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Fresh Access Bucks: Increasing Food Access and Florida Farmer Sales at Markets Statewide

Florida Organic Growers Final Grant Report



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Submitted to Wholesome Wave Charitable Ventures, Inc.



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Executive Summary

The randomized control trial (RCT) was managed and evaluated by the University of Delaware's Center for Research in Education and Social Policy (UD-CRESP) across a national sample of three networks of farmers markets (FMs) in 13 states and the District of Columbia, over a two-year time span. This report presents and analyzes the data from the subset of 13 FMs in the Florida Organic Growers and Consumers (also known as Florida Organic Growers or FOG) FM network that participated in the RCT between January 2016 and April 2017. The RCT randomly awarded incentives to Supplemental Nutrition Assistance Program (SNAP) recipients to use to purchase fruits and vegetables (FVs). Changes in three pre-designated outcome variables (FV consumption, FV purchase, Body Mass Index (BMI)) were calculated using results of an online survey that addressed: standard dietary consumption over time; food insecurity; health status and perception; food purchasing; and, demographics. UD-CRESP also analyzed the effect of FV incentives randomly awarded to SNAP recipients on their FM spending.

The research resulted in the following findings. First and due to the small size of the FOG sample, no statistically significant changes were identified in these three pre-designated outcome variables. However, SNAP expenditures for FOG participants more than doubled when spending at the baseline and highest incentive levels were compared, a statistically significant result. Specifically, the research showed statistically significant higher SNAP spending on FV at the moderate and highest incentive levels when compared to the baseline or lowest incentive level. Additionally, FOG's subset of Hispanic participants also spent statistically significant more on FV when baseline and the highest level of incentives were compared.

Regarding outcomes from the national, or overall, sample (of which FOG was a subset), financial incentives awarded at FMs to SNAP participants had statistically significant, positive effects on FV consumption while no statistically significant changes were found in either FV purchase and BMI. Analysis of SNAP spending showed statistically significant higher spending at most incentive levels when compared to baseline.

Based on these results, our first recommendation is that a codified incentive program at the highest level be implemented. Our second recommendation is that culturally appropriate programming for Hispanic participants at FOG FMs be developed.

Background

Between 2016 and 2017, the University of Delaware's Center for Research in Education and Social Policy (UD-CRESP) partnered with Florida Organic Growers and Consumers (Florida Organic Growers or FOG) to measure the impact of expanded nutrition program incentives at farmers markets (FMs), following a Randomized Control Trial (RCT) research design and using funding from an individual Food Insecurity Nutrition Incentives Program (FINI) grant. During approximately the same timeframe, parallel studies were undertaken by Wholesome Wave, Inc. (WW) and the New York City Department of Health and Mental Hygiene (NYCDOHMH). Specifically, WW was funded by a FINI grant to undertake an RCT within their national network of FMs between 2015 and 2017. Finally, NYCDOHMH received an individual FINI grant that funded the RCT within its FM network between 2016 and 2017.

UD-CRESP conducted the multi-site RCT, across the three FINI-funded grants, to assess the impact of awarding additional Supplemental Nutrition Assistance Program (SNAP) incentives at the 76 FMs operating under the auspices of FOG, NYCDOHMH, and WW on recipients' FV purchase and consumption practices, among other parameters.

This report provides the results and outcomes of the RCT conducted at the 13 FOG FMs between 2016 and 2017, unless otherwise noted.

This report also includes a separate Excel spreadsheet ("FOG FMs_all Rounds_3-30-18") that was provided directly to WW via email. The spreadsheet reports on key participation parameters (i.e., tickets received, surveys sent, surveys completed, unique individuals, number and percent double completers, RCT monetary and nonmonetary incentives, SNAP dollars spent) for all 13 FMs that participated in the RCT between 2016 and 2017.

Design Participant Recruitment and Retention

SNAP shoppers at participating FOG FMs were offered the opportunity to participate in a study where they would be eligible to receive additional funds to spend at the FMs. Participants were initially made aware of their potential eligibility for the study through a yellow enrollment ticket provided by the market manager, as well as a printed flier containing RCT information. The numbered enrollment ticket requested the shopper's first name, email address, and cell phone number. The shopper's enrollment ticket number and identifier (i.e., the initials of their first and last names plus the last four digits of the Electronic Benefits Transaction (EBT) card used to access SNAP benefits) were recorded using the specialized software, "FMTracks^{™1}". Ultimately a link was able to be made, then between the FM Tracks sales data and the online survey.

UD-CRESP sent enrollment tickets and pre-stamped return envelopes to FOG FM managers, prior to implementation of the RCT. Upon receipt of completed tickets, UD-CRESP staff entered data from each ticket into an Excel spreadsheet. Through linkage of Qualtrics[™] survey software to the spreadsheet, SNAP shoppers were invited to participate in the study via email or text, or both.

Shoppers who responded to the invitation, and who both consented to participate and completed the corresponding online survey, were randomly awarded one of three monetary incentive amounts, or the nonmonetary incentive if available and as previously described. At the start of the following month, shoppers were sent an email and/or text with instructions on how to participate again, unless they opted out. Continued participation required completion of the survey again, after which, another randomized additional incentive was assigned.

Incentives were authorized for use at the participants' primary FM, or at another allowable FM within the FOG network, for the remainder of the month, when the monetary incentive expired. At the start of the next month, participants were invited to complete another survey if they had chosen to remain in the study. Finally, at the end of each round (roughly a farmers' market season), we included a final 'follow-up' month during which prior participants were invited to complete the survey, with the same odds of winning randomly assigned incentives as in prior months. No new RCT participants were recruited during this follow-up month.

¹ FMTracks[™] is an IOS-based program developed by Case Western Reserve University. It organizes market sales data, individual purchase data, incentive redemptions/expenditures, and EBT transactions.

All consent, survey, and other forms of formal communication with participants were reviewed and approved by UD's Institutional Review Board prior to its use in the RCT. Study materials were made available in English and Spanish.

Incentive Levels

After enrollment and survey completion, participants were randomly and equally assigned (computer generated) to one of three conditions: 1) no additional monetary incentive beyond baseline; 2) moderate monetary incentive; or, 3) maximum monetary incentive. During certain times in the RCT, a nonmonetary incentive (i.e. a reusable grocery bag imprinted with a healthy eating message) was randomly and equally assigned as a fourth option. When awarded, the nonmonetary incentive was given only once during the month; however, the recipient remained eligible to receive their FM's baseline monetary incentive throughout the entire month.

