

A Detroit woman listens to South African political activist Nelson Mandela speak in June 1990 shortly after his release from prison.



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### 3 National Maps of Stroke Mortality by Race, Ethnicity, and Gender

In this section, national geographic disparities in stroke death rates are presented for the total U.S. population and for the five largest racial and ethnic groups in the United States—American Indians and Alaska Natives, Asians and Pacific Islanders, blacks, Hispanics, and whites. A map depicting rates for the total population of each racial and ethnic group is followed by separate maps for women and men in each group.

Each national map presents spatially smoothed, age-adjusted stroke death rates for counties across the United States. Hawaii, New York City, and the District of Columbia are displayed using a larger scale than the rest of the nation to enhance visualization of these areas. Alaska is shown using a smaller scale because of the large land area it occupies.

For American Indians and Alaska Natives, Asians and Pacific Islanders, blacks, and Hispanics, stroke death rates

were not calculated for a majority of counties nationwide because of small population sizes and infrequent stroke deaths in these counties. If a county and its neighboring counties reported fewer than 20 stroke deaths for a specific racial or ethnic group during 1991–1998, then a rate was not calculated for that county (see Appendix B for more details).

For part of the study period, Oklahoma and New Hampshire did not collect data on Hispanic origin on death certificates. Consequently, we were unable to report stroke death rates for Hispanics in those states. During 1991–1993 in New York City, Hispanic origin was recorded as “unknown” on approximately 18% of stroke death certificates for people ages 35 and older. Therefore, the stroke death rates for Hispanics in New York City may be underestimated.

## Total Population

The age-adjusted stroke death rate for U.S. residents ages 35 and older was 121/100,000 during 1991–1998. Stroke is the third leading cause of death in the United States, preceded by heart disease and cancer.

The national map of age-adjusted, spatially smoothed stroke death rates for the total U.S. population shows considerable geographic disparity across the 3,100 counties for which data were available. County death rates ranged from 61 to 241/100,000. An approximately twofold difference existed between the midpoint of the highest quintile (194) and the midpoint of the lowest quintile (87). 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 frequency distribution shows the range of smoothed stroke death rates for the total population (Figure 3.1). The vertical dotted lines and the graded color bar along the x-axis illustrate the quintiles into which counties were divided on the basis of these rates.

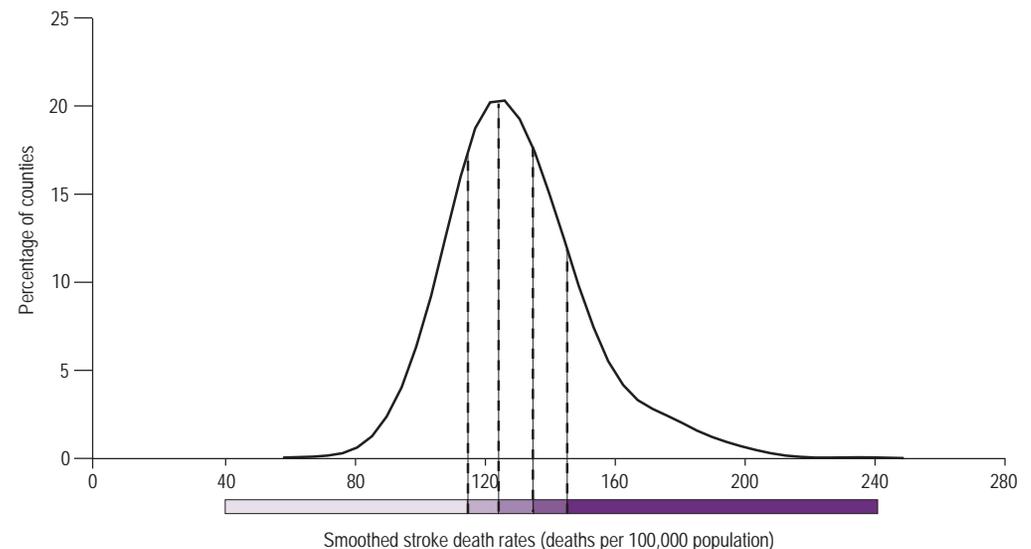
The map for the total population indicates that a majority of the counties in the southeastern states (except Florida) were in the top 40% of stroke death rates. The overall pattern shows that nearly all of the counties in the highest quintile were reported in two areas of the Southeast. The first area covers vast expanses of southeastern coastal states (Virginia, North Carolina, South Carolina, and Georgia), as well as part of Alabama. The second area encompasses Mississippi Delta counties in Tennessee, Arkansas, Mississippi, Louisiana, and the southeastern “boothel” area of Missouri. A separate pocket of counties with high rates was observed in the Pacific Northwest, namely Washington, Oregon, and northern California. Counties in the lowest quintile were reported primarily in the Southwest, the Great Plains, the Northeast, and southern Florida.

