WHOLESOME WAVE’S FRUIT AND VEGETABLE PRESCRIPTION PROGRAM®

2013 REPORT
2013 FVRx HEALTHCARE PARTNERS

El Centro Family Health
  - Española Clinic
New York City Health and Hospitals Corporation
  - Harlem Hospital Center
  - Lincoln Medical and Mental Health Center
Holyoke Health Center
Lincoln Medical Center
Skowhegan Family Medicine
Thundermist Health Center
Unity Healthcare
  - Upper Cardozo Health Center

2013 FVRx FARMERS MARKET PARTNERS

DC Greens
Española Farmers Market
Farm Fresh Rhode Island
Holyoke Farmer’s Market
New York City Department of Health and Mental Hygiene
Skowhegan Farmers’ Market

2013 FVRx PROGRAM SUPPORTER

The Laurie M. Tisch Illumination Fund
Obesity rates have more than doubled in adults since the 1970's, with two-thirds of U.S. adults now overweight or obese. In addition, childhood obesity rates have tripled in the past 30 years, and more than one-third of children and adolescents had a Body Mass Index (BMI) at or above the 85th percentile for their age in 2012. Recently, the World Health Organization has named childhood obesity as one of the most serious public health challenges of the 21st century, noting that overweight and obese children are likely to stay obese into adulthood and more likely to develop preventable diseases like diabetes and heart disease at a younger age.

Wholesome Wave’s Fruit and Vegetable Prescription Program® (FVRx®) is an innovative program that partners healthcare providers and local farm-to-retail businesses to promote healthy eating in underserved communities. Participating healthcare providers select participants from their patient populations based on specific health factors, anticipated adherence to a treatment protocol, and the likelihood to benefit from a community-based health promotion program. FVRx patients meet with healthcare providers on a monthly basis to receive tailored counseling on ways to improve their health and diet, and are prescribed FVRx prescription vouchers that can be redeemed at farm-to-retail businesses, such as farmers markets, for fresh fruits and vegetables. Designed to support and engage the patient’s family as a whole, FVRx benefits are provided to the patient and all household members.

FVRx provides actionable guidance to overweight and obese children and adults with diet-related preventable diseases, such as type 2 diabetes and heart disease. The program is designed to facilitate short and long-term behavior change in patients and their families by improving access to and consumption of healthy, locally grown foods, with the goal of achieving positive health outcomes for patients with diet-related chronic disease. The program is also designed to achieve direct economic benefits for small and mid-sized farms, bring additional food and educational resources into underserved communities, and deepen existing patient-provider relationships.

Each dollar invested in the FVRx program benefits the community by nourishing the consumer, boosting farmer revenue, and supporting overall community health and engagement.

FVRx initially launched with a feasibility study in 2010 in Maine and Massachusetts. A total of 246 participants successfully completed the FVRx program, joining forces with healthcare partners and farmers markets at three sites. Results inferred promising outcomes in regard to patients’ shopping and eating habits, as well as on their knowledge about the importance of fruits and vegetables in their diet. The program rapidly expanded in 2011 to include additional sites in Massachusetts and Maine, plus California and Rhode Island. The 2011 data indicated that the FVRx program had a positive impact on patients’ health status over the four-month program: 54% of patients reported an increase in knowledge of the importance of fruits and vegetables, and 38% of patients decreased their Body Mass Index (BMI). In 2012, FVRx worked with ten health centers, specifically targeting overweight or obese pediatric patients and their families. Two of the ten health centers included a pilot to benefit pregnant women. Data from 2012 showed continued success with pediatric patients: 55% of patients reported an increase in their fruit and vegetable consumption, and 38% of patients decreased their BMI. During the intervention period, the percentage
of FVRx households reporting that they had access to enough of the kinds of foods they wanted increased significantly from 36% reported in the pre-survey to 56% reported in the post-survey (see more details in the 2012 FVRx Report).

