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A Monitoring and Evaluation Plan and Research Strategies
for Wholesome Wave Georgia

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A Monitoring and Evaluation Plan and Research Strategies for Wholesome Wave Georgia

By

Sarah Pierce

Thesis Committee Chair: Amy Webb Girard, PhD

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Abstract

A Monitoring and Evaluation Plan and Research Strategies
for Wholesome Wave Georgia

by Sarah Pierce

Background: Georgia has a high rate of food insecurity and an increasing prevalence of diet-related diseases, with nearly 1.8 million Georgians having limited access to affordable, nutritious food. Wholesome Wave Georgia (WWG) aims to increase access to fresh, local food to all Georgians through its nutrition incentive programs and other supporting programs. Primary goals of WWG are to decrease food insecurity and to decrease the prevalence of diet-related diseases. WWG seeks to monitor and evaluate its programs and conduct research to improve program processes, demonstrate impact, and secure and validate funding.

Methods: The purpose of this thesis was to examine program indicators and methods commonly utilized in data collection and analysis for farmers markets and nutrition incentive programs, and to identify areas of research, monitoring, and evaluation to which Wholesome Wave Georgia can contribute, in order to improve programs and processes, and demonstrate impact. A logic model and a monitoring and evaluation framework were developed to standardize and improve future monitoring and evaluation efforts. Challenges to implementing the framework are discussed and recommendations are made for future research endeavors.

Results: The logic model development identified several indicators necessary for demonstrating program impacts that are not currently being monitored, and no plan exists to collect this data. A review of the literature revealed gaps in the current body of research and common indicators and measurement tools used by programs similar to WWG programs. WWG is already collecting data for and monitoring many of these indicators and utilizing tools like surveys and focus groups in program evaluations. Research designs for rigorous conduction of effective studies were also identified and can be implemented in future research.

Conclusions: Recommendations were made to use the developed monitoring and evaluation framework for current and future programs, including indicators selected based on anticipated program impacts and formative research. Recommendations were also made for framework implementation prioritization and for future research collaborations. This thesis serves as a resource for WWG as it plans future research endeavors, providing an evidence base for selecting indicators and outcomes to measure and analyze.

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Chapter 1

Introduction

Problem Statement

Nearly 1.8 million Georgians are food insecure, meaning that they have limited or uncertain access to adequate food. These 1.8 million Georgians rely on federal and state nutrition assistance to purchase food, often with limited healthy options, as fresh, wholesome foods are comparatively more costly than processed foods. Food insecurity is associated with chronic diet-related disease, disproportionately affecting those of low socioeconomic status. Nutrition incentive programs have been implemented to improve the diets of food-insecure individuals, but there is limited published research demonstrating the effects of nutrition incentive programs that can be effectively compared due to a lack of standardized indicators and measured outcomes.

WWG Background

Wholesome Wave Georgia's (WWG) mission is to increase access to fresh, healthy, and local food to all Georgians by empowering networks of farmers to facilitate access to and awareness of healthy food choices. Government nutrition programs including the Supplemental Nutrition Assistance Program (SNAP), Women Infants and Children Nutrition Program (WIC), and the Senior Farmers Market Nutrition Program (SFMNP) are leveraged to create financial incentives to encourage low-income individuals to shop at local farmers' markets. This flagship program is currently known as the Healthy Food Incentive Program (HFIP) but is soon to be rebranded. Each nutrition benefit dollar spent

at a WWG partner farm or market is doubled, doubling the purchasing power of the consumer and doubling the income of the farmer.

In 2015, WWG doubled over $192,000 federal and state benefit dollars to be spent on local, healthy food. This amounts to its program participants receiving over $384,000 worth of fresh, locally grown food and $384,000 put back into Georgia's economy, supporting local farmers and food producers.

WWG seeks to monitor and evaluate its programs and conduct research to improve program processes, demonstrate impact, and secure and validate funding. Effective research will increase the credibility of WWG and its programs while providing evidence-informed guidance for its programs moving forward. This report will help WWG identify and plan research and evaluation opportunities that will contribute to reaching these goals.

Purpose Statement

This thesis seeks to examine indicators and methods utilized in data collection and analysis for farmers markets and nutrition incentive programs, and to identify areas of research, monitoring, and evaluation to which Wholesome Wave Georgia can contribute, in order to improve programs and processes, and demonstrate impact.

Research Question

How can WWG strategically conduct research and utilize a standard monitoring and evaluation plan to effectively demonstrate how its programs increase access to healthy food, increase revenue for farmers, and affect health outcomes?

Significance Statement

The produced document will serve as a resource for WWG as it examines current programs and monitoring and evaluation methods, and plans future research endeavors, providing an evidence base for selecting indicators and outcomes to measure and analyze.

Chapter 2

Literature Review

Poverty and Food Security in the United States and Georgia

According to the United States Census Bureau, there were 46.7 million people in poverty in the U.S. in 2014, representing a long-term increase in poverty over the past fifty years (DeNavas-Walt, 2015). This represents 14.8 percent of the total U.S. population and 21.1 percent of children under the age of 18 (DeNavas-Walt, 2015). The official poverty measure is based on the size, age makeup, and cash resources of a household, not including noncash benefits from government programs like the Supplemental Nutrition Assistance Program (SNAP). A second measure, the supplemental poverty measure (SPM), includes both cash resources and in-kind government benefits in its measure of poverty, as well as taking other factors into account, such as geographic differences in costs of living; thus, the SPM is a more comprehensive and accurate measure of poverty (Bridges, 2015; Short, 2015). The SPM for 2014 indicated 15.3 percent (48.4 million) of Americans are living in poverty, significantly higher than the official poverty rate. However, due to the inclusion of tax credits and noncash federal benefits in the calculation of the SPM, populations like Blacks, children under 18, and those living in rural areas had significantly lower rates of poverty than the official measure when using the SPM (Bridges, 2015; Short, 2015). This demonstrates the positive impact that noncash federal benefit programs like SNAP may have in reducing poverty in some populations. Populations including Hispanics, Asians, seniors 65 and older, non-native citizens, and non-citizens have significantly higher

percentages of poverty when using the SPM, indicating a lesser impact of federal programs on poverty reduction for these populations.

Food security, as defined by the 1996 World Food Summit, "exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (FAO, 1996). This widely accepted definition of food security is used for the purpose of this thesis since it is the most comprehensive, reinforcing the multifaceted nature of food security and giving rise to food insecurity as a social and political construct rather than a result of a failed food supply (FAO, 1996, 2006).

Households in poverty are more likely to experience food insecurity, as they have limited money and other resources to access adequate food. Since 1995, the U.S. Department of Agriculture (USDA) has conducted an annual survey to collect information on food access and adequacy, food spending, and sources of food assistance for U.S. households (Coleman-Jensen, 2015). The results provide information about the prevalence and severity of food insecurity in the U.S. In 2014, 14 percent (17.4 million households) were classified by the USDA as food insecure (Coleman-Jensen, 2015). This means that at some point during the year, the household was unable to provide enough food for all of its members due to a lack of resources. Though the .3 percent drop in food insecurity since 2013 is statistically insignificant, food insecurity has declined nearly one percent since 2011, a significant change (Coleman-Jensen, 2015). However, since homeless families and individuals are not included in the survey, the statistics are biased substantially downwards.

Since 2006, the USDA has used four labels to describe the range of severity of food security: high, marginal, low, and very low. Previously, only three classifications were used: food secure, food insecure without hunger, and food insecure with hunger (Coleman-Jensen, 2015). Households with high and marginal food security, both previously classified as food secure, report no or few indications of food access problems and no or little changes in diets or food intake. Households classified as having low food security, previously labeled food insecurity without hunger, report reductions in diet quality, variety, or desirability, but they report little or no reduction in food intake. Those classified as having very low food security, previously labeled food insecure with hunger, report multiple disruptions in eating patterns and reduced food intake for household members. These very low food secure households report having anxiety over their food supply, an inability to afford balanced meals, and eating less or skipping meals due to lack of money for food. While households with marginal food security are considered by the USDA to be food secure, existing literature indicates that they are more like food insecure households than food secure households, including having similar disease patterns and health risks (Cook et al., 2013).

The 2014 survey found that 5.6 percent of U.S. households had very low food security, unchanged since the 2013 survey (Coleman-Jensen, 2015). About one-fourth of very low food secure households experienced the related conditions only occasionally throughout the year, for one or two months; for one-third, however, the related conditions were experienced chronically, nearly every month of the year. Food insecurity rates were considerably higher than the national average for households with incomes near or below the poverty line that were Black- and Hispanic-headed households, households with

children headed by single parents, or households with women living alone. Food insecurity rates were also highest in rural areas and lowest in suburban areas (Coleman-Jensen, 2015).

The U.S. South – which, according to the U.S. Census Bureau, is comprised of 16 states, including Georgia, and the District of Columbia – had the highest poverty rate of the four U.S. regions in 2014 (DeNavas-Walt, 2015). Nearly 1.8 million Georgians in 2014 – 19 percent of the population – were under the federal poverty line, up from 15.7 percent in 2010 (Bureau, 2010-2014). Eleven percent of Georgia's seniors and 26% of children are included in this figure. In 2014, 15.7 percent of surveyed households in Georgia reported being food insecure, and 6.2 percent reported very low food security (Coleman-Jensen, 2015). Seniors age sixty and older are at increased risk for food insecurity due to higher isolation rates; common factors of senior food insecurity include living alone, having low ability to prepare food, and residing in the South (Coleman-Jensen, 2015). Sixteen percent of seniors age 60 and older in Georgia were classified as food insecure in 2014 (Coleman-Jensen, 2015). According to the state Department of Public Health (DPH), Georgia ranked seventh in senior food insecurity in the U.S. in 2013 (Bernal, 2013). The highest rates of both poverty and food insecurity are found in Georgia's central and southern counties. Georgia's 2nd Congressional District, comprised of 27 rural southwestern-most counties, had the highest rate (34%) of child food insecurity in the U.S. in 2014 (America, 2016). Following national trends, Georgia's Black- and Hispanic-headed households are more likely to report food insecurity. Georgia's Hancock County was identified in 2011 as a majority Black county with one of the fifteen highest food insecurity rates (30.4%) in the U.S. (America, 2016).

Federal Assistance Programs

To combat food insecurity, federal food and nutrition assistance programs were designed to provide low-income households resources to access food and nutrition information. The National School Lunch Program was established in the mid-1940s, as government concern grew about the nutritional status of drafted young men during World War II (Fox, 2004). The government committed to ensuring no citizen goes hungry or is without an adequate diet. Today the Food and Nutrition Service (FNS), part of the USDA, administers fifteen distinct food assistance and nutrition programs (FANPs), spending a total of $103 billion to operate the programs in fiscal year 2014 (USDA, 2014).

The largest of the programs, the Supplemental Nutrition Assistance Program (SNAP, formerly the Food Stamp Program), provides monetary benefits for purchasing food to eligible households at or below 130 percent of the federal poverty level. In 2014, SNAP distributed benefits to 46.5 million people at a cost of $76 billion (USDA, 2014). Benefits are dispersed electronically through a Electronic Benefits Transfer (EBT) card on a monthly basis. The average monthly benefit amount per individual in Georgia in 2014 was $130, about $5 more than the U.S. average (Coleman-Jensen, 2015). Participants can use benefits dollars to purchase almost any food, food-producing seed or plant, or drink, including meal replacement drinks like Ensure, since the FDA gives it a nutritional value content, as opposed a supplement facts label. The type of product label signifies whether the FDA has classified an item as supplement or food. Supplements, including vitamins, are not eligible, as well as hot prepared food, alcohol, and energy

drinks with supplement facts labels (Fox, 2004). Since SNAP eligibility is based almost entirely on financial need, it offers the most widespread nutrition assistance to the low-income population.

Other major FANPs are targeted toward individuals or households with specific characteristics and need. The Women, Infants, and Children (WIC) Supplemental Nutrition Program provides health education and monetary benefits for low-income pregnant women, breastfeeding mothers (up to 1 year), postpartum women (up to 6 months), and children up to 5 years of age (Fox, 2004). For WIC, the income threshold is at or below 185 percent of the federal poverty level, and participants must have at least one documented nutritional risk. The WIC program serves about 8.3 million participants each month, at a cost of $6.2 billion; the average monthly benefit is $63 per recipient (USDA, 2014). Benefits are dispersed in the form of vouchers that can be redeemed at WIC-authorized vendors for healthy foods like milk, eggs, and cereal (Fox, 2004).

WIC-eligible women and children are also eligible for the WIC Farmers Market Nutrition Program (WIC FMNP), in which the distributed vouchers can be redeemed for local fruits and vegetables at authorized farmers markets or with direct marketing farmers (Fox, 2004). In 2013, the WIC FMNP served 1.5 million participants (USDA, 2014). The Senior FMNP, like WIC FMNP, provides vouchers for fresh local fruits and vegetables to low-income seniors at or above 60 years of age and at or below 185 percent of the federal poverty level (Fox, 2004). Only farmers and farmers' markets authorized by state agencies may accept and redeem FMNP vouchers; authorization is limited to farmers and markets that are producer-only (produce is sold solely by the grower), making wholesalers ineligible (Fox, 2004). Both programs increase awareness of local farmers'

markets to FMNP voucher recipients and have been proven to contribute significantly to farmers' market vendor sales. In 2006, the USDA reported WIC FMNP average monthly sales were $1,744 nationwide, and Senior FMNP average monthly sales were $1,004, with only 61 and 45 percent total farmers' market participation, respectively, at the time (Ragland, 2009).

