THE ROLE OF FARMERS’ MARKET INCENTIVES ON THE FRUIT AND VEGETABLE INTAKE AND FOOD SECURITY STATUS OF SUPPLEMENTAL NUTRITION ASSISTANCE PROGRAM PARTICIPANTS

by

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A dissertation submitted in partial fulfillment of other requirements for the degree of DOCTOR OF PHILOSOPHY in Nutrition, Dietetics, and Food Sciences

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ABSTRACT

The Role of Farmers’ Market Incentives on the Fruit and Vegetable Intake and Food Security Status of Supplemental Nutrition Assistance Program Participants

By

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Socioeconomic status strongly impacts food choices and eating patterns of both adults and children. Low-income individuals tend to eat diets high in calories and fat, and low in nutrient dense foods such as fruits and vegetables. Barriers such as cost, access, availability, and knowledge are commonly reported reasons for limited intake of fruits and vegetables. Low-income individuals are more likely to experience food insecurity, which can also limit the consumption of nutrient dense foods. As a result, low-income individuals are at an increased risk for obesity and chronic diseases.

Farmers’ market incentives were found to significantly increase food security status among program participants and although fruit and vegetable consumption among those participants did increase, the change was not statistically significant for fruit and most types of vegetables. However, mean carotenoid levels were found
to increase among participants who received an 8-week intervention that included weekly farmers’ market incentives. Data collected through qualitative interviews indicates that farmers’ market incentives helped participants overcome barriers associated with poor fruit and vegetable intake. Furthermore, parents expressed value in the opportunity for children to select, purchase, prepare, and consume fruit and vegetables purchased at the farmers’ market. However, qualitative and quantitative data suggest that farmers’ market incentive programs would have greater participation if individuals were not required to match their federal nutrition assistance benefits. Further research should be conducted using a completely randomized design and larger sample sizes to determine changes in fruit and vegetable intake among participants of farmers’ market incentive programs. The combination of nutrition education and farmers’ market incentives should be investigated to determine if program participants would further benefit from a combination of two intervention strategies.
The Role of Farmers' Market Incentives on the Fruit and Vegetable Intake and Food Security Status of Supplemental Nutrition Assistance Program Participants

Mateja R. Savoie Roskos

Public health professionals in the United States are implementing various interventions in effort to improve dietary intake in low-income individuals. One intervention strategy that has gained attention over the past several years is providing financial incentives for federal nutrition assistance users when they purchase fruit and vegetables at local farmers’ markets. The overall objective of the research studies included in this dissertation were to develop, implement, and evaluate farmers’ market incentive programs in Utah in effort to determine if this intervention increases fruit and vegetable intake and improves food security status among low-income individuals.

The first study conducted in the Healthy Eating for Life study assessed the feasibility of implementing and evaluating a farmers’ market incentive program and to determine the utilization of benefits among individuals receiving incentives. Results of this study show that there was a slight but not significant increase in carotenoid levels among most intervention groups. Additionally, there was greater participation in the farmers’ market incentive program and an increase in the amount of incentives utilized among participants who were not required to match
Supplemental Nutrition Assistance Program benefits to receive the incentives. Individual interviews were conducted with participants of Healthy Eating for Life for the second study. Participants were asked about their experiences with receiving farmers’ market incentives after receiving the intervention for 8-weeks. Results of this study confirm that farmers’ market incentives help reduce common barriers to purchasing fruit and vegetables allowing participants and their families to consume more produce during the study period.

Double Up Food Bucks is a farmers’ market incentive program that was implemented at the Downtown Farmers’ Market in Salt Lake City. Individuals at one farmers’ market were surveyed before and four-weeks after receiving the matching incentives to determine changes in fruit and vegetable intake and food security status among each individual. Although there was not a significant change in the intake of most fruit and vegetables, food security status of participants did significantly improve.
I would like to dedicate this dissertation to my husband Thomas Roskos. Thank you for always believing in me.
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CHAPTER 1
INTRODUCTION AND BACKGROUND

Abstract

In general, low-income individuals are at increased nutritional risk as a result of food insecurity and poor dietary intake. Although programs such as the Supplemental Nutrition Assistance Program aim to improve nutritional status of low-income Americans, these nutrition-related issues remain a problem for many individuals. As a result, innovative interventions strategies for low-income individuals receiving federal nutrition assistance have been implemented across the United States. Among the most noteworthy includes the implementation of farmers’ market incentive programs, which encourage the use of federal nutrition assistance benefits at farmers’ markets for the purchase of fruit and vegetables and other nutrient dense foods. Farmers’ market incentive programs provide an opportunity for low-income individuals to increase fruit and vegetable consumption and reduce food insecurity by lowering the cost of produce at local markets. Evaluations of farmers’ market incentive programs were conducted to determine changes in food security status and fruit and vegetable intake among program participants in Utah.
Introduction

Socioeconomic status (SES) is a strong predictor of morbidity and mortality in the United States (Darmon & Drewnowski, 2008). Low-income individuals commonly suffer from higher rates of chronic diseases such as obesity, diabetes, cancer, and heart disease, all of which are directly related to poor dietary intake and nutritional status among this population (Darmon & Drewnowski, 2008). The increased risk for poor health and nutrition status among this population results from numerous barriers such as inadequate financial resources, transportation, time, access, availability, and knowledge, to name a few (Eikenberry & Smith, 2004; Wheeler & Chapman-Novakofski, 2014). Federal nutrition assistance programs have been implemented as a way to improve the nutritional health of this population and therefore reduce the health inequalities.

The Supplemental Nutrition Assistance Program (SNAP), previously known as the Food Stamp Program, aims to reduce food insecurity and improve diet quality among low-income Americans (Andreyeva, Tripp, & Schwartz, 2015; Gregory & Deb 2015). An estimated 45.7 million people used SNAP benefits in 2015, costing roughly 74 million dollars (United States Department of Agriculture [USDA], 2015). This makes SNAP the largest nutrition assistance program in the United States (USDA, 2015). Although numerous studies have found that participation in SNAP reduces food insecurity among program participants, dietary quality among these individuals remains poor (Andreyeva et al., 2015). Diverse interventions strategies have been implemented in collaboration with SNAP and other federal nutrition
assistance programs in effort to reduce food insecurity and improve dietary intake among low-income individuals.

Background

Although a diet rich in fruits and vegetables (F&V) reduces the risk for obesity and chronic diseases, very few low-income Americans are meeting the Dietary Guidelines for Americans recommended intakes (Kimmons, Gillespie, Seymour, Serdula, & Blanck, 2009; Stewart, Blisard, & Jolliffe, 2003). More specifically, low-income individuals only consume 0.96 cups of fruit and 1.43 cups of vegetables per day on average compared to their higher income counterparts who consume 1.80 and 2.60 cups, respectively (Dong & Lin 2009). As previously mentioned, there are numerous barriers preventing low-income individuals from consuming F&V rich diets. First, low-income families would have to spend an estimated 40-70% of their grocery budget on F&V to meet the dietary guidelines recommendations for everyone in the household, an amount that is substantially greater than the proportion of food dollars that would have to be spent in higher income households (Cassady, Jetter, & Culp, 2007). Second, low-income families living in low-income neighborhoods tend to have less access to F&V. Data from the National Health and Nutrition Examination Survey (NHANES) indicates that total F&V intake decreases by 0.24 servings per day as a result of each 1 standard deviation decrease in a neighborhood SES index (Dubowitz et al., 2008). This is not
surprising since many low-income neighborhoods are known to have a limited number of supermarkets and other venues that sell produce, which may be making it difficult for these individuals to consume adequate F&V (Evans et al., 2015; Moore & Roux, 2006; Parsons & Morales, 2013). In addition to lack of access and high cost of F&V, lack of food resources or food insecurity can also contribute to low intake of F&V in this population.

Food insecurity is defined as the inability to continuously access safe and nutritious foods in a way that is socially acceptable (Anderson, 1990). In the United States, an estimated 50 million people experience food insecurity at any given time, most of which are considered lower SES as evidence by a household income below the federal poverty guidelines (Coleman-Jensen, Rabbitt, & Gregory 2015; USDA, 2015). For the first time since the Great Recession, rates of food insecurity are demonstrating a slight decline in the U.S. (Coleman-Jensen et al., 2015). However, the impact of food insecurity on the overall health status of affected individuals remains substantial.

Food insecurity typically results in the consumption of processed foods causing dietary intakes that are higher in calories, sugar, sodium, and saturated fat (Drewnowski & Darmon, 2005; Seligman, Laraia, & Kushel, 2010). Nutrient dense foods such as F&V, whole grains, and lean meats are often limited, if not entirely skipped, due to their higher cost, shorter shelf life, and fewer calories (Seligman et al., 2010). Therefore, extended periods of food insecurity can result in serious nutritional deficiencies and chronic diseases as previously mentioned. Implementation of diverse intervention strategies is necessary to improve food
security status and F&V intake and therefore reduce the risk of chronic diseases in low-income populations (Bazzano, 2006; McCormack, Laska, Larson & Story, 2010; Wheeler & Chapman-Novasofski, 2014).

Farmers’ markets have been established in communities across the country in effort to increase consumption of locally grown F&V (Blanck, Thompson, Nebeling, & Yaroch 2011; Pitts et al., 2014; Quandt, Dupuis, Fish, & D’Agostino, 2013). Low-income rural communities have found farmers’ markets to be especially valuable for improving access to F&V in areas where limited F&V are commercially sold (Dimitri, Oberholtzer, & Nischan, 2013). Many farmers’ markets are now accepting federal nutrition assistance benefits provided through programs such as SNAP and the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) as a way to increase F&V consumption in these individuals (Byker, Shanks, Misyak, & Serrano, 2012). However, only a small proportion of federal nutrition assistance benefits are currently being redeemed at farmers’ markets each year (Dimitri et al., 2013). For example, only $18.8 million in SNAP benefits were redeemed at farmers’ markets in 2012, a meager 0.27% of SNAP benefits redeemed that year (USDA, 2015; USDA, 2015). Although this is a significant increase from previous years, it remains a small portion of SNAP benefits currently being spent (Dimitri et al., 2013). Incentive programs have been developed and implemented across the country as a way to support the use of federal nutrition assistance at farmers’ markets.

Farmers’ market incentive programs encourage the use of federal nutrition assistance benefits at farmers’ markets by lowering the cost of produce. These
programs distribute financial incentives in effort to increase F&V consumption and reduce food insecurity among this population. The WIC Farmers’ Market Nutrition Program (FMNP) and the Senior Farmers’ Market Nutrition Program (SFMNP) provide up to $30 and $50 respectively, as annual F&V incentives for eligible participants (McCormack et al., 2010). Numerous other privately funded farmers’ market incentive programs such as the Double Value Coupon Program and Double Up Food Bucks have also been established around the country (Dimitri et al., 2013; Parsons & Morales, 2013). Together these programs help overcome the barrier of cost, making it easier for low-income individuals to purchase F&V.

Although farmers’ market incentives reduce the cost of F&V, these programs do not reduce other barriers such as lack of knowledge, skills, self-efficacy, family support, preparation time, and personal preferences. Nutrition education is an intervention strategy that has been shown to reduce these barriers and improve dietary choices in low-income individuals (Gibson, 2003; Mello et al., 2010; Wall, Least, Gromis, & Lohse, 2012). The Supplemental Nutrition Assistance Program–Education (SNAP-Ed) and WIC both provide nutrition education to eligible participants across the United States (Taylor-Powell, 2006; USDA, 2011). Participation in SNAP-Ed nutrition education at a farmers’ market has been found to result in higher self-efficacy and more positive attitudes related to preparing and consuming F&V (Dannefer et al., 2015). Furthermore, individuals who participated in at least two SNAP-Ed classes at the farmers’ market reported consuming nearly ½ cup of F&V per day more than their counterparts who received less nutrition education (Dannefer et al., 2015). Pairing farmers’ market incentives with nutrition
education may be one way to reduce multiple barriers to consuming F&V among low-income individuals (Weinstein, Galindo, Fried, Rucker & Davis, 2014).

Very few studies have been published demonstrating the effect of farmers’ market incentive programs on the food security status and dietary intake of F&V among low-income individuals. Additionally, only one previous study has investigated the effect of farmers’ market incentives and nutrition education on the dietary intake of low-income individuals receiving federal nutrition assistance (Anderson et al., 2001). In addition, no studies to date have investigated the feasibility of implementing and evaluating farmers’ market incentive programs.

Study Objectives and Hypothesis

The work in this dissertation is focused on the effect of farmers’ market incentives on the F&V intake and food security status among SNAP participants in Utah. Furthermore, this dissertation investigates the feasibility of implementing and evaluating a farmers’ market incentive program. Objectives 1 and 2 are based on data collected from the Healthy Eating for Life (HEaL) study, which was conducted in the summer and fall of 2014. The purpose of HEaL was to examine the feasibility and effectiveness of farmers’ market incentives among SNAP participants in Cache Valley, Utah. Data from the HEaL study was used for objective 1 to investigate the viability of implementing and evaluating a farmers’ market incentive program. Qualitative data from semi-structured interviews was used in objective 2 to investigate the participant’s experiences with receiving and using farmers market
The objectives and hypotheses of this study include:

1. The objective of this study was to determine the feasibility of program implementation and evaluation and the utilization of benefits among farmers’ market incentive program participants. It was hypothesized that as the utilization of benefits at the farmers’ market increased, F&V intake would increase.

2. To explore the experiences of SNAP participants at farmers’ markets after receiving farmers’ market incentives. It was hypothesized that incentives would reduce the common barriers associated with shopping at farmers’ markets among low-income individuals.

3. To determine whether Double Up Food Bucks increased F&V intake and improved food security status among participants. It was hypothesized that F&V intake would significantly increase and food security status would significantly improve at the four-week follow up.
Study Rational and Significance

The significance of this study includes:

- This study is the first study of farmers’ market incentives to incorporate an objective measurement of F&V intake. The Resonance Raman Light Scattering Spectroscopy (RRS) was used to determine the carotenoid levels at each data collection period of the quantitative portion of the HEaL study.
- This study is one of few studies to use validated measurements including 24-hour recalls and food frequency questionnaires to measure the effect of farmers’ market incentives on F&V consumption.
- This study is the only study to conduct qualitative semi structured individual interviews among participants who have received farmers’ market incentives and nutrition education.
- This study is one of few studies to compare F&V intake and food security status of farmers’ market incentive participants before and after program participation.
- This study is the first to investigate how the utilization of farmers’ market incentives is associated with F&V intake among program participants.
References


Association, 107(11), 1909-1915. doi: 10.1016/j.jada.2007.08.015


for evaluation and research efforts. *Journal of the American Dietetic Association, 110*(3), 399-408. doi: 10.1016/j.jada.2009.11.023


Quandt, S. A., Dupuis, J., Fish, C., & D'Agostino, R. B. (2013). Feasibility of using a community-supported agriculture program to improve F&V inventories and consumption in an underresourced urban community. *Preventing Chronic Disease, 10*(8). doi: 10.5888/pcd10

Seligman, H., Laraia, B., & Kushel, M. (2010). Food insecurity is associated with chronic disease among low-income NHANES participants. *The Journal of


CHAPTER 2

BARRIERS AND INTERVENTIONS TO IMPROVE FRUIT AND VEGETABLE INTAKE AND FOOD SECURITY STATUS AMONG LOW-INCOME POPULATIONS: A LITERATURE REVIEW

Abstract

Obesity and chronic diseases are common health problems affecting many adults in the U.S. Unfortunately, very few Americans are meeting the recommended intakes of F&V, which has been known to contribute to an increased risk of chronic disease. Low-income individuals especially have a difficult time consuming adequate F&V as a result of numerous barriers such as cost, access, and availability. Food insecurity, a common struggle for many low-income Americans, makes it even more challenging for this population to consume healthy diets rich in F&V. Numerous interventions have been implemented in effort to reduce food insecurity and improve dietary intake among low-income individuals. Farmers’ market incentive programs have been recently established in many states across the country with the goal of reducing such barriers. Previous research suggests that these programs are effective at improving F&V intake and reducing food insecurity among participants. However, more research needs to be conducted using stronger study designs and measurement techniques before conclusions regarding program effectiveness can be made. This review of the literature discusses these issues in detail.
Introduction

There is a well-established relationship between the consumption of a healthy diet rich in F&V and the decreased risk for chronic diseases. Nutrients such as lycopene, carotenoids, vitamin C, and fiber among many others have been found to help protect against various chronic diseases such as heart disease, type 2 diabetes, certain cancers, and obesity to name a few (Bhupathiraju et al., 2013; Hung et al., 2004; Joshipura et al., 1999; Joshipura et al., 2001; Michaels et al., 2000; & Michaud et al., 2000). Unfortunately, very few Americans consume recommended intakes of F&V, which negatively impacts overall health status (Blanck, Gillespie, Kimmons, Seymour, & Serdula, 2008). The list of barriers preventing individuals from consuming F&V is more extensive for the low-income population. Cost, access, availability are among the most commonly discussed barriers for this population (Eikenberry & Smith, 2004; Wheeler & Chapman-Novasofski, 2014). Consumption of adequate F&V becomes difficult for families with a minimal food budget and for those individuals that live in areas where limited healthy options are available. It is even more of a challenge for low-income families experiencing consistent food insecurity when food choices are often restricted to processed foods that are low in cost (Seligman, Laraia, & Kushel, 2010). Numerous interventions have been implemented targeting this demographic group in effort to increase F&V consumption, change long-term dietary behaviors, and improve food security status among low-income adults and children. Farmers’ market incentive programs is one
intervention strategy that has been implemented over the past 10 years to improve these nutrition-related behaviors.

Link Between Fruit and Vegetable Intake and Chronic Disease

Obesity and chronic diseases are affecting the lives of many Americans. At the current rate, obesity prevalence will increase by 65 million adults in the United States by the year 2030 (Wang, McPherson, Marsh, Gortmaker, & Brown, 2011). This increase in obesity will consequently lead to an increase in the prevalence of numerous other chronic diseases such as diabetes, heart disease, and cancer, which are estimated to increase in occurrence over the next 15 years (Wang et al., 2011). As the prevalence of chronic diseases increase, the costs associated with prevention and medical care also increases. In the U.S., the estimated increase in costs associated with chronic diseases is approximately $48 billion per year, a growth of exponential proportions (Wang et al., 2011). Effective interventions and policies to decrease the risk for chronic diseases especially among high-risk groups would have immense benefit.

Numerous nutrition interventions have been implemented to improve dietary intake and reduce the risk for chronic diseases. More specifically, studies have emphasized increasing F&V intake to meet the dietary guidelines for Americans (Bazzano, 2006; McCormack et al., 2010; Wheeler & Chapman-Novasofski, 2014). There is a modest to strong association between F&V intake and
reduced risk for chronic diseases such as diabetes, cardiovascular diseases, certain cancers, hypertension, eye diseases, dementia, and osteoporosis among many others (Bhupathiraju et al., 2013; Boeing et al., 2012; Ford & Mokdad, 2000; Hung et al., 2004; Liu et al., 2000). F&V intake is also strongly associated with a decreased risk for mortality from these chronic diseases (Bazzano, 2006). It has been estimated that 2.635 million deaths per year worldwide can be attributed to poor intake of F&V (Lock, Pomerleau, Causer, Altman, & McKee, 2005). Increasing F&V intake could reduce morbidity and mortality from these diseases.

Strong inverse associations have been found between chronic disease risk and F&V intake. For every 1 additional serving of F&V per day, there is a decreased risk of ischemic stroke (6%) (RR=0.94), coronary heart disease (CHD) (4%) (RR=0.96), and diabetes (14%) (Carter, Gray, Troughton, Khunti, & Davies, 2010; Joshipura et al., 1999; Joshipura et al., 2001; McCall et al., 2009). Other studies have found greater benefits resulting from an increase in two servings per days including a 27% decrease risk for stroke, and a decrease in mortality from stroke (42%), cardiovascular diseases (CVD) (27%), ischemic heart disease (24%) and over all causes of mortality (15%) (Bazzano et al., 2002). The highest quartiles of F&V have also been found to reduce the risk of CVD (RR= 0.68), CHD (RR=0.80) myocardial infarction (MI) (RR= 0.62), and metabolic syndrome (Bhupathiraju et al., 2013; Esmaillzadeh et al., 2006; Joshipura et al., 2001; Liu et al., 2000). In another study, consuming 5 or more servings of F&V per day was found to decrease the risk for CVD by 28% as compared to a consumption of less than 1.5 servings of F&V per day (Hung et al., 2004).
Other studies have investigated the relationship between chronic diseases and specific nutrients found in F&V. An inverse relationship was found between dietary beta-carotene and lycopene intakes and risk of lung cancer in men and women ($n = 124,207$) (Michaud et al., 2000). The risk ($RR= 0.68$) of lung cancer decreased significantly with high intakes of carotenoids (Michaud et al., 2000). However, significant results were not consistently found with other cancers such as rectal and colon (Michaels et al., 2000; Michaud et al., 2000). Consumption of vegetables rich in beta-carotene, citrus fruit and other vitamin C rich foods, are associated with the greatest protective benefit from CHD and other chronic diseases (Bhupathiraju et al., 2013; Hung et al., 2004; Joshipura et al., 1999; Joshipura et al., 2001). It’s likely that the micronutrients found in the F&Vs play a large role in the decreased disease risk (Hung et al., 2004). Other nutrients such as fiber and water content in F&V may contribute to health outcomes such as weight loss and weight maintenance (Boeing et al., 2012; Herman, Harrison, & Jenks, 2006; Ledikwe et al., 2006).

Diets rich in F&V may be effective at aiding in weight loss and weight maintenance in many populations (Boeing et al., 2012; Herman et al., 2006; Ledikwe et al., 2006). A prospective cohort study found that women ($n=74,063$) with the highest intakes of F&V were 24% less likely to become obese over a 12-year period as compared to their counterparts consuming low amounts of F&V (He et al., 2004). Several studies have found that high intakes of F&V replace energy dense foods and therefore decrease caloric intake causing weight loss (Boeing et al., 2012; Herman, et al., 2006; Ledikwe et al., 2006). Newby et al., (2003) found that higher F&V intake
was associated with reduced weight gain and lower Body Mass Index (BMI) as compared to individuals with low F&V intake. Weight reductions were also likely influenced by the replacement of calorie dense foods such as soda, processed foods, and fast food with F&V (Newby et al., 2003). However, an increase in F&V may not contribute to weight loss or weight maintenance if other nutrition-related behaviors are not adopted (Casazza et al., 2013).

In response to the significant amount of benefits found with high intakes of F&V, recommendations exist to increase F&V consumption among children and adults in the U.S (Hung et al., 2004; USDA, 2010). Healthy People 2020, the Dietary Guidelines for Americans, and MyPlate all exist to improve the health of Americans. One of the goals of Healthy People 2020 is to increase F&V consumption among individuals of all ages due to current low intakes among all demographic groups (USDA, 2010). The 2010 Dietary Guidelines for Americans recommend increasing F&V intake as a way to reduce the risk of obesity, cancer and other chronic diseases, as listed above (Bazzano, 2006; McCormack et al., 2010; Wheeler & Chapman-Novakofski, 2014). MyPlate, a dietary intake tool for Americans, encourages individuals to make half of each plate F&V for the same health benefits (USDA, 2010). Unfortunately, these recommendations and guidelines have not been enough to significantly change dietary patterns of Americans.

F&V intake has shown little improvement over the years (Serdula et al., 2004). Despite the abundance of research demonstrating disease prevention, trends in dietary intake of F&V remain well below the recommended levels (Rose & Richards, 2004). It is estimated that adults are consuming no more than 28% and
49% of the recommended intake of F&V, respectively (Krebs-Smith & Kantor, 2001; Rose & Richards, 2004). BRFSS data from 1994-2000 found very minimal change in F&V intake per day in adults (Serdula et al., 2004). More recently, only 25% of individuals report consuming 5 or more servings of F&V per day however, this is an increase from the 19% reported in 1990 (Blanck et al., 2008; Li et al., 2000; Lutifyya, Chang, & Lipsky, 2012; Serdula et al., 2004). Although these numbers provide a general idea of F&V consumption, they do not consider differences among various populations of adults.

F&V intake varies depending on a variety of demographic and social factors, therefore, the data mentioned may not accurately represent F&V intake for low-income individuals. Several studies have suggested that F&V intake is even lower in populations with low-income and education levels (Stewart & Blissard, 2008; Dibsdall, Bobbine, & Frewer, 2002; Herman et al., 2006; McCormack et al., 2010; Turrell, Hewitt, Patterson, Oldenburg, & Gould, 2002; Wheeler & Chapman-Novasofski, 2014). In fact, high-income individuals are twice as likely to meet the dietary guideline recommendations for F&V as compared to their low-income counterparts (Cleveland, Cook, Krebs-Smith & Friday, 1997). A qualitative study found that very few low-income individuals were consuming the recommended five servings of F&V per day (Dibsdall et al., 2003). More specifically, the average low-income individual only consumes 0.96 cups of fruit and 1.43 cups of vegetables compared to their higher income counterparts who consume 1.80 and 2.60 cups, respectively (Dong & Lin 2009). Poor dietary intake of F&V is likely a contributing factor to the disproportionately higher prevalence of chronic diseases such as
obesity and type 2 diabetes in low-income populations (Blanck et al., 2011; Drewnowski & Specter, 2004).

Increasing Fruit and Vegetable Consumption in Low-income Individuals

Most interventions aimed at increasing F&V intake have emphasized changing attitudes, beliefs, knowledge and behaviors. Efforts have utilized nutrition education and food assistance through federally funded programs like the Supplemental Nutrition Assistance Program (SNAP) and Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) (Cassady Jetter, & Culp, 2007; Dong & Lin 2009). Although these programs have been successful at decreasing food insecurity and promoting F&V intake, they have not significantly increased F&V intake in the target population (Krebs-Smith & Kantor, 2001). More recently, interventions have highlighted the food environment of low-income and minority groups and how it plays a large role in food choices (Cassady et al., 2007; Jennings et al., 2012; Morland, Wing, & Roux, 2002). Finding evidence-based strategies to reduce barriers associated with poor F&V intake is vital to improving dietary intake in this population (Evans et al., 2012).

There are multiple barriers that limit F&V consumption in low-income individuals (Darko, Eggett, & Richards, 2013; Eikenberry & Smith, 2004; Morland et al., 2002; Ni Mhurchu et al., 2011; Reyes, Klotz, & Herring, 2013; Treiman et al., 1996; Wheeler & Chapman-Novasofski, 2014). Time, cost, access, and availability
are a few of the most commonly cited barriers (Eikenberry & Smith, 2004; Wheeler & Chapman-Novasofski, 2014). Transportation, lack of knowledge, tradition, taste, habit, time, and food preparation are also perceived barriers reported in this population (Eikenberry & Smith, 2004; Glanz, Basil, Mailbach, Goldberg, & Snyder, 1998; Haynes-Maslow, Parsons, Wheeler, & Leone, 2013; Ni Mhurchu et al., 2011; Treiman et al., 2006). As foods are more accessible and less costly, low-income individuals are more likely to purchase and therefore consume them (Bodor, Rose, Farley, Swalm, & Scott, 2008; Haynes-Maslow et al., 2013; Larson & Story, 2009; Larson, Story, & Nelson, 2009). Typically, as individual level determinants such as self-efficacy, nutrition knowledge and cooking skills improve, there is an increase in F&V intake among low-income individuals (Williams, Ball, & Crawford, 2010). Numerous interventions have been implemented to reduce individual level determinants to improve nutritional intake.

Interventions aimed at increasing F&V intake should strive to change the misconceptions and misinformation related to the self-reported barriers of the participants (Williams et al., 2010). Reyes et al., (2013) found that low-income mothers had many misconceptions about what constitutes healthy foods. For example, many women thought that fruit juice was a healthy option for infants, which predictably was associated with higher juice intakes among infants and children of these parents (Reyes et al., 2013). Similarly, low-income individuals have a skewed idea of their own dietary intake. Less than 5% of low-income women reported consuming an unhealthy diet, however, of the 680 women surveyed, only 18% reported consuming at least 5 servings of F&V each day (Dibsdell et al., 2003).
These misconceptions of healthy eating influence dietary intake and overall health status of this population.

As previously stated, low socioeconomic status (SES) is associated with a decreased intake of F&V (Serdula et al., 2004; Turrell et al., 2002). Additionally, low-income individuals are less likely to purchase foods high in fiber or low in fat, sugar and sodium as compared to their higher income counterparts (Turrell et al., 2002). For these reasons, low-income individuals can be at higher risk for chronic diseases and overall poorer health. Unfortunately, multiple barriers exist that make it challenging for low-income individuals to consume the recommended intakes of F&V. Interventions and policies must be implemented to reduce barriers such as cost, accessibility, and availability of F&V to increase F&V purchase and consumption habits among low-income populations.

Cost of Fruit and Vegetables

Cost of healthy food has been reported as the greatest barrier of poor dietary habits in low-income individuals (Cassady et al., 2007; Darko et al., 2013; Larson & Gilliland, 2009; Morland et al., 2002; Reyes et al., 2013). In fact, among focus group participants, cost of food was discussed four times more than any other barrier (Haynes-Maslow et al., 2013). Food costs occupy a greater proportion of income in low-income households as compared to higher income households (McDermottt & Stephens, 2010). This can make it especially challenging for individuals in this
demographic group to eat a healthy diet (McDermott & Stephens, 2010). In most circumstances, F&Vs are more expensive than processed foods in terms of a source of energy, however, they do provide key nutrients like vitamins and minerals at a reasonable price (Darmon, Darmon, Maillot, & Drewnowski, 2005; Drewnowski, 2004). Unfortunately, with poor intakes of F&V, many low-income individuals are consuming inadequate amounts of potassium, vitamin D, calcium, and dietary fiber among others (Monsivais, Aggarwal, & Drewnowski, 2011). Increasing F&V intake to improve the intake of potassium alone would cost an estimated $380 per person per year in addition to the average food costs (Monsivais et al., 2011). As a result, increasing F&V purchases may seem financially unrealistic for many low-income families.

Food dollars allocated towards F&V each month is minimal in low-income groups. Not surprisingly, low-income individuals spend significantly less food dollars on F&V each month as compared to their higher income counterparts (Frazao, Andrews, Smallwood, & Prell, 2007; French, Wall, & Mitchell, 2010; Guthrie, Lin, Ver Ploeg, & Frazao, 2007; Kirpatrick et al., 2003). On average, low-income households spend $49-$57 per month on F&V as compared to $76 per month spent by higher income households (Frazao et al., 2007; Guthrie et al., 2007). In a similar study, low-income households reported purchasing 59.61 ± 1.03 servings of F&V each week as compared to 66.38 ± 1.01 reported in higher income households (Kirpatrick et al., 2003). Furthermore, of the F&V that are consumed in low-income households, many were canned and frozen due to their lower cost and longer shelf life (Haynes-Maslow et al., 2013). Participants of federal nutrition assistance
programs have reported that healthy diets rich in F&V are not feasible due to the high cost (Eikenberry & Smith, 2004). Likewise, many low-income families are focused more on consuming adequate energy instead of adequate nutrients (Darko et al., 2013).

Several studies have found diets high in F&V are more costly than the typical American diet (Darmon, Briend, & Drewnowski, 2004). Energy dense foods and beverages high in sugar and saturated fat are often times more affordable than nutrient dense foods high in nutrients like vitamins, minerals, and fiber (Darmon et al., 2002; Darmon et al. 2004; Drewnowski & Specter, 2004). Early literature suggested that foods high in added fats, added sugars, and refined grains were among the lowest priced foods on the market (Drewnowski & Specter, 2004; Drewnowski, Darmon, & Briend, 2004). However, more recent research, conducted using a database from the USDA through the Nutrient Rich Foods index, suggests that numerous F&V such as carrots, broccoli, tomato soup, tomato juice and potatoes are affordable and nutritionally dense (Drewnowski, 2013). This new methodology that emphasizes nutrient density instead of price per gram, likely contributes to the changes in the results of these studies (Drewnowski, 2013).

Unfortunately, processed foods still seem more affordable to low-income individuals on a small grocery budget (Drewnowski et al., 2004). Individuals report eating more processed foods high in carbohydrates and calories as a way to feed the family during times of limited financial resources (Darko et al., 2013). Similarly, SNAP participants commonly rely on processed foods at the end of the month after their benefits have run out (Seefeldt & Castelli, 2009). Unfortunately, these energy dense
foods high in processed grains and added sugars and low in F&V have been linked to chronic diseases such as heart disease, obesity, and type 2 diabetes (Ledikwe et al., 2006; Liu et al., 2002; Ludwig, 2011). Although many chronic diseases are preventable through a healthy diet, making healthy food purchases can be challenging for low-income families on a limited food budget.

Following the dietary guidelines can be costly for low-income individuals since a greater proportion of their income is spent on food (Morland et al., 2002). According to Cassady et al., (2007) to meet the dietary guidelines for everyone in the household, low-income families would have to spend 40-70% of their grocery budget on F&V, an unrealistic amount for most households. This is significantly more than the current 15% spent on F&V on average among consumers of all income levels (Reed et al., 2007). To reduce the grocery budget, low-income individuals use a variety of techniques including: using coupons, menu planning, using local and federal nutrition assistance benefits, price matching and shopping at stores with the lowest prices (Darko et al., 2013; Dong & Leibtag, 2010; Wiig & Jeffery 2008). Although these techniques can reduce prices, the cost of groceries remains a strong influence on shopping behaviors of low-income individuals.

Although many don’t agree with these findings, Stewart et al., (2011) found that it was possible to meet the dietary guideline recommendations for F&V on a budget that was similar to the Thrifty Food Plan, a food plan developed by the USDA for individuals living on a limited food budget (Davis & You, 2010; Drewnowski & Eichelsdoefer, 2010). However, low-income households would likely have to spend less money on other foods such as processed items and fast food to meet these
recommendations (Steward et al., 2011). These foods are often selected for consumption as a result of the minimal time required for preparation (Davis & You, 2010). Approximately 26% of food dollars in low-income households goes towards eating out at fast food restaurants (Frazao et al., 2007; Guthrie et al., 2007). Furthermore, one study found that low-income families spend a larger percentage of their food budget (54%) at carry out restaurants as compared to higher income families (37%) (French et al., 2010). These restaurants typically have few healthy choices available, which may result in fewer nutrient dense foods such as F&V to be consumed (French et al., 2010). The perceived difficulty of purchasing F&V may be influenced by the reduced food budget available to use at the grocery store (French et al., 2010). It is possible that cost would be less of a barrier to F&V intake if more food money was used to purchase food at the grocery store where prices are cheaper. Some have argued that if food dollars were budgeted more carefully low-income individuals could consume a healthier diet within their current food budget (McDermott et al., 2010).

Accessibility of Fruit and Vegetables

Accessibility is defined as an individual’s ability to access healthy foods (Bustillos, Sharkey, Anding, & McIntosh, 2009). Food accessibility is an environmental determinant of diet and diet-related health outcomes. One of the most commonly reported barriers to F&V consumption in low-income populations
is limited access to these foods (Evans et al., 2015; Wiig et al., 2008; Williams et al., 2010). In fact, low-income individuals with the greatest perceived accessibility of F&V, even if the actual access is poor, are more likely to have higher intakes of F&V (Williams et al., 2010). Several factors influence perceived accessibility of food including transportation, store accessibility, and fast food availability (Wiig et al., 2008). Many low-income individuals live in areas with limited access to F&V, which is a significant barrier to adequate F&V intake.

Many low-income individuals in rural and urban areas live in what are known as “food deserts” (Larson & Gilliland, 2009; Morris, Reuhauser, & Campbell, 1992). Food deserts are considered areas with poor access to healthy foods such as F&V (Larson & Gilliland, 2009). Low-income neighborhoods are more likely to have limited access to supermarkets as compared to their higher income counterparts, which can contribute to health disparities (Parsons & Morales, 2013). Often times this causes individuals to shop in convenience stores or corner stores that typically charge more for a limited variety of healthy options (Larson & Gilliland, 2009; Morris, Reuhauser, & Campbell, 1992). Therefore, living in food deserts can limit the accessibility of F&V and increases the availability of highly processed, calorie dense foods, which have been linked to chronic diseases (Blanck et al., 2011; Moore & Roux, 2006; Parsons & Morales, 2013). Individuals who live in food deserts typically have higher grocery bills as compared to others with easy access to healthy foods (Latham & Moffat, 2006).

Low-income and minority neighborhoods are known to have inadequate access to stores with healthy foods (Zenk et al., 2005; Zenk et al., 2005). Several
studies have found that individuals in low-income and minority neighborhoods have significantly fewer supermarkets as compared to their affluent white counterparts (Chung & Myers, 1999; Inagami, Cohen, Finch, & Asch, 2006). For example, in an urban area of the U.S., African Americans lived in economically disadvantaged areas that were approximately 1.1 miles further away from a supermarket as compared to their white counterparts (Zenk et al., 2005). Typically, this leads to higher food costs for individuals in these areas since chain supermarkets tend to have the lowest prices. However, some authors have disagreed that access is an issue for this population as a result of finding cities with adequate access to healthy foods in low-income neighborhoods (Cassady et al., 2007; Chung et al., 1999; Inagami et al., 2006; Liese, Weis, Pluto, Smith, & Lawson, 2007). However, a study conducted in a rural county in the U.S. found that only 16% of the stores in the county were supermarkets with the majority of available stores considered convenience stores (Liese et al., 2007). Most healthy food items surveyed were found at the supermarkets, however, both convenience stores and grocery stores had limited availability and higher cost than the same products priced out at nearby supermarkets (Liese et al., 2007). For example, apples (per lb) cost 1.12+/-0.22 at the supermarket compared to 2.07+/-0 at the convenience stores (Liese et al., 2007). Similar results were found with other F&V such as oranges (0.32 +/- 0.17 and 0.50), and tomatoes (0.32_0.17 0.50), at supermarkets and convenience stores, respectively (Liese et al., 2007). Poor access to F&V or perceived poor access is strongly associated with dietary intake of these items in most studies.
Access to grocery stores and other food venues are vital to the purchasing habits and dietary intake of healthy foods especially in low-income communities (Larson et al., 2009; Morland et al., 2002; Morland, Roux, & Wiig, 2006; Morland & Evenson, 2009). Laraia et al. (2004) found that low to middle income pregnant women living at least 4 miles away from a supermarket had significantly poorer diets as compared to women living in closer proximity. Similar results were found in SNAP participants who lived at least 5 miles away from the grocery store (Rose & Richards, 2004). In fact, low-income individuals living in neighborhoods with limited access to grocery stores and supermarkets have increased intake of fats and processed meats and low intakes of whole grains and fruits as compared to individuals with better access (Franco et al., 2009). One study found that individuals with convenient supermarket access consumed 1 serving more of fruit per day as compared to individuals with limited supermarket access (Rose & Richards, 2004). Other studies have not found a relationship between access and poor F&V intake (Boone-Heinonen et al., 2011; Fuller, Cummins, & Mathews, 2013). However, these studies were not conducted specifically with low-income individuals, therefore, they may not accurately reflect the access barrier in this population.

Improving access to F&V has been proposed through various interventions including opening supermarkets in areas with limited food access. F&V has been found to significantly increase in areas where supermarkets have been opened (Wrigley, Warm, & Margetts, 2003). Among individuals with poor diets, F&V intake increased by 60% after opening a supermarket in a food desert, a significant increase of 1.31 to 1.75 portions of F&Vs per day (Wrigley et al., 2003). However,
the time investment in opening supermarkets is lengthy and does not reduce the immediate barrier of food accessibility in many areas (Blanck et al., 2011; Dimitri, Oberholtzer, & Nischan, 2013). More realistic interventions must be implemented to improve access to F&V.

There are more timely opportunities for nutrition professionals to improve intake of F&V through improving accessibility. Several programs have been initiated to increase access to healthy foods including mobile vending carts, farm stands, community supported agriculture (CSA), produce basket delivery for seniors, and adding F&V to convenience stores in food deserts (Abusabha, Manjoshi, & Klein, 2011; Blanck et al., 2011; Bodor et al., 2008; Evans et al., 2012; Johnson, Beaudoin, Smith, Beresford, & LoGerfo, 2004; Quandt et al., 2013; Rose & Richards, 2004; Scalzo, 2005; Tester, Stevens, Yen, Laraia, 2010). Most studies have found at least modest effects on self-reported F&V intake after program participation.

Establishing farmers’ markets or farm stands in low-income areas has been an additional strategy for improving access to F&V and reducing food deserts across the country (Sage, McCracken, & Sage, 2013; Wang, Qiu, & Swallow, 2014). Evans et al., (2012) found a significant increase in consumption of numerous F&V after implementing farm stands in a low-income community. Additionally, a mobile produce van intervention increased self-reported intake of fruits (0.54 servings/day) and vegetables (0.61 servings/day) in low-income communities by reducing barriers to access and cost (Jennings et al., 2012). A more modest effect was found in low-income senior neighborhoods. Abushabha et al., (2011) found that a mobile produce van selling reduced priced produce in senior neighborhoods
increased F&V consumption by 0.37 servings per day. These interventions have the potential to increase access to F&Vs in areas with limited supermarket access. Further research needs to be done to understand the relationship between F&V accessibility interventions and long-term health benefits (Larson et al., 2009, Larson & Story, 2009).

Few studies have investigated the association between access to food and health outcomes. A study conducted in New York City found that access to food through a variety of food sources including farmers' markets, was inversely associated with obesity (Rundle et al., 2009). Typically, obesity rates are lower in areas with easier access to supermarkets and farmers' markets and higher in areas saturated with fast food restaurants (Morland et al., 2006; Morland & Evenson, 2009, Inagami et al., 2006; Rundle et al., 2009). Adults with limited access to supermarkets have higher BMIs as compared to individuals with easy supermarket access (Morland et al., 2006). Additionally, an inverse relationship exists between farmers' market access and obesity in nonmetropolitan areas in the U.S with a decreased prevalence of obesity of 0.07% (Jilcott, Keyserling, Crawford, McGuirt, & Ammerman, 2011). Similar results were found for supermarket access, comparable with previous literature (Jilcott et al., 2011). Inagami et al. (2006) found that individuals who shopped in grocery stores in their low-income neighborhoods had higher BMIs than their counterparts shopping in the higher income neighborhoods in which they reside. These studies suggest that the food environment plays a large role in dietary intake and health related outcomes in low-income individuals.
Accessibility of F&V is also influenced by transportation (Haynes-Maslow et al., 2013). Many low-income individuals rely on the city bus, walking or carpooling to get to the grocery store (Haynes-Maslow et al., 2013). Many of these modes of transportation come with challenges such as the risk for theft, inconvenient schedules, additional time commitment, and the need to physically carry grocery purchases (Haynes-Maslow et al., 2013; Rose & Richards, 2004). Rose & Richards (2004) found that although 75% of SNAP participants in the National Food Stamp Survey lived within 5 miles of a grocery store, a round trip to the store could take more than 30 minutes for transportation alone due to the different modes of transportation used. Limited transportation lessens the ability to travel to food stores and farmers’ markets that carry high quality produce (Haynes-Maslow et al., 2013). It’s likely that individuals with limited transportation are also unable to get to the grocery store often enough to keep fresh produce available.

Individuals living in low-income, minority, and rural neighborhoods are the most likely to be effected by poor access to supermarkets and healthy food options yet have access to a higher number of fast food restaurants and corner stores (Block, Schribner, & Desalvo, 2004; Jones & Bhatia, 2010; Larson et al., 2009). Low-income neighborhoods have half the number of supermarkets as compared to wealthier neighborhoods (Moore & Roux, 2006). These areas are also more likely to have fewer produce markets, health food stores, and specialty stores making it more challenging for individuals living in these communities to make healthy food choices (Moore & Roux, 2006).
In contrast, low-income neighborhoods tend to have easy access to fast food restaurants, which is likely contributing to the high rates of obesity in these groups (Larson et al., 2009; Moore & Diaz Roux, 2006). A study conducted by Block et al., (2004) found that predominately black neighborhoods had 2.4 fast food restaurants per square mile, nearly double the amount as found in predominately white neighborhoods. Corner stores are also easily accessible and frequently used in low-income urban areas (D’Angelo, Surantkar, Song, Stauffer, Gittelsohn, 2011). In a sample of low-income individuals, 97% reported shopping at corner stores (D’Angelo et al., 2011). Unfortunately, corner stores typically have limited availability of F&V. The combination of increased access of fast food and decreased access to healthy foods are likely contributing to the health disparities such as obesity among low-income minority groups (Zenk et al., 2006).

