Advancing Food as Medicine Programming in the Retail Setting

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ABSTRACT

Over half of the American population, over 117 million individuals, have at least one or more preventable chronic diseases that are related to poor eating and exercise habits. This includes cardiovascular disease, type II diabetes, and poor bone health (Schap, 2016). The expansion of Food as Medicine programming in grocery stores is predicted to impact consumer food choices. Food retailers are trailing nutrition-related programs to understand how they can provide solutions to change eating habits (FMI, 2019) as more consumers shift their dietary habits and mindsets to be more focused on how food choices can affect health status.

This project aimed to evaluate whether placing nutrition educational materials in ten Food City pharmacies in southwest Virginia and eastern Tennessee would provide consumer guidance in making food choices in the grocery store, specifically for populations looking to follow a low-carbohydrate diet or a heart-healthy diet. A pilot passive quasi-experimental design was created to determine if there was a product lift of the promoted products on the nutrition educational materials. Stores with both the resource racks and bag stuffers at the counters saw a 13.38% increase in carbohydrate-aware items and 1.04% in heart-healthy items. Stores that had bag stuffers only at the pharmacy counters saw a 10.55% increase in carbohydrate-aware items and a -0.11% decrease in heart-healthy items. Comparison stores saw a 11.19% increase in carbohydrate-aware items and a -0.48% decrease in heart-healthy items.

This intervention was successful as it provided real world significance in product lift as well as it provided insight into future program development and modifications for future resources.

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Introduction

Background and Setting

The idea of "Food as Medicine" is attributed to Hippocrates, who said, "Let food be thy medicine and medicine be thy food" (Hippocrates, 400 BC). Food as Medicine is a philosophy that food and nutrition can aid an individual in preventing and recovering from an illness or condition and improve food security (Academy of Nutrition and Dietetics, 2023). Utilizing both medical and nutritional interventions concurrently could improve health outcomes.

Based on 2023 population data of southwest Virginia, southeastern Kentucky, and eastern Tennessee, the average total population is 4.1 million, with a projected population increase of 2.4% to 4.2 million by 2027. The population is 87% Caucasian, 5% African American, 5% Hispanic, and 3% other races. The average household size of this area is 2.42, with an average of 13 years of education (twelve years being the completion of high school), and a median household income of $46,053 (Synergos, 2024). The national median household income was $74,580 in 2022 (Guzman & Kollar, 2023). Based on this population data, the average consumer household spends $177.80 on groceries weekly, with an average of 20% of income spent on food (Synergos, 2024).

Food City is a grocery store chain with 153 stores in southwest Virginia, eastern Tennessee, southeastern Kentucky, West Virginia, northern Georgia, and northern Alabama. The company currently serves over 1.4 million customer households with a population of over three million (Synergos, 2024). Food City reviews consumer population data based on five main districts: Chattanooga, Knoxville, Tri-Cities, Coalfields, and Huntsville. The Chattanooga district covers six counties in Tennessee, seven in Georgia, and one in Alabama. The Knoxville district covers 20 counties in Tennessee. The Tri-Cities district covers eleven counties in Virginia and

eight counties in Tennessee. The Coalfields district covers eight counties in Virginia, eleven in Kentucky, and four in West Virginia. The Huntsville district covers three counties in Alabama.

The median age of Food City shoppers across their 153 store locations is 53.9, with a median income of $63,695. The average years of education are 14.48, and the average household size is 2.77. Weekly spending on groceries is $144.61, with 11.9% of total income spent on groceries (Synergos, 2024).

Over half of the American population, over 117 million individuals, have at least one or more preventable chronic diseases that are related to poor eating and exercise habits. This includes cardiovascular disease, type II diabetes, and poor bone health (Schap, 2016). More consumers are recognizing the connection between their health status and the food choices they make. With a shift in mindset of consumers, Food as Medicine programming argues that food and nutrition can play a role in health as preventing or treating disease. The expansion of health and well-being programs in the retail setting is predicted to continue to grow as grocery stores learn that they can provide solutions for medically tailored diets and changing eating patterns for lifestyle purposes (FMI, 2019).

Currently, dietitians working in the food retail setting are involved in recipe development, product innovation, nutrient analysis, employee wellness, and nutrition communication. They also serve as communicators between retailers and consumers. Dietitians can translate nutrition and food knowledge to practical solutions for individuals to make informed food choices (Academy of Nutrition and Dietetics, 2021).

Statement of the Problem

Based on survey data collected during 2023 (Food City Consumer Research Analytics, 2024), Food City customers were asked if they currently followed or desired to follow a specific

eating plan; customers were able to choose multiple options. From over 10,000 surveys, 34% of customers were interested in a low-carbohydrate diet, and 30% in a heart-healthy diet. Other popular options included high protein diets (23%), Mediterranean eating patterns (16%), and the ketogenic diet (15%) shown in table 1. Customers could also write in an eating plan that they follow, and gluten-free or Celiac disease was written in 2% (202) of the surveys. This survey provided an incentive for a free case of water with completion.

Table 1
Survey Results

Low-Carbohydrate	34%
Heart-Healthy	30%
High-Protein	23%
Mediterranean	16%
Gluten-Free	2%

Pick Well is a current shelf tag hierarchy program designed and implemented by the dietitians at Food City. It features color-coded tags highlighting "better for you" in-store and online choices on their website. It promotes options such as "Dietitian's Pick," "Heart-Healthy," "Low Sodium," "Whole Grain," "No Sugar Added," "Carb-Aware," and "Gluten-Free" (Food City, n.d.). These tags are located on the shelves with items to designate them as a choice that would follow a particular diet or be a better choice for a specific nutrient. The intervention utilized the *Pick Well* tags to help guide shoppers in choosing from these items.

The engagement and participation with the *Pick Well* “healthy aisles” have changed between the three phases of program implementation. During January 2023, a survey of customers was completed to determine their nutritional material or promotion needs. In August 2023, classified as phase I, the resource racks were piloted in selected stores to provide nutrition

and education resources stationed at the in-store pharmacies. In January 2024, classified as phase II, the bag stuffers were placed on the resource racks as additional nutrition educational materials. The number of units sold in the "healthy aisles" were assessed per store during these three periods to determine if there was a product lift during any of the phases compared to before January 2023. Product lift is the increased purchasing of certain products based on promotional drives.

The aim of this project was to determine if there was a lift in the products featured on the nutrition educational materials. These units excluded gluten-free designated items which are items that are either certified, identified as, or are naturally gluten-free.

