

**Increasing access to healthful foods: A qualitative study with residents of low-income communities**

Alexandra Evans, PhD<sup>1§</sup>  
[Alexandra.E.Evans@uth.tmc.edu](mailto:Alexandra.E.Evans@uth.tmc.edu)

Karen Banks, MS<sup>2</sup>  
[karenobanks@gmail.com](mailto:karenobanks@gmail.com)

Rose Jennings, MPhil<sup>1</sup>  
[Rose.Jennings@uth.tmc.edu](mailto:Rose.Jennings@uth.tmc.edu)

Eileen Nehme, MPH<sup>1</sup>  
[Eileen.k.nehme@uth.tmc.edu](mailto:Eileen.k.nehme@uth.tmc.edu)

Cori Nemec, MPH<sup>1</sup>  
[Cori.e.nemec@uth.tmc.edu](mailto:Cori.e.nemec@uth.tmc.edu)

Shreela Sharma, PhD<sup>1</sup>  
[Shreela.V.Sharma@uth.tmc.edu](mailto:Shreela.V.Sharma@uth.tmc.edu)

Aliya Hussaini, MD<sup>3</sup>  
[Aliya.hussaini@msdf.org](mailto:Aliya.hussaini@msdf.org)

Amy Yaroch, PhD<sup>4</sup>  
[ayaroch@centerfornutrition.org](mailto:ayaroch@centerfornutrition.org)

<sup>1</sup>University of Texas School of Public Health - Austin Regional Campus  
Michael & Susan Dell Center for Healthy Living  
1616 Guadalupe St. | Suite 6.300 | Austin, TX 78701

<sup>2</sup> Share Our Strength Center for Best Practices  
1030 15<sup>th</sup> St NW, Ste 1100 West  
Washington, D.C. 20005

<sup>3</sup>Michael and Susan Dell Foundation

<sup>4</sup> Gretchen Swanson Center for Nutrition

<sup>§</sup>Corresponding author.

**ABSTRACT**

**Background:** Inadequate access to healthful foods has been identified as a significant barrier to healthful dietary behaviors among individuals who live in communities with limited geographic and economic access. The purpose of this study was to collect qualitative data obtained from focus groups with residents living in underserved, low-income communities about their food purchasing choices and their perceptions of the most effective ways to increase access to healthful foods in their own communities.

**Methods:** Spanish and English focus groups were conducted in low-income, ethnically –diverse communities. Participants were asked about their knowledge, factors influencing their food purchasing decisions, and their perceptions regarding solutions to increase access to more healthful foods.

**Results:** A total of 148 people participated in 13 focus groups. The majority of participants were female and ethnically diverse (63% Hispanic, 17% African American, 16% Caucasian, and 4% “other”). 77% of participants reported making less than \$1999 per month. Participants reported high levels of knowledge and preference for healthful foods. The most important barriers influencing healthful shopping behaviors included price of healthful foods, lack of geographical access to healthful food, lack of quality of available food, and lack of overall quality of the proximate retail stores. Solutions to inadequate access included placement of new chain supermarkets in their communities. Strategies implemented in convenience stores were not seen as an acceptable. Farmers’ markets, with specific stipulations, and community gardens were regarded as beneficial supplementary solutions.

**Conclusions:** The results from the focus groups provide important input from a needs assessment perspective from the community and identify gaps to provide direction for the future.

**Key words:** qualitative study, access to healthful foods, food insecurity, ethnically diverse, health disparities,

**BACKGROUND:**

Food insecurity or lack of consistent access to enough nutritious food for an active healthy life [1] is experienced by approximately 17.9 million households in the United States (U.S.). Food insecurity placing them at greater risk for engaging in less healthful dietary behaviors and consuming fewer servings of fruits and vegetables (F&V) and dairy foods, and fewer complex micro-nutrients compared to individuals who are food secure [2,3]. A strong relationship between food insecurity and poverty exists, with higher rates of food insecurity and hunger occurring among individuals with lower socioeconomic status (SES) [2].

Food access is a critical component of food insecurity, and is often considered a function of a variety of factors, including the spatial proximity to food resources, as well as the affordability, cultural appropriateness, and the nutritional adequacy of available resources. Limited food access has been found to disproportionately affect low-income individuals who are more likely to live in communities with lower access to healthful foods [1,4-10]. These types of underserved communities are often referred to as “food deserts”<sup>5</sup> and tend to have few food retailers who sell healthier food products (e.g., fresh F&V) and more food retailers who sell unhealthful foods [11-13]. Low-income individuals living in communities with limited food access tend to have less healthful diets and are a higher risk for chronic disease compared to individuals living in higher income communities [8, 13-15].

