

# PLACE MATTERS FOR HEALTH IN THE SOUTH DELTA:

## Ensuring Opportunities for Good Health for All

### A Report on Health Inequities in South Delta, Mississippi





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**Ensuring Opportunities for Good Health for All**

**A Report on Health Inequities in South Delta, Mississippi**

**Prepared by the  
Joint Center for Political and Economic Studies**

**In Conjunction With  
The Center on Human Needs, Virginia Commonwealth University  
and The Virginia Network for Geospatial Health Research  
and The South Delta PLACE MATTERS Team**

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Joint Center for Political and Economic Studies, Washington, DC 20005

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## FOREWORD

Place matters for health in important ways, according to a growing body of research. Differences in neighborhood conditions powerfully predict who is healthy, who is sick, and who lives longer. And because of patterns of residential segregation, these differences are the fundamental causes of health inequities among different racial, ethnic, and socioeconomic groups.

The Joint Center for Political and Economic Studies and the South Delta, MS, PLACE MATTERS Team are pleased to add to the existing knowledge base with this report, *PLACE MATTERS for Health in the South Delta: Ensuring Opportunities for Good Health for All, A Report on Health Inequities in the South Delta of Mississippi*. The report, supported by a grant from the National Institute on Minority Health and Health Disparities (NIMHD) of the National Institutes of Health, provides a comprehensive analysis of the range of social, economic, and environmental conditions in the South Delta and documents their relationship to the health status of the county's residents.

The study finds that social, economic, and environmental conditions in low-income and non-white neighborhoods make it more difficult for people in these neighborhoods to live healthy lives.

The overall pattern in this report – and those of others that the Joint Center has conducted with other PLACE MATTERS communities – suggests that we need to tackle the structures and systems that create and perpetuate inequality to fully close racial and ethnic health gaps. Accordingly, because the Joint Center seeks not only to document these inequities, we are committed to helping remedy them.

Through our PLACE MATTERS initiative, which is generously supported by the W.K. Kellogg Foundation, we are working with leaders in 24 communities around the country to identify and address social, economic, and environmental conditions that shape health. We look forward to continuing to work with leaders in the South Delta and other communities to ensure that every child, regardless of their race, ethnicity, or place of residence, can enjoy the opportunity to live a healthy, safe, and productive life.

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*Ralph B. Everett*  
*President and CEO*  
*Joint Center for Political and Economic Studies*



## Access to Food Providers and Recreational Facilities in the South Delta, Mississippi and Its Relationship to Health

### EXECUTIVE SUMMARY

*[I]nequities in health [and] avoidable health inequalities arise because of the circumstances in which people grow, live, work, and age, and the systems put in place to deal with illness. The conditions in which people live and die are, in turn, shaped by political, social, and economic forces.*

World Health Organization Commission on the Social Determinants of Health (2008)

Place matters for health in important ways. Neighborhood conditions—such as the quality of public schools; the age, density, and size of housing; access to medical care and healthy foods; the availability of good jobs; levels of exposure to environmental degradation and violence; and the availability of exercise options—powerfully predict who is healthy, who is sick, and who lives longer. This study examined the relationships between health, community demographic characteristics, and food access in the South Delta region of Mississippi, and attempted to address specific questions raised by the South Delta PLACE MATTERS Team:

- What is the relationship between race, socioeconomic status (as measured by income, wealth, or education), place of residence, and access to green space?
- What is the relationship between race, socioeconomic status, place of residence, and access to food providers?
- What is the relationship between access to food providers and food expenditures?
- What is the relationship between access to food and to green space and health?

The study found that:

- Between 2005 and 2009, nearly two of every three South Delta households had annual incomes below 200% of the federal poverty level (FPL), and more than one-third had annual incomes less than the FPL (\$22,000 for a family of four).
- Between 1999 and 2007, the premature death rate (death prior to the age of 65) in the South Delta was nearly 50% higher for black residents than for white residents.

- There are only two grocery stores located within the approximately 840 square mile area of the South Delta, and they both are located in Rolling Fork. This problem of low food access is compounded by the fact that 17% of households in the South Delta lack a vehicle. Two of the three census tracts in the South Delta were defined by the United States Department of Agriculture in 2010 as “food deserts.”
- In 2007 more than one-third of South Delta adults were classified as obese.
- According to the Centers for Disease Control and Prevention, in 2009 the South Delta had a higher rate of physically inactive adults than more than 90% of U.S. counties, in part due to a lack of recreational facilities.
- Between 1990 and 2008, life expectancy at birth varied by more than 10 years among counties within the broader Mississippi Delta. Issaquena County had the highest life expectancy at 79.5 years. At 69.0 years, Tunica County had the lowest life expectancy of all the Mississippi Delta counties. This life expectancy is lower than that of the Dominican Republic, Estonia, or Sri Lanka.

The overall pattern suggests that socioeconomic conditions in neighborhoods of concentrated poverty, which are predominantly African American, make it more difficult for people in these communities to live healthy lives. Clearly, there is a strong moral imperative to enact policies to redress the inequalities of the past, as well as current inequities, in ways that will improve health for all. It should be unacceptable in the world’s wealthiest society that a person’s life can be cut short by nearly 20 years simply because of where one lives. But there also is a powerful economic incentive. A study released by the Joint Center for Political and Economic Studies in 2009 found that direct medical costs associated with health inequities among African Americans, Hispanics, and Asian Americans approached \$230 billion between 2003 and 2006 (see *The Economic Burden of Health Inequalities in the United States*, by T.A. LaVeist, D.J. Gaskin, and P. Richard). When indirect costs, such as lowered productivity and lost tax revenue resulting from illness and premature death, were included, the total cost of health inequities exceeded \$1.24 trillion. Thus, for both moral and economic reasons, we must address health inequities and their root causes now.

In light of these findings, elected officials, planners, and land use authorities in Issaquena and Sharkey counties should consider the following strategies:

- Seek ways to provide greater access to establishments that offer fresh fruits and vegetables at affordable prices. Among the possibilities are (1) providing vouchers for low-income people to use farmers' markets; (2) providing public transportation to reach food retailers, particularly supermarkets that offer healthy and high-quality foods at affordable prices; and (3) offering incentives to businesses that increase access to healthy and high-quality foods, including support for a Healthy Food Financing Initiative and similar programs to assist populations in food deserts.
- Seek ways to promote more physical activity among the counties' residents by providing greater access to recreational facilities within manageable distances and increasing the time allotment in schools for physical activity.
- Increase understanding among policy makers of the social determinants of health through professional education and other tools.
- Increase public understanding of the social determinants of health and the importance of healthy lifestyles and seek ways to empower citizens to be strong advocates for policies and practices that will make healthy lifestyles more accessible to them.

## INTRODUCTION

The health of Sharkey and Issaquena County residents is related to many factors.<sup>1</sup> Across the region, disease rates vary dramatically by age, socioeconomic status, and race and ethnicity. Place matters in health because of characteristics of the areas in which people live. These social determinants of health include such characteristics as access to medical care and healthy foods, environmental quality, availability of exercise options, quality of schools, income levels, and stress related to unmet needs in each of these areas.

Regional statistics oversimplify important differences that exist between neighborhoods and communities within the Mississippi Delta and that contribute to significant differences in the health of residents. Regardless of one's education, income, or motivation to make healthy choices, health risks may be introduced by crime, air pollution, the absence of places to exercise or nutritious food, poor schools, a scarcity of good jobs, and stress related to these community challenges.<sup>13, 16-24</sup> Geographic disparities in health status within Sharkey and Issaquena counties reflect, in part, geographic patterns in the population and living conditions. These patterns often are a legacy of our history of racial discrimination, as well as institutional policies and practices that place vulnerable populations in stressed areas. This cycle of hardship entrenches patterns of socioeconomic disadvantage.<sup>25-29</sup>

This report specifically focuses on access to recreational facilities and food providers in Sharkey County and Issaquena County and how such access is associated with health outcomes. According to the United States Department of Agriculture (USDA), in 2008 Issaquena County had no grocery stores and Sharkey County had only two.<sup>30</sup> (We define grocery stores as establishments engaged in retailing a general line of food such as canned and frozen goods; fresh fruits and vegetables; and fresh and prepared meats, fish, and poultry. Convenience stores and supercenters/warehouse clubs are excluded from this category.) Furthermore, in 2006, more than one of every 10 (10.7%) Sharkey County households and more than one in six Issaquena County households had no car and lived more than one mile from the nearest grocery store.<sup>30</sup> In addition, according to the Mississippi Department of Health, households in the South Delta have limited options for recreation or fitness facilities (these are defined as establishments primarily engaged in operating fitness and recreational sports facilities that feature exercise and other active physical fitness conditioning or recreational sports activities, such as swimming, skating, or racquet sports; specifically, NAIC Code 713940). Lack of access to recreational facilities and food providers has been shown to be associated with higher obesity rates and other adverse health outcomes.<sup>31-35</sup>

Part I of this report provides background information about the two counties of Sharkey and Issaquena and their three respective census tracts (also referred to as the South Delta in this document), including population data, health outcomes, socioeconomic conditions, and community characteristics. Part II examines the relationship between access to food providers, recreational facilities, and health. Part III presents some conclusions about community-level factors related to food access and health outcomes in the South Delta. Appendices A and B, available online at [www.jointcenter.org](http://www.jointcenter.org), present detail about the data and methods used in preparing this report.

## I. Background: Population, Community Characteristics, and Health in the South Delta

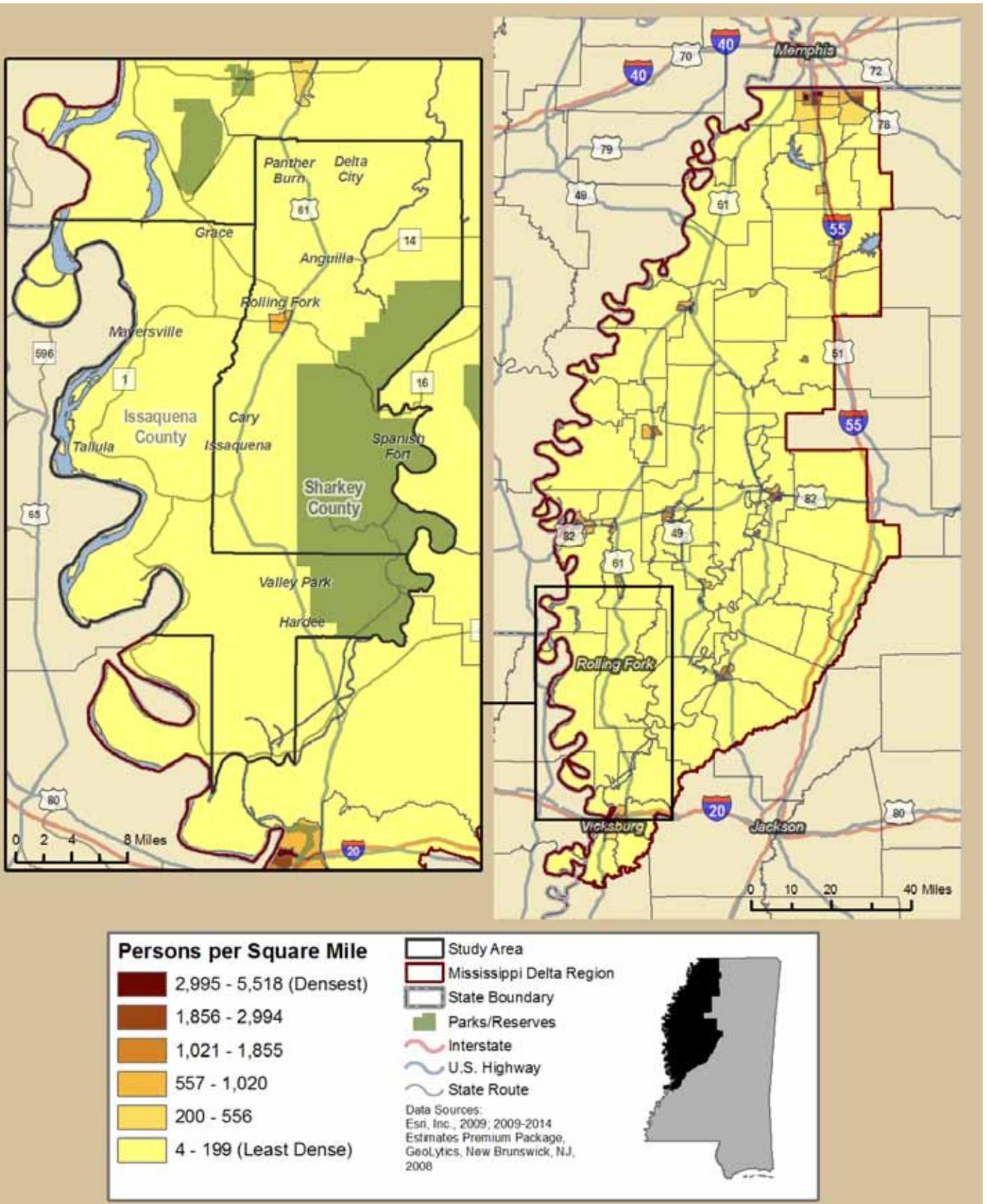
### *Population*

The South Delta is located on the eastern border of Mississippi on the shore of the Mississippi River and includes Sharkey and Issaquena counties. Sharkey County had a population of 5,184 people in 2009 and contains the city of Rolling Fork,<sup>36</sup> which had a population density of 935 persons per square mile in 2009 and is home to more than a quarter (26.8%) of the county's population; the rest of Sharkey County had a population density of 8.3 persons per square mile (see Map 1). Issaquena County had 2,130 residents in 2009 and a population density of 3.9 persons per square mile.<sup>37</sup> While the South Delta is the most rural part of the Mississippi Delta, the rest of the Mississippi Delta is also largely rural. The Mississippi Delta includes the counties of Bolivar, Carroll, Coahoma, DeSoto, Holmes, Humphreys, Issaquena, Leflore, Panola, Quitman, Sharkey, Sunflower, Tallahatchie, Tate, Tunica, Warren, Washington, and Yazoo.

