

Understanding Food Access and Food Insecurity in Michigan and the Greater Detroit Area

Paige Bunker, Tim Marvin, and Fuchun Yang

University of Michigan College of LSA

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Introduction

The analysis team took on the job of exploring food access and food insecurity rates across Michigan as a whole, as well as in Wayne County and Genesee County specifically. The purpose of doing so was to determine which demographic groups were most likely to experience problems with food access or insecurity and what cofactors may cause that experience. Doing so will enable us to give best practices advice to the Michigan Department of Health and Human Services on how to spend the \$500,000 grant from the Charles M. Bartholomew Foundation to address food access/insecurity in the state.

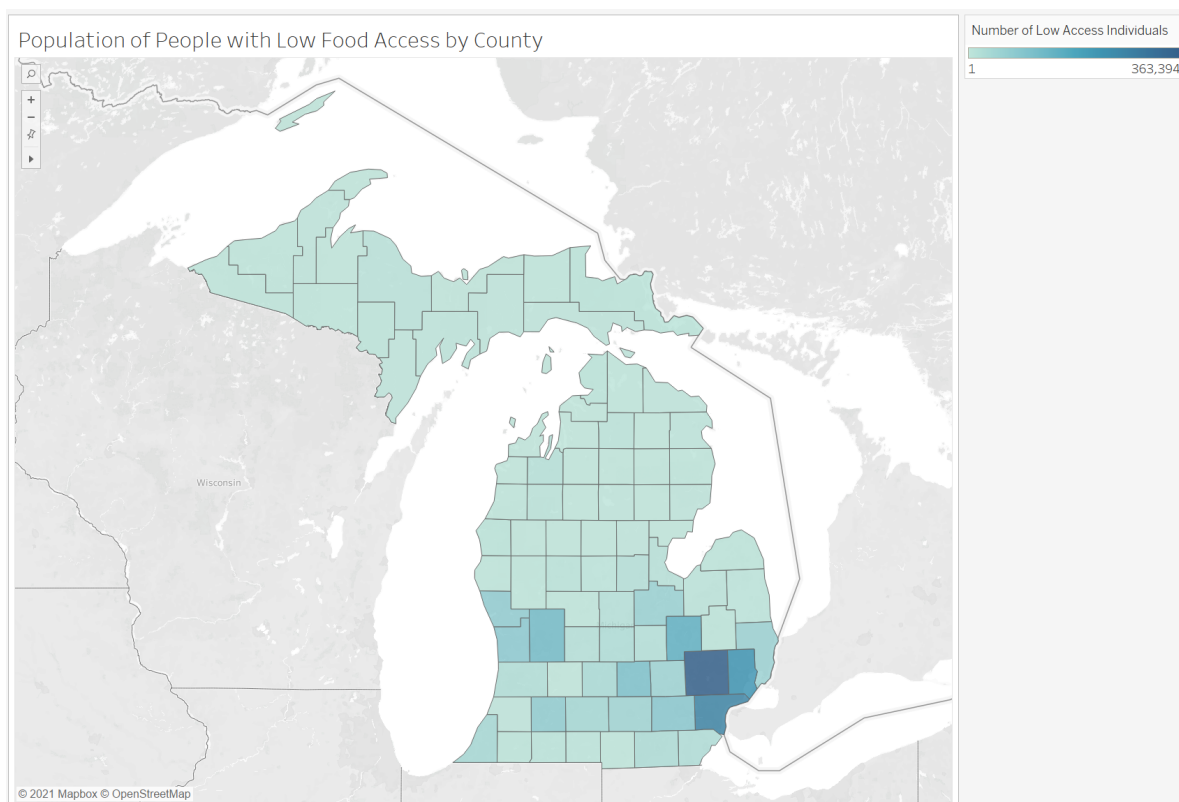
For the purposes of this report, a low access zone is defined as a low-income census tract where a significant number (at least 500 people) or share (at least 33 percent) of the population is greater than 1 mile from the nearest supermarket, supercenter, or large grocery store for an urban area or greater than 10 miles for a rural area. This measure shows that an estimated 18.8 million people, or 6.1 percent of the U.S. population, live in low-income and low access tracts and are more than 1 mile or 10 miles from a supermarket (given their urban or rural location). Food insecurity will be defined using the Census Bureau's Household Food Security Scale (as seen in the December 2020 Current Population Survey with Food Security Supplement) with a 12-month reference period. The scale ranges from 1 to 4. In this report, anyone that scores a 1 will be considered food secure, and anyone with a score of 2-4 will be considered food insecure.

For the purposes of this analysis, the team has only analyzed Michigan's data from the Food Access Research Atlas of 2019 and the Current Population Survey (CPS) Food Security Supplement of December 2020. The Food Access Research Atlas provides a summary of food access indicators for various census tracts and food access data for populations within census

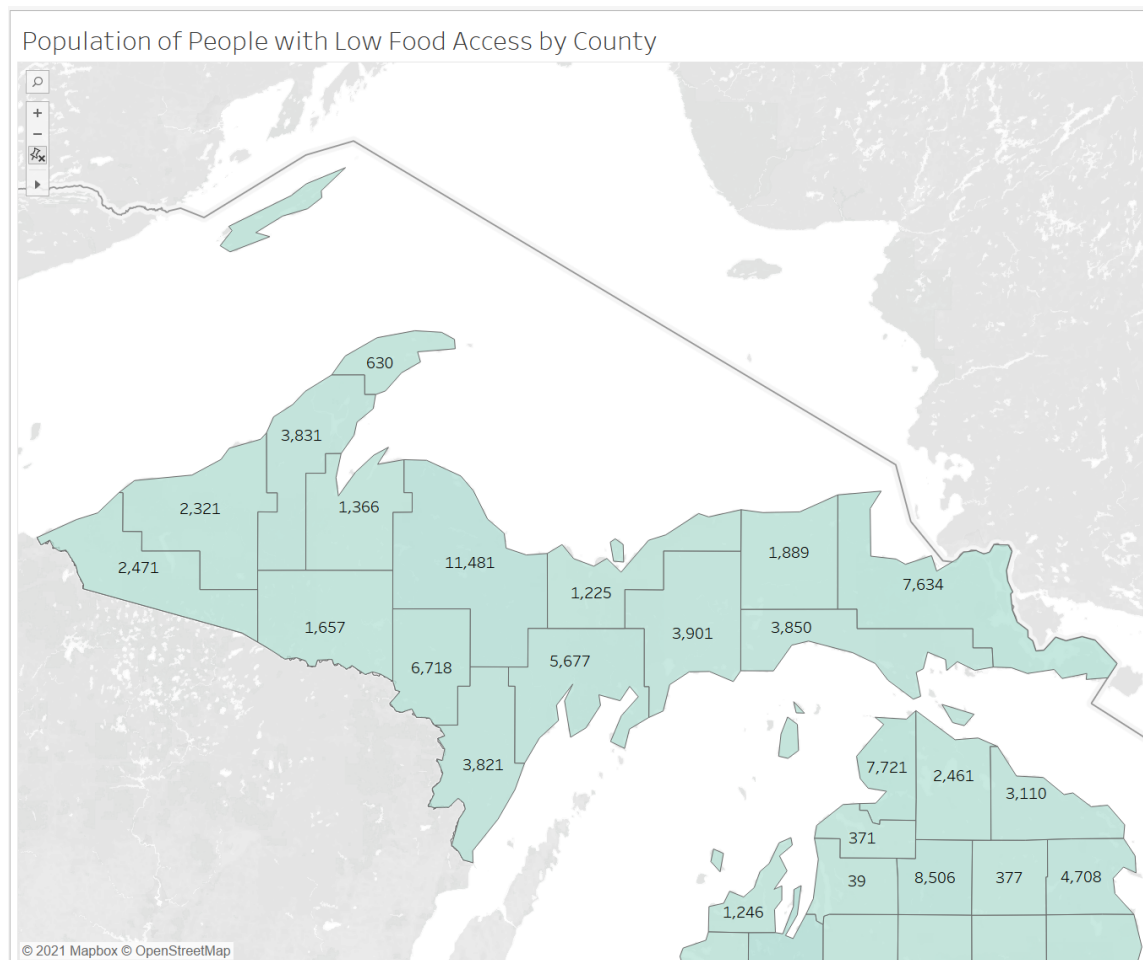
tracts, based on 2010 census tract polygons. The CPS Food Security Supplement provides data on the range of food insecurity that is experienced within households as well as personal characteristics of households such as race and parenthood status. The entire Current Population Survey is most commonly used for employment status data collection. However, for the purpose and focus of this research, the team has only analyzed data from its Food Security Supplement.

