

LOWERING GROCERY COSTS, MAXIMIZING MEALS
PORTION CONTROL AND IMPROVING NUTRITION
VALUE AT ARCHWAY INC.

An Interactive Qualifying Project

Submitted to the Faculty of
WORCESTER POLYTECHNIC INSTITUTE

In partial fulfillment of the requirements for the
Degree of Bachelor of Science

By

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Date: 10 / 19 / 2016

Report Submitted to:

Archway Inc. and Professor Chickery Kasouf

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1. ABSTRACT

Archway Inc. is a non-profit organization that works collaboratively with families to provide services to children and adults with cognitive disabilities. Some of these disabilities include, but are not limited to Autism Spectrum Disorders, Intellectual Disability/Intellectual Developmental Disorder, Asperger's, Schizophrenia, and Down's syndrome.

This project aims to reduce cost and to optimize portion control of food served for individuals with autism spectrum disorder (ASD) in Archway Inc. This project starts by defining autism spectrum disorder and how individuals with autism are challenged. It also reviews research on healthy diets, which highlights the benefits of different parts of the diets such as proteins, minerals, and vegetables, and more pertinently, the unique diet and nutrition needs of ASD individuals. These challenges occur because ASD clients (children and adults) usually portray common factors and challenges when it comes to nutrition.

2. ACKNOWLEDGMENTS

The research, approach and recommendations of this report would not have been possible without the guidance and expertise of several key individuals who must be recognized. I would like to thank Lucy Tresise, the Director of Archway Inc. for not only her expertise and assistance, but also for giving us a chance to find ways to improve portion control and reduce the cost of food in Archway. Without her knowledge and guidance, the project would not have been possible. I would also like to thank Professor Chickery Kasouf for providing extensive feedback on the project's research, approach and report. Without his expertise and passion for reducing the cost of food in Archway, the project would not have been possible.

3. EXECUTIVE SUMMARY

Archway strives to educate while treating developmental disabilities and social connection to people with disabilities in a safe and healthy environment. This is achieved by providing a home like environment (rather than institutional) through professional staff that understands the unique challenges of ASD. Archway being a non-profit organization has been looking for ways to reduce the cost of groceries while improving the nutrition of its clients.

The cost of healthy food has been gradually increasing in the past decade. As a result, conventional products (non organic) are more appealing to many non-profit organizations because they tend to be cheaper than organic products. Because these conventional foods are often unhealthy, some of the residents in these organizations are overweight and/or have been diagnosed with high cholesterol and/or are at-risk for diabetes.

This report provides recommendations for how Archway can be frugal in procuring its healthy meals and maximizing portion control. By doing this, Archway will save money on groceries as well as improve the nutritional value of the clients' food. Furthermore, this project compares prices of different stores and comes up with the best way to save money for grocery shopping. By buying similar grocery items from cheaper stores and local farms, Archway will save about 20% of their grocery budget. This percentage was determined by recording all the prices of all the items in Archway's shopping list and comparing them to other stores in order to figure out how much they could save compared to where they currently shop (Walmart). This is a very significant amount considering that Archway spends about \$1500 weekly in total on grocery shopping, which amounts to \$78,000 a year.

Moreover, considering that Archway is a non-profit private organization, every penny saved will be diverted towards improving the life of the clients.

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1. INTRODUCTION

“Autism ... offers a chance for us to glimpse an awe-filled vision of the world that might otherwise pass us by,” Colin Zimbleman, Ph.D in *The Art of Autism* (Zimbleman, 2016).

Autism spectrum disorder, also known as ASD, is defined as a “developmental disability that can cause significant social, communication and behavioral challenges,”(CDC 2015). The goal of this project is to improve the diet and reduce the cost of food for the special needs residents in Archway Inc. Archway is a non-profit organization that provides services for children and adults with cognitive disabilities. Some of these disabilities include but are not limited to autism spectrum disorders, intellectual disability or intellectual developmental disorder, Asperger’s, Schizophrenia, and Down’s syndrome. Archway not only strives to treat, educate patients but also offers a comfortable, safe home for its clients through professional staff that understands the unique challenges of ASD.

The rising cost of healthy food has made Archway’s target of providing healthy meals to their patients a significant challenge (Medical Daily, 2004). This need has been made more urgent by the current state of their residents, some of who are overweight and are at risk of diabetes. ASD patients tend to be more overweight because they are usually less active compared to their peers, some lack the knowledge to know when they are full when eating, while some is due to the medication they are taking (Lindsay *et al*, 2006; Cornish *et al*, 1998). In addition, ASD patients have special dietary needs that complicate design of meal plans within the residences in Archway. Some ASD medications have side effects that can reduce appetite or cause dizziness, rash, weight loss or weight gain (Medical Daily *et al*. 2004; Lindsay *et al*., 2006; Cornish *et al*., 1998). Some of these medications include Zyprexa (olanzapine), Clozaril (clozapine), Seroquel (quetiapine) and Risperdal (risperidone) (Medical Daily *et al* 2004, Leonard *et al* 2016, Child Mind Institute *et al* 2016).

Some ASD individuals can have food digestion sensitivity due to the problems with their digestive system. Examples of the special cases that Archway faces with some of their ASD patients include allergies to almonds, peanuts, apple, and corn among others, as well as lactose-free, gluten-free, casein-free, soy-free diets. Some patients are required to obtain lots of sodium, roughage or fluids with their meals to combat the effects of medications they are taking. As a consequence of all these diverse needs, Archway has a difficult task of trying to fulfill all these criteria at an affordable price.

This report starts by defining autism spectrum disorder and how individuals with autism are challenged. It shows a study on healthy diets and what makes a good healthy diet for everyone in general. This will attempt to provide information that could be useful in improving the nutrition of Archway and understanding the benefits of different parts of diet such as proteins, minerals, and vegetables. Then because the research is for special needs individuals, this study focused on the common factors and challenges on nutrition for special-needs children and adults starting from the entire country, to Massachusetts, and finally to my case study in Archway.

In order to reduce the cost of food in Archway, as is the goal of this project, this report needed to establish the current nutritional value and cost of current practices. To achieve this, I searched for locally produced food around Worcester MA, as well as other ways to reduce the cost of food. It is of significance to understand the current diet situation for special needs clients and attempt to find solutions and recommendations on how to reduce institution's cost of food.

2. BACKGROUND

2.1. What Is Autism Spectrum Disorder?

According to the Centers for Disease Control and Prevention (CDC) autism spectrum disorder (ASD) is defined as a collection of developmental disabilities that can cause significant social, communication and behavioral challenges (CDC, 2015). People with ASD demonstrate behavior their family, teachers, and everyone around them find challenging (Interactive Autism Network, 2016). The spectrum of ASD varies widely with some individuals exhibiting unusual characteristics such as photographic memory, while other are extremely low functioning that need assistance with daily activities such as showering and using the bathroom. Usually, ASD can be diagnosed as early as 18 months and last for the entire lifetime of an individual. The learning capabilities, social cognition, and reactions to sensations abilities of ASD individuals are unique, and require lots of patience and understanding from those around them (CDC, 2015).

2.2. Causes of ASD

The CDC (2005) estimates that 1 in 68 children have been diagnosed with ASD and regardless of ethnicity or socioeconomic status. Although scientists have not yet determined all the causes of ASD, they have been able to relate it to several factors such as genetic inheritance, environment, and genetically modified products (CDC, 2015). Unfortunately, there are no known medical tests (such as blood work) that can assist doctors to diagnose ASD. However, ASD individuals start to show physical and behavioral characteristics as early as in the first year of life. One of the most common symptoms of ASD is getting stuck on tasks or repetition of certain routine and daily activities. This is because children with ASD have a unique way of learning, communicating or even expressing emotions. When a child is suspected to have ASD or difficulty learning, doctors usually performs a few

awareness tests. As further explained in the next section, some tests can be clinically done to determine if a child has ASD (CDC, 2015).

2.3. Sign and Symptoms of ASD

Children with ASD experience difficulties when interacting with others socially, in expressing their emotions and in communication (CDC, 2015, Handleman, 2000). They might portray repetitive behaviors and are not flexible to change when it comes to their daily activities. For instance, children or adults with ASD might not point at objects to show interest and might not look at objects that another person is pointing (CDC, 2015). Moreover, they do not relate well with others and often avoid eye contact. People with ASD may repeat or echo words or phrases instead of speaking normally (CDC, 2015, Handleman, 2000). One young man with ASD said, “I wish I could live on Planet Autistic,” expressing frustration at how people don’t relate to him on this planet (Interactive Autism Network (2016).

2.4. Treatments

There is no known cure for ASD (CDC, 2015). However, research reveals that treatment at an early stage could intervene and assist in improving a child’s development. Early intervention treatment services has been shown to help children from birth to about three years old learn helpful skills such as showering, eating, toilet training, among others (Handleman *et al* 2000).

2.5. Challenges and responsibilities that comes with ASD individuals

Since it is challenging to deal with children with ASD, most parents through the support of the state take these children to healthcare facilities and non-profit organizations like group homes (Handleman *et al*, 2000). These group homes are government regulated

and are coordinated by trained individuals that understand and know different professional ways to help special needs individuals.

2.6. Nutrition challenges in individuals with ASD

According to the health education authority's National Food Guide - *The Balance of Good Health* (2001), eating a balanced diet is essential for a person's ability to stay healthy and prevent diseases. However, several studies have concluded that ASD children have unusual eating habits (Lindsay *et al*, 2006, Cornish *et al*, 1998). Although, there hasn't been sufficient research on the correlation between children with ASD and nutrition intake, recent studies have shown that children with ASD have distinctive eating behaviors and peculiar preferences for nutrition (Lindsay *et al*, 2006, Cornish *et al*, 1998). According to a study by De Meyer (1974), eating difficulties and nutrition deficiency was reported by 94% of the parents of children with ASD. This means that most of these children are at risk of deficient and/or excessive nutrition. It is essential to establish if the diets of children with ASD are imbalanced with regards to definite nutritional constituents (Lindsay *et al*, 2006, James *et al*, 2004).

Children with ASD are frequently viewed as fussy or choosy eaters (Cermak *et al*, 2009) and therefore tend to be on a restricted diet where their intake of food is redundant and limited. In fact, they could be limited to as few as 5 types of foods (Cermak *et al*, 2009, James *et al*, 2004). Studies on ASD food spectrum reveal that children with ASD are affected by sensory factors that include smell, texture, color, and temperature, which can contribute to food selectivity (Cermak *et al*, 2009). As a result, many parents of ASD children have reported challenges with children's day-to-day activities, conduct, and communication (Cermak *et al*, 2009).

Furthermore, ASD individuals often prefer repetition and routine behavior or patterns as part of their lifestyle and breaking it may be difficult for them (CDC, 2015, Lindsay *et al*, 2006, James *et al*, 2004, Cornish *et al*, 1998). Consequently, these individuals often become selective and limited to what they do or eat. For instance, an ASD patient may have trouble adapting to new food alternatives - a child who is dependent on a specific type of meal, and is then confronted with having to eat something different may refuse to eat it. These occasions usually result in aggressive tantrums, which are normally self-injurious behavior (SIB). As a result, intervention for the safety of the individual is required.

Cornish *et al.* (1998) conducted a study that collected 3-day dietary data of 17 children with ASD. Almost 60% of these children ate less than 20 types of food compared to their peers who consume over hundred types of food (Cornish *et al*, 1998, Food Standards Agency, 2001). This selectivity leads to nutrition deficiency in ASD population. Furthermore, according to Ahearn, *et al.* (2001) ASD children are likely to take fewer bites of food compared to their peers. In this study, ASD children ate about 67% of their food serving. Eating fewer servings leads to less nutritional intake which in turn results in nutritional deficiency

The American Society for Clinical Nutrition conducted a study that showed that in comparison to control children, children with ASD had lower baseline plasma concentrations of homocysteine, cystathionine, cysteine, and total glutathione and significantly higher concentrations of SAH, adenosine, and oxidized glutathione. This implies that those specific children were eating less diversity of food. This study also showed that amplified susceptibility to oxidative stress and a reduced capacity for methylation might contribute to the development and clinical manifestation of autism (James *et al*, 2004, Handleman *et al* 2000).

