

Mapping the Causes of Obesity across the State of Texas

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I. Introduction

The prevalence of obesity across the United States has grown substantially in the last 30 years, mimicking the behavior of epidemics. There are a number of factors that can contribute to the occurrence of obesity among adults, which include small-scale behavioral factors as well as large-scale environmental and socioeconomic factors. This study focuses on the large-scale elements that are thought to contribute to the prevalence of obesity in the state of Texas. Because obesity is such a complicated issue that can result as a combination of several components, this study aims not to determine the direct causes of the obesity epidemic but rather to demonstrate important trends that may lead to a better understanding of the problem overall.

II. Methodology

Through the use of the carto.com mapping program, seven maps were created demonstrating the occurrence of obesity across the counties of Texas. Low income as a contributor to obesity was studied through the existence of food deserts (areas of low income where residents have low access to proper grocery stores). Other variables include unemployment, education level, adequate health insurance, access to primary care doctors, and physical inactivity. This list is not exhaustive, and ignores many of the smaller factors that may contribute to an individual's nutritional health.

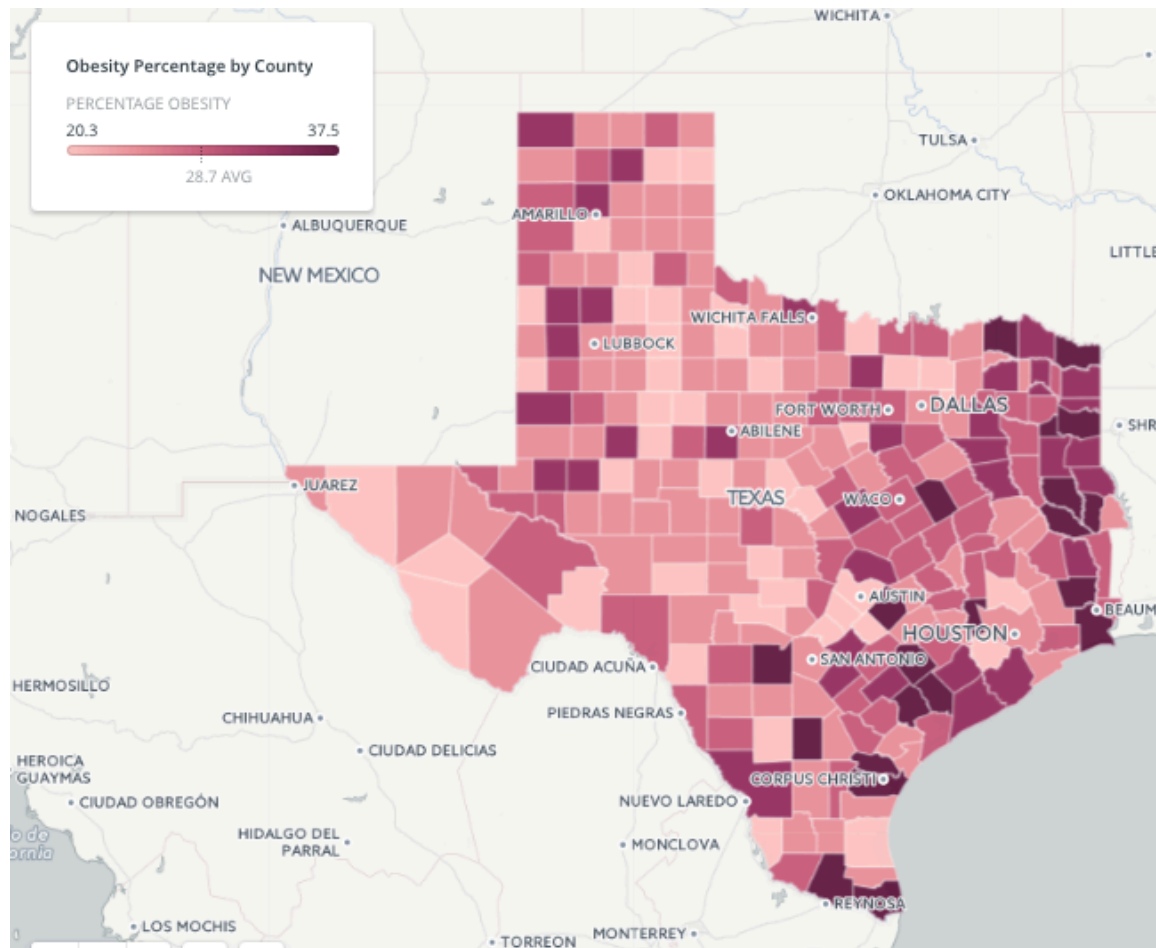
Along with Maps 2 through 6, there are tables that indicate the percentage of counties (under the "percentage" column) that match or challenge the hypotheses of how these factors may affect the incidence of obesity. It is thought that an increase in unemployment causes an increase in obesity, an increase in education level causes a decrease in obesity, an increase in physical inactivity causes an increase in obesity, an increase in primary care doctors causes a decrease in obesity, and a decrease in insurance causes an increase in obesity. The averages across Texas for each county were calculated in order to determine if a particular county is above or below average for the specific variable. These averages were then used to demonstrate whether a county is more likely to follow the predicted trends or reveal a separate trend. Below each map image is a link to an interactive online map. In order to create a consistent timeline, all data was sourced from 2013 datasets.

