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## Article

## The legacy of slavery and contemporary declines in heart disease mortality in the U.S. South

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## ABSTRACT

**Background:** This study aims to characterize the role of county-specific legacy of slavery in patterning temporal (i.e., 1968–2014), and geographic (i.e., Southern counties) declines in heart disease mortality. In this context, the U.S. has witnessed dramatic declines in heart disease mortality since the 1960s, which have benefitted place and race groups unevenly, with slower declines in the South, especially for the Black population.

**Methods:** Age-adjusted race- and county-specific mortality rates from 1968–2014 for all diseases of the heart were calculated for all Southern U.S. counties. Candidate confounding and mediating covariates from 1860, 1930, and 1970, were combined with mortality data in multivariable regression models to estimate the ecological association between the concentration of slavery in 1860 and declines in heart disease mortality from 1968–2014.

**Results:** Black populations, in counties with a history of highest versus lowest concentration of slavery, experienced a 17% slower decline in heart disease mortality. The association for Black populations varied by region (stronger in Deep South than Upper South states) and was partially explained by intervening socioeconomic factors. In models accounting for spatial autocorrelation, there was no association between slave concentration and heart disease mortality decline for Whites.

**Conclusions:** Nearly 50 years of declining heart disease mortality is a major public health success, but one marked by uneven progress by place and race. At the county level, progress in heart disease mortality reduction among Blacks is associated with place-based historical legacy of slavery. Effective and equitable public health prevention efforts should consider the historical context of place and the social and economic institutions that may play a role in facilitating or impeding diffusion of prevention efforts thereby producing heart healthy places and populations.

## Introduction

Heart disease has remained the leading cause of death in the U.S. since 1950 (Heron and Anderson, 2016), despite substantial declines over 50 years (Cooper et al., 2000). This reduction is due, in part, to public health prevention and improved clinical treatment (Ford et al., 2007). Declines in heart disease mortality are evident across racial, gender, and geographic lines. For example, the average U.S. county experienced a 62% reduction in heart disease mortality rates between 1973 and 2010, but this varied dramatically by region, with many southern counties experiencing slower declines substantially less than 50%, and northern and western counties experiencing faster declines from 65–82%. (Casper et al., 2016). Furthermore, county-specific