In a 2014 survey of food insecure households, 61 percent reported participating in a federal food and nutrition assistance program like SNAP or WIC in the month prior to the survey (Coleman-Jensen, 2015). The FNS reported that 85 percent of all individuals eligible for SNAP participated in the program in 2013; Georgia had a higher participation rate of 93 percent among all eligible people, up from 87 percent in 2011 (Cunnyngham, 2016). However, only 81 percent of Georgians characterized as working poor, meaning they were eligible for SNAP and part of a household in which a member earns money from a job, participated in SNAP (Cunnyngham, 2016). This represents a gap in the number of households eligible for SNAP and the number actually participating. Research shows that common reasons eligible individuals do not participate in SNAP include low knowledge about eligibility guidelines, perceived high difficulty of the application process, and stigma around participating in SNAP (Coleman-Jensen, 2015; Cunnyngham, 2016). Seniors aged sixty and older have one of the poorest participation rates, with only 42% of eligible seniors participating across the country (America, 2016), even with the existence of the Senior SNAP program, which offers a simplified SNAP application and a waiver of the interview (Lee, Johnson, & Brown, 2011). In Georgia, Currently, it is estimated that 89,000 eligible older adults in Georgia are not participating (35.5%).
Barriers: Stigma, Application issues, Misperception of benefit amounts

(Lee et al., 2011)

Georgia's SNAP participation rate among all eligible individuals was higher than the national average in 2013; from 2011-2013, Georgia had significantly higher SNAP participation rates than half the other states (Cunnyngham, 2016). A study of SNAP participation in among public housing residents in central Georgia counties revealed that most of the residents participating in a FANP were unable to feed themselves and/or their families throughout the entire month (Gaddis, 2015). This was attributed to a recent policy change that decreased SNAP benefits for participants (Bolen, 2015; Gaddis, 2015).

The SNAP program is intended to help households become more food secure, though in 2013, over half of SNAP households were food insecure, and about 30% experienced very low food security (Mabli, 2013). This could be due to SNAP households receiving insufficient benefits, the household's budget management inefficiencies, and/or inadequate nutrition education (Dinour, Bergen, & Yeh, 2007). However, the complex relationship between SNAP and food security makes impact evaluation vulnerable to selection bias and reverse causality, since food insecure households are more likely to enroll in SNAP (Fox, 2004). Overall, research shows that SNAP participation is associated with an improvement in food security and increases household energy/calorie availability; the evidence showing an increase in available nutritious food is weaker (Mabli, 2013). WIC and Senior FMNPs have been found to increase consumption of fruits and vegetables, though relatively few studies have been conducted (Fox, 2004; Kropf, Holben, Holcomb, & Anderson, 2007).

Research has shown an association between participation in FNAPs and diet-related conditions and diseases like obesity and diabetes, due in part to the fact that the

majority of food insecure households with higher risks of these diseases participate in at least one assistance program (Dinour et al., 2007). In addition, SNAP participation does not ensure consumption of nutritious foods. One study found that SNAP participation was a significant predictor of being overweight for women (Townsend, Peerson, Love, Achterberg, & Murphy, 2001). These programs generally distribute benefits on a monthly cycle, and studies have shown that families on SNAP use all of their monthly funds before the end of the month (Dinour et al., 2007). This leads to what is known as the monthly "food stamp cycle", wherein overeating occurs during a three-week period when food stamps are available, then is followed by a week of involuntary food restriction when resources have been exhausted, and the cycle continues on (Dinour et al., 2007).

Food Security and Diet-related Illness Association

Food insecurity has been associated with numerous poor health outcomes and may have serious impacts on individual physical and emotional well-being, and community economies and social networks. The U.S. population that is the most food insecure is also most at risk for diet-related diseases including type 2 diabetes, hypertension, coronary heart disease, stroke, and certain cancers (Ahima & Lazar, 2013; Baumgartner, Heymsfield, & Roche, 1995; Seligman, Laraia, & Kushel, 2010). Food insecure adults are also more likely to have depression and other mental health problems (Pan, Sherry, Njai, & Blanck, 2012); and for HIV-positive adults, food insecurity has been found to be a predictor of treatment non-adherence, often worsening their condition (Kalichman et al., 2014). Obesity is often a comorbidity of these conditions, as obese individuals are at increased risk of developing medical problems than can lower

productivity and quality of life, increase healthcare costs, and lead to premature death (Baumgartner et al., 1995; Martin & Ferris, 2007; Pan et al., 2012; Seligman et al., 2010). The findings that marginally food secure households have similar patterns of disease and health risks as food insecure households, emphasize the potential underestimation of the prevalence of poor health outcomes associated with food insecurity (Cook et al., 2013).

The Centers for Disease Control and Prevention (CDC) uses body weight and height to calculate a body mass index (BMI) measure that is used to define adult ranges for being underweight (<18.5), healthy weight (18.5 - <25), overweight (25 - <30), and obese (30 and higher) (CDC, 2016). For adolescents and children under 20 years, obesity is defined as a BMI at or above the 95th percentile of the sex-specific CDC BMI-for-age growth charts (CDC, 2016; Ogden, Carroll, Kit, & Flegal, 2014). The BMI is not an accurate measure of overall health or a perfect measure of body fat (Ahima & Lazar, 2013; Baumgartner et al., 1995). For most individuals, it is highly correlated with their amount of body fat, though does not account for fat distribution differences in sex, age, or race (CDC, 2016; Flegal et al., 2009).

In 2012, over two-thirds (68.5%) of adults were overweight or obese, and 34.9% of adults were obese, using age-adjusted estimates (Ogden et al., 2014). The same year, 31.8% of youth in the U.S. were overweight or obese, and 16.9% were obese, with significant differences in race (Ogden et al., 2014). Non-Hispanic Asian youth had the lowest prevalence of obesity (8.6%), and Hispanic youth had the highest prevalence (22.4%), compared to non-Hispanic whites (14.1%) and non-Hispanic blacks (20.2%) (Ogden et al., 2014). Though adult obesity prevalence remained stable from 2004-2012,

there was a significance increase in obesity in women 60 years and older (31.5% to 38.1%) (Ogden et al., 2014).

According to the USDA Economic Research Service (ERS), food insecurity is robustly linked to household income; those with incomes below the federal poverty line are four times as likely to experience food insecurity, compared to households above the federal poverty level (Coleman-Jensen, 2015). Previous studies have found obesity and food insecurity to be more prevalent in low-income populations and have demonstrated an association between household food insecurity and adult obesity, likely related to the fact that processed, calorie-dense, high-sugar, and high-fat foods are typically less expensive that healthier foods (Coleman-Jensen, 2015; Martin & Ferris, 2007; Pan et al., 2012). Research shows that a greater percentage of people in higher-income households meet recommendations for the consumption of nutrients than do people in lower-income households (Brown, 2008). Irregular and unreliable eating patterns experienced by food insecure households can also negatively affect metabolic rates and contribute to obesity, as the body responds to food shortage by increasing body fat storage (Martin & Ferris, 2007; Pan et al., 2012). One study found that some food insecure adult groups had a significantly higher prevalence of obesity, including women, non-Hispanic blacks, and those with a household income of less than $25,000 (Pan et al., 2012).

A lesser number of studies have been conducted to investigate a potential link between food insecurity and obesity in children, and the results have been conflicting (Martin & Ferris, 2007). These studies have produced a range of results, showing no significant associations, negative associations, and some association, wherein food

insecurity alone was not found to be a significant factor in predicting obesity in low-income children (Martin & Ferris, 2007).

One study found food insecurity to be a significant predictor of adult obesity, with food insecure adults found to be over twice as likely to be obese as food secure adults (Martin & Ferris, 2007). The same study, however, found that food insecurity did not increase the risk of child obesity for children living in households below the federal poverty line, but these children of low-income households were slightly less than half as likely to be obese as their higher-income peers. The study did find that having an obese parent significantly increased the odds of children being obese (Martin & Ferris, 2007). Though in general, study results have shown that neither poverty nor food insecurity alone are risk factors for adult obesity, food security appears to play a significant contributing role (Martin & Ferris, 2007; Pan et al., 2012).

To tackle this issue, researchers suggest concentrating on increasing access to affordable healthy food for all, with a focus on addressing the low transportation availability of low-income populations, which has been closely linked with food insecurity (Drewnowski, 2004; Kalichman et al., 2014; Martin & Ferris, 2007; Pan et al., 2012; Seligman et al., 2010). Environmental and social determinants like community safety, secure housing, social support, and education and income level, must be considered and addressed in any strategy, as they can also have a substantial affect on food security and public health (Pan et al., 2012).

Fruits and Vegetable Consumption Associated with Positive Health Outcomes

Poor dietary habits have been identified as a major contributor to the rise in obesity and chronic diseases like type 2 diabetes and coronary heart disease (Drewnowski, 2004; McCormack, Laska, Larson, & Story, 2010). Mechanisms related to these conditions and diseases such as chronic inflammation, insulin resistance, altered hormone metabolism, and decreased glucose tolerance can be influenced and counteracted by the increased intake of fruits and vegetables (Boeing et al., 2012; Drewnowski, 2004). Fruits and vegetable contain phytochemicals that influence the body's inflammatory, cellular redox, endothelial, and metabolic processes; these mechanisms are thought to be chiefly responsible for the risk-reducing effect of increased fruit and vegetable consumption (Boeing et al., 2012).

Dietary Guidelines for Americans (DGA) 2015-2020, published by the U.S. Departments of Agriculture and Health and Human Services, a healthy diet includes a variety of vegetables from differing subgroups, whole fruits, whole grains, low-fat dairy, a variety of proteins, and oils, specifying that at least half of every meal should consist of fruits and vegetables (USDA, 2015). The guidelines recommend limiting sodium, trans and saturated fats, and added sugars. Despite these recommendations, many Americans do not consume the suggested amount of fruits and vegetables and have diets high in empty calories (CDC, 2013). In Georgia, nearly 42 percent of adults and 43 percent of children report consuming fruits less than once daily; 23 percent of adults and 43 percent of children report consuming vegetables less than once daily (CDC, 2013).

Healthy diets in line with the DGA have been associated with lower morbidity and mortality from major chronic diseases (Boeing et al., 2012; Yu et al., 2015). One

prospective study that followed a cohort of low-income, mostly African-American individuals from the southeastern U.S. found that higher adherence to the DGA was associated with 14% - 23% lower mortality from all diseases, with significant associations between lower total mortality and the recommendations for increasing plant proteins, whole grains, and dairy in diets (Yu et al., 2015).

Studies investigating the link between fruit and vegetable consumption and the development of chronic diseases and conditions have found that increased intake of fruits and vegetables is directly associated with a blood-pressure-lowering effect, a protective effect on bone health, and decreased risk of obesity, coronary heart disease, stroke, cancer, and dementia (Boeing et al., 2012). Increased fruit and vegetable consumption is indirectly associated with decreased risk of developing type 2 diabetes, by way of directly lowering the risk of weight gain. In one study, a significantly decreased risk of developing type 2 diabetes was associated with consumption of relatively large amounts of leafy green vegetables (Boeing et al., 2012). Research has demonstrated that fruits and vegetables from specific botanical families employ protective effects against various cancers but do not protect against all types or among subtypes equally (Boeing et al., 2012).

Nutrition Incentives

Unhealthy dietary behaviors have been associated with low accessibility and affordability of fruits and vegetables (Blumenthal et al., 2014; Kegler et al., 2014; Kropf et al., 2007; Mello et al., 2010). As food insecurity worsens as a result of having low access and resources, the frequency of fruit and vegetable consumption declines significantly (Dinour et al., 2007). Research shows that low-income populations consume

lower levels of fruits, vegetables, and micronutrients than higher-income populations and are less likely to think that eating recommended amounts of fruits and vegetables daily leads to good health (Seligman et al., 2010; Treiman et al., 1996).

Price discrepancies between fresh fruits and vegetables and packaged, processed foods incentivize the purchase and consumption of these cheaper, less healthy foods. To combat the growing problems of fresh food accessibility and diet-related chronic disease, nutrition incentives were designed to increase the purchasing power of low-income individuals, many by leveraging existing government food assistance programs (Brown, 2008; Wall, Mhurchu, Blakely, Rodgers, & Wilton, 2006). Nutrition incentive programs offer monetary incentives to participants for purchasing healthy foods. It is natural that financial incentives like coupons and discounts could reduce the economic barrier to making healthier food purchases. Research has shown that making fruits and vegetable more affordable increases their purchase and consumption (Wall et al., 2006; Young et al., 2013). The USDA's Economic Research Service estimates that a twenty percent reduction in the cost of fruits and vegetables would result in a modest increase of fruit and vegetable purchases (Brown, 2008).

Nutrition incentives have been associated with increased fruit and vegetable consumption and positive health outcomes, as well as boosts to local economies. Research indicates that the use of monetary incentives is an effective tool to address food insecurity, whether structured as a matched or fixed value incentive amount, though an optimal incentive value has not yet been determined (Brown, 2008). Experimental and observational research has been conducted to ascertain nutrition incentive impacts on dietary intake, health outcomes, and economies. Evidence from several kinds of studies

has shown the use of incentives has been effective in modifying dietary behavior (French et al., 1997; Horgen & Brownell, 2002).

