

A FOOD PANTRY'S CONTRIBUTION TOWARDS
REDUCING THE NEEDS-GAP

By

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A FOOD PANTRY'S CONTRIBUTION TOWARDS
REDUCING THE NEEDS-GAP

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Abstract: This research estimates the contribution of a local food pantry's food assistance program in helping lower-income households. The assistance provided is measured by the extent to which it closes households' needs-gaps, defined as the additional income the households would need to afford their basic needs such as food, housing, transportation, health care, and the like. Primary and secondary data sources were compiled to estimate the needs-gaps for different household types as well as the cost savings provided by the food pantry. The food pantry provides households with approximately five to 16 days' worth of food and saves them over \$80 in food expenditures each month they visit. While this is a major help for lower-income households facing financial struggles, it reduces the needs-gap by only 1-2%. Food pantries are thus essential for helping low-income households, but are only part of the solution to helping all Americans acquire their basic needs.

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CHAPTER I

INTRODUCTION

Take a look into almost any community and you are likely to notice someone struggling with poverty, whether it be the homeless man panhandling at the stoplight, the single mom working two jobs, or the young boy wearing shoes two sizes too big. The US Census Bureau reported 39.7 million Americans living below the poverty threshold in 2017, with poverty thresholds defined as the specified dollar amount considered to be the minimum level of resources necessary to meet the basic needs of a family unit (Coleman-Jensen, et al., 2017; Lee, 2018). One might presume basic needs to be limited to food, water and shelter, but as incomes have risen considerably in the last two centuries, so have our notions concerning what constitutes basic needs. In modern times, basic needs encompass not only food, water and shelter but also healthcare and transportation. As defined by the Economic Policy Institute (EPI), basic needs are food, housing, transportation, healthcare, childcare, taxes and other necessities (EPI, 2018).

Regardless of the time period, food has been the most important basic need. It is more detrimental for a person to go without food than it is to go without shelter, transportation or healthcare (barring no major health issues). Around the world, low-income and poverty stricken households' inability to provide food for themselves have

spurred government and philanthropic organizations interests in the establishment of food assistance programs. While many governments attempt to ensure food security for its citizens, some countries fall short of this promise. Venezuela for example, states the right to food in their constitution but has altered its political institutions in a way that makes access to food assistance more difficult (FIAN, 2001). Most political sides can agree it is necessary to provide food assistance for food insecure families – the disagreements arise concerning the source and funding of these programs. In the US, political support surrounds food assistance programs such as the Supplemental Nutritional Assistance Program (SNAP), with disagreements arising when discussing the program’s institutional framework and recipients’ eligibility requirements (Gritter and MacRobert, 2015). Though government funded food assistance programs are politically debated, charity food assistance is rarely opposed and is considered the safety net for programs like SNAP (Gritter and MacRobert, 2015; Fisher, 2017)

Food charities have been in existence for centuries and can be traced back to English soup kitchens as early as the 1700’s. The establishment of food charities in the US stem from the onset of the Great Depression, with poor, hungry individuals waiting in lines for free bread and food to take home to their families (Fisher, 2017). In the late 1960’s the first food bank was created after John van Hengel, a volunteer at a soup kitchen in Phoenix, AZ, encountered a woman rummaging through a trash bin outside a grocery store looking for food (Feeding American, n.d.). Mimicking how banks store money for future use, Van Hengel established St. Mary’s Food Bank – a place where food which would have been discarded could instead be donated and available to the hungry people in Phoenix (Feeding America, n.d.). Distributing 275,000 pounds of food

in its first year, news of its success spread, and by 1977, 18 food banks had been established across the US. Van Hengel created an organization overseeing these food banks which is now known as Feeding America, the nation's largest domestic hunger-relief organization with a network of 200 food banks and 60,000 food pantries and meal programs (Feeding America, n.d.). With food pantries acting as smaller, local food assistance distribution points, relying on supplies from regional food banks and community donations.

Given the broad support for food pantries in the US, it is worth asking how far they go in helping people acquire their basic needs. Do they ensure most households have all their basic needs met? Does it help them acquire 50% of their basic needs they could not otherwise afford? If not 50%, what percentage? Estimating this percentage is important because it helps us gauge the extent to which existing charities are helping households live a dignified life, and the extent to which other efforts (*e.g.*, extra funding for food pantries, government programs) are needed.

This is not an easy question to answer as the primary objective of food pantries is to help as many people as much as possible on a constrained budget, not to collect detailed data on the items they are providing people. While the majority of food pantries collect detailed data on the demographics and number of people they help along with pounds of food provided, they do not collect information regarding the nutritional or monetary value of the food distributed. At best, the weight of food provided is disaggregated into categories such as cereal, soup, canned fruit and the like. A challenge in collecting detailed data is the nature of the food pantry – heavily relying on an ever-changing donation-based supply and providing this food free of cost makes having a

detailed inventory or checkout system like a grocery store nearly impossible and unnecessary in meeting the goals of the food pantry.

However, this detailed information is necessary in measuring the true assistance food pantries provide. In the first step of obtaining this information, this study recorded the foods acquired by 2,031 families in 2018 including information on the household size as well as the caloric and nutritional content of the exact food items acquired by these households.

1.1 Objectives

The general objective is to determine the percentage of the needs-gap met by food assistance provided from food pantries through an in-depth evaluation of one food pantry in a Midwestern town. This in-depth evaluation includes the following four objectives:

1. Estimate the calories acquired from a local food pantry in Stillwater, Oklahoma, and the corresponding monetary savings in food purchases for different types of households.
2. Identify the amount of money each household type would need to afford their basic needs.
3. Estimate the average income of clients at this food pantry for different household types.
4. Combine these three data sources to identify the percent of the needs-gap met by the food pantry.

1.2 Definitions

Basic Needs: a set of goods and services required to live and function in today's society:

food, housing, childcare, transportation, healthcare, taxes and miscellaneous goods.

Client: An individual who has obtained free food for their household from the food pantry studied during 2018.

Adult: An individual between the ages of 18 and 64 years.

Elder: Any individual 65 years of age or older.

Needs-gap: The amount of money required for a household to purchase its basic needs (if it had to purchase all the goods and services comprising those needs) minus the amount of income the household makes on an annual basis. If the household income exceeds the amount needed the needs-gap is set to zero.

Our Daily Bread (ODB): An operating food pantry / food and resource center located in Stillwater, Oklahoma.

Percentage reduction in needs-gap: $[(\text{Needs-gap if household acquires food from Our Daily Bread}) / (\text{Needs-gap if it does not})] - 1$

CHAPTER II

BACKGROUND

To fully understand the scope of this study, the following sections give insight into food insecurity and charity food organizations through a review of literature and a narrative of the food pantry this study uses as a case study.

2.1 Literature Review

Food insecurity occurs when households lack access to nutritionally adequate and safe foods, or are unable to acquire these foods in socially acceptable ways due to insufficient funds and other resources for food (Handforth, Hennick and Schwartz, 2013; Coleman-Jensen, Gregory and Singh, 2014; Bazerghi, McKay and Dunn, 2016). A household who reduces their food intake and reports hunger as some point during a year because of an inability to acquire food due to lack of money and resources is considered very food insecure (Coleman-Jensen, Gregory and Singh, 2014). A household is more likely to be food insecure if they are near or below the federal poverty threshold, if it is a single-headed household with children (in particular a single-woman headed household with

children), an African-American or Hispanic headed household, a disabled person is in the household, or if the household has a low level of education (Gunderson, Kreider and Pepper, 2001; Coleman-Jensen, Gregory and Singh, 2014; Ratcliff, McKernan, and Zhang, 2011; Bazerghi, McKay and Dunn, 2016; Daponte et al., 1998; Borjas, 2004; Bhattacharya, Currie and Haider, 2004).

Food security is inversely related to income (Gunderson, Kreider and Pepper, 2001; Coleman-Jensen, Gregory and Singh, 2014; Gunderson and Ribar, 2011).

Households with limited resources seek assistance from a variety of outlets to meet their needs, participating in multiple programs such as federal food assistance or obtain food from charity food providers (Coleman-Jensen, Gregory and Singh, 2014). A case study conducted by Daponte, Lewis, Sanders and Taylor (1998) found that households may begin to use charity food providers, such as food banks, for a variety of reasons including the loss of a job, a child added to the household, or an increase in housing, medical, or utility expenses.

The most common forms of food charity organizations are food banks and food pantries. A typical US food bank receives donations from individual donors, grocers and other organizations, then inspects and sorts the donated goods for distribution to local food pantries and charity food organizations (Mohan, Gopalakrishnan and Mizzi, 2013; Tarasuk and Beaton, 1999). The majority of donations to food banks and pantries are made by grocery stores with Mohan, Gopalakrishnan and Mizzi (2013) finding that grocery stores donate “unsaleable food and non-food items with damaged packaging or nearing their expiration dates” to food charity organizations (p. 249). However, since the supply of food for charity organizations is dependent upon donations, the goods supplied

can vary drastically from delivery to delivery. It is common practice for charity organizations to measure the weight rather than the dollar value of the donations received as a measure of the contribution and thus the success of the organization. When the weight of donations is used as a measure of success for the food bank, food banks that chose to not include heavy empty calories, such as soda and candy, are penalized as it may significantly reduce the weight of the goods received and thus the interpreted successfulness of the organization (Handforth, Hennick and Schwartz, 2013). Consequently, using the weight of donated goods received and distributed does not provide accurate measurements of assistance in terms of value of assistance provided.

As aforementioned, food banks are the main donation point where goods are sorted and repackaged for distribution to local food pantries where community members are able to acquire these goods. The typical food pantry client is allowed to get resources from the food pantry anywhere from once a week to once a month depending on the organization. Canadian food banks aim to provide three days' worth of food, while many US food banks aim to supply one week's worth (Tarasuk and Beaton, 1999; Bazerghi, McKay and Dunn, 2016). With this limited supply of food provided, food banks and thus food pantries are unable to completely eliminate food insecurity or meet a household's total nutritional needs resulting in the majority of food charity clients remaining food insecure (Bazerghi, McKay and Dunn, 2016).

The 1998 case study regarding a food pantry in Allegheny County, Pennsylvania, conducted by Daponte *et al.* is the only one of its kind to estimate the value of food assistance received from food pantries. This study estimated food pantry users to receive anywhere from \$3 - \$150 worth of food per visit. While this is a broad estimate and

values are not explicitly associated with household sizes or composition, it is one of the only studies to provide an estimate. The study also found food pantry users are evolving to become chronic users, using food pantries for an average of 20 months, rather than as a short-term emergency resource (Daponte, Lewis, Sanders and Taylor, 1998).

Though there is extensive literature on determinants of food insecurity and the relationships between income and food insecurity, there is a lack of information concerning the economic value of the contributions of food charity organizations to low-income and food insecure individuals. This study's purpose is to determine the value of the foods low-income and food-insecure households acquire from charitable organizations and the extent to which the assistance meets basic needs households are unable to acquire due to a lack of income or resources.

