DEVELOPMENT OF MEAL KIT INTERVENTION RESOURCES FOR CHARITABLE FOOD ASSISTANCE PROGRAMS IN GEORGIA

by

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(Under the Direction of Jung Sun Lee)

ABSTRACT

This study developed evidence-based meal kit intervention resources for charitable food assistance programs in Georgia to improve the use, acceptability, and preparation self-efficacy of commonly underused foods among clients. Using a systematic approach based on a comprehensive needs assessment and collaboration with key informants, this research highlights the process of acquiring food bank inventory data, identifying underused food items, selecting recipe types and formats, developing a recipe calendar, and producing cooking demonstration videos tailored to the needs of low-income Georgians. The findings offer guidance for future resource development that supports multiple food distribution models and agency types and informs meal kit interventions to promote healthier eating and food security among charitable food assistance participants.

INDEX WORDS: Meal kit, charitable food assistance program, evidence-based, low-income population

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DEDICATION

This thesis is dedicated to Nancy Jay, whose unwavering support, love, and strength was a true inspiration to every life she touched. Her example taught me the value of humility, compassion, and reiliance in the face of adversity. I hope this work reflects those same values and contributes to supporting underserved communities in overcoming barriers to food and nutrition access.

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Finally, I would like to recognize Abigail Klinker for her foundational work on the Georgia Hunger Study. Her efforts laid the groundwork that made it possible for me, and future students, to create informed interventions that benefit underserved communities in Georgia.

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CHAPTER 1

INTRODUCTION

Food insecurity is a growing public health problem in the United States (U.S.) which impacted 13.5% of Americans nationally and 12.8% of Americans living in the state of Georgia in 2023.[5] Charitable food assistance programs (CFAP) supplement the food supply for those experiencing food insecurity and have seen an increase in demand since the COVID-19 pandemic.[17,19,20] Food-insecure populations may experience limited knowledge, time, and resources for preparing and consuming nutrient-dense foods which may lead to higher rates of chronic conditions such as obesity, diabetes, and hypertension.[9,12-16] The findings from the 2023 Georgia Hunger Study (GHS) showed that 28% of CFAP providers in Georgia report their clients have limited understanding, interests, and ability to choose, prepare, and store healthier foods at home. Additionally, interviews with food bank representatives suggest there are specific foods (key ingredients) that are difficult to distribute or underused among pantry clients.[23]

Commercial meal kit programs (e.g., HelloFresh, Blue Apron, etc.) which deliver food boxes, aid in increasing ingredient use and preparation self-efficacy among their clients. However, these programs are often inaccessible to those who experience food insecurity for reasons related to financial and preparation resources.[48,49] Meal kit interventions in CFAP are not new, with nutrition interventions becoming more popular among nutrition researchers due to the rising food insecurity rates in the U.S. However, there currently exists no meal kit interventions within CFAP in Georgia and few within the southern region of the U.S.[5,50-54] Meal kit interventions tailored to low-income, low-resource individuals have been shown to improve fruit

and vegetable intake, cooking self-efficacy, use of commonly underused food items, food security status, and perceived nutrient-dense food availability.[50-54] Therefore, creating a meal kit intervention for CFAP in Georgia may be beneficial for helping CFAP clients overcome the common barriers to healthy eating. The first step in designing a meal kit intervention for CFAP clients in Georgia is the development of intervention resources, such as recipes, recipe tips, and cooking demonstration videos.[50-54]

The objective of this study is to develop these critical meal kit intervention resources using a tailored, evidence-based approach. The achievement of this objective underscores the steps of a systematic meal kit material development approach that allows for the flexibility and scalability needed for widespread implementation. This study is guided by three specific aims. First, to form a collaboration team of key informants to support the development of tailored meal kit recipes highlighting specific foods (key ingredients) that are difficult to distribute or underused among CFAP clients. Then, to develop tailored meal kit recipes and related materials, and finally, to disseminate the meal kit recipes and materials to SNAP-Ed eligible Georgians through the 2025 University of Georgia Supplemental Nutrition Assistance Program-Education (UGA SNAP-Ed) Recipe Calendar.

This thesis describes the processes of creating meal kit intervention resources for CFAP in Georgia while emphasizing the importance of informed collaboration and following evidence-based approaches. Chapter 2 includes a review of the existing literature on the current state of food insecurity in the U.S. and Georgia, the charitable food assistance landscape in Georgia, barriers and opportunities to healthy eating in the charitable food assistance participants, and nutrition interventions implemented within CFAP, including meal kit interventions. Chapter 3 describes the key considerations for meal kit intervention resource development, the process of

acquisition and analysis of food bank inventory data, and identification of underused food items. Chapter 4 presents the results of inventory analysis and categorization, as well as the confirmed underused food items and final recipes, recipe calendar, and cooking demonstration videos. Chapter 5 presents the overall discussion and conclusion of meal kit intervention resource development, including the outcomes, key takeaways, strengths, limitations, and implications of these findings on future research and practice.

CHAPTER 2

LITERATURE REVIEW

FOOD INSECURITY IN THE U.S. AND GEORGIA

Food insecurity is a growing public health problem in the U.S. which impacted 13.5% of Americans nationally and 12.8% of Americans living in the state of Georgia in 2023.[5] Food insecurity, according to the U.S. Department of Agriculture (USDA), "is a household-level economic and social condition of limited or uncertain access to adequate food."[1] Inadequate quantity and quality of food intake over a long period of time can negatively impact an individual's health outcomes by increasing their risk for nutrition-related chronic conditions.

Food Security Measures

There is currently one validated national food security measure in the U.S.: the U.S. Household Food Security Survey Module (HFSSM). The HFSSM has been implemented annually in the Current Population Survey Food Security Supplement (CPS-FSS) since 1995 and is used to estimate the prevalence of food insecurity in the U.S.[2,3] The HFSSM includes 18 total items, but has been adapted into several shorter surveys tailored to different populations, such as in the 10-item U.S. Adult Food Security Survey Module, 6-Item Short Form of the Food Security Survey Module, and the 9-item Self-Administered Food Security Survey Module for Youth Ages 12 and Older. All food security questions have a 30-day or 12-month reference period.

The USDA currently defines food security on a 4-level scale, ranging from "high food security" to "very low food security".[1] Food security is categorized as high food security (HFS) or marginal food security (MFS) – the difference between the two is that those with MFS may

report some anxiety over food sufficiency; however, food intake is not affected in households with HFS or MFS.[1] Conversely, food insecurity can be described as either low food security (LFS) or very low food security (VLFS). Low food security is considered more severe than marginal food security, as the reported lack of food access begins to negatively impact overall diet quality; however, daily food intake is not yet significantly impacted.[1] The most severe form of food insecurity is very low insecurity. Very low food security can occur when a household's food access is so low that eating patterns are disrupted and food intake is reduced.[1]

Feeding America is a nationwide network of charitable food assistance programs (CFAP) that uses CPS-FSS data and associated factors (i.e., unemployment rates, median income, poverty rates, homeownership rates, disability rates, and percent of the population that is Black or Hispanic) to estimate rates of food insecurity at local levels in its "Map the Meal Gap" report. This methodology provides valuable insight into how many Americans utilizing CFAP may experience food insecurity. However, this methodology has historically resulted in Feeding America's food insecurity data being more inflated than HFSSM data.[4,5]

Food Security Trends

Based on the CPS-FSS, the prevalence of food insecurity in the U.S. in 2023 was 13.5% -- a statistically significant increase from 12.8% of U.S. households in 2022 and 10.5% of households in 2020.[5-7] Of this increase in food insecurity, the number of households experiencing very low food security remained the same in 2023 compared to 2022 (5.1%; 6.8 million households), but the number of households experiencing low food security showed a statistically significant increase of 0.7% (1 million households) compared to 2022.[5,6] Alternatively, most recent data from Feeding America's "Map the Meal Gap" report show that

13.5% of Americans experienced food insecurity in 2022.[4] This estimate is in line with the CPS-FSS's 2023 figure of 13.5%, but higher compared to the 2022 statistic of 12.8%.[4-6]

The CPS-FSS data do not show state-level differences in food security from 2022 to 2023 directly but rather identifies the average prevalence of food insecurity between 2021-2023 compared to the U.S. average prevalence. The average prevalence of food insecurity in Georgia between 2021-2023 was 12.8%, while the U.S. average prevalence is 12.2%.[5] For both national and statewide data, food insecurity rates have not reached this level since the 2011-2013 data cycle.[5] Data from 2020-2022 show that, in Georgia, the average prevalence of food insecurity was 11.3% compared to the U.S. average which was 11.2%.[6] This HFSSM data collection cycle shows food insecurity rates throughout the height of the COVID-19 pandemic. Not only has the difference between the average prevalence of food insecurity in the U.S. compared to Georgia increased sixfold, but food insecurity data in Georgia alone shows a 1.5% increase since the 2020-2022 cycle.[5,6]

Data from Feeding America's "Map the Meal Gap" indicates a similar upward trend in food insecurity rates since the COVID-19 pandemic, both nationally and in the state of Georgia.[4] The food insecurity rate in the U.S., according to Feeding America, was 10.4% in 2021 compared to the 2022 rate of 13.5%.[4] In Georgia, the food insecurity rate was 10.7% in 2021. As shown with national data from Feeding America, statewide data from Georgia shows a significant increase in food insecurity, showing that an estimated rate of 13.1% of Georgians experienced food insecurity in 2022.[4] Therefore, "Map the Meal Gap" data shows a similar upward trend in food insecurity rates, both nationally and in the state of Georgia since 2021, as data from the CPS-FSS. The most recent annual food insecurity data from the CPS-FSS and "Map the Meal Gap" suggest that food insecurity rates in Georgia have been generally lower

than national food insecurity rates.[4] However, average prevalence data from the CPS-FSS suggests otherwise, showing food insecurity rates are typically higher than national rates.[5] Despite these differences, all of the available data highlight a concerning downward trend in food security rates both nationally, and in the state of Georgia that should be addressed.

Table 1. Food Insecurity Prevalence in the U.S. and Georgia from 2021 to 2023[4,5]

	CPS-FSS		Feeding America	
	U.S.	**Georgia**	**U.S.**	**Georgia**
2021	10.2%	9.9%	10.4%	10.7%
2022	12.8%	11.3%	13.5%	13.1%
2023	13.5%	12.8%	--	--

Note: The state-level CPS-FSS food insecurity data shown are averages and likely underrepresent true annual data. The food insecurity rates for Georgia from the CPS-FSS are averaged from 2019-2021, 2020-2022, and 2021-2023 rates. No annual state-specific data was available from the CPS-FSS report.

Impact of Food Insecurity on Health

The connection between food insecurity and health outcomes has long been studied. Overwhelming evidence suggests that food insecurity results in compromised nutrient-dense food intake, which can promote chronic disease development later in life.[8] One proposed explanation for this connection is that those experiencing food insecurity often engage in the "substitution effect," characterized by prioritizing inexpensive, energy-dense foods. These foods, however, tend to be high in added sugars, saturated fat, and sodium – key nutrients that promote chronic disease development and progression.[8]

Poor diet quality among individuals with food insecurity is a well-documented and well-supported phenomenon. A systematic review of studies measuring the Healthy Eating Index (HEI) scores of food-insecure individuals found that the HEI scores of these individuals were

significantly lower than the U.S. adult average score of 58/100.[9] Of the five studies that assessed diet quality and micronutrient intake, the highest HEI score assessed in food-insecure individuals was a 51/100, which is 7 points lower than the average U.S. adult HEI score.[9-11]

Within all of the studies assessed from Eicher-Miller's [9] systematic review, chronic conditions and disease rates among food-insecure individuals utilizing CFAP were significantly higher than rates in the general U.S. population.[9] Obesity rates among the participating CFAP clients were 68.7% in a cross-sectional study in 270 food pantry clients (67.4% female, 85.9% non-Hispanic white) in Indiana.[9,12] This proportion of 68.7% is substantially higher than the current U.S. obesity rate, which as assessed by the August 2021-August 2023 NHANES cycle, is 40.3% of U.S. adults.[13] Self-reported rates of hypertension among the assessed studies were as high as 72.3% in another study, conducted in 144 food pantry clients (69.4% female, 52.7% African American, average age of 62.8 years old) in Delaware. This compares to the current 47.7% average proportion of U.S. adults.[9,14,15] Similarly, diabetes rates were as high as 34.3% of CFAP clients in the same Delaware study compared to the current U.S. population average of 11.6% according to the CDC's National Diabetes Statistics Report.[9,14,16] It may be due to various factors, including some barriers related to access to nutrient-dense foods, that the chronic disease rates continue to be higher among CFAP clients and individuals experiencing food insecurity. See **Table 2**.

Table 2. Chronic Disease/Condition Rates in Charitable Food Assistance Program (CFAP) Clients Compared to the U.S. Population

	CFAP Clients	U.S. Population
Obesity	68.7% [12]	40.3% [13]
Hypertension	72.3% [14]	47.7% [15]
Diabetes and/or Prediabetes	34.3% [14]	11.6% [16]

Note: The CFAP Client proportions are the maximum values found from studies in the Eicher-Miller [9] systematic review. The sample sizes of studies assessed in Eicher-Miller [9] are not the same, nor is the data nationally representative.

Charitable Food Assistance Programs

Charitable food assistance programs (CFAP) include any organization or program that offers free food to individuals; therefore, CFAP can be critical resources to individuals and households who are experiencing food insecurity.[17] In the U.S., Feeding America is the largest domestic hunger-relief organization, with over 200 partner food banks.[17] These food banks typically supply food and other supplies to a network of smaller agencies, including, but not limited to, food pantries, meal programs, and backpack programs. It is from these agencies that individuals and households experiencing food insecurity can acquire food.[17] See **Figure 1**.

Figure 1. Charitable Food Assistance Program (CFAP) Food Distribution Process

Figure from Abigail Klinker. The Feasibility of Compiling a Statewide List of Emergency Food Assistance Programs in Georgia (2023) MS Thesis. University of Georgia, Athens, GA

The CPS-FSS included a supplemental survey asking participants about their use of community nutrition assistance or charitable food assistance.[18] All households with incomes below 185% of the federal poverty level were asked these supplemental questions. The CPS-FSS found that 7.1% of households received free groceries from a food pantry, food bank, church, or other place that helps with free food, and 2.3% of households received free meals from a church, shelter, home-delivered meal service like Meals on Wheels, or other places that help with free meals.[18] Of the households sampled making less than 185% below the federal poverty level, not all of them were food insecure. However, of the households experiencing either low food security or very low food security, 58.1% received free groceries and 52.7% received free meals within the last 12 months from when they took the survey.[18] Interestingly, even households who were not considered to be food insecure utilized charitable food assistance to receive either free groceries or free meals.[18] Because the CPS-FSS is administered to households, anyone in the U.S. population who is unhoused was excluded from taking the survey.[18] Therefore, the percentage of the U.S. population utilizing charitable food assistance is likely higher than what the HFSSM suggests.[18]

Although CPS-FSS data helps provide nationally representative insight into the use of CFAP in U.S. households, Feeding America offers more scoping data that considers unhoused individuals utilizing CFAP. A 2023 Feeding America Food Bank Pulse Survey showed that food banks across the nation were seeing an increase in demand, with 2/3 of responding CFAP reporting increased demand in March 2023.[19] These findings were attributed to state-level decreases in Supplemental Nutrition Assistance Program (SNAP) emergency allotment funding.[19]

Additionally, Feeding America's 2024 Charitable Food Assistance Participation report found that over 50 million Americans utilized charitable food assistance at some point in time during 2023, which was a significant increase from the estimated 49 million in 2022.[20,21] CFAP help to alleviate growing food insecurity within the U.S. With food insecurity rates rising in the state of Georgia, it is important to study its statewide CFAP landscape.

CHARITABLE FOOD ASSISTANCE LANDSCAPE IN GEORGIA

Identifying Needs: The Georgia Hunger Study

The Georgia Hunger Study (GHS), conducted in 2023 and led by Dr. Jung Sun Lee, was a statewide needs assessment of Georgia's charitable food assistance network based on a partnership among the University of Georgia (UGA), Feeding Georgia, Georgia Regional Food Banks, UGA Extension, and the Georgia Department of Human Services. The GHS aimed to understand barriers and challenges in food access among low-income Georgians using mixed methods such as focus group interviews, surveys, and geospatial mapping.[22,23] Statewide surveys were conducted with food bank partner agencies (N=953) and clients (N=1,703), and focus groups were held with agency staff or volunteers (N=63) representing 39 Georgia counties.[22,23]

The GHS was the first ever study in Georgia to assess the statewide charitable food assistance landscape, create a comprehensive list and interactive map highlighting 2,404 CFAP agencies in 9 Georgia regional food bank areas, and gather insight into the unique needs of Georgians utilizing CFAP.[22,23] Not only was the GHS crucial in assessing the statewide charitable food assistance landscape, but it also served as an unprecedented gateway for collaborations between UGA and CFAPs in Georgia. These types of collaborations are crucial to

creating and implementing policy, systems, and environment (PSE) interventions aimed at addressing the needs of CFAP clients in Georgia.

The beginning of my involvement with CFAP in Georgia was during data entry of GHS paper surveys into Qualtrics, an online survey and data management platform. It was through manual data entry that I became acquainted with the characteristics of CFAP clients in Georgia and the various barriers to providing healther foods that CFAP agencies in Georgia experience.

The GHS identified several important needs among CFAP agencies and clients. Most notably, the need for resources for improving client understanding, interest, and ability to choose, prepare, and store healthier foods at home, agency strategies for storing and handling healthier foods, and nutrition education within CFAP agencies.[23] Almost 96% of participating agencies reported that it was "somewhat important" or "very important" to serve healthier foods, but several barriers prevent them from doing so.[23] About 40.4% of agencies claimed they were unable to store and handle healthier foods. Almost 28% of agencies also reported that their clients have limited understanding, interests, and ability to choose, prepare, and store healthier foods at home, such as produce items.[23]

Even with the ability to store healthier foods, agencies cannot guarantee that these foods will be chosen by clients due to these client-based barriers. Key informant interviews with food bank representatives revealed that there were specific foods that were difficult to distribute or underused among pantry clients.[23] The reasons for the underutilization of healthier foods, such as produce items, maybe the clients' limited understanding of, and interest in, following a nutrient-dense, balanced diet. Adequate dietary interventions and tailored nutrition education may help improve these knowledge-related barriers.

However, findings from the GHS showed that only 24.1% of participating CFAP agencies in Georgia offered any type of nutrition education.[23] Of the types of nutrition education offered, 70.8% were in the form of fliers or written materials on nutrition and health, 50.7% were in the form of cooking demonstrations or cooking classes, and 31.8% were in the form of workshops or classes on specific nutrition-related health problems.[23] Effective nutrition education interventions within the food pantry setting often encompass a variety of participant engagement tactics, as eliciting knowledge gain and subsequent behavior change relies on more than simply providing educational materials. Nutrition education theories such as Fink's Taxonomy for Significant Learning and Social Cognitive Theory suggest that interventions or activities that build foundational knowledge must also be accompanied by opportunities to apply and integrate that knowledge to build self-efficacy, motivation, interest, and self-regulation for sustained change.[24,25]

Therefore, the written materials that make up 70.8% of nutrition education within Georgia CFAP may improve the limited understanding of nutrient-dense foods of CFAP clients, but are likely not sufficient in improving client interest and ability to choose, prepare, and store healthier foods at home. Although cooking demonstrations/classes and classes on specific nutrition-related health problems may improve the likelihood of improved client interest and ability to choose, prepare, and store healthier foods at home, these types of interventions are often more time-consuming, labor-intensive to administer, and are not always appropriate for every CFAP distribution model, therefore making up the minority of nutrition education interventions provided.

