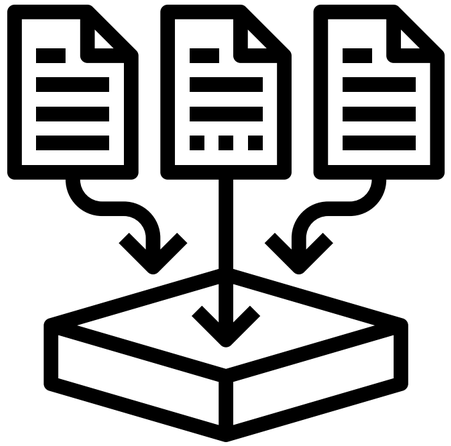
# ALL ABOUT OBESITY

## Introduction

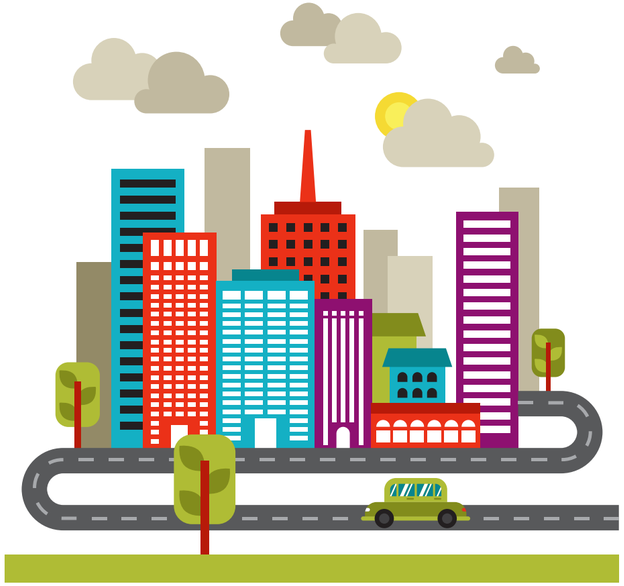
- The report analyzes data from the Food Environment Atlas of the U.S. Department of Agriculture.
- Goal: Explore health disparities in U.S. counties by studying obesity and diabetes rates in relation to rural/urban areas, age, fast food restaurants, and physical activity facilities.

## Data Cleaning

- Data sourced from three sheets: **HEALTH, SOCIOECONOMIC, and RESTAURANTS.**
- Cleaned data saved in a CSV file and used across all analyses in this report.