2.2 Our Daily Bread

Our Daily Bread (ODB), a food pantry located in Stillwater, Oklahoma, provides assistance to low-income and food insecure households in Payne County, Oklahoma, through the distribution of food items to clients at no cost. ODB is a client-choice food pantry allowing clients to choose the food items they want from several food categories, making the ODB shopping experience similar to a shopping at a grocery store. Though referred to here as a food pantry, organizations like ODB are increasingly referred to as "Food and Resource Centers" to accentuate the fact that they try to do more than just provide food assistance. In addition to food assistance, ODB offers cooking and health classes, SNAP application assistance, and hosts Infant Crisis Services' Baby Mobile

which provides formula, food and diapers to babies and toddlers (Our Daily Bread, 2019). Clients seeking food assistance typically receive an array of goods including canned goods, cereal, pasta, bread, baked goods, dairy products, meat and fresh produce. Since opening their doors in September 2017, ODB has provided food assistance to 16,934 households, averaging 996 households a month (ODB, 2019).

Upon a client's first visit to ODB, and every year after, a client meets with an intake volunteer and goes through an intake process to gather information regarding their household demographics, which is entered a software system called Charity Tracker, a system used by almost all charity organizations in Stillwater, Oklahoma. The Charity Tracker system provides clients with unique client and household identifiers, allowing ODB and other charity organization officials to track forms of charity assistance these clients received. Information entered into this system includes a household's address and size, verified through all household members' IDs, as well as members' ages, employment status and alternate forms of assistance received, etc. Upon every visit to ODB clients are able to update their household information, *e.g.* the addition of a family member to the household.

The Regional Food Bank of Oklahoma, local supermarkets and grocery stores, as well as individuals in the community supply food to ODB for distribution. ODB is able to place orders through the Regional Food Bank of Oklahoma for certain food items, such as canned or boxed goods at a low cost, and perishable items at no cost. The majority of food sourced through food retailers in the community is provided from Walmart, Aldi, Sprouts, Kum and Go, and Red Lobster through a retail recovery program. This program allows retailers to donate foods nearing or past their sell by dates which can no longer be

sold. ODB volunteers are responsible for the collection of these retail donations as well as the sorting and stocking of shelves at ODB for distribution. Relying on donations, ODB's inventory varies from day to day. While there are always items available in each food category, the variety of these items change often with no guarantee the same products or variety of products will be available throughout the entire shopping session, much less from session to session.

Similar to charity organizations mentioned in the literature review, ODB uses the weight of donations as a measurement of assistance provided, excluding sugary drinks and candy, as these are not distributed to clients. Becky Taylor, Executive Director of ODB, estimates an average of 100,000 pounds of donations every month (Taylor, 2019). This influx of varying amounts, types and brands of products donated to ODB everyday make an electronic inventory system similar to a grocery checkout system not only time consuming but unnecessary, as all goods are provided to clients at no cost. Due to these constraints there are no inventory or checkout systems in place.

To manage the distribution of these food items to clients, a system was developed to constrain quantities allowed based on household size. This system allows households to receive items from all food categories, with the number of items allowed from each category dependent upon household size. As ODB is a volunteer-based operation, a volunteer accompanies each client during their "shopping trip" and follows an instruction card, color coded by household size, which outlines the quantities allowed for each household size in each food category. Following the Regional Food Bank of Oklahoma suggestions, the cards outline the quantities allowed for households ranging from one to six people. A combination of cards is used for households who exceed six people.

To receive assistance from ODB households must have monthly incomes at or below guidelines set by the Emergency Food Assistance Program ranging from \$1,872 for a one-person household to \$6,534 for an eight-person household (Oklahoma Department of Human Services, 2018). Qualifying households are able to receive assistance once every 30 days.

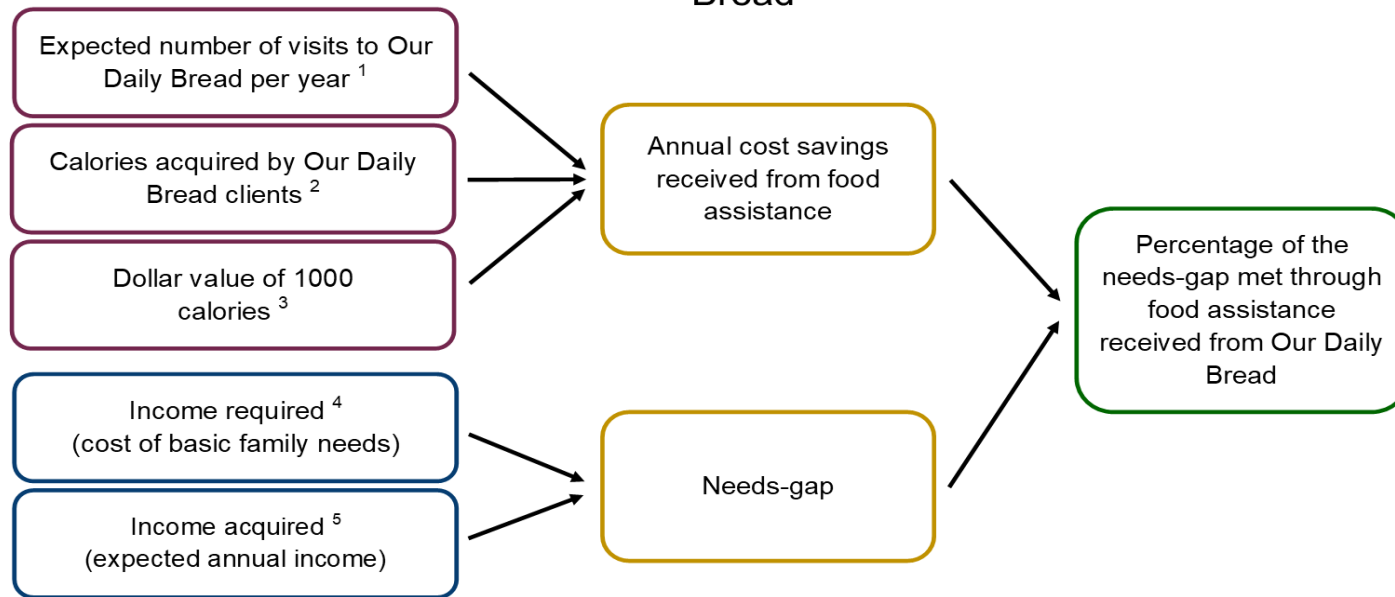
CHAPTER III

METHODOLOGY

This study uses a food pantry in Stillwater, Oklahoma, Our Daily Bread (ODB), as a case study to quantify the value of assistance food pantry clients receive and determine the percentage of the needs-gap met by this assistance. Analyses of multiple sources are combined to reach the main objective of this study. The methodology for the compilation of these analyses are shown in *Figure 1*.

Figure 1

Method for Determining the Percentage of the Needs-Gap Met Through Food Assistance Received from Our Daily Bread



1. Demographical data provided by Our Daily Bread sourced from the Charity Tracker Program. 2. Calories acquired by household size from data collected at Our Daily Bread for the purpose of this study. 3. Ates, A. 2018 "Nutrients Required and Acquired: An Overview of SNAP Eligible and Ineligible Household Behaviors." 4. Economic Policy Institute. 2018. "Family Budget Calculator." Available at: <https://www.epi.org/resources/budget/>; United States Census. 2018. Federal Poverty Thresholds. Available at: <https://www.census.gov/data/tables/time-series/demo/income-poverty/historical-poverty-thresholds.html> 5. Ahn, S., Norwood, F., and Smith, T. 2018. "Can Internet Surveys Reliably Measure Food Security Rates?" Working Paper. Department of Agricultural Economics. Oklahoma State University; Coleman-Jensen, A., Rabbitt, M., Gregory, C., and Singh, A. 2018. Statistical Supplement to Household Food Security in the United States in 2017. Economic Research Service. United States Department of Agriculture.; (USDA) United State Department of Agriculture. February 5, 2015. Supplemental Nutrition Assistance Program (SNAP)—Outreach. Accessed November 15, 2018 at <https://www.fns.usda.gov/snap/outreach>.

3.1 Cost Savings

The first objective of this study is to determine the cost savings food pantry users acquire when receiving food assistance from ODB. This cost savings is estimated by first determining households of different types' expected annual visits to ODB using demographic data provided by ODB from the Charity Tracker system. Next, calories acquired by different household types are determined through primary data collection during shopping sessions at ODB. Then, the dollar value of calories is estimated from a working paper reviewing SNAP household behaviors concerning food required and acquired (Ates and Holcomb, 2019). Calories acquired by household types is combined with the dollar value of calories to determine the estimated cost savings per visit for different household types. Finally, combining the expected number of visits and the estimated cost savings per visit, the annual cost savings by household type can be determined.

3.2 The Needs-Gap

The second and third objectives of this study are used to estimate the needs-gap, or the lack of acquired income needed to meet a household's basic needs. The second objective, estimating the average income of different household types who use food pantries, is achieved through the combination of two surveys and SNAP data. The third objective of estimating the income required by these household types to meet their basic needs is achieved through two methods. The first method uses data sourced from the Economic Policy Institute's (EPI) Family Budget Calculator, providing households' estimated costs

of basic needs by geographic location. This is considered the preferred measure of basic needs because the items comprising “needs” are transparent as is the methodology. The second method uses federal poverty thresholds as a representation of income required to meet basic needs nationally. Federal poverty thresholds are provided largely as a means of comparison, as the US Census Bureau does not explicitly state what are considered basic needs and thus their individual costs but, has the more *ad hoc* interpretation of being three times the cost of a minimum food diet (Institute for Research on Poverty, n.d.). Poverty thresholds are considerably less than the EPI’s costs of basic needs, and may be useful for readers who feel the EPI’s calculations encompass some amenities that are not “needs”. Finally, the needs-gap is estimated by determining the difference between income acquired and required, unless the gap is negative, in which case it is set to zero.

3.3 Need-Gap Met Through Food Assistance

The final objective of this study is achieved through applying the annual cost savings ODB households received to their estimated needs-gap, resulting in the percentage of the needs-gap met through food assistance from ODB. For example, if the needs-gap is \$10,000 and the ODB provides \$1,000 worth of food relief annually, the needs-gap has changed by $(9000/10000) - 1 = -0.1$, which can be interpreted as a 10% of the needs-gap met through food assistance.

CHAPTER IV

DATA

In order to fulfill this study's research objectives, data is compiled from multiple primary and secondary data sources. Detailed descriptions of each data set and the respective sources are as follows.

4.1 Demographics

Due to the variety of types of households who seek food assistance from ODB and the value of the assistance received varying across these types, this study first analyzes the demographics of ODB clients and their respective households to provide a profile of these different household types.