Charitable Food Assistance Distribution Models

CFAP agencies often distribute food in ways that align with their unique resources, physical capacity, funding, and volunteer and staff base. Since these characteristics often differ among agencies, the varying distribution models followed by Georgia CFAP can affect the types of nutrition education each agency can provide to their clients. The GHS found that the primary food distribution models followed by Georgia CFAP include a mix of pre-packed boxes and volunteer-selected foods for clients (40.4%), curbside pick-up distribution (38.9%), pre-packed boxes only (29.7%), and delivery (25.3%).[23] Only 16.9% of participating agencies followed a client-choice model, which allows clients to choose foods from the pantry in a "grocery-store" style manner.[23]

Client-choice distribution models are often cited in the literature as being the most favorable among CFAP clients and are the prime target for nutritional interventions.[9,26,27] Client-choice models promote agency in the clients' decision-making and allow for the impact of nutritional interventions on decision-making to be directly assessed.[9,27] During the COVID-19 pandemic, many CFAP following client-choice distribution models switched to limited-contact models such as curbside pick-up, pre-packed boxes, or delivery in an attempt to mitigate the spread of COVID-19 to clients.[26] However, few CFAP have transitioned back to client-choice since the pandemic, nationwide.[26] This trend is corroborated by the GHS's findings that client-choice distribution models in Georgia are in the minority. With the altered CFAP distribution landscape after the COVID-19 pandemic, adaptable nutritional interventions are key for widespread implementation.

Participant Demographic Insights

Among its many insights, the GHS provided data on several Georgia CFAP client characteristics. Over 1,700 CFAP clients completed the GHS Client Survey, answering questions about their age, race and ethnicity, educational attainment, household characteristics, occupation, and income level.[22] These data were collected from a convenience sample from select CFAP agencies with higher or lower than average proximity to serve Georgians in need; therefore, findings may not be representative of the whole state of Georgia. However, GHS client characteristic results can provide a valuable snapshot of information that can be used to help design PSE interventions for CFAP.

The most highly represented age group from the GHS Client Survey was adults aged 60+ years old (36.6%).[22] National data from the USDA's Economic Research Service suggests that food insecurity rates in adults 65+ years old have been steadily increasing, with over 9% of U.S. older adults experiencing food insecurity in 2022.[28] Additionally, almost 50% of clients identified as non-Hispanic Black versus 38% of CFAP clients who identified as non-Hispanic White and 10% of clients who identified as Hispanic.[22] National food security statistics paint a similar picture, with non-Hispanic Black individuals experiencing the highest food insecurity rates in the U.S.[29]

One notable difference, however, is the percentage of Georgian CFAP clients who identify as Hispanic and national food insecurity rates in Hispanic individuals. Nationally, individuals identifying as Hispanic have the second-highest food insecurity rate behind non-Hispanic Black individuals.[29] The lower percentage of Hispanic individuals who participated in the GHS likely under-represents the true percentage of Hispanic individuals in Georgia who are experiencing food insecurity and would benefit from utilizing CFAP. Although the exact reasons

for this potential under-representation are unknown, Hispanic individuals may be unaware of CFAP resources in their area or may experience transportation barriers.[22] Additionally, Hispanic individuals may question whether or not they can take advantage of such resources depending on their legal citizenship status.

About 35% of GHS client survey participants had obtained a high school diploma or GED and 19% had not completed high school.[22] About two-thirds of participating clients were making a monthly income of $2,000 or less, which would qualify any household that has more than one resident for SNAP benefits in Georgia.[22,30,31] However, only 48.1% of clients reported receiving SNAP assistance in the last year.[22] The complexity of the SNAP application can be a deterrent to those who qualify to complete it, especially individuals with limited literacy.

Another notable finding from the GHS Client Survey is the proportion of participating clients afflicted by chronic disease. Almost 65% of participating CFAP clients reported having at least one nutrition-related chronic health condition.[22] The most common chronic diseases reported included hypertension (51.6%) and diabetes or prediabetes (31.7%).[22] Additionally, about 1/3 of clients believed their health status to be “fair” or “poor” on a 5-point scale from “poor” to “excellent”.[22] Individuals with chronic disease have unique nutritional needs that can be supported through CFAP which participate in nutritional interventions that promote basic healthy eating guidelines such as highlighting foods low in added sugar, sodium, and saturated fats. However, such nutritional interventions seldom exist at CFAP, which underscores a missed opportunity to promote client health. These client characteristics unique to Georgians, identified by the GHS, are essential to understand to tailor future nutritional interventions so that client participation is maximized.

HEALTHY EATING IN THE CHARITABLE FOOD ASSISTANCE NETWORK

Barriers to Healthy Eating

Barriers that may prevent CFAP clients from accessing adequate amounts of nutrient-dense foods exist at the client and food pantry level. Several small-scale qualitative studies conducted in different regions of the U.S. share similar findings. These regions include the Southwest (Texas), Northeast (Pennsylvania), Midwest (Ohio), and Southeast (Georgia). Shared findings among these varying regions suggest that there are likely common barriers that prevent CFAP from providing nutrient-dense foods throughout the nation.

Client Barriers

In one study conducted by Dave et al.[32] in Texas, researchers interviewed 54 CFAP clients from 10 different agencies in the Houston-Metro area. This study aimed to identify the common barriers to healthy eating among CFAP clients. A major theme identified through the conducted interviews was financial uncertainty and food prices, where participants claimed they were unable to purchase enough "healthy" foods for their entire family.[32] Another prevalent barrier was that participants had a lack of time to cook dinner, often leading to fast food consumption. Similarly, a lack of transportation to the grocery store was also reported by several participants.[32] Most frequently, these participants did not have a car or were not able to use public transportation, resulting in an increased reliance on "corner stores" which seldomly stocked adequate amounts of fruits, vegetables, whole grains, and other nutrient-dense foods.[32]

Even if participants were able to acquire nutrient-dense foods, some reported not having adequate kitchen equipment to prepare a full recipe.[32] Some participants only had a one-burner stove or just one or two pots/pans, which made it difficult to cook multiple components of a recipe at once. Additionally, a lack of nutrition knowledge and skills for preparing fresh

vegetables or incorporating vegetables into meals was reported among younger participants.[32] Another barrier was evident in the participants' support systems. Many CFAP clients also reported having a lack of social support for eating healthily, especially from spouses and children who have food aversions to fruits and vegetables.[32]

Another study, conducted by Oliver et al.[33] in Southeastern Pennsylvania, interviewed 11 female CFAP clients. Similar results to Dave et al.[32] were found, as this study identified significant knowledge, financial/resource, and familial influence barriers. Specific knowledge barriers included clients not knowing which foods were considered "healthy" and having a lack of preparation self-efficacy to prepare unfamiliar nutrient-dense foods or prepare them in a palatable manner.[33] Participants reported that food costs were a major barrier to purchasing nutrient-dense foods and that it was also common not to have enough kitchen equipment to prepare recipes.[33] Interestingly, it was revealed that sometimes CFAP clients may have the necessary equipment, such as a slow cooker, to prepare a recipe, but they may not know how to use it. Child and spouse food aversions were also commonly reported among the participants, which prevented them from purchasing nutrient-dense foods that they knew their families would not accept.[33]

However, a new barrier emerged in this study that was not presented by Dave et al.[32] This barrier was clients or clients' families having special dietary needs.[33] Multiple participants reported having immediate family members with varying chronic conditions or food intolerances that they believed were conflicting.[33] For example, one participant reported that her daughter required gluten-free foods, which made this client want to prioritize fruits and vegetables, but her husband had kidney disease. This client believed her husband's condition meant he could not have any "healthy" foods due to potassium and phosphorus restrictions.[33] Special dietary needs

further complicate food choices for CFAP clients, and common dietary misconceptions, such as one client's belief that all potassium and phosphorus foods needed to be avoided for a kidney-friendly diet, contribute to the strength of this barrier.[33]

Table 3. CFAP Client Barriers to Healthy Eating [32,33]

Client Barrier	Examples
Lack of nutrition knowledge and cooking self-efficacy	"Sometimes they (food pantry) give us these fresh vegetables like spinach and carrots. I don't know what to cook with it. So I return it or they go bad in my refrigerator." [32]
	"Nobody knew what to do with it, we're talking about what can you do with a spaghetti squash. Some of them were like "oh, no, I don't like that…" [33]
Financial uncertainty and high food prices	"When we get our food stamp dollars, it is like a feast. But then, especially toward the end of the month, we start checking our pockets to find you know the dollars to take care of food and pay bills." [32]
	"For us, eating different fruits and vegetables is expensive. It is hard to buy them on a regular basis since it is costly. And eating out-of-season fresh fruits and vegetables is even more expensive." [32]
	"If you have a lot of people in your family, it's cheaper to go get dollar burgers than go to the grocery store and buy something else. But I think that's part of it, the economics decides on what you get and how you do certain things." [33]
Lack of family/social support for healthy eating	"My husband is a big meat eater. His meals are incomplete without meat. So I have to buy meat and foods that compliment meat. I then don't have enough money to buy fruits and vegetables after that." [32]
	"If you have a picky eater, you'll be making something for you, something for the husband, something for the kids. That's 3 separate meals, 3 times a day." [33]
Lack of reliable transportation to grocery stores	"We do not have any grocery store close by. I have to go to [name of food pantry] in a bus. But carrying groceries on a bus is difficult, especially with children. Even to get to the pantry, I have to take two buses." [32]
	"We have to wait until we can get a ride to go to a decent grocery store. Sometimes it is hard for us to even get here (pantry) since I have to take two buses to get here." [32]

Limited kitchen equipment and time to cook healthy meals	"We do not have a blender or a toaster and only have a few pots and pans at home." [32]
	"People from the community come in, and a lot of them say they live in a room, or they're homeless or [live in] shelters, so all they had was a microwave and a hot plate." [33]
	"I would like to get some time to cook. But with the two jobs, I get too tired and don't have time to cook. So then my kids eat whatever is easily available at home or we go to some restaurant." [32]
	"If it takes too long to prepare, I'm not going to do it. If they could do something in 5 minutes, it might help." [33]
Special dietary needs within the household	"My niece is gluten-free. I had to go on the computer and learn how to make stuff, using gluten-free products. [But] my husband is on dialysis and everything healthy, he can't have because it is high in potassium or phosphorus." [33]
	"My daughter has the cystic fibrosis…we have to be very careful with [her] nutrition [for the disease]." [33]

Agency Barriers

Several barriers exist at the agency-level that reduce the ability of these agencies to adequately supply nutrient-dense foods to their clients. A review, conducted by Levi et al.,[34] of a Healthy Eating Research expert panel held in 2019 outlined several barriers at the agency-level to stocking nutrient-dense foods. Some major barriers were the inability of CFAP to purchase nutrient-dense foods to supplement donations, lack of structural resources to store perishable foods, like refrigerators, and not having enough personnel or having high volunteer turnover.[34] Since this expert panel was convened to discuss the implementation of healthy eating standards in CFAP, this would require personnel and volunteers to sort through donations and categorize the food based on nutrient density into "choose often", "choose sometimes" and "choose rarely" categories. Experts were concerned that volunteers may lack the training and expertise needed to sort products correctly.[34] Even in CFAP not implementing specific healthy eating standards, it

may still take a level of nutritional knowledge among staff to supply nutrient-dense foods at the agency.

Another study, conducted by Barone et al.[35] in Cincinnati, Ohio, aimed at exploring the barriers to providing nutrient-dense food options and providing nutrition education at the agency-level. Researchers interviewed 41 food pantry coordinators and identified several qualitative themes. Logistical barriers to providing more nutrient-dense foods were evident, including having limited space and equipment to store perishable items, such as fresh produce, and a lack of transportation vehicles for fresh produce from local partners such as community gardens and farmers.[35]

However, this study is unique in that it also assessed barriers at the agency-level to providing nutrition education to clients.[35] Only 24% of the pantry coordinators interviewed reported providing nutrition education at their pantries. Common barriers that prevented pantry coordinators from providing nutrition education included not having enough staff or volunteers with nutrition expertise (51.2%), limited funding (48.8%), client disinterest in nutrition education efforts (41.5%), and limited space for endeavors like cooking demonstrations and classes (24.4%).[35]

Findings from the GHS corroborated many of the agency-level findings previously described, including that food suppliers do not provide enough nutrient-dense foods – particularly food banks (34.9%) and donors (20.1%).[23] When insufficient quantities of nutrient-dense foods are supplied by food banks and donors, agencies often have limited funding to purchase nutrient-dense foods to supplement (34.3%).[23] Importantly, the most prevalent barrier reported by CFAP agencies in Georgia, similar to the findings by Levi et al.,[34] and Barone et al.,[35] was the inability to store or handle nutrient-dense foods (40.4%), as there is often a lack of

temperature-controlled storage options, such as refrigeration, for perishable food items.[23] However, GHS findings add to the understanding of agency-level barriers by suggesting client characteristics may influence how many nutrient-dense foods CFAP provide. Some agencies reported that certain client characteristics prevent them from providing nutrient-dense foods, such that their clients have limited understanding, interests, and ability to choose, prepare, and store healthier foods at home, such as produce items (27.9%).[23]

Figure 2. CFAP Agency Barriers to Providing Healthy Foods [23,34,35]

Opportunities

Despite the many client-level and agency-level barriers to healthy eating among CFAP clients, several opportunities to overcome these barriers exist. At the client level, improving consumption of nutrient-dense foods will depend on efforts to make healthy eating inexpensive, easy, and accessible. Efforts should also focus on fostering support for healthy eating and improving client nutrition education and awareness – especially for clients with family members who have varying dietary restrictions.[32,33] At the agency level, CFAP should focus on becoming a change agent for healthy eating in their clients.[23,34-36]

One way to accomplish this could be for agencies to partner with other community resources in ways that provide mutual benefit. For example, several agencies participating in the Barone et al.[35] study formed community partnerships with farmers' markets, farmers, and community gardens to gather additional fresh produce outside of what their food bank and donors could provide.[35] Not only did this improve the agencies' stock of nutrient-dense foods, but this partnership reduced producer-level food waste by passing extra produce from growers onto consumers.

Additionally, agencies should participate in streamlined approaches to nutrition education that require minimal existing nutrition knowledge from staff and make it easy for clients to choose nutrient-dense foods. Strategies to achieve this might include environmental "nudges" or employing choice architecture.[36] One current initiative that incorporates both "nudges" and choice architecture is the Supporting Wellness at Pantries (SWAP) initiative.[37] SWAP uses Healthy Eating Research (HER) guidelines to categorize foods in participating food pantries using a traffic light system, where foods marked green are "choose often," foods marked yellow

are “choose sometimes,” and foods marked red are “choose rarely” based on each food’s nutrient content.[37]

Over 200 food pantries nationwide currently participate in this initiative to make nutritious decision-making easy for clients.[37] Although SWAP’s implementation requires staff training, there are a plethora of resources, toolkits, signage, and training tools for food banks and food pantries to utilize.[37] The SWAP initiative improves client nutrition education and awareness and makes healthy eating easy and inexpensive, but there are hundreds of other existing interventions that are designed to improve nutrient-dense food offerings in CFAP.

INTERVENTIONS WITHIN THE CHARITABLE FOOD ASSISTANCE NETWORK

Perceived Needs and Wants of Consumers for Nutrition Interventions

The literature assessing CFAP client preferences for nutrition interventions is limited, but existing research provides valuable insights into considerations researchers should have before designing PSE interventions targeting healthy eating in the charitable food assistance network. In one study conducted by Long et al.[38] in Arkansas, researchers interviewed 50 CFAP clients from 6 different food pantries. This study aimed to identify CFAP clients’ needs and preferences regarding food received from food pantries. Identifying food preferences is beneficial – especially for interventions that highlight certain nutrient-dense foods or provide recipes. However, identifying least-liked foods can also be beneficial for interventions targeting CFAP client acceptability of nutrient-dense, but commonly disliked foods.

Findings showed that clients desired larger quantities of food from food pantries – especially meat and dairy products, as clients claimed these items were among the most expensive at the grocery store.[38] Although varied, CFAP often has restrictions on how many

times an individual can come to the agency each month, as well as a limit on the quantity of items or number of meals the individual can receive in one trip. Another theme emerged which showed CFAP clients not only desired more food, but higher quality food such as healthier foods like fresh fruits and vegetables.[38]

Additionally, clients wanted foods that were not expired or near their expiration date.[38] Importantly, larger companies or small businesses often donate food that is near its expiration date to food pantries, with Feeding America estimating that about 2.9 billion meals were donated to CFAP from businesses in 2021.[39] Perhaps client dissatisfaction with foods close to their expiration date comes from a common misunderstanding among the U.S. population that food is unsafe to eat once the "best-by" or "sell-by" dates have passed. Since CFAP acquires a large amount of food from businesses near their "best-by" or "sell-by" dates, nutrition education targeting this misconception might better help CFAP increase client utilization of these foods.

Lastly, clients valued foods that were relevant to their households, whether that be familiar foods or foods that were appropriate for various chronic conditions.[38] Several participating clients noted that whole grain options, such as whole grain pasta or brown rice, were unfamiliar to cook with and undesirable among the clients' families.[38] Nutrition interventions at CFAP targeting whole grain products to improve favorability among clients may be beneficial for improving diet quality and preparation self-efficacy among CFAP clients. Additionally, many clients wanted their food pantry to prioritize stocking foods lower in added sugar, saturated fat, and sodium so that they could more easily provide food for their immediate family members with chronic conditions such as diabetes, heart disease, and hypertension.[38] This preference suggests that nutrition interventions which indicate foods that are "diabetes-friendly," "heart healthy," or "blood pressure friendly" might also be favorable among CFAP clients.

In another study, conducted by Cooksey-Stowers et al.[40] in Connecticut, researchers administered surveys to 230 CFAP clients from 4 different agencies. The researchers aimed to assess the clients' level of support for different types of nutritional interventions within CFAP. These researchers created and validated the Nutrition Intervention Index (NII) scale, which ranged from 0-56.[40] Participants had a mean score of 42.0 (SD=9.6), with Black and Hispanic clients scoring higher than White clients. Additionally, younger CFAP clients tended to have higher NII scores than older clients.[40]

The interventions most preferred among clients included the pantry simply providing more nutritious items, having more refrigerators in the pantry for fresh produce, improving nutritious food visibility within the pantry through "nudges," labeling food items that are good to eat for certain chronic conditions, and providing nutritious meal kits or ingredient bundles with an included recipe.[40] Notably, the least preferred nutrition interventions were restricting unhealthy donations, mobile apps that educate about healthy food choices, dividing their shopping cart into food groups, traffic-light labeling foods according to their nutrient content (i.e., SWAP), and cooking demonstrations.[40] These intervention preferences strongly align with the CFAP clients' food needs and preferences outlined by Long et al.[38] Importantly, "nudges" and nutritious meal kits may be avenues for improving client use and acceptability of unfamiliar food items like whole grains.[38]

A different cross-sectional study, conducted by Hollis-Hansen et al.,[41] showed very similar results to the Cooksey-Stowers et al.[40] study. This study also aimed to identify CFAP client preferences related to nutritional interventions and provided foods by their pantry.[41] All 200 participants were served by the same large-scale CFAP in Texas which serves over 20,000 clients annually. Researchers assessed the clients' overall desire to participate in nutrition

interventions using an adapted NII from the Cooksey-Stowers et al.[40] study which included an additional question about nutritious frozen or "no cook" meals as an intervention.[41] The mean score on the NII was 49.3 (SD= 7.5) on a scale from 0-60, which suggested a strong desire among participating clients to participate in nutritional interventions.[41]

The types of nutrition interventions most desired by clients were the same ones preferred in the Cooksey-Stowers et al.[40] study, just preferred in a different order. Preferred interventions, in order of favorability, included the pantry simply providing more nutritious items, providing nutritious meal kits or ingredient bundles with an included recipe, improving nutritious food visibility within the pantry through "nudges," having more refrigerators in the pantry for fresh produce, and labeling food items that are good to eat for certain chronic conditions.[41] Notably, the least preferred nutrition intervention types included restricting unhealthy donations, providing nutritious frozen or "no-prep" meals, mobile apps that educate about healthy food choices, dividing their shopping cart into food groups, and traffic-light labeling foods according to their nutrient content (i.e., SWAP).[41]

Among these findings, researchers were particularly surprised by the nutritious frozen or "no-prep" meals being the second-lowest preferred intervention among clients, as this type of intervention requires little time and effort in the kitchen – especially since time to cook nutritious meals is a common barrier to healthy eating among CFAP clients.[32,33,41] In their discussion, the researchers hypothesized that this could be due to the large Hispanic participant pool (52%), where Hispanic individuals have historically reported higher enjoyment and preference toward cooking compared to other racial/ethnic groups.[41,42]

Importantly, this study adds to the understanding of nutrition intervention preferences among CFAP clients in that researchers also collected data about cuisine preferences for recipe-

related interventions.[41] Results showed that for recipe-related interventions, the types of cuisine that were most preferred among clients were Mexican (83%), Chinese (59%), Italian (53%), Soul Food (40%), and Southwest/TexMex (40%).[41] Although these findings provide valuable insights into potential directions in which to focus recipe-related interventions, it is important to note that there are likely regional differences among cuisine preferences. This study was conducted in Texas, which, according to the U.S. Census Bureau, has a large Hispanic/Latino population of almost 40%.[43] Comparatively, Georgia's U.S. Census data show that only 11% of Georgia's population is Hispanic/Latino.[43] Given Georgia's regional location, it is more likely that Southern Cuisine or Soul Food might be among the most popular; however, there currently exists no literature that looks at cuisines preferred among Georgians.

