

Prevalence and Mortality of Heart Disease and Related Conditions: Disparities affecting the South, Rural Areas, and American Indian and Alaska Natives

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Purpose & Aims

This brief was designed to identify trends in the prevalence of stroke, angina or coronary heart disease, and heart attack (myocardial infarction) while also assessing trends in mortality for heart disease and associated conditions across the nation. We aimed to identify whether disease-related mortality (congestive heart failure, ischemic heart disease, and stroke and cerebrovascular disease) and prevalence of disease (stroke, angina or coronary heart disease, and myocardial infarction) varied across both place (rurality, region) and time (mortality: 2006-2016; prevalence: 2011-2015).

Background

Previous work has identified health inequities in underlying social determinants of health, disease, and mortality across geography.¹⁻⁴ Therefore, identifying place-based factors associated with health inequities can be essential to ongoing surveillance efforts that seek to inform policy makers and other key stakeholders.

We used the World Health Organization's (WHO) Framework for Action on the Social Determinants of Health as the underlying framework, given structural determinants (e.g., place-based) of health inequities are a key mechanism with which this framework explores health inequities.² Examining factors that are important in identifying vulnerable populations across time and space (i.e., place) are both timely and critical to inform targeted and tailored approaches to ameliorate health inequities facing millions of individuals throughout the U.S.

Key Findings

- ◆ The likelihood of stroke, angina or coronary heart disease, and heart attack (myocardial infarction) was significantly higher in the South.
- ◆ The likelihood of stroke, angina or coronary heart disease, and heart attack (myocardial infarction) was significantly higher for American Indian or Alaska Native individuals as compared to White individuals.
- ◆ Rural areas of the South experienced high rates of mortality for multiple years related to congestive heart failure, ischemic heart disease, and stroke and cerebrovascular disease.
- ◆ Stroke and cerebrovascular disease mortality were highest in the South as compared to all other regions.
- ◆ Major declines were identified in mortality rates for ischemic heart disease over time (2006-2016).
- ◆ Both region and rurality were critical in assessing mortality, with major variation in rates of mortality across each.

Methods

Prevalence

Data

The nationally representative Behavioral Risk Factor Surveillance System (BRFSS) data were pooled to assess prevalence of outcomes (years: 2011, 2012, 2013, 2014, and 2015).

Outcomes

Key outcomes included: 1) having ever been told one had a stroke by a health care professional (versus not); 2) having ever been told one had angina or coronary heart disease by a health care professional (versus not); and 3) having ever been told one had a heart attack, also called a myocardial infarction, by a health care professional (versus not).

Place-Based Variables

Place-based or geospatial characteristics included rurality. For the purposes of this brief we will use the word “rural” generally to describe all non-metro and non-metropolitan statistical areas (MSA) areas. Rurality was assessed for prevalence in the BRFSS using 4-levels: 1) in the center city of an MSA; 2) outside the center city of an MSA but inside the county containing the center city; 3) inside a suburban county of the MSA; 4) not in an MSA (most rural area identifiable using the public use file of the BRFSS). In addition, U.S. Census Regions (Northeast, Midwest, South, West) were included.

Statistical Analyses

Odds ratios (OR) and 99% confidence intervals (CI) are reported to identify statistically significant differences. Multivariable analyses account for individual-level variables (i.e., age, income, sex, education, race and ethnicity, insurance status); place-based variables (i.e., region, rurality); and temporality (i.e., time).

Mortality

Data

Mortality rates were assessed using the National Center for Health Statistics (NCHS) data from the U.S. Centers for Disease Control and Prevention (CDC) Wonder database (2006-2016). The public use mortality file was used for mortality rate analyses. Of note, CDC Wonder data are suppressed in cases where relatively small cell sizes present, which is especially relevant for analyses that may include race, time, region, and rurality. Thus, complete analyses including detailed race and ethnicity were not presented due to data suppression in the CDC Wonder data.

Outcomes

Relevant International Classification of Diseases (ICD) codes, namely ICD-10 codes, were included to determine disease-related mortality for congestive heart failure, ischemic heart disease, and stroke and cerebrovascular disease mortality.

Place-Based Variables

For mortality outcomes we present analyses across U.S. Census Regions (Northeast, Midwest, South, West). Rurality was assessed for mortality in the CDC Wonder data using 6-levels with the NCHS Urban-Rural Classification Scheme for Counties: Metropolitan areas: 1) Large Central Metro; 2) Large Fringe Metro; 3) Medium Metro; 4) Small Metro; Non-Metropolitan areas: 5) Micropolitan; 6) Non-core).

Statistical Analyses

Age-adjusted mortality rates per 100,000 were utilized for descriptive analyses. The public use file used is limited to descriptive analyses alone and as such, tests for significant differences were not possible and therefore not presented. Thus, discussion of change or relative differences do not indicate statistically significant differences.

Results

Prevalence by Rurality and Region (pooled BRFSS data 2011-2015)

Brief Note: Comparing Unadjusted and Adjusted Analyses using the BRFSS

Unadjusted analyses demonstrate the magnitude of the difference in the outcome (e.g., stroke), while adjusted analyses, in addition to other things, help to describe the factors driving the problem.

Stroke

Brief summary (unadjusted analyses): When simply comparing rural to non-rural areas, we find that individuals residing in rural areas (areas not in an MSA) were more likely to report a stroke than those residing in non-rural areas.

Technical detail highlighting detailed odds ratios (OR) and associated 99% confidence intervals (CI) for statistically significant differences: The following compares individuals living in areas outside an MSA versus those living inside an MSA. Those less likely to report having ever had a stroke included those in the center city of an MSA versus not in an MSA (OR=0.853 CI 0.817-0.891); those outside the center city of an MSA but inside the county containing the center city versus not in an MSA (OR=0.739 CI 0.703-0.777); and those inside a suburban county of the MSA versus not in an MSA (OR=0.825 CI 0.781-0.871).

