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2 National Maps of Heart Disease and Stroke Mortality Among American Indians and Alaska Natives

American Indians and Alaska Natives

American Indian and Alaska Native (AI/AN) people made up 1.5% of the U.S. population ages 35 years and older in 2000. During 1996–2000, the age-adjusted heart disease death rate for AI/AN people in this age group was 352/100,000.

The national map of age-adjusted, spatially smoothed heart disease death rates for all AI/AN people shows considerable geographic disparity across the 806 counties for which sufficient data existed to calculate rates. County death rates ranged from 65 to 2,606/100,000. The quintile ranking for each county is depicted on the national map, with the darkest color representing counties with the highest rates and the lightest color representing counties with the lowest rates. The map indicates that the highest heart disease death rates were located primarily in South and North Dakota, Wisconsin, and Michigan. Smaller concentrations of counties in the top quintile also were observed along the North Carolina–South Carolina border and in Mississippi and Oklahoma. Counties with the lowest rates were located largely in California and Florida, with groupings of low-rate counties also found in parts of Illinois, Texas, the Northeast, and the Southwest.

Women and Men

During 1996–2000, the age-adjusted death rate for heart disease was 278/100,000 for AI/AN women and 445/100,000 for AI/AN men ages 35 and older. The maps of age-adjusted, spatially smoothed heart disease death rates for AI/AN women and men show considerable geographic disparity across the counties for which sufficient data existed to calculate rates. For women, county death rates ranged from 60 to 1,110/100,000. For men, the range was 108 to 2,374/100,000.

The maps for women and men indicate slightly different geographic patterns than the patterns for the total population. This difference can be largely attributed to the small number of counties with sufficient data to calculate rates for women and men separately. The patterns for women and men are similar, with groups of counties with high rates in Oregon, northern California, and Arizona.

A Note on Methods

Heart disease deaths were defined as those for which the underlying cause of death listed on the death certificate was diseases of the heart, defined according to the *International Classification of Diseases* (*ICD-9* codes 390–398, 402, and 404–429; *ICD-10* codes I00–I09, I11, I13, I20–I51).[1,2] Heart disease death rates were age-adjusted to the 2000 U.S. population and spatially smoothed using a spatial moving average. A detailed explanation of the methods used to generate the death rates and create the maps can be found in Appendix B.