Healthy aisle products are evaluated monthly by Food City based on qualifying items during the set purchasing periods. Historical comparisons may show variances related to qualifying items from year to date due to product availability. The changes in healthy item choices during these periods may be due to inflation. This assessment is limited to product purchasing based on units, purchasing patterns during this period, and are likely impacted due to inflationary price increases. The data for the intervention will compare product lift to January 2024 data.

Purpose of the Project

This project aimed to provide nutritional educational resources specific to various chronic health conditions in the retail setting. The primary aim of the project was to determine if sales of featured products increased after distributing the materials over a five-week period at Food City pharmacy locations. The intended outcomes were that customers are better informed in purchasing food products that meet their specific health and dietary needs, increased customer

loyalty, and the ability highlight the return on investment (ROI) for nutrition programs in this company.

Project Objectives

This project aimed to answer a research question regarding the changing of eating behaviors to follow a healthier diet. The two topics identified through a previous needs assessment as the primary needs for Food City customers were to follow a diabetic or a low-carbohydrate diet and a heart-healthy diet.

Research Question:

1. How does distributing nutrition educational materials for specific dietary needs (carbohydrate-aware diet and heart-healthy diet) in a grocery store setting impact the sale of targeted products?

The dietitians and the dietetic intern created two nutrition educational handouts. One handout targeted a population looking to modify their carbohydrate intake. People with diabetes or those looking to follow a low-carbohydrate diet would benefit from this material. The second was targeted toward a population looking for heart-healthy alternatives. This handout would benefit people at risk of heart disease or currently experiencing heart disease.

Definition of Terms

Return on investment (ROI) - evaluation tool to determine efficiency and profitability of an investment; measures the amount of return on an investment relative to the investment cost (Fernando, 2023).

Low-carbohydrate diet – low carbohydrate intake as a percent of daily macronutrient intake (<26% of macronutrient intake from carbohydrates or less than 130 grams of carbohydrates per day) (Oh, 2023).

Heart- healthy diet – also known as the cardiac diet; an eating plan to reduce sodium and fat intake to prevent heart disease; consuming more fruit, vegetables, and whole grains, limiting sugar intake and foods high in saturated fat, and consuming low-fat dairy products, fish, poultry, nuts, and legumes (NIH, 2021).

Review of Literature

Diabetes Mellitus

Over 30 million people (one in ten people) in the United States have diabetes, with approximately 90-95% of cases being type II diabetes (CDC, 2023). Diabetes is one of the most common chronic diseases in the United States and one of the leading causes of death in both the United States as a whole and in the state of Virginia (VDH, 2018). Type II diabetes is a preventable but manageable condition with the modifications of eating and exercise habits, medication, and self-management (VDH, 2018). In Virginia, in 2017, 631,194 people were diagnosed with diabetes, or 9.6% of the state population. The Southern and Eastern parts of Virginia had the highest prevalence of diabetes, as high as 73% of the population. One out of every ten people in the state of Virginia have diabetes, and one out of every three Virginia residents is estimated to have prediabetes (VDH, 2018). In Tennessee, approximately 730,416 people had diabetes in 2021, or 13.4% of the state population. Over 614,656 or 34.3% of the population of people in Tennessee are estimated to have prediabetes (ADA, 2023).

Prediabetes is a condition when blood sugar levels are higher than the normal range (70 mg/dL-100 mg/dL) but not high enough to be diagnosed as diabetes. Lifestyle changes can prevent or delay the development of type II diabetes after a diagnosis of prediabetes (CDC, 2022). The World Health Organization (WHO) defines the diagnosis of prediabetes by two specific parameters after ingesting 75 grams of oral glucose load. It includes an impaired fasting

glucose (IFG) with a fasting plasma glucose (FPG) of 110-125 mg/dL and/or an impaired glucose tolerance (IGT) of two-hour plasma glucose of 140-200 mg/dL. The American Diabetes Association (ADA) classifies an IFG in a lower range of 100-125 mg/dL and includes a hemoglobin A1c (HbA1c) in the range of 5.7-6.4% for prediabetes (Bansal, 2015). To assess the risk score for diabetes, age, sex, ethnicity, fasting glucose, systolic blood pressure, HDL cholesterol, BMI, and family history of diabetes can be better predictors compared to abnormal IFG or IGT values only (Stern et al., 2002).

Nutrition interventions for type II diabetes involve balancing diet changes and exercise. Common meal planning methods, such as carbohydrate counting and the plate method, can improve HbA1c and blood glucose levels while a person is not receiving insulin (Diabetes UK, n.d.). Carbohydrate counting is tracking the amount of carbohydrates consumed during each meal and can be beneficial for someone already prescribed insulin because it can provide a way for one to know how much insulin to take with meals. The plate method is a way to provide guidance in portion sizes. Half of the plate should be fruits and vegetables, ¼ as whole grains, and ¼ as protein (NIH, 2016).

Typical medical interventions for type II diabetes include using insulin to provide the body with another way to utilize glucose from meals since it is no longer sensitive to insulin released by the pancreas. Other interventions include oral medications such as metformin, which helps the body utilize insulin more efficiently and lowers blood glucose levels.

Diabetes is an expensive healthcare cost. In Virginia, the cost of direct diabetes expenses was $6.1 billion in 2017 (ADA, 2021). In Tennessee, the cost of direct diabetes expenses was $5.2 billion in 2017 (ADA, 2023). In 2022, the average healthcare costs for individuals with diabetes is 2.6 times higher than individuals without diabetes. On average, the healthcare direct

costs for diabetes are $12,000 per year, and overall healthcare costs of a person with diabetes are $19,700 per year (Parker et al., 2024).

Cardiovascular Disease

Heart disease is the leading cause of death in the United States. Common cardiovascular disease types include coronary heart disease (CHD), stroke, hypertension, and congestive heart failure (CHF) (NIH, 2011). In the state of Virginia, heart disease is the second leading cause of death. In 2017, over 14,000 Virginians died from heart disease (AHA, 2018). In the state of Tennessee, heart disease is the leading cause of death. In 2017, over 16,000 Tennesseans died from heart disease-related conditions (AHA, 2018).

