Widening Rural Disadvantage in U.S. Premature Heart Disease Mortality: Trends by Region and Race/Ethnicity, 2000 - 2014

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Disclosures: NONE

Disclaimer: The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

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Study Purpose

- Premature heart disease mortality is a serious public health problem in the United States.
- Recent national declines driven by improved medical care for heart attack patients and by risk factor improvements.
- Access to care and risk factor prevalences worse in rural areas.

- **Main comparison: Trends by geography**
- **Stratified analysis by race/ethnicity**
Study Population

- Adults aged 25 to 64 years old, residing in the United States
- Years = 2000 to 2014
- 5 mutually exclusive racial/ethnic groups:
  - White non-Hispanic
  - Hispanic (any race)
  - Black non-Hispanic
  - Asian/Pacific Islander (non-Hispanic)
  - American Indian/Alaska Native (non-Hispanic)
Data Sources

- Heart disease mortality data from the National Vital Statistics System
- Diseases of the heart (ICD-10 I00-I09, I11, I13, I20-I51)
- Underlying cause of death
- Population data were comprised of intercensal (2000-2009), census (2010) and postcensal (2011-2014) bridged-race estimates.
- All data were accessed through CDC WONDER.
Definitions: Region

- **South** = AL, AR, DE, DC, FL, GA, KY, LA, MD, MS, NC, OK, SC, TN, TX, VA, WV (Census definition)

- **Non-South** = all other states
Definitions: Urban-Rural

- **Large Central Metro** = the central city counties of metropolitan statistical areas (MSAs) of total population > 1 million.
- **Large Fringe Metro** = the non-central city counties of MSAs of total population > 1 million.
- **Medium/Small Metro** = counties in MSAs with total population < 1 million.
- **Micropolitan/Rural** = non-metropolitan counties including small cities/towns (micropolitan).
Figure 1.
National Center for Health Statistics Urban-Rural Classification Scheme for United States Counties
POPULATION AT RISK
Figure 2.
Population at Risk: **White Adults Aged 25 to 64** by Residential Region and Urbanicity, United States, 2014
\[ n = 107,252,241 \]
Figure 3.
Population at Risk: *Hispanic Adults Aged 25 to 64* by Residential Region and Urbanicity, United States, 2014
\[ n = 27,252,241 \]
Figure 4.
Population at Risk: Black Adults Aged 25 to 64
by Residential Region and Urbanicity, United States, 2014
n = 21,168,905
Figure 5.
Population at Risk: Asian/Pacific Islander Adults Aged 25 to 64 by Residential Region and Urbanicity, United States, 2014
n = 10,532,411
Figure 6.
Population at Risk: American Indian/Alaska Native Adults Aged 25 to 64 by Residential Region and Urbanicity, United States, 2014
n = 1,354,145

- Large Central Metro South: 24.6%
- Large Central Metro Non-South: 13.3%
- Large Fringe Metro South: 12.6%
- Large Fringe Metro Non-South: 7.4%
- Medium/Small Metro South: 10.8%
- Medium/Small Metro Non-South: 5.1%
- Rural South: 21.6%
- Rural Non-South: 4.6%
HEART DISEASE MORTALITY TRENDS
Statistical Analyses

- Death rates were age-adjusted by the direct method to the 2000 US standard population.
- Linear regression of the log-transformed death rates, weighted by the inverse of the variance.
- Average annual percent change (AAPC) and 95% confidence intervals (CI) derived from regression parameters.
Figure 7.
Premature Heart Disease Mortality Among Whites by Residential Urbanicity and Region, 2000-2014
Figure 8.
AAPC in Premature Heart Disease Mortality Among Whites by Residential Urbanicity and Region, 2000-2014
Figure 9.
Premature Heart Disease Mortality Among Hispanics by Residential Urbanicity and Region, 2000-2014
Figure 10.
AAPC in Premature Heart Disease Mortality Among Hispanics by Residential Urbanicity and Region, 2000-2014
Figure 11.
Premature Heart Disease Mortality Among **Blacks** by Residential Urbanicity and Region, 2000-2014

**South**

- Large Central Metro
- Large Fringe Metro
- Medium/Small Metro
- Micropolitan/Rural

**Non-South**

- Large Central Metro
- Large Fringe Metro
- Medium/Small Metro
- Micropolitan/Rural

Age-Adjusted Death Rate per 100,000 Population

Year:
Figure 12.
AAPC in Premature Heart Disease Mortality Among **Blacks** by Residential Urbanicity and Region, 2000-2014
Figure 13.
Premature Heart Disease Mortality Among Asians/Pacific Islanders by Residential Urbanicity and Region, 2000-2014
Figure 14. AAPC in Premature Heart Disease Mortality Among Asians/Pacific Islanders by Residential Urbanicity and Region, 2000-2014
Figure 15.
Premature Heart Disease Mortality Among American Indians/Alaska Natives by Residential Urbanicity and Region, 2000-2014
Figure 16.
AAPC in Premature Heart Disease Mortality Among American Indians/Alaska Natives by Residential Urbanicity and Region, 2000-2014
Summary

- Rates highest in Micropolitan/Rural areas, except among Blacks in the Non-South
- Significant rural declines for Blacks
- Where and for whom is there a significant widening of a rural disadvantage?
- White non-Hispanics in the South and Non-South
- Black non-Hispanics in the South
- American Indians/AN in the South
Methodological Concerns I

- Misclassification of race/ethnicity in population denominators – bridged race estimates.
- Census undercounts/overcounts – differential by geographic area?
- Prison population impacts on rural population counts.
Methodological Concerns II

- Misclassification of race/ethnicity on death certificates.
- Misclassification of underlying cause of death.
- Model fit – overall excellent
- Recent increases masked by 15 year study period
Challenges

- Contribution of incidence vs. case fatality
- Surveillance of heart disease incidence
- Intractable problem of achieving guidelines-based care for acute events in rural areas
- Rural prosperity declines
- Internal migration of healthier, more prosperous people away from rural areas
Thank you