Experimental randomized, controlled trials (RCTs) are considered the gold standard in research methods, enabling intervention efficacy and causal inferences to be determined through the utilization of randomly assigned treatment and control groups (West et al., 2008). RCTs use randomization to assign study participants to groups that either receive interventions or do not, minimizing selection bias and creating a control group for comparison. The groups' outcomes can then be compared after the completion of the intervention, and outcome differences may be attributed to the intervention received or lack thereof (West et al., 2008). Randomization is not possible or ethical in many situations, especially in public health research; therefore, alternative research designs have been proposed that allow relatively strong causal inferences (West et al., 2008). Randomized encouragement designs provide an alternative to RCTs when the use of treatment assignment is impractical or unethical; participants are randomly offered the opportunity to receive an intervention, but are allowed to decide whether or not to receive it. Assessments can be made using an intention to treat analysis, meaning all participants randomly assigned to a treatment are included in the analysis within the groups to which they were assigned (West et al., 2008). Nonrandom quantitative assignment designs assign treatment based on quantitative measures of need, risk, or merit; to infer causality, modeling is used to examine the relationship between the assignment variable and the outcome variable, and relationships are examined separately for treated and control groups. In observational studies treatment is presumed to be nonrandom, and treatment is not assigned and often voluntary. To mitigate selection bias, design elements such as

matching and stratifying, using pretests on multiple occasions, and using multiple control groups with different strengths and weaknesses can be employed (West et al., 2008).

An evaluation of a Michigan county farmers' market nutrition incentive program found that recipients self-reported a significant increase in fruit and vegetable consumption following interventions using both coupon and education approaches (J. V. Anderson et al., 2001). The study recruited low-income women from WIC and Community Action Agency populations to participate, assigning each to one of four intervention arms: education, coupon, education and coupon, or no intervention. Randomization was not possible for every group due to WIC policy and scheduled clinic appointments. Each group was assessed over two months, using self-administered pre- and post-test questionnaires, examining fruit and vegetable consumption and attitudes, the consumption frequency of specific types of fruits and vegetables, and farmers' market use; the questionnaires were developed through organized focus groups of WIC participants. The education-including interventions involved participation in a twenty-minute presentation that covered fruit and vegetable healthiness, seasonality, storage, and preparation. The coupon-including intervention participants received a $20 coupon for produce from farmers' markets. WIC records documented the redemption of coupons. Outcomes were assessed via multivariate analysis to gauge specific intervention effects on individual outcome variables. Significant associations were found between participating in the coupon, education, or both intervention arms and positive changes in fruit and vegetable consumption and attitudes. The education component had a greater impact on attitude change; the coupon component had a greater impact on consumption

behavior; maximum impact on the combined outcomes was achieved through the combination of both components (J. V. Anderson et al., 2001).

One study of a nutrition incentive program using a fixed amount coupon for use at either a local farmers market or grocery store found that its participants who shopped at farmers markets significantly increased their daily consumption of fruits and vegetables, compared to a control group and a grocery store group (Herman, et al. 2008). The study utilized a nonequivalent control group design (nonrandomized), and recruited low-income women participating in SNAP and/or WIC from WIC clinics, forming two intervention groups – farmers' market and grocery store – and one control. Participants were monitored for two months prior to the intervention in order to verify current fruit and vegetable intake, then interviewed six or four times over a fourteen-period, based on participation in control or intervention groups, respectively. The intervention groups received $10 weekly over six months to buy produce. Control group participants received $13 coupons for diapers for participating. The grocery store and farmers' market both documented voucher redemptions. Results show that almost all of the distributed vouchers were redeemed, and a variety of produce was purchased, with apples and lettuce being the most popular fruit and vegetable, respectively, purchased from the farmers' market. A greater variety of both fruits and vegetables were purchased from the farmers' market compared to the grocery store (Herman, Harrison, & Jenks, 2006).

In a review of interventions aimed to modify dietary behaviors including fruit and vegetable intake, Ammerman, et al. (2002) compared the results of studies that used similar outcome measures. The interventions had significant effects on fruit and vegetable consumption, with an average increase of .6 servings per day at seventeen of

twenty-two studies reviewed (Ammerman, Lindquist, Lohr, & Hersey, 2002). However, among the studies with longer follow-up periods, the magnitude of the intervention effect decreased ten percentage points from the initial follow-up, indicating the increase in uptake was not sustained. The review concluded that approaches for affecting dietary behavior change are more effective if educators help participants set goals and involve small groups.

A 2006 review of RCTs examining the effect of monetary incentives on dietary behavior found that all four reviewed studies demonstrated positive effects on targeted (fruit and vegetable) food purchases, consumption, or weight loss (Wall et al., 2006). Another finding of the RCT review was that very few RCT studies have been published addressing the issue of nutrition incentive effects (Wall et al., 2006).

Determination of the incentive amount requires the consideration of several factors, as the amount affects participant response and overall program costs (Brown, 2008). More research is needed to determine how farmers' market shopping behavior would be impacted if the nutrition incentive was eliminated (King, 2014) Of course, participants must be informed of incentive availability to take advantage of them. Reaching participants is challenging and increases workload of nutrition education providers or other local assistance workers, as well as organization overhead costs (Brown, 2008).

Nutrition Education

To effectively change dietary behaviors, nutrition education must play a role. Nutrition education includes any set of learning experiences designed to facilitate the

voluntary adoption of nutrition-related behaviors that are conducive to good health and well-being (Brown, 2008). Research shows that lower income individuals are more likely to blame genetic or metabolic factors for obesity rather than their diet (Dammann & Smith, 2009). Nutrition education approaches, including one-on-one counseling and group classes, have been found to positively affect fruit and vegetable consumption. These approaches work to influence food preferences by increasing individual knowledge and skills around food shopping and food label comprehension (Brown, 2008).

One study found that informational materials including representations of federal five-a-day recommendations were effective in increasing healthy food knowledge (J. V. Anderson et al., 2001; Gregson et al., 2001). For individuals with diet-related chronic illnesses, educational materials and classes are particularly effective (Weinstein, Galindo, Fried, Rucker, & Davis, 2014). Nutrition education can improve attitudes towards healthy diets; one study found positive attitudes towards healthy eating to be associated with higher-quality diets, independent of socio-economic status, as long as good nutrition was viewed as important (Aggarwal, Monsivais, Cook, & Drewnowski, 2014). Research shows that providing nutrition information at the point of purchase with posters, brochures, and shelf or table labels may also positively influence purchasing behavior and consumption (Brown, 2008). Participatory methods with nutritional components, like cooking classes or gardening, are especially effective in achieving long-term nutrition learning and skill acquisition, which may contribute to increased consumption of healthily prepared fruits and vegetables (Ha & Caine-Bish, 2009; McAleese & Rankin, 2007; Wrieden et al., 2007).

Children can also be the target of nutrition education as a way to disseminate information on the food-health link to the entire family unit (A. S. Anderson et al., 2007; Kocken et al., 2016). Under the Healthy, Hunger-Free Kids Act of 2010, school districts participating in the National School Lunch Program or other child nutrition programs are required to establish a local school wellness policy for all schools in their jurisdiction (FNS, 2010). The wellness policy must include goals for nutrition promotion and education, physical activity, and other school-based activities that promote student wellness; and nutrition guidelines to promote health and reduce obesity for all available school foods (FNS, 2010).

Strategies that merely increase nutrition knowledge may not be sufficient to combat obesity in food insecure adults, but should consider the relative high cost of low-calorie, healthy food, as well as access limitations (Drewnowski, 2004; Martin & Ferris, 2007). To affect food insecurity, many approaches can be employed, with the goal to influence at least one of the many factors that affect food purchasing decisions. The combination of economic incentives and nutrition education has been found to most effectively increase both knowledge of healthy foods and healthy eating behaviors (J. V. Anderson et al., 2001; Gregson et al., 2001).

Farmers' Markets

Farmers' markets have been shown to increase access to fruits and vegetables, improve health, facilitate community cohesion, and generate social and economic capital (Morales, 2011). They inherently promote the purchase of healthier foods by providing a high availability of nutritious foods and having limited availability of foods with low

nutritional value (Brown, 2008). Markets are traditionally founded by a variety of community stakeholders (Friedlander, 1976), making their goals align with the issues and assets unique to their respective locations. Though other local food and farm marketing initiatives have emerged, farmers' markets endure as the most prominent, open forums for supporting direct agricultural business (Martinez, 2010).

In 2011, the Farmers Market Coalition (FMC) identified the need to apply greater discipline to the collection of information and analysis of the diverse impacts of farmers markets. A set of indicators for measuring farmers market activities and outcomes was drafted in 2011 by the FMC and the CDC's Communities Putting Prevention to Work (CPPW); the indicators can be categorized into four types of capital: economic, human, social, and ecological (Jeong, 2015).

The increase in the number of farmers markets implies that consumers are purchasing increasing larger portions of their food from local markets and that farmers are benefitting from the increase in direct marketing opportunities, which allow them to sell directly to the end consumer of the food (Henneberry, 2009; Larsen, 2009). Farmers markets are not as capital intensive as roadside stands and can serve as incubators for innovative producers looking to market new crops and varieties or to develop viable business models (Jeong, 2015; Wilkinson, 1997). Research shows that revenue from famers' market sales can be 200-250% higher than from wholesale sales (Wilkinson, 1997). Studies on farmers markets have found they have positive impacts on local economies in terms of job creation and increased revenue and income (Wilkinson, 1997). These positive impacts affect not only the market's participating enterprises, but the surrounding business area and the (often rural) communities from which the vendors

travel, as well (Jeong, 2015). The USDA's Economic Research Service has estimated that capturing just 5% of a community's total food market could generate $13.5 million annually in sales for a community of 150,000 people within a sustainable community food system (Wilkinson, 1997).

Research shows that SNAP redemption has increased substantially in markets offering nutrition incentives (Oberholtzer, 2012). Farmer surveys have revealed that both farmer and market characteristics are important to the impact of incentives on participating farmer revenue. Farmers were more likely to report increased sales from incentive programs if a higher proportion of their market sales was from fruits and vegetables, if they depend on markets for a higher percentage of total farm sales, and if they are very satisfied with the implementation of incentive program at markets at which they sell (Oberholtzer, 2012).

Farmers markets have also been found to stimulate consumer spending at surrounding community businesses (Bubinas, 2011). Studies have found that shoppers who traveled specifically to shop at farmers markets also spent money at nearby businesses, and a majority of surveyed shoppers report often or always patronizing other nearby businesses when they shop at the farmers market (Lev, 2003).

In order to evaluate the economic impact of farmers markets, economic multiplier effects are measured to include direct, indirect, and induced effects of a particular market. The direct effect is the value of goods sold; the indirect effect is the input purchased to produce and market goods. The induced effect is the additional household expenditures that result from the increased labor and capital income from direct and indirect effects.

Using the economic multiplier, the increase in cumulative economic activity that is a direct result of the market can be measured.

Farmers markets often rely on free, simplified modeling devices, such as Market Umbrella's Sticky Economy Evaluation Device (SEED), to analyze data from administered surveys to determine local economic impact and multiplier effects. The tool combines market economic benefits for vendors and for nearby businesses, and multiplies this sum by the Regional Input-Output Modeling System II multiplier (or RIMS II multiplier). This multiplier is calculated by the Bureau of Economic Analysis (BEA), and captures the impact of an initial round of spending plus successive rounds of re-spending of the initial dollars within a region. The greater the interaction each dollar has with the local economy, the greater the impact. The tool can be used to project farmer revenue, local business revenue, and tax revenue for localities and states, as well as analyze customer data for outreach optimization.

Economic activity and outcome indicators include farmer/vendor sales, sales at nearby businesses, creation of jobs, impacts on the local and regional economy, and impacts on neighboring businesses (Jeong, 2015).

Human capital, in terms of farmers' market impacts, includes skills obtained or increased, and measurement indicators include change in fresh produce consumption and change in food knowledge (Jeong, 2015). The human impacts relate to behavior change rather than physical health. Health impacts would include changes in food security, and changes in blood pressure.

Social interactions trough farmers' markets can foster relationships between vendors and customers, contributing to community building and strengthening. Social

capital includes volunteer hours, nonprofits conducting education at the market, and instances of civic engagement. Ecological capital is less commonly measured, and can include acres in production of preserved, distance from harvest to final consumers, crop diversity, water conservation, humane livestock practices, and sustainability practices.

Collecting, Analyzing, and Reporting Data

According to a study by the USDA on farmers' markets that operate incentive programs, most surveyed organizations collect some form of program performance data, and about one third do so as part of an annual evaluation (King, 2014). The extent to which the organizations collect and analyze data are not consistent, however, nor are the specific aspects each organization examines. An analysis of published research indicates that most farmers markets and their partners have used two broad types of data collection practices: macro-level measurement toolkits and customer or vendor surveys (Jeong, 2015). Macro-level measurement toolkits take a comprehensive approach to measuring impact, taking into account direct, indirect, and induced effects. Customer and vendor surveys are able to quantify the addition of new shoppers or vendors, assess their preferences, or collect demographic characteristics (Jeong, 2015).

Current utilized research tools include surveys (targeting farmers, producers, vendors, and shoppers), interviews, multivariate analysis (logistic, multiple regression), and model analysis (IMPLAN/I-O MODEL) (Jeong, 2015). Multivariate analysis produces a depiction of the general impact of each intervention component (J. V. Anderson et al., 2001). Sample size determination is important for demonstrating study

strength. Many studies to date have had small sample sizes and have not reported prior power calculations to justify the small sample (Wall et al., 2006).

