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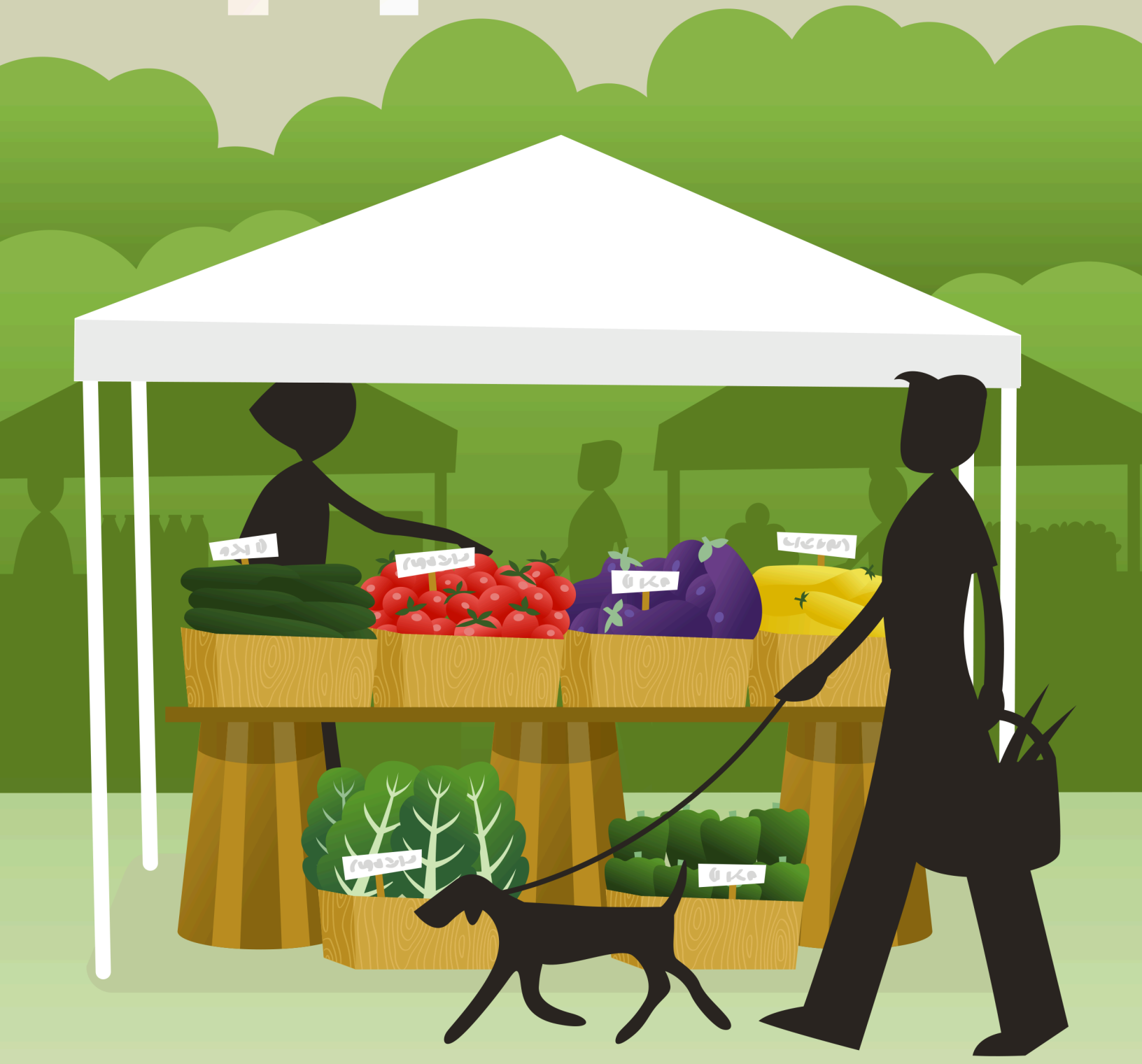

PCD Collection: Communities Putting Prevention to Work (CPPW)

PREVENTING CHRONIC DISEASE
PUBLIC HEALTH RESEARCH, PRACTICE, AND POLICY

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Formative Evaluation for a Healthy Corner Store Initiative in Pitt County, North Carolina: Assessing the Rural Food Environment, Part 1

Stephanie B. Jilcott Pitts, PhD; Karamie R. Bringolf, MPH; Katherine K. Lawton, MPH; Jared T. McGuirt, MPH; Elizabeth Wall-Bassett, PhD, RD; Jo Morgan, MAEd; Melissa Nelson Laska, PhD, RD; Joseph R. Sharkey, PhD, MPH, RD

Formative Evaluation for a Healthy Corner Store Initiative in Pitt County, North Carolina: Engaging Stakeholders for a Healthy Corner Store Initiative, Part 2

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ORIGINAL RESEARCH Volume 10 — July 18, 2013

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In this audio podcast, listen as lead author Stephanie B. Jilcott Pitts, PhD, answers questions about the Communities Putting Prevention to Work healthy corner store initiative.

Abstract

Introduction
Obesity prevalence in the rural United States is higher than in urban or suburban areas, perhaps as a result of the food environment. Because rural residents live farther from supermarkets than their urban- and suburban-dwelling counterparts, they may be more reliant on smaller corner stores that offer fewer healthful food items.

Methods
As part of a Communities Putting Prevention to Work (CPPW) healthy corner store initiative, we reviewed audit tools in the fall of 2010 to measure the consumer food environment in eastern North Carolina and chose the NEMS-S-Rev (Nutrition Environment Measures Survey-Stores-Revised) to assess 42 food stores. During the spring and summer of 2011, 2 trained graduate assistants audited stores, achieving interrater reliability of at least 80%. NEMS-S-Rev scores of stores in rural versus urban areas were compared.

Results
Overall, healthful foods were less available and of lower quality in rural areas than in urban areas. NEMS-S-Rev scores indicated that healthful foods were more likely to be available and had similar pricing and quality in rural corner stores than in urban corner stores.

Conclusion
Food store audit data provided a baseline to implement and evaluate a CPPW healthy corner store initiative in Pitt County. This work serves as a case study, providing lessons learned for engaging community partners when conducting rural food store audits.

Introduction

In the United States, obesity is a costly (1) and devastating public health problem (2). There is disproportionate obesity prevalence in rural America, particularly the rural South (3,4). The obesity disparity in rural areas versus more urban and suburban areas of the United States may be a result of the food environment, rural food deserts in particular (5–7). Rural residents may live far from supermarkets, which stock more healthful foods than do corner stores (8,9). Therefore, rural residents may be more reliant on the less-healthful foods in corner stores (also referred to as convenience stores or food marts) and similar lower-volume food venues. Corner stores and small stores in rural areas may serve an important role for “filler” shopping (ie, purchase of small quantities of groceries before a big shopping trip is needed) (10) and for residents with limited access to transportation to urban areas.

Food environments can be conceptualized in terms of the *community food environment* (defined as spatial access to food venues) and the *consumer food environment* (defined as what consumers encounter in each food venue) (11). Food store audits are one way researchers have measured the consumer food environment, and these typically entail assessment of availability, price, and quality of foods available in traditional food venues such as supermarkets and grocery stores and in nontraditional food venues such as mass merchandisers (12). A growing amount of research has assessed the consumer food environment in urban areas (13–15) as well as in rural settings, such as rural Texas (8,16,17). Two review articles (18,19) provide comprehensive summaries of tools to assess the community and consumer food environments, and many resources are available via the National Cancer Institute's Food Environment Measures website (https://riskfactor.cancer.gov/mfe/instruments/), a continually updated online repository for food environment assessment tools. Despite these resources and assessment tools, methods for conducting food store audits in rural areas of the United States have not been assessed extensively.

Several recent US federal initiatives have sought to engage communities to promote healthful food environments, including the Healthy Food Financing Initiative and the Centers for Disease Control and Prevention's $372.8 million Communities Putting Prevention to Work (CPPW) initiative (20). To plan for promotion of healthful foods and to evaluate the effectiveness of such efforts, high-quality data are needed, and communities must choose from among the many audit tools available to collect such data. Furthermore, few examples are available of how information gathered from food audits can be efficiently compiled and disseminated to community leaders, thus informing policy makers on what evidence supports or promotes a more healthful rural food environment.

Federal efforts to engage communities to promote healthful food environments are evolving. Assessments of the consumer food environment must meet the needs of all stakeholders working to create more healthful food environments. These include public health practitioners, researchers, policy makers, retailers, and community advocacy groups (18). Thus, in this article we describe a case study to assess the consumer food environment in rural eastern North Carolina (Pitt County) to guide planning and implementation of a CPPW healthy corner store initiative. We discuss results and lessons learned and how these may inform similar efforts to plan, evaluate, and advocate promotion of more healthful food options in rural corner stores.

Methods

Food stores in rural eastern North Carolina

Many efforts have been made to define and describe food deserts, which often are based on geographic proximity to the residential address, or density measures of food venue availability in specific low-income or minority neighborhoods (21). For CPPW baseline data collection, we audited a purposive sample of food stores on the basis of being either 1) located in 1 of 5 Pitt County rural food deserts (we defined a "rural food desert" as a Pitt County municipality with no chain supermarket) or 2) located in more urban municipalities that had chain supermarkets (termed "urban nonfood deserts" for our purposes), giving priority to stores located in or near low-income census block groups. (The sample was not random or representative of all food stores.) When initial results were presented to a group of Pitt County planners, also a part of the CPPW leadership team, they suggested conducting audits in corner stores in rural crossroads communities, or rural areas designated by an intersection with a small surrounding population base, not currently designated as a formal municipality. The planners suggested this approach because such communities often have a substantial number of people living nearby who may not have easily accessible fresh produce or other healthful food options. Thus, we also conducted food store audits in these small crossroads communities.

Selection of food store audit tool

In fall 2010, we reviewed recently developed audit tools to measure the consumer food environment, published from 2005 through 2010 and found from keyword searches on Google Scholar and PubMed, focusing particularly on development, testing, and evaluation of the rural food environment. We also examined the National Cancer Institute's Food Environment Measures website, which listed available audit tools. We worked with community partners to choose an appropriate audit tool by assessing the following factors: 1) ability to use the tool in different types of traditional and nontraditional food stores, including supermarkets, corner stores, and dollar stores, because such venues are important for rural consumers (12); 2) assessment of availability, price, and quality of food items; 3) inclusion of canned vegetables and meats, because both are frequently purchased by low-income people (22) and rural residents may live far from supermarkets that carry fresh vegetables and meats (9); 4) time required in the store to complete the audit, because we did not want to foster distrust between store owners and research assistants conducting audits; 5) ability to calculate a score for each food store assessed, because we wanted to be able to easily disseminate results to community stakeholders; and 6) applicability to varied communities and racial/ethnic groups (vs applicability to only select racial/ethnic groups), because CPPW goals focused on all racial/ethnic groups using corner stores. Because it met the criteria, the evaluation team decided to use the Nutrition Environment Measures Survey-Stores-Revised (NEMS-S-Rev) (14) as the food store audit tool most appropriate for the purposes of meeting CPPW goals.

Using the NEMS-S-Rev to audit food stores

In spring and summer of 2011, we audited 42 food stores in 10 Pitt County municipalities and 4 designated crossroads communities of Pitt County, using the NEMS-S-Rev to measure the food environments. In urban (nonfood desert) areas, we selected a purposive sample of stores considering geographic variability (in location of stores) and store proximity to low-income areas. We included corner stores and chain supermarkets, as described by the NEMS-S-Rev protocol (14). Because CPPW focused on making changes to corner stores, we audited 33 corner stores. For comparison, we also audited 9 chain supermarkets. For the purposes of this article, we defined corner stores as both convenience stores and food marts (Standard Industry Classification code 541101–5). Convenience stores were defined as venues selling limited amounts of a medium variety of canned goods, dairy products, prepackaged meats, and other grocery items. Food marts were defined as similar to convenience stores in terms of the size and variety of items they sell, but they are associated with a gas station. At the time the study was conducted, there were 20 supermarkets and 65 corner stores in Pitt County.

Stores were scored on availability, price, and quality in each of 12 food categories (milk, cheese, fresh fruit, fresh vegetables, frozen and canned vegetables, meat, meat alternatives, beverages, bread, grains, cereal, and chips). Availability was defined by whether certain food items were available in the stores, with more points assigned to stores with a greater number of healthful food items available. The range of possible availability scores was 0 to 34, with higher scores indicating that the store had more healthful foods available than stores with lower availability scores. The price score was measured by comparing the price of the more-healthful option (eg, whole-wheat bread) to the price of the less-healthful option (eg, white bread). If the more-healthful option had a lower price than the less-healthful option, the store received 2 points; if the prices were the same, the store received 1 point; and if the more-healthful option had a higher price than the less-healthful option, the store lost 1 point. The range of possible price scores was −12 to 24; higher scores indicated that more-healthful options cost less than less-healthful options or that less-healthful options were more expensive than more-healthful options. Negative scores were possible, because stores received negative points for having more-healthful items priced higher than less-healthful items. Quality was measured only for fruits and vegetables and was a subjective measurement. Graduate assistants determined produce quality by assessing bruising, discoloration, and rotting. One point was assigned if 25% to 49% of the fruits and vegetables were acceptable, 2 points if 50% to 74% were acceptable, and 3 points if 75% or more were acceptable. The quality score for fresh fruits and vegetables could range from 0 to 6, with higher scores indicating higher quality. According to standard NEMS-S-Rev protocol, the overall score was calculated by summing availability, pricing, and quality scores (possible overall scores ranged from −12 to 64).

Before assessing stores for baseline data collection and scoring, 2 research assistants independently and simultaneously audited 1 of each store type including a chain supermarket, small grocery store, convenience/corner store, and dollar store. To increase data collection credibility and interrater reliability, and to settle discrepancies, the 2 graduate assistants jointly compared results on the independently scored stores. Then, for each food store included in the final purposive sample, the graduate assistants assessed stores individually then jointly to compare assessments, resolve discrepancies, measure interrater reliability, and score stores. A final interrater reliability of 80% or greater was achieved for all food store audits. We did not conduct significance tests because of the small purposive sample of stores selected.

Results

Overall, stores in rural Pitt County had lower mean NEMS-S-Rev scores than did the stores in more urban areas, which, by definition, included supermarkets (Table). However, supermarkets in urban areas did not seem to have healthful options as competitively priced as did corner stores in urban and rural areas, as indicated by the negative NEMS-S-Rev price score for supermarkets.

Among corner stores, the focus of the Pitt County CPPW initiative, those in rural areas (n = 17) had higher availability scores but similar price and quality scores than corner stores in urban areas (n =16). The availability and overall NEMS -S-Rev scores were slightly lower for corner stores in rural areas when corner stores in crossroads communities were excluded from the analysis.

Discussion

Audited supermarkets had a price score of −2.1 and corner stores had a price score of 2.3, indicating that more-healthful items were more competitively priced in the corner stores audited than in the audited supermarkets. However, as expected, supermarkets had higher overall NEMS-S-Rev scores than corner stores. At corner stores, specifically, those in rural areas had higher NEMS-S-Rev availability scores than did corner stores in more urban areas, which suggests that corner stores in rural areas had more healthful options available than corner stores in urban areas. These results provided a baseline from which to implement and evaluate a CPPW healthy corner store initiative in Pitt County.

Our study has limitations. We used a small, nonrandom, purposive sample of food stores. Because we did not audit a representative or random sample of stores, audit results may not represent the overall patterns of availability, pricing, and quality of foods in Pitt County. However, we did purposively sample stores, ensuring that stores audited were frequented by rural and low-income customers, to ensure that CPPW efforts reach those most at risk for obesity. Also, because audit tools often measure only select food items, they may not capture the rural consumer food environment in its entirety. Analyses of national data related to rural consumers' food choices can inform development of future audit tools to more accurately capture the rural consumer food environment. We were not able to assess certain aspects of stores (eg, product placement, whether the store sold food from a grill, presence of advertisements of unhealthful foods).

Strengths of our efforts include assessment of the availability, price, and quality of healthful versus unhealthful food items, using a validated audit tool. We evaluated appropriate audit tools based on available literature and selected tools to gather credible evidence on the basis of time, cost, and technical demand. We used a collaborative and tailored approach to engage community partners in the planning and evaluation of the CPPW healthy corner store initiative.

Our food store audit results were compiled and presented to the CPPW team to inform planning and evaluation of the healthy corner store initiative. NEMS-S-Rev scores were used to determine changes to make in corner stores and were used as an evaluation tool after healthful changes were made. Based on store owner or manager interest in partnering with the CPPW initiative, we selected 11 stores in which to conduct qualitative interviews with food store owners and managers, as reported in Part 2 of this evaluation report and as done by others (23,24) to determine relevant characteristics of the store's customer base and customer shopping patterns and to learn about inventory decisions. Finally, we conducted baseline customer intercept surveys in 9 of the 11 selected corner stores to learn more about customer shopping patterns and healthful food options customers would purchase from corner stores, also reported in Part 2 of our formative evaluation report. We compiled tailored corner store reports for each of the 11 stores, and hand delivered the reports to stores with a letter thanking them for their participation. These reports and letters were used to build rapport with local store owners. Reports included aggregated and individualized NEMS-S-Rev results, as well as results of the store owner qualitative interviews and the customer surveys, and we distributed these to the CPPW project team as well as to each store owner.

When assessing the consumer food environment of small stores, store owners and managers may perceive the people conducting audits as competitors or fear that audit results will have negative repercussions. Therefore, auditor intentions must be clearly presented to store owners. Rapport with store owners and managers can be built during food audits, if the process is presented in a nonthreatening way. Although all audits for this study were conducted during daylight hours, the safety of auditors was occasionally an issue in corner stores. This issue can be resolved by partnership with community agencies that have connections to local law enforcement resources. In addition, as the NEMS-S-Rev did not include detailed information to assess sodium content of foods, as new nutrition recommendations emerge, such as those regarding sodium, audit tools should include some assessment of availability of low-sodium options. Finally, as recently suggested by Rose et al (25), because the NEMS-S-Rev does not include any assessment of the broader community food environment, a more complete picture of the rural community and consumer food environment could be provided by combining measures of food store access using geographic information systems, with measures of availability, pricing, and quality of healthful items as assessed using food store audit tools.

To aid the CPPW team in identifying which store to pilot the healthy corner store initiative, we also compiled a list ranking stores in terms of customer volume, location of the store (proximal to low-income areas), and willingness of the owner to provide more-healthful food in the store. The combination of these efforts, described here and in Part 2 of this report, as well as reports of previous efforts (23,24) guided CPPW planning for effectively promoting healthful foods in both rural and urban food stores.

There is a need to ensure that low-income residents, particularly those in the rural South, have access to healthful foods. Many US communities have been funded through the CPPW initiative to address the need for access to more-healthful food via environmental and policy changes (20). In Pitt County, as has been done in other communities across the nation, we collaborated with corner store owners to supply and promote more healthful food choices in rural and underserved areas, and to support corner stores as economically thriving and sustainable rural food venues. We hope that the Pitt County experience will offer guidance to others collecting empirical data to pursue policy and environmental changes in the rural food environment.

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Author Information

Corresponding Author: Stephanie B. Jilcott Pitts, PhD, Associate Professor, East Carolina University, Department of Public Health, 600 Moye Blvd, MS 660, Greenville, NC 27834. Telephone: (252) 744-5572. E-mail: jilcotts@ecu.edu.

Author Affiliations: Karamie R. Bringolf, Katherine K. Lawton, Elizabeth Wall-Bassett, East Carolina University, Greenville, North Carolina; Jared T. McGuirt, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina; Jo Morgan, Pitt County Health Department, Greenville, North Carolina; Melissa Nelson Laska, University of Minnesota, Minneapolis, Minnesota; Joseph R. Sharkey, Texas A&M University, College Station, Texas.

References

1. Finkelstein EA, Strombotne KL. The economics of obesity. Am J Clin Nutr 2010;91(5):1520S–4S. CrossRef PubMed
2. Flegal KM, Carroll MD, Ogden CL, Curtin LR. Prevalence and trends in obesity among US adults, 1999-2008. JAMA 2010;303(3):235–41. CrossRef PubMed
3. Michimi A, Wimberly MC. Spatial patterns of obesity and associated risk factors in the conterminous US. Am J Prev Med 2010;39(2):E1–12. CrossRef PubMed
4. Jackson JE, Doescher MP, Jerant AF, Hart LG. A national study of obesity prevalence and trends by type of rural county. J Rural Health 2005;21(2):140–8. CrossRef PubMed
5. McEntee J, Agyeman J. Towards the development of a GIS method for identifying rural food deserts: geographic access in Vermont, USA. Appl Geogr 2010;30(1):165–76. CrossRef
6. Jilcott SB, Liu H, Moore JB, Bethel JW, Wilson J, Ammerman AS. Commute times, food retail gaps, and body mass index in North Carolina counties. Prev Chronic Dis 2010;7(5):A107. PubMed
7. Smith C, Morton LW. Rural food deserts: low income perspectives on food access in Minnesota and Iowa. J Nutr Educ Behav 2009;41(3):176–87. CrossRef PubMed
8. Bustillos B, Sharkey JR, Anding J, McIntosh A. Availability of more healthful food alternatives in traditional, convenience, and nontraditional types of food stores in two rural Texas counties. J Am Diet Assoc 2009;109 (5):883–9. CrossRef PubMed
9. Liese AD, Weis KE, Pluto D, Smith E, Lawson A. Food store types, availability, and cost of foods in a rural environment. J Am Diet Assoc 2007;107(11):1916–23. CrossRef PubMed
10. Jilcott SB, Laraia BA, Evenson KR, Ammerman AS. Perceptions of the community food environment and related influences on food choice among midlife women residing in rural and urban areas: a qualitative analysis. Women Health 2009;49(2-3):164–80. CrossRef PubMed
11. Glanz K, Sallis JF, Saelens BE, Frank LD. Healthy nutrition environments: concepts and measures. Am J Health Promot 2005;19(5):330–3. CrossRef PubMed
12. Sharkey JR. Measuring potential access to food stores and food-service places in rural areas in the US. Am J Prev Med 2009;36(4, Suppl):S151–5. CrossRef PubMed
13. Laska MN, Borradaile KE, Tester J, Foster GD, Gittelsohn J. Healthy food availability in small urban food stores: a comparison of four US cities. Public Health Nutr 2010;13(7):1031–5. CrossRef PubMed
14. Andreyeva T, Blumenthal DM, Schwartz MB, Long MW, Brownell KD. Availability and prices of foods across stores and neighborhoods: the case of New Haven, Connecticut. Health Aff (Millwood) 2008;27(5):1381–8. CrossRef PubMed
15. Krukowski RA, West DS, Harvey-Berino J, Elaine Prewitt T. Neighborhood impact on healthy food availability and pricing in food stores. J Community Health 2010;35(3):315–20. CrossRef PubMed
16. Dean WR, Sharkey JR. Rural and urban differences in the associations between characteristics of the community food environment and fruit and vegetable intake. J Nutr Educ Behav 2011;43(6):426–33. CrossRef PubMed
17. Dunn RA, Sharkey JR, Lotade-Manje J, Bouhlal Y, Nayga RM Jr. Socio-economic status, racial composition and the affordability of fresh fruits and vegetables in neighborhoods of a large rural region in Texas. Nutr J 2011;10:6. CrossRef PubMed
18. Ohri-Vachaspati P, Leviton LC. Measuring food environments: a guide to available instruments. Am J Health Promot 2010;24(6):410–26. CrossRef PubMed
19. McKinnon RA, Reedy J, Morrissette MA, Lytle LA, Yaroch AL. Measures of the food environment: a compilation of the literature, 1990-2007. Am J Prev Med 2009;36(4, Suppl):S124–33. CrossRef PubMed

20. Bunnell R, O'Neil D, Soler R, Payne R, Giles WH, Collins J, et al. Fifty communities putting prevention to work: accelerating chronic disease prevention through policy, systems and environmental change. J Community Health 2012;37(5):1080–90. CrossRef PubMed
21. Jiao J, Moudon AV, Ulmer J, Hurvitz PM, Drewnowski A. How to identify food deserts: measuring physical and economic access to supermarkets in King County, Washington. Am J Public Health 2012;102(10):e32–9. CrossRef PubMed
22. Wiig K, Smith C. The art of grocery shopping on a food stamp budget: factors influencing the food choices of low-income women as they try to make ends meet. Public Health Nutr 2009;12(10):1726–34. CrossRef PubMed
23. Gittelsohn J, Sharma S. Physical, consumer, and social aspects of measuring the food environment among diverse low-income populations. Am J Prev Med 2009;36(4, Suppl):S161–5. CrossRef PubMed
24. Gittelsohn J, Suratkar S, Song HJ, Sacher S, Rajan R, Rasooly IR, et al. Process evaluation of Baltimore Healthy Stores: a pilot health intervention program with supermarkets and corner stores in Baltimore City. Health Promot Pract 2010;11(5):723–32. CrossRef PubMed
25. Rose D, Bodor JN, Hutchinson PL, Swalm CM. The importance of a multi-dimensional approach for studying the links between food access and consumption. J Nutr 2010;140(6):1170–4. CrossRef PubMed

Table

Table. Nutrition Environment Scores[a] of Food Stores in Rural Food Desert and Urban Municipalities in Pitt County, North Carolina (N = 42)

Return

Type of Store	Rural Food Desert Stores (n = 17)	Urban Nonfood Desert Stores (n = 25)
Supermarket (n = 9), mean (SD)	NA	n = 9
Availability	NA	29.7 (3.7)
Price	NA	−2.1 (2.0)
Quality	NA	5.2 (0.67)
Overall	NA	32.8 (4.3)
All corner stores (n = 33), mean (SD)	n = 17	n = 16
Availability	9.1 (3.0)	8.4 (2.6)
Price	2.3 (1.6)	2.4 (1.5)
Quality	0.06 (0.24)	0.06 (0.25)
Overall	11.4 (3.0)	10.8 (3.0)
Corner stores[b] (n = 25), mean (SD)	n = 9	n = 16
Availability	7.7 (3.1)	8.4 (2.6)
Price	2.4 (1.7)	2.3 (1.5)
Quality	0.1 (0.33)	0.06 (0.25)
Overall	10.2 (3.5)	10.8 (3.0)

Abbreviation: SD, standard deviation; NA, not applicable.
[a] The nutrition environment was assessed using the Nutrition Environment Measures Survey-Stores-Revised (14).
[b] Excluding those in crossroads communities, or rural areas designated by an intersection with a small surrounding population base, not currently designated as a formal municipality.

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PREVENTING CHRONIC DISEASE
PUBLIC HEALTH RESEARCH, PRACTICE, AND POLICY

ORIGINAL RESEARCH Volume 10 — July 18, 2013

Formative Evaluation for a Healthy Corner Store Initiative in Pitt County, North Carolina: Engaging Stakeholders for a Healthy Corner Store Initiative, Part 2

Stephanie B. Jilcott Pitts, PhD; Karamie R. Bringolf, MPH; Cameron L. Lloyd, MPH; Jared T. McGuirt, MPH; Katherine K. Lawton, MPH; Jo Morgan, MAEd

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PEER REVIEWED

In this audio podcast, listen as lead author Stephanie B. Jilcott Pitts, PhD, answers questions about the Communities Putting Prevention to Work healthy corner store initiative.

Abstract

Introduction
We examined the feasibility of increasing access to healthful food in corner stores to inform a Communities Putting Prevention to Work (CPPW) initiative by engaging stakeholders (corner store owners and customers) in a formative evaluation.

Methods
Qualitative interviews were conducted with corner store owners and managers (n = 11). Customer intercept surveys (n = 179) were also conducted with customers of 9 stores. Corner stores were located in rural food deserts (municipalities without a chain supermarket) and in low-income, urban municipalities in eastern North Carolina. Interviews were transcribed verbatim and double-coded. Qualitative themes related to feasibility of increasing access to healthful foods were extracted. Shopping patterns of rural and urban customers were compared by using *t* tests.

Results
Corner store owners were willing to stock more healthful foods, but they perceived that customer demand for these foods was low. Rural customers reported more frequently shopping at corner stores than urban customers and more frequently stated that the reason they do not eat more fruits and vegetables is that the stores in which they shop do not sell them. Most customers reported they would be very or somewhat likely to purchase fresh produce at a corner store.

Conclusion
Corner stores may be an important source of food for rural and low-income residents and thus a good place in which to intervene. The results of this formative evaluation were used to plan and evaluate a CPPW healthy corner store initiative.

Introduction

Obesity rates in the rural, southern United States are higher than in other US regions (1,2). The food environment may be a partial cause of high obesity rates (3). Thus, there is a need to implement environmental and policy-level supports to accessing healthful food in the rural southern United States. Because rural residents often reside farther than urban and suburban residents from supermarkets, which offer a wide selection of competitively priced healthful foods (4–8), they may rely more on corner stores for grocery shopping. For this reason, increasing access to healthful foods in corner stores may be an effective strategy to increase their consumption (9).

Results of several healthy corner store projects have suggested that increasing access to and promoting healthful items in corner stores increases sales of those items (10–13). However, to ensure that resources are used most efficiently to promote eating healthful foods and as the first step in the Centers for Disease Control and Prevention's (CDC's) evaluation framework (14), formative evaluation is needed to determine rural customers' willingness to purchase healthful foods and store owners' willingness to stock and promote more healthful foods.

In this article we describe a formative evaluation, the purpose of which was to engage stakeholders to examine the feasibility of increasing access to healthful foods in rural corner stores and to obtain baseline data for outcome evaluation. We used a mixed-methods approach by conducting qualitative interviews with corner store owners and managers to determine their perspectives on supplying and promoting more healthful foods in stores and by conducting intercept surveys with corner store customers to examine demographics, baseline fruit and vegetable consumption, shopping patterns, and purchasing habits.

Methods

Pitt County Communities Putting Prevention to Work partnership

This study was conducted in Pitt County (estimated population of 159,057), eastern North Carolina, which has a small urban center (estimated population of 84,986) as its county seat and is surrounded by rural agricultural areas. The Pitt County Health Department (PCHD) received a Communities Putting Prevention to Work (CPPW) grant to adopt and implement obesity prevention efforts via environmental and policy changes (15). The formative evaluation described here and in Part 1 of this series (16) was conducted to inform development and implementation of the Pitt County CPPW healthy corner store initiative. For the purposes of this article, a corner store included both convenience stores and food marts. Convenience stores were those establishments primarily engaged in the retail sale of a medium variety of canned goods, dairy products, prepackaged meats, and other grocery items in limited amounts, and food marts were stores that were similar to convenience stores in size and variety of items sold, but they were also associated with a gas station. The study was reviewed and approved by the East Carolina University Medical Center institutional review board.

Owner and manager in-depth interviews

Study setting and participants

Participants were owners or managers of purposively sampled corner stores in rural food desert and urban nonfood desert municipalities in Pitt County. We defined a rural food desert as a municipality without a chain supermarket and defined urban nonfood desert municipalities as those with a chain supermarket in close proximity to neighborhoods designated as low-income by the 2000 census (17). Eligible participants were aged 18 or older, current food store owners or managers, and willing to take part in the 60-minute qualitative interview.

During February and March 2011, face-to-face qualitative, in-depth interviews were conducted with 11 food store owners and managers. Before the interview, the interviewer reviewed the informed consent document with participants and answered questions, and then participants signed the informed consent. Of the 11 stores with owners or managers interviewed, 5 were located in rural municipalities and 6 were located in the city limits of Greenville in close proximity to low-income areas.

Interview guide questions were chosen from those published on the healthy corner stores website (18) and the New Orleans Corner Store Survey (19). The guide included questions about types of customers, acceptance of benefits from government food assistance programs (Special Supplemental Nutrition Program for Women, Infants, and Children [WIC] and Supplemental Nutrition Assistance Program [SNAP]), store products and inventory, and availability of healthful food items. The qualitative interview guide used with store owners and managers included a definition of healthful foods as "water, whole-wheat bread, low-fat milk, baked chips, fruits, and vegetables." The final portion of the interview guide assessed the owner's perception of the store as a part of the community and whether the food store owner would be interested in working in partnership with CPPW staff to increase access to healthful food options in the store.