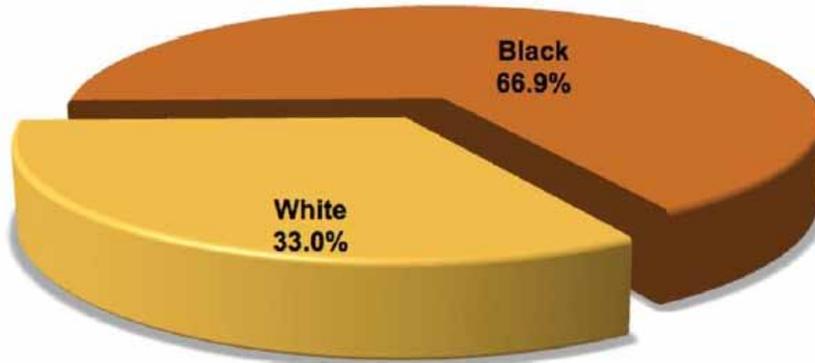
The South Delta's population is composed almost entirely (99.9%) of blacks and non-Hispanic whites.<sup>36</sup> In both the South Delta and the Mississippi Delta, the majority population is black (see Figure 1). The Mississippi Delta has a higher percentage of Hispanics and Asians than the South Delta, but these percentages are still less than in Mississippi and far less than national averages (see Table 1). The vast majority of the population in the Delta is native born.<sup>36</sup>

In many cities and towns, people of color and disadvantaged populations have historically been relegated to isolated and segregated communities, and this segregation perpetuates cycles of hardship because of limited housing and employment opportunities, persistent housing discrimination, and lack of access to financial capital. A useful tool for measuring racial segregation is the Diversity Index, which measures the likelihood that two people randomly chosen from an area will be of a different race or ethnicity. The higher the value, the less segregated the area. The index for the South Delta is 85.7%, while the index for the Mississippi Delta is 88.7%. The value

Map 1: Population Density by Census Tract, South Delta and Mississippi Delta (2009)



**Figure 1: Race/Ethnicity in South Delta, MS**



Source: U.S. Census Bureau 2009, American Community Survey

**Table 1. Demographic Characteristics of the South Delta, the Mississippi Delta, the State of Mississippi, and the United States (2009)**

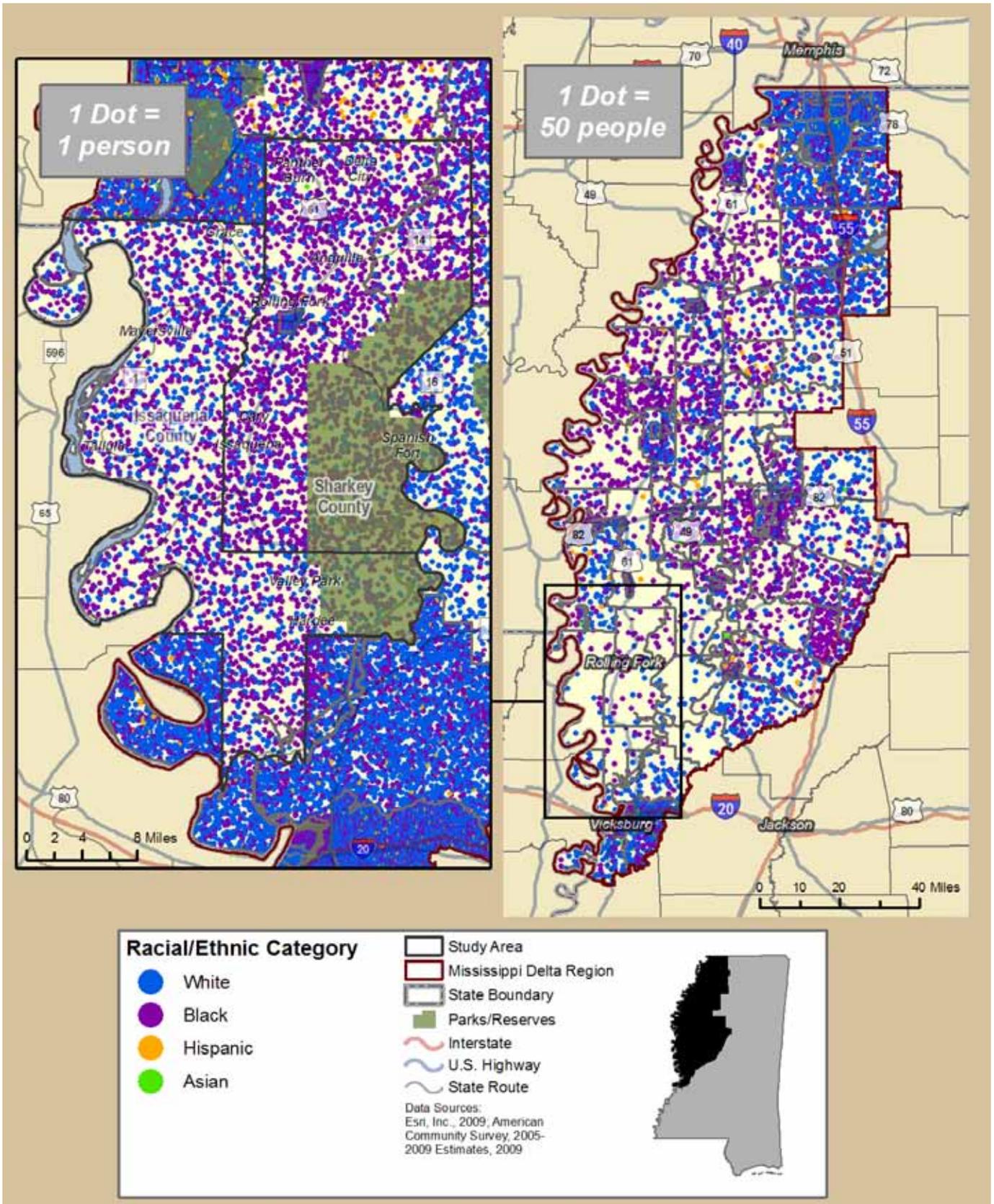
	South Delta	Mississippi Delta	Mississippi	United States
<b>Population</b> <sup>(a)</sup>	7,314	341,582	2,922,240	307,006,556
<b>Population Density</b> <sup>(b)</sup>	8.3	52.6	62.5	86.7
<b>Race/Ethnicity</b> <sup>(a)</sup>				
White	33.0%	37.3%	58.8%	64.9%
Black	66.9%	59.8%	36.9%	12.1%
Hispanic	0.1%	1.6%	2.1%	15.8%
Asian	0.0%	0.5%	0.8%	4.4%
Other	0.0%	0.9%	1.3%	2.8%
<b>Foreign Born</b> <sup>(a)</sup>	0.0%	1.7%	1.9%	12.5%

(a) U.S. Census Bureau, 2005-2009, American Community Survey

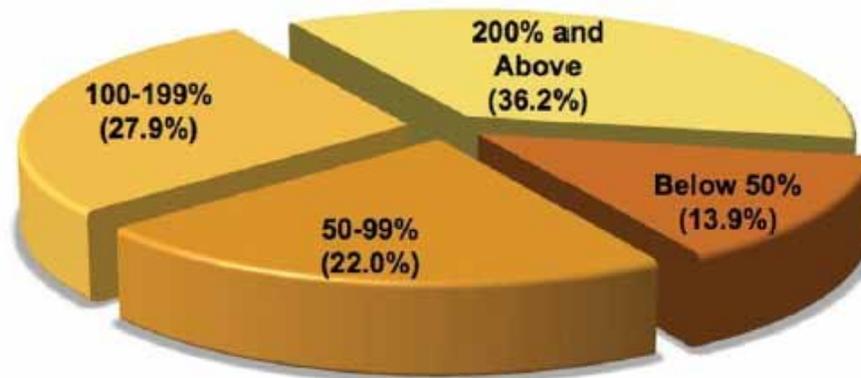
(b) Persons per square mile; 2009 Geolytics Projection

Note: "Other" includes American Indian and Alaska Native, Native Hawaiian and Other Pacific Islander, and those who identified themselves as some other race or two or more races. Racial groups include the non-Hispanic population only; Hispanic can include any racial group.

Map 2: Distribution of Racial and Ethnic Groups, South Delta and Mississippi Delta (2005–2009)



**Figure 2: Ratio of Income to Poverty, South Delta (2005-2009)**



Source: U.S. Census Bureau, 2005-2009, American Community Survey

ranges by census tract in the Mississippi Delta from a low of 75.7% in Greenville to a high of 91.5% in Vicksburg.

While the residential area of the South Delta is diverse, the racial composition of the student bodies in public and private schools is notably less so. The South Delta contains one private school, Sharkey-Issaquena Academy, located in Rolling Fork. A full year of tuition at the school is \$3,950,<sup>38</sup> a level that potentially prices out residents with low income or wealth, who are disproportionately likely to be black. Of the 201 students in the academy, 188 (93.5%) were white in the 2007–2008 school year. The racial composition of students enrolled in the South Delta School District (the public school system) was 96.9% black, 2.3% white, and 0.8% other racial or ethnic group. This racial separation is similar in surrounding counties. Washington and Yazoo counties are home to four private schools: Deer Creek, Benton Academy, Covenant Christian, and Manchester Academy. The proportion of black students in the private schools of the region ranged from 0% in Benton to 4.8% in Covenant Christian as of the 2007–2008 school year.<sup>39, 40</sup>

Differences in the racial composition of student bodies in public and private schools in areas of residential diversity is not unique to the South Delta.<sup>41</sup> One national, longitudinal study suggests that as the percentage of minority students increases in an area, the likelihood that white students will enroll in private schools also increases.<sup>41, 42</sup> The literature suggests that academic opportunities are more plentiful and outcomes better in private schools compared to public schools.<sup>43-45</sup> Opportunity and excellence in a student's academic career have been associated with better social and economic outcomes later in life. For example, higher educational attainment is linked to higher earnings.<sup>36</sup> In comparison, poor student performance is linked to a higher risk of high school dropout, risky health

behaviors, delinquent or criminal behavior, and limited economic success.<sup>46</sup> Thus, highly segregated school systems can significantly affect the learning environment and opportunities available to students and therefore their long-term social and economic status.

