

Tarrant County Food Desert Project

Nutrition Environment Assessment Report

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1. INTRODUCTION

Food Desert

Food desert is defined as urban neighborhoods and rural towns without ready access to fresh, healthy, and affordable food.¹ Food deserts are usually found in impoverished areas where there is a lack of grocery stores, farmers' markets, and healthy food providers. Instead, food deserts are heavy on convenience stores and quickie marts that provide mostly processed food that are high in calories and low in nutrients. These foods are known contributors to the nation's obesity epidemic.² The United States Department of Agriculture Economic Research Service has outlined a map that identifies census tracts that are food deserts. USDA, Treasury and Department of Health and Human Services have defined a food desert as a census tract with a substantial share of residents who live in low-income areas that have low levels of access to a grocery store or healthy, affordable food retail outlet. Using the census tract as a unit of analysis for identifying food deserts, USDA, Treasury and HHS will give funding priority to projects and interventions that establish healthy retail outlets in defined food deserts.

Census tracts qualify as food deserts if they meet low-income and low-access thresholds:

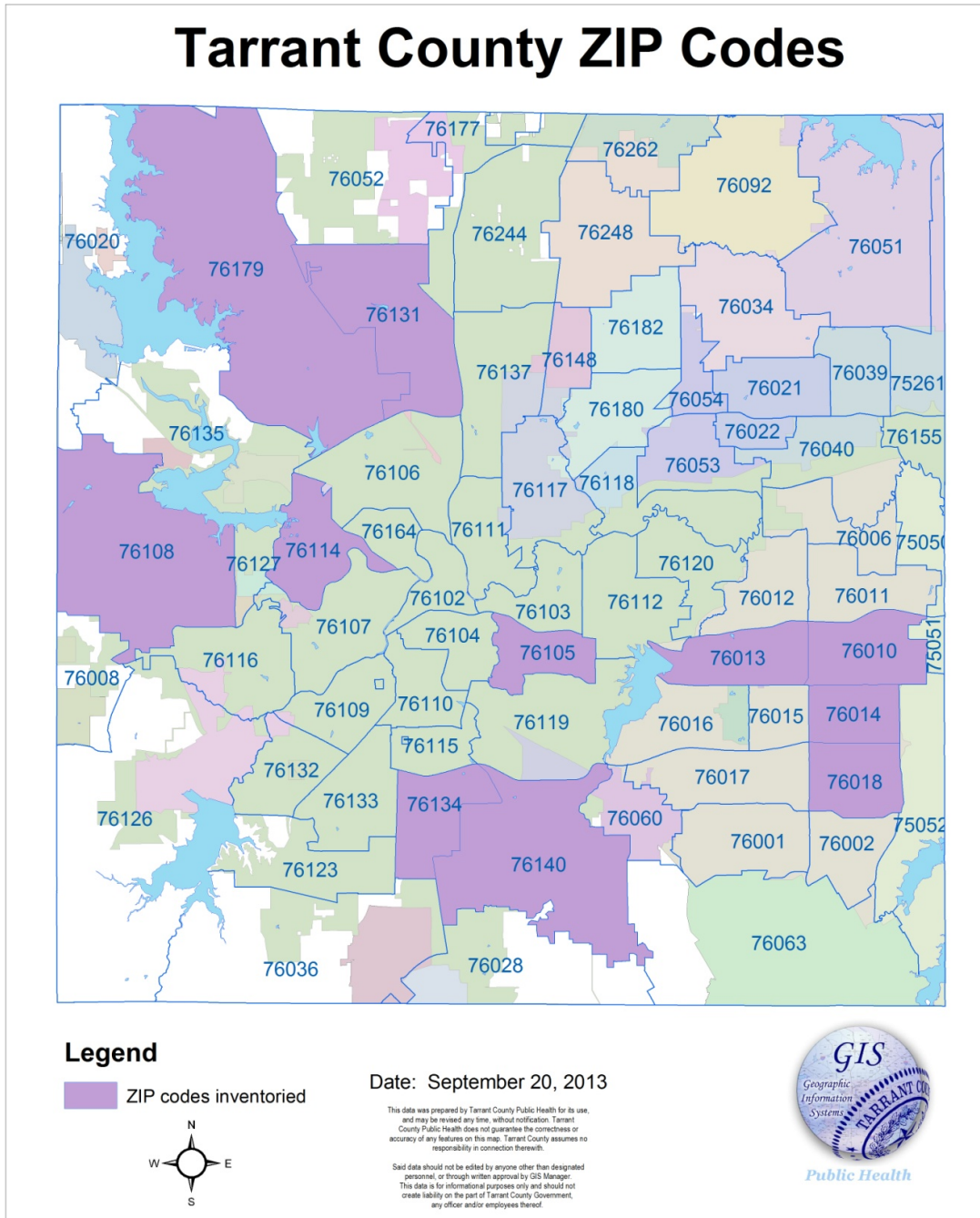
1. They qualify as "low-income communities", based on having: a) a poverty rate of 20% or greater, OR b) a median family income at or below 80% of the area median family income; AND
2. They qualify as "low-access communities", based on the determination that at least 500 persons and/or at least 33% of the census tract's population live more than one mile from a supermarket or large grocery store (10 miles, in the case of non-metropolitan census tracts).¹

Tarrant County Public Health aims to increase access to affordable fruits and vegetables in the workplace and to reduce barriers for low-income families shopping at farmers markets.² Tarrant County Public Health received funding from the Texas Department of State Health Services (DSHS) to perform a local assessment of areas of Tarrant County that were identified as "food deserts". Texas Nutrition Environment Assessment in Stores (TxNEA-S) surveys were conducted in grocery and convenience stores in 11 ZIP codes across Tarrant County. By doing this, complete local data on healthful food availability, cost and quality for these areas were obtained, which will show needs by grocery stores, convenience stores, or small retailer with regard to healthy food.

The findings will be shared with decision makers in hopes that policy and environmental changes can be made to increase availability of healthy, affordable and nutritious foods in the food deserts. This information will also be shared with the Tarrant County Food Policy Council whose role is to advocate for access to healthy foods for all residents of the county.

Areas Assessed

Eleven ZIP code areas across Tarrant County were defined as “food deserts” after evaluation using census block groups. Proximity to supermarkets (Section 2.2), and vehicle access were taken into consideration in determining these areas. Below is the map with 11 assessed ZIP codes highlighted.



2. Methods

2.1 GIS and Mapping Access

For the purposes of this study, full service grocery stores were defined as those retail food establishments providing dry, canned and frozen foods, fresh produce, meat and dairy.³ The stores could be part of a chain or independent, and any size as long as the preceding criteria were met.

Store information was retrieved from health permit data from Tarrant County Public Health and the cities of Arlington, Fort Worth, Grand Prairie, Euless and North Richland Hills, and was geo-coded by address and then located and matched to aerial photographs of the actual buildings, and then stored in a geo-database for analysis.

Walking and driving distance and time were determined for each area of analysis. Distance to more than one store from different companies or owners was determined as a proxy for variety, to add depth to the characterization.^{4,5,6} Distance values were determined based on shortest path street distance from each block group centroid (polygon center) to a store, rather than Euclidean distance. This method has been chosen because Euclidean distance does not take into account physical barriers, such as bodies of water; rather, it is merely the straight line distant between two points. In addition, using this method allowed for the calculation of drive time as well. Time values were based on speed limit attribute data in the street centerline file. The distance analysis was performed in ArcGIS 10 using the Network Analyst extension.

2.2 Samples: All Grocery and Convenience Stores within ZIP Codes Determined as "Food Deserts"

The 11 inventoried ZIP codes were chosen based on the number of blocks within that ZIP code that were further than three miles away for both the first and third grocery store in the urban areas and further than five miles in the outer, less populated ZIP codes. The exception to this was areas that had a high number of census block groups whose residents use some other means than driving alone to work, such as carpooling or using public transportation. In these instances, the cutoff for inclusion drops to greater than one mile distance for the majority of census blocks in that ZIP code, 76010 for example.

2.3 Survey Methods

2.3.1 Texas Nutrition Environment Assessment in Stores (TxNEA-S) Survey Tool

The TxNEA-S tool was adapted from Nutrition Environments Measures Survey in Stores tool (NEMS-S) by DSHS to include foods culturally appropriate for Texas communities.

TxNEA is a tool that assesses particular components of the nutrition environment. These components include the availability, cost, and quality of foods recommended by the Dietary Guidelines for Americans. It contains 14 different categories of food, with a total of 134 items.⁷

2.3.2 Survey Administration

The surveys were administered by Tarrant County Medical Reserve Corps volunteers and temporary employees from May 21st to September 9th, 2013. The Medical Reserve Corps surveyed the first three ZIP codes 76114, 76140, 76014, and the remaining eight ZIP codes were assessed by five temporary employees of Tarrant County Public Health.

Before collecting data using TxNEA, training on how to assess stores, (including obtaining permission prior to assessment, usage of the survey itself, and calculating and comparing prices for the same item), was conducted. Training materials were obtained from DSHS and a one-page key points tool was developed for the team to refer to while in store conducting the assessment.

Surveys administered were returned to the program manager on a daily basis and entered by the data entry team into the Microsoft Excel database and then imported into SAS statistical software for analysis. Due to the large amount of variables in the database, a new Excel database, with variable names corresponding to the item number and category number in the survey, was set up and used during this project to help better perform data entry and data analysis.

2.3.3 Survey Analysis

Percentage of convenience stores and grocery stores were calculated within each ZIP code area, and chi-square tests were performed to test the significance between the convenience store percentage and the grocery store percentage.

For all convenience stores and grocery stores surveyed the following results are presented:

- Percentage of stores with at least one item available
- Average number (and percentage) of available food within each of the 14 food categories for all 11 ZIP codes
- Percentage of stores carrying 0, 1, 2, 3-5, > 5 items in each of the 14 food

categories

- Percentage of stores carrying each item

Prices analyses were conducted among the five categories that were most frequently available in all convenience stores and grocery stores, and average prices were calculated for items with unit prices available in at least 10 percent of the convenience stores. Price per piece was not used in analysis, because most of the grocery stores which sold items in pieces did not have scales to weigh three pieces, which made the conversion for unit price impossible. Prices of qualified items in convenience stores and grocery stores were presented.

3. RESULTS

3.1 Overview ounce

3.1.1 Number of Stores Surveyed

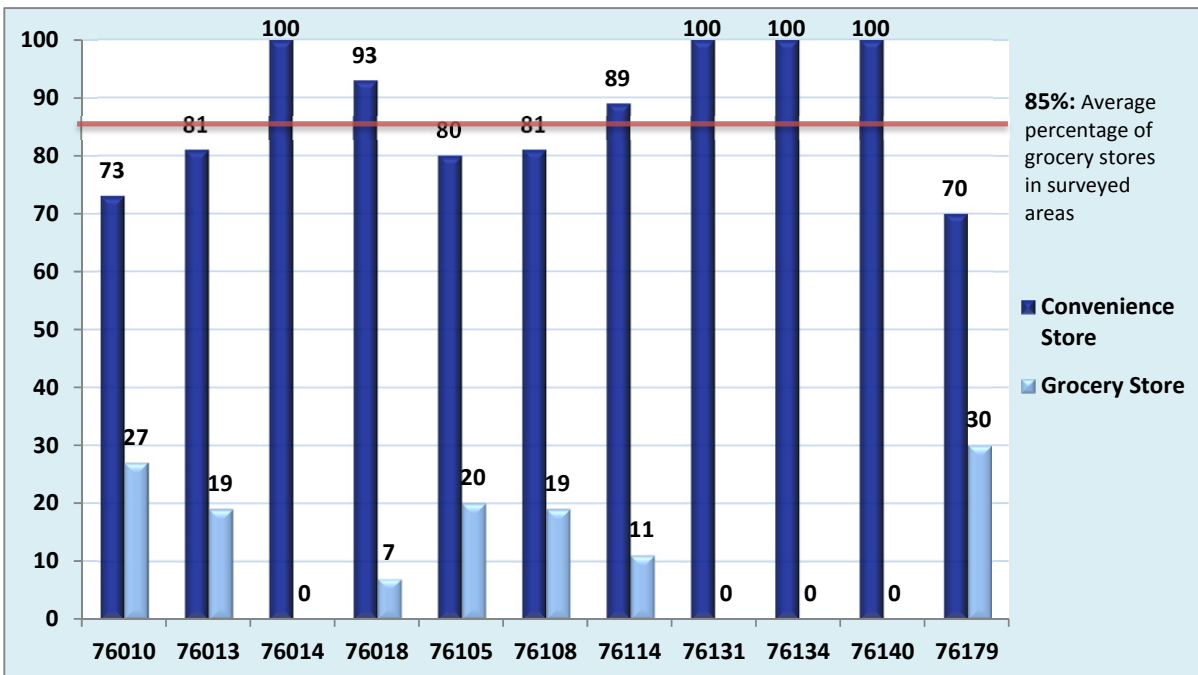
In the 11 ZIP codes, 23 of 26 grocery stores and 119 of 139 convenience stores were assessed.

3.1.2 Convenience Store Percentage VS. Grocery Store percentage in Each ZIP Code

This study focused on only grocery and convenience stores, and their percentages in these areas added up to 100 percent.