Analysis of Low Food Access Census Tracts in Michigan

Using the Food Atlas Data, we were able to evaluate some interesting background statistics regarding low food accessibility for individuals and census tracts in Michigan. We found that 40% of people in Michigan live in low access tracts, while 23.2% of the population was actually classified as low access themselves. We also found the number of low access individuals by county, and put that data into a heat map below:

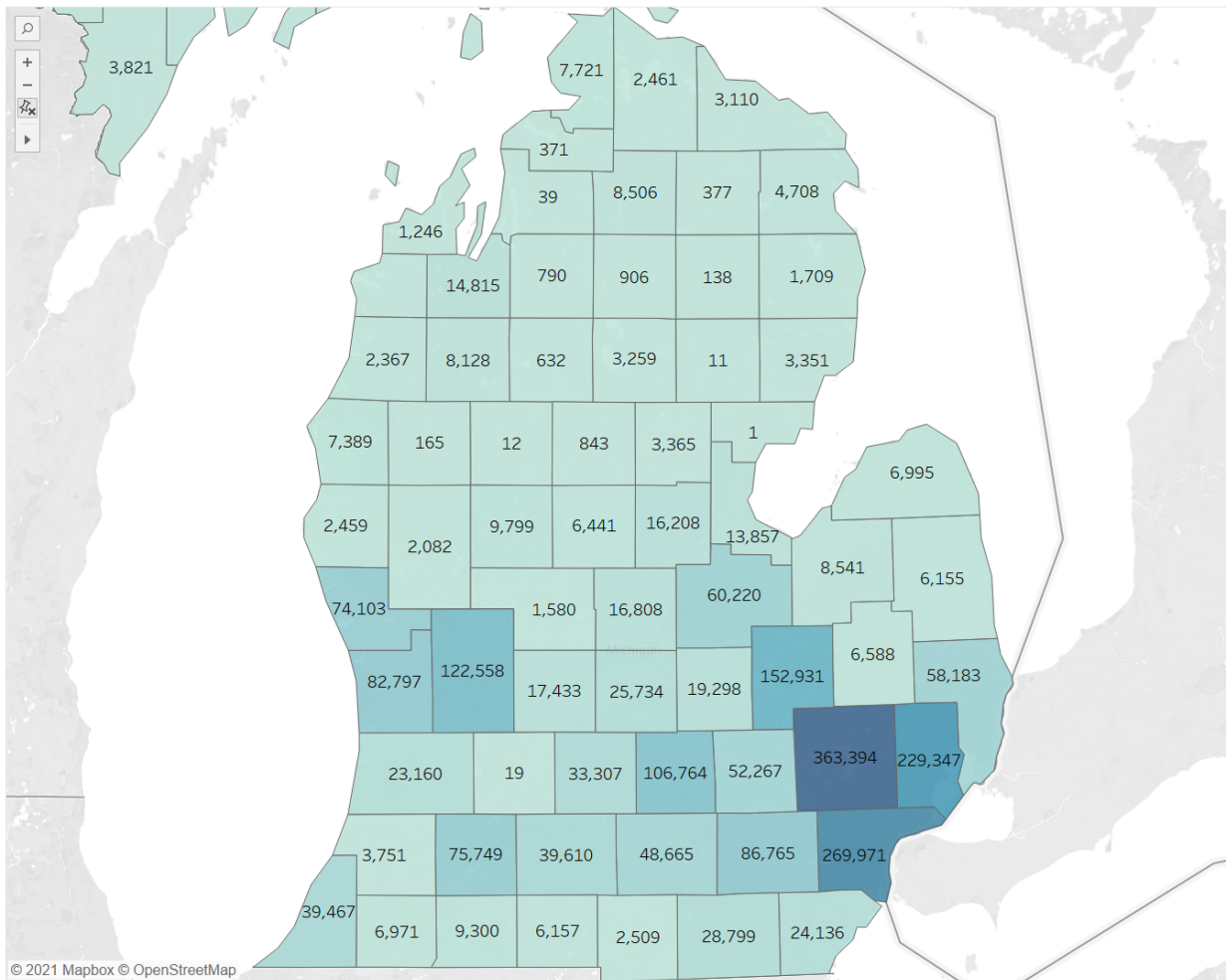


The map above shows that there is a high concentration of low food access in Southeast Michigan, but we can explore these differences in more detail by looking at the Upper and Lower Peninsulas separately.