Nutritional interventions for heart disease include the following of Dietary Approaches to Stop Hypertension (DASH) or Therapeutic Lifestyle Changes (TLC) programs, which emphasize an eating pattern high in fruit and vegetable intake, low in sodium, low in sugar, low in saturated fat, and high in fiber and whole grains. Balancing dietary changes with exercise and ceasing tobacco use has been shown to improve health outcomes for heart disease (NIH, 2023). Dietary recommendations for a heart-healthy diet include decreasing total fat to 25 - 35% of a person's daily calorie intake and saturated fat to 7%, increasing fiber intake to 10 – 25 grams daily, limiting sodium to less than 2,300 milligrams daily, and limiting added sugar intake (NIH, 2005).

Typical medical interventions for heart disease, such as medications, have proven to be effective in managing the condition. For instance, ACE inhibitors, beta-blockers, and/or calcium channel blockers are used to lower blood pressure. Nitrates are prescribed to dilate coronary arteries and relieve angina, while ranolazine is used to treat coronary disease and angina. Statins are often prescribed for cholesterol control to slow plaque buildup in arteries (NIH, 2023).

Grocery stores as a location for behavior change

Research studies have been conducted in the grocery store setting revealing an array of interventions for behavior change regarding food choices. These studies have not only fostered improvements in eating patterns and behavior but have also proven to be cost-effective. The success of specific programs was determined by a significant decrease in healthcare costs and a notable increase in sales of advertised products (Yoder et al., 2021).

A range of health retail strategies have been implemented in grocery stores, each through different approaches. A study by Yoder et al. tested nutrition-related signage and promotions, nutrition label education, group classes, grocery store tours, and personalized nutrition education. Hartmann-Boyce et al., evaluated interventions such as monetary incentives to purchase more produce with coupons or discounts and a computer-based system that provides healthier alternatives for chosen foods. Research conducted by Hobin et al., studied the use of tag labels on products on the shelf, providing on-shelf nutrition information, which offers another possibility for shoppers to make better-informed food choices. Monetary interventions, such as coupons or discounts, have significantly increased fruit and vegetable purchases compared to education-only interventions. These results highlight the potential impact of such strategies (Hartmann-Boyce et al., 2018; Yoder et al., 2021).

Dietitians as a service provider in the grocery store

From the Food Industry Association 2021 *U.S. Grocery Shopper Trends,* 47% of the grocery store shoppers interviewed rated dietitians as a positive influence on their food-making decisions. Dietitians scored highly, along with the primary food store (48%) and grocery store pharmacists (45%). Health insurance companies (41%), government agencies (35%), and

manufacturers (31%) did not score as highly regarding being advocates for the consumer's health (FMI, 2021).

Empowering consumers with the services from a dietitan in the environment where they make food choices for themselves and their families provides the opportunity to change eating behaviors (Yoder et al., 2021). With many dietitians embracing the concept of "Food as Medicine," the potential benefits of implementing this philosophy in the retail setting were explored through surveys. This research opens doors for interventions led by retail dietitians, fostering a more health-conscious food environment (Yoder et al., 2024).

According to the Academy of Nutrition and Dietetics Foundation, dietitians play a beneficial role in retail. They can elevate overall basket size (increasing the number of products a consumer buys) through direct and indirect communication with customers, collaborate with partners to improve food access and security, promote food safety education, drive brand-awareness in stores through marketing and communication, and expand access to health services through telehealth and digital nutrition services (Academy of Nutrition and Dietetics Foundation, 2021).

A study by Watowicz et al. investigated the impact of having dietitians accessible in the grocery store to remove barriers to care such as conflicting work schedules or inconvenience. Dietitians would also be able to provide education in the environment where most food choices are made. Participants could schedule and receive one-on-one nutrition counseling with a dietitian at the grocery store through scheduled meetings (Watowicz et al., 2019). The intervention conducted by Watowicz et al. evaluated dietary intake before and after three meetings with a dietitian discussing the DASH diet which was also communicated with the participants' primary care provider. The study findings suggested significant increased adherence

to DASH diet recommendations but did not show a significant decrease in blood pressure (Watowicz et al., 2019).

Rural community outreach

Changing the location of foods in the grocery store could impact consumers' choice of healthier options in rural communities. An intervention by Gustafson et al. evaluated the effectiveness of placing healthier food options in the end caps of aisles, offering recipe cards and samples at the front of the store, and offering coupons for foods advertised for the week for six-weeks. The aim was to increase awareness of locally grown produce and brand awareness of the University-sponsored program that created the recipes featured (Gustafson et al., 2019). The stores included in the study, while not showing an increase in fruit and vegetable sales, saw a significant decrease in sugar-sweetened beverage sales in the intervention group, from 30% to 15%. Partnering with the Kentucky Cooperative Extension positively impacted the intervention through the provision of recipes and marketing incentives in rural Kentucky grocery stores.

Another retail intervention in Appalachian Kentucky provided local grocery stores with the resources to increase the availability and awareness of healthy foods. This program's interventions, which included expanding the variety of produce available, providing point-of-purchase educational materials, and in-store marketing of these products, were instrumental in seeing improvements in choosing healthier options in these communities (Rushakoff et al., 2017).

Conceptual Framework

Social Determinants of Health

Numerous factors impact an individual’s health. The Social Determinants of Health (SDOH) are the systems, resources, or components that are non-medical factors that influence

one's health (Hahn, 2021). The SDOH impact how and why people engage in behavior based on their educational access and quality, their economic stability, their social or community context, their access to quality health care, as well as their neighborhood and environment. A person's SDOH are the most significant in determining their support or challenges with maintaining their health (HHS, n.d).

This project needed to take the SDOH into consideration while designing this intervention. It needed to address potential influences on someone's ability to purchase certain items. Some products were suggested to present on the handout, but due to cost and the potential for some products to be more "special occasion" foods, most options that were chosen were more cost-effective to the consumer. A person's health literacy also needed to be taken into consideration when designing the handout. Some words that were originally on the handout were more nutrition jargon, and those words needed to be changed to make it easier for the consumer to understand the information and messaging of the handout.

Food as Medicine

This program intervention aimed to evolve the Food *as* Medicine concept to a focus on Food *with* Medicine. This intervention chose to adapt this concept because the dietitians partnered with pharmacies at Food City. It was a collaborative effort to address both diet changes and medication compliance. This change in concept wording aimed to emphasize that making changes to a person's diet while also taking their prescribed medication could prevent their condition from worsening or using both methods as a treatment. Emphasizing this concept could also reduce confusion among customers who may believe that if they were to start incorporating the highlighted foods into their diets, they would be able to cease medication use immediately.

This intervention did not use Food as Medicine or Food with Medicine marketing in the handouts or described to customers and pharmacists.

