

TARRANT COUNTY RETAIL FOOD ENVIRONMENT

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INTRODUCTION

This project began in 2014 when Healthy Tarrant County Collaboration (HTCC) convened meetings with residents of Fort Worth's east and southeast sectors to gather their insights into how to address the region's chronic diseases and high morbidity rates. Community leaders pointed out that while many organizations would come over to provide education on what a healthy diet should include and how to prepare foods to be healthier, these well-meaning health educators failed to notice that many of the foods they were recommending were not readily available nearby. The 72-square mile area had just 3 supermarkets, along with an abundance of convenience stores, gas stations, and dollar stores. Among these other stores HTCC had identified a number of bright spots where healthy foods were available. This led to a decision to conduct a comprehensive retail food environment survey that included every store in the region. The project eventually was expanded to include county-wide data collection.

Concurrently, HTCC also began testing additional strategies aimed at expanding healthy food access with the aim of identifying which strategies work well in Tarrant County and that could be replicated in other underserved areas. First, two "Healthy Corner Stores" were chosen by finding owners in high-need areas who were willing to change the layout and offerings of their stores to reflect healthier eating options. Second, HTCC began working with several individuals and organizations seeking to develop urban farms. Currently, five farms are in varying stages of development. Third, HTCC's steering committee and work groups are looking into policy measures that can help support these efforts. With tremendous efforts from the HTCC team, we are excited to provide the complete data set for the entirety of Tarrant County. We hope that access to this information will positively influence the overall food environment, which in turn will ultimately provide for a healthier future for the residents of Tarrant County.

Quynh Anh H. Tran
Intern, Healthy Tarrant County Collaboration 2020-2021

CONTRIBUTORS

Our data collection began in May 2018 and was concluded in June 2020 through the efforts of student interns and classes from several universities, including Johns Hopkins University, Purdue University, Sam Houston State University, Tarleton State University, Texas Woman's University, University of Texas at Arlington, UNT Health Science Center, and Western Governor's University.

The data collection process was developed by Samantha Harrison, MPH, and Katie Pierce, BPH, based on the process used by Johns Hopkins to conduct the Baltimore City's Food Environment Report: 2018. Our surveyors have included:

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Acknowledgement:

Caitlin Misiaszek, Program Officer, Johns Hopkins Center for a Livable Future.

About HTCC:

Healthy Tarrant County Collaboration is a partnership of hospitals, public health organizations, and universities working together to build healthier communities.

TARRANT COUNTY HEALTH STATUS

Based on the most recently published data from the Behavioral Risk Factor Surveillance System survey for Tarrant county in 2015:



- **82.5% of Tarrant County residents consumed fruits and vegetables less than five times per day**



- **24.3% ate at fast food restaurants two or more times per week 66% of residents are overweight or obese**



- **33.3% have high blood cholesterol**
- **10.6% are diabetic, and**



- **7.7% are diagnosed as pre-diabetic (Division of Epidemiology and Health Information, 2015).**

Through the use of this report, community health workers, health providers, and other interested parties can use the hyperlinked maps below to assist patients and residents with finding access to healthy foods near their homes.

HEALTHY FOOD AVAILABILITY INDEX (HFAI)

HTCC utilized a measurement tool adapted from the Baltimore Healthy Food Availability Index, NEMS resources, and communication with Johns Hopkins staff to conduct surveys and data collections. Potential scores range from a low of 0 to a high of 32 points.

Item	Availability Scoring	Total Possible Score
Nonfat/Low-fat Milk	1 pt. if available 1 pt. if > 33% shelf space 1 pt. if > 50% shelf space	3 points
Fresh Fruits	1 pt. if available 1 pt. if > 5 varieties available	2 points
Frozen and Canned Fruit	1 pt. for frozen 1 pt. for canned	2 points
Fresh Vegetables	1 pt. if available 1 pt. if > 5 varieties available	2 points
Frozen and Canned Vegetables	1 pt. for frozen 1 pt. for canned	2 points
Ground Beef	1 pt. if 80% + lean 1 pt. if > 90% lean	2 points
Chicken (skinless, boneless)	1 pt. if available 1 pt. if >2 varieties available	2 points
Fish (fresh or frozen)	1 pt. if available	1 point
Eggs	1 pt. if available	1 point
Pre-packaged Meats (lunch meats, hot dogs, etc.)	1 pt. if low-fat options available 1 point if > 2 varieties available	2 points
Frozen Meals	1 pt. if low-fat options available 1 pt. if > 2 varieties available	2 points
Low-Sodium (140 mg. or less per serving)	1 pt. if low-sodium tuna available 1 pt. if low-sodium soups/broths available	2 points
Baked Goods (tortillas, bagels, English muffins, etc.)	1 pt. if low-fat options available 1 pt. if >2 varieties available	2 points
Bread	1 pt. if whole grain bread available 1 pt. if > 2 varieties available	2 points
Rice	1 pt. if available	1 point
Dried Beans	1 pt. if available	1 point
Cereal	1 pt. if healthier options available. 1 pt. if >2 varieties available	2 points
Juice	1 pt. if 100% juice available	1 point
Total Possible Points		32 points

SURVEYING PROCESS

Our survey was based on the process developed by Johns Hopkins researchers to conduct the data collection for the [Baltimore City's Food Environment Report: 2018](#).

We obtained a list of SNAP certified retail stores from Tarrant County Public Health and sorted the stores by zip code. Working one zip code at a time, trained student team members conducted surveys in gas stations, convenience stores, pharmacies, dollar stores, small and large grocery stores, and specialty food markets by using the HFAI. In total 1280 stores were visited.

Surveys were primarily completed on cell phones and mobile devices with the use of Google Maps and Google Sheets. Survey results were then compiled and higher-scoring and specialty stores (yellow for 11-20 pts., green for 21-32 pts., and blue for specialty stores) have been included in this report.



HEALTHY FOOD AVAILABILITY INDEX DATA ANALYSIS

Across Tarrant County there are a number of low-income neighborhoods that also lack nearby access to stores selling healthy and affordable foods. The lack of easy access to healthy foods is believed to contribute to poor diet, obesity, and other diet-related conditions. These areas are sometimes called food deserts or healthy food priority areas. The USDA's Economic Research Service identifies census tracts as food deserts if they meet the following low-income and low-access criteria:

- Low-income: A poverty rate of 20 percent or greater, or a median family income at 80 percent of the statewide or metropolitan area median family income.
- Low-access: At least 500 persons and/or at least 33 percent of the population lives more than 1 mile from a supermarket or large grocery store (10 miles, in the case of rural census tracts). [i]