Although numerous studies suggest access to supermarkets and grocery stores is limited among low-income neighborhoods resulting in poor dietary intake, other studies suggest the opposite is true. For example, a study conducted by Smith et al., (2010) found that the most low-income neighborhoods actually had better access to grocery stores and supermarkets that sold F&V and other nutrient dense foods than the nearby higher income neighborhoods. Authors of a similar study used GIS mapping and found that individuals living in low-income housing in Boston were located less than half a mile from the nearest supermarket therefore eliminating access as a barrier (Caspi, Kawachi, Subramanian, Adamkiewicz, & Sorensen, 2012). Furthermore, no association was found between supermarket access and F&V intake (Caspi et al., 2012). Other authors are also concluding that
access is not as much of an issue as previously thought (Dubowitz et al., 2015; Ghosh-Dastidar et al., 2014) The results from these studies demonstrate the need for further research to determine how much access is a barrier to F&V consumption in low-income populations.

Availability of Fruit and Vegetables

Availability of F&V refers to the inconsistency of F&V stocked at food stores (Bustillos et al., 2009). Despite an individual's knowledge or self-efficacy, individuals must have F&V available for them to increase purchasing and consumption habits (Bustillos et al., 2009). Supermarkets and grocery stores carry the largest variety and best quality of fresh F&V, however as previously mentioned these traditional food stores are oftentimes not accessible to low-income individuals in urban and rural areas (Bustillos et al., 2009). Food stores in low-income neighborhoods are known for having limited amounts of fresh F&V stocked on the shelves (Haynes-Maslow et al., 2013; Sloane et al., 2003; Zenk et al., 2006). This has been recognized as a barrier to F&V consumption among individuals living in these areas (Haynes-Maslow et al., 2013; Sloane et al., 2003; Zenk et al., 2006). Low-income communities typically have corner stores or convenience stores with produce of poor quality and limited variety (Bustillos et al., 2009; Inagami et al., 2006; Sloane et al., 2003; Zenk et al., 2006). Fresh produce is especially uncommon in low-income black neighborhoods where stores are more likely to carry canned and frozen F&V (Morland & Filomena, 2007). Buyers lose interest in purchasing produce in food stores that sell the same limited variety of F&V each week (Haynes-Maslow et al.,
Limited availability of F&V is an important barrier to purchasing and consumption habits related to F&V.

Availability of F&V directly influences F&V intake. In fact, individuals with greater perceived availability of F&V are more likely to consume diets rich in F&V as compared with individuals with poor perceived availability (Williams, et al., 2010). Bodor et al., (2008) found that individuals who consumed the lowest intakes of vegetables lived in low-income areas that did not have F&Vs at the nearest store. Greater consumption of F&V has been found in individuals who shop at corner stores with better availability (Martin et al., 2012). Increasing the variety of F&V for sale at corner stores has been shown to increase the odds for purchasing fruits (12%) and vegetables (15%) among groups with limited availability (Martin et al., 2012). In fact, as shelving space for F&Vs increases in local stores, intakes of vegetables significantly increase for individuals living in a one to three block radius of the stores (Bodor et al., 2008). Increasing availability of healthy foods such as F&V at local food stores is a step towards improving health and reducing the risk for disease in low-income minority neighborhoods (Zenk et al., 2006). Although a general increase in F&V availability would be beneficial in many neighborhoods, food stores should also consider the specific needs of their customers when determining which produce to stock on the shelves.

F&V availability is even more concerning for individuals who prefer culturally specific foods. The availability of culturally specific F&V is limited in the neighborhood food stores in many areas. A study by Grigsby-Toussaint et al., (2010) found that only 42% of stores stocked culturally sensitive F&V for African
Americans and Latinos in the Chicago area. Pinto beans, one of 16 culturally specific F&V was the only item commonly found in food stores in African American communities (Grigsby-Toussaint et al., 2010). Nearly one third of the culturally specific F&V were not found in any of the food stores in the Latino communities (Grigsby-Toussaint et al., 2010). Stocking more F&V that are specific to the cultural food choices of individuals living in the general area may be another strategy to increase F&V intake.

Food Insecurity

Most Americans have reliable access to adequate and nutritious foods to live a healthy and active life. However, roughly 50 million people in the United States are experiencing food insecurity, meaning they are unsure where their next meal will come from (USDA, 2015). Food insecurity is defined as the inability to continuously access safe and nutritious foods in a way that is socially acceptable (Anderson, 1990). Nearly one third of food insecure individuals are considered to have very low food security, which is defined as having a lack of financial resources preventing one or more people in a household from eating at times (USDA, 2015).

Rates of food insecurity have only recently started to decline after a several year period of remarkably high rates during the Great Recession (Coleman-Jensen, Rabbitt, Gregory, 2015). Income level and poverty are the greatest contributing factors to food insecurity with individuals being more likely to experience food
insecurity if their income is below the federal poverty guidelines (Coleman-Jensen et al., 2015). There are many other factors that increase the risk of food insecurity such as being Hispanic, African American, single, elderly, unemployed, having limited education, or living in a single parent household (Coleman-Jensen et al., 2015; Corrigan, 2011). For example, nearly 25% of Hispanic households experience food insecurity compared to a much lower 11% of non-Hispanic white households (Kaiser et al., 2015). Geographic region also influences food security status with individuals living in metropolitan cities and those living in the southern part of the United States at the highest risk (Kaiser et al., 2015). Although these factors increase the risk for food insecurity, unfortunate circumstances can be enough to lead individuals of any socio demographic background into temporary or short-term food insecurity (Andrews & Nord, 2009).

Although the U.S. produces enough food to feed all Americans, food insecurity remains an issue all over the country (Corrigan, 2011). As a result, food insecurity remains a significant public health concern in the U.S. People often experience repeated stretches of short-term food insecurity with most food insecure households experiencing food insecurity for at least seven months of the year (Nord, Andrews, & Carlson, 2009; Seligman et al., 2010). There are numerous health consequences associated with long-term food insecurity such as obesity, birth defects, nutritional deficiencies, mental health problems, behavioral problems, poor oral health, and greater risk for a variety of chronic diseases such as hypertension and diabetes (Gunderson, 2012; Seligman et al., 2010). Children who grow up in food insecure households are more likely to have difficulty learning, problems with
anxiety and depression, and reduced psychosocial functioning, to name a few (Mabli & Worthington, 2014). Due to the implications on overall health and well being, reducing food insecurity is a vital determinant of improving health status of Americans.

Families can experience food insecurity in many different ways. Food insecure individuals report they are unable to afford balanced meals, are afraid they won't have enough food to feed the household, skip meals because there is not enough food, and/or go hungry when food is not available (Nord et al., 2009). Food insecurity usually results in the consumption of energy dense foods that are low in cost (Seligman et al., 2010). These foods are typically processed making them higher in calories, sugar, sodium, and saturated fat (Drewnowski & Darmon, 2005). Nutrient dense foods such as F&V whole grains, and lean meats are often limited if not entirely skipped in the diet due to their higher cost, shorter shelf life, and fewer calories (Seligman et al., 2010). As a result, food insecure individuals typically have poor intakes of vitamins and minerals specifically iron, zinc, calcium, and b vitamins (Eicher-Miller, Mason, Weaver, McCabe, & Boushey, 2009; Lee & Frongillo, 2001; Seligman et al., 2010). Extended periods of poor dietary intake can lead to serious nutritional deficiencies and health problems, as listed above. Federal, state, and local governments and nonprofit organizations have implemented programs in attempt to reduce food insecurity and therefore improve the diet and health of individuals in the community.
Traditional Food Insecurity Interventions

Several federal nutrition assistance programs have been implemented to reduce food insecurity among individuals living under the federal poverty guidelines in the United States. Programs such as SNAP and WIC provide participants with financial resources to increase the amount of food dollars available over the course of a month for the purchase of nutritionally adequate food (Jilcott, Liu, DuBose, Chen, & Kranz, 2011; Leung, Willett, & Ding, 2012; USDA 2014). Nearly any food item can be purchased with SNAP benefits. Restricted items include: tobacco, alcohol, pet food, hot foods, and other non-food items (USDA, 2014). This means that items such as soda, chips, candy, energy drinks and other high fat, high sugar foods can currently be purchased using these benefits which is different from WIC where participants receive vouchers to use towards specific nutrient dense foods such as beans, cheese, milk, and F&V (USDA, 2014; USDA 2015). Very few studies have been conducted to determine the influence of these programs on food security status of participants.

Among the limited data available, studies indicate SNAP improves food security status of program participants. For example, Nord (2012) used data from the 2001-2009 Current Population Survey Food Security Supplements and found that very low food security status decreased by 50% among SNAP participants (n=23,082). Furthermore, food insecurity was found to decrease most significantly as the amount of allotted SNAP benefits increased (Nord, 2012). Similar results were found among households (n=3,000) with children especially when households
received SNAP benefits for six months or longer (Mabli & Worthington, 2014).

More specifically, participation in SNAP was associated with a one third decrease in
the odds of being food insecure (Mabli & Worthington, 2014).

Unfortunately, other studies have not found such promising results when
comparing SNAP participants to low-income non-SNAP participants. A study by
Mayer, Hillier, Bachhuber, and Long (2014) found that individuals who did not
receive federal nutrition assistance were less likely to experience food insecurity
then their counterparts receiving SNAP benefits. A similar study found SNAP
participation was associated with a three-fold greater risk of food insecurity
compared to their low-income counterparts not receiving SNAP benefits
(Burkhardt, Beck, Kahn, & Klein, 2011). The authors speculate that food insecurity
remains high among SNAP participants as a result of being susceptible to certain
financial and health crisis (Mayer et al., 2014). These mixed results raise questions
about whether or not SNAP is effectively reducing food insecurity as intended by the
USDA.

It has been hypothesized that the monthly payment cycle of SNAP benefits
contributes to periods of binging in the beginning of the month followed by periods
of food insecurity at the end of the month, a trend that has been termed the “food
stamp cycle” (Dinour, Bergen, & Yen, 2007; Ploeg, Mancino, & Wang, 2007). Since
SNAP benefits are only allotted once per month, many SNAP participants report
spending the majority of their benefits in the first two weeks after the benefits are
distributed, leaving limited food dollars for the end of the month resulting in
increased food insecurity (Dinour et al., 2007). SNAP participants have been
estimated to consume 10-15% fewer calories at the end of the month as a result of the food stamp cycle (Shapiro, 2005). It is possible that self-reported food security status does not improve among SNAP participants as a result of the worry associated with the ebb and flow of food security over the course of a month. Although the studies presented above suggest that food security status does not improve as a result of participating in SNAP, other nutrition assistance programs may be more effective at reducing food insecurity in this population.

Although the goal of WIC is not to improve food security, it does provide nutrition assistance, which increases the amount of financial resources available for the purchase of food (USDA, 2014). A longitudinal study of nearly 80,000 women and children found the longer women and children participated in WIC, the less likely they were to experience food insecurity (Metallinos-Katsaras, Gorman, Wilde, & Kallio, 2011). However, data from this study was collected using only 4-items from the 18-item Household Food Security Survey Module, which may reduce the validity of study results. Other studies with much smaller sample sizes have found different results. A cross sectional study of 144 infant caregivers participating in WIC found that food insecurity was more prevalent in families receiving WIC and SNAP compared to low-income individuals who were not receiving any federal nutrition assistance (Burkhardt et al., 2011). Similarly, food security status among individuals receiving only WIC benefits was found to be the same as low-income individuals not receiving nutrition assistance (Mayer et al., 2014). The results of these studies suggest that WIC may or may not be effective at reducing food insecurity among program participants. However, the variations in samples sizes
among these studies make it difficult to compare study results. More research needs to be done to determine if participation in federal nutrition assistance programs such as WIC and SNAP improve food security status. Individuals may need to participate in multiple federal and local nutrition assistance programs to see improvements in food security, however, minimal research has been conducted to investigate the influence of multiple program participation on food security status.

Food pantries are another traditional method to improving food security among low-income individuals. Historically, food pantries were used to provide food to families experiencing a time of crisis, however, many families are now relying on food pantries as a long-term source of food (Martin, Rong, Wolff, Colantonio, & Grady, 2013). A study in Canada investigated food security status of participants receiving a food pantry intervention called Freshplace (n=113) compared to a control group (n=115) over a one-year period of time (Martin et al., 2013). The Freshplace intervention included access to a client-choice pantry, which allowed participants to select the types of food they wanted (Martin et al., 2013). The control group went to a traditional food pantry where bags of food were provided without allowing for participant to select preferred foods (Martin et al., 2013). After receiving the three-month intervention, significantly fewer Freshplace participants were experiencing very low food security compared to the control group (Martin et al., 2013). It’s possible that food security improved among the Freshplace participants since they had the ability to select foods they were familiar with compared to the control group who received a bag of food that may not have meet their own cultural and taste preferences. Allowing participants to select foods that
are consistent with their personal and cultural preferences likely increases the amount of food that is consumed therefore reducing food insecurity. It is difficult to determine the effectiveness of using food pantries to reduce food insecurity with such limited literature on the topic.

Although select studies have found these programs reduce food insecurity, we continue to see a staggering number of low-income individuals who are unsure where their next meal will come from. Furthermore, funding for federal programs has recently decreased as a result of budget cuts, making it even more difficult to improve food security status through these programs (Mayer et al., 2014). Most noteworthy is the $5 billion cut in SNAP benefits in 2013, occurring near the peak of food insecurity rates in the U.S. (Mayer et al., 2014). Although these federal programs are receiving less funding and may not have the resources to reduce food insecurity in the U.S., programs focused on increasing food access are experiencing increased local and federal funding opportunities which have allowed for alternative interventions for improving food security status.

Alternative Food Insecurity Interventions

Recent public health efforts have worked towards increasing access to nutrient dense foods such as F&V, through various interventions in hopes of improving food security status and dietary intake of program participants. A growing number of private and grant funding programs have incorporated
gardening and farmers’ market interventions in effort to reduce food insecurity in urban and rural communities. A study that provided a community garden intervention to 38 families over the course of two growing seasons found that food insecurity decreased from 31% to 3% among participating families after receiving the gardening intervention (Carney et al., 2012). Although food security improved in general, skipping meals as a result of food insecurity was uncommon among participants prior to the interventions, therefore, there was not a significant difference in the number of participants who reported having to skip meals after the intervention (Carney et al., 2012). Self-reported food security status was also found to improve among individuals (n=5) who were interviewed after participating in a community gardening intervention in Baltimore, Maryland (Corrigan, 2011).

Improving access to food through gardening interventions may be an effective intervention for food insecure households however not all low-income households have the time, skills, or interest in gardening.

Farmers’ market incentives have been another approach to improve food security among low-income individuals by increasing the household food budget. One study found that women who were food insecure had the greatest intentions of using their WIC Farmers’ Market Nutrition Program (FMNP) incentives at farmers’ markets than their more food secure counterparts, however, actual shopping behaviors were not observed or identified in this study (Grin, Gayle, Saravia, & Sanders, 2013). Food security status of women receiving WIC (n=829) and women receiving WIC FMNP (n=246) was compared in a cross sectional study in Ohio (Kropf, Holben, Holcomb, & Anderson, 2007). Food security status did not differ
between the two groups even though participants receiving WIC FMNP incentives received more resources to use towards the purchase of food (Kropf et al., 2007). A similar study comparing WIC participants (n=170) and WIC FMNP participants (n=65) found that receiving additional WIC benefits to use at the farmers’ market was not associated with improved food security status of program participants (Walker, Holben, Kropf, Holcomb, & Anderson, 2007). However, participants of WIC FMNP only received $18 to use towards purchasing F&V at the farmers market therefore, the incentive provided may not have been large enough to significantly improve food security status (Walker et al., 2007). Another farmers’ market incentive program was developed for low-income individuals who were not eligible to receive federal nutrition assistance such as WIC or SNAP (Dailey et al., 2015). Participants (n=47) received $40 per month to use towards the purchase of any food items at three participating farmers’ markets (Dailey et al., 2015). Surprisingly, the results of this study show a 40% increase in food insecurity status after receiving farmers’ market incentives (Dailey et al., 2015). The authors hypothesized that participants of farmers’ market incentive programs may worry about food security as a result of not knowing if they will be able to sustain their current diets once the incentives are no longer available (Dailey et al., 2015). It is also likely that the individuals with very low food security status are not being reached through these programs.

A recent study investigating the use of farmers’ market incentives in cities such New York City, Boston, and San Diego found that participants who dropped out from the study were more likely to experience food insecurity as compared to their
counterparts who received the incentives (Dimitri, Oberholtzer, Zive, & Sandolo, 2015). Although the authors did not explain this relationship, it is possible there are barriers to participating in farmers’ market incentive programs that are especially difficult to overcome for individuals with the greatest need (Dimitri et al., 2015). Commonly reported barriers for shopping at farmers’ markets for low-income individuals include, location, lack of transportation, hours of operation, food safety concerns in regards to chemicals used during growing, and lack of knowledge/awareness of farmers’ markets in the area (Fish, Brown, & Quandt, 2015; Jilcott Pitts et al., 2015; Jones & Bhatia, 2011). These common barriers preventing low-income individuals from shopping at farmers’ markets may also be limiting the use of incentive programs among the individuals with the greatest need.

Individuals participating in alternative food insecurity interventions, such as community gardens, tend to have more resources and greater food security status than their counterparts participating in traditional interventions (Roncarolo, Adam, Bisset, & Potvin, 2015). The authors hypothesized that individuals with the fewest resources and greatest food insecurity participate in clearly defined and well-known interventions as a result of knowledge and awareness of these programs (Roncarolo et al., 2015). Interviews conducted among food insecure families (n=371) in Canada found that programs such as community gardens and food box programs do not work for many low-income individuals (Loopstra & Tarasuk, 2013). The top barriers to participating in these alternative programs include limited access to the intervention as a result of limited transportation or the program not being available in their neighborhood and the lack of fit with family schedules, needs, and interests.
(Loopstra & Tarasuk 2013). It is possible that alternative type interventions are not realistic strategies for reducing food insecurity among all food insecure individuals.

Need for Further Food Insecurity Research

Minimal research has been conducted to determine effective interventions for reducing food insecurity in the United States. Future studies should compare food security status among program participants to a control group before and after the implementation of interventions such as community gardens, farmers' market incentive programs and federal nutrition assistance programs. Utilizing a control group would allow for the elimination of confounding variables that may be influencing food security status of participants. Comparing food security status of intervention participants before, during, and after program participation through validated measurements tools such as the USDA’s U.S. Household Food Security Module would provide greater insight into whether or not food security is sustained after the conclusions of the program. Since traditional and alternative interventions to reducing food insecurity may benefit different low-income individuals, future research should investigate the effectiveness of offering both types of programs within the same organization to meet the needs of all individuals experiencing food insecurity (Roncarolo et al., 2015).
There are many different interventions to improve food security status of low-income individuals at the federal, state, and local level. The current research demonstrates conflicting results of these interventions making it difficult to determine if program participation actually reduces food insecurity. Future research using stronger study designs and larger sample sizes are necessary for advancement of this literature. Programs with the goal of improving food security should consider publishing program results to ensure program effectiveness and support the need for continued funding.

Farmers’ Markets

Farmers’ markets have been growing in popularity over the past 20 years with 6,132 U.S. farmers’ markets in 2010, a significant increase from the roughly 3,700 markets in 1994 (Byker et al., 2012; McCormack et al., 2010). Improved food access and support of local farmers are two commonly cited reasons for farmers’ market expansion across the country (Jones & Bhatia, 2011; McCormack et al., 2010). Farmers’ markets have been implemented as a strategy for reducing the barriers associated with eating fresh and local foods (Blanck, et al., 2011; Pitts et al., 2014; Quandt et al., 2013). Few studies have investigated the impact of farmers’ markets on dietary intake (Boeing et al., 2012). Pitts et al., (2014) found that shopping at a local farmers’ market was positively associated with F&V consumption in market patrons however, data was collected on a convenience sample of farmers’ markets shoppers which doesn't accurately represent the
behaviors of low-income individuals. A more recent study investigating diet quality among low-income individuals (n=205) found a positive association between shopping at farmers’ markets and consuming F&V (Jilcott Pitts et al., 2015). Similar results were found among shoppers (n=3312) in New York City (Olsho et al., 2015).

Historically, farmers market patrons were considered high SES, however many farmers markets are now accepting federal nutrition assistance benefits such as SNAP, WIC FMNP, and SFMNP (Byker et al., 2012). In 2005, the WIC FMNP and SFMNP averaged sales of $18,000 and $16,000 respectively per participating market in the U.S. (Ragland & Tropp, 2009). In 2012, roughly $18.8 million in SNAP benefits were used at farmers’ markets around the country (USDA, 2015). Although it seems significant, the SNAP benefits spent at farmers’ markets accounted for only 0.27% of SNAP purchases that year (USDA 2015). To increase federal benefit sales, the USDA implemented $5 million to use towards the purchase of point of sale equipment necessary for the use of federal nutrition assistance benefits at markets (USDA, 2014). Currently, one in four farmers’ markets across the country accepts SNAP benefits through the Electronic Benefit Transfer (EBT) card (Variyam, 2014).

Farmers’ markets across the country that accept EBT cards have typically found an increase in food sales. A pilot study was conducted by collecting weekly sales data from five farmers’ markets in Arizona before and after wireless terminals were adopted for EBT use (Bertmann, Ohri-Vachaspati, Buman, & Wharton, 2012). Farmers’ market sales significantly increased after the 10-week intervention period with sales nearly doubling at each market (Bertmann et al., 2012). Furthermore,
additional sales reported after implementation of the EBT machine resulted from EBT purchases and non-EBT purchases such as cash and credit cards (Bertmann et al., 2012). A study conducted at a large farmers’ market in Philadelphia found EBT sales increased by 38% when each individual farmer at the market had a wireless terminal for EBT transactions as compared to sales when only one wireless terminal was available for the whole market (Buttenheim, Havassy, Fang, Glyn, & Karpyn, 2012). Although accepting SNAP benefits can be inconvenient for farmers, many farmers value the ability to decrease barriers and support low-income individuals in their community (Cole, McNees, Kinney, Fisher, & Krieger, 2013; Montri, Behe, & Chung, 2013). Furthermore, qualitative data indicates that farmers believe accepting EBT cards at farmers markets draws in new customers and increases reoccurring customers (Montri et al., 2013). As a result, many farmers support the implementation of wireless terminals for EBT use (Montri et al., 2013). Other farmers are concerned about the ability to make adequate returns on F&V that are sold at a cost that is affordable and appealing for low-income individuals (Sage et al., 2013).

Federal nutrition assistant users are able to support local farmers and the local economy when EBT cards are accepted at farmers’ markets in their communities. Low-income consumers participating in a farmers’ market incentive program overwhelmingly indicated the value of purchasing local F&V and other food items from nearby farmers and growers (Dailey et al., 2015). Furthermore, the ability for low-income individuals to use nutrition assistance benefits at farmers’ markets has economic ramifications for the local economy. Each SNAP dollar spent
has been estimated to generate an additional $1.73 for the general economy (Schumacher, Nischan, & Bowman Simon, 2011). For every dollar spent at a farmers’ market, an estimated $0.62 is then re-spent locally, further supplementing the local economy (Sonntag, 2008). A farmers’ market incentive program in Michigan that requires the use of SNAP benefits to receive matched financial incentives, generated over five million dollars in the past five years from SNAP benefits and incentives for local farmers and growers alone (Double Up Food Bucks, n.d.). Therefore, using SNAP benefits for local agricultural products has been recommended for improving the local economy (Schumacher et al., 2011).

The ability to use federal nutrition assistance benefits at farmers markets has influenced shopping patterns among low-income populations. Ruelas, Iverson, Kiekal & Peters (2012) found that most low-income farmers’ market patrons visited the farmers market several times a month. Twenty-seven percent of SNAP participants (N=207) surveyed in North Carolina indicated they use farmers’ markets consistently for the purchase of fresh F&V (Jilcott, Wall-Bassett, Moore, & Sharkley, 2011). A different study in North Carolina found that roughly 42% of SNAP participants shopped at farmers’ markets over a 12-month period (Jilcott Pitts et al., 2015). Besides the ability to use benefits, other facilitators to shopping at farmers’ markets among low-income individuals include lower prices, fresher and better quality produce, and support of local farmers (Jilcott Pitts et al., 2015). However, shopping at farmers markets is not always convenient for lower income shoppers. The most common barriers to purchasing produce at farmers markets for low-income individuals included markets not allowing the use of federal nutrition
assistance benefits, location, lack of transportation, hours of operation, food
safety concerns, and lack of knowledge/awareness of farmers markets in the area
(Fish et al., 2015; Jilcott Pitts et al., 2015; Jones & Bhatia, 2011; Leone et al., 2011;
Pitts et al., 2014). African American and Latino women in North Carolina reported
that the location of farmers’ markets usually results in increased travel and
therefore eliminated the benefit of cost savings (Fish et al., 2015). A qualitative
study found that most SNAP participants were not aware SNAP benefits could be
used at select farmer’ markets therefore they did not shop at farmers’ markets in
their area (Wetherill & Gray, 2015).

Decreased costs, market information, and convenient transportation have
been found to increase farmers’ market usage in this population (Leone et al., 2011).
A qualitative study of SNAP participants found that most individuals perceived that
produce at farmers’ markets were too expensive for what they could afford
(Wetherill & Gray, 2015). The mean cost of F&V (n=230) sold at farmers’ markets in
North Carolina were found to be significantly lower in price ($0.29 for vegetables
and $0.74 for fruit) as compared to the same F&V sold at nearby grocery stores
(McGuirt, Jilcott, & Ammerman, 2011). However, farmers’ markets in some
locations have been found to be more expensive than local grocery stores and
supermarkets. Families of four living in urban areas are estimated to spend up to
$14 more per week on F&V when shopping at farmers’ markets as compared to
nearby grocery stores (Pearson et al., 2014). Farmers’ market incentives for low-
income individuals have been implemented at markets across the country as a way
to overcome the barrier of cost, allowing more low-income families to purchase
locally grown F&V.

Farmers’ Market Incentive Programs

Incentives are a commonly cited intervention strategy to change health
related behaviors. Historically, monetary incentives such as coupons and price
discounts have been effective at improving non-dietary behaviors such as smoking,
immunizations, weight loss and exercising (Paul-Ebbohimhen & Avenell, 2007;
Purnell, Gernes, Stein, Sherraden, Knoblock-Hahn, 2014; Wall et al., 2006). More
recently, incentives have been used as an intervention to overcome the barriers
associated with F&V intake to reduce the risk of obesity and chronic disease of low-
income individuals (Payne et al., 2013). Farmers’ markets have been one shopping
destination used to promote the purchase of F&V through financial incentives. A
study of SNAP stakeholders (n=522) agreed that incentivizing F&V at farmers’
markets is one effective strategy to improving access to produce among SNAP
participants across the country (Blumenthal et al., 2014). Farmers’ market
incentives are considered a promising policy-related intervention strategy to
increase F&V intake among low-income individuals (Dimitri, Olberholzer, Zive, &
Sandolo, 2015). The USDA has also indicated that incentives are a much better
alternative to other potential policies such as restricting EBT purchases of ‘junk
foods’ (USDA, 2007). Most importantly, incentive programs provide low-income
individuals with greater purchasing power and the freedom to choose F&V that they may not be able to afford otherwise (Schumacher et al., 2011).

The WIC FMNP was established as the first farmers’ market incentive program for low-income individuals in the U.S (McCormack et al., 2010). In 1992, congress established WIC FMNP to increase F&V purchasing and consumption habits of low-income women and children receiving WIC (McCormack et al., 2010). Each WIC participant is eligible to receive up to $30 a year in farmers’ market vouchers (McCormack et al., 2010; Byker et al., 2012). In 2012, this program operated in 46 states, providing $2.3 million in farmers’ market vouchers to low-income mothers and children (Byker et al., 2012; McCormack et al., 2010). Few studies have investigated the effectiveness of providing farmers’ market vouchers to low-income individuals receiving WIC benefits most of which found short-term changes in self-reported intake of F&V.

One of the first published incentive studies provided WIC participants in the intervention group (n=411) with $20 vouchers to use towards F&V purchases at the farmers’ market (Anliker & Drake, 1992). Nearly half of respondents reported making dietary changes such as eating more F&V and whole foods (Anliker & Drake, 1992). Twenty-five percent of participants reported trying at least one new fruit or vegetable that they purchased with the incentives (Anliker & Drake, 1992). F&V intake of WIC participants was compared to a convenience sample of WIC FMNP participants in a more recent study (Racine, Smith Vaughn, & Laditka, 2010). WIC FMNP participants self-reported statistically greater intakes of vegetables per day, excluding fried potatoes ($7.1 \pm 6.7$) as compared to WIC participants not receiving
farmers’ market benefits (5.5 ± 4.9). However, since F&V intake was only captured using a Food Frequency Questionnaire (FFQ), it is possible that F&V intake was overestimated in both groups (Racine et al. 2010).

A similar study determined self reported changes in dietary intake of F&V after a convenience sample of WIC FMNP participants received farmers’ market vouchers (Herman, Harrison, Afifi, & Jenks, 2008). Intervention participants received up to $10 per week in vouchers for a 2-month period of time (Herman et al., 2008). Intervention participants reported a significant increase in F&V consumption after the intervention with increased intakes of 1.4 servings per 1,000 calories consumed as compared to a decrease in 0.02 servings per 1,000 calories consumed in the control group (Herman et al., 2008). As a group, participants reported purchasing around 60 different types of F&V over the intervention period (Herman et al., 2006). Six-month follow up data found the increased intakes of F&V were sustained six months after the incentive intervention had concluded (Herman et al., 2008). No other studies to date have investigated the long-term effects of participation in a farmers’ market incentive program on low-income populations. However, several studies have found short-term benefits from similar interventions.

Shopping and dietary intake practices after receiving WIC FMNP incentives have been gathered from participants in several studies. For example, women who participated in FMNP were more likely to use the farmers’ markets and have higher consumptions of F&V after participating in the FMNP (Racine et al., 2010). A more recent study found that WIC FMNP participants who shopped at the farmers’ market and received vouchers ate more vegetables as snacks as compared to low-income
individuals who shopped at the grocery store and did not receive vouchers (Wheeler & Chapman-Novakofski, 2014). However, in many areas WIC FMNP is not established and therefore not used by low-income mothers (Grin et al., 2013). Other farmers’ market incentive programs exist for low-income individuals who are not eligible for or who do not have access to WIC FMNP.

Low-income consumers who are not eligible to receive federal nutrition assistance have also been targeted for farmers’ market incentives. A recent study provided a monthly $40 voucher to low-income participants to use at numerous farmers’ markets (Dailey et al., 2015). Over 80% of participants reported trying new F&V during the study period and 55% reported increasing F&V intake as a result of the vouchers. Furthermore, 26% of participants reported less worry and stress related to purchasing nutritious foods (Dailey et al., 2015). Unfortunately, very few farmers’ market incentive programs target this population.

Low-income seniors are another population that have been targeted for farmers’ market incentive programs through SFMNP. This program provides farmers’ market incentives to low-income seniors across the country (McCormack et al., 2010). In 2009, over 900,000 seniors participated in this program throughout 48 states (McCormack et al., 2010). Participating seniors can receive up to $50 each year to spend at participating farmers’ markets (McCormack et al., 2010). In one study, 15,000 seniors who received $50 farmers’ market vouchers through the SFMNP were surveyed (Kunkle, Luccia, & Moore, 2003). Nearly 55% of participants reported buying additional F&V with either SNAP benefits or cash (Kunkel et al., 2003). Sixty-five percent of participants reported that receiving farmers’ market
vouchers changed their dietary habits (Kunkel et al., 2003). Nearly 90% of participants reported they intended to consume more F&V through out the year due to this program, however, no long term follow up was conducted to determine actual intake (Kunkel et al., 2003).

An increase in F&V intake was found in a produce basket delivery program for low-income seniors (Johnson et al., 2004). Weekly F&V baskets contained 1.6 servings of vegetables and 0.67 servings of fruit per day (Johnson et al., 2004). Self reported F&V consumption increased 1.04 servings per day in the intervention group, with a 1.31 servings per day difference between the intervention and control group (Johnson et al., 2004). Among the senior participants in a similar F&V basket program, 94% indicated they ate more F&V after participating in the program (Dover, Buys, Allocca, & Locher, 2013). This seems to be an appropriate option for homebound seniors or other low-income individuals who are unable to shop at the farmers’ markets. However low-income seniors who are able to do their own shopping could also participate in farmers’ market incentive programs.

Less promising results have been reported in farmers’ market incentive programs that have provided smaller one-time allotments of F&V vouchers. Only thirty-two percent of participants (n=17,200) reported purchasing significantly more F&V after participating in a farmers’ market incentive program that provided each senior $5 annually (Webber, Balsam, & Oehlke, 1995). Some studies have provided even smaller incentives of 50 cents a year to use towards purchasing F&V at farmers’ markets and supermarkets (Coit, 1998; Kristal, Goldenhar, Muldoon, & Morton 1997). It’s likely the incentives were not large enough to change shopping
behaviors or F&V consumption. Several studies have found that at least 10% and up to 20% of what is purchased on healthy foods should be provided in an incentive to get high program participation (Lin, Yen, Dong, & Smallwood, 2010; McGuirt et al., 2014; NiMhurchu et al., 2010). A 10% subsidy was estimated to increase fruit intake from 0.89 to 0.97 cups per day and vegetables from 1.26 to 1.33 cups per day among SNAP participants (Lin et al., 2010). Similarly, a 10% price reduction in F&V would increase the purchase of these foods by 7.0% and 5.8%, respectively (Andreyeva, Long, & Brownell, 2010). It has also been suggested that a weekly incentive of $20 is the minimum amount to notice changed in dietary intake in low-income individuals (Ni Mhuchu et al., 2012). The size of the F&V voucher may be vital to the behavior change of participants and noticeable increases in F&V intake.

Matching incentive programs have become a more common way to increase F&V intake in individuals receiving federal nutrition assistance (Parsons & Morales, 2013). Recently, these programs have been used to incentivize individuals to use federal benefits at farmers’ markets by providing a dollar for dollar match for each dollar spent with federal benefits such as SNAP. Typically, the purpose of these programs are to increase the amount of federal benefits that are redeemed at farmers’ markets thus increasing the purchasing and consumption of F&V in federal benefit recipients (Dimitri et al., 2013). Nonprofit organizations and local governments fund the majority of the matching incentive programs currently available (Dimitri et al., 2013). However, the 2014 Farm Act includes funding of $100 million over a five year period for the Food Insecurity Nutrition Incentive (FINI) program, a USDA funded program that provides a dollar-for-dollar match
among SNAP participants who use their SNAP benefits at the farmers’ market (USDA, 2014). Through this program, more SNAP participants will have the opportunity to receive farmers’ market incentives.

Although many of these programs exist around the country, very minimal data has been collected regarding program effectiveness of increasing F&V consumption and improving food security status. Further, a majority of the data available on these programs has been published in annual reports with very little published in peer-reviewed journals. With the extensive amount of financial contribution necessary for implementation of these programs, it’s vital to determine if matching incentives to federal benefit dollars is an effective strategy for increasing F&V intake and reducing food insecurity.

The Double Value Coupon Program, funded by Wholesome Wave, is one of the first and largest privately funded farmers’ market incentive programs (Dimitri et al., 2013). Incentives at farmers’ markets through this program began in 2007 and have since spread to over 225 farmers’ markets around the country (Dimitri et al., 2013). Low-income participants can receive dollar for dollar match during each visit to the farmers’ market up to $10 in incentives for each dollar spent in federal nutrition benefits (Dimitri et al., 2013). A study conducted with program participant data found through select survey questions that perceptions of higher intake of F&V occurred in individuals who purchased produce at the farmers’ market (Dimitri et al., 2013). Additionally, nearly 70% of participants reported the incentives were an influential factor in using federal nutrition assistance benefits at the farmers’ market (Dimitri et al., 2013).
Double Up Food Bucks is a very similar farmers’ market incentive program that provides incentives to SNAP participants shopping at over 100 Michigan farmers’ markets. This program, funded by the nonprofit, Fair Food Network, has resulted in the sale of over three million pounds of F&V since 2009 (Double Up Food Bucks, n.d.). Furthermore, 93% of participants reported eating greater amounts and varieties of F&V as a result of receiving farmers’ market incentives (Double Up Food Bucks, n.d.). Since the implementation of Double Up Food Bucks, many farmers’ market incentive programs have been piloted across the country.

A similar program provided match tokens to California refugees (n=908) (Lindsay et al., 2013). Self-reported intake of F&V increased significantly from baseline to follow up. Participants who reported eating at least five servings of F&V daily increased from 23% to 30% after six months and 19% to 24% after twelve months, respectively (Lindsay et al., 2013). Self-reported intake of F&V, through one select survey question, also significantly increased at six and twelve month follow-up (Lindsay et al., 2013). Young et al., (2013) provided participants with $4 in Philly Food Bucks for every $5 spent in SNAP benefits at a local farmers’ market. Participants in the Philly Food Bucks program (n=175) were more likely to report higher intakes of F&V (OR 2.4; 95% CI, 1.6-3.7) as compared to nonusers (n=433) when compared using a select few survey questions (Young et al., 2013).

Participants of the Health Bucks program, a farmers’ market incentive program in New York City, also reported purchasing more F&V and using more SNAP benefits at the farmers’ market as a result of receiving farmers’ market incentives (Olsho et al., 2015). In another study, farmers’ market incentives were provided to 300 federal
nutrition assistance users in three U.S. cities for up to 16 weeks (Dimitri et al., 2015). A modified National Health and Nutrition Examination Survey Food Frequency Questionnaire was administered at baseline and endpoint to determine changes in F&V intake (Dimitri et al., 2015). Participants who reported the lowest consumption of vegetables at baseline were found to have the greatest increases in vegetable consumption (Dimitri et al., 2015). Furthermore, individuals with lower education levels were more likely to have a greater increase in vegetable consumption over the study period as compared to their higher educated counterparts (Dimitri et al., 2015). It’s likely that matching programs reduce the barrier of cost associated with purchasing F&V, which increases purchasing and consumption behaviors. However, use of stronger dietary evaluation methodologies are needed to determine the influence of matching programs on dietary intake and purchasing behaviors.

Farmers’ market incentive programs have become a popular intervention to increase F&V consumption in low-income populations. As explained above, vouchers for F&V have facilitated larger purchases, a greater variety and an increased self-reported consumption of F&V in families who would have struggled to provide these foods to their family otherwise (Hood, Martinzez-Donate, & Meinen, 2012; Wheeler & Chapman-Novakafski, 2014). Additionally, participants of these programs are more commonly using federal benefits such as SNAP and WIC at farmers’ markets to purchase produce instead of using federal benefits on calorie dense foods at the grocery store (Wheeler & Chapman-Novakafski, 2014). Participation in a farmers’ market incentive program may be an optimal time to
provide nutrition education to increase skills, knowledge and self-efficacy in nutrition, cooking, preparing, storing, and preserving F&V (Wheeler & Chapman-Novakafski, 2014).

Indeed, one of the limitations of incentive research has been the limited involvement of nutrition education interventions. Incentives alone do not address the barriers of self-efficacy, culinary skills, or the time commitment of cooking raw F&V (Dimitri et al., 2012). It has been proposed that incentives should be provided in addition to an education intervention instead of using incentives in place of an education intervention (Paul-Ebhohimhen & Avenell, 2007). In a few circumstances, nutrition education has been used to supplement the price incentives as a way to expand skills and knowledge related to purchasing, preparing and cooking healthy foods. Several authors have indicated the importance of using programs such as the Supplemental Nutrition Assistance Program (SNAP-Ed) to help improve dietary choices of low-income individuals (Anderson et al., 2001; Bihan et al.; 2012; Martin et al., 2012). Dannefer et al., (2015) found an increase of ½ cups of F&V per day among SNAP-Ed participants who had attended at least two nutrition education classes at the farmers’ market (Dannefer et al., 2015). Incorporating nutrition education with farmers’ market incentive programs may be an effective way to reduce multiple barriers associated with purchasing and consuming F&V.

Of the WIC farmers’ market incentive studies conducted, only one study investigated how vouchers and nutrition education influenced F&V intake in participants (Anderson et al., 2001). Education alone was found to reduce barriers and improve positive attitudes regarding F&Vs (Anderson et al., 2001). Incentives
alone decreased cost as a common barrier and increased F&V intake although no changes were found in beliefs or attitudes towards F&V in the incentive only group (Anderson et al., 2001). The greatest reported change in attitudes and dietary intake was in the education plus voucher group. Perceived availability of F&V and self-reported dietary intake increased the most as a result of combined education and vouchers as compared to either intervention alone (Anderson et al., 2001). A study conducted by Bihan et al., (2012) also investigated nutrition education and vouchers for F&V. A group of low-income participants (n=302) were randomized to either an education group or an education plus vouchers groups. Similar to the previously reported results, Bihan et al., (2012) found a significant increase in self-reported F&V consumption in both education only (0.62 servings per day) and education plus vouchers (0.74 servings per day) groups. The combination of the two interventions, education and farmers market incentives, seems to be the most effective way to improve self-reported F&V intake in a low-income population.

Limitations of Previous Farmers’ Market Incentive Research

Although many of the studies that have investigated farmers’ market incentive programs were well designed, they all relied on self-reported measurements of F&V intake such as 24-hour recalls and food frequency questionnaires. Some studies relied solely on one or a few survey questions asking participants if their F&V intake had increased after participating in the study. As commonly stated in the literature, self reported dietary intake instruments are
subject to bias, which can reduce the credibility of the study results (Martin et al., 2002; Miller et al., 2008). This is especially true among the various dietary recalls used in these studies in which participants often underestimate and overestimate the amount of food consumed (Bingham, 1991; Macdiarmid & Blundell 1998). Relying solely on these measurements reduces the validity of the study results. Improvements in nutrition-related behaviors reported by participants might have been a consequence of their awareness of being studied via the Hawthorne effect (Campbell, Honess-Morreale, Farrell, Carbone, & Brasure, 1999). Moreover, many of the surveys that have been used to evaluate farmers’ market incentive programs have failed to report internal consistency and reliability. There is a critical need for objective measurements in a randomized controlled trial to be used to determine the effectiveness of farmers’ market incentive programs. Furthermore, few studies have investigated the long-term implications of farmers’ market incentives on dietary intake and food security status of program participants (An, 2013).

**Conclusion**

Low-income individuals are at higher risk for chronic diseases, obesity, and overall poorer health as compared to their higher income counterparts. Limited intake of nutrient dense foods such as F&V has been found to contribute to the increased risk for many of these diseases. However, multiple barriers such as cost, access, and availability make it challenging for low-income individuals to consume the recommended intakes of F&V. Food insecurity, a common struggle for many
low-income Americans, also contributes to poor dietary intake. As a result, there
is a critical need for interventions and policies aimed to reduce barriers in effort to
increase F&V intake and improve food security status among this population.
Several programs currently exist to overcome these issues, however, research
regarding program effectiveness is limited resulting in the need for additional
research.


of the American Dietetic Association, 106(9), 1364-1368. doi: 10.1016/j.jada.2006.06.021


consumption: Use of farm-to-consumer venues among US adults.