2.7. How medication affects nutrition in individuals with ASD

Some antipsychotic or ASD medications approved by the U.S Food and Drug Administration (FDA) for the treatment of autism-related irritability, have been discovered to have weight gain side effects (Autism Speaks, 2005, Medical Daily et al 2004, Leonard et al 2016, Child Mind Institute et al 2016). These medications are classified as atypical antipsychotics and include Risperidone (Risperdal) and Aripiprazole (Abilify) (Autism Speaks, 2005, Hellings & Schroeder, 2001). However, these medications are an improvement (side effect-wise) over many previously used “typical” antipsychotics such as Zyprexa (olanzapine), Clozaril (clozapine). These medications have been discovered to have extreme side effects especially on weight gain and mood alteration (Medical Daily et al 2004, Leonard et al 2016, Child Mind Institute et al 2016). Individuals who are on antipsychotic medication often gain weight due to the increased appetite (Autism Speaks, 2005, Hellings & Schroeder, 2001) and therefore, many parents and guardians are advised to commit their patients to diet and exercise regimen. Changing the client's routine is not easy because one of the traits of ASD is routine, hence parents should expect breaking the routine of ASD clients to be very difficult and requires a lot of patience.

In addition, some parents or guardians or caretakers use food as a positive reinforcement to reward good behavior and reactions to situations. As a result, the patient would tantrum with potential SIB because they don't understand why a reward is being withheld. This can make the caretakers lose patience and let the patient eat whatever he/she wants. This often leads to poor diet that may cause weight gain (Autism Speaks, 2005, Hellings & Schroeder, 2001). Weight gain increases the risk of developing type 2 diabetes, obesity as well as cholesterol problems. People responsible for ASD individuals are urged by

physicians to be tolerant and patient when introducing healthy routines with ASD individuals.

2.8. Intervention of eating problems in individuals with ASD

It is possible to treat some of the eating problems that individuals with ASD exhibit (Matson et al. 2008). However, it takes patience and consistency of the environment in order to be able to break the initial eating patterns that had established. Studies have recommended different types of reinforcement procedure, such as negative and positive reinforcements, that can be used to break eating routine (Matson et al. 2008, Ledford et al. 2006, Alberto et al. 2005, Hoch et al. 2001)

Negative reinforcement is when something is removed or taken away as a result of a behavior and the same behavior that led to this removal will increase in the future because it created a favorable outcome (Alberto et al. 2005). One good example of negative reinforcement is when someone cleans up after himself or herself to avoid a fight with their roommate. For ASD individuals, because they can be very aggressive towards someone or themselves, the parents are advised to remove irritants objects or situation from the presents of the ASD client, this way, they will not become irritated. In Archway, many clients want some for of attention be it good or bad, therefore they may become jealous of others getting attention from staff and start doing anything to get noticed. As a result, staffs practice negative reinforcement in that they avoid giving one client all the attention to make other clients jealous.

On the other hand, positive reinforcement involves rewarding a person for doing the desired object (Alberto et al. 2005). For example, a parent may reward their child with a gift when they do well in school. In Archway, an example of positive reinforcement that is used is by rewarding the client with a desired food or candy after they complete a certain task

analysis such as laundry. In addition, clients that can get second serving of food may only do so after they have finished their vegetables. This motivates clients to cooperate and complete their task as well as encouraging clients' consumption of vegetables.

2.9. Store marketing strategies

Food cost varies from store to store. Many grocery stores use the different psychological enticement to make people spend more money than they were going to (Learning House Admin, 2013). One of the most common enticements that majority of the stores uses is locating the sensory department such as bakery, in the entrance of the store. By doing this, many customers will be attracted by the smell, which opens up the saliva glands; hence you are tempted to buy something from the bakery. Moreover, most stores will locate the frequently bought items at the back. By doing this, the customers will have to walk through the entire store and hopefully notices other products the store is selling. Another way that some store use to attracted customers is placing some item on-sale and placing enormous signs on those items. By placing a few items on-sale, many customers are attracted to buy those items plus many other items that are not on-sale due to laziness of not wanting to go to another store that may have lower prices on the same product. For example, a certain store may place salt and cheese on-sale but raise the cost of sugar and oil betting that when a customer comes in to buy salt or cheese, and also in need of sugar or oil, they will consider buying them despite high price, just because they are already in that particular store (Learning House Admin, 2013).

2.10. A balanced diet

Eating healthy does not necessarily mean to sacrifice what you enjoy eating, but rather to consume food in moderation (Food Standards Agency, 2001). Since different foods

contain different nutrients, moderation allows consumption of wider variety nutrients needed by your body. (Food Standards Agency, 2001, Simopoulos et al. 2004).

There are five commonly accepted groups of food according to 'The Balance of Good Health' by the food standards agency (2001), whose goal was to “give people a practical message about healthy eating.” These five groups provide a wide range of nutrients necessary for a good health (Food Standards Agency, 2001). In addition, some drinks contain lots of sugar than can affect your diet. These groups are categorized based on foods nutritional value. This includes:

- Bread cereals and potatoes
- Fruit and vegetables
- Milk and dairy
- Meat, fish and alternatives
- Foods containing fat

2.10.1. The carbohydrates and sugary foods

This is group of food that is high in carbohydrates (starch) where your body converts it to glucose, which is the source of energy for your body (McKinley Health Center, 2014). Our body needs more carbohydrates than other minerals according to Dietary Reference Intakes published by the USDA. Between 45% and 65% of total calories intake in one day should come from carbohydrates (USDA). The following are the most common types of food that are rich in carbohydrates.

- Bread
- Cereal

- Potatoes
- Cereals
- Pasta
- Rice
- Oats
- Noodles
- Corn/Maize
- Millets
- Cornmeal
- Yams
- Plantains

The following are the most common type of food that is high in sugar:

- Soft drinks
- Candy
- Jam and sugar
- Cake
- Pudding
- Biscuits and crackers
- Pastries
- Ice cream

- Rich sauces, etc.

2.10.2. Fruits and Vegetables

Fruits and vegetables (including juices) are a good source of Vitamin C, carotenes, folates, fiber and some carbohydrates (Food Standards Agency, 2001). Fiber is a type of indigestible carbohydrates, which helps the body in digestion as well as bowel evacuation (McKinley Health Center, 2014). Lack of fibers is the main cause of constipation, and increases the chances of developing colon cancer (McKinley Health Center, 2014). Fruits like avocados contain fat while tomatoes are rich in vitamin A and C, also beans and pulses are also considered to be in this group. According to Dietary Reference Intakes published by the USDA, it is encouraged to consume at least 5 portions of fruits and vegetables daily (Food Standards Agency, 2001, USDA).

2.10.3. Milk and dairy

Dairy products are good sources of calcium, protein, and vitamins B12, A and D. Calcium is necessary for bone and teeth development (McKinley Health Center, 2014, USDA). The following are considered to be from milk and dairy product family:

- Milk
- Cheese
- Yoghurt
- Fromage frais

2.10.4. Protein

Protein is usually converted to amino acids by our body so that it can be used for growth, tissue repair, immune function, cell and hormones development, as well as long-term energy (McKinley Health Center, 2014). Protein that comes from plants such as beans

and soy does not contain the essential amino acids. These amino acids are found only in animals. This group includes beef, pork, fish, poultry, eggs, nuts, beans, salami, bacon, sausage, beef/turkey burgers, pate, etc. This group not only provides high proteins content, but also may be a source of fat, iron, B vitamins, zinc, and magnesium (McKinley Health Center, 2014, Food Standards Agency, 2001).

2.10.5. Fatty food

Foods with fats contain essential fatty acids that are important for survival. Fatty acids help in normal growth and organ development. This is because fat provided a cushion for the organs as well as maintaining cell membranes (McKinley Health Center, 2014, Food Standards Agency, 2001). It is also used as a source of energy since fat is basically a concentrated energy that is stored. This is due to the fact that whenever carbohydrates (starch), is not readily used by the body, it is converted to fat. Furthermore, fat provides taste and stability to foods (McKinley Health Center, 2014, Food Standards Agency, 2001).

2.11. Portion Control

In order to maintain a healthy diet, it is important to make vegetables and fruits a priority in every meal. (Food Standards Agency, 2001, USDA, Health Canada, 2010). Variety of whole grains/ brown is better than white grains. For example, brown rice is more nutritious than white rice, as well as brown bread being healthier than white bread. This is because brown grains still contain minerals that are rich in proteins, thiamine, calcium, magnesium, fiber, and potassium. Most white grains, especially white rice, are stripped of iron, vitamins, zinc, magnesium and other nutrients during the refining process. According to a study conducted by the American Journal of Clinical Nutrition, individuals trying to lose weight or maintain their weight, brown rice can prove a healthful staple given its low glycemic rating which helps reduce insulin spikes.

Figure 1 taken from Health Canada, 2010 suggests that 50% of food portions should be vegetable and fruits while approximately 35% to be grain products and 15% to be meat and its alternatives.



Figure 1: Food portion on a plate. Picture taken from Health Canada, 2010

The following is the table that may be used to create a menu plan for the entire week.

Table 1: Menu Plan

Type of meal	Vegetables and Fruits	Grains Products	Milk and its alternatives	Meat and alternative	Oil and fats	Other
Breakfast						
Snack						
Lunch						
Snack						

Dinner						
--------	--	--	--	--	--	--

2.12. Food serving sizes for the four food parts

2.12.1. Vegetables

It is advised to consume more of the dark colored and orange vegetables daily. In addition, fatty dressings and deep-frying vegetables should be avoided at all times due to the content of unwanted fats (Health Canada, 2010). The table in appendix A portrays the serving sizes for vegetables collected from Health Canada, 2010.

2.12.2. Grain Products

Grain products can be categorized into two major groups, whole grains and non-whole grains. As explained above, whole grains are generally healthier than non-whole grains products. The table in appendix B shows the serving size of both whole and non-whole grain products generated from Health Canada (2010).

2.12.3. Milk and alternatives

Consumption of whole milk is less healthy for adults than skim or reduced fat. The recommended serving size for dairy products for adults between age 19-50 years consumption is about 2 cups or 500ml skim, 1% or 2% reduced milk a day. This is necessary for vitamin D, which is responsible for development. Soy and rice milk are usually the alternative of dairy products.

Dairy products can be combined, or used to create snacks and meals. Addition of milk in scrambled eggs and whipped potatoes will make the food tasty. However, most dairy products should be consumed in low fat at all times. Examples of these dairy products include but not limited to, cheese, ice creams, coffee cream, whipping cream, and sour cream. According to Health Canada, 2010, low fat cheeses are generally less than 20% milk fat.

2.12.4. Meat and Alternatives

According to Health Canada, 2010, 75g or 125ml of meat (which includes beef, pork, fish, poultry, etc.) is the recommended daily serving. In addition, 175 ml (3/4 cup) of cooked beans, 2 eggs, or 30 mL (2 tablespoons) of peanut butter can also be used as alternative to meats. The table in appendix C displays the serving sizes of different type of meats.

2.13. Current nutrition practices at Archway Inc.

Clients in Archway are provided with three meals and one snack a day (two snacks on weekends): breakfast, a morning snack (weekends only), lunch, evening snack, and dinner. During the weekdays, clients attend and adult day-program/work until 3pm. Nonetheless, Archway provides and packs lunches for every client attending the day program.

Archway serves clients with different needs. A few of Archways clients are on special diet plans on top of their regular meal plans. One client is required to consume a lot of sodium daily, while another is required to consume a lot of roughage due to medication. One other client is required to lose weight because he/she is in the risk of developing diabetes; hence, he/she is required to eat healthy every day.

2.13.1. Breakfast

Due to Archway's program that strives to provide a home-like environment, clients get to choose what they want for breakfast. Most clients eat cereal with milk and orange juice, while some choose oatmeal. One client often has tea for breakfast.

Assuming that each client consumes one serving of cereal with milk and a cup of orange juice, they will be consuming approximately (Fill out the nutritional fact of one serving of cereal, a cup of milk, and a cup of orange juice).

2.13.2. Snacks

Archway provides clients with two snacks. Afternoon snacks are provided every day around 4pm or when the clients arrive from the day program. These snacks consists a bag of potato chips or two pieces of rice cake, served with peanut butter and a cup of juice. Some clients may choose to eat cereal, or fruits such as apples or oranges.

The other snack is consumed in the mid-morning between breakfast and lunch. Morning snacks are only offered whenever the clients do not go to day-program and stay at home. This includes weekdays, holidays, sick-days, and sometimes snow-days. The snacks menu is the same as the afternoon snack menu. The clients may choose what they want for snack.

2.13.3. Lunch

Archway is required to provide lunches to its clients even when they are going to the day-program. For day-programs, lunch is usually packed the night before and stored in the refrigerator until morning when the clients take it with them. Normally, a turkey or ham sandwich with a bag of potato chips and juice-box will be prepared for lunch, while other times the clients may request to take leftover dinner as lunch.

During the weekend, holidays, sick-day, and some snow-days, fresh lunch will be prepared for the clients depending what is on the menu. Archway's menu consists of protein, carbohydrates and vegetables, served with a glass of water and a cup of juice. The protein part of the menu is usually chicken, beef and pork. The carbohydrate part of the menu can be potatoes, corn, spaghettis, rice, etc. Vegetable part of the menu usually is tossed salad, mixed vegetable, and broccolis among others.