For the participating FOG FMs, participants always had the same three possible levels of incentive; specifically: \$1 (spent) received \$1 additional (1:1 baseline); \$1 (spent) received \$1.50 additional (1:1.5 moderate); or, \$1 (spent) received \$2.00 additional (1:2 maximum). Nationally, participant levels of incentive were determined based on the incentive structure of the FM where they shopped.

Incentive levels are further explained as follows:

- <u>Baseline Incentive</u>: FOG FMs participating in the RCT offered a 1:1 baseline monetary incentive match (or ratio). This means that for every \$1 in SNAP funds spent, SNAP shoppers randomly assigned to the baseline condition were provided an additional \$1. As noted, this baseline incentive level was consistent for the FOG FMs throughout the study. That said, the participant was randomly assigned to an incentive level that could vary from month to month.
- <u>Moderate Incentive</u>: The next interval of additional funds participants could receive is referred to as the moderate incentive, or 1:1.5. For example, if a participant spent \$6 in SNAP funds at a FOG FM and was provided with a moderate 1:1.5 incentive ratio, that participant would receive an additional \$9 to spend on FVs for a total of \$15.
- <u>Maximum Incentive</u>: The highest incentive ratio provided was 1:2. For example, if a participant spent \$8 in SNAP funds at the FM and was provided with the maximum 1:2 incentive ratio, that participant would receive an additional \$16 to spend on FVs for a total of \$24.
- <u>Non-monetary incentive</u>: A reusable grocery bag was provided in addition to the baseline incentive and here is termed as a non-monetary incentive.

As previously noted, participants were given an equal chance of being assigned to one of the three or four possible incentive levels, depending on whether the non-monetary incentive was an option. In all cases, an additional monetary incentive allowed the RCT participant to utilize the additional incentive on FVs only (vs. any SNAP-eligible product available for purchase at the FM).

Survey Measures

The online survey was modified from the Dietary Screener Questionnaire (DSQ) in the National Health and Nutrition Examination Survey (NHANES), 2009 – 2010. Survey questions selected for the RCT include FV dietary recall questions for the previous month. This 16-item FV screener's intraclass correlations for test – retest reliability ranged from 0.62 to 0.67 for FVs for men and women combined. These reliabilities are considered adequate and approach accepted levels (0.7) for research. The survey also included questions regarding food expenditures at the FM; demographics information based on US Census parameters; and, health status and perception questions selected from the Behavioral Risk Factor Surveillance System Questionnaire.

As a monthly dietary recall, the modified DSQ asks about the frequency (e.g., three times per week) of consumption in the past month of selected foods and drinks. The modified DSQ considered fresh FVs as well as FVs bought in prepared forms or from mixed foods (e.g., 100% fruit juices, refried beans, salsa, tomato sauces, french fries, and pizza). Responses to these survey questions were converted to estimates of dietary FV intake, provided in cup equivalents and based on a set of scoring algorithms developed by NHANES (2009-2010), providing daily FV/legume intake, in cups, of RCT participants.

A two-item food insecurity (FI) screener was used to identify families at risk for food insecurity: (1) "Within the past 12 months we worried whether our food would run out before we got money to buy more," and (2) "Within the past 12 months the food we bought just didn't last and we didn't have money to get more." The two-item FI screener has high sensitivity (83%), specificity (97%), and convergent validity compared with the longer 18-item US Household Food Security Scale used by the Current Population Survey, making it an effective substitute tool to annually monitor food-security status.

Calculation of BMI used the participant's self-reported weight/height and was interpreted using standard weight status categories. These categories are the same for men and women of all body types and ages². Specifically, the BMI scores are defined as follows:

² <u>https://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html.</u>

below 18.5 is underweight; 18.5 - 24.9 is Normal or Healthy Weight; 25.0 - 29.9 is Overweight; and, 30.0 and above is Obese.

The individual purchase amount by different incentive levels was collected at the FM using FMTracks[™]. These data were connected to the survey data in order to compare the variation in purchase amount by different incentive levels, using the participant's identifier (i.e., the initials of their first and last names plus the last four digits of their unique SNAP card).

Research Approach

The data presented here reflect differences in participant purchasing, or changes to survey responses over the course of a single month, derived from both the online survey and from sales information provided by the FM. As previously described, during each month, interested SNAP shoppers were given the opportunity to enroll in the study, take the dietary intake and shopping behavior survey, and receive one of the three or four possible incentive amounts.

Survey and participation data were downloaded from Qualtrics[™] and analyzed using SAS9.4[™]. Data collection was conducted online in two waves (or "rounds"), each four months in length between January and April 2016, and again between January and April 2017. As previously noted, winning an additional monetary incentive allowed the RCT participant to utilize the additional incentive on FVs only (vs. any SNAP-eligible product available for purchase at the FM).

Our analysis examined the following evaluation questions:

- 1. What is the impact of selected (and incrementally different) incentive program innovations, both financial and non-financial, on SNAP customers' purchases of FV at the farmers market and overall grocery purchasing?
- 2. What is the impact of selected (and incrementally different) incentive program innovations, both financial and non-financial, on SNAP customers' consumption of fruits and vegetables?
- 3. What is the impact of selected (and incrementally different) incentive program innovations, both financial and non-financial, on SNAP customers' BMI?

In order to answer these questions, we initially conducted descriptive analysis of the characteristics of SNAP FM customers; SNAP FM participant grocery spending, FV consumption, and health status; and, examined differences in FV purchasing, grocery

purchasing, consumption, and related indicators based on the level of the incentive amount received. Examination of SNAP expenditure data using a one-way ANOVA was used to detect any significant differences in SNAP dollars spent by participants at different incentive levels.

We conducted a repeated measures mixed effects analysis to estimate potential changes in outcome variables after participants were assigned an incentive. Regarding FV expenditures, the repeated measures model uses a log transformation of the dollars spent on FVs over the course of the month to account for skewness in the data. In addition, the model controls for household size since the dollars spent is related to the number of people to feed in the household.

The present report also provides findings from a Complier Average Causal Effect (CACE) analysis conducted only on the larger national sample, of which the FOG data was a part. The CACE model was calculated for FV consumption, where a significant finding was identified, in order to adjust the repeated measures model results to calculate the effects for only those participants *who used* their randomly assigned incentive.