In 2009, approximately 40% of all U.S. households did not have easy access (i.e. access within 1 mile of residence) to large grocery stores and supermarkets [16]. As a result of high prevalence of U.S. households living in communities with limited access and the noted health disparities among those living in these type of communities, federal and local initiatives are underway to increase both geographic and economic access to healthful foods. Current strategies include increasing geographic access by increasing points of healthful food access (e.g.

introducing new chain supermarkets, defined for this study as full service retail outlet that specializes in selling a variety of food items from all food groups) and economic access by implementing pricing schemes (e.g. decreasing the price of healthful foods) [17-20]. Although there has been an emphasis on placing more chain supermarkets in food deserts (as opposed to non-chain supermarkets because chain supermarkets tend to have more healthy, affordable foods than non-chain supermarkets[9]), other geographic strategies to improve the healthfulness of the community food environment include changing the inventory of convenience stores (i.e. small retail stores which typically sell a limited variety of staple groceries and snacks), increasing the number of farmers' markets and farm stands, and establishing community gardens [18,19].

In addition to efforts to increase geographic access to healthful foods, strategies to increase economic access are also being implemented. These types of strategies include pricing schemes at supermarkets, convenience stores, and at farmers' markets (e.g. Double Dollar incentives for fresh produce at farmers' markets) [21].

Both the geographic and economic strategies are being implemented in communities all over the U.S. with relatively little evidence that they are effective and with almost no input from community stakeholders regarding feasibility and acceptability of these strategies. The overarching purpose of this paper is to present in-depth qualitative data obtained from focus groups with residents living in underserved, low-income communities about their food purchasing choices and their perceptions of the most effective ways to increase access to healthful foods in their own communities. The results from the focus groups will provide important input from a needs assessment perspective from the community and identify gaps to provide direction for the future.

## **METHODS**

For this study, qualitative data about access to healthful foods were collected from 138 adults living in low-income communities with limited access to healthful foods. Specifically, focus group participants were asked about their knowledge, factors influencing their food purchasing decisions, and their perceptions regarding solutions to increase access to more healthful foods. Institutional Review Board approvals from the University of Texas at Austin and the University of Texas Health Science Center were obtained before commencement of the study.

### ***Participants***

Focus group participants were recruited from 11 zip codes including both urban and rural communities in central Texas with high concentrations of individuals living in households below the poverty level, and/or with limited access to healthy food, as defined by the lack of a chain supermarket in the community within a reasonable distance from the majority of residents [22]. Figure 1 illustrates the study area and the location of chain supermarkets within the study area. Of the 11 zipcodes in the study area, 5 lack a supermarket with the nearest grocery store between 3 and 15 miles away.

Table 1 compares demographic information from the study area from which focus group participants were recruited to demographics from the county in which the study area was located and from Texas.

In order to recruit a random sample of community residents, over 20 community leaders, including church pastors, social service providers, non-profit directors, and neighborhood association members were contacted to help determine venues and times for the focus groups. Flyers were distributed to schools, churches, community recreation centers, select businesses,

and door-to-door. Inclusion criteria for participation were: 1) resident of one of our study communities, 2) responsible for purchase of most household food, and 3) between the ages of 18-65 years. While this study explicitly focused on the needs of low-income residents, specific income level was not a requirement for participation. However, given that the communities were all considered low-income, it was assumed that most the participants would be low-income as well. Interested and eligible individuals were asked to contact the research team or come to a pre-set focus group meeting. For participating in the focus groups, participants were given a small bag of local farm-fresh produce.

### ***Focus Group Questions***

The one-hour long focus group sessions were interactive discussions guided by 15 open-ended questions using a standardized focus group protocol [23]. The questions were developed using the U.S. Department of Agriculture (USDA) concept of “food security” as a guiding framework. The USDA defines “food security” as *access by all people at all times to enough nutritious food for an active, healthy life* and encompasses both geographic and economic access to healthy food [1]. Questions were developed to specifically examine participants’ perceptions with regard to what constitutes a healthful diet, factors influencing food purchasing decisions, and how to increase geographic and economic access to healthful food in the community where they live. The questions focused on three specific venues where residents are able to obtain food: supermarkets, convenience stores, and farmers’ markets. These venues were chosen because they provide equal access to all community members living in a specific community. During the focus groups, community and school gardens were also brought up by the participants and this point of access will therefore also be discussed in this paper.