Brief summary (unadjusted analyses): Individuals residing in the South were more likely than any other region (i.e., Northeast, Midwest, West) to report having ever had a stroke. Individuals residing in the Midwest were more likely to report having ever had a stroke than all areas (i.e., Northeast, West), except the South.

Technical detail highlighting detailed odds ratios (OR) and associated 99% confidence intervals (CI) for statistically significant differences: When comparing across region, we found that those in the South were more likely than all other regions (Northeast versus South: OR=0.762 CI 0.726-0.800;

Midwest versus South: OR=0.898 CI 0.863-0.933; West versus South: OR=0.723 CI 0.689-0.758) to report having ever had a stroke. Furthermore, those in the Midwest were more likely than those in the Northeast (Midwest versus Northeast: OR=1.178 CI 1.119-1.240) to report having ever had a stroke. Those in the West were less likely than those in the Midwest (OR=0.805 CI 0.766-0.847) to report having ever had a stroke.

Brief summary (adjusted analyses): The following statements account for some additional factors that may be associated with stroke risk and report differences that exist even when considering things like income, sex, education, race and ethnicity, insurance status, region, and time. Individuals residing in the South were more likely than any other region (i.e., Northeast, Midwest, West) to report having ever had a stroke. While individuals residing in the Midwest were more likely than those in the West and Northeast to report having ever had a stroke. Those in the West were also more likely than those in the Northeast to report having ever had a stroke. Further, those in the Northeast were less likely than any other regions to report having ever had a stroke. American Indian or Alaska Native, and Black or African American individuals were more likely to report having ever had a stroke as compared to White individuals; with Hispanic individuals less likely to report having ever had a stroke as compared to White individuals.

Technical detail highlighting detailed odds ratios (OR) and associated 99% confidence intervals (CI) for statistically significant differences: After accounting for age, income, sex, education, race and ethnicity, insurance status, region, and time, we found the relationship (previously identified in unadjusted analyses not controlling for these additional factors) comparing more metropolitan areas to the most rural areas did not persist and in fact those in the most metropolitan areas were now more likely (OR=1.049 CI 1.002-1.097) to report having ever had a stroke than those in the most rural areas. However, similar findings (as previously identified in unadjusted analyses) were present across region, where those in the South were more likely than all other regions (Northeast versus South: OR=0.807 CI 0.761 0.855; Midwest versus South: OR=0.933

CI 0.891-0.976; West versus South: OR=0.894 CI 0.844-0.947) to report having ever had a stroke. Further, those in the Midwest were more likely than those in the Northeast (OR=1.156 CI 1.087-1.230) to report having ever had a stroke. In addition, those in the West were more likely than those in the Northeast (OR=1.108 CI 1.031-1.192) to report having ever had a stroke. In addition, variation was present across race and ethnicity where Hispanic individuals were less likely (OR= 0.642 CI 0.573-0.718) to ever report having ever had a stroke, whereas American Indian or Alaska Native, and Black or African American individuals were more likely (OR=1.749 CI 1.503-2.034; OR=1.245 CI 1.170-1.325, respectively) than White individuals.

Angina or Coronary Heart Disease

Brief summary (unadjusted analyses): When simply comparing rural to non-rural areas, we find that individuals residing in rural areas (areas not in an MSA) were more likely to report having ever had angina or coronary heart disease than those residing in non-rural areas.

Technical detail highlighting detailed odds ratios (OR) and associated 99% confidence intervals (CI) for statistically significant differences: When comparing more metropolitan areas to the most rural areas we found that those less likely to report having ever had angina or coronary heart disease included those in the center city of an MSA versus not in an MSA (OR=0.797 CI 0.769-0.827); those outside the center city of an MSA but inside the county containing the center city versus not in an MSA (OR=0.767 CI 0.736-0.798); and those inside a suburban county of the MSA versus not in an MSA (OR=0.862 CI 0.825-0.900).

Brief summary (unadjusted analyses): Individuals residing in the South were more likely than any other region (i.e., Northeast, Midwest, West) to report having ever had angina or coronary heart disease. In contrast, individuals residing in the West were less likely to report having ever had angina or coronary heart disease than all areas (i.e., Northeast, Midwest, South).

Technical detail highlighting detailed odds ratios (OR) and associated 99% confidence intervals (CI)

for statistically significant differences: When comparing across region, we found that those in the South were more likely than all other regions (Northeast versus South: OR= 0.913 CI 0.879-0.949; Midwest versus South: OR= 0.941 CI 0.912-0.971; West versus South: OR= 0.734 CI 0.705-0.765) to report having ever had angina or coronary heart disease. Further, those in the West were less likely than those in the Northeast (OR=0.804 CI 0.766-0.843) and the Midwest (OR=0.780 CI 0.747-0.814) to report having ever had angina or coronary heart disease.

Brief summary (adjusted analyses): The following statements account for some additional factors that may be associated with angina or coronary heart disease risk and report differences that exist even when considering things like income, sex, education, race and ethnicity, insurance status, region, and time. Individuals residing in the South were more likely than any other region (i.e., Northeast, Midwest, West) to report having ever had angina or coronary heart disease. In contrast, individuals residing in the West were less likely to report having ever had angina or coronary heart disease than all areas (i.e., Northeast, Midwest, South). White individuals were more likely to report having ever had angina or coronary heart disease than any other race or ethnicity (i.e., Hispanic, Asian, and Black or African American individuals), except for American Indian or Alaska Native individuals. American Indian or Alaska Native individuals were, in fact, more likely to report having ever had angina or coronary heart disease when compared to White individuals.