All outcomes were examined based on data from SNAP participants who completed a survey once at the beginning of the month and again at the start of the following month.

The field-based, coordinated, multi-site RCT was conducted at a total of 13 FMs; one additional FM signed up for the RCT but did not solicit RCT participants. A total of 1,241 independent responses were generated from participating FOG FMs. In addition, this report at times, and where specified, draws from data from a larger national sample of FMs, which includes a total of 76 FMs and 7,097 independent responses.

RCT Results

Sample

Between January 2016 and April 2017, 818 tickets were received from all FOG FMs participating in the RCT (as reported on "FOG FMs_all Rounds_3-30-18" spreadsheet). A total of 2,672 survey invitations were sent via email or text to both first-time participants and to those who agreed to consider completion of the survey in subsequent months. Of the surveys sent, 46.4% (n=1,241) were completed. The number of first-time completers of the survey between January 2016 and April 2017 was 600.

Note that the sample size is not consistent across the gender variable nor across the following variables since participants had the option to skip over certain questions and still complete the survey.

Characteristics of RCT Participants from all FOG FMs

Of the 600 first-time survey respondents from FOG FMs who answered the gender questions, 83% (n= 486) were female. The majority of respondents 63% (n=355) were between the ages of 18 and 47.

Regarding race and ethnicity, 79% (n=427) of the respondents from FOG FMs were white and 16% (n=88) were Hispanic. Additionally, 16% of the respondents in the overall sample were Hispanic. These data reflect the relatively high percentage of Hispanic residents in the communities whose FMs participated in the RCT. Specifically and according to the Pew Research Center, Florida's Hispanic population represents almost nine percent of all Hispanics in the US, third behind California and Texas, respectively.³ In both Florida and other parts of the country, Hispanic participation in SNAP and programs such as the RCT is of particular interest, presenting an opportunity to focus on culturally appropriate nutrition education and outreach to this population.

Table 1 summarizes much of these gender, race, and ethnicity data, for participants from FOG's network of FMs and the subset of Hispanic participants from FOG's network of FMs. Data for the national sample of participants from WW, FOG, and NYCDOHMH FMs can be found in Table 8 (Appendix A).

Characteristics	FOG	Hispanic Participants from FOG FMs
Total Participants	600	88
Gender Male Female	17% 83%	13% 87%
Race	0070	
White	79%	59%
Black or African American	9%	11%
Asian/Other Pacific Islander	4%	10%
American Indian/Alaskan Native	4%	4%
Other Race	4%	17%

Table 1: Demographic Information for FOG FMs

³ Krogstad, JM. Hispanics have accounted for more than half of total U.S. population growth since 2010. <u>https://www.pewresearch.org/fact-tank/2020/07/10/hispanics-have-accounted-for-more-than-half-of-total-u-s-population-growth-since-2010/</u>. Published July 10, 2020.

Characteristics	FOG	Hispanic Participants from FOG FMs
Ethnicity		
Hispanic	16%	100%
Non-Hispanic	84%	0%
Age		
18 to 27 years	17%	20%
28 to 37 years	25%	31%
38 to 47 years	21%	23%
48 to 57 years	17%	21%
58 to 67 years	14%	2%
68 to 77 years	6%	4%
78 and above	1%	0%

¹ Overall: the national sample of all FMs; i.e., the WW, FOG, NYCDOHMH network-based FMs that recruited SNAP shoppers to participate in the RCT.

Regarding participant health information, at baseline, it was found that 82% (n=476) of FOG FM SNAP shoppers had experienced food insecurity in the prior year. More than 54% (n=315) reported that they were overweight or obese (BMI \ge 25). More than one in five (22%, n=128) stated that they were in fair or poor health. When asked about health conditions, 12% reported having diabetes and 23% had high blood pressure.

The prevalence of the health conditions faced by SNAP FM shoppers is summarized in Table 2, specifically categorized according to: participants from FOG's network of FMs and the subset of Hispanic participants from FOG's network of FMs. Data for the national sample of participants from WW, FOG, and NYCDOHMH FMs can be found in Table 9 (Appendix A).

	FOG	Hispanic Participants from FOG FMs
BMI		
Underweight (BMI below 18.5)	3%	1%
Normal Weight (BMI 18.5 – 24.9)	43%	46%
Overweight (BMI 25.0 – 29.9)	28%	25%
Obese (BMI 30.0 – 34.9)	14%	16%
Severely Obese (BMI 35.0-39.9)	7%	6%
Morbidly Obese (BMI 40.0 and over)	5%	6%

Table 2: Self-reported Participant Health Information for FOG FMs

	FOG	Hispanic Participants from FOG FMs
Food Insecurity		
Food Insecure	82%	92%
Food Secure	18%	8%
Health Status		
Excellent	11%	14%
Very Good	31%	22%
Good	36%	41%
Fair	17%	15%
Poor	5%	8%
Health Conditions		
Heart Disease	4%	7%
Diabetes	12%	11%
High Blood Pressure	23%	15%

The survey also asked SNAP FM shoppers about the amount they spent on all groceries and the amount they spent on FVs as part of their overall grocery budget – not just on items purchased at the FM. Per month, each household spent on average \$162.66 on FVs. When compared to the total amount spent on groceries, FV purchasing comprised 47% of the total.

Finally, the data on dietary intake (or consumption) revealed that FOG FM SNAP shoppers consumed on average 3.13 cups of FVs per day (an amount that includes french fries), at baseline. Further, males consumed an average of 3.33 cups of FVs per day, while females consumed 3.10 cups of FVs per day. Overall, the average amount of FVs that adults age 18-47 consumed was about 3.19 cups per day. Adults age 48-67 consumed 3.04 cups of FVs per day and older adults (68+) consumed about 3.10 cups of FVs per day.

Dietary intake and expenditure data are summarized in Table 3, specifically categorized according to: participants from FOG's network of FMs and the subset of Hispanic participants from FOG's network of FMs. Data for the national sample of participants from WW, FOG, and NYCDOHMH FMs can be found in Table 10 (Appendix A).