*Preventing Chronic Disease, 8*(2), 5.


doi:10.1007/s10900-011-9522-z

Carter, P., Gray, L. J., Troughton, J., Khunti, K., & Davies, M. J. (2010). Fruit and
vegetable intake and incidence of type 2 diabetes mellitus: systematic review

Casazza, K. (2013). Myths, presumptions, and facts about obesity (vol 368, pg 446,

Caspi, C., Kawachi, I., Subramanian, S., Adamkiewicz, G., & Sorensen, G. (2012). The
relationship between diet and perceived and objective access to
supermarkets among low-income housing residents. *Social Science Medicine,
75*(7), 1254-1262.

Cassady, D., Jetter, K. M., & Culp, J. (2007). Is price a barrier to eating more fruits and
vegetables for low-income families? *Journal of the American Dietetic
Association, 107*(11), 1909-1915. doi: 10.1016/j.jada.2007.08.015

grocery store availability and food price disparities. *Journal of Consumer
Affairs, 33*(2), 276-296.

assessing food intakes in terms of servings based on food guidance. *American

30*(5), 344-345. doi: 10.1016/s0022-3182(98)70345-0

to farmers markets for beneficiaries of nutrition assistance: Evaluation of
the farmers market access project. *Preventing Chronic Disease, 10*(14).
doi:10.5888/pcd10.130121

publications/err-economic-research-report/err194.aspx

doi:10.1016/j.apgeog.2011.01.017

food insecurity. *Journal of Prevention and Intervention in the Community,* 43,
83-94. doi: 10.1080/10852352.2015.973248

food source and food source use are associated with healthy and unhealthy
food-purchasing behaviors among low-income African-American adults in
Baltimore City. *Public Health Nutrition,* 14(9), 1632-1639. doi:
10.1017/s1368980011000498

families during a 1-month period of time. *Journal of Nutrition Education and
Behavior,* 45(1), 20-29. doi: 10.1016/j.jneb.2012.05.016

Nutrition,* 7(1), 21-27. doi: 10.1079/phn2003512


Latham, J., & Moffat, T. (2007). Determinants of variation in food cost and availability in two socioeconomically contrasting neighborhoods of Hamilton,


Lindsay, S., Lambert, J., Penn, T., Hedges, S., Ortwine, K., Mei, A. C., . . . Wooten, W. J. (2013). Monetary matched incentives to encourage the purchase of fresh fruits and vegetables at farmers markets in underserved communities. *Preventing Chronic Disease, 10*(10). doi: 10.5888/pcd10.130124


for evaluation and research efforts. *Journal of the American Dietetic Association*, 110(3), 399-408. doi: 10.1016/j.jada.2009.11.023


Quandt, S. A., Dupuis, J., Fish, C., & D’Agostino, R. B. (2013). Feasibility of using a community-supported agriculture program to improve F&V inventories and consumption in an underresourced urban community. Preventing Chronic Disease, 10(8). doi: 10.5888/pcd10


Treiman, K., Freimuth, V., Damron, D., Lasswell, A., Anliker, J., Havas, S., …


Turrell, G., Hewitt, B., Patterson, C., Oldenburg, B., & Gould, T. (2002). Socioeconomic differences in food purchasing behavior and suggested implications for diet-


doi:10.1016/j.jada.2007.08.004


Wiig, K., & Smith, C. (2009). The art of grocery shopping on a food stamp budget: Factors influencing the food choices of low-income women as they try to


CHAPTER 3

DETERMINING THE FEASIBILITY OF IMPLEMENTING AND EVALUATING A
FARMERS’ MARKET INCENTIVE PROGRAM

Abstract

**Introduction** Farmers’ market incentive programs have been implemented in effort to increase F&V consumption and food security status of federal nutrition assistance users. The objective of this study was to determine the feasibility of implementation and evaluation of a farmers’ market incentive program.

**Methods** Participants were randomly assigned to one of four farmers’ market incentive groups or a control group. Individuals and couples were eligible for $10 worth of incentives each week. Families were eligible for an additional $5 per child up to $30 total. Participants in the matching incentive group received $1 in farmers’ market incentives for every $1 they spent in SNAP benefits at the farmers’ market using their Electronic Benefits Transfer (EBT) card. Participants in the non-matching incentives groups were not required to match any of their SNAP (EBT) benefits to receive incentives. Fruit and vegetable (F&V) intake was assessed through a food frequency questionnaire, a 24 hour recall, and carotenoid levels through Resonance Raman light scattering spectroscopy at three time points over the 8-week intervention period. These measurements were also collected at a follow up data collection session, which was conducted six months after the intervention period. Repeated Measures Multivariate Analysis of Variance was run to compare
differences in means among the groups at various time periods. Utilization of benefits data was collected from participants each week at the farmers’ market. Pearson Correlation Coefficient was used to determine the correlation between the F&V measurement tools and carotenoid levels and the correlation between the utilization of benefits and F&V intake.

**Results** Of the 74 individuals who started the study, 56 participants completed both baseline and endpoint data collection, and 28 individuals participated in the 6-month follow up. No significant differences in means of F&V intake or carotenoid levels were found between groups at any time period. Carotenoids were found to be significantly correlated with self-reported F&V intake at most time points. The correlation between the change in F&V intake and total incentives spent among the completers (n=32) who received farmers’ market incentives was not significant (P=0.51). However, individuals in the highest quartile (n=8) increased F&V intake measured by the ASA24, by a mean of 0.84 servings per day and the lowest quartile (n=7) decreased F&V intake by a mean of 0.79 servings per day.

**Conclusion** Farmers’ market incentive programs may be beneficial for low-income individuals if barriers to spending federal nutrition assistance benefits are limited. Future studies should be conducted using larger sample sizes and objective measurement tools to determine if nutrition-related behaviors significantly change after program participation.
Farmers’ market incentive programs were first implemented in 2008 in the Northeast region of the United States and have since been established around the country as a way to improve food security and encourage consumption of locally grown fruit and vegetables (F&V) among federal nutrition assistance users (1–3). Nonprofit organizations and local governments have funded the majority of the matching incentive programs through grants and donations (4). The Fair Food Networks’ Double Up Food Bucks, Wholesome Waves’ Double Value Coupon Program, and New York City’s Health Bucks programs are among the largest farmers’ market incentive programs in the country (1,5). However, as a result of the 2014 Farm Bill, the United States Department of Agriculture (USDA) has recently offered over $31.5 million dollars through the Food Insecurity Nutrition Incentive (FINI) grant, which has primarily been used to develop, implement, and evaluate new and existing farmers’ market incentive programs (6). Although the incentive allocation for each of these programs vary, most programs offer a dollar for dollar incentive match based on the amount of federal nutrition assistance benefits an individual spends at the market. Most programs will allow a match up to $10 to $20 of per week as a way to double the purchasing power for these individuals (1).

The rapid growth of farmers’ market incentive programs suggest that stakeholders perceive this intervention strategy to be valuable to overcoming the nutrition-related concerns influencing federal nutrition assistance users (1). The evaluation of these incentive programs is necessary in effort to inform policy
makers of the most effective ways to implement incentive programs and to demonstrate program effectiveness through behavior change of program participants (6).

Most studies to date investigating farmers’ market incentives have focused on short-term nutrition-related behavior change among individuals after receiving farmers’ market incentives (3,7–9). Minimal data has been published regarding the feasibility of implementing a farmers’ market incentive program. Furthermore, additional research needs to be conducted relating to the extent to which participants utilize the benefits provided through these initiatives. The purpose of this study was to investigate the feasibility of implementing and evaluating a farmers’ market incentive program.

Methods

Farmers’ market incentives and nutrition education interventions for low-income individuals were evaluated to determine program effectiveness. To be eligible to participate in the study, individuals had to be 18 years of age or older and receiving nutrition assistance benefits. To determine eligibility of program participants, interested individuals were asked to complete a 21-item recruitment survey. The recruitment survey included questions regarding federal assistance use, demographics, anthropometrics, household size, and other general health questions. The Institutional Review Board at Utah State University approved the protocols for this study.
Recruitment was conducted by calling (n=1,500) and sending postcards (n=500) to SNAP participants living in one county in Utah. Of the SNAP participants contacted, 202 individuals completed the recruitment survey and 131 were eligible to participate in the study. Participants were recruited in two cohorts. Cohort 1 had 30 participants and cohort 2 had 44 participants. Participants were randomly assigned to one of five groups including: control group (group 1), education only group (group 2), non-matching incentives and education group (group 3), matching incentives and education group (group 4), and non-matching incentives only group (group 5). Random assignment was based on stratification by gender and household size.

Participants attended a 20-minute orientation session prior to data collection. Researchers explained the informed consent and answered questions related to the study. After consenting to participate, each participant was assigned a participant identification (ID) number to ensure confidentiality. Researchers aimed to randomize at least 15 participants to each group. However, because 28 participants decided not to participate after randomization but before the beginning of the study, group sizes were not equal. Group 1 started with 14 participants, Group 2 started with 15, Group 3 started with 15, Group 4 with 13, and Group 5 with 16.

The control group received weekly handouts on cooking and eating healthy on a budget (Table 1). The handouts were from the USDA 10 Tips Nutrition Education Series (10). Specific handouts were chosen because they did not include information regarding F&Vs. Handouts were mailed to the control group each week over the intervention period.
Weekly nutrition classes were provided to participants in the education only, non-matching incentives and education group, and the matching incentive and education group. Participants were asked to attend nutrition education classes for eight weeks. The education was based on the SNAP-Ed “Creates” curriculum, which emphasizes a diet following the Dietary Guidelines for Americans and MyPlate (11). Common barriers to eating fruits and vegetables such as access, cost, availability, knowledge, skills, and dietary traditions were also addressed in the curriculum. Education was provided by Nutrition Education Assistants (NEAs) who received training through the National Nutrition Certification Program (NNCP) (12). Education was provided in small groups to increase the social support for participants. Participants were able to try a variety of F&V in various recipes after observing a cooking demonstration. Participants were provided with recipes and helpful tips to increase F&V in effort to increase self-efficacy.

Non-matching and matching incentives were accepted at one farmers’ market in Utah during the 8-week intervention period. The amount of incentives for each participant was based on family size. Individuals and couples were eligible for $10 worth of incentives each week and families received an additional $5 per child up to $30 total. Participants in the matching incentive and education group (group 4) received $1 in farmers’ market incentives for every $1 they spent in SNAP (EBT) benefits at the farmers’ market. Participants in the non-matching incentives and education group (group 3) and non-matching incentives only group (group 5) were not required to match any of their SNAP (EBT) benefits to receive incentives. Participants were asked to record the total amount of incentives, SNAP (EBT)
benefits, and cash they spent at the farmers’ market each week.

Table 3-1. Description of Each Intervention Group

<table>
<thead>
<tr>
<th>Group</th>
<th>Intervention</th>
<th>Intervention Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>Control</td>
<td>Mailed USDA's 10 Tips Nutrition Education Series each week. Handouts did not discuss fruit or vegetables.</td>
</tr>
<tr>
<td>Group 2</td>
<td>Education only</td>
<td>Received weekly nutrition education focused on addressing common barriers to F&amp;V intake and increasing self-efficacy related to F&amp;V consumption.</td>
</tr>
<tr>
<td>Group 3</td>
<td>Non-matching incentives and education</td>
<td>Received weekly incentives to use at the farmers’ market and were not required to match SNAP benefits.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Received weekly nutrition education focused on addressing common barriers to F&amp;V intake and increasing self-efficacy related to F&amp;V consumption.</td>
</tr>
<tr>
<td>Group 4</td>
<td>Matching incentives and education</td>
<td>Received $1 in farmers’ market incentives for every $1 they spent in SNAP (EBT) benefits at the farmers’ market each week.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Received weekly nutrition education focused on addressing common barriers to F&amp;V intake and increasing self-efficacy related to F&amp;V consumption.</td>
</tr>
<tr>
<td>Group 5</td>
<td>Non matching incentives only</td>
<td>Received weekly incentives to use at the farmers’ market and were not required to match SNAP benefits.</td>
</tr>
</tbody>
</table>

All participants were asked to participate in three data collection periods including baseline (0 weeks), midpoint (4 weeks), and endpoint (8 weeks).

Participants who completed the endpoint data collection were invited to attend a 6-month follow up data collection session. The data collection sessions were held at a central location that was easily accessible by public and private transportation. Each data collection session took approximately 60 minutes for each participant.
Anthropometrics (height, weight, and waist circumference) were collected at each data collection period. Weight and waist circumference were measured three times for each participant at each data collection session to ensure accuracy. Pregnant women were excluded from weight and waist-circumference measurements. Resonance Raman light scattering spectroscopy (RRS) was used to collect skin carotenoid levels of participants at all data collection periods. RRS has the ability to measure carotenoid levels in skin by detecting vibrational energy of molecules through the use of a resonate laser (13,14). This method has been found to be a valid, reliable, noninvasive, and practical alternative to High Performance Liquid Chromatography (HPLC), which was previously, deemed the most effective and accurate carotenoid assessment available (15). Carotenoids were measured two times at each data collection session for each participant to ensure accuracy. If the two measurements were not similar, a third measurement was taken.

Participants were also asked to complete a variety of validated questionnaires at each data collection session including a 24 hour recall through the Automated Self-Administered 24 hour Recall (ASA24), the Eating at America’s Table Study All Day Screener which is a food frequency questionnaire developed by the National Cancer Institute, the USDA’s U.S. Household Food Security Survey Module 6-Item Short Form, and a series of questions about beliefs/behaviors regarding F&Vs (16–19). Researchers were available to answer questions and assist with the ASA24 during each data collection session. Participants were asked to complete at least two more 24-hour recalls in the week after each data collection session through the ASA24. Researchers conducted the 24-hour recalls over the phone with
individuals who did not have access to the internet or for those who requested assistance.

Participants were compensated differently depending on which group they were randomly assigned to. Each participant received $10 for each data collection session with a $10 bonus if they attended all three data collection sessions. The control group received an additional $10 bonus for attendance at all three data collection sessions for a total bonus of $20. The education only group also received $5 for each week they attended the nutrition education class with a $10 bonus if they attended all eight classes. Participants who attended the 6-month follow up data collection session received an additional $20.

Analysis

Data were double entered in Excel for accuracy. One-way analysis of variance (ANOVA) was conducted to compare demographic differences among the five groups. Independent sample t-tests were used to compare demographic differences among baseline participants and completers. Completers were considered individuals who attended both baseline and endpoint data collection sessions. Participants who were not considered completers were excluded from data analysis related to changes in F&V intake and carotenoid levels. An average of the carotenoid measurements was used to determine carotenoid level at each data collection session (baseline, midpoint, endpoint, and follow up). Total vegetable intake and total fruit intake provided by the ASA24 were combined to create total F&V intake for each participant at each data collection session. Data from the FFQ was scored
based on the scoring guidelines provided by the National Cancer Institute (20). FFQ questions (n=9) that asked for the frequency of intake among several F&V categories were expressed as daily averages by standardizing the midpoint of each category into number of times per day (20). Each of the F&V portion size questions (n=9) was assigned a cup equivalent based on MyPlate servings (20). Daily average F&V servings were computed for each F&V by multiplying the times per day by the cup equivalents (20). The sum of all the F&V categories was calculated which provided the average F&V intake for each participant at each time point (20). All FFQ questions were included in the calculation of the score except for the question that asked for frequency of consuming mixtures that include vegetables, as specified by the NCI scoring details (20).

Descriptive statistics such as mean, standard deviation, and 95% confidence interval were analyzed for carotenoids and F&V intake from the ASA24 and FFQ at each data collection session. Repeated Measures Multivariate Analysis of Variance (MANOVA) was conducted to compare the mean differences in F&V intake and carotenoids levels of the groups at each time period. Correlations analysis was conducted using Pearson Correlation Coefficient to determine the linear relationships between carotenoids and F&V intake from ASA24 and FFQ data.

Means were calculated for the amount of financial resources such as incentives, SNAP (EBT), and cash that were spent per household member in the incentive groups. Household size was calculated based on the number of adults and children living in a household at the time of recruitment. Percentages of incentives utilized were calculated. The percentage of participants who used at least 75% of
incentives were calculated based on the number of baseline participants in each group to determine drop out and compliance rates. Pearson Correlation Coefficient was conducted to determine the linear relationship between total tokens spent and the change in F&V intake from baseline to endpoint among completers. All data analysis was conducted using SPSS 21.0 (SPSS version 21.0, SPSS Inc., Chicago, IL, 2012).

**Results**

Of the 74 individuals who participated in baseline data collection, fifty-six participants attended at least the baseline and endpoint data collection periods and 28 participants also attended the follow up data collection period. The majority of completers were white, non-Hispanic, married females (Table 2). The age of participants ranged from 18-62 years old with the average age of 33 years old. The average household had 2.5 children with ages ranging from newborns to 17 years of age. Participants reported diversity in employment status with being a stay at home mom and working part time being the most common jobs. The majority of participants (n=51) reported an annual household income of less than $30,000. In addition to receiving SNAP benefits, many participants (n=52) reported receiving other types of assistance, most commonly WIC. Dropouts were significantly older (M=42.4 years, SD 14.0) than completers (M=33.4 years, SD 9.72; p=0.018). No other significant differences were found when comparing demographic characteristics of participants who completed baseline only to the completers. There was a significant difference in average household size among the five groups
Table 3-2. Sociodemographic Characteristics of Baseline, Completers, and Follow up Participants

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Baseline (n=74)</th>
<th>Completers(n=56)</th>
<th>Follow up (n=28)</th>
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</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>86.5</td>
<td>85.7</td>
<td>82.1</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-34 years</td>
<td>56.8</td>
<td>61.8</td>
<td>67.9</td>
</tr>
<tr>
<td>35-59 years</td>
<td>36.4</td>
<td>35.7</td>
<td>28.6</td>
</tr>
<tr>
<td>60 years or older</td>
<td>6.8</td>
<td>3.6</td>
<td>3.5</td>
</tr>
<tr>
<td>Race*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Indian or Native American</td>
<td>1.4</td>
<td>1.8</td>
<td>0</td>
</tr>
<tr>
<td>Asian</td>
<td>2.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Black/African American</td>
<td>1.3</td>
<td>1.8</td>
<td>0</td>
</tr>
<tr>
<td>Hawaiian Native or Pacific Islander</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>2.7</td>
<td>3.6</td>
<td>4.0</td>
</tr>
<tr>
<td>White</td>
<td>98.6</td>
<td>98.2</td>
<td>96.0</td>
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<tr>
<td>Employment</td>
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<td></td>
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</tr>
<tr>
<td>Full time</td>
<td>13.7</td>
<td>15.7</td>
<td>16.0</td>
</tr>
<tr>
<td>Part time</td>
<td>22.8</td>
<td>25.5</td>
<td>28.0</td>
</tr>
<tr>
<td>Day Laborer</td>
<td>1.5</td>
<td>2.0</td>
<td>0</td>
</tr>
<tr>
<td>Unemployed</td>
<td>15.1</td>
<td>11.7</td>
<td>8.0</td>
</tr>
<tr>
<td>Housewife or stay at home mom</td>
<td>36.3</td>
<td>33.3</td>
<td>32.0</td>
</tr>
<tr>
<td>Retired</td>
<td>1.5</td>
<td>2.0</td>
<td>4.0</td>
</tr>
<tr>
<td>Other</td>
<td>9.1</td>
<td>9.8</td>
<td>4.0</td>
</tr>
<tr>
<td>Income</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$0-$14,999</td>
<td>45.6</td>
<td>46.4</td>
<td>40.0</td>
</tr>
<tr>
<td>$15,000-$24,999</td>
<td>36.0</td>
<td>37.5</td>
<td>48.0</td>
</tr>
<tr>
<td>$25,000-$34,999</td>
<td>10.6</td>
<td>10.8</td>
<td>4.0</td>
</tr>
<tr>
<td>$35,000-$44,999</td>
<td>4.0</td>
<td>3.6</td>
<td>8.0</td>
</tr>
<tr>
<td>$45,000 and up</td>
<td>4.0</td>
<td>1.8</td>
<td>0</td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married or long term partner</td>
<td>66.2</td>
<td>67.9</td>
<td>72.0</td>
</tr>
<tr>
<td>Single</td>
<td>13.5</td>
<td>16.1</td>
<td>8.0</td>
</tr>
<tr>
<td>Widowed</td>
<td>1.4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Divorced or separated</td>
<td>18.9</td>
<td>16.1</td>
<td>20.0</td>
</tr>
<tr>
<td>Children in household</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No children</td>
<td>30.7</td>
<td>26.8</td>
<td>35.7</td>
</tr>
<tr>
<td>1-2 children</td>
<td>37.3</td>
<td>44.6</td>
<td>39.3</td>
</tr>
<tr>
<td>3-4 children</td>
<td>26.6</td>
<td>26.8</td>
<td>25.0</td>
</tr>
<tr>
<td>5 or more children</td>
<td>5.4</td>
<td>1.8</td>
<td>0</td>
</tr>
<tr>
<td>Food Assistance*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SNAP or Food Stamps</td>
<td>83.6</td>
<td>87.3</td>
<td>78.6</td>
</tr>
<tr>
<td>WIC</td>
<td>30.1</td>
<td>30.9</td>
<td>50.0</td>
</tr>
<tr>
<td>Food Bank</td>
<td>9.6</td>
<td>5.5</td>
<td>3.6</td>
</tr>
<tr>
<td>Family Assistance</td>
<td>5.5</td>
<td>3.6</td>
<td>3.6</td>
</tr>
<tr>
<td>Other assistance</td>
<td>2.7</td>
<td>1.8</td>
<td>3.6</td>
</tr>
<tr>
<td>None</td>
<td>6.8</td>
<td>7.3</td>
<td>7.1</td>
</tr>
</tbody>
</table>
*Participants could check all that apply therefore total percentage does not add up to 100%.

(P=0.004). Post hoc analysis using Tukey HDS indicated that there was not a significant difference in mean household size among the three groups that received farmers’ market incentives such as non-matching incentives and education group (group 3) (M=3.5, SD=1.4), matching incentives and education group (group 4) (M=4.3, SD 1.9), and the non-matching incentives only group (group 5) (M=3.6, SD=1.7). However, the household size of these groups did vary which influenced the total amount of incentives provided to participants in each group. There was also a significant difference in the mean age of participants in each group (P=0.01). Post hoc analysis using Tukey HSD indicated that mean age of the matching incentives and education group (group 4) (M=43.9 years) was significantly different (P=0.007) from the control group (group 1) (Mean=28.5 years) and the non-matching incentives and education group (group 3) (M=31.8 years, P=0.048). No additional significant differences in demographic characteristics were found between groups.

No significant differences in means of F&V intake or carotenoid levels were found between groups at any time period. Minor changes in carotenoid levels and F&V intake (through the ASA24 and FFQ) were found going various directions and were not consistent within groups. Carotenoid levels slightly increased from baseline to endpoint and endpoint to 6-month follow up for most groups. Carotenoids were found to be significantly correlated to F&V ASA24 data at all data collections points while the F&V FFQ data was only significantly correlated with carotenoids at baseline (r=0.395, P=0.003) and midpoint (r=0.425, p=0.001) (Table
The F&V ASA24 data and F&V FFQ data were found to be significantly correlated at midpoint (r=0.583, P<0.001) and endpoint (r=0.530, P<0.001), however, they were not significantly correlated at baseline (r=0.210, P=0.127).

Participants submitted data on the amount of financial resources spent at the farmers’ market 95% of the time. Of the three groups receiving the farmers’ market incentives, the non-matching incentives only group (group 5) spent the largest at midpoint (r=0.583, P<0.001) and endpoint (r=0.530, P<0.001), however, they were not significantly correlated at baseline (r=0.210, P=0.127).

Participants submitted data on the amount of financial resources spent at the farmers’ market 95% of the time. Of the three groups receiving the farmers’ market incentives, the non-matching incentives only group (group 5) spent the largest percentage of their incentive benefits while the percentage of eligible benefits spent in groups 3 and 4 were lower, yet comparable to one another (Table 5). The non-matching incentives only group (group 5) spent the most incentives and SNAP (EBT) benefits.

The non-matching incentives only group (group 5) spent the highest amount of incentives per household member (M=$28.40, SD=5.0) and the matching incentives and education group (group 4) spent the highest amount of SNAP (EBT) per household member (M=$15.60, SD=12.8). The non-matching incentives and education group spent a moderate amount of incentives per household member (M=$21.50, SD=10.5), however they spent minimal SNAP (EBT) compared to the other two groups (Figure 1).
Table 3-3. Descriptive Statistics of Fruit and Vegetable Intake and Carotenoids among Participants at Four Data Collection Periods

<table>
<thead>
<tr>
<th>Group</th>
<th>Baseline</th>
<th>Midpoint</th>
<th>Endpoint</th>
<th>Follow Up</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F&amp;V ASA24</td>
<td>F&amp;V FFQ</td>
<td>Carotenoids</td>
<td>F&amp;V ASA24</td>
</tr>
<tr>
<td>1</td>
<td>Mean</td>
<td>2.82</td>
<td>2.75</td>
<td>28000</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>1.10</td>
<td>1.40</td>
<td>12943</td>
</tr>
<tr>
<td></td>
<td>95% CI Lower</td>
<td>2.07</td>
<td>1.75</td>
<td>19305</td>
</tr>
<tr>
<td></td>
<td>95% CI Upper</td>
<td>3.55</td>
<td>3.75</td>
<td>36696</td>
</tr>
<tr>
<td>2</td>
<td>Mean</td>
<td>2.54</td>
<td>2.19</td>
<td>21818</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>1.78</td>
<td>1.44</td>
<td>3601</td>
</tr>
<tr>
<td></td>
<td>95% CI Lower</td>
<td>1.35</td>
<td>1.22</td>
<td>19398</td>
</tr>
<tr>
<td></td>
<td>95% CI Upper</td>
<td>3.37</td>
<td>3.15</td>
<td>24238</td>
</tr>
<tr>
<td>3</td>
<td>Mean</td>
<td>3.07</td>
<td>2.85</td>
<td>24734</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>1.70</td>
<td>1.74</td>
<td>9216</td>
</tr>
<tr>
<td></td>
<td>95% CI Lower</td>
<td>2.07</td>
<td>1.80</td>
<td>19165</td>
</tr>
<tr>
<td></td>
<td>95% CI Upper</td>
<td>4.11</td>
<td>3.90</td>
<td>30304</td>
</tr>
<tr>
<td>4</td>
<td>Mean</td>
<td>2.60</td>
<td>2.28</td>
<td>31127</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>1.31</td>
<td>1.72</td>
<td>18580</td>
</tr>
<tr>
<td></td>
<td>95% CI Lower</td>
<td>1.39</td>
<td>0.69</td>
<td>13943</td>
</tr>
<tr>
<td></td>
<td>95% CI Upper</td>
<td>3.82</td>
<td>3.87</td>
<td>48311</td>
</tr>
<tr>
<td>5</td>
<td>Mean</td>
<td>3.34</td>
<td>2.01</td>
<td>27344</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>1.89</td>
<td>1.71</td>
<td>17637</td>
</tr>
<tr>
<td></td>
<td>95% CI Lower</td>
<td>2.31</td>
<td>1.06</td>
<td>17139</td>
</tr>
<tr>
<td></td>
<td>95% CI Upper</td>
<td>4.40</td>
<td>3.12</td>
<td>37548</td>
</tr>
</tbody>
</table>
F&V data was collected from the ASA24; F&V FFQ data was collected from the National Cancer Institute’s Food Frequency Questionnaire; Carotenoids are measured by Raman intensity counts
Baseline, midpoint, and endpoint n=56; Group 1 n=11, Group 2 n=11, Group 3 n=13, Group 4 n=7, Group 5 n=14
Follow up n=28; Group 1 n=3, Group 2 n=5, Group 3 n=7, Group 4 n=4, Group 5 n=9
No significant mean differences were found among F&V intake or carotenoid levels with Repeated Measures MANOVA

Table 3-4. Correlations of Carotenoid and Fruit and Vegetable Intake Among Completers (n=56)

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. BL Carotenoid</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. MP Carotenoid</td>
<td>.915*</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. EP Carotenoid</td>
<td>.905*</td>
<td>.944*</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. BL F&amp;V ASA24</td>
<td>.290*</td>
<td>.249</td>
<td>.259</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. MP F&amp;V ASA24</td>
<td>.303*</td>
<td>.325*</td>
<td>.316*</td>
<td>.521*</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. EP F&amp;V ASA24</td>
<td>.316*</td>
<td>.294*</td>
<td>.361*</td>
<td>.477*</td>
<td>.517*</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. MP F&amp;V FFQ</td>
<td>.383*</td>
<td>.425*</td>
<td>.396*</td>
<td>.274*</td>
<td>.583*</td>
<td>.512*</td>
<td>.661*</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>9. EP F&amp;V FFQ</td>
<td>.217</td>
<td>.233</td>
<td>.239</td>
<td>.305*</td>
<td>.557*</td>
<td>.530*</td>
<td>.524</td>
<td>.619*</td>
<td>--</td>
</tr>
</tbody>
</table>

Correlation analysis conducted using Pearson Correlation Coefficient
* Correlation is significant at the level of 0.05 level (2-tailed)
BL stands for Baseline; MP stands for Midpoint; EP stands for Endpoint
F&V is data collected from the ASA24; F&V FFQ is data collected from the National Cancer Institute’s Food Frequency Questionnaire
Table 3-5. Total Amount of Financial Resources Spent by Group

<table>
<thead>
<tr>
<th>Spent at Market</th>
<th>Group 3 (n=13)</th>
<th>Group 4 (n=7)</th>
<th>Group 5 (n=14)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Incentives Eligible</td>
<td>$1840</td>
<td>$1080</td>
<td>$1960</td>
</tr>
<tr>
<td>Incentives</td>
<td>$1093</td>
<td>$631</td>
<td>$1464.50</td>
</tr>
<tr>
<td>SNAP-EBT</td>
<td>$105</td>
<td>$530</td>
<td>$376.00</td>
</tr>
<tr>
<td>Cash</td>
<td>$98.75</td>
<td>$12.25</td>
<td>$63.00</td>
</tr>
<tr>
<td>Total Financial Resources Spent</td>
<td>$1296.75</td>
<td>$1173.25</td>
<td>$1903.50</td>
</tr>
</tbody>
</table>

Weekly incentives were provided to each participant for the 8-week intervention period. Weekly incentive allotment was based on participant household size. Table shows the total amount of financial resources spent by all participants in each group during the intervention period. The amount of incentives, SNAP-EBT, and cash spent by participants was collected weekly from each participant.

As a result of the similarity in intervention designs among the three non-matching and matching intervention groups, drop out rates and utilization of benefits was compared (Table 3-6). The two non-matching incentive groups (group 3 and group 5) had lower dropout rates compared to the matching incentive and education group (group 4). Furthermore, the non-matching incentive only group (group 5) had the highest percentage (79%) of participants who used at least 75% of the incentives they were eligible for.

Lastly, a weak relationship was found between the utilization of incentives at the farmers’ market and the change in F&V intake using ASA24 data (Figure 2). The correlation between the change in F&V intake and total incentives spent among the completers (n=32) who received farmers’ market incentives was not significant (P=0.51). However, individuals in the top quartile (n=8) increased F&V intake
measured by the ASA24, by a mean of 0.84 servings per day and the lowest quartile (n=7) decreased F&V intake by a mean of 0.79 servings per day.

Figure 3-1. Average Amount of Financial Resources Spent per Household Member by Group

Table 3-6. Utilization of Benefits in Non-Matching and Matching Incentive Groups

<table>
<thead>
<tr>
<th></th>
<th>Group 3</th>
<th>Group 4</th>
<th>Group 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drop outs</td>
<td>2/15 (13%)</td>
<td>6/13 (46%)</td>
<td>2/16 (13%)</td>
</tr>
<tr>
<td>Participants who used ≥ 75% of incentives they were eligible for</td>
<td>7/15 (47%)</td>
<td>2/13 (15%)</td>
<td>11/14 (79%)</td>
</tr>
</tbody>
</table>

Drop outs were participants who quit the study before endpoint.
Percentages are based on the number of participants in each group at baseline.
Figure 3-2. Relationship Between Total Incentives Spent at the Farmers’ Market and Fruit and Vegetable Intake

Change in F&V intake was calculated using data from ASA24
No significant correlation between change in F&V intake and total incentives spent (P=0.51)

Discussion

Results of this study show that although there were no significant differences in means at any time period, there was a slight increase in carotenoid levels among most intervention groups from baseline to endpoint and endpoint to 6-month follow up. This study is consistent with previous studies that have found moderate correlations between carotenoids with 24-hour recalls and FFQ (15,21–24). For example, a comparable correlation was found between serum carotenoid levels and F&V intake from a FFQ (r=0.35) and a 24-hour recall (r=0.37) in a previous study (24). RRS may be a useful alternative to 24 hour recalls or FFQ as a way to estimate changes in F&V intake as it is an objective and less time consuming method.
This pilot study suggests there would be greater participation in farmers’ market incentive programs and an increase in the amount of incentives utilized if participants were not required to match SNAP (EBT) benefits to receive the incentives. Of the three groups that received farmers’ market incentives, the non-matching incentives only group (group 5) spent the largest percentage of their incentive benefits over the 8-week intervention period. SNAP participants consistently report the challenge of making SNAP benefits last throughout the entire month which limits their ability to match SNAP benefits to receive the incentives offered through matching incentive programs (25, 26). Interviews among farmers’ market incentive program participants from group 4 (n=7) from the current study indicate it was difficult for participants to save enough SNAP benefits on their EBT card to use at the market in the last couple weeks of the month which often times reduced the amount of matched incentives they could receive during that time period (26).

However, individuals who received non-matching incentives spent very minimal SNAP (EBT) benefits at the market. Matching programs are fundamental for increasing federal nutrition assistance revenue at farmers’ markets. One study found that federal nutrition assistance revenue nearly doubled after implementation of a matching farmers’ market incentive program at a rural farmers’ market in South Carolina (27). Furthermore, current funding for farmers’ market incentive programs specifically supports the implementation of matching-based programs as a way to get federal nutrition assistance users to spend their benefits at farmers’ markets on F&V that they may not have been able to afford otherwise (6,28). Future
studies should further study the combination of matching-based farmers’
market incentives and nutrition education to determine if the combination of the
two interventions provides participants with the knowledge and resources to
ensure federal nutrition assistance benefits last throughout the month and allow for
optimal use of incentives.

With the liberal amount of farmers’ market incentives that were provided
and utilized by participants in this study, the authors expected to see a larger
increase in carotenoid levels among individuals receiving incentives after the 8-
week intervention. It is possible that although individuals purchased F&V at the
market, they did not consume the produce until after endpoint data collection.
During interviews conducted with study participants, a majority of participants
reported preserving the F&V purchased at the market through freezing, canning,
and storing as they discussed in one of the nutrition education classes (26). This
may have influenced F&V consumption during the study period among the groups
receiving incentives and education. Since carotenoid levels slightly increased for
two of the intervention groups at follow up, it is possible that preserved F&V were
still being consumed at that time. Future studies should collect data on how F&V
purchased with incentives are being utilized during the intervention period.

There are limitations of this study that should be addressed. During the
explanation of the informed consent, individuals in this study were notified the
carotenoid scan primarily detected F&V intake. This may have influenced the
behaviors of the control group, which were found to have a slight mean increase in
carotenoid levels and self-reported F&V intake through the ASA24 over the
intervention period. Also, the FFQ used in this study was specific to F&V consumption and did not ask questions related to any other food groups. The control group may have recognized the emphasis placed on F&V intake and increased intake as a result of the Hawthorne Effect (29).

One limitation of this study was that 5% of data related to the utilization of benefits was missing. This was demonstrated by the fact that the matching incentives and education group only reported using $530 of SNAP (EBT) benefits yet $631 of incentives. Since this group received matching incentives, the amount of SNAP (EBT) dollars spent should have been equal to or more than the amount of incentives spent. It is possible that the missing data influenced the study results. Future studies should monitor the amount of incentives, SNAP (EBT) benefits, and cash that were spent at the farmers’ market each week through recording sales transactions instead of relying on self-reported data from participants.

The small sample size used in this study limited the ability to compare for significant differences in means of carotenoid levels and F&V intake among program participants at the different time periods using MANOVA. It was difficult for researchers to recruit SNAP participants for this study even with the compensation and incentives offered to participants. In addition, the dropout rate in this study was high especially among the matching incentives and education group (group 4). Researchers in future studies should find opportunities to recruit SNAP participants in person as opposed to relying on less personalized communication methods such as post cards and phone calls. Direct contact with SNAP participants may increase participation rates and allow for the use of stronger statistical designs. Furthermore,
future studies should consider providing additional compensation for individuals receiving matching incentives to improve study participation.

This was a pilot study with a small sample size that was not designed with a power analysis. Future studies should be conducted with larger sample sizes among each group and powered to determine effect changes. Since most funding opportunities support the implementation of matching-based incentive programs, a completely randomized design should be conducted in future studies to compare F&V intake and carotenoid levels among participants receiving matching incentives, matching incentives and nutrition education, and a control group. A larger sample size and the use of a completely randomized design would allow for protection against confounding variables and create a basis for inference.

The current study supports the need for future research related to the feasibility of implementing and evaluating farmers’ market incentive programs. This study demonstrates that participants of matching-based incentive programs may require nutrition education to improve management of food dollars to optimize the use of matched incentives each month. This study can be used a guide for the development of future studies related to farmers’ market incentives that are powered to determine significant changes in nutrition-related behaviors.
References


Objective To explore the experiences of Supplemental Nutrition Assistance Program participants at farmers’ markets after receiving farmers’ market incentives and nutrition education.

Design Qualitative semi-structured interviews based on inductive content analysis were conducted. Participants were asked about their experiences with shopping at farmers’ markets, barriers to fruit and vegetable intake, and dietary intake after program participation. Interviews were recorded and transcribed. Transcriptions were coded and themes were developed.

Setting A rural farmers’ market and community in Utah, USA

Subjects In October 2014 a convenience sample of Supplemental Nutrition Assistance Program participants (n=14) completed a 45-60 minute semi structured interview after receiving an 8-week intervention of weekly farmers’ market incentives and nutrition education.

Results Results confirm the importance of a farmers’ market incentive program in reducing barriers associated with shopping at farmers’ markets such as cost and accessibility among program participants. Incentives provided participants with greater spending flexibility, allowing parents to provide children with fruit and
vegetables that previously did not fit into the food budget. Participants reported an increased intake of fruit and vegetables as a result of receiving weekly incentives. However, the limited hours and days of operation were factors that reduced the use of farmers’ markets among participants, even when incentives were provided.

**Conclusions** Farmers’ market incentives are one intervention strategy to increase fruit and vegetable consumption among low-income families by helping individuals overcome barriers associated with shopping at farmers’ markets.
**Introduction**

Farmers’ markets have been promoted among low-income populations in the United States (U.S.) as a way to decrease perceived barriers associated with poor intake of fruit and vegetables (F&V) (1–3). Low-income rural communities have found farmers’ markets to be especially valuable for improving access to F&V in areas where limited F&V are commercially sold (4). Many U.S. farmers’ markets are now accepting federal nutrition assistance benefits provided through programs such as the Supplemental Nutrition Assistance Program (SNAP) and the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) as a way to increase F&V consumption among individuals receiving federal nutrition assistance (5). However, shopping at farmers’ markets is not always convenient for low-income individuals. The most common barriers to purchasing produce at farmers’ markets for low-income individuals includes markets not accepting federal nutrition assistance benefits, inconvenient location, lack of transportation, limited hours of operation, food safety concerns, and lack of knowledge/awareness of farmers’ markets in the area (1,6–10). As a result, only a small proportion of federal nutrition assistance benefits are redeemed annually at farmers’ markets (4). For example, in 2012, only $7.5 million in SNAP benefits were redeemed at farmers’ markets, a meager 0.01% of SNAP benefits redeemed that year (4).

Farmers’ market incentive programs have been recently established to help overcome barriers associated with F&V intake and to encourage the use of federal nutrition assistance benefits at farmers’ markets. These programs provide an
opportunity for low-income individuals to increase F&V consumption by reducing the cost of produce, which is commonly indicated as the greatest barrier to greater F&V intake \(^{(11, 12)}\). The WIC Farmers’ Market Nutrition Program and the Senior Farmers’ Market Nutrition Program are two federally funded farmers’ market incentive programs that provide annual incentives of up to $30 and $50 respectively for eligible individuals \(^{(13)}\). Numerous other privately funded farmers’ market incentive programs have also been established around the U.S. \(^{(4)}\). Many incentive programs offer a dollar-for-dollar match on SNAP benefits redeemed at farmers’ markets, allowing participants to double their food dollars to use towards the purchase of F&V \(^{(14)}\). Farmers’ market incentives are considered a promising policy-related intervention to increase F&V intake among low-income individuals \(^{(15)}\). Most importantly, incentive programs provide low-income individuals with greater purchasing power and the freedom to select F&V they may not be able to afford otherwise \(^{(16)}\). Previous studies have found participation in farmers’ market incentive programs to be associated with increased intakes of F&V and improve food security status \(^{(14, 17–21)}\). Herman \(^{(17)}\) found that F&V consumption increased by 1.4 servings per 1,000 calories among individuals receiving farmers’ market incentives through WIC. Minimal qualitative data has been collected from farmers’ market incentive participants to determine their experiences with participation in a farmers’ market incentive program. The objective of this study was to explore the farmers’ market shopping experiences of SNAP participants after receiving farmers’ market incentives and nutrition education.
Methods

Participant Recruitment

A convenience sample of participants who had received farmers’ market incentives and nutrition education through the Supplemental Nutrition Assistance Program-Education (SNAP-Ed) were recruited for this study. To be eligible to participate, individuals had to be 18 years of age or older and receiving SNAP benefits. Twenty-eight participants received this intervention and 21 participants who completed endpoint data collection were asked during a face-to-face interaction with a researcher if they were interested in being interviewed regarding their experiences. Out of the 17 participants who signed up to be interviewed, three participants dropped out as a result of not showing up for scheduled interviews and inability to reschedule. Participants reviewed and signed the informed consent form prior to the interview. Each participant received $20 compensation for their time.

Intervention

Prior to the interviews, participants received an 8-week intervention that included weekly farmers’ market incentives and weekly SNAP-Ed nutrition education. Participants received either regular incentives or matched incentives. Regular incentives did not require participants to spend their own food dollars at the farmers’ market. Participants who received matched incentives received $1 in farmers’ market incentives for every $1 they spent in SNAP benefits at the farmers’
market. The amount of regular and matched incentive for each participant was based on family size. Individuals and couples received $10 worth of incentives each week and families received an additional $5 per child up to $30 weekly total. Both types of incentives could be used to purchase SNAP approved items such as fruit, vegetables, meat, dairy, bread, herbs, and honey at one farmers’ market in rural Utah. Participants received the incentives in the form of plastic tokens at the farmers’ market each week. The market was open each week on Saturday from 9am-1pm.

Weekly nutrition education was based on the SNAP-Ed “Creates Curriculum”, which emphasizes the Dietary Guidelines for Americans and MyPlate. The Creates Curriculum was modified to emphasize overcoming common barriers associated with F&V consumption. Common barriers such as access, cost, availability, knowledge, skills, and cultural preferences were each individually addressed within a lesson of the curriculum. Nutrition Education Assistants provided the group education and cooking demonstrations. All Nutrition Education Assistants were trained through the National Nutrition Certification Program prior to teaching classes. Each weekly nutrition education lesson lasted 60 minutes. Education was provided in small groups ranging from three to eight people to increase the social support of peers. Participants were exposed to a variety of F&V through the weekly cooking demonstrations and recipe tasting. Participants were provided with recipes and helpful tips to increase self-efficacy for consuming more F&V.
Data Collection

Qualitative semi-structured individual interviews were conducted with 14 participants of the previously described intervention to gather detailed information about the participants’ experiences with shopping at farmers’ markets and using incentives, barriers to fruit and vegetable intake, and dietary intake before and after program participation. In-person interviews were conducted in a university clinic that was easy for participants to get to through free public transit and had free parking available. Interviews lasted from 45-60 minutes. Each interview was audio recorded, transcribed verbatim, and reviewed for accuracy.