2.13.4. Dinner/ Supper

Unlike lunch, dinner is freshly prepared daily. The supervisors make the dinner menu (which is like lunch menu with protein, carbohydrate, and vegetables sections) and the staff on duty to make dinners prepares it.

The serving size for both freshly cooked lunch and dinner required by archway is as follows:

- ½ cup of protein
- ½ cup of carbohydrates
- 1 cup of vegetables

If the clients ask for second serving after they are done with their first, they are only aloud to have seconds on the veggies.

2.14. Reducing the cost of food in Archway Inc.

In the recent years, Archway has been spending approximately \$500.00 per week on food and groceries for 8 clients and 5 staff in Mulberry House. Clients do the weekly grocery shopping every Monday and are required to spend no more than \$400.00 during this shopping. Most of the grocery shopping is done at Walmart.

The shopping list was designed in a manner that may assist the staff and clients who are responsible for grocery shopping with the client to easily locate and check the quantity needed and the aisle in Walmart that they might find the product. This design assists with time saving and helps the staff to shop the right type of food. A scanned document of the list is located in appendix D.

As we have learned, individuals with ASD are often challenging to deal with and need a lot of help and dedication. However, we should note that these individuals are

human being first then autistics and shouldn't be treated like second-class beings. Many ASD individuals in the past history have been abused due to negligence and ignorance of the condition. However, the government has invested in protecting individuals with ASD as well as educating people about these types of cognitive disabilities.

Archway's primary goal was to reduce cost of groceries while secondary goals were to improve the nutrition and maximize portion control. Consequently, this project chose to focus mainly on reducing the cost of food and in the process, finding healthier grocery items would be easier. The next section will explain testing methods and design iterations throughout the years.

3. METHODS

The goal of this project is to lower the cost of food and maximize portion control while improving nutrition value of food for individuals with autism spectrum disorder in Archway Inc. The goal was achieved through two objectives:

- I. Objectives to lowering the cost
- II. Objectives to maximizing portion control

3.1. Objectives to lower the cost of food

To meet the objective of lowering the cost of food at Archway, the following steps were taken:

- I. Conducted an interview with Archway's dietitians
- II. Conducted interviews with similar institutions about their nutrition
- III. Conducted a search for local farmers and interviewed them
- IV. Determined the cost of food at local stores

3.1.1. Interviewing Archway's dietitian

Before recommending what Archway could do to help them save money, it was important to find out what they were currently doing. To achieve this, interviews on two supervisors responsible for grocery budgeting in Archway were interviewed. The interview questions are located in appendix E.

3.2. Finding the cost of food in local stores

The table in appendix F was created to analyze the cost of different types of food in main grocery stores in the neighborhood of Archway Inc. facility. The items in the shopping list were copied from Archways weekly shopping list (appendix D), which they use for grocery shopping every week.

3.2.1. Letter/Email to local stores and farmers

Part of the goal of the project was to lower the cost of food. One of the ways that we achieved this was by reaching out to local farmers and stores in the efforts of striking a better deal on food products. This could be possible because local stores and farmers may be interested in Archway as a permanent weekly customer. Moreover, some local businesses are willing and looking for ways to support the community, and helping Archway reduce the cost of food may be just what they were looking for. A copy of the email that was sent to local grocery store managers and local farmers is in appendix G.

3.2.2. Interviewing similar institutions

Interviewing institutions that also have ASD clients was useful in finding new ideas on improving Archway's nutrition. In this interview, my goal was to find out where these institutions buy their food for their clients and how much it costs them per week. This was helpful in revealing Archway isn't the only organization in its field that has issues budgeting for the cost of food. A copy of the interview questions I asked the dietitians is in appendix H.

The criterion of selecting these institutions to be part of this project was based on their location (around Worcester), and their similarities to Archway. Location of these institutions is important because this means that they may be doing their shopping locally, hence Archway will be able to adapt easily in terms of shopping. Upon further research, a few institutions that were close to Worcester and provides care for individuals with cognitive disabilities same as Archway (according to their websites) were selected. These institutions provided important information that helped me achieve my goal. These institutions include: Center for Applied Behavioral Instructions (CABI), Advocates Organization, Venture Community service, Seven Hills Foundation, and Alternatives Worcester Connections.

Seven Hills Foundation and Alternatives Worcester Connection are the Day Habilitation programs that Archway clients “work”. Getting information on clients’ nutrition in these institutions was very helpful for the creation of a weekly menu and finding cost effective groceries. I contacted the dietitian and interviewed them.

3.3. Objective II: Maximizing portion control

As discussed in the food portion in the background chapter, studies suggest that about half of every meal should be vegetables and fruits. In addition, approximately 35% of the same meal should be grain products and 15% should be meat and its alternatives. Archway has been trying to follow this model for the past few years. However, they have been have been unsuccessful in enforcing this proportion to the clients. Therefore, I conducted interviews with staff that serve the clients to find out the main reason for not being able to achieve this proportion. A copy of the questions I asked four random staff that work at Archway is located in appendix I.

4. RESULTS

Completing the objectives in the methodology was very informative and facilitated me to achieve the goal of the project, which was to reduce the cost of food in Archway and maximize proportion. The interviews that were conducted among the different institutions were helpful in informing Archway's relative standing in terms of cost of food and nutrition in general. I also analyzed the cost of food in different stores and it was very enlightening. I went to four different stores that were about a 30-minute or less drive from Archway, which included Walmart, Price Rite, Price Chopper and Shaws. By doing this, I was able to find out stores that are cheaper and in which items. This was my pivot method of pronouncement of ways to save money for grocery shopping.

4.1. Interview with Archway

In interviewing Archway's supervisor in charge of shopping in Mulberry House, I acknowledged that Archway has been very loyal to a few local farmers and Walmart for more than a decade. After a conversation with Archway's supervisors, Margaret Sang and William Woodfin, I learned that:

- Archway has been very loyal customer to the current local farmers for decades.
- Archway in general spends approximately \$1500 in total per week in groceries.
- At Mulberry house, Archway spends approximately \$500 on grocery shopping.
- Archway spends about \$100 on meat and poultry.

- For the Adults program in Archway, clients only eat dinner and breakfast. However, staff makes turkey or ham sandwiches as lunch for the clients to take to the Day Program.

The following are their answers to the questions asked.

1. Do any of the clients in Mulberry House currently take any medications that will require special diet?

Answer: *Yes*

a. If yes who and what?

Answer: *SW and DM. SW requires daily sodium intake in terms of his V8 while DM requires taking her prune juice after every meal and as required.*

2. Do the clients exercise?

Answer: *All the clients are required (weather permitting) to go for a bike for about 45 minutes everyday after Day Program before Dinner.*

3. How much does Archway spend on food?

Answer: *Each program in Archway is given \$500 dollars to spend on groceries every week. There are three programs making the total spent to be approximately \$1500.*

4. Where does Archway buy its groceries?

Answer: *Mainly Walmart. Sometimes after they run out of some groceries before grocery day (Monday), staff may buy them from nearest stores. These stores changes depending on the item is required.*

5. For how long has this institution buy from the place named above?

Answer: *More than 10 years*

6. Does Archway spend any more money on food?

Answer: *Yes*

a. If yes, for what and from where?

Answer: *Meat and Poultry products from Tatnuck Meat, Milk and eggs from Coopers Farm, fruits and vegetables from ACME Produce.*

b. How long have you shopped there?

Answer: *more than 10 years.*

c. How much?

Answer: *100*

7. Do any of the clients have food allergies or food intolerances? If yes, who and what?

Answer: *No one in the adults programs have allergies, however, some of the clients need different condiments with the food. For example, for WD all meals are served with ketchup, while DM cannot eat carrots due to lack of tooth. Others are rewarded by peanut butter sandwich for eating their meals entirely.*

8. Are any of the clients currently following any special diet (e.g. low fat, low salt)?

Answer: *Yes*

a. If yes, how many and in what?

Answer: *Two of the Adults in Mulberry House have been gaining weight and are in danger of diabetes. Therefore, their food portions and fat consumption has been decreased from their diet completely. Moreover, they are only required to have second serving on*

vegetables and their reinforcement peanut butter sandwich has been reduced to a quarter of a sandwich only.

9. Who prepares the meals for the clients regularly?

Answer: *Staffs are scheduled to cook and prepare food for both the clients and other staffs.*

10. Do the clients eat all their meals in Archway?

Answer: *For the Adults program in Archway, clients only eat dinner and breakfast. However, staff makes turkey or ham sandwich with a bag of chips and juice box as lunch for the clients to take it to Day Program.*

11. What is the normal meal pattern that the clients follow?

- *Breakfast*
- *Mid morning snack*
- *Lunch*
- *Mid afternoon snack*
- *Dinner*
- *Evening snack*

12. What is the types of foods do the clients typically have for:

- a. **Breakfast:** *Cereal and milk or oatmeal and milk, orange juice*
- b. **Lunch:** *Mainly turkey and ham sandwiches, sometimes tuna and chicken salad.*
- c. **Dinner:** *Meat e.g. beef, chicken, turkey; Carbohydrates e.g. rice, couscous,*

French fries etc. Vegetables, e.g. salad, mixed vegetables, broccoli, green beans, etc.

d. **Snacks:** Chips, rice cake with peanut butter, cup of juice.

Note: Normally, a menu is created every Sunday for the entire week where it shows what should be cooked and on what day.

13. How often do the clients eat fast food or go to a restaurant?

Answer: *Two clients in the adults program earn fast food as reinforcement to good behavior. Normally, the client would request a cookie or a burger or ice cream from McDonalds or Dairy Queen. Sometimes the client might request a magazine, so he will be taken to Dollar Store.*

14. What beverages do the clients drink regularly?

Answer: *Clients are required to drink water with their meals. However, one client in the adult program earns caffeine free soda three times a day for good behaviors. All clients however can have either juice or milk with their snacks.*

15. What barriers, if any, stand in the way of you achieving cheaper and healthier food?

Answer: *Usually it will be cheaper to order food from wholesale dealers such as US foods, however, majority of this wholesale sellers requires online ordering and the closest one is about 2 hours away. Moreover, The state requires the clients to partake in the community interaction, in that clients are required to go out shopping.*

4.2. Interviewing similar institutions

I contacted five institutions in an effort of conducting an interview with the individual in charge of grocery shopping and nutrition of clients in these institutions. These institutions are:

I. Center for Applied Behavioral Instruction (CABI)

- II. Advocates Organization
- III. Venture Community Services
- IV. Seven Hills
- V. Alternatives

However, Advocates and Venture Community Services were the only institutions willing to provide me answers to my interview questions. When I contacted Seven Hills about seven times to try and set up an interview with the dietician, I spoke to the secretary several times who then said that she was transferring me to the person in charge. However, that individual was never available and so I left a message on their voice mail three times requesting to be contacted back. CABI on the other hand received my phone call, however, the dietician was very busy and she requested to contact me back, I gave her my contact information and I am still waiting for the call back. Alternatives was willing to provide me with information, however because it was a Day Habilitation Center, their clients bring food with them hence they never have any issue with the cost of grocery shopping and nutrition in general.

4.2.1. Center for Applied Behavioral Instruction (CABI)

Like Archway, Center for Applied Behavioral Instruction (CABI) is a private education day school licensed by Massachusetts Department of Elementary and Secondary education to serve student with autism spectrum disorder as well as challenging behaviors. These students are from ages 6 to 22, in which after the students turn 22, they are considered to have graduated and ready to live an adult life. CABI aims to use scientifically proven techniques in educating and reversing the negative learning experience by identifying the variables that supports students' success. As mentioned above, I contacted CABI but I was unable to interview them.

4.2.2. Seven Hills Foundation

Seven Hills is one of the most dynamic human services in the country that provides comprehensive supports for significantly challenged people. Unlike Archway, Seven Hills do not only serve individuals with autism spectrum, or mentally challenged, but also individuals who are physically challenged due to head trauma, are in intensive care, as well as poverty. With Seven Hills having more than 150 programs across Massachusetts and Rhode Island, it is currently offering support to almost 30,000 individuals with disabilities. Seven Hills aims to “promote and encourage the empowerment of people with significant challenges” as they exemplify the “dignity of all persons regardless of physical, social, or emotional condition.”

As mention above, contacting Seven Hills Foundation in an effort to find out their nutrition plan and food-shopping budgeting was unsuccessfully. I contacted Seven Hills about seven times to try and set up an interview with the dietician. The secretary kept saying that she was transferring me to the person in charge. However, that individual was never available and so I left a message on their voice mail three times requesting to be contacted back.

4.2.3. Alternatives Worcester Connections

Alternative Day Services goal is to provide opportunity as well as developing skills and supports for individuals with development disability. Like Archway, Alternative aims to help and provide their client to enjoy the benefits of the community as well as develop their self-care independence.