Concept of "nudging"

Nudging, or libertarian paternalism, is an aspect of choice architecture that changes people's behavior, predictably. It does not restrict any options or change economic incentives, (Thaler & Sunstein, 2008) but instead favors the use of people's current cognitive biases and current nutrition knowledge to make food choices. It is a hidden form of persuasion that aims to create healthy food environments and change food habits. The use of language and communication of a particular choice that a third party wants the consumer to choose will impact how the consumer will react and make a choice (Sunstein & Thaler, 2003). Nudging can either be a supplement or a substitute for current regulations in improving health (Hanson et al., 2016). It acts as a guide for behavior change rather than by force. The nudging strategy has been implemented in schools, hospitals, workplaces, food retail, and restaurants. Strategies in restaurants have been studied to promote healthy food environments by addressing marketing mix principles (Kraak et al., 2017).

By presenting nutrition information and promoting healthier eating in restaurants, healthy food choices and lifestyle changes may improve. By making the consumer feel like they are making their own decision to change their eating behaviors rather than by force, they are more likely to make those changes. Nudges are often promoted as a default option, presented in a more accessible position, or presented in an exciting or interesting way that differs from other options. Many consumers seek to follow a healthier lifestyle and pick foods that are better for their health. However, making those choices can be confusing and challenging in understanding nutrition information and the overwhelming number of options offered in grocery stores

(Kallehave et al., 2011; Wageningen, 2015).

This project utilized nudging to present healthier options or alternatives of foods either normally consumed or ones that are scientifically proven to show benefit to health with consumption. The intervention used passive methods where the consumer had the ability to choose to pick up the handout and then use it to guide their shopping in the store. The intervention did not physically provide consumers the handout, explain it, and follow through to note changes in purchasing. It provided the opportunity for consumers to use their judgement to decide if they trusted their pharmacy and dietitians to have a positive interest in their health and then use the handout because they trust information given by those individuals.

Targeted Population

The target population was Food City pharmacy and in-store customers. This program promoted "shopping for your health" incentives with the additional goal to increase pharmacy customer loyalty. The content created for the materials was assessed through customer surveying. This program intervention aimed to evolve the Food *as* Medicine concept to a focus on Food *with* Medicine. This intervention chose to adapt this concept because the dietitians partnered with pharmacies at Food City. It was a collaborative effort to address both diet changes and medication compliance. This change in concept wording will showcase to consumers that making changes to their diet while also taking their prescribed medication could prevent their condition from worsening or using both methods as a treatment. Highlighting this concept will also reduce confusion among customers who may believe that if they were to start incorporating the highlighted foods into their diets, they would be able to cease medication use immediately. This intervention did not use Food as Medicine or Food with Medicine marketing in the handouts or described to customers and pharmacists.

Program Methodology

This program provided a valuable passive in-store education resource for customers. It allowed the pharmacy teams in Food City stores to recommend dietitian-created nutrition resources, which could increase the probability for health improvements. The physical resources featured a Quick Response (QR) code that linked these resources to the Food City *Pick Well* website page that provides additional information regarding the qualifications of different health claims, offering a comprehensive platform for health shopping, private store-brand recipes, and additional e-commerce programs. Customers could also contact the dietitian team with further questions or information requests.

The physical copies of the nutritional materials featured were resources referred to as "bag stuffers." Bag stuffers were 8.5" by 5.5" sheets of paper that can be rotated seasonally and highlight multiple disease states. Bag stuffers focused on expanding customers' nutrition knowledge with quick shopping guides.

The resources highlighted six items on each resource qualifying as "Carb-Aware" or "Heart-Healthy." Due to customer preference and choice, similar items were designated for reporting to follow purchasing trends in a halo effect. Private label items, products with a label of the store selling them, were only included in this intervention. See Tables 2 and 3 for the items highlighted on the resources.

Table 2

Items Highlighted on Carbohydrate-Aware Nutrition Educational Resource

Carb-Aware	
Private Label	***Food Item***
Food Club	Cheese Bars, Colby jack
Food Club	Raw almonds
Food Club	Low fat cottage cheese, 16 oz
Food Club	Tuna, light, 2.6 oz pouch
Full Circle Market	Hummus, original
ShortCuts	Snack cup, broccoli
TopCare	High Performance Protein Shake, vanilla

Table 3

Items Highlighted on Heart-Healthy Nutrition Educational Resource

Heart-Healthy	
Private Label	***Food Item***
Food Club	Old Fashioned Oats, 18 oz
Food Club	Olive Oil, virgin, 8.5 oz
Full Circle Market	Fillets, Alaskan Sockeye Salmon
Full Circle Market	Berry Medley, unsweetened
Food Club	Tomatoes, no salt added, petite, diced, 14.5 oz
Full Circle Market	Navy Beans, low sodium, 15.5 oz

Data Collection

This program was a pilot study that was tested in fourteen different stores across southwest Virginia and eastern Tennessee. It was a quasi-experimental design where six stores placed resources on a rack near the front of the store in addition to bag stuffers by the pharmacy counter. Four stores only had bag stuffers by the pharmacy counter, and four stores did not have

an intervention. Stores were chosen for the intervention based on similarities in store size, customer demographics, pharmacy usage, and geographic location. The stores are categorized by intervention type, location, store number, and district in Table 4.

Table 4

Stores Designated for Tracking Intervention Participation

Intervention	***Location***	***Store Number***	***District***
Resource Rack + Bag Stuffers	Tri-Cities Area, Bristol, VA, Little Creek Xing	821	2
	Tri-Cities Area, Abingdon, VA	823	2
	Tri-Cities Area, Kingsport, TN, Eastman Road	605	3
	Knoxville Area, Knoxville, TN, Deane Hill	694	7
	Knoxville Area, Clinton, TN	654	8
	Knoxville Area, Oak Ridge, TN	681	8
Bag Stuffers Only	Tri-Cities Area, Kingsport, TN, Clinchfield Street	657	3
	Tri-Cities Area, Johnson City, TN	629	4
	Knoxville Area, Maryville, TN	647	7
	Knoxville Area, Powell, TN	679	7
Comparison	Tri-Cities Area, Bristol, VA, Bonham Road	816	2
	Tri-Cities Area, Piney Flats, TN	699	4
	Knoxville Area, Knoxville, TN, Cumberland Estates	678	7
	Knoxville Area, Knoxville, TN, Middlebrook Pike	672	7

Before the intervention was implemented in stores, a five-week “wash-out” period reporting was performed. The items designated for reporting were evaluated weekly to determine changes in product purchasing. The wash-out period for this intervention occurred from February 20, 2024, to March 26, 2024.