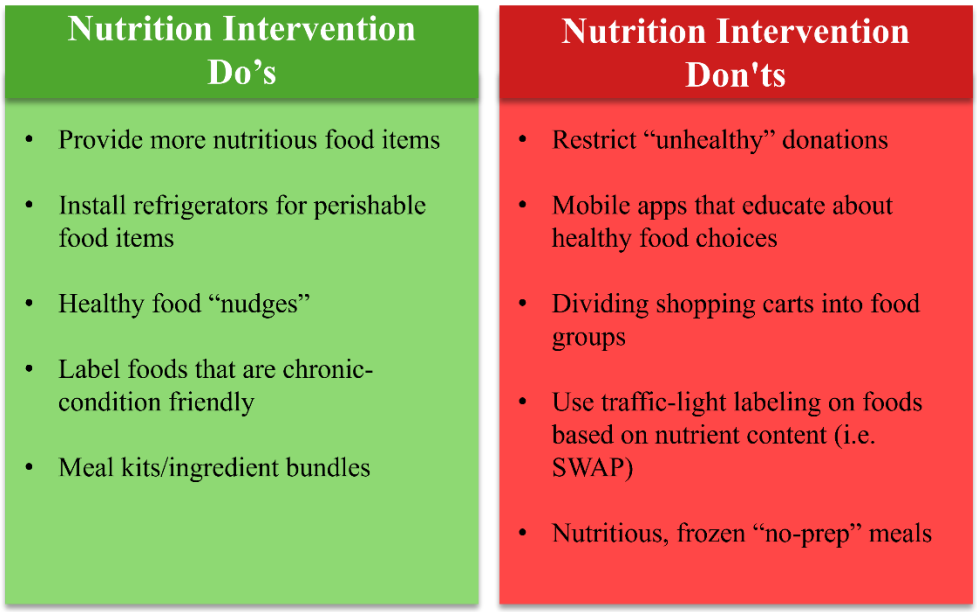

Figure 3. CFAP Nutrition Intervention Do's and Don'ts [40,41]

Figure created using Microsoft PowerPoint

Current Nutrition Intervention Strategies

Some of the nutritional intervention strategies described have been carried out among CFAP. In one study by Bush-Kaufman et al.,[44] researchers conducted 43 key informant interviews with food bank distributors, food pantries, community partners, and anti-hunger advocates in 13 different Western-region states, including Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming. This study aimed to identify the common nutritional intervention strategies CFAP in the Western region are implementing to create a healthy pantry environment.[44]

Findings showed that the common strategies, in order of prevalence, were cooking demonstrations/samples/recipes, transitioning to a client-choice distribution model, consulting with a registered dietitian, signage cards to emphasize nutritious foods, strategic product placement of nutrient-dense foods, and meal kits.[44] Notably, cooking demonstrations/samples/recipes were often implemented in conjunction with product placement and meal kits. Seldom were meal kits and product placement implemented on their own.[44] A major factor that led to the initiation of implementing cooking demonstrations/samples/recipes in CFAP included having external support such as land-grant university Cooperative Extension programs and nonprofit organizations providing print resources, cooking equipment, and staffing. These types of external support also played a major role in whether the agency could provide meal kits.[44]

Some major barriers to providing this type of nutrition intervention were agency size and kitchen facilities, and the agency's food distribution model.[44] Importantly, some agencies were able to overcome the barrier of distribution model when they had adequate staffing and funding to allocate toward equipment such as food trucks if their distribution model did not allow for on-

site cooking demonstrations or sample distribution.[44] Interestingly, the key informants who implemented meal kits did not explicitly state any implementation barriers related to the kits – only barriers related to cooking demonstrations or sampling.[44] This may be because meal kit ingredients do not have to be cooked to be distributed, unlike with prepared recipe samples and cooking demonstrations.

Similarly, the Barone et al.[35] study which identified agency barriers to providing nutrient-dense foods to clients, also identified several nutritional interventions being done within CFAP. The 41 food pantry coordinators described many interventions that align with those described in the Bush-Kaufman et al.[44] study. Similar interventions included providing food samples and nutrient-dense recipes and providing cooking classes.[35] However, additional strategies aimed at improving the procurement of nutrient-dense items, such as fresh produce, were also mentioned by the food pantry coordinators. These strategies included selecting nutrient-dense foods to receive from food banks or when purchasing additional food from grocery stores, partnering with farmers, farmers' markets, and community gardens to supply more fresh produce, and promoting the use of farmers' markets among clients.[35] These additional interventions, which focus more on procurement, satisfy the common CFAP client desire for pantries to provide more fresh fruits and vegetables.[38,40,41]

Designing Nutrition Interventions with Social Cognitive Theory

Designing effective nutrition interventions that either motivate a person to change or facilitate a person's ability to change their behavior is often guided by theory. Within nutrition intervention planning, some theories can be used to target people's motivation and awareness, which may inspire them to change, or theories that facilitate people's ability to take action and begin to change their behavior. Both types of theories are commonly used in nutritional

intervention studies.[45] A systematic review conducted by Luo and Allman-Farinelli[45] in 2021, compared the use of different theories in nutrition interventions. The researchers found that 56.4% of the 266 nutritional intervention studies included between 2000-2020 used theories that facilitate people's ability to take action; most notably, Social Cognitive Theory (SCT) (45.8%).[45] Interestingly, of the researchers in these studies using SCT to inform their interventions, 65% were registered dietitians/nutritionists.[45]

SCT was developed by the late Albert Bandura in 1986 as an adaptation to his earlier theory called "Social Learning Theory" which he developed in the 1960's.[46] SCT emphasizes the construct of "reciprocal determinism", which states that there is a fluid and dynamic interaction between people, their behavior, and their environments.[46,47] The goal of many nutritional interventions is to target personal factors and environmental factors to initiate behavior change. Some notable personal factors include self-efficacy, self-regulation, behavioral capability, and outcome expectations. Conversely, environmental factors include reinforcements, goal-setting, social support, barriers and facilitators, and observational learning.[46,47] Although not all of these constructs are necessary to promote behavior change, research suggests that the more of these constructs included in developing an intervention, the more successful it is likely to be.[46,47]

Almost all of the described nutritional interventions being implemented in CFAP target the agency's environment to reduce client barriers to healthy eating. For example, transitioning to a client-choice distribution model allows CFAP clients to "shop around" and choose food items that are relevant to their households' food preferences and chronic conditions – a factor that was highly desired, but a common barrier among CFAP clients.[32,33,38] Additionally, signage cards, strategic product placement of nutritious foods, stoplight labeling, and meal kits target

both environmental and personal factors by making it easy for clients to overcome their knowledge barriers and engage in healthier decision-making when choosing foods.[32,33,35,44]

Unlike many of the current nutrition interventions in CFAP, cooking demonstrations and meal kits also target self-efficacy and behavioral capability by demonstrating to clients how to make a recipe or providing recipe instructions with which clients may follow along. In this way, cooking demonstrations, and sometimes meal kits, also provide an opportunity for observational learning.[35,44,46,47] The best type of nutritional intervention to implement in a CFAP is highly dependent upon the needs of their clients, the agency's goals and resources, and the researchers' objectives. However, cooking demonstrations and meal kit interventions, in theory, may provide the best likelihood of promoting behavior change among CFAP clients. But, cooking demonstrations may not always feasible for CFAP to implement based on aforementioned agency barriers such as agency size and kitchen facilities, and the agency's food distribution model.[44] Additionally, the Cooksey-Stowers et al.[40] study which looked at CFAP client preferences for nutritional interventions revealed that cooking demonstrations were among the least preferred, whereas meal kits were among the top five preferred in both the Cooksey-Stowers et al.[40] and the Hollis-Hansen et al.,[41] studies. With these findings considered, meal kit interventions within CFAP may be worthwhile to design and implement when trying to improve nutrition-related behaviors among CFAP clients.

PUTTING THEORY INTO PRACTICE: MEAL KIT INTERVENTIONS

Commercial meal kit programs (e.g., HelloFresh, Blue Apron, etc.) deliver boxes of fresh and shelf-stable ingredients for various meals, coupled with step-by-step recipes that aid in increasing ingredient use and preparation self-efficacy among their clients. The recipes provided

by these meal kit programs range from $6.00 - $12.00 per serving and typically require clients to use various cooking equipment and preparation methods.[48] Therefore, these programs are often inaccessible to low-income, low-resource populations.[49] Although less available, meal kits within CFAP have begun to grow in popularity as interventions aimed at improving client intake of commonly underused foods such as fruits, vegetables, and whole grains.

Common client barriers to healthy eating include lack of nutrition knowledge and cooking self-efficacy, limited kitchen equipment, and high food prices associated with nutrient-dense foods.[32,33] As noted by Long et al.,[38] CFAP clients often avoid whole grain foods due to these foods being unfamiliar to cook with and undesirable among their families.[38] Similar findings were revealed in GHS key informant interviews specific foods that were difficult to distribute or underused among pantry clients.[23] Among these foods included different types of legumes such as chickpeas and dry beans, whole grains such as brown rice, produce items such as carrots and mushrooms, and nuts such as walnuts.[23] Meal kit interventions are comprehensive in that they target all of these common client barriers to healthy eating and are designed with SCT to facilitate a change in dietary behaviors among CFAP clients.[44,46,47] See **Figure 4**. Importantly, they are also among the most client-preferred CFAP nutrition interventions that currently exist.[40,41]

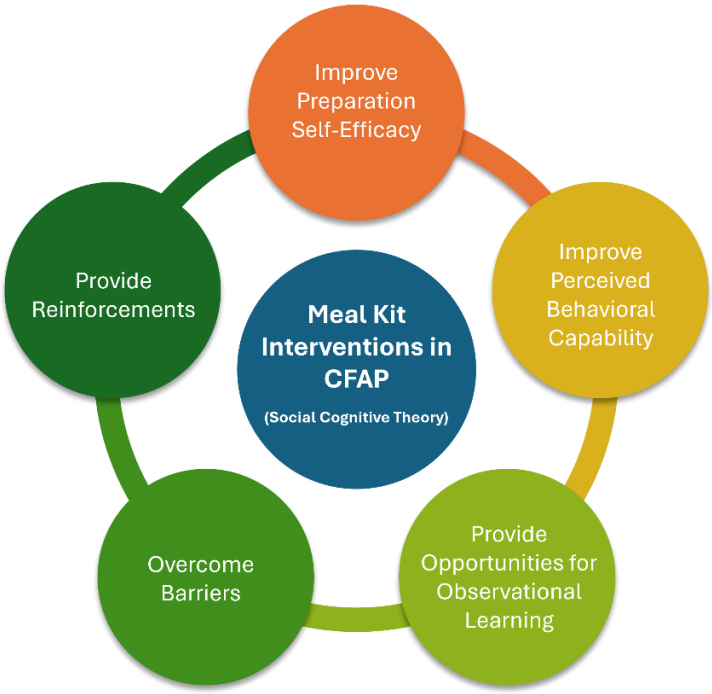

Figure 4. Social Cognitive Theory Constructs in CFAP Meal Kit Interventions [44,46,47]

Figure created using Microsoft PowerPoint

The Impact of Meal Kit Interventions on CFAP Clients' Healthy Eating Habits

The current literature that measures the impact of meal kit interventions on the healthy eating habits of low-income individuals or CFAP clients is limited. However, promising results have been shown. Although the implementation of meal kit interventions is far from standardized, the results of several meal kit intervention studies in this population show that meal kits improve fruit and vegetable intake, cooking self-efficacy, use of commonly underused food items, food security status, and perceived nutrient-dense food availability.

One such study, by Chambers et al.,[50] presented the impact of a 6-week meal kit intervention for low-income families in Gainesville, Florida, on food security status and diet

quality. This meal kit intervention, although not provided at the CFAP level, was designed to improve the diet quality and food security status of low-income individuals. For each of the 6 weeks, each participant received meal kits for 3 different meals with 4 servings per meal.[50] Each meal kit recipe contained at least 1 cup of fresh, canned, dried, or roasted fruits or vegetables. Recipes either contained meat or seafood or were vegetarian.[50] All ingredients for each recipe were measured out and packaged together within an insulated reusable bag for easy distribution to participants. [50] Additionally, researchers partnered with local high school culinary programs, where the preparation and assembly of the meal kits were part of the high school students' culinary classes. The meal kits were also accompanied by nutrition education cards on topics such as cooking terms, kitchen conversions, food safety, diet quality, and family mealtime behavior.[50]

Researchers collected pre-intervention data and post-intervention data immediately after the conclusion of the 6-week intervention and at long-term follow-up conducted 6 months after the intervention concluded.[50] Researchers found that food security scores significantly improved from baseline to post-intervention and long-term follow-up, although there were no significant differences in food security scores between post-intervention and long-term follow-up scores. [50] Similarly, fruit and vegetable intake significantly improved from baseline to post-intervention and long-term follow-up, although there were no significant differences between fruit and vegetable intake from post-intervention to long-term follow-up. [50] Although this meal kit intervention was not implemented in a CFAP setting, few studies exist that provide meal kits to low-income individuals in the southern region of the U.S. Insights from this study's recipe development guidelines, nutrition education material topics, and intervention methodology are important considerations for designing a meal kit intervention for Georgians.

Another earlier study, conducted by Yao et al.[51] in Illinois, aimed to test the effect of a 4-week intervention providing "ingredient bundles" (meal kits) and recipe tastings on CFAP clients' consumption and preparation and choice self-efficacy of whole grain foods.[51] Of the 409 participants, 205 participated in the intervention group, and 204 participated in the control group.[51] Recipe tastings were administered to every client waiting outside in a line to enter the pantry, but only study participants were verbally assessed about the likeability of the sample, predicted ease of recipe preparation, interest in preparing the recipe at home, and self-efficacy in choosing and preparing whole-grain foods.[51]

Researchers also marked whole-grain foods in the pantry with an orange MyPlate marketing tag. Before leaving the food pantry, clients in the intervention group received a bag of ingredients needed to prepare the chicken with a whole grain pasta recipe and verbally told the MyPlate whole-grain message, "Make half your grains whole."[51] For the intervention group, data was collected at baseline, 1-week post-intervention, and 1-month post-intervention. Participants in the intervention group were asked whether or not they prepared the recipe at home and questions about the likeability, ease of preparation, preparation time, changes made to the recipe, likelihood of making the recipe again, and self-efficacy in choosing and preparing whole-grain foods.[51] Participants in the control group were only asked about preparation and choice self-efficacy of whole grains.[51]

Researchers found that, of clients in the intervention group, 93% of clients rated the recipe highly in likeability, and 97% of participants found the recipe to be easy to prepare.[51] Findings also showed that participants in the intervention group had significantly higher consumption of whole-grain foods and higher choice and preparation self-efficacy of whole-grain foods compared to the control group.[51] Although this intervention included meal kits, the

kits were accompanied by recipe samples for clients to try, which might have impacted the effectiveness of this intervention. However, another study conducted in Connecticut by Stein et al.,[52] presents findings that suggest that providing recipe samples alone is ineffective at improving client use of commonly underused food items. This may indicate that meal kits within themselves have a great deal of effectiveness in improving the use of underused food items.

Stein et al.[52] aimed to test the effect of ingredient bundles and recipe tastings on CFAP client selection of kale, brown rice, and whole-wheat pasta. Researchers divided participants into three different experimental groups: those who receive recipe tastings only, those who receive recipe tastings and ingredient bundles, and those who do not receive anything (control group).[52] The 488 study participants were allocated to their groups based on which day they visited the food pantry. The study was observational and did not collect any personally identifying data.[52] The food pantry at which the study was conducted was only open on Mondays, Wednesdays, and Fridays; therefore, the study took place over a 3-week or 9-day period.[52]

The food pantry followed a client-choice distribution model and pantry staff identified kale, brown rice, and whole wheat pasta as the food items that were most infrequently selected among clients.[52] Researchers hired a community chef who was familiar with the food pantry to design recipes around the target foods that use supporting ingredients that are commonly available at the food pantry.[52] Researchers allowed participants to choose between two different recipes: Asian-Inspired Brown Fried Rice and Sautéed Kale and Cannellini Beans over Whole Wheat Pasta, to maintain the client-choice dynamic. Ingredient bundles for each recipe were made to include 4 servings.[52]

For the recipe tasting group, research assistants prepared each recipe, labeled them, and stored them in crockpots until the clients arrived at the pantry. As clients waited in line to

"shop," the research assistants offered samples of both recipes.[52] For the group receiving recipe tastings and ingredient bundles, the same recipe tasting protocol was followed, but ingredient bundles were also displayed on a table in the food pantry. Clients who approached the table were offered the ingredient bundle of their choice and a recipe to make that meal.[52] The pantry functioned normally for the control group. Research assistants noted the number of target foods selected by each client from the shelves and the number of ingredient bundles taken.[52]

Results showed no significant differences between the recipe tasting group compared to the control group in the client selection of kale, brown rice, and whole wheat pasta.[52] However, when recipe tastings and ingredient bundles were provided, client selection of the target foods doubled compared to the recipe tasting only group and tripled compared to the control group.[52] These findings suggest that recipe tastings alone do not appear to increase underused food selection, but ingredient bundles, or meal kits, may.[52]

The improvement of underused food item use is particularly important for CFAP clients in Georgia, as GHS findings revealed that 28% of CFAPs in Georgia reported their clients had limited understanding, interests, and ability to choose, prepare, and store healthier foods at home, such as produce items. Similarly, interviews with food bank representatives suggested there are specific foods (key ingredients) that are difficult to distribute or underused among pantry clientele.[23] The meal kit interventions by Yao et al.[51] and Stein et al.[52] which target CFAP client use, acceptability, and preparation self-efficacy of underused food items may be useful for designing a meal kit intervention and materials that benefit Georgian CFAP clients.

Meal Kit Intervention Feasibility and Acceptability

The aforementioned studies clarify the positive impact meal kit interventions can have on low-income individuals' fruit and vegetable intake, cooking self-efficacy, improved use of commonly underused food items, and food security status.[50-52] However, very few studies measure and discuss the acceptability or feasibility of implementing meal kit interventions in CFAP or other community organizations. Despite the limited data available, findings can still be used to inform the development of new meal kit interventions in CFAP in other states, such as Georgia.

A randomized controlled trial conducted in 2023 by Hollis-Hansen et al.[53] aimed to compare a CFAP meal kit intervention with a nutritious, frozen "no-prep" meal intervention on client food security status and diet quality. In this study, 70 CFAP clients were randomized to receive 14 days of meal kits or "no-prep" meals, each meal including 3 servings.[53] Clients completed questionnaires at baseline and two-week follow-up on their hedonic liking of study meals, perceived dietary quality, and food security.[53]

The meals for both the meal kit intervention and the "no-prep" meal intervention were made to be fairly identical, and researchers used *Axxya Nutritionist Pro™ v7.9* software to assess the nutrient content of each meal.[53] The large-scale food bank at which participants were recruited uses a client-choice distribution model. Clients are permitted one visit to the food bank per month and can pick up food for up to 21 meals per person in the household.[53] For the clients participating in the trial, "no-prep" meals were retrieved from a walk-in freezer and brought to the participant. For the participants receiving meal kits, the ingredients for the meal kit recipe were bundled in a paper bag, and the corresponding recipe was stapled or taped onto the outside of the bag. [53] In both groups, clients were able to select up to 84 servings of study meals as it was

enough for a household of three to have two meals per day, each day of the two-week study period.[53]

Researchers found that, throughout the 2-week intervention, clients receiving meal kits had greater meal satisfaction based on hedonic liking than clients who received the "no-prep" meals.[53] There were also significant improvements in self-reported diet quality and food security status among both intervention groups that were not statistically significant from each of the groups. Lastly, program satisfaction was higher among the clients receiving meal kits compared to clients receiving the "no-prep" meals.[53]

Importantly, this trial also provided insight into the implementation costs incurred by the researchers for both the meal kits and the "no-prep" meals. For the meal kits, the total cost for food and materials was $5,404.20, or $2.57 per meal distributed.[53] The total cost for the "no-prep" meals was $12,222.00, or $5.32 per meal distributed. "No-prep" meals were purchased from a specialized distributor, while meal kit recipe ingredients were purchased from grocery stores by researchers.[53]

The researchers received two separate grants to fund this trial which covered the 2-week intervention costs. For future implementation to be more cost-effective, researchers suggested that agencies with a kitchen facility could repurpose food donations into no-prep meals and meal kits. [53] Another suggestion was that agencies could purchase needed meal kit ingredients that may not be consistently available through donations at whole-sale cost, or request these foods directly from their parent food bank. [53] This randomized controlled trial offered several insights into the logistics of funding meal kits and implementing them into the existing infrastructure of a client-choice agency.