Technical detail highlighting detailed odds ratios (OR) and associated 99% confidence intervals (CI) for statistically significant differences: After accounting for age, income, sex, education, race and ethnicity, insurance status, region, and time, we found the relationship (previously identified in unadjusted analyses not controlling for these additional factors) comparing more metropolitan areas to the most rural areas did not persist. However, similar findings (as previously identified in unadjusted analyses) were present across region, where we find that those in the South were more likely than all other regions (Northeast versus South: OR=0.885 CI 0.845-0.926; Midwest versus South: OR=0.890 CI 0.857-0.923; West versus South: OR=0.799 CI

0.760-0.840) to report having ever had angina or coronary heart disease. Further, those in the West were less likely than those in the Northeast (OR=0.903 CI 0.851-0.959) and the Midwest (OR=0.898 CI 0.853-0.945) to report having ever had angina or coronary heart disease. In addition, variation was present across race and ethnicity where Hispanic, Asian, and Black or African American individuals were less likely (OR=0.669 CI 0.610-0.733; OR=0.744 CI 0.594-0.933; OR=0.787 CI 0.737-0.841, respectively) to report having ever had angina or coronary heart disease, whereas American Indian or Alaska Native individuals were more likely (OR=1.312 CI 1.128-1.525) than White individuals.

Heart Attack (Myocardial Infarction)

Brief summary (unadjusted analyses): When simply comparing rural to non-rural areas, we find that individuals residing in rural areas (areas not in an MSA) were more likely to report having ever had a heart attack than those residing in non-rural areas.

Technical detail highlighting detailed odds ratios (OR) and associated 99% confidence intervals (CI) for statistically significant differences: When comparing more metropolitan areas to the most rural areas, we found that those less likely to report having ever had a heart attack included those in the center city of an MSA versus not in an MSA (OR=0.726 CI 0.699-0.753); those outside the center city of an MSA but inside the county containing the center city versus not in an MSA (OR=0.687 CI 0.659-0.716); and those inside a suburban county of the MSA versus not in an MSA (OR=0.798 CI 0.764-0.834).

Brief summary (unadjusted analyses): Individuals residing in the South were more likely than any other region (i.e., Northeast, Midwest, West) to report having ever had a heart attack. In contrast, individuals residing in the West were less likely to report having ever had a heart attack than all areas (i.e., Northeast, Midwest, South). Further, those in the Midwest were more likely to report having ever had a heart attack than those in the Northeast.

Technical detail highlighting detailed odds ratios (OR) and associated 99% confidence intervals (CI) for statistically significant differences: When

comparing across region, we found that those in the South were more likely than all other regions (Northeast versus South: OR=0.868 CI 0.835-0.902; Midwest versus South: OR=0.949 CI 0.919-0.981; West versus South: OR=0.719 CI 0.690-0.749) to report having ever had a heart attack. Further, those in the Midwest were more likely than those in the Northeast (OR=1.094 CI 1.050-1.140) to report having ever had a heart attack. Additionally, those in the West were less likely than those in the Northeast (OR=0.829 CI 0.790-0.869) and those in the Midwest (OR=0.757 CI 0.726-0.790) to report having ever had a heart attack.

Brief summary (adjusted analyses): The following statements account for some additional factors that may be associated with heart attack risk and report differences that exist even when considering things like income, sex, education, race and ethnicity, insurance status, region, and time. We find that individuals residing in rural areas (areas not in an MSA) were more likely to report having ever had a heart attack than those residing in most non-rural areas, except for those residing inside a suburban county of the MSA (where there was no difference). Those individuals residing in the West were less likely to report having ever had a heart attack than all areas (i.e., Northeast, Midwest, South). White individuals were more likely to report having ever had a heart attack than any other race or ethnicity (i.e., Hispanic, Asian, and Black or African American individuals), except for American Indian or Alaska Native individuals. American Indian or Alaska Native individuals were, in fact, more likely to report having ever had a heart attack when compared to White individuals.

Technical detail highlighting detailed odds ratios (OR) and associated 99% confidence intervals (CI) for statistically significant differences: After accounting for age, income, sex, education, race and ethnicity, insurance status, region, and time, we found the relationship (previously identified in unadjusted analyses not controlling for these additional factors) comparing more metropolitan areas to the most rural areas did persist in some cases. We found evidence to suggest those less likely to report having ever had a heart attack included those

in the center city of an MSA versus not in an MSA (OR=0.946 CI 0.909-0.983); and those outside the center city of an MSA but inside the county containing the center city versus not in an MSA (OR=0.915 CI 0.875-0.956). However, there was no difference among those inside a suburban county of the MSA versus not in an MSA (OR=0.983 CI 0.938-1.030). Similar findings (as reported in unadjusted analyses) were present across region, where we find that those in the South were more likely than all other regions (Northeast versus South: OR=0.903 CI 0.861-0.947; Midwest versus South: OR=0.942 CI 0.907-0.980; West versus South: OR=0.844 CI 0.801-0.888) to report having ever had a heart attack. Further, those in the West were less likely than those in the Northeast (OR=0.935 CI 0.880-0.993) and Midwest (OR=0.895 CI 0.850-0.943) to report having ever had a heart attack. In addition, variation was present across race and ethnicity where Hispanic, Asian, and Black or African American individuals were less likely (OR=0.690 CI 0.629-0.757; OR=0.666 CI 0.527-0.841; OR=0.798 CI 0.747-0.853, respectively) to report having ever had a heart attack, whereas

American Indian or Alaska Natives individuals were more likely (OR=1.520 CI 1.318-1.753) than White individuals.