Wholesome Wave continued to operate the growing FVRx partner network in 2013, working to impact obesity in pediatric patients and purposefully expand the program, adapting the FVRx clinic model to a hospital setting. The 2014 program year promises further growth into new clinical and retail settings, as Wholesome Wave pilots FVRx in a grocery store and expands to include overweight or obese adult diabetic patients. Given the potential demonstrated by these pilots to impact larger patient populations and their communities, FVRx program staff are developing a focused strategic business and policy plan to sustainably scale and disseminate the FVRx intervention.

The following report summarizes the success to date of the FVRx program and highlights efforts undertaken by Wholesome Wave and its partner organizations in 2013 to achieve Wholesome Wave’s primary objectives of the FVRx program, including:

1. Educate FVRx participants and their families of the importance of fruits and vegetables in a healthy diet
2. Increase access to and consumption of fresh fruits and vegetables among FVRx participants and their families
3. Improve health-related outcomes of FVRx participants by decreasing BMI and improving nutrition
4. Facilitate measurable change in shopping behaviors and foster the adoption of healthy lifestyles in participating families
5. Drive new sales for local farmers markets and increase the purchase of fresh fruits and vegetables
6. Deepen the patient-provider relationship, improve satisfaction and engagement
7. Develop public-private partnerships to increase access to healthy nutritious food and improve community health, development, and involvement

FVRx and other Wholesome Wave programs demonstrate great potential to reduce food insecurity, impact diet-related health conditions including obesity and type 2 diabetes, and support the economic viability of small and mid-sized farms. This work serves Wholesome Wave’s mission to enable people in underserved urban and rural communities to make healthier food choices by increasing the affordability of and access to fresh, locally grown foods in ways that improve consumer health, generate revenue for small and mid-sized farms, and bolster local and regional economies.
**FVRx INTERVENTION AND METHODS**

An important component of the FVRx program is the connection between educating patients about the importance of consuming fruits and vegetables to improve health, and empowering them by providing the tools and actionable steps to make progress toward adopting healthy behaviors.

The 2013 FVRx program incorporated health behavior change messaging delivered in the primary care setting and provided farmers market vouchers to families with children who met certain eligibility criteria. Physicians enrolled FVRx participants from their existing patient populations, targeting pediatric patients between 2–18 years of age that were diagnosed as overweight or obese, as measured by BMI weight-for-age. Additional criteria included both parent/guardian and patient willingness and consent to participate, and the ability of the patient to attend at least 3 monthly clinical visits over the 4- to 6-month program intervention period.

FVRx pediatric patients and their families received obesity treatment counseling directly from their physicians during each clinical visit. This counseling included a detailed health and nutrition assessment combined with a motivational discussion of achieving healthy weight, diet, and physical activity goals (see Fig.1). Throughout the FVRx program, participants and their families also met with trained nutritionists and/or health educators, who provided ongoing assessment and guidance on fruit and vegetable consumption and the replacement of unhealthy foods with fresh fruits and vegetables.

At the end of the clinical visit, the provider distributed the Fruit and Vegetable Prescription (typically $1 per household member per day) to the family, and notified them of the times and locations of farmers markets where they could redeem the prescription. Upon arrival to the farmers market, the prescription was presented to the market manager, who exchanged the prescription for

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**THE FVRx PROCESS**

1. Overweight and obese children are enrolled by their doctor as FVRx participants.
2. A doctor and a nutritionist meet with participants and their families each month to set goals and reinforce the importance of healthy eating.
3. The doctor distributes the FVRx prescription during the visit and collects health indicators like fruit and vegetable consumption, and Body Mass Index (BMI).
4. A prescription is equal to $1/day for each patient and each family member; e.g. a family of 4 would receive $28 per week.
5. Prescriptions can be redeemed for fresh fruits and vegetables at participating farmers markets. Retailers track Rx redemption.
6. Participants return to their doctor monthly throughout the 4–6 month program to refill their FVRx prescription and set new goals for healthy eating.
tokens to spend on fruits and vegetables at the market. The market staff helped promote the overall importance of eating locally grown produce and encouraged patients to ask questions of the farmers about unfamiliar foods.