Another study, conducted by Horning et al.[54] in Minnesota, aimed to assess the feasibility and client acceptability of a 10-week meal kit intervention. Each meal kit was informed by the input of community residents and partners. Each recipe was designed to take no more than 45 minutes to make, provide whole grains, and 2-3 servings of vegetables per person.[54] Each recipe also prioritized instructing clients to flavor foods with herbs and spices instead of salt and saturated fats. Researchers designed the recipes to require minimal cooking equipment, only requiring things like a stove, oven, sheet pan, sauté pan, and saucepan.[54] The research team also consulted a registered dietitian to ensure the recipes were aligned with the Dietary Guidelines for Americans.[54]

A local chef was also consulted to create culturally relevant recipes for the area. Some of these recipes included Sauteed Mustard Greens, North African Spiced Chicken with Zucchini & Raisin-Sunflower Quinoa, and a Chicken Fajita Bowl with Lime Rice.[54] Accompanied with each meal kit were recipe cards, recipe instructions, and educational materials, including links to recipe demonstration videos with related food preparation tips. The researchers purchased the meal kits for the intervention from a local meal kit company for $12.00 per meal kit which included 4 servings.[54] Researchers collected feasibility data such as retention rates and process data such as program use. Data were collected at baseline and post-intervention.[54]

Results showed that program retention among the 60 participants was high (90%) and that program participation was also high, with 83% of the participants reporting they made 8 or more meal kit recipes.[54] Additionally, although participants received the meal kits at no cost during the intervention, 94% of participants perceived that the meal kits were either affordable or very affordable, and 96% of participants stated they would recommend the program to a friend.[54] In their discussion, the researchers emphasized the importance of creating culturally appropriate

recipes relevant to the region, as well as prioritizing nutrient density, simple preparation instructions, and limited preparation equipment within meal kit recipes.[54]

Considerations for Meal Kit Recipe and Educational Material Development

Within all of the meal kit intervention studies, there are several important takeaways to consider for the development of meal kit intervention materials. Of these studies, 60% (3/5) of them included a nutrition education component in addition to the meal kit.[50,51,54] These nutrition education components consisted of educational signage highlighting key nutrients, such as whole grains, recipe demonstration videos, or nutrition education cards. Importantly, nutrition education efforts should be tailored to those with limited food literacy and reading levels, as low educational attainment is a common characteristic among CFAP clients.[22] Although the features of a meal kit in itself aid in improving preparation self-efficacy of meals and underused ingredients, the inclusion of additional nutrition education materials helps CFAP clients overcome knowledge barriers to healthy eating and provides observational learning opportunities when cooking demonstration videos are included.[44,46,47] In improving nutrition knowledge, the client may be able to apply that knowledge to making healthy dietary choices long after the intervention has ended.

These meal kit intervention studies also offer notable techniques to consider when tailoring recipes to low-income, low-resource populations like many CFAP clients. For example, Horning et al.[54] ensured that each of their meal kit recipes utilized minimal cooking equipment. This is especially important for CFAP clients, as a common client barrier to healthy eating is limited kitchen equipment.[32,33] Additionally, Stein et al.[52] utilized community partners familiar with the CFAP at which they were conducting their intervention to help inform the supporting ingredients for each meal kit recipe. Although the "key ingredients" of focus were kale, brown

rice, and whole wheat pasta, the additional ingredients needed to make the recipe were based on the commonly available foods at that specific CFAP.[52] When considering feasibility and implementation, Hollis-Hansen et al.[53] suggested that creating meal kit recipes with ingredients already available to the agency would be a cost-effective method for long-term implementation.

Another common theme is the prioritization of nutrient density within the developed meal kit recipes. Yao et al.[51] and Stein et al.[52] focused on highlighting nutrient-dense but underused food items such as whole grain pasta, kale, and brown rice. Other interventions, such as those outlined by Chambers et al.,[50] Hollis-Hansen et al.,[53] and Horning et al.,[54] prioritized recipe alignment with the Dietary Guidelines for Americans by focusing on the nutrient or food group composition of each meal kit recipe. As all of these interventions are aimed at improving diet quality among low-income, low-resource individuals, this aspect of recipe development is essential. Additionally, it is important to consider the high prevalence of chronic conditions among CFAP clients.[9] Reducing certain nutrients, such as added sugars, sodium, cholesterol, and saturated fat, may aid in avoiding general exacerbation of chronic disease among CFAP clients.

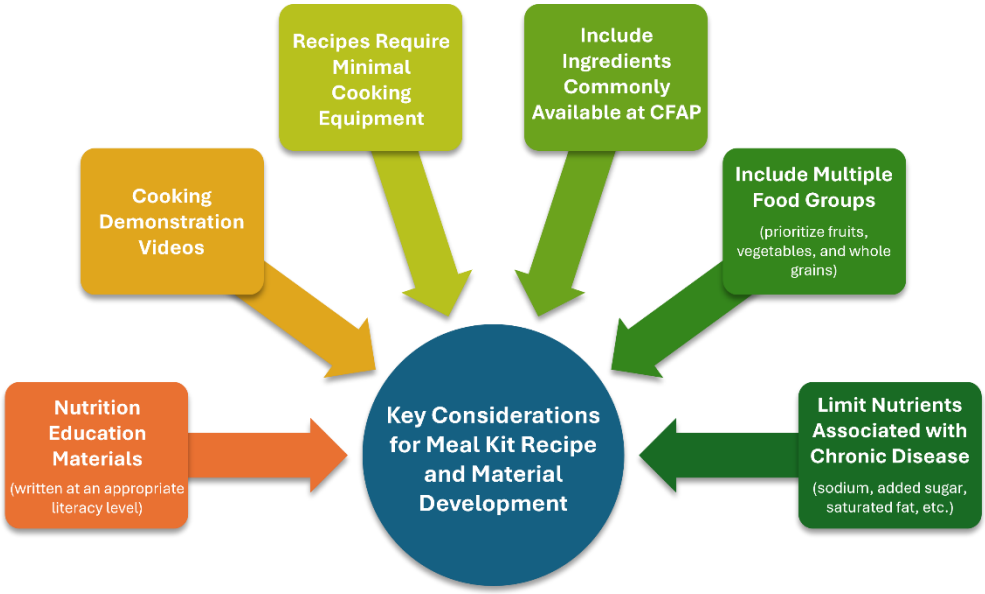

Figure 5. Key Considerations for Meal Kit Recipe and Resource Development [50-54]

Figure created using Microsoft PowerPoint

Gaps and Opportunities for Further Research

Meal kit interventions that serve low-income individuals and CFAP clients have been shown in the literature to improve fruit and vegetable intake, cooking self-efficacy, use of commonly underused food items, food security status, and perceived nutrient-dense food availability in these populations.[50-54] Given the pervasive outcomes of food insecurity and poor diet quality in these populations, such as the high prevalence of chronic disease, improvements in diet quality and food security status are necessary and should be a priority. However, very few studies exist that show the testing and implementation of meal kit interventions that serve low-income communities, with even fewer studies focusing on CFAP.

With the rising rates of CFAP utilization, these agencies are ideal locations to implement meal kit interventions. In the state of Georgia, meal kit interventions serving CFAP clients are

nonexistent. The GHS outlined several client-related agency barriers to serving nutrient-dense foods, such that their clients have limited understanding, interests, and ability to choose, prepare, and store healthier foods at home, such as produce items.[23] With the demonstrated benefits of meal kit interventions in CFAP, such an intervention in the state of Georgia is needed.

RATIONALE

Findings from the GHS suggested there are specific foods (key ingredients) that are difficult to distribute or underused among pantry clients. Additionally, 28% of agencies reported that their clients have limited understanding, interests, and ability to choose, prepare, and store healthier foods at home, such as produce items.[23] To improve the use, acceptability, and preparation self-efficacy of commonly underused food items among CFAP clients, a meal kit intervention within CFAPs in Georgia is needed. No meal kit intervention studies have been conducted within the state of Georgia to better understand the effect of these interventions on improving diet quality and the use of underused food items among CFAP clients.

There is no "one size fits all" approach to nutritional interventions in CFAP due to the various distribution methods and agency types. However, the design of meal kit intervention materials which can be used flexibly to accommodate CFAP, is the first step in implementing meal kit interventions in Georgia. To achieve this, collaboration meetings with key informants and the collection and analysis of comprehensive CFAP inventory data should precede recipe development so that the key ingredients, which the recipes highlight, and the supporting recipe ingredients, are similar across all nine food banks in Georgia. Such key informant collaboration meetings will also provide qualitative data that establishes key themes for developing related meal kit intervention materials in CFAPs.

The importance of developing tailored meal kit recipes is informed by two main ideas. The first is that previous studies that provided meal kits to adults with low income suggested acceptability was highly dependent upon whether they were tailored to their flavor preferences and resource availability.[51-54] Additionally, these recipes will feature key food items that were identified by key informants as being commonly underused by CFAP clients. Importantly, the preparation knowledge of CFAP clients for produce items and whole grains is limited.[22,23,32,35] If the meal kit recipe flavors and preparation requirements are not generally favored by, and accessible to, CFAP clients, the expected outcome of increased utilization and preparation self-efficacy of key ingredients will not be met. Therefore, flexible, flavorful recipes that require limited kitchen equipment will be prioritized. Additionally, meal kit recipes will be bolstered by additional materials, such as cooking demonstration videos and relevant nutrition tips, to help CFAP clients overcome nutrition knowledge and cooking self-efficacy barriers. The developed materials will be made available to all SNAP-Ed eligible Georgians by being featured in the 2025 UGA SNAP-Ed Recipe Calendar, preceding the pilot of a meal kit intervention in CFAP in Georgia.

Food insecurity rates have continued to increase, reaching levels that have not been seen in over a decade in the U.S.[5] CFAP have seen unrelenting, increased participation since the COVID-19 pandemic but experience significant underuse of well-stocked, nutrient-dense food items due to several client-related barriers to choosing, using, and preparing these foods.[20-22,34,35] Without a nutritional intervention that targets these barriers among CFAP clients, nutrient-dense foods that would improve client diet quality will continue to be underused and wasted at the pantry and household levels. Therefore, the development of a meal kit intervention for CFAP clients is critical. The methodology and materials created from this study may serve as a guide

for other states aiming to develop meal kit recipes and materials that improve the use of underused food items among their CFAP clients.

SPECIFIC AIMS

The purpose of this thesis is to describe the development of meal kit recipes and related materials for CFAP in Georgia. The specific aims of this study are to:

Aim 1. Form a collaboration team of key informants to support the development of tailored meal kit recipes highlighting specific foods (key ingredients) that are difficult to distribute or underused among pantry clients.

Key informant collaboration meetings with experts in recipe development, food bank PSE interventions, and food bank representatives will be conducted. These meetings will provide relevant resources and inventory data for creating acceptable meal kit recipes that require limited kitchen equipment and feature commonly underused food items. Food bank inventory data will be collected and sorted to create a comprehensive list of possible recipe ingredients.

Aim 2. Develop tailored meal kit recipes and related materials.

The information collected from the informed collaboration will inform the development of twelve tailored meal kit recipes. Collaboration with food bank nutritionists will take place for initial recipe and nutrition tip development. Preliminary recipe testing will be completed by Nutritional Sciences graduate students and UGA SNAP-Ed staff at the University of Georgia. Recipe demonstration videos will highlight the featured ingredient and nutrition tips for each month, as well as include additional food safety and nutritional considerations related to each recipe.

Aim 3. Disseminate meal kit recipes and materials to SNAP-Ed eligible Georgians through the 2025 UGA SNAP-Ed Recipe Calendar.

The developed and informally tested meal kit recipes and materials will be featured in the 2025 UGA SNAP-Ed Recipe Calendar and distributed throughout the state of Georgia. Distributions of the calendar will be monitored by tracking the number of agency orders.

The recipes and materials developed from this study will inform a pilot meal kit intervention, formal recipe sensory evaluation in CFAP, and long-term strategies for expanding this meal kit intervention statewide. Future directions may include collaborating with other states so that they may adapt the intervention for the benefit of their own unique populations.

CHAPTER 3

METHODOLOGY

STRATEGIES FOR MEAL KIT RESOURCE DEVELOPMENT

Based on the findings from existing meal kit interventions in CFAP, three key strategies were used for meal kit intervention resource development in the present study. These included developing 1) recipes requiring minimal cooking equipment, including ingredients commonly available at CFAP and multiple food groups, and limiting nutrients associated with chronic disease, 2) supplemental nutrition education materials, and 3) cooking demonstration videos (**Table 4**).

These resource development strategies, used or suggested by Chambers et al.,[50] Yao et al.,[51] Stein et al.,[52] Hollis-Hansen et al.,[53] and Horning et al.,[54] increase the likelihood of improving CFAP clients' use of underused nutrient-dense food items. These strategies help CFAP clients overcome common barriers to healthy eating, such as lack of nutrition knowledge and cooking self-efficacy, limited kitchen equipment, special dietary needs, and financial barriers.

In addition to the identified resource development strategies, this study used two novel strategies to improve the resources' flexibility in use across several different CFAP agency types and to increase the scalability potential of these resources for future statewide dissemination. These novel strategies include the use of "create-your-own" recipe frameworks and the use of regional food bank inventory data to inform recipe ingredients. Create-your-own recipe frameworks provide several ingredient options that can be customized to allow CFAP clients to

better utilize what they can acquire at their agency. Not all agencies have to have the same inventory for a create-your-own recipe to be utilized, which allows for more flexibility in using these resources. Similarly, scalability potential may be improved through the use of food bank inventory data to inform recipe ingredients. As previously described, food banks are comprised of several smaller agencies that receive food from that food bank. If the inventory data of food banks are used to inform recipes, it may better allow for the use of those recipes in those food banks' agencies.

Table 4. Strategies Used to Develop Meal Kit Resources

Key Strategies from the Literature	Resources/Strategies Implemented
Tailored meal kit recipes	
Requiring minimal cooking equipment[54]	Only minimal cooking equipment needed, such as pot, pan, cutting board, knives, mixing bowl, baking sheet, oven, stove, and refrigerator.
Including commonly available ingredients at CFAP[52,53]	Obtained/sorted inventory data from 2 regional food banks in Georgia to inform recipe ingredients
Including multiple food groups[50-54]	Most recipes included 3 different food groups (i.e., grain, protein, vegetables)
Limiting nutrients associated with chronic disease[50-54]	All traditional recipes were analyzed with *Nutritionist Pro 2.0 Nexgen* software, and had to meet specific nutrient criteria for saturated fat, sodium, and cholesterol following the UGA SNAP-Ed Recipe Guidelines (**Appendix A**).
Supplemental nutrition education materials[50,51,54]	Recipe tips on nutrition, preparation, or food safety related to each recipe
Cooking demonstration videos[54]	Cooking demonstration videos filmed/edited for each recipe

THEORETICAL FOUNDATION

The meal kit recipes and related materials described in this thesis were informed by Social Cognitive Theory. Social Cognitive Theory (SCT) is a health behavior theory, developed by Albert Bandura, that emphasizes "reciprocal determinism," or the dynamic interaction between people, their behavior, and their environments.[46,47] Like many nutritional interventions, including existing meal kit interventions, the goal is to target personal and environmental factors to initiate behavior change. Personal factors targeted by the developed meal kit recipes and related materials include self-efficacy and behavioral capability, while targeted environmental factors include reinforcements, barriers, and observational learning. Research suggests that the more personal and environmental factors considered in developing an intervention or intervention materials, the more successful it is likely to be.[46,47] Twelve meal kit recipes were developed; each accompanied by a related "recipe tip" and a recipe demonstration video.

The developed recipes were tailored to require minimal cooking equipment and were designed for free distribution at CFAP. These characteristics help overcome the well-cited barriers to healthy eating that include CFAP clients' limited access to kitchen equipment and high food prices associated with nutrient-dense foods. Additionally, the recipe tips provide useful knowledge related to nutrition, food safety, and food preparation relevant to each recipe. The tailored meal kit recipes, in combination with the recipe tips, are designed to improve CFAP clients' nutrition-related knowledge and behavioral capability for choosing and using commonly underused food items. The addition of cooking demonstration videos, coupled with their corresponding recipes, targets the CFAP clients' preparation self-efficacy of underused food items. These demonstration videos also provide an opportunity for observational learning, as

clients who have difficulty carrying out the written recipe instructions may follow along with the actress in the video who is correctly preparing the recipe.

INFORMED COLLABORATION

The primary purpose of creating a collaboration team of key informants was to acquire relevant resources, recommendations, and inventory data for creating acceptable meal kit recipes that require limited kitchen equipment and feature commonly underused food items among CFAP clients. The resources, recommendations, and inventory data were collected over a series of 5 collaboration meetings with recruited key informants with expertise in the areas of PSE interventions within CFAP, culinary and recipe development, and experience in working with and developing nutrition education content for CFAP clients.

Collaboration Meetings with Key Informants

Key Informant Recruitment

The key informants were selected through a network of partner recommendations established by the GHS and the existing professional relationships of the project's Principal Investigator (PI), Dr. Jung Sun Lee, PhD, RDN. A collaboration team including 9 key informants from UGA SNAP-Ed, UGA Cooperative Extension, and Atlanta Community Food Bank (ACFB) helped inform meal kit recipe and material development. These key informants were invited for their expertise in PSE interventions within CFAP, culinary and recipe development, and experience in working with and developing nutrition education content for CFAP clients. Recruitment to the collaboration team occurred primarily through email, and a total of 5 collaboration meetings took place online through Zoom between February 2024 and June 2024.

Key Informant Participants

Pre-collaboration CFAP resource sharing began at the beginning of 2024 when Joy Goetz, MS, RD, LD, CHES, the Nutrition and Wellness Program Manager at ACFB, shared ACFB's resource drive with UGA SNAP-Ed and other food bank representatives in the state of Georgia. The shared resources included recipe cards, produce guides, how-to cooking guides, and cooking demonstration videos created by ACFB. In the initial stages of collaboration team development, a committee member for this thesis project and UGA Extension Nutrition and Health Specialist, Alison Berg, PhD, RD, LD helped initiate the recruitment of Extension Chronic Disease Specialist, Michelle Parisi, PhD, RD, LD, who has done CFAP-related work through the Centers for Disease Control and Prevention High Obesity Program (CDC-HOP) grant in South Carolina.

A formal collaboration with Joy Goetz was initiated through email communication at the beginning of 2024. The first collaboration meeting between Joy Goetz (ACFB), Dr. Berg, Dr. Parisi (UGA Extension), and UGA SNAP-Ed was conducted in February 2024 through Zoom. A personalized collaboration invitation email was sent to the Food Bank of Northeast Georgia (FBNEGA) in February 2024. Although FBNEGA was able to provide their limited inventory data, a continued collaboration opportunity was declined. In April 2024, committee member and sensory evaluation expert, Ginnefer Cox, PhD, RD, LD, was recruited as part of the collaboration team of key informants.

