FOOD *for* EVERY CHILD

THE NEED FOR MORE SUPERMARKETS IN MISSISSIPPI

SPECIAL REPORT

ACKNOWLEDGEMENTS

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EXECUTIVE SUMMARY

MISSISSIPPI has too few supermarkets in many of its communities. This shortage of supermarkets means that residents, particularly those in lower-income communities, face much greater challenges finding fresh produce and other foods necessary to maintain a healthy diet. More than one out of every four residents in Mississippi lives in a community with limited access to a local supermarket.[1] At the same time, rates of obesity, diabetes and other diet-related disease in Mississippi are among the highest in the nation. According to the Mississippi State Department of Health, cardiovascular disease, which includes heart disease and stroke, is the leading cause of death in Mississippi, accounting for 10,000 deaths each year.[2] Meanwhile, the rate of diabetes for the state—over 12 percent of the adult population—is the second highest in the nation, according to the Centers for Disease Control and Prevention.[3]

The Food Trust conducted an extensive mapping study of supermarket distribution in Mississippi. Data was collected from standard business and health sources. This report shows that supermarkets in Mississippi are disproportionately located in higher-income communities. The situation in Mississippi is not unique; a nationwide study of more than 28,000 ZIP codes found that low-income ZIP codes have 25 percent fewer per capita supermarkets than middle-income ZIP codes.[4]

Lack of access to healthy, affordable foods has a negative impact on the health of children and families. A growing body of research indicates that people who live in communities without a supermarket suffer from disproportionately high rates of obesity, diabetes and other diet-related health problems.[5] In 2008, Mississippi spent an estimated $925 million to treat obesity-related diseases, with costs projected to increase to $3.87 billion by 2018.[6]

Through mapping, this study found that many communities in Mississippi with poor supermarket access also have a higher incidence of diet-related deaths and/or diagnosed diabetes. In contrast, when people live in a community with a supermarket, they tend to eat more servings of fruits and vegetables and are more likely to maintain a healthy weight.[7] A study of the diets of more than 10,000 residents in Mississippi and elsewhere found that residents increased their fruit and vegetable consumption by as much as 32 percent for each supermarket in their census tract.[8]

In 2008, Mississippi spent an estimated $925 million to treat obesity-related diseases, with costs projected to increase to $3.87 billion by 2018.[10]

We call upon state and local governments to take the lead in developing public-private solutions that can respond to the supermarket shortage in Mississippi. Supermarkets provide the most reliable access to nutritious and affordable produce, and their presence is an important indicator of a community's physical health and economic vitality. Improving access to supermarkets in underserved areas can help improve residents' health, create jobs and spur economic growth in areas that need it most.

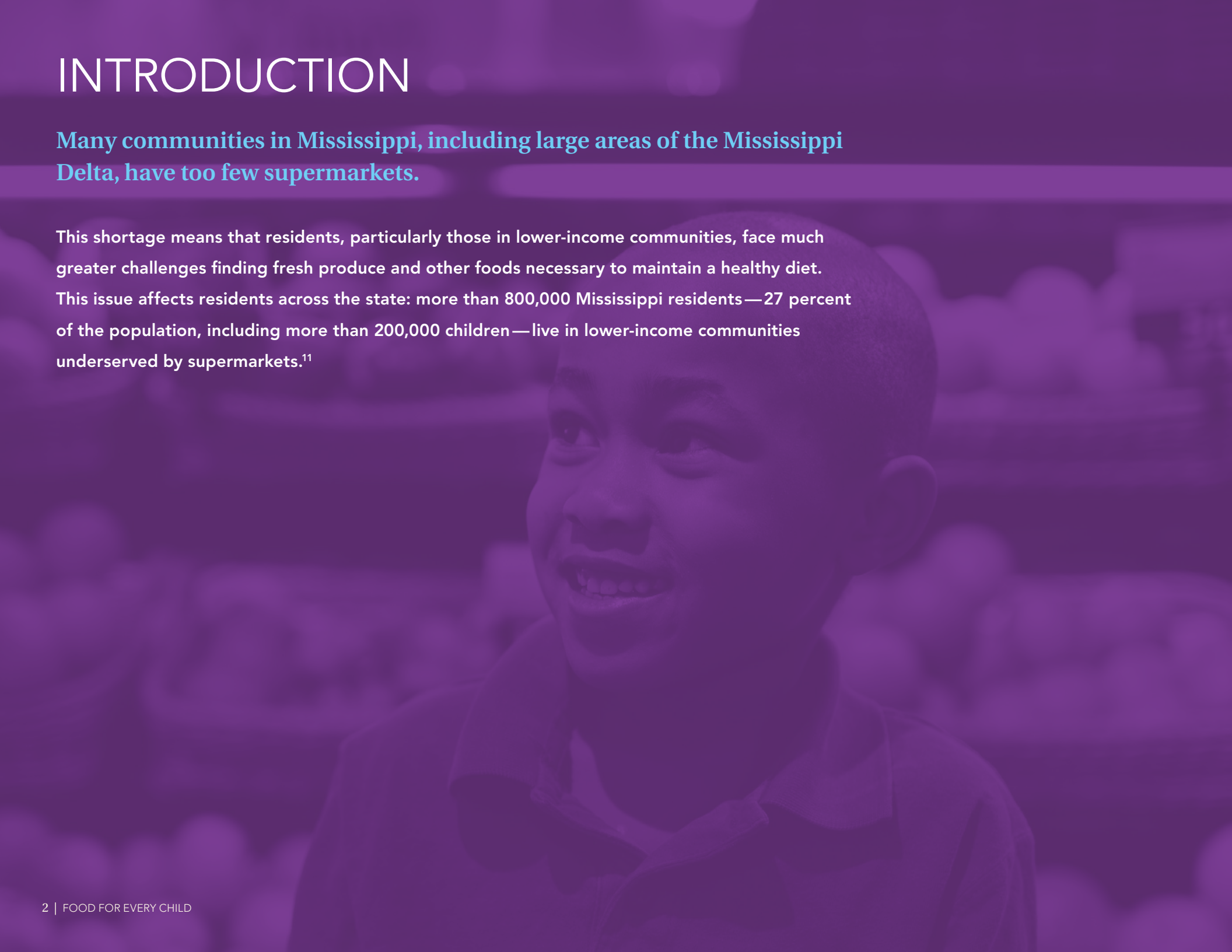
Public-private responses that have proven successful elsewhere in the country, such as Pennsylvania's Fresh Food Financing Initiative,[9] have included:

- Convening leaders from the business, government, public health, economic development and civic sectors to develop a strategy to establish more supermarkets in lower-income communities.
- Strategic investments with public funds to reduce the risks associated with the development of more supermarkets in lower-income communities.