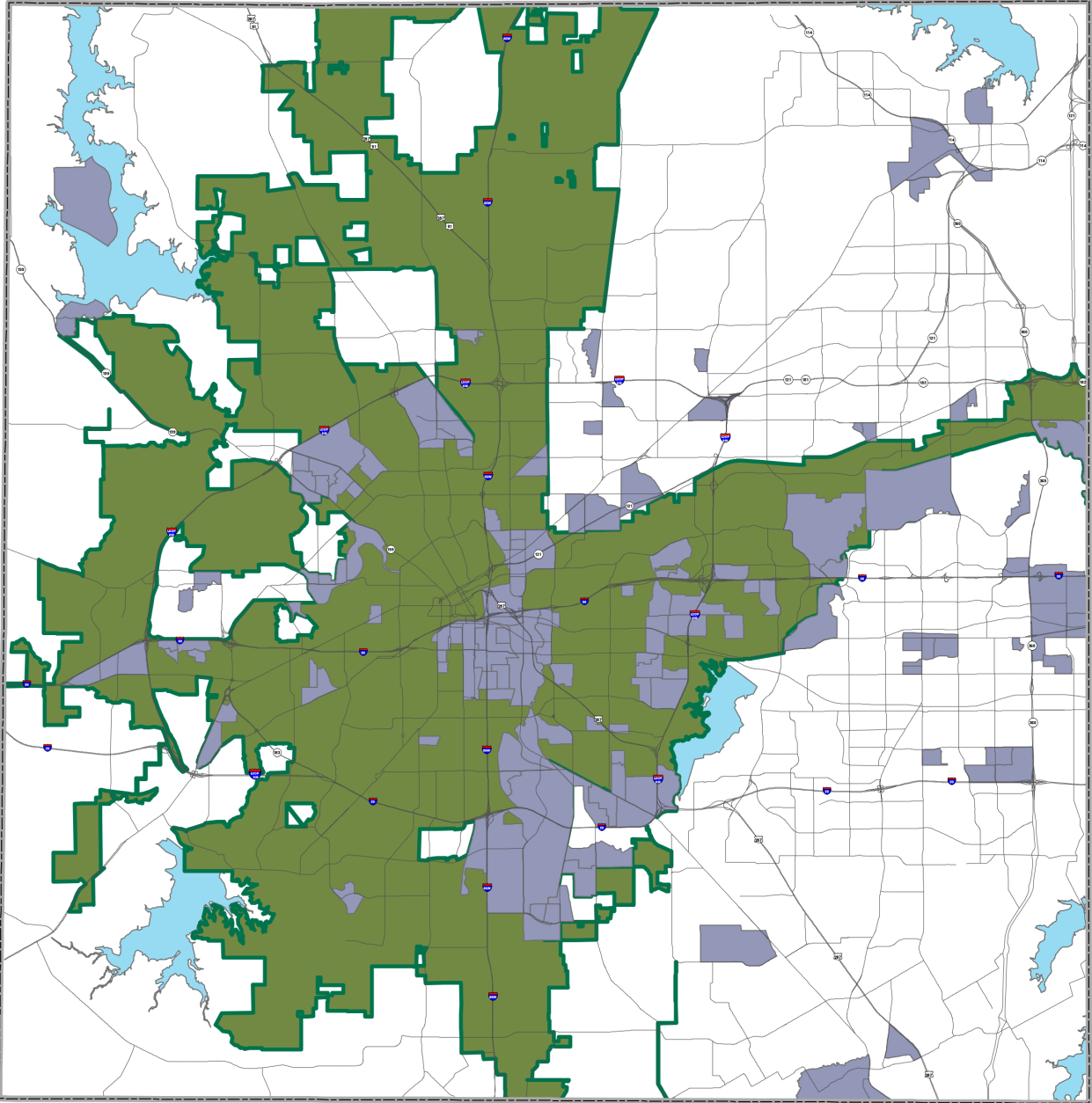
Supermarkets or large grocery stores are defined as food stores with at least \$2 million in annual sales and containing a full range of foods. Across Tarrant County in the past 40 years the number of supermarkets has declined. For example, the Winn-Dixie located at the corner of Oakland and East Lancaster is now a Planet Fitness gym. The Skaggs Alpha Beta located at the corner of Tierney Road and East Lancaster is now a Vietnamese Catholic church. The Tom Thumb located at the corner of Bridge Street and Bridgewood is now the Fort Worth ISD's Teaching and Learning Center. Others, such as the Walmart at the corner of Meadowbrook and Handley, are standing empty.

At the same time, there are retail stores selling some types of food in many of the underserved neighborhoods, including convenience stores, gas stations, dollar stores, or other specialty shops such as butcher or seafood shops.

Our aim with this study was to determine how these other stores contribute to the retail food environment in Tarrant County as a whole, with the hopes of identifying more viable retail options for residents living in identified low-income/low-access census tracts.

HEALTHY FOOD AVAILABILITY INDEX DATA ANALYSIS

Food Deserts* by Census Block Group, Tarrant County, 2018



Legend

-  Food Desert
-  City of Fort Worth
-  Water

* Food deserts are defined as areas that are greater than 1 mile from a grocery store and have a poverty level greater than or equal to 20%.

FOR REFERENCE ONLY

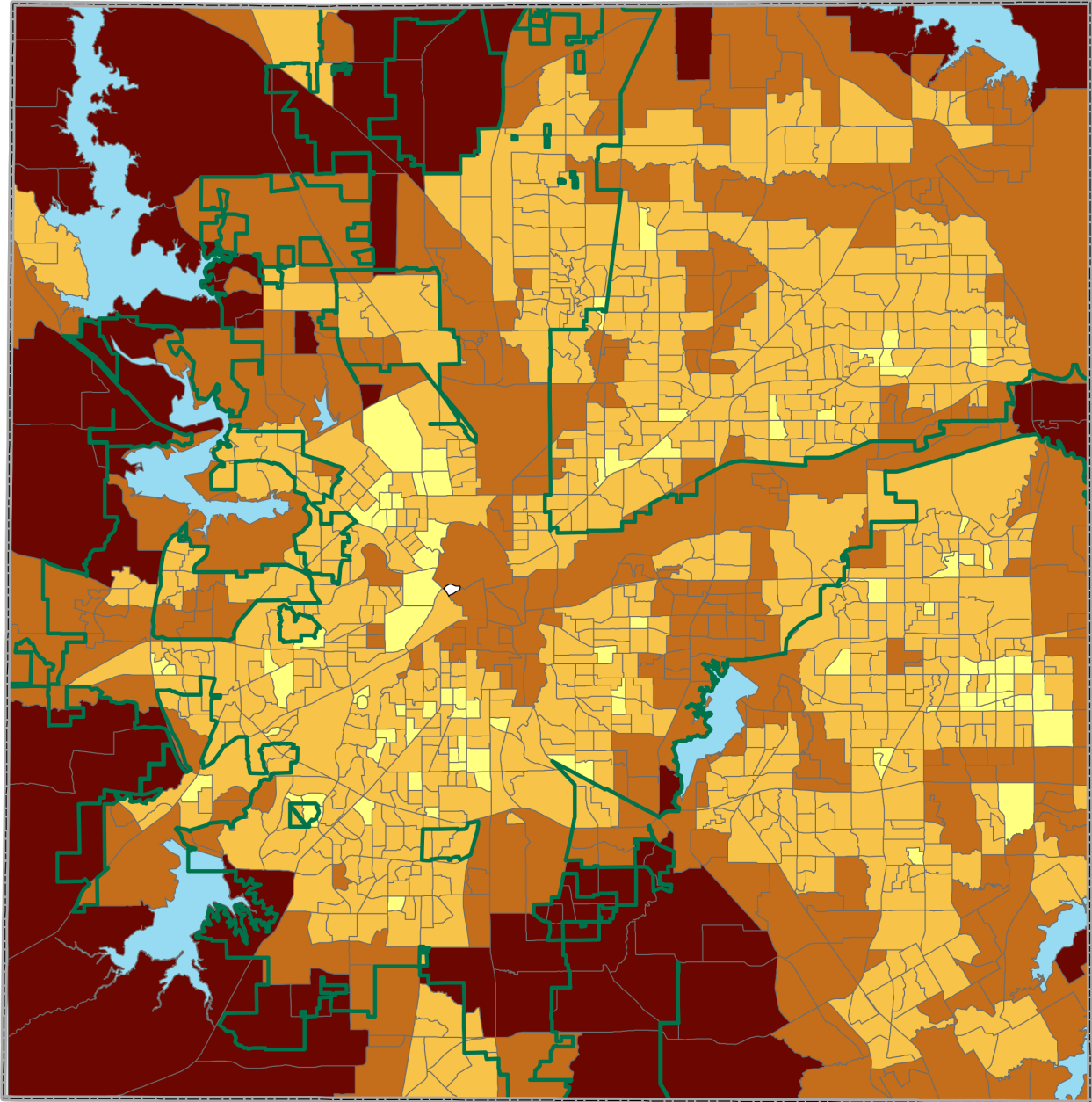


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Sources: TCPH, City of Fort Worth, US Census Bureau