- In the 11 ZIP codes, the average percentage of convenience stores out of all grocery and convenience stores was 86 percent, with a range from 70% to 100%. The difference between convenience stores and grocery stores was statistically significant ($p < 0.01$).
- ZIP codes 76014, 76131, 76134, 76140 had no grocery stores.
- ZIP code 76179 had the lowest percentage of convenience stores at 70 %

Figure 3.1.1 Percentage of convenience stores VS. grocery stores in 11 ZIP code areas, Tarrant County, 2013



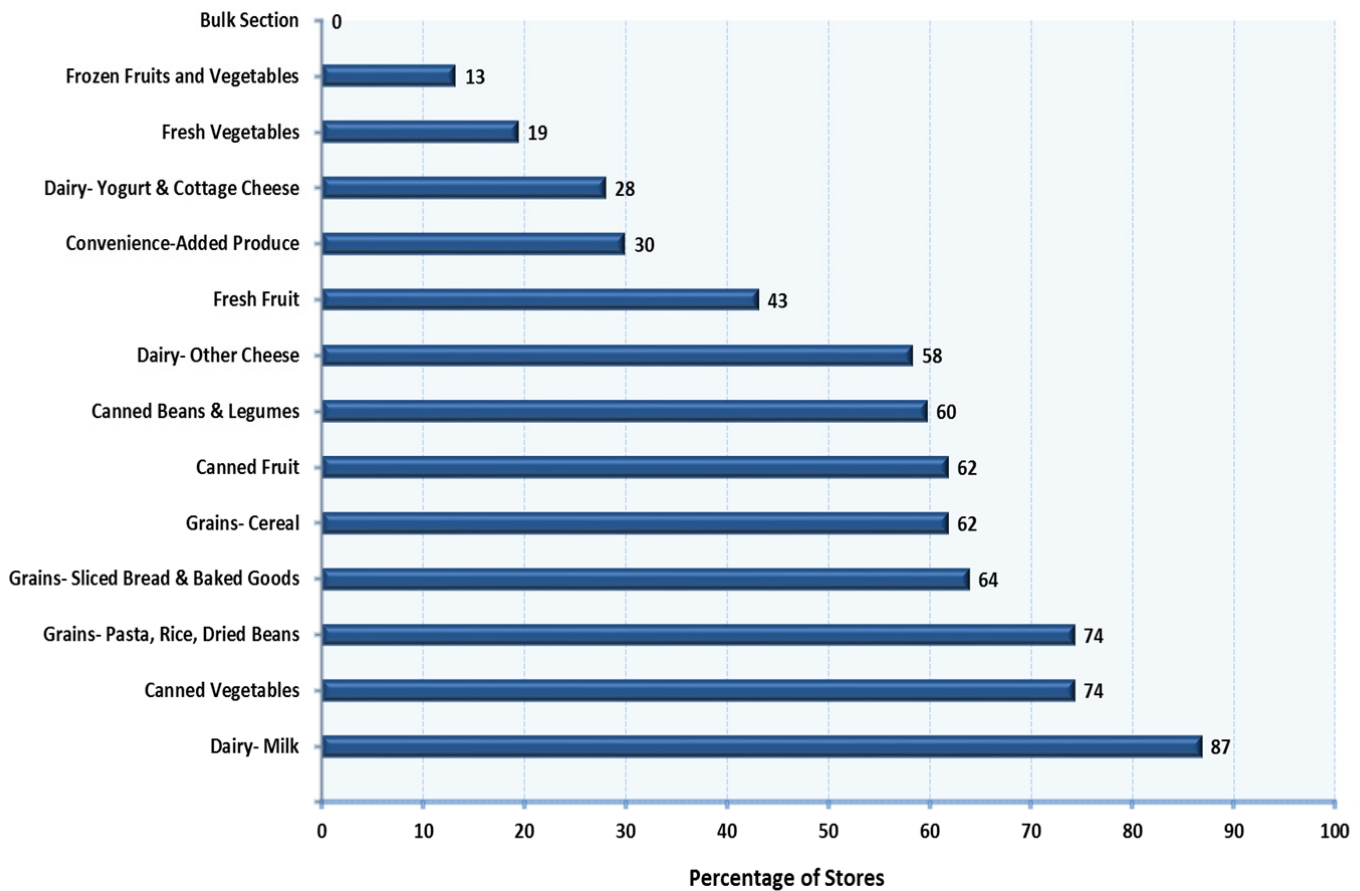
Note: Percentage of convenience stores and grocery stores were complimentary

3.2 Food Availability

3.2.1 Percentage of Stores with at Least One Item Available Within Each Measure (Category) of TxNEA

- The most frequently available category of food was “Dairy- Milk”, with 87% of grocery/convenience having at least one milk item available, followed by “Canned Vegetables”, and “Grains-Pasta, Rice & Dried Beans”, both of which were available in 74% of all the surveyed stores
- None of the stores had a bulk section.
- Besides “Bulk Section”, foods from five other categories were available in less than 50% of stores: “Frozen Fruits and Vegetables” (13%), “Fresh Vegetables” (19%), “ Dairy- Yogurt & Cottage Cheese” (28%), “Convenience-Added Produce” (30%) and “Fresh Fruit” (43%)

Figure 3.2.1 Percentage of grocery and convenience stores with at least one item available, Tarrant County, 2013



3.2.2 Average Number of Available Items in Each ZIP Code

- Overall, the average number of available items in each ZIP code was less than half the number of items listed in the survey
- ZIP code 76179 had the highest availability with 42 of 134 items (31%)
- ZIP code 76134 had the lowest availability with 15 of 134 items (11%) , followed by ZIP code 76014, with 18 out of 134 items (13%)

The “Canned Vegetables” section had the largest percentage of available items, ranging from 40% to 80% throughout the 11 ZIP codes.

Table 3.2.2 Average number of items available under each food category in 11 ZIP code areas, Tarrant County, 2013

Food Category (number of items in survey)	Average Number of Available Items (%)										
	76010	76013	76014	76018	76105	76108	76114	76131	76134	76140	76179
1.Fresh Fruit (n=16)	2 (13)	3 (19)	1 (6)	2 (13)	2 (13)	3 (19)	4 (25)	0	1 (6)	1 (6)	5 (31)
2.Fresh Vegetables (n= 14)	3 (21)	3 (21)	0	1 (7)	3 (21)	3 (21)	2 (14)	0	0	1 (7)	4 (29)
3.Convenience-Added Produce (n= 4)	1 (25)	1 (25)	1 (25)	1 (25)	1 (25)	1 (25)	1 (25)	0	0	0	1 (25)
4. Dairy- Milk (n= 18)	5 (28)	4 (22)	4 (22)	6 (33)	3 (17)	5 (28)	4 (22)	4 (22)	4 (22)	3 (17)	6 (33)
5.Dairy- Yogurt & Cottage Cheese (n= 4)	1 (25)	0	0	0	1 (25)	1 (25)	1 (25)	0	1 (25)	0	1 (25)
6.Dairy- Other Cheese (n= 8)	2 (25)	1 (13)	1 (13)	1 (13)	1 (13)	1 (13)	1 (13)	2 (25)	1 (13)	1 (13)	3 (38)
7. Canned Fruit (n= 10)	2 (20)	2 (20)	3 (30)	1 (10)	3 (30)	2 (20)	3 (30)	3 (30)	0	2 (20)	3 (30)
8. Canned Vegetables (n= 5)	2 (40)	2 (40)	2 (40)	2 (40)	3 (60)	2 (40)	3 (60)	4 (80)	2 (40)	3 (60)	2 (40)
9.Canned Beans & Legumes (n= 9)	2 (22)	2 (22)	0	1 (11)	2 (22)	2 (22)	3 (33)	3 (33)	1 (11)	3 (33)	3 (33)
10. Grains- Cereal (n= 9)	3 (33)	2 (22)	1 (11)	2 (22)	3 (33)	3 (33)	2 (22)	0	1 (11)	3 (33)	4 (44)
11. Grains- Sliced Bread & Baked Goods(n= 9)	3 (33)	2 (22)	3 (33)	2 (22)	3 (33)	2 (22)	3 (33)	4 (44)	2 (22)	3 (33)	4 (44)
12.Grains- Pasta, Rice, Dried Beans	2 (29)	2 (29)	2 (29)	1 (15)	3 (43)	3 (43)	3 (43)	2 (29)	2 (29)	3 (43)	3 (43)

(n= 7)											
13. Bulk Section (n= 8)	0	0	0	0	0	0	0	0	0	0	0
14. Frozen Fruits and Vegetables (n= 13)	2 (15)	1 (8)	0	1 (8)	1 (8)	2 (15)	2 (15)	0	0	0	3 (23)
TOTAL (N= 134)	30 (22)	25 (19)	18 (13)	21 (16)	29 (22)	30 (22)	32 (24)	22 (16)	15 (11)	23 (17)	42 (31)

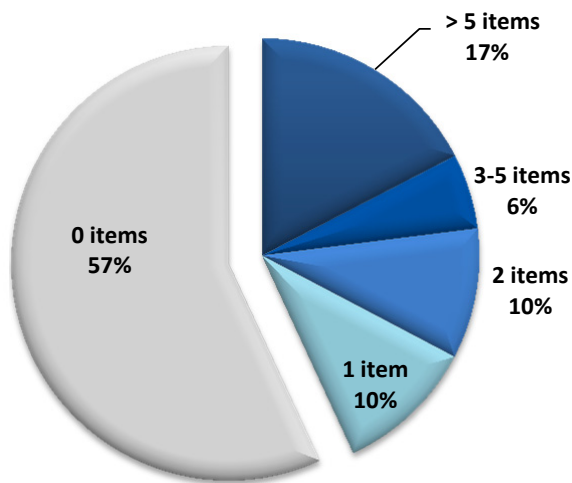
Note: the top number is the average number of available items and the bottom number reflects the percentage (%) in each category.

3.2.3 Food Availability in each of the 13 Available Food Categories

- For 11 out of 13 food categories, the largest percentage in each category reflects stores that did not contain any items.
- Two exceptions were “Dairy- Milk” and “ Canned Vegetables” , with 13% and 25% stores having no item in each category, respectively.
- “Bulk Section” was not available in any of the stores.

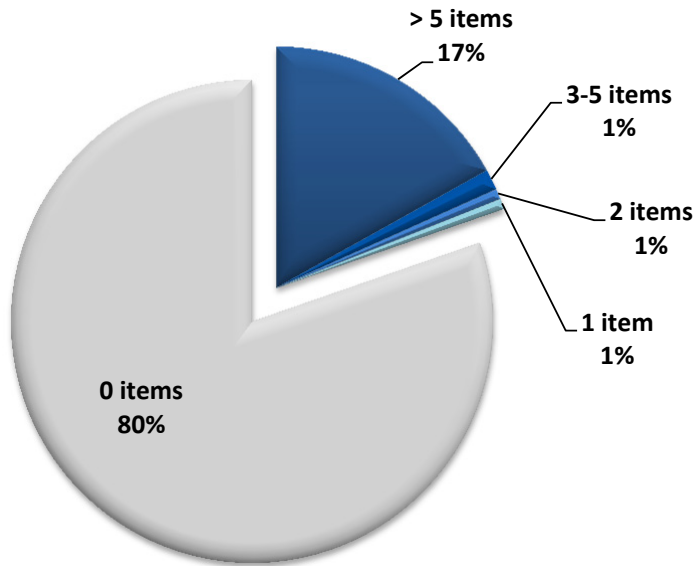
Figure 3.2.3 Percentage of stores holding 0, 1, 2, 3-5, > 5 items in each food category, Tarrant County, 2013

Fresh Fruits



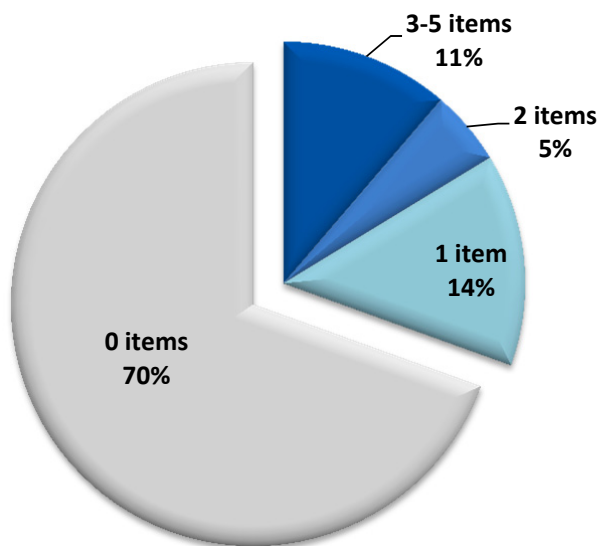
- 57% of the stores did not have any fresh fruit
- 17% of all the stores had more than five fruits available

