

**Food Desert Mapping and Analysis in the City of
Youngstown, Ohio**

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ABSTRACT

With the growth of urbanization, the access to fresh, unprocessed foods is decreasing leading to regions of food deserts. Most city planning has not been designed to include access to fresh food supply for the residents. There are many different factors contributing to the phenomenon such as low-income, lack of access to proper and feasible public transport, lack of vehicle ownership, and absence of food retailers in specific urban regions. Utilizing Geographical Information Systems (GIS), stores and public transportation were mapped, and the availability of healthy food was evaluated. Food deserts in the city of Youngstown were identified by placing a buffer zone around each store. Economic background, race/ethnicity, transportation access, and health conditions of people living in the City of Youngstown were investigated. The large stores that provide a variety of fresh foods were located on the boundary of the city making them less accessible to residents near the city center. Public transportation did not greatly improve access because of its limited schedule. Most of the stores easily accessible to residents did not carry fresh fruits and vegetables although they did carry a limited amount of milk, eggs, and bread. Adverse health conditions such as diabetes, high blood pressure, cholesterol, and obesity did not vary much between food desert regions and non-desert regions of Youngstown. All the adverse health conditions were higher in the city as compared to Mahoning County rates. There is a need to improve the availability and access to healthy and fresh food to address the well-being of the community.

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Chapter 1 Introduction

Background

The term food desert was first used in the 1990's by a resident of Scotland to describe living in a region that was deprived of easy access to food, in addition, the available food was expensive (Cummins & Macintyre, 2002). The definition of the term has varied overtime depending on the researcher (Walker, Keane, & Burke, 2010). The United States Department of Agriculture (USDA) defines a food desert as areas where people have limited access to affordable and healthy food, primarily fresh fruits, and vegetables (Dutko, Ploeg, & Farrigan, 2012). The 2008 Farm Bill defined it as as the regions in the United States where there is limited access to nutritious and affordable food specifically where a majority of the community belongs to lower income population. The emphasis on the matter have accelerated since the concept was introduced over two decades ago, although a standard to define a food desert in terms of the proximity of accessibility to a store for fresh groceries has not been established (De Master & Daniels, 2019).. Generally, a place that is outside of the walkable distance (0.5 or 1 mile) away to a grocery store that sells fresh fruit and vegetable is considered as food desert (Correll, 2019). If asked people from such regions might express that they have access to food. But it is not about having any food; the concept is about having access to nutritious, healthy, fresh food instead of having highly processed unhealthy food that could deteriorate their health and has limited nutritional value. There is a nutritional difference between eating healthy fresh nutritious food and unhealthy highly processed food. Much of the driving factor that has attracted the attention of researchers and health experts is the effect that it has on

dietary intake and body size (Bader, Purciel, Yousefzadeh, & Neckerman, 2010). Many studies have found that lack of access to healthy food causes poor dietary habits leading to obesity and other health problems. Proper diet is an effective strategy to promote good health which seems to be surprisingly unattainable in urban areas (Eisenhauer, 2001).

Food deserts have been growing in urban areas due to various reasons such as an increase in new housing further from agricultural areas, lack of reliable transportation, and lower income regions unable to support a large grocery with fresh foods. The growth of such areas has raised issues of potential health effects and well-being of residents (LeClair & Aksan, 2014). The issue of poor access to affordable and healthy food garnered attention and gained importance after the USDA was directed to conduct studies on food desert areas by the Food, Conservation and Energy Act of 2008 also known as 2008 Farm Bill (Liese, Hibbert, Ma, Bell, & Battersby, 2014). Generally, they are located in low-income areas therefore making income status another factor that contributes to food deserts. Full size grocery stores do not generally exist in low-income neighborhood for profit reason. And if there are any stores that provide fresh foods, they are overpriced which defeats the purpose of easy availability. For these reasons people rely on canned and processed food some of which can contain high levels of sodium, fat, sugar, and high fructose corn syrup. This can play a role in the health of the people from food deserts and resulting in health problems since such as obesity, high blood pressure and heart disease.

Transportation also plays a major role in urban areas. Some urban areas have good public transportation service which can help to overcome the problem of accessing a grocery store, even if an individual does not own a car. That might not be the case in rural

or suburban areas where public transportation is not reliable or feasible. Regardless, some public transportation services don't have direct routes to large grocery stores. It might take several buses and trains just to get access to fresh fruits and vegetables in which case people might choose to rely on canned and processed food instead of the hassle of getting fresh food. Having a vehicle of your own helps with easier access.

Chapter 2 Literature Review

Recognizing food desert is more a factor of population density and location of fresh food groceries than distance from city centers. Although it would seem that rural areas would have less access to large well-stocked grocery stores, urban areas with higher population densities and closer to city centers are the focus of most studies on food deserts (Bader, Purciel, Yousefzadeh, & Neckerman, 2010). It is contributed by the fact that larger supermarkets that generally offer better options are located outside of the city; predominantly in suburban areas (Eisenhauer, 2001).

The USDA defines food insecurity as “access by all people at all times to enough food for and active and healthy life” (Coleman-Jensen, Rabbitt, & Gregory, 2021). One in nine Americans are food insecure which means 37 million people in United States with an estimation of more than 11 million children are being affected (Feeding America, 2019). Various research has concluded that food insecurity can lead to psychological and behavioral changes such as stress, depression, and lack of mobility leading to an increased risk for obesity (Dinour, Bergen, & Yeh, 2007). In a study about food insecurity in The Dan River Region, Virginia, the results concluded that food deserts can be directly linked to various health conditions like diabetes, hypertension and overweight (Helmick, Smith, Parks, & Hill, 2020). In general, it is perceived that people experiencing food insecurity such as those in food deserts would not have enough food and would be expected to experience malnutrition, however as paradoxical as it might sound, those people are most likely to have adverse health conditions such as being overweight or obese (Dinour, Bergen, & Yeh, 2007).

The concern about rising health issues and obesity derives studies in socioeconomic patterns and healthy food outlets and access (Van Hoesen, Bunkley, & Currier, 2012). Disparity in access to healthy food can have an effect on dietary intake leading to various health problems such as body size, obesity, diabetes, and hypertension (Bader, Purciel, Yousefzadeh, & Neckerman, 2010). Not only accessibility to food stores but also availability of healthy options contributes to eating habits and patterns (Glanz, Sallis, Saelens, & Frank, 2007). Low quality energy-dense food, generally low cost, leads to weight gain and obesity. In the United States this is a prevalent problem, obesity rates have increased from 15.0% to 32.2% during the past 30 years (Dinour, Bergen, & Yeh, 2007).

Based on a national health survey from 2016, overall national crude prevalence of diagnosed diabetes in the United States is 9.44% with 95% Confidence Interval (CI) is 9.01-9.88% (Bullard, et al., 2018). Similarly, crude prevalence of obesity in adults was 39.8% with adults aged 40-59 at the higher end of the spectrum (42.8%) than adults aged 20-39 (35.7%) (Hales, Carroll, Fryar, & Ogden, 2017). Likewise, crude prevalence for coronary heart disease for adults 18 and over was 4.6% with 95% CI 4.3-4.9% (National Center for Health Statistics, 2018).

Disadvantaged consumers in terms of socioeconomic status are more prone to living in food desert areas driven by the factors of low income, restricted mobility, and poor public transport (Whelan, Wrigley, Warm, & Cannings, 2002; Joassart-Marcelli, Rossiter, & Bosco, 2017). Cummins and Macintyre (2002) in their research in Glasgow area in Scotland have found the location of large stores could be fairly characterized by

socioeconomic deprivation. According to the CDC, African American, Hispanic, and other minorities are more prone to increased risk of exposure to health problems as well as access to health care. Obesity, heart disease and diabetes are some of the major health problems highly present among residents of poor urban areas which is also termed as 'diseases of lifestyle' and can be avoided or prevented by making better lifestyle choices (Eisenhauer, 2001). Economic status is important to consider since it can be directly proportional to the kind of food people purchase and consume. Studies have shown that diets can vary highly depending on socioeconomic level rather by race only (Sucher & Kittler, 1991).

Unaffordability of food might be expected in poor households, nonetheless studies have shown that not all the people below the poverty line would experience food insecurity whereas people above poverty line could experience it too (Feeding America, 2019). Despite everything low-income residents are presumably living a food insecure life in terms of both quality and quantity of calories consumed (Chapman & Perkins, 2020) (Bhattacharya, Currie, & Haider, 2004). It is found that on average food deserts tend to be in lower income neighborhoods with a predominate minority residents (Dutko, Ploeg, & Farrigan, 2012). The segregation of residence by income and race could contribute to food environment differences in the neighborhoods. Large supermarkets tend to be located in wealthier, white neighborhoods while limited grocery stores are found in lower income, minority neighborhoods (Franco, Diez Roux, Glass, Caballero, & Brancati, 2008). The Cuyahoga County Board of Health and County Planning took an initiative in 2016 and 2017 to increase accessibility to healthy food focusing on increasing full-service grocery

store especially in low-income areas (Cuyahoga County Planning Commission, 2019). In 2013 the USDA Economic Research Service (ERS) identified 8894 food desert census tracts out of 72,365, accounting for 12% of the total census tracts where lower income population being majority who had less access to retailers and healthy options (Liese, Hibbert, Ma, Bell, & Battersby, 2014). Similarly, in a food survey of Atlanta, Georgia, more options for healthy food were available in higher income neighborhoods than lower income (Glanz, Sallis, Saelens, & Frank, 2007).

Living in a neighborhood with an absence of large supermarkets deprives the residents in the neighborhood the privilege of buying affordable, healthy, and fresh foods (Walker, Keane, & Burke, 2010). For residents, severely senior citizens, people with disabilities and residents without personal vehicles, distance can be a weighty barrier to access any grocery store (Cuyahoga County Planning Commission, 2019). LeClair and Aksan (2014) in their redefining the food desert discuss that large outlets could be accessible by long distance commuting, but residents rather make the choice of saving scarce time and securing food readily available in proximity which creates health and financial concerns. Another factor may be that if people were more educated about better food, they would be able to make wiser choices on their food purchases (Guthman, Morris, & Allen, 2009).

The decline in ability to afford food in poor urban areas contributes to declining number of full-service markets, food outlets and convenience stores (LeClair & Aksan, 2014). Convenience stores carry more importance in minority and low-income areas due to the absence of big supermarkets that tend to offer a wider spectrum of fresh food

(Walker, Keane, & Burke, 2010). Neighborhoods with immigrant communities and refugee population could benefit from smaller ethnic markets that sell more familiar foods (Ploeg, Mancino, Todd, Clay, & Scharadin, 2015). Farmer's market and flea market operation are perceived to be as good source of fresh produce. Initially farmer's markets started as a support system focused on providing a platform for small-scale family farmers. These have developed into market-based alternatives to target regional goals in minimizing food desert crisis making it a "win-win" situation both in economics and addressing food insecurity (Guthman, Morris, & Allen, 2009).

Supplemental Nutrition Assistance Program (SNAP), commonly known as food stamp is an antihunger initiative in the United States, also the largest initiative to reduce food insecurity in low-income families (Nestle, 2019; Guthman, Morris, & Allen, 2009). Analysis of use have shown that families use up their food stamp allowance before the end of the month. They are heavily used by the first three weeks largely on snacks and fast food, negatively associating it to low quality energy consumption and making it difficult to attain food at the end of the month (Dinour, Bergen, & Yeh, 2007; Hamrick & Andrews, 2016). Only trivial percentage of SNAP benefits have been reported to be redeemed at farmer's market. The change from paper food stamps to electronic cards is one factor that has made it more difficult for the farmer's market to accept SNAP payments (Guthman, Morris, & Allen, 2009).

In the past few years, public and private sectors both have come together to address food deserts and the people living in them by initiatives like mobile markets, food banks, and food pantry donations (Walker, Keane, & Burke, 2010; Weissman, Robinson, & Cecio,

2020). Mobile market as the name suggests are food retailers on wheels bringing food to neighborhoods experiencing disparities. Originating in 2002 this emergent intervention has gradually expanded through United States and Canada and are considered more affordable than any other retailer because of their inexpensive operation costs (Weissman, Robinson, & Cecio, 2020). Despite all the advantages it can bring, it has been criticized whether mobile markets could actually be an effective technique in alleviating food disparity due to the temporary success that has been seen in overall economic sustainability (Wishon & Villalobos, 2016).

Urban greening in older industrial cities that have experienced population decline, loss of job, neglected houses and properties is emerging as a strategy to restore the cities and address the problem being faced by food desert. Agricultural projects in these spaces can help to reconnect residents with better food production and access (Carlet, Schilling, & Heckert, 2017). However, there are opinions that management of vacant land have negligible potential for food production but could help to meet environmental sustainability goals (Herrmann, et al., 2016).

A study in Glasgow City and adjacent districts had the objectives to determine if food was differentially available, if there was any difference in prices, and to identify any disadvantages of living in socioeconomically deprived areas. Geographical scale and deprivation were based on four variables in British Census: crowd density, male employment, low social class, and percentage of residents without a car. Stores were categorized into 10-fold classification. Data on food price and availability measures were collected on 57 standard food items which were then classified into cheapest price,

branded price, and general food availability. The result gave the distribution of food store, shop type and food price, food availability, and area deprivation. Similarly, a study in New York City which is a densely populated area used data from the 2020 U.S. census for extracting vehicle ownership, ethnic/racial characteristics, and economic composition and divided into five categories. They collected data for supermarkets from a 2005 data set of business data which gave them location, name, annual sales of the businesses. Threshold of annual sales more than \$2 million was used to categorize the store as a supermarket in their study.

A similar study in Bridgeport, Connecticut used data from Geographical Information Systems (GIS) and SNAP. Preliminary assessment of food offered at several local retailers were compared to major grocery stores then, travel cost to access the stores were calculated to obtain the final cost of acquiring the food. Fast food outlets were also mapped along with grocery and convenience stores. The conclusion were two possibilities: either residents are unaware of healthy food and food accessibility is not a concern or the cost of securing healthy food is too costly than the easily accessible and cheaper lower quality food (Walker, Keane, & Burke, 2010). Data for analysis were obtained from GIS and SNAP. GIS made visual interpretation and determination of food desert possible on a wide scale where various spatial data of location, density, distance, and transport can be combined (De Master & Daniels, 2019).

As per the study conducted in Glasgow, the large stores carried more wider of items than smaller stores which carried more food items that are not nutritious and are less likely recommended for a healthy diet but were also cheaper. It did not conclude that

people living in low-income areas are significantly affected by food desert, also does not conclude that they did not exist. The results from the study in New York City found that the accessibility to food was found to be average in white communities, higher in Asian neighborhood while lesser in Hispanic and black neighborhood in the study area. Since New York City has better transit and public transportation facilities 96.3% of people in the study area had access to transportation service to help them get to a food outlet. It was benefitting to the high poverty area than low poverty area while vice versa when looked in terms of vehicle ownership in the household (Bader, Purciel, Yousefzadeh, & Neckerman, 2010).

