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4 Maps of Stroke Hospitalizations with Selected Comorbidities, by Race/Ethnicity

Stroke Hospitalizations with Selected Comorbidities, by Race/Ethnicity

This section documents the geographic patterns of three comorbid conditions—hypertension, diabetes, and atrial fibrillation—among Medicare beneficiaries ages 65 and older who were hospitalized for stroke during 1995–2002. Each of these conditions is an important risk factor for stroke.

Hypertension is the condition of repeatedly having an abnormally high blood pressure. The current clinical definition is systolic blood pressure ≥ 140 mm/Hg and/or diastolic blood pressure ≥ 90 mm/Hg. Diabetes is a metabolic disorder characterized by inadequate secretion or use of insulin and excessive amounts of sugar in the blood. Atrial fibrillation is a type of abnormal heart rhythm.

Among Medicare patients hospitalized for stroke during 1995–2002, 61.3% were also diagnosed with hypertension, 24.7% with diabetes, and 18.7% with atrial fibrillation (Figure 4.1). During 1995–2002, 24.5% of all stroke hospitalizations among Medicare beneficiaries did not have an additional diagnosis of hypertension, diabetes, or atrial fibrillation. However, 75.5% had an additional diagnosis of one of these comorbid conditions, 26.7% had two conditions, and 2.5% had all three (Figure 4.2).

Figure 4.1 Percentage of stroke hospitalizations with selected comorbidities—Medicare beneficiaries ages 65 and older, 1995–2002

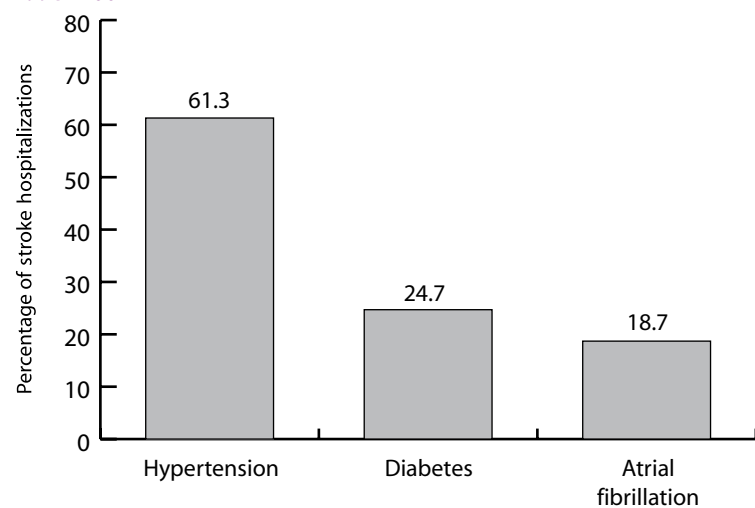
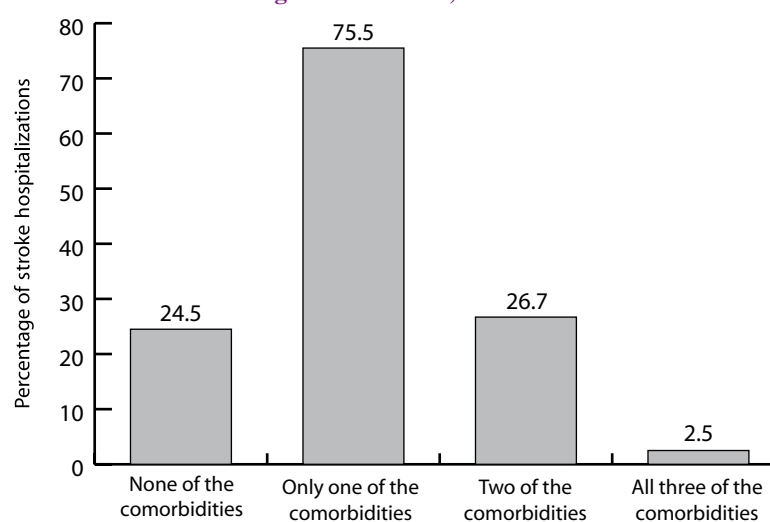


Figure 4.2 Percentage of stroke hospitalizations with any combination of selected comorbidities (hypertension, diabetes, or atrial fibrillation)—Medicare beneficiaries ages 65 and older, 1995–2002



Total Population

Overall, 61.3% of stroke hospitalizations among Medicare beneficiaries ages 65 and older included a diagnosis of hypertension. The frequency distribution indicates that for the majority of counties, the percentage of stroke hospitalizations with hypertension was between 52% and 66%. Counties with the highest percentages (i.e., counties in the top quintile, in which at least 62.9% of stroke hospitalizations included a diagnosis of hypertension) were concentrated primarily in the southeastern states (North Carolina, South Carolina, Georgia, Alabama, and Florida) and in Maryland, Michigan, and parts of New York.

Blacks

Among black Medicare beneficiaries ages 65 and older, 72.9% of stroke hospitalizations included a diagnosis of hypertension. The frequency distribution indicates that for the majority of counties, the percentage was between 60% and 78%. There did not appear to be a strong geographic pattern. Pockets of counties with the highest percentages (i.e., counties in the top quintile, in which at least 75% of stroke hospitalizations included a diagnosis of hypertension) were observed in Michigan, Indiana, Ohio, and Florida.

Hispanics

Among Hispanic Medicare beneficiaries ages 65 and older, 63.6% of stroke hospitalizations included a diagnosis of hypertension. The frequency distribution indicates that for the majority of counties, the percentage was between 52% and 75%. There did not appear to be a strong geographic pattern. Counties with the highest percentages (i.e., counties in the top quintile, in which at least 70.8% of stroke hospitalizations included a diagnosis of hypertension) were observed primarily in Florida, Michigan, eastern Pennsylvania, and some New England states.

Whites

Among white Medicare beneficiaries ages 65 and older, 59.8% of stroke hospitalizations included a diagnosis of hypertension. The frequency distribution indicates that for the majority of counties, the percentage was between 52% and 64%. Counties with the highest percentages (i.e., counties in the top quintile, in which at least 61.4% of stroke hospitalizations included a diagnosis of hypertension) were concentrated primarily in North Dakota, South Dakota, Michigan, New York, Massachusetts, Pennsylvania, Maryland, West Virginia, and Florida.

A Note on Methods

Stroke hospitalizations were defined as those for which the principal diagnosis on the Medicare hospital claim form was cerebrovascular disease, indicated by codes 430–434 and 436–438 according to the *International Classification of Diseases, 9th Revision, Clinical Modification* (ICD-9-CM). Hospitalizations for which the principal diagnosis was transient ischemic attacks (ICD-9-CM code 435) were excluded. Comorbidities were listed as secondary diagnoses on the Medicare hospital claim form (diagnosis fields 2–10). For the complete list of ICD-9-CM codes for the selected comorbidities, see Appendix B.

For each map, the counties are categorized according to quintile; the darkest color represents counties with the highest percentages, and the lightest color represents counties with the lowest percentages. All county-level percentages have been spatially smoothed to enhance the stability in counties with small populations. Counties are categorized as having “insufficient data” if the sum of stroke hospitalizations in the index county plus the neighboring counties is less than 20, the Medicare population is less than 10, or the relative standard error of the estimated percentage is $\geq 30\%$. For more details, see Appendix B.