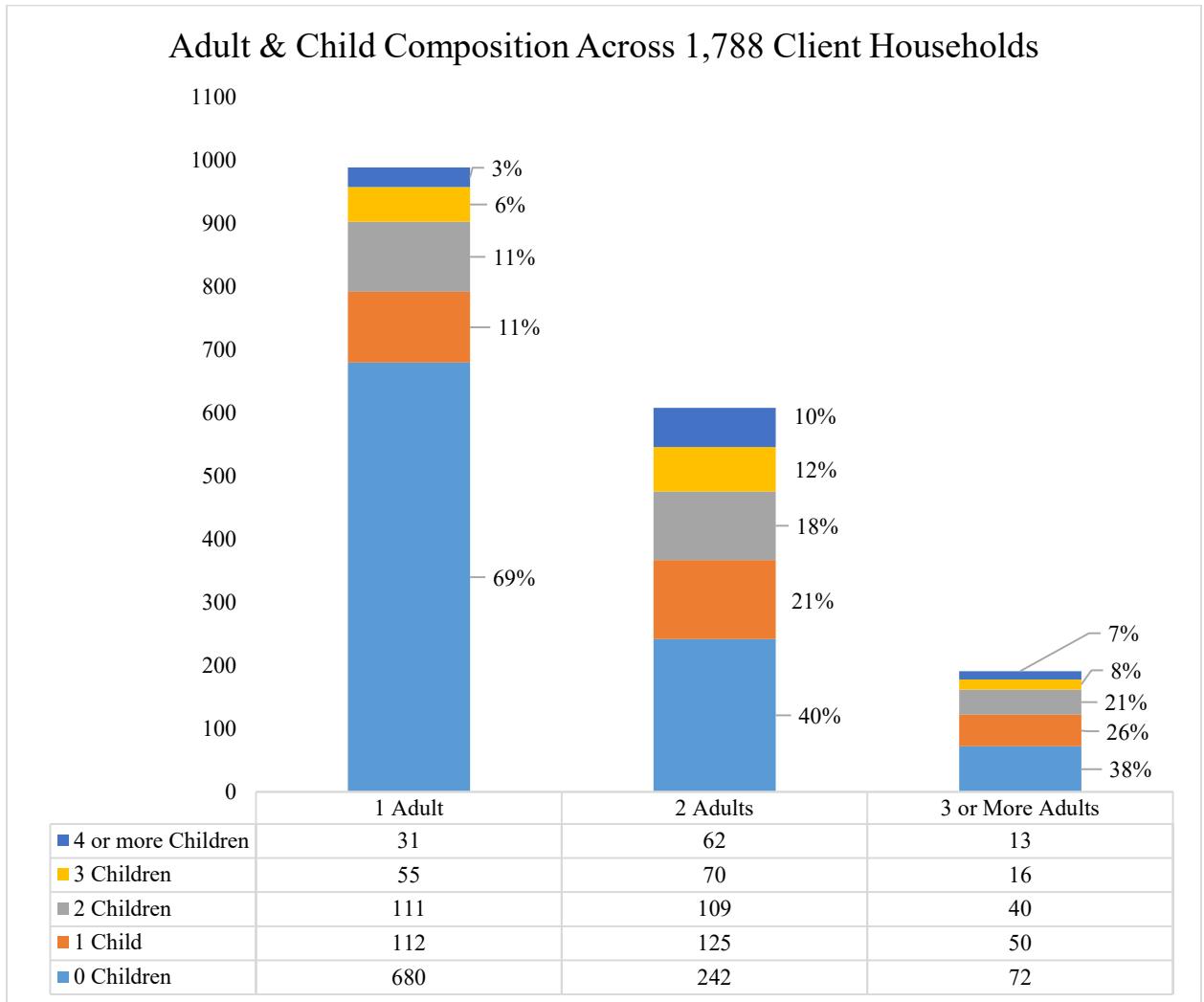
Demographics of 5,833 clients within 2,364 households were obtained through data from the Charity Tracker system employed by ODB management. This system enables ODB intake-volunteers to input household information during the intake process. This comprehensive system records information for all members of a household including age, gender, education, ethnicity, employment status, marital status, government benefits received, and housing status. Household size and address is verified through the presentation of all household members' IDs upon initial intake. However, the

demographical information such as individuals ages, employment status, etc. is entered by several volunteers who may or may not diligently pursue this information, thus the completeness of every entry varies. The most common example of this is the verified household size not equal to the sum of people in different age groups across the household (e.g. a household with a verified size of five members yet ages are listed for only two members). This limitation in the data set is addressed by only using households with complete demographic information where the sum of members across age groups is equal to the household's verified size. By removing 113 households where the sum of members across age groups do not equal verified size we are able to assume the remaining 2,251 households' demographics to be accurate. It is impossible to determine how the validity of this data is impacted by the removal of these households as these households did not provide complete information, meaning there was no valid information regarding them to begin with. Due to inability to interpret household demographics such as gender, ethnicity, education and marital status at the individual level, these demographics have been omitted from the analysis.

4.1.1 Household Composition

Of the 2,215 households used for demographical analysis, 1,788 contained at least one adult while 427 households did not contain an adult (composed of elderly people with or without children). This study will focus on households with at least one adult as the source used to estimate the cost of basic needs provides estimates for adult-households with or without children. *Figure 2* examines the 1,788 ODB households containing adults, categorizing households by adult and child composition.

Figure 2



Source: 1,788 households containing adults.

For the simplicity of interpretation, households are categorized by the number of adults: 1-adult; 2-adult; and 3-or-more-adults. For each adult category the percentage of households for each child category is inversely related to the number of children, with the majority of households not having any children. Following a similar trend, as household size increases the number of households decreases with 1-adult, no children households accounting for 680 households and 3-or-more adult, 4-or-more-children households accounting for only 13 households.

4.1.2 Households with Children

This section will provide an in-depth examination of the characteristics of households which contain children. Of the 2,215 households, 37% contain children and for clarity, households are categorized by the number of adults in each household: 1-adult; 2-adults; and 3-or-more-adults.

Table 1: Number of Children in Households, 2018

Adults in HH	Avg # of Children in all HHs	Avg # of Children in HHs with Children	Median	Max	Standard Deviation	Total Number of HHs	HHs with children	Total Number of Children
1	0.27	2.05	0	6	0.79	989	309	632
2	0.35	2.28	0	10	0.98	608	366	836
3 +	0.10	2.01	0	7	0.52	191	119	239
Total						1,788	794	1,707

Source: 1,788 households containing at least one adult with 794 households containing at least one adult and one child.

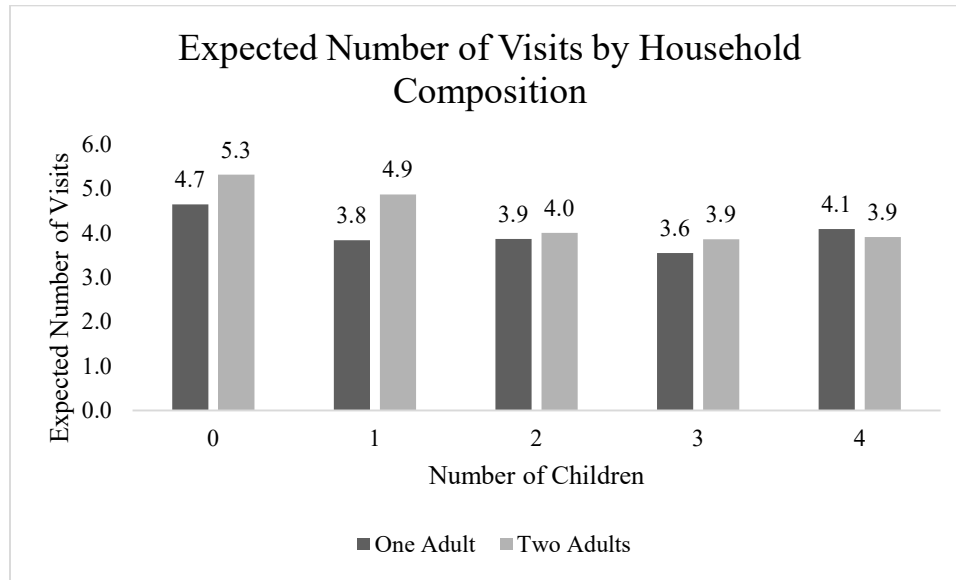
Table 1 shows the distributions of children across the 3 types of household breakdowns by number of adults. The average number of children for all households in each adult category is less than one, with the number increasing for 2-adult households but then decreasing for 3-or-more adult households. As for households containing children, the average number of children in all three adult categories is almost two, with the number following the same pattern of increasing with 2-adults but then decreasing with 3-or-more adults. One-adult households with children, which are assumed to be single parents, account for 42.6% of the households with children and 10% of all households. This can be interpreted as 1 out of every 10 households and 2 out of every 5

households with children are single parent households. The largest number of children in a single parent household was six children, observed in only one household. 2-adult households with children account for 41.2% of households with children and 9.7% of all households. The highest number of children observed in 2-adult households was one observation with 10 children. Households with children and three or more adults make up the remaining 16.2% of households with children and only 3.8% of the total households. The highest number of children observed in 3-or-more-adult households was seven children, observed twice.

4.2 Expected Number of Visits

The cost savings ODB provides clients is calculated based on the average number of visits for a household, so it is necessary to determine the expected number of times households of different types visited ODB in order to estimate the value of the assistance they received. Using demographic data discussed above, and removing households with more than two adults, the following expected number of visits for different household types was estimated as shown in *Figure 3*.

Figure 3



**Estimated using household visits from September 2017 to August 2018.*

The graph shows that households with two adults have higher number of expected visits than one-adult households, except for households with four children, where one-adult, four-children households had a slightly higher expected number of visits than two-adult, four-children households. Households with no children had higher expected number of visits than any type of household with children and for these childless households, those with two adults visited more than those with one adult.

The variation in these expected number of visits can be explained by a variety of factors including the burden of childcare, conflicting work schedules, and alternate food assistance for children such as free or reduced-price lunch. In one-adult households with children, the sole adult may not be able to visit ODB perhaps due to the costs or availability of childcare. Two-adult households with children share the responsibility of childcare between two individuals, increasing the chances of being able to visit ODB. Another possible explanation of reduced visits for one-adult households versus two-adult

households are work schedules. The adult in a one-adult household may have a work schedule which conflicts with the days and times ODB is open. A conflicting schedule would result in the adult having to alter their schedule to visit ODB thus resulting in a reduced number of visits. Two-adult households may be able to trade off altering work schedules allowing more visits to ODB. As for all households with children, expected number of visits may be lower than childless households as these children could be receiving free or reduced-price lunch at school, therefore their parents would not feel the need to seek additional food assistance from a food pantry as often.

The table shows that all household types seek food assistance less than 5 times a year even though they are allowed to receive food assistance 12 times a year (once every 30 days). This is important to note as it was found that only 9% of all the households which visit ODB seek food assistance every month, meaning 91% do not visit every time they are eligible. ODB's goal in providing food assistance is to be an emergency food source in times of financial distress, not to become a source of food which households depend consistently.