In May 2024, Joy Goetz connected a nutrition assistant from ACFB, Kristen Elliott, RD, LD, with the collaboration team to provide recommendations for tailoring meal kit recipes to CFAP clients. Once initial versions of the meal kit recipes were developed, Extension Nutrition Specialist and culinary expert, Tracey Brigman, EdD, MS, RD, LD, aided in the first round of

content feedback and recommendations. Notable key informants from UGA SNAP-Ed in content readability and 2025 UGA SNAP-Ed calendar design included UGA SNAP-Ed Program Coordinator, Edda Cotto-Rivera, MPH, CHES, Social Marketing Coordinator, Tristen Tyler Webb, BA, and Senior Graphics Designer, Jennifer Denson, BFA. The collaboration team, including 10 key informants, was essential in obtaining CFAP inventory data, the selection of commonly underused food items in CFAP, or "key ingredients," and recipe/material development and tailoring. See **Table 5.** A total of 5 monthly collaboration meetings were conducted over Zoom between February and June 2024.

Table 5. Key Informants Invited for the Meal Kit Collaboration Team

Key Informant	Organization	Areas of Expertise
Jung Sun Lee, PhD, RDN	UGA/ UGA SNAP-Ed	• Community and Public Health Nutrition • Community-based Nutrition Intervention • Food insecurity
Alison Berg, PhD, RD, LD	UGA Extension	• Community Nutrition Education • Program Dissemination and Implementation
Michelle Parisi, PhD, RD, LD	UGA Extension	• Program Dissemination and Implementation • Chronic Disease Prevention
Edda Cotto-Rivera, MPH, CHES	UGA SNAP-Ed	• Nutrition and Health Education • Public Health Interventions
Jennifer Denson, BFA	UGA SNAP-Ed	• Graphic Design • Photography
Tristen Tyler Webb, BA	UGA SNAP-Ed	• Social Marketing • Photography
Tracey Brigman, EdD, MS, RD, LD	UGA	• Ingredient Function in Foods • Food Safety • Adult Learning Theory
Ginnefer Cox, PhD, RD, LD	UGA	• Sensory Evaluation • Recipe Development • Food Safety
Joy Goetz, MS, RD, LD, CHES	ACFB	• Nutrition Resource Development for CFAP • Food Bank Inventory
Kristen Elliott, RD, LD	ACFB	• Recipe Development • Nutrition Resource Development for CFAP

Jacob Lambeck, MPA	FBNEGA	• CFAP Strategy and Impact • Food Bank Inventory

Note: The organizations listed include the University of Georgia (UGA), University of Georgia Supplemental Nutrition Assistance Program Education (UGA SNAP-Ed), University of Georgia Cooperative Extension (UGA Extension), Atlanta Community Food Bank (ACFB), and Food Bank of Northeast Georgia (FBNEGA).

Food Bank Inventory Data Acquisition

A formal collaboration request to FBNEGA was sent in February 2024 through email. In this email, sent by the PI, it was requested that a year-long list of inventory items received and distributed by the FBNEGA be shared. They were able to provide inventory data for 2023 which was sorted by pounds received and storage method. However, further collaboration on meal kit recipes and material development was declined.

In April 2024, Joy Goetz (ACFB) sent a comprehensive list of USDA commodity items received by ACFB from January 1, 2022 until April 17, 2024. This inventory data offered monthly item receipts and included the number of pounds received for each food item. These monthly item receipts allowed for inventory data to be sorted according to the most common items received per calendar month.

Inventory data from FBNEGA was sorted by number of pounds received, food group, and storage method. FBNEGA inventory data was aggregated and did not allow for ranking by month and season. Sorting was executed through the use of Microsoft Excel and food group categorization was conducted manually. Inventory data from ACFB was sorted by pounds received for each month and season and summarized in tables representing the top 10 food items by pound for each month. To allow for more direct comparisons between FBNEGA and ACFB inventory data, content analyses of all foods within the ACFB inventory were conducted, and foods were categorized by food group and storage method. The storage method for each food

item in the ACFB inventory, manually inputted and also categorized, was cross-checked and confirmed by Joy Goetz.

After sorting the FBNEGA and ACFB inventory data by number of pounds received, food group, and storage method, the data were summarized in tables representing the top 5 food items by pound for each food group and storage method. For ACFB inventory data only, food items were ranked by pounds for all 12 months. Notably, During categorization, all items received between 2022 and 2024 were combined before ranking by pound and categorized. Lastly, the food item descriptions were manually analyzed for key terms associated with their nutrient content, such as “low sodium”, “unsweetened”, “in water”, “in light syrup”, etc. Using these item descriptions, foods that had reduced sodium, low sodium, were whole grain/wheat, low fat, unsweetened, canned in light syrup, or canned in water, were color-coded for emphasis during recipe development. See **Figure 6.**

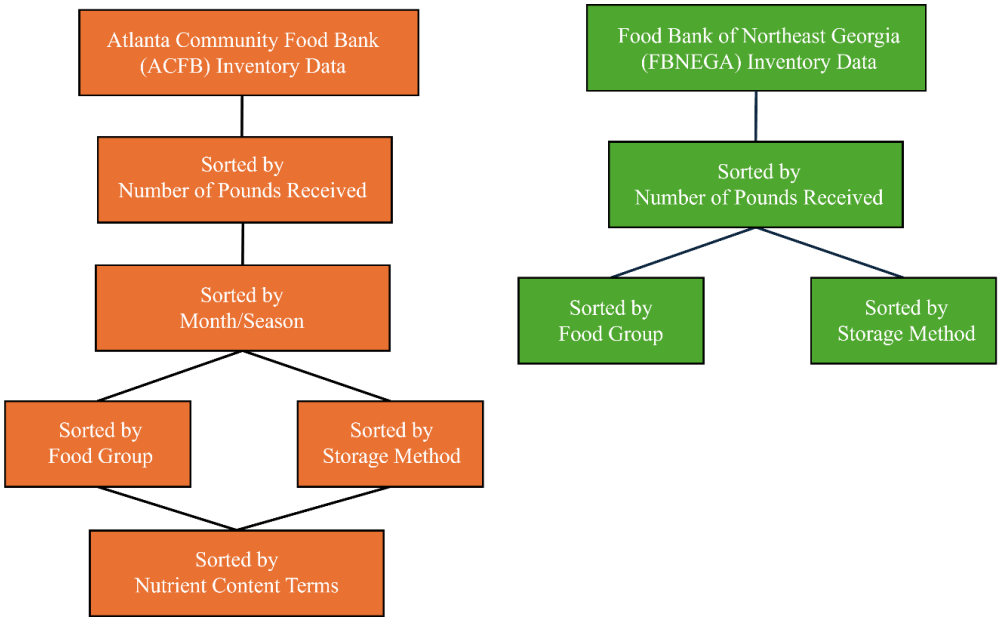

Figure 6. Food Bank Inventory Data Sorting Process

Figure created using Microsoft PowerPoint

Key Ingredient Selection

The objective of "key ingredient" selection was to identify 12 food items that are commonly underused by CFAP clients. The selection criteria for the 12 key ingredients included that the food items needed to be commonly underused by CFAP clients and be items commonly distributed throughout the year; however, there were no food group restrictions on the selection of key ingredients. A total of 8 key ingredients were confirmed by Joy Goetz during the key informant collaboration meetings. Although not necessarily underused by CFAP clients, Vidalia onions were included as a 9th key ingredient for their relevance in Georgia as the official state vegetable and that they are a household staple. Due to the limited number of identified and selected key ingredients, 9 of the 12 developed meal kit recipes included a featured food item.

CHAPTER 4

RESULTS

INFORMED COLLABORATION DATA

Inventory Data

Food Bank of Northeast Georgia

The number of inventory items provided by both regional food banks was 1,544 food items. However, data provided by FBNEGA included items such as baking ingredients, sugar-sweetened beverages, non-food items, and non-specific "assorted" items, which were all excluded from sorting (n= 222 inventory items), making the total number of items available for sorting 1,322 items, or 33,876,052 pounds of food.

FBNEGA provided inventory data for the full year of 2023. The data provided included brief item descriptions, the number of pounds received, and the storage method of each item. The inventory items provided included food, sugar-sweetened beverages, and non-food items such as cleaning, baby, and hygiene products. All items that were not food were excluded, as they could not be used in recipe development. Therefore, a total of 335 food items were sorted, and data was placed into summary tables of the top 10 food items by pounds received, the top 5 food items by each food group, including fruits, vegetables, grains, protein, and dairy, and the top 5 food items by storage method, including dry, cooler, and freezer.

The top 10 food items by pounds received included white rice, walnut halves, fresh sweet potatoes, fresh grapes, fresh oranges, canned green beans, apple juice, frozen blueberries, fresh grapefruit, and canned corn. See **Table 6**. The total number of pounds received from the 10 food

items identified from 2023 inventory data made up a total of 1,947,480 pounds of food. Of this, 820,690 pounds (42.1%) were fruits, 525,480 pounds (27.0%) were vegetables, 343,000 pounds (17.6%) were grain, and 258,310 pounds (13.3%) were proteins. No dairy foods were represented in the top 10 food items identified. Additionally, an overwhelming majority of foods from the top 10 foods list were part of the dry storage method category, with 1,060,590 pounds (54.5%) being dry, shelf-stable foods.

Table 6. List of Top 10 Food Items Distributed at the Food Bank of Northeast Georgia (FBNEGA) in 2023

Item Description	Pounds	Food Group	Storage Method
USDA rice ccc	343,000	Grain	Dry
USDA walnut halves and pieces	258,310	Protein	Dry
USDA sweet potatoes	222,000	Vegetable	Cooler
USDA fresh table grapes ccc	185,250	Fruit	Cooler
USDA oranges	184,680	Fruit	Cooler
USDA green beans	174,960	Vegetable	Dry
USDA apple juice	155,800	Fruit	Dry
USDA frozen blueberries ccc	148,320	Fruit	Freezer
USDA grapefruit	146,640	Fruit	Cooler
USDA corn, whole kernel no salt	128,520	Vegetable	Dry

When extending beyond the top 10 food items by pounds received list, other food items became evident when sorted for the top 5 by food group and storage method. Additional vegetable items included canned collard greens and canned mixed vegetables; however, since fruit was the most highly represented food group in the top 10 food items by pound list, no

additional fruit items were shown outside of the 5 listed in the top 10 list. Several additional grain items became apparent, as the only grain item represented in the top 10 list was white rice. These additional items included spaghetti noodles, dry macaroni and cheese, saltine crackers, and granola cereal. The top 5 dairy items by pound received included 2% milk, shredded cheddar cheese, shredded Monterrey Jack cheese, dry 1% milk, and Mexican-style cheese. Lastly, several additional protein foods emerged, such as garbanzo beans, dark red kidney beans, pulled pork, and yellow split peas. See **Table 7**. When FBNEGA inventory data was sorted by storage method, fresh apples, frozen chicken drumsticks, frozen boneless pork loin roast, and frozen strawberries emerged as additional common food items in the "cooler" and "freezer" storage categories. See **Table 8**.

Table 7. List of Top 5 Items by Food Group in 2023 in FBNEGA

Food Group	Item Description	Pounds	Storage Method
Vegetables	USDA sweet potatoes	222,000	Cooler
	USDA green beans	174,960	Dry
	USDA corn, whole kernel no salt	128,520	Dry
	USDA canned collard greens ccc	90,440	Dry
	USDA mixed vegetables ccc	90,440	Dry
Fruits	USDA fresh table grapes ccc	185,250	Cooler
	USDA oranges	184,680	Cooler
	USDA apple juice	155,800	Dry
	USDA frozen blueberries ccc	148,320	Freezer
	USDA grapefruit	146,640	Cooler

Grains	USDA rice ccc	343,000	Dry
	USDA spaghetti	80,960	Dry
	GNAP macaroni & cheese	45,630	Dry
	Saltine crackers, Zesta original	24,960	Dry
	Granola cereal, Nature Valley oat & honey	18,096	Dry
Proteins	USDA walnut halves and pieces	258,310	Dry
	USDA garbanzo beans	124,620	Dry
	USDA dark red kidney beans ccc	82,620	Dry
	USDA fully cooked pulled pork ccc	82,000	Freezer
	USDA yellow split peas	80,640	Dry
Dairy	USDA 2% milk, fresh ccc	36,000	Cooler
	USDA shredded yellow cheddar cheese ccc	33,600	Cooler
	Shredded Monterrey jack cheese w/ hatch green chiles	6,704	Cooler
	F2k white milk 1%	5,100	Dry
	Kraft Mexican style four cheese	1,632	Cooler

Table 8. List of Top 5 Items by Storage Method in 2023 in FBNEGA

Storage Method	Item Description	Pounds	Food Group
Dry	USDA rice ccc	343,000	Grains
	USDA walnut halves and pieces	258,310	Proteins
	USDA green beans	174,960	Vegetables
	USDA apple juice	155,800	Fruits
	USDA corn, whole kernel no salt	128,520	Vegetables
Cooler	USDA sweet potatoes	222,000	Vegetables

	USDA fresh table grapes ccc	185,250	Fruits
	USDA oranges	184,680	Fruits
	USDA grapefruit	146,640	Fruits
	Apples, SHL	116,000	Fruits
Freezer	USDA frozen blueberries ccc	148,320	Fruits
	USDA fully cooked pulled pork ccc	82,000	Proteins
	USDA chicken drumsticks ccc	76,000	Proteins
	USDA pork loin boneless roast	40,960	Proteins
	USDA frozen strawberries ccc	40,920	Fruits

Atlanta Community Food Bank

ACFB provided inventory data from January 1, 2022, until April 17, 2024. The data provided included each item's purchase order (PO) number, item number, brief item description, receipt date, and number of pounds received. The inventory items provided only included The Emergency Food Assistance Program (TEFAP) food items, so no foods were excluded as they could all be used within recipes. Therefore, a total of 987 food items were sorted, and data were placed into summary tables of the top 10 food items by pounds received, the top 5 food items by each food group, including fruits, vegetables, grains, protein, and dairy, and the top 5 food items by storage method, including dry, cooler, and freezer. All data was organized by month and season based on the items' receipt date. The food item descriptions were manually analyzed for key terms associated with their nutrient content and color-coded for emphasis during recipe development. See **Appendix B** for how food items were categorized for Spring (March 2022-May 2024).

The total number of pounds received from the 10 food items identified from 2022 to 2024 inventory data ranged between 423,877 (May) and 439,552 (November) pounds of food per month, with a total of 5,156,164 pounds of food received among the top 120 food items. Of the 120 foods identified among all 12 months, 1,583,254 pounds (30.7%) were proteins, 1,328,334 pounds (25.8%) were grains, 1,084,271 pounds (21.0%) were vegetables, 1,032,265 pounds (20.0%) were fruits, and 128,040 pounds (2.5%) were dairy. As seen in the FBNEGA inventory data, a large majority of the top 120 food items were also part of the dry storage method category, with 4,379,843 pounds (84.9%) being dry, shelf-stable foods.

As seen with the FBNEGA inventory data, other food items became evident beyond the top 120 food items by pound received when sorted for top 5 by food group and storage method. This was particularly true for underrepresented food groups and storage methods in the top 120 list, such as dairy, cooler, and freezer foods. Importantly, these top 5 data were organized by month. It was the case for the month of May that 5 frozen food items could not be identified, as there were only 4 different frozen food items received by ACFB in that month. Additionally, in every month, there were fewer than 5 grain or dairy food items received by ACFB; therefore, the number of food items listed in these categories ranges from 1-5, depending on the month. However, all other storage methods and all food groups had at least 5 food items to be sorted for all months. See **Appendix B** for how the top 5 food items were categorized by food group and storage method for the month of January.

Due to TEFAP items having more detailed item descriptions compared to the variety of inventory items offered by FBNEGA, the inventory data provided by ACFB was manually analyzed for key terms associated with their nutrient content. All top 120 food items identified, as well as the top 5 items identified for food group and storage method, were color-coded in

Microsoft Excel based on nutrient keywords for emphasis during recipe development. A total of 14 food items were identified based on these nutrient keywords. Only 1 item was identified for each of the "reduced sodium" and "canned in water" categories. In each of the "low sodium," "unsweetened," and "canned in light syrup" categories, 2 food items were identified. In the "whole grain/wheat" and "low fat" categories, 3 food items were identified. See **Table 9**.

Table 9. List of Top Food Items by Nutrient Key Terms in the Atlanta Community Food Bank (ACFB) Inventory, 2022-2024

Nutrient Key Term	Item Description	Total Pounds	Months Received
Reduced Sodium	TEFAP peanut butter (gf), 12-16 oz. jars reduced sodium	92,160	March, April
Low Sodium	TEFAP cut green beans low sodi, 24-14.5 oz cans (85cs)	252,720	March, June, August, September, October, November
	TEFAP chick peas (low sodium), 24/15 oz cans	41,310	June
Whole Grain/Wheat	TEFAP brown long grain rice, 30/2 lbs bags per case	172,025	January, March, April, September
	TEFAP hot wheat cereal, 10/18oz	81,600	July, November
	TEFAP frozen wheat tortilla, 24/10 ct	81,000	May, October
Low Fat	TEFAP-low fat milk 1% milk, 9-1/2 gallons per case (50cs)	184,582	February, July, September, October, November

	TEFAP 1% lowfat milk-32 oz uht, 12/32oz cartons	121,500	April, October, December
	TEFAP 1% lowfat milk-8 oz uht, 27/8oz cartons	42,240	March
Unsweetened	TEFAP unsweetened apple sauce, 24-15 oz cans	126,360	March, April, November
	TEFAP applesauce cup, unsweet, cup - 96/4.5	79,800	January, February
Canned in Light Syrup	TEFAP pear halves in ls, 24/15 oz cans	87,480	February, June
	TEFAP mixed fruit in ls, 24/15 oz cans per case (102cs)	43,740	November
Canned in Water	TEFAP canned chicken n/water, 24/12.5 oz cans (100cs)	41,400	July

Key Ingredients

A total of 9 key ingredients were identified to be featured within the meal kit recipes. Due to the limited number of identified key ingredients, only 9 of the 12 developed meal kit recipes included a featured food item. Several of the chosen recipes and month placement for those recipes were informed directly by the key ingredient. For example, February is "National Heart Health Month" and walnuts are a rich source of omega-3 fatty acids that are beneficial for heart health. Therefore, walnuts were placed as the key ingredient for February, and recipes featuring walnuts were considered. Additionally, September is "National Mushroom Month", so mushrooms were placed as the key ingredient for September. Other key ingredients, however, were placed after the recipes were decided, such as in January which is "National Soup Month" and a day in October which is "National Gumbo Day." For these months, key ingredients that would match soup or gumbo recipes were placed accordingly, such as split peas for January and

dry beans for October. The remaining key ingredients were placed based on their peak season, such as chickpeas in June, lentils in August, and carrots in December.

MEAL KIT RECIPES

Timeline

Initial information needed for meal kit recipe and material development was collected throughout the first few monthly key informant collaboration meetings beginning in February 2024. However, recipe selection and recipe tip development did not begin until May 2024. Recipe selection underwent 5 rounds of feedback from key informants. Feedback was provided through live comments that are available through file sharing on Microsoft OneDrive. Recipe selection was finalized by August 2024, but recipe tailoring continued until September 2024. Recipes were tailored to achieve nutrient specifications, minimize preparation equipment needed, and align with inventory data and seasonal recommendations.

In August and September 2024, recipe testing and informal sensory evaluation of appearance, texture, flavor, saltiness, and smell occurred over the span of 4 nonconsecutive days. On each day, 3 recipes were prepared, photographed, and informally sensory evaluated by graduate students in the Department of Nutritional Sciences and UGA SNAP-Ed staff. The development of the recipe tips was finalized by August 2024 after several rounds of key informant feedback. Recipe demonstration video production was the final step in meal kit material development and occurred between September 2024 and December 2024. Within this four-month time frame, video production planning, filming, and editing occurred.