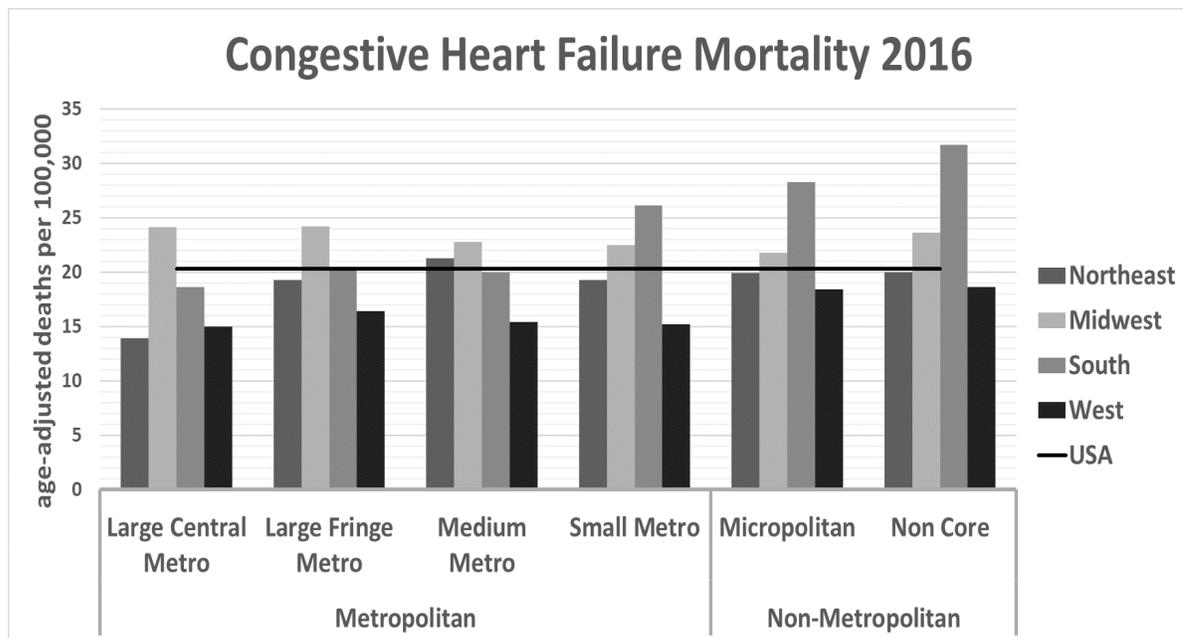
Age-adjusted Mortality by Region and Rurality (public use mortality file 2006-2016)

Results are presented for congestive heart failure, stroke and cerebrovascular disease, and ischemic heart disease mortality (age-adjusted) across region and rurality for 2016. In addition, we present 10-year trends across region and rurality for 2006-2016.

Age-adjusted Congestive Heart Failure Mortality by Rurality, and Region

Figure 1, using data for 2016, presents evidence that among small metro areas and non-metropolitan areas (micropolitan, non-core) congestive heart failure mortality rates were highest in the South, whereas mortality rates were highest in the Midwest among large central, large fringe, and medium metro areas.

Figure 1. Age-adjusted Congestive Heart Failure Mortality in the U.S. in 2016 by Region and Rurality



Metropolitan areas refer to more urban areas, while non-metropolitan refers to more rural areas.

Age-adjusted Congestive Heart Failure Mortality Over Time, Rurality, and Region

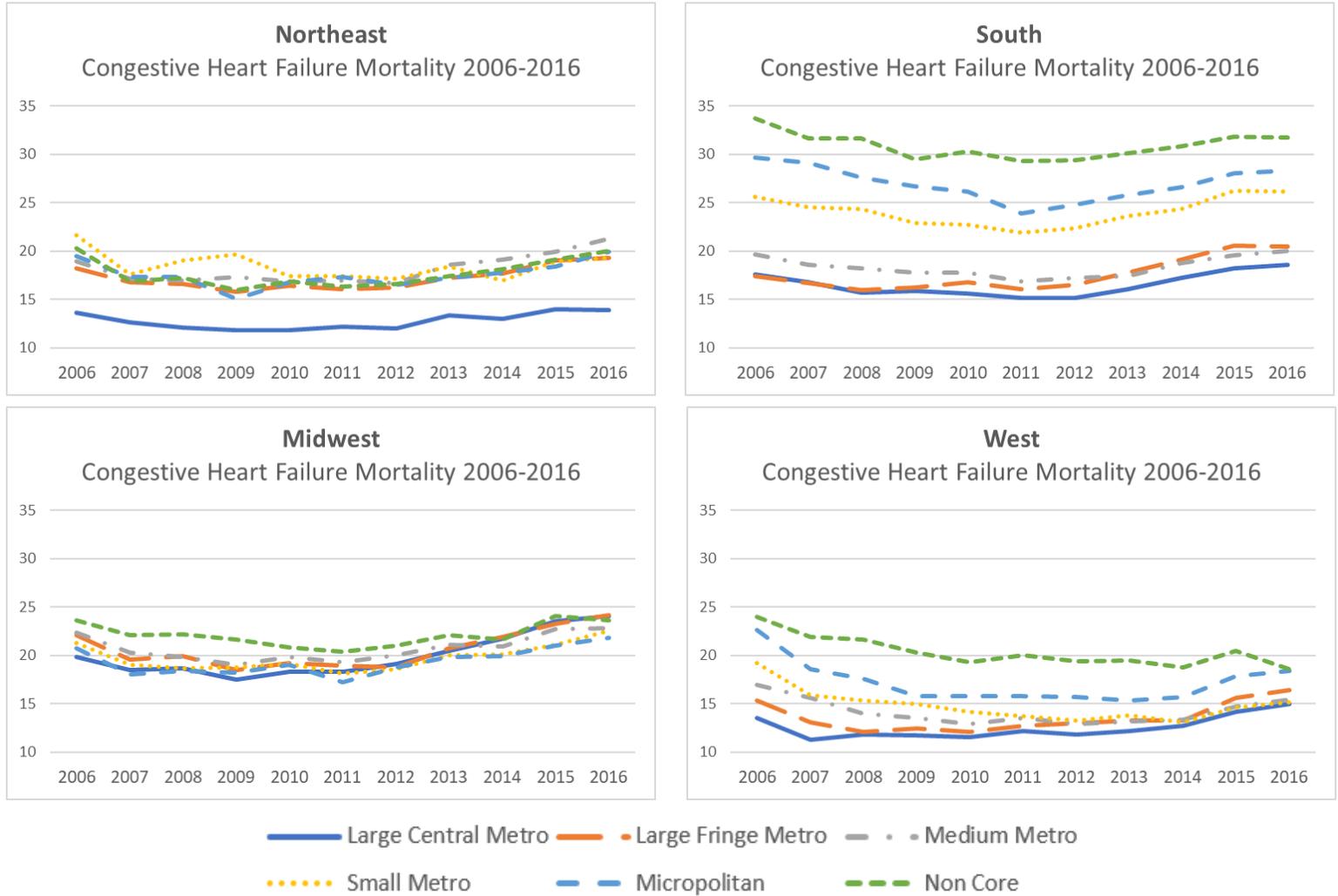
Analyses were performed to assess congestive heart failure age-adjusted mortality rates across time, rurality, and region (see **Figure 2**). In many cases, rates were somewhat stable over time from 2006 to 2016.