The results from the study in The Dan River Region, Virginia concluded that food insecurity was almost triple the state-level in the study area and double in national level. Moreover, obesity was not directly related to food insecurity, nonetheless other chronic conditions like diabetes was 1.5 times more likely to occur and a 77% increased risk of hypertension (Dinour, Bergen, & Yeh, 2007). Health data was collected from various online sources like PubMed, Economic Research Services, Cumulative Index to Nursing and Allied Health Literature, and United States Department of Agriculture (USDA) in addition to government agencies and hunger research organizations for their study of obesity in food insecure areas. Nonetheless, there are studies that have not found any difference in weight status of people based on the residents living in a food insecure area. Kaiser et. al. (2002) researched various counties in California on Mexican American children living in food insecure environment and could not validate a connection between the location and weight or height status of the children. Similar results were identified

that showed no effect found in school going children, but differences were significant in preschool children and adults (Bhattacharya, Currie, & Haider, 2004).

Cuyahoga County Planning Commission in their supermarket assessment for Cleveland and surrounding areas in 2018 used Retail Food Establishment licensing data, Google maps and other sources to map 187 grocery stores, no distinction was made depending on the size of the store for the analysis. A distance of half mile was used as a baseline for walkability and 2010 census data for population characteristics such as - income, poverty level, access to vehicles, and health data from Ohio Department of Health (excluded areas of large, uninhabited places like airports and industrial areas). Calculation of distance to supermarket was achieved via street network and not Euclidian straight-line distance. The criteria to be recognized as food desert were half mile distance and 30% of population whose income was under 200% of poverty level. In Cuyahoga County, 35% of the population were determined to be living in a food desert and 59% of the population in the city of Cleveland. Furthermore, the results indicated towards those places have a strong association with poor health outcomes.

A 2014 community food access study in South Carolina used 2009 USDA census data and CDC's healthier retail tract for the identification of food deserts. The results showed that 38 out of 169 census tracts were concluded to be a food desert area that is 22.5% of total study area. Studies have adapted various approaches to identify places with difficult access to food such as GIS mapping, supermarket surveys, secondary data like census tract, federal supplemental benefit usage data, retail tract data etc. Similarly, 23.5% of

were living in area that needs high food priority in Baltimore City with 185% below Federal Poverty Level of median household income (Misiaszek, Buzogany, & Freishtat, 2018).

Various buffer distance has been used in different studies since there is no standard for distance to determine an area to be identified as a food desert. It is a cumulation of all factors rather than only distance. A buffer of 0.5 mile is widely used in most food environment study that approximates a walking distance to be of 800 to 1000 meters i.e., equivalent to 0.5 to 0.62 mile (Bader, Purciel, Yousefzadeh, & Neckerman, 2010). In Baltimore's food environment reports of 2015 and 2018, they used a quarter mile distance from the nearest grocery store, Cuyahoga County's survey of supermarkets used quarter mile, half mile and one mile for their analysis for distance from the supermarket. South Carolina food access study used a 1-mile buffer for urban areas and 10 miles for rural areas.

Recently policy initiatives have been targeting making healthy food accessible to reduce the rate of obesity and food insecurity (Joassart-Marcelli, Rossiter, & Bosco, 2017). SNAP has been used for decades to help low-income families with their food budgets but, has not kept up with inflation. This kind of problem is common in rural Appalachia region of Ohio where employment level is low while food inflation is high leading to a rise in food insecurity (Chapman & Perkins, 2020). This study in Athens County, Ohio is recognized as the poorest county in Ohio and weak consumer markets makes it challenging for the small-scale producers to remain economically viable. It also affects households in all levels, results categorized out of the total food stamp receiving households in 2004 50% were food insecure, 31% food insecure without hunger and 19% food insecure with

hunger in the study area (Dinour, Bergen, & Yeh, 2007). Availability of food stamps do not necessarily mean that families are making nutritious food selections for the households (Condrasky & Marsh, 2005).

Local Food System (LFS) are a network of food producers such as farmers, ranchers, and fishermen that are integrated into a regions distribution, consumption, and waste management systems with the goal of being sustainable with respect to environmental, economic, and social health of the region. Implementation of LFS systems can be costly to build and coordinate. Available funding from various sources (donations, sponsors, government funding) are required for successful operation. These types of endeavors require considerable staff which can provide jobs to unemployed in the region (Chapman & Perkins, 2020).

Some cities in the US have been going through or gone through urban shrinkage due to loss of industry/jobs close to city centers, movement to suburban, or overall population decline. Youngstown, Ohio once home to multiple steel industries, is one of the shrinking cities (Hartt, 2019). A shrinking city faces different challenges; population loss being one of them resulting in decrease of tax revenues which leads to poorer and fewer services and capital (Beauregard, 2009; Hollander, 2011). Hence, these cities fall prey to deprived economic growth and manpower in the long run (Pallagst, Fleschurz, Nothof, & Uemura, 2021). Youngstown population was at its peak in the 1950's with over 160,000 residents. Since then, it has been continuously on the decline derived from out-migration induced by unemployment due to industrial decline in the 1970's and an approximation of 50,000 jobs loss (Pallagst, Fleschurz, & Said, 2017).

The area of Youngstown, Ohio is 33.96 square miles, total population of according to Census data 2020 is 65,469 comprising of 49.1% white, 42% Black or African American, 0.4% American Indian and Alaska native, 0.6% Asian, 10.9% Hispanic or Latino. Education of the city residents include 84.1% high school graduates and only 13.6% have a bachelor's or higher education degree. Median household income is \$28,822 while per capita income in the past 12 months is only \$18,623. Poverty effects 35.2% of the population.

Previously food resources such as food retail stores and alternative sources like church food pantry, community kitchen, soup kitchen, farmer's market, and pop-up markets along with public transportation service have been mapped in GIS which is available for public to view as story map on ArcGIS (Youngstown Food Resources, 2020). However, food desert mapping with demographic analysis and health indicators have yet to be investigated in Youngstown.

Hypothesis

H1: The average of food stores in Youngstown, Ohio will score less than 50% (or less than 12) on the modified Healthy Food Availability Index.

H2: Food desert areas will be found in lower income; minority neighborhoods and residents have lower vehicle ownership than non-food desert areas.

H3: Residents living in food deserts are expected to have higher rates of adverse health conditions compared to residents in non-food desert.

There are fewer number of supermarkets in the city, those in the city are located towards the boundary of the city limits. Furthermore, health and nutrition go hand in hand; poor diet is directly linked to poorer health.

Objectives

- Identify, classify, and map food stores in Youngstown using GIS.
 - Classification of stores will be based in the type and variety of food accessible.
 - Each store scored based on a modified Healthy Food Availability Index
- Using GIS, map 0.5-mile distance from each store and 0.25-mile distance from bus lines.
- Using US Census data, American Community Survey data, identify ethnicity, income, and education
- Identify regions of increase rates of obesity, heart disease, cholesterol, and high blood pressure.

Chapter 3 Methodology

The objective of the research was to identify regions of food desert in the city of Youngstown, the factors that are contributing to the food desert areas and the health consequences in the areas having limited access to food.

The food environment of a region is dependent on the number, location, type, and accessibility of grocery stores (Glanz, Sallis, Saelens, & Frank, 2007). A food environment has many factors intertwined - physical, economic, and social - that exerts influence on where and how people shop (Misiaszek, Buzogany, & Freishtat, 2018). Segregation of income and race composition in neighborhoods contributes to the food environment in the neighborhood (Franco, Diez Roux, Glass, Caballero, & Brancati, 2008). Incorporation with availability of food groups these factors were taken in consideration for determination and conclusion of place to be recognized as a food desert; physical being the distance travelled by an individual to the nearest grocery store, economic being the income of the individual and lastly social being the race/ethnicity of the individual. This research is heavily based on GIS since GIS mapping has become more and more detailed over time with incorporation of demographic data such as ethnicity, income, race etc. (De Master & Daniels, 2019).

The food resources included in this study were businesses with physical outlets that are permanent at the place of operation. Hence, online stores, seasonal markets like flea market, farmer's market, and pop-up stores that operate temporarily or seasonally were not examined. Also, fast-food, or sit-down restaurants were not included. The stores that sell raw or packaged grocery items were prioritized rather than pre-prepared, frozen or

any other type of already cooked/ready to eat food material. Pre-prepared foods are basically less of a concern in this study even though they might offer healthier options when fresh produce is not readily available, additionally feasibility played a factor in not including them in the study. The stores were separated into different categories:

- Chain stores: large retailers that are a chain, not necessarily owned by the same corporation but with recognizable names. Most have many departments/sections, and some offer diverse options of fresh fruits and vegetables, meat and animal products, frozen food etc.
- Convenience/small grocery store: small retailers generally privately owned, offers fewer varieties of food options.
- Gas Station: stores where the major revenue occurs from gas and cigarette sales rather than grocery items, nonetheless, sells food products.

All the stores were located by the help of google maps, internet search, land banks and a previous project carried out by students at Youngstown State University where they had mapped the majority of the grocery stores in Youngstown, Ohio (Figure 1).

A checklist was prepared for the survey which included the food groups and types such as dairy, meat, fruits, vegetable, bread, dry goods, and canned products that were going to be surveyed in all the stores in the study. The methodology for this study was inspired by the food environment studies carried out several times in Baltimore, Maryland by the City of Baltimore with association with John Hopkins Center for a Livable Future (Misiasek, Buzogany, & Freishtat, 2018)s. Over time there have been various studies on food desert and food environments, their effects, and consequences however they were more based on the proximity to the stores rather than the healthy food option availability (Franco, Diez Roux, Glass, Caballero, & Brancati, 2008). Baltimore City food environment

report uses a comprehensive assessment of food groups and different types of food carried by the stores in the city. Thus, the checklist prepared for the survey is inspired by their Healthy Food Availability Index (HFAI) with some modification (Appendix).

The stores identified are accessible by residents within the city limits of Youngstown, Ohio. Each store was surveyed and was assessed according to the modified HFAI checklist to determine the type of options they carry. Confirmation that all of the stores were surveyed was achieved by driving through the city and visiting each store individually. All the streets in the city were thoroughly explored to make sure none of the stores were left behind or missed by other methodologies. After the survey, data entry was carried out in Microsoft Excel. All the food groups included in the survey were assigned points so that if the store had the food group it would earn the point (Table 1). If a store offered many healthy options, it would score high while if a store did not offer many healthy options, then it would score low.

The scoring system (modified HFAI) used for this study was based on the scoring system produced by Glanz et. al. (2007) for their Nutrition Environment Measures Survey (NEMS) to carry out a survey in stores for healthy food availability in the city of Atlanta, Georgia which takes in account availability, price, and quality of food products in consumer nutrition environment in stores. They used nutrition related variables from literatures and publications from health organizations, federal agencies, and researchers in combination with field work and expert consultation to narrow down healthful food options which were statistically analyzed to develop a model. Baltimore food environment study also used the same model in their study, hence why this study also

followed suit with some modifications. The modified HFAI model was adopted from these reports for the store survey that was used for analysis of each store.

Table 1: Modified Healthy Food Availability Index (HFAI) score assigned to different food items

Food Items	Point
Whole milk	1
Reduced fat (1%/2%)	1
Skim milk	1
Cheese (any kind)	1
Non-dairy milk (any kind)	1
Eggs	1
Ground beef (any fat %)	1
Beef (not ground)	1
Chicken	1
Seafood (any kind)	1
Processed meat (lunch meat, sausage, bacon etc.)	1
Fresh fruit	1
Fresh vegetable	1
Frozen fruit	1
Frozen vegetable	1
Whole wheat bread	1
100% fruit juice	0.5
Rice	0.5
Pasta	0.5
Beans	0.5
Tortilla	0.5
Oats	0.5
Low sugar cereal	0.5
Canned vegetable	0.5
Low sodium canned vegetable	1
Low sodium canned soup	1
No sugar added canned fruit	1
Organic option (any)	1

The possible total HFAI score any store could receive was 24. The checklist and scoring had to be modified due to difference in food availability in Youngstown compared to the study areas in the reports from Baltimore and NEMS. Prices of common items like

milk, egg, and bread were also noted for a general comparison. After the stores were categorized, surveyed and points assigned, they were then mapped in ArcGIS Pro. All the stores were geocoded by their address to the Youngstown, Ohio street address shapefile downloaded from ArcGIS Pro website. A half mile radius buffer was used instead of 1 mile because shorter distances could give a better approximate of food environment in the neighborhood where individuals are less mobile as well as where the population is denser (Bader, Purciel, Yousefzadeh, & Neckerman, 2010). The buffer was placed with the store location being at the center of the circle (Figure 2). Many circles/buffer zones overlapped because on some streets had multiple stores close to one another, thus the dissolve tool was used to make the lines vanish and make them into one zone. The current and regular routes for the Western Reserve Transportation Authority (WRTA) bus service was obtained from their website which identifies the public transport in Youngstown; WRTA is the only public transportation in the city. It was layered on the map to estimate the feasibility of travel for the residents to get to any grocery store. A half mile buffer was also placed on the WRTA bus route as a walkable distance for people from their place of residence to the nearest bus stop.

All other demographic data for the population such as race, income, education level, private vehicle ownership, and number of households were obtained from United States Census Bureau 2020. TIGER/line shapefiles were also obtained from US Census Bureau 2020 to map on GIS. Demographic data for the city was extracted from the county data while TIGER/line shapefile was extracted from the state data. TIGER/line shapefile were from 2020 and the latest census block group data for Mahoning County were from either

2019, 2020, or were decennial. Block group data was preferably used because they are statistical subdivision of census tracts that contain roughly 600 to 3000 inhabitants (U.S. Census Bureau, 2020). Street file for Mahoning County was obtained which was used for geocoding the stores after uploading the excel HFAI analysis file to ArcGIS Pro. TIGER file was joined to census block group data that determined the exact census data for all the block groups. Youngstown data was extracted from the Mahoning County block group data. This gave the exact count of census data for every block group in the city. After the food desert was mapped based on the HFAI scores, we were able to examine the demographic data. However, majority of block groups were not completely under the food desert; only parts of them were mapped as food desert. Thus, more erasing and extracting by location for the exact area of block groups had to be done to obtain the precise count of the population living within the mapped area. New feature classes for the extracted data were created for every parameter. Then the attribute tables were exported as table in GIS, then those tables were exported to excel using table to excel tool.

Chapter 4 Results

Grocery store mapping

Eighty-six food stores were identified for the city of Youngstown, Ohio out of which 32 were chain stores, 34 were gas stations, and 20 were convenience stores (Figure 1). A majority of the stores were located on the main streets such as Market Street, South Avenue, and Mahoning Avenue. They were more saturated towards the south part of the city while the northeast part had the least. The northeast, portion of the city is lightly inhabited and has Lansdowne Airport which could be a contributing factor to the lack of stores. ArcGIS Pro default topographic basemap was used for all the maps in the study.

