



RESEARCH BRIEF #35

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The U.S. Rural Mortality Penalty is Wide and Growing

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After decades of lower or similar mortality rates in rural areas than in urban areas of the U.S., a rural mortality penalty emerged in the 1990s and has grown since the mid-2000s. Although the rural-urban mortality gap has widened across all major racial/ethnic groups over the past 30 years, it has widened the most among working-age non-Hispanic (NH) whites.

This brief summarizes the results from a study published in [Population Research and Policy Review](#) that examined rural-urban differences in mortality rates overall and from 15 specific causes among working-age (age 25-64) NH whites¹ from 1990 to 2018 and identified the causes of death that have contributed most to the widening of the rural mortality penalty.²

Results show that the rural mortality penalty is wide and growing and is pronounced across multiple causes of death. Growth in the rural disadvantage is due to smaller rural declines in deaths from cancers and cardiovascular diseases and larger rural increases in deaths from metabolic, respiratory, alcohol-related, and mental and behavioral diseases and suicides compared to urban areas. Mortality rate trends are particularly concerning for the younger working-age group (25-44) and for females overall. Ultimately, high and rising mortality rates across a variety of causes and rural places, some of which have been occurring since the 1990s and others that emerged more recently, suggest that there is not one underlying explanation. Instead, failures across a variety of institutions and policies have contributed to rural America's troubling mortality trends.

KEY FINDINGS

- The rural mortality penalty is wide and growing and is pronounced across multiple causes of death.
- Mortality trends are particularly concerning for the younger working-age group (25-44) and for rural females overall.
- Growth in the rural mortality disadvantage has been due to smaller rural declines in deaths from cancers and cardiovascular diseases and larger rural increases in deaths from metabolic, respiratory, alcohol-related, and mental and behavioral diseases and suicides compared to urban areas.

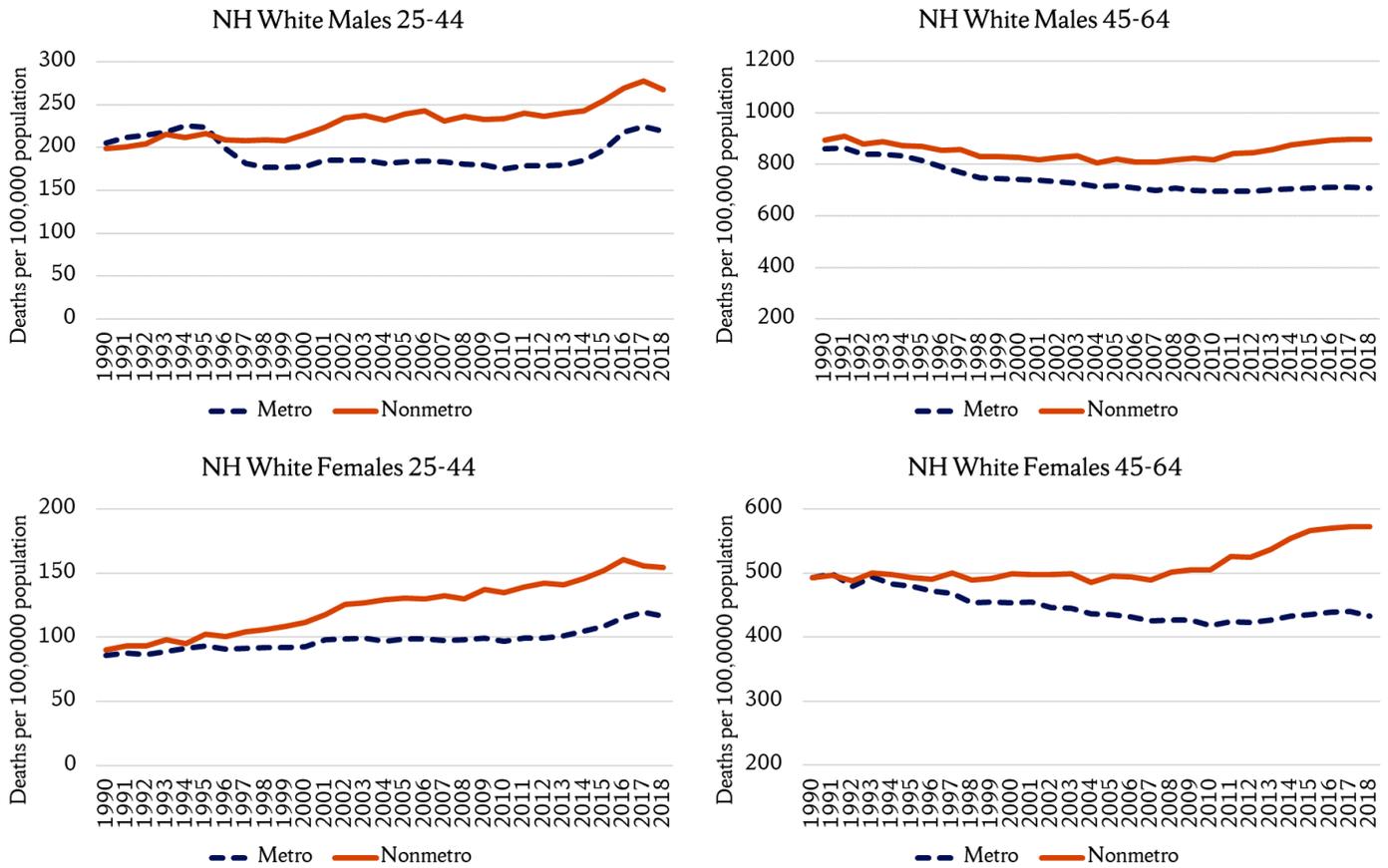
The Rural Mortality Penalty is Wide and Growing