Data management and analysis

All interviews were audio recorded and transcribed verbatim. Qualitative data were managed using NVivo version 9 (QSR International, Doncaster, Victoria, Australia). A codebook with 16 codes and operational definitions was created on the basis of interview guide questions (deductive codes) and preliminary review of 3 data-rich transcripts (inductive codes). Two coders independently coded the qualitative interview transcripts, 3 to 5 interviews at a time. Coders then met to discuss coding decisions, make revisions to the codebook, and resolve coding discrepancies. Themes related to the feasibility of increasing access to healthful foods in corner stores were determined on the basis of the frequency of similar responses.

Customer intercept surveys

Study setting and participants

During March and April 2011, customer intercept surveys were conducted at 9 of the 11 stores where the owner qualitative interviews were conducted. Upon completion of the interviews, university partners asked permission to survey customers. Surveys were not conducted at 2 of the 11 stores because of low customer volume in 1 store and because corporate headquarters needed to approve customer surveys in the other. A total of 179 surveys were conducted (20 surveys per store in 8 stores [n = 160] and 19 surveys in the ninth store). To be eligible to participate, customers had to be at least 18 years of age and a self-described regular customer of the store. Informed consent for this portion of the study was waived, because no identifying information was collected from customers.

The survey contained 33 questions and took approximately 10 minutes to complete. Customers were approached and asked if they were willing to participate. If willing, they completed the intercept survey, which included questions to assess customer demographics, food stores used by customers, reasons for using these stores, and how often customers shop at corner stores. Questions also assessed how customers traveled to the store, food items they would like to be sold at the store, and what would prompt them to buy more groceries at the corner store. The survey also assessed fruit and vegetable consumption, types of food items customers currently purchase, and willingness to buy fruits and vegetables (fresh and canned) at corner stores. The customer intercept survey asked questions about purchase and consumption of the following foods: fruits, vegetables, low-fat milk, diet soda, 100% juice, baked chips, and whole-wheat bread. Customers were classified as "rural" if shopping at a rural, food desert corner store and "urban" if shopping at an urban, nonfood desert corner store. There were no rural nonfood desert stores, and there were no urban food desert stores. There were 80 customers surveyed in 4 urban stores, and 99 surveyed in 5 rural stores.

Data management and analysis

The survey instrument was designed using Teleform software (version 10.7, Hewlett Packard, Palo Alto, California), and completed surveys were scanned and verified; responses were electronically populated into a database. Simple descriptive statistics (means and frequencies) were calculated, and χ^2 tests (for categorical variables) and *t* tests (for continuous variables) were used to examine differences in responses between rural and urban corner store customers. All analyses were conducted using SAS version 9.2 (SAS Institute, Cary, North Carolina).

Results

Owner/manager in-depth interviews

Emergent themes included 1) customer types, 2) customer preferences, 3) SNAP/WIC availability, 4) healthful items, and 5) community partnerships (Table 1). Quotes are verbatim and include dialect.

Customer types: "We've got a good mix of all of 'em really"

When participants were asked about frequent customers, many said they had a good mix of school children, retirees, and employed people. One store manager said, "In the morning time we have our regular old people who come in and do their coffee thing. Then we have our regular people that come in at 7:00 because it's time for their beer. I mean the kids going to school . . . they come in before school to get their breakfast . . . so it just depends on what time of day it is. . . . Right now it's mostly workers who are on break for lunch" (participant no. 05 [P05], rural).

Customer preferences: "Snacks: chips, little cakes, candy"

When participants were asked what items they sold the most, almost half responded that alcohol and cigarettes were most popular. When further prompted with what food items they sold the most, participants reported that snack foods were most popular. Location also influenced the type and amount of items sold. One store manager responded, "Well . . . I have a school up here, so I sell a lot of drinks, soft drinks and candy, gum. . . . Now when they get off work I see a lot of beer and cigarettes" (P03, rural).

Owners and managers stated that snack foods were sold more quickly than canned grocery items. Owners and managers stated that grocery items were sold infrequently; they perceived that most customers would rather purchase grocery items more cheaply at other food venues. None of the store owners or managers interviewed said that healthful items were among the most popular items.

SNAP/WIC availability: "There wasn't enough call for it"

Acceptance of SNAP and WIC benefits may be important to provide financial assistance to people living in low-income areas, where all stores were located. However, 8 of the 11 stores did not accept SNAP or WIC. When asked why they did not accept SNAP or WIC, 2 participants responded, "There wasn't enough call for it" (P01, rural; P03, rural). Two participants said they were interested in accepting SNAP and WIC but have not filed the application because of "laziness" (P05, rural; P07, rural). Additional barriers to accepting SNAP and WIC were noted, including minimum inventory requirements: "You have to have a lot of stuff in the store like baby food and cereal . . . and most people go to the grocery store for that" (P10, urban). Of the stores that did accept SNAP and WIC, one store owner said it was because "[they] are asking for it" (P08, urban).

Healthy items: "This is really not a place to come if you're looking to eat super healthy"

Every store stocked some healthful items such as fruits, vegetables, and whole-grain bread. Results were mixed when store owners and managers were asked how the healthful items were selling. One store owner said that "in the summer time [healthful items do] pretty good. [They] don't seem to do as well in the winter" (P09, urban). In contrast, another interview participant stated, "It depends on the time of year. Everybody has gardens out here. If people have gardens, you ain't selling no produce. So . . . you throw away a lot" (P06, rural). For the stores in which the more healthful items were not selling as well, a store manager commented, "Everything else is just really slow. Nobody likes to eat that. They don't like to be slim . . . but some [customers] do ask for them" (P04, urban).

Overall, customer preference played a role in the healthful foods that were made available in the store. One store manager, when asked if customers request healthful items, responded, "Usually . . . people know this is a convenient store. You know, they don't look for stuff like that. And also . . . room-wise, you know, you need a cooler to carry those items. And we don't have the space for it" (P04, urban).

Community partnership

Of the 11 store owners interviewed, 10 were interested in working with the CPPW community partnership to provide more healthful food options in stores. (The 1 store manager who was hesitant about partnerships needed to obtain corporate approval.) One store manager suggested, "Yeah, I think the thing to do would be to start small. . . . We need to see if we can make a dollar and not throw away 50. I mean I don't even know if people know what a salad is around here" (P04, urban). Others said they would like to work together to get more suggestions of things to try in the stores. One manager said, "[M]aybe I'm doing it wrong. . . . We are in the South here, really it's very hard . . . down here their mind is set up for fried pork chops, fried chicken" (P03, rural). Overall, store owners were interested in stocking and promoting more healthful items but noted they needed assistance.

Customer intercept surveys

Rural corner store customers were older, more likely to be white, had fewer children, and were less likely to report receiving SNAP benefits than urban customers (Table 2). Urban customers reported more frequently than rural customers that they did not eat more fruits and vegetables because they liked to eat other foods more.

Most customers shopped at grocery, corner, and dollar stores (Table 3). Rural customers reported shopping at corner stores more frequently than urban customers. Urban customers were more likely to walk to get to the corner store than rural customers, who were more likely to drive or bicycle to the store. Most customers (92%) said they would be very or somewhat likely to purchase fresh fruit at a corner store. The most common fresh fruits identified were apples, oranges, bananas, and grapes. Most customers (65%) said they would be very or somewhat likely to consider buying canned fruit at corner stores. When asked about buying fresh vegetables at corner stores, 79% of customers said they would be very or somewhat likely to do so. The 4 most common fresh vegetables customers identified were collards, cabbage, carrots, and string or green beans. Finally, 65% of customers said they would be very or somewhat likely to consider buying canned vegetables at corner stores.

Discussion

Our formative evaluation suggests that corner store owners are willing to stock more healthful foods but that they perceive customer demand of these foods to be low, indicating the need for price promotions to help create demand for more healthful options. Price promotions were encouraged as a part of the Pitt County CPPW healthy corner store initiative. We also found that store owners had not completed the paperwork to become SNAP or WIC certified due to self-described "laziness," although many corner store customers surveyed were SNAP or WIC beneficiaries. Therefore, the Pitt County CPPW healthy corner store liaison has provided technical assistance to owners to become SNAP and WIC certified.

Regarding selling fresh produce, owners expressed concern about space, equipment, short shelf-life, and low customer demand, but most expressed willingness to try to stock more healthful items. Our qualitative findings are similar to those of Song et al (11), who found that if corner store owners stock and sell healthful items regularly, they are more likely to continue stocking those items because they are responsive to consumer demand. Our work and that of others indicate that lower supply of healthful foods in corner stores is a reflection of actual or perceived customer preferences for less healthful alternatives (20), as opposed to store owners' lack of willingness to stock more healthful foods.

Compared with urban customers, rural customers more frequently reported they did not eat more fruits and vegetables because the stores where they do most of their shopping do not sell them. Rural customers reported shopping at corner stores more frequently than urban customers. Taken together, these findings support the notion that rural corner stores are a critical element of the food environment in which to intervene to provide more healthful food items.

The formative data described here and in Part 1 of this report aided the Pitt County CPPW team in identifying which store to use to pilot the healthy corner store initiative. We provided the CPPW team with a list of the 11 corner stores ranked in order from most to least likely to be a successful partner. The corner store ranked first — due to the owner's willingness to stock more healthful foods, the store's proximity to low-income housing, and the store's large SNAP and WIC customer volume — became the CPPW pilot healthy corner store. We also compiled and hand-delivered corner store reports to the 11 stores, with a letter thanking them for participation, to build rapport with store owners.

Customer intercept survey data indicated that customers decide in which store to shop on the basis of price, selection, and quality. Many customers stated that they would buy more groceries at the corner store if it had a wider selection. Therefore, in the pilot store, the owner stocked a variety of produce items, beyond the traditional apples, bananas, and oranges.

Limitations of this study include the use of purposive and convenience sampling and the small sample of owners or managers and customers. The use of convenience sampling potentially introduced volunteer and response biases. Interviewers may have been more likely to approach customers if they looked as if they were not in a rush, possibly introducing bias. Customers may have felt compelled to answer favorably about eating healthfully because of the nature of the survey. However, we did get unfavorable responses related to healthful items, suggesting that participants were responding truthfully. Strengths of this study include the potential for creating community partnerships and the use of formative evaluation data to plan and implement future CPPW healthy corner store initiatives, increasing the likelihood of long-term success and sustainability.

Further evaluation is needed to examine the business operations of corner stores to determine whether varying the mix of foods is beneficial to both the store customers and owners. Others (9,13) have found that increasing access to and promotion of healthful food items using shelf labels, taste tests, and food demonstrations have increased sales of more healthful foods in corner stores. The work described in this article informed a CPPW (15) healthy corner store initiative, which included a local program goal of increasing access to more healthful foods throughout rural and underserved areas, with participating stores agreeing to do the following: 1) increase the number and type of healthful options available, 2) rearrange produce placement to increase visibility of the product, 3) lower the price of healthful options, and 4) participate in in-store promotion of healthful options. Ultimately, evaluation of the Pitt County CPPW healthy corner store initiative should guide future work to increase access to healthful foods in rural and underserved areas.

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Author Information

Corresponding Author: Stephanie B. Jilcott Pitts, PhD, Associate Professor, East Carolina University, Department of Public Health, 600 Moye Blvd, MS 660, Greenville, NC 27834. Telephone: 252-744-5572. E-mail: jilcotts@ecu.edu.

Author Affiliations: Karamie R. Bringolf, Cameron L. Lloyd, Jared T. McGuirt, Katherine K. Lawton, East Carolina University, Department of Public Health, Greenville, North Carolina; Jo Morgan, Pitt County Health Department, Greenville, North Carolina.

References

1. Michimi A, Wimberly MC. Spatial patterns of obesity and associated risk factors in the conterminous US. Am J Prev Med 2010;39(2):E1–12. CrossRef PubMed
2. Jackson JE, Doescher MP, Jerant AF, Hart LG. A national study of obesity prevalence and trends by type of rural county. J Rural Health 2005;21(2):140–8. CrossRef PubMed
3. Glanz K, Sallis JF, Saelens BE, Frank LD. Healthy nutrition environments: concepts and measures. Am J Health Promot 2005;19(5):330–3 [ii.]. CrossRef PubMed
4. Liese AD, Weis KE, Pluto D, Smith E, Lawson A. Food store types, availability, and cost of foods in a rural environment. J Am Diet Assoc 2007;107(11):1916–23. CrossRef PubMed

5. Jilcott SB, Liu H, Moore JB, Bethel JW, Wilson J, Ammerman AS. Commute times, food retail gaps, and body mass index in North Carolina counties. Prev Chronic Dis 2010;7(5):A107. PubMed
6. Sharkey JR, Horel S. Neighborhood socioeconomic deprivation and minority composition are associated with better potential spatial access to the ground-truthed food environment in a large rural area. J Nutr 2008;138 (3):620–7. PubMed
7. Kaufman PR. Rural poor have less access to supermarkets, large grocery stores. Rural Development Perspectives 1997;13(3):19–26.
8. Larson NI, Story MT, Nelson MC. Neighborhood environments: disparities in access to healthy foods in the US. Am J Prev Med 2009;36(1):74–81. CrossRef PubMed
9. Bodor JN, Ulmer VM, Dunaway LF, Farley TA, Rose D. The rationale behind small food store interventions in low -income urban neighborhoods: insights from New Orleans. J Nutr 2010;140(6):1185–8. CrossRef PubMed
10. Laska MN, Borradaile KE, Tester J, Foster GD, Gittelsohn J. Healthy food availability in small urban food stores: a comparison of four US cities. Public Health Nutr 2010;13(7):1031–5. CrossRef PubMed
11. Song HJ, Gittelsohn J, Kim M, Suratkar S, Sharma S, Anliker J. A corner store intervention in a low-income urban community is associated with increased availability and sales of some healthy foods. Public Health Nutr 2009;12 (11):2060–7. CrossRef PubMed
12. Krukowski RA, West DS, Harvey-Berino J, Elaine Prewitt T. Neighborhood impact on healthy food availability and pricing in food stores. J Community Health 2010;35(3):315–20. CrossRef PubMed
13. Gittelsohn J, Song HJ, Suratkar S, Kumar MB, Henry EG, Sharma S, et al. An urban food store intervention positively affects food-related psychosocial variables and food behaviors. Health Educ Behav 2010;37(3):390–402. CrossRef PubMed
14. Evaluation steps. Centers for Disease Control and Prevention, Office of the Associate Director for Program Evaluation. http://www.cdc.gov/eval/steps/index.htm. Accessed July 10, 2012.
15. Bunnell R, O'Neil D, Soler R, Payne R, Giles WH, Collins J, et al. Fifty communities putting prevention to work: accelerating chronic disease prevention through policy, systems and environmental change. J Community Health 2012;37(5):1081–90. CrossRef PubMed
16. Pitts SB, Bringolf KR, Lawton KK, McGuirt JT, Wall-Bassett E, Morgan J, et al. Formative evaluation for a healthy corner store initiative in Pitt County, North Carolina: assessing the rural food environment, part 1. Prev Chronic Dis 2013;10:120318.
17. US Census Bureau. State and county quickfacts: Pitt County, North Carolina. http://quickfacts.census.gov. Accessed October 2, 2010.
18. Healthy Corner Stores Network. http://www.healthycornerstores.org/. Accessed June 13, 2013.
19. Custer S. Healthy corner stores for Healthy New Orleans neighborhoods. http://healthycornerstores.org. Accessed July 10, 2012.
20. Andreyeva T, Middleton AE, Long MW, Luedicke J, Schwartz MB. Food retailer practices, attitudes and beliefs about the supply of healthy foods. Public Health Nutr 2011;14(6):1024–31. CrossRef PubMed

Tables

Table 1. Themes and Supporting Quotes From Qualitative Interviews With 11 Corner Store Owners and Managers,[a] North Carolina, 2011

Return

Theme	Quotes to Support Theme
Customer types	"Working class, family class, students, mothers." (participant no. 08 [P08], urban)
	"That's 95% college students, if not more." (P09, urban)
Customer preferences	"What I'm saying is my clientele is not looking for something low fat. When they come into a grill they are looking for something with some grease in it." (P06, rural)
	"I had tomatoes, it didn't do really good. The only things they ask for is onions and stuff. Because they would rather go to the grocery center." (P07, rural)
	"I personally do not get a lot of people asking for fresh fruit." (P09, urban)
Food items sold most frequently	

Theme	Quotes to Support Theme
	"The ones that sells . . . ones that keep. Like . . . pork and beans, franks, Vienna sausages . . . that stuff for snacks that moves pretty rapidly but . . . canned foods, they move but . . . not like what I call snack stuff." (P02, rural)
	"The grill. That's what keeps our store going is the grill." (P06, rural)
Food items sold least frequently	"Grocery items, because they would rather go to the supermarkets, it's cheaper for them, you know." (P03, rural)
	"Well I sell a little bit of all of it. It's kinda a slow time of the year now. It's been slow this winter with the economy." (P10, urban)
SNAP/WIC availability	"Well, really I won't planning on staying here this long . . . I won't planning on it. But if I stay here, I will get the food stamps." (P02, rural)
	"I mean sometimes we will have a customer ask for something, and we don't carry it, I will get it. . . . Like the WIC, pretty much everybody ask me." (P04, urban)
	"I'm very old fashioned; I do not deal with computers at all." (P06, rural)
	"Not yet, we are in the process of getting it." (P11, urban)
Healthful items	"Well you see, to have fresh produce you have to have equipment for it. As you can see, the store is already crowded as it is. And I don't have that much people asking for it…" (P03, rural)
	"Yea, I think there's some baked chips . . . we don't sell that much whole wheat bread. People around here like the grease and the fat." (P05, rural)
	"Certain people buy them. It depends on what people are looking for. Most are looking for fried food." (P07, rural)

Abbreviations: SNAP, Supplemental Nutrition Assistance Program; WIC, Special Supplemental Nutrition Program for Women, Infants, and Children.
[a] Quotes included are verbatim and include dialect.

Table 2. Characteristics of 179 Rural Food Desert and Urban Nonfood Desert Customers in 9 Corner Stores, North Carolina, 2011

Return

Characteristic	Total Value (n = 179)	Urban Customers (n = 80)	Rural Customers (n = 99)	*P* Value
Mean age, y (SD)	42.2 (15.8)	35.1 (14.1)	47.9 (14.9)	<.001
Mean (SD) number of household members (including children)	3.1 (14)	3.1 (1.5)	3.0 (1.4)	.84
Mean (SD) number of children younger than 12	0.7 (1.0)	0.8 (1.0)	0.5 (0.9)	.05
Mean (SD) number of minutes participants live from corner store	7.6 (9.5)	7.8 (9.8)	7.5 (9.3)	.84
Mean (SD) servings of fruit eaten by participants in the past 24 hours	1.9 (1.6)	1.9 (1.6)	1.8 (1.6)	.60
Mean (SD) servings of vegetables eaten by participants in the past 24 hours	1.7 (1.3)	1.6 (1.3)	1.8 (1.3)	.25
Sex, %				
Female	38.6	43.8	34.3	.20
Male	61.5	56.3	65.7	
Race, %				
African American	56.2	68.8	45.9	.002
White	37.6	23.8	49.0	
Other	6.2	7.5	5.1	

Characteristic	Total Value (n = 179)	Urban Customers (n = 80)	Rural Customers (n = 99)	*P* Value
WIC, %	8.4	11.3	6.1	.21
SNAP, %	33.5	43.8	25.3	.009
"I eat enough fruits and vegetables everyday," % yes	55.3	51.3	58.6	.33
Reasons why participants do not eat more fruits and vegetables, % yes				
I like to eat other foods more	21.2	28.8	15.2	.03
Fruits and vegetables are too expensive	8.9	10.0	8.1	.66
I don't know how to prepare them	1.7	2.5	1.0	.33
I don't have time to prepare them	10.6	13.8	8.1	.22
The stores where I do most of my shopping don't sell them	3.9	2.5	5.1	.22
They are of poor quality at the stores where I do most of my shopping	1.7	1.3	2.0	.41
Other	11.7	11.3	12.1	.85

Abbreviation: SD, standard deviation; WIC, Special Supplemental Nutrition Program for Women, Infants, and Children; SNAP, Supplemental Nutrition Assistance Program.

Table 3. Shopping Patterns of 179 Customers in 9 Corner Stores, North Carolina, 2011

Return

Shopping Pattern	All Customers (n = 179)	Urban Customers (n = 80)	Rural Customers (n = 99)	*P* Value
	%			
Store types where customers shop				
Grocery store	99.4	100.0	99.0	.55
Corner store	96.1	96.3	96.0	.30
Dollar store	78.2	78.8	77.8	.88
Drug store	41.9	42.5	41.4	.88
Farmers market	35.2	31.3	38.4	.32
Reasons for shopping at store where customers most frequently buy food				
It has good prices	84.4	87.5	81.8	.30
It has good quality	82.1	86.3	78.8	.20
It has a good selection of items	76.0	88.8	65.7	<.001
It's close to where you live	73.2	75.0	71.7	.62
It is clean	71.5	82.5	62.6	.003
How often do participants shop for food at corner stores?				
Never	0.6	1.2	0	.05
A few times a year	1.1	2.5	0	
Once a month	8.4	13.8	4.0	
Once every 2 weeks	6.7	7.5	6.1	
1 or 2 times per week	35.2	30.0	39.4	

Shopping Pattern	All Customers (n = 179)	Urban Customers (n = 80)	Rural Customers (n = 99)	*P* Value
	%			
More than 5 times per week	48.0	45.0	50.5	
Transportation to store				
Walk	18.4	27.5	11.1	
Bicycle	1.7	0	3.0	
Car (own or that of household member)	70.4	63.8	75.8	.02
Car (that of nonhousehold member)	8.9	8.8	9.1	
Bus	0	0	0	
Other	0.6	0	1.0	
What would help more customers buy more groceries at corner stores				
Needs to have a wider selection	58.7	66.3	52.5	.06
Better prices	49.7	46.3	52.5	.40
Better quality	17.9	25.0	12.1	.03
Need a more convenient way to get to the store	9.5	7.5	11.1	.41
It needs to be cleaner	5.6	10.0	2.0	.04

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PUBLIC HEALTH RESEARCH, PRACTICE, AND POLICY

COMMUNITY CASE STUDY Volume 10 — July 25, 2013

Development of a Community-Sensitive Strategy to Increase Availability of Fresh Fruits and Vegetables in Nashville's Urban Food Deserts, 2010–2012

Celia Larson, PhD; Alisa Haushalter, DNP, RN; Tracy Buck, MS, RD; David Campbell, MS; Trevor Henderson; David Schlundt, PhD

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PEER REVIEWED

Abstract

Background
Food deserts, areas that lack full-service grocery stores, may contribute to rising rates of obesity and chronic diseases among low-income and racial/ethnic minority residents. Our corner store project, part of the Centers for Disease Control and Prevention's Communities Putting Prevention to Work initiative, aimed to increase availability of healthful foods in food deserts in Nashville, Tennessee.

Community Context
We identified 4 food deserts in which most residents are low-income and racially and ethnically diverse. Our objectives were to develop an approach to increase availability of fresh fruits and vegetables, low-fat or nonfat milk, and 100% whole-wheat bread in Nashville's food deserts and to engage community members to inform our strategy.

Methods
Five corner stores located in food deserts met inclusion criteria for our intervention. We then conducted community listening sessions, proprietor surveys, store audits, and customer-intercept surveys to identify needs, challenges to retailing the products, and potential intervention strategies.

Outcome
Few stores offered fresh fruits, fresh vegetables, low-fat or nonfat milk, or 100% whole-wheat bread, and none stocked items from all 4 categories. Major barriers to retailing healthful options identified by community members are mistrust of store owners, history of poor-quality produce, and limited familiarity with healthful options. Store owners identified neighborhood crime as the major barrier. We used community input to develop strategies.

Interpretation
Engaging community residents and understanding neighborhood context is critical to developing strategies that increase access to healthful foods in corner stores.

Background

In the United States, people living in geographic areas that have a low density of grocery stores and high density of fast food restaurants have higher rates of obesity (1,2) and chronic diseases (1) and lower rates of fruit and vegetable availability and consumption (1,3–5). Food deserts (ie, areas that lack full-service grocery stores) tend to be populated by low-income and racial/ethnic minorities (1,6). In 2010, the Centers for Disease Control and Prevention (CDC) funded 50 communities for 2 years to implement policy, systems, and environmental interventions in an effort to reduce obesity (7). Efforts to improve healthful food access in food deserts through corner and convenience stores have shown promise in metropolitan areas (8,9). We combined several approaches into a single field trial that included input from stakeholders for strategy development, technical support to store owners, and a community-wide media

campaign (8). Nashville's Communities Putting Prevention to Work (CPPW) intervention aimed to increase availability of fresh fruits and vegetables, low-fat and nonfat milk, and 100% whole-wheat bread in neighborhoods with no grocery stores by developing and implementing a process that is sensitive to community needs and concerns (10). Our outcome of interest was the establishment of a set of methods for developing and implementing a corner store initiative that includes food desert identification, a mechanism for community input, education/technical support, and a community-wide campaign.

Community Context

Food deserts

We first determined the need to develop a replicable method to identify Nashville's food deserts. No universal agreement exists on how to define areas where residents have limited access to healthful foods (1,11,12). There is agreement that food deserts provide poor access to healthful foods and consist largely of low-income residents who face transportation barriers to traveling outside their neighborhoods to find full-service grocery stores (13). We developed a detailed algorithm using geographic information technology for identifying food deserts that takes into consideration the presence of food retailers, access to transportation, and other demographic, social, and population health indicators (Appendix A) (14,15). We identified 4 food deserts in Nashville.

Demographic profile of targeted neighborhoods

The intervention took place in an area of 15,370 people who live in the census tracts (16) of the 5 targeted stores located in the 4 food deserts. Most (64.4%) residents in this area are African American; in contrast, 27.7% of Davidson County's residents are African American (Table 1). The Nashville 2010–2011 CPPW Behavioral Health Risk Factor Survey documented the following health disparities: 41.1% (standard deviation [SD]), 5.3%) of African Americans were obese, compared to 22.3% (SD, 2.6%) of whites, and 19.6% (SD, 4.2%) of African Americans reported diabetes, compared to 13.3% (SD, 4.2%) of whites. In addition, 55.8% (SD, 3.1%) of whites strongly agreed that it is easy to buy healthful food in one's neighborhood, compared to 38.4% (SD, 5.2%) of African Americans (17).

Methods

Nashville's CPPW initiative was funded for 2.5 years, from March 2010 through December 2012. During the first year we established partnership contracts, hired and trained staff, developed methodology, and conducted the baseline assessments. The second year focused on refining the implementation and conducting the postassessment. To assist with the development of the corner store initiative, a partnership was established with a local nonprofit community organization, Community Food Advocates, which previously had conducted a formative assessment that identified areas that lacked healthful food resources (18).

Identification of corner stores

We identified 29 corner stores in the 4 food deserts. We contacted each proprietor by telephone and later conducted an interview at the store. Proprietors were asked to sign an agreement to accept technical assistance; stock the fruits, vegetables, low-fat and nonfat milk, and 100% whole-wheat bread; allow a store audit and customer-intercept interviews; and feature a logo ("So Fresh") in the store. Our team conducted an observational audit of each store's surroundings, identifying and recording visible community assets or resources (eg, housing, schools, day-care centers, churches, parks) that would reasonably predict potential success to influence the likelihood of sustainable consumer purchasing. The eligibility criteria for store selection included the following: 1) the store was not exclusively a tobacco and beer or alcohol outlet, 2) the proprietor had an interest in becoming a part of the CPPW intervention and was willing to sign a commitment agreement for the duration of the grant, and 3) the surrounding area included residential or public housing, likelihood of foot traffic or walking distance to schools, child-care facilities, parks, or churches. This process resulted in the identification of 5 stores with at least 1 store in each food desert.

Baseline assessments

Before data collection, the intervention protocol and survey instruments were submitted and approved by the Metro Public Health Department institutional review board. We then conducted proprietor surveys, store audits, and customer-intercept surveys.

To inform the strategies, we conducted semistructured interviews with proprietors at the store sites. Interview questions sought to gain perceptions of the strengths and challenges associated with being a food retailer in the neighborhood. Sample questions included, "What do you believe are the benefits of having a store at this location?"; "What do you believe are the downfalls?"; "When it comes to the neighborhood, how do the people living around here feel about the store?"; and "How does the store support the community?" A CPPW contract staff member with a background in corner store, retail-food environments conducted the interviews.

We audited the stores for the presence of each of the targeted products using Nutrition Environment Measures Survey –Corner Stores (NEMS–CS), the corner store version of the NEMS–S (grocery store) audit tool and training materials (19) developed by the Philadelphia Food Trust and the Philadelphia Department of Health and used by the Department's permission. The type, number, and price of each of the following categories of items present in the store were recorded: bread, milk, fresh fruits, and fresh vegetables. Tennessee State University Master of Public Health students conducted the audits and received NEMS–S on-line training (20) and standardized group training.

Intercept surveys were conducted with adult customers at each corner store Monday through Friday, 8:00 AM through 4:30 PM. We used standardized NEMS protocol and training materials. The survey (Appendix B) asked the number and type of food and beverage items purchased. Interviewers were stationed outside the store, and customers were invited to respond to the survey. The eligibility criterion was evidence of a food or beverage purchase. CPPW staff conducted the interviews and received cultural diversity training prior to NEMS training and field work.

Community engagement for strategy development

We held 2 informal listening sessions to gather information on community stakeholders' thoughts, ideas, and attitudes. Our intention was to listen to concerns so that we could be alerted to potential barriers and strengthen our strategies as we developed the intervention. A local minister whose church is located in a targeted neighborhood and who is known for being a champion for health equity volunteered to host both sessions and assist with recruitment. Because the study area has many churches, and to inform our strategies from the perspective of those who serve individuals and families, we held 1 listening session with church leaders and clergy. The host minister personally invited church leaders located in or near the target area; 12 African American ministers attended the session. The second listening session was with racially/ethnically diverse community residents and stakeholders, including representatives of housing, food, and social services organizations. The host minister and representatives from neighborhood organizations located in each of the food deserts personally invited residents and stakeholders to the session. At both listening sessions, we described the purpose of CPPW and the corner store intervention and then facilitated discussion. Participants were asked to identify barriers to project success and potential solutions. Following the discussion, participants were served a small meal, of which some items were purchased from a neighborhood corner store by the host minister. No monetary compensation was provided to the participants or the host. Listening sessions were audiotaped and transcribed. We used Atlas-ti 6.2 (ATLAS.ti Scientific Software Development GmbH, Berlin, Germany) to analyze the transcripts and identify common and divergent themes. In addition, a brand and logo, "So Fresh," developed by the Nashville CPPW media specialist, was presented to the community members to illustrate how it would appear on storefronts. We asked participants to voice their opinions and suggest changes (Figure).

Figure. Brand and logo for the Communities Putting Prevention to Work corner store intervention in Nashville, Tennessee, 2010–2012.

Outcome

Proprietor interviews

Proprietors stated neighborhood crime or shoplifting or both are the greatest challenges for retailers in their neighborhoods (Table 2). Close proximity to densely populated areas was mentioned as the greatest benefit. Additional benefits named were families as the primary customers and being the sole retailer in the neighborhood. In response to a question about the contribution the store makes to the neighborhood, most owners stated that their customers perceived the store positively. To illustrate investment in the neighborhood, 2 owners reported they participated as a sponsor of community events such as youth sporting events. All store owners reported participating in Supplemental Nutrition Assistance Program (SNAP).

Store audits

Two stores stocked low-fat or non-fat milk, 3 stores stocked 100% whole-wheat bread, 3 stores stocked fresh fruit of any kind, and 2 stores stocked vegetables of any kind. Only 1 store stocked foods from only 1 targeted category. No store stocked items from all 4 targeted healthful food categories (Table 2).