Fresh Vegetables



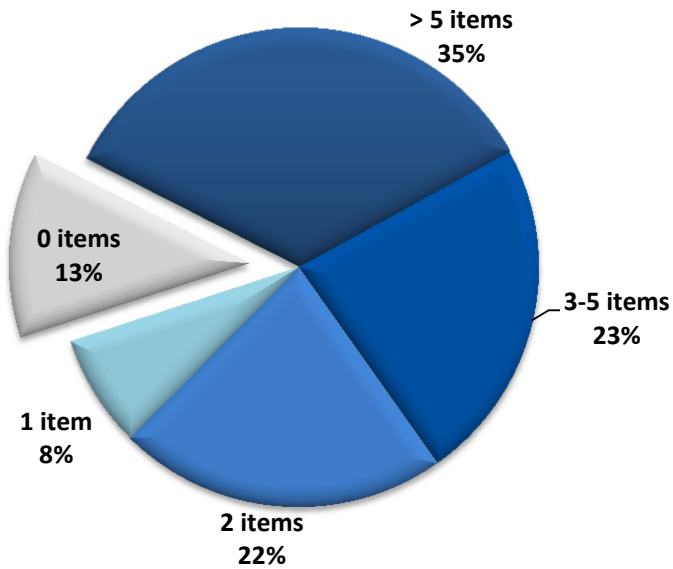
- 80% of the stores did not have any fresh vegetables
- 17% of the stores had more than five vegetables available

Convenience-added Produce



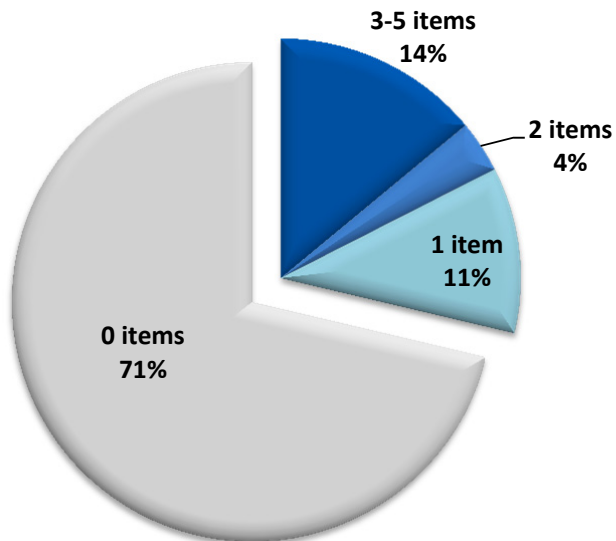
- 70% of the stores did not have any Convenience-Added Produce
- 14% of the stores had only one Convenience-Added Produce

Dairy—Milk



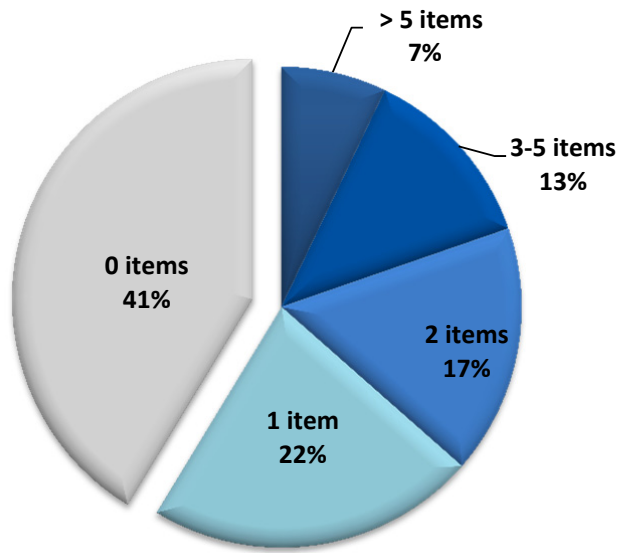
- Milk was the most available food among all 14 categories, and was not available in only 13% of the stores
- 35% of stores had more than five milk items

Dairy—Yogurt & Cottage Cheese



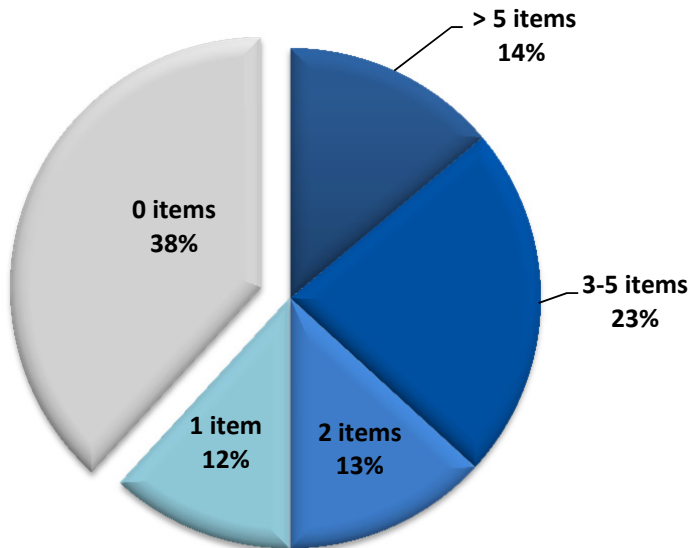
- 71% of stores did not have any yogurt or cottage cheese
- 14% of the stores had three - five items
- No store had more than five items

Dairy—Other Cheese



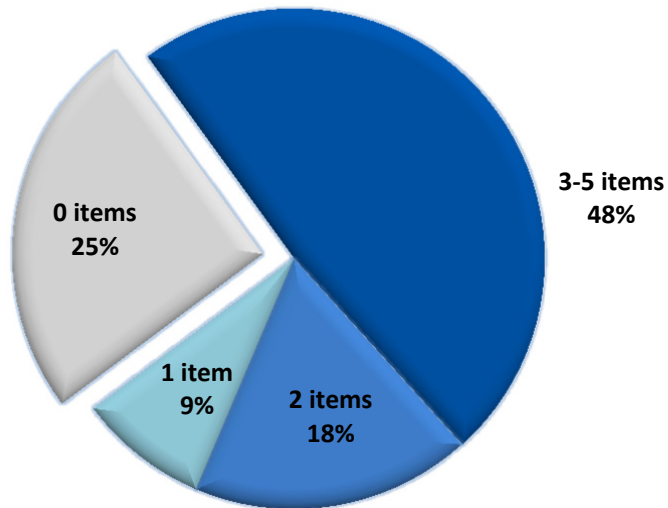
- 41% of stores did not have any cheese
- 22% of the stores had only one type of cheese

Canned Fruit



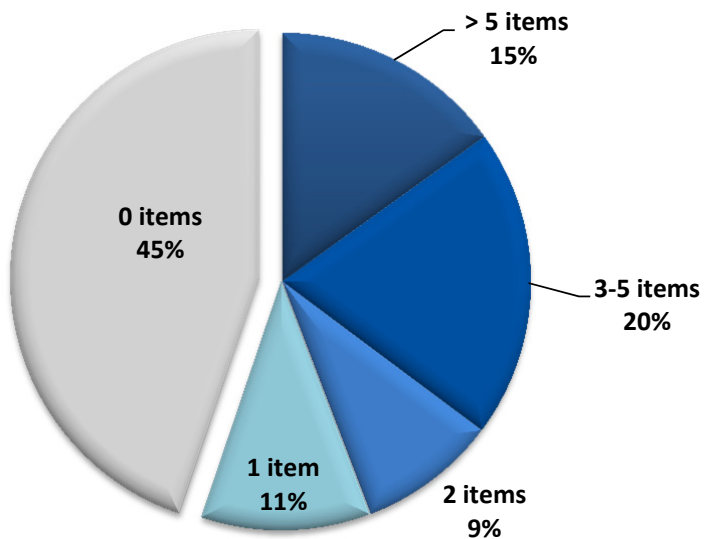
- 38% of stores did not have any canned fruit
- 23% of the stores had three-five types of canned fruit

Canned Vegetables



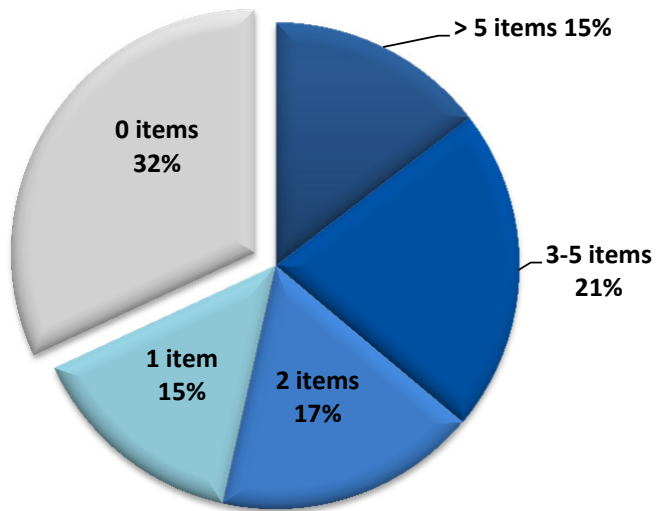
- 48% of stores had three - five canned vegetable items
- One-fourth of the stores did not have any canned vegetables

Canned Beans & Legumes



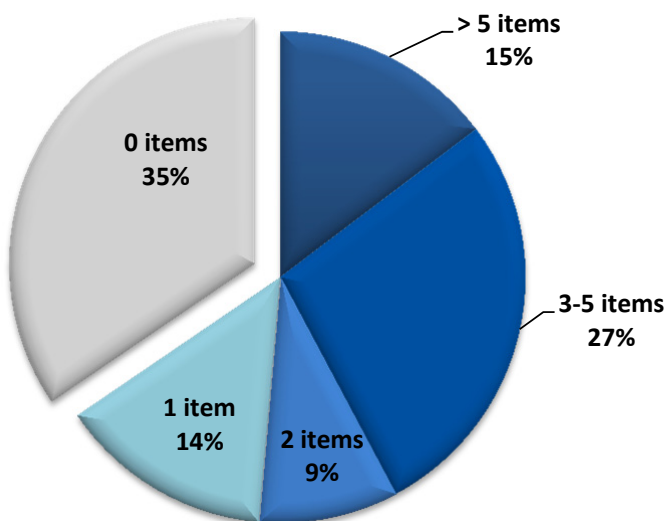
- 45% of stores had no canned beans
- One-fifth of the stores had three – five types of canned beans

Grains—Cereal



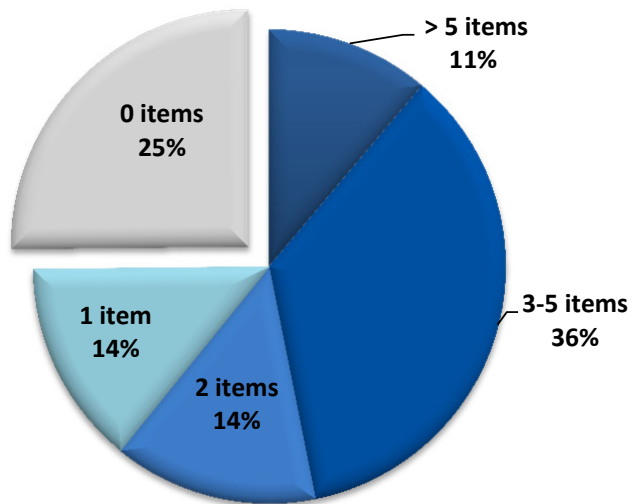
- 32% of the stores had no cereal
- One-fifth of the stores had three - five types of cereal

Grains—Sliced Bread & Baked Goods



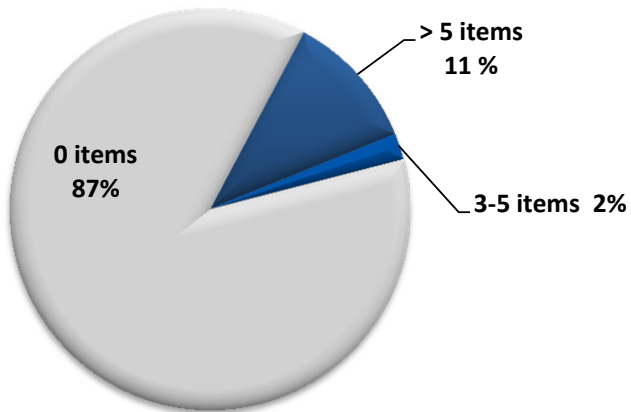
- 35% of the stores had no bread or baked goods
- About one fourth of the stores had three - five types of bread & baked goods

Grains— Pasta, Rice, Dried Beans



- 36% had three – five items
- One-fourth of the stores had no pasta, rice or dried beans

Frozen Fruits and Vegetables



- This category was least available in stores we surveyed
- 87% of the stores had no frozen fruits or vegetables