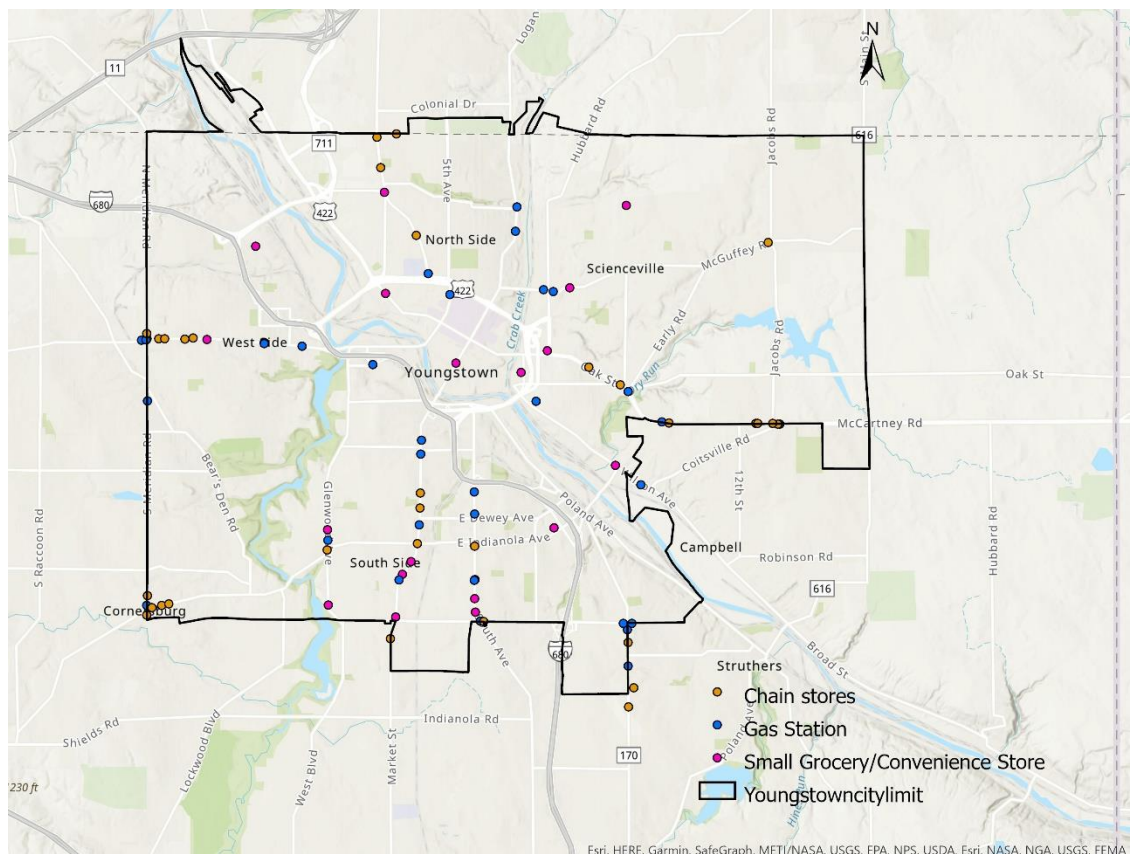


Figure 1: All the food-based stores in Youngstown, Ohio mapped and color coded based on the size and variety food offered.

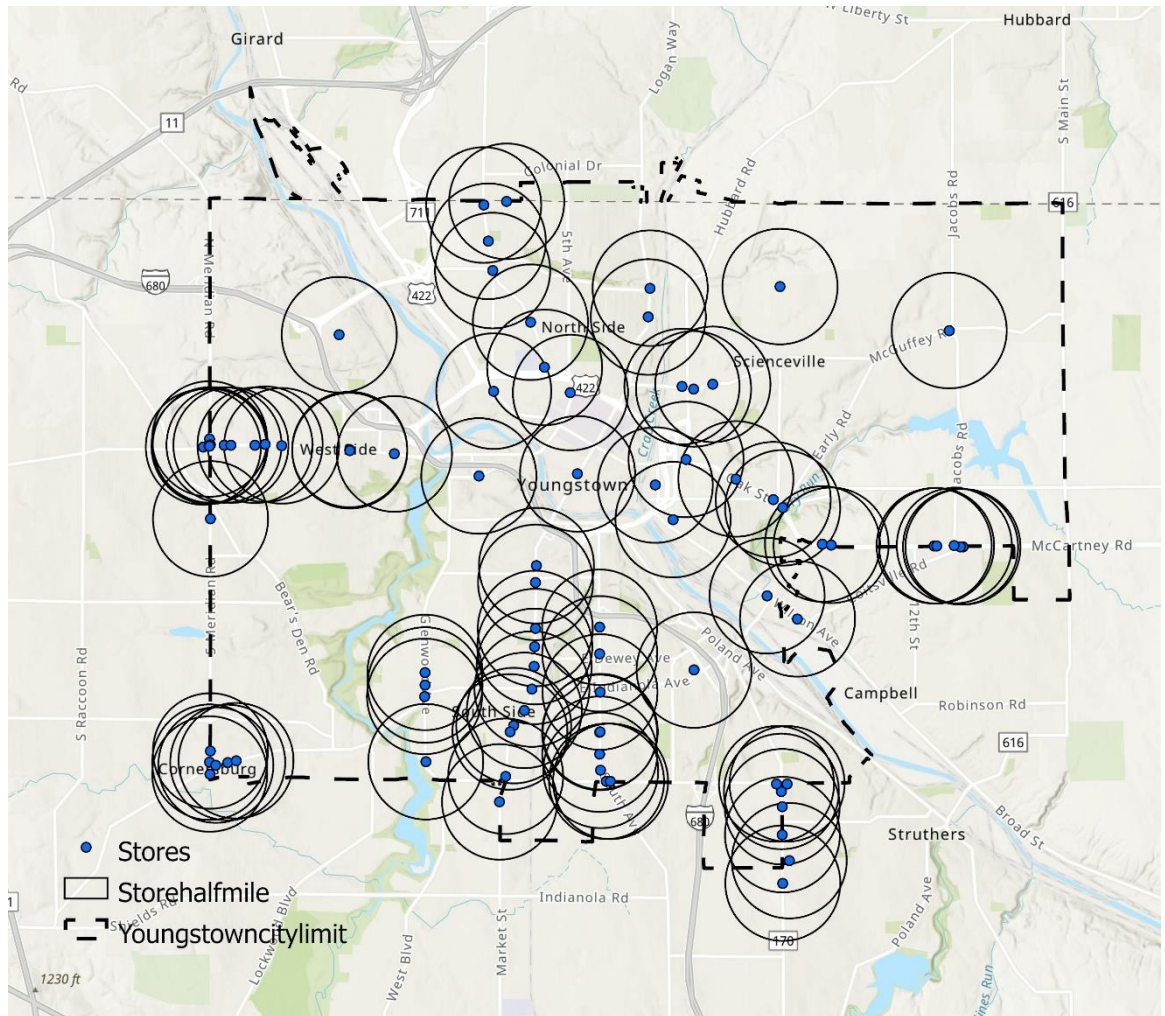


Figure 2: All the food-based stores in Youngstown, Ohio mapped with a half mile buffer

The circles around the stores in Figure 2 are a half mile buffer zone with the store location at the center of the circle. Even though the stores were fairly saturated in the southern part of Youngstown basically on the same streets with all the buffer overlapping one another, there was still large portion of the southern part of the city not covered.

Healthy Food Availability Index (HFAI)

The checklist prepared for the survey (Table 1) had major food categories that are regarded as nutritious and are recommended by health professionals for a healthy diet.

Since the total possible score was 24, the entire data was divided into 3 sections: lowest third HFAI (0-8), mid third HFAI (8.1-16), and highest third HFAI (16.1-24). This was the division used by Baltimore food environment report for their categories. The stores were determined to belong to one of the three ranges depending on how they scored and where they fall on the spectrum.

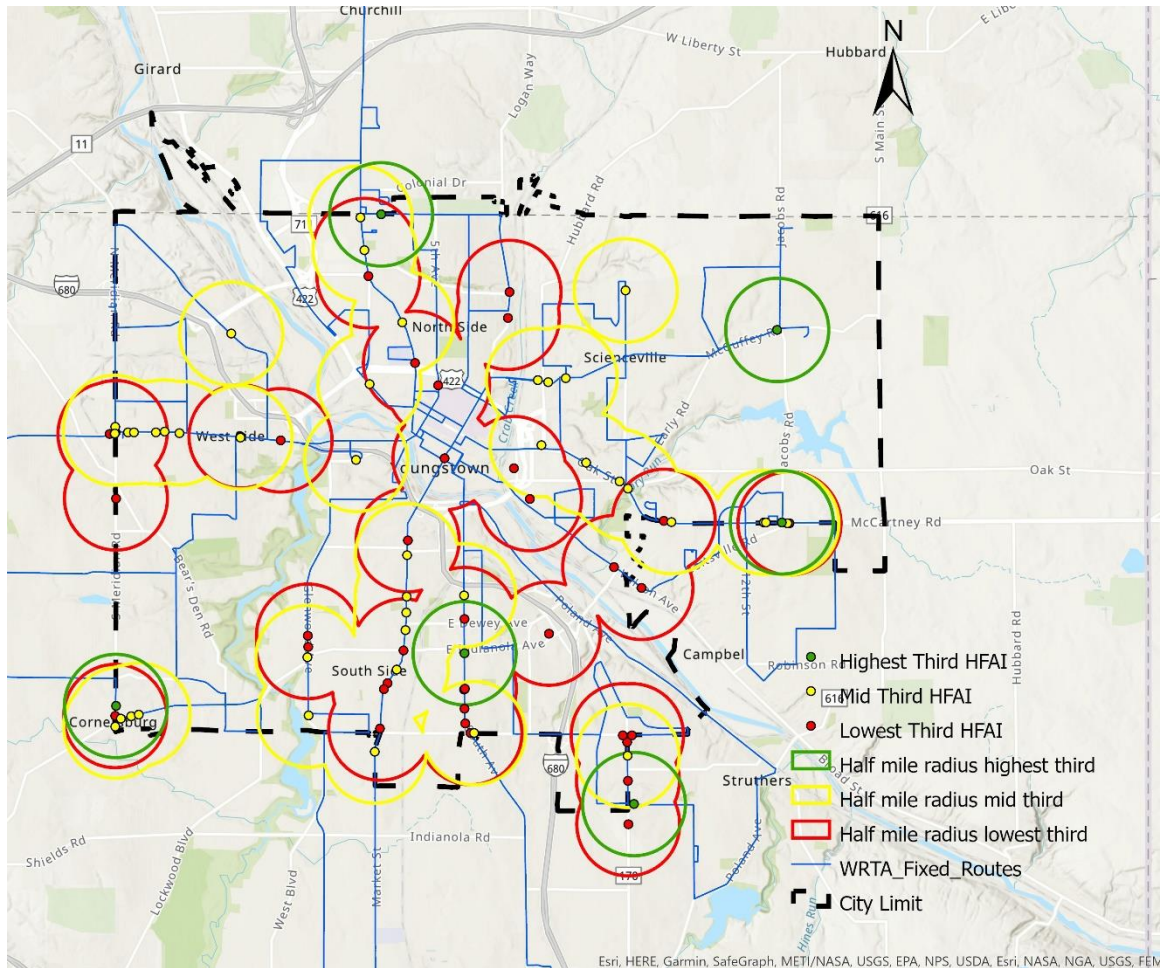


Figure 3: All stores in Youngstown, Ohio with color coded buffer zone barely offering any healthy option to its customers, 41 stores fell on the average category

The results placed 39 stores in the lowest HFAI score barely offerings and only 6 stores were found to have a high HFAI score offering plenty of healthy food options for

the population. In percentage calculation, low, mid, and high HFAI score was 45.35%, 47.67% and 6.98% respectively (Figure 3).

Figure 4 displays the area of the city that is not covered by the half mile buffer of any store (red regions). The areas covered by the half mile buffer (white regions of Figure 4) does not necessarily mean that it is not a food desert, it depends on the HFAI score.

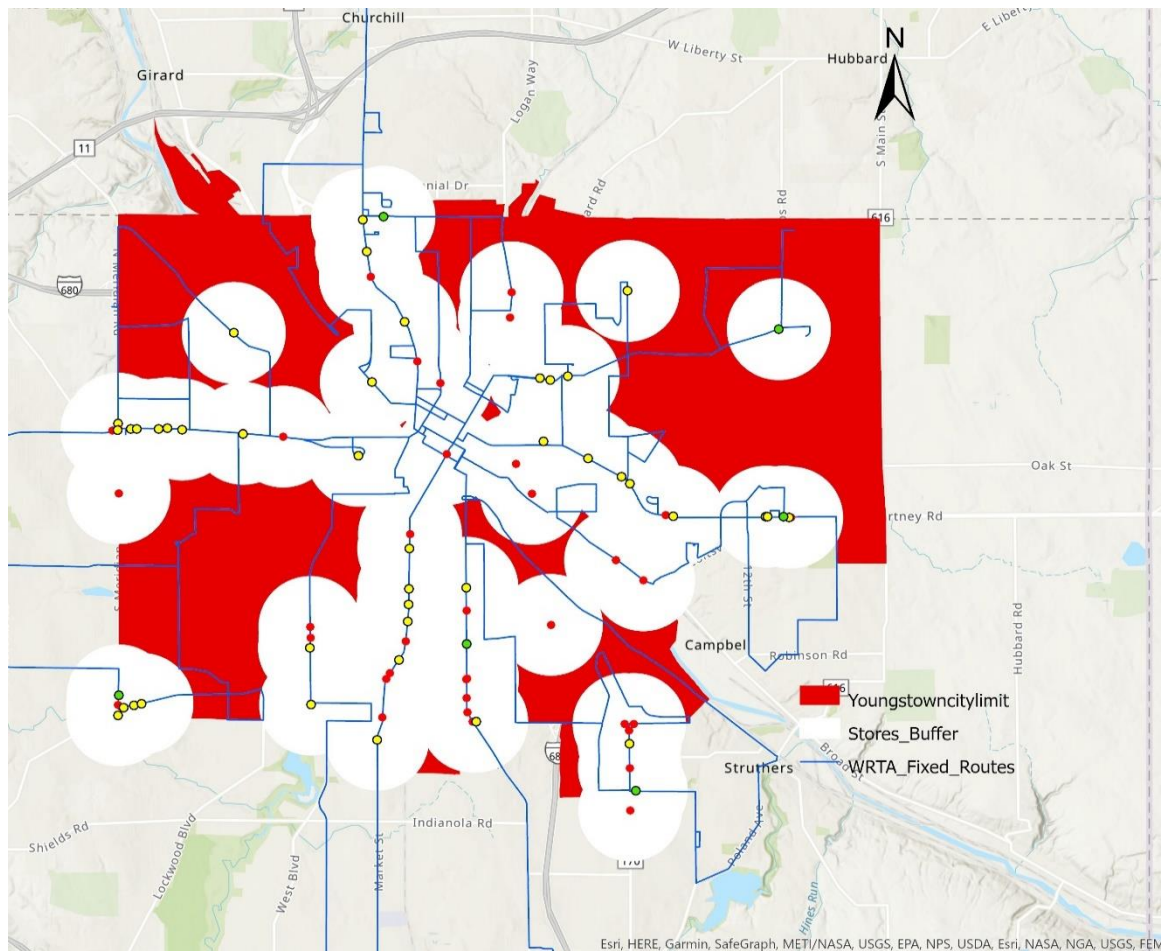


Figure 4: Map showing the part of Youngstown not covered by any type of store buffer

Easy access to healthy food for the residents of Youngstown, Ohio is restricted based on the location of stores and what they carry thereby limiting the population's choice and options. More than half of the city lies in a food desert with trivial area having access to grocery stores with high HFAI scores that carry nutritious food for a healthy living.