HEALTHY FOOD AVAILABILITY INDEX DATA ANALYSIS

Distance to Nearest Grocery Store by Census Block Group Fort Worth, 2018



Distance in Miles

- <= .5
- 0.6 - 1.5
- 1.6 - 3.0
- > 3.0

- City of Fort Worth
- Water

Not included in analysis

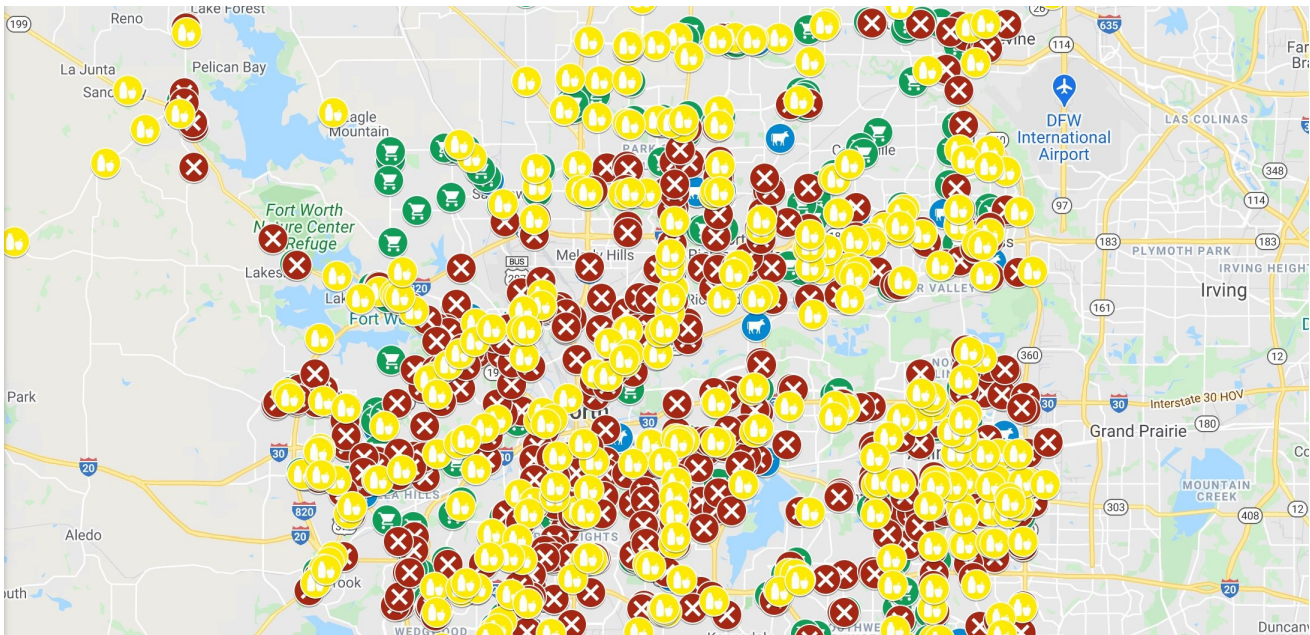
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Sources; TCPH, City of Fort Worth, US Census Bureau

RESULTS

In total, 1280 stores were surveyed. There were several stores, primarily gas stations or convenience stores, that were skipped due to safety concerns. A few stores were closed for remodeling when our surveyors visited, and 51 stores had closed permanently. The **full map** of stores surveyed is found at:

http://bit.ly/all_stores_map



For our purposes, the store categories were primarily defined as follows:

- Supermarkets: Large full-service stores owned by major supermarket corporations, such as Kroger, Albertsons, Whole Foods, etc.
- Small Grocery Stores: Smaller footprint stores offering a wide array of foods. Some of these are corporately owned, such as Aldi, or family owned, such as Save A Lot, Foodland, etc.
- Dollar Stores: Small box discount retail stores, including Dollar General, Dollar Tree, Family Dollar, and 99-Cents.
- Convenience Stores: Small stores selling primarily convenience items and snacks.
- Gas Stations: Convenience stores attached to a gas station
- Pharmacies: Drug stores, such as Walgreens, CVS, etc.
- Specialty Stores: Stores specializing in a particular food item, such as butcher shops, seafood shops, produce markets, and ethnic markets.

SUPERMARKETS

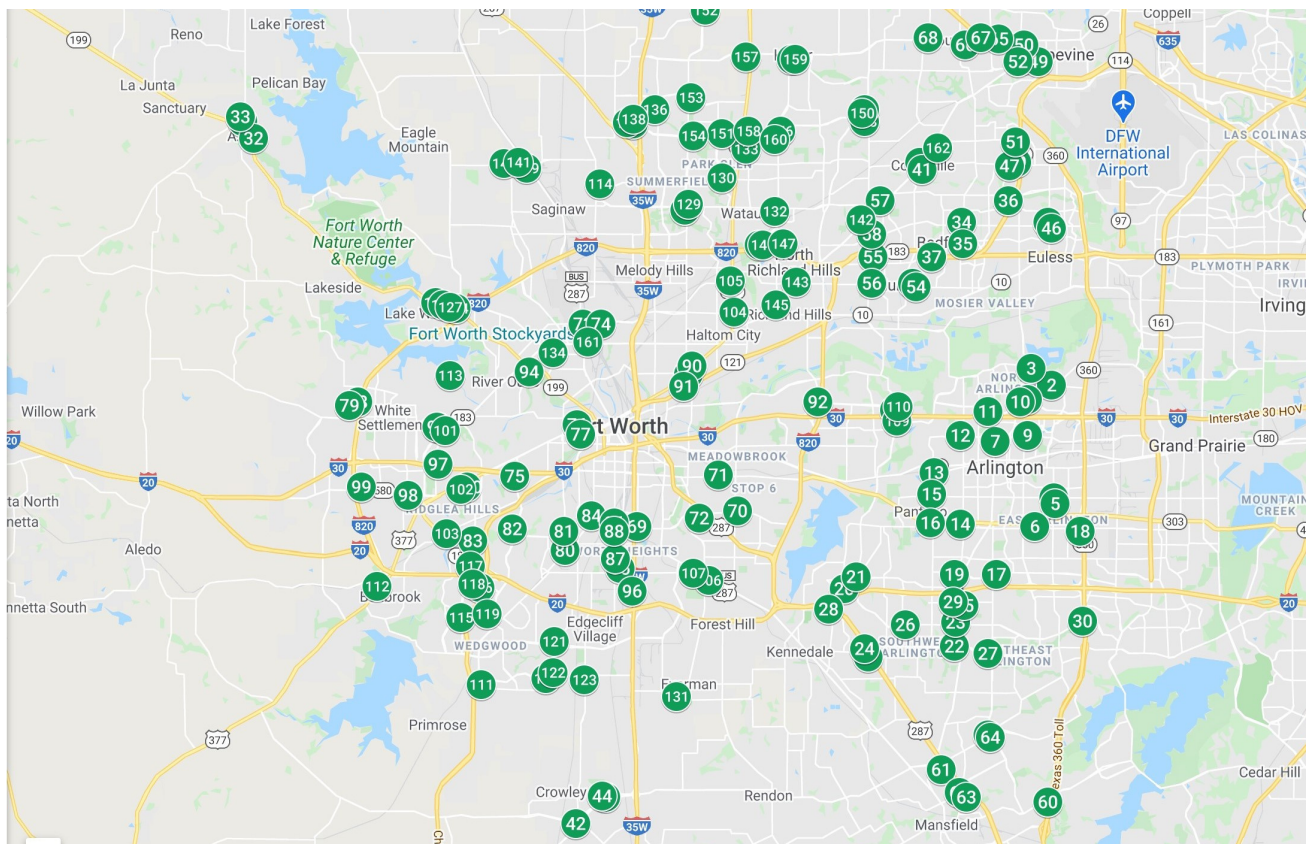
As noted, supermarkets and large grocery stores have annual sales volumes of at least \$2 million and offer a full array of fresh, frozen, and shelf stable foods. These stores also often offer other services, such as pharmacies.