A survey of farmers' markets that operate nutrition incentive programs found that the four most commonly collected performance indicators are EBT transactions/sales, customer participation/satisfaction, incentives distributed, and incentive redeemed (King, 2014). The indicators most consistently collected are quantitative data on EBT transactions and distributed incentives, giving insight to how many participants are using the program and at what cost (King, 2014). Most organizations collect qualitative information on customer participation and satisfaction, using anecdotal data to understand program reach and operation. Customer participation and satisfaction can be gathered informally, including casual discussions and unsolicited feedback, or formally, in the form of thoroughly conducted surveys. Demographic characteristics and SNAP card numbers of participants are often collected to assess utilization of farmers' markets by unique and repeat customers (King, 2014). Customer surveys are also used to assess purchasing behavior at farmers' markets and food consumption behavior (King, 2014). A survey of farmers' markets revealed that few conduct surveys to assess their nutrition incentive program effects on participant diet and overall health (King, 2014). In addition to participant satisfaction, markets also use surveys to assess farmer/vendor participation and satisfaction in order to evaluate market procedures and operations, improve program implementation, and indicate areas where technical support is needed (King, 2014).

Farmers' markets that collect performance data use it to improve program delivery, increase funding for programs, facilitate monitoring reporting, and for program advocacy (King, 2014). Many farmers' markets report that collecting quantitative data

like EBT transactions is done so primarily to fulfill funder reporting requirements, whereas qualitative data allows for markets to assess and improve upon participant buy-in (King, 2014). Performance indicators are used by stakeholders to measure program progress in relation to program goals in order to make improvements to program implementation and obtain funding to improve and expand programs. Organizations may also use performance data to promote and advance policy debate concerning the expansion and sustainability of nutrition incentives and FNAPs (King, 2014).

While program operators (market managers and farmers) usually collect their own quantitative performance data, funder organizations may conduct their own surveys to collect qualitative and quantitative performance data that is not commonly collected (King, 2014). Funders overwhelmingly report that they expect documentation on how resources were used and the resulting effects. In one survey, some funding organizations expressed an interest in obtaining more rigorous metrics of program performance than the reports they receive, which largely consist of anecdotal participant and stakeholder feedback. Funders have expressed a willingness to support and fund external evaluations in order to obtain this higher quality performance data (King, 2014). They believe this data is important to inform future funding decisions and identify strategies for program expansion.

Organizations often partner with educational institutions to conduct formal program evaluations and to collect and analyze qualitative data (King, 2014). The resources and expertise of research professionals can offer the rigor needed to conduct effective studies. Formal evaluations are not often conducted by single markets but typically collect data from multiple markets that includes weekly FNAP benefit spending,

incentive dollars distributed and redeemed, the number of farmers/vendors redeeming benefits, and the number of farmers/vendors unable to redeem benefits (King, 2014).

Collected data on chosen indicators makes it possible to monitoring and evaluate the efficiency and effectiveness of programs, which can assist in identification of program aspects that need improvement, as well as highlight program components that are working well (Kellogg, 1998; King, 2014). Program monitoring uses the collection of indicator data to measure progress toward achieving the desired program objectives over time, focusing on the implementation process (Frankel, 2007). Baseline data collected at a program's initiation provides a point of comparison for data collected throughout the program's life. Process indicators should be designed to provide a measureable response to evaluation questions that investigate if the desired level of participation was achieved, or if specific inputs were made as planned, in terms of input quality, quantity, and timing. The effective monitoring of a program can help determine if activities or inputs need to be adjusted during program implementation to achieve or improve desired outcomes (Frankel, 2007; Kellogg, 1998; King, 2014).

The creation of a logic model is essential to any monitoring and evaluation framework (Kellogg, 2004). A logic model exhibits an organization or program's effectiveness by describing logical linkages among program resources and inputs, activities and outputs, and outcomes related to a specific situation. Logic models use sequences of cause-and-effect relationships to depict both graphically and in narrative the processes that connect the external factors and underlying assumptions upon which performed activities are expected to lead to specific outcomes (Frankel, 2007; Kellogg, 2004). They are especially helpful in establishing desired long-term outcomes, which can

be complex and involve uncontrolled variables, by describing how these variables are considered in program planning and implementation (Kellogg, 2004).

Logic models include a situation statement, inputs, outputs, outcomes (short-, intermediate-, and long-term), assumptions, and external influences relevant to the program (Kellogg, 2004). The situation statement communicates the project's relevance, describing the problem, causes, affected populations, and stakeholders. The inputs include invested resources such as human resources, financial resources, materials, and equipment. Outputs include elements like program activities, developed materials, number of participants, and number of trainings. Short-term outcomes include those that effect knowledge, skills, attitudes, or motivations. Intermediate outcomes include changes in participant or organization behavior or changes in policy adaptation. Long-term outcomes reflect changed conditions as a result of changed behaviors, and include changes in economic or social conditions. Assumptions include the underlying reasoning upon which performed activities are expected to lead to specific outcomes. External influences include factors and policies that may support or hinder program effects. (Kellogg, 1998, 2004).

The creation of logic models in the project planning stage assists in evaluations down the road, since the project will be designed with assessment in mind and will be able to identify existing baseline data or plan to collect baseline data prior to the project's initiation (King, 2014). Evaluations measure how well expected objectives were achieved with program activities, assessing programs based on the data collected for the chosen indicators in the logic model and monitoring plan. Evaluations can demonstrate the extent to which outcomes can be attributed to specific programs (Frankel, 2007).

Evaluations require that data for indicators be collected at least at a program's initiation and at the program's end or set endpoints, in order to compare indicators change. A control or comparison group is also necessary to measure whether the changes in outcomes can be attributed to the program (Frankel, 2007). Outcome indicators should be designed to provide a measurable response to evaluation questions that investigate whether participants demonstrated the desired level of knowledge increase or enhanced awareness, if participant behaviors were modified to the extent desired, or if social or political conditions were affected by the program (King, 2014). Outcome indicators for measuring learning should be based on specific learner objectives identified in program materials. Behavioral change indicators should specify the behaviors targeted by the program. Some linkages between short-, intermediate-, and long-term outcomes may require significant time, but could be demonstrated by the conduction of a targeted study or the application of a relevant research base (Frankel, 2007). Monitoring and evaluation processes are intended to be continuously altered according to the ongoing analysis of collected data. Markets have reported changing evaluation processes and objectives to improve data accuracy or to collect specific data necessary to obtain funding (King, 2014).

Following program evaluation, analyzed data should be disseminated to relevant stakeholders, including funders, operators, and participants. This can be done in the form informal reports shared via newsletters, emails, or websites, or more formal reports can be assembled for grant requirements or published work (King, 2014). Formal reports should include complete description of interventions, as quality descriptions make it possible for others to implement interventions reliably and for researchers to replicate or

build on the reported findings (Wall et al., 2006). Standard reporting frameworks have been developed to provide guidelines for transparent reporting. The Consolidated Standards of Reporting Trials (CONSORT) statement provides guidelines, in the form of a checklist, for reporting of RCTs (Moher et al., 2012; Moher, Schulz, & Altman, 2001); the Transparent Reporting of Evaluations with Nonrandomized Designs (TREND) statement provides guidelines for reporting of nonrandomized trials (Des Jarlais, Lyles, & Crepaz, 2004; Wall et al., 2006). Transparent reporting is necessary to fully communicate study details in order to analyze individual studies, as well as to be able to easily identify differences and similarities among studies with the same focus (Des Jarlais et al., 2004; Moher et al., 2001). The CONSORT statement has been widely adopted by professional journals and has been credited with improving the quality of RCT reports since its adoption (Des Jarlais et al., 2004). The TREND statement was developed by CDC scientists and journal editors to complement the CONSORT statement, providing methods of adjusting for potential biases, and its use is growing (Des Jarlais et al., 2004). The utilization of systematic reporting frameworks for experimental and observational studies may encourage more in-depth analysis of interventions during planning and evaluation stages (West et al., 2008).

The effective collection, evaluation, and reporting of data can be daunting, if not impossible, for individual markets and small organizations to undertake. Many evaluation tools are not intended to be used by market managers but by professional academic researchers with significant time and resources (Jeong, 2015). The Farmers' Market Coalition, a non-profit founded to strengthen famers' markets, developed Farmers' Market Metrics, a web-based tool that will allow for data to be easily collected, stored,

and communicated. The tool uses individual market goals and staff capacity to create a tailored data collection strategy, and a system for data input and analysis is provided. Comparable data points from participating markets across the country are automatically aggregated, and can be analyzed using filters and graphs. Customizable summary reports can be created with infographics and mapping.

Tools such as Farmers' Market Metrics will not replace rigorous research designs and data collection, but can assist in the regular monitoring program impacts. The aggregated data from those using Farmers' Market Metrics enables the quantification of farmers' market benefits and improves decision-making surrounding policies, programs, and structures affecting farmers' markets' operation and expansion.

Developing appropriate and measureable indicators is crucial to effective monitoring and evaluation. The creation of a logic model can assist in this development by helping to identify program elements most likely to yield useful data (Frankel, 2007; Kellogg, 1998). In order to effectively compare similar programs, considerations must be made to select performance indicators that are most commonly available and measured, and standard reporting frameworks should be utilized (King, 2014; Wall et al., 2006).

Wholesome Wave Georgia Programs

Wholesome Wave Georgia (WWG) is a nonprofit organization founded in 2009, with a mission to increase access to fresh, healthy, and local food to all Georgians by empowering networks of farmers to facilitate access to and awareness of healthy food choices (Georgia, 2015). WWG's flagship program leverages existing federal programs to double the value of federal benefits used at WWG partner markets and with partner

farmers. This nutrition incentive program, currently called the Healthy Food Incentive Program (HFIP), encourages low-income individuals to shop at local farmers' markets and buy healthy, local produce (Georgia, 2015). Other WWG programs seek to overcome barriers to its HFIP, like the Fresh Food Bus transportation program, or to fill gaps in government nutrition programs, like the Summer Meals program which provided meals to kids during the summer that rely on school meals for a significant portion of their food (Georgia, 2015).

Each nutrition benefit dollar spent at a WWG partner farm or market is doubled, doubling the purchasing power of the consumer and doubling the income of the farmer (Georgia, 2015).Research indicates that the use of monetary incentives is an effective tool to address food insecurity, whether structured as a matched or fixed value incentive amount (Freedman, Mattison-Faye, Alia, Guest, & Hebert, 2014; Lindsay et al., 2013). WWG's HFIP offers a 1:1 match of SNAP, WIC, and Senior FMNP benefits, up to $50 per market day. Therefore, if an individual spends their $50 in benefits at a WWG partner market or farm, they will receive an additional $50 to spend at the market or farm on SNAP-eligible food. WWG's nutrition incentive programs increase food access and thus, the health and well-being of low-income Georgians (Georgia, 2015).

WWG seeks to monitor and evaluate its programs and conduct research to improve program processes, demonstrate impact, and secure and validate funding. Effective research will increase the credibility of WWG and its programs while providing evidence-informed guidance for its programs moving forward. This thesis aims to develop a monitoring and evaluation framework and research strategy to enable WWG to

identify and plan research and evaluation opportunities that will contribute to their growth and success.

Chapter 3

Report to Wholesome Wave Georgia

Executive Summary

The prevalence of food insecurity in Georgia is a growing public health concern, as over 1.6 million Georgians report not having adequate food throughout the year. Federal nutritional assistance programs (FNAPs) help to decrease food insecurity but do not ensure participants consume quality, nutritious foods. FNAP benefits including Supplemental Nutrition Assistance Program (SNAP), Women Infants and Children Farmers Market Nutrition Program (WIC FMNP), and Senior FMNP are now accepted at authorized farmers' markets and direct-marketing farmers' stands. Wholesome Wave Georgia's (WWG) flagship Healthy Food Incentive Program (HFIP) doubles the value of benefits spent with their partner farmers and markets. Other WWG programs aim to help individuals overcome barriers to participating in the HFIP. WWG's programs work to increase healthy food access, support small farmers, and contribute to local economies.

Research has been conducted on similar nutrition incentive programs, but few studies have been published that used standard indicators in data collection and few have focused on the effects on health outcomes. This report aims to answer the following research question:

> How can WWG strategically conduct research and utilize a standard monitoring and evaluation plan to effectively demonstrate how its programs increase access to healthy food, increase revenue for farmers, and affect health outcomes?

Background and Aims

Wholesome Wave Georgia, through its flagship Healthy Food Incentive Program (HFIP), doubles the value of federal nutrition assistance dollars spent on partner farmer CSAs and at partner farmers markets. This nutrition incentive benefits low-income Georgians by making healthy fruits and vegetables more affordable. The program also supports local farmers that partner with Wholesome Wave Georgia (WWG) by increasing their revenue and customer base. Since its founding in 2009, WWG has spread its reach from 3 partners in 3 counties to 45 partners in 25 counties across Georgia, increasing the amount of nutrition incentives distributed each year.

After years of quick program and operational expansion, WWG is considering how to best evaluate program processes and impacts and contribute to the growing evidence in support of nutrition incentives. The primary research question is: How can WWG strategically conduct research and utilize a standard monitoring and evaluation plan to effectively demonstrate how its programs increase access to healthy food, increase revenue for farmers, and address health disparities?