4.3 Calories Acquired

Data was collected at ODB over the course of more than 100 hours across 37 observation periods from March 2018 – August 2018. Each observation period took place during a shopping session and was devoted to observing 1 of the 16 different food categories: cereal, canned vegetables, beans, protein, soup, flex, canned fruit, rice and pasta, crackers, beverages, bread, refrigerated items, frozen items, produce, sweets, and extra “freebie” items.

Figure 4



Collection of Caloric Acquisition Data at Our Daily Bread

During each observation period, a team of one to three researchers recorded nutritional information of all available food items in the specific food category along with the selections of these items classified by household size. While the main objective of this study is to examine calories acquired, data on all nutritional information was collected to be available for use in other studies. The majority of the food items had nutritional labels and for all items with nutritional labels, the items' weights, serving sizes, servings per containers, calories, total fats, sodium, total carbohydrates, sugars and

protein were listed. The majority of labels also included calories from fat, saturated fat, trans fat, cholesterol, and dietary fiber. Few labels listed potassium and soluble fiber.

While most categories contained items with nutritional labels, the majority of items in the produce and freezer sections lacked nutritional labels (*e.g.* loose potatoes, bananas, frozen meats, etc.). When items lacked a nutritional label, the average weights of the items were measured and nutritional information was determined using the USDA Food Composition Databases. All items with estimated nutritional values can be found in the appendix.

Throughout the course of the study, each food category was observed twice. Fridge and freezer food categories had more than two observation periods devoted to each due the complex nature of recording nutritional information and selections of all the items in those categories. For those two categories, observation periods were devoted to half of the category or less, resulting in a total of four observations for the fridge category and five for the freezer category. The data collected contain nutritional information for 1,099 food items and the selections of 2,031 households across the 16 food categories

Clients' selections were recorded by their household size rather than household composition due to the nature in which ODB operates. Item allowances for each food group are set by ODB based on household size. Allowances within each food group for different household sizes are provided in the appendix. ODB uses this method to allow larger households to acquire a larger quantity of food items than smaller households.

Household sizes observed ranged from 1 to 11 people. However, this study will focus on households ranging from one to six people as 6-person households are the

largest household size for which item allowances are set by ODB and the largest household size EPI provides the cost of basic family needs. At ODB, for households larger than six people, adjustments are made to the number allowances by combining allowances from smaller household sizes, thus these numbers are not always consistent across sessions. An example of this is a 7-person household having the ability to have its allowance set by combining allowances for a household of three and a household of four or combining allowances for a household of two and a household of five. These two combinations would result in varying quantities of allowed food items for a household of this size and would be at the discretion of the ODB volunteer shopping with the household, leading to inconsistency across observation periods. Our small sample size for household sizes greater than six would also introduce bias into our analysis and for these reasons combined, data for households of more than six people have been omitted from this study.

To determine total calories acquired by different ODB household sizes, the sum of calories acquired across all food groups for each household size is estimated. Due to the distribution of household sizes observed each observation period varying and thus effecting their respective number of selections, a weighted average equation is used. The following weighted average equation is used for each food category, c , where $c = 1, 2, \dots, 15$, or 16, for each household size, s , where $s = 1, 2, \dots, 5$, or 6.

$$(1) WACAL_{c,s} = \frac{\sum_i CALORIES_i * SELECT_{i,s}}{\sum_i SELECT_{i,s}}$$

where $WALCAL_c$ is the weighted average number of calories acquired in food category c ; $CALORIES_i$ is the number of calories for food item i ; and $SELECT_i$ is the number of times food item i was selected.

The allowed quantity of food items in each food category varied not only by household size but also by the supply of donations of food to ODB. For example, clients can usually only obtain two items from the bread aisle, but when bread donations are unusually large clients may be allowed three items. Due to this variability of items selected across household sizes for any given shopping session, the following equation is used to find the average quantities per food category per household size.

$$(2) Q_{c,s} = \sum_i \frac{SELECT_{i,c,s}}{HH_{c,s}}$$

where Q_c is the average number of food items taken home from food category c ; $SELECT_{i,c}$ is the number of selections of food item i made in food category c ; and HH_c is the number of households making selections in food category c . Combining the previous formulas to determine the estimated weighted average calories taken home by each household size, s , the following equation is used

$$(3) TOTALCAL_s = \sum_c (WACAL_{c,s} * Q_{c,s})$$

where $TOTALCAL_s$ is the total calories acquired from a shopping session for household size, s . These equations yield the estimated weighted average number of calories acquired per visit by each household size shown in *Table 2*. An exception to these equations is made for 6-person households for which there were no recorded observations of caloric acquisitions for two of the sixteen food categories, bread and rice/pasta. To estimate the calories acquired by 6-person households in these two categories the average percentage increase in calories acquired by 6-person households, relative to 5-person household was determined for all food categories with the same quantities allowed, dropping the flex category as 5-person households could acquire five items versus 6-person households

who could acquire six items. These estimated values are then included in the sum of total estimated calories acquired by 6-person households.

One would expect the amount of calories acquired to increase with household size, and per the values in *Table 2*, the amount of calories does increase with household size, with the exception of 4-person households, who acquire the least amount of calories. The reason for this anomaly is unknown, but may perhaps be explained by the tastes and preferences of the households observed. Keep in mind that as household size increases, that could be due to more adults, more children, or both, so perhaps a four-person household represents a peculiar combination of adults and children that lead to the selection of lower-calorie items.

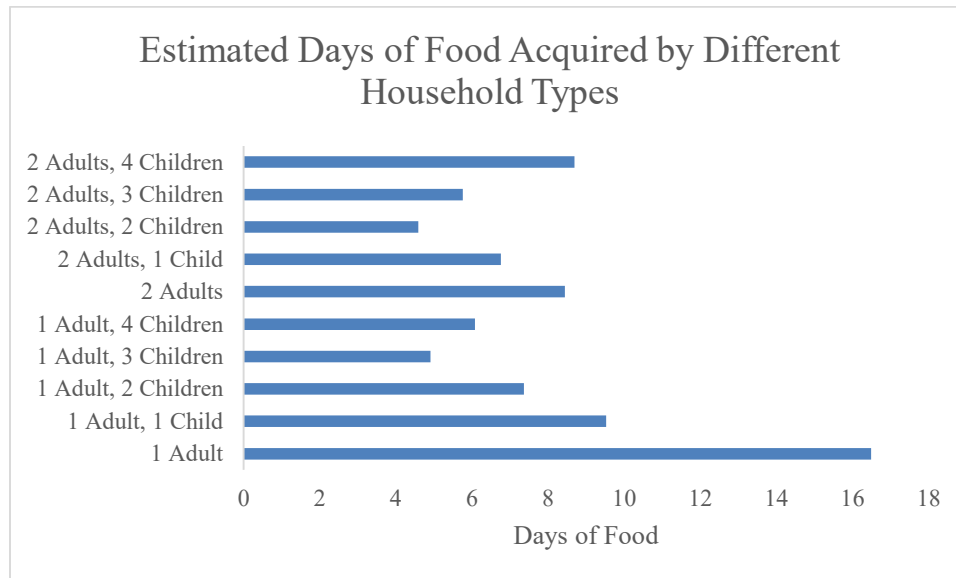
Table 2: Households Average Caloric Acquisitions from Our Daily Bread per Visit During 2018

Household Size	Weighted Average Calories	Number of Households	Number of Selections
1	39,576.88	762	3,374
2	40,491.01	475	2,154
3	44,919.38	331	1,543
4	39,012.67	254	1,148
5	59,577.06	132	805
6	106,019.50*	77	439

Source: 9,462 selections across 16 food categories made by 2,031 ODB households. *Value for 6-person household includes estimated caloric acquisitions for two food categories due to lack of observations.

To illustrate the amount of food these calories represent, consider that a single adult will consume about 2,400 calories and a child will consume about 1,850 calories each day (Center for Disease Control, 2003). Given a single-adult household acquires 39,576.88 calories per visit to ODB and consumes 2,400 calories per day, this household is expected to receive 16.49 days' worth of food. A two-adult household, however, will only acquire 8.44 days' worth of food as they acquire 40,491 calories but consume 4,800 calories a day combined. A larger household, for example one with two adults and three children, will leave with 5.75 days' worth of food as they acquire 59,577.06 calories but consume about 10,350 calories a day. *Figure 5*, below, provides a visual representation of the estimated days of food acquired across all household types.

Figure 5



Source: Assumed adults consume 2,400 calories per day and children consume 1,850 calories per day (CDC, 2003).

4.4 Value of Calories

ODB does not have price labels on their food, which presents the need to acquire caloric dollar values from external sources. Three data sources are examined and each have a range of limitations. Two academic sources include a journal article relating costs of US and their nutritive value, and a paper examining the nutrients required and acquired by SNAP eligible and ineligible households. An additional data source from an online forum is discussed for justification.

The three sources are as follows.

- I. A study by Drewnowski, A. (2010) using nutritional data from the USDA Food and Nutrient Database for Dietary Studies and price data from the Center for Nutrition Policy and Promotion to determine the relationship between energy density (kcal) and price within food groups. The energy density and price relationship was examined for 1,387 products categorized into nine food groups.
- II. A paper by Ates and Holcomb presented at the Southern Agricultural Economics Association 2019 annual meeting which used USDA FoodAPS survey data regarding food purchases and acquisitions to determine the nutrients required and acquired for SNAP eligible and ineligible households. The focus of the study limits data to food-at-home acquisitions rather than including acquisitions of food from outside sources such as restaurants. Data used in the study includes only SNAP eligible food purchases, restricting the sample to 4,367 households making 15,205 trips to grocery stores and purchasing 138,305 food products. To meet the needs of our study, dollar value per calorie was estimated by dividing total monthly household food-at-home expenditure on SNAP eligible food products by

the average household nutrients (calories) acquired from SNAP eligible food products. The strengths of this study as compared to ours is the focus on SNAP eligible food products which mimic our data regarding food products available at ODB. SNAP dollars cannot be used to buy alcohol, tobacco or nonfood items. The data used in our study only includes food products, and ODB does not distribute any kind of alcohol or tobacco product.

- III. The third source is an article by Kirk, M (n.d.) on an online forum where he determined the calories per dollar and protein per dollar for 106 grocery food items. While this article does not show any statistical validity, and there is a lack of information on the data's exact sources, it is used as a reference point for the previously mentioned sources.

Using sources discussed above, the calculated values for US dollars per 1000 calories are shown in *Table 3*.