III. Mapping the Causes

Map 1: Obesity by County

Source: <http://www.countyhealthrankings.org/app/texas/2016/measure/factors/11/datasource>

Map 1 compares percentages of obese populations within each county in Texas. To provide readers with an overall view of what portion of the population grapples with obesity, the minimum percentage among the counties is 20.3% while the maximum percentage is 37.5%, with an overall average of 28.7%.



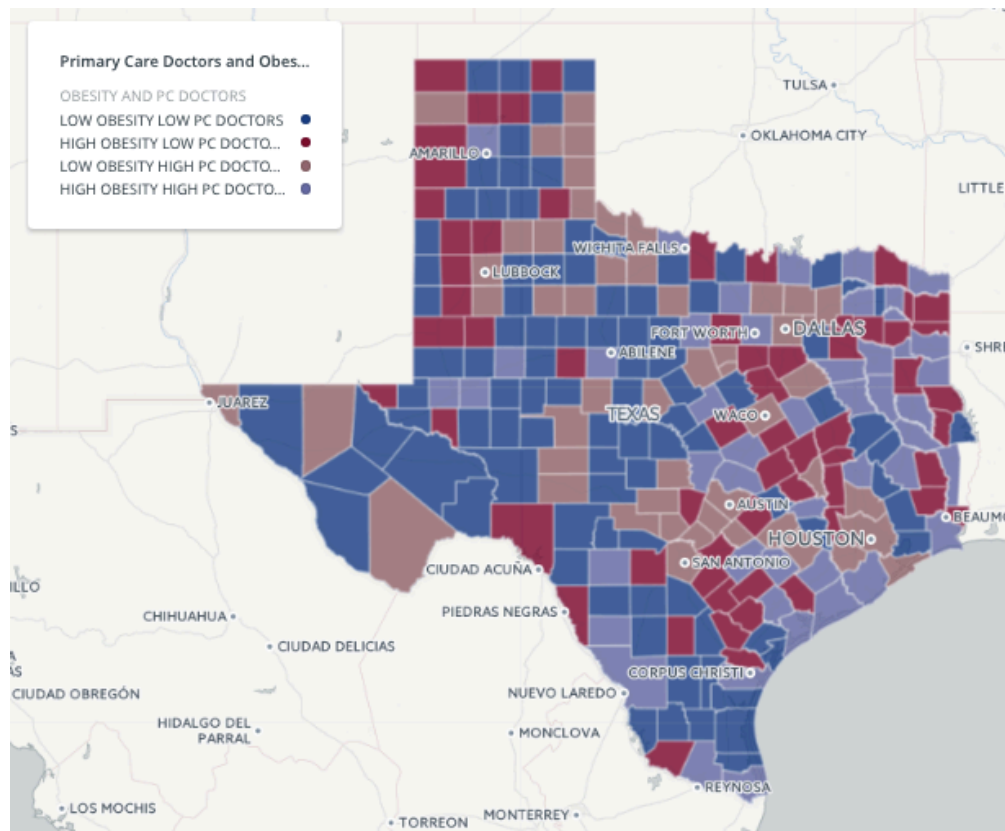
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Map 2: Primary Care Providers Versus Obesity by County