### ***Data Collection***

A total of 13 focus groups (7= Spanish; 6=English) were conducted (n=148). Spanish focus groups were conducted either by a trained, fluent Spanish speaker or by a trained English speaker accompanied by an experienced translator. Before the start of each session, research staff obtained written informed consent from all participants. All study materials were available in both English and Spanish. At the start of the focus groups, participants completed a short survey on socio-demographics (e.g., race/ethnicity, gender, age, participant employment, and food security status). The questions were drawn from another study conducted with a very similar population [24]. The sessions lasted approximately 45 -60 minutes and all focus groups were audio taped. Upon completion of the focus groups, the audiotapes were transcribed by trained research assistants. Spanish focus groups were transcribed in Spanish, checked for accuracy against original recordings, translated into English by a native Spanish speaker, and back-translated into Spanish for quality control.

### ***Data Analysis***

In order to describe the sample, frequencies for specific variables on the quantitative questionnaire were calculated. The qualitative data analysis consisted of creating a coding scheme based on the focus group questions and a set of decision rules to standardize the coding procedure. Data analysis was conducted using the qualitative software package QSR NVivo (version 8, 2008, QSR International Pty Ltd, Cambridge, MA). Two independent coders coded passages from each translated transcript into primary conceptual categories with subcategories for reoccurring themes. Organization of coded and sub-coded passages of the transcribed text

was examined and differences in coding were resolved through consensus by the two coders. Emergent themes were identified through frequency of coding within similar contexts and across focus groups [23].

## **RESULTS AND DISCUSSION:**

### **Participants**

A total of 148 people participated in 13 focus groups. The majority of participants were female and ethnically diverse (i.e. 63% Hispanic, 17% African American, 16% Caucasian, and 4% “other”). Among the Hispanic participants, the majority (53%) reported to speak Spanish most of the time. More than three-fourths of participants (77%) reported making less than \$1999 per month and 68% reported *sometimes* or *often* “running out of food by the end of the month.” (See Table 2).

According to the Center for Public Priorities, a family of four with two adults needs to earn a gross monthly income between \$3,637 and \$4,423 to afford to live in Central Texas [25]. Based on this estimate, only about 12% percent of the focus group participants earned enough to afford to live in Central Texas. However, only 30% of the participants received SNAP benefits and only 21% received Women, Infants, and Children (WIC) benefits, which may be one reason 67% of the participants reported *sometimes* or *often* feeling food insecure. These numbers suggest that strategies that increase economic access are important for this population.

### **Healthful Eating**

Overall, the participants were very knowledgeable of what it means to eat healthy. The majority of the participants used F&V as a proxy when answering questions about healthy foods

in general. Participants unanimously agreed that a variety of F&V is an essential part of a healthful diet. They listed F&V as healthful because they provide vitamins, nourishment, strength, help lower cholesterol, cause one to think clearly, and prevent diet-related diseases. F&V “help your body balance and process everything properly.” The words “fresh,” “organic,” “seasonal,” and “local” were all mentioned in connection to F&V and health, in that respective order of frequency. Results from other studies concur with our results in that levels of knowledge about healthy foods among low-income shoppers tends to be high [26] suggesting that lack of knowledge is not the driving factor influencing food purchasing and dietary behaviors among this population [24,27,28].

### **Factors influencing Food Purchasing Decisions**

Despite the high level of knowledge about the components of a healthy diet, participants voiced several external barriers in attempting to put this knowledge into practice. The four most common influences reported included cost of healthful foods, lack of geographical access to healthy food, lack of quality of available food, and lack of overall quality of the retail stores most proximate to them.

Focus group participants identified cost as the number one factor affecting food choice: “*We always look for what’s more economical.*” For families with limited financial resources, the need to stay within a fixed budget caused a trade-off between more healthful foods and oftentimes, less healthy but calorie-dense foods, such as meat. As one participant reported: “*I look at the asparagus and I realize that I can buy a big rib eye for the same price so I get the rib eye*”. F&V were viewed as very healthy but not as satiating as other foods, which posed a

dilemma for families who were forced to choose between their health values and meeting their basic caloric needs. The price of food and budget also limited families' options in the variety of food purchased and way the food was prepared. Participants reported "rarely" or "not regularly" with a shopping list, rather shopping for the same products every week or "looking for special sales", because the cost of the food and preparation methods were known, limiting the amount of food wasted. When asked specifically about organically grown produce, participants stated being willing to pay slightly more for organic but that the current price gap between organic and conventionally grown produce was too large. As one woman stated: "It is important to eat that [organic] food, but sometimes it is not possible to buy them. That type of food is expensive."