	FOG	Hispanic Participants from FOG FMs
Daily Cups, FV Intake by Gender		
Male	3.33	2.88
Female	3.10	2.98
Daily Cups, FV Intake by Age		
18 to 27 years	3.08	2.76
28 to 37 years	3.26	3.14
38 to 47 years	3.20	3.20
48 to 57 years	2.98	2.67
58 to 67 years	3.10	4.18
68 to 77 years	3.03	2.21
78 years and above	3.46	
Daily Cups, FV Intake Overall Average (in cups)	3.13	2.97
Monthly FV Grocery Expenditures, all sources, in dollars	162.66	176.98
BMI	27.1	27.0

Table 3: Mean Baseline FV Intake (or Consumption) and Expenditures for FOG FMs

RCT Incentive Coupon Usage for all FOG FMs

In total and as shown in Table 4, the study issued 1,220 monetary incentives that could be used multiple times over one month. Of these, 577 incentives were redeemed at least once, and in total, incentives were redeemed 1,028 times. In other words, participants who used incentives redeemed them an average of 1.8 times across the month. Those with an incentive spent an average of \$33.81 in SNAP funds alone (before any additional incentive was applied) per visit to the FM, as shown in Table 7.

Table 4 provides a summary of incentives issued by incentive level, including whether the incentive level was considered to be baseline, moderate, or maximum at participating FOG FMs. Sample analysis for the national sample of participants from WW, FOG, and NYCDOHMH FMs can be found in Table 11 (Appendix A).

	Incentive Level		
Incentive Ratio	Baseline	Level1 (Moderate)	Level2 (Maximum)
1	361		
1.5		344	
2			356
Non-monetary	159		
Total incentives	520	344	356

Table 4: Sample Analysis for FOG FMs

Table 5 establishes incentive assignment according to: participants from FOG's network of FMs and the subset of Hispanic participants from FOG's network of FMs. Incentive assignment for the national sample of participants from WW, FOG, and NYCDOHMH FMs can be found in Table 12 (Appendix A).

Table 5. Incentive Assignment for FOG HVIS		
Incentive Ratio	FOG	Hispanic Participants from FOG FMs
1	30%	32%
1.5	28%	29%
2	29%	30%
Non-monetary ¹	13%	10%

Table 5: Incentive Assignment for FOG FMs

¹ Participants who received the non-monetary incentive were also eligible to receive the 1.0 monetary incentive.

Changes in Outcome Variables for all FOG FMs, and National FMs

A repeated measures mixed effects analysis was conducted to estimate the potential change in FV consumption, FV expenditures and BMI, after participants were assigned an incentive. Table 6 summarizes outcomes data based on the repeated measures mixed effects analyses for the FOG sample^{4,5}. No statistically significant differences were identified, which is likely due to sample size limitations.

⁴ Outcomes data for participants from WW, FOG, and NYCDOHMH FMs can be found in Table 13 (Appendix A) for comparison purposes.

⁵ It should be noted that these tables include data from FMs that have different baseline and therefore incentive levels than the FOG FMs.

	FOG
FV Consumption (in cups)	
Intercept	2.88*
0.4	
0.8	
1.0	
1.5	0.11
2.0	0.11
Non-monetary	-0.17
Hispanic intercept	0.0801
Hispanic 0.4	
Hispanic 0.8	
Hispanic 1.0	
Hispanic 1.5	0.1108
Hispanic 2.0	-0.0904
Hispanic Non-monetary	0.3632
Monthly Grocery Expenditures on FV (Log transformation; percent change in FV expenditures)	
Intercept	4.4351*
).4	
0.8	
1.0	
1.5	0.20
2.0	0.13
	0.13
Non-monetary	0.0912
Hispanic intercept	0.0912
Hispanic 0.4	
Hispanic 0.8	
Hispanic 1.0	0 4242
Hispanic 1.5	-0.1312
Hispanic 2.0	-0.2016
Hispanic Non-monetary	-0.0604
Household size	0.15*
BMI	04 45*
Intercept	24.45*
0.4	
0.8	
1.0	0.00
1.5	0.20
2.0	0.04
Non-monetary	0.76
Hispanic intercept	1.28
Hispanic 0.4	
Hispanic 0.8	
Hispanic 1.0	
Hispanic 1.5	-0.06
Hispanic 2.0	0.27
Hispanic Non-monetary p < .05 Indicates a value different from 0.	0.18

However, significant differences were found for the aggregate, larger, sample of FM which included FOG markets. Statistically significant differences were found for participants assigned the maximum incentive (i.e., \$2.00 for \$1.00 baseline FMs) in the national sample of FMs. Specifically, and for this national sample, receiving the maximum incentive level resulted in an increased FV consumption of 0.16 daily cups. Hispanic participants did not experience any additional increases in FV consumption beyond the increases seen in the overall sample.

To understand the impact of the program for those participants that used the incentive (excluding those that received, but never used), a Complier Average Causal Effect (CACE) methodology was applied. This approach adjusts the repeated measures model results to calculate the effects for only those participants who used their randomly assigned incentive. Based on the CACE calculation, the FV consumption of participants, from the national sample of FMs, who used their 2.0 incentive was 0.31 cups per day, almost twice the average for all participants who were randomly assigned the 2.0 incentive level.

Regarding FV expenditures, the repeated measures model uses a log transformation of the dollars spent on fruits and vegetables over the course of the month to account for skewness in the data. In addition, the model controls for household size since the dollars spent is related to the number of people to feed in the household. No significant differences were found between incentive levels for the national sample or for the subsamples.

Not unexpectedly, no significant change in BMI was found for national participants regardless of incentive level. This finding is likely due to the short periods of time under study; it is unlikely that large changes in BMI are detectable over a month's time. Additional research of longer-term effects is recommended in order to better estimate the impacts of FV incentives on BMI.

Analysis of SNAP Expenditures for Participants from FOG FMs

As noted earlier, FOG participants who used incentives at the FM spent an average of \$33.81 SNAP dollars per transaction. Examination of SNAP expenditure data using a oneway ANOVA shows significant increases of SNAP dollars spent. Refer to Table 7, which presents these results according to: participants from FOG's network of FMs and the subset of Hispanic participants from FOG's network of FMs. Results for the national sample of participants from WW, FOG, and NYCDOHMH FMs can be found in Table 14 (Appendix A).