In 2006, rates for large central metro areas were 13.6, 19.8, 17.6, and 13.5 per 100,000 for the Northeast, Midwest, South, and West, respectively. In 2016, rates for large central metro areas were 13.9, 24.1, 18.6, and 15.0 per 100,000 for the Northeast, Midwest, South, and West, respectively.

In 2006, rates for the most rural areas (non-core) were 20.3, 23.6, 33.7, and 24.0 per 100,000 for the Northeast, Midwest, South, and West, respectively. In 2016, rates for the most rural areas (non-core) were 20.0, 23.6, 31.7, and 18.6 per 100,000 for the Northeast, Midwest, South, and West, respectively.

In 2006, age-adjusted mortality rates were highest for the South at 33.7 deaths per 100,000 among the most rural areas (non-core). Ten years later, in 2016, we found mortality rates were still highest in the most rural areas (non-core) of the South at 31.7 deaths per 100,000.

Figure 2. Age-adjusted Congestive Heart Failure Mortality in the U.S. 2006 to 2016 by Region and Rurality

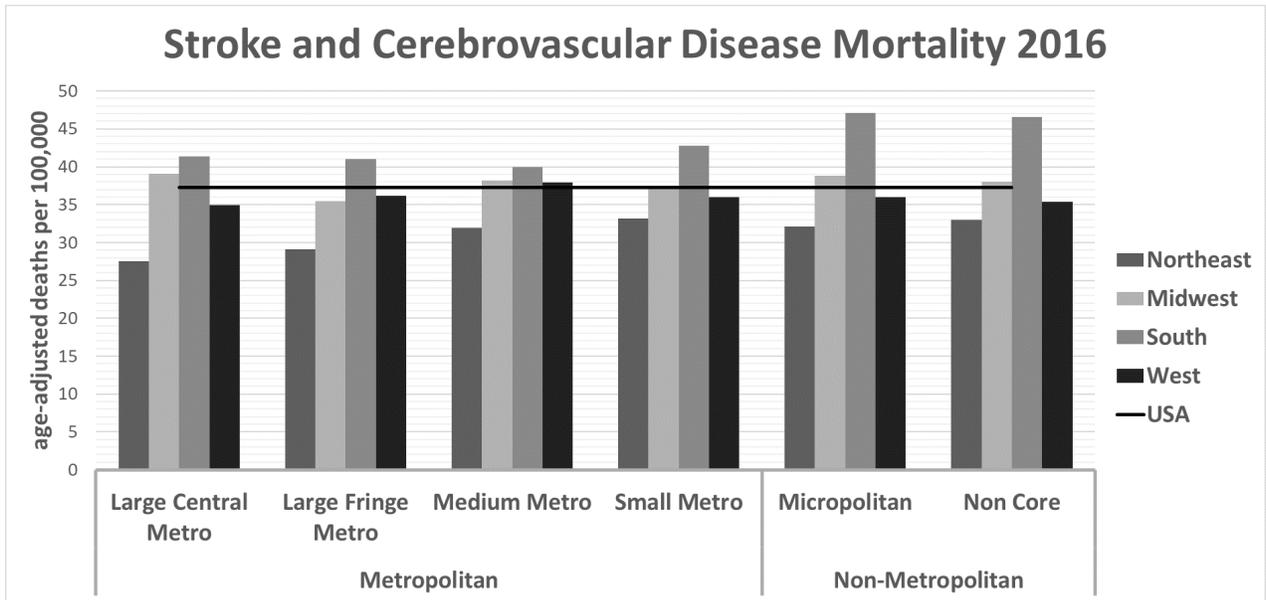


Metropolitan areas (large central metro, large fringe metro, medium metro, small metro) refer to more urban areas, while non-metropolitan (micropolitan, non core) refers to more rural areas.

Age-adjusted Stroke and Cerebrovascular Disease Mortality by Rurality and Region

Figure 3, using data from 2016, presents evidence that among both metro and non-metro areas stroke and cerebrovascular disease mortality rates were highest in the South than in any other region, with larger gaps in rates seen in non-metropolitan areas inclusive of both micropolitan areas and the most rural areas (non-core).

Figure 3. Age-adjusted Stroke and Cerebrovascular Disease Mortality in the U.S. in 2016 by Region and Rurality



Metropolitan areas refer to more urban areas, while non-metropolitan refers to more rural areas.