INTRODUCTION

Many communities in Mississippi, including large areas of the Mississippi Delta, have too few supermarkets.

This shortage means that residents, particularly those in lower-income communities, face much greater challenges finding fresh produce and other foods necessary to maintain a healthy diet. This issue affects residents across the state: more than 800,000 Mississippi residents—27 percent of the population, including more than 200,000 children—live in lower-income communities underserved by supermarkets.[11]



Rates of adult and childhood obesity in Mississippi are the highest in the country, with the adult obesity rate consistently ranking the highest for the past seven years.[12] Mississippi also has the highest death rate in the nation from cardiovascular disease, accounting for 36 percent of all deaths in the state.[13] The rate of diabetes for the state—over 12 percent of the adult population—is the second highest in the nation, according to the Centers for Disease Control and Prevention.[14] Diet-related health problems are particularly prevalent among lower-income residents in Mississippi. A recent study found that 30.1 percent of low-income children ages two to five are overweight or obese in Mississippi.[15]

Over 70 percent of lower-income households in the Lower Mississippi Delta, including 15 counties in Mississippi, are located at least 30 miles from the nearest supermarket.

At the same time, many families in Mississippi have few, if any, places in their communities where they can shop for healthy, affordable foods. Local studies of Mississippi and neighboring states have demonstrated the wide disparities in access to supermarkets. One study, for example, found that over 70 percent of lower-income households in the Lower Mississippi Delta, including 15 counties in Mississippi, are located at least 30 miles from the nearest supermarket.[16] Mississippi's supermarket deficit could be eased and diet-related health problems, such as diabetes, decreased by embracing an initiative to build more supermarkets and other healthy food markets in underserved communities.

A growing body of research demonstrates that when people have access to supermarkets they eat more fruits and vegetables and are more likely to maintain a healthy weight.[17] Both the Institute of Medicine and the Centers for Disease Control and Prevention have independently recommended increasing the number of supermarkets in underserved areas in order to help reduce the rate of obesity in the United States. They also suggest that state and local governments should create incentive programs to attract healthy food retailers, such as supermarkets, to these underserved neighborhoods.[18]

Such an investment would have economic benefits as well. Supermarkets create jobs and revitalize communities, serving as retail anchors and spurring complementary development nearby.[19]

The Food Trust conducted an extensive mapping study of Mississippi to identify communities with limited access to supermarkets and high rates of diet-related deaths and/or diagnosed diabetes. Data was collected from standard business and health sources and maps were created focusing on the state. The Food Trust researched and wrote *Food for Every Child: The Need for More Supermarkets in Mississippi* to identify the communities with the greatest need for supermarkets.

This study builds on the excellent work undertaken over the past several years by a variety of government, private and civic leaders in Mississippi to reduce and prevent obesity and make healthy foods more widely available. Despite these efforts, this report demonstrates that there is still more work to be done in Mississippi to ensure that all residents have convenient access to grocery stores selling healthy, affordable foods. The Food Trust is committed to building on these efforts and working with state and local leaders to improve access to supermarkets and other healthy food retail for residents across the state.

Methodology

To investigate supermarket access in Mississippi, a series of maps was created using Geographic Information Systems computer software. A geographic representation of food access, income and diet-related disease was developed by mapping the locations of supermarket sales, income, diet-related mortality and diagnosed diabetes data. (See Appendix for more detail.) Retail sales data for supermarkets were obtained from Trade Dimensions. Diet-related mortality data for 2009 was provided by the Mississippi State Department of Public Health. To supplement the diet-related mortality data, 2008 county-level diabetes rate estimates were retrieved from the US Centers for Disease Control and Prevention. Demographic data was derived from the 2005–2009 American Community Survey. The maps were reviewed with several of The Food Trust's contacts in Mississippi, including the Mississippi State Department of Public Health, the Mississippi Economic Policy Center, Operation Shoestring and the Partnership for a Healthy Mississippi.

Weekly sales volume at supermarkets was distributed over a five-mile radius to plot the concentration of sales and then divided by total population density and the average for weekly sales per person to calculate a ratio for weekly supermarket sales per person. The ratios were mapped; ratios greater than 1 represent high sales and ratios less than 1 represent low sales. Median household income was multiplied by the number of households to determine total income density. The term "lower-income" in this report is used to define areas where the average household income is less than the statewide median annual income ($36,796), except when citing a separate study.