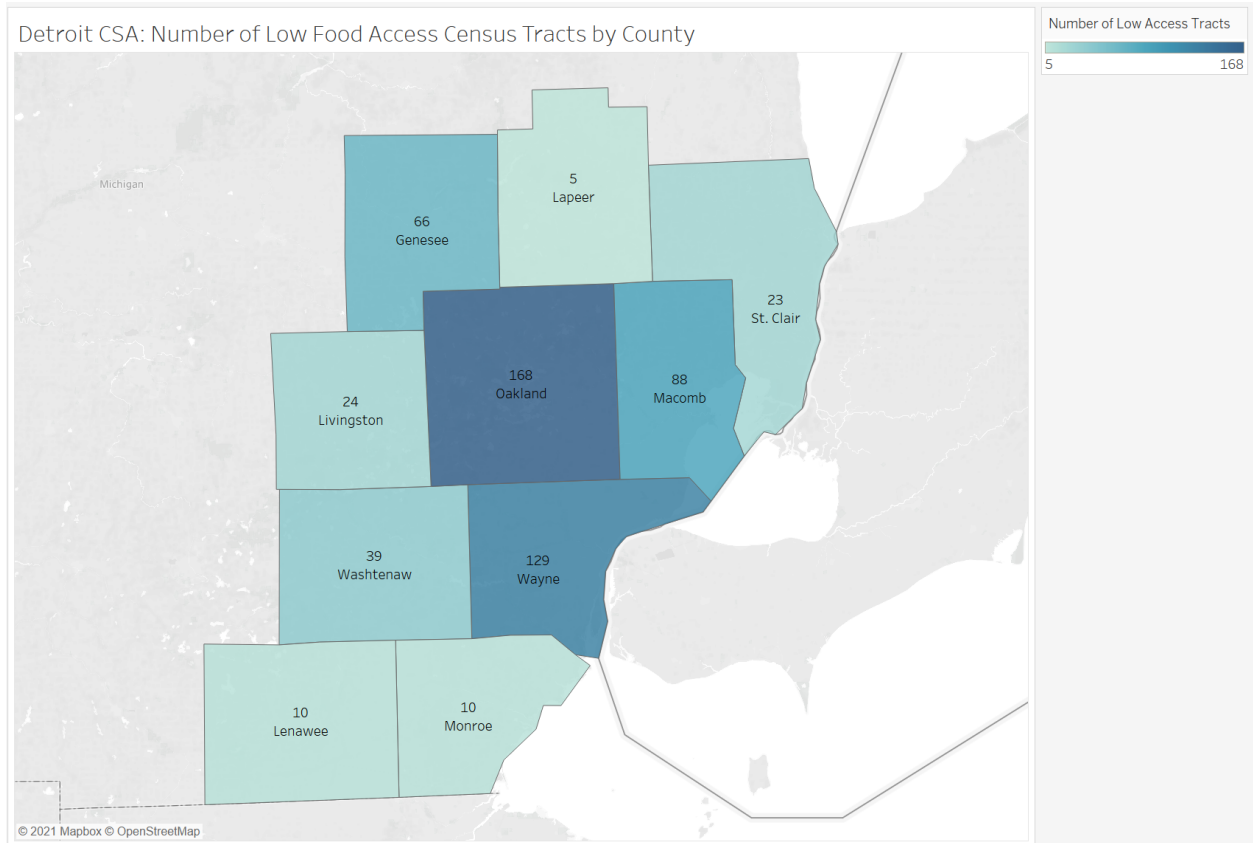


Looking at this we can see that UP has a lower amount of low access individuals, but still a fair amount of people who cannot easily access grocery stores and food suppliers. Looking at Michigan's Lower Peninsula, we can see that a majority of the low access individuals are clustered in the Southeast region, with another smaller cluster along the shores of Lake Michigan.

Population of People with Low Food Access by County



Given the density of low access individuals in Southeast Michigan, and the special interest in the Detroit area in general, we decided to more closely examine that region by looking at the number of low food access census tracts in the Detroit Combined Statistical Areas (CSA). The Detroit CSA contains the 10 following counties: Genesee, Lapeer, St. Clair, Livingston, Oakland, Macomb, Washtenaw, Wayne, Lenawee, and Monroe. The map with the number of low access tracts for this region is shown below:



Oakland county has the highest number of low access census tracts with 168, followed by Wayne with 129 and Macomb with 88. While the surrounding counties may have a lower number of low access tracts by comparison, it is important to note the high number of low access individuals as well, as pictured previously. Taking both of these measures into account, we can compare the density of low access individuals with the number of low access tracts for these counties.

Binomial Logistic Regression Analysis

<i>Variables</i>	<i>B</i>	<i>Odds ratio</i>	<i>p</i>
Population	0.00	1.00	0.00
Urban	2.85	17.33	0.00
Proportion of the tract population that is African American	-1.83	0.16	0.00
Proportion of the tract population that is seniors	1.42	4.12	0.08

This binomial logistic regression analysis aims to study whether census tracts will be more or less likely to be deemed low access based on population size, rurality level, the proportion of the tract population that is African American, and the proportion of the tract that is seniors. We ran odds ratios on the logistic regression analysis and found that the model overall was statistically significant ($p\text{-value}<0.001$), so the four variables are useful for explaining the odds of being more or less likely to be deemed as low access tract. For the logistic regression analysis, the variables of “population,” “urban,” and “proportion of African Americans in the tract” were all statistically significant ($p=0.00$) while the “proportion of senior citizens in the tract” was not ($p=0.08$).

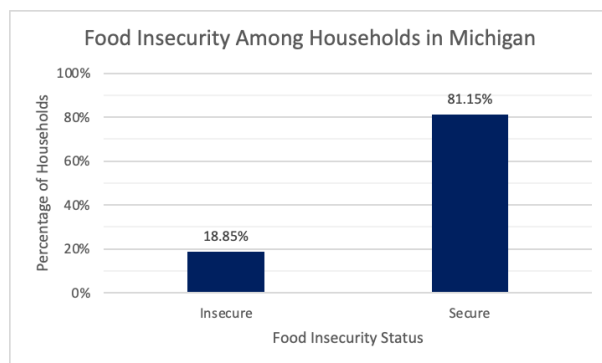
The population itself does not have an effect on whether the odds increase or decrease with regards to the census tract being deemed low access. Compared to rural census tracts, urban census tracts have higher odds of being deemed low access. Specifically, urban census tracts are associated with an increase of 17.33 odds of being deemed a low access tract when compared to rural census tracts. As the proportion of the tract population that is African American increases, the census tracks will have lower odds of being deemed low access. On the contrary, as the

proportion of the tract population that is seniors increases, there are higher odds that the census tracks will be deemed low access. The p-values of population, urban, and the proportion of the tract population that is African American are all 0.00. These three coefficients on whether the census track will be deemed low access or not are statistically significant.

Univariate Descriptives Analysis

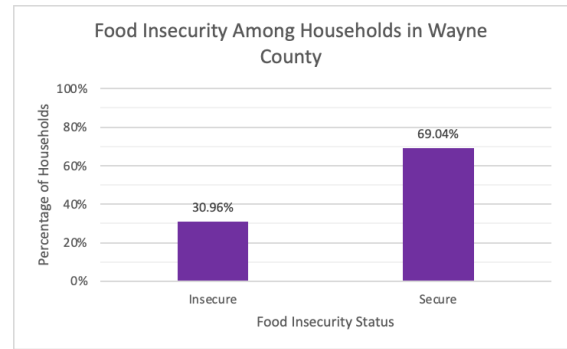
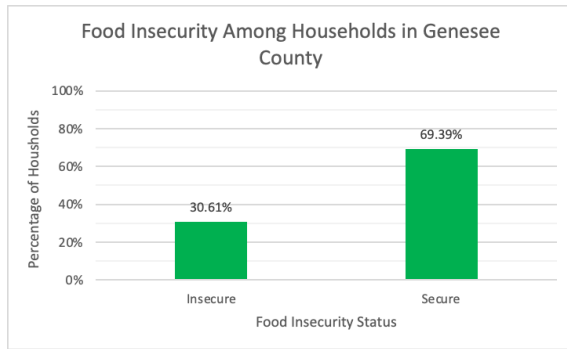
In order to get a better understanding of how food access and food insecurity rates connect to demographics of various areas throughout Michigan, the research team analyzed Michigan as a whole, Genesee County, and Wayne County on the variables listed below.