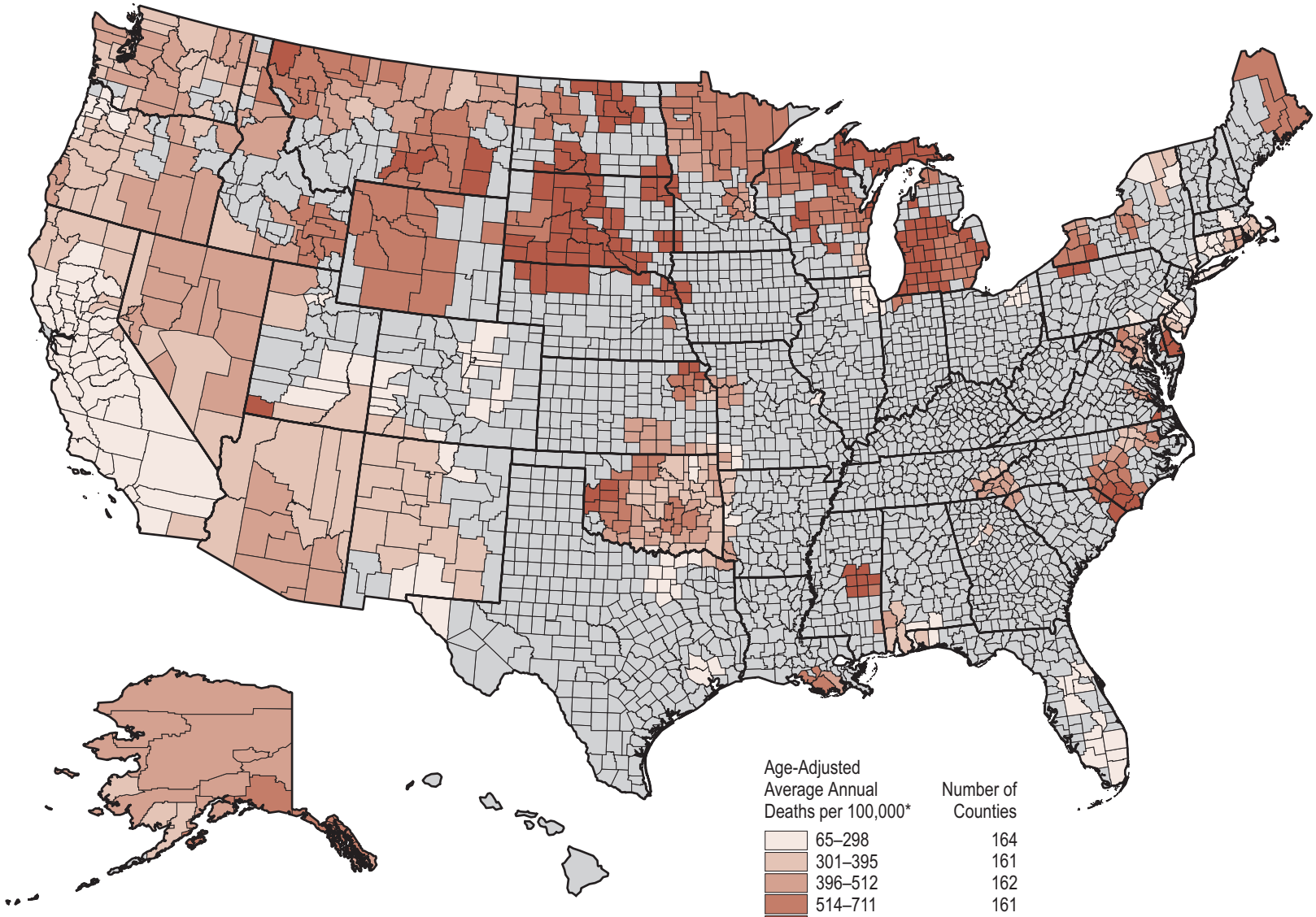
A Cautionary Note

Decedents of certain racial and ethnic minorities are sometimes misreported as "white" on death certificates; in particular, American Indians have been significantly underreported on death certificates.[3–5] In a 1996 Indian Health Service study, misclassification of American Indians ranged from 1.2% in Arizona to 28% in Oklahoma and 30.4% in California.[6] Consequently, the true heart disease death rates for AI/AN people were probably higher during 1996–2000 than indicated on the maps, and the magnitude of geographic disparity displayed on the maps may be biased.

1. U.S. Department of Health and Human Services. *International Classification of Diseases, 9th Revision, Clinical Modification.* Washington, DC: Public Health Service, Health Care Financing Administration; 1980.
2. World Health Organization. *International Classification of Diseases and Related Health Problems, 10th Revision, Clinical Modification.* Geneva: World Health Organization; 1992.
3. Frost F, Shy K. Racial differences between linked birth and infant death records in Washington state. *American Journal of Public Health* 1980;70(9):974–6.
4. Hahn RA, Mulinare J, Teutsch SM. Inconsistencies in coding of race and ethnicity between birth and death in US infants: a new look at infant mortality, 1983 through 1985. *JAMA* 1992;267(2):259–63.
5. Kennedy RD, Deapen RE. Differences between Oklahoma Indian infant mortality and other races. *Public Health Reports* 1991;106(1):97–8.
6. Indian Health Service. *Adjusting for Miscoding of Indian Race on State Death Certificates.* Rockville, MD: U.S. Department of Health and Human Services, Public Health Service; 1996.

