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# Rural Counties With Majority Black Or Indigenous Populations Suffer The Highest Rates Of Premature Death In The US

**ABSTRACT Despite well-documented health disparities by rurality and race/ethnicity, research investigating racial/ethnic health differences among US rural residents is limited. We used county-level data to measure and compare premature death rates in rural counties by each county's majority racial/ethnic group. Premature death rates were significantly higher in rural counties with a majority of non-Hispanic black or American Indian/Alaska Native (AI/AN) residents than in rural counties with a majority of non-Hispanic white residents. After we adjusted for community-level covariates, differences in premature death remained significant in counties with a majority of AI/AN residents but not those with a majority of non-Hispanic black residents. This study highlights the particular vulnerability of non-Hispanic black and AI/AN rural communities to high rates of premature mortality. Policies to improve rural health should focus on these racially diverse communities, addressing economic vitality and current and historical political context to mitigate health inequities and the harmful health effects of neglecting social determinants of health.**

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Disparities in health outcomes and life expectancy by geography and race/ethnicity in the US are well documented.[1,2] When disparities are unnecessary, avoidable, and unfair or unjust, they are considered inequities.[3,4] Understanding health inequities and addressing them through policy require paying attention to systems and structures that render some individuals and communities more vulnerable than others.[1,2,5]

In the US there are clear health inequities in mortality that disproportionately affect rural residents compared to urban residents and people of color and indigenous people—that is, American Indians/Alaska Natives (AI/AN)—compared to non-Hispanic whites. However, less is known about health inequities within rural areas by race/ethnicity, despite the fact that one in five rural residents is a person of color or an indigenous person.[6–8] A clearer understanding of how racial/ethnic and geographic contexts intersect is vital to designing policies and programs to address health inequities.

Rural areas have historically faced constraints related to achieving good health outcomes, including higher rates of poverty, lower employment rates, aging populations with higher morbidity rates, and barriers to health care access.[9–13] While progress has been made in many metropolitan areas to improve health outcomes, recent declines in life expectancy are felt more acutely in rural settings, where mortality from nearly all of the leading causes of death is higher than in urban areas.[1,14]

Furthermore, US mortality rates differ by race/ethnicity. Recent mortality statistics indicate that, on average, non-Hispanic blacks have the

highest all-cause age-adjusted death rate and that non-Hispanic black and AI/AN people have a higher risk of dying from most of the leading causes of death than non-Hispanic whites do.[15,16] While cause-specific rates vary by race/ethnicity, the overall higher all-cause mortality rates for non-Hispanic black and AI/AN people are clear. Still, more information is needed to understand the contributors to and geographic context of such inequities.

These and other disparities in health outcomes are now recognized as health inequities rooted in structural racism.[17] Structural racism refers to the way in which societies foster racial discrimination, through mutually reinforcing inequitable systems and access to various social determinants of health (such as housing, education, employment, earnings, benefits, credit, media, health care, and criminal justice) that, in turn, perpetuate discriminatory beliefs, values, and distribution of resources. All together, these affect the risk of adverse health outcomes by race/ethnicity.[17] The particular historical legacy of racial oppression experienced by non-Hispanic black and AI/AN people in rural and urban communities has affected health outcomes at the intersection of race/ethnicity and geography.[18,19]

Despite clear documentation of both rural and racial/ethnic inequities in health, there has been limited research examining racial/ethnic disparities in health specifically within rural settings. The research that has been done has found evidence of significant disparities among rural residents by race/ethnicity in health and health care access.[20,21] A Centers for Disease Control and Prevention (CDC) study in 2017 found that people of color and AI/AN people had worse health than their non-Hispanic white counterparts did on fifteen of the seventeen measures studied, including number of chronic conditions, access to care, obesity, and cigarette smoking. Notably, there was considerable variation among rural people of color and AI/AN people, with some groups comparing favorably with non-Hispanic whites on a few measures.[20] Other research has pointed to a "rural mortality penalty" and race-based disparities in mortality, which together mean that rural black residents have higher premature mortality rates than their white or urban black counterparts do.[13,21]

In addition, data from one study showed differences in county-level premature death by rural versus urban status and by majority racial/ethnic group.[6] In that study rural counties fared worse than urban counties across all types of racial/ethnic composition.[6] Like the CDC study before it,[20] this analysis uncovered striking disparities by both race/ethnicity and geography, but it did not control for contextual factors such as socioeconomic and demographic characteristics, and it did not fully explore the inequities by race/ethnicity within rural contexts. In the present study we aimed to build on this research by examining racial/ethnic differences in premature death among rural residents and how those differences are influenced by contextual, demographic, and structural factors.

