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Bringing Produce to the People: Implementing a social marketing food access intervention in rural food deserts

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Abstract

To describe and evaluate the process of implementation of a social marketing food access intervention for food desert communities in rural California. Case study approach used mixed-methods data from nationwide market comparisons, environmental assessment, and community informants. Lessons learned demonstrate room for improvement in the implementation of such strategies and underscore the importance of community involvement in decision-making; the strategic importance of operational decisions relating to intervention design, site and product selection, and distribution models; and a reconsideration of the problem of “access” in rural areas.

Keywords

Community Development; Rural Health; Food Access; Case Study

Introduction

Rural food deserts – places located more than 10 miles from a supermarket – often lack access to fresh produce, cluster in low-resource, low-income, ethnic minority communities, and are associated with disproportionate rates of poor health outcomes and chronic disease among residents.¹ Interventions aimed at eliminating food deserts have included building permanent structures (e.g., full-service supermarkets), “making over” existing small stores to sell fresh produce,^{2–5} and temporary solutions (e.g., farmer’s markets).^{6–8} Such interventions have had mixed success and have mostly been conducted in urban areas. The nature of rural areas – sparsely populated, having minimal development and commercial areas – means that some of these interventions are not transferrable to rural settings.^{1,9} For example, larger chain stores often select areas based on their potential for profitability and where insurance and security costs are low; rural areas do not typically meet those criteria.¹⁰ Innovative strategies are needed to increase access to nutritious foods in rural areas.^{11,12} One recent intervention that has gained traction is the development of mobile farmer’s markets

that deliver produce for sale at a reasonable price. Although mobile farmer's markets first emerged in urban areas, public health and policy makers concerned with rural food access are focused on whether this intervention might provide fresh produce to rural residents in low-resource areas. The purpose of this report is to describe and evaluate the process of implementation for 1 mobile farmer's market by a non-profit organization who aimed to increase access to fresh produce in rural food deserts. Specifically, it details the social marketing-based intervention plan, its implementation, and lessons learned.

Description of the Intervention

From November 2013 through May 2015, a nonprofit organization developed *Produce on the Go (POTG)*, a mobile farmer's market, to improve food access in a rural Central California county by providing locally-grown fruit, vegetables, and nuts for purchase through weekly visits by a mobile grocery truck. Merced is a largely rural county in Central California, with high poverty (25.4%) and unemployment (17.5%), and where 1 in 6 (15.6%) households are food insecure.¹³ Despite its agricultural bounty, this county is home to many food deserts, defined as areas that are at least 10 miles from the nearest supermarket or chain grocery store, in predominately low-income Latino majority communities.¹⁴ Disparities in access to fresh produce due to the lack of supermarkets and large grocery stores in food deserts are associated with residents' dietary intake, rates of obesity and chronic disease.

POTG was developed by a non-profit organization and funded by the Merced County Human Services Agency, California FreshWorks, and the United States Department of Agriculture (USDA). The mobile food access intervention included 2 vehicles (a cargo van, purchased with funding provided by these organizations, and an 18-wheel refrigerated semi-truck, donated by a drink distributor) to sell fresh produce at several Merced County sites on a weekly basis. Two vehicles allowed access to different types of locations. From 10 sites launched in November 2013, the intervention expanded to 19 sites, mostly in Latino-majority, low-income communities.

Social marketing theory, which incorporates commercial marketing principles in the planning and execution of behavior change interventions, underpinned the *POTG* intervention design.¹⁵⁻¹⁷ Social marketing takes into account: 1) exchange theory: consumers must perceive a benefit in exchange for their participation/purchase/behavior change; 2) audience segmentation: subgroups similar in some way related to the target behavior or may respond similarly to intervention; 3) marketing mix: combination of price, product, place, and promotion; 4) customer orientation; and 5) continuous monitoring. Exchange theory was fundamental to the intervention design: *POTG* sought to provide the benefit of food access to participants/customers. Audience segmentation was place-based, with each truck site serving distinct audiences. Promotion activities included postcard mailers, roadside signage, community festival participation, recipe cards/produce descriptions from SNAP-Ed, and the hiring of community liaisons to provide nutrition education and opportunities for physical activity at select sites. Other components of the marketing mix are further discussed under Lessons Learned, along with customer orientation

and continuous monitoring. Refer to Figure 1 for a logic model detailing the intervention components and expected outcomes.