Age-adjusted Stroke and Cerebrovascular Disease Mortality Over Time, Rurality, and Region

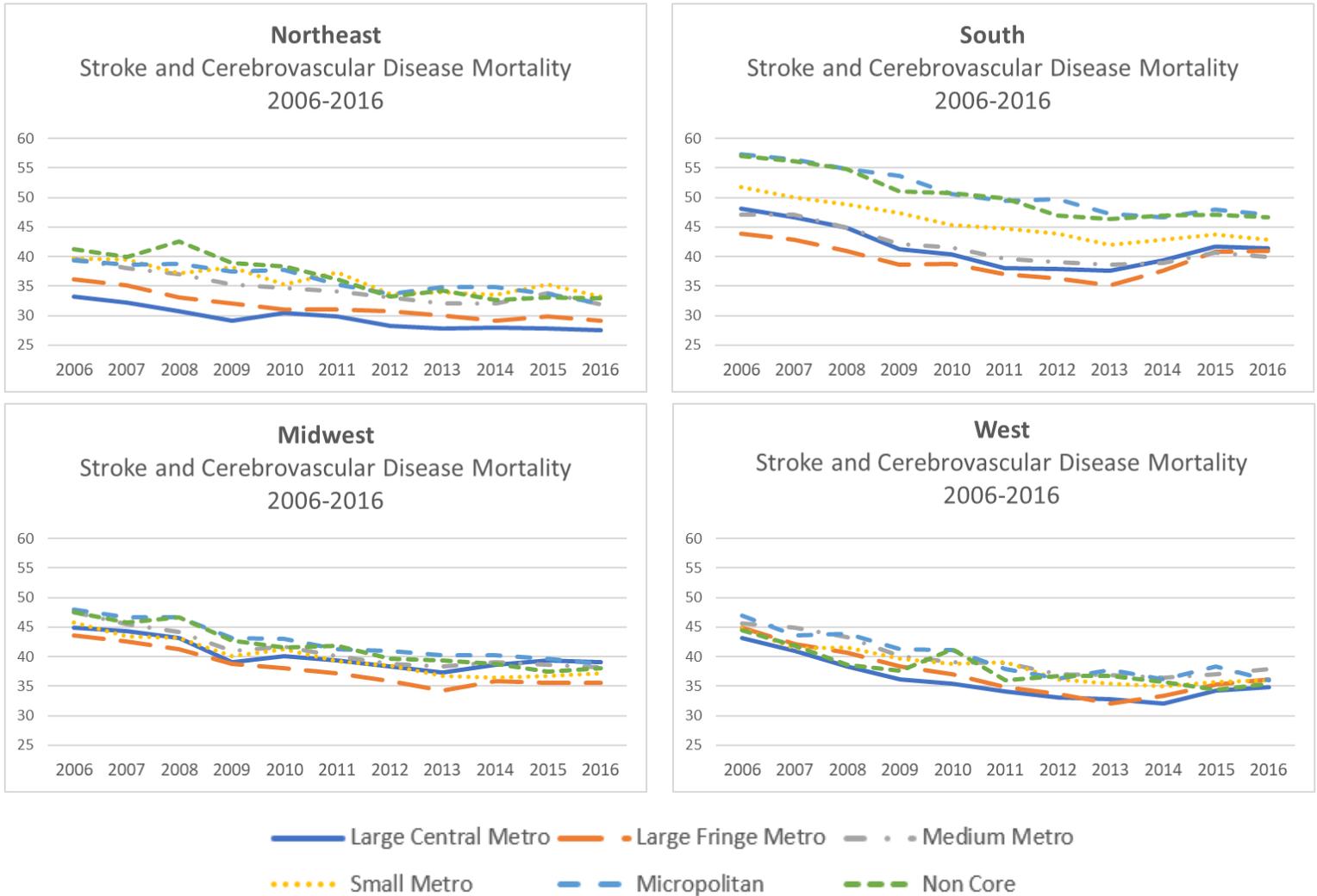
Analyses were performed to assess stroke and cerebrovascular disease age-adjusted mortality rates across time, rurality, and region (Figure 4). In many cases rates varied over time from 2006 to 2016.

In 2006, rates for large central metro areas were 33.3, 44.9, 48.1, and 43.1 per 100,000 for the Northeast, Midwest, South, and West, respectively. In 2016, rates for large central metro areas were 27.5, 39.1, 41.4, and 34.9 per 100,000 for the Northeast, Midwest, South, and West, respectively.

In 2006, rates for the most rural areas (non-core) were 41.2, 47.6, 57.0, and 44.4 per 100,000 for the Northeast, Midwest, South, and West, respectively. In 2016, rates for the most rural areas (non-core) areas were 33.0, 38.0, 46.6, and 35.4 per 100,000 for the Northeast, Midwest, South, and West, respectively.

In 2006, mortality rates were highest for the non-metropolitan South at 57.3 and 57.0 deaths per 100,000 among micropolitan areas and the most rural areas (non-core), respectively. Ten years later, in 2016, we found mortality rates were still highest in non-metropolitan areas of the South at 47.1 and 46.6 for micropolitan areas and the most rural areas (non-core), respectively.

Figure 4. Age-adjusted Stroke and Cerebrovascular Disease Mortality in the U.S. 2006 to 2016 by Region and Rurality