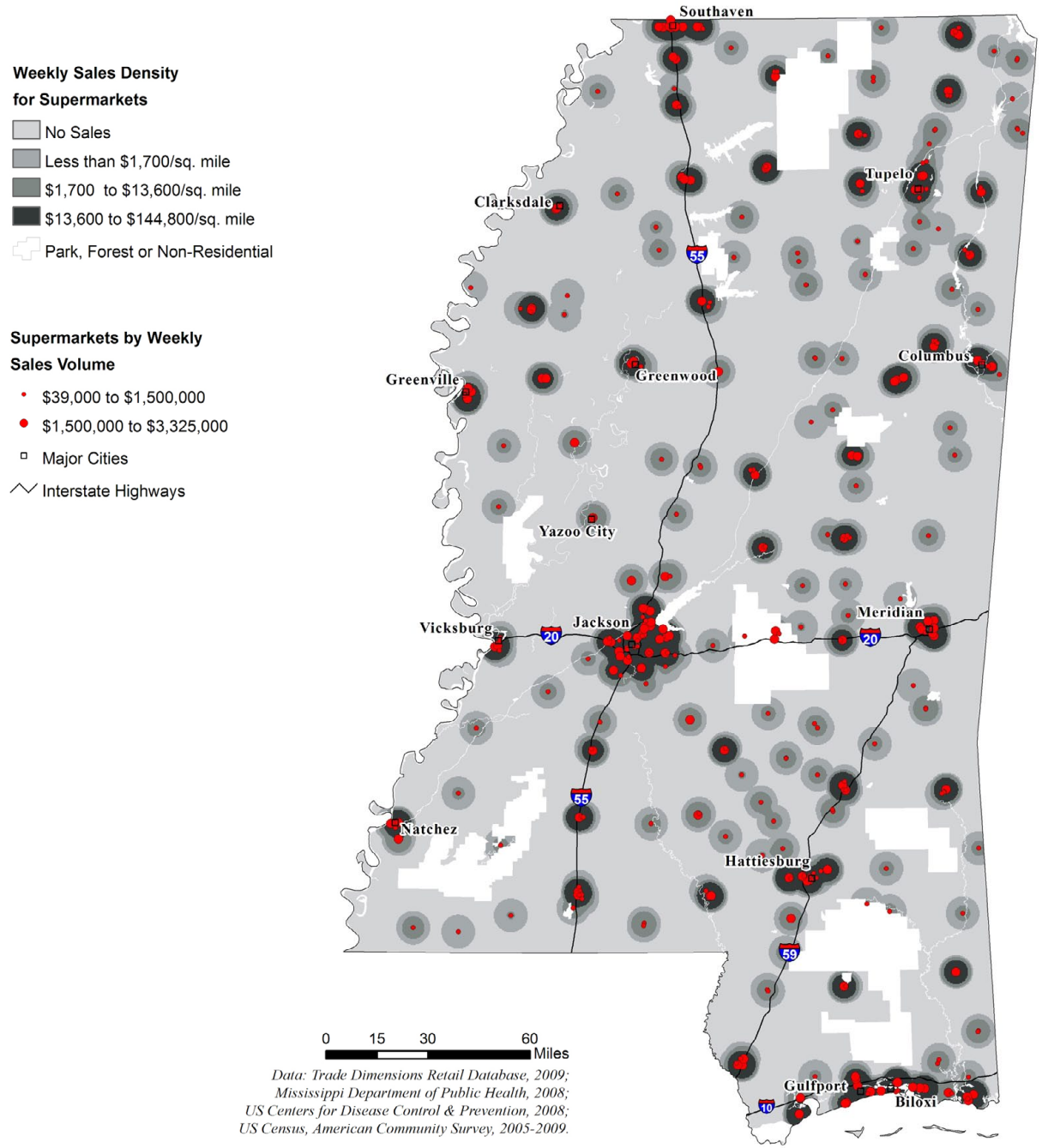
A total of 11,825 diet-related deaths were mapped across the state, as were county rates of diagnosed diabetes. The ratio of deaths and diagnosed diabetes per total population was mapped. "High" diet-related mortality and/or diagnosed diabetes areas are defined as having rates greater than the statewide average, and "low" areas have diet-related death rates and/or diagnosed diabetes lower than the statewide average. The Mississippi rate of diagnosed diabetes is 12.48 percent. Only data for Mississippi were analyzed, so no comparisons were made with rates outside of the state.

KEY FINDINGS

Access to healthy, affordable foods is not evenly distributed in Mississippi. Many people have to travel excessive distances to buy food at a supermarket.

- **The uneven distribution of supermarkets is a serious problem in Mississippi. There are large areas of the state with few supermarkets and many communities where none exist at all.**

1: Weekly Sales Volume for Supermarkets in Mississippi



Data: Trade Dimensions Retail Database, 2009; Mississippi Department of Public Health, 2008; US Centers for Disease Control & Prevention, 2008; US Census, American Community Survey, 2005-2009.

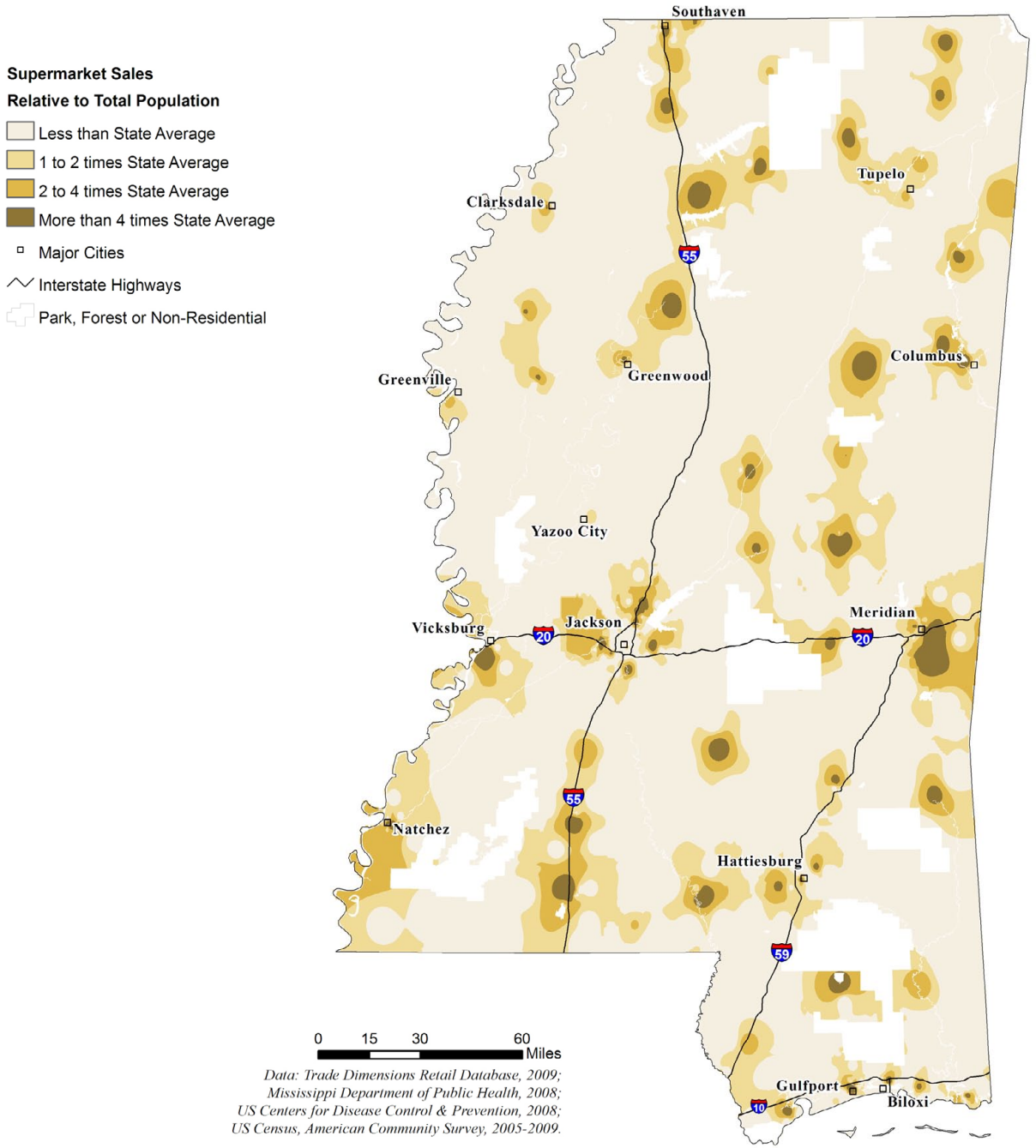
MAP 1: *Weekly Sales Volume for Supermarkets* shows the location of 350 stores throughout Mississippi and the weekly sales volume at each store. The smaller red circles represent lower weekly sales volume; the larger red circles represent higher weekly sales volume. The gray shading shows how supermarket sales are distributed across the state. The darkest areas have the highest concentration of supermarket sales, whereas the lightest areas have the lowest sales, indicating that few or no supermarkets are located there.