Specifically, for all FOG FM participants, a statistically significant increase in SNAP spending was observed between the baseline and moderate incentive levels (\$20.40 to \$33.81); SNAP spending between the baseline and highest incentive levels more than

doubled (\$20.40 to \$40.07), also a statistically significant increase. Data analysis showed similar, statistically significant increases in SNAP spending (\$19.84 to \$38.62) for FOG FMs' Hispanic participants between the baseline and highest incentive levels.

Donars		
Incentive Ratio	FOG	Hispanic Participants from FOG FMs
0.4		
0.8		
1	20.40	19.84
1.5	33.81*+	32.44
2	44.07*+	38.62+

Table 7: SNAP Expenditures at Farmers Markets, per Transaction and by Incentive Level, in Dollars

* p < .05. Statistical significance indicated for the difference with the preceding incentive level. * p < .05 Statistical significance indicated for the difference with the baseline level.

⁺ p < .05 Statistical significance indicated for the difference with the baseline I

Anecdotal Feedback

Communication received from FM managers and RCT participants during the RCT is included verbatim in Appendix B. Overall, there was little to no criticism of the RCT process. Rather, FM managers recognized the benefit of additional RCT spending to their market's farmer vendors, and on the overall reputations and desirability of their FMs. Further, numerous participants expressed appreciation for the increased incentives and the value of the additional FVs to their health. All questions and concerns were promptly addressed. Acknowledgement of communications that did not necessitate a response was provided in most cases.

Conclusions and Recommendations

The study showed three notable effects. First, participants shopping at participating FOG FMs spent statistically significant higher amounts of their SNAP dollars on FVs at the moderate and highest incentive levels, when compared to baseline. Second, the Hispanic subset of these FOG participants spent statistically significant higher amounts of their SNAP dollars on FVs at the highest incentive level, when compared to baseline. Last, when considering the overall or national sample of SNAP shoppers at FMs, statistically signification changes between baseline and the highest incentive level were shown both in the amount of FVs consumed and in the amount of SNAP dollars spent.

Based on these effects, we make two recommendations. First, and from a policy perspective, our recommendation is that an incentive program at the highest level be codified. Our analysis of the national or overall sample showed that a FV incentive for

SNAP recipients at FMs at the highest level increased FV consumption. At baseline, participants reported consuming 2.77 cups of FVs per day which increased to 2.93 cups at the highest incentive level, a statistically significant increase. Accordingly, a dedicated FV incentive at the highest level for SNAP recipients would help to close the gap between current FV consumption and that recommended by the Dietary Guidelines for Americans (4.5 cups of FVs per day)⁶. Improving dietary quality among participants results in numerous health benefits for the individual, including a reduced risk of stroke and other cardiovascular diseases, a reduced risk of developing cancer, and a reduced risk of Type 2 Diabetes^{7,8,9}. Beyond the individual level, improved dietary quality also results in a reduced strain on the health system as a decreased incidence of health problems for the individual reduces the need for care and interventions.

Further, a codified FV incentive for SNAP recipients at FMs conveys economic benefits since the highest incentive level is associated with a statistically significant increase in SNAP FV expenditures at FMs. Also, incentive programs have the potential to bring new customers to FMs and bolster FM use among participants. The increases in FM sales relieves local farmers of the need to ship their products over long distances and is mutually beneficial for the consumers and sellers.

An alternative to our recommendation for an incentive at the highest level is codification of an FV incentive at the moderate level. This would still confer the benefits of an increase in FV consumption and a statistically significant increase in SNAP spending, creating a costsaving alternative to an FV incentive at the highest level. At FOG FMs, providing a *"spend" \$1 and get \$1.50"* would still result in \$14 additional SNAP dollars spent per transaction on FV, while *"spend \$1 and get \$2"* resulted in an increase of \$24 per transaction.

Our second recommendation is that culturally appropriate programming for Hispanic participants at FMs be created or expanded given that SNAP spending on FV for this subset of the population also increased at higher incentive levels. The relatively high percentage of

⁶ U.S. Department of Health and Human Services and U.S. Department of Agriculture. 2015–2020 Dietary Guidelines for Americans. 8th Edition. December 2015. Available at

http://health.gov/dietaryguidelines/2015/guidelines/.

 ⁷ Jardim TV, Mozaffarian D, Abrahams- Gessel S, Sy S, Lee Y, Liu J, et al. (2019) Cardiometabolic disease costs associated with suboptimal diet in the United States: A cost analysis based on a microsimulation model. PLoS Med 16(12): e1002981. https://doi.org/10.1371/ journal.pmed.1002981
 ⁸ Mozaffarian D, Benjamin EJ, Go AS, et. al. (2016) Heart Disease and Stroke Statistics—2016 Update. American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Circulation. 133:e38–e360. https://doi.org/10.1161/CIR.00000000000350

⁹ Mozaffariam D, (2016) Dietary and Policy Priorities for Cardiovascular Disease, Diabetes, and Obesity A Comprehensive Review. American Heart Association. Circulation. 133:187–225. https://doi.org/10.1161/CIRCULATIONAHA.115.018585

Hispanic residents in the communities whose FOG FMs participated in the RCT presents a unique opportunity to offer this specialized programming.

In conclusion, investing in FM incentive programs, which is supported by this study's findings and widely across the literature, should be prioritized. Specifically, this RCT supports the effectiveness of incentive programs in improving nutrition behaviors of SNAP shoppers and increasing spending at FMs. Such programs address the need to increase purchasing power for low-income consumers, such as SNAP participants, enabling the purchase of healthy foods. This is particularly timely as, in recent years, the price of healthy items such as FVs has increased relative to unhealthy items. Accordingly, incentive programs such as the one analyzed in this RCT, improve the affordability of FVs for program participants. Therefore, incentive programs that increase SNAP shoppers' ability to purchase additional FVs should be part of future policies to support this population which will create more equitable access for those whose food budgets are otherwise limited.

Appendix A: Additional Tables

Characteristics	Overall ¹
Total Participants	3,073
Gender	
Male	18%
Female	82%
Race	
White	72%
Black or African American	12%
Asian/Other Pacific Islander	4%
American Indian/Alaskan Native	4%
Other Race	8%
Ethnicity	
Hispanic	18%
Non-Hispanic	82%
Age	
18 to 27 years	15%
28 to 37 years	28%
38 to 47 years	21%
48 to 57 years	16%
58 to 67 years	15%
68 to 77 years	5%
78 and above	1%

Table 8: Demographic Information for the Overall Sample of FMs

¹ Overall: the national sample of all FMs; i.e., the WW, FOG, NYCDOHMH network-based FMs that recruited SNAP shoppers to participate in the RCT.