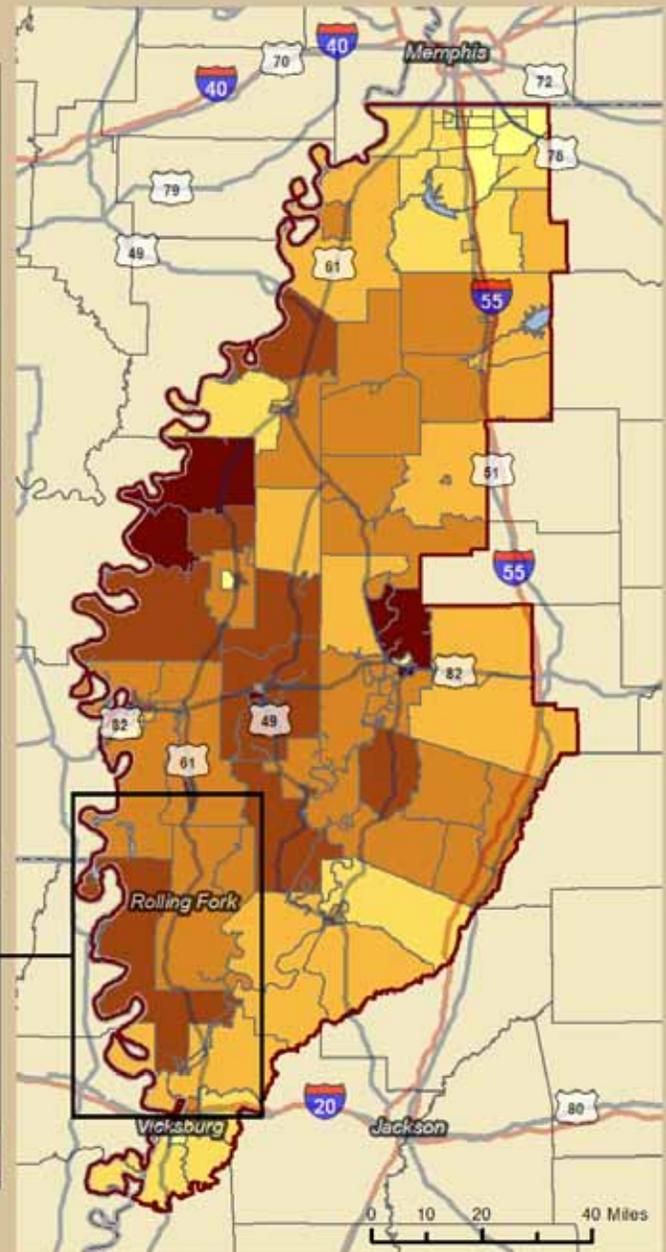
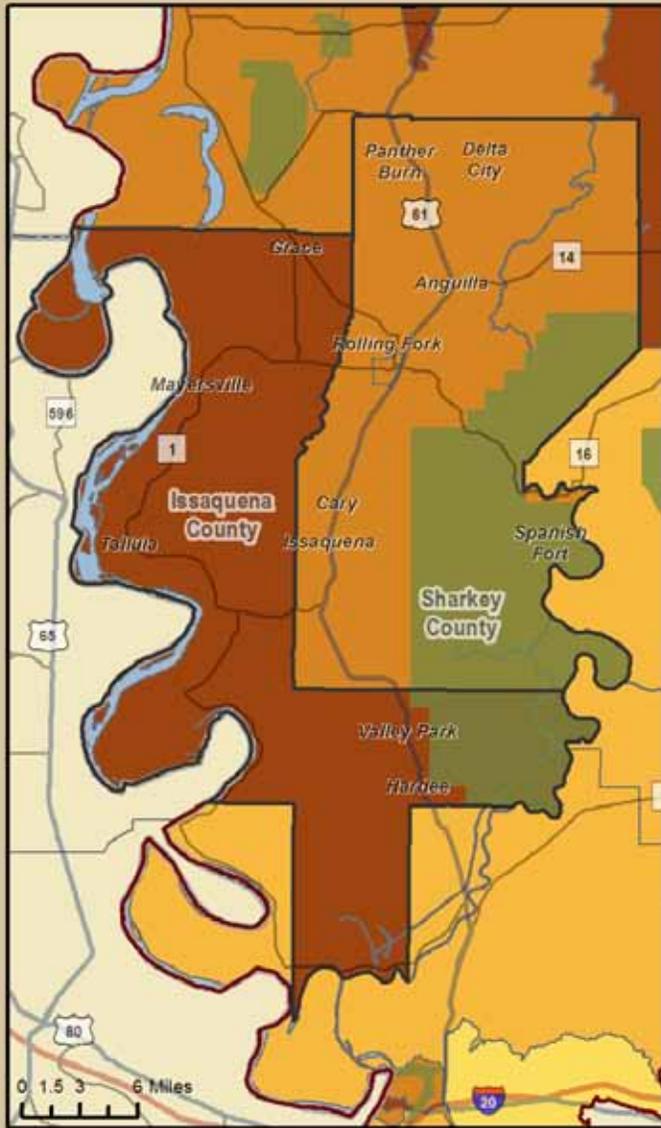
Map 2 illustrates the racial and ethnic distribution throughout both the South Delta and the Mississippi Delta. The census tracts with the highest white population are predominantly in DeSoto County, while the areas with the highest black population are predominantly in Washington County.

### *Socioeconomic Characteristics*

As is true of other communities, socioeconomic conditions in the South Delta and the Mississippi Delta exert an important and often unrecognized influence on health status. Nationally, families with incomes below the federal poverty level (FPL) (\$22,000 or less for a family of four in 2009) are 3.6 times more likely to report fair or poor health than those with incomes of at least twice the poverty level.<sup>47</sup>

Poverty rates are high in the South Delta. Figure 2 shows that, between 2005 and 2009, nearly two of every three South Delta households had incomes below 200% of the FPL (\$44,100 for a family of four in 2009). More than one out of three South Delta households had incomes below the FPL (less than 100% FPL), and approximately one in seven households lived in severe poverty (less than 50% FPL). The poverty rate in the South Delta (35.9%) was greater than the average for the state of Mississippi (21.4%) and much higher than the national average (14.4%) (see Table 2).<sup>48</sup>

Map 3: Poverty by Census Tract, South Delta and Mississippi Delta (2009)



**Percent of Population with Incomes Below 150% of the Federal Poverty Level**



- Study Area
- Mississippi Delta Region
- State Boundary
- Parks/Reserves
- Interstate
- U.S. Highway
- State Route

Data Sources:  
 Esri, Inc., 2009, 2009-2014  
 Estimates Premium Package,  
 GeoLytics, New Brunswick, NJ,  
 2008



In 2009, the U.S. Census Bureau estimated that nationally 23.6% of households were below 150% of the FPL.<sup>36</sup> In the South Delta, the percentage was 55.7%,<sup>37</sup> more than twice the rate of the U.S. In the entire Mississippi Delta, 38.8% of households had incomes below 150% of the FPL. The highest percentage was in Greenwood County, where in one census tract 83.8% of households reported incomes below 150% of the FPL (see Map 3).

In 2009, the median income for households in Sharkey County and Issaquena County was \$29,495 and \$20,250, respectively.<sup>48</sup> In both Sharkey and Issaquena counties, median income was more than twice as high in white households (\$45,833 and \$33,622, respectively) than in black households (\$18,778 and \$15,927, respectively).<sup>48</sup> The county with the highest median income in the Mississippi Delta was DeSoto (\$57,995).<sup>48</sup> Even in the county with the smallest racial disparity—DeSoto—white households reported an income of \$61,801 and black households reported \$45,354.<sup>48</sup>

Persistence of concentrated poverty across several decades may pose additional health and social consequences, particularly for the children living in those areas. A persistent lack of economic resources during childhood has consequences for a child's cognitive, emotional, behavioral, and physical development.<sup>49, 50</sup> It may also diminish the likelihood of high school completion, thus perpetuating disadvantage and the multigenerational cycle of living in conditions that adversely affect health.<sup>49</sup> Persistent poverty, defined as having at least 20% of the population with incomes under 100% of the FPL for at least two census periods, has been a pervasive influence throughout the Mississippi Delta region. According to the Census definition, of the 119 census tracts in the Mississippi Delta region, 69 (58.0%) have experienced persistent poverty since at least 1990. All three census tracts in the South Delta meet this definition (Map 4).

Insufficient income to meet basic needs intensifies material hardship. People of limited means often spend a disproportionately large portion of their income on housing, leaving little for other basic needs. Nationally in 2009, the risk of housing cost burden (paying more than 30% of income toward housing costs) was almost seven times larger for those earning less than \$20,000 per year compared to those earning \$75,000 or more.<sup>36</sup> In 2009, housing cost burden was high in both the South Delta and the Mississippi Delta. In the South Delta 21.8% of households had moderate to severe (between 30% and 49.9% of income) housing cost burden and another 10.4% experienced severe housing cost burden (more than 50% of income).<sup>48</sup> In the Mississippi Delta, 16.8% of households experienced moderate housing cost burden and another 12.2% experienced severe housing cost burden. In the state of Mississippi, a smaller percentage of households reported moderate or severe housing cost burden: 14.7% and 6.3%, respectively.<sup>48</sup>

Low income also increases the likelihood of living in undesirable housing conditions.<sup>51</sup> In 2009, the percentage of South Delta households lacking plumbing was 1.13%, a higher rate than in the Mississippi Delta (0.48%), the state of Mississippi (0.42%), or the U.S. (0.36%).<sup>37</sup> Even basic needs like food become more tenuous in the presence of poverty. Nationally in 2009, those living below the FPL were 5.7 times more likely to report food insecurity than were households making at least 185% of the FPL.<sup>52</sup> The USDA reports that households in Mississippi experienced the third highest prevalence of food insecurity (17.4%) of all states and the District of Columbia between 2007 and 2009.<sup>52</sup>

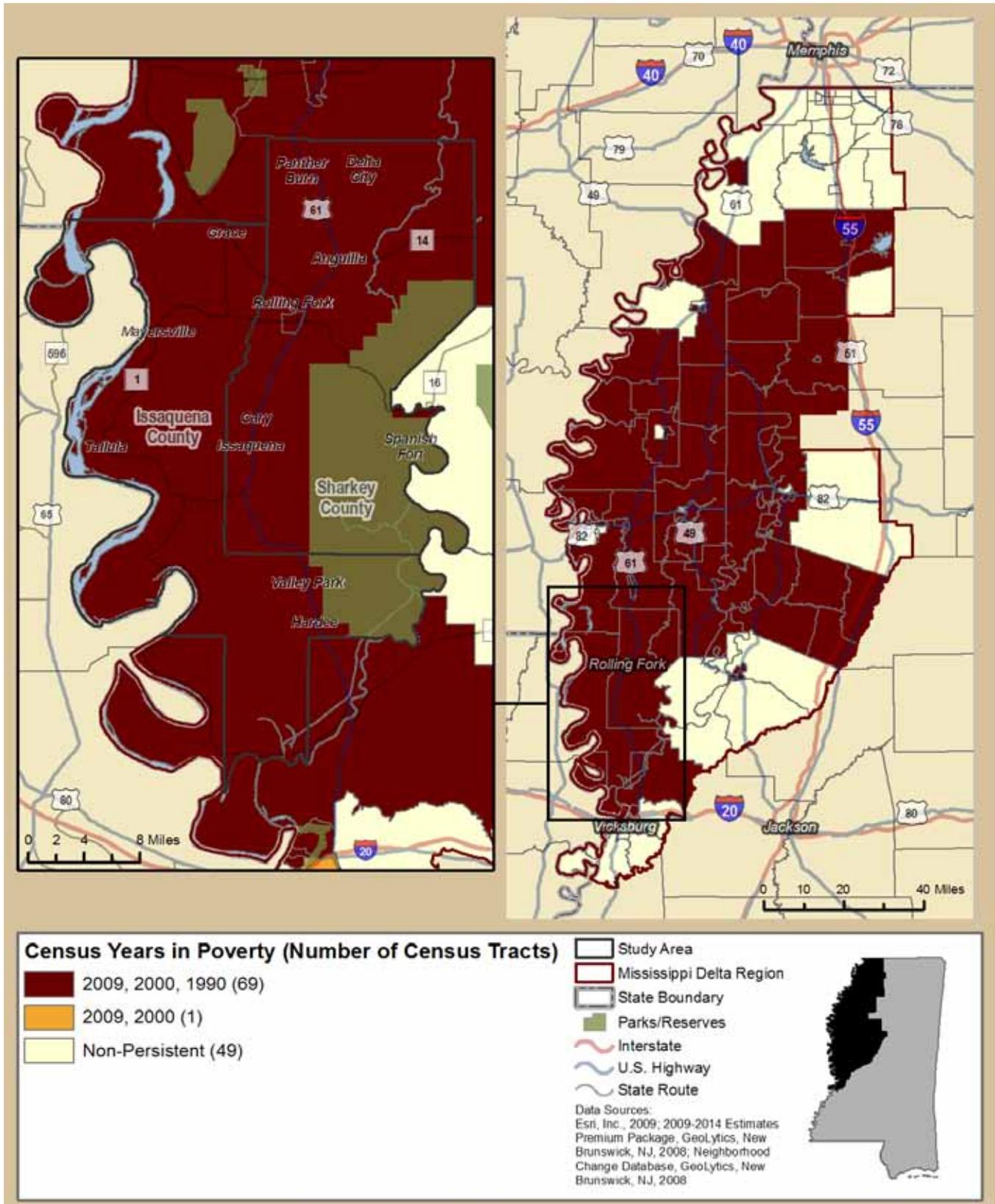
Because of a lack of access to financial capital, impoverished families are more likely to rent than own property and are more likely to live in less desirable areas. In 2009, 12.1% of housing units in the South Delta were vacant, compared to 8.1% in the Mississippi Delta, 9.8% in Mississippi, and 9.1% in the U.S.<sup>37</sup> That same year, 58.1% of South Delta housing units were occupied by owners rather than renters, compared to 63.9% in the Mississippi Delta, 65.6% in Mississippi, and 60.7% in the U.S.<sup>37</sup>