Table 3: Average US Dollar per 1000 Calories: Data Sources and Estimates

Source	\$/1000 calories	Food Products (n)	Data Source
I. Drewnowski, A. “The Cost of US Foods as Related to Their Nutritive Value.”	2.800	1387	USDA Center for Nutrition Policy and Promotion
II. Ates, A. and Holcomb, R. “Nutrients Required and Acquired: An Overview of SNAP Eligible and Ineligible Household Behaviors.”	2.196	138,305	USDA
III. Kirk, M. “Calorie Per Dollar List – Eat for 21 Dollars a Week.”	1.807	106	Personal Data

As shown in *Table 3*, data from Ates and Holcomb’s study is superior due to largest sample size in addition to the data source. Its value does not raise any concerns, as it lies between Drewnowski’s and Kirk’s estimates. Therefore, for these reasons combined, Ate’s estimate of \$2.196 per 1,000 calories will be used to estimate the monetary value of the food acquired from ODB.

4.5 Income Required to Afford Basic Needs

While poverty thresholds are commonly sought out as measures of economic deprivation in society, they do not accurately depict a broader measure of economic welfare. In response to this, organizations have developed the Basic Family Budget and the Basic

Needs Budget (Economic Policy Institute, 2018; National Center for Children in Poverty, 2009).

The Basic Family Budget, developed by the Economic Policy Institute, EPI, and used in several studies, represents a family's pre-tax income required to attain a modest yet adequate standard of living in their community (EPI, 2018; Groves et al., 2018; Koball and Jiang, 2018). The budget is updated annually and estimates geographic-specific costs for household sizes ranging from one or two adults with zero to four children. By adjusting for household composition, the budget has a comparative advantage over poverty thresholds as this budget associates different costs with adults and children, unlike poverty thresholds which are determined by the number of people in a household, with children having equal costs as adults. Moreover, the poverty threshold does not actually refer to the costs of acquiring a specific set of goods and thus is not used to measure the amount of money needed to acquire basic needs but, is instead a standard for measuring how the number of households with very low incomes change over time.

Geographic location plays an important role in the determination of the family budget due to varied costs of living across the United States. This addition of geographic location gives a comparative advantage over poverty thresholds, as the poverty threshold is determined on a national level (except for adjustments to the states of Alaska and Hawaii).

In order to utilize the budget, the EPI has developed the Basic Family Budget calculator, a free online budget tool using the following methodology to calculate the cost of each basic need (Gould, Mokhiber and Bryant, 2018):

- **Housing:** It is assumed families with one or two children reside within two-bedroom apartments and families with three children reside within three-bedroom apartments.
- **Food:** costs are based on the “low-cost plan” provided by the USDA’s food plans which represent the cost of achieving nutritionally adequate diets.
- **Transportation:** expenses are calculated based on the cost of owning and operating a car for commutes to work and other necessary trips.
- **Child care:** based on costs of center-based and family-based child care for 4-year-olds and school age children assuming all urban areas use center-based care and rural areas use family-based care.
- **Health care:** calculated from a weighted average of costs of insurance for employer-sponsored and non-group programs in addition to out-of-pocket medical expenses.
- **Other necessities:** costs of clothing, household supplies, school supplies and other miscellaneous items.
- **Taxes:** include federal personal income taxes, state income taxes, local income or wage taxes and Social Security and Medicare payroll taxes.

An alternative budget, the Basic Needs Budget developed by the National Center for Children in Poverty, NCCP, is modeled after the EPI’s basic needs budget with slight modifications, such as including the age of children and employment status of adults to determine child care costs (Dinan, 2009). Unlike the EPI’s Basic Family Budget where costs can be calculated for any county, state, or metro area in the in the US for the most recent year, the NCCP’s Basic Needs Budget is limited to 20 states with a handful of

counties within each state and the majority of the data is outdated. While the improved estimates of childcare cost could prove to be beneficial to this study, the outdated data and inability to select any geographic region the user needs pose limitations and thus the EPI’s Basic Family Budget provides the highest level of utility for this study. However, it is important to consider that EPI is one of few organizations which devote time and resources to estimating the costs of living, and thus may be more liberal in their estimates.

An example of the EPI’s Basic Family Budget estimations in two geographic-specific locations is shown in *Table 4*.

Table 4: Pre-tax Income Required by a Two Adult, Two Child Household to Meet an Adequate Yet Modest Standard of Living in Payne County, Oklahoma Versus the Washington, DC Metro Area

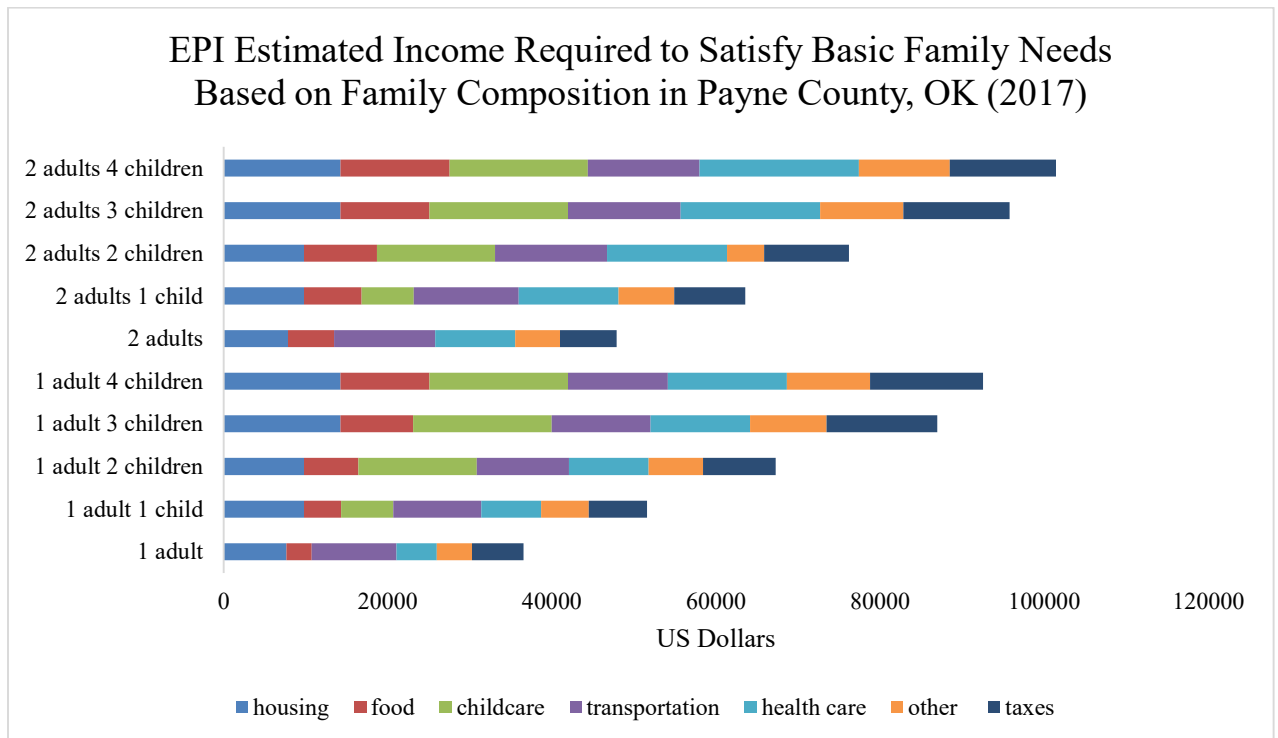
Budget Items	Payne County, OK	Washington, DC metro area
Housing	9,780	20,313
Food	8,895	10,300
Child Care	14,407	21,143
Transportation	13,649	13,376
Health Care	14,603	11,108
Other Necessities	7,534	12,350
Taxes	10,331	16,950
Total	\$ 76,199	\$105,539
Percentage of Poverty Threshold	310%	429%

Source: Economic Policy Institute, Basic Family Budget Calculator. Payne County, Oklahoma and Washington, DC metro area, 2017; ASPE US Federal Poverty Guidelines, 2018.

As shown in the table, geographic location is a key factor in estimating the level of income required to satisfy a family’s basic needs. All budget items except for healthcare are higher in the Washington, D.C. metro area compared to Payne County, Oklahoma with the most significant differences being the cost of housing, child care and taxes. The drastic differences in in the cost of basic family needs further justifies the importance of geographic location when estimating a household’s required income in this study.

To further illustrate the costs of basic family needs, *Figure 6* depicts the various budget line components of income required by households of different types in Payne County, Oklahoma.

Figure 6



Source: EPI Basic Family Budget calculator; Payne County, Oklahoma 2017.

This graph illustrates how the cost of basic needs increases with each additional child and adult. Childcare costs increase rapidly with the addition of the first, second and third child, leveling off with the fourth child. A one adult, childless household requires \$36,538 annually while a one-adult, one-child household requires \$51,608. The most significant increase in costs are child care; for a household with one child, regardless of the number of adults, is estimated to be \$6,355 increasing to \$16,884 for a household with 4 children. However, the most significant increases in costs to note are the increases in healthcare and food costs. These costs increase at a linear rate with every additional child increasing the budget by an average of \$1,927 for food and \$2,409 for healthcare. The costs of food range from \$3,080 for a childless one-adult household to \$13,291 for a two-adult, four-child household. The costs of healthcare range from \$4,892 for a childless one-adult household to \$19,422 for a two-adult, four-child household. Overall, each additional adult increases the annual costs of basic family needs by an average of \$11,367 and each child increases the costs by an average of \$13,691.

An alternative measurement of the income required by households to meet their basic needs are federal poverty thresholds issued by the United States Census Bureau. Federal poverty thresholds are adjusted annually for price changes using the Consumer Price Index (CPI-U) and are not (with the exception of Alaska and Hawaii) based on geographic location. The Census Bureau states that while poverty thresholds reflect a family's need, they are not a complete description of what families need to live (United States Census Bureau, 2018) and thus are not representative of the complete cost of a family's basic needs as its specific calculation simply involves tripling the amount of money it requires to consume one's basic food needs. Nonetheless, federal poverty

thresholds are available for each household type described in this study and may provide a more conservative estimate of income required than the EPI’s Family Budget Calculator. Poverty thresholds for 2017 are provided in the *Table 5*.

Table 5: Federal Poverty Thresholds, 2017

	1 Adult	2 Adults
0 Children	\$12,490	\$16,493
1 Child	\$16,414	\$19,730
2 Children	\$19,749	\$24,858
3 Children	\$24,944	\$29,253
4 Children	\$28,805	\$32,753

Source: United States Census Bureau Federal Poverty Thresholds, 2017.

4.6 Income Acquired

Although ODB does sometimes ask its clients about their estimated household income, it is not an information item pursued diligently and thus this information is missing for most households. Unlike SNAP recipients, who must prove their income, ODB clients must only state that their income falls short of a threshold relative to their household size. As an alternative to the ODB income data, one internal source and two external sources are used to estimate the distributions of household income for ODB households.

Three sources are used because there is no one superior data source for the incomes of people using food pantries. Two of these sources rely on survey data which relies on stated annual incomes. A limitation within these sets of survey data is the possibility that many respondents do not know their precise actual household income and

may unknowingly provide misleading numbers. A third source verifies household incomes and thus the numbers are backed by evidence, but some respondents may not reveal all of their income sources and this source is not necessarily representative of all food pantry clients.