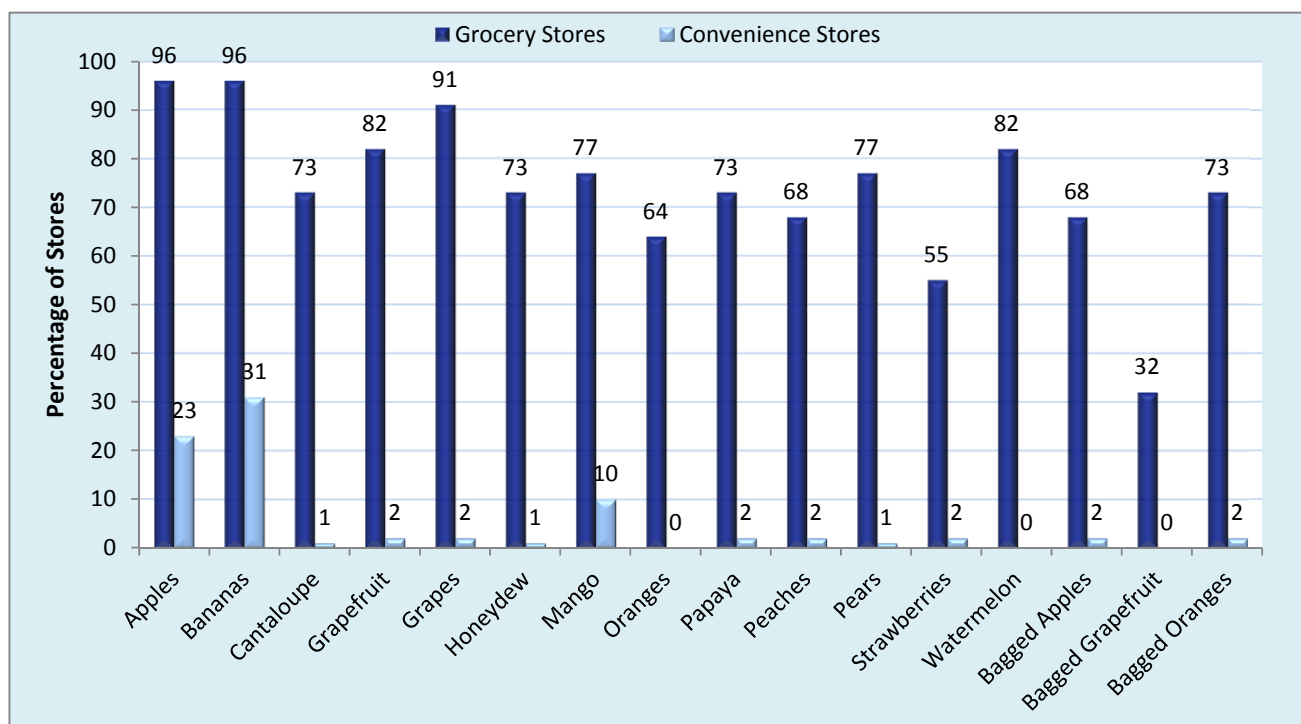
3.2.4 Compare Availability of Each Item in Grocery Stores with Convenience

Stores

- Overall, grocery stores had much higher availability for each item compared to convenience stores
- There were two exceptions in the Dairy-Milk category: grocery and convenience stores had similar availability rates for whole milk and 2% reduced fat milk
- Most frequently available and least frequently available items were the same, regardless of the type of stores

Fresh Fruits

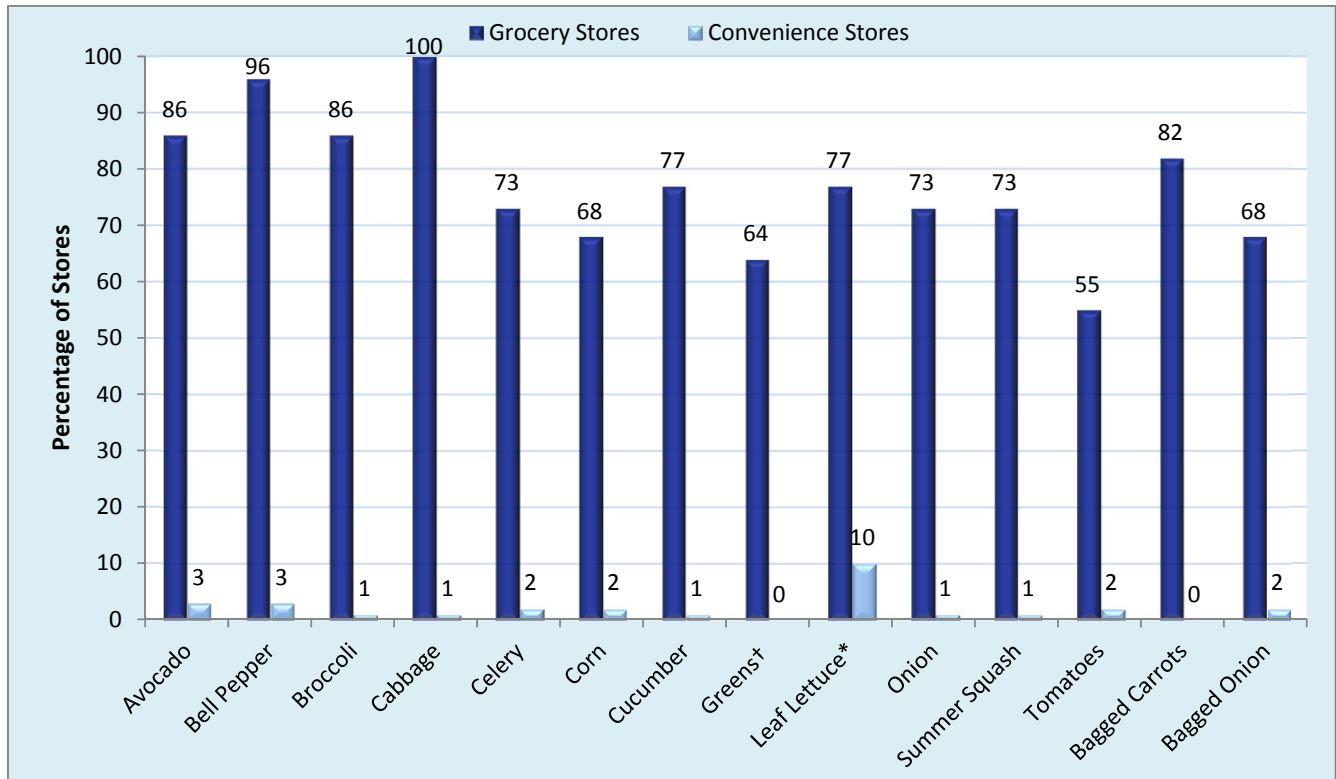
Figure 3.2.4 1 Availability of fresh fruits by store type, Tarrant County, 2013



- Most frequently available fruits in grocery stores were *Apples, Bananas, and Grapes*
- Most frequently available fruits in convenience stores were *Bananas, Apples, and Mango*
- Least frequently available fruits in grocery stores were *Bagged Grapefruit, Strawberries, and Oranges*
- Least frequently available fruits in convenience stores were *Bagged Grapefruit, Watermelon, and Oranges*

Fresh Vegetables

Figure 3.2.4 2 Availability of fresh vegetables by store type, Tarrant County, 2013

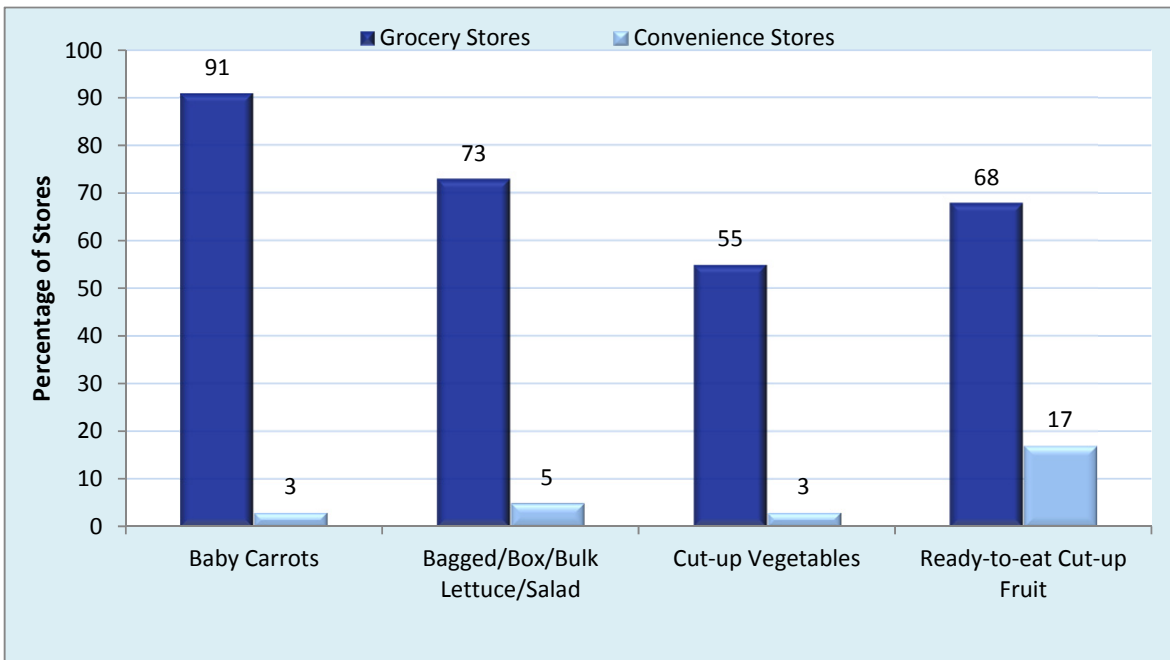


† Excludes leaf lettuce; *Excludes iceberg lettuce.

- Most frequently available fresh vegetables in grocery stores were *Cabbage, Bell Pepper, and Broccoli*
- Most frequently available fresh vegetables in convenience stores were *Leaf Lettuce, Bell Pepper, and Avocado*
- Least frequently available fresh vegetables in grocery stores were *Tomatoes, Greens, and Corn*
- Least frequently available fresh vegetables in convenience stores were *Bagged Carrots and Greens*

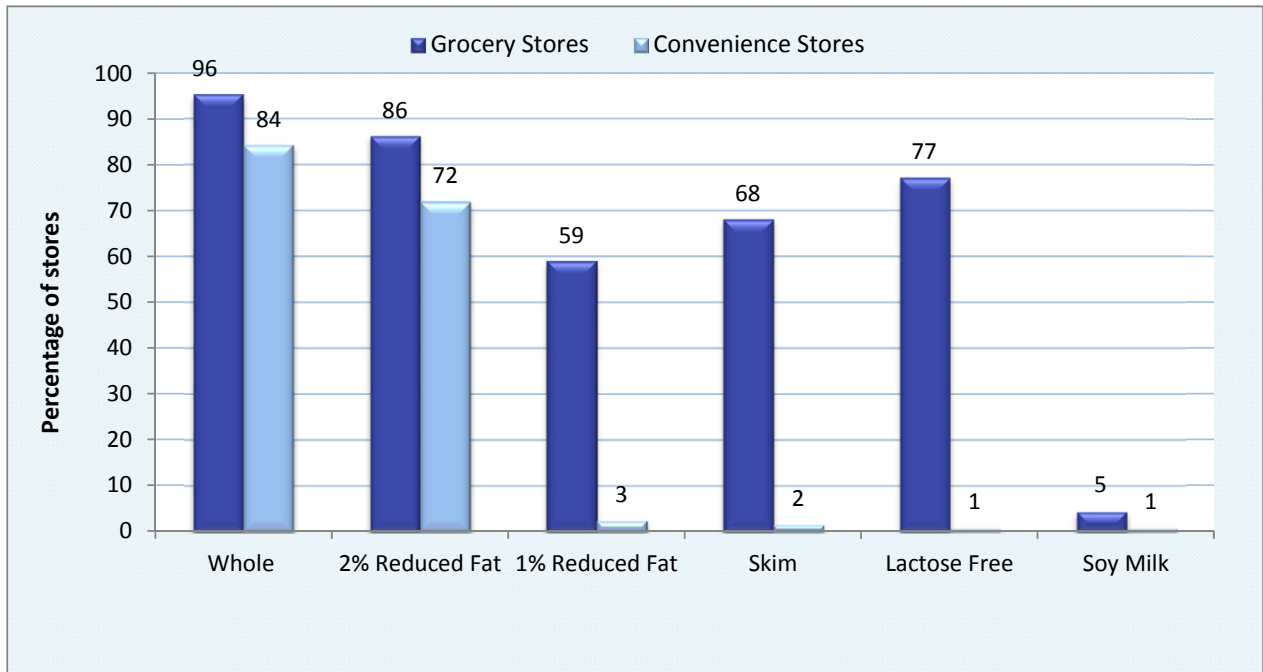
Convenience-Added Produce

Figure 3.2.4 3 Availability of convenience-added produce by store type, Tarrant County, 2013



- Most frequently available item in grocery stores was *Baby Carrots*
- Most frequently available item in convenience stores was *Ready-to-eat Cut-up Fruit*
- Least frequently available item in grocery stores was *Cut-up Vegetables*
- Least frequently available item in convenience stores was *Baby Carrots*