Purchasing patterns were tracked over five weeks, which was recommended by the data analysis team because it is the spending cycle of how loyalty marketing engagement is tracked. Promotions cycle every five weeks as well. Tracking the number of units sold determined if there was an increase in the number of featured items purchased. Qualitative methods for this study included post-intervention feedback from the pharmacy teams on implementing the materials as they were the ones that had a greater ability to see engagement with pharmacy users.

The resources were printed and distributed to the intervention stores. Carbohydrate-aware resources were distributed to Tri-Cities pharmacies on March 29, 2024. Due to delays in printing and mail delivery, Carbohydrate-Aware and Heart-Healthy resources were not delivered to Knoxville and Heart-Healthy resources were not delivered to Tri-Cities pharmacies until the following week, April 5, 2024.

Quantitative data, a key evaluation component, was collected and analyzed using Microsoft Excel. Sales data, the number of products purchased, was provided weekly by the marketing team at Food City through Microsoft Excel. Products on the handout as well as those in the halo effect were presented in the data.

The number of highlighted products sold in the wash-out period compared to products sold during the intervention indicated a possible product lift during the intervention. Real world significance was a 1-2% increase in the product lift compared to the wash-out period, deemed significant by the marketing team. Furthermore, product sales over time were charted to visually

identify trends and understand how product purchasing patterns evolved over the five weeks.

Qualitative data was collected through post-intervention surveys completed by the pharmacy teams participating in the intervention. Each pharmacist was asked to provide their insight on how the intervention went and for suggestions for additional programming. During the intervention, the pharmacies were visited three additional times to restock resources and to gain perspective from pharmacists regarding participation.

Results

Program Outcomes

The number of units sold included the items featured on the handout as well as the items classified under the halo effect. There was the greatest increase in carbohydrate-aware items sold in the stores with the resource rack and bag stuffers during the intervention compared to the wash-out period at 13.38%. The comparison stores had a greater percent change at 11.19% compared to the bag stuffer only stores at 10.55% as shown in Table 5.

Table 5

Carbohydrate-Aware Average Units Sold by Intervention Type

	Total Units (WASH)	Total Units (POST)	% Change
RR + BS Average	1963	2225	13.38
BS Only Average	1887	2086	10.55
Comparison Store Average	1376	1530	11.19

There was a positive change in items sold during the intervention compared to the wash-out period at 1.04%. The stores with bag stuffers only at the pharmacy counters as well as the comparison stores saw a negative change in purchasing at -0.11% and -0.48% as seen in Table 6.

Table 6

Heart-Healthy Average Units Sold by Intervention Type

	Total Units (WASH)	Total Units (POST)	% Change
RR + BS Average	1087	1098	1.04
BS Only Average	950	949	-0.11
Comparison Store Average	888	884	-0.48

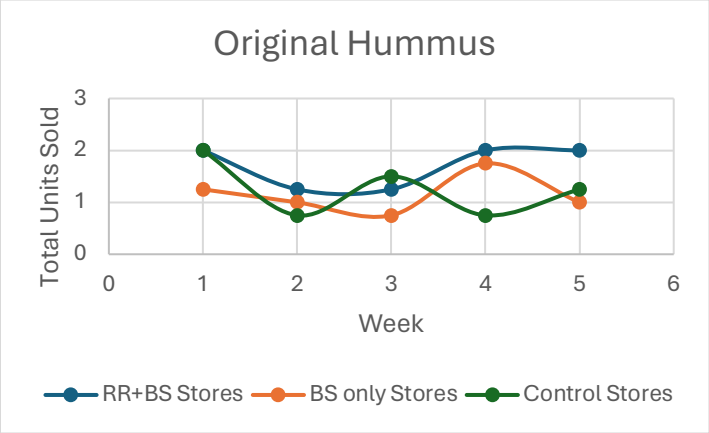
In total, 50 post-intervention surveys were sent to participating pharmacy teams. Of those 50 surveys sent, only six were completed. Two follow-up reminders were sent after the initial survey was sent. Two Tri-Cities pharmacies in the Resource Rack and Bag Stuffer intervention completed the survey and three of the four pharmacies in the Bag Stuffer Only intervention completed the survey. Two pharmacists at one store completed the survey.

Pharmacists neither agreed nor disagreed that the nutrition resources located at the pharmacy provided guidance in making food choices for patients. The respondents did agree that they were comfortable with promoting the resource and answering questions patients had. They also agreed that if there were additional nutrition resources made, they would be comfortable promoting them too. The pharmacy team was uncertain if the nutrition resources were providing guidance in making food choices for patients.

One pharmacist noted that incentives or coupons for the highlighted products could increase engagement with the resources. They also suggested focusing on one or two products or disease states per period, such as quarterly, and providing recipes via the Food City website. Having a QR code that leads customers directly to the page featuring recipe ideas for each product could also improve engagement. Due to the limited feedback, themes and coding could not be completed.

Graph 1

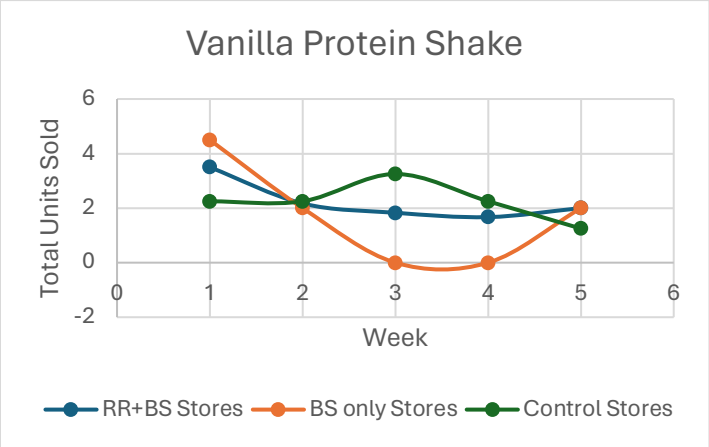
Original Hummus Outcomes: Carb-Aware



The original hummus is not a widely recognized or commonly consumed food in this culture and population. As seen in Graph 1, low purchasing of this product with limited changes occurred during the intervention. This item was not on sale at any time during the intervention.