This report will examine this question and make recommendations for WWG, providing necessary framework documents. The main purpose is to assist WWG in effectively demonstrating the impact of its programs and its value to Georgia communities. The report outlines WWG's organization logic model, examines gaps, and identifies areas for improved tracking and data collection. Strategies for conducting research are detailed and recommendations are given for prioritization. Recommendations are based on existing data and published literature, in addition to previous evaluations and research conducted by WWG and its partners.

Methods

To compile examples of nutrition incentive studies and program evaluations, a review of the literature was conducted. Scientific, peer-reviewed articles that included research published in English between 1975 and 2016 were identified through PubMed and Google Scholar searches, including the following key words in various combinations: poverty, food security, food insecurity, food access, low-income, nutrition incentive, fruit and vegetable consumption, dietary intake, chronic disease, farmers market, Georgia, evaluation, indicators, impact, local food system, assessment, outcomes. Article abstracts were reviewed and relevant articles were retrieved. Using a snowball strategy, additional articles were identified through cited references in the primary articles, and pertinent articles were retrieved. In addition to peer-reviewed articles, program evaluation reports were included, due to their relevance, if they quantitatively or qualitatively measured and analyzed nutrition-related outcomes, health-related outcomes, economic outcomes, social outcomes, or ecological outcomes if the programs were comparable to those conducted by WWG. Relevant references were categorized according to content, including: poverty and food insecurity, food access, federal benefit programs, diet-disease association, nutrition incentives, nutrition education, farmers markets, monitoring and evaluation. References were also organized by source type – journal article, government report, and other – and research design type – literature review, descriptive study, intervention impact study, quantitative reports, and qualitative reports. The evidence found provides a reasonable basis for my recommendations and conclusions.

Supporting Evidence

Food insecurity has been associated with numerous poor health outcomes and may have serious impacts on individual physical and emotional well-being, and community economies and social networks. The U.S. population that is the most food insecure is also most at risk for diet-related diseases including type 2 diabetes, hypertension, coronary heart disease, stroke, and certain cancers (Ahima & Lazar, 2013; Baumgartner et al., 1995; Seligman et al., 2010). Poor dietary habits have been identified as a major contributor to the rise in obesity and chronic diseases like type 2 diabetes and coronary heart disease (Drewnowski, 2004; McCormack et al., 2010). Studies have found that increased intake of fruits and vegetables is directly associated with a blood-pressure-lowering effect, a protective effect on bone health, and decreased risk of obesity, coronary heart disease, stroke, cancer, and dementia (Boeing et al., 2012).

Unhealthy dietary behaviors have been associated with low accessibility and affordability of fruits and vegetables (Blumenthal et al., 2014; Kegler et al., 2014; Kropf et al., 2007; Mello et al., 2010). Research shows that low-income populations consume lower levels of fruits, vegetables, and micronutrients than higher-income populations and are less likely to think that eating recommended amounts of fruits and vegetables daily leads to good health (Seligman et al., 2010; Treiman et al., 1996). Research has shown that making fruits and vegetable more affordable increases their purchase and consumption (Young et al., 2013).

Nutrition incentives have been associated with increased fruit and vegetable consumption and positive health outcomes, as well as boosts to local economies (Herman, et al. 2008; (Bubinas, 2011). The combination of economic incentives and

nutrition education has been found to most effectively increase both knowledge of healthy foods and healthy eating behaviors (J. V. Anderson et al., 2001; Gregson et al., 2001).

In order to evaluate the impact of farmers markets and their programs, modeling devices, such as Market Umbrella's Sticky Economy Evaluation Device (SEED), can analyze data from administered surveys to determine local impacts and multiplier effects. Funders have expressed a willingness to support and fund external evaluations in order to obtain this higher quality performance data (King, 2014). Organizations often partner with educational institutions to conduct formal program evaluations and to collect and analyze qualitative data (King, 2014). The resources and expertise of research professionals can offer the rigor needed to conduct effective studies.

Collected data on chosen indicators makes it possible to monitoring and evaluate the efficiency and effectiveness of programs, which can assist in identification of program aspects that need improvement, as well as highlight program components that are working well (Kellogg, 1998; King, 2014). Program monitoring uses the collection of indicator data to measure progress toward achieving the desired program objectives over time (Frankel, 2007). The effective monitoring of a program can help determine if activities or inputs need to be adjusted during program implementation to achieve or improve desired outcomes (Frankel, 2007; Kellogg, 1998; King, 2014).

Connecting Program Inputs to Outcomes

The creation of a logic model is essential to any monitoring and evaluation framework (Kellogg, 2004). A logic model exhibits an organization or program's

effectiveness by describing logical linkages among program resources and inputs, activities and outputs, and outcomes related to a specific situation. They are especially helpful in establishing desired long-term outcomes, which can be complex and involve uncontrolled variables, by describing how these variables are considered in program planning and implementation (Kellogg, 2004).

The creation of logic models in the project planning stage assists in evaluations down the road, since the project will be designed with assessment in mind and will be able to identify existing baseline data or plan to collect baseline data prior to the project's initiation (King, 2014). Evaluations measure how well expected objectives were achieved with program activities, assessing programs based on the data collected for the chosen indicators in the logic model and monitoring plan. Evaluations can demonstrate the extent to which outcomes can be attributed to specific programs (Frankel, 2007). Outcome indicators should be designed to provide a measurable response to evaluation questions (King, 2014). Outcome indicators for measuring learning should be based on specific learner objectives identified in program materials. Behavioral change indicators should specify the behaviors targeted by the program.

Following program evaluation, analyzed data should be disseminated to relevant stakeholders, including funders, operators, and participants. This can be done in the form informal reports shared via newsletters, emails, or websites, or more formal reports can be assembled for grant requirements or published work (King, 2014). Formal reports should include complete description of interventions, as quality descriptions make it possible for others to implement interventions reliably and for researchers to replicate or build on the reported findings (Wall et al., 2006). Standard reporting frameworks have

been developed to provide guidelines for transparent reporting. The Consolidated Standards of Reporting Trials (CONSORT) statement provides guidelines, in the form of a checklist, for reporting of RCTs (Moher et al., 2012; Moher et al., 2001); the Transparent Reporting of Evaluations with Nonrandomized Designs (TREND) statement provides guidelines for reporting of nonrandomized trials (Des Jarlais et al., 2004; Wall et al., 2006). Transparent reporting is necessary to fully communicate study details in order to analyze individual studies, as well as to be able to easily identify differences and similarities among studies with the same focus (Des Jarlais et al., 2004; Moher et al., 2001).

Developing appropriate and measureable indicators is crucial to effective monitoring and evaluation. The creation of a logic model can assist in this development by helping to identify program elements most likely to yield useful data (Frankel, 2007; Kellogg, 1998). In order to effectively compare similar programs, considerations must be made to select performance indicators that are most commonly available and measured, and standard reporting frameworks should be utilized (King, 2014; Wall et al., 2006).

Wholesome Wave Georgia Monitoring and Evaluations

The previously conducted evaluations focused on the Healthy Food Incentive Program, previously named the Double Value Coupon Program. An initial 2013 evaluation sought to discover effective outreach strategies and learn participants' knowledge, perception, and use of the program, through the conduction of focus groups and surveys of low-income residents in Atlanta (Beck-Pancer, 2013). This evaluation also used the number of new and repeat SNAP card swipes at markets to determine the

individual level of program use. The evaluation was limited in the fact that a most of the data collected was qualitative and gathered from a small sample, making generalizations difficult, and the sample did not include any current program users. The quantitative data used was not gathered specifically for this evaluation, thus limiting the examination of associations (Beck-Pancer, 2013).

A 2014 evaluation sought to examine program impacts, like changes in healthy food consumption, on HFIP participants using surveys and market transaction data, similar to the 2013 evaluation (Borda, 2014). This evaluation also had a very small survey sample size, and associations could not be fully examined. The market transaction data used limited the evaluation, since the available collected variables were not specifically chosen for the evaluation (Borda, 2014). In 2015, another evaluation used an edited version of the survey developed by the 2014 evaluation team to answer similar evaluation questions to assess the HFIP, while also including market transaction data (C. Anderson, S. Blackwell, E. Gerndt, I. Martin, 2015). This evaluation improved on the geographic diversity and number of participants surveyed, making conclusions drawn about the HFIP more accurate and generalizable. Another 2015 evaluation sought to identify barriers to the HFIP and recommend strategies to overcome these barrier (Groenevelt, 2015). This evaluation used examples from published literature and market manager surveys to identify barriers and potential solutions, also gleaning information from participant survey data of previous evaluations (Groenevelt, 2015). Overall, evaluators made recommendations to provide/increase transportation to markets; focus on increasing senior participation in programs; improve clarity of marketing materials; customize implementation and research strategies according to specific markets and

market type (urban, rural, small, large) (C. Anderson, S. Blackwell, E. Gerndt, I. Martin, 2015; Beck-Pancer, 2013; Borda, 2014; Groenevelt, 2015). These evaluations were conducted only on WWG's HFIP , focused mainly on participant attitudes and program use, did not employ robust research designs, and most were limited by small sample size and the existence of few available tracked indicators. Further research is necessary to make causal connections through the use of Randomized Controlled Trials (RCTs) or longitudinal studies, and should evaluate other WWG program impacts or WWG organization impacts as a whole, such as impacts on farmers and local economies.

Present monitoring of market indicators, such as number of new customers, number of EBT swipes, dollar amount of EBT purchases, total purchase amount by food type, have been ongoing for the HFIP; other programs like SNAP Enrollment are not regularly monitored with standard indicators. Recently, a new process for HFIP data collection has begun at a small group of WWG partner markets selected to pilot this initiative. The process uses FM Tracks, a web-based application, to facilitate regular tracking of market customers through the conduction of short surveys. Though not all WWG partners are currently using FM Tracks, all are informed of the data collection activity and understand its potential implications for program improvement. This may aid in partners' adoption and effective implementation of further data collection measures and evaluation protocols.

The developed monitoring and evaluation framework creates a standardized model for program assessment. The framework allows for program background information to be given in each plan before listing and describing the indicators to be measured for the program and the means by which they will be verified, with hyperlinks

to the actual record spreadsheets on WWG's shared web-based hard drive. The indicators will be defined in a table that includes baseline and target indicator measures. Each plan will include specific program logic models based on the organization logic model created for this thesis. The logic model demonstrates the flow from program inputs, to activities, to outputs, and to impacts. Similarly, an included data flow table will indicate from where, how, and to what end data is collected for each program. A data use table shows how the collected data will be used, how the data will be disseminated and in what format, who is responsible for disseminating the data, and whether any feedback is necessary. The evaluation section will list evaluation questions being assessed and describe the type of evaluation. A reporting plan table describes the what data will be reported, who is responsible for reporting it, in what format and to whom, and the report due date. A costing estimate table is also included to determine individual activity and total program costs. These elements will ensure that necessary data is collected, evaluated, and disseminated in a standard process that can be shared with partners, funders, and other stakeholders to describe program intentions, activities, and impacts. Using the framework, a monitoring and evaluation plan was detailed for the SNAP Enrollment Program (Appendix 2).

Wholesome Wave Georgia Logic Model

The developed logic model for Wholesome Wave Georgia (Appendix 1) includes the organization's inputs, activities, outputs, short-term impacts, intermediate impacts, and long-term impacts, as well at the current situation, influencing external factors, and the assumptions underlying the organization. The inputs, activities, outputs, and impacts

have been grouped by subject in order to condense the model to a size that is more easily read and understood.

The WWG organization logic model is based on several assumptions that speak to the reasoning for conducting activities to lead to desired outcomes. Assumptions underlying all organization activities are numerous and include availability of sufficient funding, engagement and response of program participants, and activities ability to result in certain outcomes. Formative published research offers support for many of these assumptions. External factors and policies that may support or hinder program effects such as poverty, stigma, baseline nutrition knowledge, and the prevalence of diet-related chronic illness are included in the model to demonstrate the inclusion and consideration of these factors in program planning and implementation.

The inputs, or invested resources, of WWG include: WWG staff and volunteers (full time staff, interns, board members, volunteers); workspace and equipment (office, time, computers, iPads); national networks; partner market managers and farmers; community partners; formative research; transportation; and funding.

The activities conducted by WWG are numerous and include: technical assistance (EBT and WIC authorization assistance); trainings (community partnership, partner market, and farmer trainings); fundraising (events and grant-writing); outreach efforts (flyer distribution, partner resources development and distribution, and volunteer recruitment); WWG programs (HFIP, SNAP Enrollment, Fruit and Vegetable Prescription Program, Transportation Program, and Summer Meals Program); WWG Scholarships (market manager and partner contribution scholarships); recruitment of partners; and data collection. Activities are conduct and supported by listed inputs.

The outputs, or measurable results from activities include: number of partners (number of partner markets and farmers, number of farmers impacted by programs, number of healthcare partnerships, number of community partnerships developed, and number of dropout partners); number of program participants (number of new program participants, number of repeat program participants, and number of participants in nutrition classes); number of provided incentives (number of EBT transactions, number of WIC vouchers redeemed, number of SFMNP vouchers redeemed, and dollar amount of incentives distributed); number of SNAP enrollments (number of individuals assisted with SNAP enrollment, number of individuals successfully enrolled in SNAP, and number of individuals enrolled in SNAP and using programs); number of EBT authorization assistance (number of farmers authorized to accept SNAP/WIC/SFMNP and number of farmers' markets authorized to accept SNAP in Georgia); number of people reached with WWG program information (number of materials distributed, number of people reached by partners, number of people reached by outreach efforts, and number of people reached with WWG information); stakeholder feedback; amount of funding received; number of staff hours spent at classes, conferences, etc.; and number of cooking and nutrition classes conducted. These outputs are generated, or wish to be generated, by WWG activities, and the collection of this data will provide WWG with a basis on which to monitor organization outcomes.

