

# VICTOR (Visually Interactive Calculator Trimming Obesity Rates)

## A Look at Obesity Across Counties in the United States and an Interactive Tool to Counteract its Rise

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### Background

Adult obesity in the United States is projected to rise above 50% by the year 2030 in 29 states, with no state below the obesity rate of 30%.

Cancer, diabetes, and heart disease are a few examples of illnesses that can co-occur with obesity, impacting what will soon be a minimum of 1 in 3 Americans. Financial costs of obesity will skyrocket from \$147B to \$580B annually by the year 2030!

### Data Sources and Processing

Our team utilized public and requested datasets which had information related to food access on the county level for the majority of the United States. We then cleaned the data by standardizing column headers, accounted for renamed counties, dropped counties without obesity rates, and merged the datasets. We then developed variables to indicate access to healthy food.

**The Food Environment Atlas**

Maintained by the USDA at the county level. It has robust data related to food access and overall food environment.

**Map the Meal Gap (MMG)**

Map the Meal Gap, created by Feeding America, contains factors related to food insecurity and cost.

**CDC National Center for Health Statistics**

The CDC has information on obesity rates across 3,413 counties, excluding HI and AK.

**National Equity Atlas**

County level data related to the percentage of households without access to a vehicle.

**US Census Bureau**

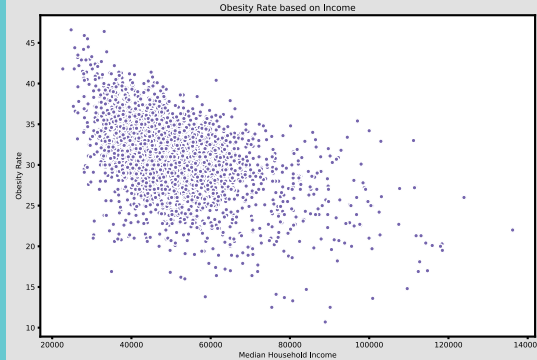
Annual estimates for resident populations by county with demographic breakdowns

Unemployment and education data by county.



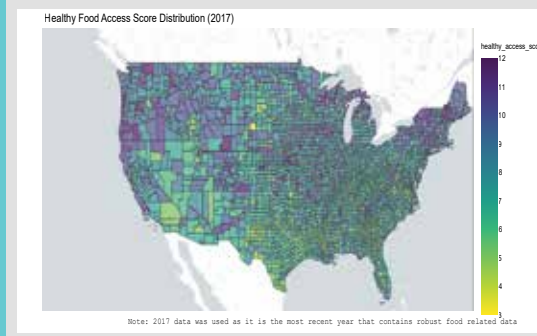
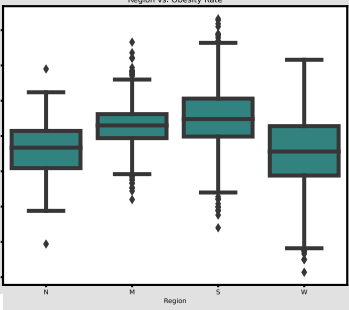
### Data Insights

We hypothesized that select socioeconomic factors and the concentration of access to healthier foods played a likely role in the country's rising obesity rates. Thus we looked at obesity rates through the lens of income, food access, store concentration, and region.



We found that household income and obesity rates had a negative correlation. After running Welch's ANOVA, followed by Bonferroni, the data supports that obesity rates are significantly different between each income bracket.

In this comparison of Region vs. Obesity Rate we found that each region (with the exception of the north and the west) had obesity rates significantly different from each other. In addition, the south had the highest average and median obesity rate.



**In summary, low income counties have low healthy food access and higher obesity rates, with the south especially impacted.**

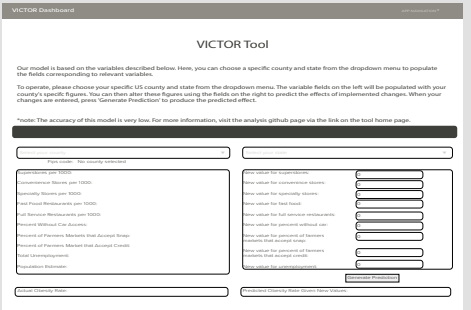
### Highlights

- Obesity is predicted to reach further crisis levels in the United States.
- While obesity impacts individuals, the United States is collectively negatively impacted due to the rising costs associated with comorbidity, social, and mental health issues.
- VICTOR is a tool empowering counties to trim obesity rates and aid in mitigating the epidemic.

### Proposed Solution: VICTOR

Virtual Interactive Calculator Trimming Obesity Rates

VICTOR is an interactive application geared to allow counties to view what factors they can change to lower obesity rates. By inputting new values for various factors (supercenter concentration, convenience store concentration, specialty store concentration, fast food restaurant concentration, full service restaurant concentration, percent of farmers markets that accept credit cards and SNAP, population, and unemployment rate), users will see how obesity rates changes.



The above variables were found to be significantly associated with obesity rates and together explain about 33% of the variation of obesity in the United States.

### Challenges and Future Work

- While we wanted to represent all 50 states of the US, we were unable to include Hawaii and Alaska as these states were lacking key factor data (i.e. obesity rate) for consistent, continuous analysis. This means our data has a lower than desired representation of indigenous peoples.
- As 2017 was the year with the most robust food related data, we chose to use it. However, when more current data is available it would be beneficial to redo the analysis.
- When including the racial makeup of a county as a variable, our models accuracy rose significantly. However, racial makeup is not an indicator for obesity. Rather, societal factors surrounding race are what contribute to obesity. Our limitation is that we were not able to find most of these factors; thus, our models accuracy stayed around 30% whereas the inclusion of race brought it into the 50-60% accuracy range. For the future, we would like to look into the interaction between race and current variables, in addition to food access information not present in our current datasets.
- Other variables to add would include access to fitness centers, green spaces, and healthcare.