

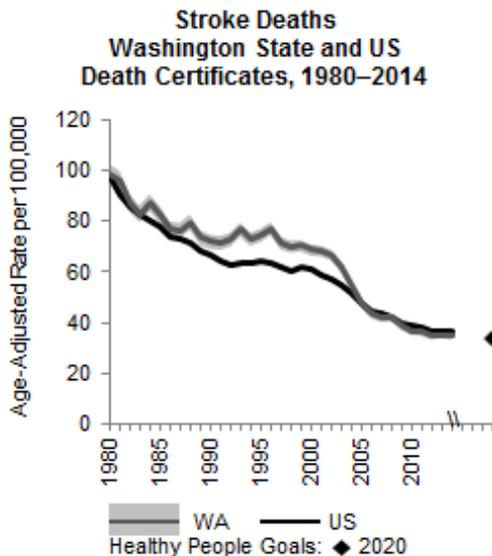
# Stroke

**Definition:** Sudden loss of muscle function, vision, sensation, or speech caused by problems in blood vessels going to or in or around the brain. Ischemic stroke, about 80% of all strokes, is caused by a severe reduction in blood supply to part of the brain. Blood flow becomes obstructed from a blocked artery due to atherosclerosis or by bits of debris (emboli) transported through the bloodstream, usually from the heart. Hemorrhagic stroke occurs when blood vessels break, causing bleeding into or around the brain. ICD-9 codes 430-434, 436-438. ICD-10 codes I60-I69.

This is a data update of the *Health of Washington State* chapter on [Stroke](#) published in 2014.

## Time Trends

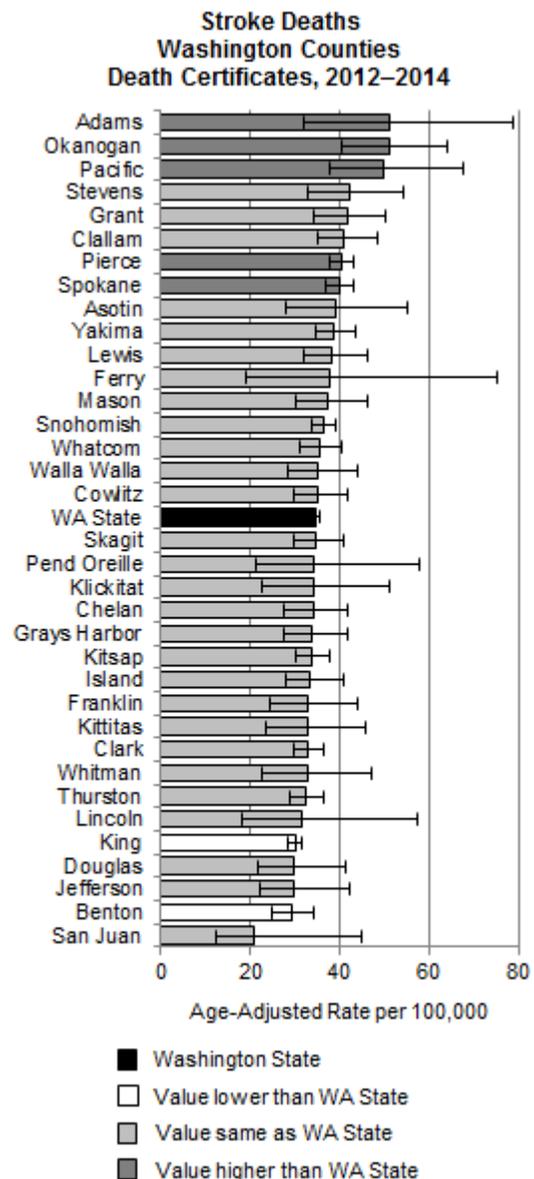
Stroke death rates have steadily declined in both Washington and the United States. Between 1980 and 2014, the [age-adjusted](#) death rate declined from 99 to 35 deaths per 100,000 people in Washington and from 62 to 36 deaths per 100,000 people in the United States. Prior to 2005, the age-adjusted rate of death was higher in Washington than the United States. Since 2005, after changes in coding of stroke on [death certificates](#) were implemented, the rates have been similar. (See [Technical Notes](#).) Washington is close to meeting the *Healthy People 2020* goal of 33.8 deaths per 100,000 people, and will likely meet the goal.