	Overall ¹
BMI	
Underweight (BMI below 18.5)	3%
Normal Weight ((BMI 18.5 – 24.9)	37%
Overweight (BMI 25.0 – 29.9)	27%
Obese (BMI 30.0 – 34.9)	16%
Severely Obese (BMI 35.0-39.9)	9%
Morbidly Obese ((BMI 40.0 and over)	9%
Food Insecurity	
Food Insecure	82%
Food Secure	18%
Health Status	
Excellent	9%
Very Good	28%
Good	37%
Fair	19%
Poor	7%
Health Conditions	
Heart Disease	5%
Diabetes	13%
High Blood Pressure	23%

Table 9: Self-reported Participant Health Information for the Overall Sample of FMs

¹ Overall: the national sample of all FMs; i.e., the WW, FOG, NYCDOHMH network-based FMs that recruited SNAP shoppers to participate in the RCT.

	Overall ¹	
Daily Cups, FV Intake by Gender		
Male	3.27	
Female	2.95	
Daily Cups, FV Intake by Age		
18 to 27 years	2.93	
28 to 37 years	3.03	
38 to 47 years	3.12	
48 to 57 years	2.98	
58 to 67 years	2.91	
68 to 77 years	3.03	
78 years and above	2.75	
Daily Cups, FV Intake Overall Average (in cups)	3.00	
Monthly FV Grocery Expenditures, all sources, in dollars	153.76	
BMI	28.5	

Table 10: Mean Baseline FV Intake (or Consumption) and Expenditures for the Overall Sample of FMs

¹Overall: the national sample of all FMs; i.e., the WW, FOG, NYCDOHMH network-based FMs that recruited SNAP shoppers to participate in the RCT.

Table 11: Sample Analysis for the Overall¹ Sample of FMs

	Incentive Level			
Incentive Ratio	Baseline	Level1 (Moderate)	Level2 (Maximum)	Total
0.4	1199			1199
0.8		1060		1060
1	1627		1108	2735
1.5		1002		1002
2			982	982
Non-monetary	858			858
Total monetary	2826	2062	2090	6978

¹Overall: the national sample of all FMs; i.e., the WW, FOG, NYCDOHMH network-based FMs that recruited SNAP shoppers to participate in the RCT.

Incentive Ratio	
0.4	17%
0.8	15%
1 ²	39%
1.5	14%
2	14%
Non-monetary ³	24%

Table 12: Incentive Assignment for the Overall Sample of FMs

¹ Overall: the national sample of all FMs; i.e., the WW, FOG, NYCDOHMH network-based FMs that recruited SNAP shoppers to

² The1.0 incentive ratio includes FMs, including FOG, whose baseline incentive ratio was 1.0 (moderate 1.5 and maximum 2.0), as well as FMs whose 1.0 incentive ratio represented the maximum possible monetary incentive (baseline 0.4 and moderate 0.8). ³ Participants who received the non-monetary incentive were also eligible to receive the 1.0 monetary incentive.

	Overall ¹
FV Consumption (in cups)	
Intercept	2.77*
0.4	
0.8	-0.04
1.0	0.00
1.5	0.08
2.0	0.16*
Non-monetary	-0.03
Hispanic intercept	-0.02
Hispanic 0.4	
Hispanic 0.8	-0.01
Hispanic 1.0	0.00
Hispanic 1.5	0.11
Hispanic 2.0	-0.10
Hispanic Non-monetary	-0.07
Monthly Grocery Expenditures on FV (Log	0.07
transformation; percent change in FV expenditures)	
Intercept	4.44*
0.4	7.77
0.8	0.04
1.0	-0.02
1.5	0.05
2.0	0.03
Non-monetary	-0.01
Hispanic intercept	0.04
Hispanic 0.4	0.04
	0.00
Hispanic 0.8	-0.09
Hispanic 1.0	0.06
Hispanic 1.5	0.00
Hispanic 2.0	0.05
Hispanic Non-monetary	-0.04
Household size	0.02*
BMI	05 00*
Intercept	25.33*
0.4	0.00
0.8	0.22
1.0	-0.09
1.5	-0.01
2.0	-0.09
Non-monetary	0.11
Hispanic intercept	1.21
Hispanic 0.4	0.07
Hispanic 0.8	0.37
Hispanic 1.0	-0.19
Hispanic 1.5	-0.92
Hispanic 2.0	-0.82
Hispanic Non-monetary	-0.73

Table 13: Repeated-Measures Fixed-Effects on Outcomes for the Overall Sample of FMs

* p < .05 Indicates a value different from 0. ¹ Overall: the national sample of all FMs; i.e., the WW, FOG, NYCDOHMH network-based FMs that recruited SNAP shoppers to participate in the RCT.

Table 14: SNAP Expenditures at Farmers Markets, per Transaction and by Incentive Level, in
Dollars for the Overall Sample of FMs

Incentive Ratio	Overall ¹	
0.4	26.10	
0.8	36.71*+	
1	33.59+	
1.5	29.42*	
2	35.78*+	

* p < .05. Statistical significance indicated for the difference with the preceding incentive level.
 * p < .05 Statistical significance indicated for the difference with the baseline level.
 ¹ Overall: the national sample of all FMs; i.e., the WW, FOG, NYCDOHMH network-based FMs that recruited SNAP shoppers to participate in the RCT. The baseline reference level for the national sample of FMs is .4.

Appendix B: Anecdotal Feedback from all FMs

(Note, in many cases participants and FM managers refer to "vouchers," which means the incentive randomly awarded by the RCT process.)

(participant, undated)

Good morning!

I was so happy to take part in your survey. I only spend my SNAP benefits at the Farmer's Market. As excited and thankful as I was to receive the awesome redemption voucher, I was discouraged as it expires barely a week after I received it. The facts are I only receive \$22.00 a month in SNAP benefits....that is as a Mom of 2! Also, it is given at the beginning of the month. So when I took your survey, I had already used up September's benefits at the previous week's market. Is there any way you can send a new voucher I can use at this Saturday's market or send me a link and I will happily take the survey again please? Thanks so much in advance for your help,

(participant, undated)

Since I have no way to copy anything I brought my phone and showed them the email of winning... I used it all up already was down to nothing for food I want to thank you so much this helped me so much I made a nice veg roast and a large apple and blueberry pie.. can I get some more help for October?