The three sources are as follows:

- I. An internet survey administered by Ahn, Norwood and Smith (2018) which measured households' food security status as well as the use of food pantries. The survey was administered to more than 1,000 Oklahomans in June of 2016 and December of 2017, providing 300 observations of food pantry users.
- II. The food security survey administered annually by the US government as part of its Current Population Survey (CPS), is analyzed by the USDA's Economic Research Service (ERS), and is thus referred to as the ERS data. This survey is useful because it uses a true random sample where each member of the US population has an equal probability of being selected for the survey, thus making it representative of the US population. Though the CPS is administered monthly, only in December does it measure food security using a carefully designed and rigorously tested questionnaire, allowing researchers to categorize households as having high levels of marginal food security, low food security, or very low food security (Bickel, *et al*, 2000). However, the survey does not include enough Oklahomans in one year, so the sample used includes all Midwesterners in non-metropolitan areas from 2012 – 2016 to better represent food pantry users in Payne County, OK. This resulted in a total of 559 observations of food pantry users. The benefits of the ERS data are that they use an ideal sampling method

and that when applied to these years and regions a large number of observations are available. They also contain detailed information about household size. The limitation is that there is a limited number of Oklahoma respondents in any one year and the income data are stated figures.

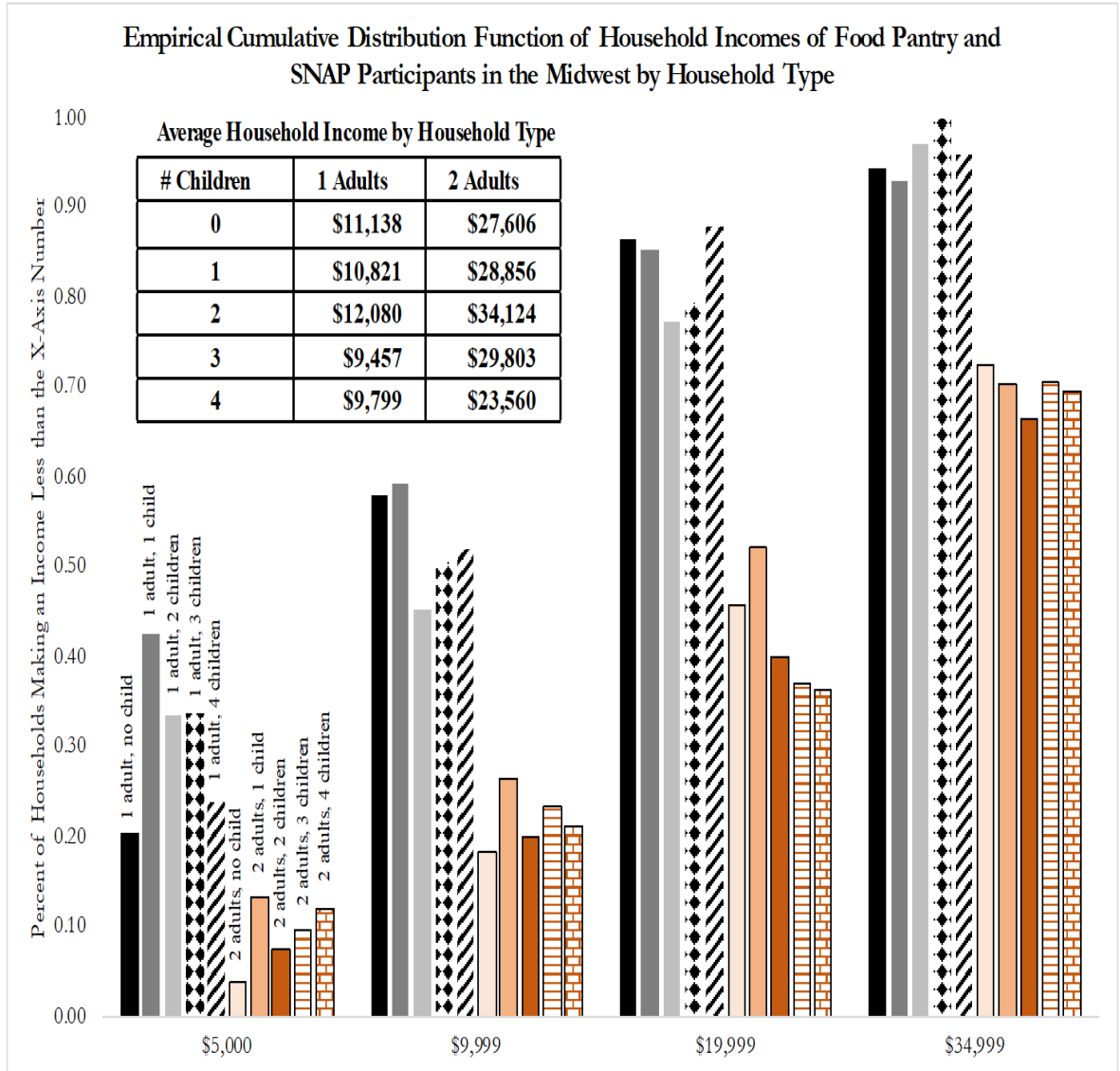
III. The Supplemental Nutrition Assistance Program Quality Control Database provides the incomes of household who obtain Supplemental Nutrition Assistance Program (SNAP) benefits and can thus be considered food insecure. 2016 data for Oklahoma recipients includes 1,034 observations. These data are referred to as SNAPQC data. These data have the useful feature that reported income is verified by SNAP through check stubs, employer statements, child support agreements, and the like (USDA, 2015). Of course, a recipient could voluntarily not report some income sources. While this sample is less representative of the ODB population, as only about 34% of ODB households obtain SNAP benefits, it has the advantage of having more objective measures of household income and provides information of household size and number of children.

The three samples were combined to form one dataset used to acquire an empirical cumulative income distribution for the ten different household types used in EPI budgets, *e.g.* households with up to two adults and four children. Once households of other types were eliminated (*e.g.* households with more than two adults and/or more than four children) a total of 1,692 observations remained. An empirical cumulative distribution function (CDF) was created by first identifying the following income thresholds: \$5,000; \$7,499; \$9,999; \$12,499; \$14,999; \$24,999; \$14,999; \$24,999; \$29,999; \$34,999; \$39,999; \$49,999; \$59,999; \$74,999; and \$99,999. Once thresholds were identified, the

percent of each type of household with an income below each threshold was calculated.

An illustration of this CDF for select income thresholds is shown in *Figure 7*.

Figure 7



There are patterns of income to note, including how income varies for households with and without children. For households with one adult and no children, 20% have an income less than \$5,000, almost 60% have an income less \$9,999, and nearly 90% have

an income less than \$19,999. The percentage of households falling below these thresholds increases significantly for one-adult, one-child households. One-adult, one-child households have lower percentages than one-adult childless households for the \$19,999 and \$34,999 thresholds, meaning one-adult, one-child households are less likely than one-adult, childless household to earn incomes below those thresholds. The graph shows that 90% of one adult households with or without children lie below the \$34,999 threshold and nearly 90% lie below the \$19,999 threshold. Households with two adults follow a similar pattern as those with one adult, as households with children are more likely to fall below the thresholds than households without children except for the \$34,999 threshold where households with no children have a slightly higher percentage of households lying below the threshold than household with children. These results show that households with adults and no children have a higher income than adults and children, with the biggest decrease in income appearing for households with one child.

The figure also shows the average income for each household type, calculated as the areas between the CDF and the value of 1 across all income thresholds, as shown in the embedded table. Both adult household types (*e.g.* one adult with or without children and two adults with or without children) exhibit a pattern of households with two children having the highest average income and four children having the lowest average income. One-adult, two-children households have the highest average income across all one-adult households with an average income of \$12,100 and one-adult, four-children households have the lowest average income of \$9,799. Two-adult, two-children households have the highest average income across all household types with \$34,124 and two-adult, four-children households have the lowest across two-adult households with \$23,560.

CHAPTER V

FINDINGS

The compilations of the aforementioned data lead to several findings, which in turn are combined to meet the final objective of this research study. Each finding building up to the fulfillment of the final objective are described as follows.

5.1 Cost Savings

A component necessary in estimating the needs-gap met by ODB is the amount of money ODB households save on average each visit. The cost savings is determined using data regarding calories acquired by ODB households and the monetary value of these calories. Both data components have been estimated and discussed previously. The following equation is used to calculate cost savings.

$$(4) \text{CSAVE}_s = \frac{\text{TOTALCAL}_s}{1000} * \$2.196$$

where CSAVE_s is the US dollar amount of money saved by household size, s ; and TOTCAL_s is the weighted average total calories acquired by household size, s . Using

this equation, the estimated cost saving per household type is presented in the *Table 6*, below.

Table 6: Cost Savings Based on the Value of Calories Acquired by Households of Different Sizes per Visit to ODB

Household Size	Cost Savings
1	\$86.89
2	\$88.90
3	\$98.62
4	\$85.65
5	\$130.81
6	\$232.82*

** 6-person household cost savings use estimated caloric acquisition data*

The cost savings ODB users receive show that as household size increases, the cost saving increases with the exception of 4-person households who acquire the least amount of calories. The savings cost is directly correlated with the amount of calories acquired and with households of larger sizes acquiring large amount of calories they received a higher cost savings.

5.2 Monthly Food Budget Cost Savings

To illustrate the extent to which cost savings from food assistance alleviates households' financial burdens, it is important to estimate the percentage of different types of households' monthly food budgets met though the aforementioned cost savings. The following table presents different households' EPI estimated monthly food costs, their respective cost savings received through food assistance and the percent of their monthly food costs met by their cost savings.

Table 7: Percent of Monthly Food Costs Met Through Cost Savings Received from Our Daily Bread Food Assistance

Household Type	Monthly Costs of Food	Cost Savings Received Through ODB Food Assistance	Percent of Monthly Food Costs Met by ODB
One Adult, No Children	\$256.67	\$86.89	34.85%
One Adult, One Child	\$378.42	\$88.90	23.49%
One Adult, Two Children	\$553.67	\$98.62	17.81%
One Adult, Three Children	\$738.92	\$85.65	11.59%
One Adult, Four Children	\$904.42	\$130.81	14.46%
Two Adults, No Children	\$470.58	\$88.90	18.89%
Two Adults, One Child	\$585.75	\$98.62	16.84%
Two Adults, Two Children	\$741.25	\$85.65	11.55%
Two Adults, Three Children	\$905.17	\$130.81	14.45%
Two Adults, Four Children	\$1,107.58	\$232.82*	21.02%

**Cost savings for 6-person households use estimated caloric acquisition data.*

EPI estimated monthly costs of food range from \$257 for a one-adult, no child household to \$1,108 for a two-adult, four-child household. With households able to visit ODB once a month (every 30 days) and depending on size receive \$87 - \$233 in cost savings through food assistance every trip, households can expect to have 11.55% - 34.85% of their monthly food costs met through ODB's food assistance. As ODB's goal in providing food assistance is to help households facing temporary financial crises (i.e. loss of a job, unexpected increase in bills, etc.) these cost savings allow households to allocate funds otherwise spent on food, to other areas of their budget.