Map 1 shows that supermarkets in Mississippi are unevenly distributed. Supermarkets are highly concentrated along major highways and in the metropolitan areas surrounding major cities, while many inner cities, small towns and rural communities across Mississippi are relatively underserved. This suggests that many people are traveling considerable distances to buy food in those areas where supermarkets are more easily accessible.

More than 800,000 Mississippi residents—27 percent of the population, including more than 200,000 children—live in these underserved communities.

MAP 2: *Supermarket Sales and Total Population* shows that the amount of supermarket sales in a particular location does not seem to be associated with the population of that area. Communities with greater than average supermarket sales relative to total population are shown in yellow and brown tones. In these communities, people are either spending more than average in supermarkets, as might be the case in higher-income communities, or more people are buying groceries in these communities than the number of people who live there, indicating that people are traveling from outside the area to shop there.

2: Supermarket Sales and Total Population in Mississippi

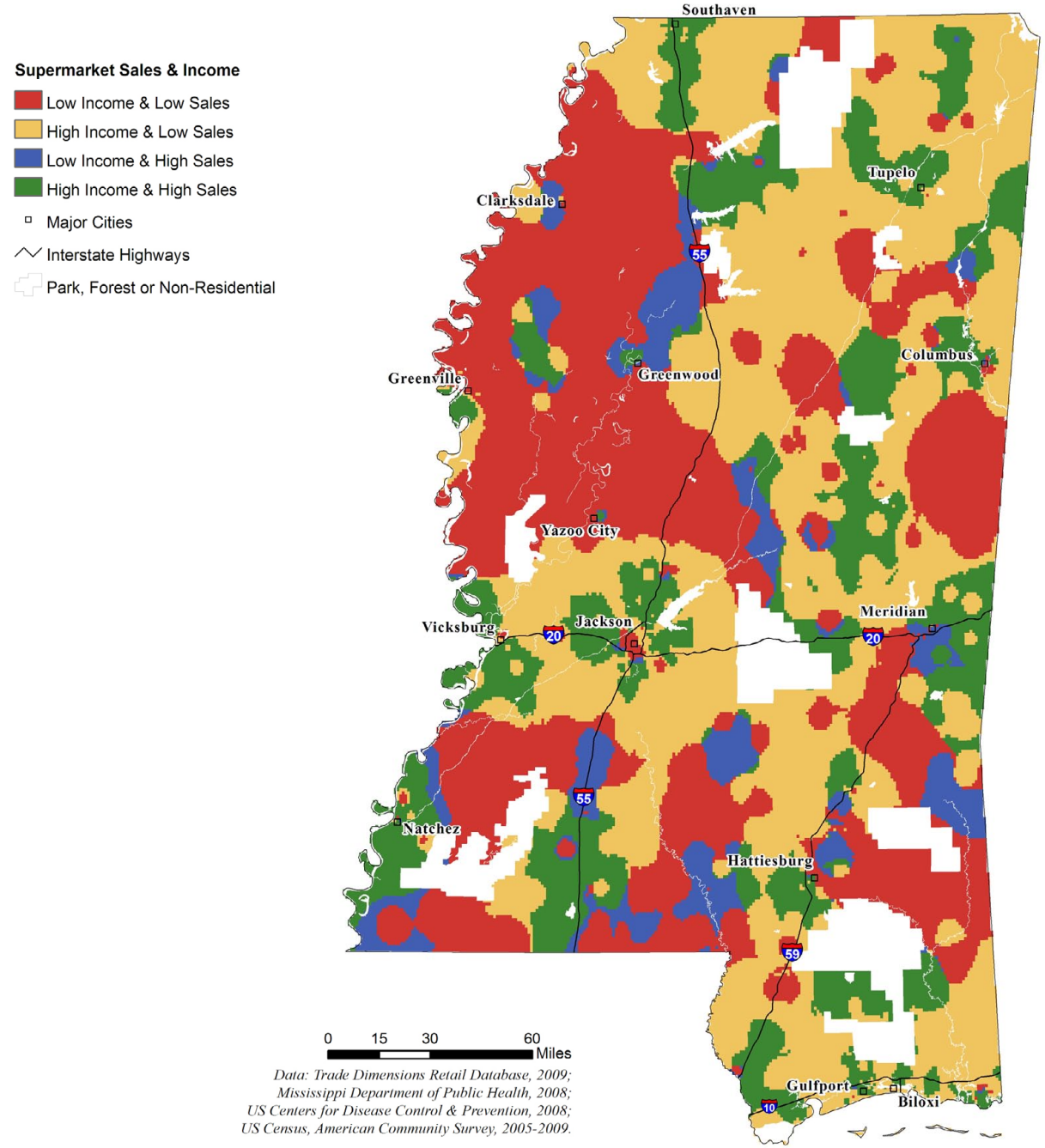


KEY FINDINGS

The uneven distribution of supermarkets in Mississippi leaves a disproportionate number of lower-income people without access to healthy, affordable food.

- More than one out of every four residents in Mississippi lives in a community with limited access to a local supermarket. This shortage of supermarkets means that residents, particularly those in lower-income communities, face much greater challenges finding fresh produce and other foods necessary to maintain a healthy diet.