## Study Data And Methods

**DATA AND STUDY POPULATION** Using data from the 2017 County Health Rankings produced by the University of Wisconsin Population Health Institute, which compiles county-level data from a variety of sources, we identified differences in premature death among rural counties by county-level racial/ethnic composition. The County Health Rankings data include information from a compilation of years, depending on the data source. Because of our focus in this analysis on inequities within rural areas, we included only counties that were classified as rural, based on 2013 Urban Influence Codes. Using these codes, the Office of Management and Budget classifies counties into twelve groups, with two being metro (urban) and the rest being rural (also called "nonmetropolitan" and including both noncore and micropolitan counties).[22]

**MEASUREMENT** The dependent variable for these analyses was the county-level premature death rate, defined as years of potential life lost before age seventy-five per 100,000 people.[23] This measure originates from the mortality files of the National Center for Health Statistics and is often referred to as years of potential life lost.[24] It is a widely used measure of population health, with a US average of just under 7,500 years lost per 100,000 people in 2016.[25,26]

The primary independent variable was county-level race/ethnicity. In this study we classified counties based on their racial/ethnic composition, with a particular focus on which racial/ethnic group accounted for the majority (that is, more than 50 percent) of the county's population. Race/ethnicity data originally came from the Census Bureau's American Community Survey and included the categories of non-Hispanic white, non-Hispanic black, Hispanic, Asian, and AI/AN.

County-level socioeconomic and demographic data included median household income, the percentage of the population that was younger than age eighteen, the percentage of the population that was female, unemployment rate (the percentage of the population ages sixteen and older who were unemployed but seeking work), and a measure of limited access to healthy food. The latter measure was calculated based on the

percentage of the population in rural areas who had household incomes below 200 percent of the federal poverty level and lived more than ten miles from a grocery store. Additionally, we included a measure of the number of primary care physicians per capita (expressed in terms of physicians per 100,000 population) to account for access to care. For information on the original data source for each variable, see online appendix exhibit 1.[27]

**ANALYSIS** We first used simple linear regression and one-way analysis-of-variance tests to compare rural counties based on their racial/ethnic composition to see whether there were significant differences in sociodemographic characteristics and the unadjusted premature death rate. Second, we conducted a series of ordinary least squares regression models to see whether the association between premature death and race/ethnicity was consistent after we adjusted for county-level sociodemographic, economic, and structural characteristics. Third, we adjusted for the sociodemographic characteristics listed above for all rural counties. Fourth, we stratified by majority racial/ethnic group, using the Stata margins command to generate predicted county-level premature death rates by majority racial/ethnic group. In all of the multivariable models, we also included a fixed effect for state. All analyses were conducted in Stata, version 15.

We also conducted sensitivity analyses (not shown) to identify the sociodemographic characteristics that were most strongly associated with premature death and to avoid multicollinearity. We ultimately left several measures out of the model, including educational attainment (high school graduation rate), the percentage of the population over age sixty-five, child poverty rate, and uninsurance rate. The remaining covariates were those with the most consistent and strongest predictive power, with no correlation coefficients greater than 0.5.

**LIMITATIONS** While this study was novel research with widespread implications, it should be considered in light of its potential limitations. First, we used county-level cross-sectional data, which did not allow us to evaluate health outcomes for individuals or examine changing trends over time. Still, context matters for health, and significant differences between counties in health outcomes based on their racial/ethnic composition, even at a single point in time, should serve as a call for action and motivate future research to examine trends over time.

Second, classifying counties by the majority racial/ethnic group creates a blunt measure of a continuum of racial/ethnic diversity in rural counties. Still, by focusing exclusively on racial/ethnic disparities among rural residents, we aimed to illuminate how those played out specifically in rural settings, which is an understudied topic. Future research should continue to add nuance to the understanding of how rurality intersects with race/ethnicity as it relates to health, including regional differences in the relationships described herein.

## Study Results

Most of the 1,970 rural counties in the US (89 percent) had a majority of non-Hispanic white residents in 2015 (exhibit 1). Sixty-six (3.5 percent) of the remaining counties had a majority of non-Hispanic black residents, another sixty-six (3.5 percent) had a majority of Hispanic residents, twenty-five (1.3 percent) had a majority of AI/AN residents, and fifty-eight (2.9 percent) had no majority racial/ethnic group. No county, rural or urban, was majority Asian.