Customer-intercept surveys

From the sample of 204 customer intercepts, we found no purchases of low-fat milk, nonfat milk, or 100% whole-wheat bread and few purchases of fresh fruits or vegetables (Table 3). We were confident the majority of customers who made food and beverage purchases represented the neighborhood because most walked to the stores, and parking was limited.

Listening sessions with community stakeholders

Barriers to retailing fresh produce and other healthful options identified by both groups included the need for consumer education, neighborhood history of poor-quality produce offered in small stores, mistrust of store proprietors, and mistrust of government (Table 3). The groups discussed potential solutions to the barriers. Community members suggested that taste tests, free samples, cooking demonstrations, and cooking classes would

increase knowledge of fruits and vegetables and how to prepare them. Both groups recommended solutions that address poor-quality produce, such as having mobile farmers markets or setting up fruit and vegetable stands near the stores. Clergy recommended involvement by religious institutions so that partnerships formed among markets, government, and academic institutions could address education, accessibility, and sustainability after the CPPW grant. These types of actions could serve to mitigate and reverse any mistrust that exists between consumers, corner store management, and government agencies. Both groups expressed positive opinions about the logo and brand. Comments indicated that the colors and the image would convey an invitation to customers to purchase the healthful products. We did not analyze the comments by neighborhood or food desert because of the commitment to anonymity of listening session participants.

Store strategy development and implementation

The approach to strategy development and implementation involved 3 components, which were offered to stores according to their expressed need: 1) technical assistance, 2) partnership development, and 3) a communications campaign to increase awareness of the corner store's new product offerings. A CPPW corner store team was formed; it comprised several staff members who had previously worked in the study neighborhoods and a contract staff member who had previously managed a similar corner store close to one of the food deserts.

Technical assistance

The CDC offered technical assistance to CPPW communities. The CPPW corner store team requested and received education and resources on food procurement and marketing from the National Food Security Council. The team provided education to corner store proprietors, which included consultation on store design and layout, education on methods to assure cleanliness, and information on how to promote purchase of featured items. Additional support included 1) funding for purchase of food displays and coolers, 2) education on where and how to procure products not currently retailed, and 3) advisement on how to promote and direct consumers to targeted items.

The corner store team met with each store owner to review the layout and merchandising of products, suggest alternatives, and identify needs for stocking healthful items. These needs included shelf space for bread and refrigeration space for adding or increasing availability of fresh produce and low-fat or nonfat milk. Two stores received refrigeration units, and 2 stores received display units. We assisted in establishing a relationship between the store proprietors and a mobile market for purchasing seasonal fresh fruits and vegetables. The mobile market made available bulk product packages of various produce items at a lower cost based on procurement by all 5 stores. The 5 stores already had established vendor relationships for purchasing bread and milk.

The corner store team assisted with product placement to increase visibility of healthful items by replacing unhealthful food items or nonfood items with the new, more healthful food options. In addition, colorful signs that displayed the logo were placed near the items. Finally, the team provided samples of foods and beverages made with various fruits and vegetables sold in the store.

Partnership development

We served as a liaison to establish relationships between the leaders of churches, community organizations, and corner store proprietors in each targeted neighborhood. The partnership discussions involved developing and implementing a plan so that a neighborhood organization, such as a church, could "adopt" a corner store for purchasing the targeted items.

Communications campaign

A 3-tiered media and communications campaign was launched to increase awareness of the corner store initiative among individual consumers, the neighborhood, and the broader community. To increase awareness at the individual level, the corner store brand and logo, "So Fresh," was printed on promotional posters, signage, and point-of-purchase flags. We assisted store owners with promotional display placement. The neighborhood strategies included installing branded posters outside each store, visible from the sidewalks and street. Announcements of the corner stores' new product launch were made at neighborhood events and posted on bulletin boards and websites. The minister champion was instrumental in the word-of-mouth campaign across the network of churches. At the community level, the corner store initiative was featured as a component of the larger CPPW community campaign: "NashVitality — the spirit of a healthy, active, and green city." Billboards that featured the availability of fresh fruits and vegetables in corner stores were placed at strategic locations near the food deserts. Similar advertisements were printed in free publications such as neighborhood magazines and flyers. The corner store initiative was also featured on the CPPW NashVitality social network and Internet campaign.

As a result of attention jurisdiction-wide, opportunities to strengthen the effort emerged from nontraditional partners. For example, students from a private school "adopted" one of the stores and provided cleanup and painting of both the interior and exterior. This type of volunteerism illustrates how unanticipated partnerships may emerge from an effective communications campaign that can result in technical assistance, education about the problem and solutions, and potential sustainable relationships within the larger community.

Interpretation

The CPPW Nashville corner store initiative is the first field trial in the city to develop and implement an initiative to increase the availability of fresh fruits and vegetables, 100% whole-wheat bread and low-fat or nonfat milk in low-income neighborhood corner stores. We developed an approach informed by community context and community members' knowledge, attitudes, and experiences. Our experiences during the first year of development and initial stages of implementation yielded many insights and lessons learned.

The baseline results illustrated opportunities to increase access to healthful foods in corner stores. Technical assistance benefited stores in the areas of food procurement, displays, and marketing. Other venues suggested by the community should be considered to increase exposure, availability, and access: mobile farmers markets, community gardens, food tastings, and educational cooking demonstrations.

The greatest challenge for communities is the concern for safety from crime in and around the corner stores. Incorporating police department representatives in strategy development will be an important step to solving this problem. An additional challenge is the lack of trust between the corner store owners and community members. The development of partnerships between stores and community organizations may help to sustain the viability and availability of healthful foods in corner stores by engaging organizations to promote the purchase of targeted items. Relationship building among residents and store owners can serve to mitigate the mistrust that may result from ethnic/racial discordance or cultural differences. Developing community forums such as town hall meetings and listening sessions for dialogue and relationship building can lead to overturning the mistrust between community members, store owners, and government agencies. These opportunities for dialogue can yield information to guide community campaigns including media and strategy development. In addition, although we did not include an evaluation of partnership building and maintenance, a process evaluation can serve to document and inform the effectiveness of such strategies.

Our aim to increase the supply of healthful foods in Nashville's food deserts yielded a comprehensive, replicable approach, sensitive to community interests and needs. Postevaluation is currently under way. Since baseline data collection, 2 stores have closed; one because of economic downturn and the other because of family illness. From among 3 remaining stores, preliminary evidence suggests an increase in availability of the variety of fruits and vegetables. Efforts will continue to assess the impact, assure sustainability, and promote dialogue with the community to explore additional ways to increase equitable access to healthful foods.

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Author Information

Corresponding Author: Celia Larson, PhD, Metro Public Health Department, 311 23rd Ave North, Nashville, TN 37203. Telephone: 615-340-8958. E-mail: celia.larson@nashville.gov.

Author Affiliations: Alisa Haushalter, Tracy Buck, David Campbell, Trevor Henderson, Metro Public Health Department, Nashville, Tennessee; David Schlundt, Vanderbilt University, Nashville, Tennessee.

References

1. Gordon C, Purciel-Hill M, Ghai NR, Kaufman L, Graham R, Van Wye G. Measuring food deserts in New York City's low-income neighborhoods. Health Place 2011;(2):696–700. CrossRef PubMed
2. Galvez MP, Hong L, Choi E, Liao L, Godbold J, Brenner B. Childhood obesity and neighborhood food-store availability in an inner-city community. Acad Pediatr 2009;9(5):339–43. CrossRef PubMed
3. Michimi A, Wimberly MC. Associations of supermarket accessibility with obesity and fruit and vegetable consumption in the conterminous United States. Int J Health Geogr 2010;9:49. PubMed
4. Baker EA, Schootman M, Barnidge E, Kelly C. The role of race and poverty in access to foods that enable individuals to adhere to dietary guidelines. Prev Chronic Dis 2006;3(3):A76. PubMed

5. Ahern M, Brown C, Duka S. A national study of the association between food environments and county-level health outcomes. J Rural Health 2011;27(4):367–79. CrossRef PubMed
6. Powell LM, Slater S, Mirtcheva D, Bao Y, Chaloupka FJ. Food store availability and neighborhood characteristics in the United States. Prev Med 2007;44(3):189–95. CrossRef PubMed
7. Bunnell R, O'Neil D, Soler R, Payne R, Giles WH, Collins J, et al. Fifty Communities Putting Prevention to Work: accelerating chronic disease prevention through policy, systems and environmental change. J Community Health 2012;37(5):1081–90. CrossRef PubMed
8. Gittelsohn J, Rown M, Gadhoke P. Interventions in small food stores to change the food environment, improve diet, and reduce risk of chronic disease. Prev Chronic Dis 2012; 9:110015.
9. Song HJ, Gittelsohn J, Kim M, Suratkar S, Sharma S, Anliker JA. Corner store intervention in a low-income urban community is associated with increased availability and sales of some healthy foods. Public Health Nutr 2009;12 (11):2060–7. CrossRef PubMed
10. Kreuter MW, Sugg-Skinner C, Holt CL, Clark EM, Haire-Joshu D, Fu Q, et al. Cultural tailoring for mammography and fruit and vegetable intake among low-income African-American women in urban public health centers. Prev Med 2005;41(1):53–62. CrossRef PubMed
11. Forsyth A, Lytle L, Riper DV. Finding food: issues and challenges in using Geographic Information Systems to measure food access. J Transp Land Use 2010;3(1):43–65. PubMed
12. Bader MD, Purciel M, Yousefzadeh P, Neckerman KM. Disparities in neighborhood food environments: implications of measurement strategies. Econ Geogr 2010;86(4):409–30. CrossRef PubMed
13. Jiao J, Moudon AV, Ulmer J, Hurvitz PM, Drewnowski A. How to identify food deserts: measuring physical and economic access to supermarkets in King County, Washington. Am J Public Health 2012;102(10):e32–9. CrossRef PubMed
14. Claritas, Inc. Nashville/Davidson County TN Profile 2010. Nielsen SiteReports. http://www.claritas.com/sitereports. Accessed September 7, 2010.
15. McClellan L, Schlundt D. Overview of Nashville REACH 2010's approach to eliminating disparities in diabetes and cardiovascular disease. J Ambul Care Manage 2006;29(2):106–11. PubMed
16. US Census Bureau. 2010. Davidson County, TN. http://factfinder2.census.gov . Accessed June 25, 2012.
17. Rogers B, Thomas SD. Communities Putting Prevention to Work Behavioral Risk Factor Surveillance Survey Davidson County, TN 2011. Nashville (TN): Metropolitan Nashville Public Health Department; 2012. http://health.nashville.gov/PDFs/HealthData/2010-2011_BRFSS_Final_Report.pdf. Accessed January 3, 2013.
18. National Public Television (NPT) Reports. Children's health crisis. http://www.wnpt.org/productions/chcv2/obesity/food_desert.html. Accessed January 7, 2013.
19. Glanz K, Sallis JF, Saelens BE, Frank LD. Nutrition Environment Measures Survey in stores (NEMS-S): development and evaluation. Am J Prev Med 2007;32(4):282–9. CrossRef PubMed
20. The Trustees of the University of Pennsylvania. Nutrition Environment Measures Survey: online training NEMS. http://www.med.upenn.edu/nems/onlinetraining.shtml. Accessed May 7, 2011.

Tables

Table 1. Demographic Characteristics in Targeted Census Tracts Located in Food Deserts, Compared With Nashville/Davidson County and State of Tennessee, 2010

Return

Characteristic[a]	Food Desert 1, Store A	Food Desert 2, Store B	Food Desert 3, Store C	Food Desert 4, Store D	Food Desert 4, Store E	Total Population of All Food-Desert Census Tracts	Davidson County	Tennessee
Census tract population, n	1,816	2,189	5,317	2,047	4,001	15,370	626,681	6,346,105
Female head of household, %	33.5	24.0	25.7	26.8	51.4	44.8	14.7	13.9

Characteristic[a]	Food Desert 1, Store A	Food Desert 2, Store B	Food Desert 3, Store C	Food Desert 4, Store D	Food Desert 4, Store E	Total Population of All Food-Desert Census Tracts	Davidson County	Tennessee
Individuals living below federal poverty guidelines, %	31.4	45.7	35.4	42.6	73.7	45.6	17.7	16.9
Households that received Supplemental Security Income or public assistance, or participated in SNAP in previous 12 months	59.9	83.8	63.1	52.6	92.3	72.6	19.5	22.3
Aged 0–17 y, %	27.1	27.0	27.3	25.5	35.6	30.2	21.8	23.5
Aged ≥65 y, %	6.1	8.65	7.9	7.6	3.2	7.5	10.4	13.4
Black/African American, %	91.1	60.3	43.3	51.1	89.6	64.4	27.7	16.7
Hispanic/Latino, %	1.5	1.0	18.9	9.1	3.5	9.1	9.8	4.6
White, %	5.1	35.8	38.4	38.9	5.4	25.4	61.4	77.6

Abbreviation: SNAP, Supplemental Nutrition Assistance Program.
[a] Source: US Census Bureau (16).

Table 2. Proprietor Perceptions, Store Audits, and Customer-Intercept Data From 5 Food-Desert Corner Stores in Nashville, Tennessee, 2011

Return

Survey Item	Food Desert 1, Store A	Food Desert 2, Store B	Food Desert 3, Store C	Food Desert 4, Store D	Food Desert 4, Store E
Proprietor Perceptions					
Barriers to retailing targeted items					
Neighborhood crime/shoplifting	✓	✓	✓	✓	✓
Lack of structural support for selling items (coolers/displays)		✓			
Strengths to retailing targeted items					
Dense residential area	✓		✓	✓	✓
High levels of foot traffic			✓		✓
Families are primary customers		✓			✓
Only store in area/great location		✓		✓	
Role of store in neighborhood					
Supports community as a sponsor of sports or events	✓	✓			
Customers proud of or like having store in neighborhood	✓	✓	✓	✓	
Estimated use of SNAP/EBT, %	75	30	40	40	15
Store Audits					
Presence of targeted items stocked					
Fresh fruit and vegetables			✓	✓	✓

Survey Item	Food Desert 1, Store A	Food Desert 2, Store B	Food Desert 3, Store C	Food Desert 4, Store D	Food Desert 4, Store E
Low-fat or nonfat milk	✓	✓			
100% whole-wheat bread		✓	✓		✓
Customer-Intercept Data					
Customer intercepts, n	54	41	32	30	47
Total items purchased, n	78	84	44	53	80
Fresh fruits and vegetables purchased, n	6	5	0	0	0
Low-fat or nonfat milk purchased, n	0	0	0	0	0
100% Whole-wheat bread purchased, n	0	0	0	0	0

Abbreviations: SNAP, Supplemental Nutrition Assistance Program, EBT, electronic benefit transfer.

Table 3. Stakeholders' Perceptions of Barriers to Selling Fresh Produce and Other Healthful Foods and Beverages, Nashville, Tennessee, 2011

Return

Themes	Residents	Clergy
Consumer education	"Even the people selling these items . . . aren't quite sure what they are or how to prepare them."	"There are . . . people who don't know the benefits of eating fresh fruits and vegetables."
	"People would love to eat better, but they don't know how, or even why they should."	"There are . . . people who don't know how to tell if what they're buying is fresh."
Poor-quality produce	"The quality is not as good as you would find in an actual grocery store. This can cause people to feel like they have to use a lot of canned or frozen goods."	"When they do have fruits and vegetables, they are too often of such poor quality that we wouldn't even want to buy them."
		"Companies vary their quality from store to store in different areas: low-income areas equal worse quality equal higher prices."
Mistrust of store owners	"Corner stores are not owned by people who have any… connection to the community (don't live there, didn't grow up there, didn't go to school there, don't go to church there, etc.). Ninety-five percent of . . . residents are African American, but 90% of the businesses . . . are owned by people who are not."	"Systematic racism in economics: there is no investment in low-income areas, simply because businesses don't feel they can be profitable."
	"[Store owners'] perceptions of what people want; eg, 'I know these people don't want this, so I'm not going to order it.'"	"This is an overwhelmingly predominantly black community, but there are hardly any store owners who have any kind of connection to the community."
Mistrust of government	"Community residents cringe when they see the government supporting these store owners who don't necessarily have their best interests at heart."	"Some people [feel] it is wrong for government to empower stores that take advantage of our communities. . . . We should get some help to build our own."
	"There is a feeling of resentment about . . . stores receiving incentives . . . keeping up the bad practices of poor customer service and selling goods of inferior quality and for higher prices."	
	"What happens when the grant ends?"	

Appendices

Appendix A. Methodology for Determining Food Deserts in Nashville, Tennessee

Return

The Nashville Communities Putting Prevention to Work initiative used multiple data sources and a detailed algorithm for identifying food deserts. Data sources included parcel information from Metro City Planning Department, metro tax records identifying food retailers, public transit routes and bus stops from Metro Transit Authority, and population social, economic, and demographic estimates using 2000 Census and Claritas, 2009 census estimates (14) and health status information using Nashville's REACH 2010 Survey data (15). We identified all full-service grocery stores based on pre-existing knowledge by using the business name and owner such as Walmart, Kroger, Publix, and Piggly Wiggly. The address of each grocery store and all bus routes and bus stops in Davidson County were mapped using ArcView Geographic Information Systems software (Esri, Redlands, California). Aggregated geographic information data was associated with each residential parcel using geocoded location, census tract, or census block group. A residential parcel is a single property identified as having residential use such as a home, trailer, condominium, or apartment building. Distance in miles from each residential household (owner occupied or rented) to the nearest full-service grocery store and metro bus stop were calculated. Thirty-five variables associated with census tracts and census block groups were assembled from existing data sets including the following: the 2000 census, the 2009 Claritas estimates, and random citywide surveys of the Nashville REACH 2010 project (15). These variables reflected demographic characteristics, poverty and social distress, lack of access to transportation, and the prevalence of obesity, diabetes, and hypertension (Table).

Each variable was converted to a *z* score (subtracting the mean and dividing by the standard deviation) across the geographic units (tract or block group). For each household, a weighted sum was computed with *z* score–distance to the nearest grocery given a weight of 5, a *z* score–distance to the bus stop a weight of 2, and the other standardized variables a weight of 1. Higher weights were chosen for household distance to stores and bus stops because these constructs are the most important measures of access to food without transportation at the household level. The use of standardized scores converted all measures to a single metric, which allowed for equal weighting of the economic, demographic, and social factors associated with food deserts.

Mean food desert scores were computed for each census block, as a weighted sum of the household *z* scores, resulting in the scoring of 460 census blocks where food desert scores ranged from −37 to 60. A cutoff score of 20, 1 standard deviation above the mean, was used to identify food deserts.

Table. Variables Used to Create Food Desert Index for Nashville, Tennessee

Variable	Description	Sources	Geographic Resolution
Distance to major grocery stores	Computed distance from each residential parcel to the nearest grocery store	Parcels and grocery stores (derived from tax records)	Parcel level
Distance to nearest bus stop	Computed distance from each residential parcel to the nearest bus stop	Parcels and metro transit	Parcel level
Elite-impoverished composite	Factor analytically derived index from census data for Nashville	2000 US census	Block group level
Comfortable-distressed	Factor analytically derived index from census data for Nashville	2000 US census	Block group level
Population mean	Number of people living in census block group	2009 US census estimates from Claritas	Block group level
Population density	People per square mile	2009 US census estimates from Claritas	Block group level
Percentage white	Demographics	2009 US census estimates from Claritas	Block group level
Percentage black	Demographics	2009 US census estimates from Claritas	Block group level
Percentage Hispanic	Demographics	2009 US census estimates from Claritas	Block group level
Per capita income	Demographics		Block group level

Variable	Description	Sources	Geographic Resolution
		2009 US census estimates from Claritas	
Median age	Demographics	2009 US census estimates from Claritas	Block group level
Percentage married	Demographics	2009 US census estimates from Claritas	Block group level
Percentage households occupied by renters	Housing	2009 US census estimates from Claritas	Block group level
Percentage households with no car	Housing	2009 US census estimates from Claritas	Block group level
Percentage of households with one car	Housing	2009 US census estimates from Claritas	Block group level
Average cars per household	Housing	2009 US census estimates from Claritas	Block group level
Median household income	Demographics	2009 US census	Block group level
Median income whites	Demographics	2009 US census estimates from Claritas	Block group level
Median income blacks	Demographics	2009 US census estimates from Claritas	Block group level
Percentage children under poverty line	Demographics	2009 US census estimates from Claritas	Block group level
Percentage or workforce unemployed	Demographics	2009 US census estimates from Claritas	Block group level
Percentage divorced	Demographics	2009 US census estimates from Claritas	Block group level
Percentage single	Demographics	2009 US census estimates from Claritas	Block group level
Average commute time	Housing	2009 US census estimates from Claritas	Block group level
Median housing value	Housing	2009 US census estimates from Claritas	Block group level
Percentage of housing that is trailers	Housing	2009 US census estimates from Claritas	Block group level
Percentage high school dropouts	Demographics	2009 US census estimates from Claritas	Block group level
Percentage of adults below poverty level	Demographics	2009 US census estimates from Claritas	Block group level
Percentage of adults who are college graduates	Demographics	2009 US census estimates from Claritas	Block group level
Population change from 2000–2009	Demographics	2009 US census estimates from Claritas 2000 US census data	Block group level
Percentage uninsured	Percentage of people surveyed who reported having no insurance	2001–2004 REACH 2010 data	Census tract level
Percentage obese	Percentage of people surveyed reporting BMI ≥30	2001–2004 REACH 2010 data	Census tract level
Percentage hypertensive	Percentage of people surveyed reporting a diagnosis of high blood pressure	2001–2004 REACH 2010 data	Census tract level

Variable	Description	Sources	Geographic Resolution
Percentage high cholesterol	Percentage of people surveyed reporting a diagnosis of high cholesterol	2001–2004 REACH 2010 data	Census tract level
Percentage diabetes	Percentage of people surveyed reporting adiagnosis of diabetes	2001–2004 REACH 2010 data	Census tract level

Appendix B. Intercept Survey

Return

Corner store:_____ Date: _____/_____/_____ Time: _____:_____

[Baseline /Post] Interviewer Initials: _____

Day of the week: M T W R F

Key Product Information Categories: [B: Beverage] [C: Candy and fruit snacks] [CH: Chips, Pretzels, Popcorn & Crackers] [F: Fruit] [IC: Frozen Treats] [P: Pastry] [PF: Prepared Food] [NSG: Nuts, Seeds & Granola] [O: Other]						
#	Quantity	Size(oz)	Product Brand	Product Name	Product Flavor	Product Category
ex.	2	.067	Frito Lay	Nacho Cheese Doritos	Nacho	CH
1						
2						
3						
4						
5						

Age: [child: 5–12 years] [adolescent: 13–18 years] [adult: 19 or older]

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PUBLIC HEALTH RESEARCH, PRACTICE, AND POLICY

ORIGINAL RESEARCH Volume 10 — September 26, 2013

The Impact of New York City's Health Bucks Program on Electronic Benefit Transfer Spending at Farmers Markets, 2006–2009

Sabrina Baronberg, MPH; Lillian Dunn, MPH; Cathy Nonas, MS, RD; Rachel Dannefer, MPH, MIA; Rachel Sacks, MPH

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PEER REVIEWED

Abstract

Introduction
Increasing the accessibility and affordability of fresh produce is an important strategy for municipalities combatting obesity and related health conditions. Farmers markets offer a promising venue for intervention in urban settings, and in recent years, an increasing number of programs have provided financial incentives to Supplemental Nutrition Assistance Program (SNAP) recipients. However, few studies have explored the impact of these programs on use of SNAP benefits at farmers markets.

Methods
New York City's Health Bucks Program provides SNAP recipients with a $2 coupon for every $5 spent using SNAP benefits at participating farmers markets. We analyzed approximately 4 years of electronic benefit transfer (EBT) sales data, from July 2006 through November 2009, to develop a preliminary assessment of the effect of the Health Bucks Program on EBT spending at participating markets.

Results
Farmers markets that offered Health Bucks coupons to SNAP recipients averaged higher daily EBT sales than markets without the incentive ($383.07, 95% confidence interval [CI], 333.1–433.1, vs $273.97, 95% CI, 243.4–304.5, $P <$ 0.001) following the introduction of a direct point-of-purchase incentive. Multivariate analysis indicated this difference remained after adjusting for the year the market was held and the neighborhood poverty level.

Conclusion
When a $2 financial incentive was distributed with EBT, use of SNAP benefits increased at participating New York City farmers markets. We encourage other urban jurisdictions to consider adapting the Health Bucks Program to encourage low-income shoppers to purchase fresh produce as one potential strategy in a comprehensive approach to increasing healthful food access and affordability in low-income neighborhoods.

Introduction

Increasing access to fresh fruits and vegetables in low-income neighborhoods and promoting consumption of these foods are important strategies for reducing the risk of heart disease, stroke, type 2 diabetes, and cancer (1–5). However, in low-income communities, limited availability and high prices present obstacles to the purchase and consumption of fresh produce (6–9). In New York City, 2009 data showed that 17.2% of residents in low-income neighborhoods reported eating no fruits and vegetables on the preceding day, compared with 8.0% of residents in high -income neighborhoods ($P <$ .001) (10). Farmers markets, which are mobile and can be located throughout urban neighborhoods, offer a promising venue for intervention to decrease this disparity (11–14).

In 2005, the New York City Department of Health and Mental Hygiene (DOHMH) introduced Health Bucks, a coupon-distribution program providing financial incentives for low-income New Yorkers to shop at farmers markets in the city's highest poverty areas. Two-dollar Health Bucks coupons were given to community-based organizations for distribution to residents for use at 11 participating markets during the annual growing season (July 1–November 15). In 2006, the DOHMH expanded Health Bucks to encourage recipients of Supplemental Nutrition Assistance Program (SNAP) benefits to use electronic benefit transfer (EBT) wireless terminals at farmers markets to purchase fruits and vegetables. EBT is the mechanism through which New York State delivers cash and SNAP benefits (formerly known as food stamps) to the state's recipients. Funds are deposited into the accounts of individual recipients and made accessible to them via state-issued SNAP benefits cards (15). In 2006 when DOHMH expanded Health Bucks, it gave SNAP recipients at some markets a $2 coupon for every $5 in EBT credits spent. The objective of this study was to examine the program's effect on mean EBT sales and to determine via a preliminary assessment whether Health Bucks increased EBT spending in a sample of NYC farmers markets.

Methods

Greenmarket (http://www.grownyc.org/greenmarket), the largest outdoor urban farmers market network in the United States, manages the subset of the markets in New York City that participate in the Health Bucks program. Greenmarket has been on the forefront of national efforts to encourage SNAP spending at farmers markets and has installed EBT wireless terminals at many of the markets that are members of its network. As standard practice, Greenmarket records EBT sales at markets that accept SNAP benefits.

Greenmarket provided DOHMH with records of daily EBT sales for each individual market on each day of operation from July 2006 through November 2009. Data fields included the name and address of the market, the market date, and the total value of EBT sales in the market on that date. Altogether, Greenmarket provided EBT sales data for 1,289 market days (ie, each day of operation for each individual market) over the study period. Thirteen market days were excluded because their EBT sales were not attributed to a specific market, and an additional 15 days were excluded because records reflected EBT sales that took place at special events rather than ongoing farmers markets. Because Health Bucks are offered only during the growing season, defined as July 1 through November 15, days outside these dates were excluded (193 days). After these exclusions, our sample included EBT sales from 24 markets, operating for 45 days on average, for a total of 1,068 market days. Markets included in the final sample spanned all 5 boroughs of New York City, and 18 of the markets were located in high-poverty neighborhoods (≥20% of residents earned less than 200% of the federal poverty level [FPL]). Eleven of the 24 markets in the sample did not accept Health Bucks during the study period. Four markets had EBT sales data before and after they began accepting Health Bucks, and the remaining 9 markets had sales data available after the market began accepting Health Bucks coupons. The number of markets represented each year varied; our data included 8 markets in years 2006 and 2007, 15 in 2008, and 23 in 2009.

Independent *t* tests were used to assess differences in mean daily EBT sales among farmers markets. First, for each year of the study period, we compared differences in mean daily EBT revenue among markets that participated in the Health Bucks program and those that did not. Next, we examined a subset of markets for which EBT data were available both before and after Health Bucks coupons were offered. These markets each had a different number of market days before and after the introduction of Health Bucks because of variation in market days from year to year. Also, for one market, there was only one year of data before Health Bucks coupons were introduced compared with 3 years of data after introduction. Because sales before and after Health Bucks coupons introduction at individual markets would be correlated with each other, we used a linear mixed model to account for this dependency while assessing whether adding Health Bucks coupons as an incentive increased average daily EBT sales at these markets. Finally, we used a linear regression model to examine the impact of Health Bucks coupons on mean EBT market revenue. We adjusted for market year, because annual increases in funding of Health Bucks would be expected to cause shifts in related EBT sales each year. We also adjusted for neighborhood poverty level, because EBT use would be expected to vary with neighborhood poverty levels. FPL thresholds were used to define the neighborhood poverty level; a high-poverty neighborhood was defined as one in which 20% of residents or more earned less than 200% of FPL, a determination consistent with DOHMH standard practice. For all significance testing, the α level was set at $P < .05$. We used SPSS for Windows version 18.0 (SPSS Inc, Chicago, Illinois) to conduct all analyses.

Results

The number of farmers markets accepting SNAP benefits via EBT terminals increased from 8 in 2006 to 23 in 2009. Average daily per-market EBT sales among all markets accepting SNAP benefits rose from $114.55 in 2006 to $465.87 in 2009. Among these markets, participation in the Health Bucks Program also expanded over time. In 2006, 5 Greenmarket markets participated in Health Bucks; this total grew to 12 participating Greenmarket markets in 2009 (Table).

During the first 2 years of the study period, markets that participated in the Health Bucks Program had lower average daily EBT sales than nonparticipating markets (Figure 1). In 2006, average daily EBT sales in participating markets were $94.64 (95% confidence interval [CI], 71.0–118.3), compared with $161.00 (95% CI, 119.2–202.8) among nonparticipating markets (P = .004); in 2007, participating markets averaged $109.15 (95% CI, 81.8–136.5) in daily EBT sales, compared with $381.28 (95% CI 316.4–446.2) among nonparticipating markets (P < .001). However, this balance shifted in the later years of analysis. In 2008, when the SNAP incentive expanded and the majority of coupon distribution shifted to EBT, participating markets documented $397.17 (95% CI, 310.5–483.8) in average daily EBT revenues, compared with $211.85 (95% CI, 161.0–262.7) at nonparticipating markets (P < .001); in 2009, participating markets showed nearly double the average daily EBT revenues of nonparticipating markets ($595.73, 95% CI, 495.4–696.1, vs $301.19, 95% CI, 253.9–348.4, P < 0.001).