Smoothed County Heart Disease Death Rates 1996–2000

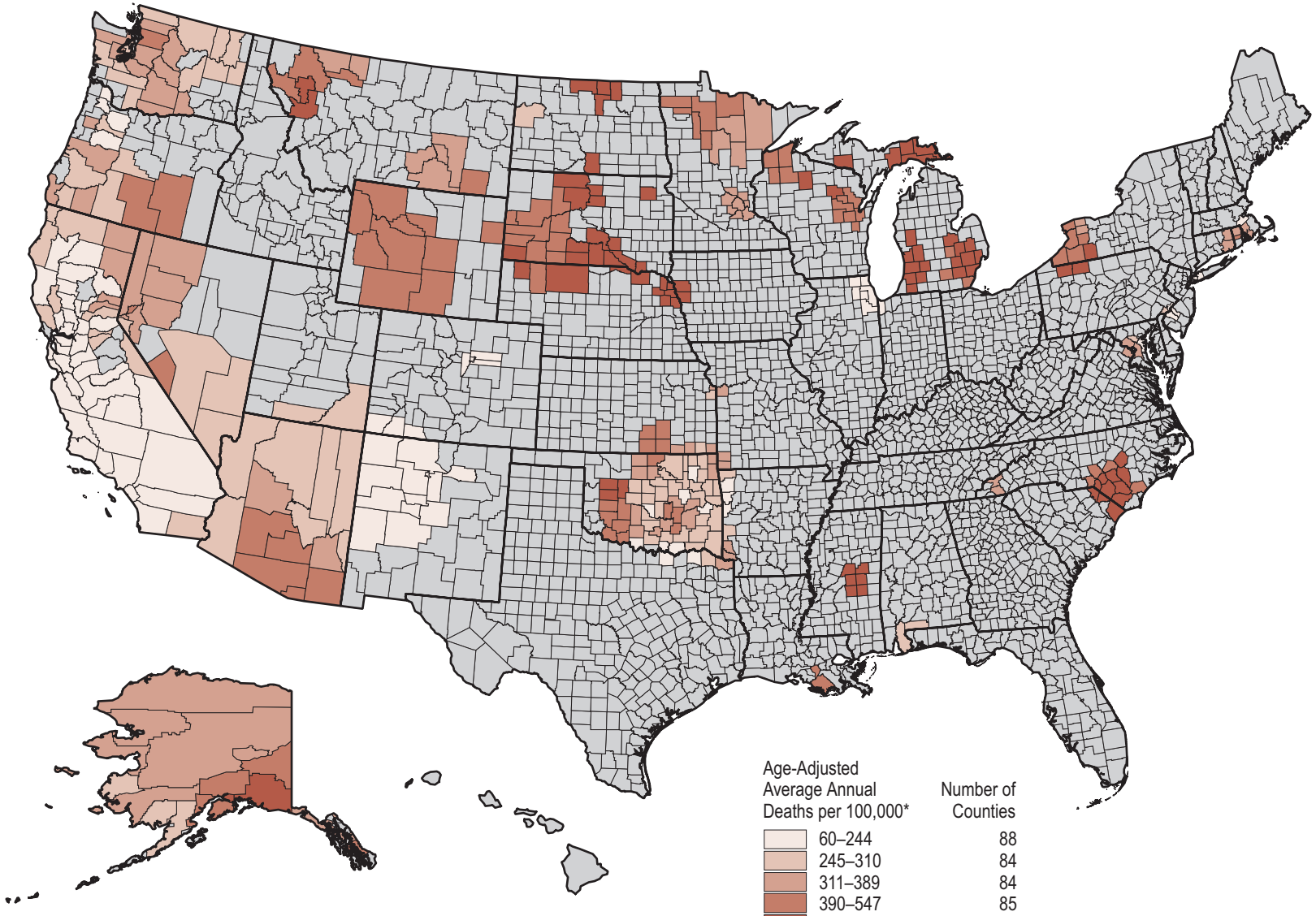
American Indians and Alaska Natives Ages 35 Years and Older



* Heart disease death rates are spatially smoothed to enhance the stability of rates in counties with small populations. See Appendix B for details.