# OBESITY AND DIABETES IN METROPOLITAN VS. POPULATION LOSS COUNTIES



# What Are Metropolitan and Population Loss Counties?

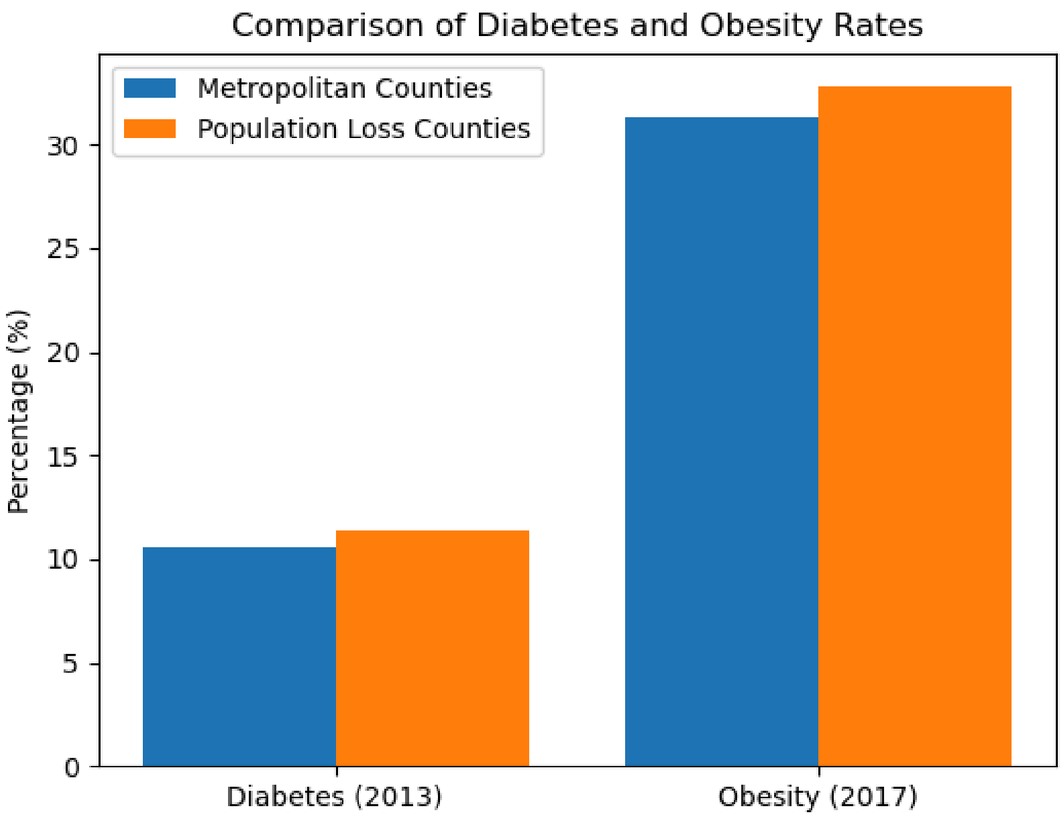
**Metropolitan Counties:**

- Urban areas with high population density.
- Better access to healthcare, physical activity options, and diverse resources.

**Population Loss Counties:**

- Rural areas experiencing consistent population decline.
- Limited job opportunities, economic growth, and resources.
- Often characterized by higher poverty rates and reduced access to healthcare.