Throughout the meal kit recipe and material development process, there were often extended waiting periods and some delays. Due to the size of the key informant collaboration

team, not everyone's availabilities aligned with the scheduled monthly collaboration meetings between February and June 2024. Therefore, feedback in the development of the meal kit recipes and materials often required extended waiting periods of several weeks. Additionally, campus closures related to Hurricane Helene in September 2024, and funding amendment review and approvalwith the video production delayed the production schedule for the 12 recipe demonstration videos. See **Table 10.**

Table 10. Timeline for the Development of the Meal Kit Recipes and Related Materials

Task	Time	Comments
Recruitment of Key Informants	~ 8 months	A total of 10 key informants were recruited to the collaboration team.
Key Informant Collaboration Meetings	~ 5 months	A total of 5 monthly collaboration meetings took place.
Key Ingredient Selection and Inventory Data Collection/Sorting	~ 4 months	A total of 9 key ingredients were identified and inventory data from ACFB and FBNEGA were collected and sorted.
Recipe Selection	~ 3 months	A total of 12 meal kit recipes were selected and informed by 5 different rounds of key informant feedback.
Recipe Tailoring	~ 3 months	Recipes were tailored to achieve several nutrient specifications, minimize preparation equipment needed, and align with inventory data and seasonal recommendations.
Recipe Tip Development	~ 3 months	A total of 12 recipe tips, including nutrition, food preparation, and food safety information related to each recipe, were developed.
Recipe Testing	4 days	Recipe testing occurred over 4 days with 3 recipes being prepared, photographed, and informally sensory evaluated on each day.
Video Production Preparation	~ 2 months	Recipe checklists, video scripts, and task/personnel schedules were developed. Ingredients for each recipe were purchased and pre-cooked in preparation for the video production days. The preparation period was extended due to Hurricane Helene, and budget amendment review and approval delays.

Video Filming	2 days	A total of 7 recipe videos were filmed on Day 1, and 6 recipe videos were filmed on Day 2.
Video Editing/Feedback	~ 2 months	The recipe videos and teaser trailers for each recipe underwent a total of 8 revision cycles.

Recipe Development

All original meal kit recipes were sourced from ACFB's Microsoft OneDrive of nutrition education materials and recipes entitled "Pantry to Plate," UGA SNAP-Ed, Ohio State University's SNAP-Ed program, Oregon State University Extension, and University of Maryland Extension. Recipe selection occurred during 5 separate rounds of key informant feedback. All key informant feedback was provided through live comments available through file sharing on Microsoft OneDrive. Since 12 recipes were selected for the 2025 UGA SNAP-Ed Recipe Calendar, all recipe options were listed on separate presentation slides, using Microsoft PowerPoint, with their corresponding month and key ingredients.

The 9 key ingredients identified through the 5 key informant collaboration meetings were associated with 9 of the 12 calendar months. The month placement for the 9 key ingredients was based on related food "celebration" days in the U.S., chronic disease awareness months, such as "Heart Health" month in February, or the key ingredient's seasonal peak. Of the considered recipes, 9 of them were related to the key ingredient of that month, and the remaining 3 recipes were chosen based on national food-related "celebration" months/days, such as "National Salad Month" in May and "National Vidalia Onion Month" in April. A variety of recipe types were considered for their alignment, ensuring flexibility so that the recipes can be easily used and accepted by multiple CFAP agency types and distribution methods.

Create-Your-Own Recipe Frameworks

Through collaboration with Joy Goetz from ACFB, the research team acquired access to ACFB's "Pantry-to-Plate" resource drive which included a plethora of recipes for CFAP clients. Among these recipes were flexible recipe frameworks that ACFB dubbed "Build-Your-Own Recipe Guides." These recipe frameworks include 4-5 ingredient options for each food group within the recipe. For example, the "Build-Your-Own-Pizza" recipe guide had several options for crust, sauce, toppings, and cheese from which clients could choose. These recipe frameworks are unique in that they do not require CFAP clients to have a specific set of ingredients to prepare the recipe. Instead, the recipe can be customized to allow CFAP clients to better utilize what they can acquire at the food pantry or what they have at home. Due to this built-in flexibility, the research team adopted several of these recipe frameworks, calling them within the 2025 UGA SNAP-Ed Recipe Calendar, "Create-Your-Own" recipes.

Recipes Considered and Chosen

In addition to the "create-your-own" recipes, full "meal" recipes, including an entrée and a side dish, were considered, as well as smaller recipes for side dishes or snacks. A total of 33 recipes were initially considered, and 19 recipe options were eliminated after the first round of key informant feedback. Of the remaining 14 recipes, the final 12 were decided by the fifth round of key informant feedback. Of the 12 selected recipes, 6 followed a traditional recipe format with 2 recipes being small side dish or snack recipes and 4 being full "meal" recipes. The remaining 6 recipes were "create-your-own" recipe frameworks. See **Table 11.**

Table 11. Meal Kit Recipe Selection Process

	Recipes Initially Considered (n=33)	**Recipes Remaining After First Round of Key Informant Feedback** (n=14)	**Final Recipes Selected** (n=12)
January	• Slow Cooker Stew Peas • Coconut Split-Pea Curry • Create-Your-Own Soup	• Create-Your-Own Soup	• Create-Your-Own Soup
February	• Walnut-Crusted Pork Chops with Cherry Topping • Walnut and Broccoli Stir-Fry • Blueberry Walnut Crisp • Walnut Trail Mix	• Blueberry Walnut Crisp • Walnut Trail Mix	• Walnut Trail Mix
March	• Create-Your-Own Stir-Fry	• Create-Your-Own Stir-Fry	• Create-Your-Own Stir-Fry
April	• Caramelized Onion Lentils and Rice • Southwestern Style Rice Bowl • Chicken Salad Sandwich • Cucumber Onion Salad	• Southwestern Style Rice Bowl • Chicken Salad Sandwich	• Southwestern Style Rice Bowl
May	• Create-Your-Own Salad	• Create-Your-Own Salad	• Create-Your-Own Salad
June	• White Chicken Chili • Jerk Fish Tacos, Pineapple Slaw, and Crispy Chickpeas • Curry Chickpea Sandwich • Three Bean Medley	• Three Bean Medley	• Three Bean Medley
July	• Create-Your-Own Frittata • Veggie and Cheese Frittata	• Create-Your-Own Frittata	• Create-Your-Own Frittata
August	• Lentil Sloppy Joe's with Dark Greens Coleslaw	• Lentil Sloppy Joe's with Dark Greens Coleslaw	• Lentil Sloppy Joe's with Dark Greens Coleslaw

	• Lentil Tacos with South of the Border Salad		
September	• Mushroom Orange "Chicken" Rice Bowl • Creamy Chicken and Mushroom Pasta • Teriyaki Mushroom Rice Bowl • Blended Mushroom Burger with Southern Collard Greens	• Blended Mushroom Burger with Southern Collard Greens	• Blended Mushroom Burger with Southern Collard Greens
October	• Vegetable Gumbo Soup with Rice • Tex-Mex Beans with Rice Casserole	• Vegetable Gumbo Soup with Rice	• Vegetable Gumbo Soup with Rice
November	• Create-Your-Own Pizza • Homemade Veggie Pizza	• Create-Your-Own Pizza	• Create-Your-Own Pizza
December	• Pasta Bolognese • Chili Tomato Macaroni • Create-Your-Own Pasta • Carrot Cake Baked Oatmeal	• Create-Your-Own Pasta	• Create-Your-Own Pasta

Tailoring Recipes Based on Informed Collaboration Data

Once the 12 meal kit recipes were decided, they underwent a 3-month tailoring process that focused on the key themes that the existing literature and GHS identified that should be focused upon for meal kit recipe development for CFAP clients. These key themes included minimizing preparation equipment required for the recipe, simplifying ingredients and preparation instructions, meeting MyPlate food group recommendations, and limiting nutrients associated with chronic disease exacerbation, such as sodium, saturated fat, and added sugar content. Additionally, the food bank inventory data provided by ACFB and FBNEGA were considered in tailoring the recipes to be sustainable and cost-efficient so that CFAP could source ingredients and get long-term use from the developed recipes. To achieve this, ingredient options within the existing "create-your-own" recipe frameworks were modified to include items within the top 10 food items by month and top 5 food items by food group inventory summary tables. Additionally, ingredient storage methods were considered for any recipe that utilized fresh produce, where the fresh produce items were replaced with canned, shelf-stable produce items if these were more readily available in CFAP, according to inventory data.

The specific guidelines that informed changes made through recipe tailoring were the UGA SNAP-Ed recipe guidelines. These guidelines have been used in UGA SNAP-Ed recipe development since 2017 and include specific criteria for nutrient composition, ingredient, and instruction recommendations. Nutrient analysis was conducted for the 6 "traditional" recipes but not the "create-your-own" framework recipes, as the nutrient content differed depending on the ingredients chosen. Nutrient analysis was completed using *Nutritionist Pro 2.0 Nexgen* software, per the UGA SNAP-Ed recipe guidelines. Several of the developed recipes were chosen for being culturally appropriate for low-income Georgians and could be classified as "southern

cuisine." Additionally, professional recipe presentation and photography were carried out for each recipe by Jennifer Denson. See **Appendix A**.

Recipe Testing

After the 12 selected meal kit recipes were tailored according to the preparation equipment required, simplified ingredients and instructions, MyPlate food group recommendations, and nutrient content, recipe testing occurred. Recipe testing included the preparation of each recipe, informal sensory evaluation of the recipe based on appearance, texture, flavor, saltiness, and smell, and photography of the final, prepared product of each recipe. Recipe testing took place over 4 non-consecutive days with 3 recipes being tested each day. On each day, 3-4 people assisted and were assigned specific tasks related to preparation and photography. They comprised graduate students and faculty in the Department of Nutrition and UGA SNAP-Ed team members. All of those assisting participated in the informal sensory evaluation. Any recommended adjustments to appearance, texture, flavor, saltiness, and smell were made to the recipes before video production took place.

Recipe Adjustments Based on Sensory Evaluation

Of the 12 recipes that were tested and sensory evaluated, 6 did not require any adjustments to appearance, texture, flavor, saltiness, or smell. These recipes included Create-Your-Own Soup, Create-Your-Own Salad, Create-Your-Own Frittata, Vegetable Gumbo Soup with Rice, Create-Your-Own Pizza, and Create-Your-Own Pasta. The only "Create-Your-Own" recipe framework that required sensory-related adjustments was Create-Your-Own Stir-Fry. This recipe included "spicy soy sauce" and "teriyaki sauce" options that, in the original ACFB recipe framework, required ¼ cup of soy sauce.

With the exception of the Vegetable Gumbo Soup with Rice recipe from UGA SNAP-Ed, all other traditional recipes required adjustments. During recipe testing, the 3/4 people who assisted with sensory evaluation perceived the sauces to be “too salty” with the existing soy sauce ratio. Therefore, the quantity of soy sauce was reduced to 3 tablespoons and 1 tablespoon of water was added to the sauce recipes to reduce saltiness. After this adjustment, no other changes were needed to saltiness or other sensory attributes.

Sensory evaluation participants unanimously agreed that the Dark Greens Coleslaw in the Lentil Sloppy Joe’s with Dark Greens Coleslaw recipe needed more acidity. Therefore, the 2 tablespoons of vinegar required by the ACFB recipe was increased to ¼ cup. After this adjustment, no other changes were needed to flavor or other sensory attributes. The Southwestern Style Rice Bowl, Three Bean Medley, and Blended Mushroom Burger with Southern Collard Greens all required flavor adjustments through the addition or increase of seasonings. The original Southwestern Style Rice Bowl recipe from Oregon State University Extension required ¼ teaspoon of garlic powder, oregano, and cumin; however, sensory evaluation participants found the final product to be too bland. Therefore, the ratios of these seasonings were increased from ¼ teaspoon to 1 teaspoon. After this adjustment, no other changes were needed to flavor or other sensory attributes.

Similarly, the Three Bean Medley recipe required the addition of ingredients to improve flavor. The original Three Bean Medley recipe from the University of Maryland Extension required 6 tablespoons of vinegar and did not include any salt in the ingredients list. During sensory evaluation for this recipe, participants noted that the recipe was “bland” and needed more salt. Because this recipe includes primarily canned ingredients, the sodium of the original recipe was in between the SNAP-Ed Recipe Guidelines for appetizers and entrees (See

Appendix A). Due to the already high sodium content, only ¼ teaspoon of salt could be added without pushing the sodium content significantly beyond the limit for entrees (550 mg). Additional flavor was added by increasing the vinegar amount to 8 tablespoons, or ½ cup, from the original 6 tablespoons. After these adjustments, no other changes were needed to flavor or other sensory attributes.

The final recipe that required flavor adjustments was the Blended Mushroom Burger with Southern Collard Greens. The original recipe from ACFB only required 1 teaspoon of garlic powder and ground black pepper for the Southern Collard Greens and "to taste" ratios for the Blended Mushroom Burger. During sensory evaluation of this recipe, participants recommended the addition of seasonings to both the Blended Mushroom Burger and the Southern Collard Greens to improve flavor. Since the original recipe's sodium content was significantly under the SNAP-Ed recipe guidelines, ¼ teaspoon of salt was added to the Southern Collard Greens. Additionally, ¼ teaspoon of onion powder was added to the Southern Collard Greens and ratios were specified to ¼ teaspoon of garlic powder and black pepper on the ingredients list instead of "to taste" for the Blended Mushroom Burger. After these adjustments, no other changes were needed to flavor or other sensory attributes.

Although not sensory-related, the original Walnut Trail Mix recipe did not yield 4 servings of ¾ cup of trail mix. Therefore, ingredient ratios were increased to 2/3 cup for the walnuts, raisins, miniature pretzels, and chocolate chips from the 1/3 cup required by the original Ohio State University SNAP-Ed recipe. The remaining recipes required ingredient adjustments to improve flavor. See **Table 12** for the summary of recipe modifications.

Table 12. Meal Kit Recipe Modifications based on Sensory Evaluation

Recipe Name	Issue Identified	Modifications Made
Create-Your-Own Soup	None	N/A
Walnut Trail Mix	Yielded too little (not sensory)	Increased each ingredient from 1/3 cup to 2/3 cup
Create-Your-Own Stir-Fry	Too salty	Reduced soy sauce from ¼ cup (570 mg sodium/serving) to 3 tablespoons (428 mg sodium/serving); added 1 tablespoon of water. This resulted in a 25% reduction in sodium per serving.
Southwestern Style Rice Bowl	Too bland	Increased garlic powder, oregano, and cumin from ¼ teaspoon each to 1 teaspoon each
Create-Your-Own Salad	None	N/A
Three Bean Medley	Too bland and lacked acidity	Added ¼ teaspoon of salt; increased vinegar from 6 tablespoons to 8 tablespoons (1/2 cup)
Create-Your-Own Frittata	None	N/A
Lentil Sloppy Joe's with Dark Greens Coleslaw	Lacked acidity	Increased vinegar from 2 tablespoons to ¼ cup
Blended Mushroom Burger with Southern Collard Greens	Too bland	Burger: changed seasonings from "to taste" to ¼ teaspoon each Collard Greens: added ¼ teaspoon of salt and ¼ teaspoon of onion powder
Vegetable Gumbo Soup with Rice	None	N/A
Create-Your-Own Pizza	None	N/A
Create-Your-Own Pasta	None	N/A

Final Tailored Recipes

Each of the 12 recipes was tailored to minimize the preparation equipment required for the recipe, simplify ingredients and preparation instructions, meet MyPlate food group recommendations, and limit nutrients associated with chronic disease, such as sodium, saturated fat, and added sugar content. Additionally, the FBNEGA and ACFB inventory summary tables were used in adjusting recipe ingredients so that the recipes contained foods commonly available at CFAP. See **Appendix C** for the final tailored recipe cards for January, June, and August.

SUPPLEMENTAL NUTRITION EDUCATION RESOURCES

Recipe Tips

Recipe tip development took place concurrently with meal kit recipe development. The recipe tips were designed to provide relevant, quick education to CFAP clients on nutrition, preparation, or food safety related to each recipe. A total of 12 recipe tips were developed – 1 for each of the 12 meal kit recipes. As with recipe selection, the recipe tips were listed on separate presentation slides, using Microsoft PowerPoint, with their corresponding recipe, month, and key ingredients. All key informant feedback was provided through live comments available through file sharing on OneDrive. Of the 12 recipe tips developed, 8 of them were finalized after the second round of key informant feedback. As with recipe selection, the remaining recipe tips were decided by the fifth round of key informant feedback.

The 12 recipe tips were created to accompany each of the 12 recipes and provide additional information on nutrition, preparation, or food safety related to each recipe. Of the 12 developed recipe tips, 3 were nutrition-related, 4 were preparation-related, and 5 were food safety-related. The nutrition-related recipe tip topics centered around MyPlate nutrition messages

such as “make your salad colorful” for Create-Your-Own Salad, which is in line with MyPlate’s “vary your veggies” message. The preparation-related tips were placed within recipes that were more complex and needed supplemental instruction in addition to the recipe instructions. Some of the included preparation topics were “how to cook split peas” for Create-Your-Own Soup and “ways to soak dry beans” for the Vegetable Gumbo Soup with Rice. Lastly, food safety tips included topics such as “3 ways to thaw meat safely” for Create-Your-Own Stir-Fry, and “safe storage tips for leftovers” for the Three Bean Medley. See **Table 13** for the full list of recipe tip topics.

Table 13. Meal Kit Recipe Tip Topics

Month	Recipe	Recipe Tip Topic	Recipe Tip Category
January	Create-Your-Own Soup	How to cook split peas	Preparation
February	Walnut Trail Mix	Make it your own	Preparation
March	Create-Your-Own Stir Fry	3 ways to thaw meat safely	Food Safety
April	Southwestern Style Rice Bowl	Tips for storing onions	Food Safety
May	Create-Your-Own Salad	Make your salad colorful	Nutrition
June	Three Bean Medley	Safe storage tips for leftovers	Food Safety
July	Create-Your-Own Frittata	How to tell if your eggs are still good	Food Safety
August	Lentil Sloppy Joe’s w/ Dark Greens Coleslaw	Vary your protein sources	Nutrition
September	Blended Mushroom Burger with Southern Collard Greens	Tips for handling raw meat	Food Safety

October	Vegetable Gumbo Soup w/ Rice	Ways to soak dry beans	Preparation
November	Create-Your-Own Pizza	Try different pizza crusts	Preparation
December	Create-Your-Own Pasta	Choose whole grains when you can	Nutrition

Recipe Demonstration Videos

UGA SNAP-Ed contracted a professional video production crew, BED Productions, for recipe demonstration video filming and editing. Full recipe demonstration videos and teaser trailers for each recipe were included in the contract. BED Productions provided an actress with experience in filming cooking videos to act as the "home chef" in each of the 12 videos.

Video Production Preparation

In preparation for video filming, recipe checklists for each of the 12 developed recipes were created, as well as video scripts and a production schedule. Each recipe checklist included the preparation and presentation equipment needed, a shopping list for that recipe's ingredients, and instructions for the order in which to complete tasks during the video. The recipe scripts contained engaging intros and outros, while the body of the scripts included preparation instructions, general food safety tips, nutrition information, and preparation recommendations in addition to each recipe's "recipe tip." The production schedule included the list of recipes planned to be filmed on each day, the schedule for when graduate students and the UGA SNAP-Ed team needed to be on-site to assist with video filming tasks, and each person's assigned preparation tasks for each day.

Notably, the recipe demonstration videos were filmed at the University Health Center's (UHC) kitchen, which is a large, on-campus facility often used for student cooking

demonstrations. To ensure that all of the preparation equipment needed for each recipe was readily available, graduate students and the UGA SNAP-Ed staff took inventory of the UHC kitchen's equipment, and equipment that was not available at UHC was supplemented by the smaller, UGA SNAP-Ed kitchen. On each of the 2 filming days, 6 recipes were scheduled. Due to the compact time frame for filming, all recipe ingredients needed to be provided in both raw and cooked form so that the video could cut to a cooked product without the need to cook each ingredient in real-time.

To account for any day-of mistakes, 3 quantities of each ingredient for every recipe were purchased. A team of 3 people, including 2 graduate students and a member of the UGA SNAP-Ed staff, were responsible for preparing and storing the raw and cooked versions of each ingredient and placing each recipe's ingredients together in 12 different "recipe bags." The campus closures related to Hurricane Helene required each member of the food preparation team to prepare the ingredients for 4 different recipes in their home kitchens and bring the "recipe bags" to the UHC kitchen on the morning of the first video filming day. Raw and cooked recipe ingredients for the recipes being filmed on Day 2 were stored in the UHC kitchen refrigerator for later use.

Recipe Video Filming

Recipe video filming occurred for an 8-hour period on two consecutive dates. Before each video, graduate students placed each raw ingredient into small bowls on a cutting board for the beginning of each video and for still "ingredient" shots. Graduate students and UGA SNAP-Ed staff also assisted with placing the "final product" of each recipe and replacing raw ingredients with cooked ones, as they were being cooked in the video. Script edits were also

made throughout the course of video filming when needed. All opened and used ingredients were discarded in compost bins at the end of each filming day.