Smoothed County Heart Disease Death Rates 1996–2000

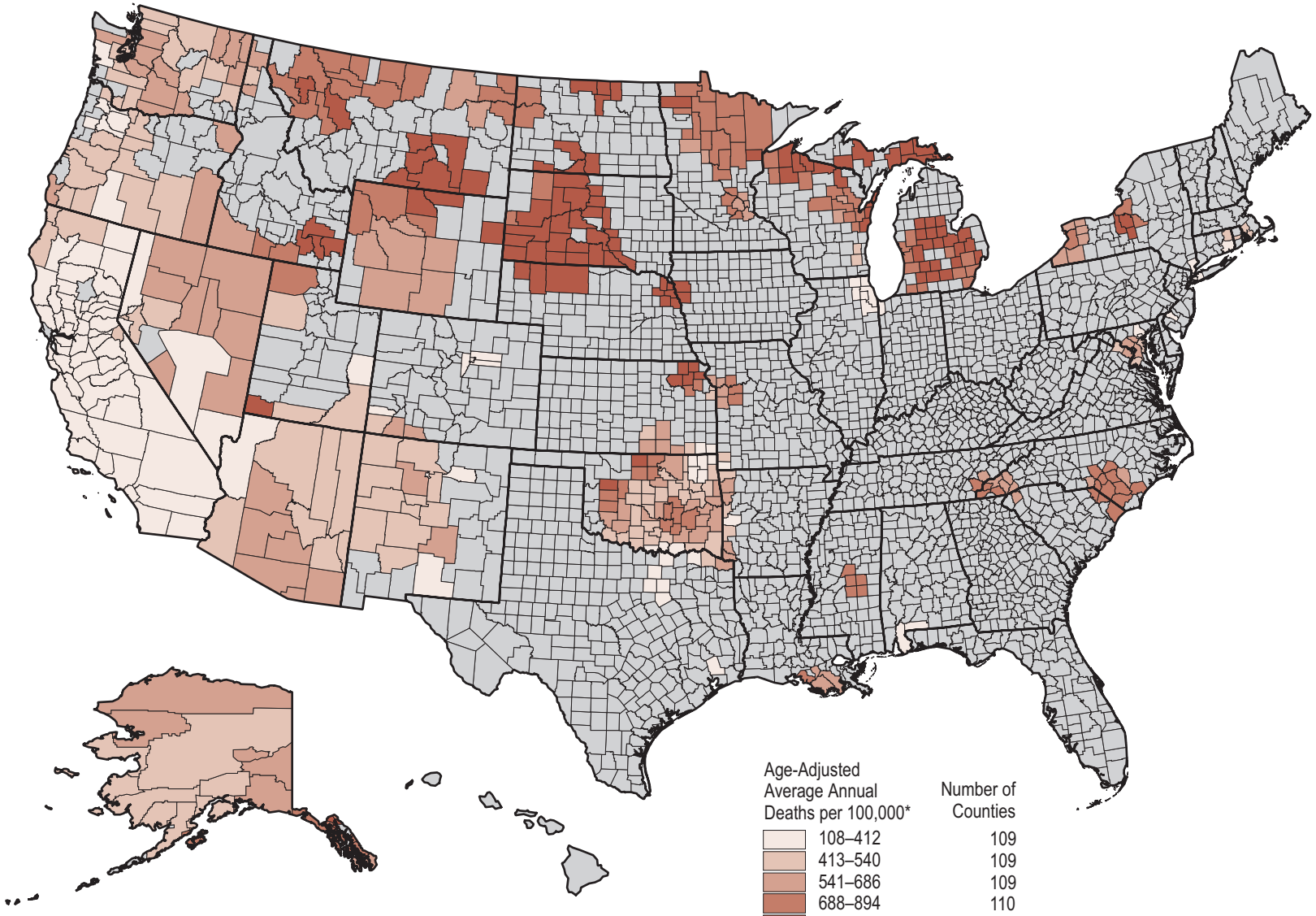
American Indian and Alaska Native Women Ages 35 Years and Older



* Heart disease death rates are spatially smoothed to enhance the stability of rates in counties with small populations. See Appendix B for details.