One researcher (MSR) conducted all interviews for consistency. The interviewer, an adjunct faculty at Utah State University at the time of the study, is a Registered Dietitian with a Masters’ of Public Health. She has experience with interviewing low-income individuals, transcribing audio recordings, and coding qualitative data. The interviewer dressed casually to help participants feel more comfortable. No other researchers were present during the interview, however, a few participants brought a family member with them. The interviewer established a rapport with participants prior to the interviews during the three data collection sessions for the 8-week intervention. Participants were informed of the researcher’s interest in investigating the behaviors and experiences of farmers’ market incentive participants. The interviewer informed participants that the data from the interviews would be used as part of her dissertation for completion of a PhD. The
interviewer took notes throughout interviews based on thoughts and reactions towards the participant comments.

Participants were informed the interviews were about their personal experiences with the previously explained study. Open-ended interview questions were developed based on the research questions, a practice interview, and gaps in the literature. Follow-up questions were added to successive interviews based on previous interviews to generate in-depth responses. The interview script included questions about self perceived barriers to F&V intake, experiences with using the farmers’ market incentives, experiences with nutrition education, perceived nutrition related behavior changes, and future SNAP use at the farmers’ market. The interview guide also included probes for each question such as “can you say more about that?” to get participants to answer questions in greater detail. The interviewer tested the interview questions and probes with a low-income individual prior to the recorded interviews to ensure questions were appropriate and sensitive for the target audience. The interviewer prompted more in-depth information from participants as a result of answers to previous questions. It is believed that saturation was reached at 14 interviews, however, researchers were limited by the number of participants willing to be interviewed. Interviews were transcribed in Microsoft Word and codes were developed in Excel.

Basic demographic information was collected from all participants prior to interviews. Participants completed a six-item survey following the intervention period. Questions included the use of farmers’ market, foods purchased at farmers’ markets, barriers to using farmers’ markets, and likelihood of shopping at farmers’
markets in the future.

**Qualitative Data Analysis**

Researchers used inductive content analysis, a research method used to interpret data to gain a new understanding or greater knowledge of the topic area \(^{(23)}\). Two researchers conducted independent coding. Codes were generated from quotes derived from line-by-line review of the transcriptions. The researchers compared codes and memos as transcriptions were being reviewed. All disagreements in codes were discussed until researchers were in agreement. Categories were developed based on the emergent codes.

After categories were created in the initial coding phase, each category was defined and inclusion and exclusion criteria were developed and entered into a codebook. Using the codebook, a third researcher went back through the transcriptions and re-coded data into defined categories. The initial two researchers developed themes based on the defined categories. The COREQ 32-item checklist was used for reporting qualitative data in this study \(^{(24)}\).

Confidentiality and anonymity of participants was maintained by using identification numbers (ID). In this paper, quotes are identified by ID number only, to maintain the confidentiality of the small number of male participants. Recordings were kept on a locked computer in an office only accessible to study personnel. Study personnel upheld ethical standards by only accessing recordings and transcriptions for study use. This study was approved by the Institutional Review Board at Utah State University.
Results

A total of 14 interviews were conducted in October 2014. Table 1 includes the demographic characteristics of study participants. The majority of participants were female (n=10) with an average age of 37 years old. All participants were white low-income individuals from Northern Utah. Results of the 6-item survey indicate that seventy-one percent of participants (n=10) reported that receiving farmers’ market incentives made them more likely to shop at the local farmers’ market. Fifty percent of participants (n=7) reported that personal illness or family conflict prevented them from shopping at the farmers’ market at some point during the study. All participants reported going to the farmers’ market and purchasing either fruits or vegetables while they were receiving farmers’ market incentives. Other foods commonly purchased with SNAP and incentive benefits included breads, herbs, and honey. Eighty-six percent of participants (n=12) reported they intend to continue shopping at the farmers’ market in the future.

Table 2 includes the interview questions used to answer three research questions related to the use of farmers’ markets, farmers’ market incentives, and barriers overcome by receiving incentives. Themes developed through coding and analyzing data are identified for each research question. Themes are discussed in detail below.
Use of Farmers’ Markets

Several factors influenced the use of farmers’ markets as a shopping destination prior to participating in the farmers’ market incentive program. Lack of knowledge that SNAP benefits could be used at the farmers’ market was a common theme that influenced most of the participants. Numerous participants mentioned they were unaware SNAP benefits could be used at select farmers’ markets. Many of them also indicated they are more likely to shop at farmers’ markets in the future.

Table 4-1 Demographic Characteristics of Interview Participants (n=14)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>71%</td>
</tr>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>18-39 years</td>
<td>71%</td>
</tr>
<tr>
<td>40-59 years</td>
<td>22%</td>
</tr>
<tr>
<td>60 years or older</td>
<td>7%</td>
</tr>
<tr>
<td>Children under the age of 18 in household</td>
<td></td>
</tr>
<tr>
<td>No children</td>
<td>14%</td>
</tr>
<tr>
<td>1-2 children</td>
<td>43%</td>
</tr>
<tr>
<td>3-4 children</td>
<td>43%</td>
</tr>
<tr>
<td>Annual Household Income</td>
<td></td>
</tr>
<tr>
<td>&lt; $10,000</td>
<td>14%</td>
</tr>
<tr>
<td>$10,000 to $19,999</td>
<td>43%</td>
</tr>
<tr>
<td>$20,000 to $29,999</td>
<td>36%</td>
</tr>
<tr>
<td>$30,000 to $39,999</td>
<td>0%</td>
</tr>
<tr>
<td>$40,000 to $49,999</td>
<td>7%</td>
</tr>
<tr>
<td>Employment Status</td>
<td></td>
</tr>
<tr>
<td>Full Time</td>
<td>21%</td>
</tr>
<tr>
<td>Part Time</td>
<td>21%</td>
</tr>
<tr>
<td>Unemployed</td>
<td>15%</td>
</tr>
<tr>
<td>Housewife/Stay At Home Mom</td>
<td>36%</td>
</tr>
<tr>
<td>Other</td>
<td>7%</td>
</tr>
</tbody>
</table>
now that they are aware of SNAP acceptance. This was described in statements such as “First of all I didn’t know that I could [use SNAP benefits at farmers’ markets].” (ID45). Even the few participants who had shopped at the farmers’ market prior to the study also did not realize SNAP benefits could be used as a form of payment. “We have always just gone to the farmer’s market and paid cash. I didn’t even know that we could [use SNAP benefits at the market].” (ID47). A few participants recommended better advertisement of SNAP acceptance at farmers’ markets. For example, one participant suggested the following, “I get mail sometimes about my benefits from the state so if they were to just send a letter like once or twice a year...to say how to use your EBT card at the farmers’ market.” (ID11).

Participants mentioned how shopping at the farmers’ market can be inconvenient. The limited days and hours of operation made it difficult to attend for many participants as a result of conflicting work and family schedules. A few participants reported they were unable to attend the farmers’ market at times as a result of family obligations. One participant mentioned, “There were a couple of times when the kids were sick and so I couldn’t go to the farmers’ market.” (ID50). Sleep schedule as a result of shift work also influenced farmers’ market use for one participant. For example, “We missed some of the [farmers’ markets] because our sleeping schedule doesn’t work the best with it.” (ID53). A few participants recommended keeping the market open later in the day or increasing the frequency of the market during the week. For example, “Maybe if the farmers’ market was open more days or longer hours.” (ID35). A couple people mentioned that the
farmers’ market is not a one-stop-shop shop, making it less convenient to shop at compared to the supermarket, which has everything on the grocery list. For example, “[F&V] are so easily accessible at the grocery store where I also have to get other things that it’s just easier to use SNAP benefits at the grocery store instead of making an extra trip to the farmers’ market just for the few items.” (ID46).

Participants discussed how the incentives motivated them to overcome barriers to shopping at the farmers’ market. A few participants mentioned they overcame their worries of shopping at the farmers’ market and talking with local farmers. For example, “having the incentives made it easier to, more freeing to talk to the vendors and discuss the different varieties of things that they had available.” (ID50). One participant mentioned how the incentives helped her overcome misconceptions about the farmers’ market and fear of doing something new that prevented her from shopping at the market. She reported previously thinking that farmers’ market produce “is all just organic and it’s super expensive and so I thought well I’m not even going to go…..Then I thought well I’m just going to go and check this out and see how it works and got hooked.”(ID35). Another participant mentioned overcoming the barrier of shopping at the farmers’ market with young children as a result of the incentives. Several people declared they would continue to shop at farmers’ markets if an incentive program was available in the long-term. Although there is an assumption that SNAP participants may not utilize farmers’ markets as a result of a perceived stigma associated with using SNAP benefits, none of the individuals in this study mentioned this as a barrier of shopping at this specific farmers’ market.
Table 4-2 Themes Resulting from Research and Interview Questions Related to Farmers’ Market Incentive Use in SNAP Participants

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Interview Questions</th>
<th>Theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What influences the use of farmers’ markets?</td>
<td>What would make it easier for you to use SNAP benefits at the farmers’ market?</td>
<td>Awareness</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Convenience</td>
</tr>
<tr>
<td></td>
<td>Tell me about your experiences using farmers’ market incentives.</td>
<td></td>
</tr>
<tr>
<td>2. What were the benefits of using farmers’ market incentives?</td>
<td>How does your diet now compare to your diet before the study?</td>
<td>F&amp;V Exposure for Children</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Improved F&amp;V Intake</td>
</tr>
<tr>
<td></td>
<td>Tell me about your experiences using farmers’ market incentives.</td>
<td>Local Connections</td>
</tr>
<tr>
<td>3. What barriers to purchasing F&amp;V were overcome as a result of the farmers’ market incentives?</td>
<td>Before you started the study, what were the reasons why you didn’t eat more F&amp;V?</td>
<td>Budgeting</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cost</td>
</tr>
<tr>
<td></td>
<td>Did participation in the study change any of those reasons?</td>
<td>Availability</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Benefits of Farmers’ Market Incentives

One of the greatest benefits of the farmers’ market incentives among participants with children was the ability to expose their children to a variety of F&V. Participants reported the incentives allowed them to “treat” their children with F&V they wouldn’t normally be able to purchase due to a typically limited food budget. Participants with young children consistently indicated how thankful they were to be able to say yes when their children asked for F&V at the market. For example “They loved it. You know, and my son would be like, ‘lets get this!’ and ‘lets get this!’ and half the time I would say yes because we’d have the extra money.”
Participants reported that they were able to splurge on F&Vs for their children because the incentives provided them with greater spending flexibility by providing financial resources that weren’t already allotted to other foods. For example, one participant told us about her daughter requesting peaches, “instead of having to tell her, ‘No we can’t afford it’ or, ‘No we have to buy things that we’re going to have for lunch’ or whatever, I could give her a peach for a treat.” (ID50)

Participants with children also described how much children enjoyed being able to assist with selecting produce at the farmers’ market. Most participants with children were excited to have their children involved in the process of selecting, purchasing, and carrying F&V. One person stated “And they really enjoyed helping to pick out the corn. We’d count the corn that goes in the basket or whatever, and they loved helping to carry things.” (ID50). Another mom said “And so we got to let them pick out different [fruit and vegetables] that they wanted, and we had them use the tokens and pay for it too.” (ID99). Parents felt like including children in the process of shopping and purchasing produce increased their ownership of the selected foods. It also gave children the opportunity to select the F&V they wanted to eat instead of being told what was being purchased by their parents. One mom even felt like it made her children more aware of the food they were consuming. For example, “I think it made them a little more aware of what they’re eating and it wasn’t just what mom wants them to eat. It’s something that they wanted as well.” (ID99). In contrast with the major theme, one participant felt like having her children with her at the farmers’ market made the shopping experience more challenging, however, she was willing to do it because of the incentives.
Another benefit to farmers’ market incentives was the improved F&V intake among participants. Participants reported trying new F&V from what was purchased at the market as a result of having more money to use towards produce. Participants felt like they had greater spending flexibility, which allowed them to purchase new F&V to try without worrying about their food budget. For example, “Yeah the incentives made it even more fun to experiment with different things at the farmers’ market. I could splurge and experiment on a particular fruit or vegetable.” (ID50). Other participants mentioned trying new F&Vs such as celeriac, Hawaiian apples, lemon cucumbers, yellow watermelon, sand cherries, and yellow doll melon for the first time as a result of having the incentives available.

Most participants reported replacing calorie dense foods with F&V while they were receiving farmers’ market incentives. For example, “Instead of pasta I was eating spaghetti squash with marinara sauce on top.” (ID46). Another participant said “We eat a little less meat at dinner and have 3 different kinds of vegetables.” (ID39). A couple of participants mentioned they are adding more F&V into their diets without replacing other foods. One participant mentioned she sneaks vegetables into her families diet. “I have been sneaking stuff in. Like my six year old, I’ll put kale or stuff in to our smoothies in the morning.” (ID42).

Lastly, participants emphasized the value of building connections with farmers, their community, and purchasing locally grown foods. Participants appreciated the high quality of local produce compared to produce sold at grocery stores. Many participants discussed the difference in taste, aroma, and appearance of locally grown produce. One participant said “But [F&V] quality at the grocery
store is significantly less than what you can get at the farmer’s market...So when you get them at the store they’re nowhere near as good.” (ID53). Participants appreciated being able to support local farmers and enjoyed developing relationships with farmers. Another participant said, “You know I enjoy getting the produce [at the farmers’ market] because I always feel like it’s more fresh than the grocery stores. Plus I like supporting the community.” (ID52). Community involvement and support was important for many participants. A few participants indicated they valued being able to disperse their incentives to various farmers to ‘share the wealth’. One participant said “But we would disperse [incentives] throughout different farmers, so it wasn’t just one farmer.” (ID99). A minor theme was participant involvement with farmers outside of purchasing produce at the market. Two participants got involved in the community by volunteering for farmers after getting to know them during their experiences at the farmers’ market.

**Barriers Overcome By Receiving Incentives**

It was difficult for participants who received matching incentives, a dollar-for-dollar match of incentives and SNAP benefits, to budget SNAP benefits to allow them to be matched each week at the farmers’ market. Participants talked about how SNAP benefits don’t usually last the entire month, making it challenging to leave SNAP benefits on the Electronic Benefit Transfer (EBT), the electronic form of SNAP payment, to match for incentives that are provided later in the month. Most participants found ways to budget their SNAP benefits to get their maximum incentive allotment each week. One woman said “It was kind of a juggling for me to
try and make [SNAP benefits] last to that third and fourth week, to make sure I had $30 on [my EBT].” (ID12). Another woman said “I had an experience where had to wait a week with 20 dollars [on my EBT] just waiting for that Saturday so that I could [match SNAP benefits to get incentives]. (ID39). Another woman talked about pretending that she was out of benefits so make sure she had SNAP benefits to match for incentives.

Cost was the most commonly cited barrier to F&V consumption among participants of this study prior to receiving farmers’ market incentives. However, most participants reported the incentives helped them overcome the barrier of cost and allowed them greater spending flexibility. For example, “I was able to get more vegetables than I normally would.” (ID39). Some participants discussed how the incentives decreased worry over the cost of food in general. For example, “[The incentives] was just a really great blessing for us. To have that and not feel like we were on such as tight budget every little second of picking and choosing all the time.” (ID12) Another participant alluded that the incentives prevented her family from being hungry during the study period. She mentioned “we are struggling right now and that was definitely a help every week. That was sometimes what got us through our meals for the week.” (ID42).

Participants also indicated that availability was a barrier to F&V intake prior to the study. Most participants reported the incentives made F&V more available to consume on a regular basis. Participants consistently reported they had more F&V in the home and therefore noticed they consumed more for meals and snacks. For example, “Because I had more fruits and vegetables on hand, then we ate more of
them.” (ID50). Another participant said, “I’m trying to keep [fruits and vegetables] more available at home, and things to eat it with.” (ID99). Several participants talked about preserving F&V to make them more available to consume later in the year after the farmers’ market season ended. For example, “I bought extra veggies, cut them up and froze them.” (ID39). Another participant said, “I was able to use a few fruits and vegetables to can, and that was kind of nice because then I could store up my supply for winter.” (ID99). Many participants talked about buying F&V in bulk at the farmers’ market to preserve through freezing and canning. A few participants reported freezing F&V to use in smoothies.

Discussion

Farmers’ market incentives are an intervention strategy used to increase F&V consumption among low-income families by helping individuals overcome barriers associated with shopping at farmers’ markets. Prior to this study, minimal qualitative data had been collected regarding the experiences individuals have when they shop at farmers’ markets and use farmers’ market incentives. Awareness and lack of convenience were the most commonly discussed reasons for not using farmers’ markets before receiving farmers’ market incentives. Participants were not aware SNAP benefits could be redeemed at farmers market, which is consistent with previous studies (25,26). This noteworthy barrier is likely associated with the limited use of farmers’ markets among low-income shoppers with SNAP benefits. Going forward, farmers’ markets should ensure advertising and marketing efforts of SNAP
acceptance are distributed in areas where low-income individuals congregate to increase awareness and improve SNAP sales at farmers’ markets. Further research should be done to determine the best ways to reach this target population through marketing and advertising efforts. SNAP programs should consider sending out information prior to the farmers’ market season about the names and locations of farmers’ markets that accept SNAP benefits in the area. This should also be considered for farmers’ markets with incentive programs to increase program awareness in the community. Limited hours and days of operation were key barriers to using farmers’ market among most participants. Previous studies have also identified these as common barriers among SNAP participants in urban and rural areas (25,26). Furthermore, farmers’ markets are not a one-stop-shop, which influences the use of farmers’ markets as a shopping destination even when incentives are provided (26). Providing farmers’ markets in the parking lots of grocery stores has been proposed as a way to make shopping at farmers’ markets more convenient for low-income individuals (26,27).

The ability to ‘treat’ children to requested F&V’s and to allow them to be a part of the selecting and purchasing process was of high value for participating parents and exciting for the children. This is conflicting with studies investigating shopping behaviors among parents and children at grocery stores. An observational study found that when parents bring children grocery shopping at grocery stores, children only ask for F&V 23% of the time, with other requests primarily for sweets and snacks (28). A qualitative study also found that children influence purchasing patterns of parents typically by increasing sweet and other snack food purchases
Furthermore, parents report shopping with children at the grocery store is stressful because they end up purchasing unplanned items, which increases their grocery bill. Shopping with children at farmers’ market may be an avenue to increase interest in nutrient dense foods such as F&V among children. Farmers’ market incentives may be an effective strategy for getting parents extra food dollars to allow for purchases of F&V as requested by children.

Because farmers’ market incentive programs are costly to implement, behavior change among program participants is vital to continued program implementation. Participants in this study reported that receiving farmers’ market incentives increased their F&V intake and the variety of F&V purchased. This is consistent with previous quantitative studies that have reported significant increases in consumption and diversity of F&V's purchased after receiving farmers’ market incentives. However, the self reported dietary data is a limitation of previous studies and may result in an overestimation of F&V consumption. Farmers’ market incentive programs may be an effective way to increase the amount and types of F&V's consumed among federal nutrition assistance users. Furthermore, several participants reported replacing calorie dense foods with F&V during meals and snacks. Long-term access to low cost produce through farmers’ market incentive programs may reduce the consumption of calorie dense foods therefore reducing the risk of obesity and chronic disease among this population.

Participants appreciated and valued local connections. Furthermore, participants enjoyed being able to support local farmers’ by purchasing locally grown foods at the market. These results are consistent with a previous study which
found low-income shoppers receiving farmers’ market incentives highly valued the ability to purchase locally grown foods from farmers in their community \(^{(20)}\) . Future studies should be conducted to determine if relationships with farmers influence the long-term use of farmers’ markets among low-income shoppers.

Lastly, there are numerous barriers to purchasing F&V that can be limited as a result of receiving farmers’ market incentives. Participants most commonly reported budgeting SNAP benefits, cost, and availability as the main barriers that were overcome during this study. A similar study found that low-income individuals felt like mobile markets, a farm stand that can be moved to various locations, reduced barriers such as access to F&V \(^{(30)}\). However, this type of intervention does not address the barrier of cost that is so influential for most low-income shoppers \(^{(30)}\). Many participants in the current study reported canning and freezing F&V as an avenue to improve food availability later in the year. A qualitative study of low-income gardeners also found that participants utilized food preservation techniques to help overcome the barrier of F&V availability \(^{(31)}\). Farmers’ market incentives may be an effective intervention strategy for limiting common barriers to consuming seasonal F&V among low-income individuals. Future studies should further investigate the relationship between overcoming barriers and improved F&V intake among farmers’ market incentive participants.

Understanding the experiences and changes in behavior among farmers’ market incentive participants will allow for improved program implementation and continued funding opportunities in the future. Although study participants received SNAP benefits and farmers’ market incentives, the type and amount of incentive
provided to each individual varied based on household size. This may have influenced their experience with the farmers’ market incentive program. Most farmers’ market incentive programs do not base benefit amount on family size, which limits the generalizability of study results. Furthermore, this convenience sample of participants does not represent the entire population of farmers’ market incentive participants. It is possible that participants who agreed to be interviewed had different experiences and perspectives than other participants. Since this qualitative data represents only a small sample size from a limited geographic area with minimal demographic diversity, results are not generalizable to the entire population.

**Conclusion**

The findings of this study have potential implications for increasing farmers’ market use among SNAP participants in the U.S. Furthermore, this study demonstrates the experiences of farmers’ market incentive participants, which can be used to support the continued development and funding of farmers’ market incentive programs across the country. The results of this study are aligned with previous literature that suggests farmers’ market incentive programs are effective at increasing F&V consumption among participants. Future studies should consider investigating the long-term implications of farmers’ market incentives among low-income populations.
References


CHAPTER 5

REDUCING FOOD INSECURITY AND IMPROVING FRUIT AND VEGETABLE INTAKE AMONG FARMERS’ MARKET INCENTIVE PROGRAM PARTICIPANTS

Abstract

Objective: To determine if participation in a farmers’ market incentive pilot program had an impact on food security and fruit and vegetable (F&V) intake of participants.

Methods: SNAP participants were eligible to receive a dollar per dollar match up to $10 per week in farmers’ market incentives. A pretest posttest design was used to measure F&V intake and food security status of 54 adult participants before and after receiving farmers’ market incentives. The six-item BRFSS questionnaire and U.S. Household Food Security Survey Module were used to measure F&V intake and food security, respectively. Wilcoxon Signed Rank Test was used to compare scores of F&V intake.

Results: After receiving incentives, fewer individuals reported experiencing food insecurity related behaviors. A significantly (P<0.05) increased intake was found among selected vegetables.

Conclusion and Implications: This study demonstrated that participation in a farmers’ market incentive program was positively related to greater food security and intake of select vegetables among SNAP participants.

1. Coauthered by Mateja R. Savoie-Roskos, Carrie Durward, Melanie Jewkes, Heidi LeBlanc (See Appendix G)
2. Published in the Journal of Nutrition Education and Behavior, 2016; 48(1): 70-76
INTRODUCTION

Food security refers to the ability to have sufficient food available at all times, resources available to purchase nutritious foods, and appropriate use of food based on nutrition knowledge. Roughly 14.3% of American households experienced food insecurity at some time in 2013. Food insecurity is most prevalent among households that are at or below the federal poverty line. Households in rural communities and those with children are also more likely to experience food insecurity. The diet of food insecure individuals tends to be less nutritious and balanced as compared to their food secure counterparts. More specifically, food insecure individuals are more likely to have diets that do not meet the dietary guideline recommendations for fruit and vegetables (F&V).

Shopping at farmers’ markets is associated with improved food security and greater F&V consumption especially among low-income individuals. This development corresponds with the current focus on incentivizing SNAP participants to improve dietary intake and raise health outcomes among these individuals. Major federal nutrition assistance programs such as the Supplemental Nutrition Assistance Program (SNAP) and the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) are now allowing benefits to be used at farmers’ markets as a way to improve food security and increase F&V consumption among low-income participants. Federal nutrition assistance users are encouraged to use nutrition assistance benefits at farmers’ markets through newly established farmers’ market incentive programs. The WIC Farmers’ Market
Nutrition Program (FMNP) and the Senior Farmers’ Market Nutrition Program (SFMNP) provide up to $30 and $50 respectfully, as annual F&V incentives for eligible participants.\textsuperscript{15} Matching programs have become a common strategy for incentivizing SNAP participants to use their benefits at farmers’ markets by providing a dollar for dollar match on each dollar spent with federal benefits.\textsuperscript{16-19} Few studies have been published demonstrating the effect of farmers’ market incentive programs, more specifically matching programs, on food security and F&V intake among program participants. Furthermore, few studies have used validated measurement tools to investigate behavior change before and after program participation. Thus, the goal of the current pilot study was to determine whether the Double-Up Food Bucks farmers’ market incentive program improved food security and F&V intake among SNAP participants in Utah.

METHODS

Study Design

A pretest posttest study design was chosen for this pilot study. This design allowed researchers to measure the change in food security status and F&V consumption of participants from baseline to four weeks after initial participation in the Double-Up Food Bucks program at a farmers’ market in Utah. The protocol for this study was considered exempt and was approved by the Institutional Review Board at Utah State University. Participants’ consent was obtained prior to data collection after review of the informed consent document.
To be eligible to participate in the study, individuals must be 18 years of age or older, receiving SNAP benefits, and participating in the Double-Up Food Bucks program at the Salt Lake City Downtown Farmers’ Market. The Double-Up Food Bucks program is a grant-funded program that provides matching benefits to SNAP participants who spend their SNAP benefits at selected farmers’ markets in Utah. For every dollar spent using SNAP benefits, participants receive an additional dollar in Double-Up Food Bucks up to a maximum of $10 Double-Up Food Bucks per farmers’ market visit. Double-Up Food Bucks can only be used for F&V purchases.

A convenience sample of 96 adult farmers’ market patrons were recruited to participate in the survey at the farmers’ market when they came to participate in the Double-Up Food Bucks program. Participants who were interested in completing the survey were provided with the letter of information and a 2-page, 28-item paper survey, which took approximately 5-10 minutes to complete. A researcher was available to answer questions about the study and the Double-Up Food Bucks program. As an incentive, after participants completed the survey, they were provided with $2 worth of tokens to use for F&V at the market. Participants were asked if they were willing to participate in a four-week follow up survey. First name and phone number were collected from 74 interested participants. Researchers contacted participants via telephone four weeks after completion of the initial survey. Researchers contacted participants up to three times to have them complete the four-week follow-up survey. Fifty-four participants completed the follow-up survey and were mailed a voucher worth $3 to use at the farmers’ market as an additional incentive.
Confidentiality was maintained by using ID numbers on data collection instruments in place of names and other identifying information. Individuals who were interested in completing the follow-up survey filled out a form separate from the initial survey with their first name, phone number, and study ID number. The contact information of follow-up participants was compiled and stored in a computer file available only to study personnel who placed follow up phone calls.

**Data and Instrumentation**

The 28-item initial survey used in this study included 16 questions about demographics, F&V consumption, food security, food assistance use, and shopping habits. These survey items were developed by nutrition faculty at Utah State University. F&V consumption was measured using the six-item validated F&V module of the Behavior Risk Factor Surveillance System (BRFSS). Responses were modified based on the National Cancer Institute F&V Screener so it could be self-administered. Responses for the six F&V BRFSS questions included: never, 1-3 times/month, 1-2 times/week, 3-4 times/week, 5-6 times/week, 1 time/day, 2 times/day, and 3 times/day or more. The six-item short form of the Food Security Module, validated by the United States Department of Agriculture (USDA) was used to measure food security. The 16-item follow-up survey included two questions about self-reported changes in F&V intake and variety and two question about farmers’ market shopping habits, the follow-up survey also included the 6-item F&V BRFSS module and the six-item Food Security Module as discussed above. Each
To assess the content validity of the survey, several faculty and staff were asked to independently review the survey prior to survey administration. Changes were made to the survey to further align the questions with the data being measured.

Data Analysis

Data were double entered for accuracy. Frequencies and descriptive statistics including mean, standard deviation, medians, and interquartile range (IQR) were analyzed. If more than one question from the food security module or the F&V module were skipped, surveys were excluded from the final analysis. Two participants who completed both the initial and follow-up survey were excluded from the study as a result of not completing any of the questions within the food security module and F&V module. Small amounts of data were missing randomly from other surveys, however, missing data did not exceed the threshold previously mentioned. There was no missing demographic data. Baseline differences between participants who only completed the initial survey to those participants who completed both the initial and four-week follow-up survey were analyzed using independent sample t-tests. Scales were developed for the food security and F&V questionnaires following instructions provided by the USDA and BRFSS, respectively. Participants were categorized as food secure or food insecure based on the developed scales. Wilcoxon Signed Rank Test was used to compare
each question in the F&V module, the total F&V consumption for each participant, and the food security score for each participant. All data analyses were conducted using SPSS 21.0 (SPSS version 21.0, SPSS Inc., Chicago, IL, 2012).

RESULTS

Fifty-four participants completed the initial and follow-up surveys. There was no significant difference between the demographic characteristics of the participants who only completed the initial survey compared to those who completed both the initial and four-week follow up survey. Follow-up participants were significantly ($P<.05$) more likely than participants who only completed the initial survey to have shopped at the farmers’ market prior to the Double-Up Food Bucks program.

The majority of participants who completed the initial and follow-up surveys were white, non-Hispanic females (Table 1). Age of participants ranged from 23 to 83 years old with the average age of 38 years. The average household had 1.6 children under the age of 18. Seventy-four percent of participants reported shopping at the farmers’ market prior to the Double-Up Food Bucks program. Additionally, 63% of participants reported they had not had enough money for food at some point in the previous 12 months.

The percentages of the responses for the food insecurity questions for the initial and follow-up surveys were compared. After participating in Double-Up Food
Table 5-1. Demographic Characteristics of Double-Up Food Bucks Participants in Utah (n=54)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>74%</td>
</tr>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>18-39 years</td>
<td>67%</td>
</tr>
<tr>
<td>40-59 years</td>
<td>28%</td>
</tr>
<tr>
<td>60 years or older</td>
<td>5%</td>
</tr>
<tr>
<td>Race/Ethnicity</td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>2%</td>
</tr>
<tr>
<td>Black/African American</td>
<td>7%</td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>9%</td>
</tr>
<tr>
<td>White</td>
<td>71%</td>
</tr>
<tr>
<td>Some Other Race or Multiple Races</td>
<td>11%</td>
</tr>
<tr>
<td>Children under the age of 18 in household</td>
<td></td>
</tr>
<tr>
<td>No children</td>
<td>32%</td>
</tr>
<tr>
<td>1-2 children</td>
<td>45%</td>
</tr>
<tr>
<td>3-4 children</td>
<td>22%</td>
</tr>
<tr>
<td>5 children</td>
<td>1%</td>
</tr>
<tr>
<td>Receive Other Nutrition Assistance*</td>
<td></td>
</tr>
<tr>
<td>Assistance from family or friends</td>
<td>22%</td>
</tr>
<tr>
<td>Food Bank</td>
<td>26%</td>
</tr>
<tr>
<td>Soup Kitchen or Community Meals Center</td>
<td>2%</td>
</tr>
<tr>
<td>WIC</td>
<td>20%</td>
</tr>
<tr>
<td>Employment Status</td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>45%</td>
</tr>
<tr>
<td>Not Employed</td>
<td>55%</td>
</tr>
</tbody>
</table>

*Participants were able to select all the nutrition assistance programs they receive therefore % of total does not equal 100%.
WIC indicates the Special Supplemental Nutrition Program for Women, Infants, and Children

Bucks, fewer individuals reported experiencing food insecurity related behaviors (Table 2). Participants reported a decrease in the frequency of skipping meals,
eating less food, feeling hungry, and not having enough money to buy enough food and eat balanced meals. The median of the food security score decreased significantly from 3.0 to 2.0 ($P=.002$).

The mean, standard deviation, and $P$-value for each of the six F&V questions and the F&V score were compared (Table 3). The individual question score for other vegetables (tomatoes, corn, eggplant, peas, lettuce, cabbage, and white potatoes) significantly increased ($P=.001$). The scores of the other individual questions regarding the intake of fruit juice, fruit, canned beans, dark colored vegetables, and orange colored vegetables did not change significantly; neither did the total F&V score ($P=0.10$). However, 86% of participants reported an increase in F&V consumption and 84% reported an increase in the variety of F&V consumed after receiving farmers’ market incentives. Ninety-eight percent of participants reported purchasing fruit and 100% of participants reported purchasing vegetables at the farmers market over the study period.

**DISCUSSION**

Evidence-based programming is an essential component to developing successful nutrition-related interventions. Implementing farmers’ market incentive programs is an innovative strategy to improve food security status and F&V intake.
### Table 5-2. Percentages of Participants who Reported Food Insecurity Before and After Program Participation

<table>
<thead>
<tr>
<th>Food Insecurity Questions*</th>
<th>Survey</th>
<th>Answers</th>
<th>Initial (n=53)</th>
<th>Follow Up (n=54)</th>
<th>Initial (n=52)</th>
<th>Follow Up (n=54)</th>
<th>Initial (n=53)</th>
<th>Follow Up (n=54)</th>
<th>Initial (n=52)</th>
<th>Follow Up (n=54)</th>
<th>Initial (n=53)</th>
<th>Follow Up (n=54)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The food we bought didn’t last and we didn’t have money to get more</td>
<td>Initial (n=53)</td>
<td>Often True</td>
<td>9.4%</td>
<td>17.9%</td>
<td>7.7%</td>
<td>&lt;1%</td>
<td>50.9%</td>
<td>33.9%</td>
<td>50.9%</td>
<td>70.4%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Follow Up (n=54)</td>
<td>Sometimes True</td>
<td>64.2%</td>
<td>33.9%</td>
<td>19.2%</td>
<td>16.1%</td>
<td>45.3%</td>
<td>66.1%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Never True</td>
<td>22.6%</td>
<td>46.4%</td>
<td>19.2%</td>
<td>12.5%</td>
<td>3.8%</td>
<td>0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Don’t Know</td>
<td>3.8%</td>
<td>0%</td>
<td>3.8%</td>
<td>0%</td>
<td>50%</td>
<td>70.4%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We couldn’t afford to eat balanced meals</td>
<td>Initial (n=53)</td>
<td>Yes, Almost Every Day</td>
<td>22.6%</td>
<td>19.6%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Follow Up (n=54)</td>
<td>Sometimes True</td>
<td>47.2%</td>
<td>33.9%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Never True</td>
<td>26.4%</td>
<td>46.4%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Don’t Know</td>
<td>3.8%</td>
<td>0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We cut the size of meals or skipped meals because there wasn’t enough money for food</td>
<td>Initial (n=52)</td>
<td>Yes, Only One or Two Days</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Follow Up (n=54)</td>
<td>Yes Some Days But Not Every Day</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We ate less than I felt we should because there wasn’t enough money for food</td>
<td>Initial (n=53)</td>
<td>Yes</td>
<td>37.7%</td>
<td>32.1%</td>
<td>50.9%</td>
<td>33.9%</td>
<td>50.9%</td>
<td>33.9%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Follow Up (n=54)</td>
<td>No</td>
<td>60.4%</td>
<td>67.9%</td>
<td>45.3%</td>
<td>66.1%</td>
<td>0%</td>
<td>0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Don’t Know</td>
<td>0%</td>
<td>0%</td>
<td>3.8%</td>
<td>0%</td>
<td>3.8%</td>
<td>0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We were hungry but didn’t eat because there wasn’t enough money for food</td>
<td>Initial (n=53)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Follow Up (n=54)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Food insecurity answers were based on whether or not the statement was often true, sometimes true, or never true in the last month.
Table 5-3. Change in Fruit and Vegetable Intake of Double-Up Bucks Participants After Program Participation

<table>
<thead>
<tr>
<th>Frequency of F&amp;V Intake</th>
<th>Pretest</th>
<th>Posttest</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean ± SD</td>
<td>Median (IQR)</td>
<td>Mean ± SD</td>
</tr>
<tr>
<td><strong>Questions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consumption of 100% pure fruit juice (n=48)</td>
<td>0.26 ± 0.32</td>
<td>0.07 (0.07, 0.50)</td>
<td>0.24 ± 0.37</td>
</tr>
<tr>
<td>Consumption of fresh, frozen, and canned fruit (n=49)</td>
<td>0.71 ± 0.71</td>
<td>0.50 (0.21, 1.0)</td>
<td>0.81 ± 0.67</td>
</tr>
<tr>
<td>Consumption of cooked or canned beans (n=48)</td>
<td>0.35 ± 0.53</td>
<td>0.21 (0.07, 0.29)</td>
<td>0.28 ± 0.49</td>
</tr>
<tr>
<td>Consumption of dark green vegetables (n=49)</td>
<td>0.46 ± 0.49</td>
<td>0.21 (0.21, 0.79)</td>
<td>0.52 ± 0.58</td>
</tr>
<tr>
<td>Consumption of orange-colored vegetables (n=49)</td>
<td>0.27 ± 0.46</td>
<td>0.21 (0.07, 0.21)</td>
<td>0.27 ± 0.26</td>
</tr>
<tr>
<td>Consumption of other vegetables (n=49)</td>
<td>0.52 ± 0.53</td>
<td>0.50 (0.21, 0.79)</td>
<td>0.77 ± 0.61</td>
</tr>
<tr>
<td><strong>Total F&amp;V Consumption (n=47)</strong></td>
<td>3.3 ± 0.8</td>
<td>2.34 (1.41, 3.25)</td>
<td>4.0 ± 0.8</td>
</tr>
</tbody>
</table>

*P < 0.05 is considered significant

Values are median and Interquartile Range (IQR) from a Likert scale (never = 0.0, 1-3 times/month = 0.067, 1-2 times/week = 0.214, 3-4 times/week = 0.5, 5-6 times/week = 0.786, 1 time/day = 1.0, 2 times/day = 2.0, 3 times/day or more = 3.0).

Comparisons performed using Wilcoxon signed-rank test
among low-income individuals. Results of this pilot study suggest an increase in food security status of select SNAP participants after receiving farmers’ market incentives over a 4-week period. Review of the literature indicates that few studies have investigated the impact of farmers’ market incentives on food security status of program participants. Significant differences were not found regarding food security status among WIC Farmers Market Nutrition Program (FMNP) participants as compared to WIC participants when utilizing the 18-item U.S. Food Security Module. However, it is possible that the small allotment of $18 per year was not adequate to improve food security status among participants. The Double-Up Food Bucks participants received a higher benefit of up to $10 matched per farmers’ market visit. It is likely that matching programs result in greater food security and F&V intakes due to the larger financial allotment provided weekly. Incentives of at least $20 a week have been reported as the minimum amount required to support nutrition-related behavior changes in low-income populations.

Results also suggest that the intake of certain vegetables increased among study participants, however, results are not generalizable to the entire population receiving Double-Up Food Bucks due to the small convenience sample. Previous studies with larger sample sizes indicate that F&V intake significantly increases among farmers’ market incentive participants after program participation. Self reported F&V intake increased significantly (P=0.006) among participants of the Philly Food Bucks incentive program as compared to nonparticipants. Researchers of the USDA’s Healthy Incentives Pilot (HIP) found a 0.24 cup equivalent increase in F&V intake among participants receiving farmers’ market incentives as compared to
the control group. A similar study found a significant increase (P<.001) in F&V intake of 1.4 servings per 1,000 calories among individuals who received WIC FMNP as compared to the control group. Furthermore, participants who receive farmers’ market incentives eat more vegetables as snacks as compared to individuals who do not receive the same incentives. Findings of the current study align with previous research which suggests a positive correlation between F&V consumption and participating in the Double-Up Food Bucks program.

This pilot study is one of few studies to investigate nutrition-related behavior change among participants of a matching farmers’ market incentives program. As a result, this study is at the forefront of research supporting farmers’ market incentive programs for low-income individuals. Results of this pilot study indicate that further research should be conducted regarding farmers’ market incentives as an intervention strategy for improving food security and F&V consumption among low-income SNAP participants.

Despite the strengths of this study, there are limitations. This pilot study used a small sample size of participants to determine changes in nutrition-related behaviors. Therefore, this study was not powered to determine an effect size between the initial and four-week follow-up surveys for food security and F&V consumption. Furthermore, as a result of the small convenience sample used in this study, it is possible that results are not generalizable to the entire population of Double-Up Food Bucks participants. It is likely that demographics, shopping habits, food security status, and F&V consumption varies among study participants and all Double-Up Food Bucks participants. This was demonstrated by the difference in
farmers’ market use among study participants who completed the initial survey compared to those who completed both the initial and follow-up survey. Based on existing literature, it is likely that more generalizable and conclusive results would have been found with a larger sample of participants over a longer study period.

The initial and four-week follow-up surveys used in this study relied on self-reported data for food security and F&V consumption. Self-reported instruments are subject to bias, which may cause an overestimation of study results.\textsuperscript{31} Causal inference of the results is limited since the researchers did not use a control group. Therefore, it is possible that other factors besides participating in the Double-Up Food Bucks program influenced changes in food security and vegetable intake. Improvements in food security and vegetable intake reported by participants may have been a result of the participants’ awareness of being studied via the Hawthorne effect.\textsuperscript{32} It’s possible that participants who completed the follow-up study did not accurately represent the entire population since they were found to be more likely to have previously shopped at the farmers’ market as compared to participants who only completed the initial survey. BRFSS and the National Cancer Institute previously validated the F&V module and the food security module used in this study, however, combining the instruments may have compromised the validity of the survey used in this study. Lastly, the survey used in this study was not assessed for face validity among the target audience therefore, it is possible the survey was not accurate in measuring what was intended.
The results of this study suggest potential benefits to implementing farmers’ market incentive programs. The validated measurement tools used in this study could be used in future studies to determine changes in food security and F&V intake among program participants. Future studies should be conducted with larger sample sizes based on power analyses. Long-term implications of farmers’ market incentive programs should be investigated. Objective data such as participant weight, height, waist circumference, and carotenoid levels should be collected in future studies before, during, and after receiving farmers’ market incentives. Participants could be followed over a longer period of time to determine changes in long-term nutrition-related behaviors. Increased intakes of F&V were sustained among participating seniors six months after a study on the Senior Farmers’ Market Nutrition Program had concluded. Review of the literature indicates that no study to date has determined the long-term implications of farmers’ market incentives on food security status. Qualitative data from interviews or focus groups would be beneficial to determine the values, beliefs, and experiences of participants in regards to program participation. Furthermore, incorporating a theoretical model into the development of survey tools would strengthen future study results. Integrating nutrition education with farmers’ market incentives may optimize program impacts. Nutrition education paired with a farmers’ market incentives was found to be an effective way to improve F&V consumption among low-income individuals with diabetes. Over half of the participants of the Healthy Options
program which provided cooking classes, nutrition counseling, and farmers’
market vouchers reported an increase in F&V consumption after program
participation. Results of the current and previously mentioned studies indicate
the value of continued research on the effectiveness of changing nutrition-related
behaviors among low-income individuals participating in farmers’ market incentive
programs.
REFERENCES


CHAPTER 6
SUMMARY AND CONCLUSION

Summary

Low-income individuals are at increased risk for chronic disease as compared to their higher income counterparts. Numerous barriers play a role in this health disparity. Cost, access, and availability are among the most commonly discussed barriers that influence the consumption of nutrient dense foods in low-income Americans. However, many other barriers such as self-efficacy, time, transportation, and knowledge are also known to affect the dietary intake among this population. Low-income Americans are also more likely to experience food insecurity, which can influence the quantity and quality of food that is purchased and consumed. Federal nutrition assistance programs have been established to improve dietary intake and reduce hunger among individuals living below the federal poverty guidelines. Even with the help from these programs, many low-income individuals are still unsure where their next meal will come from. More so, getting enough food to eat is often more of a concern for these individuals than the types of food they are consuming. As a result, diet quality of low-income individuals tends to be poor and often remains that way for long periods of time.