A vital component of the FVRx program is the collection and analysis of both process and outcome measures in accordance with academic Institutional Review Board (IRB) research protocols. Data collection occurred throughout the program duration, primarily May through October. Patient health metrics including height, weight, blood pressure, Body Mass Index (BMI), and fruit and vegetable consumption were tracked by the health center at each visit. Additional demographic information was collected from pediatric patients at the time of enrollment and participants filled out pre- and post-surveys to report any changes in fruit and vegetable consumption, knowledge, shopping habits, and satisfaction with their healthcare team and program. Partnering farmers markets tracked prescription redemption.

**FVRx GEOGRAPHIC AND DEMOGRAPHIC OVERVIEW**

The FVRx program worked with seven healthcare providers (Table 1) in 2013, geographically located in five states and the District of Columbia. In total, 286 patients and their households (for a total of 1,290 family members) participated in the FVRx program. Of the 286, 203 patients (71%) completed the intervention from start to finish, making at least 3 visits to the health care site and 6 visits to the farmers markets over the 4- to 6-month intervention period. This marks the highest number of pediatric patients actively participating and completing the program in the 3-year history of FVRx.

<table>
<thead>
<tr>
<th>Health Center</th>
<th>Number of Patients</th>
<th>Completing FVRx (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>El Centro Family Health, Española Clinic, Española, NM</td>
<td>12</td>
<td>83.3</td>
</tr>
<tr>
<td>Harlem Hospital Center, NY</td>
<td>14</td>
<td>45.5</td>
</tr>
<tr>
<td>Holyoke Health Center, MA</td>
<td>30</td>
<td>63.3</td>
</tr>
<tr>
<td>Lincoln Medical and Mental Health Center, NY</td>
<td>72</td>
<td>80.6</td>
</tr>
<tr>
<td>Skowhegan Family Medicine, ME</td>
<td>29</td>
<td>89.7</td>
</tr>
<tr>
<td>Thundermist Health Center, RI</td>
<td>74</td>
<td>66.2</td>
</tr>
<tr>
<td>Unity Health Care, Upper Cardozo Clinic, DC</td>
<td>25</td>
<td>84.0</td>
</tr>
<tr>
<td>Total Patients</td>
<td>286</td>
<td>71.0</td>
</tr>
</tbody>
</table>

About Patients and Patient Households Enrolled:

- **Average age of FVRx patient:** 10.6 yrs
- **Average family size:** 4.5 family members
- **Primary language spoken in the home other than English:** 34.6% of households
- **At least one household member receiving:**
  - Supplemental Nutrition Assistance Program (SNAP): 64.2%
  - Women, Infants, and Children (WIC): 22.1%
- **Primary caretakers of pediatric patient’s with a Bachelor’s degree or higher:** 9.2%
FVRx INCREASES PATIENT SATISFACTION

The FVRx program gives healthcare providers the opportunity to see their recommendations turn into action by counseling families on nutrition improvement and motivating them to adopt healthier lifestyles. Counseling is delivered along with a fruit and vegetable prescription and information about participating farmers markets at the end of each visit.

During clinical visits, families received health behavior change counseling from one or more members of a primary care team (primary care provider, nutritionist, and, in some cases, a community health worker). The team provided ongoing counseling to participants and their families about the importance of healthy eating and active living, with a focus on the importance of eating fresh fruits and vegetables.

Families then redeemed their prescriptions for fresh fruits and vegetables at participating farmers markets, and continued to meet monthly with their healthcare provider through the end of the program. FVRx tracked ongoing participation and found an improvement in overall knowledge and satisfaction.

In 2013:

- 96.4% of participants were told about the importance of fruits and vegetables directly from healthcare providers at every visit.
- 61.2% of FVRx patients made 4 or more clinical visits over the intervention period.
- 96.4% of participants agreed that they were happier with their healthy weight program because of the FVRx program.
- Over the course of the season, survey results show patients significantly increased their knowledge of the importance of fruits and vegetables in their family’s diet (Fig 2).