The frequency distribution in the bottom right corner of each map shows the range of percentages observed among counties on the corresponding map. The vertical dotted lines and the graded color bar along the x-axis illustrate the quintiles into which counties

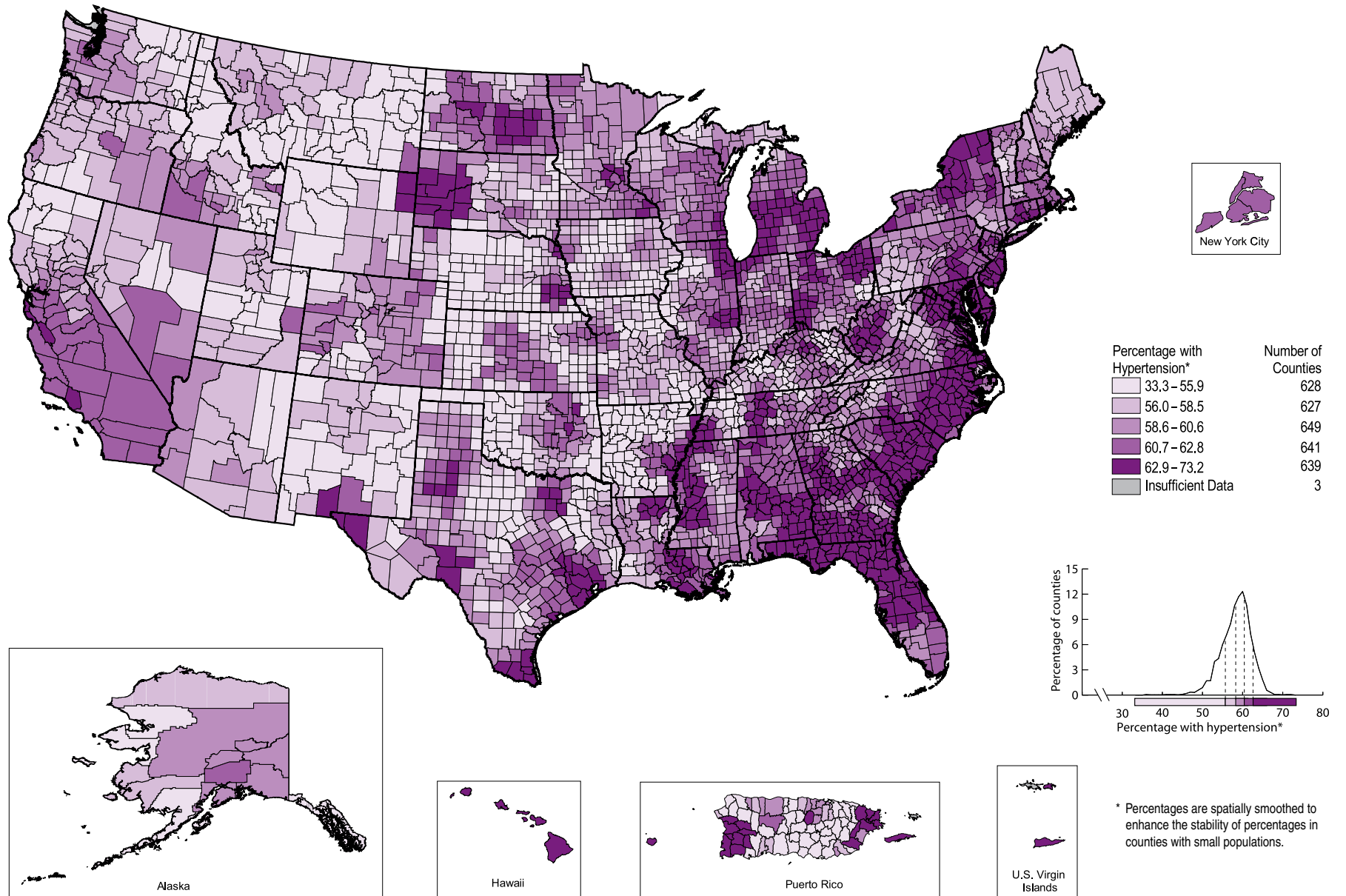
were divided on the basis of these percentages. The quintiles do not always have equal numbers of counties because many counties have the same percentage of hospitalizations. For a detailed explanation of the methods, see Appendix B.

A Cautionary Note

In the Medicare data sets, the accuracy of codes for Hispanic race and ethnicity is limited because these codes are not reported separately. For example, a person who is white and Hispanic is reported as either white or Hispanic. This reporting practice can result in misclassification of race and ethnicity. According to 1996 data, the probability that the racial/ethnic designation on Medicare claim forms is correct is 96.6% for whites and 95.5% for blacks, but only 19.4% for Hispanics. At the same time, the probability that a person identified as Hispanic in the Medicare data set is actually Hispanic is 98% (Arday SL, Arday DR, Monroe A, Zhang MD. HCFA’s racial and ethnic data: current accuracy and recent improvements. *Health Care Financing Review* 2000;21[4]:107–16). Together, these data suggest that Hispanics are underreported in the Medicare data sets and that this underreporting could introduce bias into the results presented here.

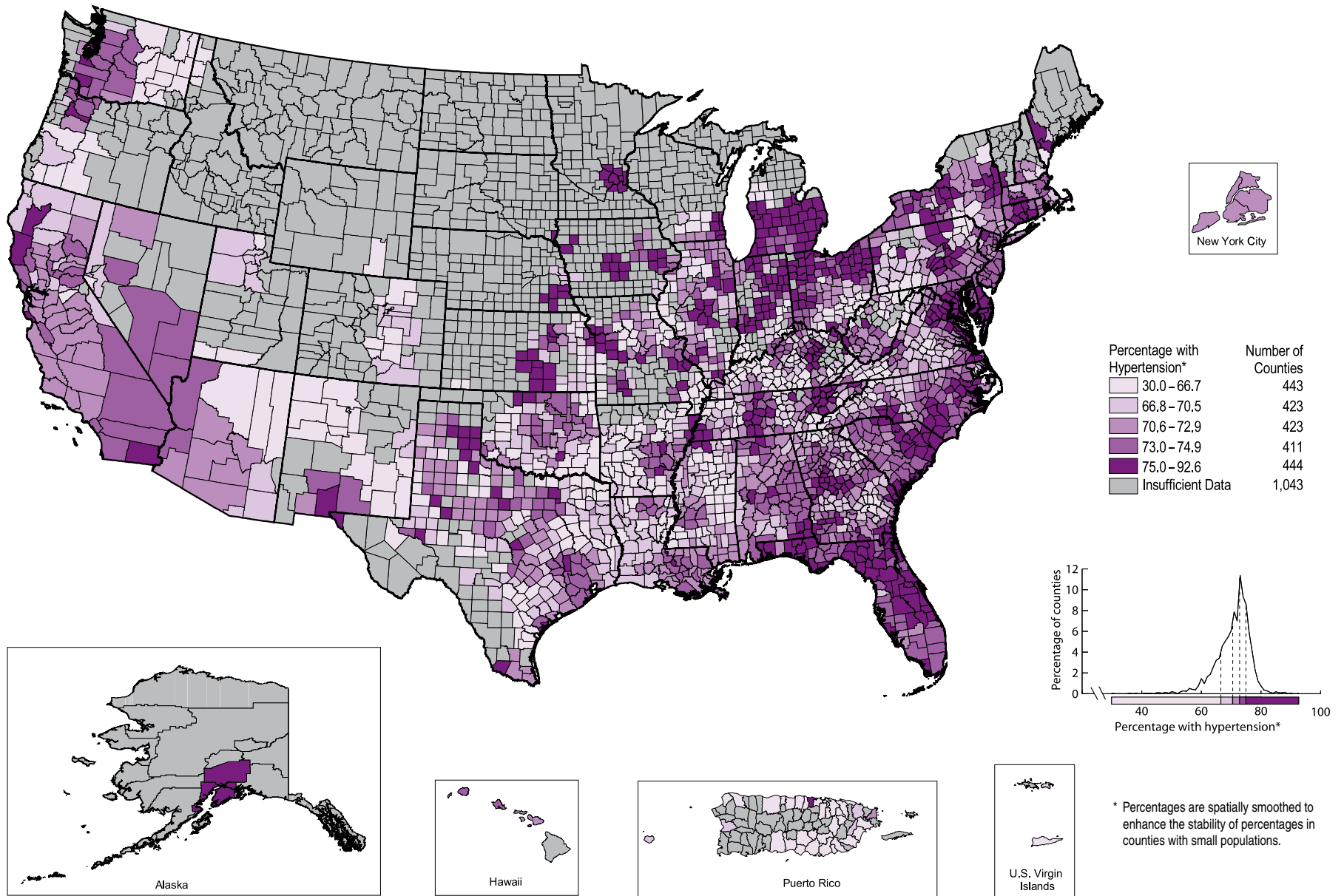
Medicare Beneficiaries Ages 65 and Older 1995–2002