The U.S. rural mortality penalty is wide and growing. This is the case for the rural population overall (all racial/ethnic groups combined) and for NH whites, NH blacks (not shown), and Hispanics (not shown). As shown in Figure 1, between 1990 and 2018, mortality rates increased among both metro and nonmetro males and females ages 25-44, but increases were larger among nonmetro adults in this age group. Rates also increased among nonmetro males and females

ages 45-64 but declined among metro males and females in this age group.

The increasing disadvantage for rural residents is due to a combination of metro mortality rate declines that occurred primarily throughout the 1990s and 2000s and nonmetro mortality rate increases that occurred primarily throughout the 2010s. Mortality rate increases among rural females have been startling. Among NH white females ages 25-44, rates increased in both metro and nonmetro counties, but the increase was over twice as large among nonmetro females. Among NH white females ages 45-64, the mortality rate declined by 10.8% in metro counties but increased by 16.1% in nonmetro counties.

Figure 1: The Mortality Gap between Rural and Urban Working-Age Adults Grew for NH White Males and Females from 1990 to 2018

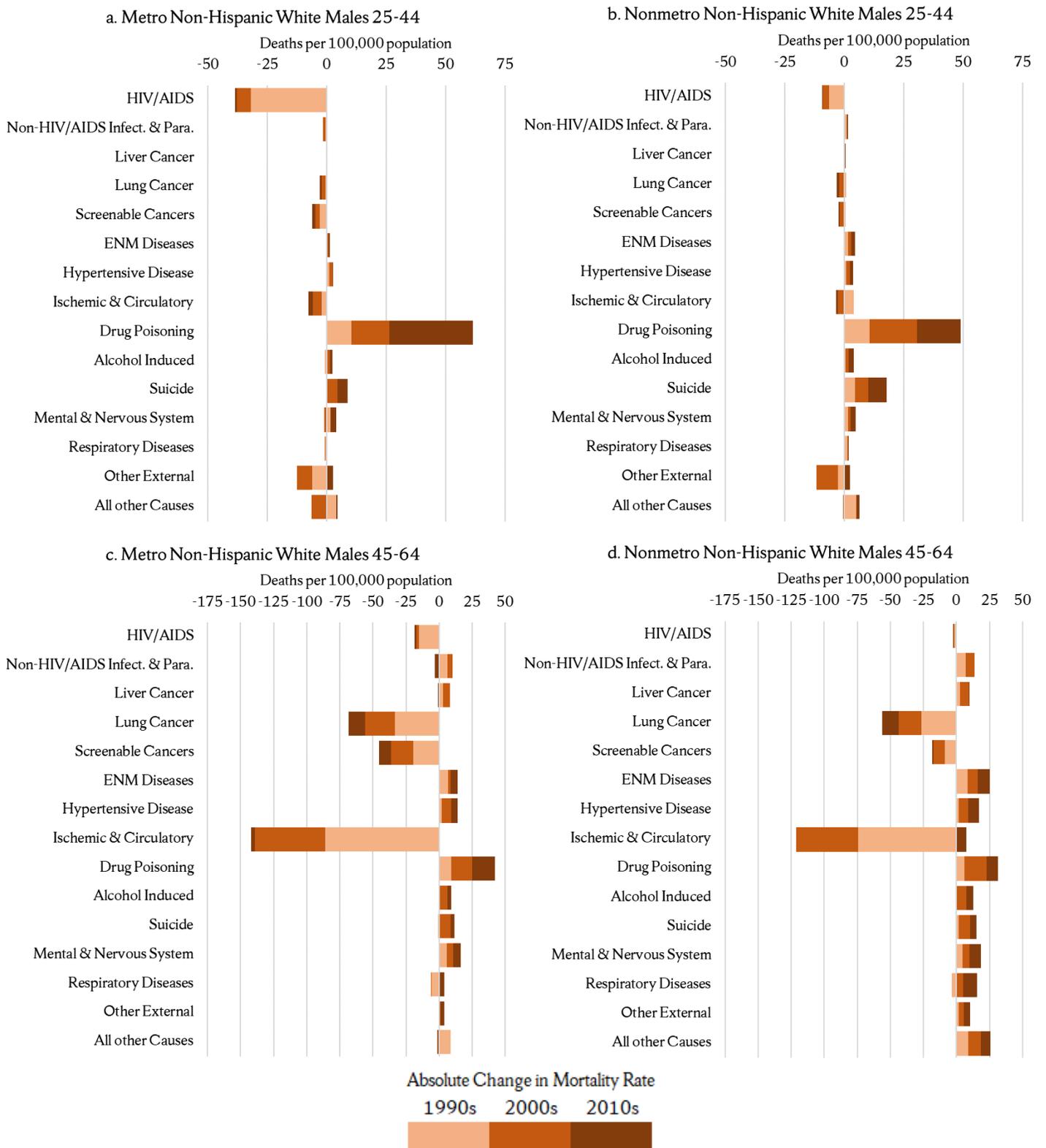


Data Source: National Center for Health Statistics, 1990-2018. Note: Rates are age-adjusted.