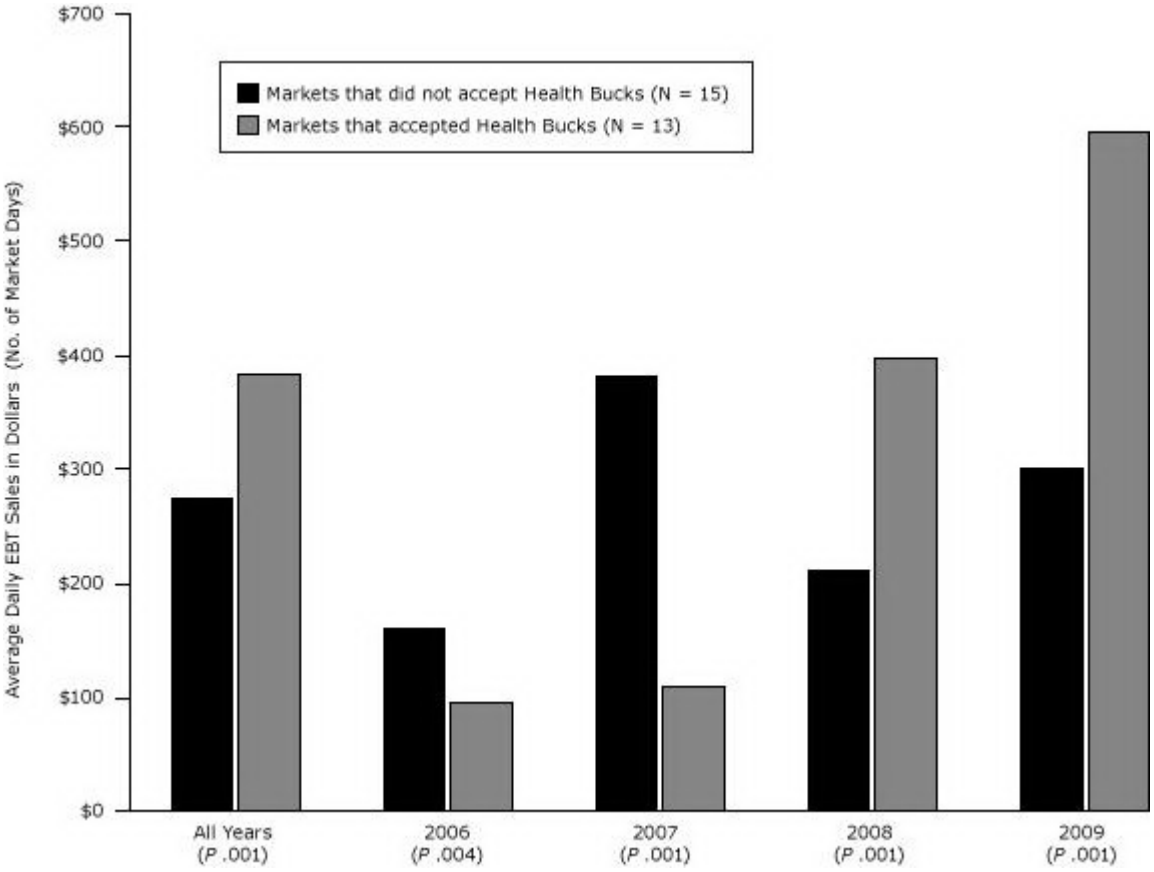

Figure 1. Average daily EBT sales at New York City farmers markets with and without the Health Bucks incentive, from 2006 through 2009. From 2006 through 2007, Health Bucks coupons were distributed primarily through community-based organizations. From 2008 through 2009, they were distributed primarily as an incentive for using EBT at farmers markets. Values are in dollars (followed by number of market days) and represent average sales per market day. Abbreviation: EBT, electronic benefit transfer. [Atabular version of this figure is also available.]

To examine potential confounders, our linear regression model adjusted for the income level of the neighborhood in which the markets were located and the year in which data were collected. We found that after controlling for these factors, markets participating in Health Bucks averaged $170.79 more in daily EBT sales than nonparticipating markets (95% CI, 102.4–239.1, P < .001).

To account for variation in market size, types of vendors, and operational hours that may have affected our comparison of EBT sales data across markets, we examined a subset of farmers markets for which EBT data were available both before and after Health Bucks were offered. We compared sales data within each individual market before and after the Health Bucks EBT incentive was introduced and found significant increases in EBT sales after introduction of the Health Bucks incentive in Market A ($340.67, 95% CI, 270.1–411.3 vs $1,607.88, 95% CI, 1341.30–1874.50, P < .001) and Market B ($18.00, 95% CI, 1.1–34.9 vs $66.53, 95% CI, 50.2–82.9, P = .041). Figure 2 displays average daily EBT sales for each market before and after introduction of Health Bucks.

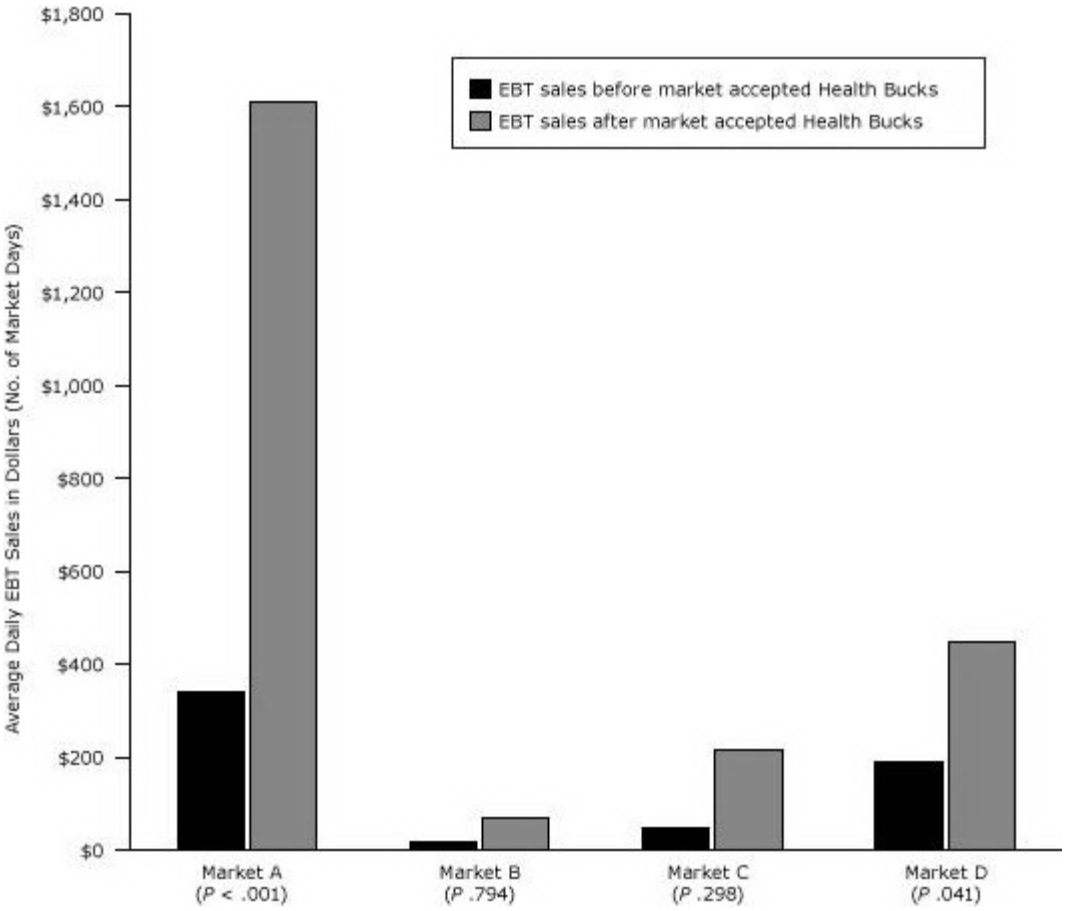

Figure 2. Average daily EBT sales at select New York City farmers markets before and after markets accepted Health Bucks, from 2006 through 2009. Analysis is limited to markets that accepted EBT both before and after accepting Health Bucks. Values are in dollars (followed by number of market days) and represent average sales per market day. Abbreviation: EBT, electronic benefit transfer. [A tabular version of this figure is also available.]

Discussion

In this preliminary study of the impact of Health Bucks on EBT spending at NYC farmer's markets, we found that offering a direct financial incentive to SNAP recipients using EBT at urban farmers markets in 3 low-income New York City neighborhoods was associated with significant increases in EBT sales at those markets. Among markets accepting EBT in 2008 and 2009, the average daily EBT sales at participating markets were nearly double the sales of markets that did not offer the incentive. After controlling for neighborhood income level and the year in which data were collected, increases in sales figures remained significant. Additionally, we compared sales data from 4 markets for which EBT data were available before and after the Health Bucks EBT incentive was introduced and found that the introduction of Health Bucks resulted in significant increases in EBT revenue in 2 of the 4 markets.

These preliminary results suggest Health Bucks could be a useful program model for the delivery of financial incentives that encourage low-income shoppers to visit farmers markets in neighborhoods where the availability of affordable, high quality produce in the retail environment may be limited (7,9). Our findings merit further exploration, especially considering research that suggests the consumption of fruits and vegetables may be higher among low-income people and SNAP recipients who shop in farmers markets (16,17). Studies have also documented high levels of coupon use in farmers markets among low-income older adults (11) and among participants in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) Farmers Market Nutrition Program (12–14). However, if more jurisdictions begin to provide these types of financial incentives, then developing successful strategies for distributing them will be essential. Health Bucks coupons offer a distribution model that should be further investigated for potential application in other settings seeking to encourage SNAP spending at farmers markets.

In 2008, several years after the launch of Health Bucks and midway through our study period, the New York City Human Resources Administration provided substantial financial support for the EBT incentive. This additional funding increased the number of coupons distributed from almost 20,000 in 2007 to more than 200,000 in 2008. Health Bucks was further expanded as part of the Centers for Disease Control and Prevention (CDC's) Communities

Putting Prevention to Work program (18), which funded grants to markets to hire market managers to operate the required EBT terminals. Health Bucks is now one of the largest farmers market financial programs in the United States, and our study's findings provide evidence suggesting the effectiveness of encouraging EBT spending at farmers markets via coupons for fresh produce.

This preliminary study has limitations. First, although our findings suggest that SNAP beneficiaries spent more at markets after the Health Bucks incentive was implemented, we cannot be certain that those individuals were buying more fruits and vegetables because farmers markets sell foods and goods other than fresh produce. Second, we acknowledge that the provision of the Health Bucks incentives may have shifted SNAP spending on fruits and vegetables from other food outlets to farmers markets, rather than increasing SNAP spending on produce overall. Alternatively, SNAP recipients may have shifted their spending from farmers markets that did not offer the Health Bucks incentive to markets that did. However, a recent study examining the effects of a subsidy for fresh fruits and vegetables for postpartum women who are beneficiaries of WIC programs indicated that incentive programs did increase purchasing and consumption of fresh produce, particularly for WIC recipients who received coupons for produce at farmers markets (12). This finding leads us to suspect that Health Bucks may have had the same effect, indicating the importance of further research to explore this possibility. Third, Greenmarket's data do not allow us to control for variations in size, vendor type, and operational hours in our analyses, and markets included in our analyses varied across years. These differences may have affected EBT sales; however, our internal comparison analysis of mean EBT sales in the same markets before and after the incentive aimed to address this limitation by comparing sales within the same market, where these factors would be relatively constant. Fourth, although the total number of days of sales data for this study was substantial (1,068), only 24 markets are represented in this study, and the sample sizes were limited, particularly for the analysis within the same markets. Further studies are needed to determine whether these are reliable effects. Finally, our data are limited to a nonrandom sample of participating Health Bucks markets that are members of the Greenmarket network and for which daily mean EBT sales data are available.

Future studies should address these limitations by exploring in greater detail how Health Bucks affects EBT spending in farmers markets citywide. One avenue for exploration would be to determine how Greenmarket's data capture can be improved to allow for finer analyses of market characteristics and locations that may affect EBT sales. Second, studies should be designed to assess whether increased EBT spending at farmers markets is directly linked to the purchase of fresh produce at farmers markets in low-income neighborhoods. One way to accomplish this goal would be to track how SNAP recipients spend the financial incentives they receive through Health Bucks. Third, if purchases of fresh fruits and vegetables do increase, then we must also investigate whether increased spending on fresh produce leads to greater consumption of fruits and vegetables among this low-income population; we note that a link between the purchase of fresh produce and its consumption has not yet been reliably established. Finally, by providing SNAP recipients with $2 coupons for every $5 spent via EBT, Health Bucks increased SNAP recipients' purchasing power by 40% (calculated as 40% of $5 = $2). However, programs across the country provide varying financial incentives, including many with a dollar-per-dollar match (12–14). Given the increasingly limited funding available for these types of programs, further research should examine the incentive level required to change SNAP purchasing patterns.

Because US health care costs for obesity and its associated health consequences reach $147 billion per year (19), municipalities are seeking to identify strategies that encourage healthier behaviors, particularly among populations at greatest risk. Improving the local food environment in low-income neighborhoods is a key avenue for exploration (20–22). We urge other urban jurisdictions to consider adapting the Health Bucks program where feasible to encourage low-income shoppers to purchase fresh produce as one potential strategy in a comprehensive approach to increasing access to and affordability of healthful food in low-income neighborhoods.

Acknowledgments

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Author Information

Corresponding Author: Sabrina Baronberg, MPH, Director, Food Access and Community Health Programs, Bureau of Chronic Disease Prevention and Tobacco Control, New York City Department of Health and Mental Hygiene, 42-09 28th St, 9th Floor – CN 46, Queens, NY 11101. Telephone: 347-396-4307. E-mail: sbaronbe@health.nyc.gov.

Author Affiliations: Lillian Dunn, Cathy Nonas, Rachel Dannefer, Bureau of Chronic Disease Prevention and Tobacco Control, New York City Department of Health and Mental Hygiene, New York, New York; Rachel Sacks, consultant to New York City Department of Health and Mental Hygiene, New York, New York.

References

1. US Department of Agriculture and US Department of Health and Human Services. Dietary guidelines for Americans, 2010. 7th edition, Washington (DC): US Government Printing Office; 2010.
2. Bodor JN, Ulmer VM, Dunaway LF, Farley TA, Rose D. The rationale behind small food store interventions in low-income urban neighborhoods: insights from New Orleans. J Nutr 2010;140(6):1185–8. CrossRef PubMed
3. Boeing H, Bechthold A, Bub A, Ellinger S, Haller D, Kroke A, et al. Critical review: vegetables and fruit intake in the prevention of chronic disease. Eur J Nutr 2012;51(6):637–63. CrossRef PubMed
4. Martínez-González MÁ, de la Fuente-Arrillaga C, López-del-Burgo C, Vázquez-Ruiz Z, Benito S, Ruiz-Canela M. Low consumption of fruit and vegetables and risk of chronic disease: a review of the epidemiological evidence and temporal trends among Spanish graduates. Public Health Nutr 2011;14(12A):2309–15. CrossRef PubMed
5. World Health Organization and Food and Agriculture Organization of the United Nations. Fruit and vegetables for health: report of a joint FAO/WHO workshop, 1-3 September 2004, Kobe, Japan. http://www.who.int/dietphysicalactivity/publications/fruit_vegetables_report.pdf . Accessed May 30, 2013.
6. Morland K, Wing S, Diez Roux A. The contextual effect of the local food environment on residents' diets: the atherosclerosis risk in communities study. Am J Public Health 2002;92(11):1761–7. CrossRef PubMed
7. Graham R, Kaufman L, Novoa Z, Karpati A. Eating in, eating out, eating well: access to healthy food in north and central Brooklyn. New York (NY): New York City Department of Health and Mental Hygiene; 2006.
8. Ver Ploeg ML, Chang HH, Lin BH. Over, under, or about right: misperceptions of body weight among food stamp participants. Obesity (Silver Spring) 2008;16(9):2120–5. CrossRef PubMed
9. Moore LV, Diez Roux AV, Nettleton JA, Jacobs DR Jr. Associations of the local food environment with diet quality — a comparison of assessments based on surveys and geographic information systems: the Multi-Ethnic Study of Atherosclerosis. Am J Epidemiol 2008;167(8):917–24. CrossRef PubMed
10. New York City Department of Health and Mental Hygiene. 2009 Community Health Survey. http://www.nyc.gov/html/doh/html/community/community.shtml. Accessed January 10, 2012.
11. Balsam A, Webber D, Oehlke B. The farmers market coupon program for low-income elders. J Nutr Elder 1994;13(4):35–42. CrossRef PubMed
12. Herman DR, Harrison GG, Afifi AA, Jenks E. Effect of a targeted subsidy on intake of fruits and vegetables among low-income women in the Special Supplemental Nutrition Program for Women, Infants, and Children. Am J Public Health 2008;98(1):98–105. CrossRef PubMed
13. Racine EF, Smith Vaughn A, Laditka SB. Farmers market use among African-American women participating in the Special Supplemental Nutrition Program for Women, Infants, and Children. J Am Diet Assoc 2010;110(3):441–6. CrossRef PubMed
14. Anliker JA, Winne M, Drake LT. An evaluation of the Connecticut farmers' market coupon program. J Nutr Educ 1992;24(4):185–91. CrossRef
15. New York State Office of Temporary and Disability Assistance. Electronic Benefits Transfer (EBT). http://otda.ny.gov/programs/ebt/. Accessed May 30, 2013.
16. Jilcott Pitts SB, Wu Q, McGuirt JT, Crawford TW, Keyserling TC, Ammerman AS. Associations between access to farmers' markets and supermarkets, shopping patterns, fruit and vegetable consumption and health indicators among women of reproductive age in eastern North Carolina, USA. Public Health Nutr 2013;24:1–9. E-pub ahead of print May 24, 2013. CrossRef PubMed
17. Gustafson A, Lewis S, Perkins S, Wilson C, Buckner E, Vail A. Neighbourhood and consumer food environment is associated with dietary intake among Supplemental Nutrition Assisstance Program (SNAP) participants in Fayette County, KY. Public Health Nutr 2013;16(7):1229–37. PubMed
18. Bunnell R, O'Neil D, Soler R, Payne R, Giles WH, Collins J, et al. Fifty communities putting prevention to work: accelerating chronic disease prevention through policy, systems, and environmental change. J Community Health 2012;37(5):1081–90. CrossRef PubMed
19. Trogdon JG, Finkelstein EA, Feagan CW, Cohen JW. State- and payer-specific estimates of annual medical expenditures attributable to obesity. Obesity (Silver Spring) 2012;20(1):214–20. CrossRef PubMed

20. O'Malley K, Gustat J, Rice J, Johnson CC. Feasibility of increasing access to healthy foods in neighborhood corner stores. J Community Health 2013;38(4):741-9. CrossRef PubMed
21. Bassett MT. Of personal choice and level playing fields: why we need government policies on food content. Am J Public Health 2012;102(9):1624. CrossRef PubMed
22. Hosler AS, Rajulu DT, Fredrick BL, Ronsani AE. Assessing retail fruit and vegetable availability in urban and rural underserved communities. Prev Chronic Dis 2008;5(4):A123. PubMed

Table

Table. Characteristics of New York City Greenmarkets[a] by Year, 2006–2009

Return

Year	2006	2007	2008	2009
Number of Greenmarkets accepting EBT	8	8	15	23
Number of Greenmarkets offering Health Bucks incentives	5	6	8	12
Number of Greenmarket market days[b] with EBT data	120	177	272	499

Abbreviation: EBT, electronic benefit transfer.
[a] Greenmarket (http://www.grownyc.org/greenmarket), an outdoor urban farmers market network, manages the subset of the markets in New York City that participate in the Health Bucks program.
[b] Includes each day of operation for each individual market.

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PREVENTING CHRONIC DISEASE
PUBLIC HEALTH RESEARCH, PRACTICE, AND POLICY

ORIGINAL RESEARCH Volume 10 — October 03, 2013

Increasing Access to Farmers Markets for Beneficiaries of Nutrition Assistance: Evaluation of the Farmers Market Access Project

Kate Cole, MPH; Molly McNees, PhD; Karen Kinney, MBA; Kari Fisher, MPH, RD, CD; James W. Krieger, MD, MPH

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In this podcast interview, listen to author Kate Cole, MPH, talk about increasing access to farmers markets in low-income communities.

PEER REVIEWED

Abstract

Introduction
Increased acceptance of nutrition benefits at farmers markets could improve access to nutritious foods for low-income shoppers. The objective of this study was to evaluate a pilot project to increase participation by farmers markets and their vendors in the Supplemental Nutrition Assistance Program (SNAP) and Special Supplemental Nutrition Program for Women, Infants, and Children (WIC).

Methods
The intervention targeted 9 markets in lower-income regions of King County, Washington. Markets and vendors were offered subsidized electronic benefits transfer (EBT) terminals for processing SNAP, and vendors could apply to accept WIC cash value vouchers. WIC staff received information on using SNAP and vouchers at farmers markets. We used mixed methods post-implementation to measure participation, describe factors in acceptance of benefits, and assess information needs for WIC staff to conduct effective outreach.

Results
Of approximately 88 WIC-eligible vendors, 38 agreed to accept vouchers. Ten of 125 vendors installed an EBT terminal, and 6 markets installed a central market terminal. The number of market stalls accepting SNAP increased from 80 to 143, an increase of 79%. Participating vendors wanted to provide access to SNAP and WIC shoppers, although redemption rates were low. Some WIC staff members were unfamiliar with markets, which hindered outreach.

Conclusion
Vendors and markets value low-income shoppers and, when offered support, will take on some inconvenience to serve them. To improve participation and sustainability, we recommend ongoing subsidies and streamlined procedures better suited to meet markets' capabilities. Low EBT redemption rates at farmers markets suggest a need for more outreach to low-income shoppers and relationship building with WIC staff.

Introduction

The lack of affordable sources of fresh produce contributes to poor nutrition in many low-income neighborhoods (1,2). To address this problem, the Centers for Disease Control and Prevention (CDC) and the US Department of Agriculture (USDA) recommend increasing access to farmers markets, which, because of their flexibility, can bring produce directly into underserved communities (3,4).

The USDA's Supplemental Nutrition Assistance Program (SNAP) and Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) allow for use of benefits at farmers markets. In 1994, USDA began issuing SNAP

benefits through electronic benefits transfer (EBT) cards rather than paper coupons. Although USDA provided EBT card-reading terminals to retailers, they required electricity and a landline, which are not available at most farmers markets. Between 1993 and 2007, SNAP sales at farmers markets decreased from $9.5 million to $1.7 million nationally (5). More recently, wireless terminals have been introduced, but they remain inaccessible for many markets and vendors because of an estimated national cost of $850 per terminal, plus $40 monthly fees (5). In 2009, WIC launched cash value vouchers (in paper format) for the purchase of fruits and vegetables. Most paper vouchers are redeemed at supermarkets; states can approve vouchers for use at farmers markets, although few have done so (6).

In 2010, CDC funded Public Health–Seattle & King County through Communities Putting Prevention to Work (CPPW), a national initiative to prevent chronic disease through policy, systems, and environmental changes (7). Public Health–Seattle & King County funded the Farmers Market Access Project (FMAP). FMAP subsidized EBT terminals and facilitated WIC-authorized vendors' participation in a state waiver allowing the use of vouchers at farmers markets. The objective of this study was to evaluate motivations and barriers to participation among vendors and markets and explore WIC staff experience in promoting farmers markets.

Methods

Study design

We used mixed methods to evaluate the program after implementation (Table 1). We examined project records to determine redemption rates of WIC vouchers and SNAP benefits at intervention markets. We also surveyed or interviewed market managers and vendors about their decision to accept or decline vouchers or SNAP or both and vendors' employees about their experience accepting SNAP and vouchers. We surveyed WIC clinic staff and conducted a focus group with WIC staff and market managers to evaluate training needs for conducting effective client outreach. The University of Washington's Human Subjects Division deemed our study exempt.

Intervention

FMAP recruited all 9 farmers markets in the CPPW target region of South King County for the pilot. FMAP offered 2 options for these markets to accept SNAP. Option 1: Markets, through their governing body and manager, could become authorized SNAP retailers and either purchase or lease a wireless EBT/credit/debit terminal. FMAP reimbursed a year's operating costs, excluding credit/debit transaction fees, plus the cost of a 1-year lease or half the purchase price. One terminal can serve an entire market, meaning shoppers swipe their EBT or credit/debit cards at the market entrance in exchange for dollar "tokens" to be used at vendors' stalls. Three markets were authorized SNAP retailers before the intervention, although 2 lacked terminals, and one could not accept credit/debit. FMAP offered them EBT/credit/debit terminals. Option 2: FMAP reimbursed individual vendors for a 1-year terminal lease or 50% of purchase cost plus a year's operating costs, excluding credit/debit transaction fees, in exchange for becoming authorized SNAP retailers. Vendors who received terminals could use them to accept SNAP and credit/debit at any retail location where they sold, including at markets that received a market-wide terminal. Vendors were eligible to apply for a terminal if they had a stall at an intervention market and sold at least 50% SNAP-eligible products, as determined by USDA.

For this pilot, vendors at the intervention markets could apply to Washington State for authorization to accept WIC vouchers. To expedite the contracting process, the state limited eligibility to vendors already participating in an existing WIC program. Vendors were required to complete an application and attend a training session. When accepting vouchers, sales staff were required to check the shopper's identification, obtain a signature, and record purchase information.

The first 10 months of the intervention were dedicated to planning and outreach. The FMAP coordinator consulted with an FMAP advisory committee of WIC and SNAP program staff, vendors, and market representatives to recruit and train market managers and vendors. An advisory committee member met with and e-mailed WIC clinic lead staff to explain the project and encouraged them to educate their staff and clients. The advisory committee also produced and translated outreach materials for distribution at WIC clinics and markets.

Setting

Our study was conducted from August 2011 through February 2012 — beginning 3 months after markets opened until 4 months after markets closed — to gather feedback at the height of the sales season and to allow vendors to reflect on their experience after markets closed. The participating markets were located in an area encompassing 44% of the county's 1.9 million residents (8). This area is more racially diverse and has higher rates of poverty than the rest of the county (8). Of residents in this region, 20% receive SNAP benefits and 3% receive WIC benefits, compared with the county as a whole, at 6% and 2%, respectively. The only food deserts in King County are in this region (9).

Study population and data collection

Participation in the intervention was determined by asking market managers to provide estimates of the number of vendor stalls and SNAP-eligible vendors at their markets and reviewing FMAP records. FMAP records also provided information on redemption rates for SNAP and WIC vouchers. For surveys and interviews, we had 3 study groups: vendors, market managers, and WIC clinic staff (Figure). All participants had to be 18 years of age or older, speak English or Spanish, or have someone to interpret, and agree to participate in the study. The FMAP committee consulted on survey and focus group questions and the interview guide (Appendix), which were then reviewed by public health evaluators and pilot tested with the target audience.

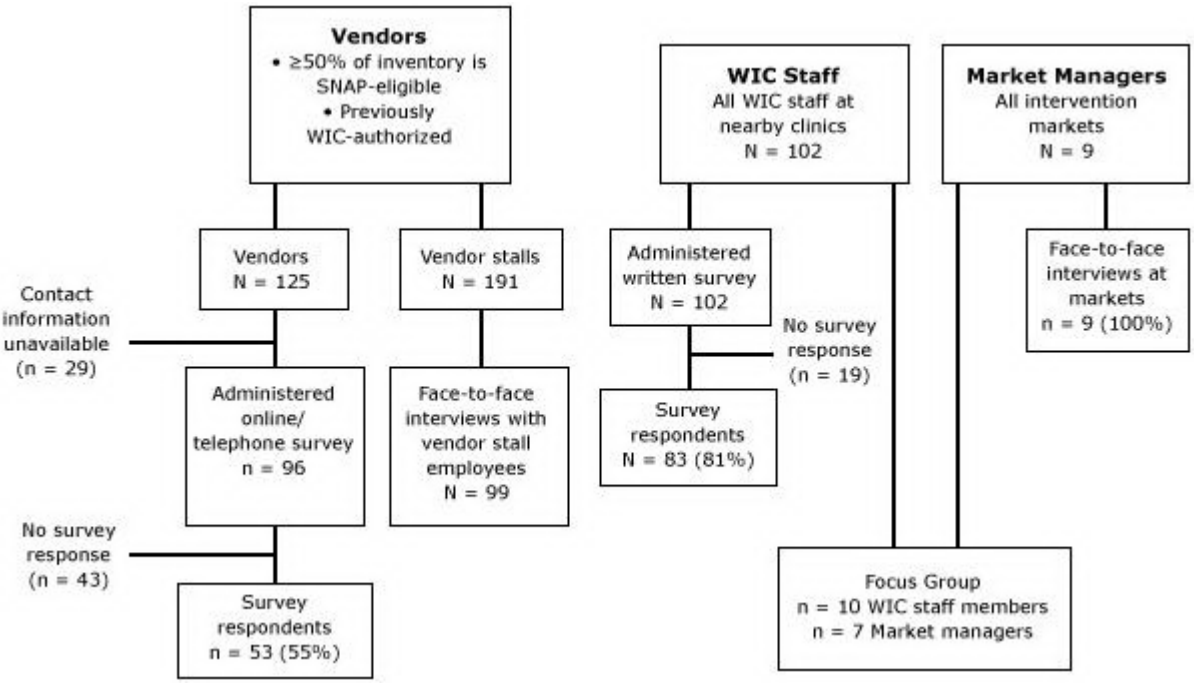

Figure. Eligibility criteria and sample sizes for vendors, market managers, and WIC clinic staff included in the evaluation of the Farmers Market Access Project, King County, Washington, 2011. N = the number surveyed or invited to be surveyed; n = number responding. Abbreviations: WIC, Special Supplemental Nutrition Program for Women, Infants, and Children; SNAP, Supplemental Nutrition Assistance Program; FMAP, Farmers Market Access Project. [A text description of this figure is also available.]

Vendors eligible to apply to accept SNAP or vouchers and for whom we had accurate contact information were surveyed 2 to 4 months after markets closed. This Internet and telephone survey asked vendors about factors influencing their decision to participate in FMAP. We sent 2 e-mails and made 1 telephone call to each nonrespondent.

We also surveyed employees at market stalls who were either participating in FMAP or were selling at a market that had received a terminal through FMAP. We asked about their experience accepting vouchers and SNAP at the market where they were operating that day. All markets operated 1 day per week, and we visited each for 1 full day beginning 3 months after markets opened.

Using a semistructured interview guide, we interviewed managers at each market during our market visit. Because they influenced decisions made by the market's governing organization, we asked about triggers and barriers to installing a central market EBT terminal through FMAP and post-intervention intentions to maintain a terminal.

We surveyed all WIC staff at 13 clinics near the markets during the month in which markets closed through a self-administered questionnaire. Lead staff distributed and collected the surveys at a staff meeting.

We convened a focus group 1 month after markets closed. Managers from each of the markets and 1 representative from each of the WIC clinics were asked to participate. Advisory committee members from both WIC and market management facilitated the focus group.

Data analysis

We described quantitative data by using frequencies calculated with PASW Statistics 18.0 (SPSS Inc, Chicago, Illinois). We reported Likert scale responses as mean and standard deviation (SD). The focus group discussion was audio-recorded and transcribed. One researcher coded the focus group, open-ended survey items, and interview responses,

and formed themes and key examples. The second and third authors reviewed this analysis, iteratively discussing disparate interpretations.

Results

Vendor acceptance of SNAP and WIC vouchers

Before the intervention, 3 markets representing a total of approximately 80 vendor stalls accepted SNAP. Through FMAP, 6 of the 9 markets either received terminals or upgraded their existing equipment. Of the 125 vendors eligible to receive a terminal, 10 (8%) became SNAP retailers and either received a terminal or upgraded their credit/debit terminal to accept SNAP. FMAP also permitted 63 additional vendor stalls to accept SNAP, an increase of 79% from 80 to 143 stalls.

Of the 88 vendors eligible to apply to accept vouchers, 38 (43%) applied and were authorized; 25 of these (66%) successfully redeemed vouchers. Pregnant and postpartum WIC clients receive $10 in vouchers monthly, plus $6 per child aged 1 to 5 years. Vendors accepted vouchers from July through October 2011. Of 95,244 vouchers distributed at area WIC clinics during this period, 427 (0.4%) were redeemed at the FMAP farmers markets, totaling $3,052; traditional retailers in the region redeemed $582,000 in vouchers during this period.

Vendors and employees

WIC Vouchers

The most common reason cited for not applying to accept vouchers was an inability to attend the required training (Table 2). One vendor explained, “I need to be able to sign up before the market season begins because I can’t handle both [selling and attending a training] at once.” Some respondents learned of the project too late to apply or thought accepting or depositing vouchers seemed too complicated.

Most participating vendors reported participating because they wanted to make it easier for WIC clients to purchase their food. One vendor explained, “The process was a little different because you had to write things down, but other than that, it would just be one more way of letting them have my food.” Nearly half said they accepted vouchers to earn more money, and most were interested in accepting vouchers again in the future.

