

Escape from poverty helps explain diabetes epidemic in the American South

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The strikingly high prevalence of Type 2 diabetes in the American South can be partially traced to rapid economic growth between 1950 and 1980, new research suggests.

The study tests the "thrifty phenotype" hypothesis, which suggests that if economic conditions present during [fetal development](#) improve dramatically during a person's childhood, the prospects of poor health in adulthood increase.

According to the hypothesis, children whose parents endured being poor were unprepared biologically to manage the riches of processed foods and the more sedentary life that accompanied higher incomes. The resulting obesity leads to a high risk for multiple diseases.

In the South, and particularly for African Americans, poverty was rampant for several generations until industrialization took hold in the 1950s and '60s, leading to rapid economic growth. The benefits of prosperity and the South's large African American population – also at higher risk than whites for diabetes – both help explain the region's current poorer health.

"It's a clash between anticipated lifestyle and the lifestyle that's realized," said Richard Steckel, distinguished university professor of economics, anthropology and history at The Ohio State University and author of the study. "If the thrifty phenotype hypothesis is correct, people with diabetes today should have had a socioeconomic history of moving from

poverty to prosperity."

And that is what Steckel's study showed. He investigated the relationship between state-based per-capita income growth and diabetes prevalence by state. The analysis indicated that the most dramatic improvements in household income from 1950 to 1980 were clearly associated with a higher prevalence of Type 2 diabetes, and Southern states topped both of those lists.

If future rates of diabetes can be predicted based on income history, "this message is dire for historically poor countries undergoing rapid growth," Steckel said. He also said the research has health-care implications, suggesting that doctors should collect data on patients' socioeconomic background at the same time they take medical histories.

The research is published in the July/August issue of the *American Journal of Human Biology*.

Steckel specializes in the study of slaves' health, so he is an expert on the economics of the South. In the course of his work, he examined a map outlining Type 2 diabetes prevalence in the United States. Without a single word, the map told a story: Southern states have far higher percentages of people with this disease than do states to the north and west.

In many areas of the South stretching from Oklahoma to West Virginia, more than 10.6 percent of the adult population had Type 2 diabetes in 2009, according to the Centers for Disease Control and Prevention (CDC). Percentages were lower in all other states, except in select portions of several states in the West and in pockets of Ohio, Indiana, Michigan and Pennsylvania.

Steckel obtained state per-capita income data from the Bureau of

Economic Analysis and diabetes figures from the CDC. He constructed a statistical model to investigate the consequences of income change on [diabetes prevalence](#), analyzing the ratio of per-capita income in 1980 to that in 1950 and those ratios' relationship to the proportion of each state reporting Type 2 diabetes in 2009.

The model suggested that two variables, the income ratio and the share of each state's population that was African American in 2010, could explain more than half of the nation's variance in the prevalence of Type 2 diabetes.

Diabetes is more common in African Americans than in whites, and blacks compose a large share of the Southern population, Steckel noted. The growth rate of median income between 1953 and 2001 in the South was 191 percent for blacks and 84 percent for whites, compared to 97 percent and 54 percent, respectively, for the whole country.

"If these improvements in income translated into increased net nutrition and weight gain, then blacks, and especially Southern blacks, should, under the hypothesis, have been particularly susceptible to Type 2 diabetes," Steckel said.

Under the hypothesis, pregnant women living in poverty influence fetal development by sending biological signals that adequate nutrition will be hard to come by in life. When children instead grow up under relatively prosperous conditions, their bodies can't adjust.

"The fetus builds inadequate organs because of the forecast on the part of the mother received from earlier generations that there is going to be a lean world. When the child then becomes obese and stresses these organs, this leads to metabolic syndrome among adults, and then diabetes," he said.

"You have uncoordinated growth. Growth in utero is uncoordinated with your needs as an adult. ... It has been a disaster for the South."

There is more to the prosperity than just income, which serves as a proxy for all kinds of ways household behavior changed with added wealth. More food was available, and mothers entering the labor market were less likely to monitor children's diet and physical activity. With industrialization came mechanization, which lowered physical effort at work, while at the same time higher incomes reduced the need for such manual labor as chopping wood and farm chores around a home. Health club memberships also are lower in the South than in other parts of the country.

"This article does not contradict studies that show proximate causes of diabetes. I'm just trying to back up behind those proximate causes and say this is the underlying mechanism: a socioeconomic revolution, a nutrition revolution and a 'derevolution' of exercise and work," Steckel said.

This is why socioeconomic data could be useful during a physical exam, he said, in a way that could make preventive medicine more effective.

"You can probably identify the people most at risk for [diabetes](#) based on their socioeconomic history, and those are the ones clinicians should target."

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