Stroke Hospitalizations with Hypertension Total Population



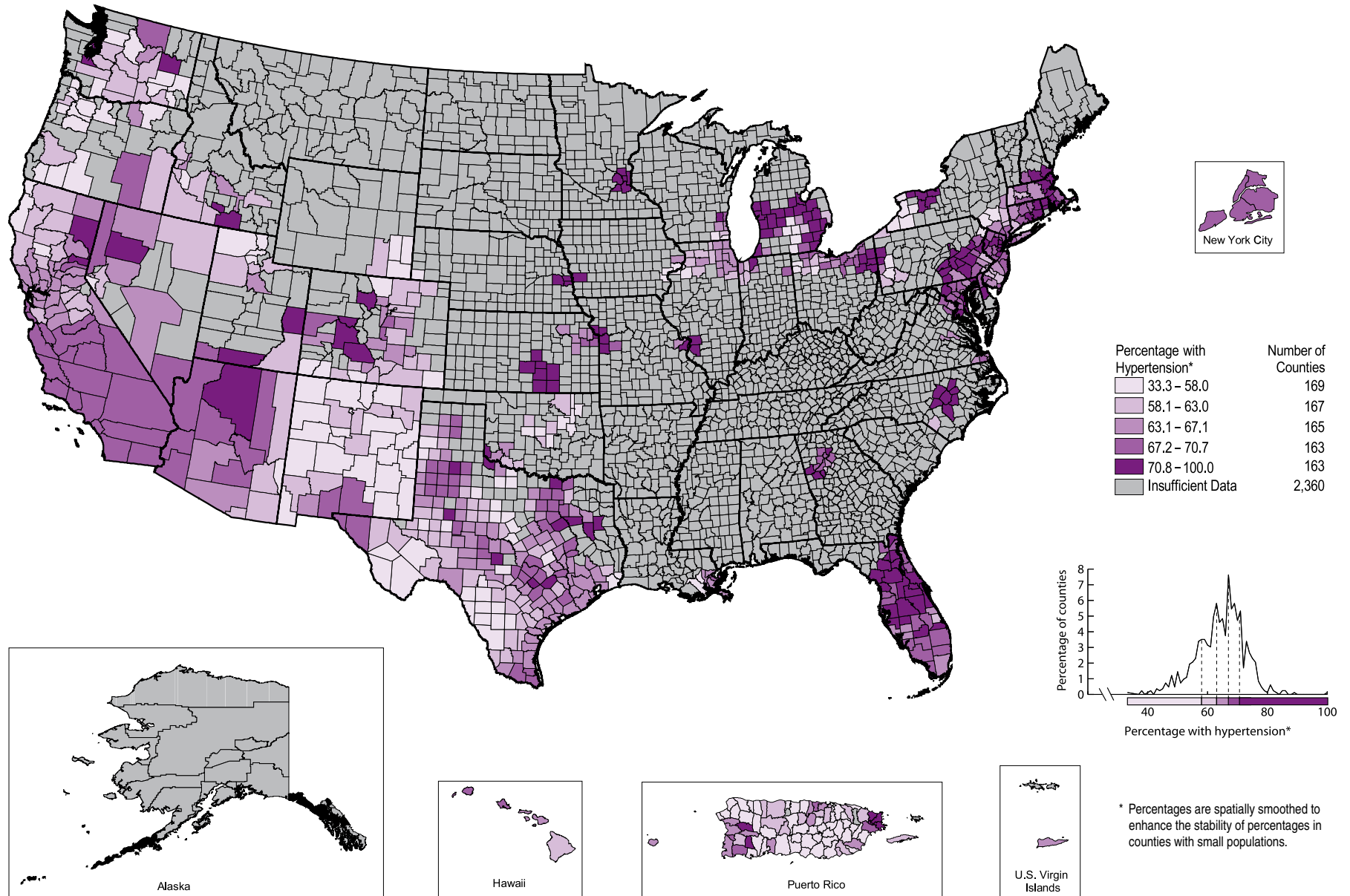
Medicare Beneficiaries Ages 65 and Older 1995–2002