	All Supermarkets	Snap Only	Snap and WIC	No SNAP and / or WIC
Number Surveyed	163	63	100	0
Average HFAI Score	31.03			
Median HFAI Score	32			
Range HFAI Score	11 (22-32)			

Table 1: Healthy Food Availability Index for Supermarkets

Site Map:

http://bit.ly/super_market_map



SMALL GROCERY

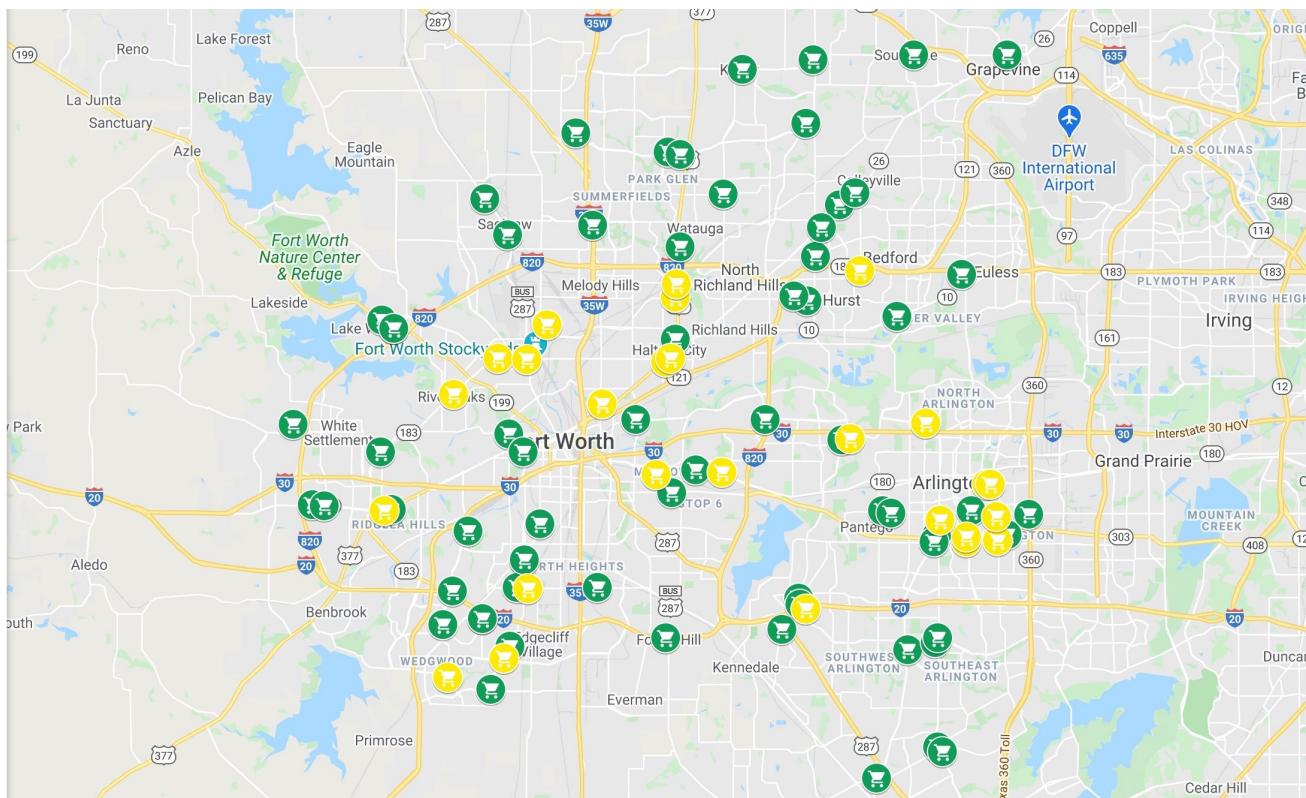
Small grocery stores offer a smaller footprint than supermarkets, but still offer most categories of food. In Tarrant County, small grocery stores include discount stores such as Aldi, Foodland, Save A Lot, and Elrod's Cost Plus, along with some independently owned stores.

	All Small Grocery Stores	Snap Only	Snap and WIC	No SNAP and / or WIC
Number Surveyed	92	73	19	0
Average HFAI Score	23.6			
Median HFAI Score	24			
Range HFAI Score	22 (11-32)			

Table 2: Healthy Food Availability Index for Small Grocery Stores

Site Map:

http://bit.ly/small_grocery



DOLLAR STORES

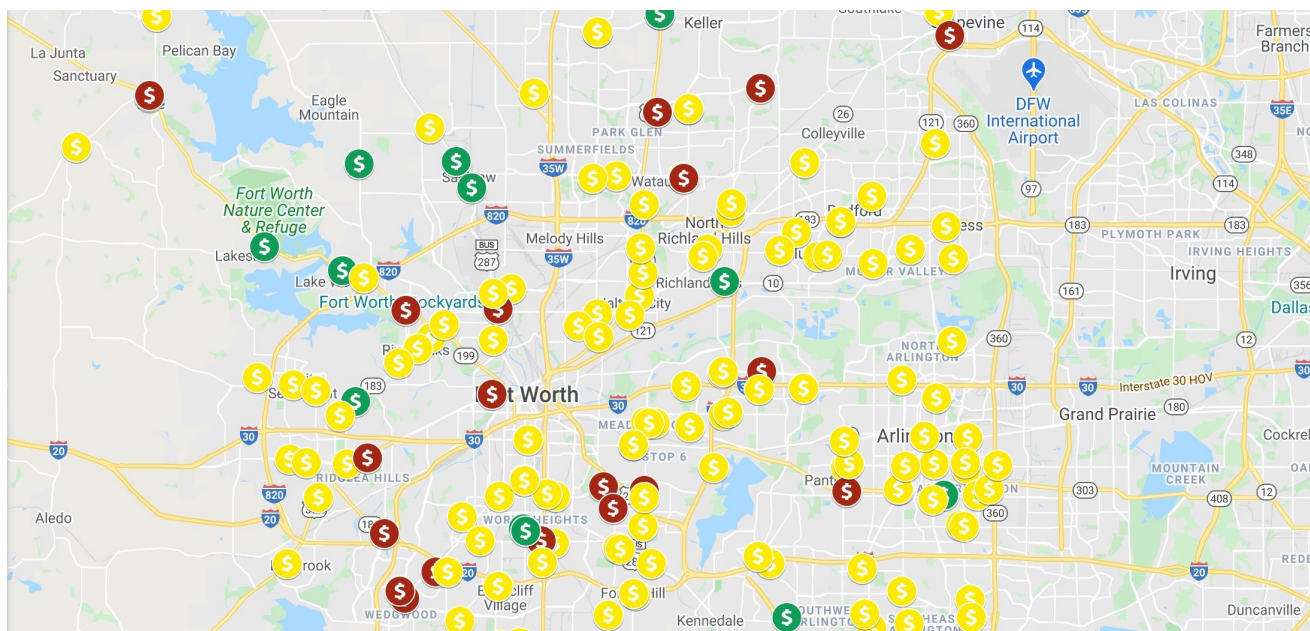
Dollar stores are small box discount retail stores that are either corporately owned or franchised to local owners. In Tarrant County the primary dollar store brands are Dollar General, Family Dollar, Dollar Tree, and 99-Cents Only. Many dollar stores carry a wide array of frozen, canned, and shelf stable grocery staples. Interestingly, the 99-Cents Only stores carry fresh produce. Nationally, Dollar General has been remodeling many of its corporately owned stores to include fresh produce and meats; however, few have been so remodeled in Tarrant County to date.

	All Dollar Stores	Snap Only	Snap and WIC	No SNAP and / or WIC
Number Surveyed	174	174	0	0
Average HFAI Score	14.5			
Median HFAI Score	14			
Range HFAI Score	22 (3-26)			

Table 3: Healthy Food Availability Index for Dollar Stores

Site Map:

http://bit.ly/dollar_stores_map



In December 2019 the City of Fort Worth adopted an ordinance requiring all future new dollar stores built within its city limits to allocate 10% of the floor space to sales of fresh produce, meats, and dairy. This can make it feasible for more residents to buy most of their groceries at a dollar store.