Fig 2: FVRx Patient Self-Reported Knowledge about the Importance of Fruits and Vegetables in Diet

A Wilcoxon signed-rank test showed a significant effect (increase) in patients’ self-reported knowledge of the importance of fruits and vegetables in their family’s diet ($Z = -7.559, p < 0.001$).

“Partnering with Wholesome Wave has allowed us not only to provide nutritional counseling to our patients, but also gives the families the fruits and vegetables needed to achieve a healthier lifestyle.”
– Jennifer Cook, Nutritionist, Rhode Island

“We see improved attendance at healthy weight visits during the market season. I don’t think this can be underestimated. Having done a healthy weight clinic for over 5 years now, it is clear that FVRx is the best incentive we have had. Even for the families that don’t maximize the opportunity, they seem more engaged than without an incentive.”
– Vinny Biggs, MD, Massachusetts

“Parents are more receptive to the advice and more willing to admit that they could not modify diet because of the accessibility to fresh vegetables and fruits. I am also amazed to see their BMI dropping already.”
– Sundari Periasamy, MD, New York
FVRx PATIENTS REDUCE BMI

More research studies are confirming the importance of keeping BMI and waistline measurements under control in order to reduce the risk of disease and premature death. FVRx helps patients and their families stick to a healthy diet—especially to lose weight—by empowering patients to consume fruits and vegetables.

The Centers for Disease Control and Prevention (CDC) and the American Academy of Pediatrics (AAP) recommend the use of BMI to screen for overweight and obesity in children beginning at 2 years old. After weight and height are used to calculate BMI in children and teens, the BMI number is plotted on the CDC BMI-for-age growth charts (for either girls or boys) to obtain a percentile ranking. Percentiles are the most commonly used indicator to assess the size and growth patterns of individual children in the United States. The percentile indicates the relative position of the child’s BMI number among children of the same sex and age.

Although significant change in BMI is not expected of FVRx patients in the 4- to 6-month FVRx program, changes in weight and BMI are followed at every health center visit. The following results highlight the impact of FVRx on BMI by age and sex categories, and on weight and BMI by health center location.

- Overall, of all children completing the intervention (N=202), 21.8% lost weight from baseline to their last program visit. These patients lost a total combined 174.7 pounds and experienced an average weight loss of 4.0 pounds (st dev 3.3 pounds) (Table 2). Another 2.0% also maintained their weight, while another 7.9% gained less than a pound.

For those children and adolescents that completed the FVRx intervention in 2013, the following changes in weight by number and percentage, and BMI by percentage were observed.

- Of female children ages 2 to 5, for whom the difference in BMI percentile can be computed (n= 13), 7.7% (1 patient) decreased her BMI percentile 1 percentile point.

- Of female children ages 6 to 10, for whom the difference in BMI percentile can be computed (n= 25), 28.0% decreased their BMI percentile an average of 2.7 percentile points.

- Of female children ages 11 to 19, for whom the difference in BMI percentile can be computed (n= 48), 41.7% decreased their BMI percentile an average of 2.6 percentile points.

- Of male children ages 2 to 5, for whom the difference in BMI percentile can be computed (n= 19), 60.0% decreased their BMI percentile an average of 6.7 percentile points.

- Of male children ages 6 to 10 (n=28), for whom the difference in BMI percentile can be computed (n= 25), 36.0% decreased their BMI percentile an average of 3.7 percentile points.

- Of male children ages 11 to 19, for whom the difference in BMI percentile can be computed (n= 28), 35.7% decreased their BMI percentile an average of 2 percentile points.

1 Differences in BMI percentiles cannot be computed for those patients with BMI percentiles above 99 percent on both visits. The population in some age categories is small and thus the information should be used with some caution.
The following table illustrates changes in weight and BMI for pediatric patients by geographic location and health center.