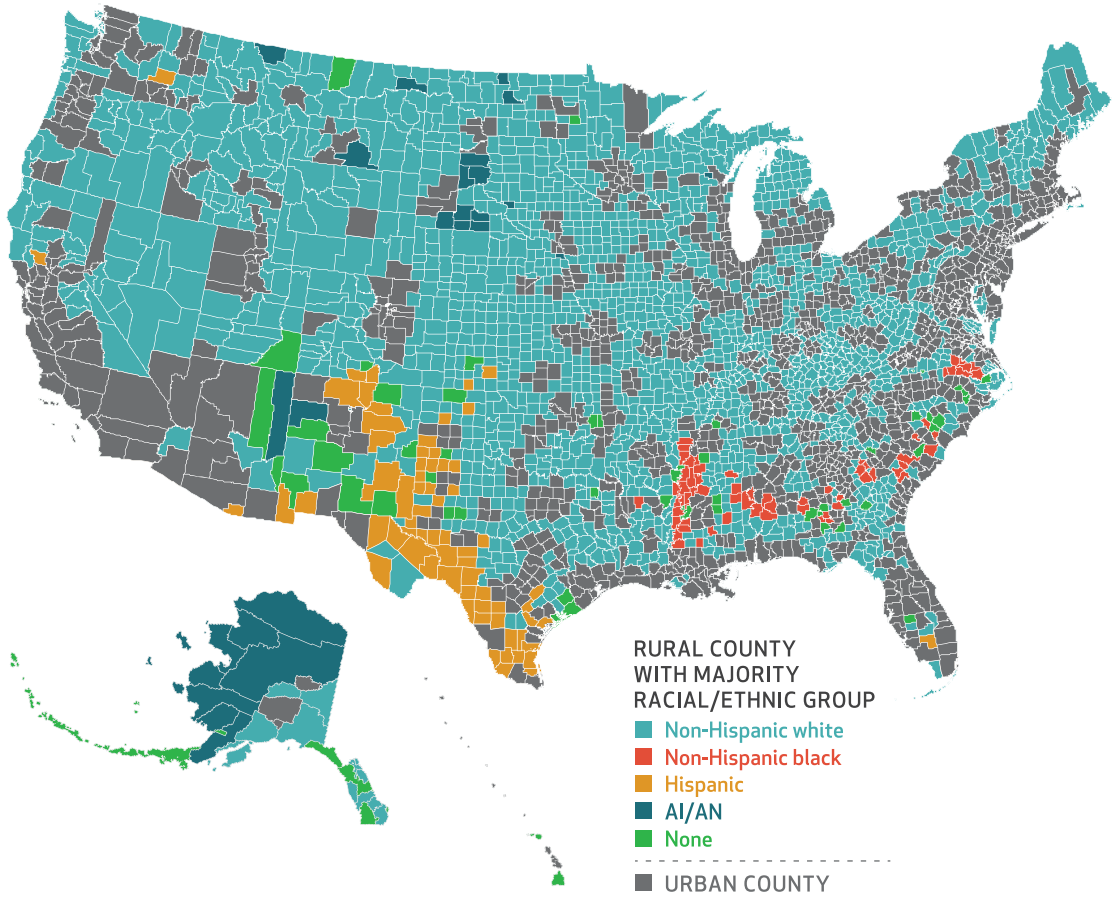
Compared with rural counties with a majority of non-Hispanic white residents, in 2015 all other rural counties had lower median household incomes, higher unemployment rates, and higher percentages of people younger than age eighteen—although the difference for counties with a majority of non-Hispanic black residents was not significant for percentage of the population younger than age eighteen (exhibit 2). Rural counties with a majority of non-Hispanic white residents had better access to healthy food than all other rural county types did. For rural counties with a majority of AI/AN residents, the rate of limited access to healthy food was nearly three times as high as for rural counties with a majority of non-Hispanic white residents (29.8 percent versus 9.0 percent).

When we used unadjusted models, rural counties with a majority of non-Hispanic black or AI/AN residents had significantly higher predicted rates of premature death than did rural counties with a majority of non-Hispanic white residents in 2012–14 (county-level averages of 11,560 and 15,774 years of potential life lost before age seventy-five per 100,000 people, respectively, versus 8,262 years) (exhibit 3). Rural counties with no majority racial/ethnic group also had significantly higher rates of premature death (9,536 versus 8,262 years of potential life lost).