Figure 5 displays regions of the city in extreme food desert highlighted in red with no to little access to a grocery store that carries healthy food. Yellow regions have average exposure to be recognized as a food desert. Green regions have good access to healthy and nutritious food options.

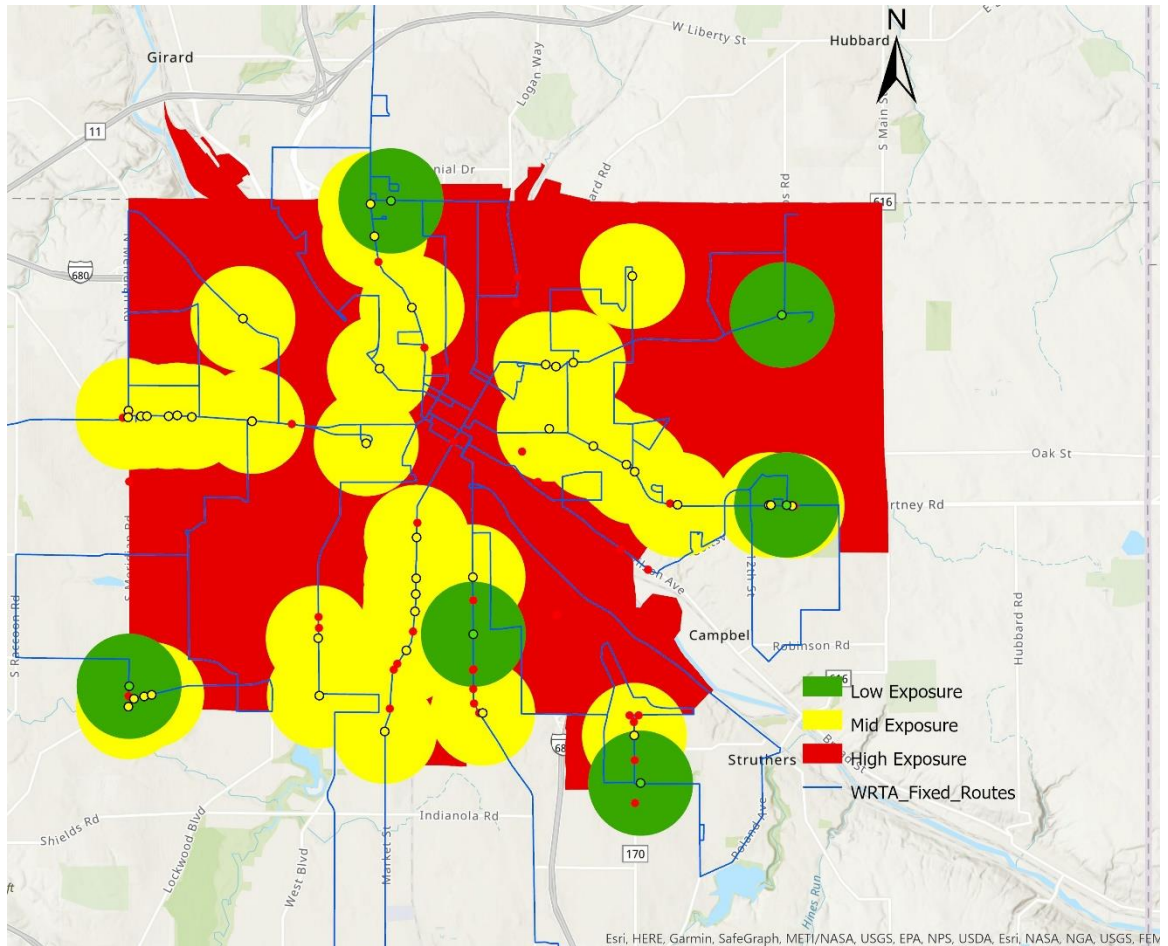


Figure 5: Youngstown segregated into three zones based on food desert exposure

Prices and Availability

Gas stations were found to be the most expensive on an average followed by small grocery/convenience store. Chain stores were a little cheaper than the other two categories (Table 2, Figure 6b). Whole milk was widely carried by most stores, options of reduced fat (1% or 2%) were moderately available while only limited number of stores

had the option of skim milk or dairy free milk. Gas stations and small grocery stores had bananas, apples, and oranges to be bought by single piece.

Table 2: Cost of common food items found from stores in Youngstown, Ohio.

Type of Store:	Gas Station			Small Grocery			Chain stores		
Items:	Cost per item, USD			Cost per item, USD			Cost per item, USD		
	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
Milk (1 gal)	4.99	2.99	4.50	4.50	3.50	3.95	4.49	2.40	3.49
Eggs (dozen)	2.99	2.69	2.27	2.99	2.40	1.99	3.19	1.25	1.61
Wheat bread	3.49	2.39	2.84	2.99	1.99	2.53	2.99	1.50	2.22

Some stores were found to be out of stock of milk, eggs, and bread even though they carried them. Stocking of the items were dependent on the day of the week; they would be out of stock towards the end of their week (varied by restocking day, Figure 6a). Milk (whole and reduced fat, 1% and 2%), eggs and processed meat were the most widely sold products carried by 74, 61 and 63 respectively out of 86 stores. Fresh produce like fruit and vegetable were only sold in 23 and 11 stores respectively, while frozen fruit and vegetable were sold in 12 and 29 stores respectively. White bread was sold in 52 stores while the healthier option of whole wheat bread was only seen in 33 stores. Dry and canned foods like rice, pasta, cereal, and canned soup were rampant in the stores which are also easy things to sell since they have a longer shelf life and sellers do not have to worry about them going bad quickly. Although, some stores were found selling food items that were past the sell by date.



Figure 6: a) Photos of empty shelves of dairy products and eggs from the stores b) Photos of the cost of milk at one store.

Race/Ethnicity

White and Black Americans were found dominant in both, food desert and non-desert areas. There were no substantial differences between their population with respect to dominance. The other minority populations are nominal to ethnic demographics in Mahoning County (Table 3 and 4).

Table 3: Total population of one race and their percentage living in food desert based on decennial census 2020

Race/Ethnicity (One Race)	Number of People	% Of total one race population
White	22666	48.54
Black/African American	20958	44.88
American Indian and Alaskan Native alone	211	0.45
Asian alone	239	0.51
Native Hawaiian and Pacific Islander alone	25	0.05
Some other race alone	2596	5.55
Total	46695	100

Source: U.S. Census Bureau 2020

Table 4: Total population of one race and their percentage living in non-food desert based on decennial census 2020

Race/Ethnicity (One race)	Number of People	% of total one race population
White	24086	46.30
Black/African American	24605	47.30
American Indian and Alaskan Native alone	236	0.45
Asian alone	250	0.48
Native Hawaiian and Pacific Islander alone	27	0.05
Some other race alone	2814	5.41
Total	52018	100

Source: U.S. Census Bureau 2020

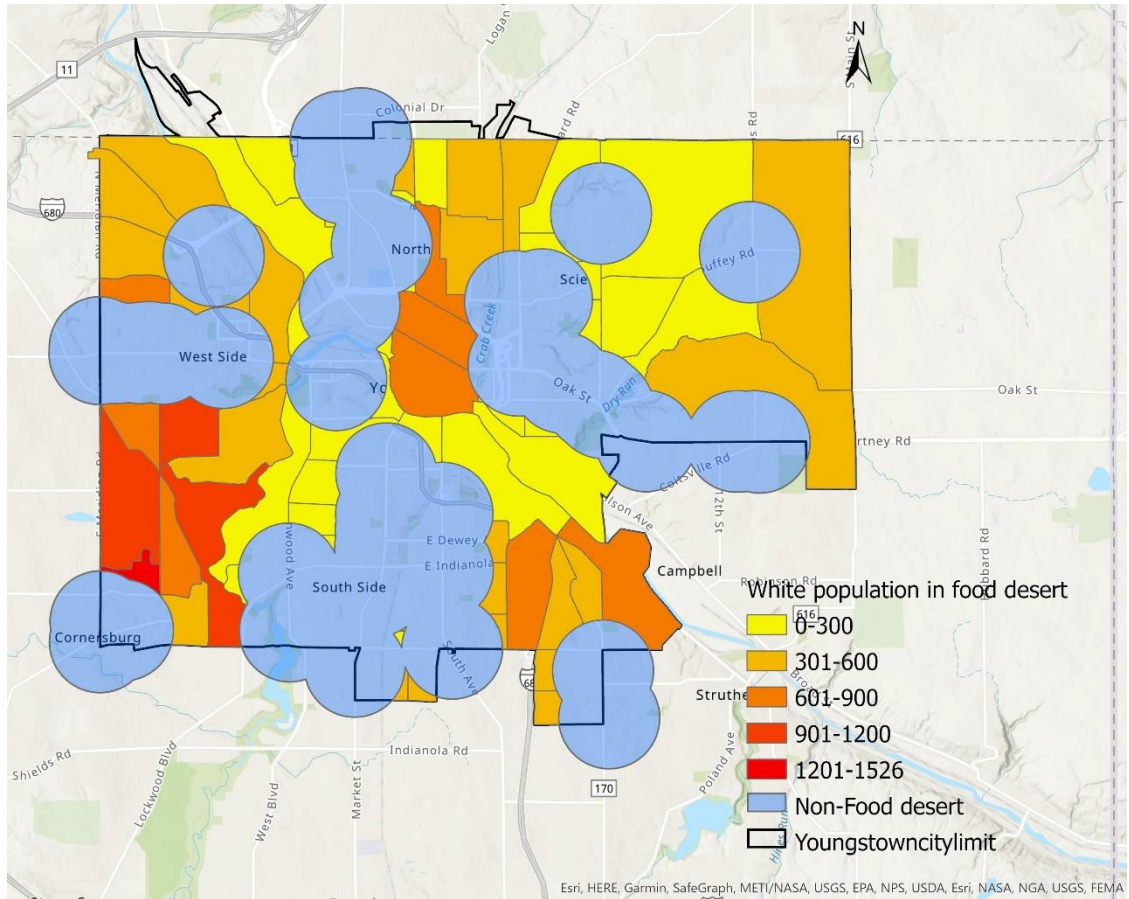


Figure 7: Map of distribution of white population in food desert in Youngstown (as described by US Census Bureau, Decennial Census 2020)

The population of White Americans resided towards the southwest of the city and lesser in all other parts with the least white residents in the central and northeast part. Whereas the Black/African American populations were more prominent in the northeast part of the city (Figure 7 and 8).

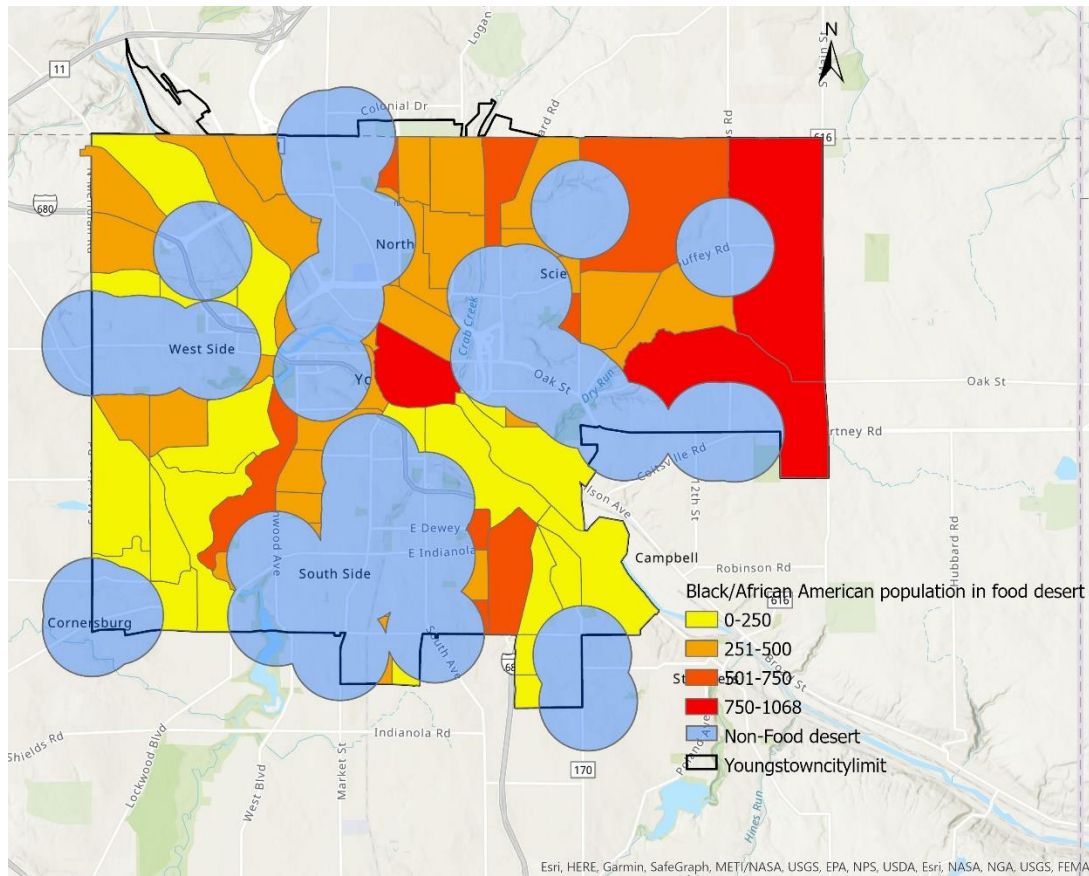


Figure 8: Map of distribution of Black/African American population in food desert in Youngstown (as described by US Census Bureau, Decennial Census 2020)

Transportation

The households in food desert who had their own vehicle were not drastically different to the vehicle ownership in non-food desert (Table 5 and 6, Figure 10). Similar results were obtained for all other means of transportation possible in the city (public bus, taxi, or walking). From the data obtained from U.S. Census 2020, it could not be determined whether people living in food desert have lesser mobility to commute to a grocery store. Residents both inside and outside food desert have similar ownership of private vehicles, and the public transport is fairly accessible from any neighborhood.