Table 2: Reduction in FVRx Pediatric Patient BMI Percentiles and Weight by Health Center, 2013

<table>
<thead>
<tr>
<th>Health Center</th>
<th>Patients Losing Weight (%)</th>
<th>Patients Reducing BMI Percentile (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>El Centro Family Health, Española Clinic, Española, NM</td>
<td>10.0</td>
<td>40.0</td>
</tr>
<tr>
<td>Harlem Hospital Center, NY</td>
<td>25.0</td>
<td>30.0</td>
</tr>
<tr>
<td>Holyoke Health Center, MA</td>
<td>31.6</td>
<td>37.5</td>
</tr>
<tr>
<td>Lincoln Medical and Mental Health Center, NY</td>
<td>15.5</td>
<td>25.0</td>
</tr>
<tr>
<td>Skowhegan Family Medicine, ME</td>
<td>15.4</td>
<td>38.5</td>
</tr>
<tr>
<td>Thundermist Health Center, RI</td>
<td>28.6</td>
<td>34.2</td>
</tr>
<tr>
<td>Unity Health Care, Upper Cardozo Clinic, DC</td>
<td>25.0</td>
<td>66.7</td>
</tr>
<tr>
<td>All Patients</td>
<td>21.8</td>
<td>35.3</td>
</tr>
</tbody>
</table>

Note: Reported for patients completing the intervention (N=202); BMI percentile change is not computed on those patients with BMI percentiles above 99 percent for both the first and last visit (N=133).

“I have stories of patients trying new foods, weight loss, and better food security.”
– Katherine Szema, MD, New York

“One family’s daughter lost enough weight to have her Type 2 diabetes symptoms completely go away...her mom would rave every week when she came to visit.”
– Kayla Ringelheim, Farmers Market Manager, Rhode Island
**FVRx PATIENTS INCREASE FRUIT AND VEGETABLE CONSUMPTION**

The FVRx program gives participants the opportunity to access fresh fruits and vegetables while learning how their food choices affect their health and well-being. It provides the structure for providers and participants to have ongoing discussions, and the tools to support continued progress.

Fruit and Vegetable (FV) consumption data are gathered from patients via pre- and post-surveys and during each health center visit using a modified version of the National Cancer Institute’s Eating at America’s Table Study, Quick Food Scan.

Survey results in 2013 showed that 55.6% of patients increased their FV consumption in the time spanning their first to last visit with their provider (Table 3). Of those identified to increase their FV consumption, results showed an average increase in consumption of 2 cups daily.

**Table 3: Patients with Increased FV Intake by Health Center, 2013**

<table>
<thead>
<tr>
<th>Health Care Center</th>
<th>Patients Increasing FV Consumption (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>El Centro Family Health, Española Clinic, Española, NM</td>
<td>44.4</td>
</tr>
<tr>
<td>Harlem Hospital Center, NY</td>
<td>80.0</td>
</tr>
<tr>
<td>Holyoke Health Center, MA</td>
<td>42.1</td>
</tr>
<tr>
<td>Skowhegan Family Medicine, ME</td>
<td>57.7</td>
</tr>
<tr>
<td>Thundermist Health Center, RI</td>
<td>57.1</td>
</tr>
<tr>
<td>Unity Health Care, Upper Cardozo Clinic, DC</td>
<td>42.9</td>
</tr>
<tr>
<td>All Patients</td>
<td>55.6</td>
</tr>
</tbody>
</table>

N=144. Note: One health care site was excluded from this analysis due to data collection inconsistencies at the site.

A statistical analysis was conducted comparing FV consumption at the time of enrollment in the FVRx program versus the time of the last health center visit. Analysis showed a significant increase in consumption (measured in cups) (Fig 3) from the time of enrollment (M=3.0, SD=2.0) to the time of the last health center visit (M=3.6, SD=2.1); t(143)=3.55, p = 0.001, illustrating the ability of the FVRx program to influence patient behaviors.

Survey results showed that patients consumed fruits and vegetables in fresh form more often by the end of the intervention period, with over three-quarters reporting that they always or very often ate their fruits and vegetables as fresh by the end of the intervention. These results were measured to be statistically significant (Fig 4).

A Wilcoxon signed-rank test showed a significant effect (increase) in how often patients ate their vegetables and fruit in fresh form. (Vegetables Z = -4.285, p = <0.001; Fruit Z=-3.036, p = 0.002).