PHARMACIES

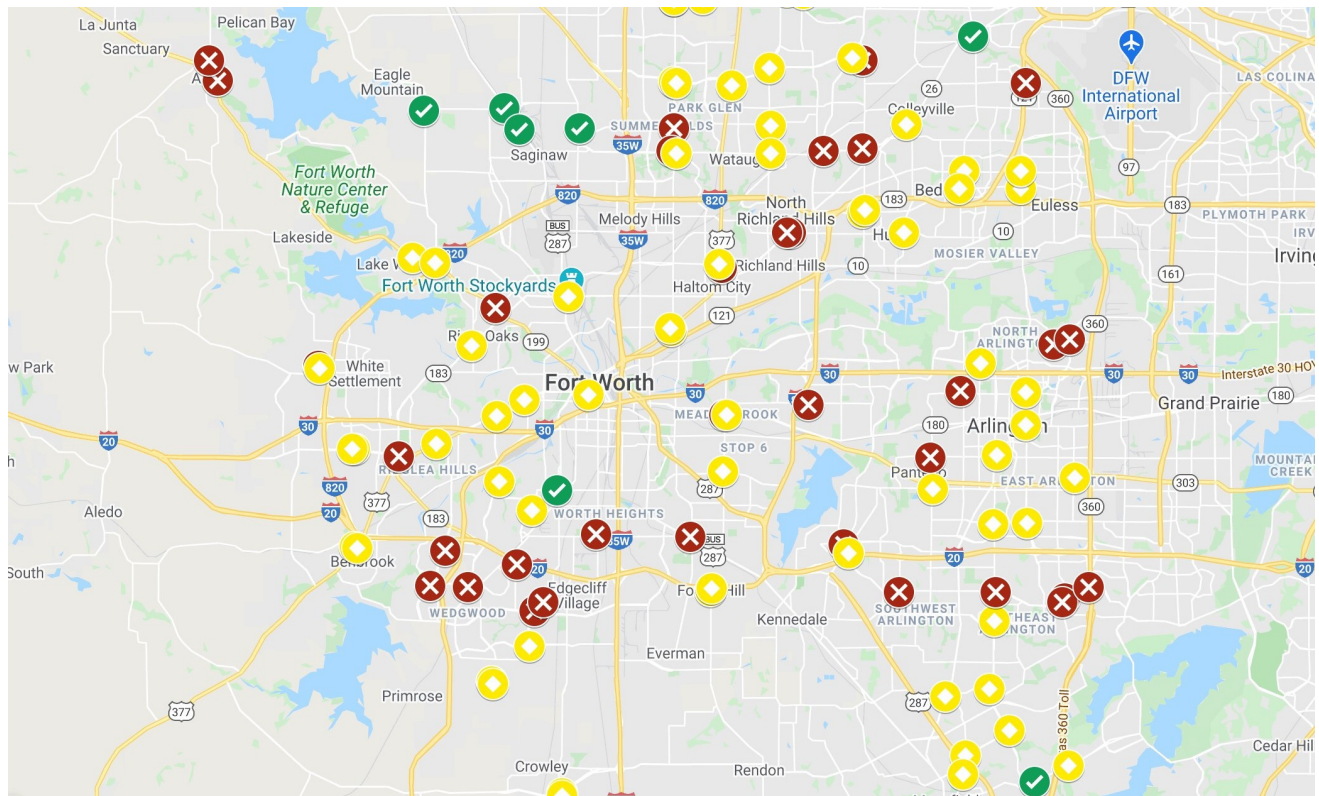
Pharmacies are retail stores that sell prescription and over the counter medications along with an array of other household and personal items. In Tarrant County, many pharmacies also sell some food items. All of the pharmacies surveyed were either CVS or Walgreens stores.

	All Pharmacies	Snap Only	Snap and WIC	No SNAP and / or WIC
Number Surveyed	111	11	0	0
Average HFAI Score	12.8			
Median HFAI Score	12			
Range HFAI Score	12 (5-26)			

Table 4: Healthy Food Availability Index for Pharmacies

Site Map:

http://bit.ly/pharmacies_map



CONVENIENCE STORES

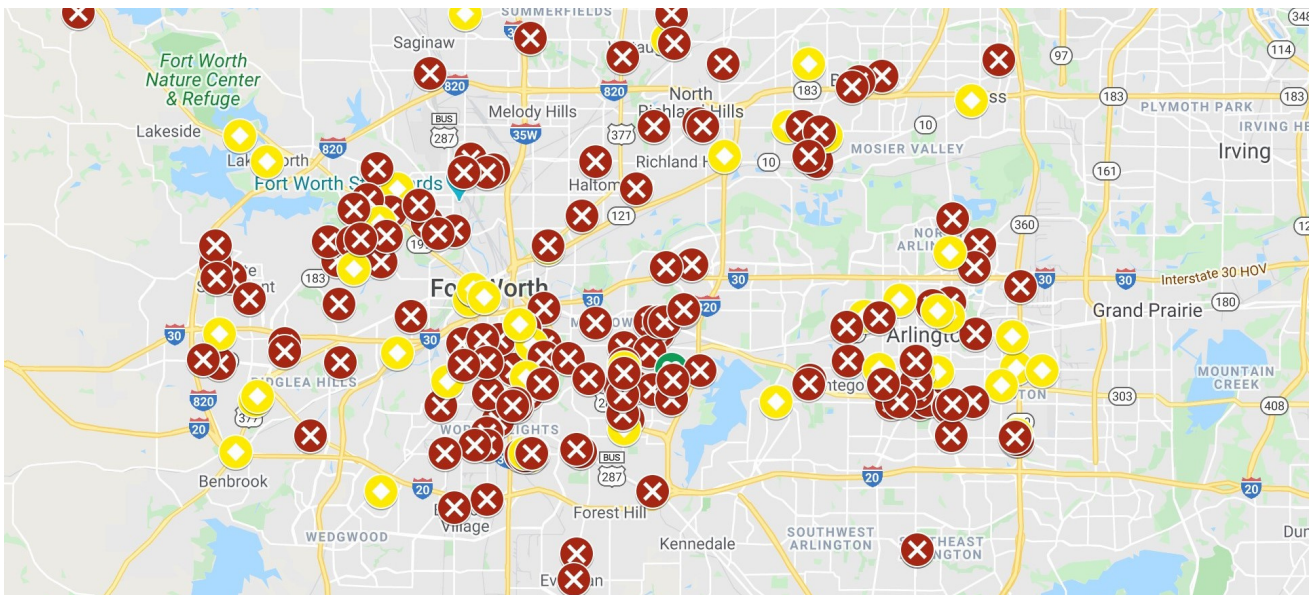
Convenience stores are small retail businesses that stock a range of everyday items, including some food items and non-food items. The available food items are often snack foods such as chips, crackers, candy bars, etc.; however, in Tarrant County a few offer more grocery items including fresh, frozen, or canned fruits and vegetables. Most of the stores also sell tobacco and alcohol, lotto tickets, and offer money order, ATM, or wire transfer services. Many of Tarrant County's convenience stores are locally owned; however, a few are corporately owned (7Eleven, Quick Save, Quick Sak).