Description of the Evaluation

The process evaluation of the *POTG* intervention followed a parallel-convergent mixed-methods case study design consisting of 3 separate research activities (Table 1).¹⁸ The aim of the evaluation was to assess the implementation of the intervention as it was conceptualized, focused on the inputs, activities, and 2 short and mid-term outcomes, namely, residents' awareness of the mobile food vehicles and potential for sustainability (Figure 1), and to determine whether the intervention was appropriate and accessible.¹⁹ Three separate evaluation activities delivered distinct types of information that were then integrated to provide a more comprehensive understanding of the process of implementation and consequent outcomes than could be achieved through any single method.^{20,21} These activities included (1) an *environmental assessment* to understand how structural factors at different types of sites affected the sustainability of the intervention and how residents perceived of and interacted with the intervention (i.e., the consumer experience); (2) a *national market assessment* that consisted of interviews with managers of similar mobile produce interventions and served to compare barriers and facilitators to implementation, best practices, and structural features at intervention sites that might condition effectiveness/sustainability; and (3) *focus groups, interviews, and surveys with community informants*, to assess residents' perspectives on food access in their communities and their thoughts on and experiences with the intervention as appropriate and accessible. Surveys also helped in understanding the demographic profile of participants to assess whether the intervention reached the target population. Integration was achieved in the design and interpretation,²⁰ revealing how the various components of the intervention fit together. The University of California, Merced, Institutional Review Board approved the components involving human subjects.

Environmental Assessment

An assessment of 4 target neighborhoods, representing 5 of the 19 intervention sites, aimed to understand the environmental or contextual features that may influence the effectiveness of the produce truck as a strategy to improve food access in Merced County. Each location was physically visited by 2 trained research assistants at different times to allow for verification of the observations. The data collection instrument (coding sheet) was based on an assessment of prior literature²⁻⁵ and the parallel assessment of national produce trucks, to capture contextual components hypothesized to affect success. These included: parking; proximity to public transportation and walk/bike paths; retailers/services; and homes/offices/other locations where people might gather. The 5 site assessments were systematically coded independently by 2 researchers; inter-coder reliability was near-perfect (Cohen's Kappa=0.99).

National Market Assessment

A total of 5 mobile interventions selling produce in food deserts in any region of the United States were identified through the California FreshWorks website and a general Internet

search. Managers were interviewed to solicit information regarding the process of implementation of the intervention, the appropriateness and accessibility of the intervention (e.g., the degree to which the intervention successfully engaged the target community), and the potential for the sustainability of the intervention. The interviewer recorded extensive interview notes, which were deductively analyzed for themes around community engagement and sustainability.²² Interventions were excluded if: (1) the intervention was not yet active; (2) managers could not be identified due to insufficient contact information; and (3) the intervention operated exclusively outside of the United States. Details about the comparison interventions can be requested from the first author.

Community Informants: Depth Interviews, Focus Groups, and Surveys

Depth interviews (n=30) and focus groups (n=7 participants; 2 focus groups) were conducted by trained bilingual (English/Spanish), bicultural (Mexican-American) research assistants to obtain feedback about the appropriateness and accessibility of *POTG* and food access issues within the community. Informants were recruited near intervention sites. The interview guide was pre-tested in mock interviews with college students. Informants also completed demographic questionnaires (data in Table 2). Each focus group had a dedicated moderator and a notetaker.²³ Audio recordings were transcribed verbatim. To preserve content integrity, Spanish transcripts were not translated; all analyses were conducted by bilingual, bicultural researchers. The codebook was based on domains of interest to the intervention managers, as per the logic model (Figure 1), which included the following domains: awareness, perceptions, and expectations of the intervention; barriers and facilitators to shopping *POTG*; and food access challenges.^{22,24} Transcripts were separately coded by 2 researchers. Responses were organized first into the domains of interest; themes and patterns were then identified within each domain, and codes systematically assigned to quotations representing themes/domains. A third researcher reviewed the coding scheme and resolved discrepancies. Saturation occurred at the 7th interview for awareness/perceptions; the 11th interview for food access challenges.