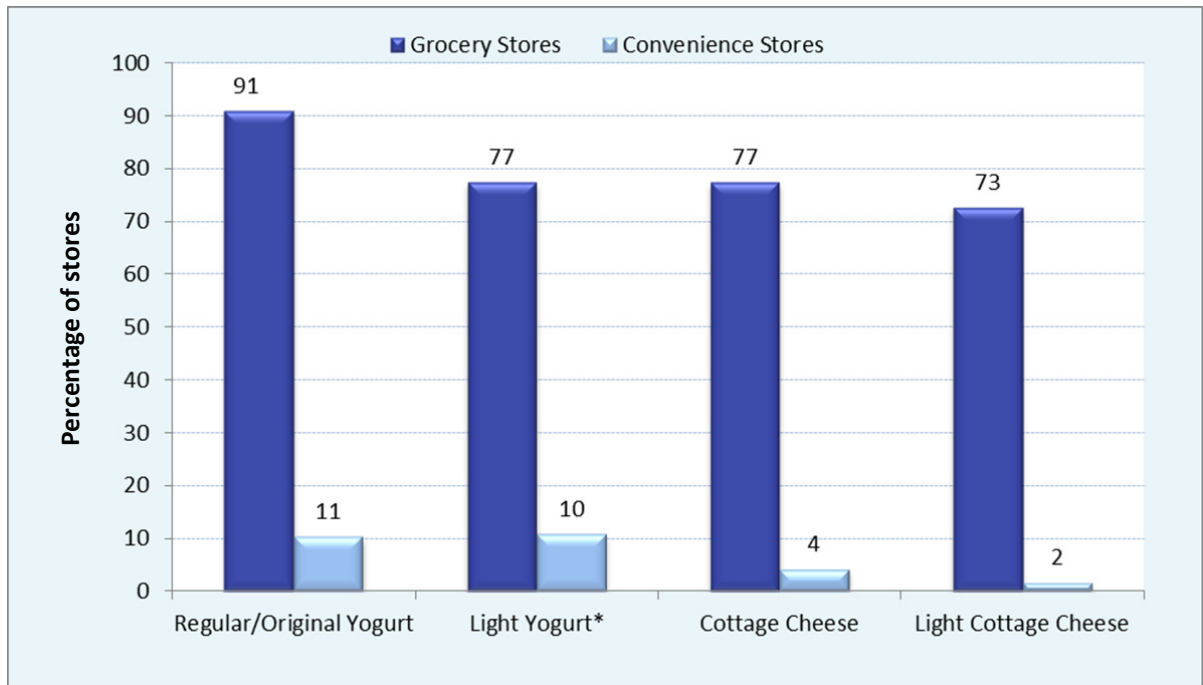
Figure 3.2.4 4 Availability of milk items by store type, Tarrant County, 2013



- Grocery stores and convenience stores both had highest availability rates in *Whole Milk*
- Coming next was *2% Reduced Fat Milk*
- Both stores had least availability rate on *Soy Milk*

Dairy-Yogurt & Cottage Cheese

Figure 3.2.4 5 Availability of yogurt/ cottage cheese by store type, Tarrant County, 2013

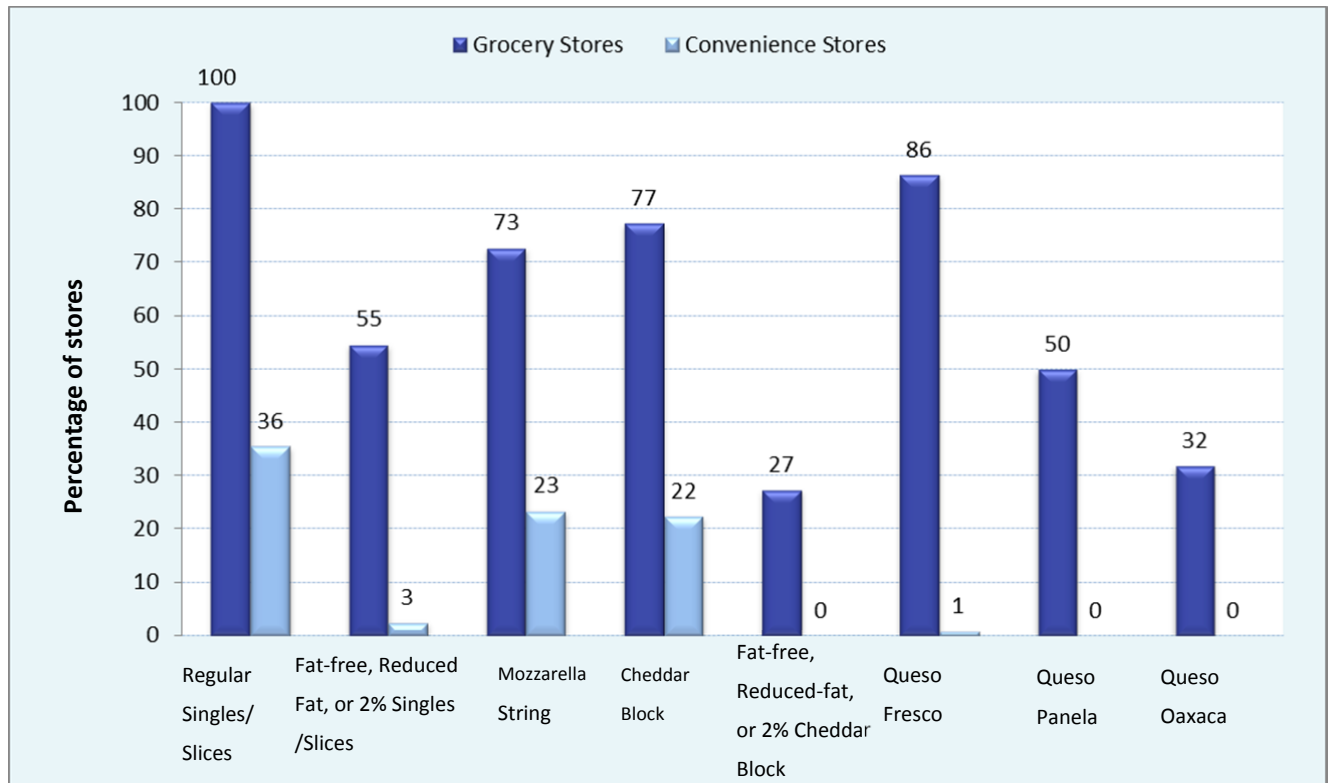


Note: * must say 'light', 'non-fat' or 'fat free'

- Most frequently available item was *Regular Yogurt* in both grocery stores as well as convenience stores
- Least frequently available item was *Light Cottage Cheese* in both grocery stores as well as convenience stores

Dairy-Other Cheese

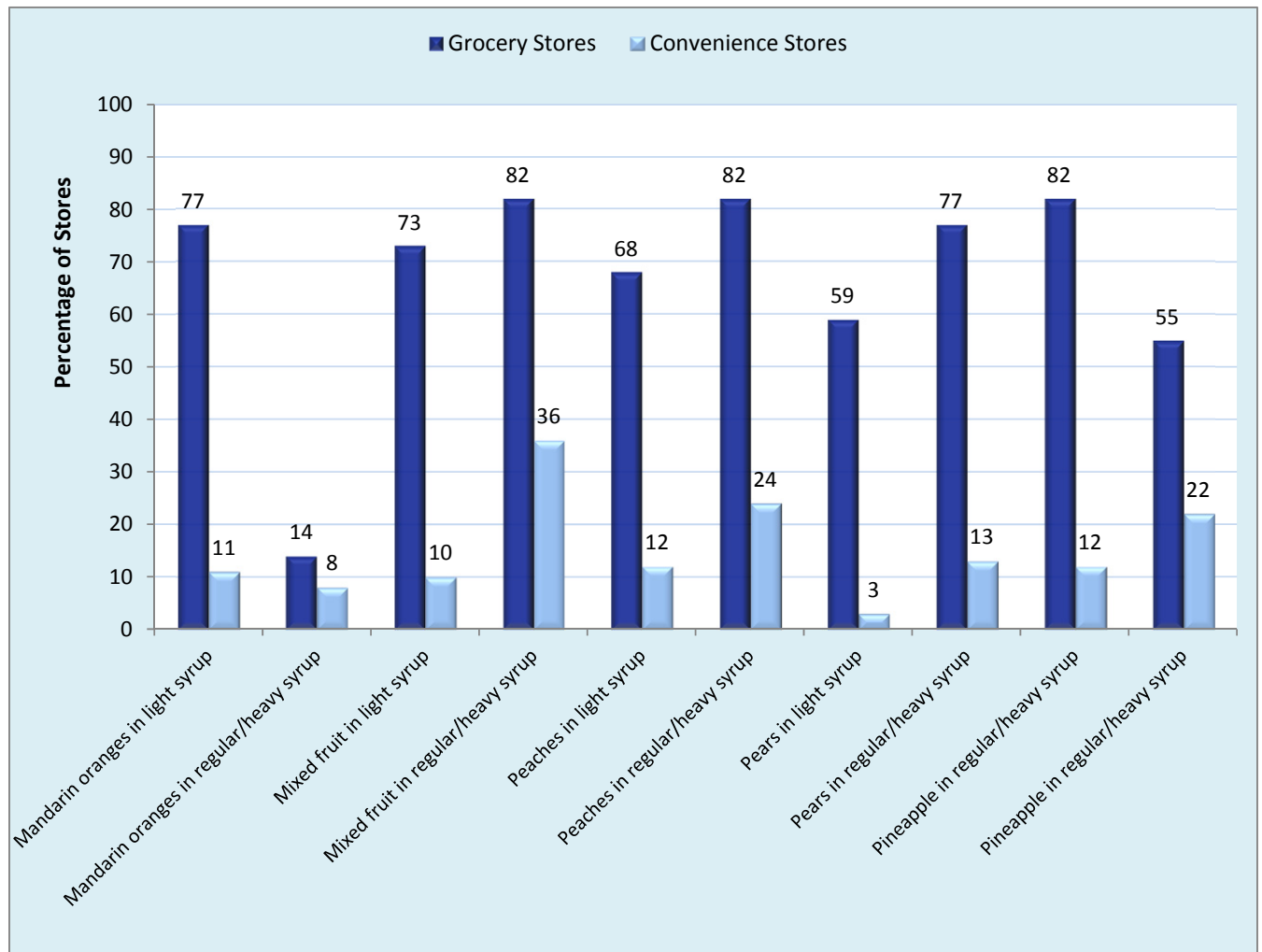
Figure 3.2.4 6 Availability of cheese by store type, Tarrant County, 2013



- Most frequently available item in both grocery stores and convenience stores was *Regular Singles/Slices Cheese*
- Least frequently available item in grocery stores was *Fat-Free Cheddar Block*
- Least frequently available items in convenience stores were *Fat-Free, Reduced-fat, or 2% Cheddar Block, Queso Panela, Queso Oaxaca*

Canned Fruits

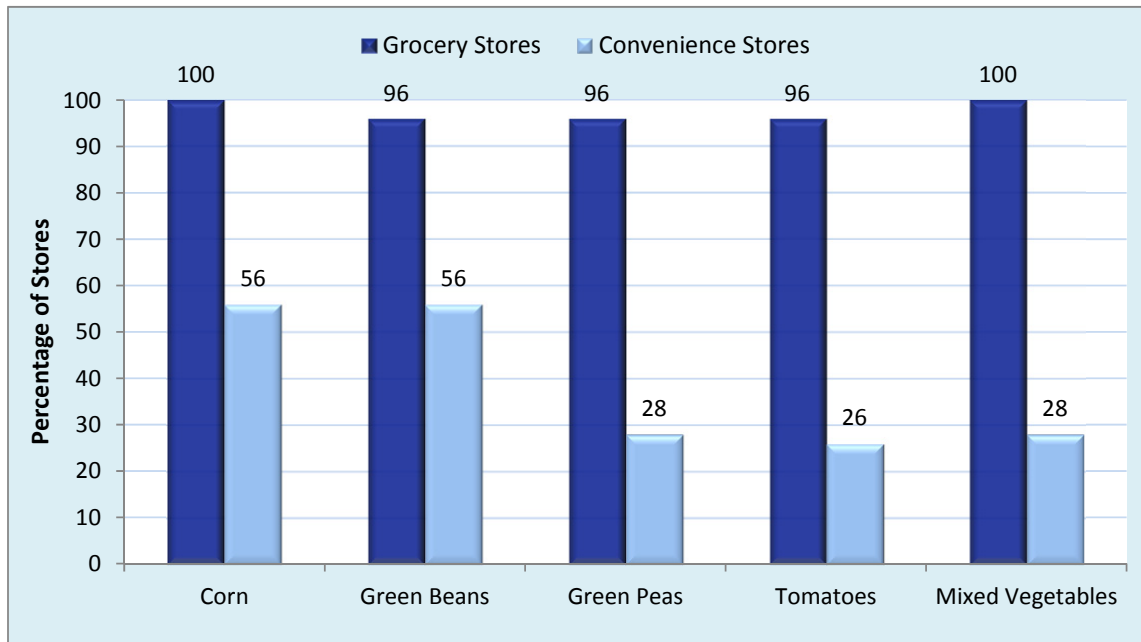
Figure 3.2.4 7 Availability of canned fruits by store type, Tarrant County, 2013



- Most frequently available items in grocery stores were *Mixed fruit in regular/heavy syrup*, *Peaches in regular/Heavy syrup*, and *Pineapple in light syrup*
- Most frequently available items in convenience stores were also *Mixed fruit in regular/heavy syrup*, *Peaches in regular/heavy syrup*, and *Pineapple in heavy syrup*
- Least frequently available item in grocery stores was *Mandarin Oranges in regular syrup*
- Least frequently available items in convenience stores was *Peaches in light syrup*