3: Supermarket Sales and Income in Mississippi



Data: Trade Dimensions Retail Database, 2009; Mississippi Department of Public Health, 2008; US Centers for Disease Control & Prevention, 2008; US Census, American Community Survey, 2005-2009.

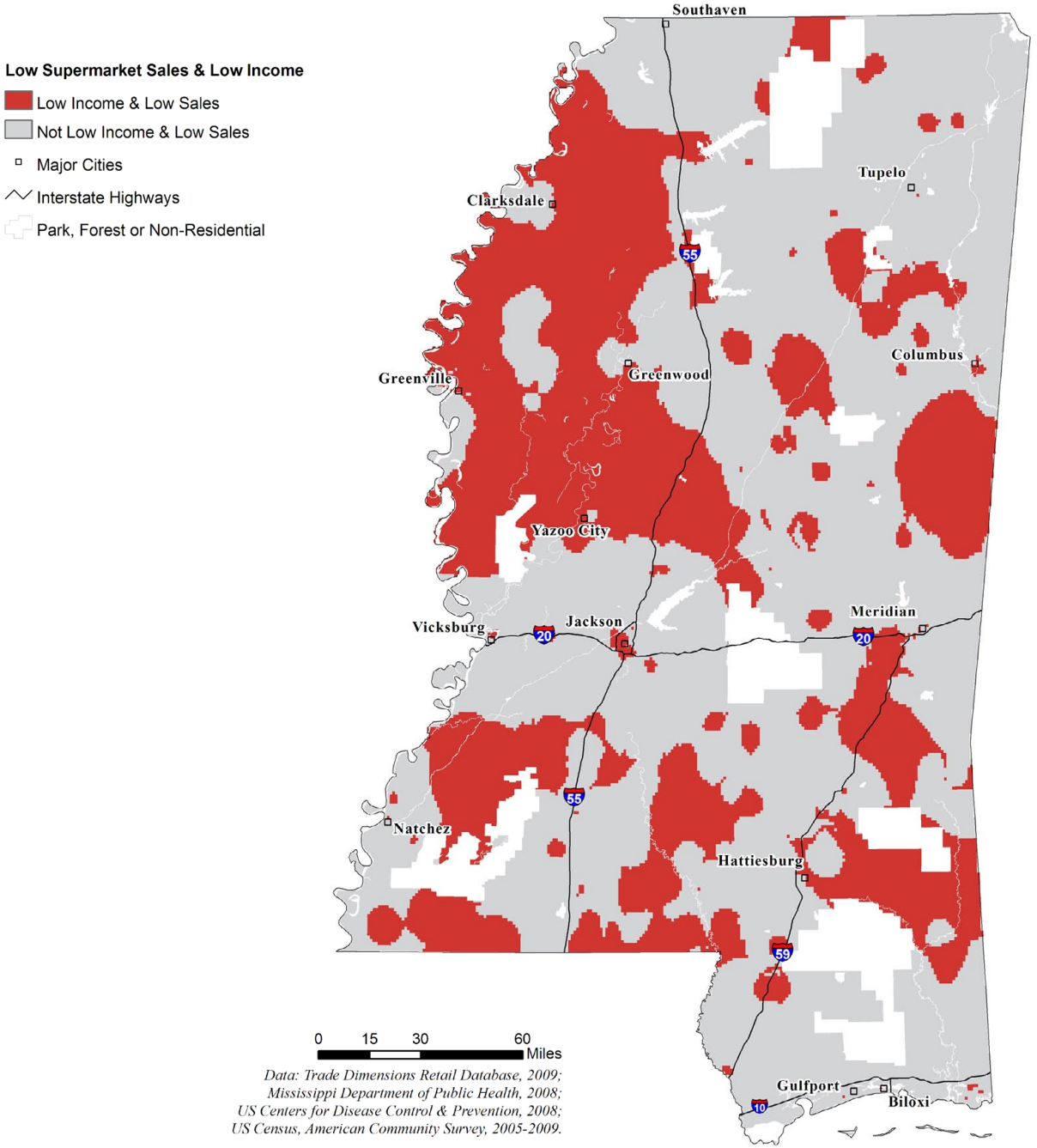
MAP 3: *Supermarket Sales and Income* shows the distribution of supermarket sales and the distribution of income throughout the state. Higher-income areas with higher supermarket sales have the most healthy food resources and are indicated by the green areas of the map. In some lower-income areas, there are communities with higher than average supermarket sales volumes, as highlighted in blue. People in the areas shown in yellow have fewer supermarkets to shop at in their community. However, since residents of these communities have higher incomes and often have high car ownership rates, they are more likely to be able to drive to stores or to shop at small specialty food purveyors. The red areas represent lower-income communities that have fewer supermarkets and lower per capita supermarket sales.

Underserved areas include the cities of Jackson and Hattiesburg, large portions of the Mississippi Delta and multiple rural counties statewide.

MAP 4: *Low Supermarket Sales and Low Income* further highlights areas with low supermarket sales because there are few to no supermarkets located there. Since income is also lower in these areas, families face more difficulty traveling to the areas where supermarkets are concentrated, especially when public transit is not convenient. This is particularly significant in Mississippi, where over 21 percent of the population lives below the poverty line and are disproportionately affected by the lack of supermarkets.[20]

Lower-income communities with insufficient supermarket access can be found in areas across the state of Mississippi. Underserved areas include the cities of Jackson and Hattiesburg, large portions of the Mississippi Delta and multiple rural counties statewide.