# How does the rate of obesity and diabetes compare in population loss counties versus metropolitan counties?



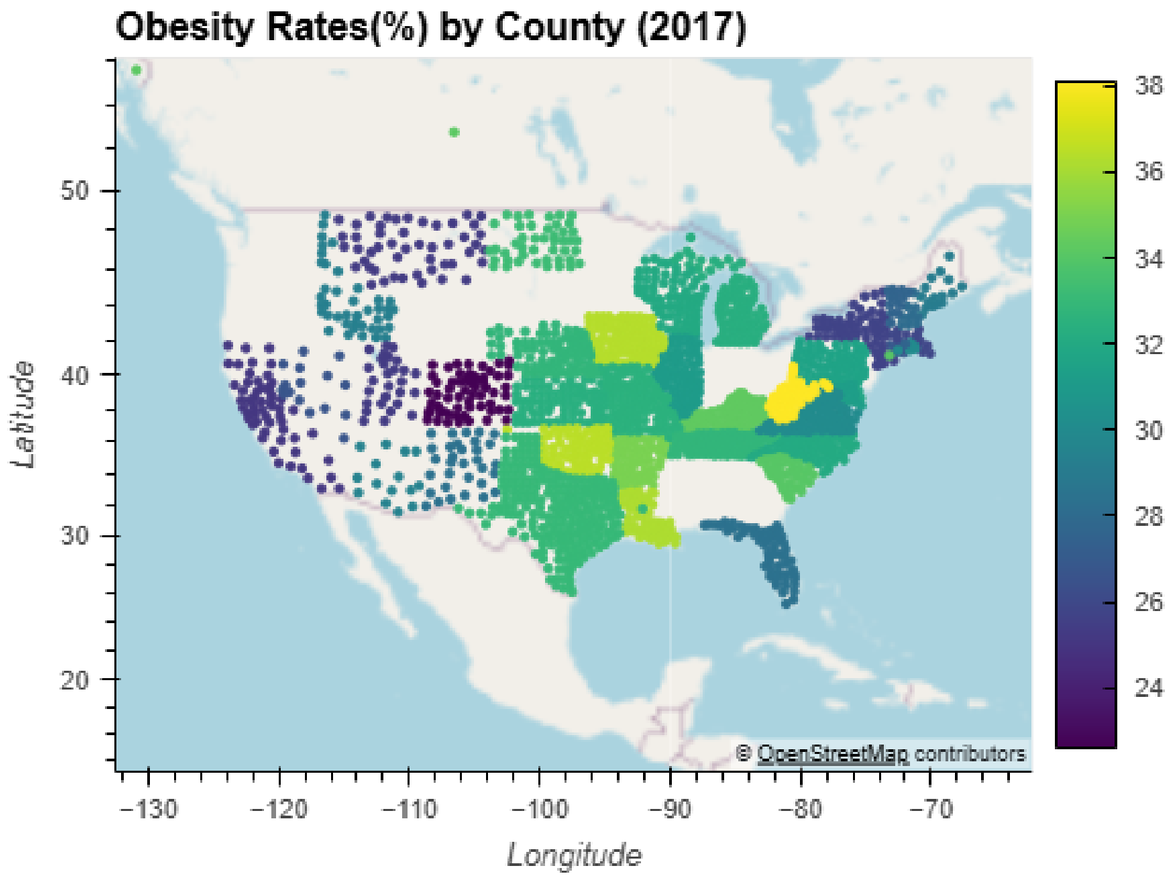

Diabetes Rates (2013):

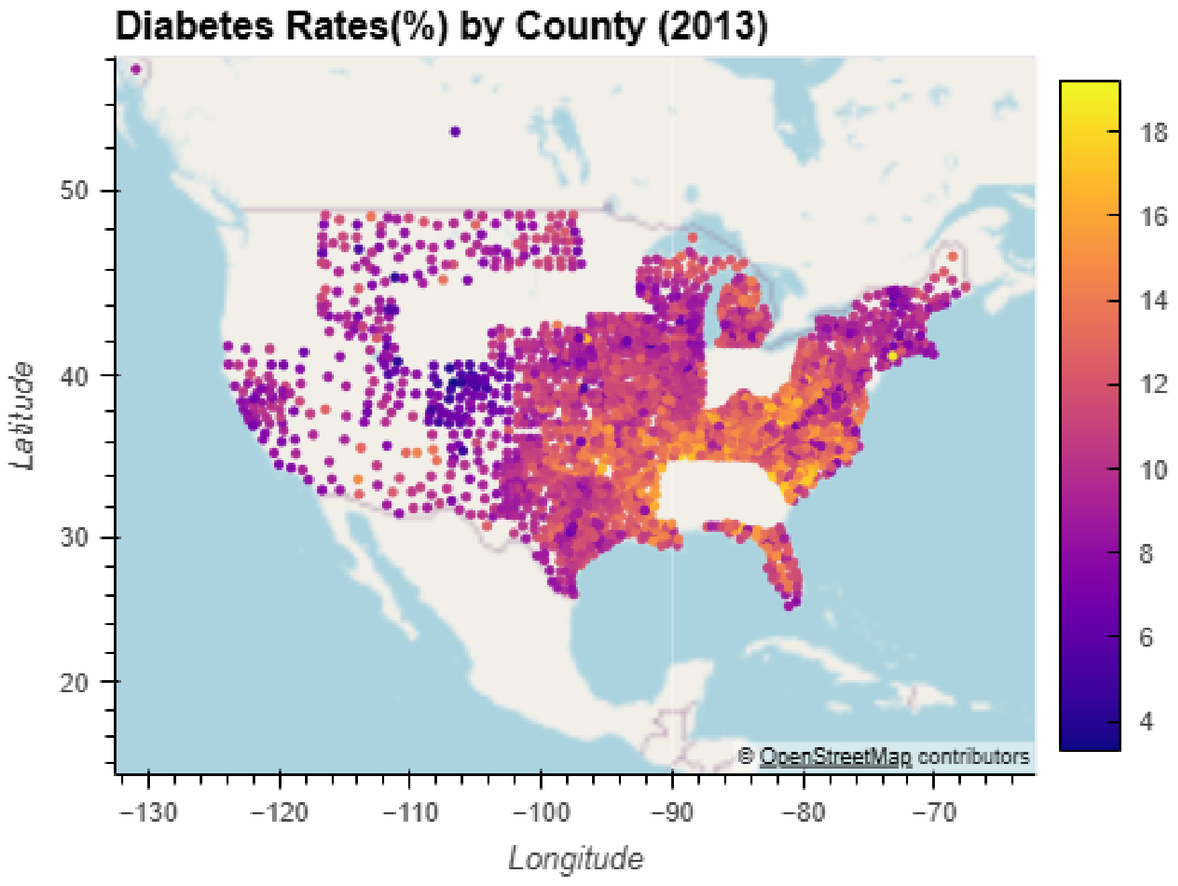
- Metropolitan Counties: **10.57%**
- Population Loss Counties: **11.38%**