Smoothed County Heart Disease Death Rates 1996–2000

American Indian and Alaska Native Men Ages 35 Years and Older



* Heart disease death rates are spatially smoothed to enhance the stability of rates in counties with small populations. See Appendix B for details.

American Indians and Alaska Natives

American Indian and Alaska Native (AI/AN) people made up 1.5% of the U.S. population ages 35 years and older in 2000. During 1991–1998, the age-adjusted stroke death rate for AI/AN people in this age group was 79/100,000.

The national map of age-adjusted, spatially smoothed stroke death rates for all AI/AN people shows considerable geographic disparity across the 303 counties for which sufficient data existed to calculate rates. County death rates ranged from 29 to 272/100,000. The quintile ranking for each county is depicted on the national map, with the darkest color representing counties with the highest rates and the lightest color representing counties with the lowest rates. The map suggests somewhat of a north–south gradient in stroke mortality among AI/AN people. Counties with high rates were reported primarily in the northern states of Alaska, Washington, Idaho, Montana, Wyoming, South Dakota, Wisconsin, and Minnesota. Counties with low rates were reported primarily in central Oklahoma and southern California. Exceptions to the north–south gradient were high rates in counties along the North Carolina–South Carolina border and along the southern tip of Louisiana.

Women and Men

During 1991–1998, the age-adjusted death rate for stroke was 77/100,000 for AI/AN women and 80/100,000 for AI/AN men ages 35 and older. The maps of age-adjusted, spatially smoothed stroke death rates for AI/AN women and men show considerable geographic disparity across the counties for which sufficient data existed to calculate rates. For women, county death rates ranged from 35 to 291/100,000. For men, the range was 33 to 291/100,000.

The maps for women and men indicate slightly different geographic patterns than the patterns for the total population. This difference can be largely attributed to the small number of counties with sufficient data to calculate rates for women and men separately. The patterns for women and men are similar, with groups of counties with high rates in Oregon, northern California, and Arizona.

A Note on Methods

Stroke deaths were defined as those for which the underlying cause of death listed on the death certificate was cerebrovascular disease, defined according to the *International Classification of Diseases, 9th Revision, Clinical Modification* (codes 430–438).[1] Stroke death rates were age-adjusted to the 2000 U.S. population and spatially smoothed using a spatial moving average. A detailed explanation of the methods used to generate the death rates and create the maps can be found in Appendix B.