## All Women and All Men

During 1991–1998, the age-adjusted death rate for stroke was 117/100,000 for women and 126/100,000 for men ages 35 and older. For both women and men, stroke is the third leading cause of death in the United States, preceded by heart disease and cancer.

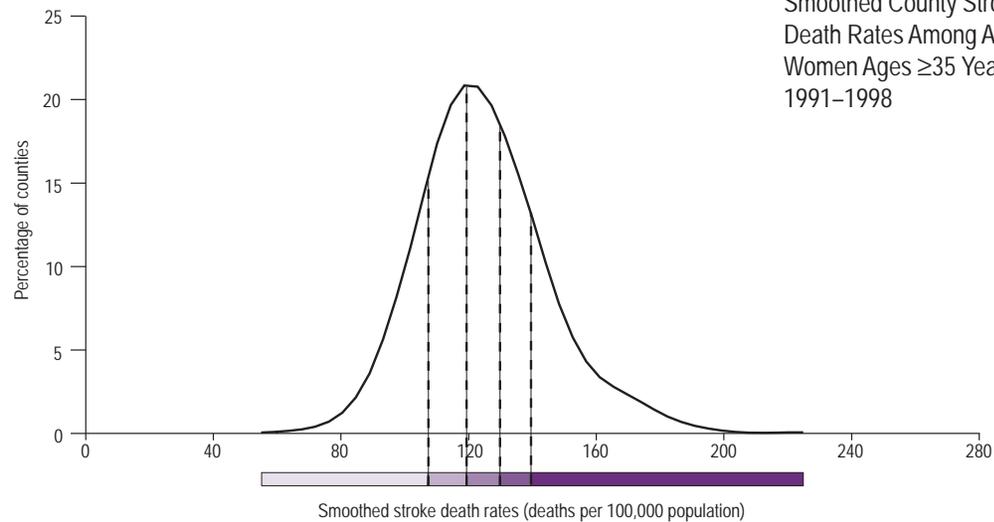
The maps of age-adjusted, spatially smoothed stroke death rates for women and men show considerable geographic disparity. For women, county death rates ranged from 58 to 226/100,000. The range for men was 60 to 258/100,000. For both women and men, an approximately twofold difference existed between the midpoint of the highest quintile (184 for women, 206 for men) and the midpoint of the lowest quintile (84 for women, 88 for men).

Figure 3.1  
Frequency Distribution of  
Smoothed County Stroke  
Death Rates Among All  
People Ages  $\geq 35$  Years,  
1991–1998



## Stroke Mortality: Total Population

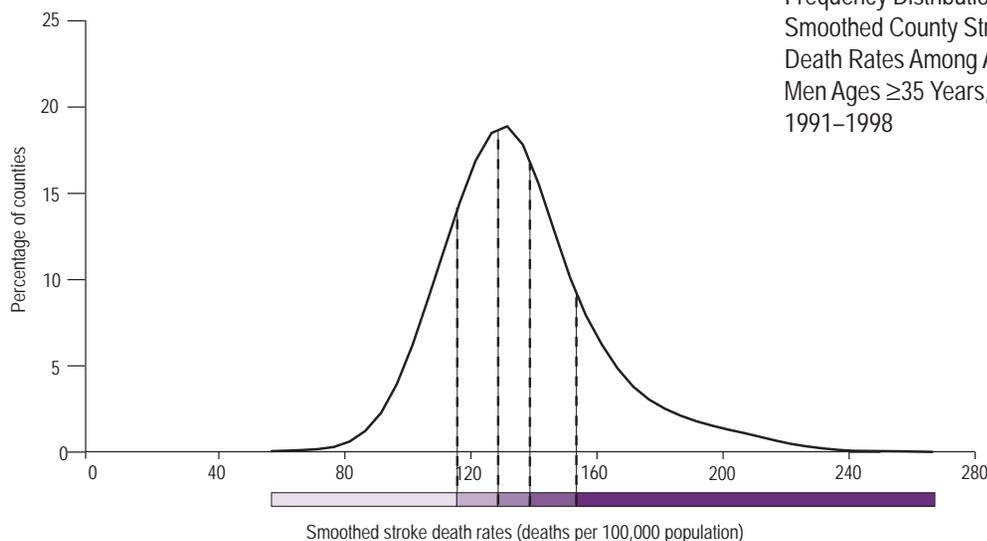
Figure 3.2  
Frequency Distribution of  
Smoothed County Stroke  
Death Rates Among All  
Women Ages  $\geq 35$  Years,  
1991–1998



The frequency distributions show the range of smoothed stroke death rates for women (Figure 3.2) and for men (Figure 3.3).