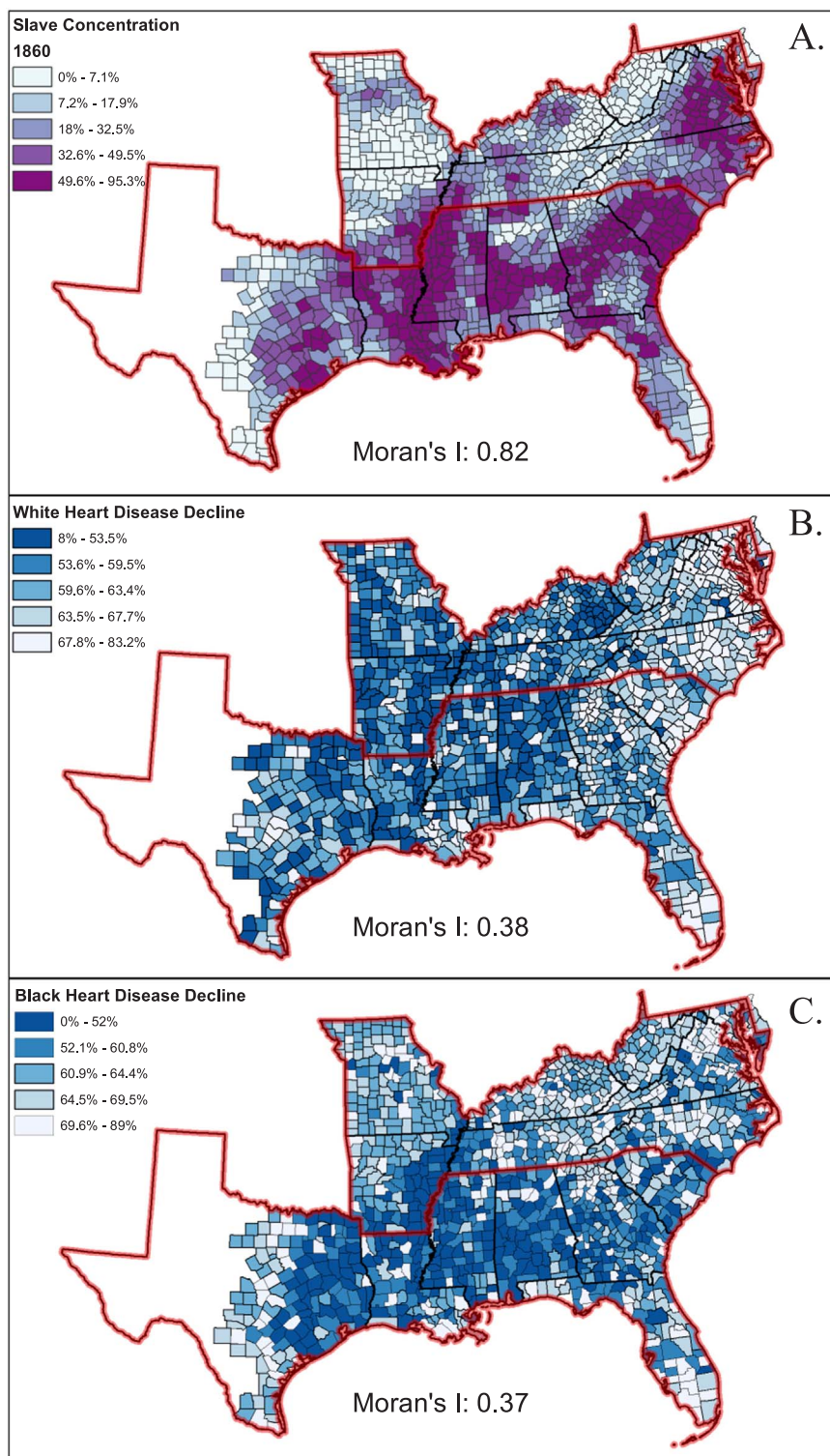
declines were faster for Whites (63% on average) than for Blacks (54% on average) nationwide (Vaughan, Quick, Pathak, Kramer, & Casper, 2015). In this context of notable but uneven progress in addressing a complex chronic disease, heart disease represents both a success story for public health efforts, as well as an opportunity to learn lessons about the challenges of promoting equitable improvements in population health.

*Unequal rates of decline*

Characterizing inter-group differences in the rate of decline in heart disease mortality can be instructive for both etiologic and public health prevention purposes. Geoffrey Rose (1994, 2001) argued that the

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**Fig. 1.** Geographic variation in 1860 slave concentration, and relative decline in heart disease mortality by race, 1968–2014. Regions (Upper South & Deep South) outlined with red border. Panel A: Slave concentration (% of total population who are slaves) as measured in 1860 Census normalized to 2010 county and county-equivalent boundaries. Source: National Historic Geographic Information System (NHGIS). Panels B & C: Age adjusted, percent decline in mortality from all diseases of the heart between 1968 and 2014 for Whites and Blacks respectively. Source: National Center for Health Statistics. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

causes of sick individuals (within-population variation in disease cases) are not necessarily the same as the causes of sick populations (between-population variation in disease incidence rates) (Schwartz & Diez-Roux, 2001). The etiologies of cases and rates could differ for several reasons. For example, population group level processes may be direct upstream determinants of individual level risk behavior, such as when state and local smoke-free legislation, tobacco marketing, and taxation affect individual tobacco accessibility and affordability, resulting in variation in area-based smoking prevalence (Dwyer-Lindgren et al., 2014). Alternatively, contextual effects of local areas may indirectly affect health

behaviors through broad social norms, micro-level social network influences, or exposure of individuals to health-relevant socioeconomic opportunities and constraints embedded in places and institutions (Osypuk, 2013; Yusuf & Anand, 2010).

*Fundamental social causes of disease* (FSCD) theory suggests that inequities in disease rates between socially stratified groups reflect the groups' differential access to the technology, knowledge, and resources necessary to prevent or treat disease (Phelan, Link, & Tehranifar, 2010). For instance, in the absence of effective prevention or treatment, variation in disease rates is likely to be random; it is the unequal access to,

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