(Comment by phone from a voucher winner, undated) I am very grateful for the opportunity to purchase more fruits & vegetables. My son has had

health issues, which I feel are the result of decreased fruit and vegetable intake since I went on SNAP benefits.

(participant, undated) The few extra bucks was very helpful last time. *********

(Comment by phone from a market manager, undated)

The extra dollars are so helpful to our customers. I would gladly take a whole lot of hassle trying to figure out any glitches in the lottery system if it means extra benefits for our customers.

(participant, undated)

May I say this is helping me so much.. its very hard to stretch the little bit I do have and I try to eat healthy but can't always afford to.. many thank you. :-)

(Karen McGlammery, Webb City FM Manager, 10/4/15)

We had a great market yesterday with THREE very excited lottery winners redeeming!! This is such an awesome program. And our local paper ran a story on the lottery program yesterday.

(participant, undated)

The social culture in my particular area (Seacoast of NH) might give some skewed

results. The Eat Local/Buy Local movement has been a hard driving factor throughout the entire recession. Residents are predominantly physically active and conscientious about their health and environment. Compared to the rest of the country, obesity is quite low, but smoking is very popular. Believe it or not, some SNAP recipients had perfectly good eating habits prior to enrolling in the program. SNAP acceptance at the farmer's market simply makes it possible to continue (to some degree) while enduring financial hardships.

(participant, undated)

This program is an amazing way to get healthy foods and choices into lower income families. It's great for us and the farmers get a whole new group of people to share their goodies with. I also plan to use the winter markets too so I'll be looking for the surveys then too. Hope this research is successful because we will be taking advantage as long as it exists. If you need an advocate I would be happy to share my experiences. Thanks again *************

(Karen McGlammery, 10/15/15)

You helped one of our market clients, Sam, be able to access the survey and she was a winner and was so happy. I've copied a couple of statements from her emails (with her permission) to share with you. [In the first paragraph she is referring to the fact that as of October our Friday market is over for the season so we are down to two markets per week instead of three, thus only two times to match EBT funds instead of three]. Also, in conversation at the market I teased Sam that she'd have to hold a dinner party now that she can buy so many veggies with the lottery. She said that seriously, she now would be able to have someone over for a meal when she never could before as she just didn't have enough food. I hadn't thought about that social aspect of not having enough food...

Sam:

"I am so excited!!!!! I was thinking over how the dropping of Friday markets would cut \$60-\$75 match dollars per month out of my budget and how I would have to shift things around for that... AND then I got a double match! That'll be like \$90 extra match if I make it to every market this month! Every month seems to work out for food now because of the matches, providence of "random" food showing up, and good farmers who are very generous in general and even more so when they suspect that you don't have very much on a given day. I have always been pleased with the Webb City market and how well it works and is put together, but now it is staple in my life even more. Thank you, Karen and Eileen for all the wonderful things you do, countless hours, and hard work you put into making the market great! This is one of the hardest working programs I have seen in terms of personal, small famers agricultural, local economy, and many other intangible, impacts."

(participant, 10/15/15)

I am so very grateful for this program and the ability to be able to use the SNAP benefits at the farmers market to obtain fresh food for my family and to support local farmers.

(from a farmers market manager, undated)

I thought you might also be interested in a quote from one of our other SNAP customers on

Saturday. When I told her that the in-market survey was part of a research project that would hopefully justify future funding, she was very enthusiastic about the match program and happy to participate in the survey. As she left she said "I haven't eaten this healthy in vears!"

(Englewood FM, undated)

So glad to be able to buy fresh, organic veggies at the farmers market instead of at WalMart.

(undated)

The market and this program is jessy a blessing all together, with it and exercise, I have been able to lose and keep off 135 pounds now of over a year. This program made it a much easier to be able to purchase real food. Thanks again for what you guys are doing,

(Tucson, AZ FM customer, 4/18/16)

Thank you for doing this. Anything to help with making fresh food available is making a huge difference in people's lives & making a difference for farmers. Incentives help to offset higher costs at farmers markets"

(From a participant at Southwest Community FM, 5/11/16)

"this survey has really made it possible for me to have not only enough food each month with the little help i get from the state but also able to eat much healthier. I love the fresh fruit and veg that my refrigerator is filled with as oppose to frozen dinners."

(From a participant from the Grandin Road FM, 6/16/16)

I'm glad to hear what you guys do with the data from the Farmers Market surveys! Sounds like it could potentially lead to some positive results! Thanks for your work on this project that, at least for me, is a worthwhile program!

(Tracy Herner, Williamsburg VA FM Manager, undated)

Don't know how frequently you hear stories, but this past weekend was a huge success for us! We did over \$400 in SNAP, which is a record. 2 customers got over \$100 in tokens. and one of those was an RCT winner. She got \$120 in SNAP tokens, and \$240 in F&V.....for a whopping \$360 to spend at the market. She was nearly crying as that is more than she gets all year. Because of how happy she was about winning, she encourage 3 other SNAP recipients to come to the market with her.

(Sara Rhoades, City of Alexandria, VA, 9/9/2016) We've increased our sales at the market by >200% this summer because of this RCT *****

(Alyssa Lerman, 11/3/15)

The Concord Farmers' Market concluded for the season this past Saturday (with positive feedback from customers participating in the RCT surveys!) ****

(Forwarded from Eileen Nichols, Webb City FM, 10/13/16)

"Hey, I just back from the doctor and my AIC dropped, meaning I am no longer considered to have prediabetes. That's something you can to take to your market match funders."

(Lee Perron, Englewood FM, 1/22/16)

We, as in the collective "all of us", had a BIG day at the market yesterday. Please note the photos. We had our first RCT winner! She showed with her voucher on her smart phone. That's Amy and the winner with the voucher displayed on the phone. She was so excited that she swiped for \$60 in SNAP funds and she received \$90 in black tokens. Wow! Katie, I checked the transaction log for data and sure enough the \$90 showed up as 1.5 RCT! The tracking is working well... and Carmen you now have your data available residing in the portal. The winner is one of our participants that come every week. Amy spent time reinforcing with each sign up and with those who have already signed up the importance of filling out the survey. Some said they thought it was a little long.... But when Amy shared the story of the winner receiving a \$90 dollar match... we think the list got a little easier to fill out. We had 22 participants, with 11 new, and we sent in 14 RCT cards this week. They purchased \$462 in SNAP, we matched \$442, and the vendors redeemed \$754... including our first 20 black tokens for redemption. So, there's the numbers and the platform is humming along.