5.3 Needs-gap

Using expected income data for food pantry users shown previously in *Figure 7*, compared to estimated income required to meet basic family needs the following equations are used. Let $f_h(I_h)$ be the probability distribution function of income for household type h , and let N_h be the expenditures required for them to purchase their basic needs. The expected needs-gap for household type h can then be calculated using the following equation

$$(5) \int_0^{\infty} (N_h - I_h) f_h(I_h) dI_h = N_h - \int_0^{\infty} (I_h) f_h(I_h) dI_h = N_h - E(I_h)$$

Note that because we have an empirical cumulative distribution function, $E(I_h)$ is calculated as

$$(6) \int_0^{\infty} (1 - F_h(I_h)) dI_h$$

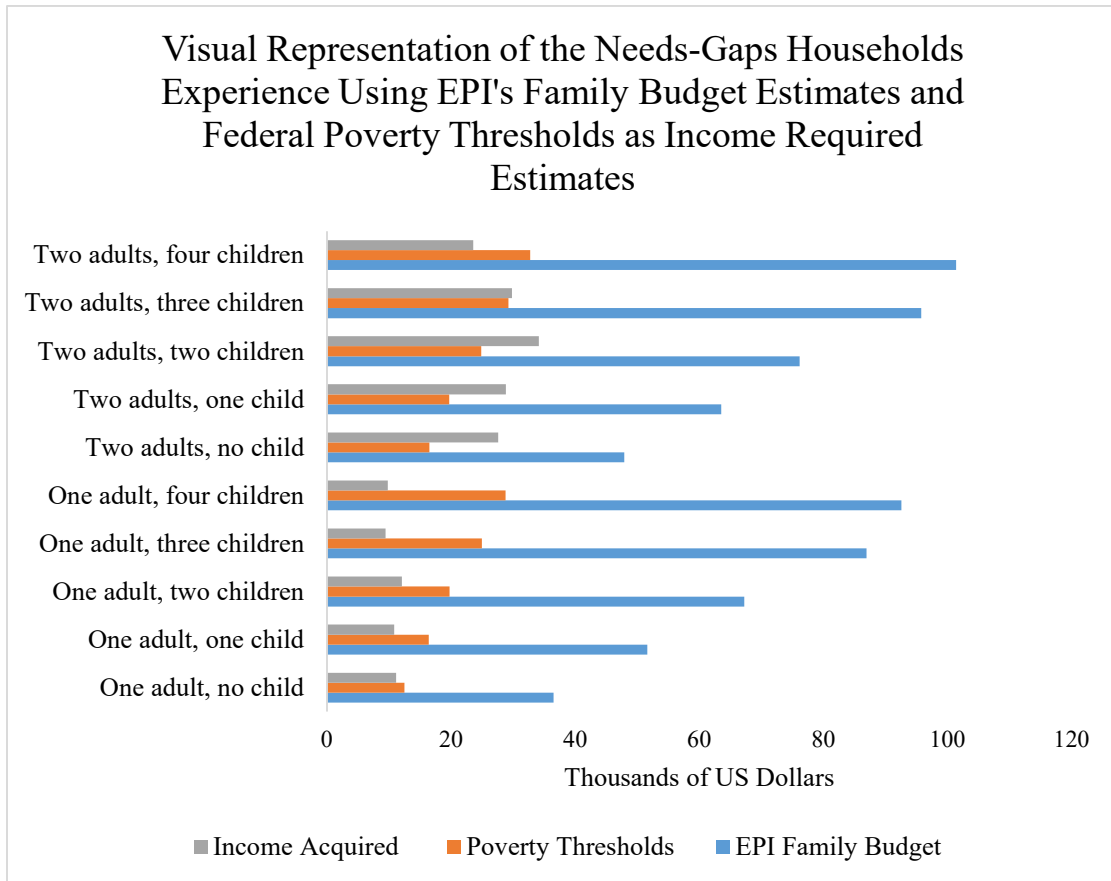
Using equations 5 and 6, above, and EPI sourced data for income required, a single adult household in Payne County, Oklahoma, whose basic needs cost \$36,538, but whose expected income is only \$11,138, has an expected needs-gap of \$25,400.27. Using the same logic, a two-adult, two-child household whose basic needs require \$76,199 in expenditures but an expected income of \$34,124 has an expected needs-gap of \$42,074.86.

In order for these households to meet EPI's basic family needs standards, the two-adult, two-child household must increase their incomes by at least 123% and the childless two-adult households must increase their income by 228%. While these increases in incomes may seem unattainable by most, it represents the hardships poverty-stricken families face.

Using federal poverty thresholds as a measurement of income required in lieu of EPI estimates, the following results are derived. A childless, one-adult household with an expected annual income of \$11,137.73 and a poverty threshold of \$12,490 experiences an expected needs-gap of \$1,352.27. A household under these conditions would have to raise their annual income by 12%

to reach the federal poverty threshold. As for a two-adult, two-child household with an expected annual income of \$34,124.14 and a federal poverty threshold of \$24,858 this household has exceeded the threshold by \$9,266.14 and thus does not experience a needs-gap. A visual representation of needs gap using the EPI’s Family Budget calculator as well as federal poverty thresholds is provided in *Figure 8*.

Figure 8



When using federal poverty thresholds for a household’s required income, four out of ten household types do not experience a needs-gap in comparison to using the EPI’s Family Budget calculator where all household types experience a needs-gap. Providing estimated needs-gaps

under both incomes required scenarios provides a range of estimated needs-gaps for households of different types.

5.4 Percentage of Needs-Gap Met by ODB Food Assistance

The main objective of this study is to determine the percentage of the needs-gap met by food assistance from Our Daily Bread. The percentage is determined using a household's expected needs-gap compared to the value of food assistance received from ODB. Using expected income acquired and required (required meaning the amount of money needed to purchase basic needs), the cost savings received from ODB food assistance, and the expected number of times households visit ODB, the following estimates of the expected needs-gap met by ODB are derived.

5.4.1 Needs-Gap Estimated Using EPI's Family Budget Calculator

The first approach to estimating the percentage of the needs-gap met through ODB assistance is accomplished using the EPI's family budget calculator to estimate the needs-gap. As acknowledged earlier, these values are representative of total basic family living costs and thus are more generous estimates as compared to federal poverty thresholds. The results of this approach are shown in *Table 8*.

Table 8: Households' Needs-Gaps Met by Receiving Food Assistance from Our Daily Bread, Using EPI's Basic Family Budgets as Estimated Income Required

Household Type	EPI estimated income required	Income acquired	Needs-gap	Cost savings per ODB visit	Maximum possible percentage of needs-gap met *	E(visits)	Percentage of needs-gap met by ODB based on E(visits)
One adult, no child	\$36,538	\$11,137.73	\$25,400.27	\$86.89	4.1%	4.65	1.59%
One adult, one child	\$51,608	\$10,821.18	\$40,786.82	\$88.90	2.62%	3.84	0.84%
One adult, two children	\$67,278	\$12,079.67	\$55,198.33	\$98.62	2.14%	3.87	0.69%
One adult, three children	\$86,965	\$9,457.20	\$77,507.80	\$85.65	1.33%	3.56	0.39%
One adult, four children	\$92,555	\$9,799.40	\$82,755.60	\$130.81	1.90%	4.09	0.65%
Two adults, no child	\$47,905	\$27,606.40	\$20,298.60	\$88.90	5.26%	5.32	2.33%
Two adults, one child	\$63,554	\$28,856.32	\$34,697.68	\$98.62	3.41%	4.88	1.39%
Two adults, two children	\$76,199	\$34,124.14	\$42,074.86	\$85.65	2.44%	4.01	0.82%
Two adults, three children	\$95,768	\$29,803.04	\$65,964.96	\$130.81	2.38%	3.87	0.77%
Two adults, four children	\$101,418	\$23,559.76	\$77,8585.24	\$232.82**	3.59%	3.91	1.17%

*Assumes households visit ODB 12 times per year.

** Cost savings for 6-person households use estimated caloric acquisition data.

Shown in *Table 8*, when it is assumed food pantry users visit ODB every allowable period, once every 30 days (12 times a year), the percentage of the expected needs-gap met by ODB ranges from 1.9% to 5.26% dependent on household composition. In order to provide a more realistic estimation of the percentage of the expected needs gap met by ODB, the expected number of visits for the different household compositions are used. This method yields a range of 0.39% to 2.33% of the expected needs-gap met by ODB.

The majority of household compositions show less than 1% of their needs-gap is met by ODB food assistance. Three out of five types of household compositions which contain two adults, have their needs-gap met by more than 1%. However, as for the five types of household compositions that include one adult, only households composed of one adult with no children have their needs-gap met by more than 1%.

In addition, these results show that households with no children benefit the most from ODB food assistance, and households with two adults and children benefit more than households with one adult and children. An exception to the latter are households with one adult and one child, who benefit more than any household with two adults and children.

Data shows that adult only households benefit more from ODB because they have a higher number of expected visits than households with children. Households with one adult and children have a total number of expected visits lower than that of households with two adults and children. This may be explained by a single adult household's lack of available child care or inability to leave work frequently, both of which could result in fewer visits. For two adult households with children, the burden of child care and

managing of work schedules is shared between two adults, theoretically giving the household the ability to visit ODB more often.

The lack of the needs-gap met by ODB for single adult households with children can be explained by the high cost of child care and the limited income acquired by a single adult thus resulting in a widened needs-gap. ODB does not alter assistance received based on a household being a single parent or two parent household, but only on the number of household members. This results in a one-adult, two-child household receiving the same amount of assistance as a two-adult, one-child household even though the households have different incomes required and thus varying needs-gaps.

5.4.2 Needs-Gap Estimated Using Poverty Thresholds

Using federal poverty thresholds as an estimate for income required yields a more conservative estimate of the needs-gap different household types experience. These conservative estimates thus increase the percentage of the needs-gap met through ODB food assistance as shown in *Table 9*.