Short-term impacts, those that effect knowledge, skills, or attitudes, include: increased knowledge and skills (increased knowledge of foods that contribute to a healthy diet, increased cooking knowledge and skills, increased understanding of seasonality and local foods, and staff learning/increased knowledge); increased awareness of WWG

mission and programs; and increased perception of farmers' markets as affordable food option. These short-term impacts can be linked to specific outputs designed to provide the measurements necessary to evaluate the level of impact.

Intermediate impacts, those that reflect change in behavior or policies, include: increased uptake of WWG programs and policies (increased number of farmers' markets adopt producer-only policies and increased number of healthcare providers adopting FVRx); strengthened and expanded WWG programs and partners (increased partner market capacity and sustainability, wider reach of WWG programs, and clients of community partners connected to an increased number of services); increased purchase and intake of healthy food; increased support for programs and staff; decreased stigma of federal benefit recipients; decreased poor health outcomes; and decreased food insecurity (reduction in healthy food access disparities and increased ability to purchase healthy, local food). Intermediate impacts can be directly linked to preceding short-term impacts and program outputs.

Long-term impacts, those that reflect changed conditions as a result of changed behaviors, include: reduction in diet-related disease prevalence; increased economic activity (increased local job creation, increased revenue in local economies, and increased income of local farmers); increased capacity and sustainability of Georgia farmers' markets; increased sustainable farming practices; and increased supportive policy environment (policy changes to increase FINI funding and increased acceptance of federal benefit recipients). These long-term impacts can be link to preceding intermediate- and short-term impacts and program outputs.

The listed outputs are necessary to connect WWG activities to desired program impacts, and those that are not currently monitored must be collected in order to demonstrate impact on the outcomes to which they link. For example, WWG's SNAP Enrollment Program aims to reduce food insecurity and increase purchase and intake of healthy food, but currently, the necessary indicator to demonstrate that impact, the number of individuals enrolled in SNAP and using WWG's programs, is not being collected and individuals assisted with SNAP enrollment are rarely followed-up with. In this way, WWG can determine the all indicators which should be collected to demonstrate programs impacts.

Prioritization for the initiation of new indicator collection should be given to indicators which WWG has the current capacity to collect without great additional funding or collaborative assistance. These include the number of individuals enrolled in SNAP and using programs and the number of staff hours spent at classes and conferences. Indicators like body measures are necessary to collect in order to demonstrate impacts such as decreased health poor health outcomes and reduction in diet-related disease prevalence, but will require collaboration with researchers and/or medical professionals to adequately gather these measurements. The SNAP Enrollment Program is the most feasible program to pilot use of the created monitoring and evaluation plan, as the small size of the program relative to the others will require little additional staff time and resources and no additional partner resources. Piloting the new plan with a small, largely internally conducted program will allow WWG to become familiarized with the plan and make adjustments, if necessary.

Recommendations

- Use created framework to monitor and evaluate current program processes and impacts.
- Develop and implement monitoring and evaluation plan for all current programs and for each new program.
- Select monitoring indicators based on anticipated impacts and previous research.
- Prioritize implementation of monitoring and evaluation plan for the SNAP Enrollment Program,
- Utilize free data collection, analysis, and reporting tools from Market Umbrella.
- Partner with university, health care foundation, or other research entity to conduct longitudinal and experimental research.

Chapter 4

Discussion

Wholesome Wave Georgia seeks to monitor and evaluate its programs and conduct research to improve program processes, demonstrate impact, and secure and validate funding. Effective research will increase the credibility of WWG and its programs while providing evidence-informed guidance for its programs moving forward. This thesis examines indicators and methods utilized in data collection and analysis for farmers markets, and to identify areas of research, monitoring, and evaluation to which Wholesome Wave Georgia can contribute. Research has been conducted on nutrition incentive programs similar to those of WWG, but few studies have been published that used standard indicators in data collection and few have focused on the effects on health outcomes.

The monitoring and evaluation framework, created in collaboration with WWG staff, creates a standardized model for program assessment. The framework allows for program background information to be given in each plan before listing and describing the indicators to be measured for the program and the means by which they will be verified, with hyperlinks to the actual record spreadsheets on WWG's shared web-based hard drive. The indicators will be defined in a table that includes baseline and target indicator measures. Each plan will include specific program logic models based on the organization logic model created for this thesis. The logic model demonstrates the flow from program inputs, to activities, to outputs, and to impacts. Similarly, an included data flow table will indicate from where, how, and to what end data is collected for each program. A data use table shows how the collected data will be used, how the data will be

disseminated and in what format, who is responsible for disseminating the data, and whether any feedback is necessary. The evaluation section will list evaluation questions being assessed and describe the type of evaluation. A reporting plan table describes what data will be reported, who is responsible for reporting it, in what format and to whom, and the report due date. A costing estimate table is also included to determine individual activity and total program costs. These elements will ensure that necessary data is collected, evaluated, and disseminated in a standard process that can be shared with partners, funders, and other stakeholders to describe program intentions, activities, and impacts.

The challenge to create innovative approaches to address food access and insecurity in Georgia has been met by Wholesome Wave Georgia. The next challenge is to rigorously examine and evaluate the impact of these interventions on dietary intake and health indicators. With a full-time staff of only four, the capacity of WWG to research and incorporate new methods of data collection and analysis is severely limited. It would be difficult for the staff alone to plan and manage such an endeavor. The addition of regular long-term interns working with the organization improves WWG's capacity, and a team of dedicated volunteers supplements human resource needs for larger events. Collection of data for previous internal evaluations has been spearheaded by WWG interns and public health graduate students that collaborate with WWG for course credit. Greater collaboration with an educational institution and/or researchers will further increase WWG's capacity to conduct more rigorous studies and evaluations of its programs.

The previously conducted evaluations focused on the Healthy Food Incentive Program, previously named the Double Value Coupon Program. An initial 2013 evaluation sought to discover effective outreach strategies and learn participants' knowledge, perception, and use of the program, through the conduction of focus groups and surveys of low-income residents in Atlanta (Beck-Pancer, 2013). This evaluation also used the number of new and repeat SNAP card swipes at markets to determine the individual level of program use. The evaluation was limited in the fact that a most of the data collected was qualitative and gathered from a small sample, making generalizations difficult, and the sample did not include any current program users. The quantitative data used was not gathered specifically for this evaluation, thus limiting the examination of associations (Beck-Pancer, 2013).

A 2014 evaluation sought to examine program impacts, like changes in healthy food consumption, on HFIP participants using surveys and market transaction data, similar to the 2013 evaluation (Borda, 2014). This evaluation also had a very small survey sample size, and associations could not be fully examined. The market transaction data used limited the evaluation, since the available collected variables were not specifically chosen for the evaluation (Borda, 2014). In 2015, another evaluation used an edited version of the survey developed by the 2014 evaluation team to answer similar evaluation questions to assess the HFIP, while also including market transaction data (C. Anderson, S. Blackwell, E. Gerndt, I. Martin, 2015). This evaluation improved on the geographic diversity and number of participants surveyed, making conclusions drawn about the HFIP more accurate and generalizable. Another 2015 evaluation sought to identify barriers to the HFIP and recommend strategies to overcome these barrier

(Groenevelt, 2015). This evaluation used examples from published literature and market manager surveys to identify barriers and potential solutions, also gleaning information from participant survey data of previous evaluations (Groenevelt, 2015). Overall, evaluators made recommendations to provide/increase transportation to markets; focus on increasing senior participation in programs; improve clarity of marketing materials; customize implementation and research strategies according to specific markets and market type (urban, rural, small, large) (C. Anderson, S. Blackwell, E. Gerndt, I. Martin, 2015; Beck-Pancer, 2013; Borda, 2014; Groenevelt, 2015). These evaluations were conducted only on WWG's HFIP, focused mainly on participant attitudes and program use, did not employ robust research designs, and most were limited by small sample size and the existence of few available tracked indicators. Further research is necessary to make causal connections through the use of Randomized Controlled Trials (RCTs) or longitudinal studies, and should evaluate other WWG program impacts or WWG organization impacts as a whole, such as impacts on farmers and local economies.

Present monitoring of market indicators, such as number of new customers, number of EBT swipes, dollar amount of EBT purchases, total purchase amount by food type, have been ongoing for the HFIP; other programs like SNAP Enrollment are not regularly monitored with standard indicators. Recently, a new process for HFIP data collection has begun at a small group of WWG partner markets selected to pilot this initiative. The process uses FM Tracks, a web-based application, to facilitate regular tracking of market customers through the conduction of short surveys. Though not all WWG partners are currently using FM Tracks, all are informed of the data collection activity and understand its potential implications for program improvement. This may aid

in partners' adoption and effective implementation of further data collection measures and evaluation protocols.

The goal of all WWG's interventions is to influence one or more of the many factors that affect healthy food access, be it food prices, nutrition knowledge, or transportation availability. One future challenge rests in determining which of these factors can be most effectively influenced by WWG, directly or indirectly. The utilization of the accompanying literature review may give insight into potential food-access-influencing factors and the tracking indicators necessary to determine the level of influence.

WWG's mission is two-fold in that it aims to increase food access for low-income Georgians, while simultaneously supporting local farmers by increasing their income and providing them marketing resources. However, the M&E plan developed for purposes of this project focuses specifically on the issue of food access as it relates to the public health issue of food insecurity in Georgia. These two missions points are increasingly in conflict: as WWG expands to partner with greater numbers of market and farmers across the state, not all markets and farmers are eligible for partnership due to WWG's partnership requirement that markets and farmers be producer-only, prohibiting the sale of products not grown or made by the farmer or vendor or their employees. This makes farmers that sell at non-producer-only markets or those that supplement their crops yields with non-local, non-seasonal, or wholesale products ineligible to participate in WWG's programs that could increase their income. To achieve increased healthy food access to all Georgians, WWG would need to offer its programs in retail stores with healthy food options to reach communities that do not have enough local growers to meet the needs of

the population. WWG is limited in this way within its current model, and would need to revise its partner requirements or allow exceptions to achieve a full statewide reach and achieve greater impacts.

The public health implications related to the impacts of WWG's programs are great. Fruit and vegetable consumption in the U.S. has been consistently low, and consumption among low-income individuals is significantly worse due to the relatively high cost of quality fruits and vegetables. Low-income individuals are also most at risk for diseases and conditions that are caused or exacerbated by poor, low-nutrient diets. WWG's programs target these low-income individuals with a program to help overcome the cost barrier by subsidizing the purchase of local produce. By improving the dietary quality of program participants, their risk for diet-related conditions and diseases like hypertension and type 2 diabetes may decrease. Regional and state public health may be affected by the subsequent decrease in the prevalence of diet-related diseases.

The utilization of a standard monitoring and evaluation plan will help WWG identify weak program areas for improvement and make the organization responsible for ongoing program evaluation. The continuous process of collecting and analyzing data will aid in improving programs and increasing participant satisfaction through the implementation of changes due to stakeholder feedback. The monitoring and evaluation plan will enable WWG to operate more efficiently, using the same framework for each program and similar performance indicators. This will provide WWG with concrete, valuable data that can be used to solicit financial support from funders and advocate for supportive policies. With added funding and the development of a more positive policy

environment, WWG's capacity will be increased, improving its chances of achieve its intended programmatic goals.

Collaboration with an educational institution and/or researcher will allow for more the conduction of more rigorous studies and evaluations of WWG's programs, which are necessary to effectively demonstrate impacts. There are many well-recognized and well-respected universities, colleges, and programs in Georgia, and WWG is fortunate to be in such proximity. WWG has partnered with Emory University and the University of Georgia in Athens to host interns, and has collaborated with the Medical College of Georgia on WWG programs and Georgia State University on other public health initiatives. WWG's relationship with Emory University's Rollins School of Public Health (RSPH) is especially developed, partnering with course instructors to lead teams of students in program evaluations and hosting at least one intern since the summer of 2014. As such, WWG should continue to expand collaboration with RSPH, as well as continue to develop partnerships with other universities to discover new perceptions of their own work and ideas for improvement and evaluation.

Future potential research should focus on areas where there are current gaps in published research surrounding effects of nutrition incentives, farmers' market, and federal programs. Conducted research should be designed using commonly used indicators and measurements, avoiding the inability to compare findings to additional WWG studies and those of other organizations due to methodological differences. Future research designs should also employ calculations to determine appropriate sample size, allowing for meaningful control groups comparisons, and ensure adequate duration to assess sustained adoption and maintenance of healthier dietary behaviors. A potential

study that does not require a control group could compare participant purchases with the Dietary Guidelines for Americans (DGA) recommendations before and after program participation.

WWG is situated to make a contribution to fill the void in the literature regarding effects of the Senior Farmers' Market Nutrition Program (SFMNP) by evaluating the effects of the program in conjunction with its Healthy Food Incentive Program (HFIP). The need is great, with 16% of Georgia's seniors aged sixty and older classified as food insecure in 2014 (Coleman-Jensen, 2015). According to the state Department of Public Health (DPH), Georgia ranked seventh in senior food insecurity in the U.S. in 2013 (Bernal, 2013). To address senior food insecurity in Georgia, the DPH has recommended increasing EBT at farmers' market, and prioritizing enrollment in senior SNAP and WIC programs (Bernal, 2013). An evaluation of the SFMNP + HFIP could compare senior produce purchases and consumption from partner WWG markets that accept SFMNP vouchers and those that do not. Seniors enrolled in SNAP through WWG's SNAP Enrollment Program could also be followed to evaluate the impacts of the SNAP Enrollment program, the effects of SNAP benefits on dietary behaviors, and the effects of the using the HFIP to double SNAP benefits at WWG partner markets.