Better stroke prevention through control of high blood pressure and high cholesterol, use of blood thinners to reduce risk of clot formation in patients with atrial fibrillation, reductions in

smoking, and improved acute treatment have contributed to the national decline in stroke deaths.<sup>1</sup>

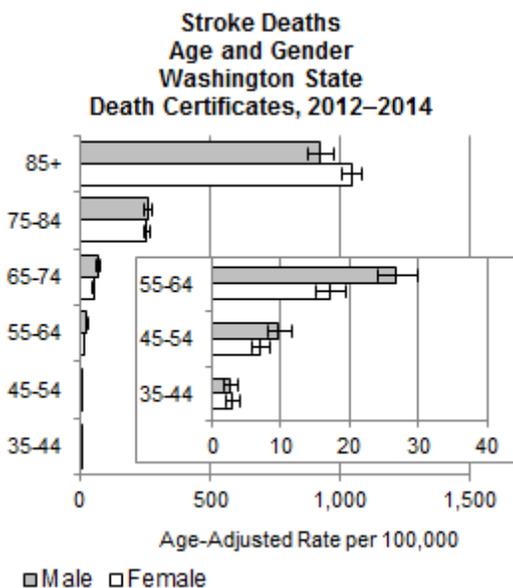
## Geographic Variation



Washington's age-adjusted stroke death rate during 2012–2014 was 35 deaths per 100,000 people. Age-adjusted rates ranged from 21 deaths per 100,000 people in San Juan County to 51 deaths per 100,000 people in Adams County. Five counties had age-adjusted death rates that were higher than the state rate: Adams, Okanogan, Pacific, Pierce, and Spokane counties. Two counties had age-adjusted death rates that were lower than the state rate: King and Benton counties. The rate of death from stroke in Columbia, Garfield, Skamania, and Wahkiakum counties was not included in the chart because there were too few deaths, less than 11 in the three-year period, to report a reliable rate.

### Age and Gender

Similar to national patterns,<sup>2</sup> stroke death rates in Washington increase rapidly with age. From rates of less than 70 per 100,000 for men and women ages 65–74, rates increase to about 258 and 261 per 100,000 for women and men, respectively ages 75–84 and to 1,045 and 925 per 100,000 for women and men, respectively, ages 85 and older. Despite the increase with age, 11% of stroke deaths occur among people younger than 65 years. Men ages 45–74 have higher stroke death rates than women. Women ages 85 and older have higher stroke death rates than men.