	All Convenience Stores	Snap Only	Snap and WIC	No SNAP and / or WIC
Number Surveyed	204	204	0	0
Average HFAI Score	7.7			
Median HFAI Score	7			
Range HFAI Score	23 (0-23)			

Table 5: Healthy Food Availability Index for Convenience Stores

Site Map:

http://bit.ly/convenience_stores_map



GAS STATIONS

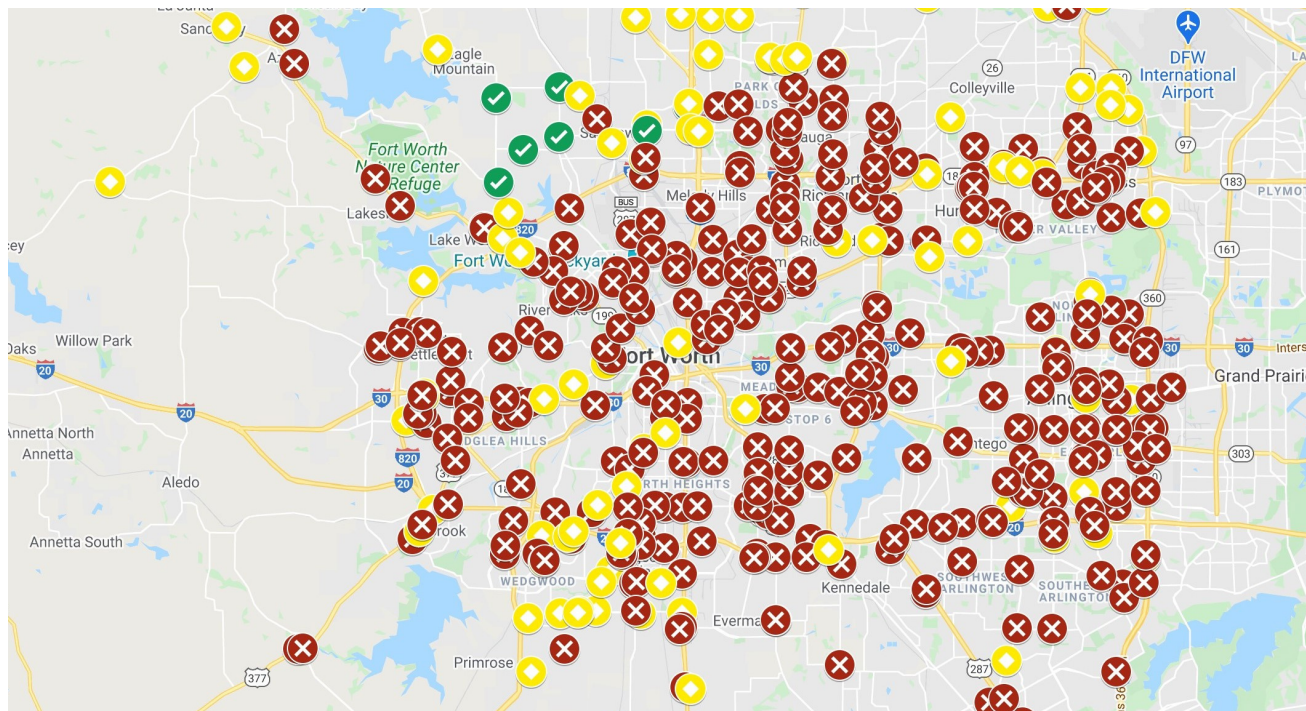
Gas stations are similar to convenience stores, but with added gas service pumps. The stores offer selections of packaged or processed foods and general non-food items. Gas stations often have limited-to-no availability of healthy food options due to its convenient style of in-and-out type of stores. While some national companies own and operate the attached store, others appear to license the store to local owners.

	All Gas Stations	Snap Only	Snap and WIC	No SNAP and / or WIC
Number Surveyed	483	483	0	0
Average HFAI Score	7.9			
Median HFAI Score	7			
Range HFAI Score	24 (0-24)			

Table 6: Healthy Food Availability Index for Gas Stations

Site Map:

http://bit.ly/gas_stations_map



SPECIALTY MARKETS

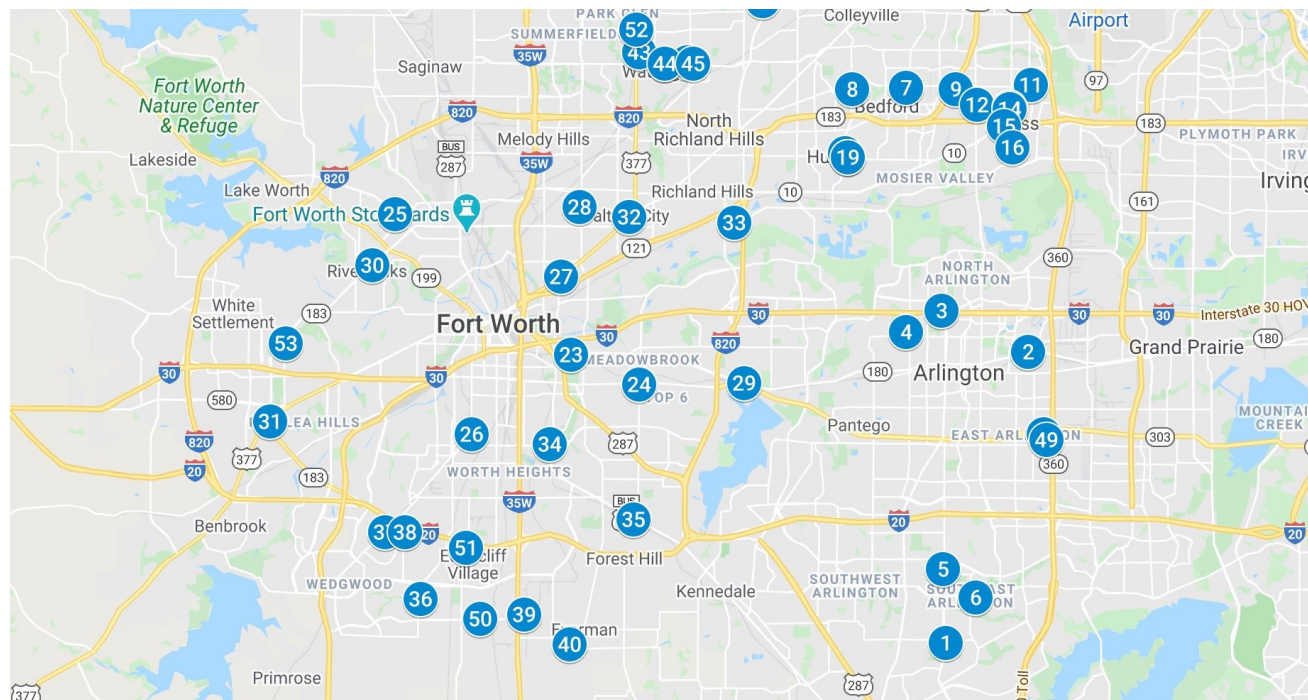
Across Tarrant County we found a number of stores selling a limited array of items; however, the items sold are part of a healthy diet. These included butcher shops selling fresh meats, seafood shops selling fresh fish and seafood, produce markets selling fresh produce, and ethnic stores selling unique items. Due to the limited array of items sold, these stores received low HFAI scores; however, the items they offer can be important to residents looking for those items.

	All Specialty Markets	Snap Only	Snap and WIC	No SNAP and / or WIC
Number Surveyed	53	43	10	0
Average HFAI Score	9.0			
Median HFAI Score	9			
Range HFAI Score	19 (0-19)			

Table 7: Healthy Food Availability Index for Specialty Markets

Site Map:

http://bit.ly/specialty_stores_map



GAMING MACHINES AND ILLEGAL GAMBLING

Many of the convenience stores and gas stations we surveyed had slot machines on the premises. These machines are classified as “coin operated amusement machines” and are legal providing they have received an amusement permit from the city and state and the players receive a prize valued \$5 or less. The issue with the machines is that pretty often the stores allow customers to use these for gambling, and payouts can be in the thousands of dollars.

Stores that have six or more machines meet the state’s definition for a game room and are subject to some regulation through an ordinance adopted by Tarrant County in December 2019. These stores have restrictions on distance from residential areas, and other requirements. The problem we find is that many of the stores with the machines have five or fewer machines, which causes them to not be regulated as game rooms.

At many of the stores with gaming machines, there are other environmental conditions that are not conducive to a healthy shopping environment. For example, at many of these stores, customers are allowed to smoke indoors, even though there are smoke-free ordinances in force. Customers may drink beer while playing the games. Most importantly, many of the stores illegally pay gambling winnings.