Forty-seven of the 99 employees surveyed at markets accepted vouchers. Most experienced no problems, but 12 reported difficulty following the steps required in voucher transactions. Noting that banks would not redeem the vouchers without proper transaction documentation, 1 vendor lamented, “We’re so busy that we can’t stop and check IDs. We only got $100 in [vouchers] and every one of them was filled out wrong, so it was a total loss.”

Supplemental Nutrition Assistance Program

Among the 43 vendors who did not receive a terminal, the most common reason for nonparticipation was the expense of credit/debit sales fees (Table 2). The second most common response was the belief that the terminal would not be profitable; half of these respondents explained they sold at few markets and/or had total sales too low to warrant accepting noncash currencies. Six of the nonparticipating vendors expressed interest in future participation.

Among the 9 vendors surveyed who acquired a terminal, the most common reasons for doing so were to make it easier for SNAP clients to buy their food and to increase sales. When asked if they felt it was worth their time and effort to get a terminal, 6 of 9 said yes. Two vendors were unsure, noting low SNAP profits: “EBT sales at farmers markets were low, but I believe they will grow with time.” One vendor said he would not continue using his terminal without a subsidy.

Of the 16 employees who operated terminals, 7 said the terminal was slow to process cards. One vendor had never gotten his terminal to work successfully.

Of the 99 employees surveyed, 82 sold at markets that received a market terminal. Fifty-two of these said the market’s SNAP/credit/debit capabilities increased their stall’s profits at that market. Most wanted the market to continue the system.

Market managers

Three market managers operated city- or volunteer-run markets and chose not to get a terminal. These managers expressed concern over the legal responsibilities associated with becoming a SNAP retailer and the additional accounting work in handling SNAP sales and reimbursement. In contrast, 5 of the 6 participating markets were run by independent organizations with paid staff and the capacity to absorb additional work. These managers cited increased convenience and a larger customer base as their primary motivations. However, 1 manager stated, “From a business perspective, it’s a lot of overhead for very little money. It’s an access issue — we wanted to reach out.” Two managers said they had been hesitant about the extra responsibility of accepting SNAP, noting that they would not have

participated without FMAP's encouragement. Despite some initial reluctance, all managers were happy with their improved SNAP/credit/debit capabilities and planned to retain their terminal without subsidies.

WIC clinic staff

The mean rating of FMAP knowledge was high among the 83 WIC staff surveyed, but fewer than half reported discussing with every client opportunities to use vouchers or SNAP at farmers markets (Table 3). Most who did indicated that clients responded enthusiastically or wanted more information about using benefits at markets. Some, however, said clients with limited English proficiency were confused or overwhelmed by this information. Respondents cited transportation/market location and language as the most common barriers to using vouchers at markets.

Many of the themes identified by the focus group comprising market managers and WIC staff supported our WIC staff survey results. Both parties felt better coordination between WIC and markets would improve outreach to shoppers. One WIC staff member said it was difficult to tell clients about the market because she had never been. She suggested, "We could set up a day to have a tour for all the WIC staff, how it's available and how it runs. Recruit some of our clients to help other clients at the market." Another WIC staff member agreed: "We had to explain to clients how to use the [vouchers] and the EBT, but we really weren't connected with the farmers; we did not know how the process was going to be."

As the focus group concluded, WIC staff and market managers suggested future collaboration: "You could attend one of our staff meetings and talk about how we can do a better job of promoting the market," a WIC staff member said to a manager. "I'm going to make sure we have a WIC person at our market," resolved a manager.

Discussion

We found that farmers markets and vendors wanted to encourage shoppers using WIC and SNAP benefits and, when offered support through FMAP, were willing to take on some inconvenience to serve them. This expands on conclusions from a 2003 study on the use of vouchers in the Senior Farmers Market Nutrition Program, which found vendors would make accommodations to participate in programs serving low-income seniors (10). That said, the ongoing costs associated with terminals and difficulties securing voucher authorization and redemption were barriers. Our findings suggest that vendor participation could be increased by simplifying the enrollment and transaction processes and reducing costs associated with accepting benefits. Other communities have subsidized costs and have seen increases in market participation and shopper use (11–13).

Few vendors chose to get their own terminals, and most vendors viewed FMAP's short-term subsidies as insufficient to offset terminal operation costs, consistent with a previous study (14). In contrast, the market-wide terminal model offered an economy of scale, providing lower cost relative to terminals operated by individual vendors. Other studies cite the pros and cons of both models, reporting an accounting burden on market managers as SNAP usage increases and, in one intervention, higher total SNAP sales when vendors had their own terminals compared with the market-wide terminal model (13,14). Because of the advantages and disadvantages of each model, as well as our finding that some markets are unlikely to adopt terminals, we recommend that both models be encouraged.

SNAP and WIC voucher redemption rates during the intervention were low, a problem faced by many farmers markets (13,15). The nationwide increase in SNAP spending at markets as the number of markets accepting SNAP has increased suggests that redemption rates grow as markets and vendors perceive that opportunity costs are acceptable and shoppers' awareness increases (12). Previous research cites market inaccessibility (eg, transportation and hours), unfamiliarity with farmers markets, and a perception of higher prices as barriers to attracting low-income shoppers (13,15,16). Our findings suggest that interventions to address these barriers — and robust outreach — are needed for a supply-side intervention to succeed. Relationship building between WIC staff and market personnel is one way to encourage outreach, because WIC staff may be motivated to promote farmers markets when they feel connected to and knowledgeable about them. Other communities have succeeded in attracting low-income shoppers and increasing benefit redemptions at markets through strong community and organizational partnerships (17,18). In addition, incentives for SNAP and WIC shoppers, such as free vouchers and matching funds for spending benefits at markets, have been successful at attracting low-income shoppers (13,19).

Our study has several limitations. Although we included the views and experiences of multiple stakeholders, we surveyed a small number of cases — those in FMAP. These markets all serve low-income areas; our findings may not be representative of farmers markets in general. Because we only surveyed English and Spanish speakers, some vendors were not represented. We had a low response rate among employees because some stalls were not present on the day of our visit and because of time and language barriers.

Our study suggests that, when given support, farmers markets will accept some inconvenience to serve nutrition assistance beneficiaries; however, without subsidies, many will find the costs of equipment and fees too high. In addition, market managers and WIC staff are willing to work together to improve outreach to low-income shoppers.

Although nutrition assistance programs align with the social values of many farmers markets and their vendors, these programs as currently designed are better suited to the capacity of large food retailers. By translating pilot interventions such as this into wider-reaching policies, adapting the requirements of federal nutrition assistance programs to meet the capabilities of farmers markets, and providing incentives for the use of nutrition benefits at markets, policy makers have the opportunity to shift the local food environment toward greater access to fresh produce for lower-income residents.

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Author Information

Corresponding Author: Molly McNees, PhD, Public Health–Seattle & King County, 401 5th Ave, Ste 1300, Seattle, WA 98401. Telephone: 206-263-8771. E-mail: molly.mcnees@kingcounty.gov.

Author Affiliations: Kate Cole, University of Washington School of Public Health, Seattle, Washington; Karen Kinney, King County Department of Natural Resources and Parks, Seattle, Washington; Kari Fisher, Public Health–Seattle & King County, Seattle, Washington; James W. Krieger, Public Health–Seattle & King County, and the Schools of Medicine and Public Health, University of Washington, Seattle, Washington.

References

1. Morland K, Wing S, Diez Roux A, Poole C. Neighborhood characteristics associated with the location of food stores and food service places. Am J Prev Med 2002;22(1):23–9. CrossRef PubMed
2. Larson NI, Story MT, Nelson MC. Neighborhood environments: disparities in access to healthy foods in the U.S. Am J. Prev Med 2009;36(1):74–81. CrossRef PubMed
3. Khan LK, Sobush K, Keener D, Goodman K, Lowry A, Kakietek J, et al. Recommended community strategies and measurements to prevent obesity in the United States. MMWR Recomm Rep 2009;58(RR-7):1–26. PubMed
4. Strategic plan FY 2010-2015. Washington (DC): US Department of Agriculture, Office of the Chief Financial Officer; 2010. http://www.ocfo.usda.gov/usdasp/sp2010/sp2010.pdf. Accessed May 22, 2013.
5. Supplemental Nutrition Assistance Program: feasibility of implementing electronic benefits transfer system in farmers' markets, report to Congress. Washington (DC): US Department of Agriculture; 2010. http://www.fns.usda.gov/snap/ebt/pdfs/Kohl–Feasibility.pdf. Accessed May 22, 2013.
6. Tessman N, Fisher A. State implementation of the new WIC produce package: opportunities and barriers for WIC clients to use their benefits at farmers' markets. Portland (OR): Community Food Security Coalition; 2009.
7. Bunnell R, O'Neil D, Soler R, Payne R, Giles WH, Collins J, et al. Fifty communities putting prevention to work: accelerating chronic disease prevention through policy, systems and environmental change. J Community Health 2012;37(5):1081–90. CrossRef PubMed
8. American Fact Finder: Profile of General Population, King County Washington 2010. US Census Bureau. http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC_10_DP_DPDP1&prodType=table. Accessed April 14, 2012.
9. Food Access Research Atlas. Washington (DC): US Department of Agriculture, Economic Research Service. http://www.ers.usda.gov/data/fooddesert/fooddesert.html. Updated May 8, 2013. Accessed May 22, 2013.
10. Kunkel ME, Luccia B, Moore AC. Evaluation of the South Carolina Seniors Farmers' Market Nutrition Program. J Am Diet Assoc 2003;103(7):880–3. CrossRef PubMed
11. Jones P, Bhatia R. Supporting equitable food systems through food assistance at farmers' markets. Am J Public Health 2011;101(5):781–3. CrossRef PubMed

12. Roper N. SNAP Redemptions at farmers' markets exceed $11 million in 2011. Charlottesville (VA): Farmers Market Coalition; 2012. http://farmersmarketcoalition.org/snap-redemptions-at-farmers-markets-exceed-11m-in-2011. Accessed May 22, 2013.
13. Briggs S, Fisher A, Lott M, Miller S, Tessman N. Real food, real choice: connecting SNAP recipients with farmers' markets. Portland (OR): Community Food Security Coalition; 2010.
14. Buttenheim AM, Havassy J, Fang M, Glyn J, Karpyn AE. Increasing supplemental nutrition assistance program/electronic benefits transfer sales at farmers' markets with vendor-operated wireless point-of-sale terminals. J Acad Nutr Diet 2012;112(5):636–41. CrossRef PubMed
15. Grace C, Grace T, Becker N, Lyden J. Barriers to using urban farmers' market: an investigation of food stamp clients' perception. Portland: Oregon Food Bank; 2005.
16. Nadovich J, Metrick J. Connecting local farmers with USDA Farmers Market Nutrition Program participants. Perkasie (PA): Southeastern Pennsylvania Resource Conservation and Development Council, US Department of Agriculture; 2010. http://www.ams.usda.gov/AMSv1.0/getfile?dDocName=STELPRDC5083319. Accessed May 22, 2013.
17. Conrey EJ, Frongillo EA, Dollahite JS, Griffin MR. Integrated program enhancements increased utilization of Farmers' Market Nutrition Program. J Nutr 2003;133(6):1841–4. PubMed
18. Fisher A. Hot peppers and parking lot peaches: evaluating farmers' markets in low-income communities. Venice (CA): Community Food Security Coalition; 1999.
19. Food stamp program: options for delivering financial incentives to participants for purchasing targeted foods. Washington (DC): US Government Accountability Office; 2008. http://www.gao.gov/new.items/d08415.pdf. Accessed May 22, 2013.

Tables

Table 1. Timetable of Intervention and Evaluation Activities of Farmers Market Access Project, King County, Washington, 2010–2012

Return

Activities	2010						2011												2012		
	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M
Intervention																					
Advisory Committee forms, meets monthly	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
SNAP and WIC voucher workshops for vendors and market managers		■				■															
Outreach newsletters and e-mails distributed to vendors						■	■	■													
WIC voucher training sessions for vendors										■	■	■	■								
SNAP and WIC client outreach materials developed and distributed to WIC clinics										■	■	■	■	■							
Markets open, markets and vendors accept SNAP/EBT and credit/debit											■	■	■	■	■	■					
Vendors accepting WIC vouchers (1 month after markets opened due to WIC approval of voucher applications)												■	■	■	■	■					
Outreach (signs and ethnic media) to SNAP and WIC clients												■	■	■	■						
Evaluation																					
Managers interviewed and vendor stall employees surveyed at markets														■	■						
WIC staff surveyed in clinics																■					
Focus group with WIC staff and market managers																	■				

Activities	2010						2011												2012		
	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M
Telephone and e-mail survey of vendors																		■	■	■	

Abbreviations: SNAP, Supplemental Nutrition Assistance Program; WIC, Special Supplemental Nutrition Program for Women, Infants, and Children; EBT, electronic benefits transfer.

Table 2. Internet and Telephone Survey of Vendors (N = 53) Eligible to Participate in Farmers Market Access Project, 9 Farmers Markets, King County, Washington, 2011

Return

Factor (No. of Respondents)	n
WIC Cash Value Vouchers	
Nonparticipating vendors (n = 19)[a]	
Reasons for not participating[b]	
Unaware of project	6
Unable to attend required training	8
Accepting or depositing vouchers too complicated	5
Did not seem profitable	2
Other[c]	4
Interested in applying to participate next year	
Yes	4
No	6
Maybe/only if there were changes	9
Participating vendors (n = 31)[a]	
Reasons for participating[b]	
To make it easier for WIC customers to buy my food	27
I felt like I would earn more money	15
Other[c]	5
Interested in participating again next year[d]	
Yes	22
No	5
Maybe	2
Wireless EBT/Credit/Debit Terminals for Vendors	
Nonparticipating vendors (n = 43)[a]	
Reasons for not participating[b]	
Did not want to pay credit/debit fees	19
Did not seem profitable	14
I mostly sell at markets that have their own terminal	9
Application was too complicated	6
Unaware of project	6
Project launched during market season	5

Factor (No. of Respondents)	n
Accounting and usage seemed too difficult	5
Other[c]	5
Interested in applying for a terminal next year	
Yes	6
No	25
Maybe	12
Participating vendors (n = 9)[a]	
Reason for participating[b]	
To make it easier for SNAP clients to buy my food	6
To increase sales	6
Other[c]	4
Do you feel it was worth your time and effort to get a terminal?[e]	
Yes	6
Unsure	2
No	0
Plan to continue using terminal next year[e]	
Yes, even without financial assistance	6
Yes, but only with financial assistance	1
No	1

Abbreviations: WIC, Special Supplemental Nutrition Program for Women, Infants and Children SNAP, Supplemental Nutrition Assistance Program.
[a] 53 vendors were surveyed; 3 were not eligible to accept SNAP and thus did not complete this portion of the survey. One vendor who was eligible for SNAP and cash value vouchers completed only the portion of the survey that addressed vouchers.
[b] Participants were given 10 responses to choose from and allowed to choose up to 2 reasons.
[c] "Other" includes both the open response "other" and responses chosen by only 1 participant.
[d] Two participants did not answer the question.
[e] One participant did not answer the question.

Table 3. Survey of WIC Staff (N = 83) on Knowledge of Farmers Market Access Project, Outreach to Clients, and Perceptions of Client Interest in Shopping at Farmers Markets, King County, Washington, 2011

Return

Topic/Factor (No. of Respondents)	Value[a]
Farmers Market Access Project outreach (n = 83)	
Frequency of discussion of WIC voucher opportunities at markets per client visit (n = 83)	
At least once to more than once with every client	37 (44.6)
With many, but not all, clients	32 (38.6)
Rarely or never	14 (16.9)
Frequency of discussion of SNAP opportunities at markets per client visit (n = 82)	
At least once with every client	25 (30.5)
With some, but not all, clients	38 (46.3)
Rarely or never	19 (23.2)

Topic/Factor (No. of Respondents)	Value[a]
Staff perceptions of client interest in Farmers Market Access Project[b, c]	
English-speaking clients' response to learning about WIC voucher opportunities (n = 64)	
Enthusiastic/wanted more information	53 (82.8)
Confused/overwhelmed	3 (4.7)
Indifferent/uninterested	9 (14.1)
Limited-English–proficiency clients' response to learning about WIC voucher opportunities (n = 64)	
Enthusiastic/wanted more information	50 (78.1)
Confused/overwhelmed	12 (18.8)
Indifferent/uninterested	9 (14.1)
English-speaking clients' response to learning about SNAP opportunities (n = 46)	
Enthusiastic/wanted more information	36 (78.3)
Confused/overwhelmed	5 (10.9)
Indifferent/uninterested	9 (19.6)
Limited-English–proficiency clients' response to learning about SNAP opportunities (n = 49)	
Enthusiastic/wanted more information	35 (71.4)
Confused/overwhelmed	11 (22.4)
Indifferent/uninterested	7 (14.3)
Staff perceptions of client barriers[c, d]	
Barriers clients face to using WIC vouchers at markets (n = 66)	
Transportation/location	36 (54.5)
Language	21 (31.8)
Schedule	11 (16.7)
Lack of participating vendors or markets	10 (15.2)
WIC staff knowledge of Farmers Market Access Project[e] (n = 80)	
Mean (SD)	7.4 (2.2)

Abbreviations: WIC, Special Supplemental Nutrition Program for Women, Infants, and Children; SNAP, Supplemental Nutrition Assistance Program; SD, standard deviation.
[a] All values are numbers (percentages), unless otherwise indicated.
[b] Excludes respondents who indicated promoting the Farmers Market Access Project rarely or never (n = 14 for WIC vouchers; n = 19 for SNAP).
[c] Respondents allowed to choose up to 3 responses; responses do not total 100%.
[d] Open-response question; answers coded and 4 most common responses reported; responses do not total 100%.
[e] Knowledge measured according to 10-point Likert scale (1 = very low; 10 = very high).

Appendix: Survey, Interview, and Focus Group Guides

Return

A. Vendor Survey Questions

A1. Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) cash value voucher non-participants:

(WIC vouchers were commonly known by vendors as "$6 and $10 WIC Fruit & Vegetable Checks," and thus this term was used in the vendor survey.)

This year, there was a project that would allow vendors to accept $6 and $10 WIC Fruit & Vegetable checks. Why did you decide not to participate? (You may choose up to 2 answers.)

- I didn't know about the project

- I don't sell the right kind of food
- I couldn't attend the required training
- The application process seemed too complicated
- It didn't seem like I would make much money from it
- The check amounts were too large
- I was worried it would be hard to deposit the checks and I would lose money
- The penalties for making a mistake when depositing a check were too high
- It is too hard to accept checks from customers
- I, or my employees, don't speak enough English
- Other (please specify):

Do you want to accept the $6 and $10 WIC Fruit & Vegetable checks next year? (Please choose only 1 answer)

- No
- Maybe, I need more information
- Yes

A2. WIC Cash Value Voucher Participants:

Why did you decide to apply to accept $6 and $10 WIC Fruit & Vegetable checks? (You may choose up to 2 answers.)

- I wanted to make it easier for WIC customers to buy my food
- I felt like I would earn more money
- The process seemed easy
- Other (please explain):

Do you plan to continue to accept $6 and $10 WIC Fruit & Vegetable checks next year? (Please choose only 1 answer.)

- Yes
- Maybe
- No

A3. SNAP/EBT Nonparticipants:

This year, there was a project helping vendors get a wireless EBT (food stamps)/credit/debit terminal if they applied to accept EBT (get an FNS number to be a SNAP retailer). Why did you decide not to get a wireless terminal? (You may choose up to 2 answers.)

- I didn't know about the project
- I didn't think I would make much money from it
- The application was too complicated
- The accounting seemed like too much work
- Too much risk if people made mistakes
- I mostly sell at markets with their own terminals
- I didn't want to pay credit/debit fees
- I, or my employees, don't speak enough English
- Other (please explain):

Do you want to apply for a wireless terminal next year?

- No
- Maybe, I need more information
- Yes, I'm interested

A4. SNAP/EBT Participants

Why did you decide to get a wireless terminal through the Farmers Market Access Project? (You may choose up to 2 answers.)

- To make it easier for people who have EBT (food stamps) to buy my food
- To increase sales
- To make it easier for people shopping with credit/debit
- It seemed like a good opportunity to get a cheap wireless terminal
- I wanted to use the terminal at other locations (CSA, farm stand, etc)
- Other (please explain):

Did you feel it was worth your time and effort to get set up to accept EBT and credit/debit?
(Please choose only 1 answer.)

- Yes, it was worth it
- No, it was not worth it
- I'm not sure

Do you want to continue using the wireless terminal next year? (Please choose only 1 answer.)

- Yes, I'll continue even without financial support
- Yes, but only if there is some financial support
- No, I don't want to continue using the terminal
- No, because the markets I sell at already have their own terminal
- Unsure

A5. For all vendors, regardless of participation:

Is there anything else you'd like to add about the wireless terminal project or the $6 and $10 WIC Fruit & Vegetable checks? (Optional) **(Open response)**

B. Vendor Stall Employee Survey Questions

Does this stall have a wireless terminal that is capable of accepting EBT/food stamps? (If yes) Have you experienced any problems accepting EBT? Please describe.

Does this stall accept $6 and $10 WIC Fruit & Vegetable checks? (If yes) Have you experienced any problems accepting $6 and $10 WIC Fruit & Vegetable checks? Please describe.

(For employees at markets with a central market SNAP/credit/debit terminal): Do you want this market to continue using the SNAP/credit/debit token system next year?

C. WIC Staff Survey Questions

How often during WIC visits do you discuss opportunities to use cash value vouchers at farmers markets with your clients? (Please choose only 1 answer.)

- More than once with every client
- At least once with every client
- With most, but not all clients
- With about half my clients
- Rarely

Do you talk with your clients about opportunities to use SNAP/EBT benefits at farmers markets? (Please choose only 1 answer.)

- Yes, with every client
- Yes, with every client I know receives SNAP/EBT
- With most, but not all clients
- Only if they ask

- No, I rarely or ever talk to my clients about EBT at farmers markets

How do the majority of your English-speaking clients respond to learning about WIC cash value voucher opportunities at farmers markets? (You may choose up to 2 answers.)

- Enthusiastic
- Curious — want more information
- Overwhelmed
- Indifferent
- Confused
- Uninterested

How do the majority of your non-English-speaking clients respond to learning about WIC cash value vouchers opportunities at farmers markets? (You may choose up to 2 answers.)

- Enthusiastic
- Curious — want more information
- Overwhelmed
- Indifferent
- Confused
- Uninterested

If you talk to many of your clients about EBT opportunities at farmers markets, how do the majority of your English-speaking clients respond? (You may choose up to 2 answers.)

- Enthusiastic
- Curious — want more information
- Overwhelmed
- Indifferent
- Confused
- Uninterested

If you talk to many of your clients about EBT opportunities at farmers markets, how do the majority of your non-English-speaking clients respond? (You may choose up to 2 answers.)

- Enthusiastic
- Curious — want more information
- Overwhelmed
- Indifferent
- Confused
- Uninterested

On a scale of 1 to 10, how knowledgeable do you feel about the Farmers Market Access Project (FMAP)?

(not at all knowledgeable) 1 2 3 4 5 6 7 8 9 10 (very knowledgeable)

What barriers do your clients face in using WIC Fruit & Vegetable checks at farmers markets? (open response question)

D. WIC Staff and Market Manager Focus Group Guide

What went well with the Farmers Market Access Project?

What should be improved?

How has this experience changed your perception of the WIC staff/market managers?

How did communication between markets and WIC staff work? What worked? What needs to be improved?

What can the markets do to better attract WIC clients?

What would you like to see WIC staff and market managers do differently?

What could you do to make collaboration between WIC clinics and markets better in the future?

E. Market Manager Interview Guide

Did you receive a wireless EBT/credit/debit terminal through the Farmers Market Access Project?

What were the reasons for your choice?

If you don't have a wireless EBT/credit/debit terminal, do you plan to get one next year? Please explain why.

If you do have a wireless EBT/credit/debit terminal, do you plan to keep it for next year even if subsidies are no longer provided? Please explain why.

Anything else you'd like to add?

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PREVENTING CHRONIC DISEASE
PUBLIC HEALTH RESEARCH, PRACTICE, AND POLICY

COMMUNITY CASE STUDY

Volume 10 — October 03, 2013

Partnering With Community Institutions to Increase Access to Healthful Foods Across Municipalities

Lara Jaskiewicz, PhD; Rachael D. Dombrowski, MPH; Heather M. Drummond, MPH; Gina Massuda Barnett, MPH; Maryann Mason, PhD; Christina Welter, DrPh

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PEER REVIEWED

Abstract

Background
Low-income and minority communities have higher rates of nutrition-related chronic diseases than do high-income and nonminority communities and often have reduced availability to healthful foods. Corner store initiatives have been proposed as a strategy to improve access to healthful foods in these communities, yet few studies evaluating these initiatives have been published.

Community Context
Suburban Cook County, Illinois, encompasses 125 municipalities with a population of more than 2 million. From 2000 through 2009, the percentage of low-income suburban Cook County residents increased 41%; African-American populations increased 20%, and Hispanic populations increased 44%. A 2012 report found that access to stores selling healthful foods was low in several areas of the county.

Methods
Beginning in March 2011, the Cook County Department of Public Health recruited community institutions (ie, local governments, nonprofit organizations, faith-based institutions) who recruited corner stores to participate in the initiative. Corner stores were asked to add new, healthful foods (May–June 2011) to become eligible to receive new equipment, marketing materials, and enhanced community outreach (July 2011–February 2012).

Outcomes
Nine community institutions participated. Of the 53 corner stores approached, 25 (47%) participated in the trial phase, which included offering 6 healthful foods in their stores. Of those, 21 (84%) completed the conversion phase, which included expansion of healthful foods through additional equipment and marketing and promotional activities.

Interpretation
Community institutions can play a key role in identifying and engaging corner stores across jurisdictions that are willing and able to implement a retail environment initiative to improve access to healthful foods in their communities.

Background

Unhealthful eating and sedentary lifestyles contribute to many negative health outcomes, including the development of chronic conditions such as diabetes, heart disease, and stroke (1,2). The rising incidence of these diseases continues to strain our health care system (3). In the United States, nearly 24 million people have limited or no access to healthful foods (4).

Communities of low socioeconomic status are more likely than communities of high socioeconomic status to have fewer stores selling fresh produce or to have to travel farther to reach such a store (4,5). These low-access communities generally have many fast-food restaurants, chain pharmacies, and other small food stores, while having few full-service grocery stores (6–8).

This phenomenon has spurred initiatives to encourage small grocery stores (corner stores) in low-access communities to sell more healthful foods (9–11). Because such initiatives are new, few reports exist describing methods for community engagement and factors influencing success. This article contributes to the knowledge base for implementation of corner store initiatives in multiple communities.

Community Context

Suburban Cook County surrounds the city of Chicago, Illinois, in the Midwestern United States. It covers 735 square miles and encompasses 125 municipalities with 2,233,179 people (12). Similar to nationwide trends, the population living at or below 200% of the federal poverty guidelines in suburban Cook County increased 41% from 2000 through 2009 (12–14); the African American population increased 20%, and the Hispanic population increased 44% (12–14).

Minority populations are disproportionately affected by chronic diseases in suburban Cook County (14). For example, the rate of coronary heart disease among African Americans (152.8 per 100,000 population) is 17% higher than the rate for whites, and 52% higher than the Healthy People 2020 goal of 100.8 per 100,000 population (15). The diabetes mortality rate for African Americans in suburban Cook County (93.5 per 100,000 population) is 85% higher than the rate for whites.

Some of the nation's poorest communities are in suburban Cook County (Figure 1), and chronic disease mortality rates there are the highest in the Midwest. Furthermore, capacity to deliver human services varies widely across the county, and municipalities with the greatest needs often have the lowest capacity to address them (16). Lack of infrastructure and coordination of services also continuously contributes to health inequities in suburban Cook County (16).

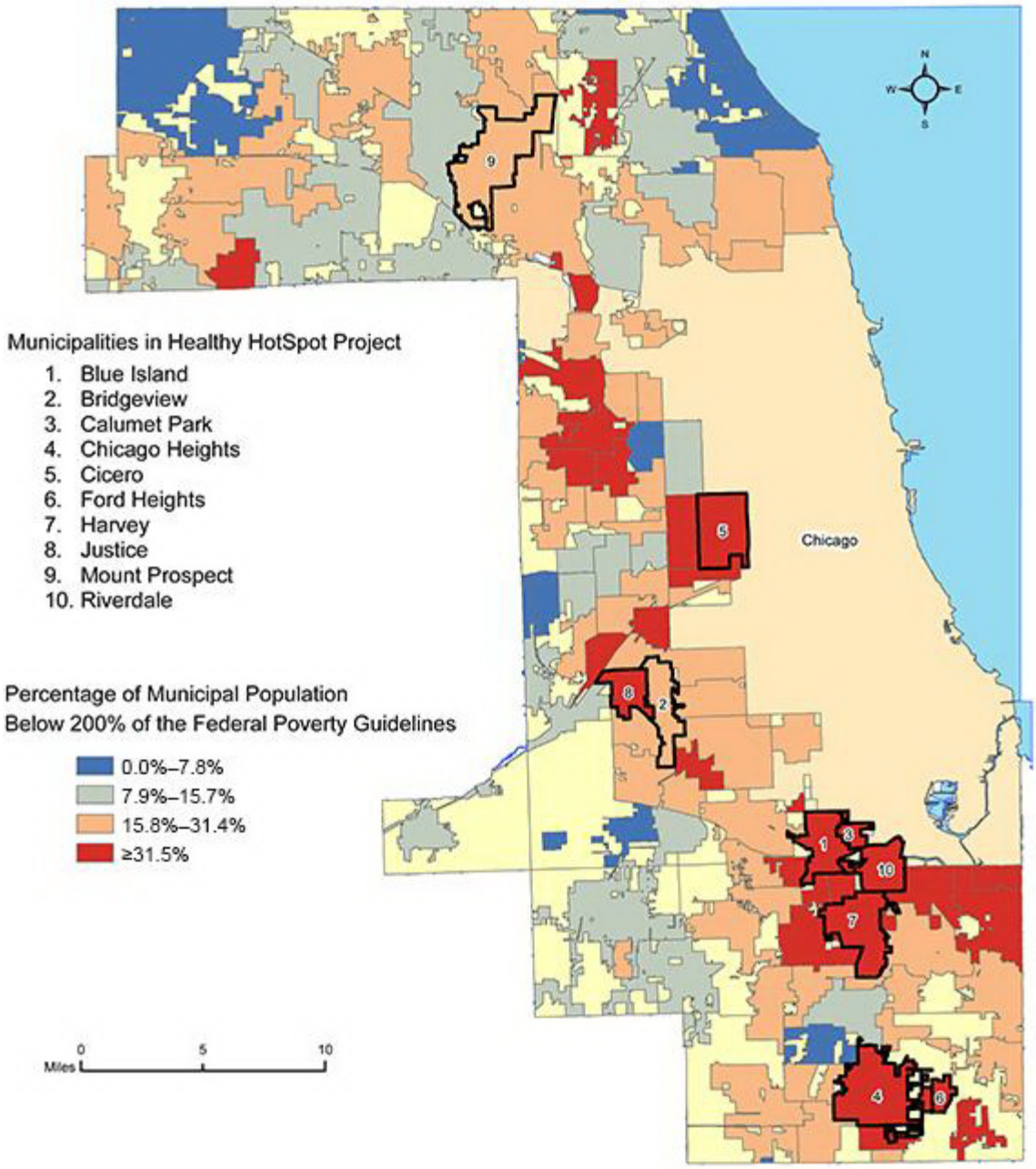

Figure 1. Population below 200% of the federal poverty guidelines, Healthy HotSpot Corner Store Initiative, Suburban Cook County, Illinois, 2005–2009 (13). Map created by the Cook County Department of Public Health, Epidemiology Unit. Abbreviation: FPG, federal poverty guidelines. [A text description of this figure is also available.]

