

**Research and Professional Briefs**

# Increasing Access and Affordability of Produce Improves Perceived Consumption of Vegetables in Low-Income Seniors

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**ABSTRACT**

High cost and limited access to food have been associated with lower intake of fruits and vegetables in limited-income individuals. The Veggie Mobile is a van that carries fresh produce and travels in low-income neighborhoods, selling fruits and vegetables at a fraction of regular supermarket prices. The purpose of this study was to determine whether participation in the Veggie Mobile increases fruit and vegetable intake in a group of seniors. The intervention, buying fruits and vegetables from the Veggie Mobile, was implemented between April and October 2008 in two senior housing sites that had not previously received Veggie Mobile services. Participants were asked about fruit and vegetable intake using a modified six-item questionnaire based on the Behavioral Risk Factor Surveillance System at preintervention and again at 3 to 5 months. The post-survey also included questions about perceived benefits and barriers to using the Veggie Mobile. The two cross-sections of seniors were matched using date of birth. Wilcoxon signed rank test and paired samples *t* tests examined change in pre- and post-intervention variables. Seventy-nine older adults completed the baseline survey and 63 completed the post-survey. Of these, 43 participants completed both surveys (70% white [*n*=30], mean age 69 ± 9 years). Mean intake of fruits and vegetables after using the Veggie Mobile increased by 0.37 servings/day. Vegetable intake alone increased from 1.98 ± 1.71 servings/day to 2.58 ± 1.4 servings/day (*P*=0.027), half of which was potatoes. Change in fruit intake was not significant (*P*=0.358). At post-intervention, seniors visited the supermarket less often (*P*=0.001) and spent an average of \$14.92 less during their last visit. The majority of participants who completed the post-survey (62 of 63) indicated being satisfied with the pro-

gram. The Veggie Mobile provides an example of a simple community intervention that has potential to lead to positive behavior change among low-income seniors.

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A large body of research links diets rich in fruits and vegetables (F/V) with lower risks of many chronic diseases (1-4). Despite this evidence, intake levels remain below national recommendations (5-10). Several factors influence dietary intake and food-purchasing decisions, including nutrition, cost, quality, and availability of food (11-17). Cost and availability are especially salient factors for individuals with limited incomes (13,16,18). Poorer neighborhoods have been found to have fewer grocery stores and less F/V markets than wealthier neighborhoods (19-21). Furthermore, supermarkets, especially those in more affluent neighborhoods, often provide better availability of produce, greater selection, and lower prices (22-27). In fact, living within close proximity to a chain supermarket has been associated with increased F/V consumption (5,19,21,28).

In an effort to address barriers and make fresh F/V more affordable and accessible to lower-income residents, the Capital District Community Gardens located in Troy, NY launched the Veggie Mobile in April 2007 (Figure). The Veggie Mobile is a van that carries fresh produce and travels to low-income neighborhoods in New York State's Capital Region, selling F/V at wholesale cost, on average 48% lower than local supermarket prices. Essentially a produce aisle on wheels, the refrigerated box truck is equipped with shelves and offers between 50 and 75 varieties of seasonal F/V. On a weekly basis, the Veggie Mobile is scheduled to make 1-hour stops at senior centers, public housing projects, and other densely populated locations.

The Veggie Mobile program has an annual operating budget of \$110,000 and requires two individuals to operate the van and handle and sell the produce. In 2010, the van made 22 weekly stops, served approximately 40,000 individuals and infused 115,000 pounds of fresh produce into the urban food deserts it served. The Veggie Mobile is not a self-sustaining program, given that the produce is sold wholesale and does not render a profit. The cost of transportation, van maintenance, salaries for the individuals who operate the van, and the one-time cost of the van itself are covered with grant funding and community donations. The aim of the present study was to preliminarily evaluate the impact of the Veggie Mobile on the shopping and eating habits of a group of community-

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**Figure.** The Veggie Mobile at a stop in a low-income neighborhood in the Capital Region of New York State.

dwelling seniors. It was hypothesized that participants who utilized the Veggie Mobile service would report increased intakes of F/V and decreased visits to the shopping market, often viewed as a burden by seniors who face mobility and transportation challenges (29,30). Benefits and barriers to shopping at the Veggie Mobile were also assessed.