GAMING MACHINES AND ILLEGAL GAMBLING

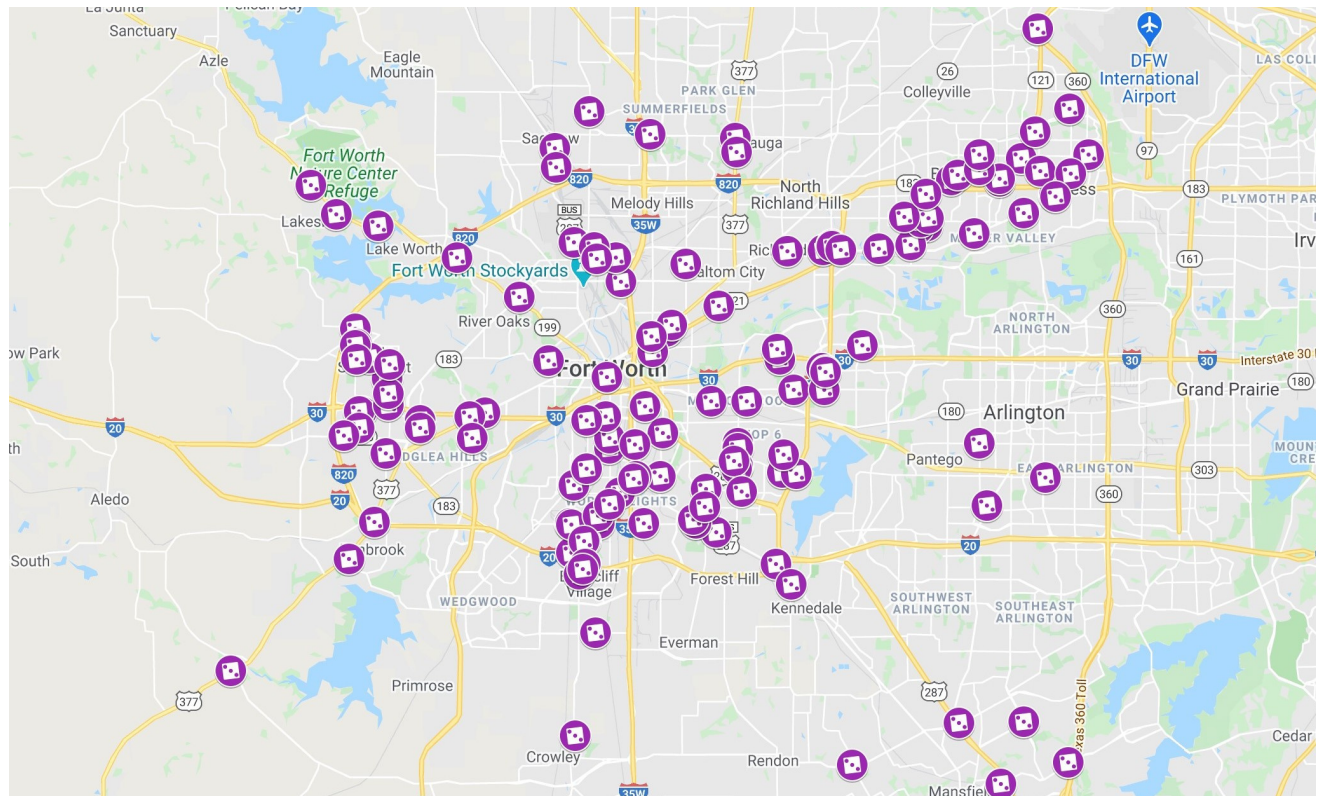
This report just contains the convenience and gas station stores included in our survey, and does not include other establishments that have gaming machines such as bars, vape shops, etc. This category of stores has the lowest average and median HFAI scores.

	All Stores with Game Machines	Snap Only	Snap and WIC	No SNAP and / or WIC
Number Surveyed	144	144	0	0
Average HFAI Score	6.5			
Median HFAI Score	6			
Range HFAI Score	17 (0-17)			

Table 8: Healthy Food Availability Index for Specialty Markets

Site Map:

http://bit.ly/gaming_machines



SUMMARY OF FINDINGS

Store Type	Number Surveyed	HFAI Score			% Snap	% WIC
		Range	Average	Median		
Supermarkets	163	11 (22-32)	32	32	100%	61%
Small Grocery Stores	92	22 (11-32)	24	24	100%	21%
Dollar Stores	174	22 (3-26)	14	14	100%	0%
Pharmacies	111	21 (5-26)	12	12	100%	0%
Convenience Stores	204	23 (0-23)	7	7	100%	0%
Gas Stations	483	24 (0-24)	7	7	100%	0%
Specialty	53	19 (0-19)	9	9	19%	0%

Table 9: Summary of Healthy Food Availability Index for All Stores



DISCUSSION

The built environment affects the type of food sources in a community, and the systems that help meet demand and supply of healthy food. The ubiquitous nature of convenience stores and other retail food purveyors surveyed indicates that the food available at such stores will readily make its way to the hands of community residents. Considering the aforementioned BRFSS findings (page 4 of this report) that two-thirds of Tarrant County's population is overweight or obese, and fewer than one out of five Tarrant residents consumes sufficient servings of fruits or vegetables, the nature of food access in our community is a matter of critical importance. The findings of our study demonstrate that the quality of food and low HFAI score found in such retail food outlets within our community justifies our extensive examination and underscores its potential association with our community health outcomes.

Our study reveals that, as found in studies of other urban areas, Tarrant county convenience stores surveyed account for the largest source of energy dense-nutrient poor (ENDP) foods compared to small grocery stores, pharmacies, and other food establishments (Pend & Kaza, 2020).

Our study meaningfully contributes to local and national knowledge about retail food stores because of its focus on convenience stores. Research on nutrition policies often focuses on the importance of access to a full-service supermarket in maintaining a healthy diet (Vaughan et al., 2017). Yet, unhealthy food purchases are also made from full-service supermarkets (Vaughan et al., 2017) and a few healthy food choices are increasingly available at convenience stores. Thus, unlike studies that focus exclusively on convenience stores or grocery stores, our study includes both options and allows for comparison of the data between various types of food retailers. Ultimately our study findings delineate between the nutritional options found at grocery stores and those available at convenience stores.

The results of our study confirm that, as has been found in studies of other urban geographic locations, (Caspi et al., 2020) Tarrant County's convenience stores and dollar stores, extensively located in low-income neighborhoods where there are few grocery stores, sell primarily energy-dense food of poor nutritional value; although, many of the dollar stores offer an array of healthy grocery staples.

DISCUSSION

Another study supports the findings of our study, reporting that convenience stores and dollar stores collectively accounted for 7% of total food expenditure and were the source of unhealthy food purchases for roughly 20 to 25 % of households. Comparatively, fewer than 6% of households purchased fruits or vegetables in convenience stores (Elbel, 2018). Our findings coupled with these and others suggest that convenience stores are purveyors of junk foods in Tarrant County as they are in other studied locations.

Our study findings also support the role of geography in access to healthy food. Geographical proximity, an aspect of social environment, affects the access to healthy food as it relates to participation in daily activities. Factors such as the ability to juggle work, shopping practices for both food and non-food stores, and transportation opportunities affect the utilization of food establishments and purchase of healthy food (Pend & Kaza, 2020). Our study results echo those of other studies that poor neighborhoods are likely to have a higher density of fast-food restaurants and convenience stores established at closer proximity than other full-service stores (Elbel, 2018).

Considerations of the access to retail food stores are similar for our study as for national studies of food availability and may help explain some findings. The accessibility of retail stores varies for individuals within the same area. People rely on different resources available such as transportation options, their income, and time to access local food stores (Widener, 2018). The older population has lower mobility that may affect their ability to walk, access public transportation, or carry heavy grocery bags. Transportation barriers related to physical or financial limitations exist among the older population who may inhabit alone. According to a report by Pew Research Center, people aged 60 and above account for 22% of US population (73 million) of which 23% (16.7 million) live alone (Livingston, 2020). Transportation arrangements often depend on public service resources or reliance on family members. This affects the access to healthy food for vulnerable populations. Furthermore, the older population have unique nutritional needs whereby poor access to healthy foods pose greater health risks. Lack of affordable healthy foods within a reasonable distance related to interaction of transportation barriers, economic, and geographic conditions play a major role in food choices and shopping practices.