Stroke Hospitalizations with Hypertension Blacks



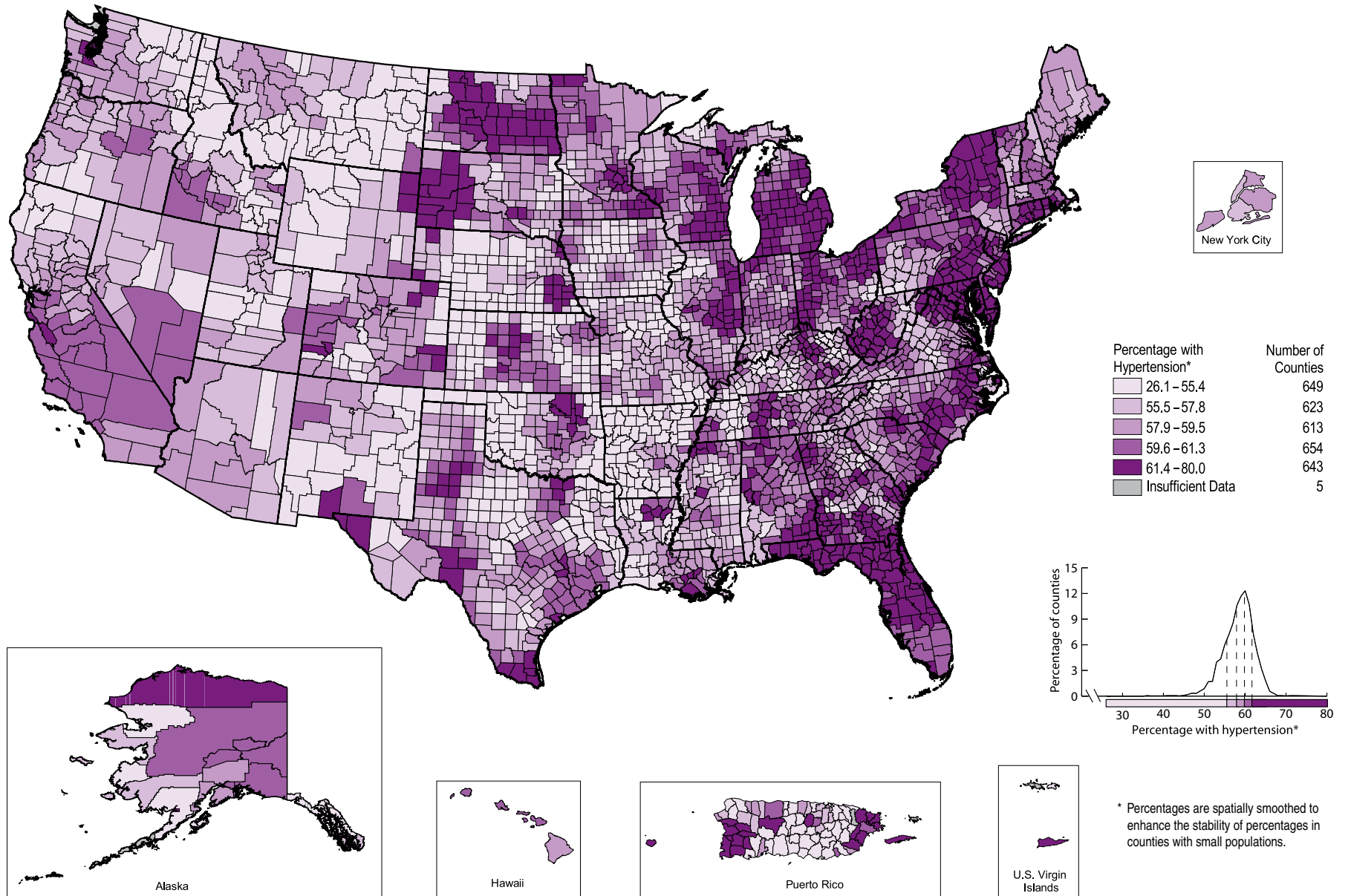
Medicare Beneficiaries Ages 65 and Older 1995–2002

Stroke Hospitalizations with Hypertension Hispanics



Medicare Beneficiaries Ages 65 and Older 1995–2002

Stroke Hospitalizations with Hypertension Whites



Total Population

Overall, 24.7% of stroke hospitalizations among Medicare beneficiaries ages 65 and older included a diagnosis of diabetes. The frequency distribution indicates that for the majority of counties, the percentage was between 18% and 28%. Counties with the highest percentages (i.e., counties in the top quintile, in which at least 26.6% of stroke hospitalizations included a diagnosis of diabetes) were located primarily in the southeastern states (North Carolina, South Carolina, Georgia, and Alabama), Puerto Rico, southwestern Texas, and sections of Ohio, Kentucky, and Pennsylvania.

Blacks

Among black Medicare beneficiaries ages 65 and older, 35.4% of stroke hospitalizations included a diagnosis of diabetes. The frequency distribution indicates that for the majority of counties, the percentage was between 28% and 42%. There did not appear to be a strong geographic pattern. However, concentrations of counties with the highest percentages (i.e., counties in the top quintile, in which at least 38.9% of stroke hospitalizations included a diagnosis of diabetes) were found in New York, Pennsylvania, West Virginia, South Carolina, northern Missouri, and parts of the New England states.

Hispanics

Among Hispanic Medicare beneficiaries ages 65 and older, 40% of stroke hospitalizations included a diagnosis of diabetes. The frequency distribution indicates that for the majority of counties, the percentage was between 30% and 50%. Counties with the highest percentages (i.e., counties in the top quintile, in which at least 47.6% of stroke hospitalizations included a diagnosis of diabetes) were located primarily along the northeastern corridor from the District of Columbia to Boston and in central Texas.

Whites

Among white Medicare beneficiaries ages 65 and older, 23.1% of stroke hospitalizations included a diagnosis of diabetes. The frequency distribution indicates that for the majority of counties, the percentage was between 18% and 26%. Concentrations of counties with the highest percentages (i.e., counties in the top quintile, in which at least 25% of stroke hospitalizations included a diagnosis of diabetes) were located primarily in New York, Pennsylvania, Ohio, West Virginia, northern Michigan, southern Texas, and Puerto Rico.

A Note on Methods

Stroke hospitalizations were defined as those for which the principal diagnosis on the Medicare hospital claim form was cerebrovascular disease, indicated by codes 430–434 and 436–438 according to the *International Classification of Diseases, 9th Revision, Clinical Modification* (ICD-9-CM). Hospitalizations for which the principal diagnosis was transient ischemic attacks (ICD-9-CM code 435) were excluded. Comorbidities were listed as secondary diagnoses (diagnosis fields 2–10) on the Medicare hospital claim form. For the complete list of ICD-9-CM codes for the selected comorbidities, see Appendix B.

For each map, the counties are categorized according to quintile; the darkest color represents counties with the highest percentages, and the lightest color represents counties with the lowest percentages. All county-level percentages have been spatially smoothed to enhance the stability in counties with small populations. Counties are categorized as having “insufficient data” if the sum of stroke hospitalizations in the index county plus the neighboring counties is less than 20, the Medicare population is less than 10, or the relative standard error of the estimated percentage is $\geq 30\%$. For more details, see Appendix B.

The frequency distribution in the bottom right corner of each map shows the range of percentages observed among counties on the corresponding map. The vertical dotted lines and the graded color bar along the x-axis illustrate the quintiles into which counties