"Due to the additional income for fruits and vegetables, I have seen patients increase the amount of healthy options in their diet."
– Randolph Nunez, MD, New York
FOOD SECURITY INDICATORS IMPROVE FOR FVRx FAMILIES

FVRx played a vital role in 2013 to increase awareness of and access to fresh fruits and vegetables in underserved communities by connecting patients and their families to participating farmers markets.

A number of indicators point to increasing food security for participating FVRx families. Families were surveyed at the time of enrollment in the program and at the last clinical visit to determine overall change in food security indicators using a modified version of the Current Population Survey, Food Security Supplement Questionnaire.

One indicator of food security measured as part of the FVRx program asked about the types and amounts of food household members have eaten over the last three months. Survey results showed an overall increase in FVRx households reporting that they had access to enough of the kinds of foods they wanted as recommended by their provider by the end of the program (Fig 5).

A Wilcoxon signed-rank test showed a significant effect (increase) in FVRx households’ food security indicators from pre- to post-survey (Z = -6.580, p = <0.001); 49.4% of households reported increasing, over the FVRx season, the types and amount of foods desired by the household.

Survey results from other indicators measuring changes in food security are presented in Figure 6. Pre- and post-FVRx surveys showed that a positive change occurred in many food security indicators, including if families worried about whether their food would run out before they had money to buy more, their ability to afford to eat balanced meals, and the number of households in which children did not eat for a whole day because there wasn’t enough money for food.

A Wilcoxon signed-rank test showed a significant effect (a decrease) in the number of households that reported worrying about whether their food would run out before they got money to buy more (Z = -2.879; p = 0.004), not being able to afford to eat balanced meals (Z = -4.547, p = <0.001), and in the number of households that reported that children in the household did not eat for a whole day because there wasn’t enough money for food (Z=-4.321, p = <0.001).

"Often people think that farmers markets are automatically out of reach—that they’ll be expensive and they just ‘aren’t for them.’ Programs like this bring people who might think that way into the market family, and since we talk to them at the market table we can let them know that they are welcome and appreciated. They often bring more relatives and friends to the market, and they have a great time."
– Matthew Lustig, Farmers Market Manager, Massachusetts
FVRx brings business to farmers markets & improves patients’ shopping experience

Wholesome Wave is dedicated to increasing the affordability and access to fresh, locally grown food in ways that generate significant impact on local economies and has achieved considerable success through the expansion and growth of the FVRx program.

- 83.8% of FVRx families reported getting most or all of their fresh fruits and vegetables at the farmers market during the market season.

- The percentage of FVRx families reporting that the farmers market was their main venue for purchasing fresh fruits and vegetables increased from 15.3% reported in the pre-survey to 79.8% reported in the post-survey (Fig 7).

- Over 92% of FVRx patients agreed or strongly agreed that the FVRx prescription was important in their decision to shop at the farmers market.

This connection was found to also have a significant impact on the farmers market economy by introducing new customers and generating increased revenue.

FVRx families exchanged their fruit and vegetable prescription at participating farmers markets for tokens or other currency accepted by fruit and vegetable suppliers. Market managers encouraged FVRx families to ask questions about unfamiliar fruits and vegetables, including how to store or prepare them. FVRx families spent their tokens with participating farmers, who then turned the tokens in to market staff for reimbursement.

Data reported by market staff showed an increase in the number of new farmers market customers and overall farmers market revenue. In 2013:

- FVRx families redeemed over $100,000 with participating farmers and markets.
- FVRx families spent an average of $370 in prescriptions on fresh fruits and vegetables.
- During the 4- to 6-month program, FVRx families averaged 12 visits to farmers markets, 61.0% of which had never or rarely been to a farmers market before participating in FVRx.

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Response categories include never, rarely, about half the time, very often, and always. Only the last two are reported here for ease of exposition. A Wilcoxon signed-rank test showed a significant effect (increase) in households’ use of farmers market to purchase fresh FV from pre- to post-survey (Z = -9.991, p = <0.001) and a significant decrease in households; use of supermarkets (Z = -6.512, p = <0.001).