Food Insecurity Among Households:

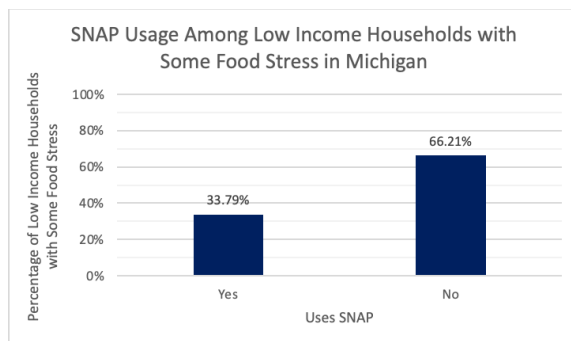


This first variable details levels of food insecurity among households over a 12-month reference period. For the purposes of this analysis, the research team created two groups among the various responses to this variable, labeling the response of “High Food Security” as

“Secure” and the remaining three responses of “Marginal Food Security,” “Low Food Security,” and “Very Low Food Security” as “Insecure.” The research team first analyzed food insecurity among households in Michigan as a whole, Genesee County, and Wayne County. The analyses demonstrated that in all three lenses, the percentage of households that faced food insecurity was in the minority in comparison to the percentage of households that were food secure. However, it is important to note that both counties had higher rates of food insecurity among households when compared to Michigan as a whole, with Wayne County having the highest percentage of 30.96%. Genesee County was slightly under this rate at about 30.61% while Michigan had the lowest relative rate of food insecure households of 18.85%.

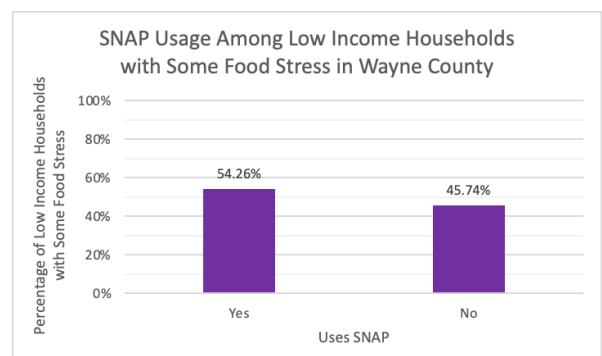
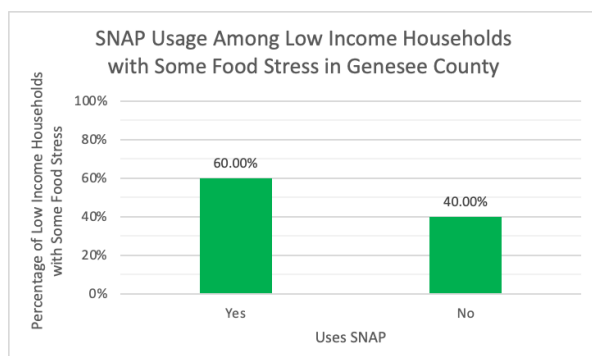


SNAP Usage Among Low Income Households with Some Food Stress:

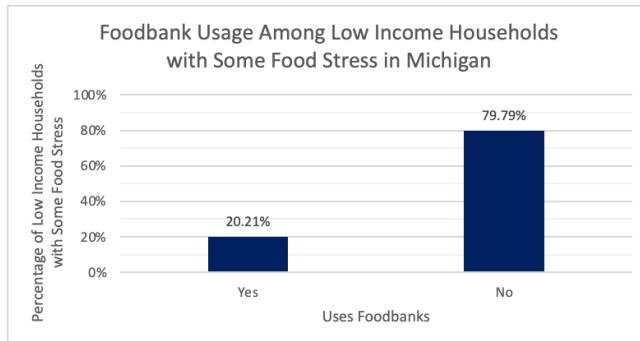


This variable measures whether or not anyone in a low income household with some food stress received SNAP (the Supplemental Nutrition Assistance Program) or food stamp benefits in the past 12 months. When comparing SNAP usage

among low income households with some food stress in Michigan as a whole, Genesee County, and Wayne County, the research team's analyses demonstrated that within both specific counties, the majority — 60% in Genesee and 54.26% in Wayne — of low income households with some food stress use SNAP. However, this does not apply to the state of Michigan as a whole where only about 34% of low income households with some food stress use SNAP.

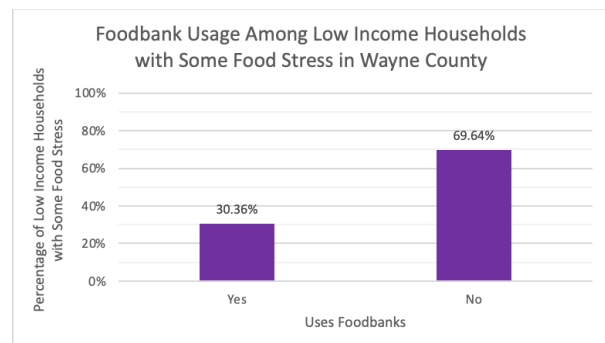
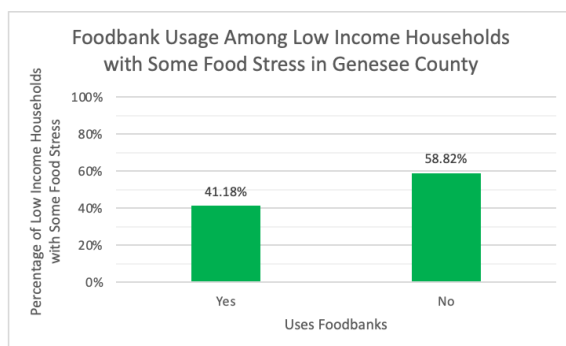


Foodbank Usage Among Low Income Households with Some Food Stress in Michigan:

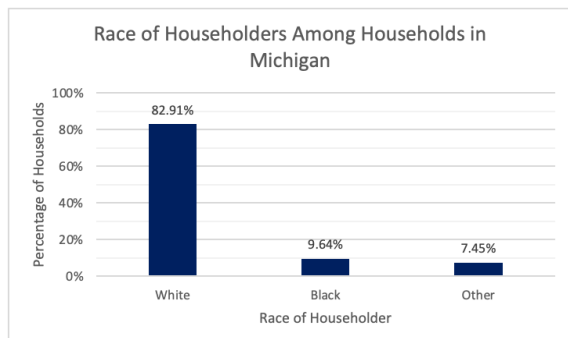


This variable measures whether or not anyone in a low income household with some food stress received emergency food from a church, a food pantry, or a foodbank in the last 12 months. The research team

compared foodbank usage among low income households with some food stress in Michigan as a whole, Genesee County, and Wayne County. Though all three analyses concluded that the majority of low income households with some food stress do not use food banks, it is important to note that both counties of focus have higher rates of foodbank usage among low income households with some food stress in comparison to Michigan as a whole. Specifically, Genesee County has the highest percentage of 41.18% while Wayne county is below this at 30.36%. In comparison, Michigan as a whole has the lowest percent of low income households with some food stress that use foodbanks at a rate of about 20.21%.