After contacting Alternatives in an effort to find out their nutrition plan and food shopping budgeting, I was informed that Alternative is a day Habilitation where clients bring their own lunch. Therefore, they barely do shopping groceries. However, they provide snacks to clients. After the interview, the following was the answers I received.

1. How much does Alternative spend on food?

Answer: \$0

2. Where does Alternative buy its groceries?

Answer: *N/A*

3. For how long has this institution buy from the place named above?

Answer: *N/A*

4. Does Alternative spend any more money on food?

Answer: *about \$40 a week for snacks only*

5. Who prepares the meals for the clients regularly?

Answer: *Clients bring their own lunch*

6. Do the clients eat all their meals in Alternatives?

Answer: *Yes lunch only and sometimes some snacks*

7. What is the normal meal pattern that the clients follow?

- *Mid-morning snack*
- *Lunch*
- *Mid-afternoon snack*

8. What is the types of foods do the clients typically have for:

Answer: *Normally the clients bring lunch with them, no other meal is provided*

a. *Breakfast: N/A*

b. *Lunch: Depends on what they brought for lunch*

c. *Dinner: N/A*

d. *Snacks: Chips, water, fruits*

9. How often do the clients eat fast food or go to a restaurant?

Answer: *N/A*

10. What beverages do the clients drink regularly?

Answer: *Water and drinks they brought from home*

11. What barriers, if any, stand in the way of you achieving cheaper and healthier food?

Answer: *NO*

4.2.4. Advocates Organization

Advocates is a caring agency that provides services to individuals with disabilities, elders, as well as any individuals with challenges to overcome personal and social barriers. Advocates aims to help these individuals achieves their hopes and dreams as well as helping them become responsible and independent in the community.

Unlike Archway, Advocates have clients in about eleven different locations around Massachusetts. However, their main office is located in at 1881 Worcester Road in Framingham Massachusetts. With the different locations, Advocates provides home-based programs that helps the clients feel as part of the family. These locations are a houses and each is in different cities. Moreover, these houses average about 5 clients per location and contain about three to four staff.

I tried unsuccessfully contacting Advocates' main office in an attempt to interview the person in charge of food budgeting. Every time I called I was put on hold in an attempt of finding the right person to talk to but it was unsuccessful. However, I was able to contact

one of the staff (Malvin Mwangi) that works for Advocates in one of their houses located in West Boylston and he was helpful enough to provide me with the answers that I needed.

The following is the response I got from him.

Name of Organization: Advocates

Contact Info: advocates.org. Mobile: (508) 628-6300

Address: 74 Maple St West Boylston 01583

1. How many clients does this company have?

Answer: *More than 300 but only four at this location*

- a. Are they all in one location?

Answer: *Yes*

2. Do any of the clients currently take any medications that will require special diet?

Answer: *Yes*

- a. If yes who and what?

Answer: *One individual (AC) has medications that requires he to have a glass of water 1 hour before meals and also required to have low fat meals*

3. Do the clients exercise?

Answer: *Yes, they have memberships to the YMCA and in addition they have a relax room in the house where they use it as a workout area.*

4. How much does this Organization spend on food weekly?

Answer: *\$100*

5. Where does the organization buy its groceries?

Answer: *Stop and Shop*

6. For how long has this institution buy from the place named above?

Answer: *More than 10 years*

7. Does this organization spend any more money on food?

Answer: *No*

a. If yes, what is it?

Answer:

b. How much?

Answer:

8. Do any of the clients have food allergies or food intolerances? If yes, who and what?

Answer: *No*

9. Are any of the clients currently following any special diet (e.g. low fat, low salt)?

Answer: *Yes*

a. If yes, how many and in what?

Answer: *One individual (AC) is required to eat low fat meals due to her weight gain in the last couple months*

10. Who prepares the meals for the clients regularly?

Answer: *Staff on shift is required to prepare the meals for the clients*

11. Do the clients eat all their meals?

Answer: *yes*

12. What is the normal meal pattern that the clients follow?

- *Breakfast*
- *Mid-afternoon snack*
- *Dinner*
- *Evening snack*

13. What is the types of foods do the clients typically have for:

Answer: *Normally, a menu is created every Sunday for the entire week where it shows what should be cooked and on what day. Usually the menu would compose of the following:*

- a. Breakfast: Cereal and milk or oatmeal and milk, orange juice*
- b. Lunch: Mainly Turkey and ham sandwiches, sometimes tuna and chicken salad.*
- c. Dinner: Meat e.g. beef, chicken, turkey; Carbohydrates e.g. rice, couscous, French fries etc. Vegetables, e.g. salad, mixed vegetables, broccoli, green beans, etc.*
- d. Snacks: Chips, rice cake with peanut butter, cup of juice.*

14. How often do the clients eat fast food or go to a restaurant?

Answer: *Twice a week*

15. What beverages do the clients drink regularly?

Answer: *mostly water. TC has a fluid restriction due to medical conditions. He mostly drinks soda but it is always measured and he cannot exceed his daily intake of 1800ml*

16. What barriers, if any, stand in the way of you achieving cheaper and healthier food?

Answer: *The Company does a great job on maintaining food portions and buying the right kind of foods. They try to limit processed food and it is working out great for the clients*

4.2.5. Venture Community Services

Venture Community Services provides support to development challenged individuals through educative and innovative practices that encourage independent, empowerment, and opportunity (venture official website). Since 1975, Venture has aimed to provide support using honesty, respect, integrity, and innovation as its core values. Venture consists of day care rehabilitation, transportation agency, shared living, as well as residential programs for individuals who have transition out of institutional settings.

I contacted Ventures and conducted the interview via phone call. I spoke with a gentleman named Eutycus Wakiria and this are the answers I was able to get from him.

Name of Organization: Venture Community Services

Contact Info: Phone:(508) 347-8181

Address: 1 Picker Rd, Sturbridge, MA 01566

1. How many clients does this company have?

Answer: *about 300 clients*

a. Are the all in one location?

Answer: *NO*

2. Do any of the clients currently take any medications that will require special diet?

Answer: *YES*

- a. If yes who and what?

Answer: *Clients on blood thinners for example one individual avoids leafy diets*

3. Do the clients exercise?

Answer: *YES*

4. How much does this Organization spend on food weekly?

Answer: *\$500*

5. Where does the organization buy its groceries?

Answer: *Walmart*

6. For how long has this institution buy from the place named above?

Answer: *More than 10 years*

7. Does this organization spend any more money on food?

Answer: *Yes*

- a. If yes, what is it?

Answer: *Ice cream/Burgers on rewards*

- b. How much?

Answer: *\$5*

8. Do any of the clients have food allergies or food intolerances? If yes, who and what?

Answer: *NUTS*

9. Are any of the clients currently following any special diet (e.g. low fat, low salt)?

Answer: *Yes*

a. If yes, how many and in what?

Answer: *Clients with Hypertension avoid increased sodium intake*

10. Who prepares the meals for the clients regularly?

Answer: *The staff*

11. Do the clients eat all their meals?

Answer: *Yes*

12. What is the normal meal pattern that the clients follow?

- *Breakfast*
- *Dinner*

13. What is the types of foods do the clients typically have for:

Answer:

a. *Breakfast: Coffee, cereal and milk or oatmeal and milk, orange juice*

b. *Lunch: N/A*

c. *Dinner: Meat e.g. beef, chicken, turkey; Carbohydrates e.g. rice, couscous, French fries etc. Vegetables, e.g. salad, mixed vegetables, broccoli, green beans, etc.*

14. How often do the clients eat fast food or go to a restaurant?

Answer: *once a week*

15. What beverages do the clients drink regularly?

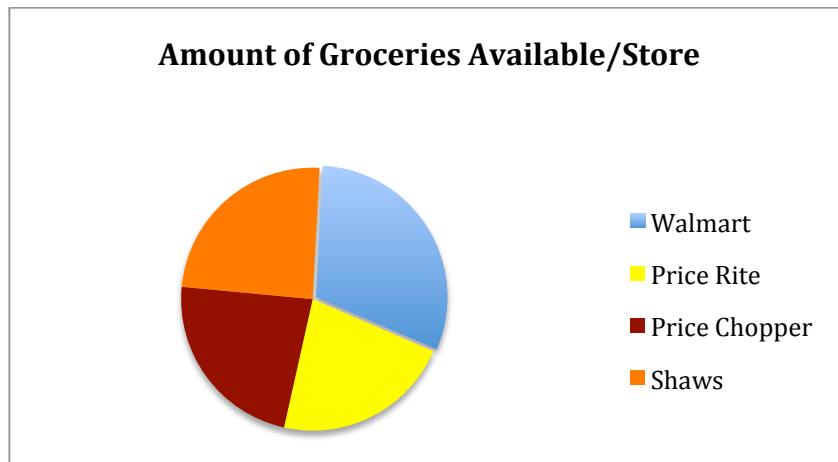
Answer: *Coffee*

16. What barriers, if any, stand in the way of you achieving cheaper and healthier food?

Answer: *Time and money*

4.3. Find the cost of food in local stores

After visiting several stores that are within twenty minutes drive from Archway, I was able to record all the prices of all the groceries that were from Archway's list. Walmart and Price Rite were cheaper in almost all of the products. As shown in the table below, Walmart was cheaper in approximately 49 products. This is approximately 46% of the entire product Archway buy weekly. On the other hand, Price rite was cheaper in 42 products, which is about 39% of the list. The other 15% of the product in the list were not in other stores and therefore was disqualify in this calculation of the cheapest stores for Archways shopping list. The table in appendix J was completed in the effort to determine which store is the cheapest. The summery of items available in store is shown on the graph below.



The table in appendix J, Walmart and Price Rite were at the top in terms of cheap groceries. It would have saved Archway approximately \$130.00 dollars to buy the cheaper

products from Price Rite instead of buying the entire groceries at Walmart. A summary on the calculations is shown below.

Table 2: summary box on cost analysis

Summary Box		
Stores	Total amount of products in the store	Total cost of those products
Walmart	92 products	623.63
Shaws	73 Products	646.98
Price Rite	66 products	381.03
Price Chopper	69 Products	626.98
Savings if not bought in Walmart	42 Products	130.48

Figure 2: graph of amount of products in each store

4.4. Conduct a search for local farmers

Archway being located in Leicester is in such an advantage with local farmers as there are several local farms that are about 20 minutes away from Archway. Many of these local farms sell all types of foods, from vegetables and fruits, to rice and flour and even milk, beef and poultry. Some of them are basically a mini mart where they sell sandwiches, candy, and including soft beverages such as Kool-Aid, soda, water, and juices, extra.

Loyalty is one of the values that Archway has exhibited for a long time. Archway has been buying food from three local farms for more than a decade now. Tatnuck Meat and Seafood is one of the local stores that deliver meat produce that include but not limited to beef tips, chicken breast, turkey tips, and sausages to Archway every Thursday. Coopers Farm is another local farm that has been delivering milk, and eggs to Archway for more than

ten years. ACME Fresh Market is another local farm that deliver mostly fresh vegetables such as cucumber, broccolis, lattes, and cabbages as well as fruits e.g. apples, pairs, oranges, and bananas. Although Archway has been loyal to these local farms, I still wanted to check and see if I could get better deals from any other local stores and farms. However, none of the store I checked had better prices than Tatnuck, Coopers or ACME that will make Archway breaks their loyalty to these farms. Tatnuck was cheaper in most of the meat products such as boneless rib roast at \$5.99 per pound, chicken and turkey sausages for \$2.98 per pounds, boneless pork roast for \$1.20 per pound, and chicken wings at \$1.99 per pound. This was cheaper than Fairway Beef and Poultry in Worcester, where boneless rib roast was \$6.99 per pound, frozen hamburger patties \$6.98 (2lb package), boneless pork roast for \$1.99 per pound and chicken wings for \$1.99 per pound.

I contacted several local farms in an effort to find out how much most of their produce cost. I started with Little Bit Farm and Apiary located at 26 Charles St. Leicester, which is about 7 minutes drive away from Archway. As the name suggests, Little Bit Farm and Apiary is small in size and only sell farm fresh products such as:

- Candles- Made with 100% bees wax
- Eggs
- Honey
- Hand cream made from bees wax
- Hand-made soaps
- Herbs
- Lip Balm made from bees wax
- Sunflowers
- Vegetables

- Garlic

I also visited Fairway Beef and Poultry, which is meat and poultry based local store located at 48 Grafton St. Worcester, Massachusetts. This store is cheaper than big name brand stores such as Walmart, Price Rite, Stop and Shop, etc. In addition, it often has weekly deals (can be checked online) that sometimes maybe cheaper than where Archway buys their meats and poultry (Tatnuck Meat) in some products. However, if there was no deal, none of the products they sell will be cheaper than Tatnuck Meat. Moreover, Tatnuck Meat delivers to Archway while Fairway Beef does not.