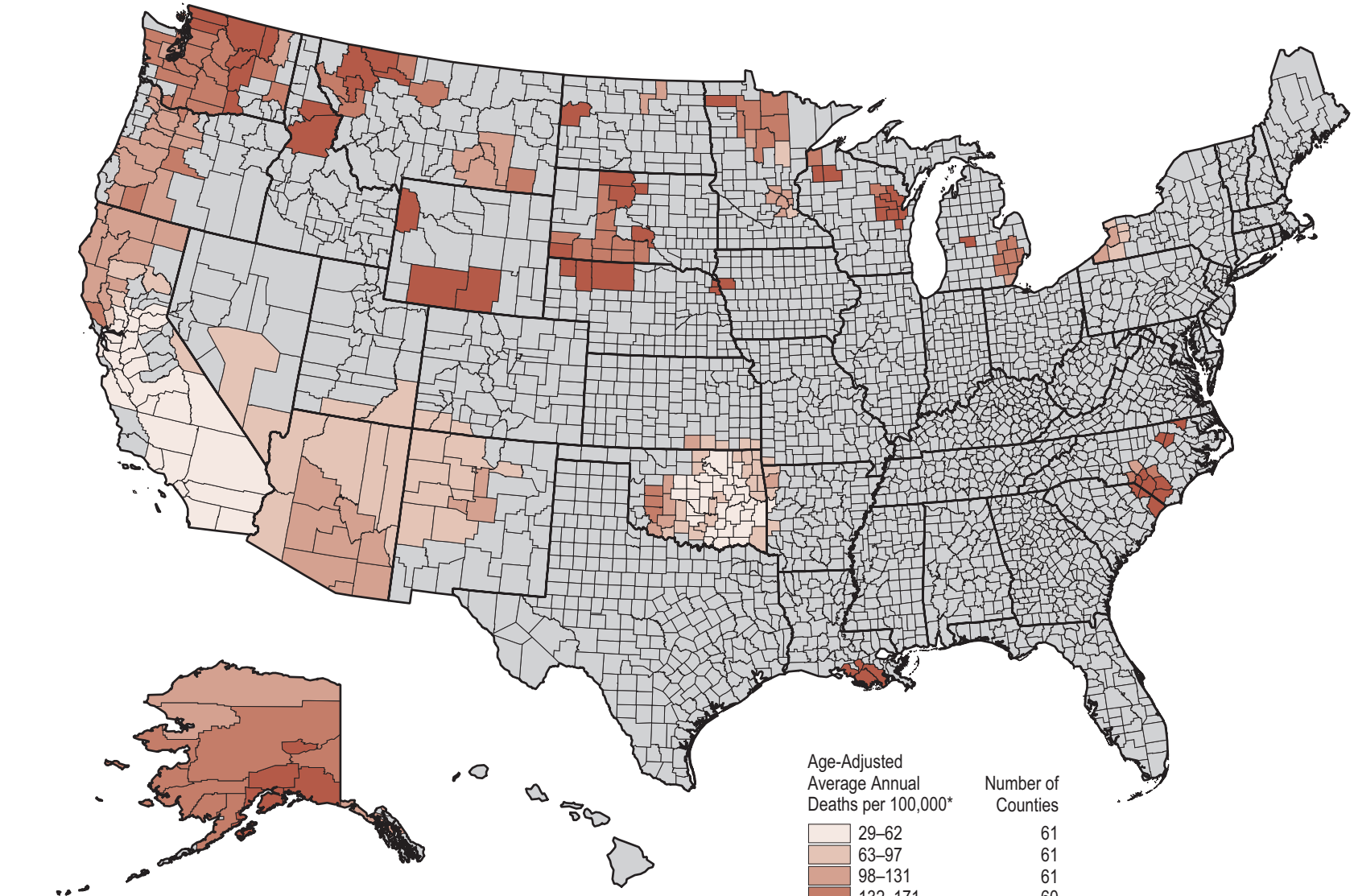
A Cautionary Note

Decedents of certain racial and ethnic minorities are sometimes misreported as "white" on death certificates; in particular, American Indians have been significantly underreported on death certificates.[2–4] In a 1996 Indian Health Service study, misclassification of American Indians ranged from 1.2% in Arizona to 28% in Oklahoma and 30.4% in California.[5] Consequently, the true stroke death rates for AI/AN people were probably higher during 1991–1998 than indicated on the maps, and the magnitude of geographic disparity displayed on the maps may be biased.

1. U.S. Department of Health and Human Services. *International Classification of Diseases, 9th Revision, Clinical Modification.* Washington, DC: Public Health Service, Health Care Financing Administration; 1980.
2. Frost F, Shy K. Racial differences between linked birth and infant death records in Washington State. *American Journal of Public Health* 1980;70(9):974–6.
3. Hahn RA, Mulinare J, Teutsch SM. Inconsistencies in coding of race and ethnicity between birth and death in US infants: a new look at infant mortality, 1983 through 1985. *JAMA* 1992;267(2):259–63.
4. Kennedy RD, Deapen RE. Differences between Oklahoma Indian infant mortality and other races. *Public Health Reports* 1991;106(1):97–8.
5. Indian Health Service. *Adjusting for Miscoding of Indian Race on State Death Certificates.* Rockville, MD: U.S. Department of Health and Human Services, Public Health Service; 1996.