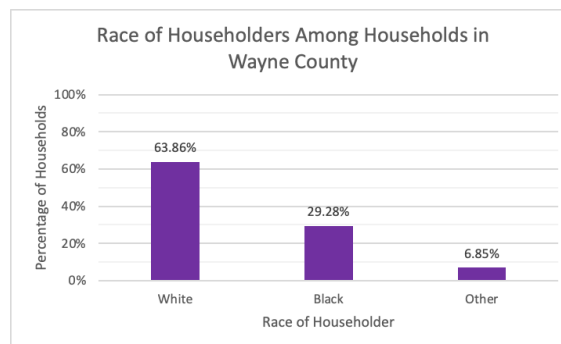
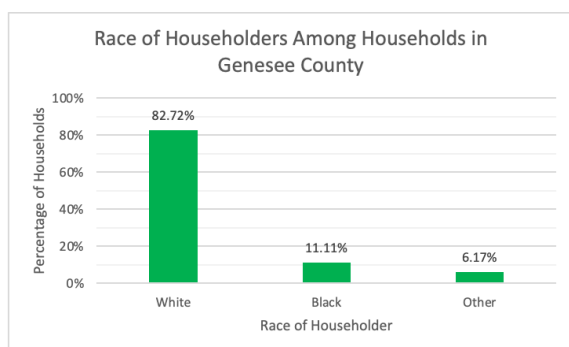


Race of Householders Among Households:

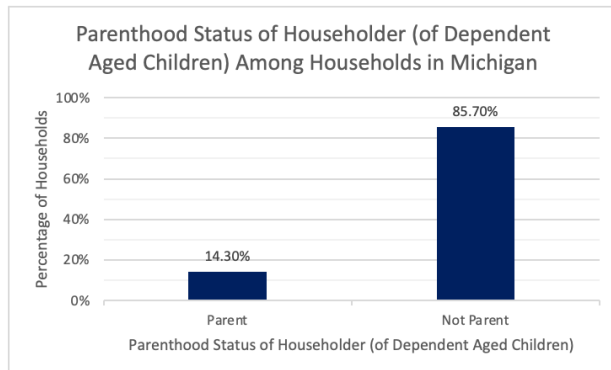


When comparing the race of householders among households in Michigan, Genesee County, and Wayne County, the research team calculated the percentage of households with householders who were “white,” “black,” or “other” (with “other” accounting for any race besides white or black). In

all three analyses, white made up the majority race of householders, with Michigan as a whole having just barely the highest percent of households with white householders in comparison to Genesee County which was a close second (both were at about 82%). The percentage of white householders among households in Wayne County was 63.86%, which is a fair amount less than the similar values in Michigan and Genesee County. For all three geographical lenses, the next largest category of householder race was black, though Wayne County now had the highest percentage of householders with this race of about 30%. Comparatively, Genesee County and Michigan only had about 10% black householders among households. All three geographical analyses had very similar percentages for householders with races in the “other” category, all ranging between 6%-8% (Michigan had the largest percentage of 7.45%, Wayne County had 6.85%, and Genesee County had the smallest percentage of 6.17%).



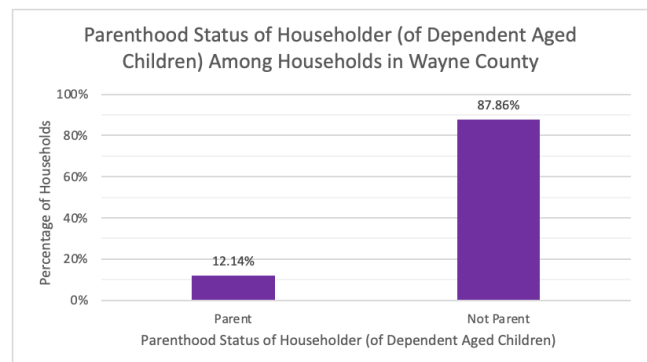
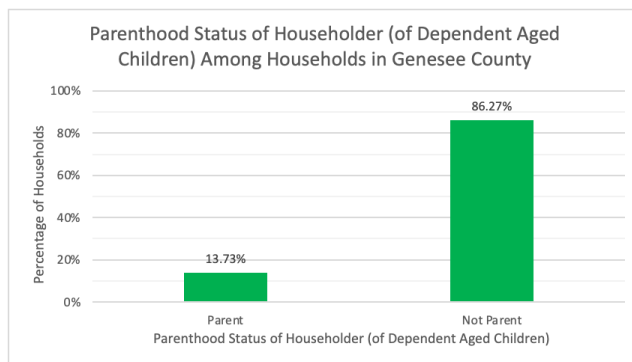
Parenthood Status of Householder (of Dependent Aged Children) Among Households:



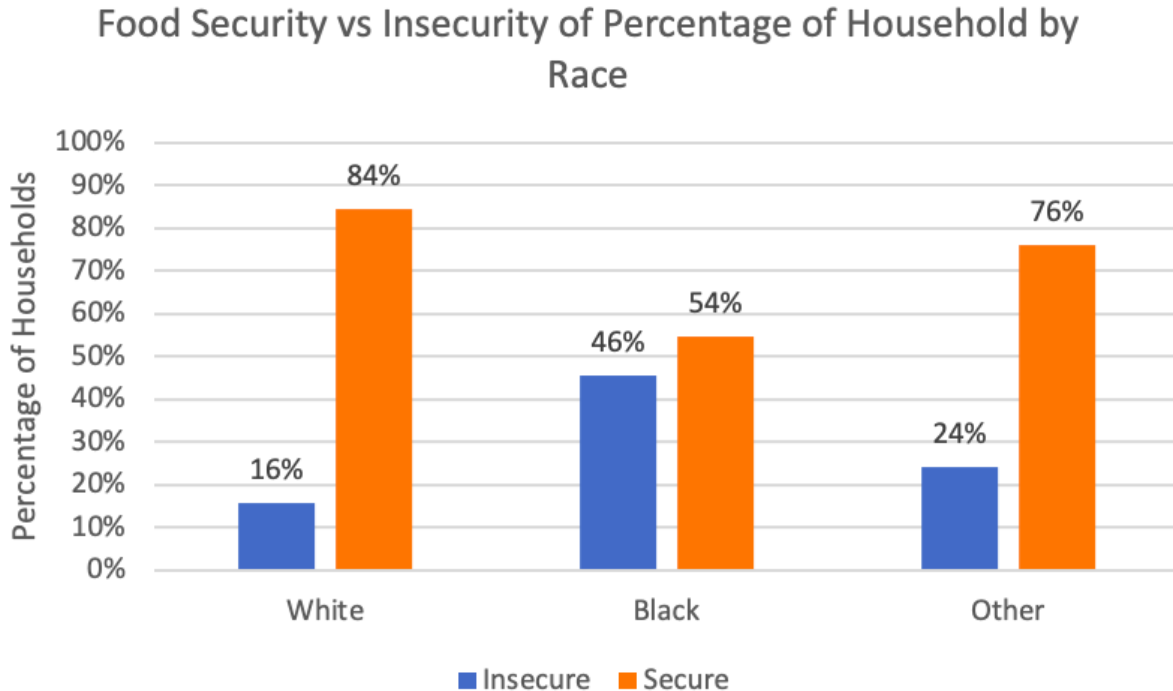
The parenthood status of householders of dependent aged children remained fairly consistent between households in Michigan as a whole, Genesee County, and Wayne County.