Source: <http://www.dshs.texas.gov/chs/hprc/tables/2013/13PC.aspx>

Not only could lack of access to healthcare be a cause of obesity and poor nutritional health, but lack of access to doctors could mean that those already facing obesity may not be able to receive proper treatment. In this hypothesis, a higher amount of primary care doctors would correlate with less obesity and a lower amount of primary care doctors would correlate with more obesity. Map 2 compares obesity rates and the number of primary care doctors per 100,000 people in each county. [Average number of PC Doctors = 79.6]

Above/Below Average	Number of Counties	Percentages	Notes
High obesity low PC Doctors	61	44.3%	An inverse relationship between obesity and PC doctors would support the hypothesis that lower PC doctors per county contributes to a rise in obesity
Low obesity high PC Doctors	51		
High obesity high PC doctors	47	55.7%	Most counties do not demonstrate an inverse relationship between these two variables. This map does not support the hypothesis
Low obesity low PC doctors	94		



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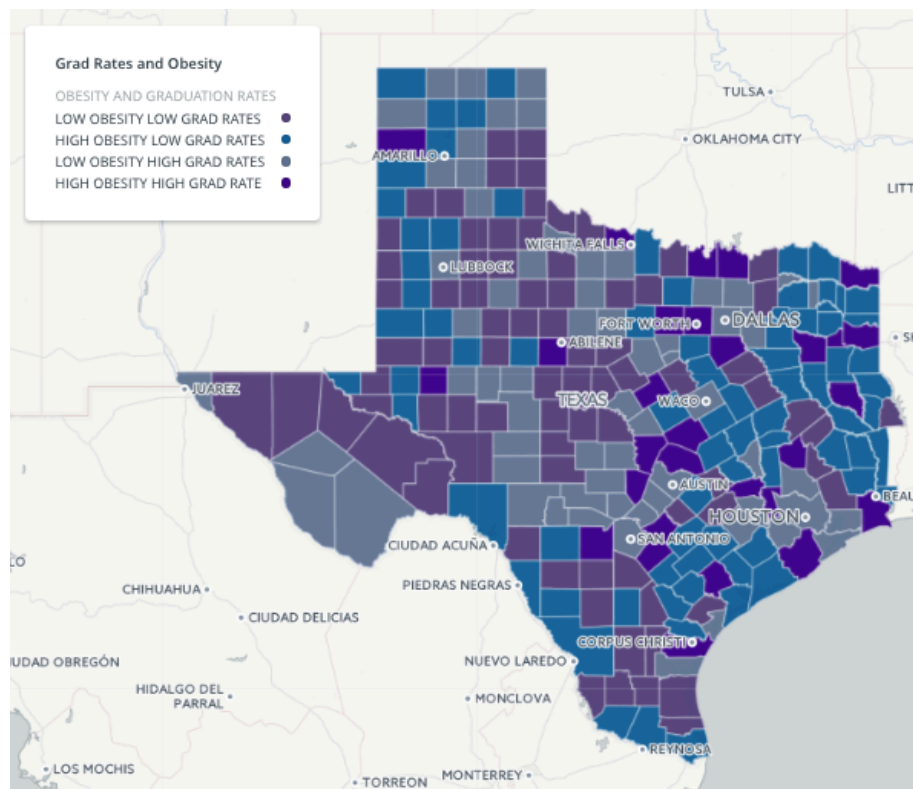
Map 3: Education Level (college graduation rates) Versus Obesity by County