Multiple Causes of Death Contribute to the Rural Mortality Disadvantage

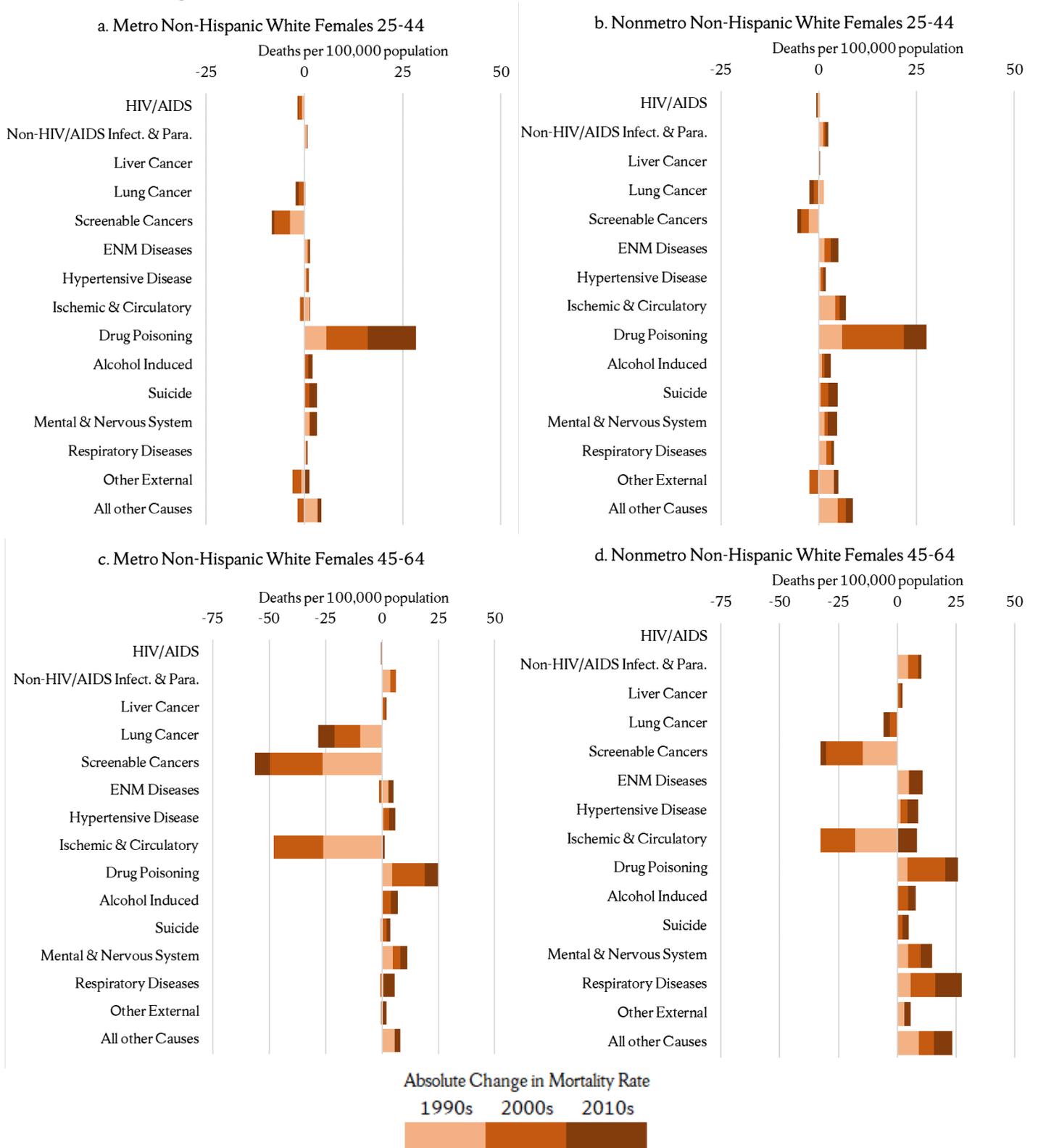
The widening rural mortality penalty is due to multiple causes of death. Figures 2 and 3 decompose the change in mortality between 1990 and 2018 into decades for males (Figure 2) and females (Figure 3), showing changes in the 1990s, 2000s, and 2010s, which collectively account for the total change in mortality over the 1990-2018 period. Bars to the left of the '0' line indicate a decline in mortality from that cause. Bars to the right of the '0' line indicate an increase in mortality from that cause. Over the past 30 years, rural working-age males and females experienced increases in more causes of death and by a greater magnitude than their urban peers. Smaller rural declines in mortality from cancers and cardiovascular disease (throughout the 1990s and 2000s) and larger increases in deaths from metabolic and respiratory diseases, suicide, alcohol-related, and mental/behavioral disorders (throughout the 2010s) collectively drove the growth in the rural disadvantage.

Figure 2. Changes in Mortality Rates by Cause of Death and by Decade for Metro and Nonmetro NH White Males ages 25-44 and 45-64



Data Source: National Center for Health Statistics, 1990-2018. Note: Rates are age-adjusted. Causes of death are exhaustive and mutually exclusive. ENM=endocrine, nutritional, and metabolic diseases.

Figure 3. Changes in Mortality Rates by Cause of Death and by Decade for Metro and Nonmetro NH White Females ages 25-44 and 45-64



Data Source: National Center for Health Statistics, 1990-2018. Note: Rates are age-adjusted. Causes of death are exhaustive and mutually exclusive. ENM=endocrine, nutritional, and metabolic diseases.

