The Economics of Malaria and Malaria Eradication in the United States

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Detailed abstract

This paper examines the effects of demographic changes and New Deal policies on malaria's decline in the American South during the early 20th century. Malaria is a serious public health problem in developing countries today: according to the World Health Organization (WHO), an estimated 500 million people contract the disease every year worldwide. Understanding the various determinants of this disease has important implications for devising optimal health policies and identifying at-risk populations. Although there is a vast literature on malaria's biology, few studies have investigated the socioeconomic predictors of this disease. Given the accessibility and completeness of historical data on the United States, our research contributes to the malaria literature by examining the history of the disease in the American South. Our research design estimates the within-county relationship between various socioeconomic factors, New Deal policies, and the prevalence of this disease in 1920, 1930, and 1940. Our results indicate that the Agricultural Adjustment Act and migration out of rural Southern counties are the principle reasons for malaria's demise in the United States.

Although, today, malaria primarily afflicts developing countries, the disease was a significant public health problem in the American South through the 1930s. Figures I, II, and III present the malaria death rates, by county, in 1920, 1930, and 1940, respectively. As illustrated by the dark-shaded counties, many counties within the American South had malaria death rates above 50 deaths per 100,000 inhabitants in 1920 and 1930. Since there were approximately 200 to 400 infections to every one death, malaria may have infected as many as one in every five individuals per year in the most impacted areas. The external validity of my results is strengthened by the fact that the burden of the disease in the American South is comparable to malarial countries today.

The fact that malaria was eradicated from the American South also underscores the value of this research. As Figures II and III illustrate, there was a substantial decline in the malaria death rate between 1930 and 1940. For example, only one county had above 50 malaria deaths per 100,000 inhabitants in 1940, as opposed to 68 counties in 1930. Identifying the most significant factors for malaria's decline in the

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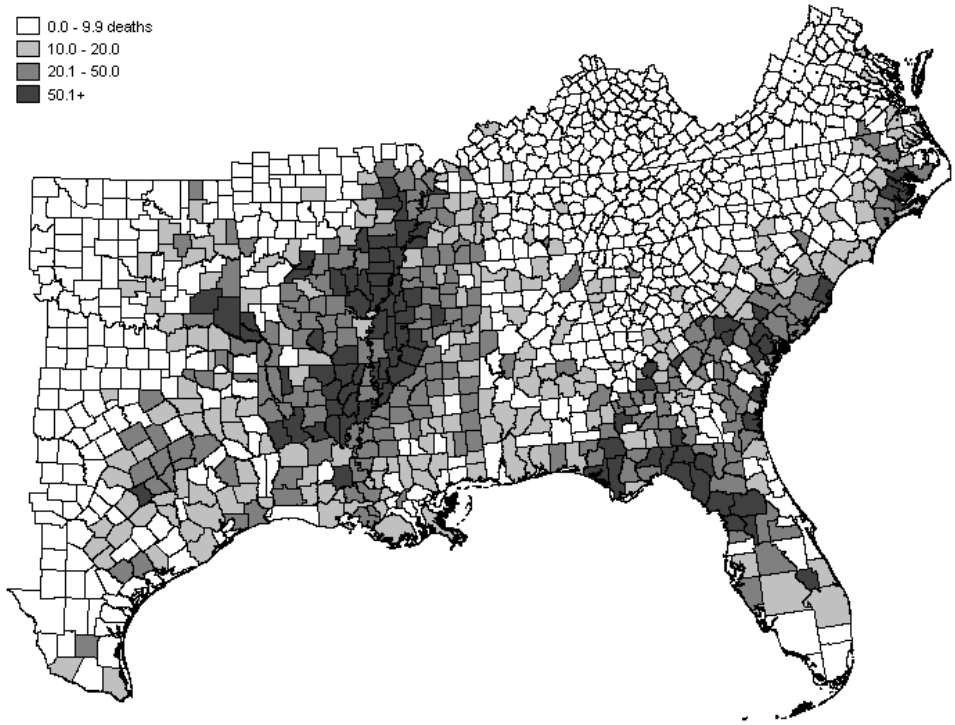
American South may provide practical policy recommendations for malaria eradication efforts today. Given much of malaria's demise occurred in the 1930s, New Deal policies may have played an important role.

The outcome of interest is the malaria death rate (per 100,000 inhabitants) at the county level in 1920, 1930, and 1940. We match these county malaria death rates to detailed census data for each county and decade. Importantly, the 1920, 1930, and 1940 censuses have a wide array of economic and demographic variables at the county level, which allow us to test the various factors that plausibly affect malaria transmission. For example, we have information on crop value, amount of farmland, number of farmers, urban and rural population, population density, number of manufacturing establishments, and average manufacturing wage. In addition, we have county-level information on New Deal spending that occurred in the 1930s. Specifically, we have information on the level of Agricultural Adjustment Act (AAA) expenditures and Public Works Projects expenditures at the county level.

To address concerns of omitted variables bias, we are able to control for unobservable factors that are fixed over time by using a within-county estimation strategy. Arguably, there are potentially minor time-variant factors that we fail to control for with this approach that may be correlated with demographic changes. Our New Deal analyses rely on the exogeneity of AAA spending. To account for potential endogeneity of the Public Works expenditures, we use an instrumental-variables identification strategy.