Source: <https://data.ers.usda.gov/reports.aspx?ID=18243>

Levels of education may contribute to nutritional health due to knowledge of healthy eating and exercise habits, as well as access to more income and therefore being in more control of one's environment. This could include access to healthier and more expensive foods and access to exercise facilities. With this hypothesis a higher graduation rate would correlate with lower obesity levels, and a lower graduation rate would correlate with higher obesity levels. Map 3 demonstrates college graduation rates of adults over 25 years of age versus obesity levels in each county.

[Average graduation rate = 0.18]

Above/Below Average	Number of Counties	Percentages	Notes
high obesity low grad rate	79	56.9%	An inverse relationship between these two variables would support the hypothesis that higher graduation rates contributes to a decrease in obesity
low obesity high grad rate	65		
high obesity high grad rate	29	43.1%	Most counties demonstrate an inverse relationship between high graduation rates and obesity
low obesity low grad rate	80		



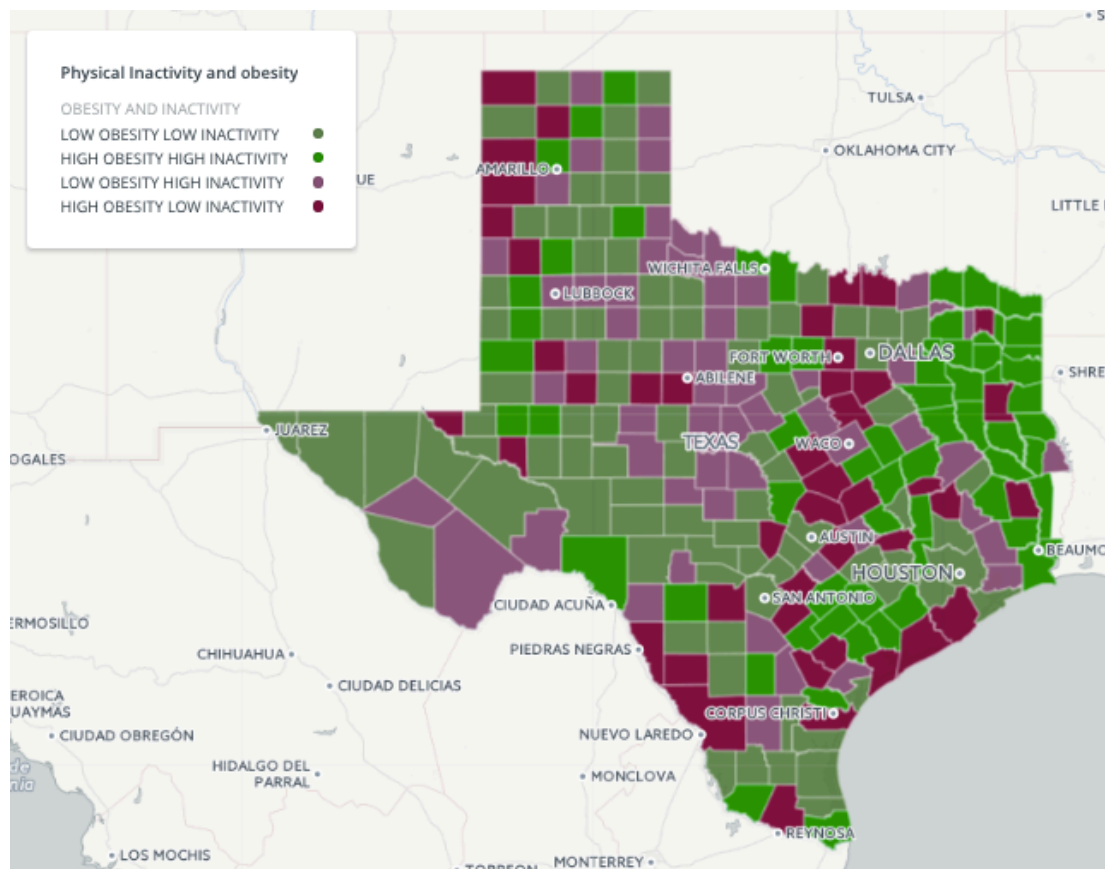
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Map 4: Physical Inactivity Versus Obesity by County