The maps indicate that for both women and men, a majority of the counties in the southeastern states (except Florida) were in the two highest quintiles of stroke death rates. The southeastern coastal states (Virginia, North Carolina, South Carolina, and Georgia) and parts of the Mississippi Delta had dense concentrations of counties in the highest quintiles for women and men. Differences in the geographic patterns between women and men were observed in the midwestern and western states. For women, a pocket of counties with high rates extended from the western portion of Montana westward and southward through much of California. For men, a concentration of counties with high rates was observed in North Dakota, South Dakota, and other sections of the Midwest.

Figure 3.3  
Frequency Distribution of  
Smoothed County Stroke  
Death Rates Among All  
Men Ages  $\geq 35$  Years,  
1991–1998

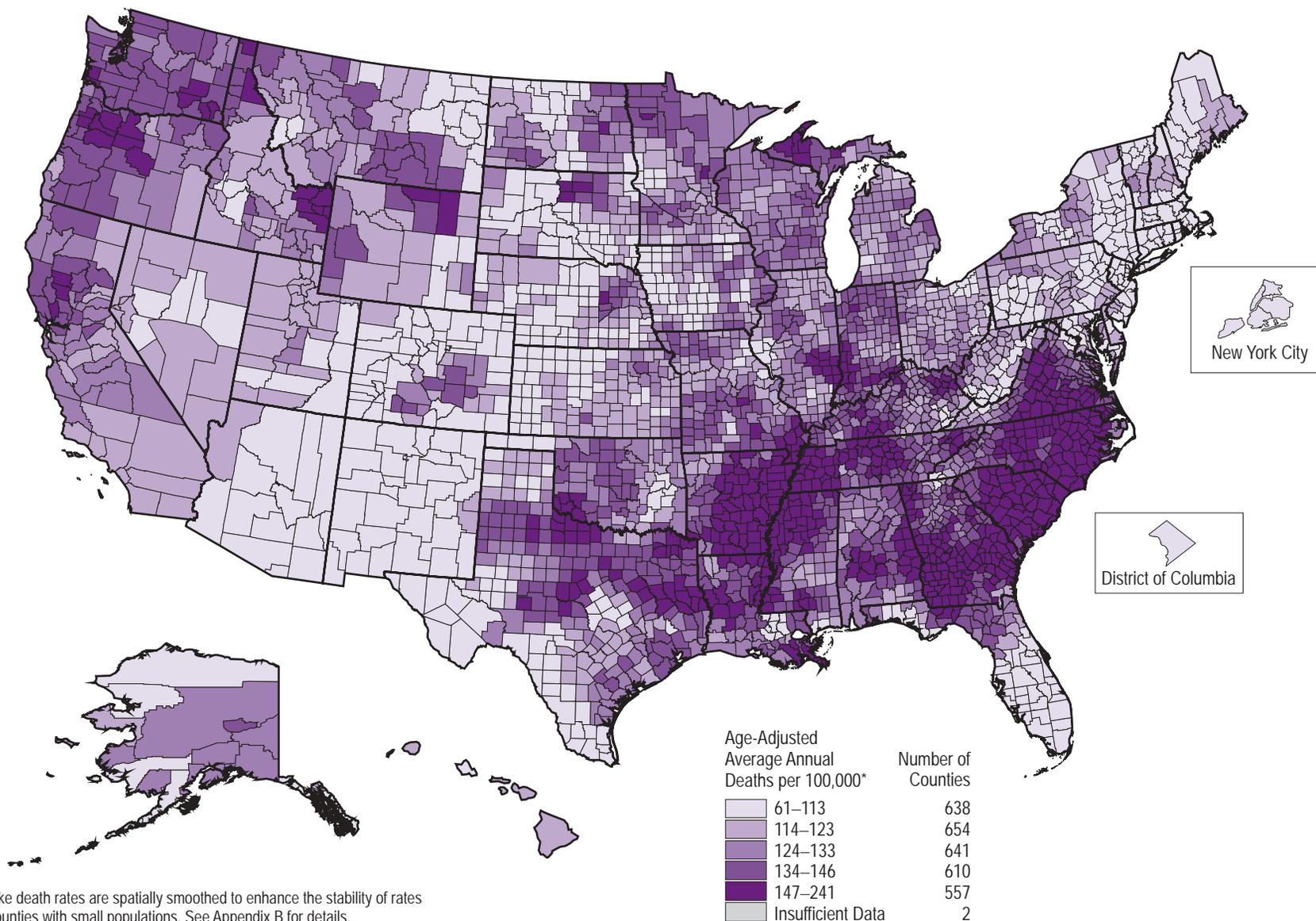


### A Note on Methods

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, 9<sup>th</sup> Revision, Clinical Modification* (codes 430–438) (Washington, DC: Department of Health and Human Services; 1980). 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.

# Smoothed County Stroke Death Rates 1991–1998

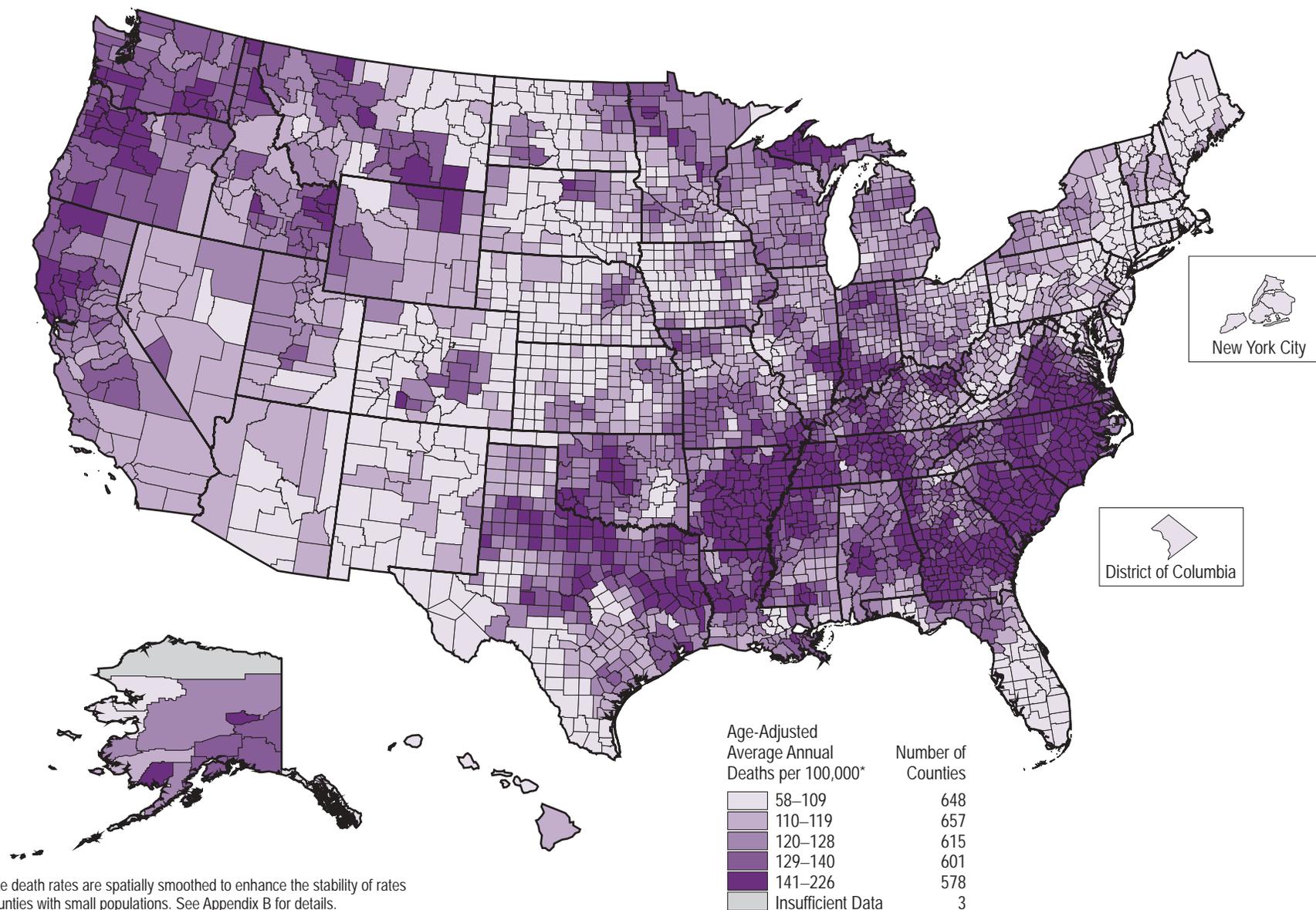
Total Population  
Ages 35 Years and Older