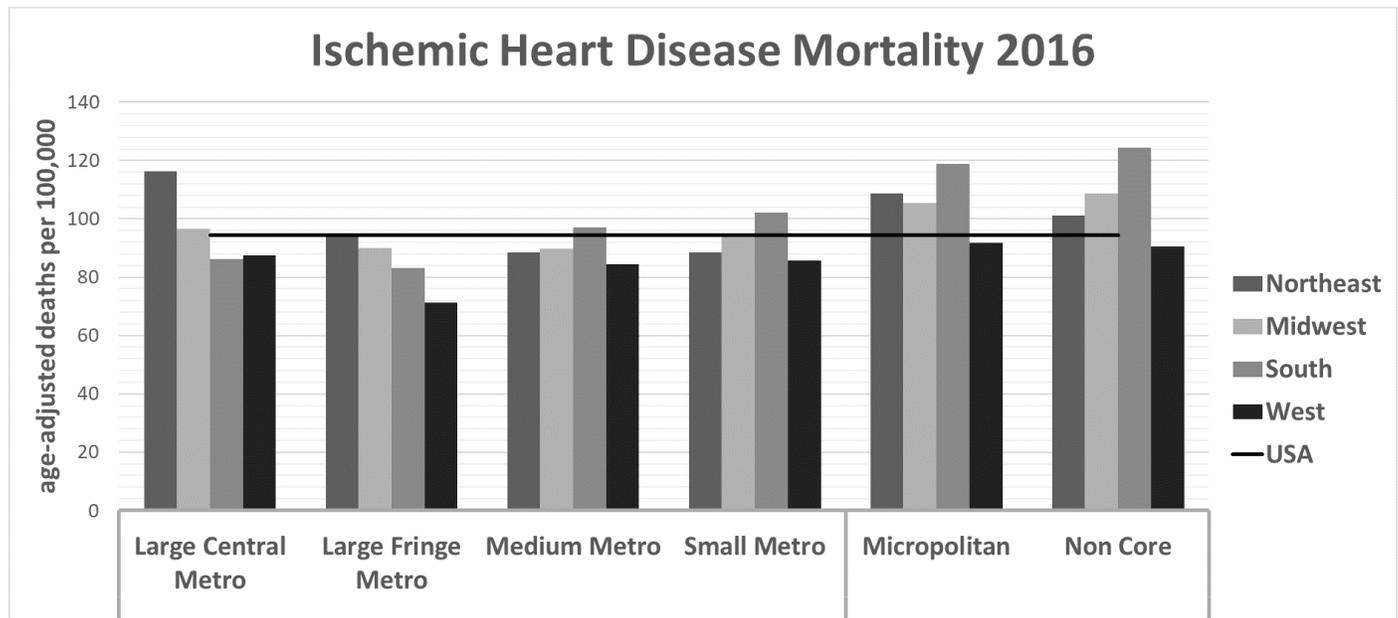


Metropolitan areas (large central metro, large fringe metro, medium metro, small metro) refer to more urban areas, while non-metropolitan (micropolitan, non-core) refers to more rural areas

Age-adjusted Ischemic Heart Disease Mortality by Rurality and Region

Figure 5, using data from 2016, presents evidence that among medium metro areas, small metro areas and non-metropolitan areas (micropolitan, non-core) ischemic heart disease age-adjusted mortality rates were highest in the South, whereas mortality rates were highest in the Northeast among large central metro areas and large fringe metro areas.

Figure 5. Age-adjusted Ischemic Heart Disease Mortality in the U.S. in 2016 by Region and Rurality



Metropolitan areas refer to more urban areas, while non-metropolitan refers to more rural areas

Age-adjusted Ischemic Heart Disease Mortality Over Time, Rurality, and Region

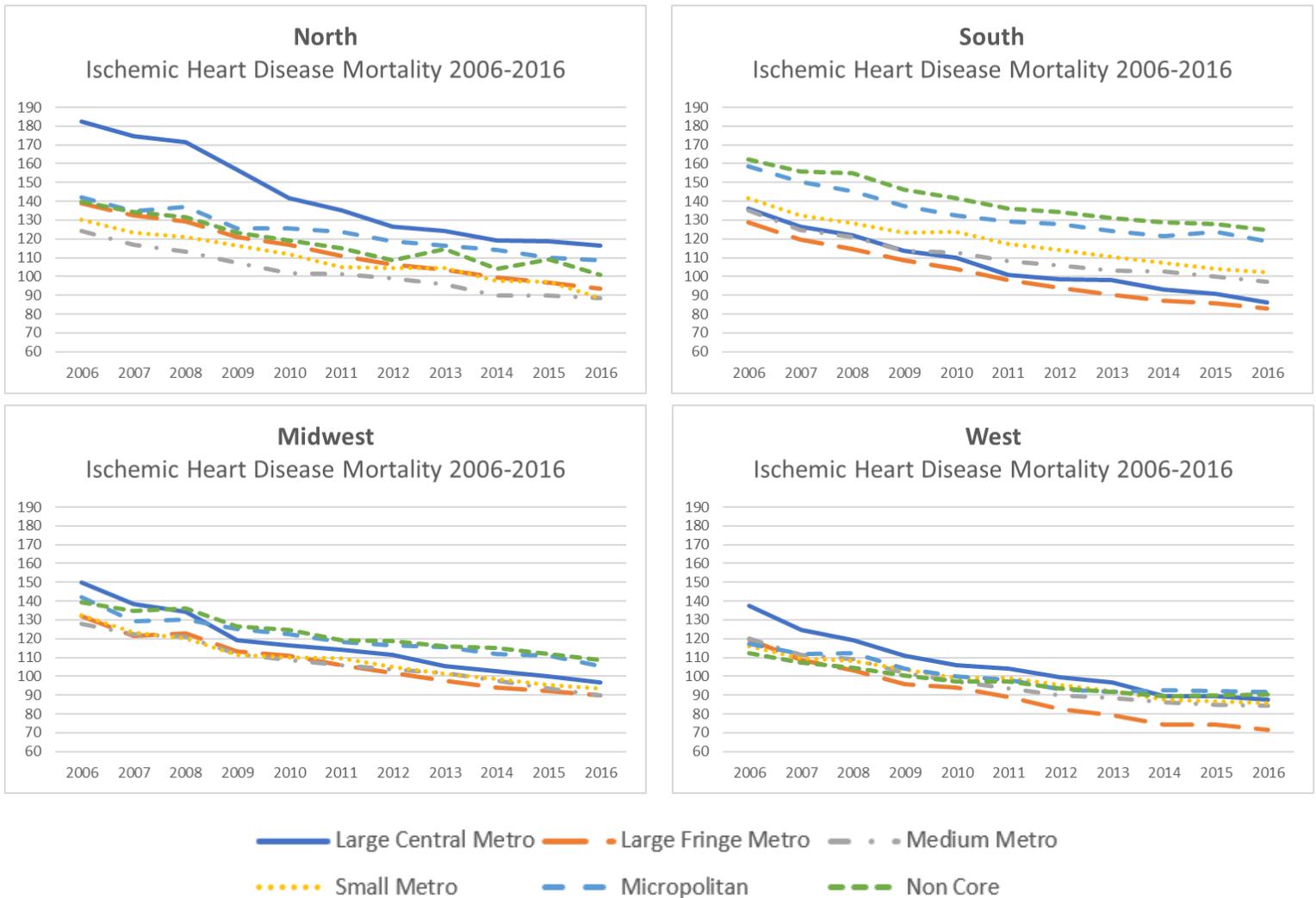
We present analyses in **Figure 6** (next page) for ischemic heart disease mortality noting the largest changes in rates over time (e.g., a 66-point downward swing from 2006 at 182.4 to 2016 at 116.4 for large central metro areas of the Northeast) relative to other outcomes presented in this study.