After we adjusted for sociodemographic, economic, and structural characteristics, the differences between counties with a majority of non-Hispanic white residents and most other counties lessened, although a significantly higher premature death rate remained for counties with a majority of AI/AN residents (12,114 versus

**EXHIBIT 1**

**Majority racial/ethnic groups in US rural counties, 2015**




**SOURCE** Authors' analysis of 2015 Census Bureau Population Estimates Program data, from the 2017 County Health Rankings. **NOTES** "None" indicates that no racial/ethnic group constituted more than 50 percent of the county population. There were 1,970 rural counties. AI/AN is American Indian/Alaska Native.

8,469 years of potential life lost). The premature death rates for rural counties with a majority of non-Hispanic black residents and those with no majority group were no longer significantly different from the rate for rural counties with a majority of non-Hispanic white residents. After adjustment, rural counties with a majority of Hispanic residents had lower rates of premature

**EXHIBIT 2**

**Sample sociodemographic characteristics of rural counties, by majority racial/ethnic group, 2017**

| | | Majority racial/ethnic group | | | | |
|---|---|---|---|---|---|---|
| **Characteristic** | **All rural counties (*N* = 1,970)** | **Non-Hispanic white (*n* = 1,753)** | **Non-Hispanic black (*n* = 66)** | **Hispanic (*n* = 68)** | **AI/AN (*n* = 25)** | **None (*n* = 58)** |
| Median household income ($) | 44,790 | 45,605 | 30,281**** | 43,166** | 39,001**** | 41,080**** |
| Unemployment rate (%) | 5.6 | 5.4 | 9.3**** | 6.4**** | 9.0**** | 6.6**** |
| Population younger than age 18 (%) | 22.3 | 21.9 | 22.0 | 26.5**** | 33.4**** | 23.3*** |
| Female (%) | 49.6 | 49.7 | 50.3* | 47.9**** | 49.2 | 48.5*** |
| Limited access to healthy food (%) | 9.5 | 9.0 | 11.1* | 12.8*** | 29.8**** | 11.7** |
| Primary care physicians per capita[a] | 50.6 | 41.7 | 39.4*** | 35.8**** | 53.0 | 43.7* |

**SOURCE** Authors' analysis of 2017 County Health Rankings data. **NOTES** "None" indicates that no racial/ethnic group constituted more than 50 percent of the county population. Significance indicates differences from rural counties with a majority of non-Hispanic white residents. AI/AN is American Indian/Alaska Native. [a]Per 100,000 population. *$p < 0.10$ **$p < 0.05$ ***$p < 0.01$ ****$p < 0.001$

death, compared with counties with a majority of non-Hispanic white residents (6,926 versus 8,469 years of potential life lost).

Exhibit 4 presents the full regression coefficients for the multivariable model. Higher median income and more primary care physicians per capita both had a small but significant association with lower premature death rates in 2012–14, while having a larger population of people younger than age eighteen and higher unemployment rates were associated with higher premature death rates.

## Discussion

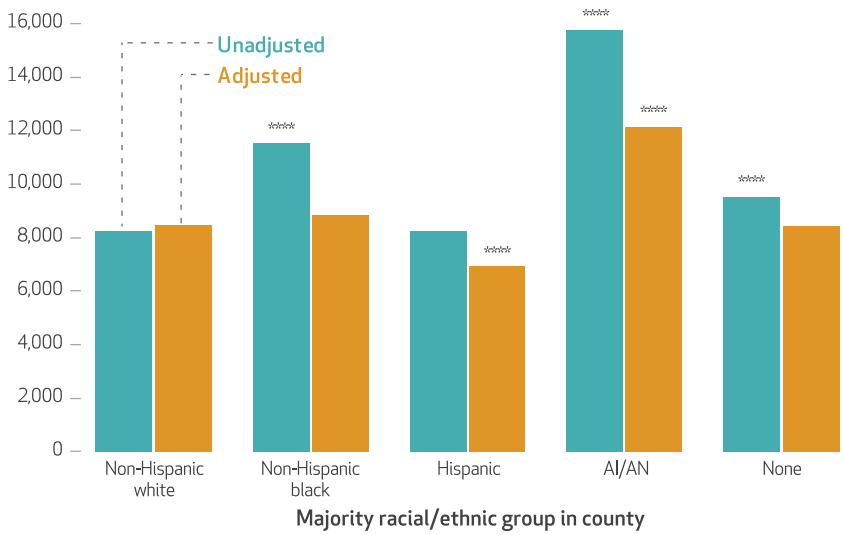
Rural counties with a majority of non-Hispanic black or AI/AN residents had elevated rates of premature death based on 2017 data. Those differences can be partially, but not fully, explained by the sociodemographic, economic, and structural characteristics of these communities. This analysis also found increased rates of premature death in rural counties with more children and higher unemployment, and lower rates in counties with higher median incomes and more primary care physicians per capita. Together, these results imply a need for policy attention to social determinants of health and community context to improve health equity in rural America.