When the research team analyzed this variable, the team grouped together those who didn't have

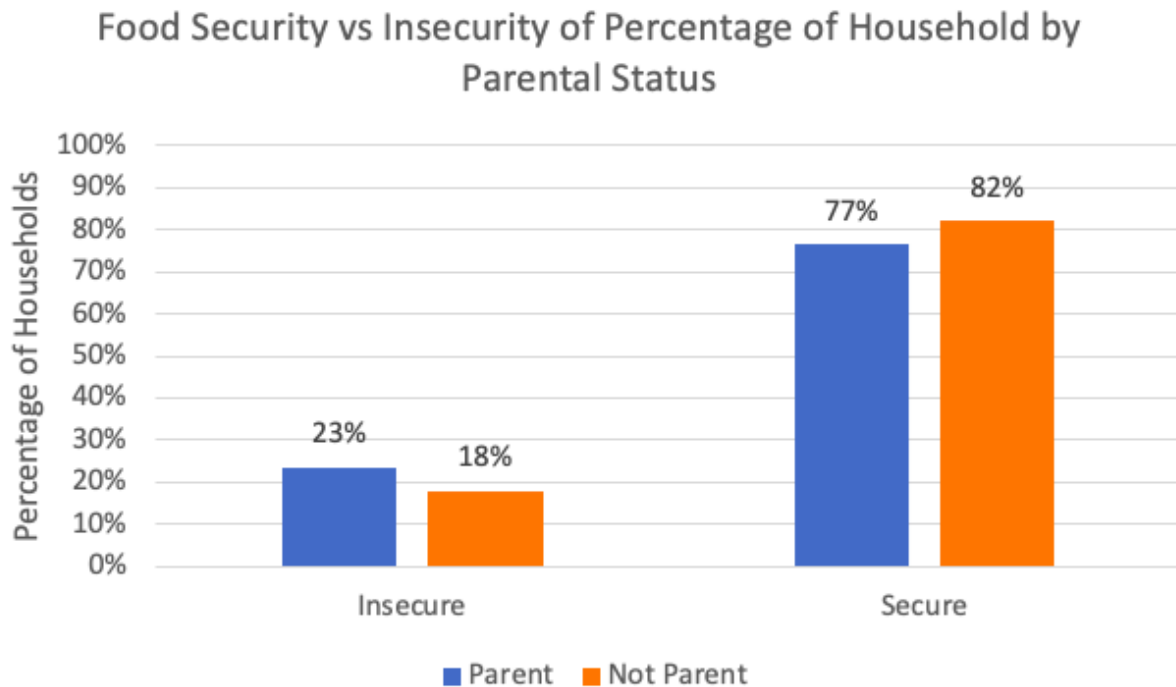
any children at all and those who didn't have any children under the age of 18 into the same category of "Not Parent" for the purposes of the analysis. In contrast, anyone with children under the age of 18, no matter how many, were grouped into the category of "Parent." In all three analyses, the vast majority of householders were in the category of "Not Parent" because they either had no children or they had children who were no longer of dependent age, with percentages ranging between 85% to 88%. Though these percentages were all quite similar, Wayne County still had the highest percentage of householders in the "Not Parent" category of 87.86% while Michigan had the lowest respective percentage of 85.70% (with Genesee County being in the middle at 86.27%).



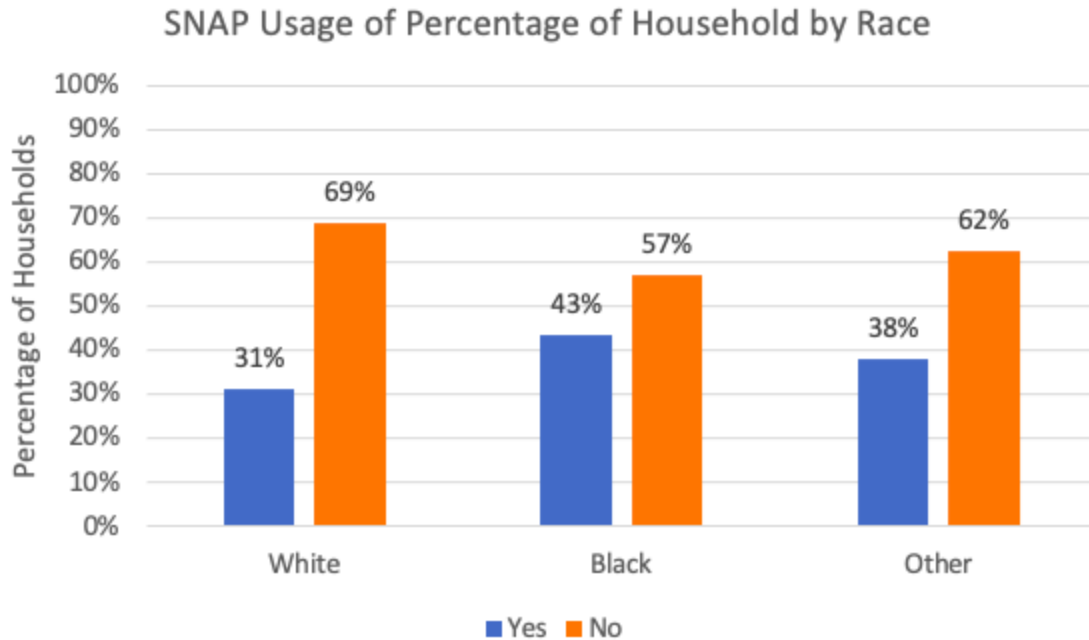
Bivariate Descriptives and Chi-squared tests