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“It has been great encouraging patients to branch out of grocery stores and into farmer’s markets, giving them access to fresh local fruits and veggies!”
– Sylvia Taggart, MD, Washington, D.C.

“For us, having a presence at the market is great for the general relationship with the community as well. Seeing health center staff at the market is powerful role modeling for the community.”
– Vinny Biggs, MD, Massachusetts

“The farmers like this program. Some of the families were their kin—we live in a small and interconnected community. They especially enjoyed seeing young people at the market and were eager to share cooking tips or other information about the produce they were growing. Many thanked us for the opportunity to have the tokens to spend at the market and seemed to feel part of our extended community.”
– Sabra Moore, Farmers Market Manager, New Mexico
**FVRx IMPACTS KNOWLEDGE ABOUT LOCAL FOOD AND FARMERS MARKETS**

A critical part of FVRx's success in changing participant behavior to adopt healthier shopping and eating habits is the program's ability to increase knowledge about the process of food production, preparation, and consumption.

In 2013, FVRx tracked each household's change in knowledge about local foods, healthy eating, and farmers markets. FVRx families reported both a significant increase in their knowledge of the importance of fruits and vegetables in their diet as well as local foods and the farmers market (Fig 8). FVRx participant knowledge increased regarding the types of and locations from which to buy local foods, as well as how to prepare them and how to engage with the participating FVRx farmers markets.

In each, a Wilcoxon signed-rank test also showed a significant increase in respondents' self-reported knowledge of topics from pre- to post-survey (categories were “know a lot,” “know some,” “know only a little,” and “know nothing”) at the \( P < 0.01 \) level. These include change in knowledge regarding preparing fresh FV \( (Z = -6.510) \); the FV grown locally in the area \( (Z = -6.000) \); where to buy locally grown produce \( (Z = -8.162) \); and knowledge about the farmers market participating in FVRx \( (Z = -8.819) \).

“Having been a FVRx site since its inception I have been able to have the impact of this program reinforced year after year. The program is a wonderful way to introduce families to fresh, whole, locally grown food.”

– Vinny Biggs, MD, Massachusetts

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**Fig 8: FVRx Patient Knowledge Change about Local Produce and Farmers Market**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Pre-survey</th>
<th>Post-survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>How to prepare fresh FV</td>
<td>68.2%</td>
<td>90.8%</td>
</tr>
<tr>
<td>The FV grown locally in the area</td>
<td>46.8%</td>
<td>72.3%</td>
</tr>
<tr>
<td>Where to buy locally grown produce</td>
<td>53.2%</td>
<td>83.8%</td>
</tr>
<tr>
<td>The farmers markets that participate in FVRx</td>
<td>48.6%</td>
<td>88.4%</td>
</tr>
</tbody>
</table>

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A LOOK BACK: FVRx SUMMARY 2011–2013

Wholesome Wave first piloted FVRx in 2010, consistently making improvements in program operations over the years of 2012 and 2013, allowing for the rapid expansion to different sites and patient populations. The program has resulted in (1) reduced risk factors, such as obesity, that contribute to the development of the chronic health conditions of diabetes and heart disease; (2) improved patient satisfaction and provider-patient relationships; (3) increased fruit and vegetable consumption; (4) improved food security indicators; (5) increased business to farmers markets and enhanced shopping experiences for participants and their families; and (6) a raised awareness of the affordability and access to fresh, locally sourced food, its production, preparation, and its role in supporting a healthy lifestyle.

Most notably, FVRx has realized a statistically significant increase in fruit and vegetable consumption and reduction in the risk factors that contribute to the development of preventable chronic health conditions in the United States, by implementing a behavior modification and community health program for at-risk participants and their families. Wholesome Wave has continued to see a year-over-year increase in fresh fruit and vegetable consumption in participants over the program period, paired with decreases in weight and other risk factors that contribute to poor health.