Table 5: Transportation situation in food desert in Youngstown based on American Community Survey (ACS) 5-year estimate 2019

Means of transportation	Total	% Total vehicle transportation population
Total vehicle ownerships (car, truck, van)	16428	85.86
• Carpool (car, truck, van)	2112	11.04
Total Public transportation (Bus)	596	3.11
Public Transportation (Taxicab)	70	0.37
Motorcycle	20	0.10
Bicycle	21	0.11
Walked	570	2.99
Other means of transportation	788	4.12
Worked from home	640	3.35
Total	19133	100

Source: U.S. Census Bureau 2020

Table 6: Transportation situation in non-food desert in Youngstown based on ACS 5-year estimate 2019

Means of transportation	Total	% Total vehicle transportation population
Total vehicle ownerships (car, truck, van)	18866	85.12
• Carpool (car, truck, van)	2423	10.93
Total Public transportation (Bus)	808	3.65
Public Transportation (Taxicab)	78	0.35
Motorcycle	20	0.09
Bicycle	21	0.09
Walked	643	2.90
Other means of transportation	913	4.12
Worked from home	814	3.67
Total	22163	100

Source: U.S. Census Bureau 2020

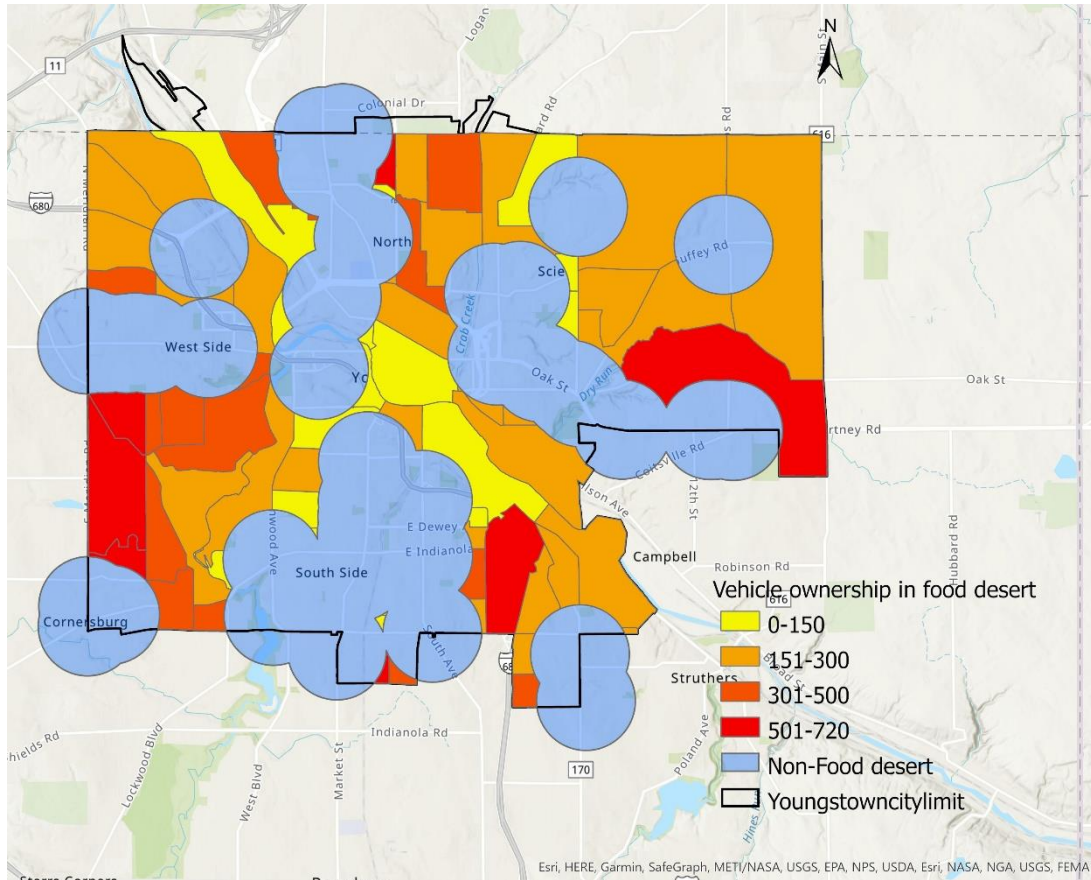


Figure 9: Map of number of the population who owns their own vehicle out of the total vehicle ownership population in the food desert in Youngstown (as of U.S. Census, 2020)

Public Transport

Public bus (WRTA) fixed routes were map with quarter mile buffer (Figure 10). A quarter mile buffer is used because a quarter mile buffer for bus route and half mile for a railway line is preferably used in public transit industry to determine passengers' access to the system by foot (El-Geneidy, Grimsrud, Wasfi, Tetreault, & Surprenant-Legault, 2014). The city is well covered as the public transportation route is seen to be at a walkable distance from most places in the city. However, the downside to the public transport scene would be that the buses are not frequent. They only reach at a specific bus stop once an hour and if passengers miss the bus, then they would have to wait for

another hour. Additionally, these routes only operate from 5:30 am to 9 pm, Monday through Saturday at the time of this study, meaning, there is no public transport on Sunday which could be a major downside for commuting to a grocery store. For some residents to access a large grocery store, it could take more than one bus trip requiring changing buses multiple times and taking several hours just for transportation. Therefore, taking a public bus to access better food options may not be a choice for many due to the time factor.

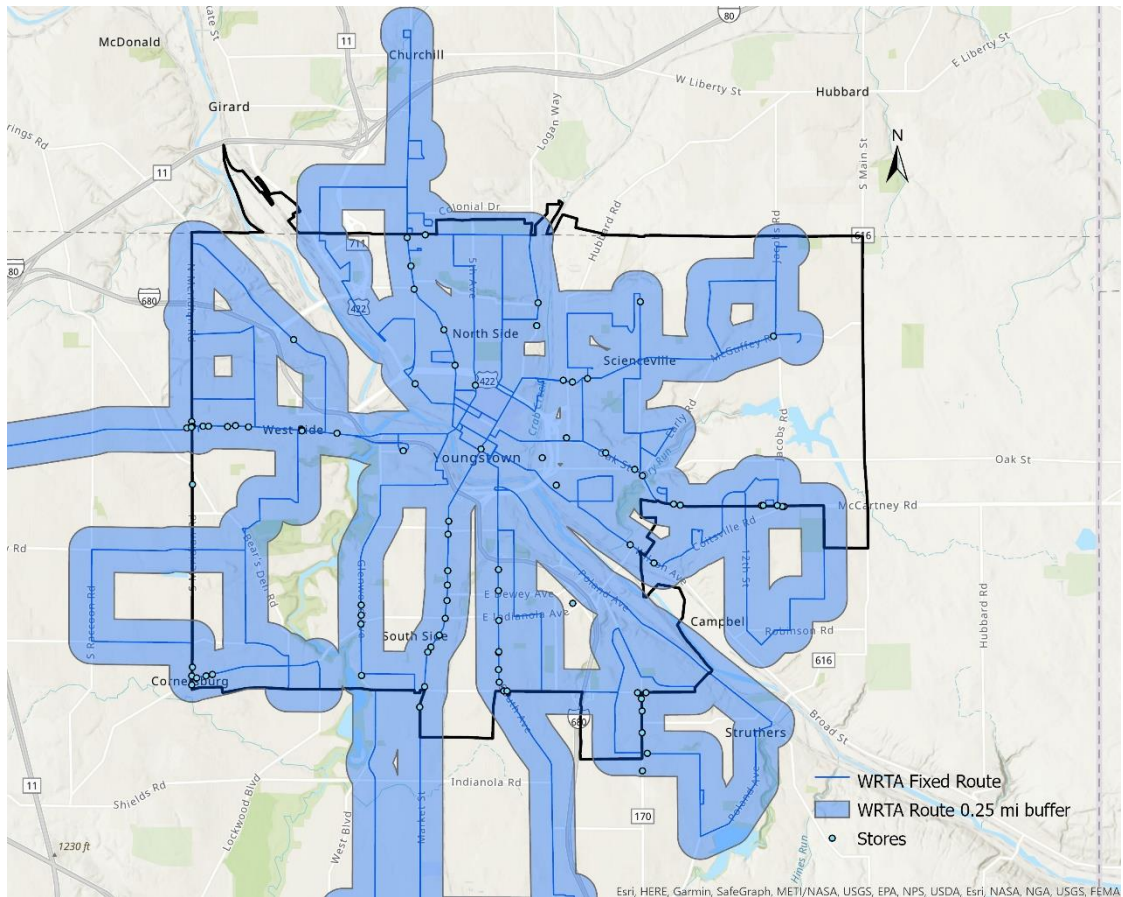


Figure 10: Youngstown WRTA fixed route with quarter mile buffer

Household

Table 7: Household data in food desert based on ACS 5-year estimates 2019

Total married couple household	11,934
Total married couple household with own children under 18 years	5,152
Total married couple household with no own children under 18 years	6,782
Total other households	11,425
Total Household	23,359

Source: U.S. Census Bureau

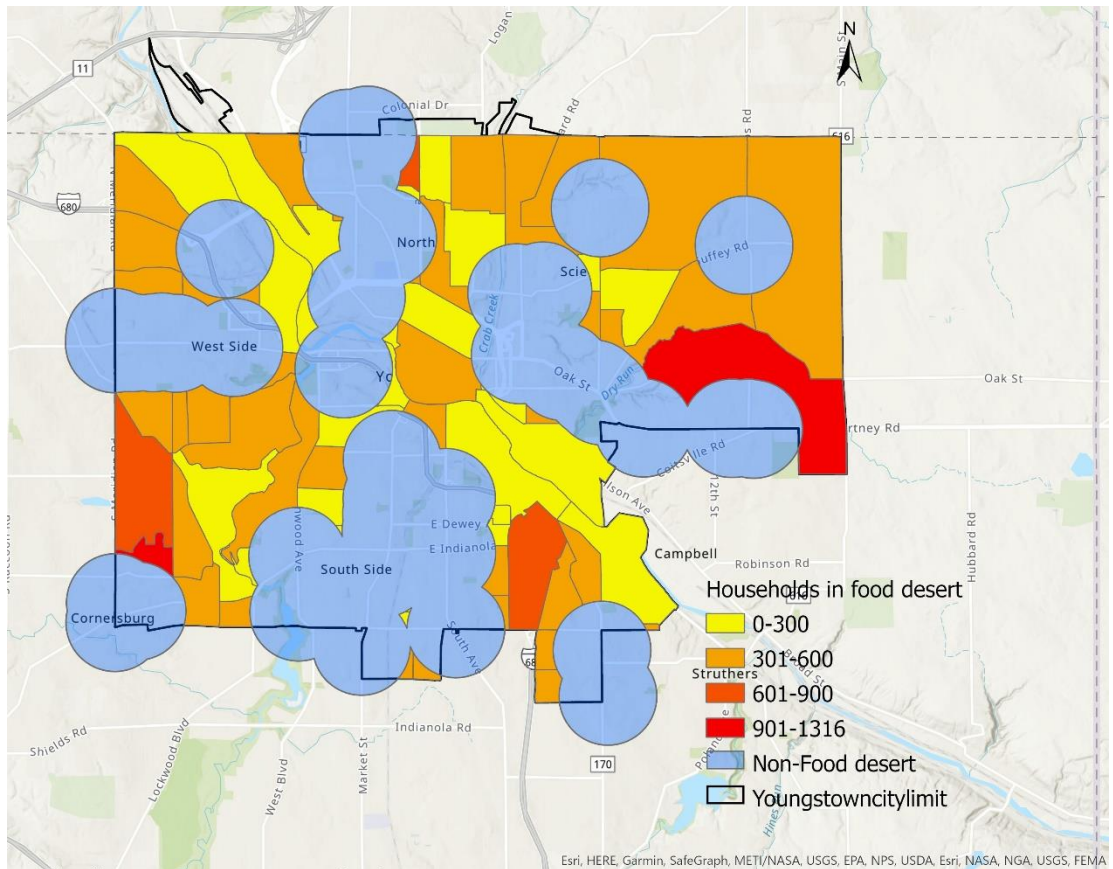


Figure 11: Map showing density of households in the food desert (as of U.S. Census 2020)

Education

Education information was obtained through 2019 ACS data. Approximately a third of the population has obtained a regular high school diploma. Approximately 14% of the population of Youngstown has achieved a bachelor's degree or higher compared to the national average of 33%.

Table 8: Education qualification of food desert population in Youngstown based on ACS 5-year estimates 2019

Level of Education	Number of People	% Of total population
No Schooling completed	485	1.32
Below High School	5,254	14.30
Regular High School Diploma	12,683	34.52
GED or Alternative Credential	2,295	6.25
Some college (no degree)	8,159	22.21
Associate's Degree	2,559	6.97
Bachelor's Degree	3,737	10.17
Master's Degree	1,208	3.29
Professional School Degree	174	0.47
Doctorate Degree	183	0.5
Total	36,737	100

Source: U.S. Census Bureau 2020

Poverty

Average median household income in the past 12 months (2019) is \$29,421 (inflation adjusted dollars). The Federal Poverty level for a household of four in 2019 was \$25,750 (ASPE, 2019). The total households under federal the poverty level in a food desert is 30.9% with 69.1% of the households above the poverty level (Table 9 and Figure 12).

Table 9: Poverty estimates in Youngstown for households in food desert based on ACS 5-year estimates 2019

Parameter	Population
Total family household income in the past 12 months below poverty level	3,576
Total non-family household income in the past 12 months below poverty level	3,640
Total income in the past 12 months below poverty level	7,216
Total family household income in the past 12 months at or above poverty level	8,358
Total non-family household income in the past 12 months at or above poverty level	7,785
Total income in the past 12 months at or above poverty level	16,143
Total household population for poverty estimates	23,359

Source: U.S. Census Bureau 2020

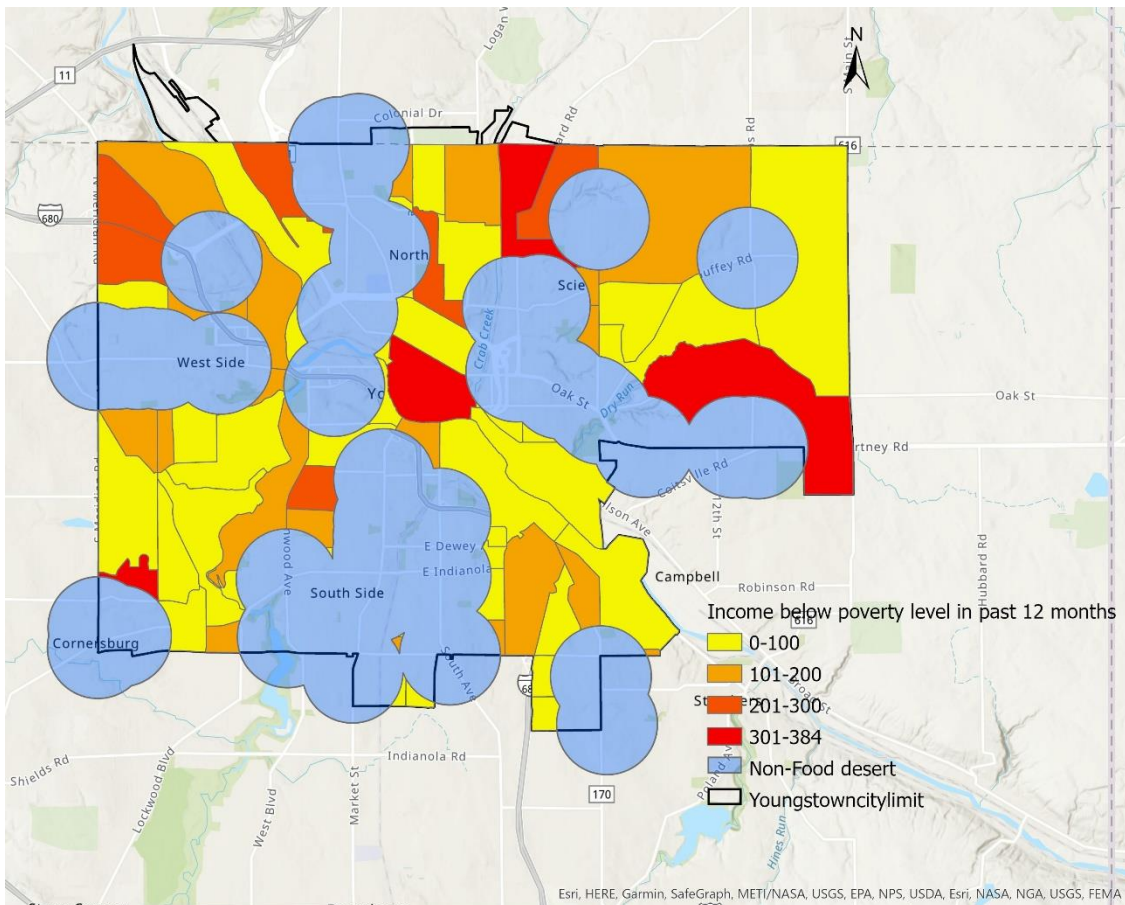


Figure 12: Map showing number of households in food desert with income in the past 12 months (2019) below poverty level (as of U.S. Census 2020)

Public Assistance/SNAP

Out of 23359 of total households in the food desert of Youngstown, Ohio, 8,323 households (35.6%) have cash public assistance or foods stamp/SNAP benefits, while 15,036 households (64.4%) do not have any public assistance or food stamp benefits. SNAP is made available to families that have an income at or below 130% of federal poverty level.