4.5. Results on maximizing portion control interviews

After I conducted interviews with four staffs (Bennett Amisa, Peter Munene, Alex Kamanu and Margaret Sang) in Archway. The following are their answers for the interview questions.

Name: Bennett Amisa

Contact Info: 774 – 6413931

1. Approximately how many clients are you responsible during dinner or lunch per meal?

Answer: *Depends on the which Archway's program but usually between 2 and 1*

2. What is the serving size for:

a. Vegetables?

Answer: *A half a plate to a plate full*

b. Meat and Alternatives?

Answer: *About a quarter of a plate*

c. Grains and Carbohydrates?

Answer: *half to 3/4 of a plate.*

3. Does all the staffs follow these serving sizes? Why or why not?

Answer: *Most of them try*

4. Do you follow these serving sizes? Why or why not?

Answer: *Yes*

5. What are the challenges, if any; do you face while making the clients meal that can affect the serving size?

Answer: *Sometimes the vegetables may not be enough for every client to get a full plate before their meal. Sometimes the vegetables are not well prepared this leads to overcompensation with grains and.*

6. What challenges, if any, do you face while serving the clients?

Answer: *The clients may not want to eat any vegetables and may be aggressive towards staff. Therefore many staff may be afraid of serving them one serving of vegetables.*

7. What can you do to improve the serving size of clients' meal?

Answer: *Make the vegetable more appealing to consume.*

Name: Peter Munene

Contact Info: 774 – 2627993

1. Approximately how many clients are you responsible during dinner or lunch per meal?

Answer: *between 1 and 2.*

2. What is the serving size for:

a. Vegetables?

Answer: *A half of plate*

b. Meat and Alternatives?

Answer: *Quarter of a plate*

c. Grains and Carbohydrates?

Answer: *Quarter.*

3. Does all the staffs follow these serving sizes? Why or why not?

Answer: *no just a few*

4. Do you follow these serving sizes? Why or why not?

Answer: *I try but sometimes there is small amount of vegetable left especially if you are in 2nd meal.*

5. What are the challenges, if any; do you face while making the clients meal that can affect the serving size?

Answer: *Because there are two meals per dinner and lunch, the cook sometimes may under estimate how much food to make for all the clients and staff in both meal one and meal two. Hence people in first meal leave less food for the people in second, which affects the serving size.*

6. What challenges, if any, do you face while serving the clients?

Answer: *Archway bought oversized serving spoons that were double the normal serving size.*

7. What can you do to improve the serving size of clients' meal?

Answer: *Buy better serving spoons and the cook should make more food. Better have left over than run out of food.*

Name: Alex Kamanu

Contact Info: 508 414 0204

1. Approximately how many clients are you responsible during dinner or lunch per meal?

Answer: *1-2*

2. What is the serving size for:

a. Vegetables?

Answer: *Plate-full*

b. Meat and Alternatives?

Answer: *half a serving-spoon*

c. Grains and Carbohydrates?

Answer: *half a serving-spoon.*

3. Does all the staffs follow these serving sizes? Why or why not?

Answer: *Nope*

4. Do you follow these serving sizes? Why or why not?

Answer: *I try*

5. What are the challenges, if any; do you face while making the clients meal that can affect the serving size?

Answer: *Some clients refuse to eat an entire plate of salad because they don't like eating some of the ingredients e.g. carrots.*

6. What challenges, if any, do you face while serving the clients?

Answer: *The clients may not want to eat any vegetables, and sometimes the food looks like it is not enough because of the big plates. This makes us increase the amount.*

7. What can you do to improve the serving size of clients' meal?

Answer: *Buy small plates that way you cannot over serve them*

Name: Margaret Sang

Contact Info: 508- 6152292

1. Approximately how many clients are you responsible during dinner or lunch per meal?

Answer: *between 1 and 2.*

2. What is the serving size for:

a. Vegetables?

Answer: *one cup*

b. Meat and Alternatives?

Answer: *half a cup*

c. Grains and Carbohydrates?

Answer: *half a cup*

3. Does all the staffs follow these serving sizes? Why or why not?

Answer: *Majority of the staff does try their best, but some do not pay attention to the serving sizes*

4. Do you follow these serving sizes? Why or why not?

Answer: *Yes, I also try to remind everyone during dinner and lunchtime.*

5. What are the challenges, if any; do you face while making the clients meal that can affect the serving size?

Answer: *Sometime one program may not have enough food, but usually they will obtain more from other programs.*

6. What challenges, if any, do you face while serving the clients?

Answer: *Some staff may not follow the normal serving sizes. Also, the serving spoons are bigger than the normal ones.*

7. What can you do to improve the serving size of clients' meal?

Answer: *Keep reminding staff of the serving size and that the serving spoons are bigger than the normal size.*

5. RECOMMENDATION

I conducted the interviews with other institutions with the aim of relating Archway to those similar institutions. The interviews were helpful and enlightening. I recognized that most of these institutions are also struggling with budgeting the cost of groceries considering majority of them are non-profit organizations. Some of them, like Archway, also have clients that are on special diet and so the meal planning and design becomes challenging. Furthermore, majority of these institutions are buying their groceries in nearby supermarkets such as Walmart and Price Chopper as well as from local farmers.

After speaking with Lucy Tresise to try to find out exactly what she wanted to obtain on this objective, she said, “lower the cost of food.” She was looking on ways that she could save money on groceries shopping as well as maximize the portion control of the serving size for the adults in Archway.

5.1. First Technique Of Saving Money: Shop at Different Stores

Archway has been shopping almost everything in Walmart regardless of the price. However, Archway can save money is by buying each product from the cheapest store that the product is sold. If an item that is sold in a different store is cheaper than in Walmart, then buying it at the cheapest store should help minimize cost. After looking at the cost analysis (appendix J), several items were cheaper in Price Rite than any other supermarkets. As a result, a table was created that shows what items to be bought in Walmart and which ones should be bought in Price Rite. The list was based on which store is cheaper and in which items. The table in appendix K was create to show which items should be bought and in which store. This is because that product was found to be cheaper at that corresponding store.

5.1.1. Advantages of this technique

Although it may be time consuming and may consist of adding another day of the week for shopping, in the long run, it will be advantageous to use this technic to in the effort of trying to save money. As shown in appendix K, it will cost about \$279.84 to buy all the products in blue in Walmart. In addition, it will cost about \$210.4 buying the rest in Price Rite. In total, this will be about \$490.24. This total amount is about \$133 less that what it would have cost Archway to buy all the products on the list from Walmart. This is about 21% savings per week (considering that Archway buys everything on the list). That is approximately \$6,760 a year (which is about 21% of the total cost yearly assuming that everything in the list was bought every week in Walmart).

The total amount of the products bought every week is always less because the quantity of each product bought weekly depends on how much is left from the week before. That is why Archway spends approximately \$500 weekly instead of \$623 a week. As a result, the saving per week as calculated is expected to be lower than \$130 weekly. The following table is the summery of the savings. However it is expected the total amount spent using this method will result to approximately 20% cheaper than if bought only in Walmart like Archway currently do.

Table 3: summery of amount of items bought in Walmart and Price Rite

Summary		
Stores	Amount of Products	Total in \$
Walmart	52 products	279.84
Price Rite	42 Products	210.4
Total	94	490.24

5.2. Example of saving using this method

After grocery shopping was done Monday October 10th 2016, I decided to experiment the theory that Archway will save close to 20% regardless of the amount spent. Therefore, I made a copy of the recite and compared prices of all the products that were bought that day. Every product that was bought in Walmart and was cheaper in Price Rite was evaluated as if it was bought at Price Rite.

As shown in table 10 located in appendix L, Archway could have saved about \$76, which is about 17% of the total spent that day in Walmart. Therefore it is likely that Archway will be saving up to 20% if they use this method weekly. The following table summarizes the method done.

Table 4:summary of items bought between Walmart and Price Rite

Summary of how Archway could have saved money 10/11/2016		
Store	Number of products should have been bought	Total
Walmart	41 products	240.64
Price Rite	28 Products	121.51
Total	69 products	362.15
Saving		76.79

NOTE:

It should be noted that the actual total was \$443.22. This total in table 10, appendix L, from Walmart on that October 10th 2016 is \$438 because there were fruits that were bought.

Those fruits are not in the shopping list; it is and usually bought depending on how much they have spent that day shopping. Moreover, different people normally buy different fruits for the clients, depending on what those individuals would like to buy. Archway normally buys fruits such as apples, oranges, mango, pairs, and fresh vegetables from ACME Produce. These products are routinely delivered every Thursdays. Therefore, I decided not to include it in this cost analysis. That day for example, the individual that went shopping with the clients preferred to buy bananas and oranges while the week before that, mango was the fruit that was bought.

5.2.1. Disadvantages

Considering Archway habitually does their grocery shopping every Monday evening and it is all done in Walmart, it is so much time consuming if shopping is done in two different stores. Normally, it takes about an hour and half to complete shopping. Shopping at two different stores that are located about half an hour away will double the time spent. One way they to solve this problem might be shopping two days of the week. For example, shopping on Sunday in Price Rite and Monday in Walmart.

Moreover, Price Rite does not pack your groceries in plastic bags unless you are willing to pay about twenty cents a bag. This is very expensive especially if you are paying for the bag every week. However, using Walmart's bags from Monday's shopping to pack groceries from Price Rite could easily solve that problem.

5.3. Second Technique: Walmart Rewards Programs

Upon further research, I found out Walmart's reward program would be easier and cheaper than going to different stores for groceries. This is because Walmart has a price match guarantee where Walmart promises to match the price of any competitors; hence it will be the same as buying from their competitors such as Price Rite.

Walmart has this reward programs in form of an app called Walmart Savings Catcher. You are required to download and signup for free in order to access this rewards. This app works in that, when you take a picture of the bar code on the bottom of every Walmart's receipt, or enter the receipt number located on the top of the receipt. The app will take approximately 72 hours trying to "catch" any deals and all the extra money you paid will be available for you to use on Walmart e-gift cards. However, that money can only be used to buy products in Walmart.

One of the advantages of this app is that you will save money without wasting time trying to find deals from other stores. In addition, the savings can accumulate up to \$599.99 per year, which is a lot of money for a gift card. Moreover, many store that have deals will show up on this app which means that sometime you maybe able to save up to 40% depending on how much you spent. However, the main disadvantage using this app is that the money saved is available for you to use in Walmart only. To make it worse, Walmart has the right to deduct up to \$599.99 from this savings without notice and without a reason. This is such a disadvantage because after you make a saving, that money should go back to your account so that you could use it however you want to without restrictions.

5.4. Maximizing Portion Control

Staff and clients often have difficulties to follow these proportions. Some of the main reasons staff may not follow the meal sizes may include negligence to follow the right proportion amount, they are trying to avoid any unpleasant confrontation with a client that may want to eat more meat than vegetables, some clients may refuse to eat the vegetables, some serving spoons are double the serving size, big plates that make one-serving look less than it is.

Archway has done a great job of trying to educate staff of the serving sizes of the parts of the meal. However, staff need to be reminded every to serve the right size in every meal. This will help the clients eat better and in healthy sizes. One-way Archway can do to help remind staff to remember the serving size is by putting up posters close to where food is served. An example of this poster is shown in appendix M. Moreover, the person making dinner should always make sure to read the serving sizes on the groceries to make sure they make enough for everyone.

Another way Archway can avoid over-serving meals is to buy one-size serving plate. Considering that Archway has bigger plates, using smaller plates will make it easier for the staff to serve smaller size to the clients.

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7. APPENDIX A

Table 5: Vegetable-serving size generated from Health Canada, 2010.