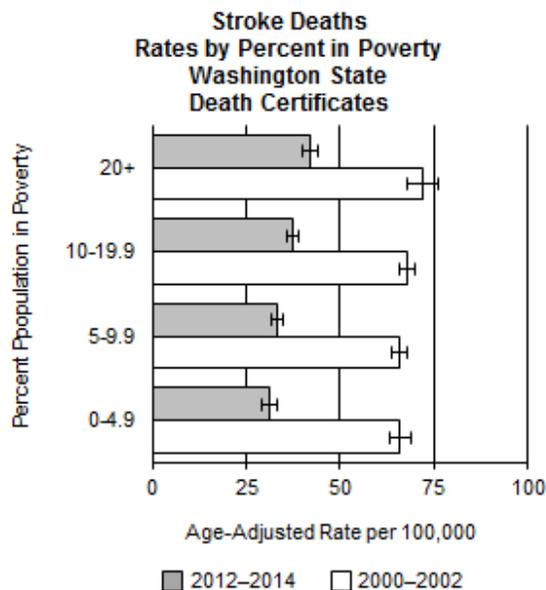


### Economic Factors and Education

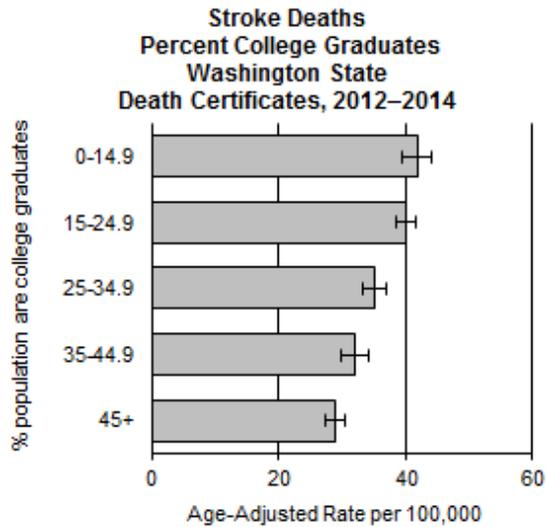
Individuals in lower socioeconomic groups have higher rates of stroke deaths than those in

higher groups.<sup>3,4</sup> Studies also suggest that living in lower socioeconomic neighborhoods is associated with a shorter survival period following a stroke, regardless of individual socioeconomic position or traditional risk factors.<sup>5,6</sup> However, it is not clear how socioeconomic factors influence stroke outcomes.<sup>7</sup>

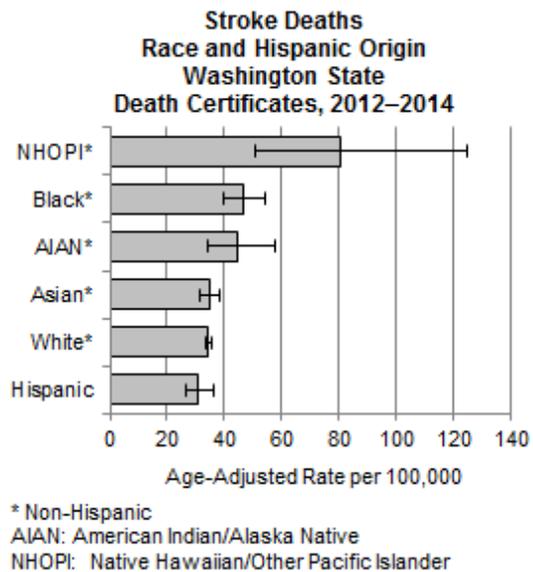
To measure the relationship between socioeconomic position and stroke death in Washington, we looked at the relationships between stroke death rates and neighborhood measures of economic resources and educational attainment. We defined neighborhood economic resources as the percent of people in a census tract living in poverty. During 2012–2014 combined, age-adjusted stroke death rates were 1.4 times higher for Washington residents living in census tracts with 20% or more of the population living below the federal poverty level compared to rates in census tracts where less than 5% of the population lived in poverty. Since early 2000, rates for all groups have been decreasing; however, the relative difference between the lowest and highest poverty groups increased. Compared to the highest poverty level, rates in the lowest level were 9% higher in 2000–2002 and 36% higher in 2012–2014.



We defined neighborhood educational attainment as the percent of census tract residents ages 25 and older with a college education or more. During 2012–2014, age-adjusted stroke death rates were 1.4 times higher for Washington residents in census tracts where less than 15% of the population were college graduates compared to rates in census tracts where 45% or more of the population were college graduates.



### Race and Hispanic Origin



Age-adjusted stroke death rates during 2012–2014 were highest among Washington’s black (46 deaths per 100,000 people) and American Indian and Alaska Native (45 deaths per 100,000 people) residents. The rate for Native Hawaiian and other Pacific Islander residents is also high (81 deaths per 100,000 people), but subject to greater random variation than rates for other groups because of small numbers. Compared to national age-adjusted stroke death rates, the age-adjusted stroke death rates for American Indians and Alaska Natives in Washington was higher than for this group in the United States (32 deaths per 100,000 people). Reasons for these differences are unknown.