In 2010, the Cook County Department of Public Health (CCDPH) identified municipalities in suburban Cook County with limited access to healthful foods (6) and designed a corner store initiative that applied community engagement principles and leveraged trust of local community institutions. This approach aimed to promote community ownership, initiative sustainability, and community promotion of availability of healthful foods to increase consumer demand for the sale of these foods. Outcomes of interest were 1) increased capacity of community institutions to work with local stores, and 2) increased corner store owner capacity to identify, stock, and sell more healthful foods.

Methods

Intervention

In collaboration with the Public Health Institute of Metropolitan Chicago, CCDPH used funding from Communities Putting Prevention to Work (CPPW) to implement a corner store initiative, branded as “Healthy HotSpot.” The location included multiple municipalities in suburban Cook County. This initiative was 1 component of the CPPW initiative in suburban Cook County, which focused on changing policies, systems, and environments to prevent obesity by

promoting healthful eating and active living. The national CPPW initiative focused on both obesity prevention and tobacco control, with the goal of reducing the burden of chronic disease (10).

Based on a model developed by The Food Trust in Philadelphia, Pennsylvania, the Healthy HotSpot initiative partnered with community institutions to increase sales of healthful foods in local corner stores. Unlike most corner store initiatives (which include 1 partner working with many stores), Healthy HotSpot worked with 8 separate community institutions to reach 21 stores in various suburban Cook County communities (17). Healthy HotSpot staff received training on healthy corner store initiatives and provided input to the Healthy HotSpot initiative plan on the basis of their suburban Cook County experiences. The Healthy HotSpot initiative began with a trial phase, with store recruitment and the addition of new foods that met program criteria. Staff notified store owners that if they successfully added the new foods, they would receive $250 and be invited to participate in the second phase (conversion). The conversion phase provided stores with new equipment, marketing materials, enhanced community outreach and engagement, and an additional $250 (Figure 2).

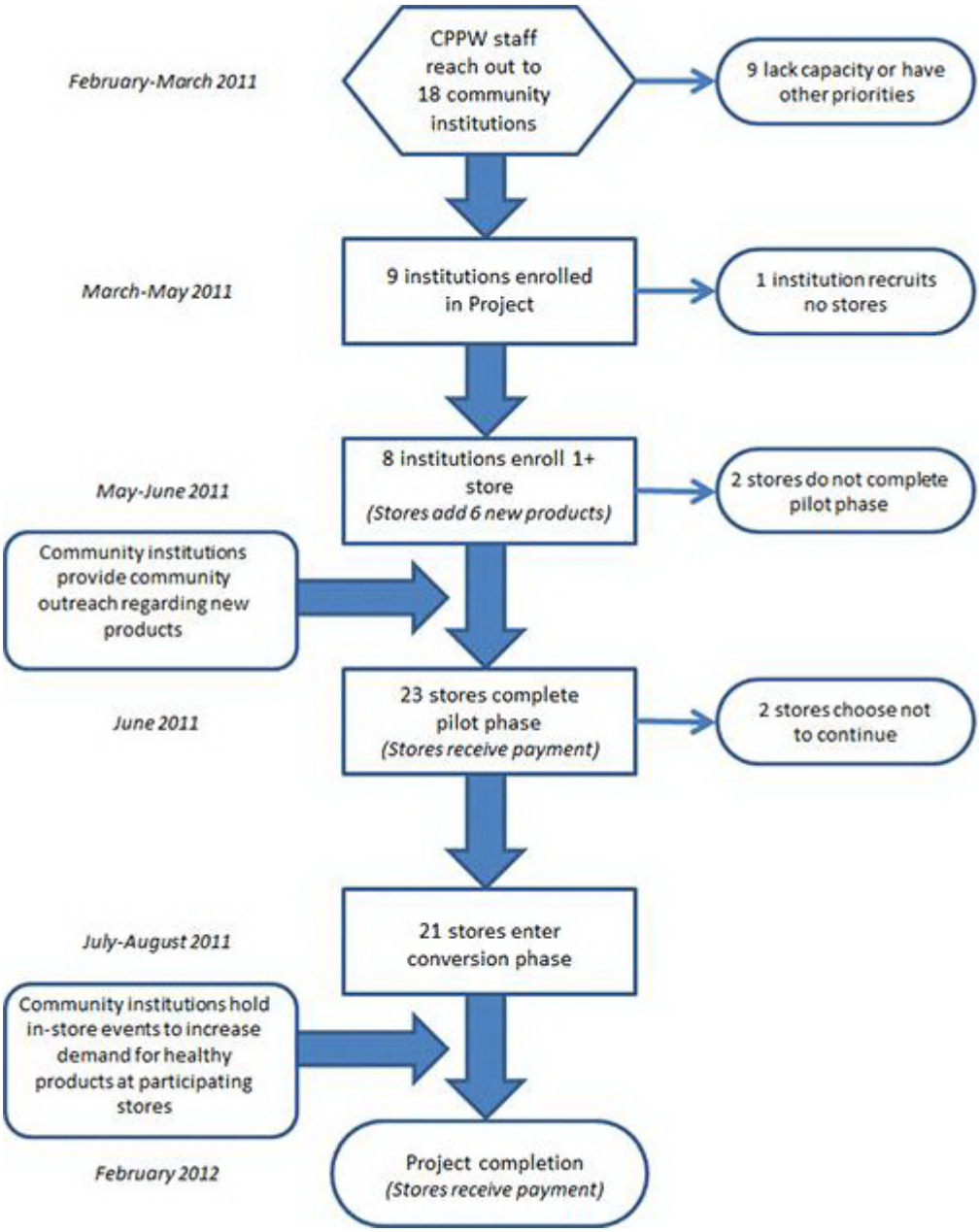

Figure 2. Recruitment process of the Healthy HotSpot Corner Store Initiative, Suburban Cook County, Illinois, 2011–2012. [A text description of this figure is also available.]

Community engagement

Local community institutions (ie, local governments, nonprofits, faith-based institutions) became integral partners in the initiative because of detailed community knowledge and local presence, which assisted in determining candidate stores and allowed for regular interaction with store owners. Local institutions also served as representatives of the initiative in each municipality and conducted community promotion for increased consumption of healthful foods.

The initiative started in March 2011, with a planned ending in February 2012. Several months before the initiative began Healthy HotSpot staff conducted community outreach within suburban Cook County to solicit applications for a local grant program. Municipalities with a high percentage of low-income residents were a focus. When the corner store initiative was ready to begin, Healthy HotSpot staff contacted community institutions from those primarily low-income communities that had expressed concerns about food access while ensuring regional participation (Figure 1). Community institution recruitment occurred in late March and early April 2011.

To build the capacity of community institutions, Healthy HotSpot staff conducted a day-long store recruitment workshop and 3 technical assistance webinars. The workshop occurred before store recruitment and explained the initiative structure and how to build relationships with corner store owners. Subsequent webinars provided guidance on community outreach and marketing and on pricing, purchasing, and placement of healthful foods. The webinars formed the basis of fact sheets to distribute to store owners.

Community institutions were responsible for identifying and recruiting candidate local corner stores into the initiative during late April and early May 2011. Candidate stores had small product selections, sold food, and had 1 checkout counter. Community institutions had authority in identifying the number and characteristics of candidate stores (eg, stores serving a specific neighborhood). If stores agreed to participate in the trial phase, the community institution notified its designated Healthy HotSpot staff person, who visited the store with a representative of the community institution. During their visit, this pair completed a baseline store product assessment and enrollment form (based on The Food Trust's protocol). Store owners received materials including an initiative overview and a healthy product menu, in English or Spanish (www.healthyhotspot.org).

Store owners committed to add 6 new foods, including 1 fresh fruit, 1 fresh vegetable, and 4 foods chosen from additional categories — low-fat dairy, lean proteins, canned or frozen fruits and vegetables, or whole grains. Stores used existing equipment to store foods. After the store added the new foods (within 4 to 6 weeks), Healthy HotSpot and community institution staff visited the store together to document the new product additions, provide successful owners with a $250 check, and enroll the store in the conversion phase. The trial phase was scheduled to last from mid-May to late June 2011.

The conversion phase consisted of providing new equipment, increasing marketing, and stores continuing to sell healthful foods. Healthy HotSpot staff purchased equipment from grocery industry suppliers and met county environmental health standards. Municipal health inspectors received letters to inform them of the initiative and provide an avenue for questions or concerns. None were raised.

Two Healthy HotSpot staff members led the conversion process, dividing up the stores between them. They visited each store with community institution staff and assessed the store's needs for equipment including refrigerators, freezers, shelving, display baskets, and scales. On the basis of discussion with the store owner, a list of the new equipment was developed for each store that included the location of the equipment in the store. Healthy HotSpot staff shared the equipment plans with store owners to ensure agreement before new equipment was purchased and to show the local health inspector. The conversions cost an average of $3,500 per store. The conversion phase was to begin by mid-July 2011 and last through February 2012. Healthy Hotspot staff notified community institution staff of large equipment delivery dates, and they participated as their schedules allowed. Conversion visits were the only times Healthy HotSpot staff interacted directly with the store owners without the presence of the community institution.

The initiative developed and provided marketing materials for the stores participating in the conversion phase. In-store materials included posters, shelf tags, stickers, and end-of-aisle flags. The intention was to draw shoppers' attention to the healthful foods in the stores; community institution staff helped to place these items. The community institutions conducted regular community outreach about store changes through newsletters, flyers at community events, or news articles. They were expected to host an in-store event, such as a taste test, in each store.

The Healthy HotSpot initiative had a $200,000 budget for store incentive payments, store equipment, and community institution resources. A separate budget paid for Healthy HotSpot staff time and initiative marketing materials. Healthy HotSpot and CCDPH staff developed the marketing materials in-house and used commercial printers for the final product.

Evaluation

The process evaluation took place during April and May 2012, in parallel with a program evaluation. The program evaluation included interviews with community institutions and store owners. We report the results of the process evaluation, which used quantitative analysis of data from existing initiative and communications records; therefore, our

study protocol was not submitted for human subjects review. The initiative implementation plan laid out the expected steps, actors, and timing. Relevant initiative records included staff e-mails, store enrollment and follow-up assessment forms, training attendance records, outreach plans and reports, memoranda of understanding between the Healthy HotSpot initiative and community institutions and between the Healthy HotSpot initiative and participating stores, and other initiative documentation. The process evaluation asked the following questions:

- Fidelity of implementation: How closely did the initiative implementation follow the initiative plan?
- Dose delivered: What types of training were provided to participating community institutions? Which community institutions participated in trainings?
- Dose received: Did community partners successfully recruit stores into the initiative? Did participating stores increase the number of healthful foods offered?
- Recruitment: What planned and actual procedures were used by Healthy HotSpot staff to recruit community institutions? What planned and actual procedures were used by community partners to recruit stores?
- Context: What external factors affected implementation?

Outcomes

Sixteen community institutions were identified as potential partners by Healthy HotSpot staff on the basis of their location in a low-income community or their previously stated interest in community food access. As planned, they were contacted through e-mail and telephone. Of those, 7 were interested and believed they had the staff available to participate in the initiative. An additional 2 institutions were recruited in high-need communities, 1 of which joined after the start of the trial phase (Table 1). Thus, 9 community institutions participated in the initiative, 8 of which attended a mandatory workshop on the initiative model. The community institutions comprised 3 municipal governments, 4 nonprofit organizations, and 2 faith-based institutions (Table 2).

In the spring of 2011, representatives from each of the 9 community institutions visited local corner stores (mean, 5.9 stores; Table 2) to meet in person with the owners. Although community institutions were expected to recruit stores independently, only 1 community institution did not need Healthy HotSpot staff support. Healthy HotSpot staff participated in multiple recruitment visits, even in cases in which a relationship existed with the owner. Eight institutions successfully recruited at least 1 store into the trial phase.

Twenty-five stores were initially recruited into the initiative. Of these, 2 did not complete the trial phase. Two stores that completed the trial phase opted out of the conversion phase. One was sold to a new owner planning to convert it to a liquor store. The other closed due to economic reasons. At the transition from trial phase to conversion phase, 2 community institutions requested the addition of new stores, which were brought into the initiative with an accelerated trial timeline. Each store that completed the trial phase was asked to participate in the conversion phase. Of 53 stores approached, 25 (47%) participated in the trial phase. Of these, 21 (84%) completed the conversion phase (Table 2).

In addition to the required fresh fruits and vegetables, the most commonly added food type was whole grains (15 stores). Low-fat dairy products were added in 10 stores and canned fruits or vegetables in 9 stores. The least popular category was lean protein.

Over 7 months, the 8 community institutions participated in an average of 1.9 training sessions of the 4 offered (range 0–4). The highest rate of participation was for the initial in-person orientation to the Healthy HotSpot initiative. Only 3 institutions participated in the final webinar, which focused on increasing consumer demand and promotion of participating stores. During the initiative, half of the community institutions experienced changes in program staffing or staff responsibilities. Conflicting priorities related to organizational finances or staffing levels may have also interfered with institutions' ability to participate.

Healthy HotSpot staff provided programmatic support to community institution representatives via telephone calls, in-person meetings, and e-mails. The total number of each type of support was quantified retrospectively by accessing electronic calendars and e-mail records for the 6 Healthy HotSpot staff. Because of staff turnover and lack of telephone records, only electronic calendars (indicating phone or in-person meetings) and e-mails sent by Healthy HotSpot staff were analyzed. Data for the process evaluation included records starting March 1, 2011, through March 31, 2012, and coincided with the Healthy HotSpot initiative period from recruitment through conversion. The 8 community institutions that enrolled at least 1 corner store in the trial phase received an average of 3.4 calls, 11.8 in-person meetings, and 72.6 e-mails from Healthy HotSpot staff during this period (Table 3). The total number of Healthy HotSpot staff contacts with community institutions ranged from 62 to 118, with an average of 87.8 contacts. Healthy HotSpot staff typically did not interact directly with stores without the community institution. The 8 community institutions that enrolled at least 1 store held an average of 4.6 promotional events (range, 2–13) during the overall initiative period, including 1.8 in-store events (range, 0–5) and 2.9 community events (range, 0–8).

Interpretation

All planned aspects of the program were delivered, and more than 80% of stores entering the initiative completed both phases, thereby increasing access to healthful foods for high-need communities. There were 2 primary issues affecting success. One was delay in the implementation timeline; the other was the capacity of community institutions to carry out the expected initiative activities.

Implementation delays

The ability to adhere to the proposed timeline was affected by several factors: 1) the short initiative time frame, which allowed little time for planning and relationship development, 2) personnel changes, 3) the process by which program documents were approved, and 4) the equipment ordering and delivery process. A community-based initiative that involves collaboration with multiple partners and municipalities requires time to develop rapport, increase the functional capacity of communities that have inadequate resources, and create sustainable change. The new process developed to recruit community institutions was successful but could have used more time to strengthen their comprehension of the initiative.

Because of the initiative structure — a county health department working with an external fiscal agent — the development of memoranda of understanding required more time than anticipated, because each institution required separate legal review. Including legal review in the initiative timeline would have eased implementation. Furthermore, the process to order, deliver, and install new store equipment was more complex and lengthy than expected. Although Healthy HotSpot staff developed an internal process to identify vendors and schedule deliveries, products were not delivered in the planned time frame. Some equipment delivery took 6 to 8 weeks, when 2 weeks had been anticipated. Discussing delivery timelines with vendors earlier could have assisted in initiative planning.

Community institution capacity

The second factor affecting implementation was the need to increase the functional capacity of community institutions to operate independently. According to the original initiative plan, staff of the community institutions would independently perform several roles after being trained and receiving initiative materials. Those roles included store recruitment, conducting promotional events, conducting store compliance checks, and providing store support. During implementation, however, Healthy HotSpot staff was requested to help perform those functions. Only 2 community institutions did not require intensive engagement of Healthy HotSpot staff. This may have resulted from the inherent capacity of the staff members assigned at those 2 institutions or from their gained understanding of the initiative (through trainings and materials, although no consistent relationship was found between training participation and initiative success). One successful institution had a positive community reputation, experience in community health programming, and a college intern program that provided staffing throughout the initiative. That institution was able to quickly translate Healthy HotSpot initiative suggestions into action within the institution's existing programming and structure.

In general, the ability to build on community assets, to adapt programmatic timelines to community needs, and to be inclusive of all partners' perspectives were key to the successful conversion of 21 corner stores. In designing an initiative of this nature, it is important to consider the various administrative requirements of multiple organizations and the ability of the convening organization to quickly and adequately address challenges encountered by community partners to ensure initiative success.

Community institutions can play a key role in identifying and engaging corner stores across jurisdictions that are willing and able to implement a retail environment initiative to improve access to healthful foods in their communities. This process evaluation illustrates one effort to implement a healthy corner store initiative in a strict time frame. The complexity of institutional relationships created bottlenecks that can be anticipated during future efforts. The strengths of working with local partners included local access to stores and programming; the weaknesses resulted from lack of capacity. With its successful implementation, CCDPH has trained additional staff on this initiative and is identifying ways to build on this foundation.

Acknowledgments

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Author Information

Corresponding Author: Lara Jaskiewicz, PhD, Assistant Professor, School of Public, Nonprofit, and Health Administration, Grand Valley State University, 401 W Fulton St, Room 288C, Grand Rapids, MI 49504. Telephone: 616-331-6580. E-mail: JaskiewL@gvsu.edu.

Author Affiliations: Rachael D. Dombrowski, Chicago Public Schools, Chicago, Illinois; Heather M. Drummond, Christina Welter, University of Illinois Chicago, Chicago, Illinois; Gina Massuda Barnett, Cook County Department of Public Health, Oak Forest, Illinois; Maryann Mason, Department of Pediatrics, Feinberg School of Medicine, Northwestern University, Chicago, Illinois.

References

1. Koh HK. A 2020 vision for healthy people. N Engl J Med 2010;362(18):1653–6. CrossRef PubMed
2. Khan LK, Sobush K, Keener D, Goodman K, Lowry A, Kakietek J, et al. Recommended community strategies and measurements to prevent obesity in the United States. MMWR Recomm Rep 2009;58(RR-7):1–26. PubMed
3. Wang Y, Beydoun MA, Liang L, Caballero B, Kumanyika SK. Will all Americans become overweight or obese? Estimating the progression and cost of the US obesity epidemic. Obesity (Silver Spring) 2008;16(10):2323–30. CrossRef PubMed
4. Ver Ploeg M, Breneman V, Farrigan T, Hamrick K, Hopkins D, Kaufman P, et al. Access to affordable and nutritious food — measuring and understanding food deserts and their consequences: report to congress. Washington (DC): US Department of Agriculture; 2009.
5. Powell LM, Slater S, Mirtcheva D, Bao Y, Chaloupka FJ. Food store availability and neighborhood characteristics in the United States. Prev Med 2007;44(3):189–95. CrossRef PubMed
6. Block D, Bisegerwa J, Bowen K, Lowe B, Owens J, Sager N, et al. Food access in suburban Cook County. Oak Forest (IL): Cook County Department of Public Health; 2012.
7. Block D, Chavez N. Finding food in Chicago and the suburbs: the report of the northeastern Illinois community food security assessment report to the public. Chicago (IL): Chicago State University; 2008.
8. Block D, Kouba J. A comparison of the availability and affordability of a market basket in two communities in the Chicago area. Public Health Nutr 2006;9(7):837–45. CrossRef PubMed
9. Frieden TR. A framework for public health action: the health impact pyramid. Am J Public Health 2010;100(4):590–5. CrossRef PubMed
10. Bunnell R, O'Neil D, Soler R, Payne R, Giles WH, Collins J, et al. Fifty communities putting prevention to work: accelerating chronic disease prevention through policy, systems and environmental change. J Community Health 2012;37(5):1081–90. CrossRef PubMed
11. Gittelsohn J, Rowan M, Gadhoke P. Interventions in small food stores to change the food environment, improve diet, and reduce risk of chronic disease. Prev Chronic Dis 2012;9(2):E59. PubMed
12. State and county quickfacts: Cook County, Illinois. US Census Bureau; 2013. http://quickfacts.census.gov/qfd/states/17/17031.html. Accessed February 6, 2013.
13. Census 2000 summary file: Cook County, IL. US Census Bureau; 2000. http://factfinder.census.gov/servlet/QTTable?_bm=n&_lang=en&qr_name=DEC_2000_SF1_U_DP1&ds_name=DEC_2000_SF1_U&geo_id=05000US17031. Accessed November 14, 2011.
14. WePLAN 2015, suburban Cook County community health assessment and plan. Oak Forest (IL): Cook County Department of Public Health; 2011.
15. Healthy poeople 2020. US Department of Health and Human Services; 2013. http://www.healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicId=21. Accessed August 20, 2013.
16. Hendrick R, Mossberger K. Uneven capacity and delivery of human services in Chicago suburbs: the role of townships and municipalities. Chicago (IL): University of Illinois Chicago; 2009.
17. Healthy Corner Store Initiative. The Food Trust; 2013. Http://www.thefoodtrust.org/php/programs/corner.store.campaign.php. Accessed March 6, 2013.

Tables

Table 1. Municipality Demographics, Healthy HotSpot Corner Store Initiative, Suburban Cook County, Illinois, 2011–2012[a]

Return

Municipality	Population	% Below 200% Federal Poverty Guidelines	% Black	% Latino
Blue Island	23,706	43.7	30.8	47.0
Bridgeview and Justice	29,372	32.1	11.6	14.2
Calumet Park	7,835	38.3	88.3	6.8
Chicago Heights	30,276	48.8	41.5	33.9
Cicero	83,891	49.8	3.8	86.6
Ford Heights	2,763	61.9	95.6	1.5
Harvey	25,282	56.4	75.8	19.0
Mount Prospect	54,167	18.0	2.4	15.5
Riverdale	13,549	46.0	93.7	1.7

[a] Data obtained from the US Census Bureau (13).

Table 2. Characteristics and Achievements of Municipality and Community Institutions That Participated in Health HotSpot Corner Store Initiative, Suburban Cook County, Illinois, 2011–2012

Return

Municipality	Institution type	Stores Approached	Trial Phase Stores	ConversionPhase Stores	Conversion Rate, %[a]
Blue Island[b]	Government	6	3	2	67[b]
Bridgeview and Justice	Faith-based	4	0	0	NA
Calumet Park	Nonprofit	6	2	1	50
Chicago Heights	Nonprofit	8	2	2	100
Cicero[b]	Nonprofit	9	8	7	88[b]
Ford Heights	Faith-based	2	2	2	100
Harvey	Nonprofit	10	4	3	75
Mount Prospect	Government	4	1	1	100
Riverdale	Government	4	3	3	100
Total	NA	53	25	21	84

Abbreviation: NA, not applicable.
[a] The percentage of pilot phase stores that became conversion phase stores.
[b] Municipalities in which some stores experienced an accelerated trial phase.

Table 3. Communication with and Training Given by Health HotSpot Staff to Community Institutions, by Municipality: Healthy HotSpot Corner Store Initiative, Suburban Cook County, Illinois, 2011–2012

Return

Municipality	No. of Phone Calls	No. of In-Person Meetings	No. of E-mails	Total CPPW Staff Contacts	Trainings Attended
Blue Island	2	7	88	97	3
Riverdale	3	17	98	118	1

Municipality	No. of Phone Calls	No. of In-Person Meetings	No. of E-mails	Total CPPW Staff Contacts	Trainings Attended
Mount Prospect	6	19	65	90	4
Calumet Park	0	11	51	62	1
Chicago Heights	3	11	89	103	1
Cicero	6	6	83	95	4
Harvey	5	17	52	74	1
Ford Heights	2	6	55	63	0
Total	27	94	581	702	NA

Abbreviation: CPPW, Communities Putting Prevention to Work; NA, not applicable.

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Improving Fruit and Vegetable Consumption Among Low-Income Customers at Farmers Markets: Philly Food Bucks, Philadelphia, Pennsylvania, 2011

Candace R. Young, MS; Jennifer L. Aquilante, MPH, RD; Sara Solomon, MPH, RD; Lisa Colby, MSW; Mukethe A. Kawinzi; Nicky Uy; Giridhar Mallya, MD, MSHP

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Abstract

Introduction

We evaluated whether Philly Food Bucks, a bonus incentive program at farmers markets, is associated with increased fruit and vegetable consumption and Supplemental Nutrition Assistance Program (SNAP) sales at farmers markets in low-income areas.

Methods

A convenience sample of 662 customers at 22 farmers markets in low-income neighborhoods in Philadelphia, Pennsylvania, was surveyed via face-to-face interviews. Questions addressed shopping characteristics, self-reported change in fruit and vegetable consumption, whether customers tried new fruits or vegetables, use of Philly Food Bucks, and demographic information. Market-level SNAP sales and Philly Food Bucks redemption data were also collected to monitor sales patterns.

Results

Philly Food Bucks users were significantly more likely than nonusers to report increasing fruit and vegetable consumption (OR, 2.4; 95% CI, 1.6–3.7; $P < .001$) and to report trying new fruits or vegetables (OR 1.8; 95% CI, 1.2–2.7; $P = .006$). At the market level, average SNAP sales more than doubled at farmers markets in low-income areas in the first 2 years of the Philly Food Bucks program. At the city's largest farmers market in a low-income area, the program was associated with an almost 5-fold higher increase in annual SNAP sales compared with baseline.

Conclusion

Results from this study demonstrate that a bonus incentive program tied to SNAP was associated with self-reported increases in fruit and vegetable consumption and increased SNAP sales at participating farmers markets in low-income communities. More research is warranted to evaluate the long-term impact of bonus incentives on farmers market use, dietary behaviors, and health outcomes.

Introduction

The local food environment is a determinant of food access and diet quality (1–3). This relationship is of particular concern in low-income urban communities where there are few supermarkets and an abundance of fast food outlets and corner stores. In Philadelphia, residents of low-income neighborhoods are half as likely to have access to grocery stores as residents of high-income neighborhoods (4).

Numerous strategies have been implemented to improve access to healthful foods in low-income communities, including supermarket financing initiatives (5), efforts to provide healthy foods at corner stores (6–8), and expansion of farmers markets (9,10). However, less attention has been devoted to improving affordability of healthful foods. During the past 4 decades, prices of healthful foods and beverages have increased relative to unhealthful items (11).

Programs that increase the purchasing power for low-income consumers to buy healthful foods are promising approaches (9,12,13). However, the impact of bonus incentive programs has not been extensively evaluated.

Farmers markets may be particularly conducive for bonus incentive programs because they offer predominantly healthful foods (14,15) and increasingly are located in low-income communities and are equipped to accept Supplemental Nutrition Assistance Program (SNAP) benefits through the use of wireless technology (16,17). Philadelphia, Pennsylvania, is one of several cities and counties nationwide that have implemented bonus incentive programs targeting SNAP recipients as part of the Communities Putting Prevention to Work (CPPW) initiative of the Centers for Disease Control and Prevention, which aims to reduce chronic diseases through policy, systems, and environmental changes (18).

From 2010 to 2011, The Food Trust partnered with the Philadelphia Department of Public Health CPPW-funded Get Healthy Philly initiative to implement Philly Food Bucks, $2 bonus incentive coupons that could be redeemed only for fresh fruits and vegetables at farmers markets. The Philly Food Bucks program aimed to bring new customers to markets in low-income communities, to increase purchasing power for fruits and vegetables, to increase fruit and vegetable consumption among low-income customers, and to increase use of SNAP at farmers markets. Philly Food Bucks were distributed in 1 of 2 ways. They were distributed onsite at farmers markets along with SNAP purchases: a $2 bonus incentive coupon was received for every $5 in SNAP benefits used. (Original SNAP purchases did not need to be fresh fruits and vegetables to qualify.) Philly Food Bucks were also distributed by community organizations that serve SNAP-eligible populations to promote farmers market access among low-income residents. Those coupons could be redeemed without making a SNAP purchase.

Our study presents data from 2 sources: customer surveys and objective sales data from 22 farmers markets in low-income areas of Philadelphia. Ten of 22 markets were newly opened in 2010 to 2011 through Get Healthy Philly. The other 12 markets were in operation for 3 to 14 years. At schools near the 22 markets, more than 70% of students are eligible for free or reduced-price school meals (range, 72% to 95%), indicating that more than 70% of households near these markets are at or below 185% of the federal income poverty level (19,20).

This study addresses the following questions: What are the characteristics of Philly Food Bucks users? Among farmers market customers, are Philly Food Bucks users more likely than nonusers to report increased fruit and vegetable intake? What is the association between the Philly Food Bucks bonus incentive program and SNAP sales at farmers markets?

Methods

The study protocol was determined to be exempt from review by the Institutional Review Board of the Philadelphia Department of Public Health.

Data collection

Customer survey

A customer survey was conducted at farmers markets to assess self-reported dietary behaviors since visiting the market (change in fruit and vegetable consumption and trying new fruits and vegetables), shopping frequency, distance traveled to market, participation in SNAP and other food assistance programs in the past year, use of Philly Food Bucks, and demographic information.

Market staff conducted the 22-question survey in face-to-face interviews with a convenience sample of 662 shoppers at 22 farmers markets in low-income areas of Philadelphia from September to November 2011. Surveys were administered and recorded by 15 trained farmers market staff from The Food Trust. All interviewers were familiar with market operations and benefits accepted at the market (SNAP, Philly Food Bucks, vouchers for Special Supplemental Nutrition Program for Women, Infants, and Children [WIC], and vouchers for the Senior Farmers' Market Nutrition Program). Market staff approached customers by asking them to participate in a brief survey about farmers markets. Refusals were not tracked but were estimated at 10%.

Surveys were collected during market hours, which varied by market. Survey collection was completed over the course of 1 to 5 market days, depending on size of market, volume of customers, and weather (eg, when it rained, an additional survey day was scheduled). Surveys took approximately 5 minutes to complete.

Market-level sales data

For the 22 markets in the study, SNAP and Philly Food Bucks data were tracked, including market-level SNAP sales (in dollars) for the 2009 through 2011 market seasons and Philly Food Bucks distribution and redemption (in dollars) for the 2010 and 2011 seasons. These data are used to reimburse farmers for SNAP and Philly Food Bucks purchases. Philly Food Bucks distribution and redemption are tracked by using the unique serial number on each coupon. In 2009, there were 12 markets in low-income neighborhoods; in 2010, 16; and in 2011, 22. The largest and longest-running market in a low-income community, based in West Philadelphia, accounted for 54% of our farmers market

SNAP sales in 2011 and one-fourth of all farmers market SNAP sales in Pennsylvania. To examine differences in trends in SNAP sales before and after implementation of the Philly Food Bucks program, we focused on this site because sales data were available beginning in 2005. This market has been the subject of previous research (17) as a model and case study for markets in other urban, low-income areas.

SNAP eligibility data

The Pennsylvania Department of Public Welfare publishes monthly data on the SNAP-eligible population of Philadelphia County (21). Monthly data on the percentage of the Philadelphia population eligible for SNAP were averaged for May through November for each year from 2005 through 2011 to serve as a control variable in examining increases in SNAP sales.

Statistical analysis

Customer survey

Customer surveys were scanned using Remark Office OMR 7.0 (Gravic Inc, Malvern, Pennsylvania) and data analyzed in SPSS Version 17.0 (IBM Corporation, Chicago, Illinois). Cross tabulations and χ^2 statistics were calculated to analyze demographic and shopping characteristics of Philly Food Bucks users and whether they differed significantly from non–Philly Food Bucks users.

Multivariate binary logistic regression was used to examine predictors of self-reported increased fruit and vegetable consumption and trying new fruits or vegetables since becoming a market customer. Increased fruit and vegetable consumption was assessed by using the following survey item: "Since becoming a customer at this market, do you eat more, less, or the same amount of fruits and vegetables?" and coded as a dichotomous dependent variable (increased vs decreased and no change). Trying new fruits or vegetables was measured by using the following survey item: "Since becoming a customer at this market, have you tried any new or unfamiliar fruits or vegetables?" (tried new vs no).