(participant, 10/8/15)

Tara,

Thanks for taking the time to get back to me. Yes I did win for October I plan to spend about \$200 of my food assistance in Portsmouth Saturday. This program is an amazing way to get healthy foods and choices into lower income families. It's great for us and the farmers get a whole new group of people to share their goodies with. I also plan to use the winter markets too so I'll be looking for the surveys then too. Hope this research is successful because we will be taking advantage as long as it exists. If you need an advocate I would be happy to share my experiences. Thanks again.

(newspaper article)

Webb City market fuels healthier eating, research program for low-income customers BY MIKE POUND mpound@joplinglobe.com | Posted: Friday, October 2, 2015 6:50 pm

WEBB CITY, Mo. — The Webb City Farmers Market has been selected to take part in a research program that hopefully will allow low-income residents to continue to receive increased access to local fresh fruits and vegetables.

In March, the market received a three-year \$33,000 grant that provided matching dollars for customers enrolled in the government's food stamp program. The grant was part of a larger United States Department of Agriculture \$3.77 million grant award to Wholesome Wave, a national nonprofit organization. Wholesome Wave in turn issued the \$33,000 annual grant to the Webb City market. A group of St. Louis farmers markets and the Webb City market were the only markets in the state selected to take part in the program.

Karen McGlamery, volunteer market manager, said the fact that the Webb City market was even considered for the grant from Wholesome Wave is a testament to the determination of Eileen Nichols, the founder and director of the Webb City Farmers Market. "Eileen called them (Wholesome Wave) repeatedly," McGlamery said. "The fact that we got the grant says a lot about the Webb City Farmers Market and Eileen Nichols."

Under the program, food stamp customers may swipe their Supplemental Nutrition Assistance Program (SNAP) cards at the Webb City market's information desk and receive tokens for the amount of money they wish to spend. The market then, thanks to the grant from Wholesome Wave, will issue matching tokens — up to \$15 — to the customer to be used at the market. While the customers may spend their SNAP tokens on any market product, the matching token may only be used for produce, McGlamery said.

In addition to the matching token program, the market has been selected by Wholesome Wave to take part in a research program, McGlamery said.

When SNAP customers purchase their tokens at the market, they are asked to take part in a short, anonymous survey. The purpose of the survey, McGlamery said, is to gauge how the SNAP money is being spent at the market. The information will be used by Wholesome Wave to help justify continued support for farmers markets from the USDA.

As part of the research project, during three months of each year, customers who take part in the survey are entered in a drawing for a much larger token match for the month in which their name is drawn.

This year, the drawings began in September and will continue through October and November. McGlamery said that in September several Webb City customers won additional token matches.

"We had one woman who spent \$40 and walked away with 123 (\$1) market tokens," McGlamery said.

McGlamery said the whole idea surrounding the Wholesome Wave grant is to encourage people to eat healthier and to be able to stretch their food budgets.

"But it also helps our growers by giving them another market and increasing their business," she said.

For more information about the SNAP program and to be entered into the drawing, you may visit the market's information desk located on the east side of the market pavilion in King Jack Park.

Fall hours

The Webb City Farmers Market fall hours are from 4 p.m. to 7 p.m. on Tuesdays and from 9 a.m. to noon on Saturdays.

(Rob Shepard, Healthy Exchange Project Coordinator, Greenmarket GrowNYC, 2/13/17) 2/10/17 at 97^{th} St – "A few of the EBT lottery winners used all of their available money at the market (in two cases they purchased \$150 in tokens). It seems that winning the lottery is becoming an important incentive for people to shop at the market."

2/12/17 at Cortelyou – "Year round Health Bucks and RCT have had a clear positive impact on this market! Even with freezing rain all day, I still did good EBT sales due to several regulars who previously came seasonally showing up to get their Health Bucks."

(Eileen Nichols, Manager, Webb City FM, 2/17/17) "We're getting the word out! The lottery is in the "continue reading" section."



Webb City Farmers Market

Posted by Eileen Nichols 11 hrs • 🚱

For our food stamp customers - did you know that you can use your card to buy food at the market? Just come to the information table. And, did you know that we can match your food sta... Continue Reading



(participant, 3/2/17) "I found the survey. Thanks for your prompt reply. I appreciate it and your program."

(participant, 3/7/17) "The program has been a godsend getting fresh vegetables and fruits."

(Roxanne Garcia, Co-Director, Heirloom Farmers Markets, 3/31/17) "We have really enjoyed distributing the lottery. Our farmers and customers have really benefited!" ***********************

(participant, 7/26/17)

Please send me a survey. I must say I miss the extra health bucks. Last year I was able to go vegetarian because of the extra help. This year I wanted to see if I can eat vegan for a little while. This I was also able to buy white peaches. This year the prices on vegetables and fruit went up. I try to make all of my food purchases at the farmers markets. I also juice a lot. I have been able to keep my UC under control because of the changes made. Thank you for this program. It makes a difference.

(participant, undated) Thank you. Please keep encouraging others to eat healthy. "An ounce of prevention is better than a life time of cures".

(participant, 8/7/17) You guys are so nice to me and your vegetables are so fresh and healthy.

(participant, 9/30/17)

I want to let you know what a life-saver your program was to me and my family last month. My 9 year old has Lyme disease and will have it the rest of his life, so learning how to thrive with Lyme has been my #1 priority this past year. Before approaching what Lyme is all about, when, where and how it was identified and how it functions unlike any other disease, I have been well-advised to focus on and master 4 areas: 1. Nutrient 2. toxins 3. stress 4. sleep. It sounds a lot simpler than it is! Your program was just the thing we need that helped me with 3 of 4 of those areas last month and being able to get him the quantity of vegetables made a noticeable impact on him in just the one month I was able to participate. At the same time, I am also climbing out of a messy domestic violence situation which has made becoming financially independent a real challenge, and affects every part of our lives. I cannot express enough how just this little bit of help goes a very long way.

(participant, 10/11/17)

Si gracias hay mucho producto buenísimo (Yes thank you there is a lot of great produce).