Farmers’ market incentive programs are a newly popular intervention developed in effort to improve the health of low-income Americans, especially those receiving federal nutrition assistance. Although some of these incentive programs
have been available for nearly 10 years, minimal data has been collected regarding behavior change of program participants and the feasibility of program implementation. The objective of this research was to develop, implement, and evaluate farmers’ market incentive programs aimed at increasing fruit and vegetable (F&V) consumption and improving food security status of low-income individuals in Utah. Quantitative and qualitative evaluation techniques were used in this study to determine behavior change and program effectiveness.

Healthy Eating for Life (HEaL) Study

The Healthy Eating for Life (HEaL) Study was an 8-week pilot study investigating the feasibility of implementing and evaluating a farmers’ market incentive program. Furthermore, this study was conducted to determine changes in F&V intake and food security status of program participants. Participants were randomized into the control, education only, education and matching incentives, education and non-matching incentives, and non-matching incentives only groups in two different cohorts. Quantitative data was collected at baseline, midpoint, and endpoint. Semi-structured interviews and a six-month follow up data collection session were conducted after completion of the study.

This pilot study suggests there would be greater participation in farmers’ market incentive programs and an increase in the amount of incentives utilized if participants were provided with farmers’ market incentives that did not require a dollar for dollar match of federal nutrition assistance benefits. However, this would likely decrease the amount of SNAP (EBT) benefits that would be spent at
participating markets. Carotenoid levels increased among most of the intervention groups from baseline to endpoint. Although self-reported intake of F&V did not increase from baseline to follow up, there was a positive correlation between carotenoid levels and self-reported F&V intake at most data collection periods.

Interview participants expressed they were not aware SNAP benefits could be redeemed at farmers’ markets. However, most participants reported they plan to use the farmers’ market now they know the local market accepts SNAP benefits. Participants reported that receiving incentives would make them more likely to purchase F&V at the farmers’ market in the future. One of the main benefits of receiving incentives among participants was their ability to treat their children to the F&V they requested at the market instead of having to say no due to food budget limitations. Furthermore, participants reported they increased their F&V intake and the variety of F&V purchased during the study period. Future studies should investigate the long-term implications of receiving farmers’ market incentives using a completely randomized design, larger sample sizes that are powered to detect significant changes in nutrition-related behaviors. Since participants emphasized the fact that children were exposed to F&V at the market and were able to purchase preferred F&V, future studies should investigate the change in F&V intake among children from households receiving farmers’ market incentives.

**Food Security and F&V Intake Among Double Up Food Bucks Participants**
Double Up Food Bucks (DUFB) was implemented at a farmers’ market in Salt Lake City, UT in 2014. Participants of the Supplemental Nutrition Assistance Program (SNAP) were eligible to receive a dollar-for-dollar match of farmers’ market incentives for each dollar they spent in SNAP benefits at the market. Fifty-four participants completed the initial and four week follow up survey. Results of this study indicate that F&V intake did not change significantly for total F&V score (P=.10) or the individual F&V categories except for the ‘other vegetables’ category (peas, eggplant, corn, tomatoes, lettuce, potatoes, and cabbage) (P=.001). The USDA household food security score, was found to significantly change (P<.05) from baseline to follow up. Furthermore, participants reported a reduced frequency of skipping meals, feeling hungry, eating less food, and not having enough money to purchase healthy foods at follow up as compared to baseline.

This study is the first to compare F&V intake and food security status of low-income individuals before and after participating in a matched farmers’ market incentive program. Results from the research included in this dissertation and published in the Journal of Nutrition Education and Behavior add to the limited literature regarding the effectiveness of farmers’ market incentive programs while highlighting the need for additional research in this area. Programming and evaluation efforts conducted in this study were used for successfully developing a Food Insecurity Nutrition Incentive (FINI) grant by Utahns Against Hunger and Utah State University faculty.

This study is the first study to use validated modules to measure F&V intake and food security status of farmers’ market incentive program participants. The
brief survey used in this study could serve as a primary survey tool for other farmers’ market incentive programs around the country. Use of this survey would allow other programs to determine behavior change among program participants after receiving incentives for an extended period of time. Future studies should be conducted using larger sample sizes that are based on a power analysis. Furthermore, long-term implications of farmers’ market incentive programs should be evaluated to determine if changes in behaviors are sustained over time.

Conclusions

As was demonstrated in the studies discussed in this dissertation, farmers’ market incentives may positively affect food security status and F&V intake among low-income participants. In addition, farmers’ market incentive may reduce common barriers associated with purchasing F&V and shopping at farmers’ markets. Implementing incentive programs at farmers’ markets may be an effective way to improve the nutritional status of low-income Americans. However, further research and program evaluation efforts must be conducted to determine the most effective way to implement these programs to ensure incentives and federal nutrition assistance benefits are utilized. Future studies should be conducted using objective measurements and validated measurement tools to determine changes in nutrition-related behaviors as demonstrated in this dissertation.
Appendix A. HEaL Recruitment Script
First we will explain a little bit about the study, and then we will go over a few questions to see if you are eligible.

The purpose of this study is to look at several ways to help people eat better, and see which one works best. Participants will be assigned to different groups randomly. Each group will be asked to do different things, such as attend weekly hour-long education sessions, or read handouts that will be sent to them in the mail.

Participants will be asked to attend three data collection sessions, which will take place at the USTAR building on USU’s campus. At the data collection session, we will ask you to fill out a series of questionnaires about your diet and life in general. We will also ask to take your height, weight, and waist circumference, and scan your hand to see how much carotenoid, or orange colored molecules found in fruits and vegetables, is in your skin. The scan is painless and fast. An LED light is shined on a small part of your palm for less than 90 seconds. In the week after the data collection session, we will ask you to complete two more questionnaires about your diet. Total the data collection session should take about 1 hour of your time. You will be compensated $10 for each data collection session, and if you complete all three data collection sessions, you will receive a $10 bonus at the end of the study.

Please click on the arrows in the bottom right corner to continue learning about the study.

Depending on what group you are assigned to, you will be asked to do different things, and will be compensated for your time differently.
Group 1 will be asked to read handouts to learn about healthy eating. These handouts will be sent to them in the mail, and should take about 30 minutes each to read at most. This group will be compensated $20 at the end of the study if they complete all three data collection sessions, and report reading all handouts.

Group 2 will be asked to attend weekly hour-long small-group education sessions, where they will learn about cooking and eating healthy on a budget, with a cooking demonstration and samples to taste. At the end of the intervention, participants will be compensated $5 for each class that they went to, with a $10 bonus if they went to all 8 classes, for a maximum amount of $50 if all classes are attended.

Group 3 will be asked to come to weekly hour-long education sessions similar to those in group two. They will also be given healthy eating tokens to spend at the Cache Valley Gardener’s Market http://www.gardenersmarket.org/. The amount of money in tokens will depend on family size, with singles and couples receiving $10 each week, and families will get $5 for each child up to $30 maximum per week.

Group 4 will be asked to come to weekly hour-long education sessions, and will be enrolled in a double-bucks program. For each dollar that participants spend at the Cache Valley Gardener’s Market, they will receive $1 of healthy eating tokens to spend. Singles and couples will be eligible for up to $10 of double-buck tokens, and families will be eligible for $5 more per child, up to $30 total.

Group 5 will receive healthy eating tokens to spend at the Cache Valley Gardener’s Market. The amount of money in tokens will depend on family size, with singles and couples receiving $10, and families will get $5 for each child up to $30 maximum.

Participants will be assigned to one of these groups randomly. Although we can’t tell you which group you will be in before you sign up, each group is designed to help improve your diet, and each group is compensated for their time fairly.
Based on this information, are you still interested in participating in this study?

- Yes
- No

Thank you for your time. Please contact Dr. Carrie Durward at carrie.durward@usu.edu or 814-321-3632 if you have any questions about the study.

We are going to ask a series of questions to see if you are eligible to participate. All of your answers are completely confidential.

How old are you?

- Under 10 years old
- 18 years of age or older

You must be 18 years of age or older to participate in this study. Thank you for your time. If you have any questions about the study please contact Dr. Carrie Durward at carrie.durward@usu.edu or 814-321-3632.
Do you receive any of the following forms of food assistance?

☐ SNAP or Food Stamps
☐ WIC
☐ Food Bank
☐ Soup Kitchen
☐ Family assistance
☐ Other form of food assistance
☐ I do not receive any form of food assistance

You must be receiving SNAP benefits to participate in this study. Thank you for your time and consideration. If you have any questions about the study please contact Dr. Carrie Durward at carrie.durward@usu.edu or 814-321-3532.

What is your gender?


How tall are you? ______feet and ______ inches


How much do you weigh in pounds? (If you aren't sure, please give us your best guess).


Do you live with an adult spouse or partner?

- Yes
- No

Do any children live in your household?

- Yes
- No

How many children live in your household?


What are their ages?


Do you smoke or chew tobacco? This would include cigarettes, cigars, e-cigarettes, vaporizers, chewing tobacco, hooka or water pipes.

- Yes
- No

Please indicate the type, amount and how often you smoke.


Do you use self-tanner?

- ☐ Yes
- ☐ No

Do you take any dietary supplements? This would include vitamins, minerals, oils (like fish oil), or herbs.)

- ☐ Yes
- ☐ No

Please list the type, amount, and how often you take them.

[Blank space]

It looks like you are eligible to participate in this study! Please complete the following questions regarding your contact information so we can contact you for an orientation session.

What is your first and last name?

[Blank space]

What is your mailing address?

[Blank space]
What is the best telephone number to reach you at?


Is this phone your home number, cell number, or work number?

- Home
- Cell
- Work

What is your email address (if you have one)?


What is the best way to get a hold of you?

- Email
- Telephone
- Physical address
- Other

When is the best time to call?


Appendix B. HEaL Survey Tools
What is your study ID number?

You will read several statements that people have made about their food situation. For these statements, please indicate whether the statement was often true, sometimes true, or never true for your household in the last 1 month.

We worried whether our food would run out before we got money to buy more. Was that often true, sometimes true, or never true for your in the last 1 month?

- Often true
- Sometimes true
- Never true
- Don't know or refuse to answer
The food that we bought just didn’t last, and we didn’t have money to get more. Was that often, sometimes, or never true for your household in the last 1 month?

- Often true
- Sometimes true
- Never true
- Don’t know or refuse to answer

We couldn’t afford to eat balanced meals. Was that often, sometimes, or never true for household in the last 1 month?

- Often true
- Sometimes true
- Never true
- Don’t know or refuse to answer

In the last 1 month, did you or other adults in your household ever cut the size of your meals or skip meals because there wasn’t enough money for food?

- Yes
- No
- Don’t know

In the last 30 days, how many days did this happen? _____ days.
In the last 1 month, did you ever eat less than you felt you should because there wasn't enough money for food?

☐ Yes  
☐ No  
☐ Don't know

In the last 1 month, were you every hungry but didn't eat because there wasn't enough money for food?

☐ Yes  
☐ No  
☐ Don't know

In the last 1 month, did you lose weight because there wasn't enough money for food?

☐ Yes  
☐ No  
☐ Don't know

In the last 1 month, did you or other adults in your household ever not eat for a whole day because there wasn't enough money for food?

☐ Yes  
☐ No  
☐ Don't know
In the last 30 days, how many days did this happen? ____ days.

Are there any children under 18 years of age living in your household?

☐ Yes
☐ No

There will be a few questions people have made about the food situation of their children. For these statements, please indicate whether the statement was OFTEN true, SOMETIMES true, or NEVER true in the last 1 month for your child/children living in the household who are under 18 years old.

We relied on only a few kinds of low-cost food to feed the children because we were running out of money to buy food. Was that often, sometimes, or never true for your household in the last 1 month?

☐ Often true
☐ Sometimes true
☐ Never true
☐ Don't know or refuse to answer
We couldn’t feed our children a balanced meal, because we couldn’t afford that. Was that often, sometimes, or never true for (you/your household) in the last 1 month?

- Often true
- Sometimes true
- Never true
- Don’t know or refuse to answer

The children were not eating enough because we just couldn’t afford enough food. Was that often, sometimes, or never true for your household in the last 1 month?

- Often true
- Sometimes true
- Never true
- Don’t know or refuse to answer

In the last 1 month, did you ever cut the size of any of the children’s meals because there wasn’t enough money for food?

- Yes
- No
- Don’t know
In the last 1 month, did any of the children ever skip meals because there wasn't enough money for food?

☐ Yes
☐ No
☐ Don’t know

In the last 30 days, how many days did this happen? _____ days.

In the last 1 month, were the children ever hungry but you just couldn’t afford more food?

☐ Yes
☐ No
☐ Don’t know

In the last 1 month, did any of the children ever not eat for a whole day because there wasn’t enough money for food?

☐ Yes
☐ No
☐ Don’t know

Thank you for completing this survey. If you have any questions about the survey please contact Dr. Carrie Durward at 814-321-3632 or at carrie.durward@usu.edu.
Baseline HEaL Demographic Survey

Please answer these questions by checking a box or boxes or writing your answer on the line. All of your answers are completely confidential.

1. Date of birth (Month, day, year)__________________________________________________________

2. Age (years)
__________________________________________________________

3. Gender__________________________________________________________

4. What race and or ethnicity do you identify with? (Please check as many as apply)

☐ White
☐ Black/African American
☐ Hispanic/Latino
☐ Asian
☐ American Indian or Native American
☐ Hawaiian Native or Pacific Islander
☐ Other
__________________________________________________________
(please write in if checked)

5. What best describes your job or employment? (Please check as many as apply.)

☐ Full time (35 hours a week or more)
☐ Part time (less than 35 hours a week)
☐ Day laborer
☐ Unemployed
☐ Housewife or stay at home mom
☐ Retired
☐ Other
__________________________________________________________
(please write in if checked)

6. About how much money is made in your household every year? (Please check one.)

☐ 0 to $4,999
☐ $5,000 to $9,999
☐ $10,000 to $14,999
7. Which best describes your current relationship? (Please check as many as apply.)
   ☐ Married or long-term partner
   ☐ Single
   ☐ Widowed
   ☐ Divorced or separated

8. If you have a spouse or a partner, do they live in your home? ☐ Yes ☐ No

9. Do any other adults live in your home? ☐ Yes ☐ No

10. If yes, how many other adults live in your home?
    ____________________________________________

11. Do any children live in your household? ☐ Yes ☐ No

12. If yes, how many children live in your household?
    ____________________________________________

13. If yes, please list their ages.______________________________________________________________

14. Are you or your spouse or partner currently pregnant? ☐ Yes ☐ No

15. If you are female, are you currently breastfeeding? ☐ Yes ☐ No

16. Do any other children live in your home? ☐ Yes ☐ No

17. Do you receive any of the following forms of food assistance?
   ☐ SNAP or food stamps
   ☐ WIC
   ☐ Food Bank
   ☐ Soup Kitchen
   ☐ Family
☐ Other form of food assistance

____________________________________________________________________________
(Please write in if checked)

☐ None of the above

18. Do you ever use self-tanner or get a spray tan? ☐ Yes ☐ No

19. If yes, when was the last time you used self-tanner or got a spray tan? ________________

20. Do you smoke, chew tobacco, or use any other form of nicotine? (This includes cigarettes, cigars, e-cigarettes, vaporizers, chewing tobacco, hooka, or water pipes) ☐ Yes ☐ No

21. If yes, please write the type(s), amount(s), and how often.

____________________________________________________________________________

____________________________________________________________________________
Mediators for Behavior Change Survey for HEaL

For these questions, please let us know how much you agree or disagree with the statement by checking one box.

1. Eating fruits and vegetables adds variety to what I eat.
   □ I disagree a lot   □ I disagree a little   □ I agree a little   □ I agree a lot

2. I would feel better if I ate more fruits and vegetables.
   □ I disagree a lot   □ I disagree a little   □ I agree a little   □ I agree a lot

3. By trying more fruits and vegetables I can learn which ones I like and don't like.
   □ I disagree a lot   □ I disagree a little   □ I agree a little   □ I agree a lot

4. I feel that I am helping my body by eating more fruits and vegetables.
   □ I disagree a lot   □ I disagree a little   □ I agree a little   □ I agree a lot

5. I may develop health problems if I do not eat fruits and vegetables.
   □ I disagree a lot   □ I disagree a little   □ I agree a little   □ I agree a lot

6. I do not eat more fruits and vegetables because I do not know how to prepare them.
   □ I disagree a lot   □ I disagree a little   □ I agree a little   □ I agree a lot

7. It is difficult to find fruits and vegetables the whole family likes. (skip if you live alone)
   □ I disagree a lot   □ I disagree a little   □ I agree a little   □ I agree a lot

8. It takes too much time to prepare fruits and vegetables.
   □ I disagree a lot   □ I disagree a little   □ I agree a little   □ I agree a lot

9. My family does not like fruits and vegetables. (skip if you live alone)
   □ I disagree a lot   □ I disagree a little   □ I agree a little   □ I agree a lot

10. I do not like fruits and vegetables.
    □ I disagree a lot   □ I disagree a little   □ I agree a little   □ I agree a lot

11. Fruits and vegetables are not always available.
    □ I disagree a lot   □ I disagree a little   □ I agree a little   □ I agree a lot

12. Fruits and vegetables are too expensive.
    □ I disagree a lot   □ I disagree a little   □ I agree a little   □ I agree a lot
13. I feel I can keep fruits and vegetables available at home.
   □ I disagree a lot   □ I disagree a little   □ I agree a little   □ I agree a lot

14. I feel I can eat the suggested number of servings of fruits and vegetables (2 servings of fruit and 3 servings of vegetables per day).
   □ I disagree a lot   □ I disagree a little   □ I agree a little   □ I agree a lot

15. I feel I can shop for a variety of fruits and vegetables.
   □ I disagree a lot   □ I disagree a little   □ I agree a little   □ I agree a lot

16. I feel I can make time to eat more fruits and vegetables.
   □ I disagree a lot   □ I disagree a little   □ I agree a little   □ I agree a lot

17. I feel I can include fruits and vegetables in every meal I eat.
   □ I disagree a lot   □ I disagree a little   □ I agree a little   □ I agree a lot

18. I feel I can plan meals or snacks with more fruit and vegetables during the next week
   □ I disagree a lot   □ I disagree a little   □ I agree a little   □ I agree a lot

19. I feel I can eat fruits or vegetables as snacks.
   □ I disagree a lot   □ I disagree a little   □ I agree a little   □ I agree a lot

20. I feel I can add extra vegetables to casseroles and stews.
   □ I disagree a lot   □ I disagree a little   □ I agree a little   □ I agree a lot

To answer the next questions, please use these serving size guidelines:

A serving of vegetables is:
- 1 cup of raw leafy vegetables
- ½ cup of other vegetables, cooked or raw
- ¾ cup of vegetable juice

A serving of fruit is:
- One medium apple, orange, or banana
- ½ cup of chopped, cooked, or canned fruit
- ¾ cup of 100% fruit juice
- ¼ cup dried fruit

21. Based on these serving sizes, how many servings of fruits and vegetables do you eat every day?

_________________________ servings
22. About how long have you been eating this number of daily servings of fruits and vegetables?
☐ less than 1 month ☐ 1-3 months ☐ 4-6 months ☐ 7-9 months ☐ 10-12 months ☐ more than 1 year

23. Are you seriously thinking about eating more servings of fruits and vegetables starting sometime in the next 6 months? ☐ Yes ☐ No

24. Are you planning to eat more servings of fruits and vegetables during the next month? ☐ Yes ☐ No
INSTRUCTIONS

- Think about what you usually ate last month.
- Please think about all the fruits and vegetables that you ate last month. Include those that were:
  - raw and cooked,
  - eaten as snacks and at meals,
  - eaten at home and away from home (restaurants, friends, take-out), and
  - eaten alone and mixed with other foods.
- Report how many times per month, week, or day you ate each food, and if you ate it, how much you usually had.
- If you mark "Never" for a question, follow the "Go to" instruction.
- Choose the best answer for each question. Mark only one response for each question.

1. Over the last month, how many times per month, week, or day did you drink 100% juice such as orange, apple, grape, or grapefruit juice? Do not count fruit drinks like Kool-Aid, lemonade, Hi-C, cranberry juice drink, Tang, and Twister. Include juice you drank at all meal times and between meals.

<table>
<thead>
<tr>
<th>Options</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5 or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never (Go to Question 2)</td>
<td>last month</td>
<td>per week</td>
<td>per week</td>
<td>per week</td>
<td>per day</td>
</tr>
<tr>
<td>1-3 times per week</td>
<td>1-2 times per week</td>
<td>3-4 times per week</td>
<td>5-6 times per week</td>
<td>1 time per day</td>
<td>2 times per day</td>
</tr>
</tbody>
</table>

1a. Each time you drank 100% juice, how much did you usually drink?

<table>
<thead>
<tr>
<th>Options</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>More than 2 cups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than ¾ cup (less than 6 ounces)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>¾ to 1¼ cup (6 to 10 ounces)</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>1¼ to 2 cups (10 to 16 ounces)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More than 2 cups (more than 16 ounces)</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

2. Over the last month, how many times per month, week, or day did you eat fruit? Count any kind of fruit—fresh, canned, and frozen. Do not count juices. Include fruit you ate at all meal times and for snacks.

<table>
<thead>
<tr>
<th>Options</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5 or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never (Go to Question 3)</td>
<td>last month</td>
<td>per week</td>
<td>per week</td>
<td>per week</td>
<td>per day</td>
</tr>
<tr>
<td>1-3 times per week</td>
<td>1-2 times per week</td>
<td>3-4 times per week</td>
<td>5-6 times per week</td>
<td>1 time per day</td>
<td>2 times per day</td>
</tr>
</tbody>
</table>

2a. Each time you ate fruit, how much did you usually eat?

<table>
<thead>
<tr>
<th>Options</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>More than 2 medium fruits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1 medium fruit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 medium fruit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 medium fruits</td>
<td></td>
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<tr>
<td>More than 2 medium fruits</td>
<td></td>
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</table>

   OR

<table>
<thead>
<tr>
<th>Options</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>More than 1 cup</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than ½ cup</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>About ½ cup</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>About 1 cup</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>More than 1 cup</td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
3. Over the last month, how often did you eat lettuce salad (with or without other vegetables)?

<table>
<thead>
<tr>
<th>Never</th>
<th>1-3</th>
<th>1-2</th>
<th>3-4</th>
<th>5-6</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5 or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Go to Question 4)</td>
<td>last month</td>
<td>times</td>
<td>per week</td>
<td>per week</td>
<td>per week</td>
<td>per day</td>
<td>per day</td>
<td>per day</td>
<td>per day</td>
</tr>
</tbody>
</table>

3a. Each time you ate lettuce salad, how much did you usually eat?

| About ½ cup | About 1 cup | About 2 cups | More than 2 cups |

4. Over the last month, how often did you eat French fries or fried potatoes?

<table>
<thead>
<tr>
<th>Never</th>
<th>1-3</th>
<th>1-2</th>
<th>3-4</th>
<th>5-6</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5 or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Go to Question 5)</td>
<td>last month</td>
<td>times</td>
<td>per week</td>
<td>per week</td>
<td>per week</td>
<td>per day</td>
<td>per day</td>
<td>per day</td>
<td>per day</td>
</tr>
</tbody>
</table>

4a. Each time you ate French fries or fried potatoes, how much did you usually eat?

| Small order or less (About 1 cup or less) | Medium order (About 1½ cups) | Large order (About 2 cups) | Super Size order or more (About 3 cups or more) |

5. Over the last month, how often did you eat other white potatoes? Count baked, boiled, and mashed potatoes, potato salad, and white potatoes that were not fried.

<table>
<thead>
<tr>
<th>Never</th>
<th>1-3</th>
<th>1-2</th>
<th>3-4</th>
<th>5-6</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5 or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Go to Question 6)</td>
<td>last month</td>
<td>times</td>
<td>per week</td>
<td>per week</td>
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</table>

5a. Each time you ate these potatoes, how much did you usually eat?

| 1 small potato or less (¼ cup or less) | 1 medium potato (½ to 1 cup) | 1 large potato (1 to 1½ cups) | 2 medium potatoes or more (1½ cups or more) |

6. Over the last month, how often did you eat cooked dried beans? Count baked beans, bean soup, refried beans, pork and beans and other bean dishes.

<table>
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<th>3-4</th>
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<tr>
<td>(Go to Question 7)</td>
<td>last month</td>
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6a. Each time you ate these beans, how much did you usually eat?

| Less than ¼ cup | ¼ to 1 cup | 1 to 1½ cups | More than 1½ cups |
7. Over the last month, how often did you eat other vegetables?

**DO NOT COUNT:**
- Lettuce salads
- White potatoes
- Cooked dried beans
- Vegetables in mixtures, such as in sandwiches, omelets, casseroles, Mexican dishes, stews, stir-fry, soups, etc.
- Rice

**COUNT:**
- All other vegetables—raw, cooked, canned, and frozen

Never
☑️ (Go to Question 8)

☑️ 1-3 times last month per week

☑️ 1-2 times last month per week

☑️ 3-4 times last month per week

☑️ 5-8 times last month per week

☑️ 1 time last month per day

☑️ 2 times last month per day

☑️ 3 times last month per day

☑️ 4 times last month per day

☑️ 5 or more times last month per day

7a. Each of these times that you ate other vegetables, how much did you usually eat?

☑️ Less than 1/2 cup

☑️ 1/2 to 1 cup

☑️ 1 to 2 cups

☑️ More than 2 cups

8. Over the last month, how often did you eat tomato sauce? Include tomato sauce on pasta or macaroni, rice, pizza and other dishes.

Never
☑️ (Go to Question 9)

☑️ 1-3 times last month per week

☑️ 1-2 times last month per week

☑️ 3-4 times last month per week

☑️ 5-8 times last month per week

☑️ 1 time last month per day

☑️ 2 times last month per day

☑️ 3 times last month per day

☑️ 4 times last month per day

☑️ 5 or more times last month per day

8a. Each time you ate tomato sauce, how much did you usually eat?

☑️ About 1/4 cup

☑️ About 1/2 cup

☑️ About 1 cup

☑️ More than 1 cup

9. Over the last month, how often did you eat vegetable soups? Include tomato soup, gazpacho, beef with vegetable soup, minestrone soup, and other soups made with vegetables.

Never
☑️ (Go to Question 10)

☑️ 1-3 times last month per week

☑️ 1-2 times last month per week

☑️ 3-4 times last month per week

☑️ 5-8 times last month per week

☑️ 1 time last month per day

☑️ 2 times last month per day

☑️ 3 times last month per day

☑️ 4 times last month per day

☑️ 5 or more times last month per day

9a. Each time you ate vegetable soup, how much did you usually eat?

☑️ Less than 1 cup

☑️ 1 to 2 cups

☑️ 2 to 3 cups

☑️ More than 3 cups

10. Over the last month, how often did you eat mixtures that included vegetables? Count such foods as sandwiches, casseroles, stews, stir-fry, omelets, and tacos.

Never
☑️ (Go to Question 11)

☑️ 1-3 times last month per week

☑️ 1-2 times last month per week

☑️ 3-4 times last month per week

☑️ 5-8 times last month per week

☑️ 1 time last month per day

☑️ 2 times last month per day

☑️ 3 times last month per day

☑️ 4 times last month per day

☑️ 5 or more times last month per day
Appendix C. HEaL Clinic Forms
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Complete 3rd measurement if ± 1 cm

Complete 3rd measurement if ± 1 kg

Complete 3rd scan if ≥ 4000

ASA 24 completed

Paper questionnaires completed

Qualtrics food security completed

Next appointment scheduled: ____________________________

Date of Visit: ____________________________
### Midpoint

**Date of Visit:** ________________

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<td>____________________________________________</td>
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## Endpoint

### Date of Visit: ________________

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<td>Complete 3rd scan if + 4000</td>
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<td>ASA 24 completed</td>
<td>ASA 24 ID ____________________ ASA 24 Password: HEaL2014!</td>
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<td>Qualtrics food security completed</td>
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Data Entered By: ____________ Date: ____________ | Data Verified By: ____________ Date: ____________

Baseline Visit | Revised 06/13/2014 | Carrie Durward | Farmers Market IRB #5959
Appendix D. HEaL Interview Guide
Interview Guide for HEaL Study

1. What did you enjoy most about the HEaL study?

2. Before you started the HEaL study, what were the reasons why you didn't eat more fruits and vegetables?
   a. Did you participation in the HEaL study change any of these reasons

3. Tell me about your experiences using the incentives at the farmers market.
   a. What made it difficult to use your farmer’s market incentives?
   b. What would make it easier (more likely) for you to use your farmers market incentives?

4. What would make you more likely to use SNAP benefits at the farmers market?

5. What were your experiences with the nutrition education classes?

6. What did you learn in the nutrition education classes?

7. What would make the nutrition education classes better?

8. As a result of the nutrition education did you make any changes?
   a. If no—are you thinking about making any changes?
      i. If no—explain.
      ii. If yes—please tell me about them.
   b. If yes—please tell me about them.

9. How does your diet now compare to your diet before you started HEaL?
   a. How long do you think you will keep up these changes?

10. Is there anything else you would like to say about your experience in the HEaL study?
Appendix E. DUFB Survey Tools
How often do you shop at this farmers’ market?

- Today is first time
- Once a week
- 2-3 times per month
- Once a month
- Every couple months

What forms of payment do you use at this farmers’ market (or plan to use)? Check all that apply.

- SNAP EBT card
- Cash
- Debit card
- Credit card
- Other (please specify)

What kind of products do you buy (or plan to buy) at this farmers’ market? Check all that apply.

- Fresh Fruits
- Meat
- Grain Flour
- Beverages
- Dairy products
- Fresh Vegetables
- Eggs
- Honey
- Plants or seeds
- Bread, rolls, or other baked goods
- Poultry
- Fish or seafood
- Herbs
- Value-added products
- Other (please specify) (jams, salsa, etc.)

Did you shop at this farmer’s market before the Double Up Food Bucks program? __Yes__ __No__

Did you know about the Double Up Food Bucks program before you came to the market today? __Yes__ __No__

How did you hear about the Double Up Food Bucks program? Check all that apply

- Flyers or signs
- From a friend
- At X, X, X
- At the market
- Other ____________________________
- News release
- KSL

Does the Double Up Food Bucks program make it more likely that you will shop at the farmer’s market? __Yes__ __No__

Will you continue shopping at this market after the Double-Up Food Bucks program ends? __Yes__ __No__

What is your age? ____________

What is your gender? ____________

What is your employment status?

- Employed
- Out of work
- Unable to work
- Other ____________________________

How many adults (18 years & older) live in your household? ________________

How many children (under the age of 18) live in your household? ________________

What race or ethnicity do you identify with? Check all that apply.

- White
- Native Hawaiian or Other Pacific Islander
- Black or African American
- Asian
- Hispanic or Latino
- Some Other Race (please specify) ____________________________
- American Indian or Alaska Native

In the last 12 months have you ever not had enough money for food? __Yes__ __No__

Do you receive any forms of food assistance? Check all that apply.

- Supplemental Nutrition Assistance Program (SNAP)
- Food Bank or Bishop’s Storehouse
- Assistance from family or friends
- Other (please specify) ____________________________________________
- Women, Infants, Children (WIC)
- Soup Kitchen or Community Meals Center
- I prefer not to answer
- None

Here are several statements that people have made about their food situation. Please tell me whether the statement was often true, sometimes true, or never true for you or your household in the last 30 days.
In the last 30 days, the food that I/we bought just didn’t last, and I/we didn’t have money to get more.
__ Often true __ Sometimes true __ Never true __ Don’t know

In the last 30 days, I/we couldn’t afford to eat balanced meals.
__ Often true __ Sometimes true __ Never true __ Don’t know

In the last 30 days, did you or other adults in your household ever cut the size of your meals or skip meals because there wasn’t enough money for food?
__ yes __ almost every day __ some days but not every day __ only one or two days __ Don’t know

In the last 30 days, did you ever eat less than you felt you should because there wasn’t enough money for food?
__ Yes __ No __ Don’t know

In the last 30 days, were you ever hungry but didn’t eat because there wasn’t enough money for food?
__ Yes __ No __ Don’t know

These next questions are about the fruit and vegetables you ate or drank during the past 30 days. Please think about all forms of fruits and vegetables including cooked or raw, fresh, frozen, or canned. Please think about all meals, snacks, and food consumed at home and away from home.

During the past 30 days, how often did you drink 100% PURE fruit juices? Do not include fruit-flavored drinks with added sugar or fruit juice you made at home and added sugar to. Only include 100% juice.
__ 0 times/week __ 1 time/week __ 2 times/week __ 3-4 times/week __ 5-6 times/week __ 1 time/day __ 2 times/day __ 3 times/day or more

During the past 30 days, not counting juice, how often did you eat fruit? Count fresh, frozen, or canned fruit.
__ 0 times/week __ 1 time/week __ 2 times/week __ 3 times/week __ 5 times/week __ 1 time/day __ 2 times/day __ 3 times/day or more

During the past 30 days, how often did you eat cooked or canned beans, such as refried, baked, black, garbanzo beans, beans in soup, soybeans, edamame, tofu, or lentils? Do NOT include long green beans.
__ 0 times/week __ 1 time/week __ 2 times/week __ 3 times/week __ 5 times/week __ 1 time/day __ 2 times/day __ 3 times/day or more

During the past 30 days, how often did you eat dark green vegetables for example broccoli or dark leafy greens including romaine, chard, collard greens, or spinach?
__ 0 times/week __ 1 time/week __ 2 times/week __ 3 times/week __ 5 times/week __ 1 time/day __ 2 times/day __ 3 times/day or more

During the past 30 days, how often did you eat orange-colored vegetables such as sweet potatoes, pumpkin, winter squash, or carrots?
__ 0 times/week __ 1 time/week __ 2 times/week __ 3 times/week __ 5 times/week __ 1 time/day __ 2 times/day __ 3 times/day or more

Not counting what you have just mentioned, how often did you eat OTHER vegetables in the past 30 days? Examples of other vegetables include tomatoes, tomato juice or V-8, corn, eggplant, peas, lettuce, cabbage, and white potatoes that are not fried such as baked or mashed potatoes.
__ 0 times/week __ 1 time/week __ 2 times/week __ 3 times/week __ 5 times/week __ 1 time/day __ 2 times/day __ 3 times/day or more
Hello, This is calling from Utah State University. About four weeks ago, you filled out a survey at the downtown salt lake farmer’s market, and told us you would be interested in doing a follow-up survey over the phone. After you finish the survey, we will send you a voucher worth $5 in Double Up Food Bucks at the downtown market. Is now a good time? This should take about 5 minutes of your time.

As a result of the Double-Up Food Bucks Program (the program that allowed you to get extra tokens at the downtown SLC market), the amount of fresh fruits and vegetables I have eaten has...

- Increased greatly
- Increased some
- Stayed the same
- Decreased some
- Decreased greatly

As a result of the Double-Up Food Bucks Program, the variety (or different kinds) of fresh fruits and vegetables I have eaten has...

- Increased greatly
- Increased some
- Stayed the same
- Decreased some
- Decreased greatly

Since you filled out the questionnaire, how many times have you gone back to the downtown SLC farmer’s market? (Please include visits to both the Saturday and Tuesday evening markets.)

- I haven’t been back
- Once
- 2-3 times
- 4-5 times
- 6-7 times
- 8-9 times
- >9 times

What kind of products did you buy at the downtown SLC farmers’ market? Check all that apply.

- Fresh Fruits
- Meat
- Grain flour
- Beverages
- Dairy products
- Fresh Vegetables
- Eggs
- Honey
- Plants or seeds
- Bread, rolls, or other baked goods
- Poultry
- Fish or seafood
- Herbs
- Value-added products
- Other (please specify)

I will read you several statements that people have made about their food situation. Please tell me whether the statement was often true, sometimes true, or never true for you or your household in the last month.

Over the past month, the food that I/we bought just didn’t last, and I/we didn’t have money to get more.

- Often true
- Sometimes true
- Never true

Over the past month, I/we couldn’t afford to eat balanced meals.

- Often true
- Sometimes true
- Never true

Over the past month, did you or other adults in your household ever cut the size of your meals or skip meals because there wasn’t enough money for food? ___ yes ___ no

If yes, how often did this happen?

- Almost every day
- Some days but not every day
- Only one or two days

In the last month, did you ever eat less than you felt you should because there wasn’t enough money for food? ___ yes ___ no

In the last month, were you ever hungry but didn’t eat because there wasn’t enough money for food? ___ yes ___ no
These next questions are about the fruit and vegetables you ate or drank during the past 30 days. Please think about all forms of fruits and vegetables including cooked or raw, fresh, frozen, or canned. Please think about all meals, snacks, and food consumed at home and away from home.

During the past month, how often did you drink 100% PURE fruit juices? Do not include fruit-flavored drinks with added sugar or fruit juice you made at home and added sugar to. Only include 100% juice.

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<td>1 time/day</td>
<td>2 times/day</td>
<td>3 times/day or more</td>
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During the past month, not counting juice, how often did you eat fruit? Count fresh, frozen, or canned fruit.

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During the past month, how often did you eat dark green vegetables for example broccoli or dark leafy greens including romaine, chard, collard greens, or spinach?

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During the past month, how often did you eat orange-colored vegetables such as sweet potatoes, pumpkin, winter squash, or carrots?

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HEal Curriculum
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F$ preserving fresh produce handout
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WEEK 1-- Food Sense Creates presents --

Create...a Wrap/Sandwich
Nothing says convenience like a sandwich or wrap! In this lesson, participants learn the basic techniques to create a wholesome and nutritious wrap or sandwich from foods already found in the pantry and fridge. We discuss some meal planning and grocery shopping strategies that ensure always having good foods on hand.

Goal
After this lesson, participants will demonstrate the skills needed to stock their pantries with nutritious foods and to use those foods to create tasty wraps or sandwiches. They will use a whole food approach that follows the MyPlate meal plan.

Lesson Objectives
Participants will be able to:
- Name three health benefits associated with fruit and vegetable intake.
- Discuss which of five MyPlate food components are found in wrap/sandwich and which food components should be added to make the meal a MyPlate meal.
- Identify various foods of a well-stocked kitchen.
- Identify basic kitchen equipment needed to make a wrap/sandwich.
- Identify steps necessary to cook and serve a wrap/sandwich.
- Identify food safety concerns when preparing a wrap/sandwich.

Handouts:
USDA 10 Tips: Choose MyPlate
MyPlate graphic
Create a Wrap/Sandwich

Recipe:
Hearty Veggie Quesadilla
Create a Wrap/Sandwich Lesson Plan

1. Introduction
   This lesson teaches how quick and easy it is to put together a tasty wrap or sandwich from ingredients you already have. First we are going to talk about MyPlate!

   a. Before we get started, what are your biggest barriers to incorporating fruits and vegetables into your diet?
      - NEAs: Have participants take 5 minutes to think about this question and write down their answers. (Collect these lists and get them to Carrie.) Lead a group discussion of their responses, and ask the class to come up with solutions to the barriers. At the end of the discussion, note that we are going to talk about different ways to overcome these barriers in future lessons.

   b. Ask class: How do you choose what to eat for a meal? Do you use any tools to help you decide what to include in your meal?
   c. Handout MyPlate graphic and ask participants what they notice about the graphic. Address the following as participants point them out:
      - There are five sections to the plate. Explain that these sections represent groups of foods that are essential to good health, and each group should be eaten at most meals.
      - The different colors are to help us remember the various groups and what foods are in each group.
      - Sections on the plate are different sizes. This helps us to remember that we need more of some food groups and less of others.
      - Half of the plate should be fruits and vegetables. Eating a large amount of fruits and vegetables increases the nutrient content of each meal while keeping caloric intake low. Fruits and vegetables are rich in vitamins, minerals, fiber, and phytochemicals all of which can help reduce the risk of chronic diseases!

   d. Each section of the MyPlate graphic is an essential component of a well-balanced diet. We will discuss each section in detail.
      - Vegetables group
         - There are many different vegetables available to meet your own personal preferences. Examples include: tomatoes, beans, peas, squash, greens (lettuce, kale, spinach), carrots, onions, etc. Many of these can be purchased at the farmers market, grocery store, or grown in your own backyard.
         - Vegetables are low in calories but high in vitamins and minerals. Eating vegetables at every meal will help fill you up without providing extra calories. Because of this, incorporating vegetables into meals and snacks is an excellent way to help maintain and lose weight!
         - There is also research that shows eating a diet rich in vegetables and fruit can lead to decreased risk for cancer, diabetes, obesity, heart disease, dementia, osteoporosis, and many more. There are so many health benefits to incorporating these foods into your diet.

      - Fruits group
         - We are fortunate to live in an area with an abundance of fruit! Locally we grow apples, peaches, plums, pears, berries, cherries and many more. Because of this, fruit can be easily found in grocery stores, farmers markets, and backyards.
o Fruits are a great way to add a little sweetness into your meal without adding an abundance of calories.
o Fruit is high in fiber which is beneficial to health. Fiber does digest slowly keeping your stomach full and satisfied for longer periods of time. That full feeling will likely make you snack less throughout the day on foods that are high in calories such as chips, candy, cookies, etc.
o It’s important to eat a variety of fruits and vegetables because they all have different nutrients (such as vitamins and minerals). Eating a variety helps ensure you are getting all the nutrients your body needs.
o It’s recommended by the USDA for adults to consume 4½ cups of fruits and vegetables per day to reduce the risk for disease.
o How do you think you can incorporate 4½ cups of fruits and vegetables into your meals and snacks?

• Grains group
  o Grains are a staple in the American diet. Grains are packed with carbohydrates which are body needs to function. The brain especially relies on carbohydrates from grains (and other sources) for energy.
  o Half of the grains you eat during the day should be whole grains.
    ▪ Ask the class: What grains are considered whole grains? (brown rice, oatmeal, whole wheat flour)
    ▪ A whole grain food uses the kernel of grain instead of just the starch of the grain. A food label must say "whole grain" on the label in order for the food to be considered a whole grain product.
    ▪ Look for grain products where you can see grain kernels, these products tend to be a darker color. Don’t rely on color alone! Sometimes breads and pastas are a darker color due to molasses or other ingredients. Checking the nutrition facts label is the best way to determine if a product is made from whole grains.

• Proteins group
  o The protein section of your plate should be the smallest serving. Protein is essential to great health, but we don’t need much of it.
  o When eating a piece of meat, the serving size should be about the size of the palm of your hand.
  o Remember to use plant based protein instead of animal proteins. Some examples include: beans, legumes, quinoa

• Dairy group
  o Choose low fat dairy products to decrease the amount of calories in your meal and to avoid harmful fats.
  o Use hard cheeses like Parmesan and Asiago instead of soft cheese like Mozzarella and Cheddar. They have more flavor which allows you to use less of them.

e. Using MyPlate to structure every meal will help you keep your body healthy and happy! We are going to demonstrate how to use some of these MyPlate principles to build a wrap/sandwich.

2. Create a Wrap/Sandwich
   a. Equipment needed
• Show and explain equipment: sharp knife, cutting board, vegetable peeler, vegetable grater, mixing spoons, etc.
b. Steps (demo each step as time permits)
   • Wrap
     o Discuss options—what do participants usually use, what better choices they could make
     o Discuss whole versus refined grains
   • Protein
     o Discuss options—both meat and plant based
     o Discuss food safety—when to worry about cross contamination, proper hygiene, acceptable temperatures, and safe storage
   • Filling
     o Discuss options—most common and not so common
     o Discuss how veggies are naturally rich in vitamins, minerals, antioxidants, and phytochemicals
     o Veggies will give the dish more volume but not calories
     o Demonstrate knife skills as you cut up veggies
   • Spread
     o Discuss options—mustard, ketchup, low-fat mayonnaise, ranch dressing, Italian dressing, hummus, bean dip, etc
     o Discuss identifying hidden fats and healthier options

3. Practice
   a. Bring pantry items from home and have class members come up with as many ideas for wraps/sandwiches as possible from those foods
   b. Have class members think about their own pantry and create as many meal options as possible from what they already have

4. Incorporating MyPlate
   a. What components of MyPlate does sandwich/wrap already have?
   b. What can we add to our plate to round out the meal?