The FVRx program operates within existing clinical workflows, with the average number of health center visits made by patients over the 4- to 6-month intervention period remaining consistent over the program’s existence, demonstrating the ability of the FVRx program to work within the parameters of the current healthcare practice and financing models, adding no additional healthcare expense to patients and their families. This result is achieved in parallel to the total number of visits to farmers markets increasing substantially. This dual success is believed to be the result of improved outreach to FVRx participants and their families by both the farmers markets and their medical care team as well as more effective identification and recruitment of eligible patients. Other attributes of success are believed to be due to the expanded access of participants and their families to farmers markets through the overall growth in number of participating farmers markets, their extended market hours, and the creation of additional market days.

A Summary of FVRx Results-to-Date: Years 2011–2013

<table>
<thead>
<tr>
<th>Variable</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of FVRx family members</td>
<td>1,122</td>
<td>1,570</td>
<td>1,290</td>
</tr>
<tr>
<td>Total number of FVRx patients</td>
<td>189</td>
<td>380</td>
<td>286</td>
</tr>
<tr>
<td>Total $ value of FVRx redeemed</td>
<td>$50,000</td>
<td>$120,000</td>
<td>$105,000</td>
</tr>
<tr>
<td>Percent of patient participants completing program (&gt;=/=3 clinical visits and 6 farmers market trips)</td>
<td>52</td>
<td>58</td>
<td>71</td>
</tr>
<tr>
<td>Percent of patient participants decreasing BMI</td>
<td>38.1</td>
<td>37.8</td>
<td>42.6</td>
</tr>
<tr>
<td>Percent of patient participants increasing Fruit and Vegetable (FV) consumption</td>
<td>66.2% of patients reported increasing their FV consumption a lot as a result of the program*</td>
<td>55.3% (1 cup average, statistically significant)</td>
<td>55.6% (.6 cup average, statistically significant)</td>
</tr>
<tr>
<td>Average number of clinical visits</td>
<td>3.4</td>
<td>3.7</td>
<td>3.6</td>
</tr>
<tr>
<td>Average number of farmers market visits</td>
<td>8.5</td>
<td>9.2</td>
<td>11.8</td>
</tr>
</tbody>
</table>

* Daily consumption not self-recorded
2014 and 2015 bring forth a wealth of opportunity for Wholesome Wave to exponentially grow and expand the FVRx program. Wholesome Wave is thoughtfully and actively developing partnerships to extend the benefits demonstrated in the pilots throughout 2011 to 2013 to new populations, including employers and their employees, health insurers and their members, and additional populations and communities throughout the United States.

Wholesome Wave will take a strategic approach to the FVRx program in 2014 and 2015, starting with the development of a business plan for FVRx. The plan will include an overall program enhancement and product development plan, leveraging the insights and successes gained to date to build out a suite of FVRx products and services that serve to improve the health of populations through the increased consumption of fruits and vegetables redeemed at farmers markets and other retail outlets.

The new suite of FVRx products and service solutions will focus on the ability to be scaled to multiple diverse participant populations and rapidly implemented in any community within the U.S., while maintaining the operational success that has resulted in the positive outcomes achieved since the program’s inception in 2010. Wholesome Wave will actively develop key partnerships with health care delivery and technology organizations to disseminate FVRx product and service solutions and build capabilities to collect and analyze data sets accurately and effectively.

In parallel, Wholesome Wave will continue to seek new pilot sites for FVRx, growing the total number of participants and their families completing the program to build out the statistical power needed to further support the evidence base, proving that FVRx can effectively create and sustain behavior change in communities, improve the health of populations, increase access to and consumption of healthy local foods, and support the local farmers market economy across the country. Wholesome Wave is preparing to implement new FVRx pilots in 2014 and 2015, in partnership with clinician researchers within academic health centers, in a concerted effort to improve the program evaluation methodology and dissemination of measured results.

FVRx is proven to be an effective health intervention that addresses critical healthcare and food access issues by offering a tested solution that integrates the healthcare delivery system with local food economies in order to improve the health and well-being of people throughout the U.S. There is a lot of exciting work to look forward to in 2014 and 2015 as Wholesome Wave continues to grow FVRx in pursuit of long-term sustainable change.