## Education

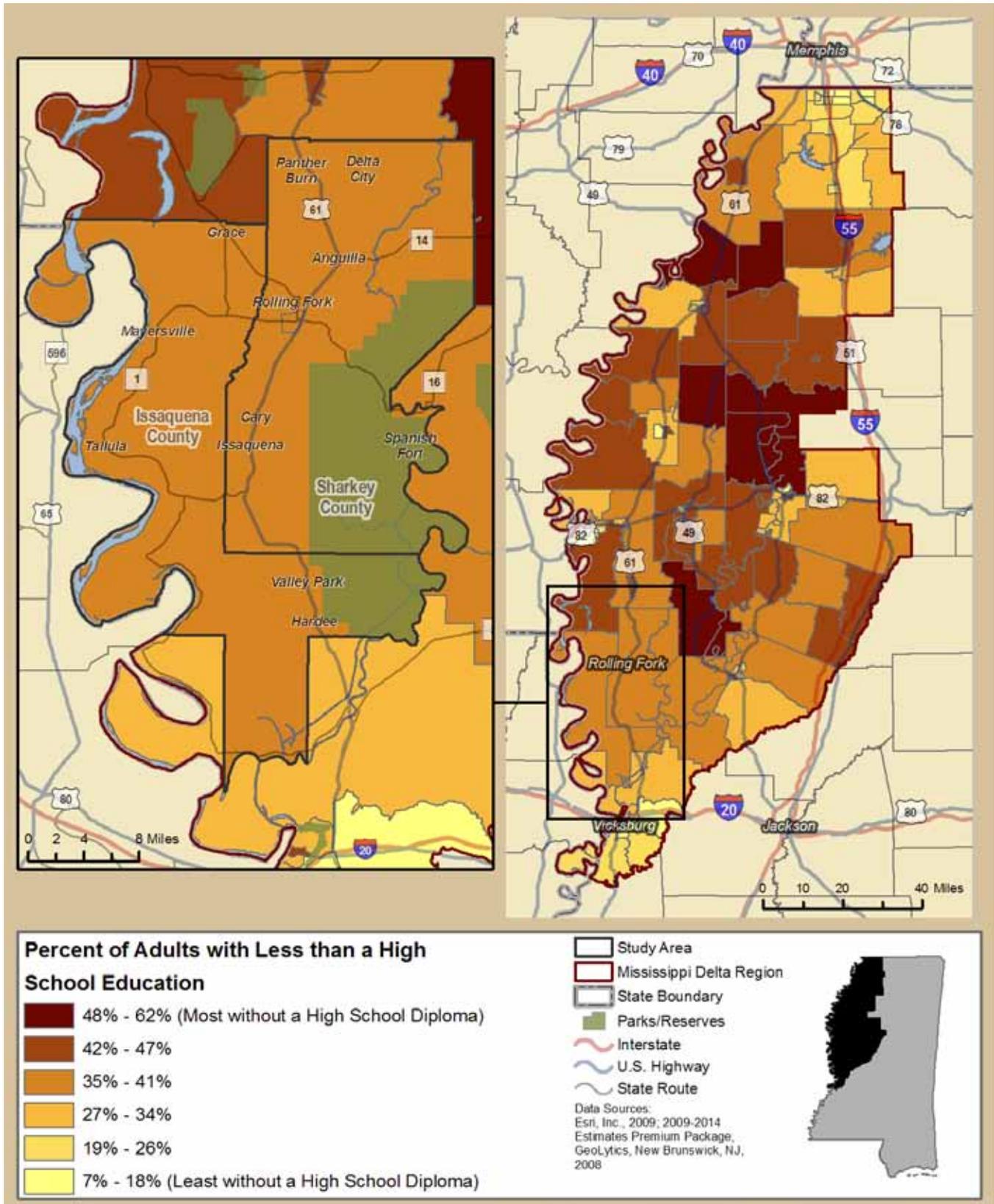
Education is a pathway to higher income and net worth, which in turn have strong influences on health status and access to health care. In 2009, American adults with less than a high school diploma as their highest educational attainment had less than half the earnings (\$18,432 versus \$47,510)<sup>36</sup> and were three times more likely to die before age 65 as those with a college education.<sup>53</sup> They are also more likely to engage in unhealthy behaviors such as cigarette smoking.<sup>54</sup>

In 2009, nearly one-third (32.7%) of adults (age 25 and older) in the South Delta had not completed high school, a percentage greater than that of the Mississippi Delta area as a whole, Mississippi, or the U.S. (see Table 2). In fact, South Delta adults were more than twice as likely to lack a high school diploma than were U.S. adults generally. The geographic distribution of educational attainment across the South Delta was largely uniform: the percentage of adults without a high school education was 39.9% in Rolling Fork, 40.5% in Issaquena County, and 39.4% in Sharkey County.<sup>37</sup> The Mississippi Delta population had a higher rate of high school completion than the South Delta, with wide geographic disparities, from a low of 20.9% in a tract in the city of Southaven in DeSoto County to a high of 62.0% in a tract in the city of Clarksdale in Coahoma<sup>37</sup> (see Map 5).

**Map 4: Persistent Poverty by Census Tract, South Delta and Mississippi Delta (1990-2009)**



**Map 5: Adults Without a High School Education by Census Tract, South Delta and Mississippi Delta (2009)**

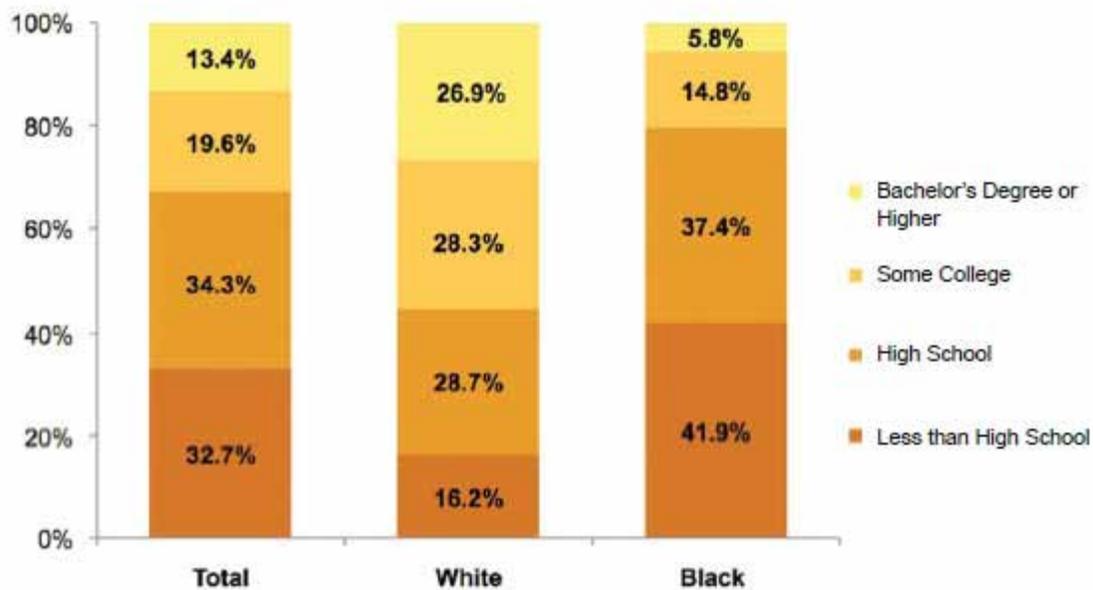


**Table 2. Socioeconomic Characteristics of the South Delta, the Mississippi Delta, the State of Mississippi and the United States**

	South Delta	Mississippi Delta	Mississippi	United States
<b>Educational Attainment</b>				
Less than High School	32.7%	23.8%	21.1%	14.7%
High School Only	34.3%	31.1%	31.2%	28.5%
Some College	19.6%	28.0%	28.6%	28.9%
Bachelor's Degree or Higher	13.4%	17.1%	19.1%	27.9%
<b>Poverty Rate</b>				
Below 50% of Poverty Level	13.9%	10.6%	9.1%	6.3%
50%-99%	22.0%	15.1%	12.3%	8.1%
100-199%	27.9%	23.5%	22.9%	18.4%
200% and Above	36.2%	50.9%	55.7%	67.3%

Source: U.S. Census Bureau, 2005-2009 American Community Survey

**Figure 3: Educational Attainment by Race in South Delta, 2005-2009**



Source: U.S. Census Bureau 2009, American Community Survey

**Table 3. Life Expectancy and Premature Mortality Rate in the South Delta, the Mississippi Delta, the State of Mississippi, and the United States**

	South Delta	Mississippi Delta	Mississippi	United States
<b>Life Expectancy at Birth</b>	72.6 <sup>(a)</sup>	72.8 <sup>(a)</sup>	74.8 <sup>(b)</sup>	77.9 <sup>(c)</sup>
<b>Premature Mortality Rate per 100,000 Persons Under Age 65<sup>(d)</sup></b>	<b>374.4</b>	<b>391.5</b>	<b>354.0</b>	<b>240.8</b>
White	294.2	302.3	299.5	225.9
Black	432.7	516.5	472.6	414.4

Note: All racial categories are non-Hispanic only.

(a) Calculated by VCU Center on Human Needs from 1990-2008 data provided by the Mississippi Department of Health, Vital Records/Public Health Statistics, and population estimates from 2001-2008 Geolytics Premium Estimates and 2009 Geolytics Premium Estimates.

(b) Calculated by VCU Center on Human Needs from 2007 data provided by Centers for Disease Control and Prevention, National Center on Health Statistics and population estimates from 2001-2008 Geolytics Premium Estimates.

(c) Health, United States 2010: With Special Features on Death and Dying; Centers for Disease Control and Prevention, 2007.

(d) 1999-2007 Centers for Disease Control and Prevention, CDC WONDER Online Data Tool.

Nationally in 2009, black adults age 25 and over were almost twice as likely to lack a high school diploma as white adults.<sup>36</sup> In the South Delta, black adults were more than 2.5 times as likely to lack a high school diploma compared to white adults (Figure 3).<sup>48</sup> In addition, in the South Delta white adults were more than 4.5 times more likely as black adults to have a bachelor's degree or higher.<sup>48</sup>

### Health Outcomes

Disparities in health outcomes based on demographic factors are well established. In 2007, life expectancy at birth for the U.S. was 77.9 years; it was 73.6 years for blacks compared to 78.4 years for whites.<sup>55</sup> Life expectancy in the South Delta was 72.6 years.

Between 1999 and 2007, the disparity between white and black populations in the premature death rate (death prior to the age of 65) was higher in the Mississippi Delta than in Mississippi but less than that of the U.S. (see Table 3). While the racial disparity was lower in the South Delta in comparison to the U.S., it was not due to a lower mortality rate in the black population but rather a mortality rate in the white population higher than the U.S. average. The overall premature mortality rate in the South Delta (regardless of race) was 133.6 deaths per 100,000 more than that of the U.S.

Nationally, non-Hispanic blacks had the highest age-adjusted mortality rate between 1999 and 2007 among racial or ethnic groups (Table 4). Non-Hispanic blacks also had the highest age-adjusted mortality rate from cardiovascular diseases.<sup>56</sup>

Between 1999 and 2007 the all-cause mortality rate in the Mississippi Delta region was 1.3 times higher than in the U.S., and circulatory disease mortality was 1.4 times higher. In the South Delta, both all-cause and circulatory disease mortality were lower than in the Mississippi Delta during the same period, but higher than in the U.S. The racial disparity between the white and black populations for all-cause and circulatory disease mortality in the South Delta was lower than in the entire Mississippi Delta, but higher than in Mississippi and in the United States. In the South Delta between 1999 and 2007, the ratio of black deaths to white deaths per 100,000 residents was 1.3-to-1, and for cardiovascular disease it was 1.4-to-1.<sup>56</sup>

As with the geographic variation in socioeconomic and environmental factors that affect health in the Mississippi Delta region, health—including life expectancy—varies sharply by county (see Map 6). Between 1990 and 2008, life expectancy at birth varied by more than 10 years among counties within the Mississippi Delta. Issaquena County had the highest life expectancy at 79.5 years, Tunica the lowest at 69.0 years. This life expectancy is lower than in the Dominican Republic, Estonia, or Sri Lanka.<sup>57</sup>

Other health measures, including premature mortality and obesity, vary sharply by county as well. In 2007, DeSoto County had the lowest age-adjusted premature mortality rate of the 18 Mississippi Delta counties (264.6 deaths per 100,000 persons under the age of 65).<sup>56</sup> That same year, the rate in Quitman County (654.4) was close to 2.5 times higher than in DeSoto County.<sup>56</sup> In 2007, adult obesity prevalence was highest in Holmes County, where 42.3% of those over 18 had a body mass index greater than 30 kg/m<sup>2</sup>.<sup>58</sup> The lowest prevalence was in Panola County (34.0%).<sup>58</sup>

**Table 4. Mortality Rates per 100,000 Persons in the South Delta, the Mississippi Delta, the State of Mississippi, and the United States (1999-2007)**

	South Delta	Mississippi Delta	Mississippi	United States
<b>All-Cause Mortality Rate<sup>(a)</sup></b>	<b>956.8</b>	<b>1,060.8</b>	<b>1,003.9</b>	<b>821.7</b>
White	828.4	957.5	942.5	815.9
Black	1,082.8	1,232.2	1,170.7	1,068.5
<b>Circulatory Disease Mortality Rate<sup>(a)</sup></b>	<b>332.3</b>	<b>424.9</b>	<b>393.6</b>	<b>301.2</b>
White	273.3	373.7	364.8	298.0
Black	387.9	512.2	477.6	402.6

Note: All Racial categories are non-Hispanic only.  
Source: 1997-2007 Centers for Disease Control and Prevention, CDC Wonder Tool.