5. Conclusion
   You don’t need a state-of-the-art kitchen, a degree from culinary school, or tons of time. You just need some basic equipment and food in the pantry to create a delicious wrap or sandwich that your family will want to come home to!

6. Taste creation and answer questions

7. Schedule/remind of next appointment
choose MyPlate
10 tips to a great plate

Making food choices for a healthy lifestyle can be as simple as using these 10 Tips.
Use the ideas in this list to balance your calories, to choose foods to eat more often, and to cut back on foods to eat less often.

1. balance calories
Find out how many calories YOU need for a day as a first step in managing your weight. Go to www.ChooseMyPlate.gov to find your calorie level. Being physically active also helps you balance calories.

2. enjoy your food, but eat less
Take the time to fully enjoy your food as you eat it. Eating too fast or when your attention is elsewhere may lead to eating too many calories. Pay attention to hunger and fullness cues before, during, and after meals. Use them to recognize when to eat and when you've had enough.

3. avoid oversized portions
Use a smaller plate, bowl, and glass. Portion out foods before you eat. When eating out, choose a smaller size option, share a dish, or take home part of your meal.

4. foods to eat more often
Eat more vegetables, fruits, whole grains, and fat-free or 1% milk and dairy products. These foods have the nutrients you need for health—including potassium, calcium, vitamin D, and fiber. Make them the basis for meals and snacks.

5. make half your plate fruits and vegetables
Choose red, orange, and dark-green vegetables like tomatoes, sweet potatoes, and broccoli, along with other vegetables for your meals. Add fruit to meals as part of main or side dishes or as dessert.

6. switch to fat-free or low-fat (1%) milk
They have the same amount of calcium and other essential nutrients as whole milk, but fewer calories and less saturated fat.

7. make half your grains whole grains
To eat more whole grains, substitute a whole-grain product for a refined product—such as eating whole-wheat bread instead of white bread or brown rice instead of white rice.

8. foods to eat less often
Cut back on foods high in solid fats, added sugars, and salt. They include cakes, cookies, ice cream, candies, sweetened drinks, pizza, and fatty meats like ribs, sausages, bacon, and hot dogs. Use these foods as occasional treats, not everyday foods.

9. compare sodium in foods
Use the Nutrition Facts label to choose lower sodium versions of foods like soup, bread, and frozen meals. Select canned foods labeled "low sodium," "reduced sodium," or "no salt added."

10. drink water instead of sugary drinks
Cut calories by drinking water or unsweetened beverages. Soda, energy drinks, and sports drinks are a major source of added sugar, and calories, in American diets.

Go to www.ChooseMyPlate.gov for more information.
Create a tasty sandwich, wrap, or pocket from simple foods. Just choose an item from each category and follow the directions. Use your imagination! Each serves one adult.

### Choose one wrap
- 2 slices of whole grain bread
- 1 whole grain bun or roll
- 1 corn or whole wheat tortilla
- ½ whole wheat pita

### Choose one or more proteins
- Cooked dried beans (pinto, black, chick pea, kidney, etc.)
- Peanut or almond butter
- Hummus
- Refried beans
- Cooked, sliced, or cubed roast, chicken, turkey, or ham
- Sliced, cubed, or shredded cheese
- Hard-boiled or scrambled egg

### Choose one or more fillings
- Lettuce
- Spinach
- Tomato
- Onion
- Sprouts
- Green pepper
- Banana pepper
- Celery
- Olives
- Pickles
- Potato
- Avocado
- Corn
- Shredded carrot
- Apple
- Grapes
- Pear
- Pineapple
- Jam
- Jelly
- Money
- Nuts (walnuts, pecans, almonds, pine nuts)

### Choose one or more spreads (optional)
- Low-fat mayonnaise, mustard, ketchup, ranch dressing, Italian dressing, hummus, etc.

**DIRECTIONS:**

Some wraps or sandwiches are better eaten cold and others are better cooked.

**For a cold wrap/sandwich:** Select foods from each category. Place spread directly on bread or tortilla or inside pita pocket. Build wrap by placing remaining ingredients on one side of bread or tortilla or inside pita pocket. Cover sandwich with other slice of bread or roll up tortilla.

**For a cooked wrap:** Select foods from each category. Cook filling ingredients in 1 tablespoon water or broth until soft. Add protein and heat through. Add spread to moisten the mixture. Place mixture on one side of bread or tortilla or inside pita pocket. Cover sandwich with other slice of bread or roll up tortilla.
WRAP/SANDWICH RECIPES
A pantry that is stocked with whole foods will help you create great tasting wraps or sandwiches like these!

Hearty Veggie Quesadillas
- ½ cup cooked pinto or black beans
- 1 medium tomato, chopped
- ½ bell pepper, chopped
- 1 green onion, chopped
- 1 carrot, peeled and grated
- 2 (6 inch) whole-wheat flour tortillas
- 2 tablespoons salsa
- Lettuce

Combine beans, tomato, pepper, onion, and carrots in medium bowl. Set aside. Warm skillet over medium heat. Place a tortilla in pan and warm one side, then flip tortilla over. Place half of ingredients from bowl on one side of tortilla and fold tortilla in half over the filling. Cook about 3 minutes or until filling is heated through. Transfer quesadilla to a plate and keep warm. Repeat for 2nd quesadilla.

Yield: 2 quesadillas

Use your imagination and add any veggie, bean, or cooked rice that you have on hand to your quesadilla.

Chickpea Pitas with Nutty Sauce
- 2 cans chickpeas, drained and rinsed
- 4 ribs celery, diced
- ¼ cup red onion, finely diced
- 1 teaspoon dried basil
- ¼ cup fresh parsley, chopped
- 1 ripe avocado, diced
- ½ cup walnuts
- ½ cup water
- 1 ½ teaspoons red wine vinegar
- 2 teaspoons mustard
- ½ teaspoon garlic powder
- Romaine lettuce or fresh spinach
- 3 whole wheat pita pockets, cut in half

In medium bowl, lightly crush chickpeas with vegetable masher. Add celery, onion, basil, parsley, and avocado. Stir to mix well. In blender or food processor, place walnuts, water, vinegar, mustard, and garlic powder. Blend until smooth. Add blended ingredients to chickpea mixture and mix well. Place lettuce or spinach in each pita pocket then add chickpea mixture.

Yield: 6 servings
WEEK 2– Food Sense Creates presents ~

Create...a Salad
A main dish salad is the perfect way to fill up on a busy day! In this lesson, participants learn the basic techniques to create a wholesome and nutritious main dish salad from foods already found in the pantry and fridge. We discuss some tips to incorporate fruits and vegetables into your diet. We discuss the difference between whole foods and refined foods, and why whole is a better choice.

Goal
After this lesson, participants will demonstrate the skills needed to stock their pantries with nutritious foods, and to use those foods to create tasty main dish salads. They will use a whole food approach that follows the MyPlate meal plan.

Lesson Objectives
Participants will be able to:
• Identify why purchasing foods that are in season is important.
• Identify ways to make fruits and vegetables more available in your house.
• Identify various foods of a well-stocked kitchen.
• Identify basic kitchen equipment needed to make a salad.
• Identify steps necessary to prepare and serve a salad.
• Identify food safety concerns when preparing a salad.
• Discuss which of five MyPlate food components are found in salads and which food components should be added to make the meal a MyPlate meal.

Handout:
F$ Produce storage tips handout
F$ Preserving fresh produce
Creates Salad handout

Recipe:
Thai noodle salad
Create a Salad Lesson Plan

1. Introduction
   This lesson teaches how quick and easy it is to create a tasty and nutritious soup from ingredients you already have.

   Availability of produce can be a huge barrier to purchasing and consuming fruits and vegetables but it doesn’t have to be! There are many ways to make produce more available to ensure you eat enough to meet the dietary guidelines.

   - Buy produce that is in season! This is nature’s way of getting you to eat a variety of fruits and vegetables and it’s a great way to save money. In season produce is often times much cheaper as compared to out of season produce and it’s much easier to find. In Cache Valley you can typically find in-season produce at the grocery store, farmers markets, local farmers, and even neighbors!
     - What fruits and vegetables are easy to find in Northern Utah in each season?
       - Summer- Carrots, cucumbers, melon, berries, peaches, tomatoes, apricots, and much more!
       - Fall- Squash, pumpkins, onions, potatoes, beets, peppers and more!
       - Winter- Carrots, onions, spinach, bananas, apples, and oranges are a few examples of produce that are reasonably priced in the winter. Try frozen fruit and vegetables without any added sugar or salt.
       - Spring- Lettuce, chard, kale, spinach, green beans, peas, and more.

   - Visit your local farmers market to see what produce is in season. Remember, you can use SNAP benefits at the farmers market to buy fresh produce. If you have extra benefits one month, try buying extra to freeze for later!

   - Freezing produce you have purchased when its available to you is a great way to make sure you have some for those times when you can’t make it to the store or the grocery budget has been used up. Many fruits and vegetables can be frozen with minimal time or materials. Some fruit and vegetables need to be blanched for a couple minutes in hot water prior to freezing. You can use small bags with individual serving sizes or large bags for freezing depending on what you want to use them for.

   - Plan your meals around what you can find at the places you shop (grocery store, farmers market etc) instead of planning meals and then searching for items that may be out of season, expensive, and hard to find. Looking in grocery adds and talking with local farmers are great ways to determine what produce you can find each season.

   - If you live far away from a grocery store or don’t make it to the store very often, purchase fruits and vegetables with a longer shelf life such as potatoes, carrots, cabbage, onions, apples, oranges, etc.

   - Frozen and canned foods can be good options too! Frozen fruits and vegetables may actually have more nutrients than fresh! Try to purchase the fruit without added sugar and the vegetables without added salt.
• Make fruits and vegetables easily available to you and your family by making very easy to find in the kitchen. Leave fruit in a bowl on the counter and cut/washed veggies in the fridge where everyone will easily see them. This is a great reminder to snack on fruits and vegetables instead of processed foods and sugary treats.
• If you’re going to be cut and about between meals, try bringing along a piece of fruit or a baggie of cut up veggies to curb your hunger until mealtime. This is a great way to prevent you from stopping at a fast food restaurant and spending money on less healthy options.
• If you have any extra yard space, try growing your own garden! This will make fruit and vegetables readily available for you to pick throughout the summer and enjoy into the fall and winter months. This can be a great way to increase access to produce especially if you live far from a grocery store or farmers market. Remember, you can use your SNAP benefits to purchase seeds and starter plants! Your local extension office is a good place to find information on how to garden if you are trying it for the first time.

a. What do you do to make fruits and vegetables available for snacks and meals?
b. What can you do to increase the availability of fruits and vegetables without spending more money?
c. Now we are going to use fruits and vegetables that are typically in the kitchen to make a delicious salad.

1. Introduction
   This lesson teaches how quick and easy it is to put together a delicious salad from ingredients you already have. First, we are going to talk about why family mealtime is important.

With busy schedules and countless obligations, families these days are hard pressed to eat any kind of balanced meal, let alone eat a meal together. But family mealtime is critical to a child’s physical, emotional, and social development, as well as to academic and behavioral outcomes. Frequent family mealtime also contributes to the level of connection your family enjoys. There are many ways to enjoy healthy meals rich in fruits and vegetables with your family.

a. Consider planning meals one to two weeks in advance. This will help with writing a grocery list and will reduce the likelihood of a last-minute crunch to pull something edible together before the kids get hungry! Planning ahead will also increase the likelihood of having fruits and vegetables on hand to include in every meal.

b. Allow children to participate in making the grocery list and doing the shopping. Ask your children what kinds of fruits and vegetables they would like to eat with meals in the next week so they can participate in the decision making.

c. When you’re at the grocery store, let your kids participate in selecting and bagging produce. Ask them if they know what certain fruits and vegetables are to get them engaged and learning.

d. Put fruit or vegetables on the table while dinner is being prepared so the family can snack on these items before the meal. This creates an opportunity for everyone to eat fruits and vegetables before they get too full. It also increases exposure to those foods.
e. If your making a meal that wasn’t planned and you’re not sure what veggies to include with the meal, give your children a choice between two items! Ask them if they want corn or beans. Refrain from asking them “what vegetable would you like for dinner?” They might ask for something you don’t have which could lead to whining or frustration. Giving them the option between two items you have on hand. This allows them to be involved in the decision making while increasing the odds that they will eat the vegetable at mealtime.

f. Don’t force children to eat fruits and vegetables. Make them available for children to try at all meals but resist the urge to make them eat their veggies before they can leave the table or have dessert. Research shows that consistent exposure to fruit and vegetables is more effective at increasing acceptance than forcing children to try foods. After several exposure children will try fruits and vegetables without your coercion. Without the fights over eating green beans, meal time will be more enjoyable for everyone!

g. Be good role models for your children! The adults in the family have the responsibility to eat fruits and vegetables at meals and snacks to show children that they are an important part of a meal. The more fruits and vegetables you eat, the more your children will follow in your footsteps.

h. Refrain from making special meals or side dishes for certain family members. This includes fruits and vegetables! Avoid being a short-order cook. Making one meal for the whole family to enjoy. Again, everyone will be much more accepting of the meals if they are part of the menu planning and shopping process!

i. Involve everyone including the children in meal preparation and cleanup. This helps children feel like they contributed to the meal and often times increases the amount of new foods they will try. Expose your children to fruits and vegetables by allowing them to wash, cut, peel or dish up fruits and vegetables for meals. If your children are young, allow them add the cut up vegetables to the salad or to wash the fruit in the sink.

3. Create a Salad
   a. Choose whole foods
   b. Equipment needed
      • Show and explain equipment: sharp knife, cutting board, vegetable peeler, vegetable grater, large mixing bowl, mixing spoons, measuring cups and spoons, saucepan, large salad bowl, etc.
   c. Steps (demo each step as time permits)
      • Base
         1. Discuss options—what do participants usually use, what better choices they could make
            a. Greens
            b. Whole grain pasta
            c. Whole grains
            d. Potatoes
            e. Whole grain bread
         2. Discuss whole versus refined grains, pasta, rice
      • Protein
         1. Discuss options—both meat and plant-based
         2. Discuss food safety—where to worry about cross contamination, proper hygiene, acceptable temperatures, and safe storage
• Veggies
  1. Discuss options—most common and not so common
  2. Discuss how veggies are naturally rich in vitamins, minerals, antioxidants, and phytochemicals
  3. Veggies will give the salad more volume but not calories
  4. Demonstrate knife skills as you cut up veggies

• Flavors
  1. Onion and garlic—can be raw or cooked
  2. Choose spices/herbs according to other ingredients
     a. Example: use Mexican spices if salad has black beans, onion, garlic, tomatoes, and corn; use Italian if salad has pasta, tomatoes, zucchini; etc.
        i. Mexican: cumin, oregano, chili powder, cilantro, garlic
        ii. Italian: basil, oregano, parsley, garlic
        iii. Asian: soy sauce, ginger, garlic, chilies, turmeric
        iv. Savory/Thanksgiving: rosemary, sage, thyme, parsley

• Dressing
  1. Homemade dressings—less fat, sodium, preservatives, cost (pennies versus dollars)

• Toppings
  1. Discuss options
  2. Watch out for added fats

4. Practice
   a. Bring pantry items from home and have class members come up with as many ideas for salads as possible from those foods
   b. Have class members think about their own pantry and create as many salad options as possible from what they already have

5. Incorporating MyPlate
   a. What components of MyPlate does salad already have?
   b. What can we add to our plate to round out the meal?

6. Conclusion

   You don’t need a state-of-the-art kitchen, degree from culinary school, or tons of time. You just need some basic equipment and food in the pantry to create a delicious salad that your family will want to come home to!

7. Taste creation and answer questions

8. Schedule/remind of next appointment
# PRODUCE STORAGE TIPS

Fruits and vegetables lose quality quickly after harvest, some within just a few days. The chart below gives suggestions for storing your produce to keep it at its best.

<table>
<thead>
<tr>
<th>GROUP</th>
<th>PRODUCE</th>
<th>STORAGE TIME</th>
<th>STORAGE RECOMMENDATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROUP 1</td>
<td>Apples</td>
<td>1-2 months</td>
<td>• These items can be kept at room temperature to ripen.</td>
</tr>
<tr>
<td></td>
<td>Apricots</td>
<td>1-2 weeks</td>
<td>• Refrigerate (40°F) for a longer life. DO NOT refrigerate tomatoes until fully ripened.</td>
</tr>
<tr>
<td></td>
<td>Peaches</td>
<td>2-3 weeks</td>
<td>• Store these fruits away from other produce. They may cause other produce to rot.</td>
</tr>
<tr>
<td></td>
<td>Pears</td>
<td>3-4 weeks</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Melons</td>
<td>1-2 weeks</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tomatoes</td>
<td>1-2 weeks</td>
<td></td>
</tr>
<tr>
<td>GROUP 2</td>
<td>Cherries</td>
<td>1-2 weeks</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fresh herbs</td>
<td>1 week</td>
<td>• Keep these items refrigerated (40°F).</td>
</tr>
<tr>
<td></td>
<td>Leafy greens</td>
<td>1-2 weeks</td>
<td>• For higher quality, cover with a damp paper towel.</td>
</tr>
<tr>
<td></td>
<td>Raspberries</td>
<td>1 week</td>
<td>• Do not wash until ready to use.</td>
</tr>
<tr>
<td></td>
<td>Strawberries</td>
<td>1 week</td>
<td></td>
</tr>
<tr>
<td>GROUP 3</td>
<td>Beets</td>
<td>2-3 weeks</td>
<td>• Keep these items refrigerated (40°F).</td>
</tr>
<tr>
<td></td>
<td>Carrots</td>
<td>2-3 weeks</td>
<td>• For better quality, these can be stored in an unsealed or vented plastic bag.</td>
</tr>
<tr>
<td></td>
<td>Corn</td>
<td>1 week</td>
<td>• Other produce in this group includes oranges, celery, radishes, and parsnips.</td>
</tr>
<tr>
<td></td>
<td>Peppers</td>
<td>1-2 weeks</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Summer squash</td>
<td>1-2 weeks</td>
<td></td>
</tr>
<tr>
<td>GROUP 4</td>
<td>Cucumbers</td>
<td>1-2 weeks</td>
<td>• These items are easily damaged by cold.</td>
</tr>
<tr>
<td></td>
<td>Green beans</td>
<td>1 week</td>
<td>• Keep these items refrigerated (40°F), but check daily for signs of rot. The fridge door is best.</td>
</tr>
<tr>
<td></td>
<td>Eggplant</td>
<td>1 week</td>
<td>• Do not wash until ready to use.</td>
</tr>
<tr>
<td>GROUP 5</td>
<td>Garlic</td>
<td>4-5 months</td>
<td>• These items do not need refrigeration.</td>
</tr>
<tr>
<td></td>
<td>Onion</td>
<td>5-6 months</td>
<td>• Store in a cool room (50-60°F).</td>
</tr>
<tr>
<td></td>
<td>Potatoes</td>
<td>5-6 months</td>
<td>• For better quality, store these on a wire rack or hang in a net bag so air can flow.</td>
</tr>
<tr>
<td></td>
<td>Winter squash</td>
<td>4-5 months</td>
<td>• Do not wash until ready to use.</td>
</tr>
</tbody>
</table>
The growing season for many fruits and vegetables is very short, but most can be processed at home so they can be enjoyed throughout the year. Freezing is the best way to preserve nutrients, but drying and canning can also be used for some types of produce.

<table>
<thead>
<tr>
<th>PRODUCE</th>
<th>FREEZING</th>
<th>DRYING</th>
<th>CANNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apricots</td>
<td>Yes – blanched halves,</td>
<td>Yes – slices</td>
<td>Yes – halves,</td>
</tr>
<tr>
<td></td>
<td>quarters, slices, or jam</td>
<td></td>
<td>quarters, or jam</td>
</tr>
<tr>
<td>Apples</td>
<td>Yes – blanched slices,</td>
<td>Yes – slices</td>
<td>Yes – quarters,</td>
</tr>
<tr>
<td></td>
<td>cubes, or jam</td>
<td></td>
<td>slices, cubes, or jam</td>
</tr>
<tr>
<td>Beets</td>
<td>Yes – blanched cubes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Carrots</td>
<td>Yes – slices or blanched cubes</td>
<td>Yes – slices</td>
<td>No</td>
</tr>
<tr>
<td>Cherries</td>
<td>Yes – pitted whole or halves</td>
<td>Yes – halves</td>
<td>Yes – pitted whole, or jam</td>
</tr>
<tr>
<td>Corn</td>
<td>Yes – blanched kernels</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Cucumber</td>
<td>Yes – grated</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Eggplant</td>
<td>Yes – grated or blanched slices</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Garlic</td>
<td>Yes – grated or pureed</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Green beans</td>
<td>Yes – blanched pieces</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Herbs</td>
<td>No</td>
<td>Yes – whole leaves</td>
<td>No</td>
</tr>
<tr>
<td>Onions</td>
<td>Yes – sliced or minced</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Peaches</td>
<td>Yes – blanched slices,</td>
<td>Yes – slices</td>
<td>Yes – quarters,</td>
</tr>
<tr>
<td></td>
<td>cubes, or jam</td>
<td></td>
<td>slices, cubes, or jam</td>
</tr>
<tr>
<td>Peppers</td>
<td>Yes – slices, rings, or cubes</td>
<td>Yes – slices</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or rings</td>
<td></td>
</tr>
<tr>
<td>Potatoes</td>
<td>Yes – cooked then grated</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Raspberries</td>
<td>Yes – whole or jam</td>
<td>Yes – whole</td>
<td>Yes – whole or jam</td>
</tr>
<tr>
<td>Strawberries</td>
<td>Yes – halves, slices, or jam</td>
<td>Yes – slices</td>
<td>Yes – Jam</td>
</tr>
<tr>
<td>Summer squash</td>
<td>Yes – grated</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Tomatoes</td>
<td>Yes – diced or cooked sauce</td>
<td>No</td>
<td>Yes – diced or cooked sauce</td>
</tr>
</tbody>
</table>

**Freezing guidelines:** Spread solids out on a cookie sheet in a single layer to freeze. After frozen, transfer to a freezer bag or container. For jams and sauces, freeze directly in the container. Use within 1 year for best quality. **Drying guidelines:** Spread out in an even layer in a dehydrator tray. Follow the manufacturer's instructions for drying times and temperatures. **Canning guidelines:** Follow the USDA Home Canning Guidelines, available at your County Extension Office or [nchfp.uga.edu/publications/publications_usda.html](http://nchfp.uga.edu/publications/publications_usda.html).
Create a delicious salad from simple foods. Just choose an item from each category and follow the directions. Use your imagination! Each salad serves four adults.

Choose one base
- **Lettuce or salad greens**: Romaine, spring greens, arugula, etc.
- **Whole wheat pasta or noodles**: 2 cups pasta or 3 cups noodles, 6 cups water. Heat water until it boils. Stir in pasta or noodles. Cook until tender, about 10 minutes. Drain.
- **Brown rice**: 1 cup rice, 2 cups water. Combine rice and water. Bring to boil. Turn heat to low and cover pan with lid. Simmer until water is absorbed, about 45 minutes.
- **Potatoes**: 3 cups diced red, yellow, or gold potatoes, 6 cups water. Heat water until it boils. Add potatoes and cook until tender, about 10 minutes. Drain.
- **Whole grain**: Cooked wheat berries, quinoa, barley, etc., or dense whole grain bread torn in bite-size pieces and toasted.

Choose one protein
- 1 (15 oz.) can or 2 cups cooked dried beans (pinto, black, white, kidney, lentils, etc.)
- ½ pound cooked ground beef
- 1½ cups cooked and diced chicken, turkey, ham, beef, fish, or pork
- 2 cups chopped hard-boiled eggs
- 1-2 (6-8 oz.) canned beef, chicken, tuna, salmon, or other fish
- 1 (12-16 oz.) package extra firm tofu, drained and marinated in soy sauce and fruit juice

Choose two or more vegetables: Tomato, cucumber, broccoli, carrots, corn, green beans, peas, squash, etc.
- 2 cups fresh vegetables
- 2 cups frozen vegetables, thawed and cooked
- 1-2 (15 oz.) canned vegetables

Choose one or more fruits (optional)
- Apple, orange, raisins, dried cranberries, etc.

Choose one or more flavors
- ½ – 1 cup diced onion, celery, green pepper
- ¼ cup sliced black olives
- ½ cup salsa
- 2-4 tablespoons fresh herbs or 1-2 teaspoons dried herbs (oregano, basil, cumin, chili powder, thyme, rosemary, sage, etc.)
- Salt and pepper to taste

Choose one dressing (optional)
- If desired or as necessary, use a fat-free or low-fat dressing to help hold the salad ingredients together, add flavor, and keep salad from being too dry.

Choose one or more toppings (optional)
- ¼ cup slivered almonds, chopped walnuts or pecans
- 2 tablespoons grated parmesan cheese
- ¼ cup grated cheddar or mozzarella cheese

**DIRECTIONS:**
Select a food from each category or use your own favorites. Combine all ingredients except dressing and toppings in a large salad bowl. Either dress salad before serving or allow family members to add dressing and toppings as desired.
SALAD RECIPES

A pantry that is stocked with whole foods will help you create great tasting salads like these!

**Taco Salad**
- 1 onion, chopped
- 2 cups frozen corn
- 3 large tomatoes, diced
- 1 (15 oz.) can kidney or pinto beans, drained
- 1 cup cooked brown rice
- 1–2 teaspoons chili powder
- 1 teaspoon dried oregano, divided
- ¼ cup chopped fresh cilantro
- ½ cup salsa
- 1 head romaine lettuce, chopped
- Crumbled tortilla chips
- Shredded cheese
- Lime wedges

Heat small amount of water or vegetable broth in large nonstick skillet over medium heat. Add onion and corn and cook until the onion begins to brown, about 5 minutes. Remove from heat and add diced tomatoes, beans, rice, chili powder, and oregano. Stir to combine. Mix cilantro into salsa. Toss lettuce in a large bowl with the bean/rice mixture. Serve sprinkled with tortilla chips and cheese, with lime wedges and salsa at table.

**Thai Noodle Salad**
- 10 ounces spaghetti noodles, cooked and cooled
- ½ cup rice vinegar or red wine vinegar
- 3 tablespoons soy sauce
- 3 tablespoons lime juice
- 3 tablespoons sugar
- 1 teaspoon minced garlic
- ¼ teaspoon red chili flakes (optional)
- ¼ teaspoon sesame oil (optional)
- 1 (15 oz.) can chickpeas, drained and rinsed
- ¼ cup shredded carrots
- 2 green onions, thinly sliced
- 1 cup bell pepper, diced
- 1 cup frozen peas, thawed
- ½ cup chopped peanuts
- ½ cup chopped cilantro

Place noodles in large bowl. In small bowl, combine vinegar, soy sauce, lime juice, sugar, garlic, red chili flakes, and sesame oil. Stir to combine and dissolve sugar. Pour over noodles. Add chickpeas, carrots, green onions, bell pepper, and peas. Stir to coat veggies with dressing. Add peanuts and cilantro just before serving. Toss to mix.

**Simple Salad Dressing**: Mix together 3 tablespoons balsamic vinegar, 2 tablespoons Dijon mustard, 1 tablespoon maple syrup or honey. Especially good on green, grain, and pasta salads!

You can change the taste of basic ingredients in your dish simply by changing the herbs and spices you use. For instance, use these herbs and spices to get these flavors:

- Mexican-use cumin, oregano, chili powder, cilantro, and garlic
- Italian-use basil, oregano, parsley, and garlic
- Asian-use soy sauce, ginger, garlic, chilies, and turmeric
- Savory/Thanksgiving-use rosemary, sage, thyme, and parsley

For information on how to order printable versions of this handout, go to extension.usu.edu

This material was funded by USDA's Supplemental Nutrition Assistance Program - SNAP. Utah State University is an affirmative action/equal opportunity institution.
WEEK 3-- Food Sense Creates presents ~

Create...Amazing Vegetables
Vegetables are often the most neglected part of a family's meal, but are by far, the most nutritious part of the meal and can be the most flavorful part of the meal when prepared properly. In this lesson, participants learn the basic techniques to create nutritious and flavorful vegetables from items already found in the pantry and fridge. We discuss some meal planning and grocery shopping strategies that ensure always having good foods on hand.

Goal
After this lesson, participants will demonstrate the skills needed to stock their pantries with nutritious foods and to use those foods to create flavorful vegetables. They will use a whole food approach that follows the MyPlate meal plan.

Lesson Objectives
Participants will be able to:
- Discuss why vegetables are disliked by many people.
- Give three ways to prepare vegetables that enhance their flavor.
- Identify various foods of a well-stocked kitchen.
- Identify basic kitchen equipment needed to prepare vegetables.
- Identify steps necessary to cook and serve vegetables.
- Identify food safety concerns when preparing vegetables.
- Discuss which of five MyPlate food components are found in vegetable dishes and which food components should be added to create a MyPlate meal.

Handouts:
USDA 10 Tips: Add More Vegetables to Your Day
Create Amazing Vegetables

Recipe:
Sweet seasoned carrots
Create Amazing Vegetables Lesson Plan

1. Introduction
   This lesson teaches how quick and easy it is to prepare and cook vegetables from ingredients you already have.
   a. Vegetables are associated with unpleasant memories for many people. Because everyone has personal taste preferences, various preparations of vegetables may not be accepted by everyone. We will address some of these taste preferences during this lesson.
   b. Ask each class member to name their favorite vegetable and how they like to prepare it. Discuss as a group why they like certain preparations of vegetables and why they do not. For example; boiled spinach becomes slimy, overcooked carrots are mushy, broccoli that is overcooked becomes limp and smelly.
   c. Build on the positive comments given by group members.
      • Some comments could include: steamed vegetables that are lightly salted, raw vegetables dipped in a dressing, carrots cooked until crisp tender with a sweet sauce.
      • Emphasize that how vegetables are prepared can make a large difference in how well a vegetable is received by family members. Tell class members that we will discuss various preparation methods in this lesson. Encourage them to try vegetables they may dislike again prepared in a different way.
      • Note that dressing and sweet sauces can add additional calories, but they can also help us enjoy our vegetables! It is important to use these items in moderation. Discuss appropriate serving sizes, and lower calorie alternatives (yogurt based dips, hummus, roasting vegetables to increase sweet flavors instead of adding sugar).
   d. Discuss further with the class that vegetables taste better when they are in season, encourage the class to choose vegetables that are local and are currently being harvested. In season vegetables often have much more flavor!
   e. Another reason people avoid vegetables at mealtimes is because they can be time consuming to prepare. Encourage the class to discover new ways to prepare vegetables.
      • Use the microwave! This is a quick and easy way to cook fresh, canned, or frozen vegetables.
      • Peel, chop, or slice up a large amount vegetables all at once and package them in individual containers. This makes for convenient on the go snacks.
   f. Choose a wide variety of colors when choosing vegetables. Every color means a different kind and amount of vitamins, and bright colors mean those vegetables are fresh and flavorful.
   g. Canned and frozen veggies are a great substitute for fresh, they are essential to a well-stocked pantry. Look for low or no-sodium varieties, and avoid frozen vegetables with added sauces—these can add a lot of calories and are usually more expensive.
   h. Tell class that when vegetables are already in our homes they become convenient to make and offer at a meal.
   i. In this lesson, we will talk about an easy way to incorporate veggies into a meal.
2. Create Amazing Vegetables
   a. Equipment needed
      • Show and explain equipment: sharp knife, cutting board, vegetable peeler, vegetable grater, large mixing bowl, mixing spoons, saucepan, baking pan, casserole/oven proof dish, etc.
   b. Steps (demo each step as time permits)
      • Vegetables
         1. Discuss options—what do participants usually use, what other choices could they make
         2. Discuss how veggies are naturally rich in vitamins, minerals, antioxidants, and phytochemicals
         3. Veggies will give the dish more volume but not calories
         4. Demonstrate knife skills as you cut up veggies
      • Cooking method
         1. Discuss best options for veggies on hand
         2. Discuss food safety—when to worry about cross contamination, proper hygiene, acceptable temperatures, and safe storage
      • Flavor
         1. Discuss options—most common and not-so-common
         2. Onion and garlic—sauteed in very small amount of oil or in water/broth
         3. Choose spices/herbs according to other ingredients
            a. Example: use Mexican spices if dish has black beans, onion, garlic, tomatoes, and corn; use Italian if dish has pasta, tomatoes, zucchini; etc.
               i. Mexican: cumin, oregano, chili powder, cilantro, garlic
               ii. Italian: basil, oregano, parsley, garlic
               iii. Asian: soy sauce, ginger, garlic, chilies, turmeric
               iv. Savory/Thanksgiving: rosemary, sage, thyme, parsley
      • Extras
         1. Discuss options
         2. Discuss appropriate serving sizes for added fats, and why we want to limit added fats. (But note the positive benefits of including moderate amounts of healthy fats in our diets—flavor, texture, and essential fatty acids.)
   3. Practice
      a. Bring pantry items from home and have class members come up with as many ideas for vegetable dishes as possible from those foods
      b. Have class members think about their own pantry and create as many meal options as possible from what they already have
   4. Incorporating MyPlate
      a. What components of MyPlate does the vegetable dish already have?
      b. What can we add to our plate to round out the meal?
   5. Conclusion
      You don’t need a state-of-the-art kitchen, a degree from culinary school, or tons of time. You just need some basic equipment and food in the pantry to create delicious vegetables that your family will want to come home to!
6. Taste creation and answer questions

7. Schedule/reminder of next appointment

**Additional Helps for Create Amazing Vegetables**

**Buying Vegetables**
One of the reasons people don’t eat all the recommended vegetables is because of the expense. One of the ways to overcome this is to buy them when they are in season. What does it mean to be “in season”? It means the vegetable is growing and being harvested at that time. It means there is an abundance of the vegetable available. When vegetables are not in season, they are more expensive, because there is a limited supply. Tomatoes in December will be much more expensive than tomatoes in September, and they won’t taste as good.

Other ways to save money when purchasing vegetables include:
- Buy frozen and canned vegetables when they are on sale.
- Purchase from a farmer’s market or local producers.
- Join a co-op.

**Vegetables and Food Safety**
Even though vegetables are nutritional powerhouses, that doesn’t mean they’re resistant to foodborne illnesses and mishandling by the consumer. It is important to follow food safety practices with vegetables.
- When purchasing cans of vegetables, do not buy cans that have dents, bulges, or signs of rust.
- Carefully select frozen vegetables. Choose packages that contain firm, individual pieces. If the product feels like a solid block, it may be a sign that it has thawed and then been refrozen.
- Thoroughly wash all fresh vegetables before peeling, eating, or cooking. A vegetable brush is helpful. Do not use soap.
- Avoid cross-contamination when preparing a meal.
  - Cross-contamination occurs when bacteria from one item is carried to another item. It can occur if hands or cooking tools are not properly washed and sanitized. Meat and poultry products are especially notable for their bacteria-possessing properties prior to cooking. If possible, use one cutting board for fresh vegetables and another for raw meat, poultry, or fish. If you only have one cutting board, be sure to wash and sanitize it after each use, or cut the fresh vegetables before you cut the meat.
  - Use a different knife for meat than for vegetables; or sanitize the knife you used to cut meat; or cut the vegetables first.
  - Wash your hands!

**Storing Vegetables**
Fresh vegetables can be very delicate. Not only do we need to protect them from cross-contamination, but we also need to protect them while they are being stored because they have a short storage life.
- If you wash lettuce and other leafy vegetables before storing, drain thoroughly because too much moisture will cause decay.
• Store most fresh vegetables in the refrigerator crisper, a covered container, or plastic bag. Store potatoes, sweet potatoes, yams, and onions in a cool, dry place with good air circulation. Keep unripe tomatoes at room temperature, away from direct sunlight until ripe, then refrigerate.
• Frozen vegetables can be stored in the freezer for several months.
• Store canned vegetables in a cool dry place. For best quality, use within a year, but products will remain safe to eat for a longer period of time.

Adding More Vegetables to Your Plate
• Make vegetables part of every meal.
• Eat vegetables for snacks.
• Serve vegetables with flavorful low-fat or no-fat dips.
• Make nutritious main-dish salads with vegetables.
• Add extra vegetables to soup.
• Order a side salad instead of chips or fries.
10 tips to help you eat more vegetables

It's easy to eat more vegetables! Eating vegetables is important because they provide vitamins and minerals and most are low in calories. To fit more vegetables in your meals, follow these simple tips. It is easier than you may think.

1. **Discover fast ways to cook**
   Cook fresh or frozen vegetables in the microwave for a quick-and-easy dish to add to any meal. Steam green beans, carrots, or broccoli in a bowl with a small amount of water in the microwave for a quick side dish.

2. **Be ahead of the game**
   Cut up a batch of bell peppers, carrots, or broccoli. Pre-package them to use when time is limited. You can enjoy them on a salad, with hummus, or in a veggie wrap.

3. **Choose vegetables rich in color**
   Brighten your plate with vegetables that are red, orange, or dark green. They are full of vitamins and minerals. Try acorn squash, cherry tomatoes, sweet potatoes, or collard greens. They not only taste great but also are good for you, too.

4. **Check the freezer aisle**
   Frozen vegetables are quick and easy to use and are just as nutritious as fresh veggies. Try adding frozen corn, peas, green beans, spinach, or sugar snap peas to some of your favorite dishes or eat as a side dish.

5. **Stock up on veggies**
   Canned vegetables are a great addition to any meal, so keep on hand canned tomatoes, kidney beans, garbanzo beans, mushrooms, and beets. Select those labeled as "reduced sodium," "low sodium," or "no salt added."

6. **Make your garden salad glow with color**
   Brighten your salad by using colorful vegetables such as black beans, sliced red bell peppers, shredded radishes, chopped red cabbage, or watercress. Your salad will not only look good but taste good, too.

7. **Sip on some vegetable soup**
   Heat it and eat it. Try tomato, butternut squash, or garden vegetable soup. Look for reduced- or low-sodium soups.

8. **While you're out**
   If dinner is away from home, no need to worry. When ordering, ask for an extra side of vegetables or side salad instead of the typical fried side dish.

9. **Savor the flavor of seasonal vegetables**
   Buy vegetables that are in season for maximum flavor at a lower cost. Check your local supermarket specials for the best-in-season buys. Or visit your local farmer's market.

10. **Try something new**
    You never know what you may like. Choose a new vegetable—add it to your recipe or look up how to fix it online.

Go to www.ChooseMyPlate.gov for more information.
Create delicious and nutritious vegetable dishes from simple foods. Just choose an item from each category and follow the directions. Use your imagination! Each dish serves four adults.

### Choose one or more vegetables to make 4 cups

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<thead>
<tr>
<th>Category</th>
<th>Vegetables</th>
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<tr>
<td>1</td>
<td>Anagula</td>
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<td>Avocado</td>
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<td>Bamboo Shoots</td>
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<td>Broccoli</td>
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<td>Brussels Sprouts</td>
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</table>

### Choose a cooking method

- **Roast**: Chop vegetables into uniform 1" cubes. Combine with 1-2 tablespoons olive oil and herbs as desired. Put on a baking sheet in single layer. Roast at 425°F till tender, 10-50 minutes depending on vegetable. Stir occasionally. Roasting brings out naturally sweet flavor of vegetables!
- **Steam**: Bring water to a boil in sauce pan with steamer basket. Place vegetables in the steamer. Cover and steam until tender (3-10 minutes depending on vegetable). If vegetables are green, leave lid askew to help retain color. Season as desired.
- **Sauté**: Heat a small amount of oil or water on low heat. Turn heat to medium-high and when pan is hot, add food. Don’t over-crowd food. The goal is to create a crust around each piece of food in the pan so that it is browned and crispy outside and tender inside. Do not over-stir.
- **Grill/Broil**: Spray grill rack or broiler pan with cooking spray. Heat grill or broiler pan for 10-15 minutes. Add cubed or sliced vegetables. Leave ¼ inch between food items to ensure even cooking. “Flip” vegetables only once during cooking to sear. Use seasonings for flavor; add sticky sauces just before serving or pass sauce around table.
- **Boil**: Place cubed vegetables in large pot and add enough water or stock to barely cover. Cover and bring to low boil over high heat; reduce heat and simmer until vegetables are tender. Do not overcook.

### Choose one or more flavors (optional)

- Chopped onion, celery, green pepper, hot pepper
- Minced garlic and/or ginger
- Lemon juice and/or zest
- 1 – 2 teaspoons dried herbs (oregano, basil, cumin, chili powder, thyme, rosemary, sage, dill, etc.)
- Salt and pepper to taste
- Soy sauce, balsamic vinegar, red wine vinegar, sesame oil, or olive oil

### Choose one or more extras (optional)

- ¼ cup breadcrumbs, 2 tablespoons grated parmesan cheese, ¼ cup grated cheddar or mozzarella cheese

### DIRECTIONS:

Select vegetables and cooking method. Choose flavors and extras. Cook according to instructions above. Add extras before serving.
AMAZING VEGGIE RECIPES

A pantry that is stocked with whole foods will help you create great tasting vegetables like these!

**Spicy Hash Browns**
- 1 tablespoon olive oil
- 1 teaspoon paprika
- ¼ teaspoon chili powder
- ½ teaspoon salt
- ¼ teaspoon pepper
- 6 cups diced baking potato
- Cooking spray
- Aluminum foil

Preheat oven to 400°F. Combine all ingredients in a large bowl and stir to coat potatoes in seasonings and oil. Line baking sheet with foil and spray with cooking spray. Spread potatoes on sheet in a single layer. Bake 30 minutes or until browned.

_Yield: 5 (1 cup) servings._

**Sweet Seasoned Carrots**
- 6 – 8 large carrots, thin sliced on the diagonal
- 1 yellow onion, diced
- 1 teaspoon butter
- 1 – 2 tablespoons brown sugar
- ½ - ¾ teaspoon Italian seasoning
- Salt and pepper to taste

Place carrots, onion, and butter in large skillet with just enough water to cover carrots. Bring to boil, reduce heat, and simmer until water is evaporated and carrots are tender but not mushy.

Add brown sugar and seasonings. Stir well to coat each carrot with seasoning and cook another 5 minutes.

_Yield: 6 servings_

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This material was funded by USDA's Supplemental Nutrition Assistance Program - SNAP. Utah State University is an affirmative action/equal opportunity institution.
WEEK 4—Food Sense Creates presents ~

Create...a Stir-Fry
Stir-fry means fast, great flavor! In this lesson, participants learn the basic techniques to create a wholesome and nutritious stir-fries from foods already found in the pantry and fridge. We discuss some meal planning and grocery shopping strategies that ensure always having good foods on hand. We discuss the difference between whole foods and refined foods, and why whole is a better choice.

Goal
After this lesson, participants will demonstrate the skills needed to stock their pantries with nutritious foods and to use those foods to create tasty stir-fries. They will use a whole food approach that follows the MyPlate meal plan.

Lesson Objectives
Participants will be able to:
• Name three ways to save money on fruits and vegetables.
• Identify what produce is most readily available for each season.
• Identify basic kitchen equipment needed to make a stir-fry.
• Identify steps necessary to cook and serve a stir-fry.
• Identify food safety concerns when preparing a stir-fry.
• Discuss which of five MyPlate food components are found in stir-fries and which food components should be added to make the meal a MyPlate meal.

Handouts:
USDA 10 Tips: Smart Shopping for Fruits and Vegetables
Create a Stir Fry handout

Recipe:
Flavorful Veggie Stir Fry
Recipe Modification: Use chicken and in season vegetables
Create a Stir-Fry Lesson Plan

1. Introduction
   This lesson teaches how quick and easy it is to put together a delicious stir-fry from ingredients you already have.

   a. It is possible to fit fruits and vegetables into every food budget! There are many ways to make fruits and vegetables more affordable for your family.