Figure 6 presents ischemic heart disease mortality rates across time, rurality, and region. In many cases, rates were lower over time from 2006 to 2016. In 2006, mortality rates were highest for the Northeast at 182.4 deaths per 100,000 among large central metro areas. However, ten years later, in 2016, we find mortality rates were highest in the most rural areas (non-core) of the South at 124.5 deaths per 100,000.

Given the substantial rate of change for ischemic heart disease mortality, greater than all other outcomes, we also calculate the change for the most metropolitan areas and

the most rural areas (see **Figure 6**). Overall, the *change in rates* from 2006 to 2016 were highest for the most metropolitan areas ranging from a low of 50.0 and 50.3 points (i.e., rates in 2006 minus rates in 2016) in the South and West, respectively to a high of 66 points in the Northeast. However, for non-metropolitan areas (micropolitan, non-core) we find the smallest changes at 25.7 and 22.0 points in micropolitan and non-core areas of the West respectively. The largest changes among micropolitan areas were seen in the South at 39.7, whereas the largest changes among the most rural areas (non-core) were seen in the Northeast at 38.7.

Figure 6. Age-adjusted Ischemic Heart Disease Mortality in the U.S. 2006 to 2016 by Region and Rurality



Metropolitan areas (large central metro, large fringe metro, medium metro, small metro) refer to more urban areas, while non-metropolitan (micropolitan, non-core) refers to more rural areas

Discussion

Limitations

While data are presented both over time and across many relevant characteristics, we were unable to include several critical factors (e.g., lifestyle, family history of disease) that may affect mortality rates and prevalence of heart disease and related conditions. That said, the data present objective outcomes for mortality that can add value to relevant public health planning. Further, the prevalence and mortality data do not overlap completely in that the BRFSS changed the weighting methodology in 2011 and, as such, may not be comparable when assessing outcomes from *before 2011 to 2011 and after*. Thus, we only included data from 2011 to 2015. The BRFSS is severely limited in assessing rurality in that multiple levels of metropolitan areas are available and yet only a single level for rural areas is available. Further, analyses is restricted (e.g., landline data) when assessing rurality in the BRFSS and may not account for those using cell phones exclusively and as such is a major limitation. In addition, the BRFSS data rely on self-reported data and as such may be affected by recall bias. We recommend analyses using the BRFSS include the restricted file using geographic identifiers (e.g., county) to link to other measures of rurality (e.g., NCHS Urban-Rural Classification Scheme for Counties). However, at the time of this analyses this restricted file was not yet available for the BRFSS for the years 2011 and after. Further, only analyses for prevalence also presented race and ethnicity comparisons, given data suppression for mortality for multiple comparisons. The WHO Framework for Action on the Social Determinants of Health includes several factors at both the individual and more structural levels (e.g., place-based) that influence health inequities.² We were not able to include all possible factors that might be related to the inequities measured in the South. As such, we suggest future study to explore additional factors related to these persistent disparities. These and other limitations should be taken into account when considering the implications of the current brief.

Conclusions

The prevalence of heart disease and related conditions varied across rurality and region with the South experiencing major disparities. Even after considering several relevant factors, region continued to play a major role in identifying place-based disparities, while rurality did not in many cases. Thus, in terms of prevalence, policy makers and other stakeholders should consider ways to reduce disparities facing the South. Further, American Indian or Alaska Native individuals faced significant health inequities as compared to White individuals across each outcome assessing prevalence. These major inequities should also serve as targets for policy makers in terms of providing additional resources to help reduce the burden of disease facing at-risk populations.

Mortality rates for common issues facing millions of Americans vary by time, rurality, and region. In most instances non-metropolitan areas of the South had the highest mortality rates relative to other regions and relative to more metropolitan areas. Mortality rates for congestive heart failure did vary, however in many cases were within five points of each other when comparing rates in 2006 and 2016 among the most metropolitan and most rural areas, respectively. Mortality rates for stroke and cerebrovascular disease also did vary, however in many cases were within 10 points of each other when comparing rates in 2006 and 2016 among the most metropolitan and most rural areas, respectively. However, the most dramatic changes occurred in ischemic heart disease mortality rates. Here we found that for large central metro areas of the Northeast (where the highest rates were found in 2006) there was a large drop from 2006 to 2016 with somewhat smaller point changes for non-metropolitan areas.

Policy makers and other decision makers and other relevant stakeholders (e.g., physicians, individuals at risk for chronic disease) can use this information to take action. Recognizing the role that place plays in mortality and prevalence of heart disease and related conditions is a critical piece of the puzzle when seeking ways to ameliorate chronic disease and related mortality.

References

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