Obesity Rates (2017):

- Metropolitan Counties: **31.28%**
- Population Loss Counties: **32.80%**

# Regional Patterns of Obesity and Diabetes Across the United States



## Is there a significant correlation between obesity and diabetes rates in population loss counties compared to metropolitan counties?

**Hypotheses for Metropolitan Counties:**

- Null Hypothesis: No significant relationship exists between obesity (2017) and diabetes (2013) rates.
- Alternative Hypothesis: A significant positive relationship exists between obesity (2017) and diabetes (2013) rates.

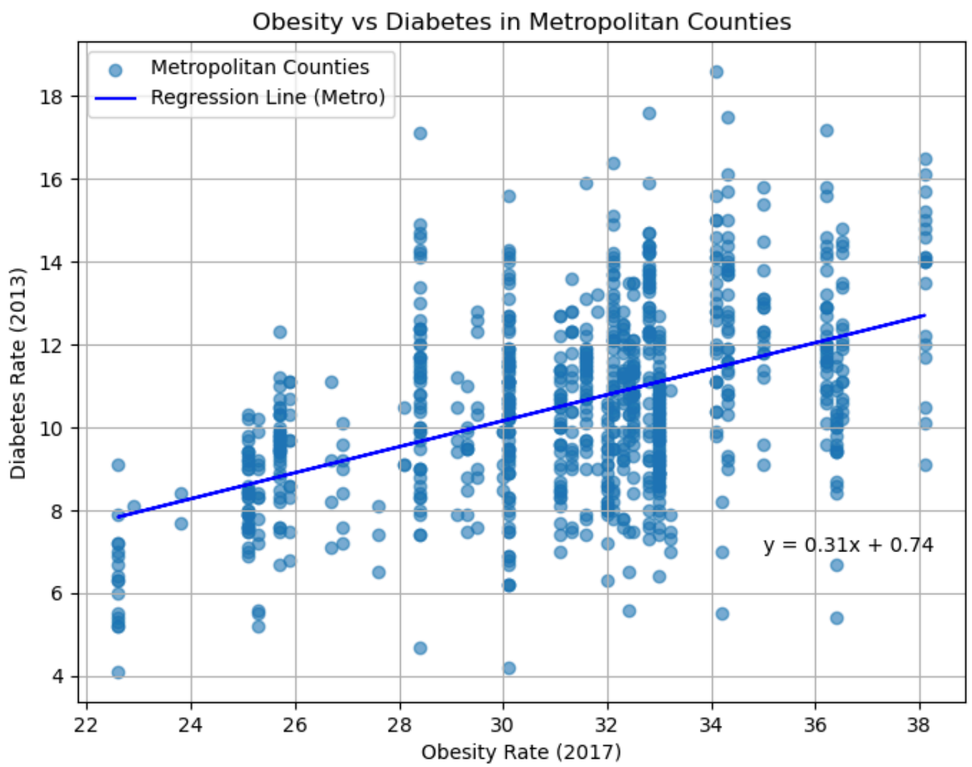
**Hypotheses for Population Loss Counties:**