4: Low Supermarket Sales and Low Income in Mississippi



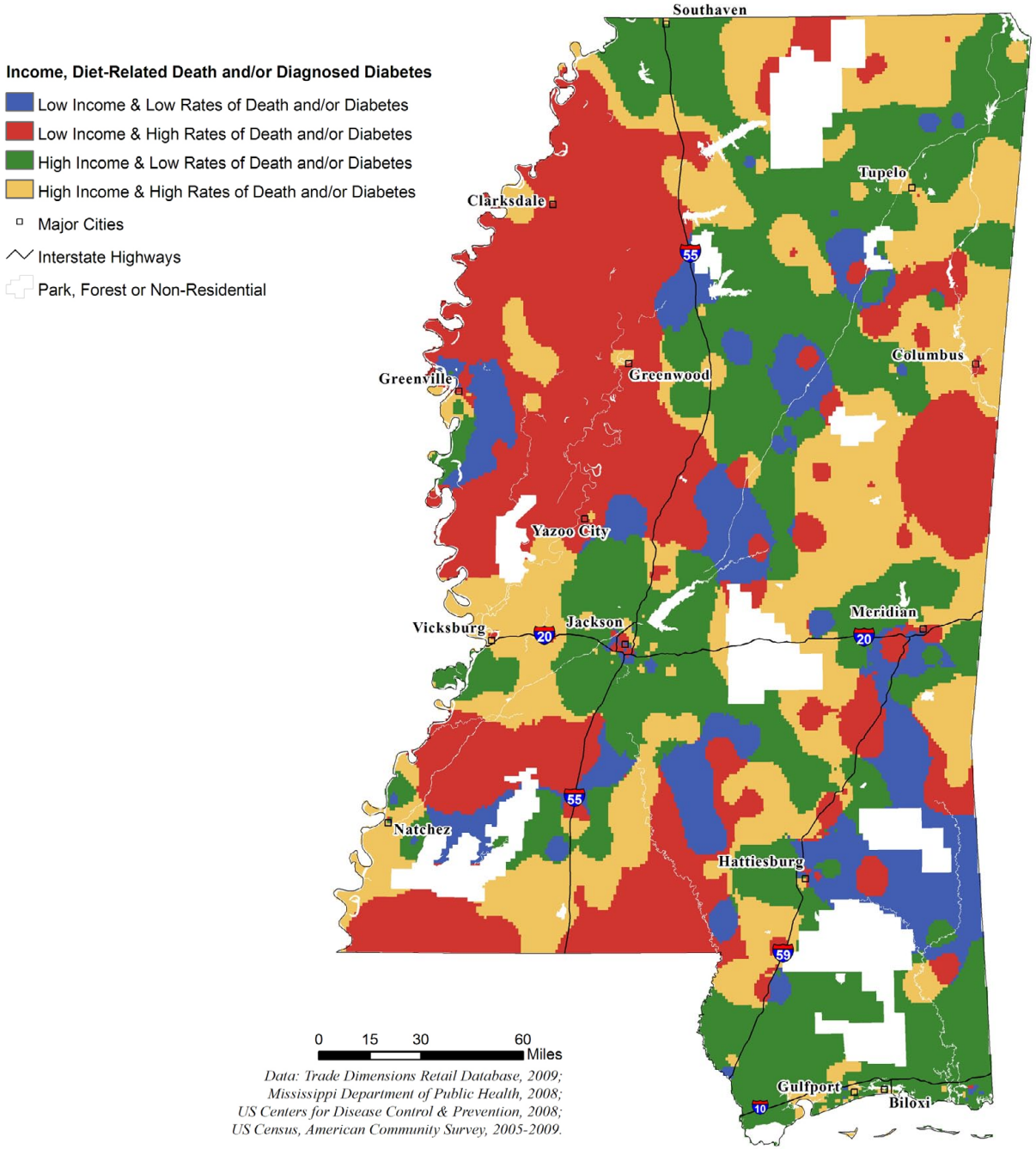
KEY FINDINGS

There is a connection between lack of supermarkets and diet-related diseases, such as diabetes.

- The Food Trust and PolicyLink, a national research and advocacy organization, conducted a comprehensive literature review which found that people living in communities without a supermarket suffer from disproportionately high rates of obesity, diabetes and other diet-related health issues. Meanwhile, people living in communities with a supermarket are more likely to maintain a healthy weight.[21]

  For example, one study of more than 10,000 residents from a cross-section of states, including Mississippi, found that residents increased their fruit and vegetable consumption by as much as 32 percent for each supermarket in their census tract.[22] Another study found that adults living in "food desert" counties in Mississippi are 23 percent less likely to consume the recommended amount of fruits and vegetables than those in other counties, controlling for age, sex, race and education.[23]

5: Income, Diet-Related Death and Diagnosed Diabetes Rates in Mississippi



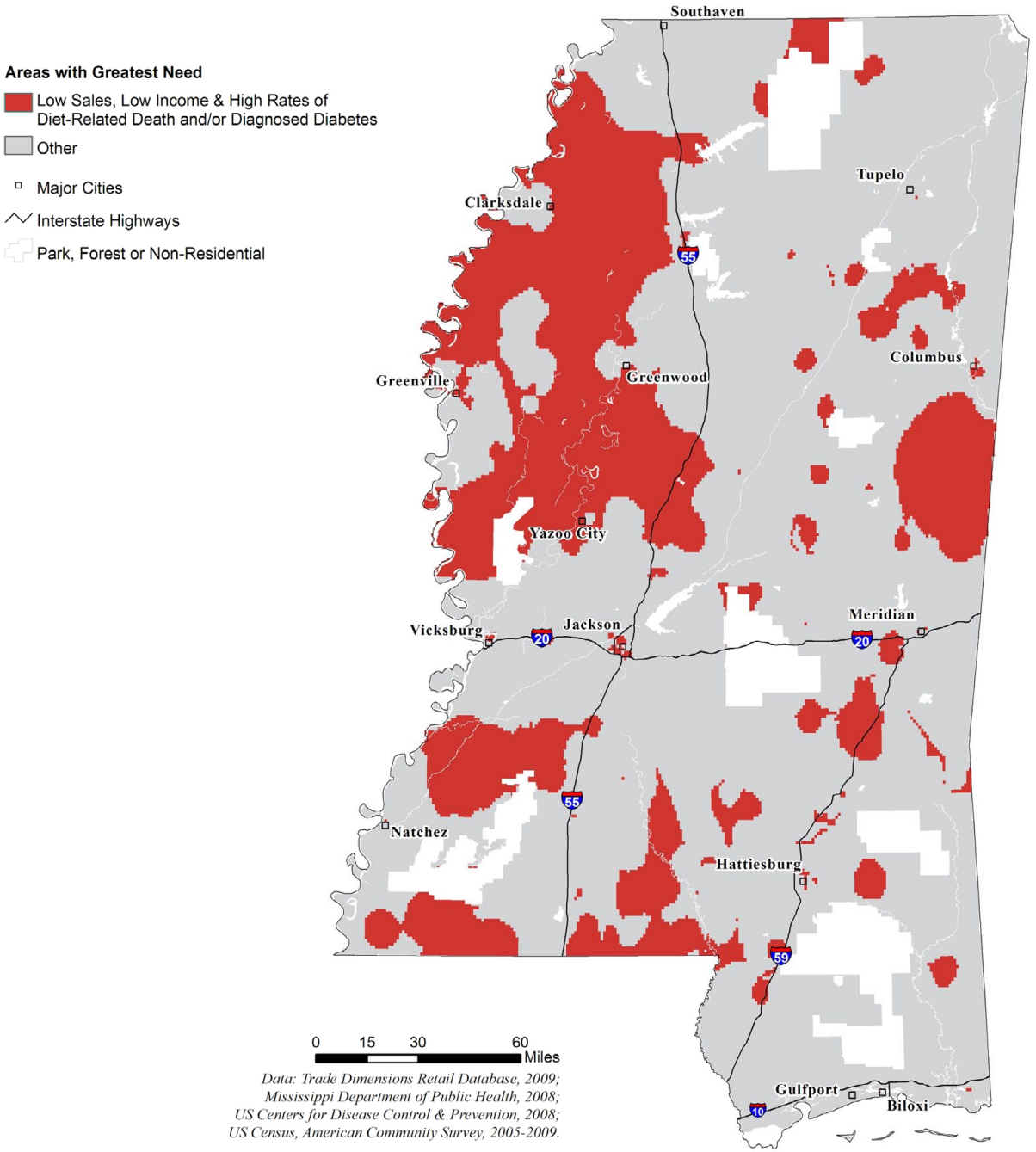
MAP 5: *Income, Diet-Related Death and Diagnosed Diabetes Rates* shows diet-related death and diagnosed diabetes data by income in Mississippi. The red areas indicate a higher than average rate of diet-related death and/or diagnosed diabetes occurring in lower-income areas. The yellow areas display higher rates of diet-related death and/or diagnosed diabetes occurring in higher-income areas. The blue and green areas have lower rates of diet-related death and/or diagnosed diabetes. The rate of diagnosed diabetes for the state—over 12 percent of the adult population—is the second highest in the nation, according to the Centers for Disease Control and Prevention.[24] Heart disease and stroke are among the top three leading causes of death in Mississippi, accounting for 36 percent of all deaths in the state.[25] Mississippi's cardiovascular disease mortality rate, which includes heart disease and stroke, is the highest in the nation.[26] In addition to the health consequences, treating diet-related diseases such as heart disease, obesity and diabetes is costly. In 2008, the direct health care cost of obesity in Mississippi was $925 million, with costs projected to increase to $3.87 billion by 2018.[27]

