



RESEARCH BRIEF #40

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Marcellus Shale Natural Gas Development Increased Income for Rural Pennsylvania Families, but Youth Obesity Rates Remained High

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Youth obesity is associated with serious health and social risks.^{1,2} Between 1970 and 2000, youth obesity rates in the U.S. increased dramatically. Despite numerous state and federal policy efforts to address this issue, youth obesity rates have remained high.³⁻⁵

Higher family income may protect children against obesity. U.S. children living in families with high incomes have the lowest obesity rates.⁶ Families with more income can afford foods that are considered “healthy” but are often more expensive. So, a logical question arises: would giving families more money reverse the epidemic of youth obesity?

My recent research from Pennsylvania using a “natural experiment” suggests that the answer to this question is “no.” This brief summarizes the findings from my recent study, published in [Social Science and Medicine](#) which examined whether an increase in

income generated by Marcellus Shale natural gas extraction in Pennsylvania led to declines in youth obesity in the Marcellus Shale “Core”- the parts of Pennsylvania where the geological characteristics were better for extracting natural gas. Families living above the Core, which is predominantly rural, benefitted from an increase in employment and wages, especially in industries that provide support services for the gas industry and its workers. Some families also received income through lease and royalty payments if they owned their property’s mineral rights. However, these independent increases in income did not alter rates of youth obesity, even in low-income families. Despite the billions of dollars that flowed into the Core areas, youth obesity for elementary-aged and middle/high school-aged youth did not change, even when accounting for initial levels of poverty or affluence. Rather than income inequality, my findings suggest that other inequities between families and geographic areas (such as grocery store options and food prices) likely cause disparities in youth obesity rates in Pennsylvania.

Rural Setting May Explain the Persistence of Youth Obesity

The context of this study could help explain the null findings. While there are small and mid-sized Pennsylvania cities located above the Marcellus Shale, much of the land area is rural. Rural areas in the U.S. have higher rates of youth

KEY FINDINGS

- Children living in families with higher incomes have lower rates of youth obesity.
- Rural areas with limited grocery options and higher food prices have higher rates of youth obesity.
- Independent increases in income due to Marcellus Shale Development did not cause changes in youth obesity rates, even for low-income families.
- Structural inequalities are likely the underlying cause of high rates of youth obesity in low-income, rural Pennsylvania families.

obesity and severe youth obesity⁶ due to limited grocery access and physical activity opportunities.^{7,8} This holds true in Pennsylvania, where families in rural counties have fewer grocery sources and higher food prices.⁹ Before the Marcellus Shale development, rural Core counties experienced more conditions known to contribute to youth obesity compared to counties outside the Core areas. Specifically, Core counties had more convenience stores, fewer specialty grocery outlets (i.e., bakeries, butcher shops), fewer recreational facilities, and lower soda prices than other Pennsylvania counties in 2007. These limitations on access to healthy goods and services could have stunted any health-promoting effects of increased family incomes.

What Are the Policy Implications?

The World Health Organization argues that we must focus on the social determinants of health (such as income) for reducing obesity rates,¹⁰ and low income is frequently viewed as the root cause of multiple public health challenges, including youth obesity. By showing that income is correlated with, but does not cause, youth obesity in PA, this study demonstrates youth obesity in Pennsylvania likely stems from other structural inequalities correlated with income. One possible cause is parents' education because it is associated with many life skills like the ability to navigate complex environments and stressful situations that could keep children healthy.^{11,12} Alternatively, unequal access to community resources that support health could create disparities in youth obesity. Policy initiatives should target the structural barriers to eating well and being physically active. Policies should address inequitable health environments and eventually eliminate the undue burden of limited access to healthy foods and recreation services. By doing so, the country could reduce youth obesity and socioeconomic and geographic disparities in obesity rates.

Data and Methods

This natural experiment used data for 317 Pennsylvania school districts located above the Marcellus Shale geological formation. Because PA was one of the first states to screen for students' body weight, PA youth obesity rates are available at the school district-level both before and after the Marcellus Shale economic boom. To measure school districts' income levels, demographic traits, and other characteristics, I use over a dozen state and national administrative and statistical sources, which were geo-coded and aggregated to the school district-level. Key to the analysis was the acquisition and use of a map created by the oil and gas industry before any drilling occurred which predicted the location of the Core of the Marcellus Shale. The PA school districts above the Core are the study's experimental "treatment" group, while PA school districts outside the Core, but above the Marcellus Shale were the "control" group. We compare districts' obesity rates before (2007) and after (2011) the Marcellus Shale boom and test whether the district's location above the Core altered those trends. Regression analyses controlled for other factors related to the Marcellus Shale development that could affect youth obesity, like increased exposure to environmental pollution or limits on physical activity because of increased traffic. Models also explored whether the effect of income was different in places that were relatively affluent or low income before Marcellus Shale development occurred. For a full description of the methods, please visit the peer-reviewed publication: <https://www.sciencedirect.com/science/article/pii/S0277953621000642>.

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