Lessons Learned

Lessons learned are syntheses of outcomes from each of the 3 separate evaluation activities, each of which provided distinct types of information; integrating these data through interpretation assisted with understanding how the various components of the intervention fit together. Integration involved iterative comparisons of the results from each of the data streams to examine the extent to which the various types of data confirm, contradict, or expand understanding of the phenomenon in question.

Importance of Community Engagement and Involvement in Decision-Making

Fostering relationships based on mutual respect and trust is a critical first step to developing successful interventions to increase food access in low-resource, minority communities. Building relationships and partnerships creates the foundation to engage with community members on their perceptions of the neighborhood food environment, including identifying their needs and input on potential solutions. Engaging neighborhood residents requires a strong community-based methodology from the planning to the implementation stages of the

intervention.^{25,26} In this mixed-methods case study we found evidence that interventions conducted with engaged communities were more successful than those in which residents (i.e., intervention targets) were not fully engaged, including *POTG*.

Governance Structure—The national assessment revealed consistency in the governance structures of the interventions: With the exception of *POTG*, all had advisory boards that were comprised of representatives of the community, and were managed, operated by, or otherwise affiliated with an existing non-profit community organization and had advisory boards that were active participants in the intervention design and decision-making processes. The advisory boards of successful interventions included representatives from the community; boards were convened regularly and frequently, and/or individual members were consulted, as managers felt appropriate. *POTG*'s advisory board was comprised of administrative officials from local governmental organizations, funders, and academics, and met only sporadically. Thus, decision-making was left to the operations manager.

Perceptions of *POTG*—Nearly one-third of community informants were aware of *POTG*, and nearly all who were aware had shopped there (Table 2). Community informants had positive perceptions of *POTG* initially; however, they reported a decline in quality over time: “When it first started it had excellent fruit...lately...they weren't getting the produce as fresh” (P5). Informants reported that the quality of *POTG* produce was not good; specifically, produce was “not as fresh as some at the grocery stores” (P3) or just “old” (P12).

Strategic Importance of Operational Decisions

Successful food access interventions grounded in a strong community-based methodology^{25,26} demonstrated their customer orientation by soliciting input from community members to make decisions regarding all aspects of day-to-day operations, including the location and timing of community visits, the produce selected, price, and accessibility. Involving community members in operational decisions helps to meet the food access needs of the community (as identified by the members themselves) facilitates trust, and encourages buy-in from community members. In contrast, most of the operational decision-making for *POTG* was made by a single individual – the operations manager, with little input from community members or members of the advisory board.

Location—*POTG* intervention sites varied in proximity to retail and services. For example, 1 site was near train tracks; when trains passed, dirt was kicked up and the noise drowned out conversation. Other sites were where people visited on a regular basis (e.g., health clinic, elementary school, post office, WIC clinic). In contrast, all of the sites described by the other interventions in the national assessment were deliberately selected to be part of something larger than the intervention.

Timing—The day of the week and time of day varied across *POTG* sites: A school site visit was scheduled in the early morning, allowing children and parents to browse the selection before school; the visit was long enough to allow teachers to bring students for morning snack. In contrast, the visit to the site next to the train tracks occurred on a Sunday morning,

on the opposite end of town from the Catholic Church where most residents attend Mass regularly. Additionally, community informants indicated that infrequent visits made it hard for them to include *POTG* in their regular shopping. Managers of other interventions included in the national assessment had made similar observations, and reported that they had addressed this issue by visiting fewer sites with greater frequency, with decisions about which sites to add/drop made in partnership with community residents.

Accessibility—Spaces suitable for parking *POTG*'s 18-wheel semi-truck were usually distant from public transportation. This was less of a problem for the *POTG* van and for the comparison produce trucks in the national assessment that operated out of converted buses or other smaller vehicles that could more easily maneuver in tighter quarters.

Competition—Some intervention sites were near neighborhood markets or vendors that sold produce at prices comparable to *POTG*. Informants mentioned that the quality and selection of the competitor's products, as well as the presentation (e.g., 1 competitor was a Mexican man selling produce out of a weathered pick-up truck), negatively affected perceptions of *POTG* compared with alternatives and also may have affected shopping behaviors.