MAP 6: *Areas with Greatest Need* displays lower-income communities where there is low access to supermarkets and a high rate of diet-related death and/or diagnosed diabetes. These areas have the greatest need for more supermarkets.

To provide healthy, affordable foods in these communities and to help address the high rates of diabetes and other diet-related diseases, Mississippi should encourage new supermarket development in lower-income areas where there are few or no supermarkets.

Increasing the availability of healthy, affordable foods in communities with high rates of diet-related diseases does not guarantee a reduction in their incidence. However, leading public health experts, including the Centers for Disease Control and Prevention and the Institute of Medicine, agree that it is a critical component in the fight against obesity. Furthermore, the White House Obesity Task Force recently highlighted the importance of increasing access to healthy, affordable foods as one of its key recommendations.[28]

6: Areas with Greatest Need in Mississippi



CONCLUSION

The lack of access to supermarkets is a problem in many communities in Mississippi, especially in lower-income areas where rates of diet-related disease, such as diabetes, are high.

When communities lack access to healthy foods, adults and children have to rely on corner and convenience stores, which often stock lower-quality foods and have higher prices, or they have to travel long distances to purchase nutritious foods. Diets that rely on food from these types of stores often contain higher amounts of sugar and fat, which can contribute to obesity, diabetes and other diet-related diseases.[29]

The increased incidence of diabetes and other diet-related diseases in lower-income communities suggests that the public sector needs to invest in supermarket development in these underserved areas to help reduce and prevent these diseases. Such an investment would have economic benefits as well, since supermarkets bring jobs to communities that need them the most.[30]

The public sector has an opportunity to partner with the supermarket industry to improve health, create jobs, leverage private dollars and revitalize communities by making investments in supermarket development. Over the long term, these initiatives will help to slow the growth of or reduce the obesity-related health care costs incurred by Mississippi.

Through mapping, this study shows that many lower-income communities in Mississippi have both poor supermarket access and high rates of diet-related death and/or diagnosed diabetes. This study demonstrates that the lack of supermarkets exacerbates significant health problems that adversely impact children and families across the state.

RECOMMENDATIONS

Mississippi must address the critical need for more supermarkets in many communities.

The number of supermarkets—and access to them—are key factors contributing to communities' health and economic development. People living in lower-income areas without access to supermarkets suffer from diet-related deaths and/or diagnosed diabetes at a rate higher than that experienced by the population as a whole. Through public-private partnerships that incentivize fresh food retail development, we can increase the number of supermarkets in underserved communities and improve the health of children and families across the state.

We recommend that state and local governments in Mississippi:

Convene leaders from the supermarket industry, government, public health, economic development and civic sectors to develop a strategy to establish more supermarkets in lower-income communities.

A key element of this strategy is for state and local governments to create a grant and loan program to support local supermarket development projects in order to increase the availability of affordable and nutritious food in underserved areas.

GIS Methodology

All data was prepared in MS Excel and mapped in ArcGIS 10 with Spatial Analyst extension. The coordinate system and projection used during mapping and analysis were the North American Datum 1983 and Mississippi State Plane West Zone. Analysis was at the census tract level of geography using interpolated rasters and density grids.

SUPERMARKET SALES
Supermarkets in the 2009 Trade Dimensions retail database were included in the analysis of sales. For the purposes of this study, the definition of a supermarket is any store that has an SIC code of 541105 and an annual sales volume greater than $2 million. There were 350 supermarkets in Mississippi with an aggregate weekly sales volume of $153,125,000. Stores were plotted using the latitude and longitude coordinates for each record and then classified into two categories; above and below $150,000 in weekly sales volume. Weekly sales volume was further transformed from a series of points to a continuous raster grid representing the sales density per square mile using the Kernel Density function with a five-mile radius in Spatial Analyst. Values of sales density were used to classify the raster grid into the four categories shown in Map 1: Weekly Sales Volume for Supermarkets.