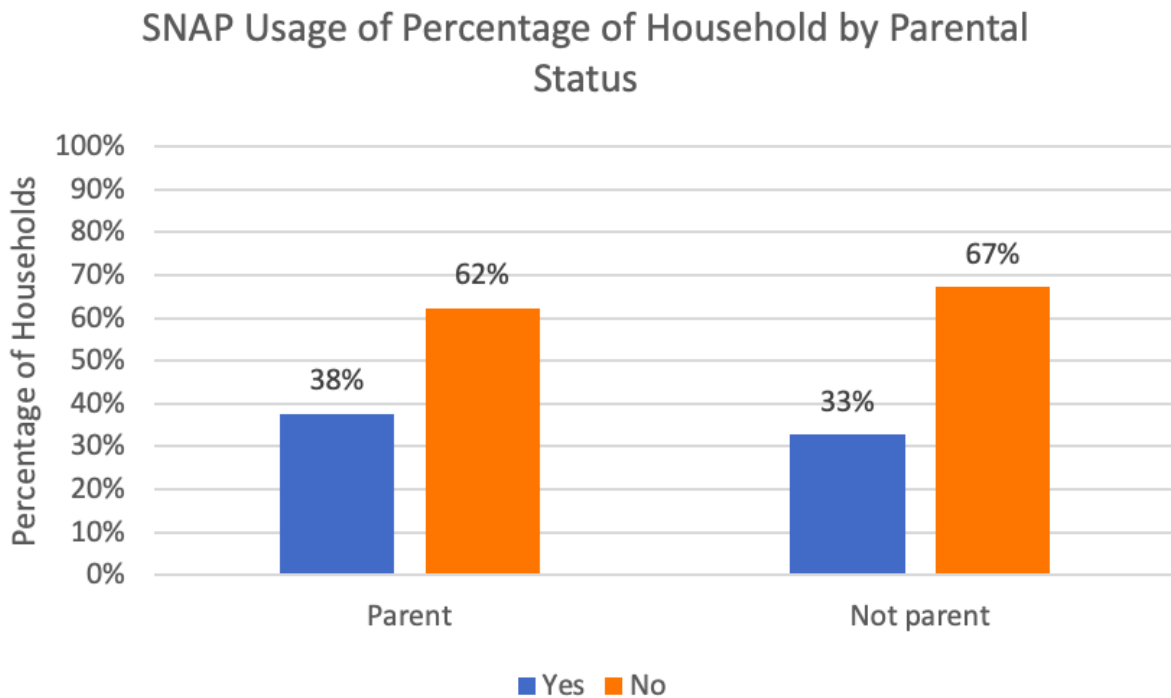
The graph above analyzes how people of different races relate to being either food insecure or food secure. Based on the results, being white, being black, or being in the “other” category for race all have statistically significant differences on whether food insecurity is present or not ($\chi^2 = 79.0$, $df = 2$, $p = 0.00$) at the 95% confidence level. It is important to note that only 16% of white people have food insecurity, while 46% of black people have food insecurity. The null hypothesis has been rejected, and the conclusion is that race and food insecurity have a dependent relationship.



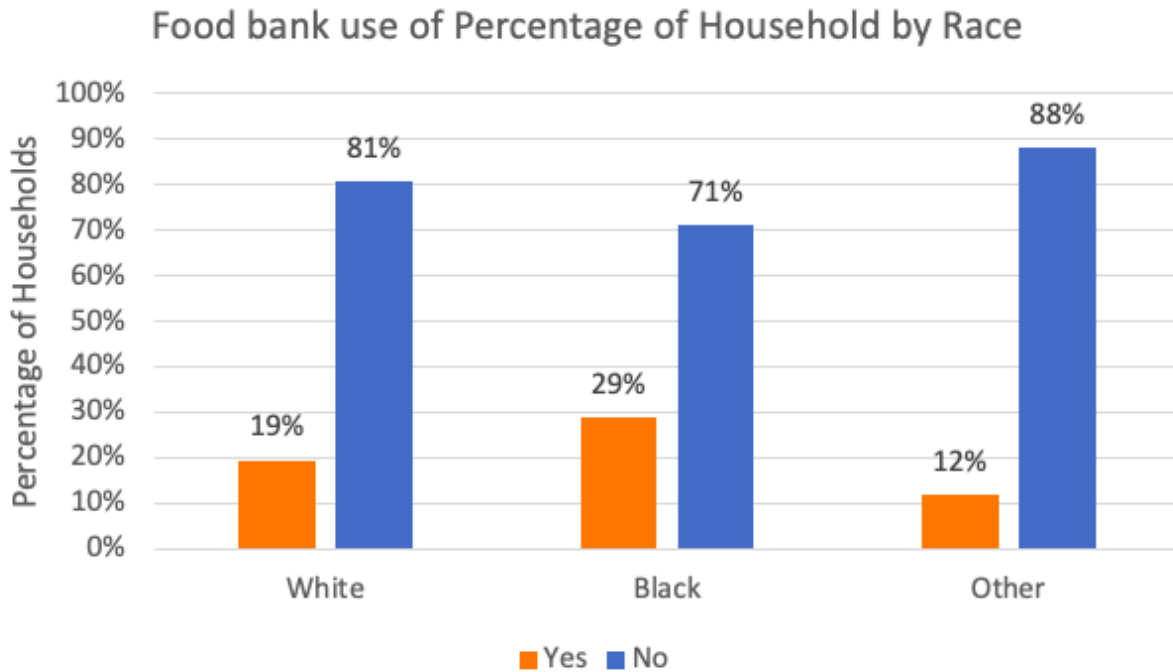
This graph demonstrates if parental status affects experiences of being either food insecure or food secure. The answers include food insecurity present and food insecurity not present. There are statistically significant differences between one's parental status and whether or not they experience food insecurity ($\chi^2 = 5.12$, $df = 1$, $p = 0.02$) at the 95% confidence level. 23% of parents and 18% of non-parents experience food insecurity, so parents have a slightly higher percentage of being food insecure. The null hypothesis has been rejected, and the conclusion is that parental status and the presence of food insecurity has a statistically dependent relationship, meaning that parents are more likely to be food insecure than those who aren't parents.