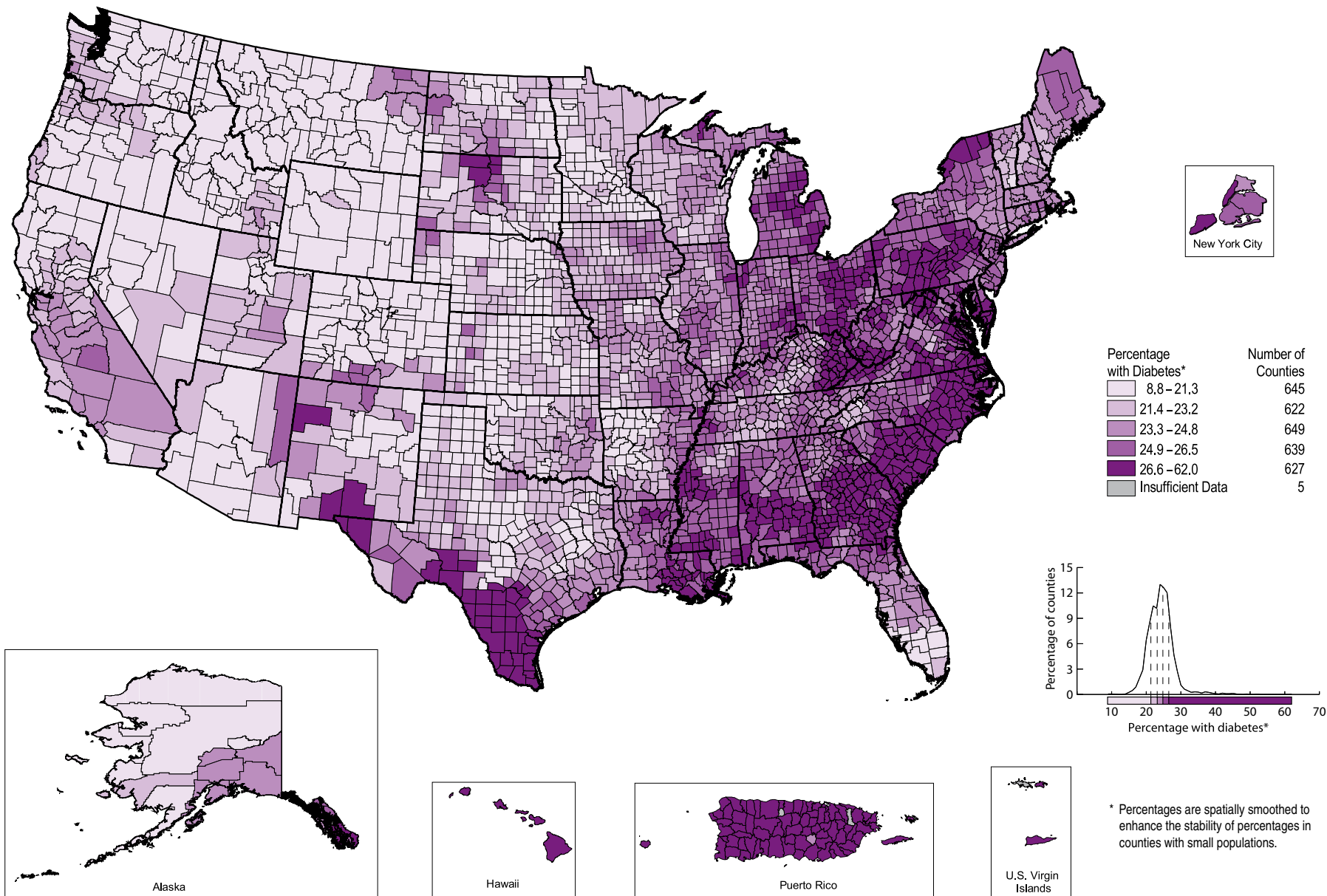
were divided on the basis of these percentages. The quintiles do not always have equal numbers of counties because many counties have the same percentage of hospitalizations. For a detailed explanation of the methods, see Appendix B.

A Cautionary Note

In the Medicare data sets, the accuracy of codes for Hispanic race and ethnicity is limited because these codes are not reported separately. For example, a person who is white and Hispanic is reported as either white or Hispanic. This reporting practice can result in misclassification of race and ethnicity. According to 1996 data, the probability that the racial/ethnic designation on Medicare claim forms is correct is 96.6% for whites and 95.5% for blacks, but only 19.4% for Hispanics. At the same time, the probability that a person identified as Hispanic in the Medicare data set is actually Hispanic is 98% (Arday SL, Arday DR, Monroe A, Zhang MD. HCFA’s racial and ethnic data: current accuracy and recent improvements. *Health Care Financing Review* 2000;21[4]:107–16). Together, these data suggest that Hispanics are underreported in the Medicare data sets and that this underreporting could introduce bias into the results presented here.

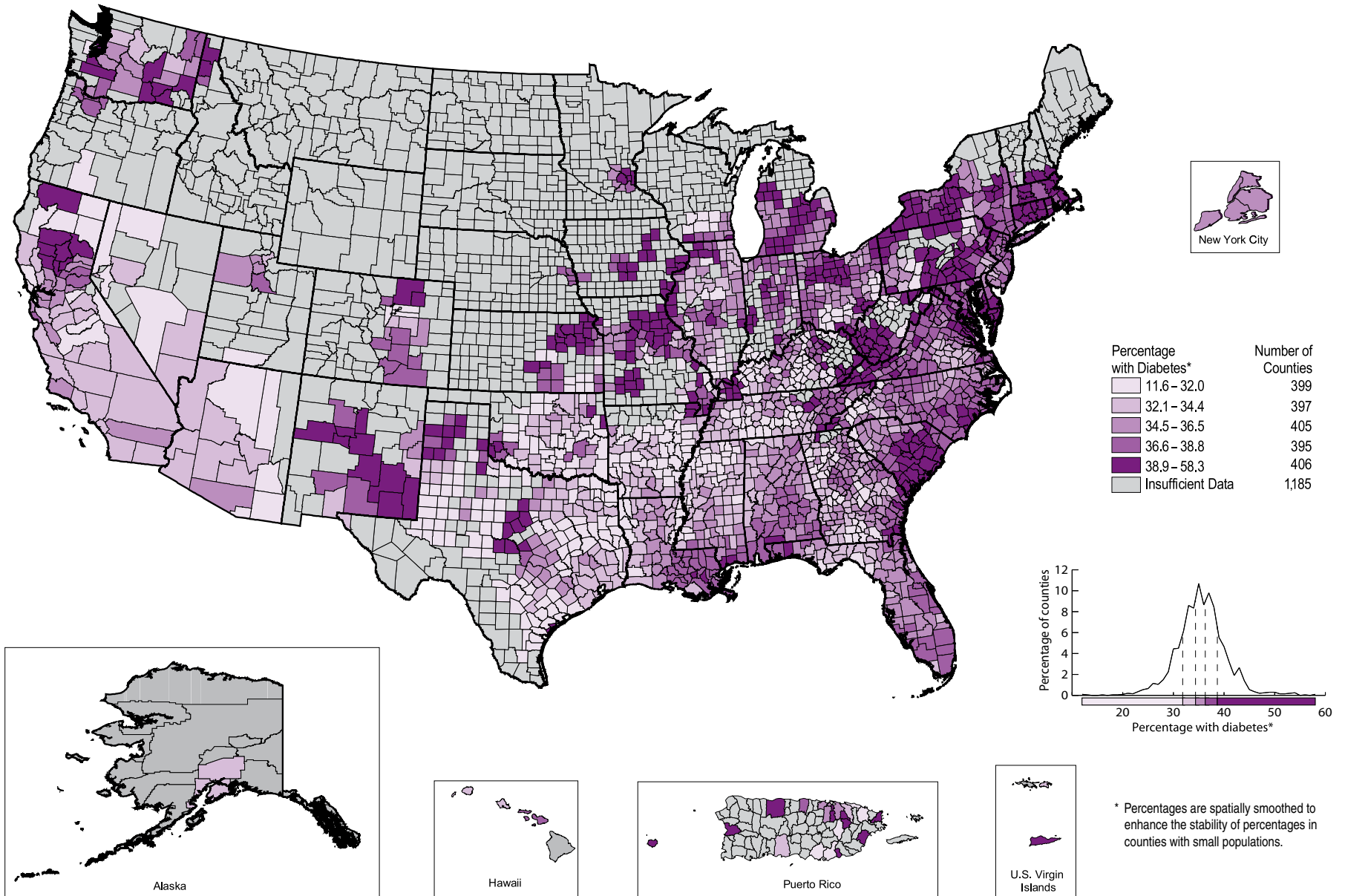
Medicare Beneficiaries Ages 65 and Older 1995–2002