Product Selection—Community informants indicated that the mobile food intervention did not meet their needs; as a result, their participation in the food access intervention declined over time. For example, some expressed that *POTG* did not offer the types of produce that they were used to eating; offering staples (eggs, milk, beans, cilantro, and tropical fruits such as avocados and mangos) would make them more likely to shop there regularly. Informants also observed an inconsistency of available produce and lack of clarity about why certain products were sometimes unavailable was a problem. Research on food access interventions in low-resource, ethnic minority communities underscores the critical need for a strong community-based strategy at all stages of planning and implementation. Soliciting input from community residents at the planning stage would have identified key products to stock; input during the implementation would have likely revealed neighborhood residents' concerns and provided an opportunity for a correction. Managers of comparison interventions reported a commitment to the social marketing principle of continuous marketing that generated this type of ongoing feedback from community residents and which formed the basis for decision-making about the product selection, increasing their success.

Definition of "access"

Research on food access typically underscores physical or spatial disparities in the distribution of food outlets across different communities (e.g. food deserts or not; rural versus urban). Yet, recent studies reveal that the cost of food also limits food access in areas designated as rural food deserts. Food access in rural food deserts requires a consideration of physical access, in terms of proximity to food outlets, and price,^{27,28} and this was borne out in this study.

Perceptions of Food Access—All community informants lived in USDA-designated food deserts, yet only 14 (37.8%) reported that they could not purchase healthy foods near their homes. When the issue of accessibility came up as a barrier to eating healthfully in the interviews/focus groups, it was related to financial and time-dependent access rather than physical access. These definitions shaped the suggestions that informants had for improving access to healthy foods in their communities, and their perceptions of *POTG*.

Price and Time—Reducing the high costs of healthy foods came up repeatedly to improve access, and was often paired with timing. As 1 informant remarked, “The accessibility to get them. Some of the veggies are high cost or they’re not in season,...they have to bring them out of different states and when it comes to that it’s a higher price...and such is not in the budget...”(P13). Similarly, another informant indicated, “Time! Time and maybe money too ‘cuz all the healthy and good stuff is usually more expensive than the junk food” (P4). Some informants discussed time in terms of food preparation: “[Fresh produce doesn’t] have preservatives like junk food does, and usually when you are busy and by the time you get to something later on in the week it’s already rotten..., but you pretty much have to make time to do that stuff.” (P6). For others, high cost was related to cost in terms of time: “... sometimes when there is good deals on stuff there [are] a lot of people there and sometimes people don’t have time to be waiting in line all day.” (P6).

Pricing—Consistent with their definitions of food access, our informants evaluated *POTG* based on its pricing: some felt prices were competitive; others felt prices were high. Still others reported inconsistency in pricing, and this was perceived as a barrier to shopping *POTG*.

Challenges

The original intent of *POTG* was to increase food access so as to improve diet behaviors and ultimately, contribute to the prevention and reduction of obesity among the rural population through a social marketing approach (Figure 1). Although no other studied intervention had such an explicit model of effects, the national assessment revealed similar expectations across all groups. We describe here some challenges to implementation and sustainability and compare them with managers’ experiences from the national assessment.

Marketing Mix—An important component of *POTG*’s social marketing approach was the “4 Ps” – the combination of price, product, place, and promotion that comprise the marketing mix. The national assessment revealed that successful mobile food access interventions reported substantial engagement with communities and spent considerable effort conducting a strategic mix of marketing activities that included residents in decision-making about price, product, and place (i.e., location). In contrast, *POTG* had less transparency about the first 3 “Ps” and only minimally engaged in the 4th: promotion. Nationally, successful trucks promoted themselves through coupons, targeted advertisements, and social media. Nutrition education was a core component of marketing activities for most, although execution varied substantially. All provided recipes. Some had regular food demonstrations including tastings, others partnered with other organizations for community health fairs and block parties to engage community members with produce on