Smoothed County Stroke Death Rates 1991–1998

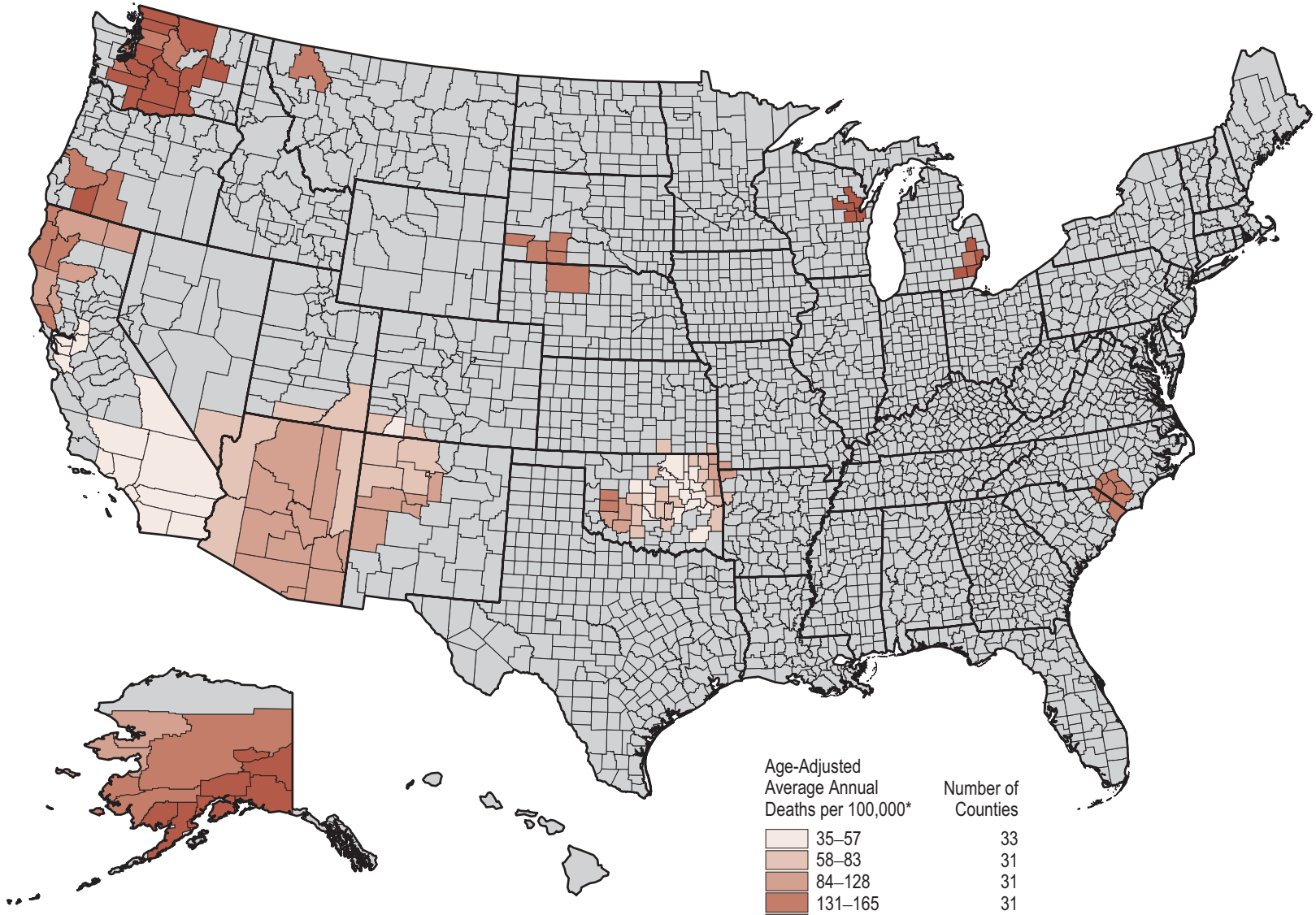
American Indians and Alaska Natives Ages 35 Years and Older



* Stroke death rates are spatially smoothed to enhance the stability of rates in counties with small populations. See Appendix B for details.