      - Purchase fruits and vegetables that are in season. In season produce is typically much cheaper than buying produce out of season. Farmers markets, farm stands, grocery stores, and local farmers are a few places these items can be found. Some examples for each season include:

         a. Summer: Carrots, cucumbers, melon, berries, peaches, tomatoes, apricots, and much more!
         b. Fall: Squash, pumpkins, onions, potatoes, beets, peppers and more!
         c. Winter: Carrots, onions, cabbage, spinach, bananas, apples, and oranges are a few examples of produce that is reasonably priced in the winter. Try frozen fruit and vegetables without any added sugar or salt.
         d. Spring: Lettuce, chard, kale, spinach, green beans, peas, and more.

      - Buy extra fresh produce during the summer months when the price is lower and freeze to eat during the winter months. Some easy to freeze produce includes: spinach, kale, raspberries, peaches, corn, tomatoes, and peppers. Even ginger can be frozen between each use! These frozen items can easily be added to soups, stews, casseroles, smoothies and stir-fries.

      - Buy produce that is on sale. Look through local newspapers and weekly grocery ads for coupons and sales. Often times you can find stores with sale prices on in season produce. If you don’t want to shop at several stores, try price matching!

      - When you make a shopping list, include the specific fruits and vegetables you want to purchase. If you plan out your meals ahead of time, you will have a good idea of what produce you want for the week.

      - During the winter season when there is less variety of produce, look in the fresh and frozen foods section. Frozen fruits and vegetables have just as many vitamins as fresh! Canned fruit and vegetables do lose some of the nutrients during processing, but they still have a lot of fiber and are very good for you. When purchasing canned fruits and vegetables, try items without added sugar or low sodium. If you’re buying canned fruit, try it in 100% juice. Avoid frozen vegetables with added sauces, these are higher in calories and usually more expensive too.

      - To ensure none of your produce goes to waste, buy only enough for a week and plan to go back to the grocery store for the produce you need the next week.

      - Try store brand options instead of name brand. They are often cheaper with the same high quality.

      - Buy fruits and vegetables in their natural most basic form. If produce has been pre cut, pre washed, or bagged, it’s likely to be more expensive than the produce you need to bag and prepare yourself.
• Plant your own garden! This is an excellent way to plant a variety of produce that you can use throughout the year. SNAP benefits can be used for gardening supplies like seeds, vegetable starters, and more! Check with your local extension office for resources to help learn how to garden.

• If you have extra fruit or vegetables on hand, try making something that you can freeze and save for later like soup or casseroles.

b. What are some of your best money saving tips for grocery shopping?
c. How does availability of produce influence your fruits and vegetable purchases?
d. A stir-fry is a great way to incorporate fruits and vegetables into meals. Next we will talk about how to create a stir-fry using what we have on hand.

2. Create a Stir-Fry
   a. Choose whole foods
      • It is easier to cook with whole foods when making a stir-fry than any other dish. We automatically think of fresh veggies!
   b. Equipment needed
      • Show and explain equipment: sharp knife, cutting board, vegetable peeler, vegetable grater, large mixing bowl, mixing cups and spoons, large skillet.
   c. Steps (demo each step as time permits)
      • Discuss importance of prepping all ingredients (protein, marinade, veggies, sauce, glaze) before you start cooking. Once you start, you work quite quickly through each step.
      • Warm skillet over low heat
         1. Prepare protein
            • Discuss options—both meat and plant based
            • Discuss food safety—when to worry about cross contamination, proper hygiene, acceptable temperatures, and safe storage
            • Discuss cutting all foods in stir-fry about same size for even cooking times
         • Marinade
            1. Discuss how it adds flavor
            2. Discuss cross contamination and meat—throw marinade out—don’t reuse
         • Vegetables
            1. Discuss how veggies are naturally rich in vitamins, minerals, antioxidants, and phytochemicals
            2. Veggies will give dish more volume but not calories
            3. Demonstrate skills as you cut up veggies
            4. Onion and garlic add flavor, other veggies provide volume and flavor
         • Sauce/glaze
            1. Sauce adds flavor
            2. Glaze provides more flavor, gives texture, and holds stir-fry together
      • Cook on medium high heat in batches to keep pan hot
         1. Very easy to use too much fat—if food is sticking to pan, reduce heat a little and add very small amount of water or broth

3. Practice
   a. Bring pantry items from home and have class members come up with as many ideas for different stir-fries as possible from those foods
   b. Have class members think about their own pantry and create as many stir-fry meal options as possible from what they already have
4. Incorporating MyPlate
   a. What components of MyPlate does stir-fry already have?
   b. What can we add to our plate to round out the meal?

5. Conclusion
   You don't need a state of the art kitchen, a degree from culinary school, or tons of time. You just need some basic equipment and food in the pantry to create a delicious stir-fry that your family will want to come home to!

6. Taste creation and answer questions

7. Schedule/remind of next appointment
smart shopping for veggies and fruits

10 tips for affordable vegetables and fruits

It is possible to fit vegetables and fruits into any budget. Making nutritious choices does not have to hurt your wallet. Getting enough of these foods promotes health and can reduce your risk of certain diseases. There are many low-cost ways to meet your fruit and vegetable needs.

1. Celebrate the season
   Use fresh vegetables and fruits that are in season. They are easy to get, have more flavor, and are usually less expensive. Your local farmer’s market is a great source of seasonal produce.

2. Why pay full price?
   Check the local newspaper, online, and at the store for sales, coupons, and specials that will cut food costs. Often, you can get more for less by visiting larger grocery stores (discount grocers if available).

3. Stick to your list
   Plan out your meals ahead of time and make a grocery list. You will save money by buying only what you need. Don’t shop when you’re hungry. Shopping after eating will make it easier to pass on the tempting snack foods. You’ll have more of your food budget for vegetables and fruits.

4. Try canned or frozen
   Compare the price and the number of servings from fresh, canned, and frozen forms of the same veggie or fruit. Canned and frozen items may be less expensive than fresh. For canned items, choose fruit canned in 100% fruit juice and vegetables with “low sodium” or “no salt added” on the label.

5. Buy small amounts frequently
   Some fresh vegetables and fruits don’t last long. Buy small amounts more often to ensure you can eat the foods without throwing any away.

6. Buy in bulk when items are on sale
   For fresh vegetables or fruits you use often, a large size bag is the better buy. Canned or frozen fruits or vegetables can be bought in large quantities when they are on sale, since they last much longer.

7. Store brands = savings
   Opt for store brands when possible. You will get the same or similar product for a cheaper price. If your grocery store has a membership card, sign up for even more savings.

8. Keep it simple
   Buy vegetables and fruits in their simplest form. Pre-cut, pre-washed, ready-to-eat, and processed foods are convenient, but often cost much more than when purchased in their basic forms.

9. Plant your own
   Start a garden—in the yard or a pot on the deck—for fresh, inexpensive, flavorful additions to meals. Herbs, cucumbers, peppers, or tomatoes are good options for beginners. Browse through a local library or online for more information on starting a garden.

10. Plan and cook smart
    Prepare and freeze vegetable soups, stews, or other dishes in advance. This saves time and money. Add leftover vegetables to casseroles or blend them to make soup. Overripe fruit is great for smoothies or baking.

Go to www.choosemyplate.gov for more information.
Create a delicious stir fry dish from simple foods. Just choose an item from each category and follow the directions. Use your imagination! Each stir fry serves four adults.

**Prepare one protein**
- 1–2 cups cooked beans or lentils
- 1 package firm tofu cut into ½ inch cubes
- 1 pound raw chicken, beef, or pork cut into bite-sized pieces

**Marinate protein**
- 1 tablespoon soy sauce + 1 tablespoon water, chicken broth or apple juice

**Prepare produce**
- 1 onion, cut in wedges + 1 – 2 cloves garlic, minced + 1 tablespoon grated ginger + 2 cups fresh vegetables from choices below:
  - Carrots
  - Cabbage
  - Mushrooms
  - Celery
  - Green pepper
  - Red pepper
  - Bean sprouts
  - Zucchini
  - Yellow squash

**Warm skillet on very low heat**

**Make a sauce of glaze**
- **Sauce**: ¼ cup vegetable or chicken broth, ¼ cup soy sauce, 1-2 teaspoons sugar, 2-4 teaspoons vinegar.
- **Glaze**: 2 teaspoons cornstarch, 2 tablespoons water, broth or apple juice.

**Turn heat under skillet to medium-high**
- Make sure all ingredients are close at hand.

**DIRECTIONS:**
Add 2–4 tablespoons water or broth to pan. When hot, add half of protein. Stir fry until well browned and cooked through, about 2-3 minutes. Transfer to clean bowl, add more water, and stir fry remaining protein the same way. Transfer to bowl. *Cooking the protein in batches helps to keep pan hot.*

Add more water to pan. Add onion and stir fry until browned but still crisp, about 1 minute. Add garlic and ginger; stir. Add half of vegetables and stir a few minutes, then add remaining vegetables. Stir fry until vegetables are tender-crisp. Do not overcook vegetables.

Return protein to pan and stir in sauce until everything is well coated. Add glaze and stir until sauces in pan are glossy.

Serve immediately with noodles or rice.
### STIR FRY RECIPES

A pantry that is stocked with whole foods will help you create great tasting stir fries like these!

- **Flavorful Veggie Stir Fry**
  - 1 (16 oz.) package extra firm tofu
  - 1 tablespoon sugar
  - 5 tablespoons soy sauce, divided
  - ¼ cup apple juice or vegetable broth
  - 3 cups broccoli florets, cut in bite-sized pieces
  - 2 medium carrots, thinly sliced
  - 1 (8 oz.) package frozen pea pods, thawed
  - 2 tablespoons chopped onion
  - 1 (8 oz.) can sliced water chestnuts, un-drained
  - 2 tablespoons cornstarch
  - Hot cooked rice, spaghetti noodles, or soba noodles

Cut tofu into 1-inch cubes and place on baking sheet. In a bowl, combine sugar, 3 tablespoons soy sauce, and apple juice or water until smooth. Pour over tofu and set aside. In a large skillet over medium-high heat, stir fry broccoli, carrots, pea pods, and onion in 1 tablespoon water or broth for 1 minute. Stir in water chestnuts. Cover and simmer for 4 minutes; remove from pan and keep warm. In the same skillet, stir fry tofu until outside is crispy. Return vegetables to pan. Combine 2 tablespoons soy sauce and cornstarch. Mix well and pour over vegetables. Stir fry until glossy. Serve over rice or noodles.

**Yield:** 4 servings

- **Teriyaki Chicken**
  - 2-3 chicken breasts
  - ½ cup soy sauce
  - ½ teaspoon ground ginger
  - 1 clove garlic, minced
  - ½ cup water
  - 2 tablespoons sugar
  - 1 large onion, chopped
  - 1-2 green peppers chopped
  - 1 cup sliced mushrooms
  - 2 tablespoons cornstarch
  - 2 tablespoons water

Cut chicken into 1-inch cubes. Combine soy sauce, ginger, garlic, ½ cup water, and sugar in small bowl. Add chicken and soak 30-60 minutes. Over medium-high heat, stir fry chicken in water or broth until done. Remove from pan and keep warm. Add vegetables to pan and stir fry until crisp tender. Add chicken back into pan. Combine cornstarch and water; add to pan and cook until thick. Serve with hot brown rice.

**Yield:** 4-6 servings

You can change the taste of basic ingredients in your dish simply by changing the herbs and spices you use. For instance, use these herbs and spices to get these flavors:

- **Mexican**-use cumin, oregano, chili powder, cilantro, and garlic
- **Italian**-use basil, oregano, parsley, and garlic
- **Asian**-use soy sauce, ginger, garlic, chiles, and turmeric
- **Savory/Thanksgiving**-use rosemary, sage, thyme, and parsley

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For information on how to order printable versions of this handout, go to extension.usu.edu

This material was funded by USDA's Supplemental Nutrition Assistance Program - SNAP. Utah State University is an affirmative action/equal opportunity institution.

Utah State University
**FOOD SENSE**
NUTRITION & FOOD SCIENCE/EXTENSION
WEEK 5-- Food $ense Creates presents ~

Create...an Omelet
Nothing could be faster and easier to make an omelet! In this lesson, participants learn the basic techniques to create a wholesome and nutritious omelet from foods already found in the pantry and fridge. We discuss some meal planning and grocery shopping strategies that ensure always having good foods on hand.

Goal
After this lesson, participants will demonstrate the skills needed to stock their pantries with nutritious foods and to use those foods to create tasty omelets. They will use a whole food approach that follows the MyPlate meal plan.

Lesson Objectives
Participants will be able to:
- Name three ways menu planning can save time and money.
- Build a menu for 7 days.
- Identify various foods of a well-stocked kitchen.
- Identify basic kitchen equipment needed to make an omelet.
- Identify steps necessary to cook and serve an omelet.
- Identify food safety concerns when preparing an omelet.
- Discuss which of the five MyPlate food components are found in omelets and which food components should be added to make the meal a MyPlate meal.

Handouts:
- Food $ense Menu Planning and Weekly Menu Worksheet
- Create an Omelet handout

Recipe:
- Garden style omelet
Create an Omelet Lesson Plan

1. Introduction
   This lesson teaches how quick and easy it is to put together a tasty omelet from ingredients you already have.
   a. Ask the class: What does a typical evening meal look like for you? Do you ever feel frustrated when everyone is hungry and you have no idea what to make?
   b. Ask the class: Do you ever plan a head of time what your evening meal will be? Do you ever plan your afternoon and morning meals a head of time?
   c. Menu planning will help you save time and money.
      - Shopping for only what you need to make the meals for the week helps you avoid impulse purchases, this will lower your bill at the checkout.
      - By planning a weekly menu, grocery shopping should be limited to once a week. The goal is to get everything you need at one time to avoid multiple trips to the grocery store.
      - After you have used a menu for a few weeks, you will begin to recognize foods that your family eats on a regular basis. This will allow you to buy extra of these foods when they are on sale, or to buy these foods in bulk. This will help keep your pantry stocked and your food bills low.
   d. Using a menu will allow you to plan more nutritious meals that will improve the overall health of your family.
      - Using the MyPlate template when planning your menus will help you pack as much nutrition as possible into your meals. Think of the MyPlate picture, what do you need to buy for every meal in order to offer all components of the plate?
      - Shopping for only what is on your menu helps you to avoid impulse purchases these types of purchases are usually foods that are high in fat, sugar, and sodium.
   e. Activity: Distribute a blank piece of paper, the weekly menu handout, and pencils to class members.
      - Tell the participants that you will give them one minute to write down as many of their favorite evening meals as they can.
      - Ask the class: Who came up with seven meals? Tell the class that they have just planned evening meals for a whole week. Point out that this is how menu planning starts. The other meals can be planned just as easily.
      - Give the class five minutes to transfer their evening meals to their template and begin planning afternoon and breakfast meals.
      - Now have the class begin a shopping list on their blank piece of paper. Have participants look at the first day/meal they have planned. Have them list every ingredient they will need for each meal. Tell them to look in their pantry when they get home and cross off the ingredients they already have.
      - Handout the Menu Planning Tip Sheet and briefly discuss it.
      - Tell class that an omelet is a versatile menu idea that can be used for breakfast, lunch, or dinner.

2. Create an Omelet
   a. Choose whole foods whenever possible
   b. Equipment needed
      - Show/explain equipment: sharp knife, cutting board, vegetable peeler, vegetable/cheese grater, large mixing bowl, mixing spoons, whisk or fork, nonstick skillet, etc.
   c. Steps (demo each step as time permits)
      - Prepare fillings of choice; set aside
1. Discuss options—most common and not so common
2. Discuss how veggies are naturally rich in vitamins, minerals, antioxidants, and phytochemicals
3. Veggies will give the dish more volume but not calories
4. Demonstrate knife skills as you cut up veggies
5. Use moderate amounts of high calorie ingredients (butter, cheese, etc.)
   - Crack eggs
     1. Discuss food safety—when to worry about cross contamination, proper hygiene, temperature, and storage
     - Add salt, pepper, water, herbs
     - Heat pan, add cooking spray
     - Add eggs to pan
     - Pull cooked eggs from edges
     - Add filling
     - Fold and slide off plate

3. Practice
   a. Bring pantry items from home and have class members come up with as many ideas for omelets as possible from those foods
   b. Have class members think about their own pantry and create as many meal options as possible from what they already have

4. Incorporating MyPlate
   a. What components of MyPlate does omelet already have?
   b. What can we add to our plate to round out the meal?

5. Conclusion
   You don’t need a state-of-the-art kitchen, a degree from culinary school, or tons of time.
   You just need some basic equipment and food in the pantry to create a delicious omelet that your family will want to come home to!

6. Taste creation and answer questions

7. Schedule/remind of next appointment

Additional Helps for Create an Omelet

Hints for Making the Perfect Omelet

One of the tricks to making a great omelet is to make sure you have all of your ingredients ready before you start cooking the eggs. Once the eggs hit the hot pan, everything goes really fast. You can precook any of the ingredients before adding them to the omelet (mushrooms, onions, meats, etc.).

Crack the eggs into a bowl and add water (one tablespoon water per egg). The water helps to make a light and fluffy omelet. Whisk the egg/water mixture vigorously to incorporate as much air into the eggs as possible.

Heat a nonstick skillet over medium-high heat until a drop of water sizzles. Spray the pan with cooking spray and add the eggs. Gently tilt the pan so eggs are evenly distributed over the bottom of the pan. Let the eggs begin to set up in the pan, then carefully push the cooked edges towards the
center of the pan. Tilt the pan to let any liquid run underneath. Repeat as needed until there is no liquid left.

Add toppings of choice down center of omelet. Fold in thirds and slide onto plate. That is all there is to it!

**Importance of Breakfast**

Although we can eat an omelet or frittata at any meal, we typically think of them as breakfast foods. Mom was right! Breakfast really is the most important meal of the day. Breakfast eaters are likely to be:

- More alert.
- More energetic.
- Quicker to react.
- Better students and employees.
- More productive.
- Less likely to overeat.
- Less likely to be absent.

Some quick, easy, and nutritious breakfast foods include:

- A blender drink made of fruit, milk and yogurt, especially if you make it the night before and keep it in the fridge.
- A piece of fruit and a bagel.
- Oatmeal with milk and raisins.
- Trail mix or granola bar with 100% fruit juice.
- Sandwich with milk.
- Whole wheat bread or English muffin with peanut butter.

Leftover pizza or a burrito works just fine as breakfast food! Breakfast for dinner is also a good idea. If you don’t have time to make your favorite breakfast for breakfast, there is no reason not to have it for dinner.
Menu Planning

ONE OF THE MOST IMPORTANT THINGS YOU WILL EVER DO!

To save time and money, budget food dollars, plan menus, and shop wisely.

PLAN MENUS
• Select some family favorites.
• Add some budget stretchers.
• Turn leftovers into planned-overs.
• Include some convenience foods.
• Read ads for store specials.
• Don’t forget to plan breakfast and healthy snacks.
• Prepare a shopping list.

SHOP WISELY
• Shop once a week or less.
• Use an organized shopping list.
• Use coupons wisely.
• Read labels and compare unit prices.
• Choose the store’s least busy time and leave children at home.
• Shop after you have eaten something.

ORGANIZE KITCHEN
• Acquire necessary equipment.
• Arrange food and equipment conveniently.

STOCK KITCHEN
• Stock cupboards, refrigerator and freezer with supplies.
• Purchase in quantity and repackage into portion sizes.

INVOLVE FAMILY MEMBERS
• Delegate mealtime tasks.
• Teach life skills.

EFFICIENT CLEANUP
• Clean as you go.
• Soak dirty dishes.
• Assign family members cleanup chores.

Why Family Mealtime?

Children who live in families that eat together 5 or more nights per week on a consistent basis enjoy the following as compared to kids who eat less than 2 times per week with their families:
• Nutrition and physical development – eat more fruits & veggies; wider variety of nutritious foods; lower rates of obesity; make healthier choices when on their own.
• Emotional development – better able to manage negative emotions; less risk of having eating disorders; more positive interactions with others.
• Social development – learn important turn-taking skills; improved communication skills; learn appropriate ways to share thoughts, feelings, opinions.
• Academics – more likely to make A’s and B’s; develop larger vocabularies.
• Behavior – less likely to use drugs, alcohol, or tobacco or engage in other risky behavior.
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CREATE AN OMELET

Create a tasty omelet from simple foods. Just follow each step. Use your imagination! Each omelet serves one adult.

**1 Prepare fillings of choice; set aside**
- Vegetables: onion, green pepper, mushroom, tomato, salsa, green chili, broccoli, squash, etc.
- Grated cheese: cheddar, mozzarella, Swiss, American, parmesan, feta, etc.
- Cooked meat: ham, bacon, Canadian bacon, chicken, etc.

**2 Crack two eggs in a small bowl**

**3 Add salt, pepper, water, and herbs to bowl and gently stir.**
- **Water:** 2 tablespoons
- **Herbs:** 1 tablespoon of chives and/or parsley (optional)

**4 Heat omelet pan or non-stick skillet over medium-high heat. Spray with cooking spray.**

**5 Add egg mixture to pan and tilt to evenly coat bottom of pan with eggs.**

**6 Pull cooked egg from edge of pan with spatula and let liquid eggs run underneath.**

**7 Add fillings down center of omelet.**

**8 Fold omelet in thirds and slide onto plate.**

**DIRECTIONS:**
The pan should be hot when you add the cooking spray so that it sizzles. Pour the egg mixture into the pan. Spread the mixture evenly over the bottom of the pan. Gently start pulling the cooked egg to the center of the pan and let the liquid egg run underneath. When the eggs are mostly set but the top is still a little runny, add any filling of choice. Fold the omelet with a spatula and carefully slide it onto a plate.
OMELET RECIPES

A pantry that is stocked with whole foods will help you create great tasting skillet meals like these!

**Ranch Style Omelet Filling**
- Cherry tomatoes, cut in half
- Sliced mushrooms
- Diced red onion
- Fresh parsley
- Cheddar cheese
- Fat-free ranch dressing

**Greek Style Omelet Filling**
- Sliced mushrooms
- Sliced green onions
- Diced tomato
- Sliced olives
- Feta cheese

**Mexican Style Omelet Filling**
- Pinto or black beans-refried or whole
- Salsa
- Avocado slices
- Monterey Jack cheese
- Cumin and chili powder (added to eggs)

**Garden Style Omelet Filling**
- Sliced mushrooms
- Sliced yellow summer squash
- Sliced zucchini
- Diced red pepper
- Diced onion
- Parmesan cheese
- Basil and garlic powder (added to eggs)

You can change the taste of basic ingredients in your dish simply by changing the herbs and spices you use. For instance, use these herbs and spices to get these flavors:

- **Mexican**: use cumin, oregano, chili powder, cilantro, and garlic
- **Italian**: use basil, oregano, parsley, and garlic
- **Asian**: use soy sauce, ginger, garlic, chiles, and turmeric
- **Savory/Thanksgiving**: use rosemary, sage, thyme, and parsley

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This material was funded by USDA's Supplemental Nutrition Assistance Program - SNAP. Utah State University is an affirmative action/equal opportunity institution.
WEEK 6-- Food Sense Creates presents ~

Create a Smoothie
Nothing says quick and easy like a smoothie! In this lesson, participants learn the basic techniques to create a wholesome and nutritious smoothie from foods already found in the pantry and fridge. We discuss some meal planning and grocery shopping strategies that ensure always having good foods on hand. We discuss the difference between whole foods and refined foods, and why whole is a better choice.

Goal
After this lesson, participants will demonstrate the skills needed to stock their pantries with nutritious foods and to use those foods to create tasty smoothies. They will use a whole food approach that follows the MyPlate meal plan.

Lesson Objectives
Participants will be able to:
- Name three reasons why family mealtime is important.
- Identify how cooking together improves nutrition for the whole family.
- Identify various foods of a well-stocked kitchen.
- Identify basic kitchen equipment needed to make a smoothie.
- Identify steps necessary to prepare a smoothie.
- Identify food safety concerns when preparing a smoothie.
- Discuss which of five MyPlate food components are found in smoothies they make and which food components should be added to make the meal a MyPlate meal.

Handouts:
Create a Smoothie
USDA 10 Tips: Focus on Fruit

Recipe:
Popeye smoothie
Create a Smoothie Lesson Plan

1. Introduction: This lesson teaches how quick and easy it is to make a smoothie from ingredients you already have. First we are going to talk about how our family and culture influence our food choices.
   a. Family traditions and culture heavily influence our dietary intake.
      • Different cultures and ethnicities have various fruits and vegetables that are commonly included in the diet. For example:
        1. European Americans—potatoes, bananas, apples, citrus juice, lettuce
        2. Mexican Americans—tomatoes, squash, peppers, onions, tropical fruits,
        3. Middle Eastern Americans—figs, dates, pomegranates, eggplants, lemons.
        4. American Indians—berries, wild greens
        5. African Americans—black eyed peas, okra, greens, and more
      • What fruits and vegetables are commonly consumed in your cultural group?
   b. Sometimes it can seem challenging to incorporate enough fruits and vegetables into our diet because of how our culture or traditions influence our diet however it doesn’t have to be this way! Here are a few tips to incorporating cultural and traditional foods:
      • Look around town for a grocery store that carries fruits and vegetables commonly consumed in your culture. Remember to ask the clerk if the store accepts SNAP benefits!
      • Shop for those cultural fruits and vegetables when they are in season so you get the best price and the best flavor.
      • Look in your grocery store for sections specifically with Mexican, Asian, or other ethnic foods. You should be able to find canned fruits and vegetables that are an excellent alternative to fresh if the produce you’re looking for is not in season.
      • If you can’t find the cultural fruit and vegetables in the grocery store that you want to include in meals, try planting your own garden with the specific produce that meets your family’s traditions and cultural preferences! Beans, peppers, tomatoes, squash, corn and many other common cultural foods can be grown here in Cache Valley.
      • If you’re going to a family gathering, ask if you could bring a fruit or vegetable side dish! This way you will make sure there will at least be some fruits/vegetables on the dinner table.
      • Find out if the fruits and vegetables you usually eat are named something different in the U.S. For example: Papaya is commonly called Papaw in Africa and the United Kingdom. Pineapple is called ananas in most other countries besides the U.S.
      • Incorporate fruits and vegetables into cultural dishes.
        1. Putting tomatoes, lettuce, avocado on burritos or tacos
        2. Add zucchini, yellow squash, tomatoes, or onions to pasta dishes
        • Make new family mealtime traditions with dishes incorporating fruits and vegetables. Find a dish with fruit or vegetables that your family really enjoys and make it on holidays or special occasions.
   c. What are some ways you can think of to include fruit and vegetables into your family traditions or cultural traditions at mealtime?
   d. A smoothie is a great way to finish off an amazing meal. They are packed with nutrition and are low in sugar and fat. A smoothie is a great substitute for traditional desert; they are smooth, creamy, and delicious! Smoothies can also be a good meal
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2. Create a Smoothie
   a. Choose whole foods as often as you can
      • Example: Discuss difference between smoothie made with ice cream, chocolate syrup, and sweetened fruit versus one with fresh or frozen fruit, spinach, and fat-free milk or a milk alternative
   b. Equipment needed
      • Show/explain equipment—good knife, cutting board, vegetable peeler, blender or food processor, etc.
   c. Steps (demo each step as time permits)
      • Produce
         1. Discuss options—what do participants usually use, what better choices could they make
         2. Discuss fresh, frozen, and canned alternatives
         3. Discuss how fruits and veggies are naturally rich in vitamins, minerals, antioxidants, and phytochemicals
         4. Fruits and veggies will give the smoothie more volume but not calories
      • Liquid
         1. Discuss options
      • Extras
         1. Discuss options—most common and not so common

3. Practice
   a. Bring pantry items from home and have class members come up with as many ideas for smoothies as possible from those foods
   b. Have class members think about their own pantry and create as many smoothie options as possible from what they already have

4. Incorporating MyPlate
   a. What components of MyPlate does smoothie already have?
   b. What can we add to our plate to round out the meal?

5. Conclusion: You don’t need a state-of-the-art-kitchen, a degree from culinary school, or tons of time. You just need some basic equipment and food in the pantry to create a delicious meal that your family will want to come home to!

6. Taste creation and answer questions

7. Schedule/remind of next appointment
focus on fruits

10 tips to help you eat more fruits

Eating fruit provides health benefits. People who eat more vegetables and fruits as part of an overall healthy diet are likely to have a reduced risk of some chronic diseases. Fruits provide nutrients vital for health, such as potassium, dietary fiber, vitamin C, and folate (folic acid). Most fruits are naturally low in fat, sodium, and calories. None have cholesterol. Any fruit or 100% fruit juice counts as a part of the Fruit Group. Fruits may be fresh, canned, frozen, or dried, and may be whole, cut-up, or pureed.

1. Keep visible reminders
   Keep a bowl of whole fruit on the table, counter, or in the refrigerator.

2. Think about taste
   Buy fresh fruits in season when they may be less expensive and at their peak flavor. Add fruits to sweeten a recipe.

3. Think about variety
   Buy fruits that are dried, frozen, and canned (in water or 100% juice) as well as fresh, so that you always have a supply on hand.

4. Don’t forget the fiber
   Make most of your choices whole or cut-up fruit, rather than juice, for the benefits that dietary fiber provides.

5. Be a good role model
   Set a good example for children by eating fruit every day with meals or as snacks.

6. Include fruit at breakfast
   At breakfast, top your cereal with bananas, peaches, or strawberries; add blueberries to pancakes; drink 100% orange or grapefruit juice. Or, try a fruit mixed with fat-free or low-fat yogurt.

7. Try fruit at lunch
   At lunch, pack a tangerine, banana, or grapes to eat, or choose fruits from a salad bar. Individual containers of fruits like peaches or applesauce are easy and convenient.

8. Experiment with fruit at dinner, too
   At dinner, add crushed pineapple to coleslaw, or include orange sections, dried cranberries, or grapes in a tossed salad.

9. Snack on fruits
   Dried fruits make great snacks. They are easy to carry and store well.

10. Keep fruits safe
    Rinse fruits before preparing or eating them. Under clean, running water, rub fruits briskly to remove dirt and surface microorganisms. After rinsing, dry with a clean towel.

Go to www.ChooseMyPlate.gov for more information.
Create a delicious and nutritious smoothie from simple foods. Just choose an item from each category and follow the directions. Use your imagination! Each smoothie serves 1 adult.

**Choose produce (2-3 cups)**
- **Fruit:** fresh, frozen, or canned such as strawberry, raspberry, blackberry, blueberry, cranberry, banana, pineapple, peach, pear, plum, cherry, melon, apple, kiwi, mango, papaya, orange, lemon, lime.
- **Vegetable:** fresh spinach, chard, kale, green pepper, avocado, carrot, cooked, frozen, or canned pumpkin, squash, sweet potato, pea.

**Choose a liquid (⅔ to 1½ cups, depending on desired consistency)**
- **Water:** inexpensive, easy, and calorie free.
- **Milk:** dairy, soy, almond, rice, hemp, coconut, etc.
- **Fruit Juice:** use sparingly for added flavor, and combine with water or milk.

**Choose extras (optional)**
- ¼ to ½ cup raw oats
- 1-2 tablespoons peanut butter
- 1-2 tablespoons ground flax seed
- 1-2 tablespoons chia seed
- ⅛ diced avocado
- ⅛ cup yogurt
- cinnamon, nutmeg, vanilla
- ice as needed

**DIRECTIONS:**
Select a food from each category, or use your own favorites. Combine all ingredients in blender or food processor in order listed. Blend until smooth. HINT: You will need minimal to no ice if using mostly frozen produce. You will need more ice if using fresh, canned, or cooked produce. Do not overload blender, and chop any large pieces of fruit or vegetables for the best texture.
SMOOTHIE RECIPES
A pantry that is stocked with good whole foods will help you create great tasting smoothies like these!

Popeye Smoothie
- 6-8 ounces yogurt, any flavor
- ½ cup skim milk
- ½ fresh or frozen banana
- ½ cup fresh or frozen fruit
- 1 cup packed fresh spinach

Combine all ingredients in blender and blend until smooth.

Yield: 1 big delicious smoothie

*Misruised to see spinach in a smoothie? Don’t worry, you won’t taste it at all, and it really boosts the nutrition of this great smoothie!

Mango Avocado Smoothie
- 1 fully ripened avocado, pitted and peeled
- 2 cups frozen mango or other frozen fruit (not thawed)
- 1 cup orange juice
- 1 cup water

Combine all ingredients in blender and blend until smooth.

Yield: 2 large or 4 small smoothies

* The avocado gives the smoothie a rich, smooth texture!
WEEK 7— Food Sense Creates presents ~

Create...a Skillet Meal
Nothing says quick and easy like a one-pot meal! In this lesson, participants learn the basic techniques to create a wholesome and nutritious skillet meal from foods already found in the pantry and fridge. We discuss some ways to incorporate fruit and vegetables into your meals and snacks without increasing preparation time. We discuss the difference between whole foods and refined foods, and why whole is a better choice.

Goal
After this lesson, participants will demonstrate the skills needed to stock their pantries with nutritious foods and to use those foods to create tasty skillet meals. They will use a whole food approach that follows the MyPlate meal plan.

Lesson Objectives
Participants will be able to:
- Name three ways to incorporate fruits and vegetables into quick and easy meals.
- Identify ways to save time on meal prep.
- Identify basic kitchen equipment needed to make a skillet meal.
- Identify steps necessary to cook and serve a skillet meal.
- Identify food safety concerns when preparing a skillet meal.
- Discuss which of five MyPlate food components are found in skillet meals and which food components should be added to make the meal a MyPlate meal.

Handouts:
USDA 10 Tips: Liven Up Your Meals With Fruits and Vegetables
Creates Skillet Meals handout

Recipe:
Skillet penne with veggies
Create a Skillet Meal Lesson Plan

1. Introduction
   This lesson teaches how quick and easy it is to put together a tasty skillet meal from ingredients you already have.
   a. It is possible to incorporate fruits and vegetables into quick and cheap meals! There are many dishes, including skillet meals, that can be prepared quickly using fruits and vegetables that are commonly found in the grocery store and your cupboard.
      • Fruits and vegetables are excellent when made on the grill especially when you already have the grill out for a different part of the meal. Brush the vegetables with oil and some seasoning (if you prefer) and grill them until they are tender. Grilled fruit is an excellent dessert on a summer day!
      • Try including vegetables like peas, tomatoes, or spinach into your families’ favorite casseroles. This is a great way to increase the flavor of the dish and an easy way to sneak vegetables into a meal.
      • Salads are a great way to pack in a bunch of produce. Salads can be a mix of any fruits or vegetables you have on hand. Cabbage, carrots, and onions are all reasonably priced, long lasting, and make great ingredients for salad. Incorporate peas, tomatoes, strawberries or any other fruit and vegetables you have available. Heads of lettuce are cheaper and last longer than bagged lettuce! Wash and cut the lettuce after grocery shopping so it’s quick and easy to prepare during meal time (though this will reduce the amount of time it stays fresh).
      • Stir fry the veggies you have in your fridge! Again, the veggies you use can vary depending on what is in season and what you have available. Broccoli, tomatoes, peas, carrots, mushrooms, and onions are great options.
      • Adding vegetables to a sandwich is a quick way to sneak in a serving of vegetables and add a little crunch to your meal. Add a slice of tomato, lettuce, peppers or cucumbers to any sandwich.
      • Try incorporating fruit into baked goods. Fruit gives the baked items moisture and flavor to make them especially delicious. Applesauce is an excellent replacement for oil in most baked recipes! Bananas, berries, or pears are also excellent additions to many recipes.
      • If you need a quick meal or snack, try making smoothies using a variety of fruits, veggies (spinach or kale), yogurt, and 100% juice. This is an easy way to get in a variety of fruits and vegetables on the go.
      • Toss some cut up spinach, tomatoes, or onions into your omelets. This can be a quick way to include vegetables especially if you’re veggies are already pre cut.
   b. A few other tips to decrease the amount of time spent preparing meals include:
      • To decrease the amount of prep time needed to wash, peel, and cut vegetables after a long day at work, try finding time before your busy week starts to prepare most of your vegetables all at once. If your produce is ready to go, the prep time for meals will significantly decrease. This is a great alternative to buying pre washed and cut produce at the grocery stores since these options are often much more expensive.
      • If you’re making lunches each day, put fruits and vegetables in baggies after you cut and washed them to they are ready to be tossed in the lunch box each day.
• Get your family involved in meal preparation. This is a great way to get help in the kitchen and to expose children to a variety of fruits and vegetables in their whole form. If children are involved in the cooking process, they are more likely to try fruits and vegetables during meal time.
• If someone in your house needs a lunch for the next day, try preparing enough for leftovers. This will save time when making lunches the next morning.
• Think ahead! Try to plan your meals for the week so you know what produce you need to buy at the grocery store. This way, you won’t have to make additional stops after work or before dinner to get the ingredients you need.
• Keep fruit and vegetables in places where everyone can easily see them. If kids (and adults) have easy access to fruit and vegetables, they are more likely to choose these items for snacks. If they are already pre cut and washed this saves you time on snack prep throughout the day!
• Cook fresh or frozen vegetables in the microwave with a little bit of water for a quick side dish.

c. How do you save time on meal prep to incorporate fruit and vegetables into your meals and snacks?

d. What type of meals do you make that you easily incorporate fruits and vegetables into?

e. Now we are going to make a tasty skillet meal that incorporates a variety of vegetables.

2. Create a Skillet Meal
   a. Choose mostly whole foods and reduce highly refined and processed foods
   b. Show and explain equipment needed
      • Sharp knife, cutting board, vegetable peeler, vegetable grater, mixing cups and spoons, saucepan, skillet with lid
   c. Steps (demo each step as time permits)
      • Protein
         1. Discuss options—both meat and plant based
         2. Discuss food safety—when to worry about cross contamination, proper hygiene, acceptable temperatures, and safe storage
      • Flavors
         1. Onion and garlic—sauté in small amount of oil, water, or broth
         2. Choose spices/herbs according to other ingredients
            a. Example: use Mexican spices if the recipe has black beans, onion, garlic, tomatoes, and corn; use Italian if casserole has pasta, tomatoes, zucchini, etc.
               i. Mexican: cumin, oregano, chili powder, cilantro, garlic
               ii. Italian: basil, oregano, parsley, garlic
               iii. Asian: soy sauce, ginger, garlic, chilies, turmeric
               iv. Savory/Thanksgiving: rosemary, sage, thyme, parsley
      • Veggies
         1. Discuss options—most common and not so common
         2. Discuss how veggies are naturally rich in vitamins, minerals, antioxidants, and phytochemicals
3. Veggies will give the dish more volume but not calories
4. Demonstrate knife skills as you cut up veggies
   • Liquid (optional depending on whether starch is precooked)
     1. Necessary to cook starch such as uncooked rice or raw potatoes
     2. Gives added flavor if something other than water is used
   • Sauce (optional)
     1. Make a sauce that doesn’t come from a can—less fat, sodium, preservatives, and cost (pennies versus dollars)
        a. Sauce made from slurry—add flour or cornstarch to water, no fat/additional calories needed
        b. SOS—define and explain; demo if time and circumstances permit
   • Starch
     1. Discuss options—what do participants usually use, what better choices they could make
     2. Discuss whole versus refined grains
     3. Discuss how starch in skillet meal is usually cooked at the same time as other ingredients. However, sometimes it may be more convenient to cook starch separately (using left over rice, etc.). Reduce or eliminate amount of liquid used if this is the case
   • Topping
     1. Discuss options
     2. Discuss appropriate portion sizes of high-fat options.

3. Practice
   a. Bring pantry items from home and have class members come up with as many ideas for skillet meals as possible from those foods
   b. Have class members think about their own pantry and create as many meal options as possible from what they already have

4. Incorporating MyPlate
   a. What components of MyPlate does skillet creation already have?
   b. What can we add to our plate to round out the meal?

5. Conclusion
   You don’t need a state-of-the-art kitchen, a degree from culinary school, or tons of time. You just need some basic equipment and food in the pantry to create a healthy and warm skillet meal that your family will want to come home to!

6. Taste creation and answer questions

7. Schedule/remind of next appointment

Additional Helps for Create a Skillet Meal

Choosing a Good Skillet
One of the most crucial pans you can own is a skillet. It is one of the most versatile pieces of equipment in your kitchen. Because the skillet is so versatile and you will use it so much, it is wise to buy the best one you can afford. A good pan will last a lifetime if you take care of it.

How do you know what to look for when buying a skillet?
- Size: 8 – 12 inches with lid
- Material options:
  - Stainless steel – best all-around choice – durable, easy to clean, non-reactive to acidic foods – look for heavy pan, preferably with a copper or aluminum bottom for even heating and that can be used in the oven.
  - Cast iron – great pan that doesn’t cost too much – can be heavy to lift, requires some care to keep it seasoned but terrific for non-stick cooking and for using in the oven as well as the stove-top, can be reactive to acidic foods if not well seasoned (example – dish with tomatoes may have slight metallic taste and have a darker color).
  - Teflon – great for non-stick cooking, especially for eggs, but you must use care not to scratch the surface – not desirable for high heat cooking. (Note: There is some controversy about Teflon being a carcinogen. At this time, Food Sense does not take a stand on the use of Teflon. If the question comes up, make sure you explain that using Teflon is a personal choice and encourage participants to research the matter so they can make their own informed decisions).
  - Electric skillet — a skillet or frying pan that is heated by plugging it into an outlet instead of being placed on the stovetop. It is convenient because it can free up space on the stove and in the oven because the entire dish can be prepared and cooked in one pot with more control over temperature than with a skillet on the stove. An electric skillet is really nice to have but if you can only have one, choose a regular skillet first.
- A good skillet is an investment. Here are some things to know that will ensure your skillet will last a long time.
  - Heat the pan slowly to the desired temperature instead of placing a cold pan on high heat.
  - Put room temperature foods into the heated pan rather than cold ones straight from the fridge.
  - Wooden spoons and spatulas are best for stirring. Metal spoons will definitely scratch non-stick coatings but can even scratch metal pans, too.
  - After using your skillet always let it cool before attempting to clean. DO NOT pour cold water into a skillet while it is hot; a sudden change in temperature may cause the metal to warp.
  - Wash pans in hot soapy water instead of in the dishwasher. Use regular dish soap and a non-abrasive scrubber. When you have something really stuck to the pan, let it soak for a while with a little soap added to the water. It’s always easier to clean skillets, dishes, and kitchen right after you eat instead of waiting until food is dried and caked on.
  - To season a cast iron skillet, you use a combination of fat and heat. First, wash and dry the pan. Set the oven to 350°. Heat the pan on the stove over low heat. With a paper towel, spread about one tablespoon of vegetable oil all over the inside of the pan. Don’t leave any excess oil in the pan. Place the warm pan in the oven and “bake” for one hour. Turn the oven off and leave the pan in until it is cool. To keep it seasoned, make sure to dry it thoroughly after each use. Every once in awhile, place the dry pan on the stove, heat it on low, add a little oil with a paper towel, and let it sit
on low heat for a few minutes. Wipe out any excess oil, cool, and store. Eventually the pan will darken, become very smooth on the inside, and be perfectly non-stick!
liven up your meals with vegetables and fruits

10 tips to improve your meals with vegetables and fruits

Discover the many benefits of adding vegetables and fruits to your meals. They are low in fat and calories, while providing fiber and other key nutrients. Most Americans should eat more than 3 cups—and for some, up to 6 cups—of vegetables and fruits each day. Vegetables and fruits don’t just add nutrition to meals. They can also add color, flavor, and texture. Explore these creative ways to bring healthy foods to your table.

1 fire up the grill
Use the grill to cook vegetables and fruits. Try grilling mushrooms, carrots, peppers, or potatoes on a kabob skewer. Brush with oil to keep them from drying out. Grilled fruits like peaches, pineapple, or mangos add great flavor to a cookout.

2 expand the flavor of your casseroles
Mix vegetables such as sautéed onions, peas, pinto beans, or tomatoes into your favorite dish for that extra flavor.