The surge in drug poisoning mortality rates is a major population health crisis in metro and nonmetro areas, alike. Among nonmetro young adults, increases from drug poisoning more than wiped-out mortality declines in other causes of death over the past three decades. However, because drug poisoning mortality increased slightly more in metro than in nonmetro areas, drug poisoning did not contribute to the increase in the rural mortality penalty. Besides drug poisoning, increases in mortality from metabolic causes among young rural males and females and increases in mortality from cardiovascular causes among young rural females are troubling. The negative health effects of obesity and substance abuse can accumulate as people age.³ Therefore, we are likely to see continued increases in obesity- and substance abuse-related mortality in this cohort of young adults as they age.

How do we Address these Troubling Trends?

Behavioral interventions targeting smoking, diet, and exercise have been widely advocated for improving health and have been attempted for decades. The public health field also regularly advocates for increasing health care access to improve health in rural areas. However, neither behavioral interventions nor increasing health care access has reduced the rural mortality penalty. Far too often, the public health approach has been to apply health care and behavioral intervention to places with already poor health. This approach has been costly and ineffective because it treats problems after they arise rather than preventing their onset. Instead, the more cost effective and humane approach would be to apply upstream interventions that target the structural (economic, social, environmental), corporate, and policy determinants of health to prevent future generations from experiencing these problematic mortality trends.

Increasing mortality rates across multiple causes suggest that there is not one underlying explanation. Growing rural-urban disparities may reflect increasing inequities in various upstream social-structural factors, including educational attainment, which is becoming an increasingly important determinant of mortality disparities,^{4,5} as well as material resources, opportunities for employment and upward mobility, social capital and integration, housing quality, environmental quality, and the distribution of economic and social resources. Therefore, interventions targeting social, structural, and policy determinants of health in rural areas must be prioritized.

Data and Methods

I used the 1990-2018 Multiple Cause-of-Death micro data files, provided by the National Center for Health Statistics under a data user agreement, to calculate death counts by cause, sex, age group, county, and year. NH white population counts came from the public-use Census bridged-race population estimates. I calculated all-cause and cause-specific mortality rates by sex and age group (25-44 and 45-64). Rates are age-adjusted within each 20-year age group using 10-year population counts and weights (25-34, 35-44, 45-54, and 55-64). Metro status was based on the 2013 USDA Economic Research Service Rural-Urban Continuum Codes, where codes 1-3 represent metropolitan counties and codes 4-9 represent nonmetro (rural) counties. I use the terms 'rural' and 'nonmetro' interchangeably throughout this brief. Additional details about the data and methods can be found in the [published peer-reviewed article](#).

Endnotes

1. This study focused on working-age NH whites because the U.S.'s recent declines in life expectancy appear to be due mostly to mortality rate increases in this population. (Case and Deaton 2015; Elo et al. 2019; Ho 2013; Woolf and Schoomaker 2019). In addition, mortality trends for NH whites differ considerably from other major racial/ethnic groups. Presenting mortality trends with all racial/ethnic groups combined would mask important differences in (a) the magnitude of all-cause and cause-specific mortality rates, (b) trends in rates over the study period, and (c) conclusions about the causes of death that have contributed most to the widening nonmetro mortality penalty since 1990.
2. Monnat, S.M. (2020). Trends in U.S. working-age non-Hispanic White mortality: rural-urban and within-rural differences. *Population Research and Policy Review*.
3. Elo, I. T., Hendi, A. S., Ho, J. Y., Vierboom, Y. C., & Preston, S. H. (2019). Trends in non-Hispanic White mortality in the United States by metropolitan-nonmetropolitan status and region, 1990-2016. *Population and Development Review*, 45(3), 549-583.
4. Hayward, M. D., Hummer, R. A., & Sasson, I. (2015). Trends and group differences in the association between educational attainment and U.S. adult mortality: Implications for understanding education's causal influence. *Social Science & Medicine*, 127, 8-18.
5. Montez, J. K., Hayward, M. D., & Zajacova, A. (2019). Educational disparities in adult health: US States as Institutional Actors on the Association. *Socius*, 5, 2378023119835345.

Acknowledgments

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