### *Socioeconomic Characteristics and Health*

Socioeconomic factors affect the way people live and may impact the risk of illness and premature death.<sup>6, 8</sup> In 2007, members of families living in poverty nationwide were nearly twice as likely to have diabetes, 5.3 times more likely to report serious psychological distress, and 1.6 times as likely to have been hospitalized during the previous year compared to families with incomes of at least 200% of the FPL.<sup>59</sup> Figure 4 groups Mississippi counties into quintiles (five equal groups) based on the percentage of the population with incomes below 150% of the FPL. The premature mortality rate in counties in the highest poverty quintile (which includes Sharkey County and Issaquena County) was 39% higher than in counties in the lowest quintile (including counties such as DeSoto, Madison, and Rankin).

In addition to suffering worse health outcomes, those with low income have diminished access to health care services. In 2009 in the United States, impoverished families were more than three times as likely to lack health insurance, more than twice as likely to lack a usual source of care, more than twice as likely to defer or delay care due to cost, and almost three times as likely to defer prescription medication due to cost compared with families that had incomes of at least 200% of the federal poverty level.<sup>60</sup>

Disparities in access to care are compounded in rural areas. In addition to higher average poverty rates in comparison to urban areas, a dispersed population and lack of a community health care source make obtaining timely, quality, and sustained health care more difficult.<sup>61</sup> In 2009, nearly one in five residents outside of a metropolitan statistical area (MSA) deferred or delayed medical care due to cost, compared to 14.8% of residents within MSAs.<sup>62</sup> The length of time between visits with a physician or other health professional can greatly impact prevention efforts

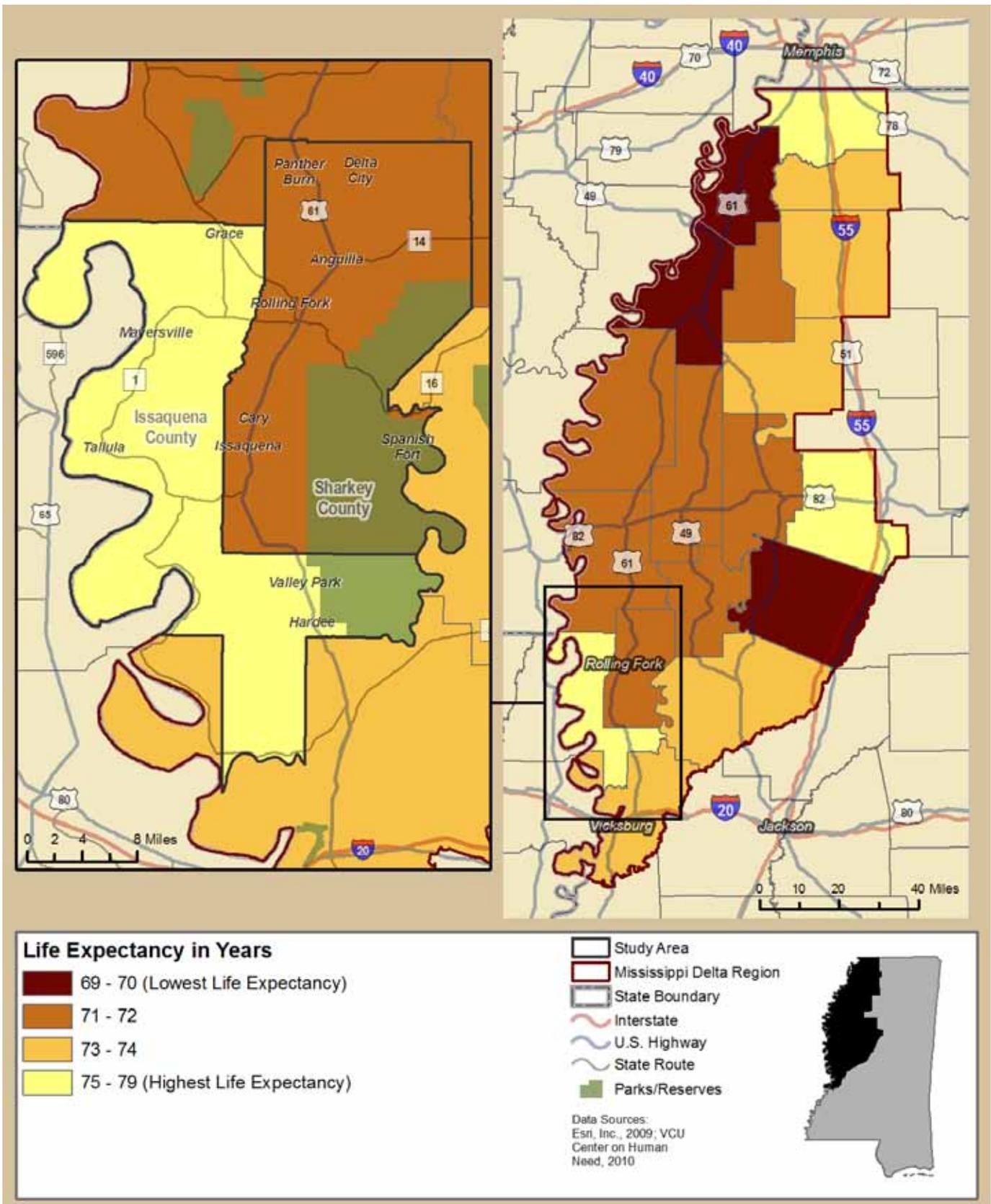
and potentially exacerbate conditions left unattended. One in 10 residents living outside of MSAs had not seen a health care professional in at least two years as of 2009. This is compared to the 8.2% of residents in large MSAs.<sup>60</sup> One in five rural residents had not seen a dentist in more than five years.<sup>60</sup>

### *Rurality and Health*

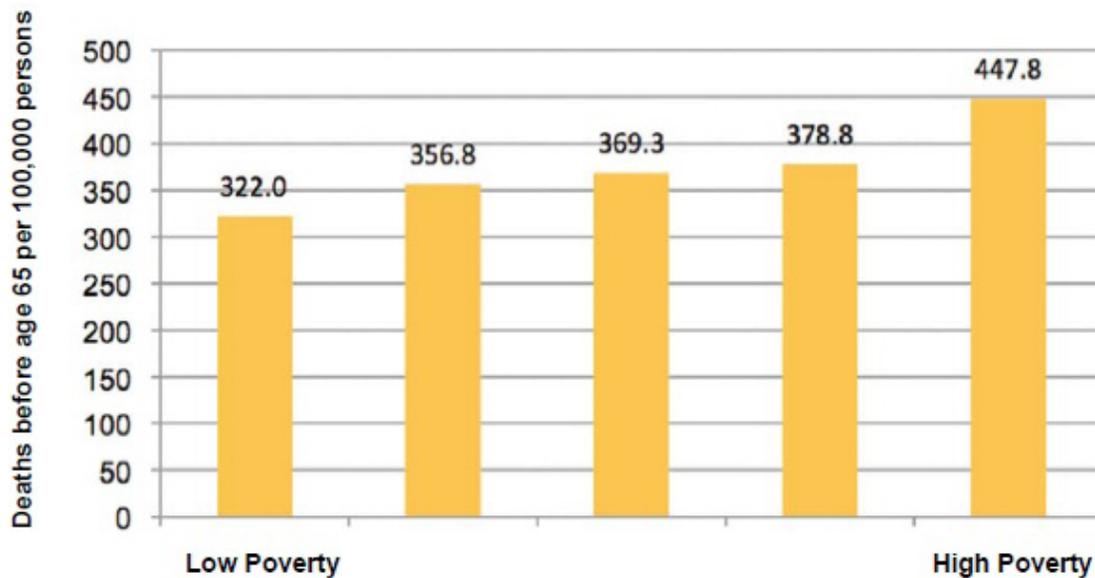
The U.S. Census Bureau designates a census tract as rural if it has a population density of less than 1,000 people per square mile.<sup>63</sup> Of the 119 census tracts within the Mississippi Delta, over half (68 tracts) met the density requirement for rural status.<sup>48</sup> These areas tend to have community assets dispersed over a wide geographic area. The South Delta region is the most rural portion of Mississippi (as determined by population density), and its counties are among the most rural in the country.<sup>37</sup>

Rural areas have unique community features that present obstacles to good health. Both in the United States and in the South, rural areas had a higher age-adjusted death rate between 2005 and 2007 than did more urban areas.<sup>55</sup> This is true even when mortality data are stratified by race.<sup>55</sup> Other reports also indicate that rural areas have higher death rates among children and young adults (less than 24 years of age) and seniors (65 years and older) and higher heart disease mortality.<sup>64</sup> Avoidable hospitalization rates are higher among rural residents than their urban counterparts, as is the prevalence of chronic diseases such as cancer, diabetes, and heart disease.<sup>62, 65</sup> Rurality also has been associated with higher rates of smoking, obesity, and physical inactivity.<sup>64</sup>

Map 6: Life Expectancy by Census Tract, South Delta and the Mississippi Delta (1990 - 2008)



**Figure 4: Average Premature Death Rate of Mississippi Counties by Poverty Levels**



**Note:** Quintile groups are based on the percentage of county population with incomes below 150% of the FPL; premature mortality is age-adjusted to the 2000 U.S. Census Population.

**Source:** 2009 Geolytics Premium Estimates; 1999-2007 Centers for Disease Control and Prevention CDC Wonder On-line Tool.

## II. Food Access, Recreational Facilities, and Health in the South Delta

### *Food Access*

In the Mississippi Delta region, the average density of grocery stores was 0.22 per 1,000 persons, the same density as the state of Mississippi but lower than the national average of 0.28 per 1,000 persons. Coahoma County had the highest density (0.44 per 1,000 persons), while the lowest was Issaquena County, which has no grocery store within its boundaries. Map 7 displays the geographic variation in grocery store density, with lighter colors indicating the lowest levels of access.