Graph 2

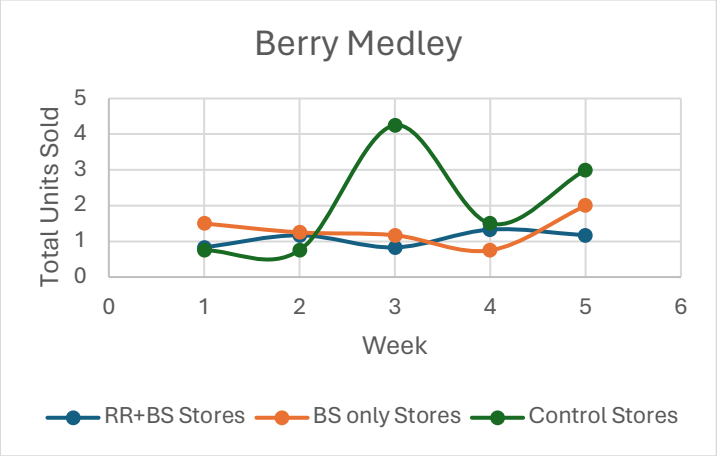
Vanilla Protein Shake Outcomes: Carb-Aware



The vanilla protein shake had a large drop from purchasing in weeks 3 and 4 in Bag Stuffer Only stores due to unknown causes as seen in Graph 2. There was consistent purchasing within the Resource Rack + Bag Stuffer stores of this product. This item was not on sale at any time during the intervention.

Graph 3

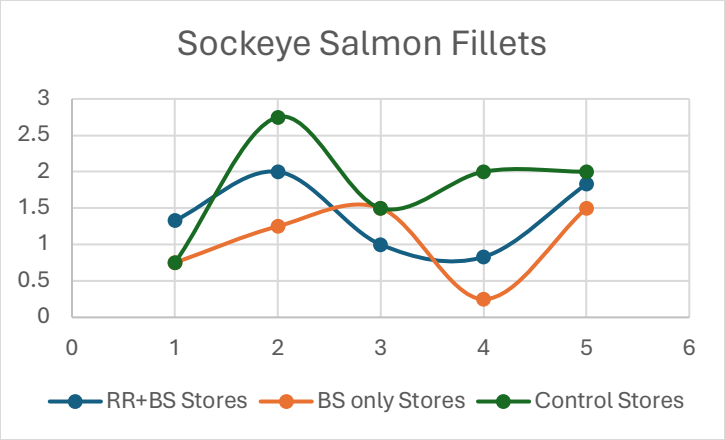
Berry Medley Outcomes: Heart-Healthy



During the intervention, the comparison stores outperformed both intervention types during the last weeks of the intervention as seen in Graph 3. There was consistent purchasing of the berry medley in the stores for both interventions. This product was not on sale at any time during the intervention.

Graph 4

Sockeye Salmon Fillets Outcomes: Heart-Healthy

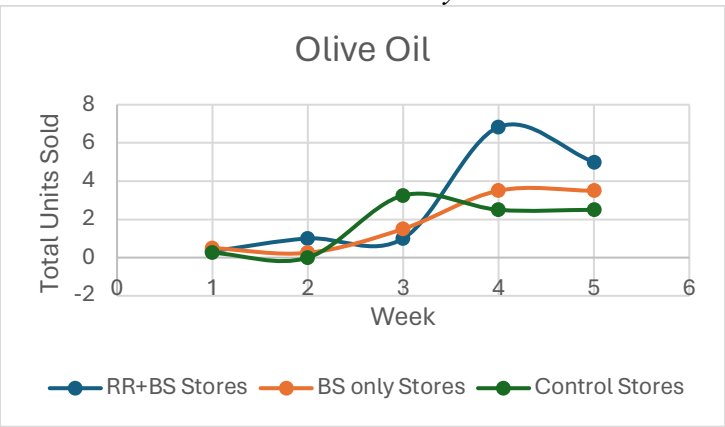


The sockeye salmon fillets were not a commonly purchased item possibly due to limited use in cultural eating patterns. It was also a more expensive frozen product featured on the handout. During data collection, the intervention did not account for fresh options at seafood

counter into the halo effect. The comparison stores outperformed both intervention types and this product was not on sale at any time during the intervention as seen in Graph 4.

Graph 5

Olive Oil Outcomes: Heart-Healthy



The olive oil was not commonly purchased on a weekly basis due to being a flavor enhancer rather than food product. The resource rack and bag stuffer stores outperformed the bag stuffer only stores and comparison stores as seen in Graph 5. This item was not on sale at any time during the intervention.

Note: Additional trend graphs for the remainder of the items can be obtained in the appendix

Discussion

The greater increase in carbohydrate-aware items may be due to the larger population that could benefit from this resource. Not only would carbohydrate-aware appeal to those with type II diabetes, but it could also appeal to those looking to follow a low-carbohydrate diet or the ketogenic diet. The carbohydrate-aware resource focused on providing suggestions for low-carbohydrate snacks in which the foods could be consumed either as-purchased or with limited preparation. The heart-healthy resource provided items that required more preparation and featured foods that may not have been a typical product purchased by consumers. Focusing on

different items that would qualify as heart-healthy and comparing them to another product that is frequently purchased could have produced different outcomes. For example, comparing a flavored yogurt to a non-fat or no-added sugar yogurt on the same handout and breaking down the nutrient label.

It cannot be concluded that the resources created solely influenced product lift during this period. Many highlighted products were featured in weekly sales throughout the intervention. The Easter holiday also occurred during the intervention period which could have influenced purchasing patterns. Product lift could also have been influenced by accessibility to items. Seasonality could have also influenced product purchasing. The wash-out period occurred during the winter months of February and early March and the intervention period occurred during the beginning of spring. Purchasing can be affected by meal choices with the changing of seasons, as people often eat differently as the temperature changes and different products move into season.

Implications

In future nutrition program planning, Food City will design recipes specifically including the products highlighted on the nutrition educational materials created during this intervention. The recipes would be linked to the products on the Food City website. Future adaptations of the nutrition material would feature multiple QR codes that would directly link a customer to a webpage with recipes for each product rather than one QR code that directs a customer to the *Pick Well* webpage.

This pilot program improved nutrition and pharmacy relationships for future programming. The dietitians and pharmacists gained face-to-face recognition, which will benefit future department programming partnerships. The results from this program will guide

the coming stages of nutrition program development within Food City and expand beyond Food City pharmacy customers. Additional resources for different disease states and other specific dietary needs will follow with the pilot program. Future programming will include meal ideas and recipe development for the products highlighted in the resources created for this intervention.