Canned Vegetables

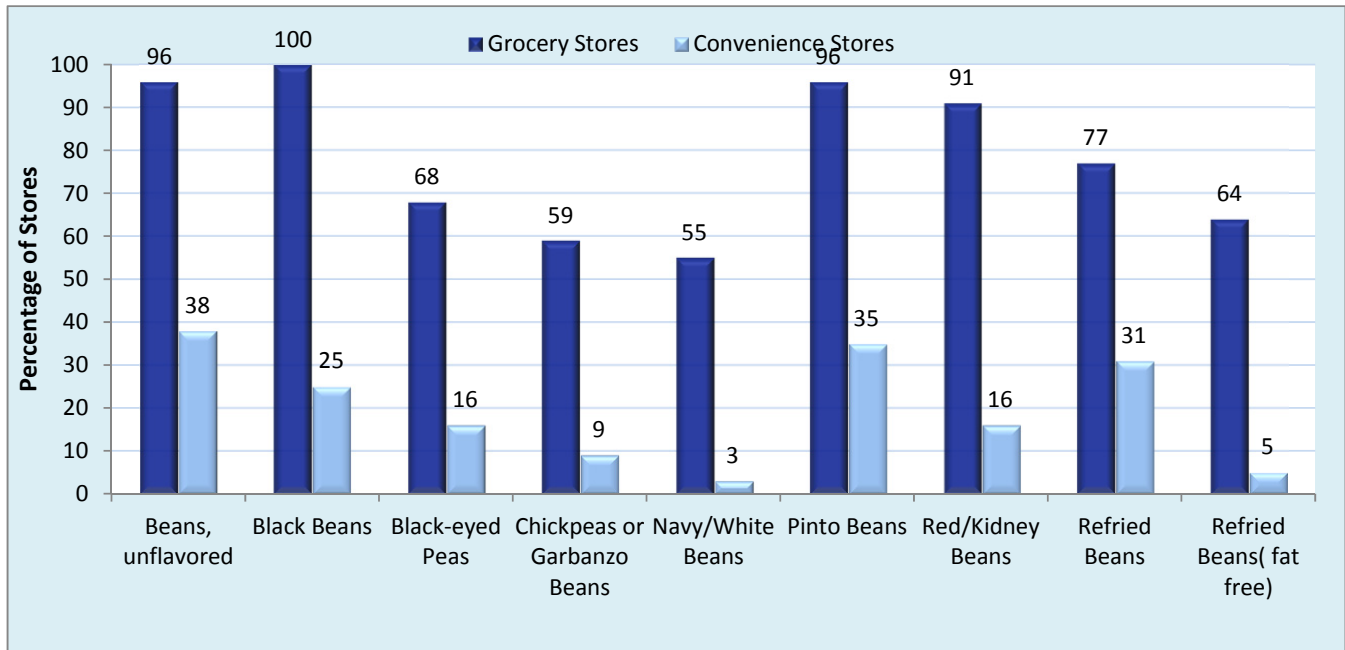
Figure 3.2.4 8 Availability of canned vegetables by store type, Tarrant County, 2013



- All canned vegetables were highly available, ranging from 96-100% of grocery stores.
- Most frequently available items in grocery stores were *Corn and Mixed Vegetables*
- Most frequently available items in convenience stores were *Corn and Green Beans*
- Least frequently available items in convenience stores was *Tomatoes*

Canned Beans & Legumes

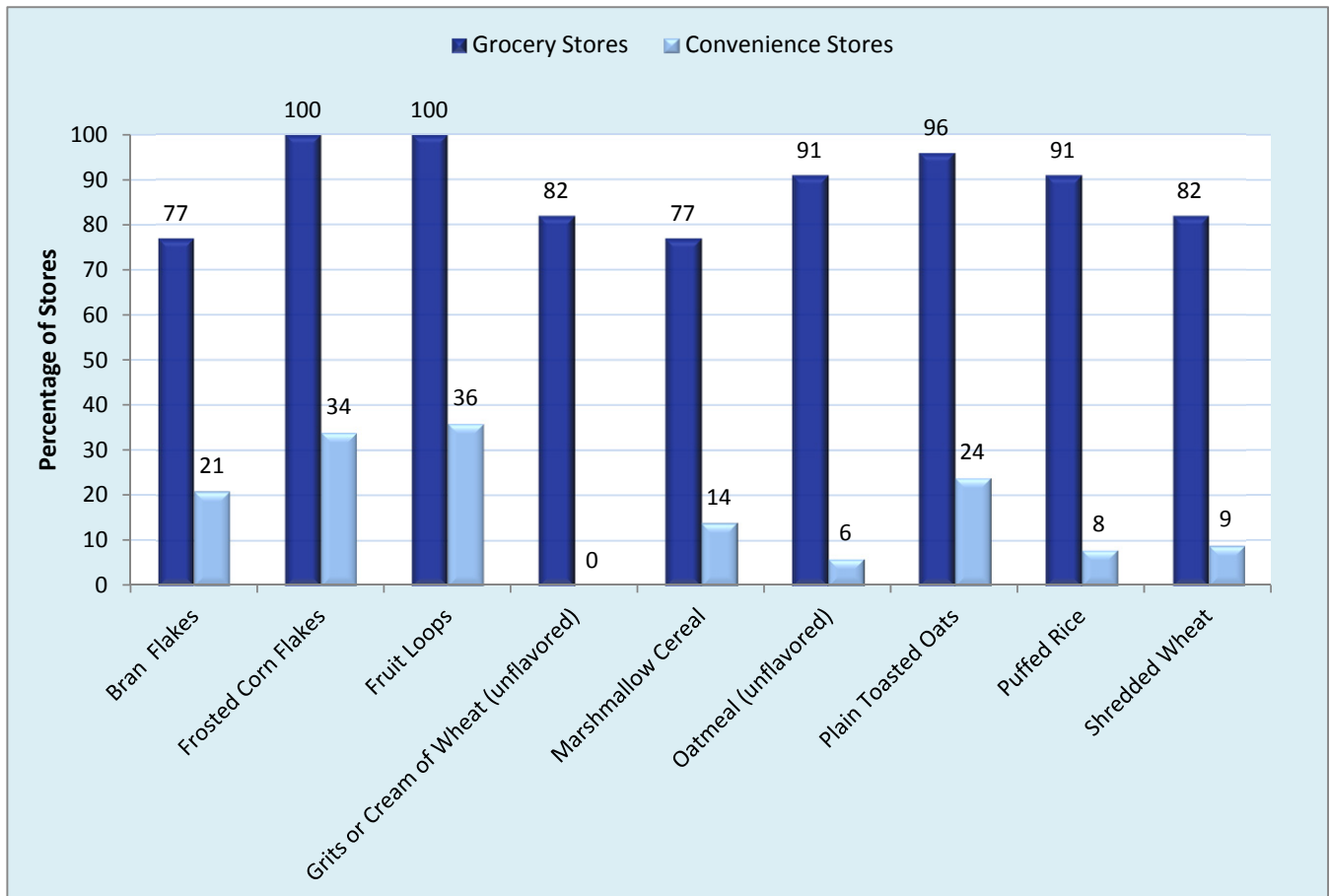
Figure 3.2.4 9 Availability of canned beans and legumes by store type, Tarrant County, 2013



- Most frequently available item in grocery stores was *Black Beans*
- Most frequently available item in convenience stores was *Pinto Beans*
- Least frequently available item in grocery stores was *Navy/White Beans*, which was also the least frequently available item in convenience stores

Grains-Cereal

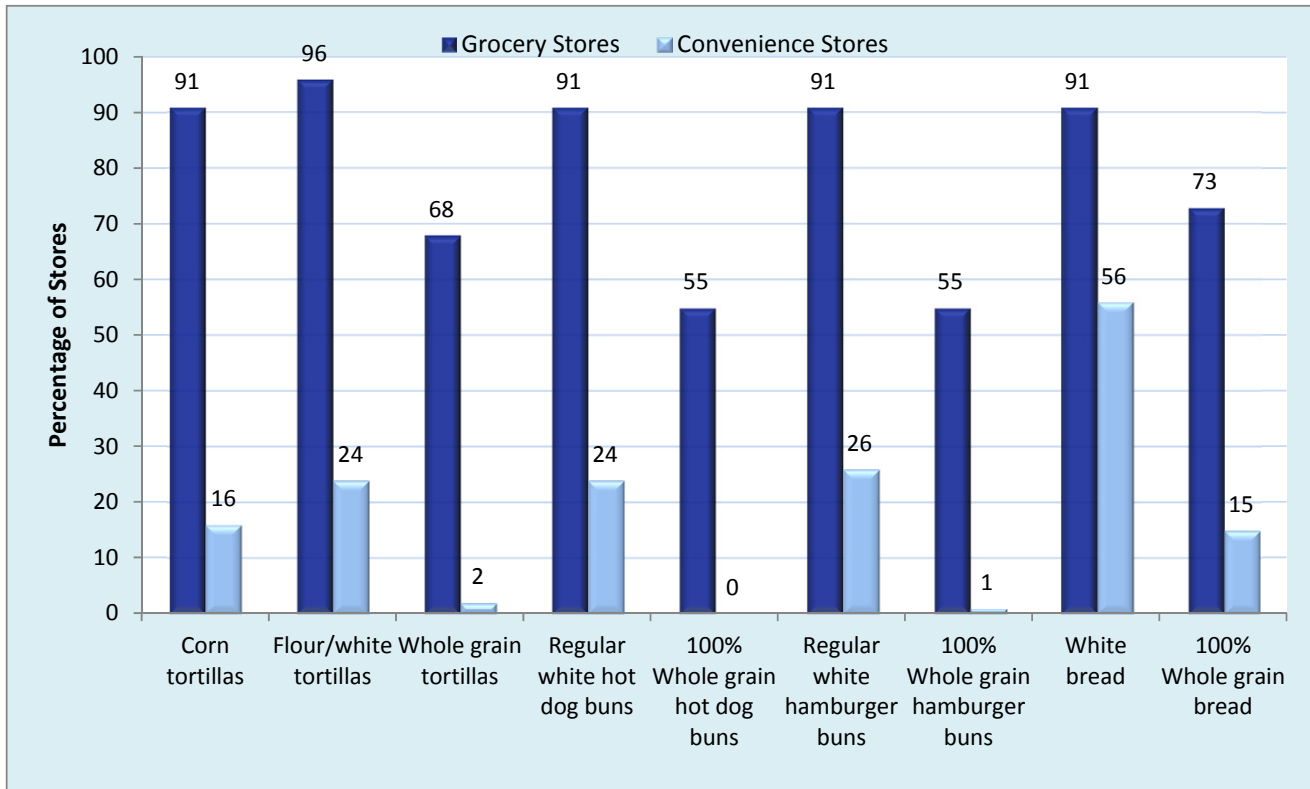
Figure 3.2.4 10 Availability of cereal by store type, Tarrant County, 2013



- Most frequently available items in grocery stores were *Fruit Loops* and *Frosted Corn Flakes*
- Most frequently available items in convenience stores were also *Fruit Loops* and *Frosted Corn Flakes*
- Least frequently available in the grocery store were Bran Flakes and Marshmallow cereal
- Least frequently available item in convenience stores was *Grits*

Grains-Sliced Bread & Baked Goods

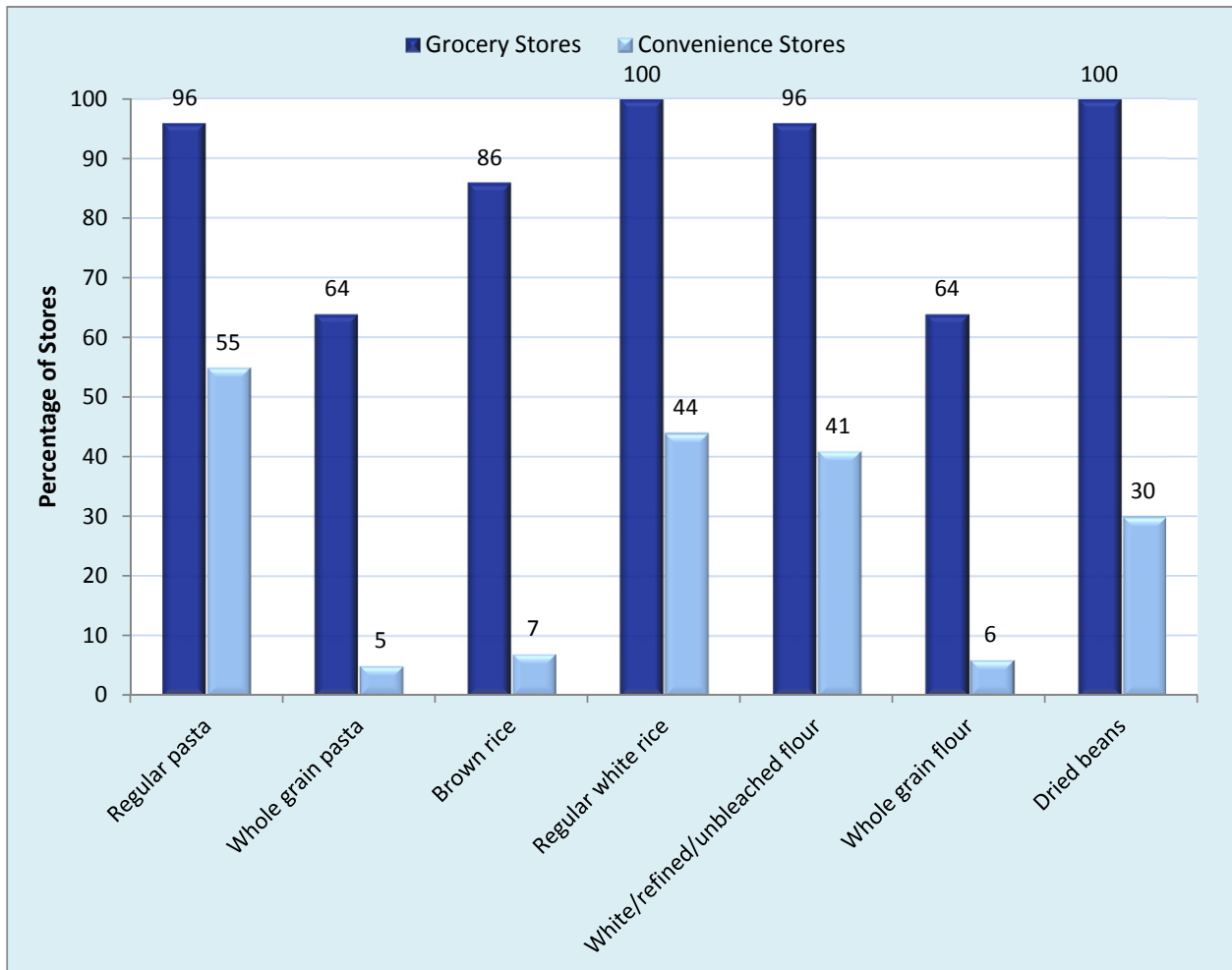
Figure 3.2.4 11 Availability of sliced bread and baked goods by store type, Tarrant County, 2013