3 planning something Italian?
Add extra vegetables to your pasta dish. Slip some peppers, spinach, red beans, onions, or cherry tomatoes into your traditional tomato sauce. Vegetables provide texture and low-calorie bulk that satisfies.

4 get creative with your salad
Toss in shredded carrots, strawberries, spinach, watercress, orange segments, or sweet peas for a flavorful, fun salad.

5 salad bars aren’t just for salads
Try eating sliced fruit from the salad bar as your dessert when dining out. This will help you avoid any baked desserts that are high in calories.

6 get in on the stir-frying fun
Try something new! Stir-fry your veggies—like broccoli, carrots, sugar snap peas, mushrooms, or green beans—for a quick-and-easy addition to any meal.

7 add them to your sandwiches
Whether it is a sandwich or wrap, vegetables make great additions to both. Try sliced tomatoes, romaine lettuce, or avocado on your everyday sandwich or wrap for extra flavor.

8 be creative with your baked goods
Add apples, bananas, blueberries, or pears to your favorite muffin recipe for a treat.

9 make a tasty fruit smoothie
For dessert, blend strawberries, blueberries, or raspberries with frozen bananas and 100% fruit juice for a delicious frozen fruit smoothie.

10 liven up an omelet
Boost the color and flavor of your morning omelet with vegetables. Simply chop, sauté, and add them to the egg as it cooks. Try combining different vegetables, such as mushrooms, spinach, onions, or bell peppers.

Go to www.ChooseMyPlate.gov for more information.
Create a tasty skillet meal from simple foods. Just choose an item from each category and follow the directions. Use your imagination! Each meal serves four adults.

<table>
<thead>
<tr>
<th>Choose one protein</th>
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<tbody>
<tr>
<td>• 1 (15 oz.) can or 2 cups cooked dried beans (pinto, black, white, kidney, etc.)</td>
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<tr>
<td>• ½ pound ground beef</td>
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<tr>
<td>• 1 pound chicken, turkey, pork chops, fish, or ham</td>
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<tr>
<td>• 1 (6-8 oz.) can beef, chicken, tuna, salmon, or other fish</td>
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<tr>
<td>• 1 (12-16 oz.) package extra firm tofu, drained and cubed</td>
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<tr>
<th>Choose one starch</th>
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<tr>
<td>• 1 cup uncooked rice</td>
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<tr>
<td>• 2 cups uncooked pasta</td>
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<tr>
<td>• 4 cups uncooked noodles.</td>
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<tr>
<td>• 2-3 cups cubed raw potatoes</td>
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</table>

Optional: cook starch beforehand and top with skillet contents (example ~ sweet 'n sour chicken over rice). Reduce liquid and sauce in recipe.

<table>
<thead>
<tr>
<th>Choose one or more flavors</th>
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<tbody>
<tr>
<td>• ½ cup chopped onion, celery, green pepper</td>
</tr>
<tr>
<td>• 1 - 2 cloves minced garlic</td>
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<tr>
<td>• ½ cup salsa</td>
</tr>
<tr>
<td>• 1 - 2 teaspoons dried herbs (oregano, basil, cumin, chili powder, thyme, rosemary, sage, etc.)</td>
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<tr>
<td>• Salt and pepper to taste</td>
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<table>
<thead>
<tr>
<th>Choose one to three vegetables</th>
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<tbody>
<tr>
<td>• Broccoli, carrots, corn, green beans, peas, squash, mixed veggies, etc.</td>
</tr>
<tr>
<td>• 2 cups fresh vegetables</td>
</tr>
<tr>
<td>• 2 cups frozen vegetables</td>
</tr>
<tr>
<td>• 1-2 (15 oz.) canned vegetables</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Choose one liquid as needed*</th>
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<tr>
<td>• ½ cups water, broth, tomato juice, milk, etc.</td>
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</table>

<table>
<thead>
<tr>
<th>Choose one sauce (optional)</th>
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<tbody>
<tr>
<td>• 1 (10 oz.) can soup (cream of mushroom, cream of chicken, cream of celery, tomato, cheese, etc.)</td>
</tr>
<tr>
<td>• 1 (15 oz.) can diced tomatoes with juice</td>
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</table>

2 cups gravy: | Mix cornstarch or flour into cold water with fork. Make sure you have no lumps. Slowly add mixture to boiling stock, stirring constantly. Reduce heat and continue to cook and stir with whisk until thickened. |
| 2 tablespoons cornstarch OR 4 tablespoons flour |
| ¼ cup COLD water |
| 2 cups HOT chicken, beef, or vegetable stock |

<table>
<thead>
<tr>
<th>Choose one or more toppings</th>
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<tbody>
<tr>
<td>• 2 tablespoons grated parmesan cheese</td>
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<tr>
<td>¼ cup grated cheddar or mozzarella cheese or breadcrumbs</td>
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DIRECTIONS:
Select a food from each category or use your own favorites. Brown meat, if using. Add remaining ingredients to pan, cook over medium heat, stirring frequently to prevent sticking and burning, until meat is thoroughly cooked and vegetables and starches are tender, 15-45 minutes. Add toppings if desired.

* Add more liquid as needed to allow starch to cook, to prevent dish from becoming too dry, and/or from sticking/burning.
SKILLET MEAL RECIPES

A pantry that is stocked with whole foods will help you create great tasting skillet meals like these!

**Spanish Macaroni**
- ½ cup onion, chopped
- ½ green pepper, chopped
- 1 ½ cups water
- 1 (8 oz.) can tomato sauce
- 1 (15 oz.) can tomatoes
- 2 (15 oz.) cans pinto or kidney beans, drained and rinsed
- 2 teaspoons chili powder
- 1 teaspoon cumin
- 1 ½ cups macaroni (uncooked)

In large skillet, sauté onion in 1 tablespoon water on medium heat until translucent. Add green pepper and cook another 2 minutes. Add remaining ingredients, except macaroni, and cook until vegetables are tender. Stir macaroni into mixture and reduce heat to low. Cover and cook until macaroni is tender, 10-15 minutes, adding additional water as needed.

*Yield: 4 servings*

**Skillet Penne with Veggies**
- 2 cups vegetable broth
- 2 cups water
- 2 ½ cups whole grain penne
- 1 small tomato, chopped
- 2 small zucchinis, chopped
- 1 (15 oz.) can cannellini beans, drained and rinsed
- 1 ½ teaspoons dry basil or ¼ cup chopped fresh basil
- ¼ cup parmesan cheese

In large nonstick skillet, cook penne in broth and water over high heat until penne is tender, about 12-15 minutes. Add tomato, zucchini, beans, and dried basil (if using fresh basil, add after veggies have cooked). Cook until veggies are tender. Stir in cheese and fresh basil if using.

*Yield: 4 servings*

You can change the taste of basic ingredients in your dish simply by changing the herbs and spices you use. For instance, use these herbs and spices to get these flavors:

- **Mexican**—use cumin, oregano, chili powder, cilantro, and garlic
- **Italian**—use basil, oregano, parsley, and garlic
- **Asian**—use soy sauce, ginger, garlic, chiles, and turmeric
- **Savory/Thanksgiving**—use rosemary, sage, thyme, and parsley

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For information on how to order printable versions of this handout, go to [extension.usu.edu](http://extension.usu.edu)

This material was funded by USDA's Supplemental Nutrition Assistance Program - SNAP.

Utah State University is an affirmative action/equal opportunity institution.
WEEK 8 -- Food $ense Creates presents ~

Create...a Soup
Nothing says comfort like soup! In this lesson, participants learn the basic techniques to create a wholesome and nutritious soup from foods already found in the pantry and fridge. We discuss some reasons why family mealtime is important. We discuss the difference between whole foods and refined foods, and why whole is a better choice.

Goal
After this lesson, participants will demonstrate the skills needed to stock their pantries with nutritious foods and to use those foods to create tasty soups. They will use a whole food approach that follows the MyPlate meal plan.

Lesson Objectives
Participants will be able to:
- Name three reasons why family mealtime is important.
- Name three ways to increase exposure to fruits and vegetables during meal preparation and mealtime.
- Identify basic kitchen equipment needed to make a soup.
- Identify steps necessary to cook and serve a soup.
- Identify food safety concerns when preparing a soup.
- Discuss which of five MyPlate food components are found in soup and which food components should be added to make the meal a MyPlate meal.

Handouts:
USDA 10 Tips: Kid Friendly Veggies and Fruits handout
Creates Soup handout

Recipe:
African Bean Soup
Create a Soup Lesson Plan

1. Introduction
   This lesson teaches how quick and easy it is to put together a delicious salad from ingredients you already have. First, we are going to talk about why family mealtime is important.

With busy schedules and countless obligations, families these days are hard pressed to eat any kind of balanced meal, let alone eat a meal together. But family mealtime is critical to a child's physical, emotional, and social development, as well as to academic and behavioral outcomes. Frequent family mealtime also contributes to the level of connection your family enjoys. There are many ways to enjoy healthy meals rich in fruits and vegetables with your family.
   a. Consider planning meals one to two weeks in advance. This will help with writing a grocery list and will reduce the likelihood of a last-minute crunch to pull something edible together before the kids get hungry! Planning ahead will also increase the likelihood of having fruits and vegetables on hand to include in every meal.
   b. Allow children to participate in making the grocery list and doing the shopping. Ask your children what kinds of fruits and vegetables they would like to eat with meals in the next week so they can participate in the decision making.
   c. When you're at the grocery store, let your kids participate in selecting and bagging produce. Ask them if they know what certain fruits and vegetables are to get them engaged and learning.
   d. Put fruit or vegetables on the table while dinner is being prepared so the family can snack on these items before the meal. This creates an opportunity for everyone to eat fruits and vegetables before they get too full. It also increases exposure to those foods.
   e. If your making a meal that wasn't planned and you're not sure what veggies to include with the meal, give your children a choice between two items! Ask them if they want corn or beans. Refrain from asking them "what vegetable would you like for dinner?" They might ask for something you don't have which could lead to whining or frustration. Giving them the option between two items you have on hand. This allows them to be involved in the decision making while increasing the odds that they will eat the vegetable at mealtime.
   f. Don't force children to eat fruits and vegetables. Make them available for children to try at all meals but resist the urge to make them eat their veggies before they can leave the table or have dessert. Research shows that consistent exposure to fruit and vegetables is more effective at increasing acceptance than forcing children to try foods. After several exposure children will try fruits and vegetables without your coercion. Without the fights over eating green beans, meal time will be more enjoyable for everyone!
   g. Be good role models for your children! The adults in the family have the responsibility to eat fruits and vegetables at meals and snacks to show children that they are an important part of a meal. The more fruits and vegetables you eat, the more your children will follow in your footsteps.
   h. Refrain from making special meals or side dishes for certain family members. This includes fruits and vegetables! Avoid being a short-order cook. Making one meal for the whole family to enjoy. Again, everyone will be much more accepting of the meals if they are part of the menu planning and shopping process!
   i. Involve everyone including the children in meal preparation and cleanup. This helps children feel like they contributed to the meal and often times increases the amount
of new foods they will try. Expose your children to fruits and vegetables by allowing them to wash, cut, peel or dish up fruits and vegetables for meals. If your children are young, allow them add the cut up vegetables to the salad or to wash the fruit in the sink.

1. Create a Soup
   a. Choose whole foods
      - Example: explain difference between soup made with cream-of-whatever soup, processed cheese, and bacon versus one made with broth, lots of veggies, and beans. Note that adding additional vegetables to cream-of-whatever soup does make it a better option than it would be otherwise, even if it isn’t the best option.
   b. Equipment needed
      - Show and explain equipment: sharp knife, cutting board, vegetable peeler, vegetable grater, mixing cups and spoons, soup pot, etc.
   c. Steps (demonstrate each step as time permits)
      - Fat
        1. Discuss amount to use (minimal)
        2. Discuss sautéing in water or broth as a desirable option to using fat
      - Onion
        1. Cooking onion before adding other ingredients provides best flavor
      - Veggies
        1. Discuss options—most common and not so common
        2. Discuss how veggies are naturally rich in vitamins, minerals, antioxidants, and phytochemicals
        3. Veggies will give the dish more volume but not calories
      - Protein
        1. Discuss options—both meat and plant based
        2. Discuss food safety—when to worry about cross contamination, proper hygiene, acceptable temperatures, and safe storage
      - Starch
        1. Discuss options—what do participants usually use; what better choices could they make
        2. It is usually best to choose a fast cooking starch like potatoes, pasta, pre-cooked beans
      - Broth/base
        1. Discuss options
        2. Discuss clear broth versus cream
           a. Discuss/show how to make clear broth for fraction of cost
           b. Discuss/show how to make a healthy creamy base
        3. SOS—define and explain; demo if time and circumstances permit
      - Seasonings
        1. Choose spices/herbs according to other ingredients (example: use Mexican spices if soup has black beans, onion, garlic, tomatoes, and corn; use Italian if soup has pasta, tomatoes, zucchini; savory if chicken noodle; etc.)
           a. Mexican: cumin, oregano, chili powder, cilantro, garlic
           b. Italian: basil, oregano, parsley, garlic
           c. Asian: soy sauce, ginger, garlic, chilies, turmeric
           d. Savory/Thanksgiving: rosemary, sage, thyme, parsley
2. Practice
   a. Bring pantry items from home and have class members come up with as many ideas for making soups as possible from those foods
   b. Have class members think about their own pantry and create as many soups as possible from what they already have

3. Incorporating MyPlate
   a. What components of MyPlate does soup already have?
   b. What can we add to our plate to round out the meal?

4. Conclusion
   You don’t need a state-of-the-art kitchen, a degree from culinary school, or tons of time. You just need some basic equipment and food in the pantry to create a delicious soup that your family will want to come home to!

5. Taste creation and answer questions

6. Schedule/remind of next appointment

Additional Helps for Create a Soup

Sautéeing Onion
Soup will have a richer flavor if you sauté the onion before adding the other ingredients. You may also add celery and garlic during this first step. Note that this method leaves out water or broth sauté instead of using a fat. This is a technique that helps to control calories without sacrificing taste.

Soup Broth
Pre-made vegetable, chicken, or beef broth in cans or cartons—easy to use and convenient but may be expensive and full of added sodium. Water or tomato juice with vegetable, chicken, or beef bouillon added in bouillon is easy to use, easy to store, and usually more economical than pre-made broth but can be high in sodium. Homemade broth is economical and easy to make. Save the ends of vegetables such as carrots, celery, onion, and cabbage. When you have a quart sized bag full of vegetable ends, add them to a pot of water and boil for 30 minutes or simmer in a crockpot for a few hours. Add salt to taste. You will get the great taste of vegetable broth without the expense! The broth can be stored in the fridge for a few days or frozen for a few months.
kid-friendly veggies and fruits

10 tips for making healthy foods more fun for children

Encourage children to eat vegetables and fruits by making it fun. Provide healthy ingredients and let kids help with preparation, based on their age and skills. Kids may try foods they avoided in the past if they helped make them.

1. smoothie creations
   Blend fat-free or low-fat yogurt or milk with fruit pieces and crushed ice. Use fresh, frozen, canned, and even overripe fruits. Try bananas, berries, peaches, and/or pineapple. If you freeze the fruit first, you can even skip the ice!

2. delicious dippers
   Kids love to dip their foods. Whip up a quick dip for veggies with yogurt and seasonings such as herbs or garlic. Serve with raw vegetables like broccoli, carrots, or cauliflower. Fruit chunks go great with a yogurt and cinnamon or vanilla dip.

3. caterpillar kabobs
   Assemble chunks of melon, apple, orange, and pear on skewers for a fruity kabob. For a raw veggie version, use vegetables like zucchini, cucumber, squash, sweet peppers, or tomatoes.

4. personalized pizzas
   Set up a pizza-making station in the kitchen. Use whole-wheat English muffins, bagels, or pita bread as the crust. Have tomato sauce, low-fat cheese, and cut-up vegetables or fruits for toppings. Let kids choose their own favorites. Then pop the pizzas into the oven to warm.

5. fruity peanut butterfly
   Start with carrot sticks or celery for the body. Attach wings made of thinly sliced apples with peanut butter and decorate with halved grapes or dried fruit.

6. frosty fruits
   Frozen treats are bound to be popular in the warm months. Just put fresh fruits such as melon chunks in the freezer (rinse first). Make “popsicles” by inserting sticks into peeled bananas and freezing.

7. bugs on a log
   Use celery, cucumber, or carrot sticks as the log and add peanut butter. Top with dried fruit such as raisins, cranberries, or cherries, depending on what bugs you want!

8. homemade trail mix
   Skip the pre-made trail mix and make your own. Use your favorite nuts and dried fruits, such as unsalted peanuts, cashews, walnuts, or sunflower seeds mixed with dried apples, pineapple, cherries, apricots, or raisins. Add whole-grain cereals to the mix, too.

9. potato person
   Decorate half a baked potato. Use sliced cherry tomatoes, peas, and low-fat cheese on the potato to make a funny face.

10. put kids in charge
    Ask your child to name new veggie or fruit creations. Let them arrange raw veggies or fruits into a fun shape or design.

Go to www.ChooseMyPlate.gov for more information.
Create a tasty soup from simple foods. Just choose an item from each category and follow the directions. Use your imagination! Each pot of soup serves four adults.

<table>
<thead>
<tr>
<th>1</th>
<th>Sauté one medium chopped onion</th>
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<tbody>
<tr>
<td>2</td>
<td>Choose one or more vegetables (2-3 cups, chopped) The following can be fresh, canned, or frozen</td>
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<tr>
<td></td>
<td>• Celery</td>
</tr>
<tr>
<td></td>
<td>• Green pepper</td>
</tr>
<tr>
<td></td>
<td>• Green beans</td>
</tr>
<tr>
<td></td>
<td>• Carrots</td>
</tr>
<tr>
<td></td>
<td>• Peas</td>
</tr>
<tr>
<td></td>
<td>• Corn</td>
</tr>
<tr>
<td></td>
<td>• Zucchini</td>
</tr>
<tr>
<td></td>
<td>• Squash</td>
</tr>
<tr>
<td></td>
<td>• Mushrooms</td>
</tr>
<tr>
<td></td>
<td>• Cauliflower</td>
</tr>
<tr>
<td></td>
<td>• Broccoli</td>
</tr>
<tr>
<td></td>
<td>• Cabbage</td>
</tr>
<tr>
<td>3</td>
<td>Choose one protein</td>
</tr>
<tr>
<td></td>
<td>• 1 (16 oz.) canned beans (pinto, kidney, black, white, chick peas, etc.)</td>
</tr>
<tr>
<td></td>
<td>• 1 pound beef, chicken, ham, sausage, etc.</td>
</tr>
<tr>
<td></td>
<td>• 1 (16 oz.) can beet, chicken, ham</td>
</tr>
<tr>
<td></td>
<td>• 1 cup grated cheese</td>
</tr>
<tr>
<td>4</td>
<td>Choose one starch</td>
</tr>
<tr>
<td></td>
<td>• 3 – 4 cups diced potatoes</td>
</tr>
<tr>
<td></td>
<td>• 2 (16 oz.) canned beans (pinto, kidney, black, white, chick peas, etc.)</td>
</tr>
<tr>
<td></td>
<td>• 4 oz. whole grain egg noodles, macaroni, pasta</td>
</tr>
<tr>
<td></td>
<td>• ½ cup uncooked brown rice</td>
</tr>
<tr>
<td>5</td>
<td>Choose a broth or base - you need 4 cups (1 quart)</td>
</tr>
<tr>
<td></td>
<td>• 2 (16 oz.) cans vegetable, chicken, or beef broth</td>
</tr>
<tr>
<td></td>
<td>• 4 cups water and vegetable, chicken, or beef bouillon</td>
</tr>
<tr>
<td></td>
<td>• 1 can crushed or diced tomatoes and 2-3 cups water</td>
</tr>
<tr>
<td></td>
<td>• 4 cups milk and bouillon</td>
</tr>
<tr>
<td></td>
<td>• Any combination of above to make 1 quart</td>
</tr>
<tr>
<td>6</td>
<td>Choose one or more seasonings</td>
</tr>
<tr>
<td></td>
<td>• 2–3 teaspoons dried herbs (oregano, basil, cumin, chili powder, thyme, rosemary, parsley, etc.)</td>
</tr>
<tr>
<td></td>
<td>• Bay leaf</td>
</tr>
<tr>
<td></td>
<td>• 2–4+ tablespoons fresh herbs</td>
</tr>
<tr>
<td></td>
<td>• Minced garlic</td>
</tr>
<tr>
<td></td>
<td>• Salt and pepper to taste</td>
</tr>
</tbody>
</table>

**DIRECTIONS:**

In large pot, cook onion in ¼ cup water or broth until slightly browned. Add vegetables and protein. Brown protein as needed. Add remaining ingredients (except fresh herbs). Partially cover pot and simmer until meat is thoroughly cooked and starch and vegetables are tender (about 20–30 minutes). Add fresh herbs. Season with salt and pepper to taste. Simmer another 5 minutes. Serve. **Note:** Beans can serve as either protein or starch.
SOUP RECIPES

A pantry that is stocked with whole foods will help you create great tasting soups like these!

African Bean Soup

- ½ cup water
- 3 tablespoons reduced-sodium soy sauce
- 1 onion, sliced
- 2 small sweet potatoes or yams, peeled and diced (about 2 cups)
- 1 large carrot, thinly sliced
- 1 celery stalk, thinly sliced
- 1 red bell pepper, seeded and diced
- 1 (15 oz) can crushed tomatoes
- 4 cups vegetable broth
- 1 (15 oz) can garbanzo beans
- ½ cup chopped fresh cilantro
- 3 tablespoons peanut butter
- 1 - 2 teaspoons curry powder
- 4 cups cooked brown rice

Heat water and soy sauce in a large pot. Add onion and cook over high heat, stirring often, until onion is soft, about 5 minutes. Add remaining ingredients except for rice. Stir to mix, then cover and simmer until vegetables are tender when pierced with a fork, about 15-20 minutes. To serve, place ½ cup cooked rice in a bowl and top it with a generous ladle of soup.

Yield: 8 servings

Black Bean Stew

- 1 large diced onion
- 1 - 3 minced cloves garlic
- ¼ teaspoon red pepper flakes
- ½ teaspoon cumin
- ½ teaspoon thyme
- 2 (16 oz) cans vegetable broth
- 1 small can diced green chilies
- 1 (14 oz) can stewed tomatoes
- 1 (28 oz) can black beans (3 cups), drained and rinsed
- Cooked brown rice
- Cilantro
- Lime slices

In a Dutch oven, sauté onion, garlic, and pepper flakes in ¼ cup water. Add herbs, broth, and chilies and bring to boil. Add tomatoes and beans. Simmer 1 hour. Remove half of stew, cool slightly, and puree until smooth. Add pureed mixture back into pot and stir to combine. Serve stew over rice with fresh cilantro and lime slices.

You can change the taste of basic ingredients in your dish simply by changing the herbs and spices you use. For instance, use these herbs and spices to get these flavors:

Mexican-use cumin, oregano, chili powder, cilantro, and garlic
Italian-use basil, oregano, parsley, and garlic
Asian-use soy sauce, ginger, garlic, chiles, and turmeric
Savory/Thanksgiving-use rosemary, sage, thyme, and parsley

For information on how to order printable versions of this handout, go to extension.usu.edu

This material was funded by USDA's Supplemental Nutrition Assistance Program - SNAP. Utah State University is an affirmative action/equal opportunity institution.
Appendix G. Co-Author Release Forms
January 6, 2016

Dear Dr. Carrie Durward:

I am in the process of preparing my dissertation in the Nutrition Dietetics and Food Sciences department at Utah State University (USU). I hope to complete my degree in Nutrition in May of 2016.

The article *Reducing Food Insecurity and Improving Fruit and Vegetable Intake Among Farmers’ Market Incentive Program Participants* of which I am first author, has been published in the Journal of Nutrition Education and Behavior. This article reports an essential part of my dissertation research on the impact of farmers’ market incentive programs on food security and fruit and vegetable intake among low-income individuals. I am requesting your permission to include the previously mentioned journal article in my dissertation. I will include acknowledgements and citations to your work. Copyright and reprint rights will also be found in the appendices.

Please indicate your approval of this request by signing the space provided below or attaching any other form necessary to confirm your permission. If you have any questions, please contact me at the phone number or email below. Thank you for your assistance.

Mateja R. Savoie-Roskos
(435)-797-5777
Mateja.savoieroskos@usu.edu

I hereby give permission to Mateja R. Savoie-Roskos to reprint the following article in her dissertation:


Signed: [Signature]
Date: January 12, 2016
January 6, 2016

Dear Heidi LeBlanc:

I am in the process of preparing my dissertation in the Nutrition Dietetics and Food Sciences department at Utah State University (USU). I hope to complete my degree in Nutrition in May of 2016.

The article Reducing Food Insecurity and Improving Fruit and Vegetable Intake Among Farmers’ Market Incentive Program Participants of which I am first author, has been published in the Journal of Nutrition Education and Behavior. This article reports an essential part of my dissertation research on the impact of farmers’ market incentive programs on food security and fruit and vegetable intake among low-income individuals. I am requesting your permission to include the previously mentioned journal article in my dissertation. I will include acknowledgements and citations to your work. Copyright and reprint rights will also be found in the appendices.

Please indicate your approval of this request by signing the space provided below or attaching any other form necessary to confirm your permission. If you have any questions, please contact me at the phone number or email below. Thank you for your assistance.

Mateja R. Savoie-Roskos
(435)-797-5577
Mateja.savoie@usu.edu

I hereby give permission to Mateja R. Savoie-Roskos to reprint the following article in her dissertation:


Signed: ____________________________
Date: January 12, 2016
January 6, 2016

Dear Melanie Jewkes:
I am in the process of preparing my dissertation in the Nutrition Dietetics and Food Sciences department at Utah State University (USU). I hope to complete my degree in Nutrition in May of 2016.

The article Reducing Food Insecurity and Improving Fruit and Vegetable Intake Among Farmers’ Market Incentive Program Participants of which I am first author, has been published in the Journal of Nutrition Education and Behavior. This article reports an essential part of my dissertation research on the impact of farmers’ market incentive programs on food security and fruit and vegetable intake among low-income individuals. I am requesting your permission to include the previously mentioned journal article in my dissertation. I will include acknowledgements and citations to your work. Copyright and reprint rights will also be found in the appendices.

Please indicate your approval of this request by signing the space provided below or attaching any other form necessary to conform your permission. If you have any questions, please contact me at the phone number or email below. Thank you for your assistance.

Mateja R. Savoie-Roskos
(435)-797-5777
Mateja.savoie@usu.edu

I hereby give permission to Mateja R. Savoie-Roskos to reprint the following article in her dissertation:


Signed: ________________________
Date: __________________________
Appendix H. Permission to Reprint
Title: Reducing Food Insecurity and Improving Fruit and Vegetable Intake Among Farmers' Market Incentive Program Participants

Author: Mateja Savoie-Roskos, Carrie Durward, Melanie Jeweks, Heidi LeBlanc

Publication: Journal of Nutrition Education and Behavior

Publisher: Elsevier

Date: Jan 1, 2016

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Curriculum Vitae
Mateja R. Savoie Roskos

691 South State Street
Richmond UT, 84333
218-766-1496
mateja.savoie@gmail.com

EDUCATION

2013-2016  PhD in Nutrition Sciences
Nutrition, Utah State University
Cumulative GPA: 3.89/4.0
Dissertation Research: The Role of Farmers’ Market Incentives and Nutrition Education on The Fruit and Vegetable Intake and Food Security Status of Supplemental Nutrition Assistance Program Participants

2011-2013  Masters of Public Health
Public Health, Idaho State University
Cumulative GPA: 3.97/4.0 Cum Laude
Thesis Research: Nutrition Related Behavior Change in Adult Participants of a Supplemental Nutrition Assistance Program Education
Date of Graduation: May 2013

2006 – 2010  Bachelors of Science in Dietetics
Dietetics (ACEND accredited), University of North Dakota
Certifications: Nonprofit Management and Leadership Certified Nonprofit Professional (CNP) ServSafe Certification Leadership Enrichment
Cumulative GPA: 3.63/4.0 Cum Laude
Date of Graduation: May 2010

2004-2006  General Studies
Bemidji State University
Cumulative GPA: 3.66/4.0

PROFESSIONAL WORK EXPERIENCE

2015-Present Professional Practice Assistant Professor, Logan Utah
Facility: Utah State University
Supervisor: Dr. Chuck Carpenter
Responsibilities: Teach Community Nutrition, Education and Counseling in Dietetics II, Maternal and Child Nutrition, Maternal and Child Nutrition Lab,
and Medical Terminology. Conduct program evaluation and assist with ACEND accreditation responsibilities.

2012-2015 SNAP-Ed Evaluation Coordinator; Adjunct Professional Practice Assistant Professor, Logan Utah
Facility: Utah State University
Supervisor: Heidi LeBlanc
Responsibilities: Conduct data analysis and interpretation with SPSS, Remark, and Qualtrics, assist director with grant writing, develop annual report, develop and oversee program evaluations, supervise undergraduate interns, assist with curriculum writing and development, assist with SNAP-Ed publications.

2013-2014 Adjunct Professional Practice Assistant Professor
USU Dietetics Program, Logan Utah
Facility: Utah State University
Supervisor: Chuck Carpenter
Responsibilities: Taught Community Nutrition (fall 2013 and fall 2014) and Maternal and Child Nutrition Lecture and Lab (spring 2014), assisted with the development of the Self Study Report (SSR) for ACEND accreditation, and assisted with other program evaluation projects requested by directors and faculty.

2011-2012 Registered Dietitian, Nutrition Consultant
Tanaka Balance, Logan Utah
Facility: Tanaka Balance
Supervisor: Larry Tanaka
Responsibilities: Provided individual nutrition counseling and education for clients with a variety of health and nutrition concerns. Provided grocery store tours and seminars as requested by clients.

2010-2011 Clinical Dietitian, Licensed Nutritionist
A’viands Food and Services Management, Yankton South Dakota
Facility: The George Mickelson Center for the Neurosciences
Supervisor: Tony Perk, FSD
Responsibilities: Provide individual nutrition counseling to children, adolescents, and adults with diabetes, hypercholesterolemia, obesity, and other chronic diseases. Provide individual and group nutrition counseling/education for patients with drug and alcohol addictions. Provide medical nutrition therapy to clients living in long-term care setting. Complete nutrition assessments and documentation for Medicare/Medicaid. Work with an interdisciplinary team to develop treatment team goals for patients.

2007-2009 Cooking Instructor
Culinary Corner, Grand Forks, North Dakota
Facility: University of North Dakota
Supervisor: Karina Wittman RD
Responsibilities: Delivered cooking demonstrations while emphasizing research based nutrition principles to UND students, faculty, and staff. Demonstrated healthy food choices, preparation methods, and safe food handling

INTERNSHIP EXPERIENCE

2012, Summer Master of Public Health Intern
Food $ense, Logan, Utah
Supervisor: Heidi Leblanc
Responsibilities: Assist with program planning, implementation, and evaluation. Speak at state conferences about Food $ense. Provide nutrition education for community programs. Assist with curriculum writing, professional writing, and web site construction.
Hours per week: 40
Total Hours: 520

2010, Spring Dietetic Intern
Red Lake Hospital, Red Lake, Minnesota
Supervisor: Jill Breyen, RD, LD, CDE
Responsibilities: Provided nutrition counseling for patients with diabetes, obesity, hypertension, hypercholesterolemia, and other chronic diseases. Taught a weekly weight loss class and a monthly cooking class. Provided group education to young parents regarding appropriate foods for all ages.
Hours per week: 40
Total Hours: 200

2010, Spring Dietetic Intern
Bethel Care Center, St. Paul, Minnesota
Supervisor: Rita Gilliam RD, LD
Responsibilities: Provided medical nutrition therapy to patients with tube feedings, mechanical ventilators, and mental health diagnosis. Completed required nutritional assessments and progress notes for Medicare/Medicaid. Assisted with interdisciplinary treatment plans for patients.
Hours per week: 40
Total Hours: 200

2008-2009 Nonprofit Leadership Intern
Red River Valley Community Action, Grand Forks, North Dakota
Supervisors: Kent Keys, Executive Director and Terry Steinke, Nutrition Coordinator

Responsibilities: Wrote grants to provide funding for the Food Fellowship Program. Collaborated with local schools and restaurants to expand food donations for the Food Fellowship Program. Assisted with obtaining and distributing food to local food shelves. Assisted with the Commodity Supplemental Food Program. Assisted with agency fundraisers.

Hours per week: 20-30
Total Hours: 315

BOOK CHAPTERS
2015 Submitted-Chapter 3 Pregnancy Nutrition
Publisher: Jones and Bartlett
Authors: Melissa Bernstein & Kimberly McMahon
Expected Published Date: Spring 2017

RESEARCH/JOURNAL ARTICLE
2016 Journal of National Extension Association of Family and Consumer Sciences
Article Title: Evaluating the Impact of SNAP-Ed Educational Materials at Farmers’ Markets
First author and corresponding author: Mateja Savoie
Additional Authors: Kelsey Hall PhD, Tayla Lambright, Chelsea Preedy, Heidi LeBlanc MS, CFCS

2016 Journal of Nutrition Education and Behavior
Article Title: Reducing Food Insecurity and Improving Fruit and Vegetable Intake Among Farmers’ Market Incentive Program Participants
First Author and corresponding author: Mateja Savoie
Additional Authors: Carrie Durward, PhD, RD, Melanie Jeweks, MS, Heidi LeBlanc MS,

2015 Journal of Nutrition Education and Behavior
Article Title: Intention to Change Nutrition-Related Behaviors in Adult Participants of a Supplemental Nutrition Assistance Program-Education
First Author and corresponding author: Mateja Savoie
Additional Authors: Monica Mispireta MD, MHS, Linda Rankin, PhD, RD, Karen Neill PhD, RN SANE-A, Heidi LeBlanc MS, CFCS, Debra Christofferson MDA, RD

2012-2013 Thesis
Masters of Public Health, Idaho State University
**Research Topic:** Nutrition Related Behavior Change Among Participants of a Supplemental Nutrition Assistance Program-Education (SNAP-Ed).

**Research Advisor:** Monica Mispireta, MD, MHS

**Responsibilities:** Complete thesis proposal, program evaluation, statistical analysis, final thesis paper, and thesis defense.

---

**2009 – 2010 Researcher**

Department of Nutrition and Dietetics, University of North Dakota

*Research Topic:* The affects of posting nutritional information at a Midwestern dining facility.

*Research Advisor:* Jan Goodwin, PhD, RD/LRD, FADA

*Responsibilities:* Participated in a research team. Developed and implemented survey and data collection. Entered data with PASW. Analyzed data. Presented findings.

---

**RESEARCH POSTERS**

**2015 Farmers’ Market Incentives and Nutrition Education: A Qualitative Study**

*Conference:* SNEB  
*Location:* Pittsburg, PA

**2015 Improving Food Security Through Farmers’ Market Incentives**

*Conference:* SNEB  
*Location:* Pittsburg, PA

**2015 The Impact of Farmers’ Market Incentives and Nutrition Education on Fruit and Vegetable Intake—A Qualitative Study**

*Conference:* ASNNA  
*Location:* Washington D.C.

**2015 Nutrition Education, Farmers Market Vouchers, and Their Effect on Improving Food Security for SNAP Participants in Cache Valley Utah**

Conference: UAND Annual Conference  
Location: SLC, UT

**2014 Food $ense Social Media Outreach**

*Conference:* USU Annual Extension Conference, UAND Annual Conference, USU Inclusive Excellence Research Event  
*Location:* Utah

**2013 Increasing Confidence in SNAP Participants at the Cache County Gardeners’ Market**
Conference: USU Annual Extension Conference,  
Location: Logan, UT

2013 Development of Rich County SNAP-Ed Program and Class Satisfaction  
Conference: USU Annual Extension Conference  
Location: Logan, UT

2013 Food $ense Increasing Breakfast in Low-Income Families  
Conference: USU Annual Extension Conference  
Location: Logan, UT

GRANTS
2015, Fall  USDA Grant  
Multi-Disciplinary Methods for Effective, Sustainable, and Scalable Evaluations  
Description: Research investigating the impact of obesity prevention through nutrition education provided by SNAP-Ed and EFNEP  
Award: $1,637,881 over three years  
Contribution: Co-PI

2014-2016, Spring  SNAP Educational Plan-2014-2016  
Food Sense, Logan, UT  
Description: Grant to fund the Utah Food Sense program. Funding is distributed to every county in the state to provide nutrition education and cooking demonstrations.  
Award: $959,473 per year  
Contribution: Co-PI

2015, Spring  USU Extension Mini Grant  
USU Extension, Logan UT  
Description: Grant to fund the expansion of Intergenerational Poverty (IGP) cooking classes through Food $ense.  
Award: $10,000  
Contribution: Co-PI

2014, Fall  FINI Grant  
United States Department of Agriculture  
Description: Grant to fund farmers market financial incentives to SNAP participants in Utah.  
Award: $247,038  
Contribution: Collaborator

2014, Spring  Research Catalyst (RC) Grant  
Utah State University, UT
Description: Grant to fund farmers market financial incentives to SNAP participants in Utah.
Award: $20,000
Contribution: Collaborator

2014, Spring    USU Extension Mini Grant
USU Extension, Logan, UT
Description: Grant to fund farmers market financial incentives to SNAP participants in Cache Valley, Utah.
Award: $9,751
Contribution: Collaborator

2014, Spring    USU Extension Mini Grant
Food Sense, Logan, UT
Description: Grant to fund a collaboration between anti hunger groups in Utah with intent to form a long standing anti hunger coalition.
Award: $10,000
Contribution: Co-PI

2013, Spring    USU Extension Mini Grant
Food Sense, Logan, UT
Description: Grant to fund nutrition education booths at farmers markets in Utah that accept Electronic Benefit Transfer (EBT).
Award: $10,000
Contribution: Co-PI

2013, Spring    USU Extension Mini Grant
Food Sense, Logan, UT
Description: Grant to fund the development of Spanish curriculum and materials for the SNAP-Ed Spanish speaking population in Utah.
Award: $10,000
Contribution: Co-PI

2013, Fall     SNAP Educational Plan-2013
Food Sense, Logan, UT
Description: Grant to fund the Utah Food Sense program. Funding is distributed to every county in the state to provide nutrition education and cooking demonstrations.
Award: $959,473
Contribution: Supporting

2009, Spring    Myra Foundation Grant
Red River Valley Community Action, Grand Forks, ND
Description: Grant provided funding for the Food Fellowship Program. Funding was utilized for purchasing the pans/lids necessary for the distribution of donated prepared and perishable food items.
Award: $1,000
Contribution: Co-PI

2009, Spring  ECOLAB Grant
Red River Valley Community Action (RRVCA), Grand Forks, ND
Description: Grant provided funding for the Food Fellowship Program. Funding was utilized for purchasing the pans/lids necessary for the distribution of donated prepared and perishable food items.
Award: $2,000
Contribution: Co-PI

SERVICE EXPERIENCE

2016  Public Health Nutrition Journal
Article Reviewer: Whetting Disadvantaged Adults’ Appetite for Nutrition Education

2015  Society of Nutrition Education and Behavior
Mentor for dietetics students

2015  Journal of the Academy of Nutrition and Dietetics
Article Reviewer: Nutrition Security in Developing Nations: Sustainable Food, Water, and Health

2015  Journal of the Academy of Nutrition and Dietetics

2015 & 2016  Society of Nutrition Education and Behavior
SNEB Abstract Reviewer

2014 & 2015  Academy of Nutrition and Dietetics
Champions for Healthy Kids Grant Reviewer

2014  Journal of the Academy of Nutrition and Dietetics
Article Reviewer: Food and Nutrition for Older Adults: Promoting Health and Wellness

2014  Society of Nutrition Education and Behavior
SBEB MyPlate e-Catalog Reviewer

2013-2015  Utah State University Dietetics Internship
Scholarship Reviewer

2013-2014  **Utah Academy of Nutrition and Dietetics (UAND)**
Conference Committee--Speaker Subcommittee

2006-2010  **Students Today Leaders Forever**
Spring Break Pay it Forward Tour 2007
Spring Break Pay it Forward Tour 2008
The Big Event (2007-2010)
Dilla Days community clean up (2007-2008)

2006-2010  **Nonprofit Leadership Student Association**
Annual Snowball Fundraiser (2007)
Annual Prom Dress Fundraiser (2008-2010)

2006-2010  **Student Association of Nutrition and Dietetics (SAND)**
Founder of the Nutrition and Dietetics Peer Mentorship Program
TEAM Nutrition (2005-2006)
Love your Body Week (2007-2009)
Meals on Wheels (2006-2008)

2008-2009  **USDA’s Team Nutrition**
Provided monthly nutrition education for children at a Grand Forks, North Dakota elementary school.

**PRESENTATIONS**

2016  **Reducing Food Insecurity and Improving Fruit and Vegetable Intake Among Farmers’ Market Incentive Program Participants**
Invited Presenter for the Journal of Nutrition Education and Behavior Journal Club Webinar Series
Location: Online Webinar

2015  **Obesity Among SNAP Participants**
Guest lecture for NDFS 6600 Current Topics in Obesity
Location: Utah State University

2015  **Secrets to Happiness**
Presenter for SNAP-Ed Annual Conference
Location: Midway, Utah

2015  **Obesity Among SNAP Participants**
Presenter for SNAP-Ed IVC Training
Location: Utah State University, Logan, UT
<table>
<thead>
<tr>
<th>Year</th>
<th>Event Description</th>
<th>Details</th>
</tr>
</thead>
</table>
| 2015 | SNAP-Ed Participant Interviews | Presenter for SNAP-Ed IVC Training  
Location: Utah State University, Logan, UT |
| 2012-2014 | SNAP-Ed Evaluations | Presenter for the SNAP-Ed Annual Conference  
Location: Salt Lake City, UT |
| 2014 | Program Evaluation | Guest lecture for Nutrition Communications  
Location: Utah State University, Logan, UT |
| 2013 | 4 Bucks a Day | FACS Conference  
Location: Brigham Young University, Provo, UT |
| 2012 | Making a Difference | Community Action Partnership, Utah’s Conference on Poverty  
Location: West Valley City, UT |
| 2012 | Get Well With Nutrition | InTech Health Fair  
Location: InTech High School, Logan, UT |
| **CONFERENCES** | | |
| 2014 and 2015 | Teaching at USU: A Faculty Workshop | USU |
| 2014 | Utah Academy of Nutrition and Dietetics Annual Conference | |
| 2014 | Academy of E-Learning Excellence | USU |
| 2014 and 2015 | Society of Nutrition Education and Behavior Annual Conference | |
| 2013 and 2015 | SNAP-Ed Mountains Plains Region Conference | |
| 2013 and 2015 | Association of SNAP-Ed Nutrition Networks and Other Implementing Agencies (ASSNA) | |
| 2008 and 2010 | American Humanics Management Institute (AHMI) | |
| 2009 | Food and Nutrition Conference and Expo (FNCE) | |
AWARDS/HONORS/SCHOLARSHIPS

2012-2013  Portneuf Medical Center Health Care Foundation Scholarship
2012      Follett Bookstore Scholarship
2011      Idaho Public Health Association Student Scholarship
2009-2010  Burness Wenberg Scholarship
2009-2010  Cindy Flannery (NWDDA) Scholarship
2008-2009  Next Generation Student Leader
2008-2009  Olive Bushby Scholarship
2008-2009  Davis and Marjorie Ronglie Scholarship
2008      Intercollegiate Academic Funding Award
2007      Presidents Honor Roll

AFFILIATIONS

2006-Present  Academy of Nutrition and Dietetics, Member
2012-Present  Society of Nutrition Education and Behavior, Member
2011-Present  Public Health/Community Nutrition Practice Group, Member
2011-Present  Utah Academy of Nutrition and Dietetics
2011-Present  Utah Public Health Association, Member
2011-2013    Idaho Public Health Association, Student Member
2011-2013    Public Health Student Association of ISU, Member
2010-2011    Nutrition Education for the Public (NEP), Member