## METHODS

### Study Participants and Design

The study reflects a cross-sectional evaluation of F/V consumption and shopping habits before and after the Veggie Mobile intervention in a group of seniors between the months of April and October 2008. Participation was limited to Veggie Mobile shoppers aged 55 years or older who were residents of the selected senior housing sites. One low-income senior housing site was selected in each of the cities of Troy and Albany, two urban areas in New York's Capital Region. The two senior sites were chosen because they did not have previous experience with Veggie Mobile services and were comprised of diverse racial/ethnic groups. The Veggie Mobile was scheduled for weekly, 1-hour stops at each site to sell F/V to residents. On repeated visits between April and May, as residents were waiting to purchase produce, they were approached and asked to complete the survey. Consenting shoppers 55 years or older were interviewed. Approximately 3 months later, researchers revisited the sites weekly and administered the post-survey. A cohort of seniors who completed the questionnaire at both time points was identified using date of birth. The Sage Colleges' Institutional Review Board for protection of human subjects approved the study. Permission was obtained from building management at the senior housing sites to conduct all data collection.

### Survey Development

Before developing the survey, two focus groups were conducted in two senior housing sites that were already

receiving Veggie Mobile services. The focus groups obtained feedback on Veggie Mobile shoppers' perceived benefits and barriers to utilizing the service. Focus group questions examined what shoppers liked most about the program, benefits of participating, perceived economic savings, impact of the program on F/V consumption, and suggestions for improvement. Focus groups were audiotaped and transcribed verbatim. Findings from the focus groups were used to inform the development of the survey.

### Survey Instrument

In addition to demographic and personal questions, participants indicated how often they visited the supermarket (twice a week or more, once a week, two to three times a month, once a month or less) and estimated the amount of money they spent during their last visit to the supermarket. F/V intake was assessed using a modified brief food questionnaire based on the Behavioral Risk Factor Surveillance System (BRFSS) six-item F/V questionnaire (31). Participants reported how often they consumed lettuce salad, potatoes, vegetables, 100% fruit juice, and fruit during the previous 24 hours. The BRFSS F/V questionnaire has been evaluated against other dietary assessment tools and was found to have moderate validity, where mean F/V intake was generally similar to estimates obtained from diet recalls (31). In a three-way comparison between the BRFSS F/V module, food frequency questionnaire data, and diet records, correlations between BRFSS and estimates from the food frequency questionnaire were 0.63 and 0.56 between BRFSS and diet records (32). Additional questions incorporated into the post-survey included the frequency of purchasing produce at the Veggie Mobile (weekly, two to three times a month, once a month or less), the amount of money spent shopping at the Veggie Mobile, as well as satisfaction with its services.

### Statistical Analyses

F/V intake was determined by computing the sum of reported F/V consumed within the previous 24 hours. Total vegetable consumption was calculated by summing all three vegetable intake variables (lettuce, potatoes, and other vegetables), and total fruit consumption was calculated by adding the intake of fruit and fruit juice together. Wilcoxon signed rank test and paired samples *t* tests were performed to examine the change in frequency of visits to the supermarket, money spent at the supermarket, and change in F/V intake after shopping at the Veggie Mobile. Statistical significance was set at  $P < 0.05$  and confidence intervals were reported where possible. Data were analyzed using SPSS for Windows (version 16.0, 2007, SPSS Inc, Chicago, IL).

## RESULTS AND DISCUSSION

At baseline, 79 participants completed the survey and 63 completed the post-intervention survey. Of these, 43 seniors completed both (70% white [ $n=30$ ], mean age  $69 \pm 9$  years). Many did not complete high school ( $n=18$ ) and 27 received food stamps (also known as Supplemental Nutrition Assistance Program). Baseline participants were

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