- Most frequently available item in grocery stores was *Flour/White Tortillas*
- Most frequently available item in convenience stores was *White Bread*
- Least frequently available items in grocery stores were *100% Whole Grain Hot Dog Buns* and *100% Whole Grain Hamburger Buns*, which were also the least frequently available items in convenience stores

Grains-Pasta, Rice, & Dried Beans

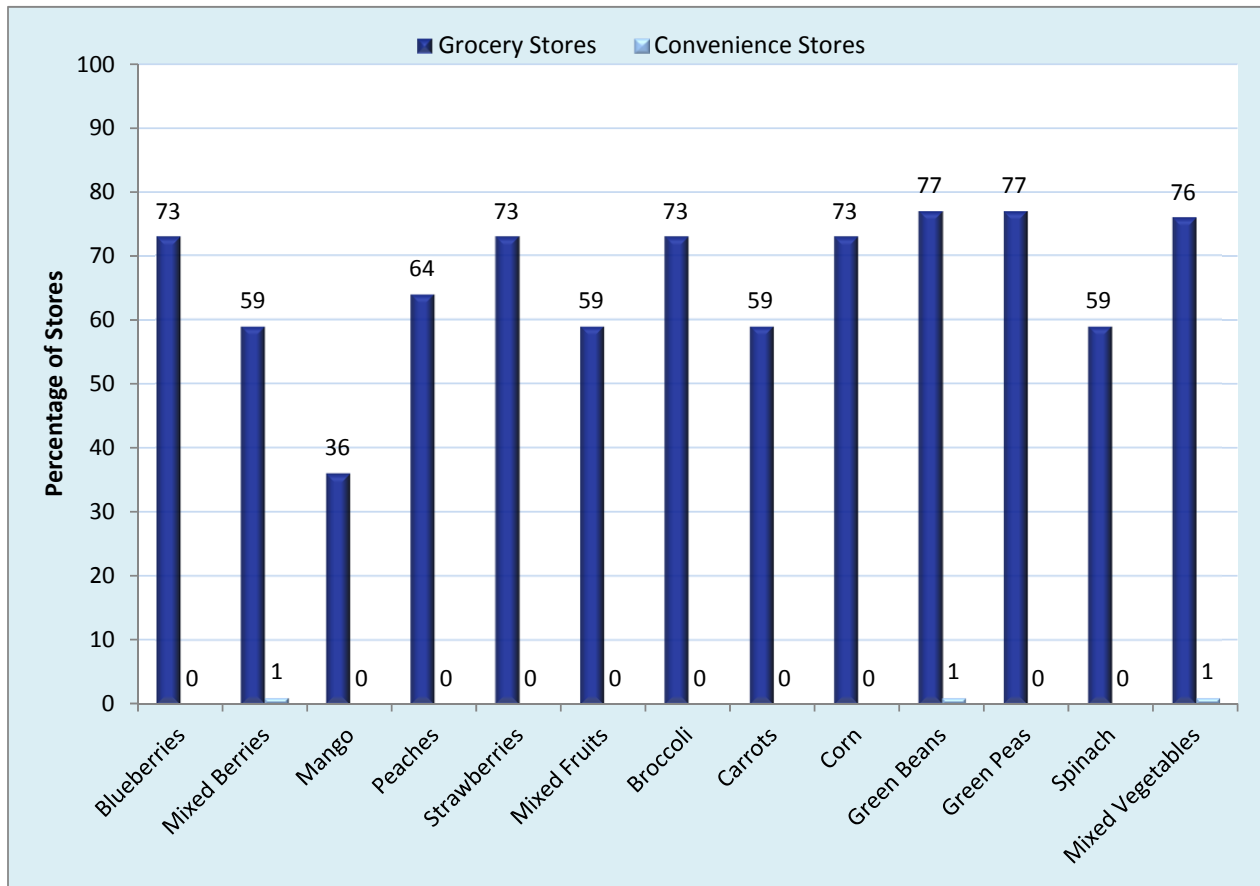
Figure 3.2.4 12 Availability of pasta, rice, dried beans by store type, Tarrant County, 2013



- Most frequently available items in grocery stores were *Regular/White Rice, and Dried Beans*
- Most frequently available item in convenience stores was *Regular Pasta*
- Least frequently available items in grocery stores were *Whole Grain Pasta and Whole Grain Flour*, which were also the least frequently available items in convenience stores

Frozen Fruits & Vegetables

Figure 3.2.4 14 Availability of frozen fruit and vegetable by store type, Tarrant County, 2013



- Most frequently available frozen items in grocery stores were *Green Beans* and *Green Peas*
- Least frequently available frozen items in grocery stores was *Mango*
- Almost no convenience stores had any frozen fruits and vegetables

3.3 Price Assessment—Items' Prices: Grocery Stores VS. Convenience Stores

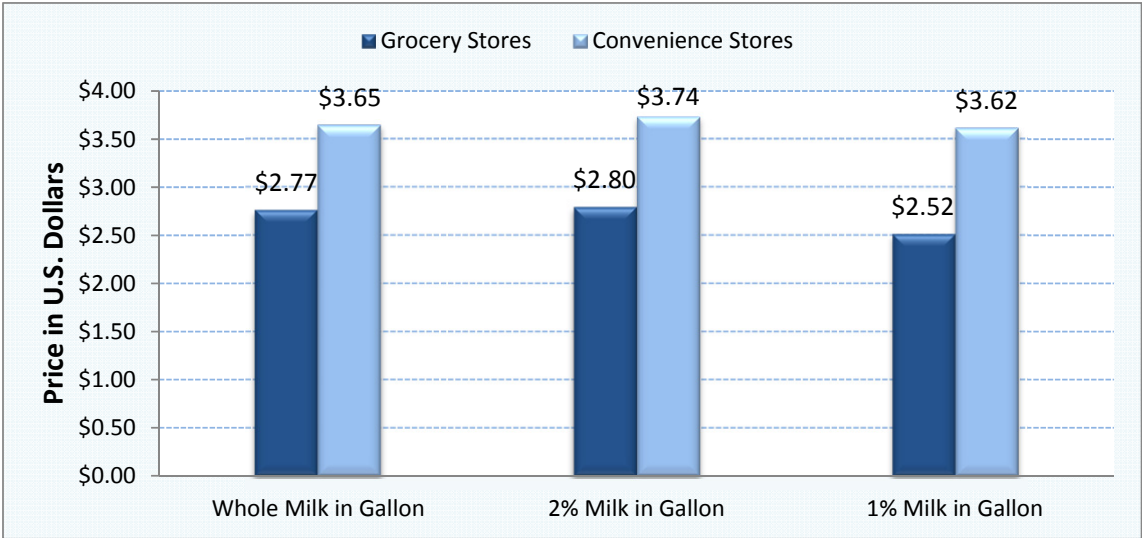
Twenty-three items were chosen and their average prices in grocery stores and convenience stores were calculated separately. Items were chosen based on their availability in both grocery and convenience stores, and those items were from the five most frequently available categories, which were “Dairy-Milk”, “Canned Vegetables”, “Grains-Pasta, Rice, Dried Beans”, “Grains-Sliced Bread & Baked Goods”, and “Grains-Cereal”, and average prices were calculated for items with unit prices available in at least 10% of the convenience stores. Price per piece were not used in analysis, because most of the grocery stores which sold items in pieces did not have scales to weigh three pieces, which made the conversion for unit price impossible. Prices of qualified items in convenience stores and grocery stores are presented below by each category.

- Items available in both convenience and grocery stores cost approximately twice as much in convenience stores.
- Items from “Dairy-Milk” category cost about 1.5 times more in a convenience store than in a grocery store.

Categories below were listed in the order of their availability frequency.

Dairy-Milk

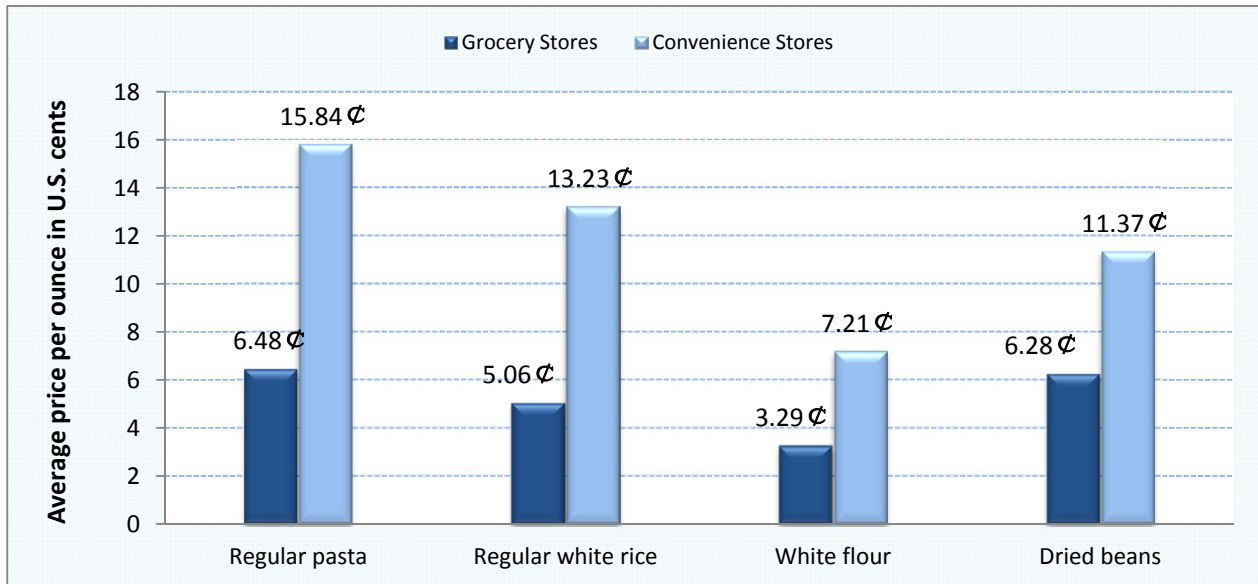
Figure 3.3.1 Price of milk by store type, Tarrant County, 2013



- Overall, milk was 30% more expensive in convenience stores compared to grocery stores.