\*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

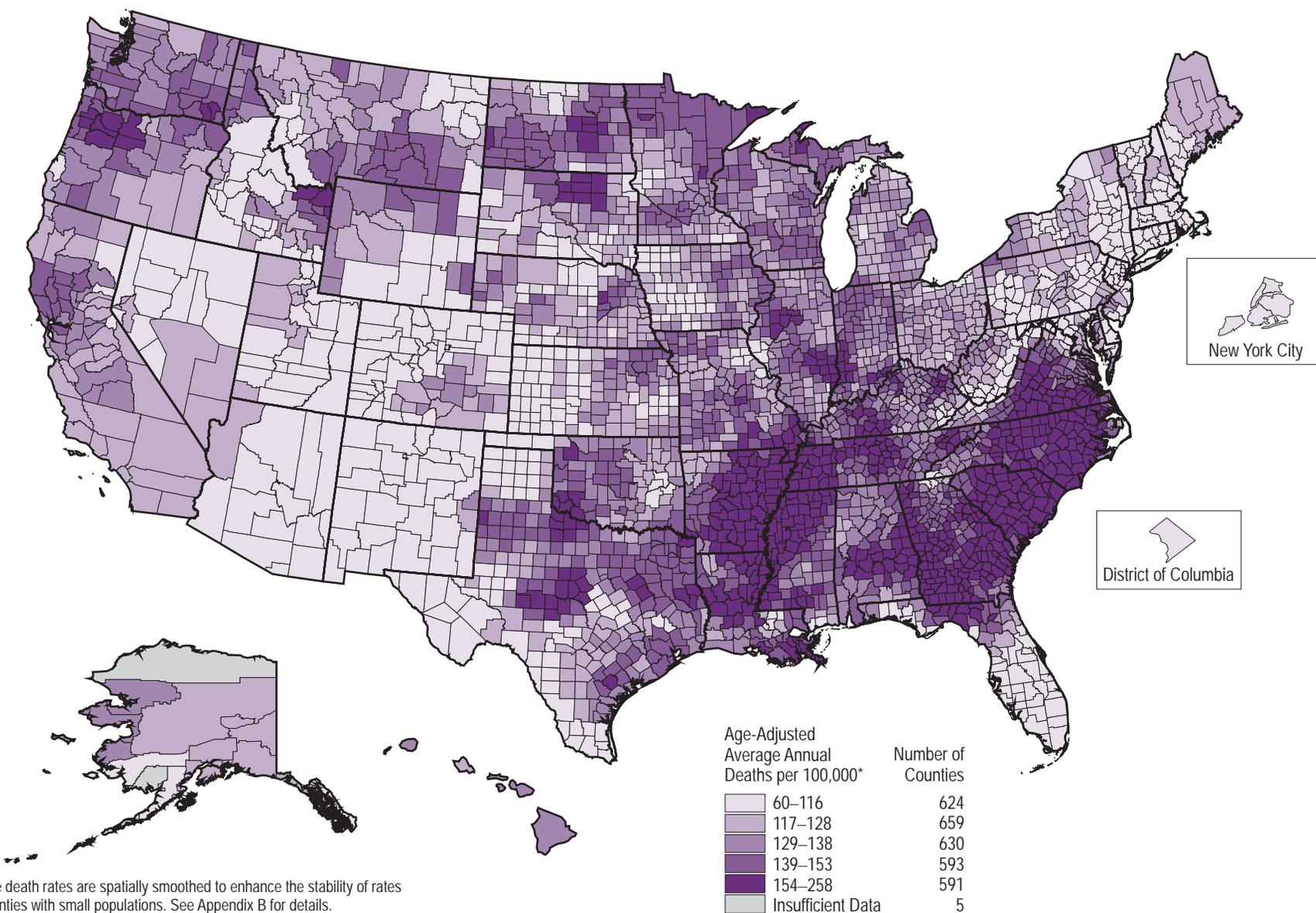
All Women  
Ages 35 Years and Older



\*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

All Men  
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.