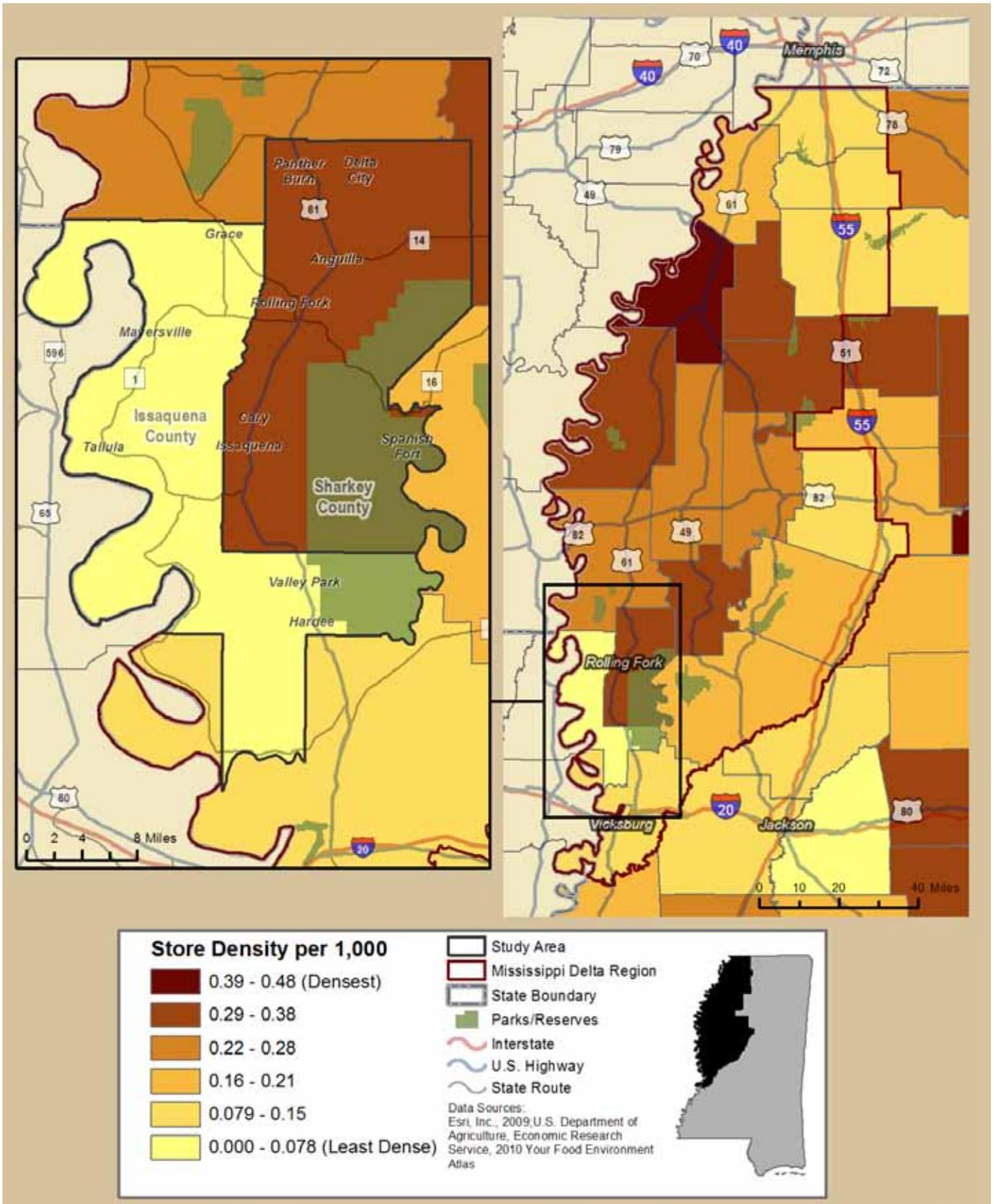
According to the USDA, in 2008 there were only two grocery stores located within the approximately 840 square mile<sup>66</sup> area that encompasses Sharkey and Issaquena counties.<sup>30</sup> By comparison, there were 18 grocery stores located in the 478 square miles<sup>66</sup> of DeSoto County (one of the more urban areas in the Delta region).<sup>30</sup> Due to the small sizes of the populations of Sharkey and Issaquena counties, however, the per capita measure of grocery store density results in a higher rate in the South Delta than in DeSoto (0.273 per thousand persons and 0.116 per thousand persons, respectively)<sup>30</sup>. Nonetheless, the

large degree of population dispersion in the South Delta means that many residents must travel relatively long distances to reach the nearest grocery store. Furthermore, both of the grocery stores in the South Delta are located in Rolling Fork, relatively close to each other. In addition to the distance to grocery stores, the problem of lack of access is further compounded in the South Delta by the low rate of vehicle ownership among households. In the South Delta 17.0% of households lacked a vehicle, compared to 2.5% of DeSoto County households.<sup>37</sup>

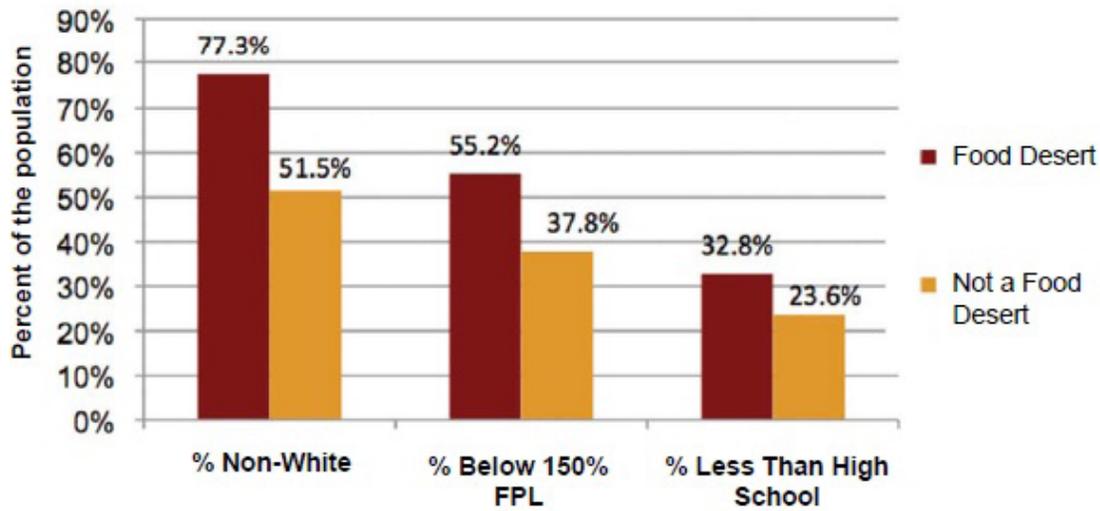
The USDA defines food deserts as low-income tracts (poverty rate at least 20%) where at least 33% of the population is more than one mile away from a supermarket or a large grocery store in an urban area (10 miles away in a rural area).<sup>67</sup> In 2010, the USDA identified 34 census tracts as food deserts in the Mississippi Delta. The food deserts included the one census tract that comprises Issaquena County and one of the two census tracts that comprise Sharkey County.

Other options for obtaining fresh fruits and vegetables available to South Delta residents include seven convenience stores and three full-service restaurants. As of 2008, the USDA had not documented any supercenters, farmers' markets, or fast food restaurants in Sharkey County or Issaquena County.<sup>30</sup>

Map 7: Density of Grocery Stores per 1,000 by County, South Delta and Mississippi Delta (2008)



**Figure 5: Characteristics of Food Deserts and Non-Food Deserts in Mississippi Delta**



Source: 2009 Geolytics Premium Estimates.

The distribution of food providers in a community is related to numerous factors, including the demographic and socioeconomic characteristics of the community. In comparison to areas with high poverty rates and large racial and ethnic minority populations, studies have found that white and more affluent communities tend to have higher densities of supermarkets.<sup>68</sup> Figure 5 illustrates how the social, economic, and demographic characteristics of food-desert census tracts in the Mississippi Delta differ from non-food-desert census tracts. While the population in non-food-desert census tracts was just over half nonwhite (51.5%), three of every four (77.3%) residents of food deserts were nonwhite. The percentages of the population below 150% of the FPL and with less than a high school diploma were higher in food deserts as well.

Map 8 displays the percentage of the population that does not own a vehicle and lives more than one mile away from the nearest grocery store. The highest percentage is in Issaquena County, where more than one in every six households (17.5%) meets this definition, and the lowest is in DeSoto County (2.2%).<sup>30</sup> More than one of every 10 households (10.7%) in Sharkey County meets these criteria.<sup>30</sup> By comparison, the national average for U.S. counties is 4.0%.<sup>30</sup>

Table 5 displays the prevalence of other distressed populations in the South Delta. Almost two-thirds of Issaquena households are both low income (an income below 200% of the FPL) and live more than a mile from the nearest grocery store. In Sharkey County, almost half of households face these conditions. A small percentage of South Delta households are more than

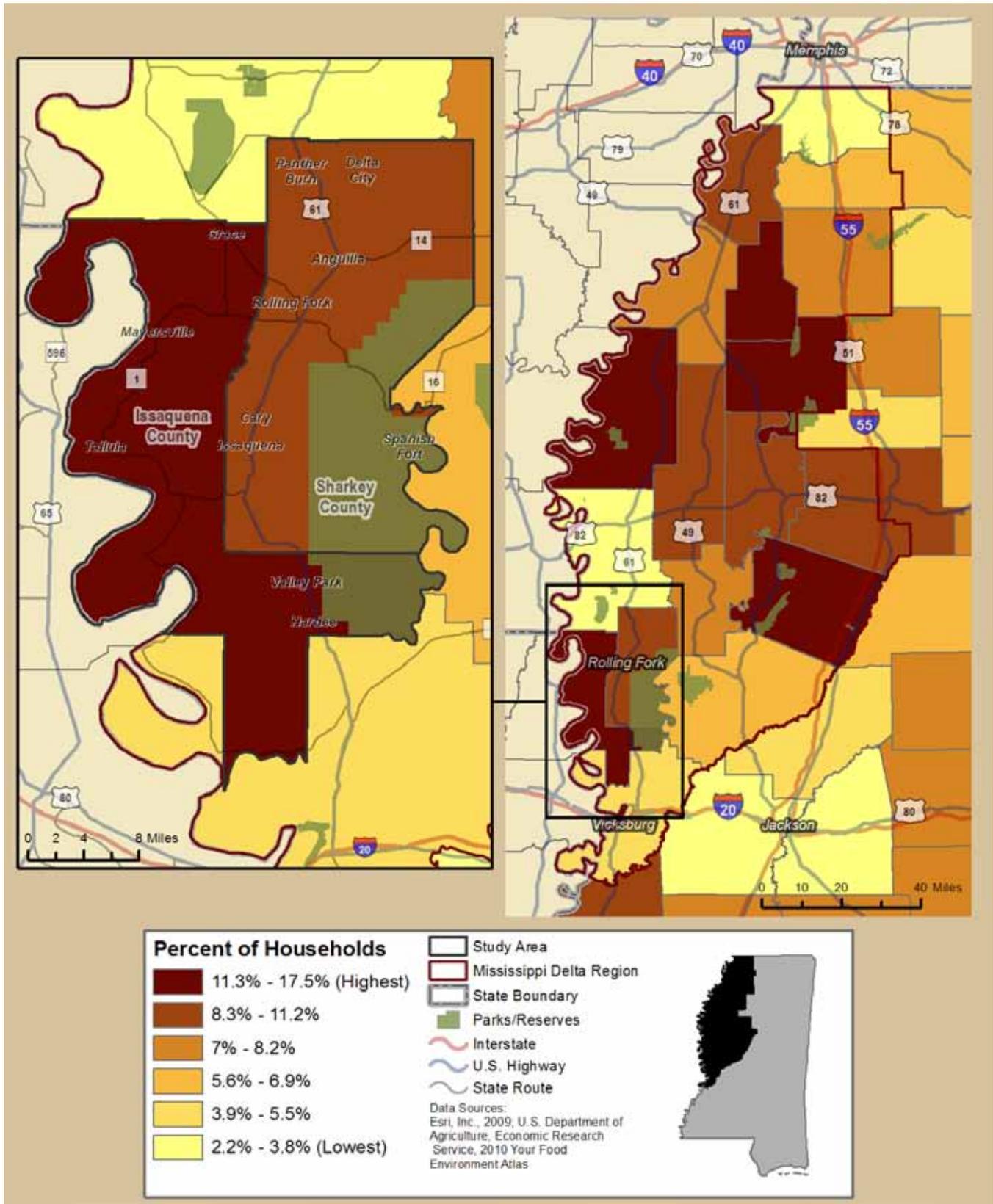
10 miles from a grocery store and lack a vehicle to get there. There is no public transit system in place for the South Delta, other than a regional Greyhound bus stop in Rolling Fork. Taxi services are available in nearby communities such as Vicksburg.