Stroke Hospitalizations with Diabetes Total Population



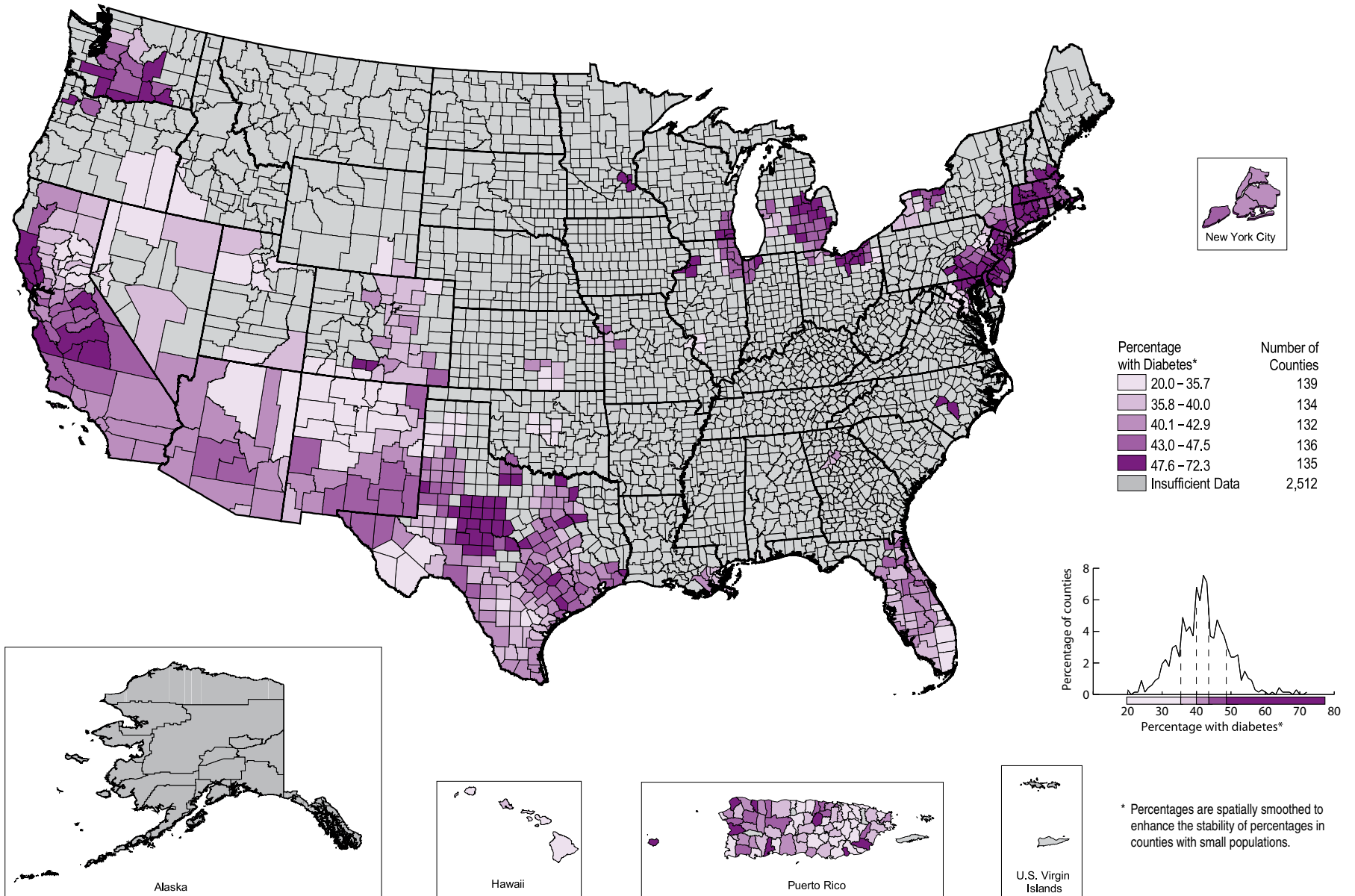
Medicare Beneficiaries Ages 65 and Older 1995–2002

Stroke Hospitalizations with Diabetes Blacks



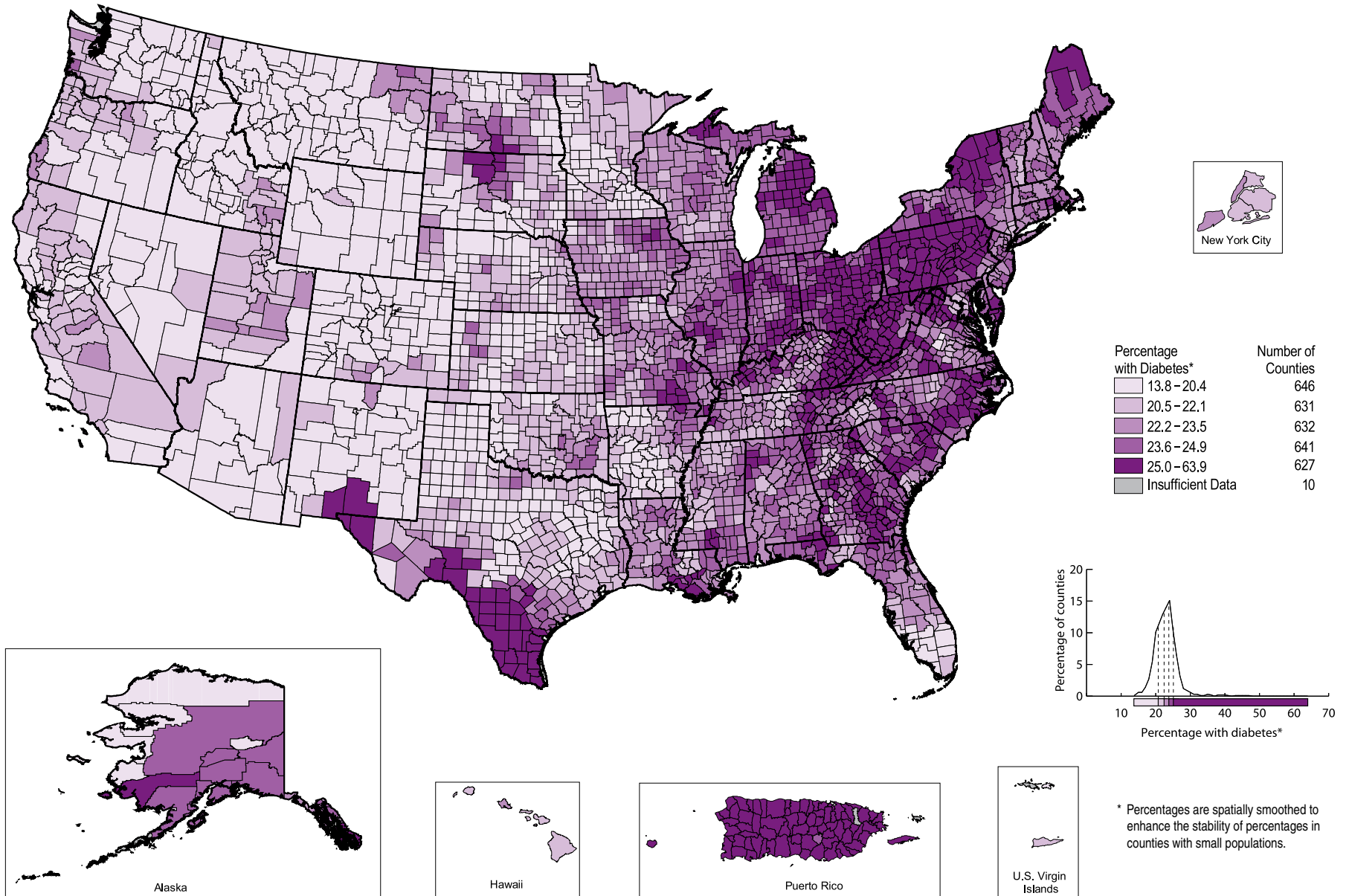
Medicare Beneficiaries Ages 65 and Older 1995–2002

