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Characteristics of persistently unhealthy counties: A comparison of white and black mortality over time

Wesley James^a, Julia Wolf^b, Jeralynn Cossman^b

^aThe University of Memphis, USA;

^bWest Virginia University, USA

Abstract

This research examines differences in white and black persistence of mortality in the United States over a period of nearly 50 years. Using data from the National Center for Health Statistics Compressed Mortality File, we calculated race-specific, all-cause age-adjusted mortality rates for ten time periods from 1968 to 2015. Counties ranking in the top 20% of mortality in at least half of the time periods are classified as persistently unhealthy. Race-specific mortality persistence is mapped illustrating geographic disparities in the clustering of unhealthy places. Persistence of white mortality is clustered in several distinct Southern regions, while black persistent mortality is evenly distributed geographically. Socioeconomic characteristics of white and black persistently unhealthy places are also examined, with a focus on rural-urban differences.

Keywords

Unhealthy places; Persistence of mortality; Rural-urban; Race

1. Introduction

In 2007, Cossman et al. (2007) found that there were persistent clusters of high and low mortality counties in the United States. When places experienced statistically significantly higher or lower mortality for at least four of seven five-year mortality rates between 1968–2002, we labeled them healthy or unhealthy places. Interestingly, most of the unhealthy places were rural. That rural places are more likely to be outliers—in both directions—has led to much research on rural-urban mortality (Murray et al., 2006) and life expectancy (Singh & Siahpush, 2014). We extend that analysis to look at race-specific mortality rates for the last 50 years. This spatial disparity continues to be problematic and we find it is concentrated differently for whites and blacks.

Research on racial mortality disparities frequently highlights the same underlying causes as research on rural mortality disparities. For example, socioeconomic status (Farmer & Ferraro, 2005; Hummer, Rogers, & Eberstein, 1998), income inequality (Kawachi & Kennedy, 1999) and concentrated disadvantage (Massey & Denton, 1993) are all considered

risk factors of racial and rural disadvantages in mortality. Similarly, it is clear that blacks experience more deleterious effects from structural factors than whites (Acevedo-Garcia, 2000; Deaton & Lubotsky, 2003). In a recent examination of the rural mortality penalty by race (Cossman, James, & Wolf, 2017), the findings suggested that even the healthiest places for blacks were worse than the unhealthiest places for whites. Race and space clearly matter in the discussion on U.S. mortality disparities and this research explores the intersection of these two factors.

2. Methods

We use the National Center for Health Statistics Compressed Mortality File from 1968 to 2015 (US Department of Health and Human Services (US DHHS), 2017), which measures all deaths by cause, decedents' age, race, sex and county of residence at time of death. Five-year all-cause age-adjusted (2000 Standard Million) mortality rates (per 100,000) are calculated from 1968 to 2012, and an additional 3-year rate from 2013 to 2015, providing rates for ten time periods. High mortality classifications are based on the top 20% of counties, indicating unhealthy places. *Persistently* unhealthy places are counties that rank in the top 20% in at least 5 of the 10 time periods. White and black race-specific mortality rates are calculated for each time period allowing for an analysis of persistence of mortality by race. Rates are mapped using ArcMap 10.4.

County characteristics are assessed using 2010 Census data. Variables indicating geographic region, racial composition, female headed household, income, poverty, uninsured, and college educated are included. We assess differences in these characteristics across persistently unhealthy counties compared to all, rural, and urban non-persistently unhealthy counties. This descriptive analysis provides a regional, demographic, and socioeconomic portrait of the persistently unhealthy places in relation to relevant comparison places.

3. Results

Persistent clusters of mortality are largely a product of white mortality, as seen in Map 1. There are 574 counties that qualify as being persistently high white mortality. Of these, 420 (73%) are rural. As shown in Map 2, persistent clusters of white unhealthy places are concentrated throughout the South, most notably Appalachia, Black Belt, Mississippi Delta, and southeastern Oklahoma. Persistent clusters of black unhealthy places is non-existent. Only 101 counties meet this qualification, 60 (59%) are rural counties, and are scattered throughout the country. Very few counties - indicated by the dark green shading - classify as persistent for both white and black mortality.

Analyzing characteristics of persistently unhealthy places yields interesting results. Compared to other U.S. counties (those that do not meet the threshold of persistence), white persistently unhealthy counties exhibit higher percentages of female headed households (20.6%–15.7%), poverty (22.0%–15.6%), and people who are uninsured (20.5%–18.0%). Additionally, the white persistently unhealthy counties report lower aggregated median household income (\$37,420–\$48,374), proportion of the county population with a college education (13.8%–21.4%), and are more likely to be in the South (84.3%–36.1%). Since the

majority of white persistently unhealthy counties are rural, we compared their socioeconomic characteristics to all other rural counties, and there are large differences. The persistently unhealthy white counties are nearly all in the south (84.3%), whereas only 31% of all other rural counties are in the south. In addition, persistently unhealthy white counties fare comparatively poor on the percentage of county households that are female headed (20.6%–14.7%), median household income (\$37,420–\$44,320), percentage of the county population living in poverty (22%–16.5%), and the percentage with a college education (13.8%–18.6%). In relation to the other urban U.S. counties (those that do not meet the threshold of persistence), there is an even greater disparity along many dimensions, including region (84.3% Southern to 44.0%), female headed households (20.6%–17.1%), income (\$37,420–\$54,693), poverty (22.0%–14.0%), uninsured (20.5%–16.5%), and college education (13.8%–25.8%).