LIMITATIONS

This analysis did not consider the aging population who might have limited access to grocery stores and may depend on public services or familial help to attain groceries. There is inadequate information to analyze the impact of inaccessibility and distance from food stores on the health and eating habits of this population. Food purchases may also occur in nontraditional areas that were not included in this study. Nontraditional food sources in locations that differ from local neighborhood markets is needed to better understand the association between food environments and food purchasing practices.

Since there are fewer options for healthy food in stores within the many of the Tarrant County zip codes included in this study, there is insufficient data to explore the possibility of shopping practices such as reliance on supermarkets and grocery stores in different zip codes from area of residence. Data on the populations that may depend on grocery stores closer to their workplaces was not captured. A study conducted in Pittsburg, Pennsylvania, demonstrated that majority of residents in food desert areas shopped at a full-service supermarket, which was not in their neighborhood (Dubowitz et al., 2015). As reflected by the findings of this study, it is important to involve residents in the establishment of healthy food retail stores according to the needs and preferences of the population.

Insufficient data affects the quality of data presented in the analysis. There were several stores, including several gas stations and convenience stores, which were skipped due to safety concerns. Convenience stores accounted for the largest proportion of retail food outlets surveyed, which constitute a nonignorable outlet for the purchase of foods, compared with other types of small food stores such as pharmacies, dollar stores, and small grocery stores. The range of food choices in the retail stores captured in this study highlights the limited food choices for this population.

Convenience stores that are at closer proximity are frequently utilized in comparison to larger food stores in further locations. Moreover, convenience stores are notable purveyors of junk foods (Elbel et al., 2015). Accessibility to retail food stores with nonhealthy foods decreases residents' diet quality. There is inadequate knowledge of the intended use of retail food stores and preferred products, especially types of foods, for purchase in supermarkets, grocery stores, dollar stores, pharmacies, convenience stores, gas stations, specialty markets, gaming machines and illegal gambling centers.

LIMITATIONS

This study did not focus on the proportion of privately owned convenient stores versus corporate chain stores. Difference in business systems for these two types of establishments affects the supply of healthy food. The retail sector has been affected by economic policies that support corporate retail chains, public- and private-sector loan policies that favor home ownership for whites, and land- use policies that facilitate development of predominately wealthy and white suburban neighborhoods (Massey & Denton, 2003). To enable successful implementation of an intervention, it is important to consider the unique challenges and differences in resources and capabilities across multiple social determinants (Winkler et al., 2019)

RECOMMENDATIONS FOR APPLICATION TO PRACTICE

Limited access to healthy food is a representation of the burdens related to environmental justice that affects equitable access to healthy food sources. The study above focused on the supply side of healthy food access by surveying eight sources of food in Tarrant county (supermarkets, grocery stores, dollar stores, pharmacies, convenience stores, gas stations, specialty markets, gaming machines and illegal gambling centers). Challenges related to food environment must be overcome to ensure greater access to healthy food for urban food deserts.

Intervention strategies

Four intervention strategies based on current status of Tarrant county are suggested to promote accessibility of healthy foods:

- Community fridges
- Virtual Supermarkets
- Mobile Markets
- 'Gardens on the Go'

RECOMMENDATIONS FOR APPLICATION TO PRACTICE

Several cities around the United States have implemented to the use of community fridges. The establishment of conventional and commercial fridges plugged into cords near apartments and business to supply free healthy food is one key feature to increase access to healthy food in lower income households (Evans, 2020). Communities willing to embrace the use of fridges set up in priority areas or near businesses by taking from and adding to it is seen as an emerging practice in cities across the United States (Groell, 2020). In setting up community fridges, safety guidelines must be considered outlining cleaning practices and the types of healthy food allowed. Currently, a 1956 Texas Health and Safety law aimed at preventing children from becoming locked inside abandoned refrigerators and freezers, combined with zoning restrictions on where large boxes may be placed in the community, are problematic for this solution.

Virtual grocery stores are an emerging path to access healthy food based on the ongoing Supplemental Nutrition Assistance Program (SNAP) Online Purchasing pilot by the USDA. The 2014 Farm Bill is set for implementation after the end of the pilot in 2021. Several states, including Texas, are participating in the SNAP Online Purchasing pilot. This will allow eligible residents to purchase healthy food online for delivery. Eight retailers nationally are eligible to provide the service namely Amazon, Dash's Market, Fresh Direct, Hy-Vee, Inc., Safeway, ShopRite, Walmart Stores Inc., and Wright's Markets, Inc. (USDA, 2020). Long term efforts to sustain access to healthy food should consider technological advances and public health climate such as the current COVID-19 pandemic, that further restrict the existing availability of healthy food sources. Follow up of existing state and national policy and resources is paramount to future planning.

Concurrently, establishment of virtual supermarkets in local public centers is beneficial in bringing healthy food close to residents. Baltimore City Health Department provides a great model that allows the department to act as a bridge between a major food source and the residents to reduce transportation and distance barriers (Benfield, 2017). This approach is applicable to the Tarrant County area whereby food would be ordered by residents through the supporting organization and collected by residents at a designated location that is easily accessible to majority of residents on particular days. Implementation of this intervention is especially beneficial where strong community partnerships are developed with public centers and local farmers or healthy food sources.

RECOMMENDATIONS FOR APPLICATION TO PRACTICE

Establishing a mobile market to serve residents in high priority areas is a major step to providing healthy food with ease of access. Tarrant Area Food Bank is considering starting a mobile grocery truck. Small scale farm and garden owners often require a greater sense of confidence that there is market for their investment or incentives for their products (Monson, 2016). Existing funds dedicated to food security must be leveraged to invest in healthy food vendors with similar goals as the forementioned Tarrant Area Food Bank. Acquiring input from community members in operational decisions such as location and timing of community visits, access, pricing, and choice of products has proven successful for community-based interventions (Ramirez et al., 2017). Currently, one farm owner in Weatherford Texas serves parks and businesses in Dallas, Parker and Tarrant counties (Bahari,2015). Partnership with existing interventions and private mobile store owners is a great foundation for future sustainability. These further benefits local farmers by widening their demand and encouraging greater investment in urban farming around the county.

Initiation of food distribution programs require clear protocols of the logistics of distribution and evaluation of community response. The Gardens on the Go program is a promising intervention that sells wholesale priced bags of fresh produce at cost. Inclusion of reputable community centers to distribute free fresh produce when available or at subsidized prices is key in fighting food insecurity for residents in low-income zip codes, such as in the zip code 76104 in Tarrant County. Buy-in from residents is essential to maintaining trust and credibility, especially with the change in operational costs that may affect the pricing of healthy food. To maintain pricing and availability of food, Gardens on the Go program would benefit from a strategy by the Agricultural Marketing Service (AMS) to partner with regional and local distributors (USDA, 2021).

DIRECTIONS FOR FUTURE RESEARCH

Studies exploring associations between food environments and food purchasing behaviors have been limited by the absence of data on where food purchases occur. It would be beneficial to explore studies on food accessibility other than dependence on traditional neighborhood market.

To expand this program, consideration should be given to resident perceptions of healthy food availability as major stakeholder of the programs. This should include aspects of their understanding of healthy food, shopping practices, and insights on their eating habits and health goals or conditions. Further consideration should be given to consider elderly population, racial minorities, economically poor population, and their access to healthy food.

In accordance with state laws, zoning and land use must be researched to determine land allocation for residential, commercial or industrial use in Tarrant County. Zoning laws are likely to affect the establishment of full-service grocery stores, supermarkets, and future interventions concerning long-term structures that will act as healthy food sources.

Future studies should consider the supply chain of healthy food, by using the existing mapping of urban farms and community gardens near and in Tarrant County. In establishing mobile markets, further research is needed to determine food sources and sustenance through funding. This can be achieved by researching documented business strategies, research into successful mobile markets, and developing financing and funding plans that involve public-private partnerships (Healthy Food Access, 2020).

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