offer, and more broadly, with the truck as food retailer. These advanced social marketing strategies were mentioned by several of the national assessment managers as instrumental for engaging communities and were credited for those interventions' successes. Promotion activities that were enacted for *POTG* included direct mailings to residents of intervention communities, signage near the sites or directing traffic to the sites, and participation in community festivals. These activities may have served to increase residents' awareness of the program. However, a major challenge, as described above, was that residents did not remember the truck would be visiting on the actual day and consequently failed to integrate shopping at the site within their regular food shopping plans. Promotion activities that might have served as more timely reminders to residents, such as a website with an updated calendar or social media postings, were never implemented. For a largely Latino, social media-savvy, and mobile phone-dependent²⁹ community, these unused communication strategies may have been more useful. Other social marketing aspects of the intervention never implemented included nutrition education and food preparation demonstrations to address knowledge and self-efficacy as mechanisms for behavior change.³⁰ Even concepts that were relatively more straightforward to communicate, such as those to increase awareness of the intervention components, appeared to have failed: For example, although nearly half of the informants received food assistance, almost none knew that the truck accepted EBT. In social marketing terms, this failure to effectively *promote* the product (i.e., to advertise EBT and affordability) contributed to potential misperceptions of *price* and lack of participation.

Sustainability—All produce trucks in the national assessment began with aspirations to effect sustainable, structural change in food distribution systems and increase food access among vulnerable communities, yet the national comparison assessment revealed challenges to sustainability. Challenges reflected the financial realities of operating a retail food business: The high costs of produce and operations, combined with low prices, made breaking even challenging. All trucks required external/grants funding to operate. To increase the potential for self-sustainability, managers negotiated serving those who most need the intervention and those who can afford to pay prices required for sustainability. Financial tensions also influenced operating decisions (i.e., locations, frequency of site visits). Lack of training in finance and management was a challenge. Yet again, we observed the importance of community relationships: Those with strong community relations developed pricing and outreach strategies to successfully navigate tensions.

Discussion

Using a mixed-methods case study, this report details a process evaluation of the implementation of a mobile food access intervention, *POTG* (Figure 1), to increase fresh produce access in rural food deserts. Lessons learned from the evaluation reveal that perceived benefits may not outweigh the challenges of utilizing the intervention.¹⁶ The intervention was not more convenient than the existing food retailers in location accessibility, price, or availability. Although distance is commonly used to define food access,³¹ a recent USDA report³² revealed that proximity is not necessarily a decisive factor for low-income people, who may travel to shop for produce at preferred stores. In line with

those findings, the majority of informants – residents of USDA-defined food deserts – expressed they were able to purchase fresh produce near their neighborhoods. Likewise, a recent study on food access in California’s Central Valley found that, although rural communities in this low-resource, Latino-majority area can be characterized as food deserts, the agriculturally-rich setting offers several non-traditional outlets (i.e. fruit and vegetable stands; dollar stores) that provide access to fresh produce.²⁸ Among low-income groups, access to personal vehicles is increasing,³² which may explain why distance was not perceived a major issue. With time a highly salient barrier, isolation from services may represent a larger factor than lack of proximity to public transportation, as isolation forces potential consumers to make additional plans to shop at *POTG*. Informants reported that physical access to fresh produce was less of a concern for them than cost was; price and affordability were more likely to influence where they shopped. Quality, variety, and availability of familiar foods were perceived as better at other retailers; competition in the form of small corner markets or other mobile vendors was also identified.

Nutrition education including food demonstrations were part of the *POTG* social marketing activities but were not implemented. These activities can elicit positive brand recognition¹⁷ while raising awareness and improving healthy eating attitudes among residents of target communities, and represent an added value that can mitigate personal barriers like cost and time. Food access interventions that include nutrition education have shown promising results among vulnerable populations.¹²

In conclusion, future mobile interventions should consider alternate distribution models. The *POTG* sites were largely inaccessible by public transportation, limiting potential clientele to those who had private transportation and could therefore reach other, non-mobile food vendors. Thus, an intervention distribution model must be flexible enough to effectively reduce barriers inherent to isolated communities, including transportation and price. Most *POTG* intervention sites made the produce truck the “destination,” since they were not proximal to other retail/services. This is a risky model; *POTG* and national comparisons revealed that the sites in which produce trucks were integrated into an active community site were more successful. Additionally, competition in the form of small corner markets or other mobile vendors existed; opportunities to synergize with these rather than compete could be explored. For example, the produce truck may serve as a supplier of fresh produce to local markets and a consultant on storage and vending produce. This natural extension of “Healthy Corner Store” projects²⁻⁵ would work well in rural settings.