Explanatory variables included in full models were having used Philly Food Bucks at the market (yes vs no) and characteristics significantly associated with Philly Food Bucks use: receiving nutrition information at market (yes vs no), becoming a customer during the 2011 season (yes vs no), walking or biking to market (yes vs no), and demographic variables sex (female vs male), age (18–25 vs 26 or older) and race (African American, Hispanic, or Asian vs white). Subjects missing data for 1 or more variables in a model were dropped from analysis in that model.

A Wald statistic with a *P* value of .05 or less was considered significant. Odds ratios (ORs) and 95% confidence intervals (CIs) for odds ratios were calculated by exponentiating e^{β}, where β equals the parameter estimate for each explanatory variable (22).

Market-level sales data

Given the increase in the number of markets in low-income areas able to accept SNAP over time, we recorded the total SNAP sales and average SNAP sales per market for each year. Similarly, total Philly Food Bucks redemption and average Philly Food Bucks redemption per market were tracked and calculated for 2010 and 2011. Bivariate linear regression was used to estimate how market-level Philly Food Bucks redemption (in dollars) predicted SNAP sales (in dollars) in 2010 and 2011.

In addition, by using sales data from the largest and longest operating market in a low-income community in Philadelphia, we assessed how trends in total annual SNAP sales differed between the pre–Philly Food Bucks period (2005–2009) and the Philly Food Bucks implementation period (2009–2011). Linear regressions were run for the 2 periods, adjusting for the annual percentage of the Philadelphia population eligible for SNAP. *P* values and 95% CIs for the slopes were compared with rates of growth in SNAP sales before and during the Philly Food Bucks program.

Results

Customer survey

In total, 662 shoppers completed surveys at the 22 markets in low-income communities. A mean of 30 surveys were collected per market (range, 18–40). One hundred seventy-five (27%) respondents were Philly Food Bucks users, 433 (65%) were not Philly Food Bucks users (Table 1); 54 (8%) respondents were excluded because use of Philly Food Bucks was unknown.

Among Philly Food Bucks users, 72% had made a SNAP purchase at market, compared with 9% of non–Philly Food Bucks users ($P < .001$). Compared with nonusers, Philly Food Bucks users were more likely to be nonwhite, to be a new customer at the market in 2011, to walk or bike to market, and to report receiving nutrition education at market. There were no significant differences between those who did and did not use Philly Food Bucks and frequenting the market on a weekly basis, traveling 3 blocks or less to get to market, or reporting prices at market were less expensive than local food stores.

In logistic regression models adjusting for other factors, Philly Food Bucks users were significantly more likely than nonusers to report eating more fruits and vegetables since becoming a market customer (OR, 2.4; 95% CI, 1.6–3.7; $P < .001$) and to report trying new or unfamiliar fruits or vegetables since becoming a market customer (OR, 1.8; 95% CI, 1.2–2.7; $P = .006$) (Table 2).

Participating in Philly Food Bucks, receiving nutrition education at market, and younger age (18 to 25 years) were significantly and positively associated with reporting an increase in fruit and vegetable consumption (Table 2). No significant associations were noted in the model between increased fruit and vegetable consumption and walking or biking to market, being a new customer at the market, sex, or race/ethnicity.

Participating in Philly Food Bucks, receiving nutrition education at market, and walking or biking to market were significantly and positively associated with trying new fruits or vegetables. Race/ethnicity other than white was negatively associated with the likelihood of trying new fruits or vegetables (Table 2). No significant associations were noted in the model between trying new fruits or vegetables and being a new customer at the market, sex, or age.

Market sales

SNAP transactions and sales per market increased steadily during the Philly Food Bucks intervention (Table 3). SNAP sales at farmers markets in low-income areas increased by more than 300% from $12,431 in 2009, before Philly Food Bucks, to $52,405 in 2011, after 2 years of the Philly Food Bucks program. Although the number of markets that accepted SNAP also increased during the same period, average SNAP sales per market more than doubled from $1,036 in 2009 to $2,382 in 2011.

Average Philly Food Bucks redemptions per market almost doubled from $679 per market in 2010 to $1,178 per market in 2011. Philly Food Bucks distributed at farmers markets and tied to SNAP purchases ($2 in Philly Food Bucks for every $5 in SNAP purchases) accounted for 75% of Philly Food Bucks redeemed. Philly Food Bucks distributed by community organizations accounted for 25% of redemptions.

Market-level SNAP and Philly Food Bucks sales were highly correlated for the 22 markets in the study. Bivariate linear regression models found that every $1 in Philly Food Bucks sales was associated with $3.75 in SNAP sales in 2010 and $2.74 in SNAP sales in 2011 (versus the bonus incentive model of $2 for $5, or $1 in Philly Food Bucks for every $2.50 of SNAP sales).

By examining data from 2005 to 2011 for the largest and longest-operating market in the city, linear regression analyses controlling for SNAP eligibility revealed that total annual SNAP redemption increased during the Philly Food Bucks period (slope, 2.01; 95% CI, 0.91–3.11) at nearly 5 times the rate as the pre–Philly Food Bucks period (slope, 0.41; 95% CI, 0.06–0.76).

Discussion

This evaluation lends support to the effectiveness of bonus incentive programs in improving nutrition behaviors of low-income residents. Our results suggest that among customers of farmers markets in low-income communities, participants in the Philly Food Bucks program were significantly more likely than nonparticipants to report eating more fruits and vegetables and trying new fruits or vegetables since becoming customers at the market. Markets participating in the Philly Food Bucks program demonstrated larger increases in SNAP sales per market than were observed before the bonus incentive program. Associations between Philly Food Bucks and SNAP sales were stronger than expected given the $2 for $5 bonus incentive model (or $1 in Philly Food Bucks for every $2.50 of SNAP sales).

The findings related to increased consumption of fruits and vegetables are consistent with those of prior studies assessing bonus incentive programs (12,13); however, there are key differences in the type and size of the incentives offered, as well as study settings and designs. Anderson and colleagues (12) found that women participating in WIC in Genesee County, Michigan, increased their fruit and vegetable consumption from baseline when provided one $20 farmers market coupon during a 5-month period. The effect was even greater for those receiving a brief, interactive nutrition education session. In another study, Herman et al (13) demonstrated that women participating in WIC in Los Angeles, California, purchased a wide variety of fruits and vegetables when given $40 per month in vouchers during 6 months for use in supermarkets and farmers markets.

In our study, participants were customers of farmers markets in low-income neighborhoods in Philadelphia. SNAP recipients received coupons based on SNAP purchases at farmers markets or through community organizations with a high percentage of SNAP-eligible clients. In contrast to studies cited above, in our study the size of the incentive was not fixed. Overall, our study population was neither exclusively female nor exclusively comprised of WIC participants. Our study also had a higher percentage of African Americans and a higher mean age compared with other studies. These characteristics may enhance the generalizability of our study to other large urban areas.

Assessment of increased fruit and vegetable consumption in our study was based on self-report at a single point in time. We also explored SNAP redemption levels at farmers markets before and during the Philly Food Bucks intervention. The growth in SNAP sales attributable to Philly Food Bucks may indicate that the incentive bolstered farmers market use among SNAP recipients. The bonus incentive program could have attracted low-income customers to markets when they otherwise would not have patronized them or it could have prompted them to "spend more to earn more." Other factors also likely contributed to increased SNAP sales, including temporal increases in SNAP eligibility and farmers market use citywide, expansion of farmers markets in low-income neighborhoods, community-based promotion of markets, and nutrition education offered at markets.

Our findings are subject to several limitations. First, the study involved a convenience sample, which may not accurately reflect a representative sample of low-income residents who did or did not use Philly Food Bucks at farmers markets. Second, Philly Food Bucks participation was not randomly assigned, so differences in fruit and vegetable consumption may reflect unmeasured confounders or that customers who want to increase fruit and vegetable consumption are more likely to participate in the Philly Food Bucks program. Third, the measure of fruit and vegetable consumption was self-reported, based on 1 survey question, and cross-sectional in nature, limiting causative conclusions. Social desirability bias may have led to over-reporting of increased fruit and vegetable consumption. However, this measure was supplemented by self-report of trying new fruits and vegetables, which was also positively associated with Philly Food Bucks use. Fourth, there could be a seasonal effect on our findings because the customer survey was conducted toward the end of the farmers market season. Fifth, increases in SNAP sales beyond baseline could be attributable to Philly Food Bucks and other factors, such as increases in the SNAP-eligible population that were accounted for in our analyses or increases in food prices at our farmers markets that were not accounted for in our analyses. Lastly, these findings may not be generalizable to rural communities.

Despite these limitations, the initiation of the Philly Food Bucks program was associated with a significantly higher likelihood of self-reported increases in fruit and vegetable consumption and trying new fruits and vegetables in addition to increased per-market SNAP sales at farmers markets in low-income communities. This pilot program highlights the potential health impact of bonus incentive programs for low-income populations.

Future work can build on successes of bonus incentive programs at farmers markets. Pilot programs, such as the US Department of Agriculture's Healthy Incentives Pilot in Massachusetts, will explore how integrating bonus incentives into the Electronic Benefits Transfer system can further increase fruit and vegetable consumption and SNAP use among low-income urban populations (23). Public and private organizations should prioritize investing in food access initiatives that address affordability as well as availability. Federal food programs should fund and further evaluate bonus incentive programs to decrease barriers to fruit and vegetable consumption among low-income populations.

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Author Information

Corresponding Author: Candace R. Young, MS, Senior Associate, The Food Trust, 1617 John F. Kennedy Blvd, Ste 900, Philadelphia, PA 19103. Telephone: 215-575-0444 (office); 917-570-1039 (cell). E-mail: cyoung@thefoodtrust.org.

Author Affiliations: Jennifer L. Aquilante, Sara Solomon, Lisa Colby, Giridhar Mallya, Philadelphia Department of Public Health, Philadelphia, Pennsylvania; Mukethe A. Kawinzi, Nicky Uy, The Food Trust, Philadelphia, Pennsylvania.

References

1. Moore LV, Diez Roux AV, Nettleton JA, Jacobs DR Jr. Associations of the local food environment with diet quality — a comparison of assessments based on surveys and geographic information systems: the Multi-Ethnic Study of Atherosclerosis. Am J Epidemiol 2008;167(8):917–24. CrossRef PubMed
2. Larson NI, Story MT, Nelson MC. Neighborhood environments — disparities in access to healthy foods in the U.S. Am J Prev Med 2009;36(1):74–81. CrossRef PubMed
3. Leone AF, Rigby S, Betterley C, Park S, Kurtz H, Johnson MA, et al. Store type and demographic influence on the availability and price of healthful foods, Leon County, Florida, 2008. Prev Chronic Dis 2011;8(6):A140. http://www.cdc.gov/pcd/issues/2011/nov/10_0231.htm. Accessed May 1, 2012. PubMed

4. Southeastern Pennsylvania Household Health Survey. Philadelphia (PA): Public Health Management Corporation, Community Health Database; 2010. http://www.chdbdata.org. Accessed August 23, 2013.
5. Giang T, Karpyn A, Laurison HB, Hillier A, Perry RD. Closing the grocery gap in underserved communities: the creation of the Pennsylvania Fresh Food Financing Initiative. J Public Health Manag Pract 2008;14(3):272–9. PubMed
6. Gittelsohn J, Suratkar S, Song HJ, Sacher S, Rajan R, Rasooly IR, et al. Process evaluation of Baltimore Healthy Stores: a pilot health intervention program with supermarkets and corner stores in Baltimore City. Health Promot Pract 2010;11(5):723–32. CrossRef PubMed
7. New York City Healthy Bodegas Initiative. New York (NY): New York City Department of Health and Mental Hygiene; 2010. http://www.nyc.gov/html/doh/downloads/pdf/cdp/healthy-bodegas-rpt2010.pdf. Accessed April 23, 2012.
8. Healthy corner stores. Philadelphia (PA): Philadelphia Department of Public Health. http://www.foodfitphilly.org/eat-healthy/healthy-corner-stores/. Accessed April 23, 2012.
9. Freedman DA, Bell BA, Collins LV. The Veggie Project: a case study of a multi-component farmers' market intervention. J Prim Prev 2011;32(3-4):213–24. CrossRef PubMed
10. Suarez-Balcazar Y, Martinez LI, Cox G, Jayraj A. African Americans' views on access to healthy foods: what a farmers' market provides. Journal of Extension 2006;44(2). http://www.joe.org/joe/2006april/a2p.shtml.
11. Drewnowski A. Obesity and the food environment — dietary energy density and diet costs. Am J Prev Med 2004;27(3 Suppl):154–62. CrossRef PubMed
12. Anderson JV, Bybee DI, Brown RM, McLean DF, Garcia EM, Breer ML, et al. 5 A Day fruit and vegetable intervention improves consumption in a low income population. J Am Diet Assoc 2001;101(2):195–202. CrossRef PubMed
13. Herman DR, Harrison GG, Jenks E. Choices made by low-income women provided with an economic supplement for fresh fruit and vegetable purchase. J Am Diet Assoc 2006;106(5):740–4. CrossRef PubMed
14. Farmers market services. Washington (DC): US Department of Agriculture, Agricultural Marketing Service. http://www.ams.usda.gov/AMSv1.0/getfile?dDocName=STELPRDC5080175&acct=frmrdirmkt. Updated February 2012. Accessed May 1, 2012.
15. Public markets and community-based food systems — making them work in lower-income neighborhoods. New York (NY): Project for Public Spaces, Inc; 2003. http://www.pps.org/pdf/kellogg_report.pdf. Accessed May 1, 2012.
16. Young C, Karpyn A, Uy N, Wich K, Glyn J. Farmers' markets in low income communities: impact of community environment, food programs and public policy. Community Development 2011;42(2):208–20. CrossRef
17. Buttenheim AM, Havassy J, Fang M, Glyn J, Karpyn AE. Increasing Supplemental Nutrition Assistance Program/Electronic Benefits Transfer sales at farmers' markets with vendor-operated wireless point-of-sale terminals. J Acad Nutr Diet 2012;112(5):636–41. CrossRef PubMed
18. Bunnell R, O'Neil D, Soler R, Payne R, Giles WH, Collins J, et al. Fifty communities putting prevention to work: accelerating chronic disease prevention through policy, systems and environmental change. J Community Health 2012;37(5):1081–90. CrossRef PubMed
19. School lunch program. Alexandria (VA): US Department of Agriculture, Food and Nutrition Service. http://www.fns.usda.gov/cnd/lunch/AboutLunch/NSLPFactSheet.pdf. Updated October 2011. Accessed April 17, 2012.
20. Building data report for October 2010 children eligible. Harrisburg (PA): Pennsylvania Department of Education, Division of Food and Nutrition; 2010. http://www.portal.state.pa.us/portal/server.pt/directory/building_data/125483?DirMode=1. Accessed April 17, 2012.
21. Pennsylvania Department of Public Welfare. Medical assistance, food stamps and cash assistance statistics reports, 2011. http://listserv.dpw.state.pa.us/ma-food-stamps-and-cash-stats.html. Accessed April 26, 2012.
22. How to interpret odds ratios in logistic regression. Los Angeles (CA): University of California, Los Angeles, Academic Technology Services, Statistical Consulting Group. http://www.ats.ucla.edu/stat/mult_pkg/faq/general/odds_ratio.htm. Accessed April 27, 2012.
23. Healthy Incentives Pilot (HIP). Alexandria (VA): US Department of Agriculture, Food and Nutrition Service. http://www.fns.usda.gov/snap/hip. Updated February 16, 2012. Accessed May 17, 2012.

Tables

Table 1. Characteristics of Farmers Market Customers, by Philly Food Bucks Use,[a] at 22 Farmers Markets in Low-Income Communities, Philadelphia, Pennsylvania, 2011

Return

Characteristic	Philly Food Bucks Users (n = 175), %	Non–Philly Food Bucks Users (n = 433), %
Sex		
Female	75.9	71.5
Race/ethnicity[b]		
African American	52.0	45.3
White	22.3	42.8
Hispanic	14.0	6.5
Asian	7.0	2.1
Other	4.7	3.3
Age, y		
18–25	12.4	14.4
26–40	36.1	29.6
41–65	38.5	35.7
≥65	13.0	20.3
Shopping characteristics		
Began shopping at market in 2011[b]	50.9	34.5
Walk or bike to market[b]	67.8	54.4
Received nutrition education while at market[b]	84.6	55.8
Increased fruit and vegetable consumption[b]	71.1	46.3
Tried new fruits or vegetables[b]	56.7	41.3
Visit the market every week	45.3	41.5
Travel 3 blocks or less to get to the market	34.5	35.2
Report that prices at market are less expensive than food stores in neighborhood	43.9	37.2
Have used a SNAP card at the farmers market[b]	72.4	8.8

Abbreviation: SNAP, Supplemental Nutrition Assistance Program.
[a] Sample size = 608; Philly Food Bucks use was unknown for 54 (8%) respondents, which are excluded from the table.
[b] χ^2 test showed significant association ($P \leq .005$).

Table 2. Multiple Logistic Regression for Factors Associated With Increasing Fruit and Vegetable Consumption and Trying New Fruits or Vegetables Among Customers at Farmers Markets in Low-Income Communities, Philadelphia, Pennsylvania, 2011

Return

Factors in Model	Model 1: Increasing Fruit and Vegetable Consumption (n = 531; missing = 131)		Model 2: Trying New Fruits or Vegetables (n = 538; missing = 124)	
	OR (95% CI)	*P* Value[a]	OR (95% CI)	*P* Value[a]
Used Philly Food Bucks	2.4 (1.6–3.7)	<.001	1.8 (1.2–2.7)	.006
Received nutrition education at market	1.8 (1.2–2.7)	.003	1.5 (1.0–2.2)	.04
Walked or biked to market	1.0 (0.7–1.4)	.98	1.4 (1.0–2.1)	.05
New customer at market in 2011	1.1 (0.8–1.6)	.59	1.0 (0.7–1.4)	.91
Female	0.9 (0.6–1.3)	.60	1.0 (0.7–1.5)	.83
Aged 18 to 25 years	1.8 (1.1–3.0)	.03	0.8 (0.5–1.3)	.41
African American, Hispanic, or Asian	0.8 (0.5–1.1)	.17	0.7 (0.5–1.0)	.03

Abbreviation: CI, confidence interval.
[a] Wald statistic.

Table 3. SNAP and Philly Food Bucks Sales at Farmers Markets in Low-Income Communities, Philadelphia, Pennsylvania, 2009 to 2011

Return

Characteristic	SNAP			Philly Food Bucks[a]		
	2009	2010	2011	2009	2010	2011
No. of participating markets	12	16	22	0	16	22
Total sales, $	12,431	25,032	52,405	NA	10,856	25,914
Average sales per market, $	1,036	1,565	2,382	NA	679	1,178
Increase from previous year in average sales per market, %	35.4.	51.0	52.3	NA	NA	73.5

Abbreviations: SNAP, Supplemental Nutrition Assistance Program; NA, not applicable
[a] Philly Food Bucks distributed onsite at farmers markets through SNAP purchases accounted for 75% of redemptions. Philly Food Bucks distributed through community organizations accounted for 25% of redemptions.

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ORIGINAL RESEARCH

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Monetary Matched Incentives to Encourage the Purchase of Fresh Fruits and Vegetables at Farmers Markets in Underserved Communities

Suzanne Lindsay, PhD, MSW, MPH; Jennifer Lambert, MA; Tanya Penn, MPH; Susan Hedges, MPH; Kristine Ortwine, MPH; Anchi Mei, MLA, MCP; Tracy Delaney, PhD, RD; Wilma J. Wooten, MD, MPH

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PEER REVIEWED

Abstract

Introduction

Farmers market programs may increase access to more healthful foods and reduce the high prevalence of obesity in low-income communities. The objective of this study was to examine outcomes of the Fresh Fund farmers market program serving low-income neighborhoods in San Diego, California.

Methods

Through its Farmers Market Fresh Fund Incentive Program, the County of San Diego Health and Human Services Agency offered monetary incentives to government nutrition assistance recipients to purchase fresh produce at 5 farmers markets. Participants enrolled at participating markets from June 1, 2010, through December 31, 2011; they completed baseline and follow-up surveys of daily consumption and weekly spending on fruits and vegetables. We examined enrollment, participation, participant health perceptions, and vendor revenue.

Results

During the study period, 7,298 eligible participants enrolled in Fresh Fund; most (82%) had previously never been to a farmers market. Among 252 participants with matched surveys at baseline and 12-month follow-up, the proportion who reported their diet to be "healthy" or "very healthy" increased from 4% to 63% ($P < .001$); nearly all (93%) stated that Fresh Fund was "important" or "very important" in their decision to shop at the farmers market. Vendors reported that 48% of all market revenue they received was received through the Fresh Fund program. At 2 markets, revenue from June 1, 2011, through January 31, 2012, increased by 74% and 68% compared with revenue from June 1, 2010, through January 31, 2011.

Conclusion

Participants in the Fresh Fund program self-reported increases in daily consumption and weekly spending on fruits and vegetables, and vendors at participating farmers markets also increased their revenue.

Introduction

In recent decades, the prevalence of overweight and obesity has increased in the United States (1,2). The National Health and Nutrition Examination Survey shows that in 2009–2010, more than 78 million adults and roughly 12.5 million children and adolescents were obese (3); these Americans are at greater risk for adverse health outcomes such as type 2 diabetes and coronary heart disease and overall morbidity and mortality (4–6). Consuming adequate amounts of fruits and vegetables is an essential part of reducing poor health outcomes (7,8); however, in 2009 only 36% of adults consumed the recommended 2 or more servings of fresh fruit per day, and only 26% consumed 3 or more servings of vegetables per day (9). Low-income Americans are particularly at risk for poor dietary habits and related health conditions because of lack of access to affordable produce (10–13).

In 2008, the City Heights Farmers Market Fresh Fund (Fresh Fund) program was established in a low-income refugee community in San Diego County by the San Diego International Rescue Committee. It was the first program in San Diego to encourage the purchase of fresh fruits and vegetables at a farmers market by eligible participants using government nutrition assistance programs. In April 2010, the Fresh Fund program was expanded to 1 additional market in north San Diego. Later that year, San Diego County was awarded funding through the Centers for Disease Control and Prevention's (CDC's) 2-year initiative, Communities Putting Prevention to Work (CPPW), to help reduce obesity and prevent chronic disease (14). One of San Diego's CPPW-funded interventions was an enhancement of the 2 existing Fresh Fund programs and expansion to 3 additional markets in low-income neighborhoods, 2 of which also have large immigrant and refugee populations. The objective of this study was to examine patterns of enrollment and market visits, participants' self-reported dietary changes while participating in the program, and the economic benefits of the program, particularly for the farmer vendors.

Methods

This study was a practice-based evaluation conducted in partnership with community-based practitioners for the purpose of understanding how interventions can be incorporated and sustained in existing community practice settings. We used mixed methods and repeated measures and collected data from Fresh Fund participants who enrolled from June 1, 2010, through December 31, 2011. The study period included an extra month (January 2012) to capture data on Fresh fund visits and money spent by participants who enrolled in December 2011 but continued to purchase produce in January 2012. With CPPW support, the Fresh Fund expansion was designed by the County of San Diego Health and Human Services Agency (HHSA), the Division of Child Development and Community Health at the University of California San Diego, and the International Rescue Committee. Five markets operated during the study period (June 1, 2010, through January 31, 2012), 2 of which were operational at the beginning of the study period. The goal of the Fresh Fund expansion program was to enroll 3,000 eligible participants. HHSA gave approval for the Institute for Public Health at San Diego State University (SDSU) to analyze Fresh Fund program data for evaluation purposes. The SDSU institutional review board reviewed and approved the evaluation plan.

Eligibility, enrollment, and participation data

Government assistance recipients in the Supplemental Nutrition Assistance Program (SNAP), the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), and Supplemental Security Income (SSI) were eligible to participate in Fresh Fund, which allowed them to use their SNAP, WIC, or SSI benefits at 5 farmers markets. Eligible participants enrolled in the program at a Fresh Fund booth at the market where they were able to use SNAP or SSI through electronic benefit transfer (EBT) cards, WIC vouchers, cash, or debit or credit cards to buy Fresh Fund "purchased" tokens. They were then given differently marked "incentive" tokens (up to $20 per month) to match the amount of their purchased tokens. Only eligible government assistance recipients could purchase tokens and receive incentive tokens (including tokens purchased with cash). The Fresh Fund tokens could be spent only at certain types of vendors: fresh produce vendors (farmers) and vendors that provided certain types of healthful packaged food (eg, eggs, bread, meat). Participants did not have to spend all of their purchased and incentive tokens on the same day they were purchased (ie, tokens could be saved for use at future markets). Among all 5 markets, farmers represented 19% of all vendors; nonfarmer vendors included vendors of arts and crafts, hot foods, and packaged foods. Eligibility for incentives was verified and tracked by using an online database in which Fresh Fund personnel recorded the amount of money used by each participant to purchase tokens each week and their receipt of matched incentive tokens. Vendors accepted these tokens from participants and exchanged them with market management at the end of the day for reimbursement. Enrollment data collected at the Fresh Fund booth each week were used to evaluate participant enrollment and market use. Participant enrollment was concurrent with outreach and media efforts that began in June 2011, including 22 weeks of television advertisements, direct-mail flyers sent 6 times to 130,000 homes in neighborhoods adjacent to the markets, and posters on buses and at bus stops. The media campaign described the value of eating fresh fruits and vegetables and the components of the Fresh Fund program (www.HealthyWorks.org). Fresh Fund program staff at each market met with local nonprofit community-based organization (CBO) managers to describe the program and encourage them to promote it. They also provided Fresh Fund informational flyers to CBOs for distribution to their clients.

Self-reported data on participants at baseline and follow-up

Participants visiting the Fresh Fund enrollment booth were asked to complete a voluntary survey (Appendix) during their first enrollment visit (baseline) and at approximately 3-month intervals for as long as they participated in the Fresh Fund program. At every visit to the market, eligible participants were required to check in at the Fresh Fund booth, where the date of each visit and the details of monetary exchanges were recorded. The baseline and follow-up surveys used numeric scales and were available in 5 languages (English, Spanish, Vietnamese, Somali, and Chinese). The surveys were conducted via paper and pencil or if necessary, because of literacy issues, through an interview. Surveys were coded by Fresh Fund program staff according to a unique subject identification, which allowed comparisons over time. Follow-up surveys were grouped into 2 categories: 3-to-6 month follow-up surveys (completed between 3 and 6.5 months after enrollment) and a 12-month-or-more follow-up survey (completed 11.5 months after

enrollment or later). If participants completed multiple follow-up surveys in 1 or both periods, we used the most recent survey data. Among the 1,697 participants who visited the market multiple times for at least 3 months, 908 completed both a baseline and 3-to-6–month follow-up survey (54% response rate). Among the 582 participants who visited the market multiple times for 12 months or more, 252 completed both a baseline and follow-up survey (43% response rate). The reported demographics (ie, sex, age, race/ethnicity, number of people in household) of those who submitted follow-up surveys were similar to those who submitted baseline surveys. Baseline and follow-up data were compared for 3 survey questions: 1) How much on average do you spend on fresh fruits and vegetables per week?, 2) On average, how many servings of fruits and/or vegetables do you usually eat each day?, and 3) In general, how healthy would you say your overall diet is?

Data on vendor revenues

Data were collected from 448 vendors at the 5 participating markets. As part of their agreement to sell at the market, each vendor was required by the market management to submit a report at the end of each market day. These vendor reports documented that the business was present at the market and the amount of money each vendor received during the market day from both Fresh Fund and non-Fresh Fund purchases. The amount of money received through the Fresh Fund program was calculated by counting both purchased and incentive tokens submitted by vendors for reimbursement.

Data management and statistical analysis

Enrollment data, baseline and follow-up survey data, and vendor data were entered into databases by Fresh Fund program staff and delivered de-identified to the evaluation team at the Institute for Public Health. We calculated descriptive statistics for all participant data, including enrollment, demographics, number of visits, and types and amounts of money exchanged and used to purchase products from vendors by market and by month. We used χ^2 tests to compare baseline and follow-up survey responses. Because the data on vendor revenue were not normally distributed, we used the Wilcoxon signed-rank test to compare these data across markets and over time. An α level of .05 was applied for all analyses. Data were analyzed using SPSS version 19 (International Business Machine Corp, Armonk, New York).

Results

A total of 7,298 eligible participants (Table 1) enrolled in Fresh Fund, exceeding the program goal of 3,000 by 143%. Most participants (82%) had previously never been to a farmers market. Enrollment increased substantially during summer 2011, and the largest enrollment was in August 2011 (n = 1,089). Participants averaged 2.8 visits, markets averaged 72 Fresh Fund participants per day, and 21,025 monetary exchanges took place during the study period. The highest number of visits (n = 2,145) occurred in August 2011 (Figure). Almost half (46%) of participants returned to the market more than once; 17% visited 5 or more times. The 2 markets operating during the entire study period had a 95% increase in enrollment and a 139% increase in visits in August 2011 compared with August 2010. More than one-third of monetary exchanges (39%) were cash exchanges, 32% were EBT exchanges, and 26% were WIC voucher exchanges. Through these exchanges, the Fresh Fund program provided $680,873 in total market spending power ($350,512 in purchased tokens plus $330,361 in incentive tokens) to eligible government nutrition assistance participants at the 5 markets, for an average of $34 per participant per visit, and an average of $93 per participant throughout the study.

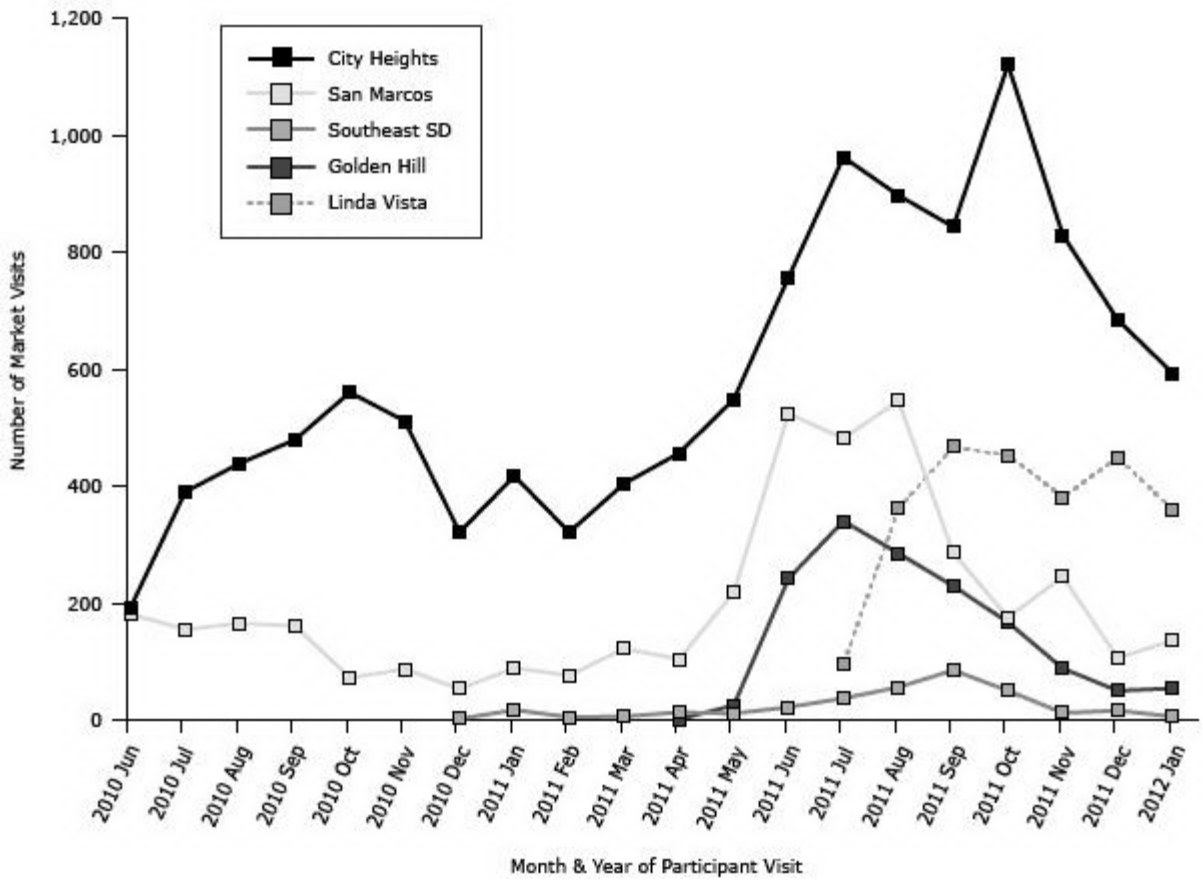

Figure. Number of Fresh Fund market visits by market location and month (20,089 total visits), June 1, 2010, through January 31, 2012. The Southeast San Diego Market opened in December 2010, the Golden Hill Market opened in April 2011, and the Linda Vista Market opened in July 2011. A media marketing campaign was initiated in June 2011. [A tabular version of this figure is also available.]