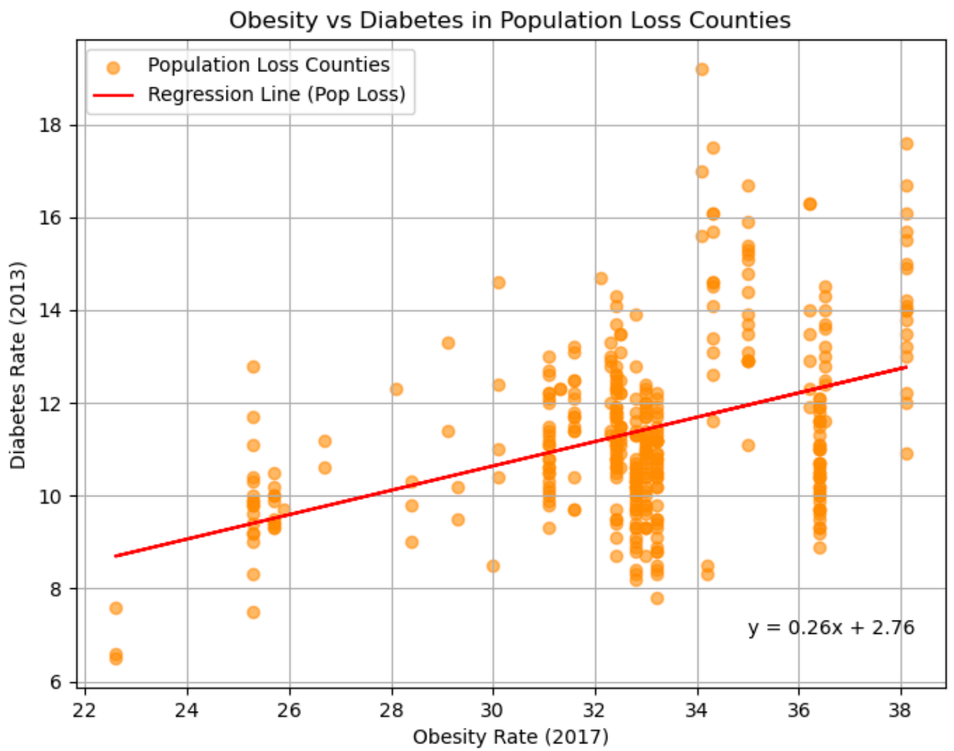
- Null Hypothesis: No significant relationship exists between obesity (2017) and diabetes (2013) rates.
- Alternative Hypothesis: A significant positive relationship exists between obesity (2017) and diabetes (2013) rates.

**Decision Rule:**

- Reject $H_0$ if p-value $< 0.05$.

# Linear Regression




**Metropolitan Counties:**

- Regression Equation: y = 0.31x + 0.74
- Slope: For every 1% increase in obesity rates, diabetes rates increase by 0.31 percentage points.
- Intercept: Baseline diabetes rate is 0.74% when obesity is 0%.

**Population Loss Counties:**

- Regression Equation: y = 0.26x + 2.76
- Slope: For every 1% increase in obesity rates, diabetes rates increase by 0.26 percentage points.
- Intercept: Baseline diabetes rate is 2.76% when obesity is 0%.

# Why the Null Hypothesis is Rejected

**Statistical Significance:**

- P-value: 0.0000 for both metropolitan and population loss counties (significant at $p < 0.05$).

**Relationship Strength:**

- $R^2$: 22.55% in metropolitan counties, 17.72% in population loss counties.