Age-adjusted rates for Washington’s black, white and Hispanic residents were all similar to the national rates for these groups. Comparable national rates were not available for Asians or Native Hawaiians and other Pacific Islanders.

#### **Data Sources** (For additional detail see [Appendix B](#))

Washington State Death Certificate Data: Washington State Department of Health, Vital Registration System Annual Statistical Files, Deaths 1980–2014, released October 2015; data prepared by Washington State Department of Health, Center for Health Statistics.

Centers for Disease Control and Prevention, National Center for Health Statistics. Compressed Mortality File 1999–2014 on CDC WONDER Online Database, released December 2015. Data are from the Compressed Mortality File 1999–2014 Series 20 No. 2T, 2015, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Accessed at <http://wonder.cdc.gov/cmfi-icd10.html>.

Washington State population counts: 2000 and 2010 U.S. Census and 2001–2009 intercensal and 2011–2014 post-censal estimates, Washington State Office of Financial Management, Forecasting Division (OFM), released January, 2015; 1990 U.S. Census and 1991–1999 OFM intercensal estimates, Vista Partnership and Krupski Consulting, released October 2007; 1980 U.S. Census and 1981–1989 OFM intercensal estimates.

#### **Technical Notes**

In January 1999, the United States began using the International Classification of Diseases, Tenth Revision (ICD-10) to classify causes of death reported on death certificates. Counts and rates for years coded with ICD-9 are multiplied by the age-specific comparability ratios (only apply to underlying causes of death). The standard errors and confidence intervals incorporate the variance of the age-specific comparability ratios. For more information on the change from ICD-9 to ICD-10, see the department’s Center for Health Statistics ICD-10 Information Page at

<http://www.doh.wa.gov/DataandStatisticalReports/VitalStatistics/Data/DeathData/ICD10.aspx>.

For many decades, stroke was always the third leading cause of death in Washington State and stroke deaths rates were consistently higher than rates in the United States. In 2005, the National Center for Health Statistics instructed states to code multi-infarct dementia (ICD-10: F011) and vascular dementia (ICD-10: F019) as mental disorders in death certificates instead of as death from stroke (ICD-10: I60-I69) where it had been coded previously. After this coding change, a large decline in stroke deaths occurred between 2004 and 2005 and the rate of death became (and continues to be) similar to the national stroke death rate.

### **For More Information**

Washington State Department of Health, Heart Disease, Stroke, and Diabetes Prevention Program: (360) 236-3770.

Healthy People 2020, Heart Disease and Stroke:  
<http://www.healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicid=21>.

Million Hearts Initiative:  
<http://millionhearts.hhs.gov/index.html>.

### **Acknowledgments**

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### **Endnotes**

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<sup>1</sup> Towfighi A, Saver JL. Stroke declines from third to fourth leading cause of death in the United States: historical perspective and challenges ahead. *Stroke*. 2011;42(8):2351-2355.

<sup>2</sup> National Center for Health Statistics. *Health, United States, 2015: With Special Feature on Racial and Ethnic Health Disparities*. Hyattsville, MD: National Center for Health Statistics; 2016.

<sup>3</sup> Addo J, Ayerbe L, Mohan KM, et al. Socioeconomic status and stroke: an updated review. *Stroke*. 2012;43(4):1186-1191.

<sup>4</sup> Pollitt RA, Rose KM, Kaufman JS. Evaluating the evidence for models of lifecourse socioeconomic factors and cardiovascular outcomes: a systematic review. *BMC Public Health*. 2005;5:1-13.

<sup>5</sup> Kapral MK, Fang J, Chan C, et al. Neighborhood income and stroke care and outcomes. *Neurology*. 2012;79(12):1200-1207.

<sup>6</sup> Brown AF, Liang LJ, Vassar SD, et al. Neighborhood socioeconomic disadvantage and mortality after stroke. *Neurology*. 2013;80(6):520-527.

<sup>7</sup> Sposato LA, Grimaud O. Neighborhood socioeconomic status and stroke mortality: disentangling individual and area effects. *Neurology*. 2013;80(6):516-517.