Stroke Hospitalizations with Diabetes Hispanics



Medicare Beneficiaries Ages 65 and Older 1995–2002

Stroke Hospitalizations with Diabetes Whites



Total Population

Overall, 18.7% of stroke hospitalizations among Medicare beneficiaries ages 65 and older included a diagnosis of atrial fibrillation. The frequency distribution indicates that for the majority of counties, the percentage with atrial fibrillation was between 12% and 23%. Counties with the highest percentages (i.e., counties in the top quintile, in which at least 19.9% of stroke hospitalizations included a diagnosis of atrial fibrillation) were located mostly in the northern half of the United States—the Northwest, Minnesota, Wisconsin, and the Northeast. Florida and Hawaii also had concentrations of counties with the highest percentages.

Blacks

Among black Medicare beneficiaries ages 65 and older, 12.3% of stroke hospitalizations included a diagnosis of atrial fibrillation. The frequency distribution indicates that for the majority of counties, the percentage was between 9% and 16%. Counties with the highest percentages (i.e., counties in the top quintile, in which at least 13.9% of stroke hospitalizations included a diagnosis of atrial fibrillation) were scattered across parts of Washington, Alabama, Florida, northern Virginia, and the Northeast.

Hispanics

Among Hispanic Medicare beneficiaries ages 65 and older, 12.8% of stroke hospitalizations included a diagnosis of atrial fibrillation. The frequency distribution indicates that for the majority of counties, the percentage was between 5% and 20%. Counties with the highest percentages (i.e., counties in the top quintile, in which at least 15.6% of stroke hospitalizations included a diagnosis of atrial fibrillation) were scattered across parts of the Northeast, Southwest, and Florida.

Whites

Among white Medicare beneficiaries ages 65 and older, 19.6% of stroke hospitalizations included a diagnosis of atrial fibrillation. The frequency distribution indicates that for the majority of counties, the percentage was between 15% and 23%. Counties with the highest percentages (i.e., counties in the top quintile, in which at least 19.9% of stroke hospitalizations included a diagnosis of atrial fibrillation) were located mostly in the northern half of the United States—the Northwest, Minnesota, Wisconsin, and the Northeast. Florida and Hawaii also had concentrations of counties with the highest percentages.

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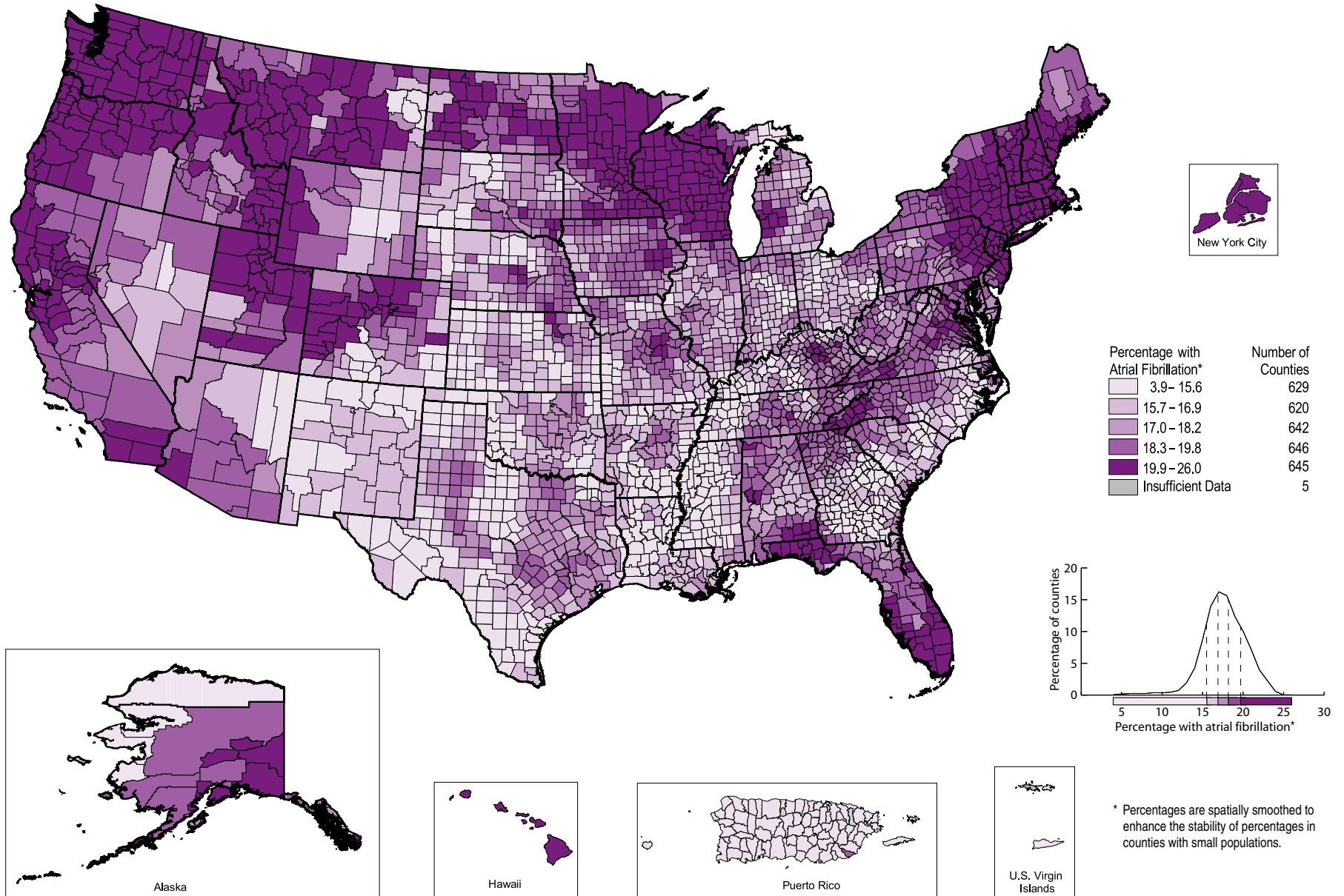
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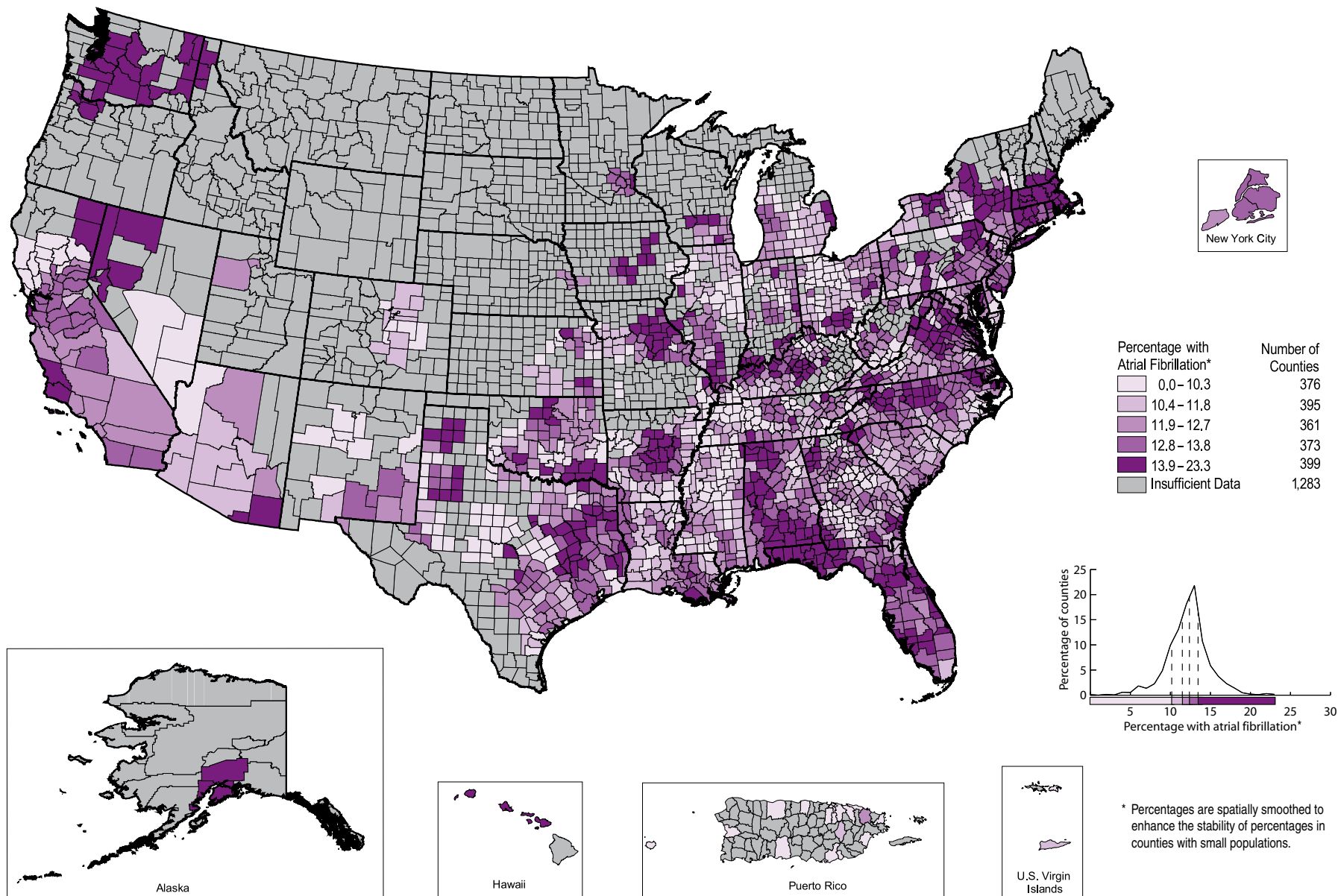
Medicare Beneficiaries Ages 65 and Older 1995–2002

