**Abstract**

**Introduction**

Reproductive health services are vital in all communities, but does this mean people in every type of socioeconomic community have access to the reproductive healthcare they need? The “Title X Family Planning Program” is a federal grant that aims to provide low-income patients with family planning and reproductive health services. Recent amendments to the program have led to major organizations opting out of the “Title X” program, and therefor a decline in low-income patients’ access to family planning and reproductive health services.

The nature of the “Title X Family Planning Program” should place Title X facilities within lower-income communities. The goal of this research project is to determine whether or not Title X clinics are indeed accessible by low-income families.

**Methods**

**Data**

The data utilized was taken from the United States Census Bureau API as well as the Michigan Department of Health & Human Services. The data extracted from the United States Census Bureau was from the “Small Area Income and Poverty Estimates (SAIPE)” API, which provides the best single-year estimates of median household income. Locations of family planning facilities in Michigan were taken from the “MDHHS Title X Family Planning Clinic Directory”.

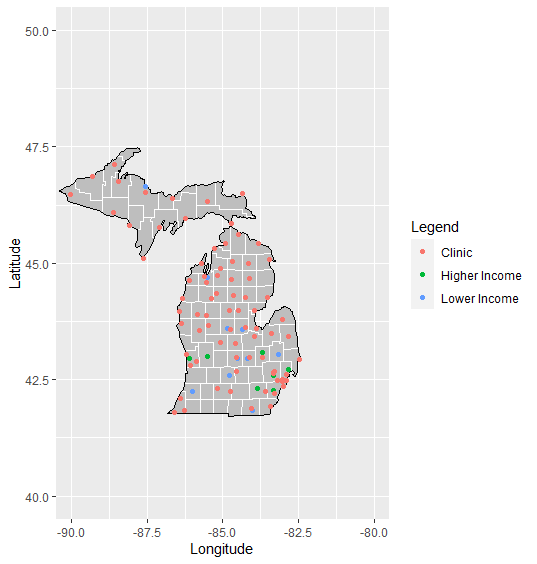
In addition to this data, the Google Maps API was utilized in order to geocode the locations of Title X facilities as well as counties in Michigan which fall in the first and third quartile of income, and compare their locations visually.

**Procedure**

In order to determine whether or not there is a correlation between income and locations of Title X Clinics within Michigan, the median income for each county in Michigan was gathered by use of the *getCensus()* function, provided by the United States Census Bureau. The variables obtained from this API were time (the year that the data was collected), state (the state the data was collected in), county (the county number which the data was collected in), NAME (the name of the county), median.income (estimated median household income) and people.count (the number of people in poverty within that county).

The *summary()* function was then used, to determine a threshold for which counties in Michigan should be considered “lower-income” (first-quartile) and which should be considered “higher-income” (third-quartile). The first-quartile was found to be <= $47,482 and the third-quartile was found to be >= $57,626. Using these bounds, the *mutate\_geocode()* function was used to convert counties which fell in these categories into latitude and longitude coordinates in order to visually compare them to locations of Title X Facilities.

Next, a map was plotted, utilizing data provided by the *maps*, *mapsdata* and *ggplot* packages:

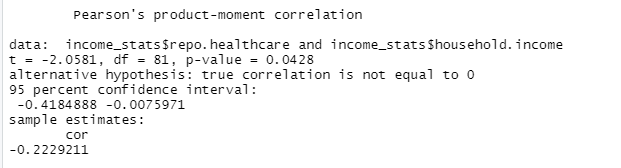


Figure

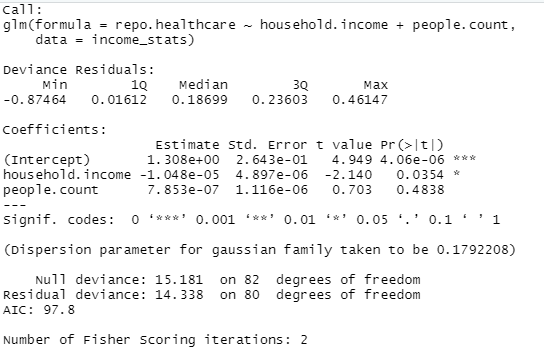
In addition to a geographic representation of the data, a point-biserial correlation test and a logistic regression test were run in order to determine whether or not there is a relationship between median household income and presence of a Title X facility.

**Results**

**Point-biserial Correlation:**



**Logistic Regression:**



Since the correlation coefficient of the point-biserialtest is negative (-0.2229211), this indicates that when a county has a Title X Clinic, the county’s income tends to be lower. Since the correlation coefficient is closer to 0 than 1, there is a weak negative linear relationship between median family income and the presence of a Title X facility. In addition to this, since the p-value is 0.0428 (<0.05), we can say that the relationship between median household income and the presence of a Title X facility in counties of Michigan is statistically significant.

The logistic regression test further solidifies the statistical significance of the relationship between median household income of counties in Michigan and the presence of a Title X facility, since the p-value is 0.0354 (<0.05) the median household income is significant in predicting whether or not there will be a Title X facility in that county.

**Conclusion**

**Appendix**