Comparison of baseline and follow-up surveys

The distribution of survey responses on daily fruit and vegetable consumption changed significantly between baseline and follow-up. The percentage of respondents who reported eating 5 or more daily servings of fruits and vegetables increased from 23.7% to 29.6% for 3-to-6–month participants (Table 2) and 19.4% to 24.2% for 12-month participants (Table 3). The distribution of responses on self-reported perceptions of diet also changed significantly for both groups of participants. The percentage of respondents who reported "healthy or very healthy diets" increased from 33.3% to 68.6% for 3-to-6–month participants and from 4.0% to 63.1% for 12-month participants.

Nearly all participants (93%) stated that Fresh Fund was either "important" or "very important." Most of participants at 3 to 6 months (71%) said that they would be "somewhat" or "completely likely" to shop at the farmers market without the Fresh Fund incentive, whereas about half (55%) of the participants at 12 months stated they would be "somewhat" or "completely likely" to continue.

Vendor revenue

Vendors reported $1.7 million in sales at the 5 markets during the study period, an average of $6,133 per market day (including both Fresh Fund and non-Fresh Fund sales). Fresh Fund tokens purchased with government assistance funding represented 14% of the revenue, incentive tokens represented 22% of revenue, and tokens purchased with personal cash or credit by Fresh Fund–eligible participants represented 12% of revenue. Thus, 48% of all market revenue received by vendors was received by encouraging government nutrition assistance–eligible persons to shop at the markets through the Fresh Fund program. The remaining 52% of the revenue was from non-Fresh Fund shoppers, or from Fresh Fund shoppers not using the Fresh Fund token-purchasing system. For the 18 farmer vendors who were present and selling at the markets from June 1, 2010, through January 31, 2011, and from June 1, 2011, through January 31, 2012, the average revenue per market day increased from $418.88 in the first period to $566.84 in the second period (P = .006). Although nonfarmer products could not be purchased with Fresh Fund tokens, average nonfarmer revenue also increased during the study period from $107.86 to $150.29 per market day (n = 33 nonfarmer

vendors, $P < .001$). Although farmers comprised only 19% of the total number of vendors at the markets, their revenue during the study period accounted for 62% of the total revenue for all vendors.

Discussion

This practice-based evaluation demonstrated that the combination of a $20 matched incentive, media marketing efforts, and collaboration with local community-based organizations was successful in bringing 7,298 low-income government assistance recipients to 1 of 5 markets, most of them for the first time. Vendors at the markets also benefited, with more than $1.7 million in sales, almost half of which (approximately $800,000) was provided by Fresh Fund participants. Two long-standing farmers markets open throughout the study period provided an opportunity for comparison of revenue generation over time. Market 1 had a 74% increase in revenue in the period June 1, 2011, through January 31, 2012, compared with June 1, 2010, through January 31, 2011, while Market 2 had a 68% increase in revenue in the same period. Eligible participants used personal cash for 12% of their purchases, indicating that the added value of the Fresh Fund program went beyond simply infusing government assistance money into the market. Participants reported increases in weekly spending for fruits and vegetables, increases in daily consumption of fruits and vegetables, and better overall dietary health, a finding that has been documented in similar studies (15). Interestingly, participants who continued in Fresh Fund for at least 12 months were demographically similar to those with baseline and 3-to-6–month follow-up surveys, yet they reported a significantly poorer baseline perception of overall dietary health; only 4% reported their diet to be "healthy" or "very healthy" at baseline. This finding may imply that those who used the Fresh Fund program longest were more likely to need it the most, and it warrants further investigation. Finally, in terms of sustainability, all 5 markets continue to encourage the use of government nutritional assistance programs for the purchase of fresh fruits and vegetables, although only 1 market continues to offer a modest incentive provided by a local nonprofit whose mission is to increase access to nutritious food. Previous research has demonstrated that low-income community members can be encouraged to shop at local farmers markets through the promotion of government nutritional assistance programs (SNAP, WIC, SSI) to purchase fresh fruits and vegetables (16,17). This evaluation adds to the current knowledge by providing information on enrollment trends, visit patterns, self-reported improvement in diet, and vendor benefits.

Implementation of the Fresh Fund program also created challenges. Some markets reported long lines and some difficulty among shoppers in understanding the token system. Because of the way data were collected, a Fresh Fund eligible participant could visit a market and spend his or her own money but not register at the Fresh Fund booth and therefore not be counted as a return visitor. Thus, the follow-up data may undercount the number of repeat visits. During Fresh Fund vendor interviews, some vendors suggested the use of an electronic management system rather than the manual token system. Use of new technologies such as swipe cards has been shown to increase sales for SNAP participants in several local farmers markets in one Arizona region, highlighting the benefits that can be gained not only by consumers but by vendors as well (18).

Incentive programs that market and encourage the purchase of local fresh fruits and vegetables by low-income populations are relatively new, and more research and evaluation are needed. Further analysis is needed to determine characteristics of farmers markets or program interventions that might encourage or discourage participation. For example, 1 market in our study may have been successful because the WIC office in that neighborhood was active in educating clients about the program. Another market may have been successful because it sold ethnic food products familiar to community members (including refugees). Studies examining whether an incentive of less than $20 a month would be sufficient for positive participant outcomes would also be valuable. Incentivizing low-income government assistance–eligible participants to purchase fresh fruits and vegetables at local farmers markets has the ultimate potential to reduce childhood and adult obesity and the long-term chronic disease burden in this population. Further research and evaluation is needed to determine whether encouraging the purchase of fresh fruits and vegetables leads to actual changes in consumption and diet, and in turn, reductions in obesity and improved health.

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Author Information

Corresponding Author: Suzanne Lindsay, PhD, MSW, MPH, Associate Professor of Epidemiology, Graduate School of Public Health, and Executive Director, Institute for Public Health, San Diego State University, 6505 Alvarado Rd, Ste 116, San Diego, CA 92120. Telephone: 619-594-4409. E-mail: slindsay@mail.sdsu.edu.

Author Affiliations: Jennifer Lambert, Tanya Penn, Susan Hedges, Kristine Ortwine, Institute for Public Health, San Diego State University, San Diego, California; Anchi Mei, International Rescue Committee, San Diego, California;

Tracy Delaney, Wilma J. Wooten, Health and Human Services Agency, County of San Diego, California. Ms Delaney is now affiliated with the Public Health Institute, Oakland, California.

References

1. Flegal KM, Carroll MD, Ogden CL, Curtin LR. Prevalence and trends in obesity among US adults, 1999–2008. JAMA 2010;303(3):235–41. CrossRef PubMed
2. Finkelstein EA, Khavjou OA, Thompson H, Trogdon JG, Pan L, Sherry B, et al. Obesity and severe obesity forecasts through 2030. Am J Prev Med 2012;42(6):563–70. CrossRef PubMed
3. Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of obesity in the United States, 2009–2010. Centers for Disease Control and Prevention. NCHS Data Brief 2012. http://www.cdc.gov/nchs/data/databriefs/db82.pdf. Accessed March, 7 2012.
4. National Heart, Lung, and Blood Institute Obesity Education Initiative. Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults. September 1998. NIH publication no. 98-4083. http://www.nhlbi.nih.gov/guidelines/obesity/ob_gdlns.pdf. Accessed January 22, 2012.
5. Nguyen DM, El-Serag HB. The big burden of obesity. Gastrointest Endosc 2009;70(4):752–7. CrossRef PubMed
6. Staser KW, Zollinger TW, Saywell RM, Kenapareddy S, Gibson PJ, Caine VA. Dietary behaviors associated with fruit and vegetable consumption, Marion County, Indiana, 2005. Prev Chronic Dis 2011;8(3):A66. PubMed
7. Ford ES, Bergmann MM, Boeing H, Li C, Capewell S. Healthy lifestyle behaviors and all-cause mortality among adults in the United States. Prev Med 2012;55(1):23–7. CrossRef PubMed
8. Appel LJ, Brands MW, Daniels SR, Karanja N, Elmer PJ, Sacks FM. Dietary approaches to prevent and treat hypertension: a scientific statement from the American Heart Association. Hypertension 2006;47(2):296–308. CrossRef PubMed
9. Centers for Disease Control and Prevention (CDC). State-specific trends in fruit and vegetable consumption among adults — United States, 2000–2009. MMWR Morb Mortal Wkly Rep 2010;59(35):1125–30. PubMed
10. United States Department of Agriculture. Characteristics and influential factors of food deserts. Economic Research Service; 2012 report no. 140. http://www.ers.usda.gov/media/883903/err140.pdf. Accessed July 22, 2013.
11. Kropf ML, Holben DH, Holcomb JP, Anderson H. Food security status and produce intake and behaviors of Special Supplemental Nutrition Program for Women, Infants, and Children and Farmers' Market Nutrition Program participants. J Am Diet Assoc 2007;107(11):1903–8. CrossRef PubMed
12. Hosler AS, Rajulu DT, Fredrick BL, Ronsani AE. Assessing retail fruit and vegetable availability in urban and rural underserved communities. Prev Chronic Dis 2008;5(4):A123. PubMed
13. Centers for Disease Control and Prevention (CDC). Differences in prevalence of obesity among black, white, and Hispanic adults — United States, 2006–2008. MMWR Morb Mortal Wkly Rep 2009;58(27):740–4. PubMed
14. Bunnell R, O'Neil D, Soler R, Payne R, Giles WH, Collins J, et al. Fifty communities putting prevention to work: accelerating chronic disease prevention through policy, systems, and environmental change. J Community Health. 2012;37(5):1081–90. CrossRef PubMed
15. Freedman DA, Choi SK, Hurley T, Anadu E, Hébert JR. A farmers' market at a federally qualified health center improves fruit and vegetable intake among low-income diabetics. Prev Med 2013;56(5):288–92. CrossRef PubMed
16. Winch R. Nutrition incentives at farmers' markets: Bringing fresh, healthy, local foods within reach. 2008. http://www.farmlandinfo.org/documents/37781/ebt_matching_programs_rachel_winch.pdf. Accessed January 23, 2012.
17. Anderson JV, Bybee DI, Brown RM, McLean DF, Garcia EM, Breer ML, et al. 5-A-Day fruit and vegetable intervention improves consumption in a low income population. J Am Diet Assoc 2001;101(2):195–202. CrossRef PubMed
18. Bertmann FMW, Ohri-Vachaspati P, Buman MP, Wharton CM. Implementation of wireless terminals at farmers' markets: impact on SNAP redemption and overall sales. Am J Public Health 2012;102(7):e53–5. CrossRef PubMed

Tables

Table 1. Characteristics of San Diego County Fresh Fund Participants, June 1 2010, Through December 31, 2011 (N = 7,298)

Characteristic	No. (%)
Sex (n = 7,285)[a]	
Male	1,121 (15.4)
Female	6,164 (84.6)
Race/ethnicity (n = 7,298)	
African American	485 (6.6)
American Indian or Alaska Native	13 (0.2)
Asian	754 (10.3)
Vietnamese	787 (10.8)
Pacific Islander/Native Hawaiian	46 (0.6)
East African	212 (2.9)
Multiracial	73 (1.0)
White	1,316 (18.0)
Hispanic or Latino	3,612 (49.5)
No. of people in household (n = 7,293)[a]	
1 or 2	1,625 (22.3)
3 or 4	3,119 (42.8)
5 or 6	2,025 (27.8)
≥7	524 (7.2)
Participant type/eligibility (n = 7,298)	
SNAP/CalFresh	1,958 (26.8)
SSI	1,248 (17.1)
WIC	4,092 (56.1)
Participant age, y (n = 7,275)[a]	
<24	984 (13.5)
25–34	2,826 (38.8)
35–44	1,546 (21.3)
45–54	542 (7.5)
55–64	448 (6.2)
≥65	929 (12.8)
Participant residence by HHSA region (n = 7,137)[a]	
Central	3,498 (49.0)
East	274 (3.8)
North Central	1,122 (15.7)
North Coastal	1,563 (21.9)
North Inland	481 (6.7)

Characteristic	No. (%)
South	199 (2.8)

Abbreviations: SNAP, Supplemental Nutrition Assistance Program; SSI, Supplemental Security Income; WIC, Special Supplemental Nutrition Program for Women, Infants, and Children; HHSA, Health and Human Service Agency.
[a]Does not total 7,298 because of unanswered questions or missing data.

Table 2. San Diego County Fresh Fund Participant Matched Baseline and 3-to-6–Month Follow-up Survey Data, June 1, 2010, Through January 31, 2012

Return

Survey Question	Matched Baseline, No. (%)	Matched 3–6 Month Follow-up, No. (%)	*P* Value[a]
How much on average do you spend on fresh fruits and vegetables per week?			
<$20	255 (28.1)	237 (26.1)	<.001
$20-$29	283 (31.2)	287 (31.6)	
≥$30	370 (40.7)	384 (42.3)	
On average, how many servings of fruits and/or vegetables do you usually eat each day?			
0–2	258 (28.4)	214 (23.6)	<.001
3 or 4	434 (47.8)	426 (46.9)	
≥5	216 (23.8)	268 (29.5)	
In general, how healthy would you say your overall diet is?			
Very unhealthy/unhealthy	339 (37.3)	20 (2.2)	<.001
Average	273 (30.1)	271 (29.8)	
Healthy/very healthy	296 (32.6)	617 (68.0)	

[a] χ^2 test was used to test for significance; an α level of .05 was applied for all analyses.

Table 3. San Diego County Fresh Fund Participant Matched Baseline and 12-Month Follow-up Survey Data, June 1, 2010, Through January 31, 2012

Return

Survey Question	Matched Baseline, No. (%) (n = 252)	Matched 12-Month Follow-up, No. (%) (n = 252)	*P* Value[a]
How much on average do you spend on fresh fruits and vegetables per week?			
<$20	91 (36.1)	53 (21.0)	<.001
$20-$29	79 (31.3)	79 (31.3)	
≥$30	82 (32.5)	120 (47.6)	
On average, how many servings of fruits and/or vegetables do you usually eat each day?			
0-2	82 (32.5)	61 (24.2)	<.001
3 or 4	121 (48.0)	130 (51.6)	
≥5	49 (19.4)	61 (24.2)	
In general, how healthy would you say your overall diet is?			
Very unhealthy/unhealthy	170 (67.5)	13 (5.2)	<.001
Average	72 (28.6)	80 (31.7)	
Healthy/very healthy	10 (4.0)	159 (63.1)	

Survey Question	Matched Baseline, No. (%) (n = 252)	Matched 12-Month Follow-up, No. (%) (n = 252)	*P* Value[a]

[a] χ^2 test was used to test for significance; an α level of .05 was applied for all analyses.

Appendix. Enrollment and Follow-up Survey Questions, Study on Farmers Market Fresh Fund Incentive Program, San Diego, California, June 1, 2010, Through January 31, 2012

Return

Enrollment Survey Questions	Follow-Up Survey Questions
1) How often do you come to this farmers market? a. This is my first time at this market. b. Every week c. Once a month d. Twice a month e. 1–2 times a season f. Missing/no answer/refused/don't know	**1) How often do you come to this farmers market?** a. This is my first time at this market since I enrolled in the Fresh Fund. b. Every week c. Once a month d. Twice a month e. 1–2 times a season f. Missing/no answer/refused/don't know
2) How did you hear about Fresh Fund? a. Word of mouth b. WIC c. FRC d. Media e. Flyers f. Other _____ g. Missing/no answer/refused/don't know	**2) How important is the Fresh Fund in your decision to come to this market?** a. Very important (I wouldn't have come without it) b. Important c. Somewhat important d. Not important (The Fresh Fund did not affect my decision to come to this market. I would have come without it.) e. Other _____ f. Missing/no answer/refused/don't know
3) How likely are you to shop at this Farmers Market if you can still use EBT/WIC, but without the Fresh Fund incentive a. Completely likely b. Somewhat likely c. Somewhat unlikely d. Completely unlikely e. Missing/no answer/refused/don't know	**3) How likely are you to shop at this Farmers Market if you can still use EBT/WIC, but without the Fresh Fund incentive?** a. Completely likely b. Somewhat likely c. Somewhat unlikely d. Completely unlikely e. Missing/no answer/refused/don't know
4) How much on average do you spend on fresh fruits and vegetables per week? a. Less than $10 b. $10–$19 c. $20–$29 d. $30–$39 e. $40 or more f. Missing/no answer/refused/don't know	**4) How much on average do you spend on fresh fruits and vegetables per week?** a. Less than $10 b. $10–$19 c. $20–$29 d. $30–$39 e. $40 or more f. Missing/no answer/refused/don't know
5) On average, how many servings of fruits and/or vegetables do you usually eat each day? (1 serving	**5) On average, how many servings of fruits and/or vegetables do you usually eat each day? (1 serving**

Enrollment Survey Questions	Follow-Up Survey Questions
= 1 cup raw, leafy vegetables or ½ cup raw or cooked other fruits/vegetables, or 1 piece) a. Less than 1 serving a day b. 1–2 servings a day c. 3–4 servings a day d. 5+ servings a day e. Missing/no answer/refused/don't know	**= 1 cup raw, leafy vegetables or ½ cup raw or cooked other fruits/vegetables, or 1 piece)** a. Less than 1 serving a day b. 1–2 servings a day c. 3–4 servings a day d. 5+ servings a day e. Missing/no answer/refused/don't know
6) Of all fruits and vegetables you buy each week, how much comes from a Farmers Market? a. Less than 25% b. 25%–49% c. 50%–75% d. 75% or more e. Missing/no answer/refused/don't know	**6) Of all fruits and vegetables you buy each week, how much comes from a Farmers Market?** a. Less than 25% b. 25%–49% c. 50%–75% d. 75% or more e. Missing/no answer/refused/don't know
7) In general, how healthy would you say your overall diet is? a. Very healthy b. Healthy c. Average d. Unhealthy e. Very unhealthy f. Missing/no answer/refused/don't know	**7) In general, how healthy would you say your overall diet is?** a. Very healthy b. Healthy c. Average d. Unhealthy e. Very unhealthy f. Missing/no answer/refused/don't know

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PUBLIC HEALTH RESEARCH, PRACTICE, AND POLICY

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Supporting Healthful Eating Through Retail Environmental Change: Communities Putting Prevention to Work

Latetia V. Moore, PhD, MSPH

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More healthful eating patterns can help people achieve recommended nutrient intakes, control calorie intake, and reduce the risk of some of the leading causes of chronic illness and death in the United States such as cardiovascular disease, diabetes, and certain types of cancer (1). Making more healthful choices easily accessible may help people start and maintain more healthful eating patterns (2,3). Although research and programs dedicated to improving access to more healthful food choices are under way (4), there is little empirical evidence to identify what aspects of the retail environment require intervention to improve access (5). It is unclear whether efforts should focus on improving proximity to stores, improving the selection of healthful options within stores with limited stock, making more healthful items more affordable, improving the quality of goods within stores, introducing more healthful options to an area via other retail models like farmers markets, or some combination of the above. One recent initiative that may elucidate what aspects of the environments to change to improve the diet and health of community members is Communities Putting Prevention to Work (CPPW). During the 2-year funding period beginning in 2010, 39 of the 50 CPPW communities committed to enhancing access to healthful food and evaluating the effect of this increased access on behavior (6). CPPW presented an opportunity to evaluate changes to the environment that may support people in making more healthful dietary choices.

This collection of articles in *Preventing Chronic Disease* presents findings from the first 7 of those 39 communities to publish results from their CPPW retail food environment initiatives. Three communities focused their efforts on improving access in corner stores. The other 4 communities chose to improve access at farmers markets in low-income areas via incentive programs or increased acceptance of food assistance benefits.

Improving access does not necessarily mean adding large, full-service grocery stores like supermarkets and supercenters to areas with low levels of access. Although these types of stores frequently offer a wider selection of high-quality, affordable, and more healthful options (2), new store development may not always be possible (7). Smaller retail venues such as small grocery stores, corner stores, and fruit and vegetable markets can also play a role in ensuring communities have adequate access to more healthful foods (8).

Each of 3 highlighted CPPW initiatives working to improve access via corner stores used qualitative or quantitative baseline assessments to identify potential barriers, engage community residents, understand neighborhood context, and develop solutions to increase access. In Pitt County, North Carolina, store assessments indicated that the pricing and quality of food items in rural corner stores were similar to that of food items in urban corner stores, but the rural corner stores were more likely to carry healthful foods (9). Qualitative interview results indicated that corner store owners were willing to stock more healthful foods but perceived low customer demand for them in underserved areas, despite the fact that more than half of customers of these stores reported that a wider selection of groceries and better prices would help them buy more groceries at corner stores (10). The awardee used these findings to establish a baseline and to identify small stores that offered limited produce to target for a healthy corner store initiative. The initiative included introducing potentially profitable healthful food items, on the basis of store owner perceptions of demand and findings from customer surveys, and offering taste tests and in-store promotions to increase demand for fruits and vegetables.

Quantitative and qualitative baseline assessments by the second of the 3 CPPW awardees in Nashville, Tennessee, focused more narrowly on 4 areas researchers identified as providing limited access, based on existing data (11). Physical assessment of the stores in these areas indicated that few of them offered fresh fruits, fresh vegetables, low-fat milk, or whole-wheat bread and none stocked items from all 4 of these food categories (11). Qualitative assessments identified a neighborhood history of poor-quality produce offered in small stores, mistrust of store proprietors, and mistrust of government (11). As in North Carolina, the Tennessee awardee used this information as a baseline and to inform the design of a corner store initiative and communications campaign. Their efforts aimed to increase awareness of the higher-quality product offerings introduced by the initiative such as seasonal fresh fruits and vegetables purchased in bulk from a local mobile market. The initiative also developed a plan to build relationships between corner store proprietors and neighborhood organizations, such as a church, to mitigate mistrust. The third CPPW grantee in Cook County, Illinois, also identified and recruited corner stores into a healthy corner store initiative and engaged community members by conducting quantitative baseline assessments and partnering with 9 community institutions including local governments, community-based organizations, and faith-based institutions (12,13). Of the 53 corner stores approached, 25 corner stores were willing to add new healthful foods to their inventory, and 21 (84%) received new equipment and marketing materials and enhanced community outreach (13).

Introducing or altering inventory in corner stores is only one way of increasing access to more healthful food options. Farmers markets, farm stands, and other retail venues that sell fresh farm produce can increase access to high-quality fresh produce, be set up in a variety of locations, and be implemented at a low cost (14–16). They may also reduce the cost of healthful foods for low-income families and result in increased fruit and vegetable intake of program participants when federal food and nutrition assistance programs extend benefits to include farmers market purchases (15,16). In addition to the potential positive effect on diet of farmers markets and other retail venues that sell fresh farm produce, these retail venues may also help to bolster local economies and foster business growth and tourism (14).

Each of the 4 highlighted CPPW initiatives working to improve access at farmers markets in low-income areas was able to demonstrate that increasing affordability of fruits and vegetables through a bonus incentive program is a successful strategy for increasing Supplemental Nutrition Assistance Program (SNAP) use or sales or both at farmers markets. Two CPPW initiatives were also able to demonstrate increases in fruit and vegetable consumption. In 9 farmers markets in lower-income regions of King County, Washington, SNAP/EBT (electronic benefit transfer) acceptance rates increased by 79% for market stalls after introduction of subsidized (EBT) terminals for processing SNAP cards (17). Analyses of 4 years of EBT sales data in New York City showed that by the last 2 years, markets participating in the Health Bucks program had 87% to 98% higher daily EBT sales than markets without the incentive (18). In Pennsylvania, average SNAP sales more than doubled in the first 2 years of the Philly Food Bucks program (19). Philly Food Bucks users were also more than twice as likely to report increasing fruit and vegetable consumption and trying new fruits or vegetables as non-Philly Food Bucks users. The County of San Diego Health and Human Services Agency directly attributed 48% of the $1.7 million total market revenue in 5 farmers' markets to an incentive program that offered matched monetary incentives of up to $20 per month (20). Participants at these markets also reported significant increases in daily consumption and weekly purchasing of fruits and vegetables and perception of overall dietary health.

Although people who live in areas with greater access to retailers of more healthful foods may have a better diet than those with limited access, dietary quality is still fairly low even in areas of high access (21). Interventions to test improving access alone versus improving access in conjunction with individual strategies that encourage people to choose more healthful foods are still needed. For these reasons, improving access to healthful foods in the community is only one of the mechanisms CPPW awardees are using to support more healthful dietary choices (6). For example, the Tennessee CPPW awardee assisted store owners with product placement to increase visibility of more healthful items and developed promotional posters, signage, and point-of-purchase flags that were posted in neighborhoods served by the stores and in the stores to increase awareness of the initiative. The awardee also provided samples of foods and beverages made with a variety of fruits and vegetables sold in the store to increase knowledge of different types of fruits and vegetables and how to prepare them.

Ensuring that all Americans have easy access to retail venues that offer affordable, healthful foods is an important step toward supporting more healthful choices and a high-quality diet in communities. Each of the 7 CPPW awardees highlighted in this commentary implemented an environmental change and has prospectively evaluated or plans to evaluate its effect. The 4 awardees improving access via farmers markets demonstrated that financial incentives increased sales at farmers markets; 2 of them also demonstrated that incentives increased fruit and vegetable intake. The 3 awardees improving access via corner stores each engaged the community to develop a context-specific approach to improving access and established a baseline. Postevaluation in each is under way. Each of the prospective program evaluations in these communities can help others understand how they can implement retail environment changes that may prompt changes in behavior. Continued evaluation efforts that prospectively evaluate retail environment changes like CPPW and stronger research study designs that can rule out alternative explanations for observed associations

(22) can help to refine future investments in public health initiatives to improve diet and reduce the burden of nutrition-related diseases.

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Author Information

Corresponding Author: Latetia V. Moore, PhD, MSPH, Nutrition Branch, Division of Nutrition, Physical Activity, and Obesity, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 4770 Buford Hwy NE, MS F77, Atlanta, GA 30341. Telephone: 770-488-5213. E-mail: lvmoore@cdc.gov.

References

1. Dietary Guidelines for Americans. Washington (DC): US Department of Agriculture and US Department of Health and Human Services; 2010. http://www.health.gov/dietaryguidelines/dga2010/DietaryGuidelines2010.pdf. Accessed April 9, 2013.
2. Larson NI, Story MT, Nelson MC. Neighborhood environments disparities in access to healthy foods in the US. Am J Prev Med 2009;36(1):74–81. CrossRef PubMed
3. Grimm K, Moore LV, Scanlon K. Access to healthier food retailers in the United States, 2011. MMWR Morb Mortal Wkly Rep. In Press.
4. Healthy Food Access Portal. PolicyLink, The Food Trust, and The Reinvestment Fund; 2013. http://www.healthyfoodaccess.org/. Accessed May 7, 2013.
5. Story M, Kaphingst KM, Robinson-O'Brien R, Glanz K. Creating healthy food and eating environments: policy and environmental approaches. Annu Rev Public Health 2008;29(1):253–72. CrossRef PubMed
6. Bunnell R, O'Neil D, Soler R, Payne R, Giles WH, Collins J, et al. Fifty communities putting prevention to work: accelerating chronic disease prevention through policy, systems and environmental change. J Community Health 2012;37(5):1081–90. CrossRef PubMed
7. Access to healthier foods: opportunities and challenges for food retailers in underserved areas. Arlington (VA): Food Marketing Institute; 2011. http://www.fmi.org/docs/consumer/access-to-healthier-foods.pdf?sfvrsn=4. Accessed May 7, 2013.
8. Bodor JN, Rose D, Farley TA, Swalm C, Scott SK. Neighbourhood fruit and vegetable availability and consumption: the role of small food stores in an urban environment. Public Health Nutr 2008;11(4):413–20. CrossRef PubMed
9. Jilcott Pitts SB, Bringolf K, Lawton K, McGuirt J, Wall-Bassett E, Morgan J, et al. Formative evaluation for a healthy corner store initiative in Pitt County, North Carolina: assessing the rural food environment, part 1. Prev Chronic Dis 2013;10:E121. PubMed
10. Jilcott Pitts SB, Bringolf K, Lloyd C, McGuirt J, Lawton K, Morgan J. Formative evaluation for a healthy corner store initiative in Pitt County, North Carolina: engaging stakeholders for a healthy corner store initiative, part 2. Prev Chronic Dis 2013;10:E120. CrossRef PubMed
11. Larson C, Haushalter A, Buck T, Campbell D, Henderson T, Schlundt D. Development of a community-sensitive strategy to increase availability of fresh fruits and vegetables in Nashville's urban food deserts, 2010–2012. Prev Chronic Dis 2013;10:E125. CrossRef PubMed
12. Food access in Suburban Cook County. Oak Forest (IL): Cook County Department of Public Health; 2011. http://www.cookcountypublichealth.org/files/CPPW/bloc-report-031612-finallr.pdf. Accessed May 7, 2013.
13. Jaskiewicz L, Dombrowski RD, Drummond H, Barnett GM, Mason M, Welter C. Partnering with community institutions to increase access to healthful foods across municipalities. Prev Chronic Dis 2013;10:E167. CrossRef
14. Brown C. The impacts of local markets: a review of research on farmers markets and community supported agriculture (CSA). Am J Agric Econ 2008;90(5):1296–302. CrossRef
15. McCormack LA, Laska MN, Larson NI, Story M. Review of the nutritional impact of farmers markets and community gardens: a call for evaluation and research efforts. J Am Diet Assoc 2010;110(3):399–408. CrossRef PubMed
16. Larsen K, Gilliland J. A farmers' market in a food desert: evaluating impacts on the price and availability of healthy food. Health Place 2009;15(4):1158–62. CrossRef PubMed

17. Cole K, McNees M, Kinney K, Fisher K, Krieger JW. Increasing access to farmers markets for beneficiaries of nutrition assistance: evaluation of the Farmers Market Access Project. Prev Chronic Dis 2013;10:E168. PubMed
18. Baronberg S, Dunn L, Nonas C, Dannefer R, Sacks R. The impact of New York City's Health Bucks Program on electronic benefit transfer spending at farmers markets, 2006–2009. Prev Chronic Dis 2013;10:E163.
19. Young CR, Aquilante JL, Solomon S, Colby L, Kawinzi MA, Uy N, et al. Improving fruit and vegetable consumption among low-income customers at farmers markets: Philly Food Bucks, Philadelphia, Pennsylvania, 2011. Prev Chronic Dis 2013;10:E166.
20. Lindsay S, Lambert J, Penn T, Hedges S, Ortwine K, Mei A, et al. Monetary matched incentives to encourage the purchase of fresh fruits and vegetables at farmers markets in underserved communities. Prev Chronic Dis 2013;10:E188.
21. Moore LV, Diez-Roux AV, Nettleton JA, Jacobs DR. Associations of the local food environment with diet quality — a comparison of GIS and survey assessments: the Multi-Ethnic Study of Atherosclerosis. Am J Epidemiol 2008;167(8):917–24. CrossRef PubMed
22. Lytle LA. Measuring the food environment state of the science. Am J Prev Med 2009;36(4):S134–44. CrossRef PubMed

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Centers for Disease Control and Prevention 1600 Clifton Rd. Atlanta, GA 30333, USA
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