### *Food Access and Health*

Inadequate diets are not uncommon among rural residents, who may be limited in their ability to acquire adequate food—both in terms of access and variety.<sup>69</sup> The Lower Mississippi Delta Nutrition Research Initiative found that, in 2000, the average diet of Mississippi Delta residents was markedly low in recommended vitamins and minerals and high in sugars and fats.<sup>70-72</sup> In 2009, 83.2% of Mississippi adults did not consume the recommended daily intake of five servings of fruits and/or vegetables.<sup>73</sup> This percentage for inadequate fruit and vegetable intake was greater than the national rate for adults (76.5%) and the fourth-highest rate of all states.<sup>73</sup> In the Mississippi Delta, households in food-desert census tracts spend an average of \$51 less per year on fruits and vegetables than do households in non-food-desert tracts.<sup>67</sup>

Access to nutritious food is important to good health. A diet deficient in fruits and vegetables and high in calories, sodium, and fat is linked to numerous acute and chronic health problems such as diabetes, hypertension, obesity, heart disease, and stroke.<sup>74</sup> Inadequate diets that result in poor nutrition can lead to improper child development and growth.<sup>75</sup> The

**Map 8: Households Without a Vehicle Located More Than One Mile From Nearest Grocery Store, South Delta and Mississippi Delta (2010)**



**Table 5. Prevalence of Distressed Populations in Sharkey, Issaquena, the Mississippi Delta, and the United States**

	Issaquena	Sharkey	Average Mississippi Delta County	Average United States County
Percentage of households with no vehicle that live > 1 mile from a grocery store	17.5%	10.7%	9.0%	4.0%
Percentage of households with no vehicle that live > 10 miles from a grocery store	3.1%	1.3%	2.0%	0.8%
Percentage of total population that is low income and that lives > 1 mile from a grocery store	64.6%	43.9%	37.1%	23.6%
Percentage of total population that is low income and that lives > 10 miles from a grocery store	15.7%	6.7%	8.3%	5.6%

Source: United States Department of Agriculture, 2006 Food Environment Atlas.

consequences of food insecurity can include anxiety over food supply and quality, decreased health-related quality of life, impaired physical and psychosocial functioning, and academic problems in children.<sup>76,77</sup>

Nationwide, blacks face a higher risk of diet-related conditions such as hypertension and stroke. Black residents of the Mississippi Delta are at particular risk for inadequate diet and related chronic conditions.<sup>70</sup> Poor diet is associated with lower educational attainment, lower socioeconomic status, and less access to supermarkets.<sup>71,77</sup> As seen in Figure 3, only 5.8% of black residents of Sharkey and Issaquena counties had a bachelor's degree or higher education, compared with 26.9% of white residents.<sup>48</sup> Additionally, 47.0% of black residents of the South Delta had incomes below the poverty level between 2005 and 2009, as opposed to 11.6% of the non-Hispanic white population.<sup>48</sup>

In 2009, Mississippi had the highest adult obesity rate (35.4%) of all states. Figure 6 illustrates the relationship between consumption of fruits and vegetables and obesity prevalence by state.

Map 9 displays the spatial distribution of obesity prevalence in the Mississippi Delta region in 2007. The highest obesity rate among Mississippi Delta counties was in Holmes (42.3%) and the lowest rate was in Leflore (38.6%). In both Sharkey and Issaquena counties, more than one of every three adults was obese. Diabetes—a condition strongly associated with obesity—is also more prevalent in the Mississippi Delta. The average age-adjusted diabetes prevalence in Mississippi Delta counties among adults in 2008 was 13.0%, compared to 8.9%

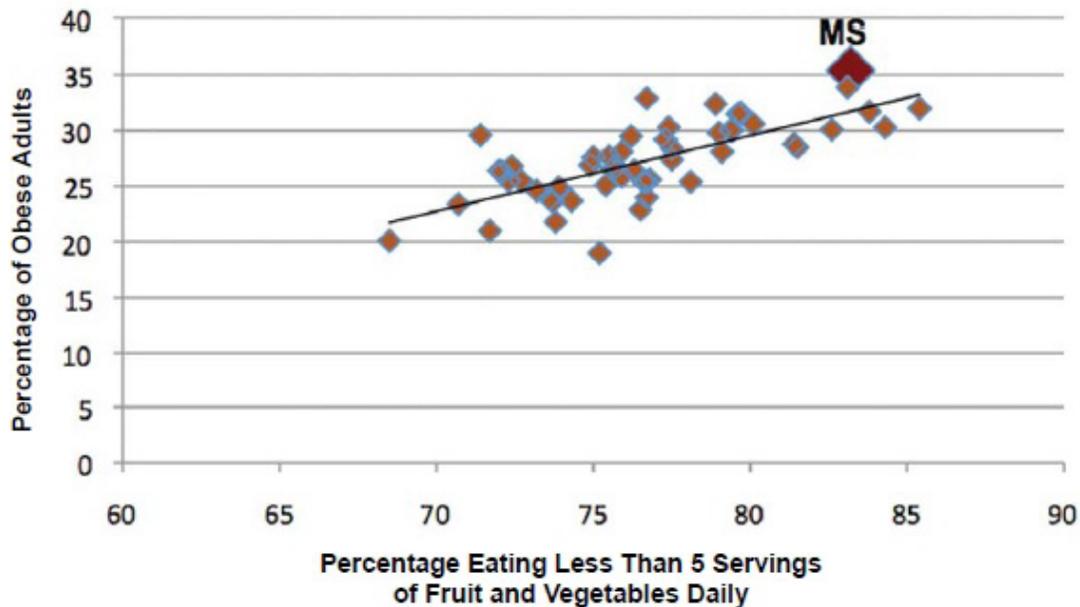
for all counties in the U.S and 12.0% among all Mississippi counties. The prevalence of diabetes in Sharkey and Issaquena counties was 12.9% and 13.0%, respectively.<sup>73</sup>

This cross-sectional analysis describes how food access and diet are correlated with poor health outcomes in the South Delta, but such associations cannot disentangle the many causes of poor health outcomes or quantify the relative significance of poor food access. However, the scarcity of food providers, combined with large distances and lack of access to a vehicle for many residents, are factors that may limit access to healthy food options for many low-income households in the South Delta. The co-occurrence of poor diets, high obesity rates, and other chronic diseases only underscores the importance of these community characteristics.

### *Recreational Facilities in the South Delta*

Previous qualitative research suggests that use of recreational facilities is dependent on many factors, with availability being paramount.<sup>78</sup> Lack of nearby access to a recreational facility, particularly for children, significantly increases the likelihood that residents will be physically inactive.<sup>78-80</sup> But other factors, including the availability of low-cost and well-maintained facilities, safety, the variety of exercise equipment,<sup>81</sup> and the availability of preferred activities, can influence levels of physical activity as well.<sup>78,82</sup>

Figure 6: Obesity Rate by Fruit/Vegetable Consumption for States (2009)



Source: 2009 Centers for Disease Control and Prevention Behavioral Risk Factor Surveillance System.

Map 10 highlights the variability among South Delta and Mississippi Delta census tracts in the density of recreational facilities (number of facilities per 1,000 people). In 2009, the areas with the highest densities were located in Panola and Bolivar counties. Issaquena County lacked any recreational facilities in the USDA dataset analyzed for this project. However, there is a park in Mayersville that offers a basketball court and baseball field. Sharkey County has a few recreational and physical activity options identified by the health department, but these are limited; they include a camping and picnic area in Rolling Fork. A country club in Sharkey was included in the rate calculation, but access is limited to club members. Not included in the rate calculation are two walking trails in Rolling Fork and the Delta National Forest, which provide recreational opportunities such as hiking, fishing, camping, and hunting for those with transportation, but may not be sufficiently accessible to residents to provide an outlet for regular physical activity.

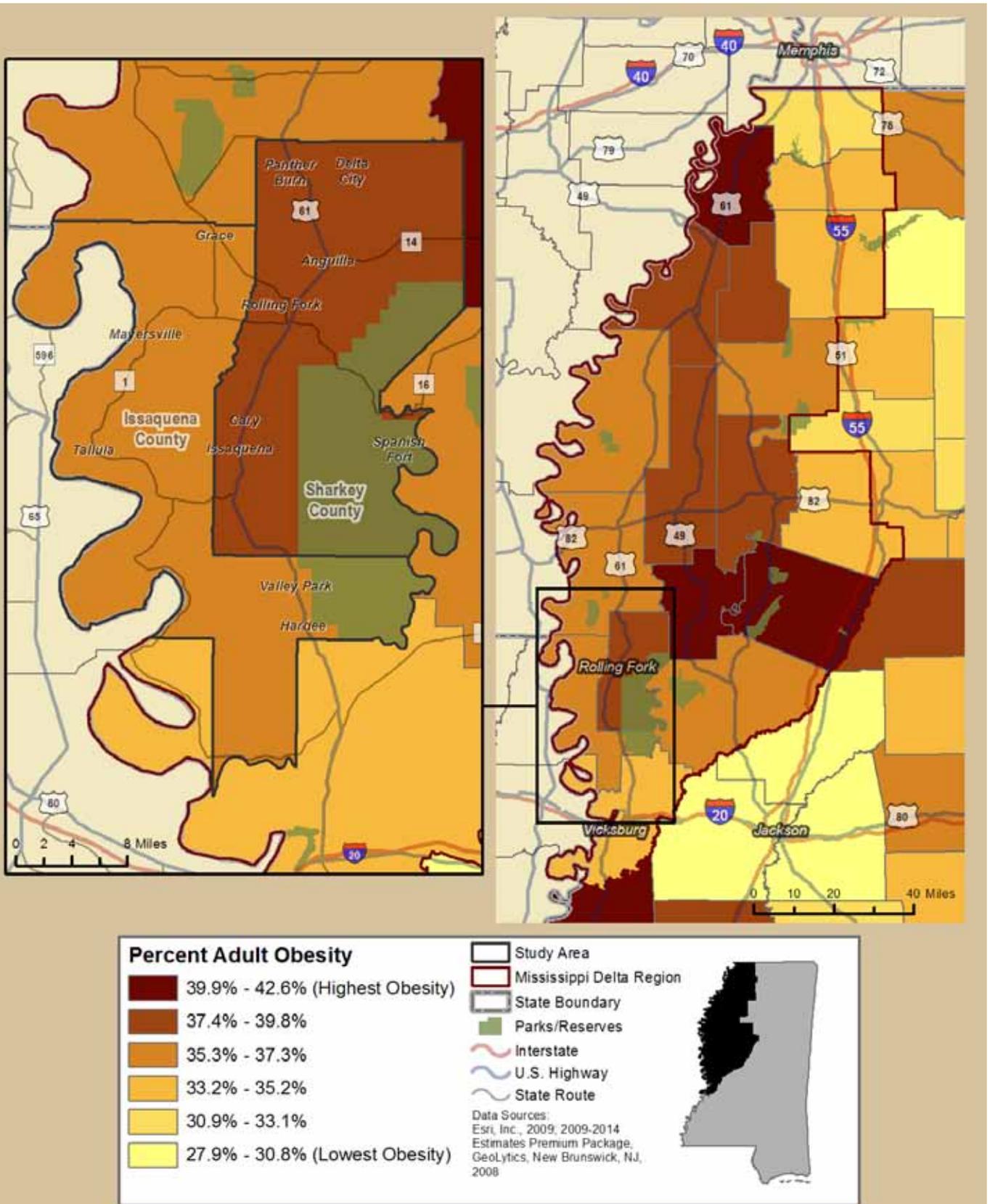
Based on previous research findings,<sup>83-85</sup> it would be expected that access to recreational facilities would be related to the geographic distribution of income, poverty, and race in the Mississippi Delta region. However, given the limited data (e.g., a majority of census tracts in the Mississippi Delta have no recreational facilities within their boundaries), we could not demonstrate a statistically significant correlation between those variables.

Apart from the park in Mayersville and the country club in Sharkey, most of the public venues for exercise in the South Delta allow for only unstructured activities such as walking and hiking. Furthermore, some types of physical activities require additional equipment and, in the case of children, adult supervision. Activities offered by the school system can be a good alternative for children, but opportunities at the public schools are limited. According to the website of the South Delta School District, the elementary school does not offer team sports, the middle school offers a choice of two sports (football and basketball) for boys and one (basketball) for girls, and the high school provides track, baseball, and softball teams.