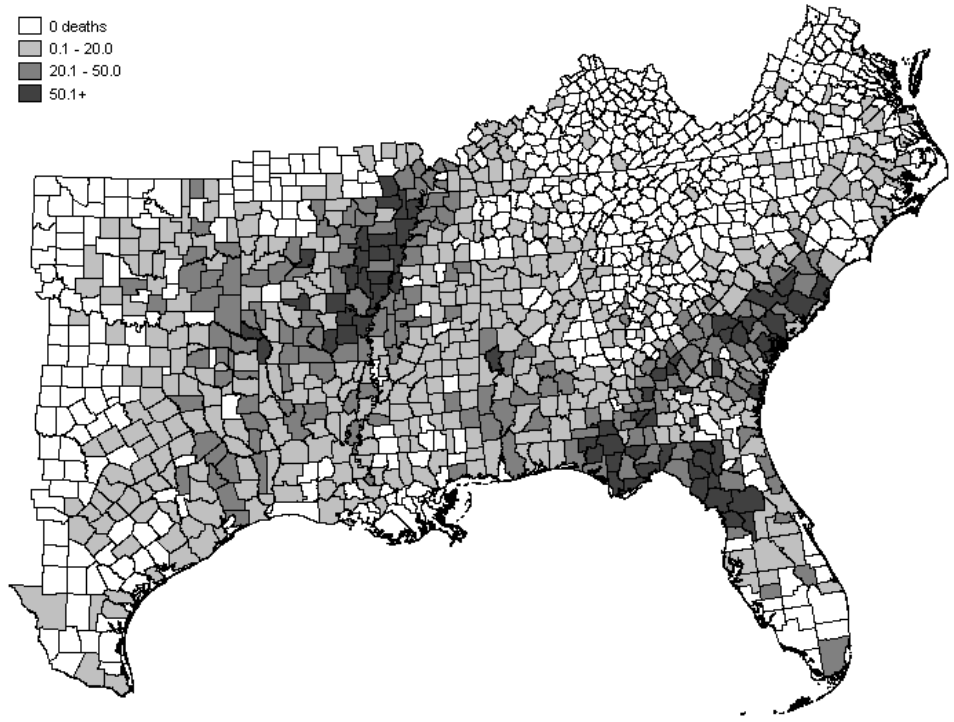
Preliminary results suggest that migration from rural counties to urban counties played the most prominent role in malaria's demise in the United States. The AAA played a significant role in eradicating malaria, most likely, by encouraging low-productivity farm labor to migrate away from malarial rural areas. As an adverse effect of the migration, malaria death rates were higher in urban counties all else equal. Despite the fact that some Public Works expenditures went towards mosquito abatement projects, we find that Public Works had little impact on the incidence of malaria.

Figure I: Malaria death rate by counties
1920



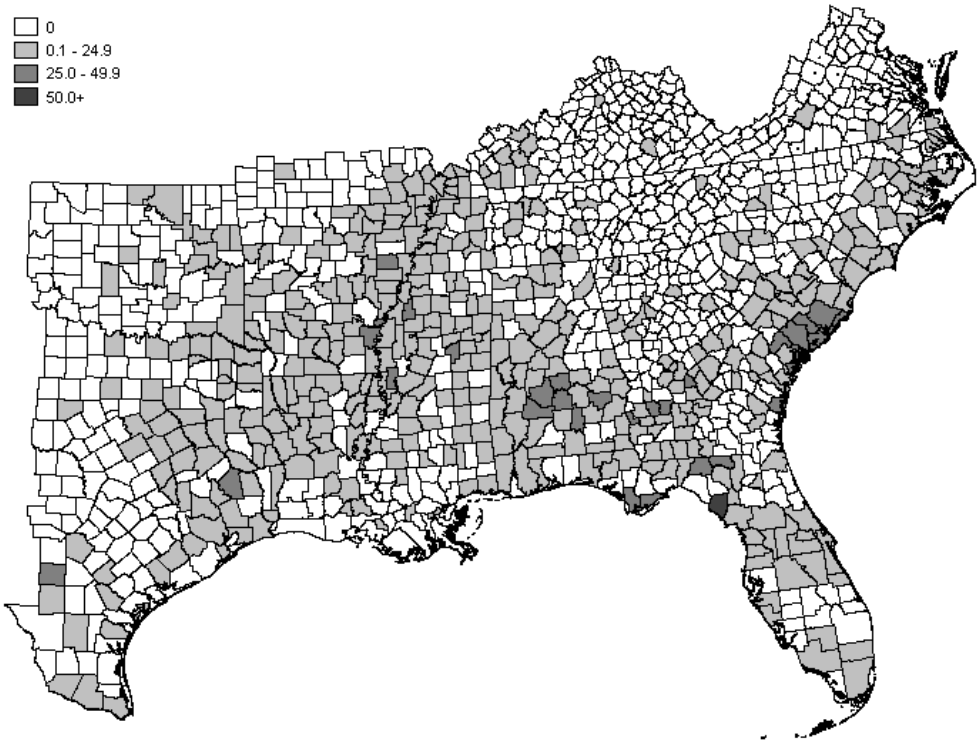
Source: Maxcy

Figure II: Malaria death rate by counties
1930



Source: Faust

Figure III: Malaria death rate by counties
1940



Source: Faust