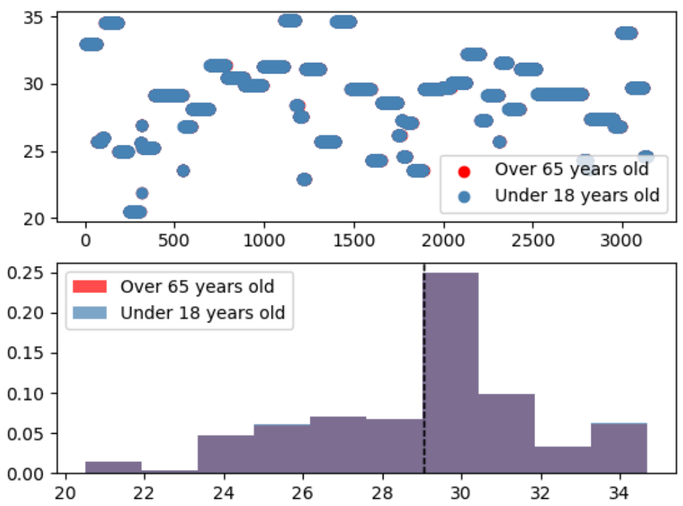
**Conclusion:**

- The null hypothesis is rejected because the relationship between obesity and diabetes is statistically significant.
- Reducing obesity could help lower diabetes rates.

# Comparison of two groups: age factor

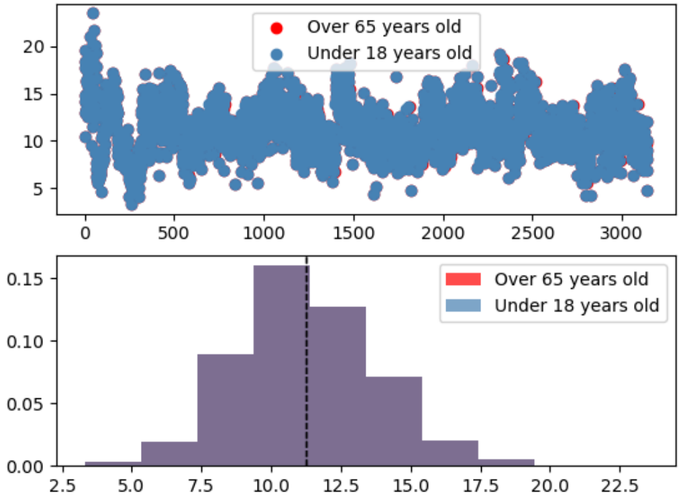
## Obesity Rates

Statistic: -0.02***



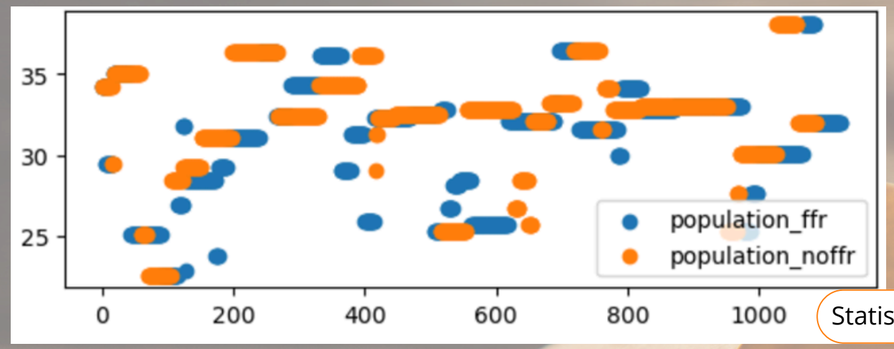

## Diabetes Rates

Statistic: 0.003***



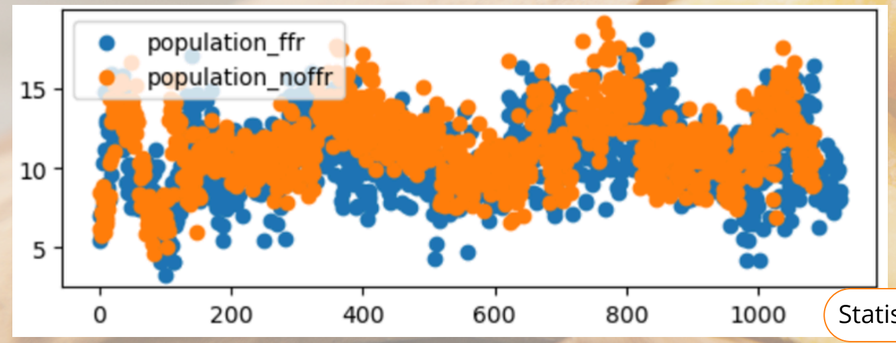
# Comparison of two groups: Fast-Food Restaurants