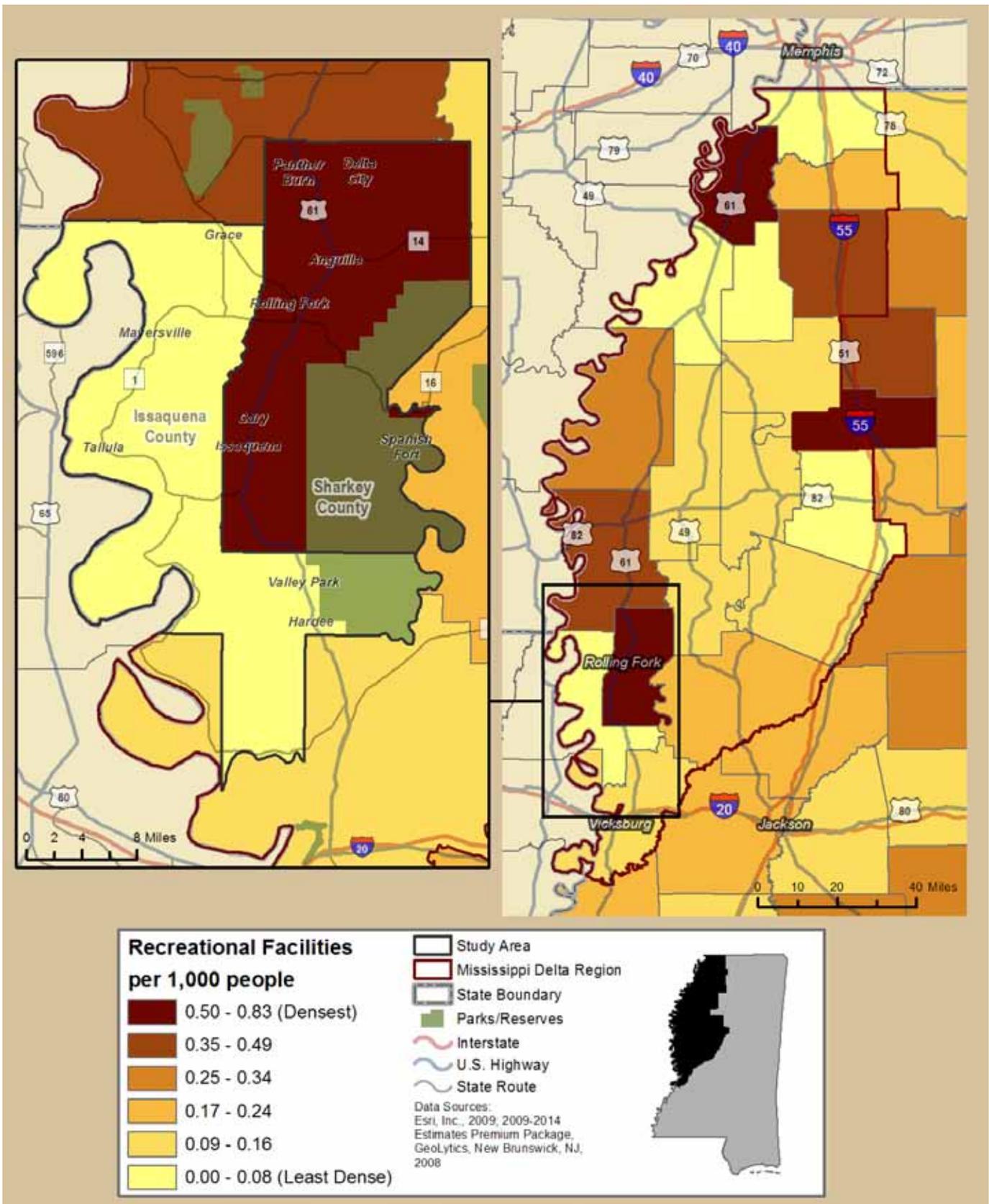
### *Recreational Facilities and Health*

A large literature documents the association between regular physical activity and positive health outcomes. In addition to lower all-cause mortality, other health benefits include reduced risk of cardiovascular disease, type 2 diabetes, stroke, depression, and obesity.<sup>86,87</sup> Despite the benefits of physical activity, a sizable proportion of the general population is sedentary, failing to meet recommended activity levels of moderate physical activity for 30 minutes five times a week, or 20 minutes of vigorous physical activity two days a week.<sup>97</sup>

Map 9: Obesity Rate by County, South Delta and Mississippi Delta (2007)



Map 10: Density of Recreational Facilities per 1,000 People by Census Tract, South Delta (2009)



**Table 6. Age-Adjusted Prevalence of Physical Inactivity in Issaquena, Sharkey, the Mississippi Delta, and the United States (2008)**

	Issaquena	Sharkey	Average Mississippi Delta County	Average United States County
Percentage of adults who were physically inactive	34.0%	36.7%	34.9%	26.2%

Notes: "Adult refers to persons over the age of 20.

"Physically inactive" refers to anyone who answered "no" to the question, "During the past month, other than your regular job, did you participate in any physical activity or exercises such as running, callisthenics, golf, gardening, or walking for exercise?" Rates are age-adjusted to 2000 U.S. Census population.

Source: 2008 Centers for Disease Control and Prevention, Behavioral Risk Factor Surveillance System.

The Centers for Disease Control and Prevention estimates that in 2009 only 37.5% of Mississippi adults regularly participated in a healthy amount of physical activity.<sup>88</sup> This was a significantly lower percentage than the national average (49.4%) and the fourth lowest level of physical activity of all states and territories.<sup>88</sup> In the South Delta the rates are even lower (see Table 6). Issaquena County had a higher rate of physically inactive adults than 94% of U.S. counties, and Sharkey County had a higher rate than 98% of counties.

Data from Mississippi counties in 2008 on physical activity among adults and socioeconomic status indicate that these variables are significantly related. Our research shows that the prevalence of physical inactivity was significantly correlated with both median income and the percentage of the population with incomes below 150% of the FPL in 2008–2009. Higher median income is associated with higher levels of physical activity, and residents of counties with high poverty rates tend to have higher levels of physical inactivity. The relationship between recreational facility density and inactivity, however, was not statistically significant.

States with smaller proportions of the population reporting that they meet minimum recommended levels of physical activity tend to have a higher prevalence of diabetes, obesity, and hypertension among adults.<sup>73</sup> As Figure 7 shows, in 2009 Mississippi had one of the highest percentages (62.5%) of adults who failed to meet minimum suggested levels of physical activity. The state also had one of the highest prevalence rates for adult diabetes (11.6%).<sup>73</sup>

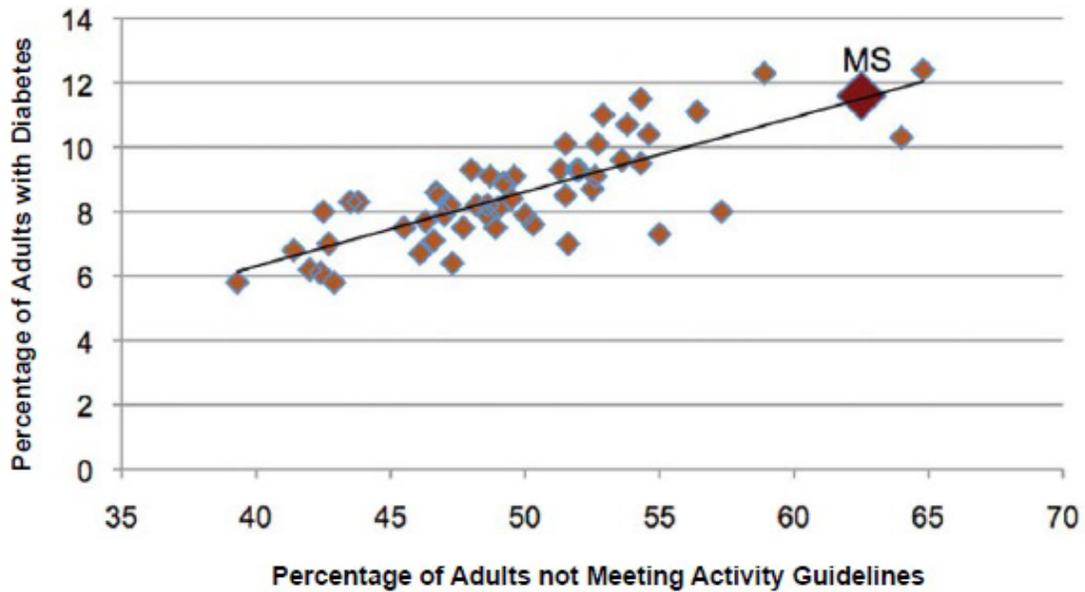
Measures of mortality are also related to physical activity. Figure 8 illustrates how premature mortality in Mississippi counties correlates with the level of physical inactivity (no physical activity outside of work). Counties with the most inactive populations (an average of 37.2% of adults reporting no physical activity outside of work) have a premature mortality rate of 436.6 per 100,000, which is 33.7% higher than the

premature mortality rate (326.5 per 100,000) in counties with the least inactive populations (in which an average of 29.4% of adults report no physical activity outside of work).

We did not find a statistically significant relationship between access to recreational facilities in Mississippi counties (as measured by density) and morbidity, mortality, or physical inactivity. This may reflect limitations related to using density rather than proximity to measure access to recreational facilities. In rural areas, density measures may mask important distinctions in access when facilities may be numerous yet clustered in a particular region of the county, especially when residents lack adequate transportation.

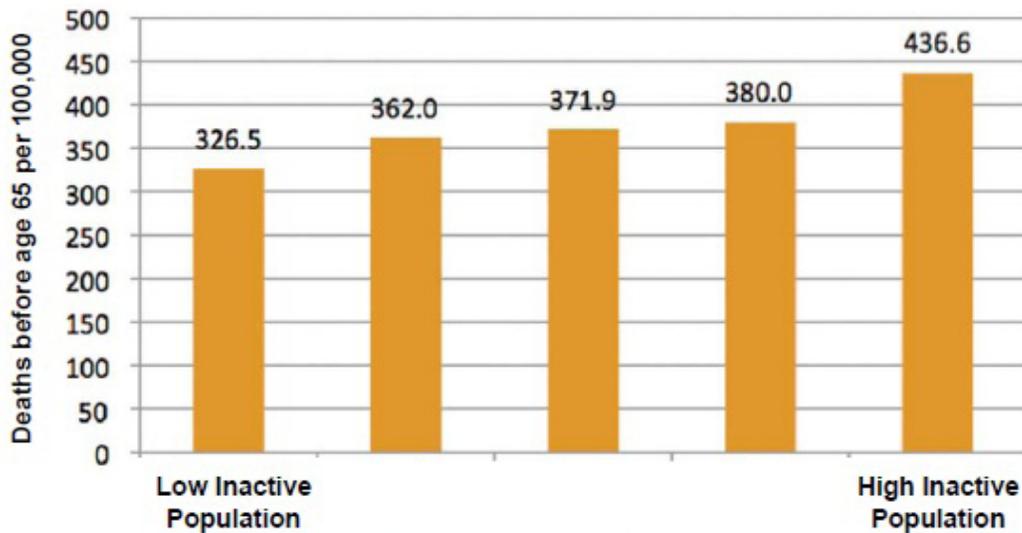
Community-based interventions that focus on the quality, safety, and variety of recreational activities offered within facilities are one way that an area can promote the physical activity of its residents. Some examples of interventions that have promoted physical activity have included walking trails, bike lanes and sidewalks, and the provision of access to exercise equipment in community centers.<sup>86, 87, 89</sup> Other possible interventions include increasing time allotment in schools for physical activity, conducting worksite health promotions, or improving public transportation so there are other options besides using a personal vehicle. These types of efforts have been shown to help decrease chronic disease risk factors within a population.<sup>86, 89</sup>

**Figure 7: Diabetes Prevalence by Activity Levels in U.S. States (2009)**



Source: 2009 Centers for Disease Control and Prevention Behavioral Risk Factor Surveillance System.

**Figure 8: Average Premature Death Rate by Activity Level in Mississippi Counties (1999-2008)**



Source: 1999-2007 Centers for Disease Control and Prevention CDC Wonder Online Tool; 2009 Centers for Disease Control and Prevention Behavioral Risk Factor Surveillance System.

### III. Conclusions

There are many unique characteristics of rural populations that influence health outcomes. In denser, urban environments, access to community assets such as hospitals, reliable employment, and safe and well-maintained public parks are more efficiently shared among the population. The challenge of strategically dispersing these assets among a more dispersed population often results in more limited access for rural residents.

While establishing more physical activity options for residents may be beneficial, we identified other factors in Sharkey County and Issaquena County, such as lack of a vehicle, that inhibit the use of existing resources. Research also shows that physical activity options must not only be convenient, but also affordable and safe. Parks or walking trails that are poorly maintained or deemed unsafe by the residents are less likely to be used.<sup>90-95</sup> Diversity of physical activities is also a factor that the population considers when determining its level of involvement.<sup>96</sup>

Similarly, access to quality food providers in the South Delta is affected by factors that are not necessarily captured by crude density measures. With two grocery stores located within the two counties and a small population size, the density measure masks the relative lack of access to food providers. There are no grocery stores outside of Rolling Fork, yet almost three-fourths of the South Delta population lives outside the city and 16% of households lack a vehicle.<sup>37</sup> In order for these households to make important dietary changes, increased access to grocery stores or improved selection of nearby alternative providers is necessary.

In light of the foregoing, elected officials, planners, and land use authorities in Issaquena and Sharkey counties should consider the following strategies:

- Seek ways to provide greater access to establishments that offer fresh fruits and vegetables at affordable prices. Among the possibilities are (1) providing vouchers for low-income people to use farmers' markets; (2) providing public transportation to reach food retailers, particularly supermarkets that offer healthy and high-quality foods at affordable prices; and (3) offering incentives to businesses that increase access to healthy and high-quality foods, including support for a Healthy Food Financing Initiative and similar programs to assist populations in food deserts.
- Seek ways to promote more physical activity among the counties' residents by providing greater access to recreational facilities within manageable distances and increasing the time allotment in schools for physical activity.
- Increase understanding among policy makers of the social determinants of health through professional education and other tools.
- Increase public understanding of the social determinants of health and the importance of healthy lifestyles and seek ways to empower citizens to be strong advocates for policies and practices that will make such healthy lifestyles more accessible to them.

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