Specifically, after adjusting for county-level characteristics, we found that the disparity between rural counties with a majority of non-Hispanic black residents and those with a majority of non-Hispanic white residents was attenuated. In unadjusted models, rural counties with a majority of non-Hispanic black residents had 140 percent the rate of premature death as rural counties with a majority of non-Hispanic white residents; the rate was attenuated to 104 percent after we adjusted for county-level characteristics. Thus, a portion of the racial/ethnic inequities could be explained by county-level differences in measured structural, economic, and sociodemographic characteristics. On average, rural counties with a majority of non-Hispanic black residents had lower median household income and nearly double the unemployment rate of rural counties with a majority of non-Hispanic white residents. Taken together, these results signal that ongoing impacts of structural racism—the inequitable allocation of resources and opportunity based on race—are a fundamental cause of health inequities.[18]

In rural counties with a majority of AI/AN residents, inequities in premature death were less fully explained by adjustment for county-level characteristics. Premature death rates went from nearly double those of rural counties with a ma-

**EXHIBIT 3**

**Predicted county-level years of potential life lost before age 75 per 100,000 people, by majority racial/ethnic group in county, 2012–14**




**SOURCE** Authors' analysis of data from 2012–14 from the 2017 County Health Rankings. **NOTES** "None" indicates that no racial/ethnic group constituted more than 50 percent of the county population. The predicted rates were generated using the margins command in Stata, version 15, after we ran ordinary least squares regression models that predicted county-level premature death (defined as years of potential life lost before age seventy-five). Adjusted models controlled for median household income, percentage of the population younger than age eighteen, percentage of the population that was female, unemployment rate, percentage of the population with limited access to healthy food, and a fixed effect for the state. Significance indicates differences from rural counties with a majority of non-Hispanic white residents. AI/AN is American Indian/Alaska Native. ****$p < 0.001$

**EXHIBIT 4**

**Estimated effects of demographic and other variables on county-level years of potential life lost before age 75 per 100,000 people, 2012–14**

| Variable | Years of potential life lost |
|---|---|
| **MAJORITY RACIAL/ETHNIC GROUP** | |
| Non-Hispanic white | Ref. |
| Non-Hispanic black | 362.0 |
| Hispanic | −1,543.5**** |
| AI/AN | 3,645.0**** |
| None | −26.5 |
| **SOCIODEMOGRAPHIC CHARACTERISTICS** | |
| Median household income | −0.1**** |
| Unemployment rate | 26,183.2**** |
| Percent of population younger than age 18 | 14,521.3**** |
| Percent of population female | 3,790.6* |
| Limited access to healthy food | 532.6 |
| Primary care physicians per capita | −4.5*** |
| **MODEL STATISTICS** | |
| Intercept | 7,364.7**** |
| F statistic | 161.7**** |
| $R^2$ | 0.5 |

**SOURCE** Authors' analysis of data from 2012–14 from the 2017 County Health Rankings. **NOTES** The exhibit shows results from an ordinary least squares regression model, which included a fixed effect for the state. "None" indicates that no racial/ethnic group constituted more than 50 percent of the county population. The unemployment rate is explained in the text. AI/AN is American Indian/Alaska Native. *$p < 0.10$ ***$p < 0.01$ ****$p < 0.001$

jority of non-Hispanic white residents (191 percent) to nearly 1.5 times the rate (143 percent). In rural counties with a majority of AI/AN residents, the average household income was lower, and the percentage unemployed was nearly twice that of rural counties with a majority of non-Hispanic white residents (9 percent versus 5 percent). In addition, more than one-third of the population of rural counties with a majority of AI/AN residents consisted of children, compared with just over one-fifth in rural counties with a majority of non-Hispanic white residents. Limited access to healthy food was more than three times as high in rural counties with a majority of AI/AN residents than in counties with a majority of non-Hispanic white residents. The latter finding is consistent with previous research and may reflect the enduring impact of structural racism. For example, the Department of Agriculture's commodity food program was designed to supply food but often did not include traditional or highly nutritious foods,[28] and other historical efforts by the US government disrupted the relationship between AI/AN people and their own land and food sources.[29]