## Obesity Rates




Statistic: -7.24 ***

## Diabetes Rates



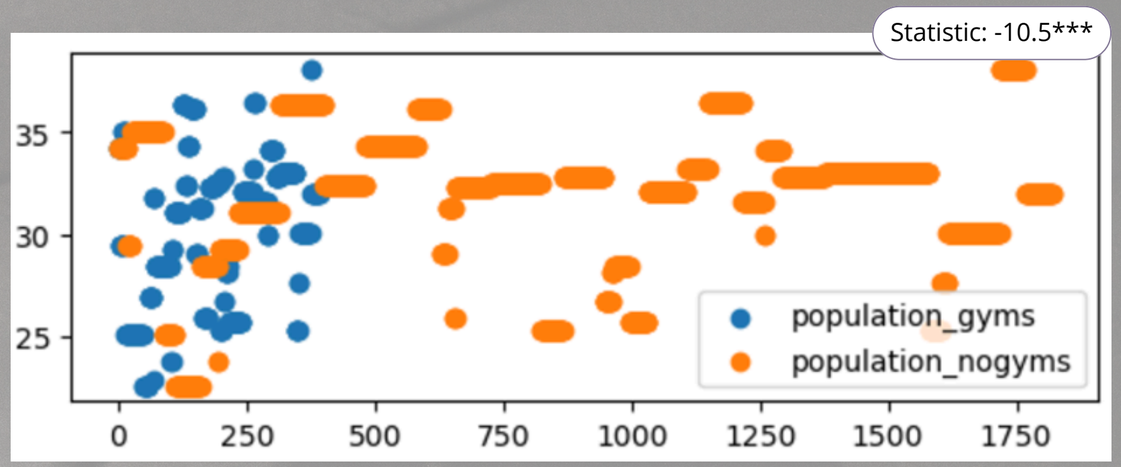

Statistic: -8.05 ***

G1: FFR < 16
G2: FFR >= 16

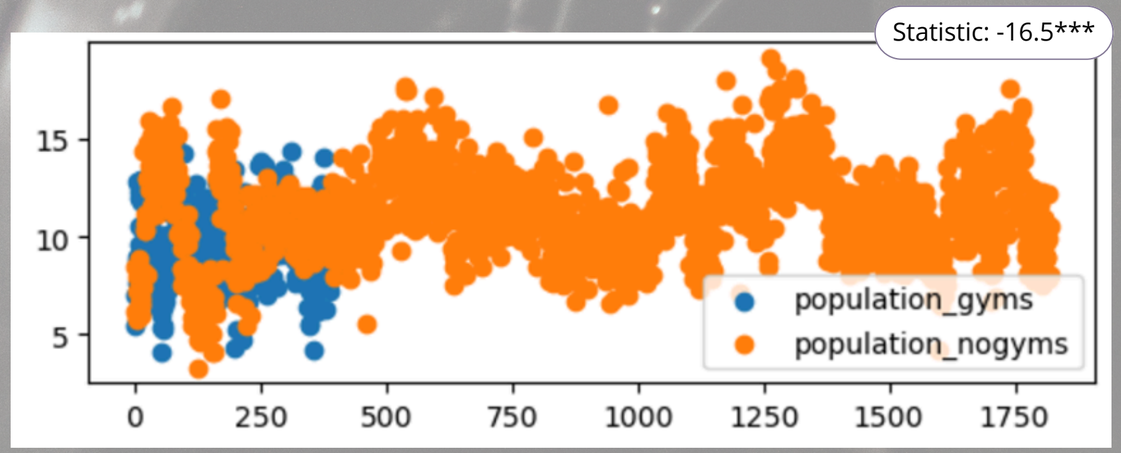
# Comparison of two groups: socioeconomic factor

## Physical Activity Facilities

### Obesity Rates




### Diabetes Rates




G1: Gym < 12
G2: Gym >= 12

THANK YOU FOR LISTENING!