Name of Vegetables and fruits	Serving sizes	Picture
Asparagus	125ml, ½ cup, 6 spears	
Beans, green	125ml, ½ cup	
Bok Choy/Chinese cabbages	125ml, ½ cup cooked	
Broccoli	125ml, ½ cup	
Brussels sprouts	125ml, ½ cup	
Carrots	125ml, ½ cup, 1 large	
Chard	125ml, ½ cup	
Dandelion greens	250 mL, 1 cup – raw	
Edamame (soy beans)	125 mL, 1/2 cup	
Endive	250ml, ½ cup	
Fiddleheads	125ml, ½ cup	
Kale/collards	250 mL, 1 cup – raw	
Leeks	125 mL, 1/2 cup, 1/2 leek	
Lettuce, romaine	250 mL, 1 cup – raw	
Mesclun mix	250 mL, 1 cup – raw	
Mustard greens	250 mL, 1 cup – raw	
Okra	125 mL, 1/2 cup	
Peas	125 mL, 1/2 cup	
Pepper, sweet, green	125ml, ½ cup, ½ medium size	

Pumpkin	125 mL, 1/2 cup	
Seaweed	125 mL, 1/2 cup	
Snow peas	125 mL, 1/2 cup	
Spinach	250ml, 1 cup- raw	
Squash	125 mL, 1/2 cup	
Sweet potatoes	125 mL, 1/2 cup	
Yam	125 mL, 1/2 cup	
Zucchini	125 mL, 1/2 cup	
Apple	1 medium	
Apricot, fresh*	3 fruits	
Avocado	1/2 fruit	
Bamboo shoots	125 mL, 1/2 cup	
Banana	1 medium	
Beans, yellow	125 mL, 1/2 cup	
Beets	125 mL, 1/2 cup	
Berries	125 mL, 1/2 cup	
Bitter melon	125 mL, 1/2 cup, 1/2 pod	
Cabbage	125 mL, 1/2 cup	
Cantaloupe*	125 mL, 1/2 cup	
Cauliflower	125 mL, 1/2 cup, 4 flowerets	
Celery	1 medium stalk	
Chayote	125 mL, 1/2 cup	
Cherries	20 fruits	
Corn	125 mL, 1/2 cup, 1 ear/cob	

Cucumber	125 mL, 1/2 cup	
Dried fruits	60 mL (correct all units), 1/4 cup	
Eggplant	125ml, 1/2 cup	
Fig Fresh	2 medium	
Fruit Juice	125ml, 1/2 cup	
Grapefruit	1/2 fruit	
Grapes	20 fruits	
Guava	125 mL, 1/2 cup, 1 fruit	
Honeydew	125 mL, 1/2 cup	
Kiwi	1 large fruit	
Kohlrabi	125 ml, 1/2 cup	
Lettuce	250ml, 1 cup- raw	
Lychee	10 fruits	
Mango*	125ml, 1/2 cup, 1/2 fruit	
Mixed vegetables	125 mL, 1/2 cup	
Mushrooms	125ml, 1/2 cup	
Nectarine*	1 fruit	
Orange	1 medium	
Papaya*	1/2 fruit	
Peach*	1 medium	
Pear	1 medium	
Peppers, bell	125 mL, 1/2 cup, 1/2 medium	
Pineapple	125 mL, 1/2 cup, 1 slice	
Plantain	125 mL, 1/2 cup	

Plum	1 fruit	
Potatoes	125 mL, 1/2 cup, 1/2 medium	
Radishes	125 mL, 1/2 cup	
Rhubarb	125 mL, 1/2 cup	
Tomato/tomato sauce	125 mL, 1/2 cup	
Turnip	125 mL, 1/2 cup	
Vegetable Juice	125 mL, 1/2 cup	
Watermelon	125 mL, 1/2 cup, 1 slice	

8. APPENDIX B

Table 6: Serving size for Grains Products generated from Health Canada, 2010

Name of Grain	Serving size for whole grain products	Serving size for non-whole grain products
Bagel	1/2 bagel, 45 g	
Barley	125 mL, 1/2 cup – cooked	
Bread	(Pumpernickel or rye) 1 slice, 35g	White: 1 slice, 35g
Bulgur	125, 1/2 cup-cooked	
Cereal	Hot, oatmeal 150 g, 175 mL, 3/4 cup – cooked Cold, whole grain: 30g	Hot, oatmeal 150 g, 175 mL, 3/4 cup – cooked Cold, whole grain: 30g
Couscous	125 ml, 1/2 cup- cooked	125ml, 1/2 cup- cooked
Cracker, saltines	Rye 30 g	10 crackers, 30 g
English muffin	1/2 muffin, 35 g	1/2 muffin, 35 g
Muffin	1/2 muffin, 35 g	
Pasta/noodles	125 mL, 1/2 cup – cooked	125 mL, 1/2 cup – cooked
Pita	35 g, 1/2 pita	35 g, 1/2 pita
Popcorn, plain	500 mL, 2 cups	
Quinoa	500 mL, 2 cups	
Rice, Brown	125 mL, 1/2 cup – cooked	
Rice, wild	125 mL, 1/2 cup – cooked	White, 125 mL, 1/2 cup – cooked Rice cake, 2 medium
Pancakes		1 small, 35g
Roll	1 roll, 35g	1 roll, 35g
Tortilla	1/2 piece 35 g	1/2 piece 35 g

Waffle	1 small, 35g	1 small, 35g
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9. APPENDIX C

Table 7: Serving size for Meat and Alternatives

Meat and alternatives	Serving sizes	Examples
Beef	75 g (2 ½ oz.) / 125 mL, (½ cup)	
Bison	75 g (2 ½ oz.) / 125 mL, (½ cup)	Buffalo
Chicken and turkey	75 g (2 ½ oz.) / 125 mL, (½ cup)	
Deli meat	75 g (2 ½ oz.) / 125 mL, (½ cup)	Turkey, Ham, low-fat, low salt
Duck	75 g (2 ½ oz.) / 125 mL, (½ cup)	
Fish	75 g (2 ½ oz.) / 125 mL, (½ cup)	Shellfish, canned example: crab, salmon, tuna) Fresh or frozen (example: herring, mackerel, trout, salmon, sardines, squid, tuna)
Game meat	75 g (2 ½ oz.) / 125 mL, (½ cup)	Deer, moose, elk, caribou, etc.
Goat	75 g (2 ½ oz.) / 125 mL, (½ cup)	
Game birds	75 g (2 ½ oz.) / 125 mL, (½ cup)	Goose, grouse etc.
Ham/Pork	75 g (2 ½ oz.) / 125 mL, (½ cup)	
Lamb	75 g (2 ½ oz.) / 125 mL, (½ cup)	
Organ Meat	75 g (2 ½ oz.) / 125 mL, (½ cup)	Liver, kidney, etc.
Rabbit	75 g (2 ½ oz.) / 125 mL, (½ cup)	Bunnies, hare, etc.

	cup)	
Veal	75 g (2 ½ oz.) / 125 mL, (½ cup)	
Beans	175 mL, ¾ cup	Cooked and canned
Eggs	2 eggs	
Hummus	175 mL, ¾ cup	
Lentils	175 mL, ¾ cup	
Nuts	60 mL, ¼ cup	Peanuts, walnuts, oven roasted, etc.
Peanut butter	30ml, 2 table spoons	
Seeds	60 mL, ¼ cup	Shelled
Tofu	150 g, 175ml, ¾ cup	

10.APPENDIX D

MH Grocery Shopping List: Walmart								
Dairy & Frozen Aisles 28, 30, & fridge	On hand	Buy	Meat/deli (Refrigerator)	On hand	Buy	Bread, Coffee/tea (Aisles 2)	On hand	Buy
Frozen Orange juice (12)			(2) Shredded mozzarella			multi grain bread (10)		
Lg green beans (2)			1 lb ham, 1 lb turkey			Multi grain English muffins (1)		
Frozen waffles (24 pcs)			1 lb sliced cheese			Multi grain Bagel (2)		
Frozen spinach (6)			Pepperoni (2)			Peanut butter (2)		
Frozen veggies (2 lg)			Chicken patties (4)			Jelly (1)		
Frozen French fries(4)			Romaine lettuce [4 pk]			Coffee Maxwell(1)		
Cookie dough (2bx)			10tomatoes/green & Red peppers					
half & half (2)			Aisle 10			Hot cocoa (1)		
Corn (4), lt margarine (4)			navy beans (1)bag			Choc flav syrup (1)		
Non-fat yogurt (1)			kidny beans (1)bag			Tetley Brit tea(1)		
Sugar free Jello pk (3)			Chick peas (4)			Folgers coff sng(1)		
Fat free pudding (5)			Kidny beans (4)can			Aisle 12		
Aisle 8			Aisle 6			Sean's candy (1)		
Brown rice (6)			Pizza shells(4)plzsaauce(2)			Work juices (5)		
Couscous (4)			Tomato paste (3)			Prune juice (1)		
Mac & cheese (5)			Spaghetti (6)			Vegetable V8 juice (3 pcks)(not spicy)		
Ritz crckrs multi gain (2)			Parmesan cheese (1)			Lemon juice (1)		
Saltines (1)			Ronzoni (Rotini) [2]			crystal light (4)		
100 calorie bites (1)			Spaghetti sauce (6)			Aisle 18		
Soy sauce (1)			Ramen noodle(1 pck)			Plastic spoons (1)		
Aisle 14			Vegetable broth (6)			Plastic forks (1)		
Cake mix (4)			Dice tomatoes (2cns)			Aluminum foil (1)		
Sugar (1) Splenda (1)			Aisle 4: Relish (1)			Sandwich bags (2)		
Canola oil (3)			Mustard (1)			Brown lunch bag (2)		
cooking spray (2)			Ketchup (2)			Lunch bowls (2 pks)		
Bisquick (1)			Fat free mayo (2)			Glad press n seal (1)		
complete seasoning (2)			Fat free Salad dr(3)			Storage ziplock bags [1 box]		
Salt (1) red pepper (1)			Lg can chicken (3)			Aisle 22		
Coriander (1), ginger (1)			Apple vinegar lrg (1)			Metal scrubbie (1)		
Parsley (2) Adobo(2)			applesauce jar (1)			Green scrubbie (1)		
Onion powder (2)			Applesauce pack (4)			Scour pads (1)		
Curry pwdr (2) parsley (1)			Raisins (1 bx)			Dish detergent (1)		
Basil (1) oregano (1)			Aisle 26			Aisle 24		
Garlic (1)paprika (1)			Cape cod multi (5 pks)			2 liter coke zero (3)		
Azafran (1), Achiote (1)						2 lt caff free diet (1)		
Aisle 16: Cereal (5)			Aisle 16:			Micro popcorn (1)		
Fiber one cereal (1)			Sugar free syrup (2)					
Quaker oatmeal (2)			Rice cakes (6)					

Figure 3: picture of Archways Shopping list.

11. APPENDIX E

Name of Organization:

Contact Info:

Address:

1. How many clients does this company have?

Answer:

- a. Are they all in one location?

Answer:

2. Do any of the clients currently take any medications that will require special diet?

Answer:

- a. If yes who and what?

Answer:

3. Do the clients exercise?

Answer:

4. How much does this Organization spend on food weekly?

Answer:

5. Where does the organization buy its groceries?

Answer:

6. Does this organization spend any more money on food?

Answer:

a. If yes, what is it?

Answer:

b. How much?

Answer:

7. Do any of the clients have food allergies or food intolerances? If yes, who and what?

Answer:

8. Are any of the clients currently following any special diet (e.g. low fat, low salt)?

Answer:

a. If yes, how many and in what?

Answer:

9. Who prepares the meals for the clients regularly?

Answer:

10. Do the clients eat all their meals?

Answer:

11. What is the normal meal pattern that the clients follow?

- Breakfast
- Mid-morning snack
- Lunch
- Mid-afternoon snack
- Dinner

- Evening snack

12. What is the types of foods do the clients typically have for:

Answer: *Normally, a menu is created every Sunday for the entire week where it shows what should be cooked and on what day. Usually the menu would compose of the following:*

- a. Breakfast: Cereal and milk or oatmeal and milk, orange juice*
- b. Lunch: Mainly Turkey and ham sandwiches, sometimes tuna and chicken salad.*
- c. Dinner: Meat e.g. beef, chicken, turkey; Carbohydrates e.g. rice, couscous, French fries etc. Vegetables, e.g. salad, mixed vegetables, broccoli, green beans, etc.*
- d. Snacks: Chips, rice cake with peanut butter, cup of juice.*

13. How often do the clients eat fast food or go to a restaurant?

Answer:

14. What beverages do the clients drink regularly?

Answer:

15. What barriers, if any, stand in the way of you achieving cheaper and healthier food?

Answer:

13.APPENDIX G

To Whom It May Concern:

My name is Obadiab Munene, a student at Worcester Polytechnic Institute (WPI). I am currently conducting a project with the goal of improving diet and reducing the cost of food for the special needs residences at Archway Inc. Archway is a non-profit organization that provides services for the children and adults with disabilities. Some of these disabilities include autism spectrum disorder as well as mental retardation among others. Archway strives to treat, educate as well as providing a home environment through professional staffs that understands the unique challenges of the disorder.

As a residence facility, Archways has been a loyal customer, and has been shopping for groceries in (insert the store name) for the past few years. However, being a non-profit organization, Archway is trying to find way to reduce the cost of food and I was wondering if there are any rewards programs for cost reduction, weekly flyers, donations, or some type of deals that Archway may enroll in.

Yours Sincerely,

Obadiab Munene

Obadiab Munene

14.APPENDIX H

Name of Organization:

Contact Info:

Address:

1. How many clients does this company have?

Answer:

- a. Are they all in one location?