Providing access to healthy foods to residents of food deserts is made more challenging in rural areas where full-service grocery stores or other traditional food access interventions may not make financial or practical sense. This mixed-methods evaluation assessing the implementation of a mobile food access social marketing intervention demonstrated room for improvement in the implementation of such strategies and provided suggestions for the sustainability and impact on rural food access disparities. Specifically, findings suggest the strategic significance of operational decisions relating to site and product selection and distribution models, and the critical role that effective implementation of social marketing principles may play in successful interventions. Findings underscore the importance of

community involvement in decision-making and nutrition education to ensure the sustainability and efficacy of mobile interventions to improve produce access.

Implications for Research and Practice

Community involvement is critical to developing and successfully implementing strategies to improve healthy food access. Consultation with community members should start at the planning phase and continue throughout implementation, involving residents in decision-making including identifying sites and schedules, product selection and pricing, and distribution channels. For example, community members can provide critical insight on the best day of the week and time of the week to visit. This may mean serving fewer communities (if there are commonly popular and unpopular times), or visiting more infrequently than once per week, or it may mean providing access to produce indirectly (e.g., by serving as a supplier/distributor to small local stores rather than serving end consumers directly). Relatedly, a produce truck as a food access intervention may have a stronger likelihood of success if it is seen as an extension of services already provided by a trusted organization, rather than as an independent, standalone program.

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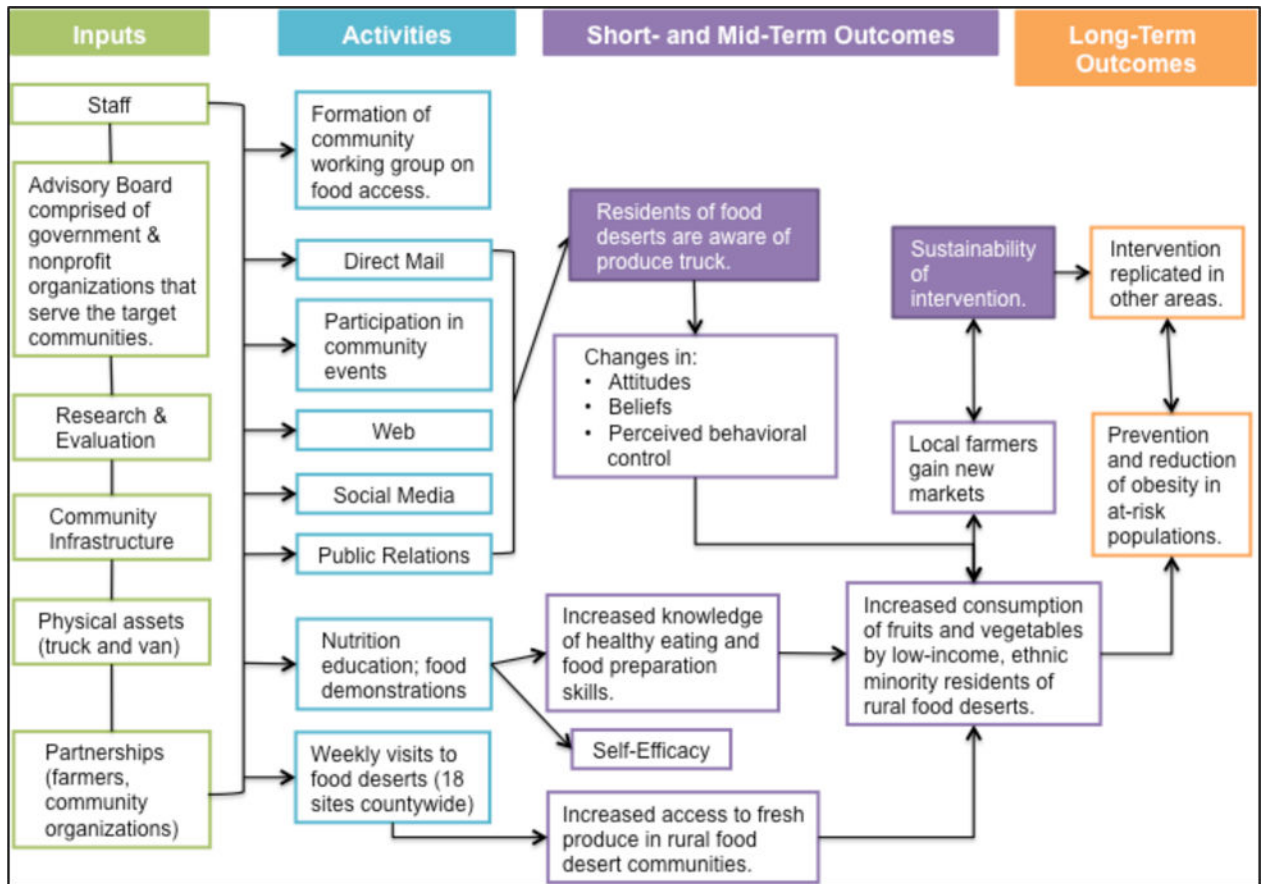