Data used to demonstrate positive health impacts of offering financial nutrition incentives can be used to advocate for changes to or increased funding for the SNAP program. Incentives similar to those of the HFIP could be implemented within the federal SNAP program to increase purchases of targeted foods that contribute to a healthy diet, potentially modifying dietary behavior at the population level (Brown, 2008). Further research is also warranted in determining a dose-response relationship between nutrition

incentive levels and outcomes according to the extent of cost reduction, as only one such study was identified, and did not focus on nutrition incentives used at farmers' markets or for produce (French et al., 2001).

Research indicates that the use of monetary incentives is an effective tool to address food insecurity, though an optimal incentive value has not yet been determined (Brown, 2008; Wall et al., 2006). WWG has currently has a limit on the amount of incentives a participant can receive per market visit, but has piloted investigation into determining the effect of the limit by allowing SNAP benefits to be matched without a limit at a small number of partner markets. WWG should continue this pilot and expand it to other markets, possibly altering the limit amount rather than eliminating it.

Few studies have examined the effect of nutrition incentives on dietary behavior using the rigorous RCT design, and even less present evidence of long-term positive effects (Ammerman et al., 2002; Wall et al., 2006). Interventions have been short-term with limited follow-up evaluations. Future WWG interventions should evaluate dietary behaviors for at least one year and follow a RCT or prospective observation study design to allow conclusions to be drawn about program impacts over this time (Ammerman et al., 2002). If an RCT is feasible, randomization could be individually randomized or cluster randomized. Individual randomization could be beneficial for interventions that include a single market, as sample size does not need to be large, and the increased randomization units make intervention arms more comparable. Cluster randomization could be beneficial for interventions spanning multiple markets or programs that seek to assess population-level effects; the reduction of self-selection maximizes generalizability, and stigma may be reduced, since all participants in a cluster receive the same

intervention. Future conducted RCTs should use the CONSORT statement as a guide for reporting findings, and similarly, nonrandomized trials should use the TREND statement as a reporting guide. The use of these standard reporting guidelines will improve intervention descriptions, facilitating analysis of data for future systematic review (Wall et al., 2006).

The evidence of the cost-effectiveness of dietary interventions is also lacking. Estimates of program and administrative costs should be compared with estimated effect costs, such as medical expenses averted due to decreased negative health outcomes, in order to demonstrate whether program benefits outweigh costs of implementation. To assess broader applicability, different intervention approaches need to be compared (Ammerman et al., 2002). Nutrition incentive programs have a greater chance of being replicated and implemented if they are shown to be both affordable and effective (Ammerman et al., 2002).

Research questions should direct study design and evaluation, and WWG's research questions should reflect great public health significance. Contributions towards the increasing evidence base surrounding nutrition incentives and food access will improve the ability of accumulated research to be comparable to future evaluations (West et al., 2008). By asking the right questions and implementing a rigorous study design to ascertain answers, WWG programs can be improved and scientific progress in public health can be facilitated.

Recommendations

- Use created framework to monitor and evaluate current program processes and impacts.
- Develop and implement monitoring and evaluation plan for all current programs and for each new program.
- Select monitoring indicators based on anticipated impacts and previous research.
- Prioritize implementation of monitoring and evaluation plan for the SNAP Enrollment Program.
- Utilize free data collection, analysis, and reporting tools from Market Umbrella.
- Partner with university, health care foundation, or other research entity to conduct longitudinal and experimental research.

Conclusions

Wholesome Wave Georgia's programs help connect low-income Georgians to healthy, local food. In doing so, food insecurity is decreased for program participants, revenue is increased for partner farmers, and local economies are bolstered. Current data collection and previous evaluations have been inadequate in comprehensively demonstrating WWG's reach and impact. This thesis will serve as a resource for WWG, providing an evidence base for selecting indicator and outcomes to measure and analyze. It will help to improve WWG's data collection, monitoring, and evaluation strategy in

order to strengthen programs and conduct research in order to effectively demonstrate intended reach and impact.

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Appendices

1. Wholesome Wave Georgia: Organization Logic Model
2. Monitoring and Evaluation Plan for SNAP Enrollment Program
3. CONSORT Statement Framework
4. TREND Statement Framework

Wholesome Wave Georgia: Organization Logic Model

SITUATION

In Georgia, diet-related illnesses are increasing in prevalence and nearly 20% of the population is food insecure due to income and food access disparities and price disparities between fresh and processed foods. Wholesome Wave Georgia (WWG) develops partnerships and conducts programs to support local, sustainable farmers; to increase access to and consumption of fresh, healthy food for all; and to decrease the prevalence of diet-related illnesses.

NPUTS

- Staff & Volunteers
- National Networks
- Partner Market Managers and Farmers
- Community Partners
- Workspace & Equipment
- Transportation
- Formative Research
- Funding

ACTIVITIES

- WWG Programs
- Technical Assistance
- Trainings
- Outreach Efforts
- Recruitment of partners
- Data Collection
- Fundraising
- WWG Scholarships
- Staff Learning and Networking

OUTPUTS

- # Partners
- # Program Participants
- # Provided Incentives
- # People Reached
- # EBT/WIC TA Provided
- # SNAP Enrollments
- Stakeholder Feedback
- $ Funding received
- # Staff hours at Workshops & Conferences
- # Cooking and nutrition classes

IMPACTS

SHORT-TERM

- Increased Knowledge and Skills
- Increased perception of farmers markets as affordable food option

- Increased awareness of WWG Mission and Programs

INTERMEDIATE

- Increased purchase/intake of healthy food
- Decreased poor health outcomes
- Decreased food insecurity

- Strengthened and Expanded WWG Programs and Partners
- Increased Uptake of WWG Programs and Policies

- Increased support for programs and staff
- Decreased stigma of FNA recipients

LONG-TERM

- Reduction in diet-related disease prevalence
- Increased Local Economic Activity

- Increased Capacity and Sustainability of Georgia Farmers Markets
- Increased sustainable farming practices

- Increased Supportive Policy Environment

ASSUMPTIONS

- There are sufficient federal funds to support all eligible individuals with benefit programs (SNAP/WIC/SFMNP).
- Potential program participants will respond to outreach and engage with WWG's programs.
- If the WWG NI program doubles the value of federal benefit dollars for SNAP, WIC, and SFMNP recipients, their purchases of healthy foods at farmers' markets will increase.
- If the WWG NI program educates consumers about the importance of eating healthy and teaches cooking skills, their consumption of healthy food will increase.
- If SNAP/WIC/SFMNP recipients with families purchase healthy food for their household, their family's consumption of healthy food will increase.
- If more people participate in the program, farmers will increase their revenue.
- Partner Farmers Markets will have fresh, local food for purchase.

EXTERNAL FACTORS

- Poverty
- Socio-economic Status
- Culture
- Food Deserts
- SNAP/WIC/SFMNP Policy/Funding Availability
- WIC Partnership
- Partner Market and Farm Hours
- Partner Market and Farm Locations
- Transportation Access
- English Literacy
- Baseline Nutrition Knowledge
- Baseline Cooking Skills
- Farmers' Market Perceptions
- Stigma
- Agriculture Subsidies
- Number of Georgia Farms and Farmers Markets
- Potential healthcare partners
- Prevalence of diet-related chronic illness

SNAP Enrollment

Monitoring and Evaluation Plan

FY 2016

Wholesome Wave Georgia

Table of Contents

Executive Summary

The SNAP Enrollment Program for Wholesome Wave Georgia (WWG) aims to meet food insecure households in their community and provide additional information, pre-screening, and enrollment services for the federal SNAP program. The potential to close the gap between eligible and enrolled households is an opportunity to decrease the prevalence of food insecurity in Georgia and empower families with economic opportunity.

The program combines outreach efforts to boost enrollment with outreach efforts to increase access to high quality, fresh, healthy produce. The population that is categorized as the most food insecure in the nation is also suffering from the highest rates of diet-related chronic disease. Thus, while simultaneously assisting in enrolling for benefits, WWG promotes its non-profit initiative that doubles SNAP at farmers markets, thereby increasing access and affordability of local produce that contribute to improved health outcomes. WWG incentivizes the use of federal food assistance at farmers markets by matching benefits dollar for dollar. Wholesome Wave Georgia is a State agency for SNAP outreach to address food insecurity, hunger, and diet-related chronic disease by increasing SNAP program knowledge and enrollment across Georgia.

The primary project is mobile outreach at forty-five partner farmers markets across Georgia. WWG collaborates with partner markets and their community contacts to disseminate printed materials, host outreach booths at markets and community events, conduct outreach visits at low-income housing structures and community centers, and facilitate a door-to-door outreach team. The goal of the outreach plan is to address food insecurity and hunger in the Georgia by increasing knowledge of and enrollment in SNAP benefits at farmers markets across the state. WWG's statewide reach engages both rural and urban communities statewide. The chosen indicators will be tracked weekly and monthly by the Outreach Coordinator.

Program Background

The SNAP Enrollment Program, a partnership with the Georgia Department of Family and Children Services (DFCS), works to increase awareness of and enrollment in the federal Supplemental Nutrition Assistance Program (SNAP). Wholesome Wave Georgia (WWG) first became a DFCS partner in 2014 to assist individuals and households in the SNAP enrollment process, as 2013 government data disclosed that 93% of Georgians eligible for SNAP were participating, and only 81%

of Georgia's eligible working poor participated in the SNAP program. Implementation for the FY 2016 SNAP Enrollment program started on October 1, 2015 and will conclude on September 30, 2016.

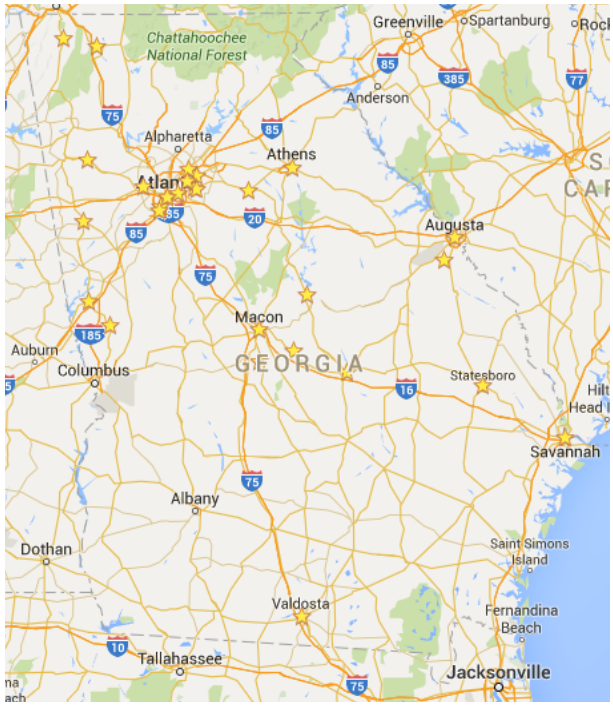
The main goal and objectives of the program are:

Overall, the goal of the SNAP Enrollment program is to decrease food insecurity and hunger in Georgia.

Objectives:

1. Increase knowledge of SNAP and eligibility guidelines.
2. Enroll eligible individuals and households in SNAP and other government benefit programs through COMPASS.
3. Increase knowledge of WWG's programs among the SNAP-eligible population.

The target population is SNAP-eligible individuals and households in Georgia. The program is operational in the 25 counties in which WWG has partner markets and farmers. Current partners are shown on the following map:



M&E planning

This M&E plan was prepared in 2016 and details proposed activities for the period October 2015 – September 2016. During the preparation of the M&E plan, the staff identified essential strategies for M&E in the project. The main decisions included project indicators, frequency of activities, and planning and travel feasibility.

The M&E Information Matrix

The matrix on the following page was prepared by Sarah Pierce, based on WWG staff discussions and the 2016 SNAP Outreach Plan.

Monitoring

Program assumptions:

- There are sufficient federal funds to support all eligible individuals with SNAP.
- If individuals or households are eligible for SNAP, they will be approved to receive benefits.
- Potential program participants will respond to outreach and engage with WWG's programs.

Program management:

Relevant Indicators:

1. # of posters and flyers disseminated
2. # of households pre-screened
3. # of households enrolled
4. # of households denied
5. # of farmers markets visited
6. # of community events attended

Means of Verification:

1. Poster and flyer distribution spreadsheet
2. SNAP Enrollment Tracking spreadsheet
3. SNAP Enrollment schedule

Responsible Parties:

1. Rachael Kane, Community Outreach Coordinator, organizes and conducts enrollments, oversees interns, and tracks indicators in appropriate spreadsheets.
2. Community Outreach intern(s) assist the coordinator in SNAP enrollment planning and conducts enrollments at farmers markets and community partner locations.
3. Sara Berney, Executive Director, assists in conducting SNAP enrollments and oversees the monitoring and reporting of indicators.
4. Caitlin Still, Events and Development Coordinator, assists in conducting SNAP enrollments and reports indicators from applicable spreadsheets to DFCS in quarterly and annual reports.