Source: <http://www.countyhealthrankings.org/app/texas/2017/measure/factors/70/data?sort=sc-0>

Sedentary lifestyles among adults may cause an increase in levels of obesity. This map compares the percentages of adults over the age of 20 that are predominately inactive in their free time. Those that have higher-paying jobs and work less hours may have more time in the day to engage in exercise and more access to expensive exercise facilities. Higher inactivity is thought to correlate with higher obesity. [Average Inactivity = 25.2%]

Above/Below Average	Number of Counties	Percentages	Notes
high obesity high inactivity	64	60.1%	A correlating relationship between these two variables would support the hypothesis that physical inactivity contributes to a rise in obesity
low obesity low inactivity	88		
high obesity low inactivity	44	39.9%	Most counties demonstrate an correlating relationship between physical inactivity and obesity
low obesity high inactivity	57		



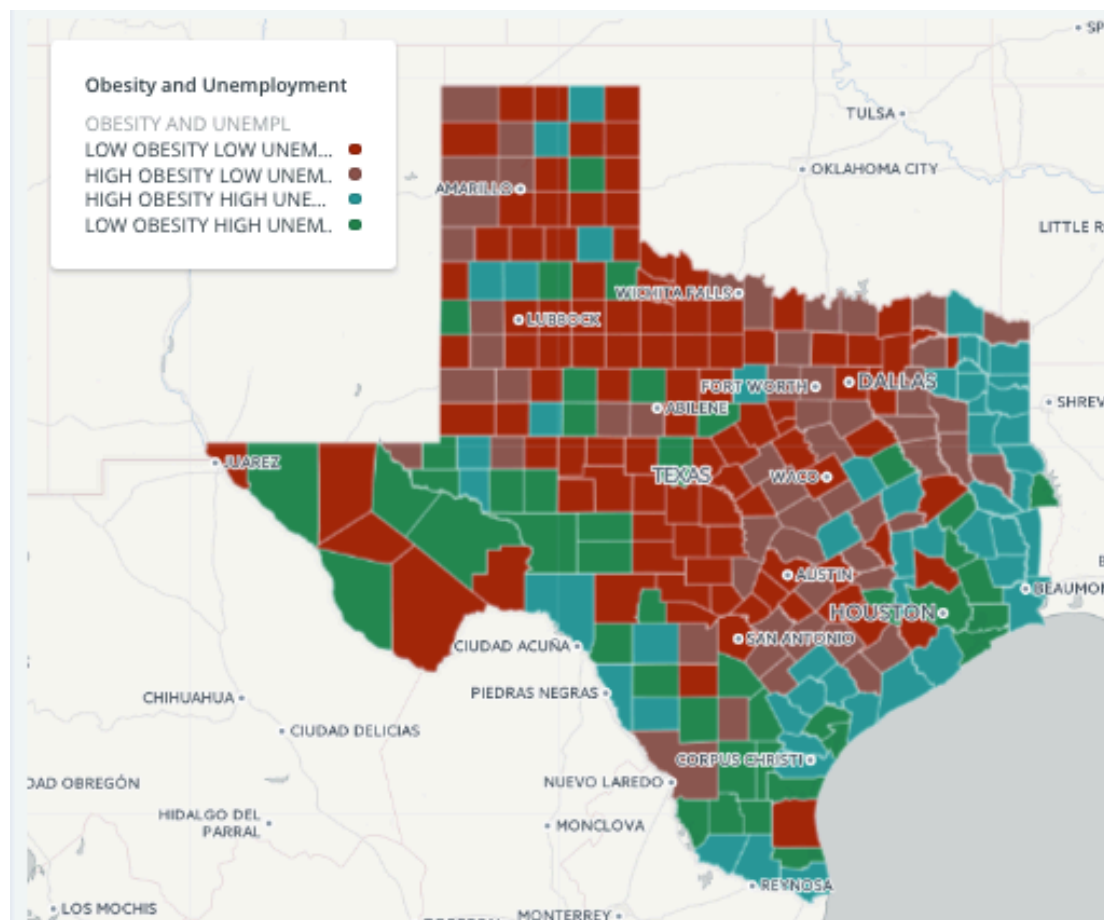
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Map 5: Unemployment Versus Obesity by County