Limitations

Due to branding guidelines, the fonts, colors, and format are uniform, making it difficult to distinguish between the two materials. This intervention was also limited to only private label items to feature for this programming phase. The size of the resource was also a limiting factor because the handout could only fit six products. The dietitians had to determine which products they thought would be the most beneficial to highlight from both a marketing and dietitian perspective. The team wanted to feature products that could increase basket size and provide additional nutritional benefits. Future resources would change the colors to make determining which handout highlighted which products easier. This intervention also had a small sample size of 14 stores, with only 10 of those with an intervention.

Conclusion

In summary, this intervention was successful as it provided real world significance in product lift as well as it provided insight into future program development and modifications for future resources. Further research on a more individualized basis is needed to determine whether this resource influences purchasing behaviors.

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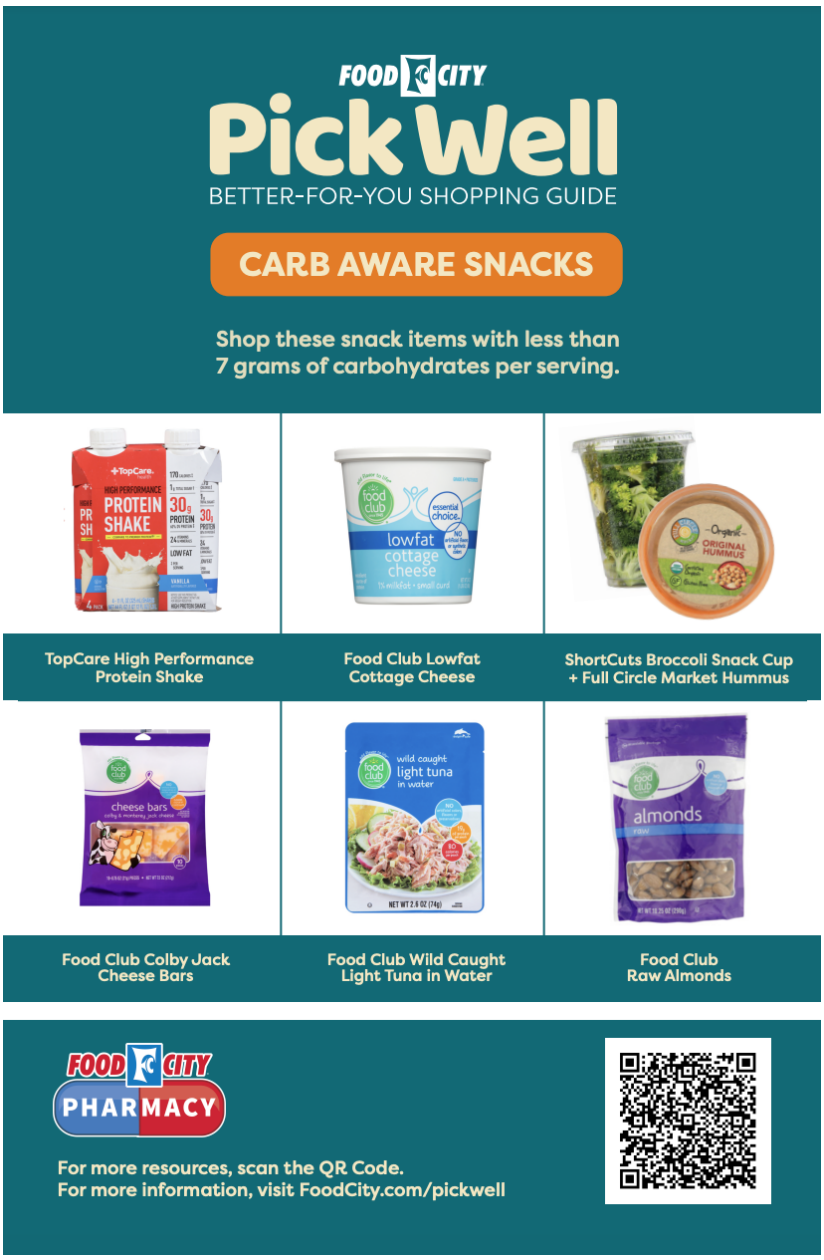
Appendix A: Carbohydrate-Aware Handout



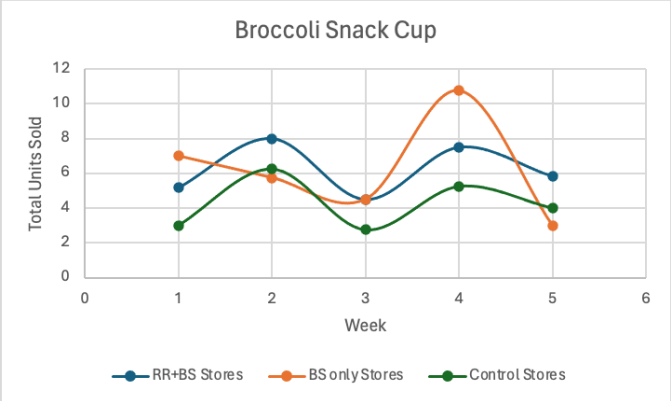
Appendix B: Heart-Healthy Handout

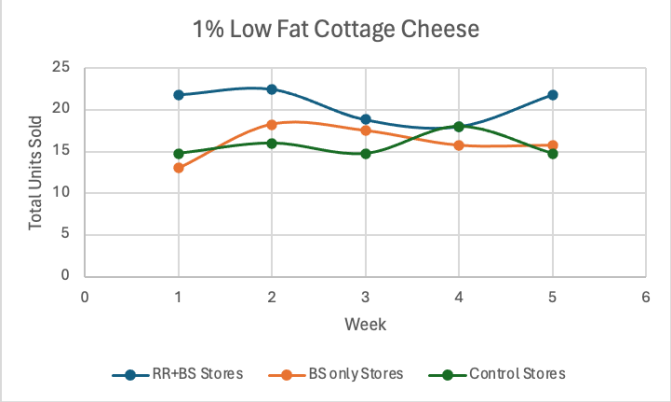
Appendix C: Post-Intervention Pharmacy Team Survey