Monitoring, Evaluation and Reporting Matrix for SNAP Enrollment Program

Indicator	Type of information	Sources of information	Baseline	Target	Methods of data gathering	Who Collects, Analyzes data	Frequency of reporting
Final goal: **The goal of the SNAP Enrollment program is to decrease food insecurity and hunger in Georgia.**							
Intermediate objectives and outputs							
1. **Increase knowledge of SNAP and eligibility guidelines.**							
1.1 # of posters and flyers disseminated	Number of posters and flyers distributed, sharing WWG program and services information, in locations where low-income people gather.	Poster and flyer distribution spreadsheet	0	10,000	Count posters and flyers distributed and track in spreadsheet.	Rachael, Intern(s)	Weekly internally, Quarterly & Annual Evaluations to DFCS
1.2 # of households pre-screened	Number of households guided through eligibility screening via tablet with data plan and enrollment, if possible.	SNAP Enrollment Tracking spreadsheet	0	120	Count applications completed in spreadsheet.	Rachael, Intern(s)	Weekly internally, Quarterly & Annual Evaluations to DFCS
1.3 # of farmers markets visited	Number of WWG partner farmers' market visits to conduct SNAP enrollments and share WWG program information.	SNAP Enrollment schedule	0	55	Count scheduled market visits on schedule.	Rachael, Intern(s)	Weekly internally, Quarterly & Annual Evaluations to DFCS
1.4 # of community events attended	Number of WWG partner community events visited to conduct SNAP enrollments and share WWG program information.	SNAP Enrollment schedule	0	96	Count scheduled community events on schedule.	Rachael, Intern(s)	Weekly internally, Quarterly & Annual Evaluations to DFCS

2. **Enroll eligible individuals and households in SNAP and other government benefit programs through COMPASS.**							
2.1 # of households pre-screened	Number of households guided through eligibility screening via tablet with data plan and enrollment, if possible.	SNAP Enrollment Tracking spreadsheet	0	120	Count applications completed in spreadsheet.	Rachael, Intern(s)	Weekly internally, Quarterly & Annual Evaluations to DFCS
2.2 # of households enrolled	Number of households approved for SNAP benefits following application submission.	SNAP Enrollment Tracking spreadsheet	0	60	Count applications marked "benefits received" in spreadsheet.	Rachael, Intern(s)	Weekly internally, Quarterly & Annual Evaluations to DFCS
2.3 # of households denied	Number of households denied SNAP benefits following application submission.	SNAP Enrollment Tracking spreadsheet	0	0	Count applications marked with denial reason in spreadsheet.	Rachael, Intern(s)	Weekly internally, Quarterly & Annual Evaluations to DFCS
3. **Increase knowledge of WWG's programs among the SNAP-eligible population.**							
3.1 # of posters and flyers disseminated	Number of posters and flyers distributed, sharing WWG program and services information, in locations where low-income people gather.	Poster and flyer distribution spreadsheet	0	10,000	Count posters and flyers distributed and track in spreadsheet.	Rachael, Intern(s)	Weekly internally, Quarterly & Annual Evaluations to DFCS
3.2 # of households pre-screened	Number of households guided through eligibility screening via tablet with data plan and enrollment, if	SNAP Enrollment Tracking spreadsheet	0	120	Count applications completed in spreadsheet.	Rachael, Intern(s)	Weekly internally, Quarterly & Annual Evaluations

	possible.						to DFCS
3.3 # of farmers markets visited	Number of WWG partner farmer markets visited to conduct SNAP enrollments and share WWG program information.	SNAP Enrollment schedule	0	55	Count scheduled market visits on schedule.	Rachael, Intern(s)	Weekly internally, Quarterly & Annual Evaluations to DFCS
3.4 # of community events attended	Number of WWG partner community events visited to conduct SNAP enrollments and share WWG program information.	SNAP Enrollment schedule	0	96	Count scheduled community events on schedule.	Rachael, Intern(s)	Weekly internally, Quarterly & Annual Evaluations to DFCS

Appendix 3: CONSORT Statement Framework

CONSORT 2010 checklist of information to include when reporting a randomised trial*

Section/Topic	Item No	Checklist item	Reported on page No
Title and abstract			
	1a	Identification as a randomized trial in the title	
	1b	Structured summary of trial design, methods, results, and conclusions (for specific guidance see CONSORT for abstracts)	
Introduction			
Background and objectives	2a	Scientific background and explanation of rationale	
	2b	Specific objectives or hypotheses	
Methods			
Trial design	3a	Description of trial design (such as parallel, factorial) including allocation ratio	
	3b	Important changes to methods after trial commencement (such as eligibility criteria), with reasons	
Participants	4a	Eligibility criteria for participants	
	4b	Settings and locations where the data were collected	
Interventions	5	The interventions for each group with sufficient details to allow replication, including how and when they were actually administered	
Outcomes	6a	Completely defined pre-specified primary and secondary outcome measures, including how and when they were assessed	
	6b	Any changes to trial outcomes after the trial commenced, with reasons	
Sample size	7a	How sample size was determined	
	7b	When applicable, explanation of any interim analyses and stopping guidelines	
Randomization:			
Sequence generation	8a	Method used to generate the random allocation sequence	
	8b	Type of randomization; details of any restriction (such as blocking and block size)	
Allocation concealment mechanism	9	Mechanism used to implement the random allocation sequence (such as sequentially numbered containers), describing any steps taken to conceal the sequence until interventions were assigned	
Implementation	10	Who generated the random allocation sequence, who enrolled participants, and who assigned participants to interventions	

Blinding	11a	If done, who was blinded after assignment to interventions (for example, participants, care providers, those assessing outcomes) and how	
	11b	If relevant, description of the similarity of interventions	
Statistical methods	12a	Statistical methods used to compare groups for primary and secondary outcomes	
	12b	Methods for additional analyses, such as subgroup analyses and adjusted analyses	
Results			
Participant flow (a diagram is strongly recommended)	13a	For each group, the numbers of participants who were randomly assigned, received intended treatment, and were analyzed for the primary outcome	
	13b	For each group, losses and exclusions after randomization, together with reasons	
Recruitment	14a	Dates defining the periods of recruitment and follow-up	
	14b	Why the trial ended or was stopped	
Baseline data	15	A table showing baseline demographic and clinical characteristics for each group	
Numbers analyzed	16	For each group, number of participants (denominator) included in each analysis and whether the analysis was by original assigned groups	
Outcomes and estimation	17a	For each primary and secondary outcome, results for each group, and the estimated effect size and its precision (such as 95% confidence interval)	
	17b	For binary outcomes, presentation of both absolute and relative effect sizes is recommended	
Ancillary analyses	18	Results of any other analyses performed, including subgroup analyses and adjusted analyses, distinguishing pre-specified from exploratory	
Harms	19	All important harms or unintended effects in each group (for specific guidance see CONSORT for harms)	
Discussion			
Limitations	20	Trial limitations, addressing sources of potential bias, imprecision, and, if relevant, multiplicity of analyses	
Generalizability	21	Generalizability (external validity, applicability) of the trial findings	
Interpretation	22	Interpretation consistent with results, balancing benefits and harms, and considering other relevant evidence	
Other information			
Registration	23	Registration number and name of trial registry	
Protocol	24	Where the full trial protocol can be accessed, if available	
Funding	25	Sources of funding and other support (such as supply of drugs), role of funders	

*We strongly recommend reading this statement in conjunction with the CONSORT 2010 Explanation and Elaboration for important clarifications on all the items. If relevant, we also recommend reading CONSORT extensions for cluster randomised trials, non-inferiority and equivalence trials, non-pharmacological treatments, herbal interventions, and pragmatic trials. Additional extensions are forthcoming: for those and for up to date references relevant to this checklist, see www.consort-statement.org.

Appendix 4: TREND Statement Framework

TREND Statement Checklist

Paper Section/ Topic	Item No	Descriptor	Reported? ✓	Reported? Pg #
Title and Abstract				
Title and Abstract	1	• Information on how unit were allocated to interventions		
		• Structured abstract recommended		
		• Information on target population or study sample		
Introduction				
Background	2	• Scientific background and explanation of rationale		
		• Theories used in designing behavioral interventions		
Methods				
Participants	3	• Eligibility criteria for participants, including criteria at different levels in recruitment/sampling plan (e.g., cities, clinics, subjects)		
		Method of recruitment (e.g., referral, self-selection), including the sampling method if a systematic sampling plan was implemented		
		• Recruitment setting		
		• Settings and locations where the data were collected		
Interventions	4	• Details of the interventions intended for each study condition and how and when they were actually administered, specifically including:		
		○ Content: what was given?		
		○ Delivery method: how was the content given?		
		○ Unit of delivery: how were the subjects grouped during delivery?		
		○ Deliverer: who delivered the intervention?		
		○ Setting: where was the intervention delivered?		
		○ Exposure quantity and duration: how many sessions or episodes or events were intended to be delivered? How long were they intended to last?		
		○ Time span: how long was it intended to take to deliver the intervention to each unit?		
		○ Activities to increase compliance or adherence (e.g., incentives)		
Objectives	5	• Specific objectives and hypotheses		
Outcomes	6	• Clearly defined primary and secondary outcome measures		
		• Methods used to collect data and any methods used to enhance the quality of measurements		
		• Information on validated instruments such as psychometric and biometric properties		
Sample Size	7	• How sample size was determined and, when applicable, explanation of any interim analyses and stopping rules		
Assignment Method	8	• Unit of assignment (the unit being assigned to study condition, e.g., individual, group, community)		
		• Method used to assign units to study conditions, including details of any restriction (e.g., blocking, stratification, minimization)		
		Inclusion of aspects employed to help minimize potential bias induced due to non-randomization (e.g., matching)		

TREND Statement Checklist

Blinding (masking)	9	• Whether or not participants, those administering the interventions, and those assessing the outcomes were blinded to study condition assignment; if so, statement regarding how the blinding was accomplished and how it was assessed.		
Unit of Analysis	10	• Description of the smallest unit that is being analyzed to assess intervention effects (e.g., individual, group, or community)		
		• If the unit of analysis differs from the unit of assignment, the analytical method used to account for this (e.g., adjusting the standard error estimates by the design effect or using multilevel analysis)		
Statistical Methods	11	• Statistical methods used to compare study groups for primary methods outcome(s), including complex methods of correlated data		
		• Statistical methods used for additional analyses, such as a subgroup • analyses and adjusted analysis		
		• Methods for imputing missing data, if used		
		Statistical software or programs used		
Results				
Participant flow	12	• Flow of participants through each stage of the study: enrollment, assignment, allocation, and intervention exposure, follow-up, analysis (a diagram is strongly recommended)		
		○ Enrollment: the numbers of participants screened for eligibility, found to be eligible or not eligible, declined to be enrolled, and enrolled in the study		
		○ Assignment: the numbers of participants assigned to a study condition		
		○ Allocation and intervention exposure: the number of participants assigned to each study condition and the number of participants who received each intervention		
		○ Follow-up: the number of participants who completed the follow-up or did not complete the follow-up (i.e., lost to follow-up), by study condition		
		○ Analysis: the number of participants included in or excluded from the main analysis, by study condition		
		• Description of protocol deviations from study as planned, along with reasons		
Recruitment	13	• Dates defining the periods of recruitment and follow-up		
Baseline Data	14	• Baseline demographic and clinical characteristics of participants in each study condition		
		• Baseline characteristics for each study condition relevant to specific disease prevention research		
		• • Baseline comparisons of those lost to follow-up and those retained, overall and by study condition		
		Comparison between study population at baseline and target population of interest		
Baseline equivalence	15	• Data on study group equivalence at baseline and statistical methods used to control for baseline differences		

TREND Statement Checklist

Numbers analyzed	16	• Number of participants (denominator) included in each analysis for each study condition, particularly when the denominators change for different outcomes; statement of the results in absolute numbers when feasible		
		• Indication of whether the analysis strategy was "intention to treat" or, if not, description of how non-compliers were treated in the analyses		
Outcomes and estimation	17	• For each primary and secondary outcome, a summary of results for each estimation study condition, and the estimated effect size and a confidence interval to indicate the precision		
		• Inclusion of null and negative findings		
		• Inclusion of results from testing pre-specified causal pathways through which the intervention was intended to operate, if any		
Ancillary analyses	18	• Summary of other analyses performed, including subgroup or restricted analyses, indicating which are pre-specified or exploratory		
Adverse events	19	• Summary of all important adverse events or unintended effects in each study condition (including summary measures, effect size estimates, and confidence intervals)		
DISCUSSION				
Interpretation	20	• Interpretation of the results, taking into account study hypotheses, sources of potential bias, imprecision of measures, multiplicative analyses, and other limitations or weaknesses of the study		
		Discussion of results taking into account the mechanism by which the intervention was intended to work (causal pathways) or alternative mechanisms or explanations		
		• Discussion of the success of and barriers to implementing the intervention, fidelity of implementation		
		• Discussion of research, programmatic, or policy implications		
Generalizability	21	• Generalizability (external validity) of the trial findings, taking into account the study population, the characteristics of the intervention, length of follow-up, incentives, compliance rates, specific sites/settings involved in the study, and other contextual issues		
Overall Evidence	22	• General interpretation of the results in the context of current evidence and current theory		

From: **Des Jarlais, D. C., Lyles, C., Crepaz, N., & the Trend Group (2004). Improving the reporting quality of nonrandomized evaluations of behavioral and public health interventions: The TREND statement.** ***American Journal of Public Health*****, 94, 361-366. For more information, visit:**
http://www.cdc.gov/trendstatement/