Answer:

2. Do any of the clients currently take any medications that will require special diet?

Answer:

- a. If yes who and what?

Answer:

3. Do the clients exercise?

Answer:

4. How much does this Organization spend on food weekly?

Answer:

5. Where does the organization buy its groceries?

Answer:

6. Does this organization spend any more money on food?

Answer:

- a. If yes, what is it?

Answer:

- b. How much?

Answer:

7. Do any of the clients have food allergies or food intolerances? If yes, who and what?

Answer:

8. Are any of the clients currently following any special diet (e.g. low fat, low salt)?

Answer:

- a. If yes, how many and in what?

Answer:

9. Who prepares the meals for the clients regularly?

Answer:

10. Do the clients eat all their meals?

Answer:

11. What is the normal meal pattern that the clients follow?

- Breakfast
- Mid-morning snack
- Lunch

- Mid-afternoon snack
- Dinner
- Evening snack

12. What is the types of foods do the clients typically have for:

Answer:

a. Breakfast:

b. Lunch:

c. Dinner:

d. Snacks:

13. How often do the clients eat fast food or go to a restaurant?

Answer:

14. What beverages do the clients drink regularly?

Answer:

15. What barriers, if any, stand in the way of you achieving cheaper and healthier food?

Answer:

15.APPENDIX I

Name:

Contact Info:

1. Approximately how many clients are you responsible during dinner or lunch per meal?

Answer:

2. What is the serving size for:

a. Vegetables?

Answer:

b. Meat and Alternatives?

Answer:

c. Grains and Carbohydrates?

Answer:

3. Do all the staffs follow these serving sizes? Why or why not?

Answer:

4. Do you follow these serving sizes? Why or why not?

Answer:

5. What are the challenges, if any, do you face while making the clients meal that can affect the serving size?

Answer:

6. What challenges, if any, do you face while serving the clients?

Answer:

7. What can you do to improve the serving size of clients' meal?

Answer:

16.APPENDIX J

Table 9: Cost analysis on different stores

Food Type	Amount Needed weekly	Cost of food in Common Grocery Stores (in USA \$)								Cheapest store	How Much Cheaper than Walmart
		Walmart	Sub Total for Walmart	Shaws	Sub Total for Shaws	Price Rite	Sub Total for Price Rite	Price Chopper	Sub Total for Price Chopper		
Frozen Orange Juice	12	2.64	31.68	2.49	29.88	1.69	20.28	2.99	35.88	Price Rite	11.4
Lg Green beans	2	1.49/24oz	2.98	2 for 3.00/16oz	6	1.49/24oz	2.98	2.49/ 32oz	4.98	Walmart	0
Frozen Waffle	one 24pcs	4.88	4.88	5.49	5.49	4.49	4.49	5.99	5.99	Price Rite	0.39
Frozen Spinach	6	1.96	11.76	2 for 4.00/16oz	24	1.29	7.74			Price Rite	4.02
Frozen veggies	2	5.98	11.96	6.99/52oz	13.98	5.49/52oz	10.98	6.99/ 52 oz.	13.98	Price Rite	0.98
Frozen frenchfrie	4	5.98	23.92	6.98	27.92	5.99	23.96	5.98	23.92	Walmart	0
half and half	2	4.24	8.48	5.59/64/oz.	11.18	3.78	7.56	5.19/32 oz.	10.38	Price Rite	0.92
Corn margarin	4	1.96	7.84	4.99	19.96	1.49/24oz	5.96	2.49	9.96	Price Rite	1.88
non-fat yorgut	4	3.01	12.04	4.99	19.96	3.99	15.96	4.29	17.16	Walmart	0
sugar free jello	1	2.18	2.18	2.99	2.99	1.99	1.99	2.79	2.79	Price Rite	0.19
fat free pudding	3	3.72	11.16			1.99	5.97	2.99	8.97	Price Rite	5.19
brown	5	3.72	18.6			1.99	9.95	2.5	12.5	Price Rite	8.65
Couscous	3	7.48	22.44	5.99	17.97	3.99	11.97	8.49	25.47	Price Rite	10.47
mac & cheese	4	1.68	6.72	1.99	7.96	2.19	8.76	2.79	11.16	Warlmar	0
	5	0.99	4.95	0.99	4.95	0.79	3.95	0.99	4.95	Price Rite	1
Ritz crackers	2	2.56/12oz	5.12	3.99/12.5oz	7.98	3.49/lb	6.98	3.99/13.7oz	7.98	Warlmar t	0
Saltines	1	1.78/16oz	1.78	3.49/16oz	3.49	.99/box	0.99	1.99/15oz	1.99	Price Rite	0.79
soy sauce	1										
cake mix	4	1.44	5.76	1.99	7.96	1.59	6.36	1.99	7.96	Warlmar	0
sugar	1	4.98/8lb	4.98	2.99/4lb	5.99					Warlmar	0
canola oil	3	2.38/48oz	7.14	3.99/48oz	11.97	2.38/48oz	7.14	3.19/48oz	9.57	Warlmar t	0
cooking spray	2	2.72/5oz	5.44	3.49/6oz	6.98	2.69/6oz	5.38	3.19/5oz	6.38	Price Rite	0.06
Bisquick	1	6.98	6.98					4.29/2lb	4.29	Price Rite	2.69
complete seasoning	2	0.98	1.96	4.49/12oz	8.98	.99/oz.	1.98			Warlmar t	0
salt	1	0.84/26oz	0.84	1.29/36oz	1.29	.39/26oz	0.39	1.19	1.19	Price Rite	0.45
red peper	1	2.98/2.60z	2.98	3.99/15oz	3.99	.99/2.5	0.99	2.99/4.5oz	2.99	Price Rite	1.99
ginger	1	2.27/2oz				1.99/2oz	1.99			Price Rite	0.28
parsley	2	5.48/2.7oz	10.96	2.99	5.98			2.59/0.25oz	5.18	Walmart	0
adobo	2	2.38	4.76	2.99/15oz	5.98	1.49/11lb	2.98	2.49/16oz	4.98	Price Rite	1.78
onion powder	2	2.44/2.62oz	4.88	3.49/2.60oz	6.98	1.99/2.5oz	3.98	3.59/5.5oz	7.18	Price Rite	0.9
curry	1	2.98/1oz	2.98							Warlmar	0
parsley	2	5.95	11.9	2.99/1oz	5.98	0.99/2.5	1.98	2.59/0.25oz	5.18	Price Rite	6.72
basil	1	2.44/.75oz	2.44	1.99/12oz	1.99	.99/1.5oz	0.99	2.99/0.6oz	2.99	Price Rite	1.45
oregano	1	2.44/.75oz	2.44			1.29/.5oz	1.29			Price Rite	1.15
garlic	1	6.48/12.5z	6.48	4.69/10.5oz	4.69	3.99/10oz	3.99	4.99/1.5lb	4.99	Price Rite	2.49

paprika	1	5.03				4.99/16oz	4.99	3.99/2.12oz	3.99	Price Rite	0.04
Azafran	1	1.59				1.49/2oz	1.49		1.49	Price Rite	0.1
Cereal	5	3.98	19.9	4.99/box	24.95	3.89/box	19.45	4.69/ box	23.45	Price Rite	0.45
fiber one cereal	1	3.74	3.74							Warlmar	0
quaker oatmeal	2	3.98	7.96	4.99	9.98	2.39	4.78	5.49	10.98	Price Rite	3.18
shredded massarell	2	2.50/7oz	5	3.79/16oz	7.58	3.69/16oz	7.38			Warlmar	0
1lb ham	1lb	3.98/lb	3.98	5.99/lb	5.99	2.99/lb	2.99	6.99	6.99	Price Rite	0.99
1lb turkey	1lb	3.98/lb	3.98	7.99/lb	7.99	2.99/lb	2.99	6.99	6.99	Price Rite	0.99
1lb sliced cheese	1lb	6.48/lb	6.48	4.99/lb	4.99	3.49/lb	3.49	5.99	5.99	Price Rite	2.99
pepperon	2										
Chiken patties	4	4.97/26oz	19.88							Walmart	0
Romain lettuce	4pk	3.24/lb	12.96	1.69/lb	6.76	.99/lb	3.96			Price Rite	9
10 tomatoes	10	1.18/lb	11.8	1.99/lb	19.9	1.29/lb	12.9	.99/lb	9.9	price Chopper	1.9
green & red	10	.78eac	7.8	3 for 5.00	15	1.79/lb	17.9	4.99/lb	49.9	walmart	0
navy	1	1.36	1.36			1.49	1.49	1.99	1.99	Walmart	0
kidney beans	1	1.54	1.54	2.19	2.19	1.59	1.59	1.99	1.99	Walmart	0
chick	4	1.94	7.76	2.19	8.76	1.19	4.76	1.89	7.56	Price Rite	3
kidney beans(can	4 can	.85/15oz	3.4	5 for 5.00	5	.49/15oz	1.96	0.79/15oz	3.16	Price Rite	1.44
Pizza	4	3.48	13.92	3.99	15.96					Walmart	0
pizza sauce	2	1.14/14oz	2.28	1.99/14oz	3.98					Walmart	0
tomato paste	3										
pizza sauce	2	1.14/14oz	2.28	1.99/14oz	3.98					Walmart	0
tomato paste	3										
spaghetti	6	1.50/6oz	9	1.67/lb	10.02	1.69/15oz	10.14	1.69/13.25oz.	10.14	Walmart	0
parmesan cheese	1										
Ronzoni	2										
spaghetti sause	6	1.00/25oz	6	1.79/25oz	10.74	1.99/24oz	11.94	2.19/1lb	13.14	Walmart	0
ramen noodle	1	1.98/6cups	1.98	2.99/6cups	2.99	1.99/6pcs	1.99			Walmart	0
Vegetable broth	6										
dice tomatoes	2	1.00/12oz	2							Walmart	0
Mustard	1	1.97	1.97	3.49/38oz	3.49	2.99/30oz	2.99			Walmart	0
Ketchup	1	4.62/64oz	4.62	5.49/64oz	5.49	1.49/38oz	1.49	3.99/4lb	3.99	Price Rite	3.13
Fat free mayo	2	3.48/32oz	6.96	3.99/30oz	7.98	3.99/30oz	7.98	4.49/30 oz.	8.98	Walmart	0
fat free salad dr	2	1.66/16oz	3.32	2.39/16oz	4.78	1.79/16oz	3.58	3.19/16oz	6.38	Walmart	0
apple vinegar	3							1.99	5.97		
apple sauce	1	1.98	1.98	3.29/46oz	3.29	2.99/64oz	2.99	2.99/46oz	2.99	Walmart	0
apple souce	1	1.98	1.98	2.99	2.99	1.99	1.99	1.99	1.99	Walmart	0
raisns	1	2.98	2.98							Walmart	0
cape cod multi	4	3.98	15.92							Walmart	0

sugar free syrup	1	1.98/8oz	1.98	3.99/24oz	3.99	2.29/8oz	2.29			Walmart	0
rice cakes	5	2.24	11.2					2.59	12.95	Walmart	0
multi grain	10	2.98	29.8	4.29	42.9	2	4	4.49	44.9	Price Rite	25.8
multi grain English	1	2.98	2.98	4.39	4.39	2.49	2.49	4.39	4.39	Price Rite	0.49
multigrain Bagel	2	2.98	5.96	4.69	9.38	1.69	3.38	3	6	Price Rite	2.58
peanut butter	2	3.32/24oz	6.64	6.49/40oz	12.98	5.39/30oz	10.78	5.99/40oz	11.98	Walmart	0
jelly	1	2.58	2.58	2.99/30oz	2.99	2.99	2.99	2.99	2.99	Walmart	0
coffee Maxwell	2	6.93	13.86	9.99	19.98	5.99	11.98	8.99	17.98	Price Rite	1.88
Hot cocoa chocolate flavor	1	3.88	3.88					4.29/8oz	4.29	Walmart	0
tetley Brit tea	1	3.18	3.28	3.49/80bags	3.49	1.99/100bags	1.99			Price Rite	1.29
Folgers coffee singles	1										
Work	5	1.98	9.9	2.99	14.95	1.77	8.85	2.29	11.45	Price Rite	1.05
Prune juice	1	5.22/64oz	5.22	5.49	5.49			5.59/64fl oz.	5.59	Walmart	0
Vegetable V8 juice	3 pcks	2.98	8.94	3.49	10.47			3.59	10.77	Walmart	0
lemon crytal light juice	4	2.48	9.92							Walmart	
plastic spoons	1	2.84/48spoons	2.84	2.99/48pcs	2.99			4.39/48spoons	4.39	Walmart	0
plastics forks	1	2.84/48forks	2.84	1.99/48pcs	1.99			4.39/48 forks	4.39	Walmart	0
Aluminum foil	1	5.92/75ft	5.92	3.79/75sq.ft	3.79	1.59/37.5sq.ft	1.59	3.99/75sqft	3.99	Walmart	0
Sandwich bags	2	3.97	7.94	3.29	6.58			2.59/90 bags	5.18	Walmart	0
lunch bowls	2	2.72/35bowls	5.44	3.29	6.58	.79/30bowls	1.58	3.69/28bowls	7.38	Price Rite	3.86
Storage ziplock	1	3.5		4.99/38bags	4.99			5.49/28bags	5.49	Walmart	0
metal scrubble	1 box	1.93	1.93							Walmart	0
Green scrubble	1	2.47/2pcs	2.47	1.00each		1.99/2pcs	1.99	1.99each	1.99	Price Rite	0.48
dish detergent	1	5.97/4.68lb	5.97	8.49/5.6lb	8.49			7.99/4.68fl oz	7.99	Walmart	0
2 liter coke zero	3	1.50/2liter	4.5	3 for 5.00	5					Walmart	0
2 lt caffeine	1	1.50/2liter	1.5	3 for 5.00	1.29					Walmart	0
microwave popcorn	1										
TOTALS		92 products	623.63	73 Products	646.98	66 products	381.03	69 Products	626.98		130.48