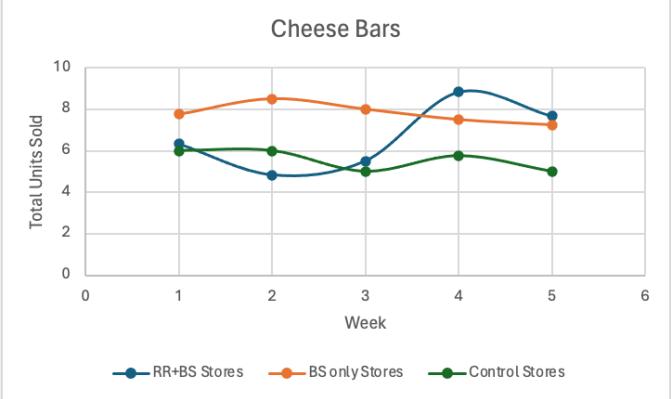
Post-Intervention Pharmacy Team Survey

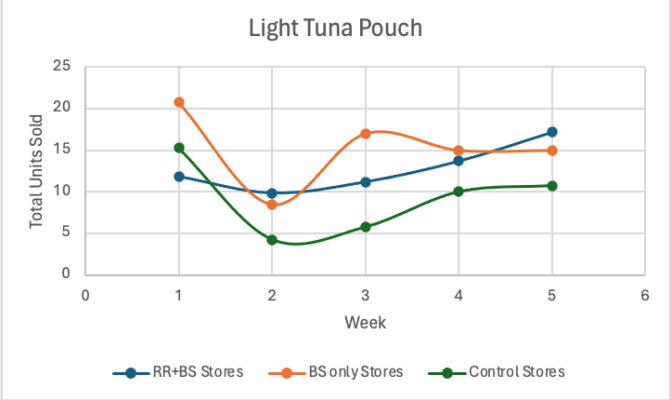
Patients have been taking the nutrition materials at the pharmacy.				
1- Strongly agree	2- Disagree	3- Neither agree nor disagree	4- Agree	5- Strongly agree
I felt comfortable with providing the resource to patients and answering questions.				
1- Strongly agree	2- Disagree	3- Neither agree nor disagree	4- Agree	5- Strongly agree
Patients expressed that the nutrition resources provided guidance in making food choices.				
1- Strongly agree	2- Disagree	3- Neither agree nor disagree	4- Agree	5- Strongly agree
If there were additional nutrition-related materials produced, I would feel comfortable promoting them.				
1- Strongly agree	2- Disagree	3- Neither agree nor disagree	4- Agree	5- Strongly agree
What changes, if any, would you like to see made to the nutrition education materials?				
What additional resources would be beneficial to meet your patients' needs?				
Any additional comments?				

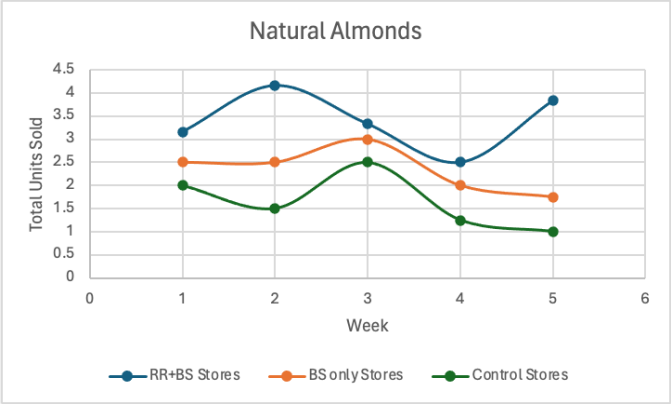
Appendix D: Average Weekly Sales Comparison by Intervention Type

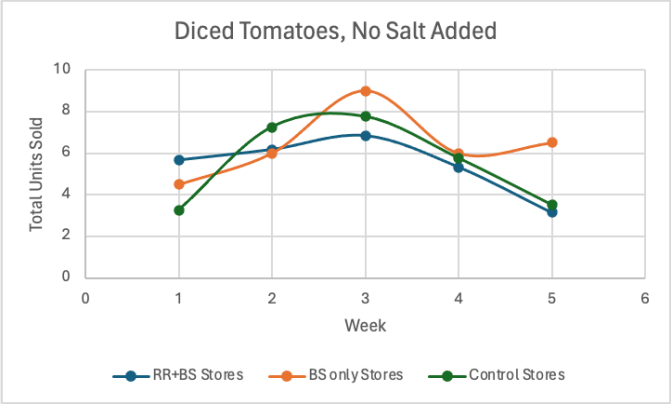


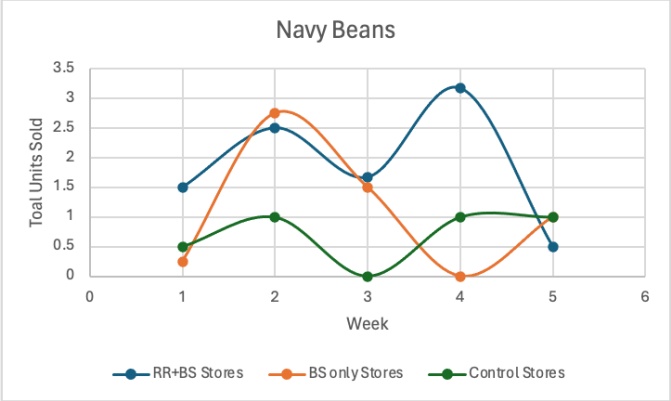


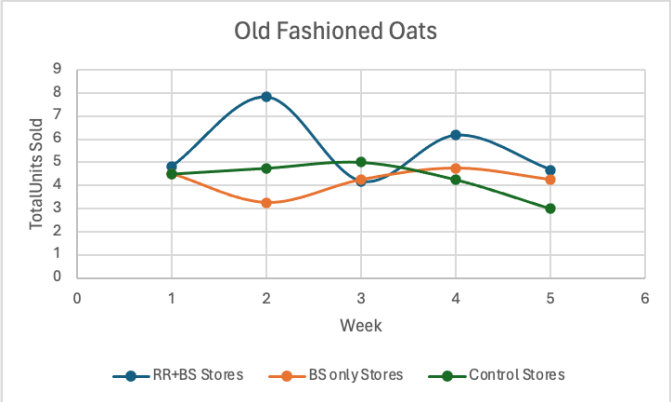





Natural Almonds
Total Units Sold
Week
RR+BS Stores
BS only Stores
Control Stores


Diced Tomatoes, No Salt Added
Total Units Sold
Week
RR+BS Stores
BS only Stores
Control Stores


Navy Beans
Toal Units Sold
Week
RR+BS Stores
BS only Stores
Control Stores


Old Fashioned Oats
TotalUnits Sold
Week
RR+BS Stores
BS only Stores
Control Stores