Stroke Hospitalizations with Atrial Fibrillation Total Population



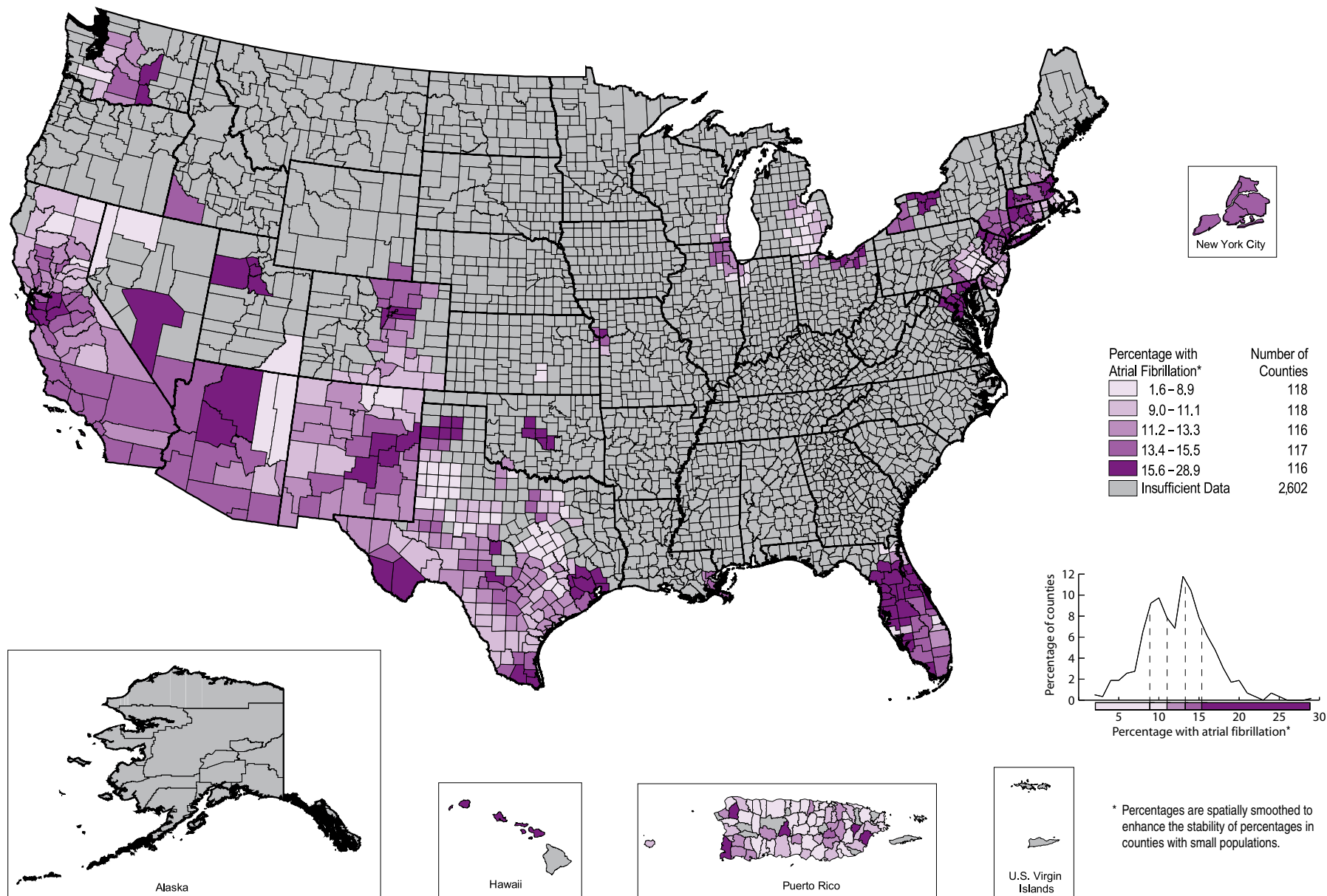
Medicare Beneficiaries Ages 65 and Older 1995–2002

Stroke Hospitalizations with Atrial Fibrillation Blacks



Medicare Beneficiaries Ages 65 and Older 1995–2002

Stroke Hospitalizations with Atrial Fibrillation Hispanics



Medicare Beneficiaries Ages 65 and Older 1995–2002

Stroke Hospitalizations with Atrial Fibrillation Whites