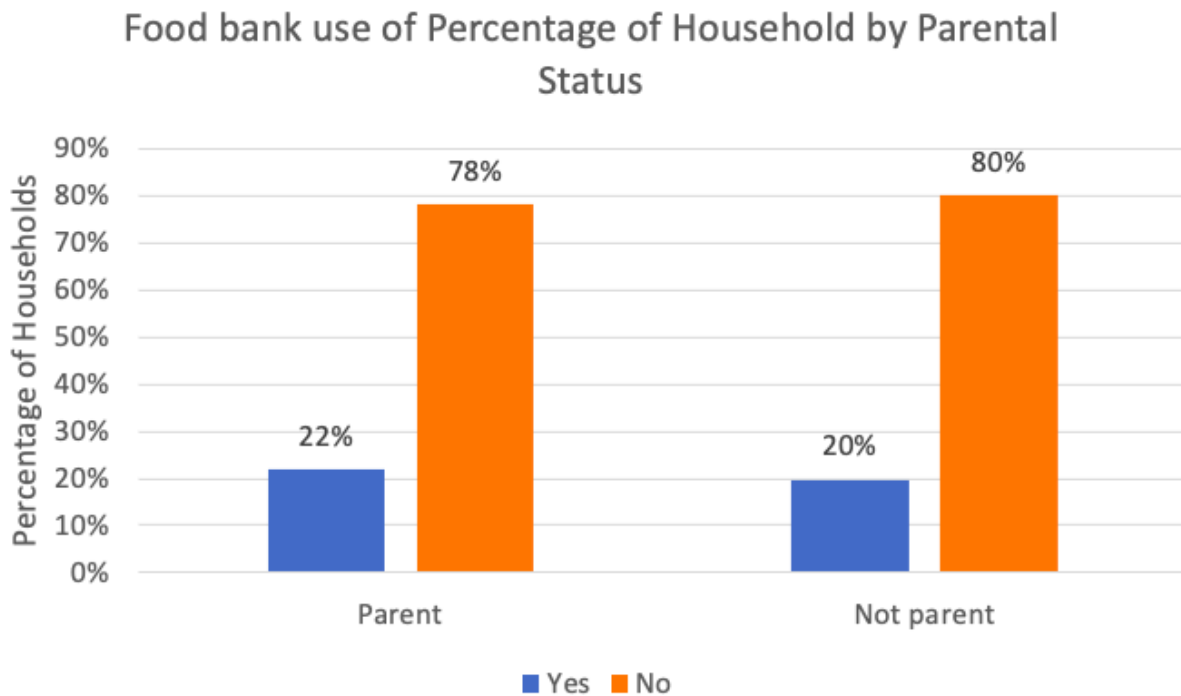
This graph talks about whether anyone in low income households with some food stress has ever received SNAP/Supplemental Nutrition Assistance Program or food stamp benefits in the past 12 months by different races. The answers include yes and no. There are no statistically significant differences between white, black, and other races ($\chi^2 = 5.00$, $df = 2$, $p = 0.08$) at the 95% confidence level. 43% black people used SNAP in the past 12 months, which is the highest percentage when compared to other races. We failed to reject the null hypothesis, and the conclusion is that SNAP usage among low income households with some food stress and race have a statistically independent relationship, meaning that a person's race does not make them any more or less likely to use SNAP.



This graph shows if parental status affects one's use of SNAP/Supplemental Nutrition Assistance Program or food stamp benefits in the past 12 months of low income households with some food stress. The answers include yes and no. There are no statistically significant differences between whether parents or non-parents have or have not used SNAP or food stamp benefits ($\chi^2 = 0.91$, $df = 1$, $p = 0.34$) at the 95% confidence level. Parents have a slightly higher percentage of 38% for usage of SNAP or food stamp benefits in the past 12 months when compared to non-parents at 33%. We failed to reject the null hypothesis, and the conclusion is that SNAP usage among low income households with some food stress and parental status have an independent relationship, meaning that a person's parental status does not influence their likelihood of using SNAP.



This graph shows whether anyone in a low income household with some food stress received emergency food from a church, food pantry, or foodbank in the past 12 months by different races. The answers include yes and no. There are statistically significant differences between the races of “white,” “black,” and “other” (chi-sq = 6.64, df = 2, p=0.04) at the 95% confidence level. Black people make up the highest percentage of those who use foodbanks (at 29%) while people of other races have lower percentages in comparison (19% for white people and 12% for those in the “other” category) The null hypothesis has been rejected, and the conclusion is that foodbank usage among low income households with some food stress and race have a dependent relationship.



This graph demonstrates if parental status affects whether any adult in low-income households with some food stress received emergency food from a church, a food pantry, or foodbank in the past 12 months. The answers include yes and no. There are no statistically significant differences between whether parents or non-parents have used a food bank or not in the past 12 months ($\chi^2 = 0.25$, $df = 1$, $p=0.62$) at the 95% confidence level. Parents have a slightly higher percentage (22%) of using foodbanks in the past 12 months than non-parents (20%). We failed to reject the null hypothesis, and the conclusion is that foodbank usage among low income households with some food stress and parental status have an independent relationship.

Executive Summary

The main points of our analysis are summarized below:

1. The majority of low access individuals are concentrated in Southeast Michigan, specifically in the Detroit CSA. It may be pertinent to focus efforts regarding food accessibility in this region and steps should be taken to increase the number of grocery stores, farmers markets, etc. in particularly low access tracts.
2. Compared to Michigan as a whole, Genesee and Wayne counties have higher rates of food insecurity among households. They also have higher rates of SNAP usage and foodbank usage among low income households with some food stress. Comparing Wayne and Genesee County, we found that Wayne County had slightly more food insecurity for households overall, while Genesee County had higher rates of SNAP and Food Usage among low income households with some food stress. Both of the counties have a higher percentage of households that experience food insecurity than the baseline levels in the state, suggesting that further research should be conducted on these counties specifically to assess why and develop potential solutions.
3. There is a significant proportion of people in Michigan who live in low food access census tracts who are not themselves low access. 40% of Michigan's population live in low access tracts while only 23% of individuals are actually considered low access. Figuring out how to bridge the divide and target individuals who are actually in low access tracts between these groups could be a key part of finding a solution.
4. Based on our bivariate analysis, both food insecurity among households and foodbank usage among low income households with some food stress have a dependent

relationship with race, and African Americans have the highest rates of food insecurity and foodbank usage among all races. These findings are consistent with broader societal trends regarding socioeconomic markers such as the racial wealth gap and income inequality. Preliminary analysis on the race of householders statewide compared to Genesee and Wayne County shows that about 30% of Wayne county is made up of African Americans, which is a far higher proportion than Genesee County and Michigan, where African Americans make up about 10% of the population. The data suggests that Wayne county may need more help to address food insecurity problems and make foodbanks more accessible to the African American community. Our analysis team recommends that the MDHHS incorporates a racial equity lense to any policies aimed at addressing food accessibility and security.

5. There is also a dependent relationship between food insecurity and parental status. There is a higher percentage of parents experiencing food insecurity. Based on the analysis of parental status of MI, Genesee, and Wayne, the amount of parents and non-parents are all almost equivalent (with the percentage of non-parents being at around 86%). The research team believes further analysis is necessary to show the percentage of parents and non-parents in each county so that this would also inform policy-makers to formulate policies to target parents who really need help due to food insecurity.

Conclusion

Our team's analysis showed that there are many different demographic factors which correlate with different types of food security and access issues. The greater Detroit area generally has both a higher percentage of food insecurity among households, and a higher

percentage of SNAP and foodbank usage among low income households with some food stress. Race has a dependent relationship with food security and foodbank usage. Among all races, African Americans need the most help in terms of food access and food security. Parents also experience more food insecurity than non-parents. Given that this is a preliminary report, we recommend that more research is done to determine the possible causal factors in these relationships to help policy-makers on formulating plans. Discovering the sources of causality, along with more supplemental background research targeting the communities of interest identified in this report, is the best course of action to address the issue of food insecurity and accessibility in Michigan.

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