Recipe Video Feedback/Editing

The post-production process began within a week after filming. The first sample video was received less than a month after filming, and there were a total of 8 revision cycles, lasting until 2 months post-production, for all recipe demonstration videos and teaser trailers. During each of the revision cycles, graduate students and UGA SNAP-Ed staff reviewed each of the videos and provided time-stamped feedback for each video in a shared Microsoft Word document available through OneDrive. The final recipe demonstration videos and teaser trailers were available 4 months post-production. The recipe demonstration videos were uploaded to UGA SNAP-Ed's Food eTalk YouTube channel and linked to their website, FoodTalk.org. The YouTube links for each video were also made into QR codes that were placed in the pre-print version of the 2025 UGA SNAP-Ed Recipe Calendar for each month and were included in the final, printed calendar.

Recipe video length ranged from 2 minutes and 56 seconds (Walnut Trail Mix) to 5 minutes and 45 seconds (Create-Your-Own Stir-Fry), depending on the complexity of the recipe. Although all 12 recipe demonstration videos have been uploaded to the Food eTalk YouTube channel and to QR codes within the printed calendar, the videos are being gradually released on the FoodTalk.org website throughout 2025 on the month with which the recipe video corresponds. See **Table 14** for the full list of videos and links.

Table 14. Meal Kit Recipe Demonstration Video List

Recipe	Video Link
Create-Your-Own Soup	https://youtu.be/T3ET8OaOnAI?si=Y5Fde0KN7_uGECl T
Walnut Trail Mix	https://youtu.be/bEDplkgUb0k?si=mV1HuOsR7QnoyAE T
Create-Your-Own Stir Fry	https://youtu.be/ZW3o9BUuzvQ?si=5NsEx1R2cX7-NQJR
Southwestern Style Rice Bowl	https://youtu.be/P5DRjqh9n4Q?si=P6kd_p7xzgQMQKv3
Create-Your-Own Salad	https://youtu.be/5vZZguPrSeA?si=d3LXaSowxKeqa7WH
Three Bean Medley	https://youtu.be/QfivwhHtU5c?si=_r1DqiY0sP_CdQ1N
Create-Your-Own Frittata	https://youtu.be/4T7gEDmmvIg?si=mXTbWeX42GuDG Mx4
Lentil Sloppy Joe's w/ Dark Greens Coleslaw	https://youtu.be/gMghJpf5kyw?si=sMeu1CHAWX_ewRx J
Blended Mushroom Burger with Southern Collard Greens	https://youtu.be/c4ct48QNt-o?si=OItYnGDV_1gN2GeC
Vegetable Gumbo Soup w/ Rice	https://youtu.be/AHlGsqOpzj4?si=LyoSAmrxriltjbo5
Create-Your-Own Pizza	https://youtu.be/SWsNSvHEomI?si=L4zftuVseex25au5
Create-Your-Own Pasta	https://youtu.be/uCY9jQczC5o?si=5cNO3Lda0f647mCP

FoodTalk.org Resources

The developed meal kit recipes, recipe tips, and cooking demonstration videos were not only printed in the 2025 UGA SNAP-Ed Recipe Calendar but are being uploaded and featured in blog posts on UGA SNAP-Ed's website, FoodTalk.org. The blog posts are authored and reviewed by the UGA SNAP-Ed staff and uploaded with the full cooking demonstration videos and recipes on the FoodTalk.org website. The developed meal kit recipe videos and materials were made available on the FoodTalk.org website so that Georgians not receiving the 2025 UGA SNAP-Ed recipe calendar could still have access to the videos and recipes. Overall, the availability of the developed recipes and resources on FoodTalk.org allows for a wider reach across Georgia.

Monthly blogs will feature 12 tailored meal kit recipes throughout 2025. These blog posts will highlight each key ingredient with a catchy title and information related to the food, such as the benefits, "fun facts", and several recipe ideas. Each key ingredient blog is scheduled to be uploaded to the FoodTalk.org website on the month in which it was featured in the calendar.

CHAPTER 5

DISCUSSION

The developed meal kit recipes and supplemental nutrition education resources, supported by literature and theoretical framework, will guide the development and pilot of a larger meal kit intervention for CFAP in Georgia to improve the use, acceptability, and preparation self-efficacy of commonly underused food items among CFAP clients. This discussion shares the outcomes, key takeaways, strengths, and limitations of the development process to inform future research and practice.

OUTCOMES AND KEY TAKEAWAYS

Development of Meal Kit Intervention Materials

The outcomes of this project include the development of recipes, recipe tips, cooking demonstration videos, online resources, and a recipe calendar tailored to low-income, low-resource CFAP clients. The development of such materials is not new, with nutrition interventions within CFAP becoming more popular among nutrition researchers due to the rising food insecurity rates in the U.S.[5,50-54] However, no meal kit interventions exist within CFAP in Georgia, and few within the southern region of the U.S. In the literature, no detailed information or toolkits exist for creating materials for a meal kit intervention in CFAP; therefore, the briefly described methodology within research papers differs significantly.

In the existing literature, meal kit interventions for low-income individuals and CFAP clients have been implemented with the primary aims of improving fruit and vegetable intake,

cooking self-efficacy, food security, and perceived nutrient-dense food availability. [50,53,54] Few studies have utilized meal kit interventions in CFAP to improve client use of commonly underused food items.[51,52] However, developing meal kit intervention materials to improve CFAP client use, acceptability, and preparation self-efficacy of underused food items was the primary focus of this study based on statewide needs assessment data from the GHS showing that almost 28% of agencies reported that their clients have limited understanding, interests, and ability to choose, prepare, and store healthier foods at home.[23]

Despite the limited studies, promising results have been shown from using meal kit interventions in CFAP to improve the use of certain food items, with consumption of underused ingredients, such as whole grain pasta, brown rice, and kale, significantly increased as a result of such interventions.[51,52] The studies that aimed to improve client use of underused food items include Yao et al.[51] and Stein et al.[52] In both of these studies, recipe sampling and meal kit distribution were used in conjunction to improve client use of underused food items. However, Yao et al.[51] also included a nutrition education component to the recipe sampling and meal kit distribution.

Cooking demonstration videos were utilized in one meal kit intervention study, Horning et al.;[54] although this study did not specifically target increasing client use of underused food items. This study was, however, successful in improving participants' cooking self-confidence and perceived ability to execute various cooking techniques.[54] These findings are supported by theory, as the use of cooking demonstration videos provides an opportunity for observational modeling, which is theorized to improve self-efficacy in SCT. [44,46,47] In all, the meal kit materials that appear to be key within the literature to improve underused food item use, intake, and cooking self-efficacy, include recipes, nutrition education, and cooking demonstration videos.[50-

[54] Therefore, the developed materials from this project, made for CFAP clients in Georgia, include all of these components.

Incorporating CFAP Inventory Data into Meal Kit Recipe Design

One common recommendation outlined in the literature is that CFAP inventory needs to be reflected within meal kit recipes to create a sustainable, long-term intervention.[53] Although the methodology behind designing the recipes used within existing CFAP meal kit interventions is vague, the recipes are often constructed by professional chefs within the community, where ingredients are informed by key informants' general knowledge of common food items provided by CFAP.[51-54] To our knowledge, no studies exist where specific inventory data is collected at the regional level for CFAP to inform the ingredients used in meal kit recipes.

The acquisition and systematic analyses of millions of pounds of food commonly received by CFAP allow for the development of sustainable and affordable recipes that CFAP can provide to their clients for years to come. In this study, CFAP inventory data was collected from 2 regional Georgia food banks: ACFB and FBNEGA. ACFB is the largest regional food bank in Georgia, covering 29 counties and working with almost 700 CFAP agencies and community partners.[55] Therefore, acquiring inventory data from ACFB was a top priority during the informed collaboration stage of this project. From the inclusion of Joy Goetz from ACFB in the collaboration team of key informants, we were able to receive 28 months of inventory data. The inclusion of monthly receipts for specific food items allowed for the systematic organization of food items into "summary tables" which allowed for easy access to a reference list of supporting recipe ingredients by food group and storage method for each month.

Although the 12 recipes were sourced from ACFB, UGA SNAP-Ed, and Land Grant University Cooperative Extension programs, the ingredients originally included in these recipes

were altered to incorporate common food items in CFAP based on the provided inventory data. The inventory summary tables aided in streamlining material development and creating "evidence-based" recipes. Although FBNEGA declined continued collaboration, the annual inventory data provided was beneficial for identifying similarities and differences with ACFB inventory data.

For example, the most represented food group in the FBNEGA data was fruit (42.1%) compared to ACFB data which had greater distributions of each food group, with protein being the most represented (30.7%). However, analysis of both FBNEGA and ACFB inventory data showed that dry food items were overwhelmingly represented compared to cooler and freezer foods, with 54.5% of foods from FBNEGA and 84.9% of foods from ACFB being dry foods. Importantly, the inventory data analyzed and categorized from FBNEGA and ACFB are likely not representative of every regional food bank in Georgia. However, from the acquired data, it appears that CFAP inventory varies more in the food groups they provide compared to the storage method. Notably, it appears that recipes designed for CFAP should include mostly dry storage items when possible.

Additionally, the literature makes it clear that CFAP clients suffer from chronic conditions at rates higher than the average U.S. population.[9,12,16,22] With this in mind, food bank inventory data were color-coded for recipe development purposes to emphasize foods with nutrient content that is considered to be more "chronic disease-friendly" such as foods low in sodium, saturated fat, and sugar, as well as foods high in fiber. Due to ACFB being a larger operation and having the staff and resources to manage inventory, ACFB was able to provide inventory data that was more standardized with detailed item descriptions of their foods compared to FBNEGA. However, only 11.7% of the top 120 food items contained such nutrient-

related descriptions. This finding suggests that foods low in sodium, saturated fat, and sugar, as well as foods high in fiber, may not be as readily available within CFAP compared to their "standard" counterparts.

Therefore, it was clear that supplemental materials should include tips for improving the nutrient content of the recipes, such as rinsing canned vegetables to reduce sodium instead of putting a "low sodium" canned vegetable item that may be unavailable to the client on the ingredient list for a recipe. With this in mind, the video scripts and several recipe tips were tailored to describe ways to improve the nutrient content of various recipes. For example, every cooking demonstration video included the excerpt, "I am rinsing my canned vegetables. Research shows that rinsing your canned vegetables (not just draining them) can reduce the sodium content by up to 40%!"

Additionally, the nutrition-related recipe tips such as "vary your protein sources" and "choose whole grains when you can" provided nutrition education in the form of preparation suggestions that improve the nutrient content of the "Lentil Sloppy Joe's" by reducing saturated fat in replacing beef with lentils and increasing fiber in the "Create-Your-Own Pasta" recipe by encouraging CFAP clients to opt for whole grain pasta when they can. Including ways CFAP clients can improve the nutritional content of their meals through preparation decreases the knowledge and accessibility barriers related to sourcing ingredients that are low in sodium, saturated fat, and sugar, as well as foods high in fiber.

Identification of Key Ingredients

As previously mentioned, commonly underused food items that have been the focus of past meal kit interventions in CFAP include whole-grain pasta, brown rice, and kale.[51,52] Through the collaboration meetings with key informants, brown rice was identified as being an underused food item in CFAP in Georgia; however, whole grain pasta and kale were not. Whole-grain pasta was an underused item identified by both Yao et al.[51] and Stein et al.[52] as being a commonly underused food item; however, kale and brown rice were also identified as part of the Stein et al.[52] study. Importantly, these studies did not aim to gather a scoping list of underused food items; therefore, it is possible that brown rice and kale may have been identified by Yao et al.,[51] had the researchers chosen to target more than one underused food item. Additionally, in this study, as well as the Yao et al.[51] and Stein et al.[52] studies, "key ingredients" were identified based on the observations of key informants. Observational identification is subject to recall bias, which could result in key ingredients being unnecessarily included or excluded.

In the present study, whole grain pasta may also be a commonly underused food item, but unreported due to potential recall bias. Importantly, however, fresh kale was not a commonly received item by both ACFB and FBNEGA, with kale not being listed at all in FBNEGA inventory data and being received at quantities not exceeding 10,000 pounds per month when other vegetable items were received at quantities greater than 35,000 pounds per month in ACFB inventory data. Therefore, although kale may be an underused food item by low-income Georgians, CFAP may not be a reliable enough source of kale to include it as a "key ingredient." Although a long-term goal of the current study is to create a flexible, statewide meal kit intervention for CFAP, it is unlikely that such an intervention developed in Georgia can be directly applied to other states and regions in the U.S. Due to probable inventory differences

among food banks across the nation, underused food items or “key ingredients” should be identified using key informant recommendations and cross-referenced with inventory data before being featured in future studies.

Innovative Approaches in Meal Kit Recipe and Material Design

Diversification of Recipe Types

Collaboration with ACFB in the creation of these meal kit intervention materials provided the UGA SNAP-Ed team with open access to ACFB’s plethora of existing nutrition resources designed for CFAP clients, including recipe cards, produce guides, how-to cooking guides, and cooking demonstration videos. Among the various recipe cards shared by ACFB were “create-your-own” recipe guides which included ingredient options for each food group included in the recipe. These “create-your-own" recipe guides were frameworks that UGA SNAP-Ed had never utilized in previous recipe calendars or culinary resources; however, these recipe frameworks offered flexibility that may better accommodate various CFAP distribution methods and regional food bank inventory, making a statewide meal kit intervention more feasible.

Of the 12 selected recipes in the present study, 6 followed a traditional recipe format, with 2 recipes being small side dish or snack recipes and 4 being full “meal” recipes that included an entrée and a side. The remaining 6 recipes were “create-your-own” recipe frameworks. The diversity of recipe types created for this initial version of meal kit intervention material development was strategic in that, through feedback and data collection, we can assess the types of recipes that would be most preferred among clients and agencies and able to be universally used in CFAP across Georgia. Although the “create-your-own" recipe frameworks showed promise during the development process for creating a more flexible intervention, we

only selected half of the recipes to follow this framework to allow for a more gradual introduction to this new type of recipe and gather feedback on its acceptability. Although feedback data has not yet been collected on the recipes, future feedback data will inform further adaptations to the developed recipes and supplemental materials. Favorable feedback for "create-your-own" frameworks may suggest it would be beneficial to make all 12 meal kit recipes follow the "create-your-own" framework.

Integration of Meal Kit Intervention Materials in a Statewide Calendar

The inclusion of meal kit intervention materials in a calendar to be distributed statewide has not yet been done within the existing literature. Annual recipe calendars have been a project carried out by UGA SNAP-Ed since 2018. Although the alignment of recipe and material creation with the annual calendar development timeline was opportune, the inclusion of the developed recipes and materials in the annual recipe calendar provides an opportunity for larger dissemination of beneficial nutrition education and resources to low-income, low-resource individuals in Georgia. Although the recipes and materials were developed for CFAP clients, the recipes, recipe tips, cooking demonstration videos, and online resources may be useful for anyone with low socioeconomic status who experiences barriers to healthy eating such as limited kitchen equipment, time to cook meals, or lack of cooking self-efficacy and nutrition knowledge.

The materials developed in this study are designed to be used in a larger meal kit intervention in CFAP. However, the inclusion of these resources in the 2025 UGA SNAP-Ed Recipe Calendar allows people who may qualify for and benefit from CFAP, but do not utilize them, to still access these resources. Therefore, the use of these meal kit recipes and materials in the recipe calendar aligns with UGA SNAP-Ed's goal to improve the likelihood that Georgians on SNAP or eligible for SNAP-Ed will make healthy food and lifestyle choices.

The outcomes of this study present a variety of meal kit intervention materials that are supported by literature, statewide needs assessment data, CFAP inventory data, and key informant collaboration. Some resulting materials, including tailored recipes, recipe tips, and cooking demonstration videos, are similar to those included in existing meal kit intervention studies.[50-54] However, the diverse recipe types, such as the "create-your-own" framework, as well as the inclusion of materials in a calendar, and the creation of "evidence-based" recipes through the use of food bank inventory data, add to the existing literature and are aimed at improving the flexibility, adaptability, and usability of the recipes and materials for a larger meal kit intervention in CFAP in Georgia.

STRENGTHS AND LIMITATIONS

Strengths

A major strength of this research is its innovative approach to the development of nutrition intervention materials for CFAP, building upon the findings from the comprehensive mixed-methods needs assessment of the CFAP landscape in Georgia. The use of meal kits to improve the use, acceptability, and preparation self-efficacy of underused produce items is largely understudied within populations experiencing food insecurity, with no existing research in CFAP in Georgia. Therefore, the innovation of the proposed study exists within its concept, with implementation possible through the unprecedented collaboration between the University of Georgia and all nine regional food banks within Georgia established by the GHS. The GHS and resulting collaboration offered a unique opportunity to develop and implement a PSE intervention to address the issue of food insecurity in the state, such as the development of tailored meal kit intervention materials.

Another strength of this research is the attention and focus put into making the intervention materials flexible and sustainable for long-term use. Existing meal kit intervention studies are useful in establishing a positive association between CFAP client use of meal kits and the improvement of dietary fruit and vegetable intake, cooking self-efficacy, food security status, perceived nutrient-dense food availability, and client use of commonly underused food items. However, the meal kit intervention materials made for these studies were not developed for long-term use and dissemination. Through the novel use of CFAP inventory data to inform meal kit recipes, it is more likely that CFAP will utilize the recipes to have most of the required ingredients available for their clients, minimizing the potential burden on agencies associated with sourcing the recipe ingredients.

Additionally, the inclusion of "create-your-own" recipes allows for the flexibility and adaptability needed for Georgia's various CFAP agency types and distribution methods. This type of recipe framework also adds an opportunity for client-choice, even in agencies that do not have a client-choice distribution model, by providing the clients with options for how they would like best to prepare the recipe. Client-choice distribution models are often cited in the literature as being the most favorable among CFAP clients and are the prime target for nutritional interventions.[9,26,27] Client-choice models promote agency in the clients' decision-making and allow for the impact of nutritional interventions on decision-making to be directly assessed.[9,27] Therefore, the research team intends to include 2-3 ingredient options for each food group category within the "create-your-own" recipe meal kits when the intervention is piloted, to preserve the choice dynamic of these recipes.

The use of informed collaboration to develop the meal kit intervention materials is not a novel approach, but still a strength of this research. In the existing literature, researchers utilize

community partnerships, such as local chefs, schools, and CFAP staff to develop materials and resources. This study took a similar interdisciplinary collaboration approach by recruiting key informants with expertise in the areas of public health nutrition and PSE interventions within CFAP, culinary and recipe development, and experience in working with and developing nutrition education content for CFAP clients. Community partnerships and informed collaboration are essential to community nutrition research that aims to create and implement PSE interventions. Without such collaboration, the developed materials and resources for a community intervention may not be successful in promoting positive change within the community for which it was developed, despite researchers' best efforts. Such informed collaboration is planned within the protocol to continue for the pilot study associated with this intervention through collaboration with local CFAP and CFAP clients.

Limitations

Despite the several strengths of this study, there are some notable limitations to consider. Although the acquisition of CFAP inventory data was critical to recipe tailoring, the inventory data collected is not representative of all 9 regional food banks in Georgia. Only 2/9 regional food banks were represented through the collected inventory data: ACFB and FBNEGA. However, these two regional food banks cover almost 40% of Georgia CFAP agencies and 30% of Georgia counties. Before a statewide meal kit intervention in CFAP can be successfully implemented, it is necessary to collect inventory data from all 9 regional food banks and possibly tailor recipes based on region if significant differences are found.

Additionally, the key ingredients identified in this study may be prone to recall bias. This is not only a limitation of this study, but a limitation that exists within the charitable food assistance system, as inventory tracking is highly inconsistent between agencies. In the Yao et

al.[51] and Stein et al.[52] studies, the key ingredients of whole grain pasta, brown rice, and kale were also anecdotally identified by key informants familiar with the pilot agencies of the studies. The lack of standardization in the operations of CFAP across the county presents several limitations to creating widespread PSE interventions.