POPULATION
Population data estimates for the State of Mississippi by census tract were retrieved from the US Census Bureau website (www.census.gov) for the 2005–2009 American Community Survey (total of 2,923,946 people). Geographies with no population were removed from the analysis, as indicated on the maps. Density of total population was calculated from the census tract centroid points using Kernel Density with a search radius of five miles.

SALES AND POPULATION
The density of weekly sales volume raster was divided by the density of total population raster. The result was then divided by $52.37 (the statewide ratio of sales to population: $153,125,000/2,923,946) to create an odds ratio for weekly supermarket sales per person for the state. An odds ratio of 1 is equivalent to the statewide rate. Anything below 1 is below the statewide rate. An odds ratio of 2 means the rate is twice the statewide rate. This is used for Map 2: Supermarket Sales and Total Population.

INCOME
Median household income ($36,796), number of households (1,086,466), and per capita income data were retrieved from the US Census Bureau website for the 2005–2009 American Community Survey. Median household income was multiplied by number of households, and the result was divided by total population to create an average per capita income ($13,672.48). Local per capita income by census tract was divided by this number, giving an income odds ratio above or below the statewide rate. The odds ratio, assigned to the census tract centroid, was used to interpolate a grid, which was then reclassified to yield two distinct values, those below and those above the statewide rate.

SALES AND INCOME
The two reclassified rasters of "sales" and "income" odds ratios were combined through multiplication to calculate a new field/layer, resulting in four distinct values which correspond to the four possible combinations of high and low odds ratios, which were used to classify Map 3: Supermarket Sales and Income and Map 4: Low Supermarket Sales and Low Income.

DIET-RELATED HEALTH
The Mississippi State Department of Public Health (MSDPH) provided mortality data by census tract for the specified list of ICD-10 codes for the year 2007. To supplement the MSDPH mortality data, 2008 county level diabetes rate estimates were retrieved from the US Centers for Disease Control and Prevention's (CDC) Diabetes Data & Trends County Level Estimates of Diagnosed Diabetes (apps.nccd.cdc.gov/DDT_STRS2). The MSDPH and CDC data were processed separately and then combined to yield a composite odds ratio for diet-related death and diagnosed diabetes.

DIET-RELATED DEATHS
A total of 11,825 diet-related deaths were recorded for Mississippi, but only 9,434 had the necessary census tract number to associate records with a geographic location. These 9,434 deaths were mapped to the census tract level and summarized based upon the census tract number to obtain a count of diet-related deaths per census tract.

DIET-RELATED DEATHS AND POPULATION
The total number of MSDPH deaths attributed to each census tract was divided by the total population of that census tract. This result was divided by the statewide ratio of diet-related deaths to total population (9,434/2,923,946 = 0.003226, or 32 diet-related deaths per 10,000 people) to calculate the deaths odds ratio. *Note: Due to the omission of deaths that could not be mapped, the resulting statewide mortality rate, to which each census tract's rate was compared, is lower than if all deaths had been counted. The result is that a greater number of tracts have a relatively high calculated mortality rate, exceeding that of the state.*

DIAGNOSED DIABETES RATES
County diabetes rates were attributed to census tracts within each county so that subsequent analysis would match the smaller level of geography used elsewhere. The rate of diagnosed diabetes in the tract was divided by the statewide rate (12.48 percent) to calculate a "diabetes" odds ratio.

DIET-RELATED DEATH AND DIAGNOSED DIABETES
The two separate odds ratios for "MSDPH deaths" and "CDC diabetes" were added, resulting in a composite "deaths/diabetes" odds ratio. An odds ratio of 2 is equivalent to the statewide rate. The odds ratio, assigned to the census tract centroid, was used to interpolate a grid, which was then reclassified to yield two distinct values, those below and those above the statewide rate for diet-related death and diagnosed diabetes.

DIET-RELATED DEATH, DIAGNOSED DIABETES AND INCOME
The two reclassified rasters of "deaths/diabetes" and "income" were combined through multiplication to calculate a new field/layer. Both operations resulted in four distinct values which correspond to the four possible combinations of high and low deaths/diabetes and income, which were used to classify Map 5: Income, Diet-related Death and Diagnosed Diabetes Rates.

DIET-RELATED DEATHS, DIAGNOSED DIABETES, SUPERMARKET SALES AND INCOME
To combine all three variables, the two reclassified rasters "deaths/diabetes" and "low supermarket sales and low income" were combined to create a new raster layer. These results were reclassified to only retain one value, "low supermarket sales, low income and high deaths and diabetes," used to produce Map 6: Areas with Greatest Need.

Endnotes

1 Population in low-income, low-supermarket tracts derived from: Trade Dimensions International, Inc. (2009); American Community Survey 2005–2009, ESRI Data & Maps 2009.

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Ensuring That Everyone Has Access To Affordable, Nutritious Food

The Food Trust, a nonprofit founded in Philadelphia in 1992, strives to make healthy food available to all. Research has shown that lack of access to healthy food has a profound impact on food choices and, therefore, a profound impact on health.

For almost 20 years, The Food Trust has worked with neighborhoods, schools, grocers, farmers and policymakers to develop a comprehensive approach to improving the health of America's children. The Food Trust's innovative initiatives integrate nutrition education with increased availability of affordable, healthy foods.

This approach has been shown to reduce the incidence of childhood overweight; a study in the journal *Pediatrics* found that the agency's School Nutrition Policy Initiative resulted in a 50 percent reduction in the incidence of overweight among Philadelphia school children.

> *"The Food Trust is transforming the food landscape one community at a time, by helping families make healthy choices and providing access to the affordable and nutritious food we all deserve."*
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> ▪ ROBERT WOOD JOHNSON FOUNDATION

The Food Trust is recognized as a regional and national leader in the prevention of childhood obesity and other diet-related diseases for this and other notable initiatives to increase food access in underserved neighborhoods, including the Healthy Corner Store Initiative and the Pennsylvania Fresh Food Financing Initiative, a public-private partnership which has sparked the development of more than 90 fresh-food retail projects across Pennsylvania.

The Centers for Disease Control and Prevention honored the Fresh Food Financing Initiative in its Showcase of Innovative Policy and Environmental Strategies for Obesity Prevention and Control, and the program was named one of the Top 15 Innovations in American Government by Harvard University.

For more information or to order additional copies of this report, visit thefoodtrust.org or contact The Food Trust.

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