Income County	80.3	85.8	72.8	80.3	71.7	78.0	78.9	78.7
Medium Income County	78.2	84.0	71.0	79.3	72.0	77.5	78.5	76.7
High Income County	74.8	82.0	71.2	80.0	73.6	77.2	78.1	75.2

Table 3. Education Distribution by Year and Gender with corresponding Average Age at Death and General Region of Death. Percentage total across each row equals 100. County type classifications were grouped.