Source: <http://www.txcip.org/tac/census/morecountyinfo.php?MORE=1042>

Unemployment contributes to lower income and therefore may decrease one's access to more nutritional foods and healthier environments in general. Map 5 demonstrates the correlation between unemployment rates and obesity by county. Higher unemployment is thought to correlate with higher obesity. [Average Unempl. Rate = 5.24]

Above/Below Average	Number of Counties	Percentages	Notes
High obesity high unempl	52	60.5%	An correlating relationship between these two variables would support the hypothesis that unemployment contributes to a rise in obesity
low obesity low unempl	101		
high obesity low unempl	56	39.5%	Most counties demonstrate a correlating relationship between unemployment and obesity
low obesity high unempl	44		



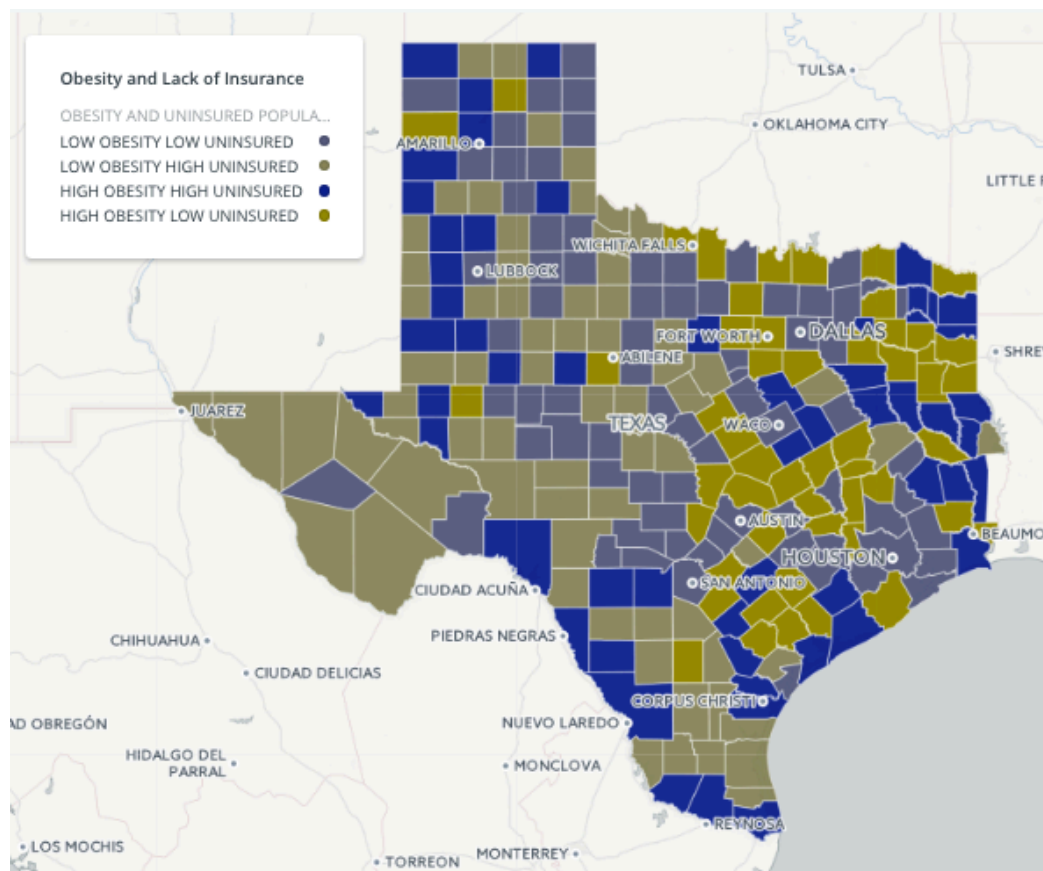
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Map 6: Uninsured Population Versus Obesity by County