Figure 1.
Logic Model.

Table 1

Evaluation Summary (Parallel Convergent Mixed Methods Design).

Component	Objective	Methods	Sampling	n	Key Findings	Integrated Interpretation
Environmental Assessment	Understand contextual features that affect <i>POTG</i> 's ¹ effectiveness and sustainability.	Visual inspection; Checklist; Photographs	4 sites identified for high-intensity intervention, incl. nutrition education.	-	<ul style="list-style-type: none"> Proximity to retail; services Schedule Site accessibility Competition 	<ul style="list-style-type: none"> Importance of community engagement, ownership, involvement in decision-making Strategic importance of operational decisions Definition of access
National Market Assessment ²	Identify and compare barriers and facilitators to mobile food trucks as food access interventions.	Interviews with managers	Inclusion: All mobile groceries/ farmer's markets with mission to increase food access.	5	<ul style="list-style-type: none"> Community engagement Sustainability challenges (cost vs. price, management, operating schedule) 	<ul style="list-style-type: none"> Challenges to implementation and intended effects
Community Informants ³	Assess awareness and perceptions of <i>POTG</i> . To understand perceptions of community food access and solicit solutions.	Depth Interviews	>17 years Live in intervention neighborhood.	30	<ul style="list-style-type: none"> High awareness; shopping barriers Selection, quality Pricing Schedule/freq Food access = cost 	<ul style="list-style-type: none"> Importance of community engagement, ownership, involvement in decision-making Strategic importance of operational decisions Definition of access Challenges to implementation and intended effects
		Focus Groups		7	<ul style="list-style-type: none"> Healthy foods are available in neighborhoods 	
	Obtain demographic data and perceptions of food access from standardized questions.	Surveys	All interview and focus group participants.	37		

¹ Produce on the Go (*POTG*).

² Additional details can be requested from the first author.

³ Refer to Table 2.

Table 2

Characteristics of Community Informants.

	Mean / Percent (N = 37)
Age	38.97 (range: 18–75)
Gender	
Females	84%
Males	16%
Language	
Spanish	62%
English	38%
Aware of <i>Produce on the Go</i>	32%
Ever shopped at <i>Produce on the Go</i>	30%
Education, highest level	
Elementary	30%
Grades 7–8	14%
High school diploma/GED	24%
Some college/technical training	24%
Some graduate/professional school	3%
Employment:	
Full-time	37%
Part-time	14%
Not employed	49%
Food assistance:	44%
Children <5 in household:	49%
Children 6–18 in household:	49%
Body Mass Index:	
<25	19%
25–29	32%
30+	46%

Note. Sample included residents from 2 high-priority communities served by *POTG*. While demographically similar, the 2 communities were selected to represent 2 ends of the urbanization spectrum in the county: 1 was suburban (South Merced) and the other rural (Planada). Information for residents who completed depth interviews (n=30) and those who participated in focus groups (n=7) is combined; there were no differences in the group characteristics.