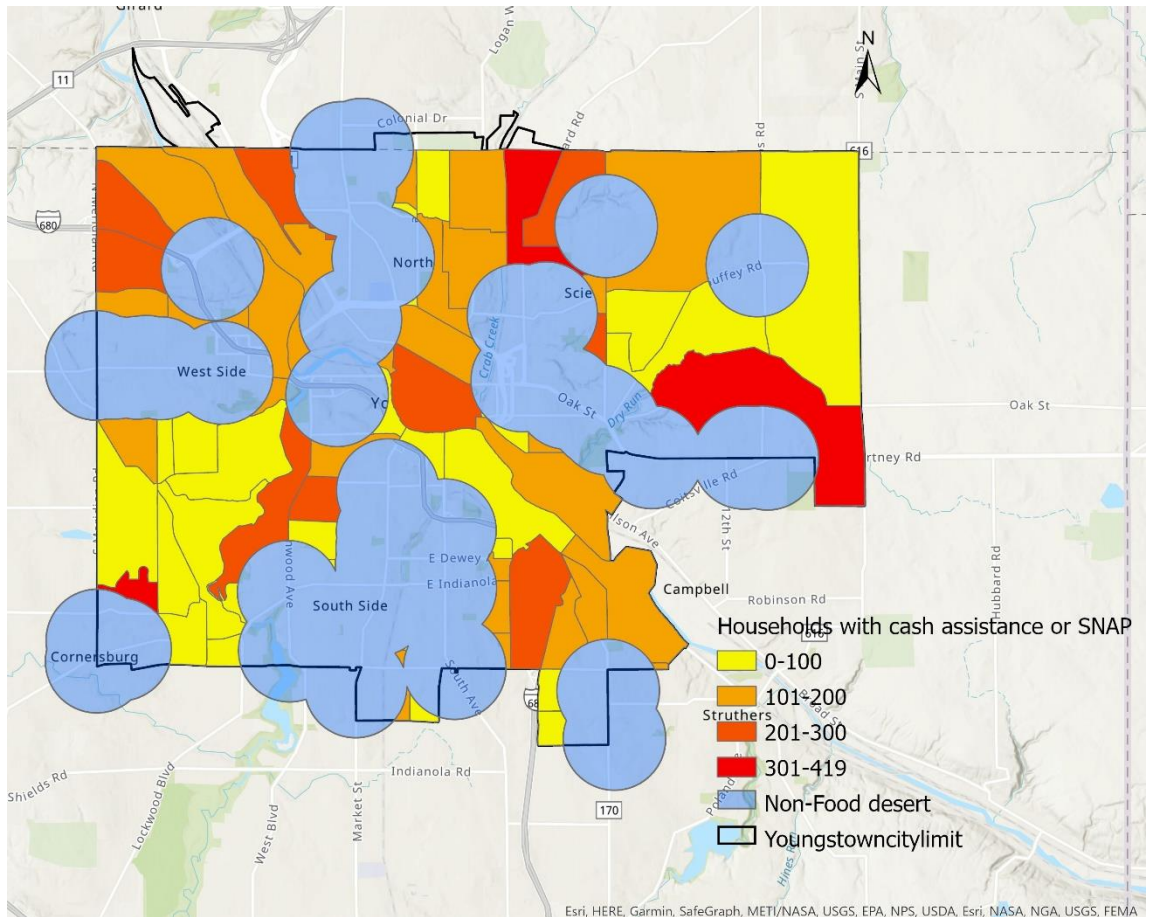


Figure 13: Map showing number of households with cash assistance or SNAP in food desert (as of US Census 2020)

Health

Health data was retrieved from 500 Cities Project: 2016 to 2019 also known as PLACES Project carried out by the CDC in collaboration with the Robert Wood Johnson

Foundation. The data relies on Behavioral Risk Factor Surveillance System, Census 2010, and American Community Survey and hence, the estimated results are only for people aged 18 years or above (Table 10). The health estimates are crude percentages of the total population.

When all the statistics for select adverse health conditions are compared in the city for both food desert and non-food desert areas, the results are similar to each other (Table 10). If the adverse health conditions are compared to Mahoning County values, it is found that Youngstown is consistently higher. High Blood Pressure, diabetes, and obesity were notably by 4-5% higher.

Table 10: Comparison of health conditions in Youngstown between food desert population and non-desert population (PLACES, CDC 2020)

Health Condition	Average % in Food Desert	Average % in Non-Food Desert	Average % in Mahoning County
High BP	43.42	43.43	38.62
Coronary Heart Disease	11.28	11.14	9.70
Diabetes	20.47	20.50	16.35
High Cholesterol	37.13	36.93	36.52
Obesity	43.69	43.94	38.25

Chapter 5 Discussion and Conclusion

The majority of the stores in Youngstown, Ohio was found not to offer food products nutritionally healthy for a diet that would be recommended by researchers and health organizations (low HFAI scores). They were seen to be selling mostly packaged and processed items like chips, candies, sodas, snacks, canned soups, dry goods, such as sugary cereal and pasta. Only 6 stores scored high in HFAI (Appendix B) that would be good option for residents to purchase a variety of food items at a reasonable price including fresh fruits and vegetables. Prices for common items like milk and eggs were highest at most small retailer which is not economical and affordable for most people who live on public and federal assistance and have income lower than poverty level. Therefore, the first hypothesis that stores in Youngstown will score less than 50% or less than 12 on the modified HFAI survey is accepted. The majority of the stores in Youngstown, Ohio scored low in HFAI resulting a huge part of the city mapped as a food desert indicating there is a limited accessibility to quality food. The average score for all the stores was 8.93 points which is less than 50% (12 points) of the total score (24 points). In fact, 59 of 86 or 68.6% of stores in Youngstown scores less than 12 on the modified HFAI survey (Appendix).

There are 23,359 households in the food desert area of Youngstown, Ohio. The White population was larger than other races or ethnicities in food desert (48.54%) followed by Black/African American population (44.88%). In non-desert areas, White and Black populations represented almost equal portions of the population with 46.30% and 47.30% respectively. From the small difference it could be concluded that minority

ethnicities like Black/African, Hispanic, Asian, and others are not prevalent in food desert areas of Youngstown. The race/ethnicity factor in food desert as was seen in previous studies of Baltimore City; 31.5% black and 8.9% white population (Misiaszek, Buzogany, & Freishtat, 2018) and Cuyahoga County (Cuyahoga County Planning Commission, 2019) was not seen in this study for Youngstown, Ohio.

In the last 12 months 7,216 households in food desert have their income below poverty level or 30.9% of Youngstown household in food desert areas had income in the past 12 months less than \$29,421 (inflation adjusted dollars). From than same population of 35.6% has access to cash public assistance or food stamp/SNAP benefits to aid their household food expenditure. According to the US Census, 12.1% of households in the US are at or below federal poverty level. Therefore, Youngstown poverty levels in food desert are higher than national levels and are a cause for concern.

Public transport WRTA bus routes were well arranged covering almost every part of the city, however the feasibility of getting a bus to a specific destination when considering the transit time, taking multiple buses to a destination, and no bus service on Sundays could make it unreliable as a source of transportation for accessing large groceries. This explains why only 3.11% of the total food desert population commutes by bus. The majority of the food desert population (85.86%) own a vehicle in their household which is the best way to commute in a small city with a mediocre public transport system.

H2: Food desert areas are in lower income; minority neighborhoods and residents have lower vehicle ownership than non-desert areas.

The second hypothesis for this study that food deserts are found in lower income, minority neighborhoods with low vehicle ownership was partly accepted. Race or ethnicity and vehicle ownership were not factors with regard to food deserts in Youngstown. The part that was consistent with the hypothesis was that there is widespread poverty in Youngstown's food deserts. Residents in the food desert area had a hard time getting affordable nutritious, fresh food.

H3: Residents living in such places are expected to have poorer health conditions compare to residents in non-food desert.

There were few differences in health conditions anywhere in Youngstown. Location of households with respect to food desert regions did not seem to be affiliated with select adverse health conditions. There was not enough to conclude that living in the food desert affected the resident health, therefore the last hypothesis that residence in food desert will have poorer health is rejected. When Youngstown health conditions are compared to Mahoning County adverse health rates, there are noticeable lower levels outside the city. There could be several possible reasons for this trend such as the residents of the city are not making healthy food choices due to lack of knowledge, accessibility to large groceries, social influences inside the city, or other factors. Expanding this type of investigation to other Mahoning County towns would help to clarify factors influencing health conditions of Youngstown.

The goal of this study was to map and study food access scenario in the city of Youngstown, Ohio. The study connects low-income neighborhoods, transportation, health conditions, and other factors that are generally involved in food desert. Living in a

food desert does not necessarily mean everyone has a lower access to quality food, yet it does mean that there are barriers to overcome such as high cost, a long commute to a quality grocery store, or knowledge of healthy options.

Future Recommendation

This study can provide basic information for future efforts to relieve food accessibility issues such as mobile markets or locations of farmer's markets. Grocery stores are not permanent; in Youngstown there have been new store openings or remodeling followed by store closures a few months later. Thus, having current information on food resource locations will allow an update on food deserts in Youngstown done at a future time. It would also be advantageous for future studies to include a larger dataset for example county or regional data which could give a better overview of where Youngstown stands with respect to neighboring cities or regions. Youngstown currently, is one of the largest cities in Mahoning County and since this study only compared some of the data with the county data, it only gives a small overview of the scenario. As Youngstown ages, it might also be beneficial to investigate the dataset focusing on dividing the study area into smaller groups looking into age groups. This may help to get a better understanding of the food desert victims rather than only generalizing to the entire desert population.

Alternative source of grocery was not mapped in this study. There are several food banks, food pantry, food center, food warehouse, and soup kitchen in the City of Youngstown that are managed by NGOs, city, churches, organizations, and sometimes by local neighborhoods where residents can get food for free and could also be at a walking distance from their house or an easily commutable distance. These alternative sources

could be further investigated to get an larger pictures of needs of Youngstown with respect to both food resources and poverty.

Limitations

The health and census data are only based on secondary data sources. There was no additional statistical analysis done on the data retrieved. Since the study was solely based on geographic measures and averages of data, it by default innates everyone in the geographic area to project the same result which could not be true to everyone. There could be household on the higher end of the spectrum who could have completely different statistics than household on the lower end of the spectrum, consequently, could have yielded a different result if on their own. Although the base idea of methodology for this study was inspired by Baltimore City Food Environment Report and comparisons of results were done with other literatures mentioned in this study, they all have their own methodology which could cause different conclusions. Therefore, comparisons could be more hypothetical than factual.

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Appendix A

HEALTHY FOOD INVENTORY IN STORES IN YOUNGSTOWN

Store Name:

Address:

Type of Store:

1. Supermarket
2. Small grocery/corner store
3. Gas station/convenience store
4. Temporary/Seasonal

Refrigerated/Fresh food products

Item 1: Milk Dairy selection: Whole Milk \$___/gal <input type="checkbox"/> Reduced Fat <input type="checkbox"/> Skim <input type="checkbox"/> Cheese <input type="checkbox"/> Non-Dairy Milk \$___ <input type="checkbox"/>	Item 2: Eggs Yes <input type="checkbox"/> No <input type="checkbox"/> \$___	Item 3: Beef Ground <input type="checkbox"/> Fat % ____ Not Ground <input type="checkbox"/> Fat % ____	Item 4: Chicken Yes <input type="checkbox"/> No <input type="checkbox"/>	Item 6: Seafood Yes <input type="checkbox"/> No <input type="checkbox"/> List the variety	Item 7: Processed Meats Lunch meat <input type="checkbox"/> Sausage <input type="checkbox"/> Bacon <input type="checkbox"/> Other:
Item 8: Fresh Fruit Apples \$___ <input type="checkbox"/> Oranges \$___ <input type="checkbox"/> Bananas \$___ <input type="checkbox"/> Other:	Item 9: Fresh Vegetable Lettuce <input type="checkbox"/> Spinach <input type="checkbox"/> Carrots <input type="checkbox"/> Cucumber <input type="checkbox"/> Squash <input type="checkbox"/> Tomato <input type="checkbox"/> Pepper <input type="checkbox"/> Greens <input type="checkbox"/> Onion <input type="checkbox"/> Potato <input type="checkbox"/> Other:		Item 10: Frozen Fruit List the items	Item 11: Frozen Vegetable List the items	
Item 12: Bread White \$___ <input type="checkbox"/> Whole wheat \$___ <input type="checkbox"/> Other:			Item 13: Juice 100% fruit juice <input type="checkbox"/> Concentrate or bottle <input type="checkbox"/>		

Dry/Canned food products

Item 14: Dry Goods Rice <input type="checkbox"/> Pasta <input type="checkbox"/> Beans <input type="checkbox"/> Tortilla <input type="checkbox"/> Oats <input type="checkbox"/> Cereal: High sugar level (> 7g/serv) <input type="checkbox"/> Low sugar level (<7g/serv) <input type="checkbox"/>	Item 15: Canned Food Soup <input type="checkbox"/> Soup - Low sodium (<140 mg) <input type="checkbox"/> Vegetables <input type="checkbox"/> Vegetables - Low sodium (<140 mg) <input type="checkbox"/> Fruits (no sugar added) <input type="checkbox"/>
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Organic Options if any:

Appendix B

SN	Store Name	Address	Type of store	Dairy							
				Whole Milk	Reduced Fat	Price per gal	Price per 1/2 gal	Skim	Cheese	Non-Dairy	Price per half gal
1	Sami Quick Stop	3822 Market St	SG	Y	Y	4.50		N	N	N	
2	Shell	3200 Market St	GS	Y	Y	4.00		N	Y	N	
3	Southside Express Mart	3122 Market St	SG	N	N			N	N	N	
4	Uptown Beverage	2935 Market St	SG	Y	Y	3.69		N	Y	N	
5	Rite Aid	2701 Market St	C	Out	Out	4.49		N	Y	Y	4.99
6	Family Dollar	2224 Market St	C	Y	Y	3.79	2.95	Out	Y	N	
7	Dollar General	2023 Market St	C	Y	Y	3.45	2.40	N	Y	Y	
8	Bestway Gas and Convenient Food Mart	2501 Market St	GS	Y	Y	3.99		N	Y	N	
9	Jordan's Market	1520 Market St	GS	Y	Y	4.99	3.99	N	N	N	
10	Gateway Gas Mart	1231 Market ST	GS	Y	Y	4.00	3.00	N	N	N	
11	Family Dollar	4030 Market St, Boardman	C	Y	Y	3.79	2.95	Y	Y	N	
12	True North (Shell)	504 E Midlothian Blvd	GS	N	N			N	Y	N	
13	Rite Aid	540 E Midlothian Blvd	C	Y	Y	4.49	2.69	N	Y	Y	5.99
14	JQ's Quick Shop	3703 South Ave	SG	N	N			N	N	N	
15	Conroy's Party Shop	3518 South Ave	SG	Y	Y	3.99	2.99	N	Y	N	
16	Gateway Gas Mart	3216 South Ave	GS	Y	Y	4.49		N	N	N	
17	No Name	3211 South Ave	SG	Y	Y		2.99	N	N	N	
18	Save A Lot	2725 South Ave	C	Y	Y	2.40		Y	Y	Y	2.79
19	South Avenue Gas Mart (Crim's Corner)	2325 South Ave	GS	Y	Y	4.29		N	N	N	
20	Quick Check (Shell)	1907 South Ave	GS	Y	Y	3.99	2.99	N	Y	N	
21	Mahoning Snacks	24 Market St	SG	N	N			N	N	N	
22	Lansdowne Supermarket (Red and White)	1721 Lansdowne Blvd	SG	Y	Y	3.50	2.50	N	Y	N	
23	Big Apple Supermarket	1108 McGuffey Rd	GS	Y	Y	3.99	2.99	N	Y	N	
24	Speed Check	1050 McGuffey Rd	GS	Y	Y	3.49	2.49	N	Y	N	
25	Quick Mart	1305 McGuffey Rd	SG	Y	Y	3.99	2.99	N	Y	N	
26	Dollar General	2981 McGuffey Rd	C	Y	Y	3.45	2.40	N	Y	Y	
27	Speed Check	1904 Oak St	GS	Y	Y	4.00	3.00	N	Y	N	
28	Dollar General	1504 Oak St	C	Y	Y	3.45	2.40	N	Y	Y	
29	1010 Quick Stop	Fruit St	SG	Y	Y	4.00	3.00	N	Y	N	
30	Family Dollar	1822 Oak St	C	Y	Y	3.79	2.95	N	Y	N	
31	Campbell Gas Mart	220 McCartney Rd	GS	Y	N	4.50		N	N	N	
32	Dollar Tree	360 McCartney Rd	C	N	N			N	Y	Y	
33	Walgreens	2864 McCartney Rd	C	Y	Y	3.69	2.69	N	Y	Y	
34	Rite Aid	693 McCartney Rd	C	Y	Y	4.49	2.89	N	Y	Y	4.99
35	Dollar General	2896 McCartney Rd	C	Y	Y	3.45	2.40	Y	Y	Y	
36	BP	735 McCartney Rd	GS	Y	Y	4.29	3.29	N	Y	N	
37	Save A Lot	2998 McCartney Rd	C	Y	Y	2.40		Y	Y	Y	2.79
38	Campbell Speed Check	2209 Wilson Ave	GS	Y	N	4.00		N	N	N	
39	Check 'n Go	1739 Wilson Ave	SG	Y	Y	4.00	3.00	N	N	N	

Dairy											
SN	Store Name	Address	Type of store	Whole Milk	Reduced Fat	Price per gal	Price per 1/2 gal	Skim	Cheese	Non-Dairy	Price per 1/2 gal
40	Shehy Gas Mart	786 Shehy Gas Mart	GS	Y	Y	3.99	2.99	N	Y	N	
41	Augusta Supermarket	632 Augusta ST	SG	Y	N	4.29		N	N	N	
42	Tom's Gas and Grocery	1425 Logan Ave	GS	Y	Y	3.59		N	Y	N	
43	Logan Gas Mart	1704 Logan Ave	GS	Y	Y	3.59		N	Y	N	
44	Save A Lot	653 Gypsy Ln	C	Y	N	2.40		Y	Y	Y	
45	Fast Trac (BP)	2703 Belmont Ave	GS	Y	N	4.29		Y	Y	N	
46	Rite Aid	2704 Belmont Ave	C	Y	Y	4.49	2.89	N	N	Y	4.99
47	Walgreens	2560 Belmont Ave	C	Y	N	3.69		Y	N	N	
48	Belmont Drive Thru	1840 Belmont Ave	SG	Y	N	4.00		N	N	N	
49	Dollar General	1370 Belmont Ave	C	Y	Y	2.40		N	Y	Y	3.50
50	Ultimate Gas Station	911 Belmont Ave	GS	Y	Y	4.00	3.00	N	Y	N	
51	Sunoco	590 Fifth Ave	GS	N	Y			N	N	N	
52	Downtown Circle	116 W Federal St	SG	N	N			N	Y	N	
53	Conroy's Party Shop	3629 Glenwood Ave	SG	Y	Y	4.00	3.00	N	Y	N	
54	Family Dollar	2708 Glenwood Ave	C	Y	Y	3.79	2.95	Y	Y	N	
55	Ohio Gas Mart	2637 Glenwood Ave	GS	Y	Y	4.00	3.00	N	N	N	
56	Big A Drive Thru	2525 Glenwood Ave	SG	N	N			N	N	N	
57	Rite Aid	3527 Canfield Rd	C	Y	Y	4.49	2.89	N	Y	Y	4.99
58	Dollar General	3265 Canfield Rd	C	Y	Y	3.45	2.40	N	Y	Y	3.50
59	Walgreens	3800 Tippecanoe Rd	C	Y	Y	3.69	2.69	Y	Y	Y	3.99
60	Family Dollar	3373 Canfield Rd	C	Y	Y	3.79	2.95	Y	Y	N	
61	Sparkle Market	3623 S Meridian Rd	C	Y	Y	2.50	1.75	Y	Y	Y	2.99
62	Express Gas (Fast Trac)	3670 S Meridian Rd	GS	Y	Y	4.98		N	Y	N	
63	Meridian Sunoco	667 S Meridian Rd	GS	Y	Y		2.99	N	N	N	
64	Sun Merchant	3605 Mahoning Ave	GS	Y	Y	3.49	2.99	N	Y	N	
65	Fast Trac (BP)	3602 Mahoning Ave	GS	Y	Y	4.29		N	Y	N	
66	Walgreens	40 N Meridian Rd	C	Y	Y	3.69	2.69	Y	Y	Y	3.99
67	Speedway	1 N Meridian Rd	GS	Y	Y	4.00		N	Y	N	
68	Family Dollar	3345 Mahoning Ave	C	Y	Y	3.79	2.95	Y	Y	N	
69	Dollar General	3309 Mahoning Ave	C	Y	Y	3.45	2.40	N	Y	N	3.50
70	Dollar Tree	3003 Mahoning Ave	C	N	N			N	Y	N	
71	CVS	2846 Mahoning Ave	C	Y	Y	4.29	2.99	of st	Y	Y	3.19
72	Schenley Carry Out	2725 Mahoning Ave	SG	Y	Y	4.00	3.00	N	N	N	
73	Lucky Food Drive Thru	3603 Mahoning Ave	SG	Y	Y	4.00	3.00	N	N	N	
74	Circle K	1821 Mahoning Ave	GS	Y	Y	3.79	2.99	Y	Y	N	
75	Best Oil	1822 Mahoning Ave	GS	Y	Y	4.00	3.00	N	Y	N	
76	Valley Service Center	1564 Mahoning Ave	GS	Y	Y	4.99		N	Y	N	
77	High Street Food Mart (Marathon/C's High)	910 High Street	GS	Y	Y	3.99		N	Y	Y	2.49
78	Isabella's Market	1283 Salt Spring	SG	Y	Y	3.69	2.49	N	Y	N	

			Dairy								
SN	Store Name	Address	Type of store	Whole Milk	Reduced Fat	Price per gal	Price per 1/2 gal	Skim	Cheese	Non-Dairy	Price per 1/2 gal
79	Rashid's Market	2550 Taft Ave	SG	Y	Y	3.69		N	Y	N	
80	BP (Fast Break)	2069 E Midlothian Blvd	GS	Y	Y	2.99	2.69	N	N	N	
81	Sami Quick Stop (Valero)	2115 E Midlothian Blvd	GS	Y	Y	3.49	2.49	N	Y	N	
82	Fast Fuel	4050 Youngstown-Poland Rd	GS	N	N			N	N	N	
83	Family Dollar	500 Youngstown-Poland Rd	C	Y	Y	3.79	2.95	Y	Y	N	
84	Kwik Fill	630 Youngstown-Poland Rd	GS	N	N			N	N	N	
85	Rite Aid	4914 Youngstown-Poland Rd	C	Y	Y	4.49	2.89	N	Y	N	
86	Nemenz IGA Store	655 Creed St	C	Y	Y	2.40	1.75	Y	Y	Y	2.49
	Counts			74	68			16	61	22	
	\$Average					3.84	2.81				3.91
	\$Max					4.99	3.99				5.99
	\$Min					2.40	1.75				2.49

SN	Store Name	Beef											Bread			
		Eggs	Price	Ground	Non Ground	Chicken	Seafood	Processed meat	Fresh Fruit	Fresh Veg	Frozen Fruit	Frozen Veg	White	Price	Wheat	Price
1	Sami Quick Stop	Y	2.49	N	N	N	N	N	N	N	N	N	Y		N	
2	Shell	N		N	N	N	N	Y	N	N	N	N	N		N	
3	Southside Express Mart	N		N	N	N	N	N	N	N	N	N	Y	3.50	N	
4	Uptown Beverage	Y		N	N	N	N	Y	N	N	N	N	Y	2.29	Y	2.29
5	Rite Aid	Y	1.99	N	N	N	N	Y	N	N	N	N	N		N	
6	Family Dollar	Y	1.45	N	N	N	Y	Y	N	N	N	N	Y	1.50	N	
7	Dollar General	Y	1.35	Y	N	N	N	Y	N	N	Y	Y	Y	1.25	Y	1.50
8	Bestway Gas and Convenient Food Mart	Y	2.99	N	N	N	N	Y	N	N	N	N	Y	1.99	Y	2.49
9	Jordan's Market	Y	1.69	N	N	Y	Y	Y	Y	N	Y	Y	Y	3.39	Y	3.39
10	Gateway Gas Mart	Y	1.99	N	N	Y	N	Y	N	N	N	N	N		N	
11	Family Dollar	N		Y	N	N	N	Y	N	N	N	Y	Y	1.50	N	
12	True North (Shell)	N		N	N	N	N	N	Y	N	N	N	N		N	
13	Rite Aid	Y	2.49	N	N	N	N	Y	N	N	N	N	Out	3.29	Out	3.29
14	JQ's Quick Shop	N		N	N	N	N	N	N	N	N	N	Y	2.49	N	
15	Conroy's Party Shop	Y	2.99	N	N	N	N	N	N	N	N	N	Y	2.49	Y	2.49
16	Gateway Gas Mart	Y	1.99	N	N	N	N	N	N	N	N	N	Y	1.99	N	
17	No Name	N		N	N	N	N	N	N	N	N	N	Y	1.99	N	
18	Save A Lot	Y		Y	Y	Y	Y	Y	Y	N	Y	Y			Y	
19	South Avenue Gas Mart (Crim's Corner)	Y	2.29	N	N	N	N	N	N	N	N	N	Y	1.99	N	
20	Quick Check (Shell)	Y		N	N	N	N	Y	Y	N	N	Y	N		N	
21	Mahoning Snacks	N		N	N	N	N	N	Y	N	N	N	N		N	
22	Lansdowne Supermarket (Red and White)	Y	1.99	N	N	Y	Y	Y	Y	N	Y	Y	Y	1.99	Y	1.99
23	Big Apple Supermarket	Y	1.99	N	N	N	N	Y	N	N	N	N	N		N	
24	Speed Check	Y	1.99	N	N	N	N	Y	Y	N	N	N	Y	1.99	N	
25	Quick Mart	Y	1.99	N	N	N	Y	Y	Y	N	Y	N			N	
26	Dollar General	Y	1.35	Y	N	Y	N	Y	N	N	Y	Y	Y	1.25	Y	1.50
27	Speed Check	Y	1.89	N	N	N	N	Y	Y	N	N	Y	Y	1.89	Y	2.39
28	Dollar General	Y	1.35	Y	N	N	Y	Y	N	N	Y	Y	N		N	
29	1010 Quick Stop	Y	2.49	N	N	N	N	Y	Y	N	N	N	Y	2.00	Y	2.49
30	Family Dollar	Out	1.50	N	N	N	N	Y	N	N	Y	Y	Y	2.35	Y	2.35
31	Campbell Gas Mart	N		N	N	N	N	N	N	N	N	N	Y	2.00	N	
32	Dollar Tree	N		N	N	N	Y	Y	N	N	Y	Y	N		N	
33	Walgreens	Y	1.69	Y	N	N	N	Y	N	N	N	Y	Y	2.99	Y	2.99
34	Rite Aid	Y	1.99	N	N	N	N	Y	N	N	N	N	N		N	
35	Dollar General	Y	1.35	Y	N	N	N	Y	N	N	Y	Y	Y	1.25	Y	1.50
36	BP	N		N	N	N	N	Y	Y	N	N	N	Y	2.49	N	
37	Save A Lot	Y	1.69	Y	Y	Y	Y	Y	Y	N	Y	Y			Y	
38	Campbell Speed Check	N		N	N	N	N	N	N	N	N	N	N		N	