On average, the premature death rate in rural counties with a majority of AI/AN residents was 15,774 per 100,000 people—the highest detected in this analysis. The particular historical context of trauma, racism, displacement, family separation, and forced assimilation experienced by AI/AN people and the distinct political nature of tribal citizenship and sovereignty may complicate the relationship between community characteristics and premature death rates.[19] For example, the practices of health care and social policy are distinct for many AI/AN people compared with their nonindigenous counterparts. They may have treaty rights to education, housing, and health services, but access to these can be hindered by the complex interplay between federal, state, and tribal governments, which frequently results in wide variability in access to and quality of services.[19]

We found that rural counties with a majority of Hispanic residents had lower rates of premature death, compared to rural counties with a majority of non-Hispanic white residents. This may be related to other trends that have been demonstrated to be part of the "Hispanic paradox"[30]—that is, Hispanic people often have better health than might be expected, given their particular social and economic position.

We found that compared to rural counties with a majority of non-Hispanic white residents, those with a majority of Hispanic residents differed in significant ways: having younger populations, lower median incomes, fewer females, poorer access to healthy food, and higher unemployment rates. Each of those is an important social determinant of health, and all tend to be associated with poorer health outcomes. Adjusting for these characteristics lowered the premature death rate of rural counties with a majority of Hispanic residents, relative to rural counties with a majority of non-Hispanic white residents. Future research should seek to explore how changing patterns of immigration to rural areas influence ongoing health outcomes and whether the Hispanic paradox holds true across generations, regions of the US, and ethnic heritage.[7,8]

**Addressing the root causes of inequities in mortality in rural communities requires a restructuring of the policies that uphold structural racism.**

Finally, we found that the fifty-eight rural counties with no majority racial/ethnic group had significantly higher rates of premature death, compared to counties with a majority of non-Hispanic white residents. This difference was attenuated after we adjusted for county-level characteristics. However, this result should serve as a call to better understand and serve these heterogeneous rural counties. As racial/ethnic diversity within rural America continues to grow,[8] we should expect to see an increase in the number of counties with no majority group. Future research should strive to illuminate the best way to promote health among all residents in those counties.

## Policy Implications

Federal, state, tribal, and local policy interventions that aim to address health inequities in rural areas must include policy initiatives that will address inequities in social determinants of health, such as income, employment, and access to healthy food. However, addressing the root causes of inequities in mortality in rural communities also requires a restructuring of the policies that uphold structural racism, starting with a clear-eyed look at historical policies—including slavery, family separation, and displacement—

that affected access to resources and opportunities for non-Hispanic black and AI/AN rural residents. Doing so requires applying a race-conscious lens to contemporary issues in rural health and social policy.[31]

One way to start is by gathering information on local capacity and constraints. For example, state, local, and tribal entities could conduct a power and asset mapping analysis in rural counties where inequities in health and premature mortality are disproportionately worse for non-Hispanic black and AI/AN residents.[32] Power mapping has the potential to center and effectively support those most affected by the disparities by identifying community assets and deficits and subsequent plans to address them.[33]

Ensuring racial/ethnic representation in decision-making and resource-allocating bodies, from the local to the national level, is essential for policy that can shift population health toward greater equity. Specifically, rural health policy discussions must involve non-Hispanic black and AI/AN residents, and racial health equity initiatives must include rural residents in rural-focused discussions and initiatives.[34]

Finally, efforts need to be made to create new systems and structures that account for and ameliorate—to the extent possible—the cumulative deprivation of historical policy inequities and that chart a path forward for race-conscious health equity work in rural America.[35] Sincere attempts to engage in honest policy discussions about reparations for slavery and land theft should be combined with local-level systems and structures that combine the abovementioned steps of gathering information and ensuring representation.[19,36,37]

## Conclusion

While rural health disparities are well documented, much less attention has been paid to inequities in health by race/ethnicity within rural areas. This study shows that elevated rates of premature death may result from neglecting the social determinants of health in rural communities, especially those with a majority of non-Hispanic black or AI/AN residents. Even after we adjusted for sociodemographic and economic conditions, rates of premature death remained higher in rural counties with a majority of AI/AN residents, compared to those with a majority of non-Hispanic white residents. Efforts to address health inequities in rural communities must account for economic vitality, food security, and current and historical political context. Ultimately, to improve rural population health, policies and programs must be redesigned to address the social determinants of health—including structural racism and historical inequities on the basis of racial/ethnic composition. ■

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