17.APPENDIX K

Table 10: what item to buy and from what store

Walmart		Price Rite	
Food Type	Cost	Food Type	Cost
Large Green beans	2.98	Frozen Orange Juice	20.28
Frozen French fries	23.92	Frozen Waffle	4.49
Margarine	12.04	Frozen Spinach	7.74
Couscous	6.72	Frozen veggies	10.98
Ritz crackers multi grain	5.12	Half and half	7.56
Cake mix	5.76	Corn	5.96
Sugar	4.98	Non-fat yogurt	1.99
Canola oil	7.14	Sugar free jello	5.97
Complete seasoning	1.96	Fat free pudding	9.95
Parsley	11.9	Brown rice	11.97
Curry powder	2.98	Mac & cheese	3.95
Fiber one cereal	3.74	Saltines	0.99
Shredded mozzarella	5	Cooking spray	5.38
Chicken patties	19.88	Bisquick	6

Green & red pepper	7.8	Salt	0.39
Navy beans	1.36	Red pepper	0.99
Kidney beans	1.54	Ginger	1.99
Pizza shells	13.92	Adobo	2.98
Pizza sauce	2.28	Onion powder	3.98
Tomato paste	0	Parsley	1.98
Spaghetti	9	Basil	0.99
Parmesan cheese		Oregano	1.29
Ronzini		Garlic	3.99
Spaghetti sauce	6	Paprika	4.99
Ramen noodle	1.98	Azafran	1.49
Vegetable broth		Cereal	19.45
Dice tomatoes	2	Quaker oatmeal	4.78
Mustard	1.97	1lb ham	2.99
Fat free mayo	6.96	1lb turkey	2.99
Fat free salad dressing	1.97	1lb sliced cheese	3.49
Apple sauce	1.98	Romaine lettuce	3.96
Apple sauce pack	1.98	Chick peas	4.76
Raisins	2.98	Kidney beans (cans)	1.96
Cape cod multi	15.92	Ketchup	1.49

Sugar free syrup	1.98	Multi grain bread	4
Rice cakes	11.2	Multi grain English Muffins	2.49
Peanut butter	6.64	Multi grain Bagel	3.38
Jelly	2.58	Coffee Maxwell	11.98
Hot cocoa	3.88	Tetley Brit tea	1.99
Chocolate flavor syrup	2.28	Folgers coffee singles	0
Prune juice	5.22	Work Juices	8.85
Vegetable V8 juice	8.94	Lunch bowls	1.58
Lemon juice	0	Green scrabble	1.99
Crystal light juice	9.92		
Plastic spoons	2.84		
Plastics forks	2.84		
Aluminum foil	5.92		
Sandwich bags	7.94		
Storage Ziplocs bags	0		
Metal scrabble	1.93		
Dish detergent	5.97		
2 liter coke zero	4.5		
2 liter caffeine free diet	1.5		
Total	279.84	Total	210.4

18.APPENDIX L

Table 11: Items bought between Walmart and Price Rite

Food Type	Amount Needed weekly	Cost of Food in Walmart Compared to Price Rite on 10/11/2016				How Much saved
		Walmart Price	Sub-total	Price Rite Price	Sub-total	
Frozen Orange Juice	12	1.53	18.36	1.69	20.28	
Large Green beans	0		0	1.49	0	
Frozen Waffle	1	3.12	3.12	4.49	4.49	
Frozen Spinach	6	1.96	11.76	1.29	7.74	4.02
Frozen veggies	0		0	5.49	0	
Frozen french-fries	2	2	4	1.99	3.98	0.02
Half and half	0		0	3.78	0	
Corn	0		0	1.49	0	
Margarine	0		0	3.99	0	
Non-fat	0		0	1.99	0	

yogurt						
Sugar free jello	1	2.64	2.64	1.99	1.99	0.65
Fat free pudding	4	3.72	14.88	1.99	7.96	12.89
Brown rice	1	3.48	3.48	2.99	2.99	0.49
Couscous	4	1.68	6.72	2.19	8.76	
Mac & cheese	0		0	0.79	0	
Ritz crackers multi grain	0		0	3.49	0	
Saltines	1	1.98	1.98	0.99	0.99	0.99
Soy sauce	0		0		0	
Cake mix	0		0	1.59	0	
Sugar	1	7.42	7.42		0	
Canola oil	2	2.38	4.76	2.38	4.76	0
Cooking spray	0		0	2.69	0	
Bisquick	0		0	6	0	
Complete seasoning	0		0	0.99	0	
Salt	1	1.98	1.98	0.39	0.39	1.59
Red pepper	1	1.98	1.98	0.99	0.99	0.99
Ginger	1	1.98	1.98	1.99	1.99	
Parsley	2	1.98	3.96	1.99	3.98	

Adobo	2	1.98	3.96	1.49	2.98	0.98
Onion powder	0		0	1.99	0	
Curry powder	0		0		0	
Parsley	2	2.98	5.96	0.99	1.98	3.98
Basil	1	2.98	2.98	0.99	0.99	1.99
Oregano	1	2.98	2.98	1.29	1.29	1.69
Garlic	0		0	3.99	0	
Paprika	1	2.98	2.98	1.99	1.99	0.99
Azafran	1	2.98	2.98	1.49	1.49	1.49
Cereal	2	3.98	7.96	3.89	7.78	0.18
Fiber one cereal	0		0		0	
Quaker oatmeal	2	2.24	4.48	2.39	4.78	
Shredded mozzarella	2	4.78	9.56	3.69	7.38	2.18
1lb ham	1	2.5	2.5	2.99	2.99	
1lb turkey	1	2.5	2.5	2.99	2.99	
1lb sliced cheese	1	3.33	3.33	3.49	3.49	
Pepperoni	3	2.22	6.66		0	
Chicken patties	4	4.97	19.88		0	
Romaine lettuce	1	3.24	3.24	0.99	0.99	2.25

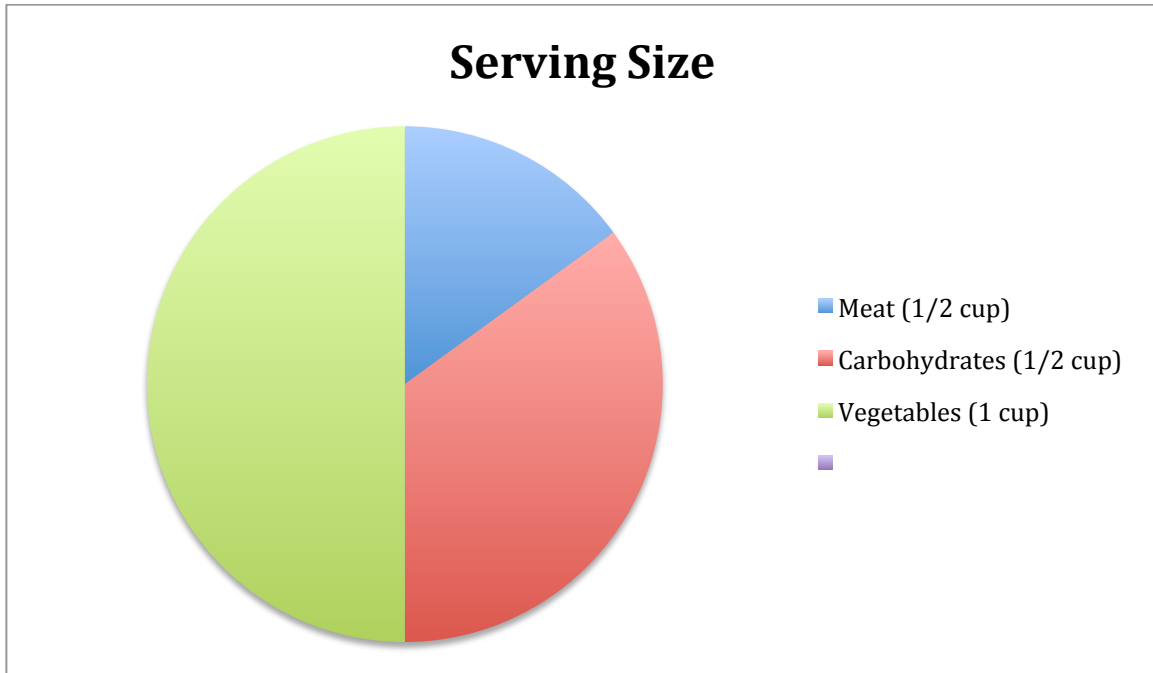
10 tomatoes	10	1.29	12.9	1.29	12.9	0
Green & red pepper	10	1.99	19.9	1.79	17.9	2
Navy beans	1	1.36	1.36	1.49	1.49	
Kidney beans	1	1.54	1.54	1.59	1.59	
Chick peas	4	1.94	7.76	1.19	4.76	3
Kidney beans (cans)	0		0	0.49	0	
Pizza shells	2	3.48	6.96		0	
Pizza sauce	2	1.14	2.28		0	
Tomato paste	0	0	0		0	
Spaghetti	4	1	4	1.69	6.76	
Parmesan cheese	1	5.42	5.42		0	
Ronzini	0		0		0	
Spaghetti sauce	6	1.5	9	1.99	11.94	
Ramen noodle	1	1.98	1.98	1.99	1.99	
Vegetable broth	4	2.22	8.88		0	
Dice tomatoes	2	0.72	1.44		0	
Mustard	0	0	0	2.99	0	

Ketchup	1	1.92	1.92	1.49	1.49	0.43
Fat free mayo	0		0	3.99	0	
Fat free salad dressing	2	3.88	7.76	1.79	3.58	4.18
Apple vinegar	1	1.66	1.66		0	
Apple sauce	1	1.98	1.98	2.99	2.99	
Apple sauce pack	5	1.84	9.2	1.99	9.95	
Raisins	1	2.98	2.98		0	
Cape cod multi	4	6.98	27.92		0	
Sugar free syrup	1	1.98	1.98	2.29	2.29	
Rice cakes	2	2.24	4.48		0	
Multi grain bread	10	2.98	29.8	2	20	9.8
Multigrain English Muffins	1	2.98	2.98	2.49	2.49	0.49
Multigrain Bagel	2	2.98	5.96	1.69	3.38	2.58
Peanut butter	0	0	0	5.39	0	
Jelly	0	0	0	2.99	0	
Coffee Maxwell	0	0	0	5.99	0	

Hot cocoa	0	0	0		0	
Chocolate flavor syrup	0	0	0	3.1	0	
Tetley Brit tea	1	3.18	3.18	1.99	1.99	1.19
Folgers coffee singles	1	5.18	5.18		0	
Work Juices	5	1.98	9.9	1.77	8.85	1.05
Prune juice	1	4.68	4.68		0	
Vegetable V8 juice	3	2.98	8.94		0	
Fruits	15	0.88	13.2		0	
Crystal light juice	4	2.48	9.92		0	
Plastic spoons	1	2.84	2.84		0	
Plastics forks	1	2.84	2.84		0	
Aluminum foil	1	5.5	5.5	1.59	1.59	3.91
Sandwich bags	1	3.97	3.97		0	
Lunch bowls	2	2.72	5.44	0.79	1.58	3.86
Storage Ziploc bags	1	4.34	4.34		0	
Metal scrabble	0		0		0	

Green scrabble	0		0	1.99	0	
Dish detergent	0		0		0	
2 liter coke zero	3	1.5	4.5		0	
2 liter caffeine free diet	1	1.5	1.5		0	
Microwave popcorn	0		0		0	
Totals			438.94		229.94	76.79

19.APPENDIX M



29.