SN	Store Name	Eggs	Price	Beef										Bread		
				Ground	Non Ground	Chicken	Seafood	Processed meat	Fresh Fruit	Fresh Veg	Frozen Fruit	Frozen Veg	White	Price	Wheat	Price
39	Check 'n Go	Y	1.99	N	N	N	Y	Y	N	N	N	N	N		N	
40	Shehy Gas Mart	Y	1.99	N	N	N	N	Y	N	N	N	N	Y	1.99	N	
41	Augusta Supermarket	Y	2.99	N	N	N	N	Y	N	N	N	N	Y	2.49	Y	2.99
42	Tom's Gas and Grocery	Y	2.00	N	N	N	N	Y	N	N	N	N	N		N	
43	Logan Gas Mart	Y	1.99	N	N	N	N	Y	N	N	N	N	Y	1.59	N	
44	Save A Lot	Y	1.69	Y	Y	Y	N	Y	Y	Y	N	Y	Y	1.29	Y	2.49
45	Fast Trac (BP)	N		N	N	N	N	Y	Y	N	N	N	N		N	
46	Rite Aid	Y	1.99	N	N	N	N	Y	N	N	N	N	N		N	
47	Walgreens	N		N	N	N	N	Y	N	N	N	Y	Y	2.99	Y	2.99
48	Belmont Drive Thru	N		N	N	N	N	N	N	N	N	N	N		N	
49	Dollar General	Y	1.50	N	N	N	N	Y	N	N	Y	Y	N		N	
50	Ultimate Gas Station	Y	2.50	N	N	N	N	Y	N	N	N	N	Y	1.50	Y	2.50
51	Sunoco	N		N	N	N	N	N	N	N	N	N	N		N	
52	Downtown Circle	Y		N	N	N	N	Y	Y	N	N	Y	N		N	
53	Conroy's Party Shop	Y	2.00	N	N	N	N	Y	N	N	N	N	N		N	
54	Family Dollar	Y	1.45	N	N	N	Y	Y	N	N	N	N	Y	1.50	Y	2.50
55	Ohio Gas Mart	Y	2.49	N	N	N	N	Y	N	N	N	N	Y	1.99	Y	2.49
56	Big A Drive Thru	N		N	N	N	N	N	N	N	N	N	N		N	
57	Rite Aid	Y	1.99	N	N	N	N	Y	N	N	N	N	N		N	
58	Dollar General	Y	1.50	Y	N	N	N	Y	N	N	Y	Y	N		N	
59	Walgreens	Y	1.69	N	N	N	N	Y	N	N	N	N	Y	2.99	Y	2.99
60	Family Dollar	Y	1.50	N	N	N	N	Y	N	N	N	Y	Y	1.50	Y	2.25
61	Sparkle Market	Y	1.25	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1.25	Y	1.50
62	Express Gas (Fast Trac)	Y	2.99	N	N	N	N	N	Y	N	N	N	N		N	
63	Meridian Sunoco	N		N	N	N	N	N	N	N	N	N	N		N	
64	Sun Merchant	Y	2.99	N	N	N	N	N	Y	N	N	N	Y	1.99	Y	2.49
65	Fast Trac (BP)	N		N	N	N	N	Y	Y	N	N	N	N		N	
66	Walgreens	N		N	N	N	N	Y	N	N	N	N	N		N	
67	Speedway	Y	2.49	N	N	N	N	Y	N	N	N	N	Y	2.99	N	
68	Family Dollar	Y	1.50	N	N	N	Y	Y	N	N	N	Y	Y	2.35	N	
69	Dollar General	Y	1.35	Y	N	N	N	Y	N	N	Y	Y	Y	1.25	Y	1.50
70	Dollar Tree	Y		N	N	N	Y	Y	N	N	Y	Y	N		N	
71	CVS	Y	3.19	N	N	N	N	N	N	N	N	Y	Y	2.49	Y	2.49
72	Schenley Carry Out	Y	2.99	N	N	N	N	N	Y	Y	N	Y	Y	2.49	Y	2.99
73	Lucky Food Drive Thru	Y	2.00	N	N	N	N	Y	N	Y	N	N	Y	2.50	Y	2.50
74	Circle K	Y	2.39	N	N	N	N	Y	Y	N	N	N	Y	3.29	Y	3.29
75	Best Oil	Y	2.29	N	N	N	N	Y	N	N	N	N	Y	2.29	N	
76	Valley Service Center	Y	1.99	N	N	N	N	Y	N	N	N	N	Y	2.49	N	
77	High Street Food Mart	N		N	N	n	N	N	Y	N	N	N	Y	2.49	N	
78	Isabella's Market	N		N	N	N	N	Y	N	Y	N	N	Y	2.25	N	

SN	Store Name	Beef											Bread			
		Eggs	Price	Ground	Non Ground	Chicken	Seafood	Processed meat	Fresh Fruit	Fresh Veg	Frozen Fruit	Frozen Veg	White	Price	Wheat	Price
79	Rashid's Market	Y	2.49	N	N	N	N	Y	N	N	N	N	N	N	N	N
80	BP (Fast Break)	N		N	N	N	N	N	N	N	N	N	Y	2.49	Y	2.99
81	Sami Quick Stop (Valero)	Y	2.49	N	N	N	N	Y	N	N	N	N	Y	2.49	Y	3.49
82	Fast Fuel	N		N	N	N	N	N	N	N	N	N	N		N	
83	Family Dollar	Y	1.45	Y	N	N	N	Y	N	N	N	Y	Y	1.50	Y	2.50
84	Kwik Fill	N		N	N	N	N	N	N	N	N	N	N		N	
85	Rite Aid	Y	1.99	N	N	N	N	Y	N	N	N	N	N		N	
86	Nemenz IGA Store	Y	1.25	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1.25	Y	1.50
	Counts	61		14	5	9	14	63	23	11	12	29	52		33	
	\$Average		2.02											2.15		2.47
	\$Max		3.19											3.50		3.49
	\$Min		1.25											1.25		1.50

SN	Store Name	Juice		Dry Goods						Canned Food					Points	Grade	
		100% Juice	Concentrate	Rice	Pasta	Beans	Tortilla	Oats	Cereal	Cereal low sugar	Soup	Low Sodium soup	Vegetable	Low Sodium Vegetable			No sugar Fruit
1	Sami Quick Stop	N	Y	N	Y	Y	N	N	Y	N	Y	N	Y	Y	N	0	1
2	Shell	N	Y	Y	Y	N	N	N	N	N	Y	N	N	N	Y	0.5	1
3	Southside Express Mart	N	N	Y	Y	Y	N	N	N	N	Y	N	Y	N	N	1	1
4	Uptown Beverage	N	Y	Y	Y	Y	N	N	Y	Y	Y	N	Y	Y	N	1	1
5	Rite Aid	N	Y	N	N	N	N	N	Y	Y	Y	N	N	N	N	2	1
6	Family Dollar	N	Y	Y	Y	N	Y	Y	N	N	Y	N	Y	N	Y	2	1
7	Dollar General	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	1.5	1
8	Bestway Gas and Convenient Food Mart	Y	Y	Y	Y	Y	N	N	Y	Y	Y	N	Y	N	N	2	1
9	Jordan's Market	Y	Y	Y	N	Y	Y	Y	N	N	N	Y	N	Y	N	1	1
10	Gateway Gas Mart	Y	Y	Y	N	Y	N	N	Y	N	Y	N	N	N	N	2	1
11	Family Dollar	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	N	2	1
12	True North (Shell)	N	Y	N	N	N	N	N	Y	N	Y	N	N	N	N	3.5	1
13	Rite Aid	Y	Y	N	N	N	N	N	Y	Y	Y	N	Y	N	Y	4.5	1
14	JQ's Quick Shop	N	Y	N	N	N	N	N	Y	Y	N	N	N	N	N	3.5	1
15	Conroy's Party Shop	Y	Y	Y	Y	Y	N	N	Y	Y	Y	N	N	N	N	5	1
16	Gateway Gas Mart	N	Y	N	N	N	N	N	Y	Y	Y	N	N	N	N	6	1
17	No Name	N	Y	N	Y	N	N	N	Y	Y	Y	N	Y	N	N	4	1
18	Save A Lot	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	5.5	1
19	South Avenue Gas Mart (Crim's Corner)	Y	Y	Y	N	Y	N	N	Y	N	Y	N	Y	N	N	6	1
20	Quick Check (Shell)	N	Y	Y	Y	Y	N	N	Y	N	Y	N	Y	N	N	5	1
21	Mahoning Snacks	N	Y	N	N	N	N	N	Y	N	N	N	N	N	N	6	1
22	Lansdowne Supermarket (Red and White)	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	N	6	1
23	Big Apple Supermarket	Y	Y	N	Y	N	N	Y	Y	Y	Y	N	Y	Y	Y	6.5	1
24	Speed Check	Y	Y	Y	Y	N	N	Y	Y	Y	Y	N	Y	Y	N	6.5	1
25	Quick Mart	N	Y	Y	Y	Y	N	Y	Y	N	Y	N	Y	N	Y	6	1
26	Dollar General	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	6	1
27	Speed Check	Y	Y	N	N	N	N	Y	N	Y	N	Y	Y	N	N	7	1
28	Dollar General	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	7	1
29	1010 Quick Stop	Y	Y	N	Y	N	N	N	N	Y	N	N	Y	N	Y	7.5	1
30	Family Dollar	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y	N	7.5	1
31	Campbell Gas Mart	Y	Y	N	Y	N	N	N	Y	Y	Y	N	Y	N	Y	8.5	2
32	Dollar Tree	N	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y	N	N	7	1
33	Walgreens	Y	Y	Y	Y	N	Y	Y	Y	Y	N	N	N	N	N	8.5	2
34	Rite Aid	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	N	N	7.5	1
35	Dollar General	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	N	8	1
36	BP	Y	Y	N	Y	Y	N	N	Y	Y	Y	N	Y	N	N	8	1

SN	Store Name	Juice		Dry Goods							Canned Food					Points	Grade
		100% Juice	Concentrate	Rice	Pasta	Beans	Tortilla	Oats	Cereal	Cereal low sugar	Soup	Low Sodium soup	Vegetable	Low Sodium Vegetable	No sugar Fruit		
37	Save A Lot	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	7	1
38	Campbell Speed Check	N	Y	N	N	N	N	N	N	N	Y	N	Y	N	N	7.5	1
39	Check 'n Go	Y	Y	Y	Y	Y	N	Y	Y	N	Y	N	Y	N	N	8	1
40	Shehy Gas Mart	N	Y	Y	N	Y	N	N	Y	Y	Y	N	Y	N	Y	8.5	2
41	Augusta Supermarket	N	Y	Y	Y	Y	N	N	Y	N	Y	N	Y	N	N	8.5	2
42	Tom's Gas and Grocery	N	Y	N	N	Y	N	N	N	N	Y	N	Y	N	N	7.5	1
43	Logan Gas Mart	N	Y	N	N	Y	N	N	N	N	N	N	Y	N	N	8	1
44	Save A Lot	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	9.5	2
45	Fast Trac (BP)	N	Y	N	N	N	N	N	N	N	Y	N	N	N	N	9	2
46	Rite Aid	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	N	N	9	2
47	Walgreens	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	N	N	8.5	2
48	Belmont Drive Thru	N	Y	N	N	N	N	N	N	N	Y	N	N	N	N	9	2
49	Dollar General	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	8.5	2
50	Ultimate Gas Station	Y	Y	N	Y	N	N	N	Y	Y	Y	N	N	N	N	9.5	2
51	Sunoco	N	Y	N	N	Y	N	N	N	N	Y	N	Y	N	N	9	2
52	Downtown Circle	Y	Y	Y	N	Y	N	Y	Y	N	Y	N	Y	N	Y	8.5	2
53	Conroy's Party Shop	N	Y	Y	Y	Y	N	N	Y	Y	Y	N	Y	Y	N	9.5	2
54	Family Dollar	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y	9.5	2
55	Ohio Gas Mart	Y	Y	Y	Y	N	N	N	Y	Y	Y	N	Y	N	N	9.5	2
56	Big A Drive Thru	N	Y	Y	Y	N	N	Y	Y	Y	Y	N	N	N	N	9.5	2
57	Rite Aid	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	N	N	11	2
58	Dollar General	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	10	2
59	Walgreens	Y	Y	Y	Y	N	N	Y	Y	Y	Y	N	Y	N	N	9.5	2
60	Family Dollar	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y	11	2
61	Sparkle Market	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	11	2
62	Express Gas (Fast Trac)	Y	Y	N	N	N	N	N	Y	N	Y	N	Y	N	N	11	2
63	Meridian Sunoco	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	11	2
64	Sun Merchant	Y	Y	Y	N	N	N	N	N	N	Y	N	N	N	Y	11	2
65	Fast Trac (BP)	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N	11	2
66	Walgreens	Y	Y	N	N	N	N	Y	Y	Y	N	N	N	N	Y	13	2
67	Speedway	Y	Y	Y	Y	N	N	N	N	N	Y	N	Y	N	N	12	2
68	Family Dollar	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y	12	2
69	Dollar General	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	13	2
70	Dollar Tree	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	N	13	2
71	CVS	Y	Y	N	Y	N	N	N	Y	N	Y	N	Y	N	Y	13	2
72	Schenley Carry Out	Y	Y	Y	Y	Y	Y	N	N	N	Y	N	Y	N	Y	13	2
73	Lucky Food Drive Thru	Y	Y	Y	Y	N	N	N	Y	Y	Y	N	Y	Y	N	14	2
74	Circle K	Y	Y	N	N	N	N	N	Y	N	Y	N	Y	N	N	14	2
75	Best Oil	Y	Y	N	Y	N	N	N	Y	Y	Y	N	Y	Y	N	15	2

SN	Store Name	Juice			Dry Goods						Canned Food						Points	Grade
		100% Juice	Concentrate	Rice	Pasta	Beans	Tortilla	Oats	Cereal	Cereal low sugar	Soup	Low Sodium soup	Vegetable	Low Sodium Vegetable	No sugar Fruit	Organic option		
76	Valley Service Center	N	Y	Y	Y	Y	N	N	N	N	Y	N	N	N	N	14	2	
77	High Street Food Mart (Marathon/C's High)	N	Y	Y	Y	Y	N	N	Y	Y	Y	N	Y	Y	N	15.5	2	
78	Isabella's Market	N	Y	Y	Y	N	N	Y	Y	Y	N	Y	N	Y	N	15.5	2	
79	Rashid's Market	N	Y	Y	Y	Y	N	N	N	N	Y	N	Y	N	N	16	2	
80	BP (Fast Break)	Y	Y	N	Y	N	N	N	Y	Y	Y	N	Y	N	Y	16.5	3	
81	Sami Quick Stop (Valero)	Y	Y	Y	N	N	N	N	Y	N	Y	N	Y	N	N	16	2	
82	Fast Fuel	N	Y	N	Y	N	N	N	Y	N	Y	N	Y	N	N	18.5	3	
83	Family Dollar	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y	N	21	3	
84	Kwik Fill	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	21	3	
85	Rite Aid	N	Y	N	Y	N	N	Y	Y	Y	Y	N	Y	N	N	22	3	
86	Nemenz IGA Store	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	23	3	
	Counts	43	85	55	60	48	25	39	67	52	77	1	68	21	32	4		
	\$Average																8.93	
	\$Max																	
	\$Min																	