Source: <https://www.enrollamerica.org/research-maps/maps/changes-in-uninsured-rates-by-county/>

Lack of insurance can oftentimes keep individuals from seeking out proper healthcare, and can also prevent individuals already suffering from obesity from receiving proper treatment. Map 6 demonstrates the correlation between lack of insurance and obesity by county. A lack of insurance is thought to correlate with higher obesity rates. [Average Uninsured = 24.5%]

Above/Below Average	Number of Counties	Percentages	Notes
high obesity high uninsured	56	52.2%	A correlating relationship between these two variables would support the hypothesis that not having health insurance contributes to a rise in obesity
low obesity low uninsured	76		
high obesity low uninsured	52	47.8%	Most counties demonstrate a correlating relationship between uninsured status and obesity
low obesity high uninsured	69		

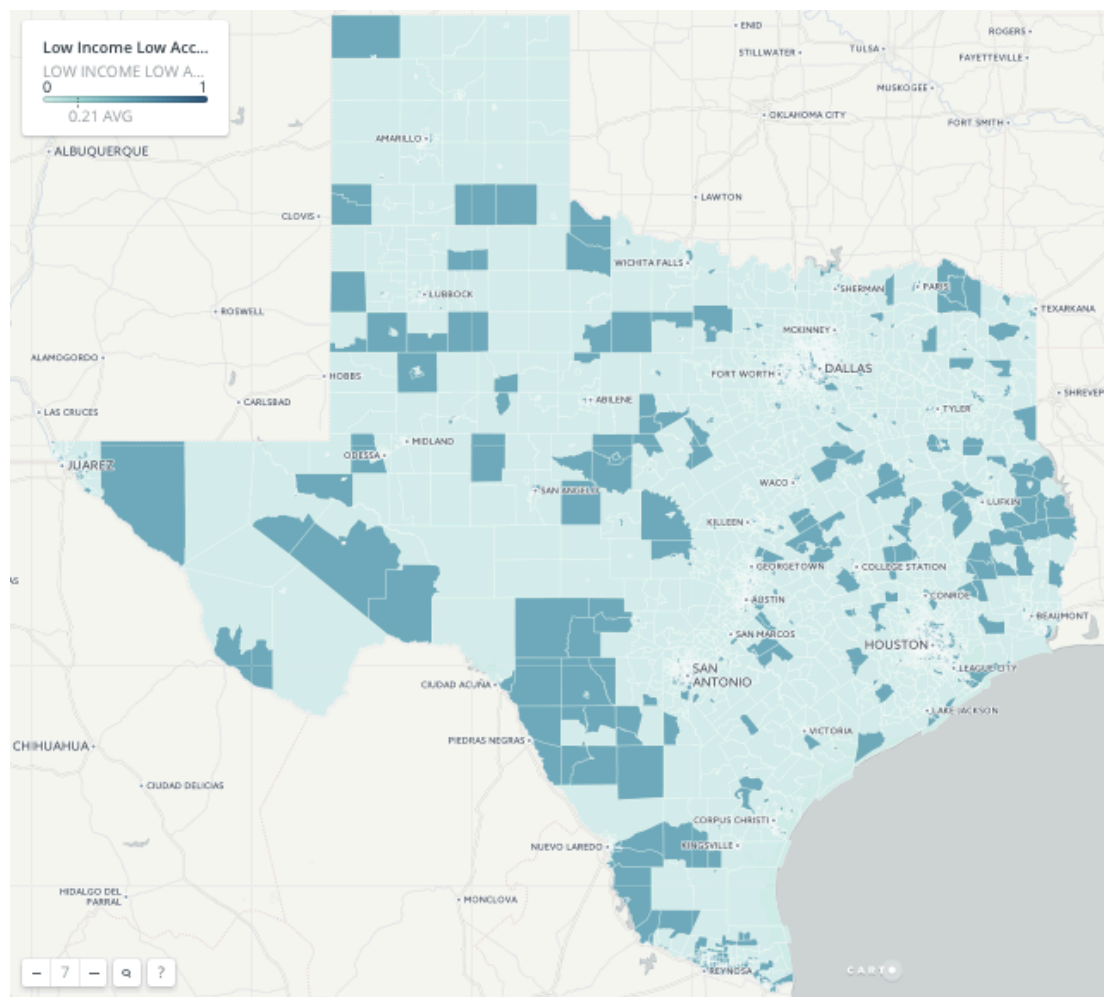


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Map 7: A look at Food Deserts: Low Income and Low Access

Source: <https://www.ers.usda.gov/data-products/food-access-research-atlas/>

Food deserts can be highly localized areas that exist in both rural and urban neighborhoods. Because the other data included in this project consisted of exclusively county data, it was difficult to compare the food desert data, which is recorded through census tracts, to the obesity data. This project would benefit highly from the inclusion of a more localized study of each variable, especially since income, graduation rate, unemployment, inactivity, insurance levels, and access to primary care providers can change from neighborhood to neighborhood. Food deserts are considered to be a very important contributor to the prevalence of obesity as residents may not have an affordable grocery store within miles of their homes and may not have the transportation systems needed to access these stores. Map 7 demonstrates which census tracts are considered “Low Income and Low Access,” and therefore coined as food deserts. LALITracts (low access and low income tracts) are denoted with either a 1 for tracts that are food deserts, and 0 for tracts that are not. More information on the prevalence and defining factors of food deserts can be found here: <https://www.ers.usda.gov/data-products/food-access-research-atlas/go-to-the-atlas/>