Black persistently unhealthy counties show none of the trends of their white persistently unhealthy counterparts. The socioeconomic difference between black persistently unhealthy places and the rest of U.S. counties that register a valid black mortality rate is marginal. Rates of female headed households (17.6%–19.2%), poverty (17.6%–18.2%), uninsured (18.8%–18.9%), and college educated (18.8%–19.3%) are nearly identical. The only substantial difference is geography, where black persistently unhealthy counties are *less* likely to be in the South (50.5%–64.5%). The rural black persistently unhealthy counties demonstrate marginal difference from other rural counties, but a marked disadvantage compared to other U.S. urban counties, especially with income (\$45,565–\$50,463), poverty (17.6%–15.8%), and college education (18.8%–23.8%) (Table 1).

4. Discussion

We mapped 48 years of race-specific mortality rates and clear spatial concentrations emerge, driven by white mortality. Most of the top 20% of persistently high mortality counties for whites are located in the South — the exception is Nevada where a handful of large counties result in another visual cluster. Black age-adjusted mortality rates do not cluster at all. This is notable, as prior work has established that for black and white mortality, rural areas do worse than urban areas, but how they cluster geographically was not yet known.

In an effort to further understand these places where mortality persists, we examined the socioeconomic characteristics of those counties. Other than the Southern regional difference, persistently unhealthy white and black counties are similar in that they both rank poorly socioeconomically, and the relative difference between counties without persistently poor mortality outcomes is notable, especially those that are urban. Prior work has acknowledged that mortality in rural places improves at a slower rate, a factor that undoubtedly affects many of these persistently unhealthy counties (Cossman et al., 2017). These results also provide further evidence that a key factor in explaining macro-level patterns of health outcomes is social and economic standing, often termed fundamental causes in the social science literature (Link & Phelan, 1995). Fundamental causes dictate access to resources and they affect health outcomes through multiple mechanisms (Link & Phelan, 1995). Why is this important? Without improving the social and economic conditions of the country's most

unhealthy counties any intervention strategy targeting individual health behaviors will be limited in its success, if not doomed to fail.

Persistently unhealthy places should continuously be tracked in future years because there is considerable overlap between them and those being ravaged by the opioid epidemic, which will continue - and possibly accelerate - the misfortunes experienced in these places. The opioid epidemic is perceived to be a problem for White America, but it may also contribute to the persistence of death in Black America in rural places with large black concentrations where people are sick — places like the Mississippi Delta and the southern Black Belt. Future research must continue to parse out the relationship between race and space in understanding mortality disparities.

5. Public health implications

Since clusters of high and low mortality rates are persistently tied to certain locations and those locations vary by race, public health researchers and policymakers may benefit from examining this interaction further. Taking into account other factors such as the natural or built environment, unchanging intangible aspects like economies, cultural traditions, or ineffective policies, how do those factors differentially work in white or black healthy or unhealthy places? How much is attributable to health care access, how much to poor social and economic conditions, how much to behavioral factors? In the effort to build productive public health interventions policy makers need to be cognizant of the people and place interactions.

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Map 1.

Persistently unhealthy places for white and black mortality, 1968–2015.

Map 2.

Persistently unhealthy places for white and black mortality in the U.S. South, 1968–2015.

Table 1.

Demographic and socioeconomic characteristics of counties.

	Persistently unhealthy counties (N = 574)	All other U.S. counties (N = 2,487)	Persistently unhealthy rural counties	All other U.S. rural counties (N = 1,515)	All other U.S. urban counties (N = 972)
White mortality designations					
% South (2013)	84.32%	36.07%	83.57%	30.96%	44.03%
% Black (2010)	15.87%	7.10%	15.14%	5.61%	9.41%
% Female head (2010)	20.63%	15.65%	20.40%	14.73%	17.08%
Median HH income (2010–14)	\$37,420	\$48,374	\$35,737	\$44,320	\$54,693
% Poverty (2010)	22.04%	15.55%	22.93%	16.52%	14.03%
% Uninsured (2010)	20.49%	18.01%	20.89%	19.01%	16.46%
% College (2010–14)	13.77%	21.38%	13.01%	18.58%	25.76%
	Persistently unhealthy counties (N = 101)	All other U.S. counties (N = 1,109)	Persistently unhealthy rural counties	All other U.S. rural counties (N = 608)	All other U.S. urban counties (N = 501)
Black mortality designations					
% South (2013)	50.50%	64.47%	56.67%	67.76%	60.48%
% Black (2010)	8.93%	13.31%	9.21%	13.45%	8.50%
% Female head (2010)	17.61%	19.19%	17.93%	19.20%	16.39%
Median HH income (2010–14)	\$45,565	\$44,560	\$40,590	\$39,695	\$50,463
% Poverty (2010)	17.62%	18.24%	19.36%	20.29%	15.76%
% Uninsured (2010)	18.75%	18.90%	19.53%	20.05%	17.51%
% College (2010–14)	18.81%	19.30%	15.30%	15.59%	23.81%