Grains-Pasta, Rice, & Dried Beans

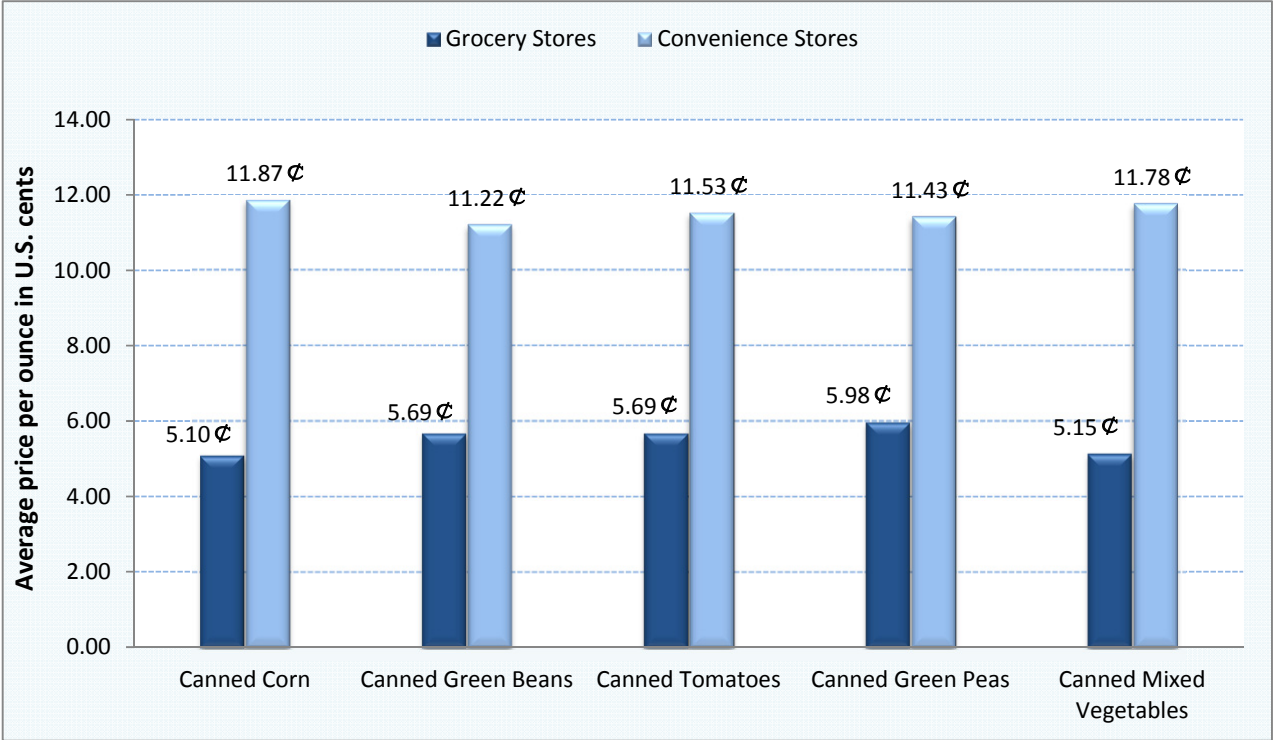
Figure 3.3.2 Price of pasta, rice, and dried beans by store type, Tarrant County, 2013



- Average unit price in a convenience store was almost double compared to a grocery store

Canned Vegetables

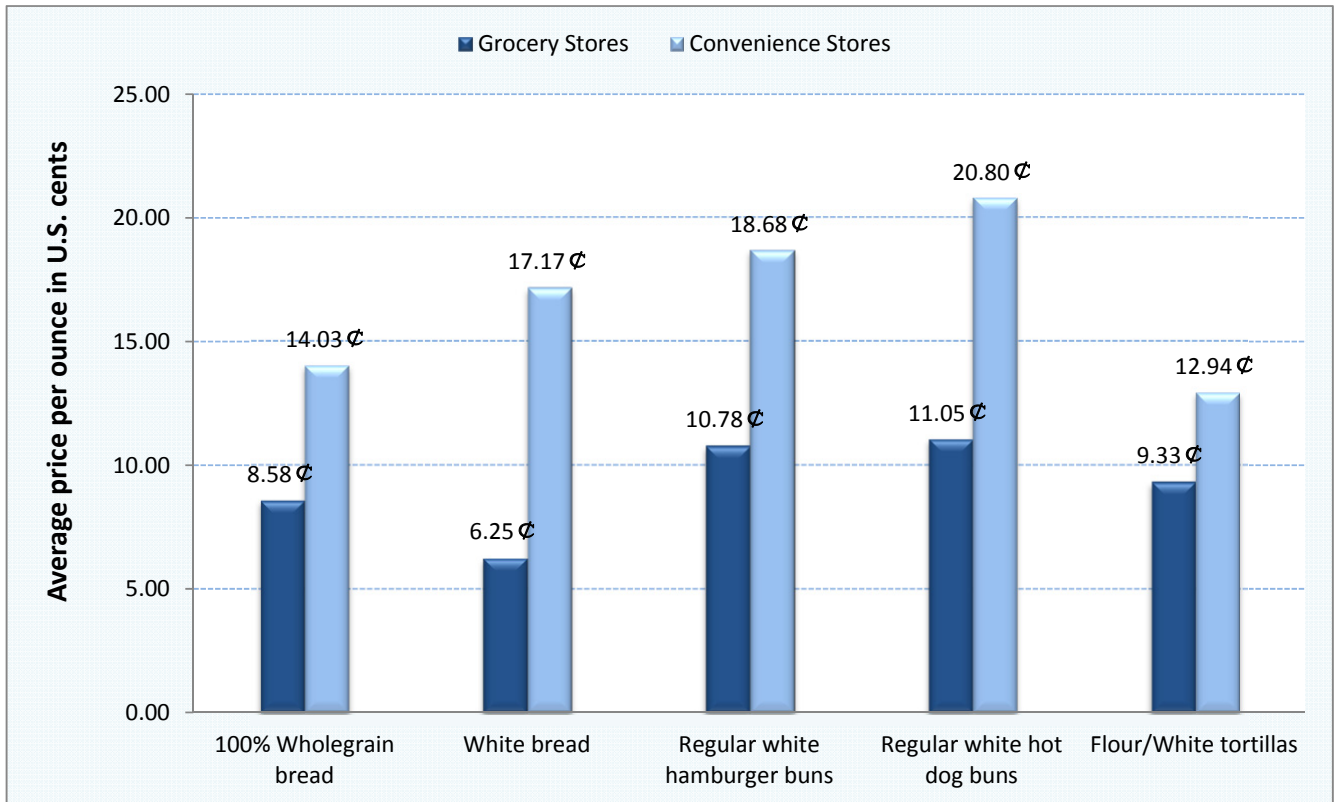
Figure 3.3.3 Price of canned vegetables by store type, Tarrant County, 2013



- Average unit price almost doubled in a convenience store compared to a grocery store
- Average unit price for all canned vegetables surveyed in a grocery store was about 5.52 ¢ per ounce
- Average unit price for all canned vegetables in a convenience store was about 11.57 ¢ per ounce

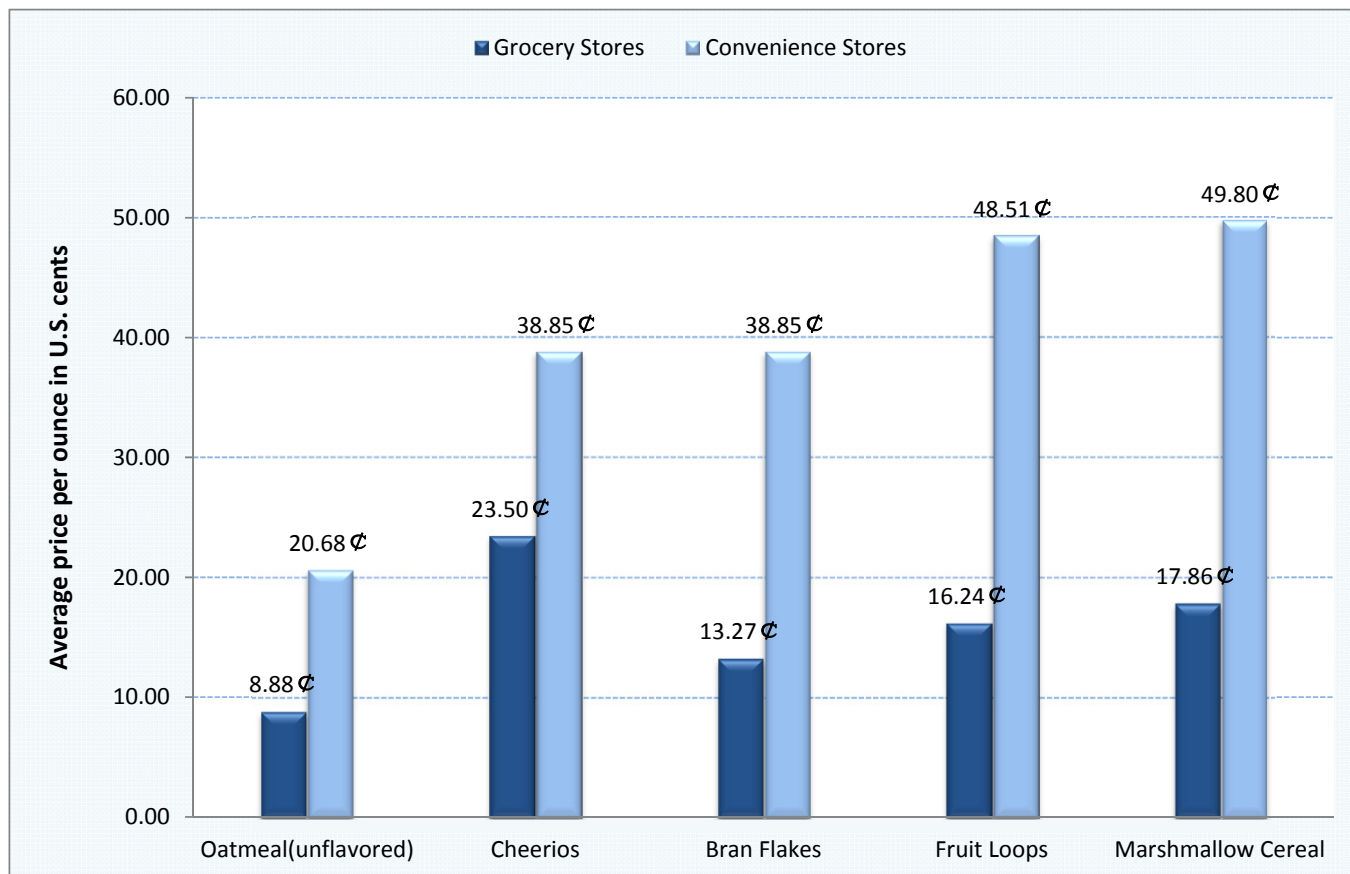
Grains-Sliced Bread & Baked Goods

Figure 3.3.4 Price of sliced bread baked goods by store type, Tarrant County, 2013



- Average unit price of *White Bread* in grocery stores was 6.25 ¢ per ounce compared to 17.17 ¢ per ounce in convenience stores; average unit price almost tripled in convenience stores
- Average unit price of *Flour/White Tortillas* in grocery stores was 9.33 ¢ per ounce compared to 12.94 ¢ per ounce in a convenience stores

Figure 3.3.5 Price cereals by store type, Tarrant County, 2013



- Average unit price of *Oatmeal (unflavored)*, *Bran Flakes*, *Frosted Corn Flakes*, *Fruit Loop*, and *Marshmallow Cereal* more than doubled in a convenience stores compared to a grocery stores
- Average unit price of *Cheerios* in convenience stores was almost twice as much as in a grocery stores

4. CONCLUSIONS

The 11 ZIP codes defined as food deserts had more convenience stores, which did not stock a variety of healthy foods such as fresh fruits and fresh vegetables (convenience stores 86% versus grocery stores 14%, $p < 0.01$). In fact, both fresh fruits and fresh vegetables were among the five least available foods in those areas.

Milk was the most available food among all the 14 categories, and only 13% of all stores did not have any milk item. The other four most frequently available food categories were “Canned Vegetables”, “Grains-Pasta, Rice, Dried Beans”, “Grains-Sliced Bread & Baked Goods”, and “Grains-Cereal”, with 87%, 74%, 74%, 64%, 62% of stores having at least one item available respectively. Least frequently available category was “Bulk Section” which none of the 142 stores had, followed by “Frozen-Fruits and Vegetables”, with only 13% of all stores having at least one item available in stores, and “Fresh Vegetables”, which had 19% of the stores with at least one item.

Overall, ZIP code 76179 had the highest food availability with 42 of 134 items available (31%) (Table 3.2.2). It also had the highest percentage of grocery stores among all 11 ZIP codes (30%) (Figure 3.1.1). ZIP code 76134 had the lowest food availability with 15 of 134 items available (11%), and it had no grocery stores.

Four ZIP codes did not have any grocery stores (76104, 76131, 76134, 76140), and these four ZIP codes were the areas with the least availability of healthy food (Table 3.3.2).

Grocery stores had much higher availability for each item compared to convenience stores, and most frequently available and least frequently available items were the same regardless of the type of stores in these areas.

Items available in convenience stores cost about two times the amount of those in grocery stores. Two possible reasons for the price differences may include: 1) large grocery stores provided store brand items at lower prices and 2) the frequent higher prices for healthy foods.

5. LIMITATIONS

- Most convenience stores with some fruits or vegetables available, sold them by piece, however, they did not have scales in the stores. Without the weight being available, price per piece could not be converted to unit price which is comparable to grocery stores. Therefore, this study did not include them in price comparison. However, according to the price differences seen in this study in items with unit prices available, if converting piece price to unit price was possible, it is likely that the differences would still exist.
- Price comparisons were made between local convenience stores and local grocery stores. Prices of available items were not compared with references outside those areas.

6. RECOMMENDATIONS

- Continue data collection and analysis on food availability, price, and quality:
 - ♦ Assessment can be done throughout the year, to track the changes in availability and price
 - ♦ Obtain data from similar projects done outside the evaluated areas or state level or national level data for comparison
- Local government and community organizations could help increase the availability of healthy foods within or near the identified food deserts:
 - ♦ Encourage small, local food retailers to provide affordable healthy food items with possible tax incentives
 - ♦ Work with Farmer's Markets or produce trucks to bring healthy food into the community regularly
 - ♦ Expand mobile food pantries
- Increase awareness about food deserts and healthy eating, so consumers demand increased availability of healthy foods.
- Report findings could be utilized by the Tarrant County Food Policy Council to formulate action steps in addressing improved access to healthy foods.

7. REFERENCES

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