Interactive Link: <https://trbmccinnis.carto.com/builder/086915ec-29d4-11e7-9fcf-0ecd1babdde5/embed>

IV. Limitations:

Because most of the data in this project was linked to counties rather than smaller areas like towns or census tracts, conclusions may be skewed. A number of factors affect obesity, which can range from large-scale environmental factors to small-scale individual factors. Many of these issues are much more localized than counties, including the prevalence of food deserts. Correlation on these maps does not mean that these issues are direct causes of obesity and therefore may be misleading. While they can demonstrate helpful trends, they do not present direct causes and effects. Obesity is a complex issue that occurs due to a number of factors, which are too numerous to list here and could not all be included within the scope of this project.

V. Conclusion:

This project aims to build a more comprehensive picture of the current state of the obesity epidemic within Texas through the use of online mapping systems. Because obesity has followed trends that depict that of an epidemic, experts have begun more so to focus on the cause of obesity as an environmental phenomenon rather than just a personal one. In order to help prevent a further rise in obesity, health officials must study the varying factors that make up a community's environment.

Through studying the correlation by county of these factors with obesity, only one was determined to not follow the predicted correlation. While obesity was expected to decline with the increase of primary care providers, the data actually demonstrated the opposite trend. An increase in unemployment correlated with an increase in obesity, an increase in education level correlated with a decrease in obesity, an increase in physical inactivity correlated with an increase in obesity, and a decrease in insurance correlated with an increase in obesity. Factors like education, unemployment, income, and insurance levels are likely to affect the prevalence of food deserts, which can be considered one of the most important factors in the cause of obesity.

Obesity remains a significant and wide-spread public health issue that can lead to a number of other serious diseases. Through better visualizing the complex ways in which one's environment may contribute to increases in obesity, we can find better ways to combat the accelerating trend.