Lastly, although most, not all of the ingredients included in the 12 meal kit recipes are commonly available CFAP food items. Some food items, such as seasonings, oils, fresh produce items such as bell peppers and tomatoes, and protein items like chicken thighs, may need to be sourced outside of CFAP by clients. Additionally, brown rice was identified as a commonly underused food item, but recent food bank inventory data suggests that CFAP has been responding to this lack of demand by replacing brown rice orders with white rice. Within the 28 months of ACFB inventory data, brown rice was significantly underrepresented by pounds received, compared to white rice. The exact cause of this is unknown. However, it may be that food banks such as ACFB may be accepting less of underused foods, such as brown rice, to reduce food waste. This phenomenon presents an unexpected threat to the availability of underused food items needed to improve client use, acceptability, and preparation self-efficacy of these key ingredients.

IMPLICATIONS FOR FUTURE RESEARCH AND PRACTICE

The findings of this study can be used to inform meal kit intervention material development strategies and methodologies in other states and programs. The results of this study will be used in a larger meal kit pilot intervention in CFAP agencies in Georgia, with a long-term goal of developing a toolkit necessary for statewide dissemination.

The methods of this study add to those available in existing literature in that they consider diverse recipe types and use food bank inventory data to improve the flexibility, adaptability, and usability of recipes and materials for a meal kit intervention in CFAP. The ability of the research team to acquire CFAP inventory data was possible from the built collaboration of the 9 regional food banks in Georgia with UGA SNAP-Ed through the GHS. The GHS was a critical precursor to the development of these meal kit intervention materials, as it provided statewide needs assessment data that revealed a need within the charitable food assistance system in Georgia and established relationships with food bank partners that allowed for access to inventory data. A statewide needs assessment, like the GHS, is unprecedented in states outside of Georgia. Given the opportunities the GHS provided for developing informed recipes and materials for a meal kit intervention in CFAP, starting with a statewide needs assessment is highly recommended for other programs in other states aiming to develop PSE interventions for CFAP clients.

However, the development of meal kit intervention resources, such as the ones developed in this study, can be done without a statewide needs assessment if one is not possible. The most crucial part in developing meal kit intervention resources is recruiting, and regularly meeting with, key informants from at least one major food bank. Although key informant collaboration was a key part of the methodology in existing literature, the only CFAP representation in key informant collaboration was from a single agency. Food banks comprise several agencies; therefore, collaborating with someone at the food bank level is key to expanding the reach of the developed resources and creating a sustainable intervention. Additionally, major food banks, such as regional food banks, are likely to have a more organized record-keeping infrastructure that tracks the annual inventory by pounds received.

Despite the inventory data provided by FBNEGA comprising significantly less information compared to ACFB inventory data, the FBNEGA inventory list still listed items by number of pounds received. As long as a list of inventory items can be acquired with the number of pounds received listed, further information such as storage method and food group can be manually deduced and analyzed by researchers. The acquisition of inventory data is crucial to create recipes that primarily use food items received by the CFAP agencies and reduce the CFAP staff's burden of sourcing ingredients for the recipes. CFAP generally struggle with staffing, consistent volunteer help, and other resources.[23] Therefore, creating intervention materials for CFAP that minimize agency burden as much as possible is necessary for ensuring a long-term, sustainable intervention.

Importantly, nutrition education resources and opportunities for observational modeling are highly effective for improving self-efficacy and behavior change, according to the literature.[44,46,47] Although filming cooking demonstration videos may not be feasible for some organizations aiming to create a meal kit intervention for CFAP clients, supporting the developed recipes with educational materials on nutrition, preparation, and food safety is important for improving client knowledge and behavioral capability for using and preparing underused food items. Improving knowledge and behavioral capability increases the likelihood of behavior change. Although this study created cooking demonstration videos for the developed recipes, videos were not provided to CFAP clients in the Chambers et al.,[50] Yao et al.,[51] Stein et al.,[52] and Hollis-Hansen et al.[53] studies; yet, these studies still found statistically significant improvements in fruit and vegetable intake, cooking self-efficacy, use of commonly underused food items, food security status, and perceived nutrient-dense food availability. Cooking demonstration videos would provide a valuable observational modeling resource for CFAP clients.

Future directions for this study include the use of the developed materials to execute a formal sensory evaluation of the recipes with CFAP clients and a pilot meal kit intervention in CFAP. It is likely that the formal sensory evaluation and pilot study will result in adjustments to the meal kit recipes and materials developed in this study and will better inform a larger meal kit intervention. A long-term goal of this study is to develop a toolkit to inform statewide dissemination of a meal kit intervention in CFAP in Georgia. In addition to formal sensory evaluation, the next steps for research include garnering support and "buy-in" from CFAP in Georgia to plan meal kit implementation, food sourcing, and distribution, acquiring inventory data for the remaining 7 regional food banks, and creating a larger recipe bank featuring more "create-your-own" framework recipes.

CHAPTER 6

CONCLUSION

With rising food insecurity rates in the U.S., the use of CFAP will likely increase. Given that CFAP clients suffer from chronic conditions at rates higher than the average U.S. population, interventions within CFAP that promote adequate access, use, and ability to prepare nutritious foods are, and will continue to be, critical. Although several types of nutritional interventions can be implemented in CFAP, meal kit interventions are among the most preferred by CFAP clients and have been shown in several studies to improve fruit and vegetable intake, cooking self-efficacy, use of commonly underused food items, food security status, and perceived nutrient-dense food availability. A common barrier among CFAP clients is that they are unable to choose, prepare, and store healthier foods at home, which leads to certain foods being underused and wasted at the agency or household level. Despite the prevalence of this problem, very few studies target these barriers to improve the use, acceptability, and preparation self-efficacy of underused food items.

In this study, recipes and supplemental nutrition education materials were developed for a meal kit intervention for CFAP in Georgia. The strategies and methodologies used to develop these materials were strategically carried out to ensure greater flexibility and scalability in the use of these materials for various agency types and distribution models in Georgia. The intentional development of meal kit intervention resources to be flexible and scalable is necessary to minimize the burden on CFAP agencies to carry out this type of intervention. Future research should work toward gathering more comprehensive inventory data and creating a larger bank of tailored recipes that will better inform a statewide meal kit intervention in Georgia. This

research adds to the existing literature on developing a meal kit intervention for CFAP that aims to improve the use, acceptability, and preparation self-efficacy of underused food items by CFAP clients. Such information is crucial to improving the diet quality, food security, and overall health of low-income, low-resource populations.

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Appendix A: UGA SNAP-Ed Recipe Guidelines

Policy

Recipes distributed by UGA SNAP-Ed aim to support the current Dietary Guidelines for Americans[1] and SNAP-Ed goals[2]. Recipes distributed will comply with the University of Georgia copyright policy.[3]

About UGA SNAP-Ed Recipes

Recipes and menu planning serve as the building blocks for healthy meals and overall intake, and UGA SNAP-Ed recipes are informed by My Plate[4] and the DASH eating plan.[5] While individual recipes cannot stand-alone and meet the Dietary Guidelines for Americans, healthy meals patterns are achieved by considering the overall food intake over a period of time. Collectively, choosing healthy recipes can contribute to meeting the recommendations of the Dietary Guidelines for Americans. Accordingly, UGA SNAP-Ed recipes:

- Emphasize nutrient-rich options from the food groups including vegetables, fruits, whole grains, lean proteins, and fat-free and low-fat dairy.
- Include ingredients that contribute minimal amounts of added sugars, saturated fat, and sodium.
- Are nutrient analyzed by a registered dietitian or a nutrition graduate student (overseen by RD) utilizing Nutritionist Pro 2.0 Nexgen or similar nutrition analysis software. Due to variations in ingredients and measurements, values are approximations.
- Special consideration is given to the nutrient profile of each recipe with emphasis on key nutrients: total calories, saturated fat, added sugar, and sodium. See nutrition criteria below.

In addition, UGA SNAP-Ed recipes:

- Are culturally appropriate for low-income Georgians.
- Offer overall appeal regarding flavor, appearance, and texture.
- Are time and resource efficient to prepare.
- Are cost analyzed by a registered dietitian or a nutrition graduate student when the recipe is used in a direct education curriculum. Cost analysis uses current prices from a major grocery store chain with multiple retail locations throughout Georgia. The cost per serving should be viewed as an estimate and may not reflect prices paid by individuals.
- Include a professional photo of the prepared food or beverage.
- Include accurate yield using household measurements if possible.
- Recipe instructions are written for limited-literacy audience.

Nutrition Criteria

- Total calories per serving will not exceed a reasonable proportion of an average person's daily calorie needs.
- Recipes aim for $\leq$15 grams of total fat per serving and $\leq$5 grams of saturated fat per serving.
- Added sugar is less than 3 teaspoons per serving (12 grams).
- Included dairy products are reduced-fat, low fat, 1% or nonfat.

- Whole grains are used when possible.
- Sodium is low to moderate (daily total target less than 1500 – 2300 milligrams daily).
    - Less than 750 milligrams sodium per serving for casserole type dishes.
    - Less than 550 milligrams sodium per serving for entrees.
    - Less than 350 milligrams per serving for appetizers, and desserts.
- Nutrition analysis does not include optional ingredients, garnishes, fat used to grease pans or suggested accompaniments unless specific amounts are given.

Ingredients

- Listed in the order they are used.
- Include 15 or less ingredients.
- Include vegetables and fruits when possible
- Specific (size of package, can, etc.)
- Are affordable and readily available.
- Avoid brand names.

Instructions

- Numbered
- Avoid abbreviations for measurements as space allows (e.g. Tablespoon and 275 degrees).
- Reinforce good food safety practices.
- Short sentences and simple words are used to describe the steps of the recipe. (8th grade reading level.)
- Limited number of steps.
- Generally, only basic equipment is required.
- Pan/dish sizes specified when necessary.

References

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3. UGA Copyright policy: https://legal.uga.edu/guidance/licensing-copyright-and-trademark
4. MyPlate: https://www.choosemyplate.gov/
5. DASH Eating Plan: https://www.nhlbi.nih.gov/health-topics/dash-eating-plan

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Appendix B: Food Bank Inventory Data (March-May, 2022-2024) and Top Food Items by Food Group and Storage Method (January, 2022-2024): Atlanta Community Food Bank (ACFB)

2022-2024			
Month	**Item Description**	**Pounds**	**Receipt Date**
March	TEFAP Peanut Butter (GF), 12-16 oz. jars REDUCED SODIUM	46,080	3/27/2024
	TEFAP Apricots Halves, 24/15 oz. cans	43,740	3/15/2022
	TEFAP V-MIXED VEGETABLES CAN, 12/29 oz cans per case	43,200	3/27/2024
	TEFAP Beef Stew, 24/24 oz. pkgs per cs	43,000	3/30/2022
	TEFAP Long Grain Brown Rice, 24/2 lb pkgs (42/50cs)	42,875	3/28/2023
	TEFAP All Purpos Flour/ Harina, 8/5 lb pkgs	42,840	3/17/2022
	TEFAP Blackeye Peas, 24-15 oz. cans (85 cs.plt.)	42,840	3/18/2022
	TEFAP-Pistachios in-shell, 12/2 lb. bags (60cs)	42,640	3/28/2022
	TEFAP 1% Lowfat Milk-8 oz UHT, 27/8oz cartons	42,240	3/13/2024
	TEFAP Fresh Apples, 12/3 lb bags per cs	42,140	3/3/2023
April	TEFAP Peanut Butter (GF), 12-16 oz. jars REDUCED SODIUM	46,080	4/9/2024
	TEFAP-Long Grain Rice, 30-2 lb. bags (42cs)	44,100	4/6/2022
	TEFAP Sliced Peaches, 24-15 OZ. cans(102cs/85cs)	43,740	4/7/2022
	TEFAP Sweet Peas, 24/15 oz cans	43,740	4/8/2024
	TEFAP-Walnut Pieces (U), 24/1 lb. bags (60cs)	43,056	4/3/2023
	TEFAP Long Grain Brown Rice, 24/2 lb pkgs (42/50cs)	42,875	4/28/2023
	TEFAP Rice- Medium Grain, 24-2 lb. bags (46cs)	42,875	4/9/2024

	TEFAP All Purpos Flour/ Harina, 8/5 lb pkgs	42,840	4/10/2023
	TEFAP Unsweetened Apple Sauce, 24-15 oz cans	42,120	4/13/2023
	TEFAP Spaghetti Sauce, 24/15 oz cans per case (85cs)	42,120	4/14/2023
May	TEFAP-Long Grain Rice, 30-2 lb. bags (42cs)	44,100	5/4/2022
	TEFAP Mixed Fruit, 24/15 oz cans (102/85cs)	43,713	5/11/2022
	TEFAP-Walnut Pieces (U), 24/1 lb. bags (60cs)	43,056	5/12/2023
	TEFAP Macaroni & Cheese, 24/7.25 oz. pkgs	42,588	5/6/2022
	TEFAP Long Grain White Rice, 24/2 lb Bags	42,000	5/9/2023
	TEFAP-Dry Navy Beans, 12/2 lb bags per box	42,000	5/17/2023
	TEFAP Dry Green Split Peas, 12/2 lb bags (70cs)	42,000	5/30/2023
	TEFAP vegetarian vegetable sou, 24/10.5 oz cans per case (120)	41,800	5/25/2023
	TEFAP blackeye peas, 24/15 oz cans (85cs)	41,310	5/6/2022
	TEFAP Refried beans, 24/15.25oz cans (90cs)	41,310	5/27/2022

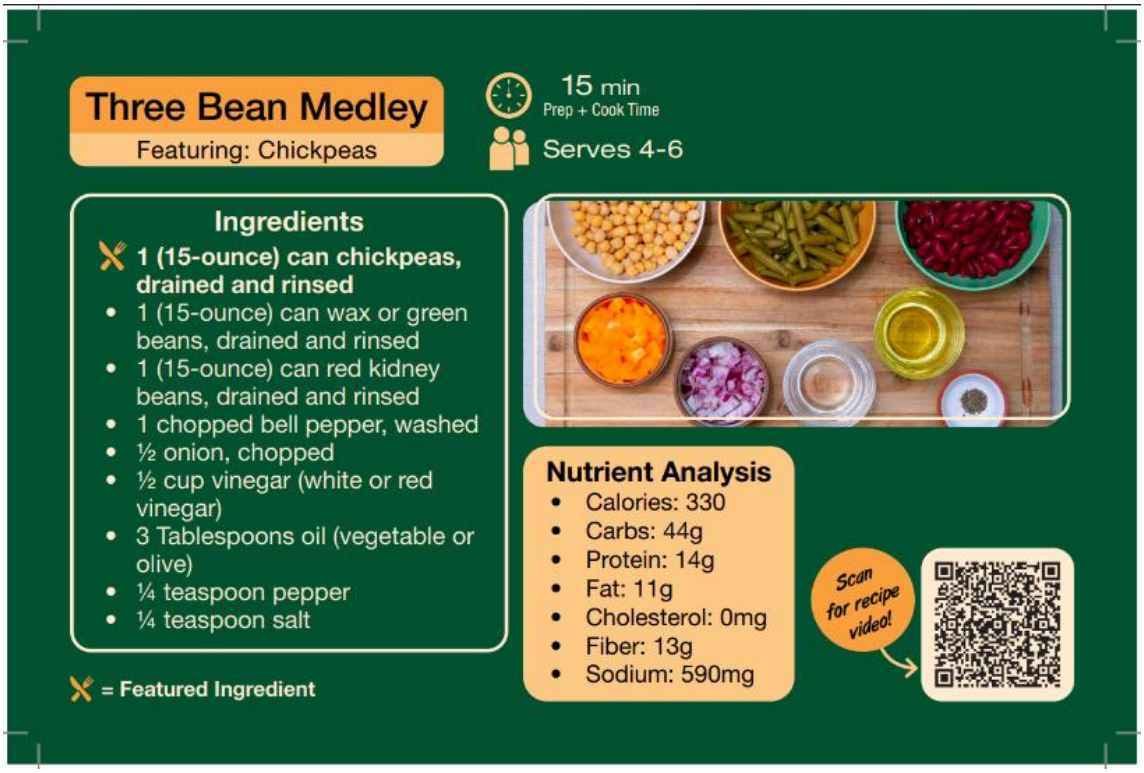
January 2022-2024			
Food Group	**Item Description**	**Pounds**	**Receipt Date**
Vegetables	TEFAP mixed vegetables, 24/15 oz cans	42,120	1/14/2022
	TEFAP Dry Yellow Split Peas, 12/2 lb bags (70cs)	42,000	1/10/2022
	TEFAP Collard Greens, 12/14 oz can	41,990	1/30/2024
	TEFAP VEG Vegetable Soup, 24/10.5 oz cans (110cs)	41,800	1/25/2024
	TEFAP Whole Kernel Corn, 24/15.25 oz can (K)	41,310	1/24/2024
Fruits	TEFAP Mixed Fruit, 24/15 oz cans	43,740	1/4/2022
	TEFAP Blueberry-Frzn3#, 12/2.5 LB PKGS PER CS	42,240	1/8/2024
	TEFAP Grapefruit Juice-64 oz, 8/64 oz units (50/60cs)	38,950	1/6/2022
	TEFAP Applesauc cup, unsweet, CUP - 96/4.5	37,800	1/2/2024
	TEFAP Frozen Strawberries, 96/4.5 oz pkgs	37,800	1/5/2024
Grains	TEFAP Yellow Corn Grits, 8/5 lb. bags (54 cs)	44,982	1/31/2022
	TEFAP Brown Long Grain Rice, 30/2 lbs bags per case	43,400	1/27/2022
	TEFAP Long Grain White Rice, 24/2 lb Bags	42,000	1/25/2024
	TEFAP Spaghetti Pasta, 20/16 oz boxes per cs (U)	40,480	1/6/2023
	*There were only 4 grain food items received by ACFB for the month of January		
Proteins	TEFAP Lentil Beans, dry, 12/2 lb pkgs (84cs)	41,975	1/29/2024
	TEFAP light red kidney beans, 24/15.5 oz cans (85cs)	41,310	1/6/2022
	TEFAP Black Beans, 24/15 oz cans per cs	41,310	1/7/2022
	TEFAP Pinto Beans, 24/15 oz cans per cs	41,310	1/8/2024
	TEFAP Refried Beans, 24/16 oz cans (90cs)	41,310	1/11/2024
Dairy	TEFAP MILK 2% FRESH, 9-64oz	36,000	1/23/2024
	TEFAP FRESH MILK 2%, 4-128OZ JUG PER CRATE	29,700	1/18/2024
	*There were only 2 dairy food items received by ACFB for the month of January		
Storage Method	**Item Description**	**Pounds**	**Receipt Date**
Dry	TEFAP Yellow Corn Grits, 8/5 lb. bags (54 cs)	44,982	1/31/2022

	TEFAP Mixed Fruit, 24/15 oz cans	43,740	1/4/2022
	TEFAP Brown Long Grain Rice, 30/2 lbs bags per case	43,400	1/27/2022
	TEFAP Long Grain Brown Rice, 24/2 lb pkgs (42/50cs)	42,875	1/2/2024
	TEFAP-Pistachios in-shell, 12/2 lb. bags (60cs)	42,640	1/27/2022
Cooler	TEFAP MILK 2% FRESH, 9-64oz	36,000	1/23/2024
	TEFAP fresh Grapefruit, CTN 34-39	33,840	1/18/2024
	BROCCOLI, 20 LB CASE	30,560	1/16/2024
	TEFAP Orange Juice-64 oz, 8/64 oz bottles	18,981	1/10/2022
	COLLARDS, BUNCH, 24 CT CASE	8,910	1/4/2024
Freezer	TEFAP Blueberry-Frzn3#, 12/2.5 LB PKGS PER CS	42,240	1/8/2024
	TEFAP Ground Bison, 40/1 lb. Packages per Case	40,000	1/10/2022
	TEFAP-Ground Beef (40/plt), 40/1 lb. Packages per Case	40,000	1/31/2023
	TEFAP Pork Taco Filling, 20/2 lb. Packages per Case	40,000	1/12/2024
	TEFAP Chicken Breast, Boneless - 10/3 LB	39,000	1/2/2024

Appendix C: Tailored Meal Kit Recipe Cards for January, June, and August 2025

January Recipe Card: Create-Your-Own Soup

June Recipe Card: Three Bean Medley



August Recipe Card: Lentil Sloppy Joe's w/ Dark Greens Coleslaw