Table 9: Households' Needs-Gaps Met by Receiving Food Assistance from Our Daily Bread, Using Federal Poverty Thresholds as Estimated Income Required

Household Type	Poverty Threshold	Income acquired	Needs-gap	Cost savings per ODB visit	Maximum possible percentage of needs-gap met *	E(visits)	Percentage of needs-gap met by ODB based on E(visits)
One adult, no child	\$12,490	\$11,137.73	\$1,352.27	\$86.89	77.11%	4.65	29.89%
One adult, one child	\$16,414	\$10,821.18	\$5,592.82	\$88.90	19.07%	3.84	6.10%
One adult, two children	\$19,749	\$12,079.67	\$7,669.33	\$98.62	15.43%	3.87	4.98%
One adult, three children	\$24,944	\$9,457.20	\$15,486.80	\$85.65	6.64%	3.56	1.97%
One adult, four children	\$28,805	\$9,799.40	\$19,005.60	\$130.81	8.26%	4.09	2.82%
Two adults, no child	\$16,493	\$27,606.40	Needs Met	\$88.90	Needs Met	5.32	Needs Met
Two adults, one child	\$19,730	\$28,856.32	Needs Met	\$98.62	Needs Met	4.88	Needs Met
Two adults, two children	\$24,858	\$34,124.14	Needs Met	\$85.65	Needs Met	4.01	Needs Met
Two adults, three children	\$29,253	\$29,803.04	Needs Met	\$130.81	Needs Met	3.87	Needs Met
Two adults, four children	\$32,753	\$23,559.76	\$9,193.24	\$232.82**	30.39%	3.91	9.91%

**Assumes households visit ODB 12 times per year.*

*** Cost savings for 6-person households use estimated caloric acquisition data.*

The most significant difference between the two approaches to estimating income required is when federal poverty thresholds are used not all household types experience a needs-gap. In this case, four out of the ten household types do not experience a needs-gap and the remaining six household types experience a smaller needs-gap than when estimated using EPI data.

When it is assumed households visit ODB every allowable period, once every 30 days (12 times per year), all households experiencing a needs-gap have their needs-gap met by at least 6.64% for one-adult, three-children households ranging to as high as 77.11% for childless, one-adult households. A more realistic estimate of the percentage of the needs-gap met though ODB food assistance is calculated using households' expected number of visits. Using this method, for households experiencing a needs-gap, the percentage of the needs-gap met ranges from 1.97% for one-adult, three-children households to 29.89% for childless, one-adult households.

Households who do not experience a needs-gap account for four household types and are households containing two adults and zero to three children. They do not experience a needs-gap because their estimated annual incomes exceed their respective federal poverty thresholds. The remaining six household types who do experience a needs-gap are one-adult households, with and without children, and two-adult, four-children households.

Two-adult, four-children households' have their needs-gap met by a greater percentage than any one-adult household with children. This may be due in part to 6-person households receiving the highest cost savings per ODB visit than any other household size. As mentioned previously, one-adult households with no children benefit

the most from ODB food assistance which may be due to these types of households having the highest number of expected visits of all the households experiencing a needs-gap.

Overall, when using federal poverty thresholds as a measurement of income required, the percentage of the needs-gap met through ODB food assistance increases significantly as compared to when EPI data is used. However, it is important to recognize that federal poverty thresholds are not fully representative of the costs of basic family living (United States Census Bureau, 2018). The different methods provide two perspectives, and the strength of one method over the other is subjective, as it depends on what are considered basic needs. EPI's estimates are higher than federal poverty thresholds as they encompass estimated costs of food, housing, transportation, healthcare, childcare, taxes, and miscellaneous goods, while federal poverty thresholds take an *ad hoc* approach, only representing three times the cost of food.

In general, a small percentage is expected across all household types as ODB provides only food assistance which is one of the smaller budget items in a family's basic needs and thus their needs-gap. These findings show that while charity food assistance programs may alleviate food insecurity through providing meals the family might otherwise go without; they do not alleviate poverty by a significant amount.

CHAPTER VI

CONCLUSION

This research determined the extent to which low-income food pantry clients' needs-gaps are met through a charity food assistance program. This was accomplished by observing the caloric acquisitions of households and monetarily valuating these acquisitions to determine the cost savings received. Households' needs-gaps were estimated by the comparison of the income required to attain a safe yet modest standard of living to the estimated income food-pantry using households acquires. The comparison of the costs savings to households' needs-gaps resulted in an estimated percentage of the needs-gap met through charity food assistance.

The first component of this research analyzed the demographics of the people who received food assistance from ODB. This analysis showed the majority of ODB households to be composed solely of adults and slightly more than one-third of all households contained children. 1 in 10 households are single parent households and when looking solely at households with children, 2 in 5 are single parent households. These demographics were also utilized to determine the expected number of visits based on household size. On average, households visited ODB three to five times a year

The second, and one of the main components of this study, estimated the monetary value of caloric acquisitions to determine the cost savings households received from ODB. This study found that caloric acquisitions and thus cost savings increased as household sizes increased with the exception of 4-person households, who acquired the least amount of calories, potentially due to varying tastes and preferences. Cost savings per trip were compared to monthly food costs to determine the percent of the food budget met by ODB for all household types. This information provides prospective ODB clients with estimated cost savings towards their food budget, allowing them to reallocate money that would otherwise be spent on food to other areas of the budget (i.e. unexpected medical, housing or transportation bills). The findings suggest cost savings are equivalent to 12% to 35% of households' monthly food budgets.

The third component of this study, the determination of the needs-gaps for households who receive food charity assistance, found households of all compositions to experience a needs-gap when using EPI estimated costs of basic family living as income required. When EPI data was replaced with federal poverty thresholds 4 out of 10 types of households did not experience a needs-gap.

The final component of this study combined the previously mentioned components to estimate the percentage of the needs-gap met through charity food assistance. The findings suggest when income required is estimated using EPI data, the percentage of the needs-gap met ranges from 0.39% to 2.33% and ranges from 1.97% to 29.89% when income required is estimated using federal poverty thresholds. These relatively low percentages are expected as ODB provides only food assistance which 1) is only a component of a household's budget and 2) ODB's goal is not for households to

become dependent upon their assistance frequently or for long periods of time but rather to provide a helping hand in a time of hardships.

This study is the first of its kind to estimate the percentage of the needs-gap met through charity food assistance as well as the first to collect detailed data on caloric and nutritional acquisitions at a food pantry. The data collected for the purpose of this study is widely applicable to further research concerning not only food pantry user's tastes and preferences but also to research regarding nutritional acquisitions of these users. Collected data could also be directly utilized to benefit the food pantry through the development of inventory forecasting models, as ODB would be able to more accurately predict which items are needed most during their fundraisers and charity food drives.

Using nutritional data collected in this study, future research could identify the extent to which food pantries meet individuals and household's nutritional requirements, identify correlations between household sizes and selections of certain food items, or compare the trends of acquisitions at food pantries versus grocery stores. Determining the extent to which food pantries meet individuals and household's nutritional requirements would be beneficial to compare to nutritional requirements met through government programs such as SNAP. Finally, a comparison of the costs of operating a food pantry versus the benefits clients receive as compared to the costs and benefits of SNAP may provide interesting insights into food assistance programs.

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APPENDICES

A

Food Item Allowances by Household Size

Food Category	1-Person HH	2-Person HH	3-Person HH	4-Person HH	5-Person HH	6-Person HH
Cereal	1	1	1	1	1	1
Canned Vegetables	2	2	3	3	4	4
Beans	2	2	3	3	4	4
Soup	2	2	3	3	4	4
Flex	3	3	4	4	5	6
Canned Fruit	2	2	3	3	4	4
Rice/Pasta	1	1	1	2	2	2
Crackers	1	1	1	1	1	1
Beverage	1	2	2	2	2	2
Bread	As labeled	As labeled	As labeled	As labeled	As labeled	As labeled
Refrigerated Foods	As labeled	As labeled	As labeled	As labeled	As labeled	As labeled
Frozen Foods	As labeled	As labeled	As labeled	As labeled	As labeled	As labeled
Produce	As labeled	As labeled	As labeled	As labeled	As labeled	As labeled
Sweets	As labeled	As labeled	As labeled	As labeled	As labeled	As labeled
“Freebie” Items	As labeled	As labeled	As labeled	As labeled	As labeled	As labeled

** Allowances set by ODB. Sections with allowances marked “as labeled” indicate allowances vary by shopping session but are consistent across all household sizes*

B

Food Items Lacking Nutritional Labels

ID	ITEM	SOURCE
A9	Oatmeal Packet	Quakeroats.com
A27	Fruit Cereal Rings	USDA
C21	Black Beans (dry)	USDA
C23	Pinto Beans with Peppers	USDA
F48	Sugar	USDA
F49	Ketchup	USDA
F52	Pudding	USDA
F55	Ramen Noodles	USDA
F57	Clam Chowder	USDA
F58	Teriyaki Sauce	USDA
F61	McCormick Ground Allspice	USDA
I61	Orville Redenbacher Smart Pop Popcorn	USDA
K75	Walmart White Sub Roll	USDA
L122	Eggs (dozen)	USDA
L123	Eggs (18 ct)	USDA
L134	Turkey on White Bread Sandwich	EatThisMuch.com
L155	Honey Ham (deli)	USDA
L193	Kozyshack Gluten Free Pudding	KozyShack.com
L55	Sprout's Mashed Potatoes	Sprouts.com
L56	Sprout's Chicken with Citrus Quinoa Pilaf	Sprouts.com
L57	Sprout's Greek Chicken with Potatoes	Sprouts.com
L58	Sprout's Grilled Sockeye Salmon with Vegetables	Sprouts.com
L59	Sprout's Vegetable Medley with Garlic Butter	Sprouts.com
L61	Hot Dogs	Oscarmayer.com
L67	Sprout's Chicken Salad and Colby Snack Box	Sprouts.com
L79	Sprout's Market Corner Fruit Burst	Sprouts.com
M6	Beef Roast with Vegetables	Fatsecret.com
M8	Smithfield Pork Hocks	Smithfield.com
M35	Bone-in Steak Ham	Frickmeats.com
M68	Beef Neck Bones	USDA
N1	Red Plum	USDA
N2	Red Pepper	USDA
N3	Green Pepper	USDA

ID	ITEM	SOURCE
N4	Cabbage	USDA
N5	Tomato	USDA
N6	Mini Seedless Watermelon	USDA
N7	Pineapple	USDA
N8	Orange	USDA
N9	Yellow Nectarine	USDA
N10	Red Potato	USDA
N11	Sweet Potato	USDA
N12	Russet Potato	USDA
N13	Squash Delicata	USDA
N14	Sweet Corn	USDA
N15	Almonds	USDA
N16	Guava	USDA
N17	Key Lime	USDA
N19	Avocado	USDA
N20	Red Onion	USDA
N21	Cauliflower	USDA
N22	Butternut Squash	USDA
N23	Broccoli	USDA
N24	Asparagus	USDA
N25	Basil	USDA
N26	Celery	USDA
N27	Apples	USDA
N28	Strawberries	USDA
N29	Lemons	USDA
N30	Okra	USDA
N31	Peach	USDA
N32	Blueberry	USDA
N33	Nectarine	USDA
N34	Mango	USDA
N35	Bananas	USDA
N36	Honeydew Melon	USDA
O11	Walmart Bakery Chocolate Caramel Parfait	MyFitnessPal.com
O56	Walmart Cheese Danish	USDA
O81	Walmart Chocolate Glazed Donuts	DunkinDonuts.com
O82	Walmart Glazed Donuts	DunkinDonuts.com

VITA

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