Smoothed County Stroke Death Rates 1991–1998

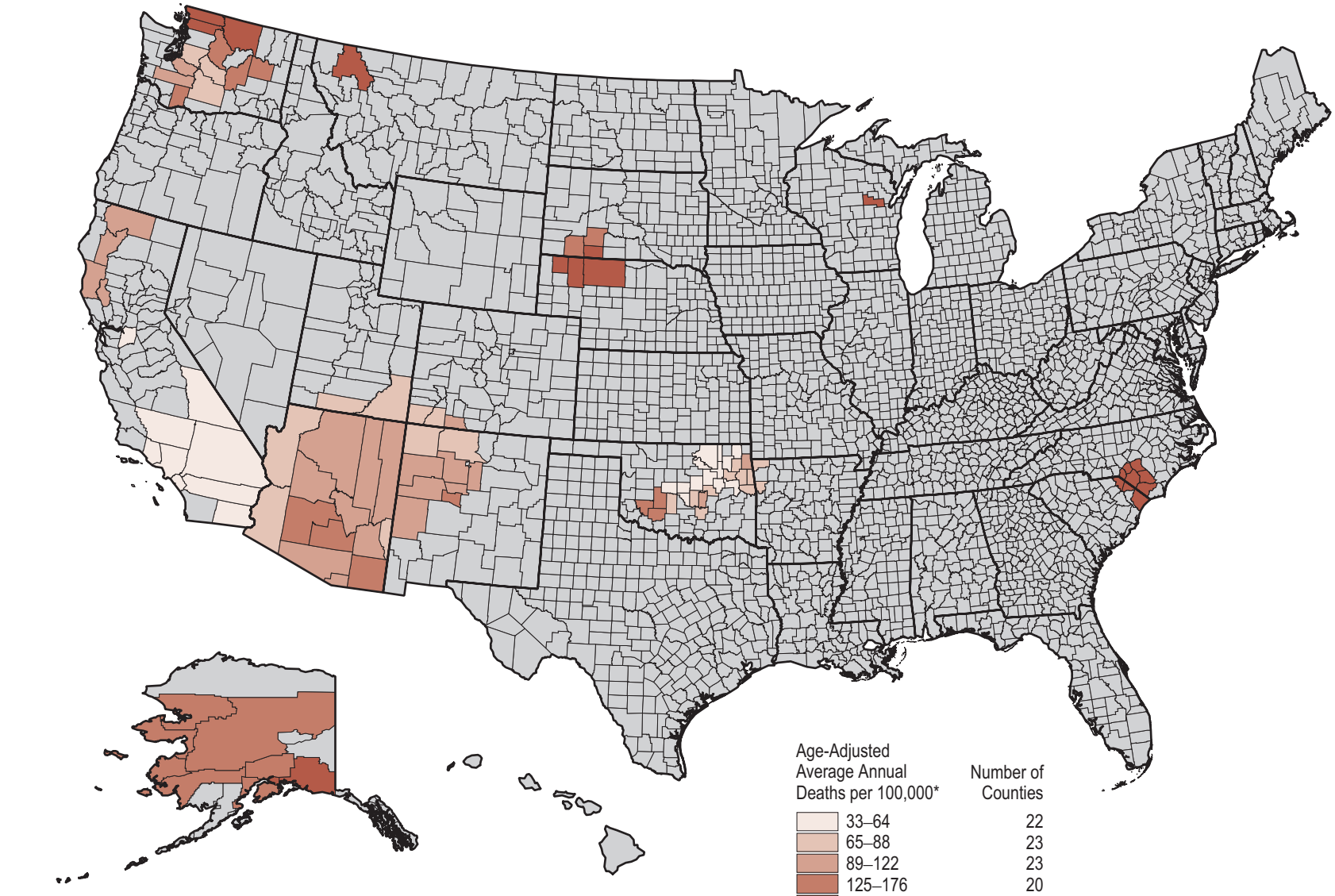
American Indian and Alaska Native Women Ages 35 Years and Older



* Stroke death rates are spatially smoothed to enhance the stability of rates in counties with small populations. See Appendix B for details.

Smoothed County Stroke Death Rates 1991–1998

American Indian and Alaska Native Men Ages 35 Years and Older



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