Although cost of food was the dominating factor affecting food purchasing decisions, the distance to a quality supermarket or large grocery store was also a major concern for participants. In some cases, residents reported having to travel up to 20 miles to buy groceries. Especially for participants who did not own a car, transportation to supermarkets was a hardship and potentially very expensive as some participants reported taking a taxi to the store due to poor and uncoordinated public transportation. Even participants who did own a car cited high gas costs as a barrier to driving to supermarkets outside their community: *"I always look for the closest place because I can save gas and sometimes there are things that are cheaper at certain places, and we know they are on sale, but also if the store is too far you have to have in mind the traffic, the time and the gas, so I prefer to buy the food in the one that is closest whether it's more expensive or not."* For many of the families in the study, grocery shopping is not a solitary errand. It requires forethought to incorporate this activity into one's daily commute or merge with other errands in order to save gas money and requires advanced preparation (e.g. placing a cooler full of ice in the car so food does not spoil).

Quality of available foods and quality of the retail stores were also consistent factors mentioned as important influences on food purchasing decisions. Terms like *fresh, not mildewed, not wilted, not bruised, not rotten, good appearance, good shape, and pretty* were used to describe food of high quality. High quality stores were described as having a *nice physical condition, clean, good upkeep, not too much traffic or panhandling in the parking lot*. Many participants who did live near a supermarket or grocery store mentioned that the quality of foods, especially produce, at the local supermarkets and grocery stores was greatly inferior compared to food items sold at other supermarkets across town in higher SES neighborhoods. In fact, some participants stated that when they had the opportunity, they would try to go to a store much further away because of the quality of foods found at those stores. However, among other participants this was rare, since it was hard to justify a trip to a better store with the high price of gas: *“because if it’s too expensive, it’s not convenient for you to go too far because you’ll spend more [on gas] than what you have.”* Thus, even though these individuals had relatively easy geographic access to a supermarket, they did not have access to *quality* food. This underscores the need to not only provide geographic and economic access, but also access to quality products.

In summary, results from the focus groups confirmed that both economic and geographic access are major factors influencing how low-income individuals shop for their food. The four specific factors that influence how and where food purchases are made include: price of food, geographic access, quality of food for sale, and quality of store. Other studies have found similar results and underscore the importance of the price of food, lack of variety, quality of food and proximity to store as main influences on where to shop [28-33].

### **Increasing geographic access to healthful foods:**

When asked how access to healthful foods could be improved, responses depended somewhat on the geographic location of where participants lived. However, all focus group conversations included comments on supermarkets, convenience stores, and more alternative venues such as farmers' markets and community gardens.

*Supermarkets:* Participants living in areas with no supermarket consistently stated that the solution to increase access to healthful foods was to place a supermarket offering a wide variety of quality items in a convenient location. For those participants already living close to a supermarket, solutions focused on increasing the quality of food available in the store and on improving the quality of the store. Some participants also mentioned expanding services provided by the store by creating common spaces for community classes on how to grow food and hosting regular farmers' markets.

Participants specifically preferred supermarkets over smaller-sized grocery stores because supermarkets also offer a variety of other needed services (i.e. payment of bills, etc). As one participant shared her thoughts about a supermarket: *"Whenever you go to [the store], you can also pay your bills; it's faster, you can use other services there. That way, I only go to one place and at the same time I get my groceries like the fruits, the tuna, the nopales, everything is there, ready!"* For some participants, a larger size meant variety: *"I like the big [store] because it's got everything in there. I mean you could just go in there and have a field day. You can shop!"*

Given that the most commonly cited barriers to the purchase of healthful foods by our participants were price of healthful foods, lack of geographic access, and lack of quality produce, introducing new supermarkets in communities would seem to be a logical strategy. However,

past studies indicate that the simple placement of a new supermarket in a food desert type of community does not necessarily translate into an increase of healthier food purchasing or healthier food intake [33-37]. Only one study has found significant positive results after a new grocery store was introduced into a community. The results from this study show that among participants with “very poor” diets at pre-intervention, F&V consumption increased from 4.13 portions to 9.83 portions per week, and among participants with “poor” diets, 60% increased F&V consumption [34]. It is important to note that while each of the studies examined the impact of a new supermarket, there is a lack of consistency across each of the studies. For example, while the new supermarket evaluated by Sadler et al. (2013) increased geographic access, the authors imply that food prices were relatively higher at this independent grocer compared to available alternatives; thus, in this low-income community, economic access was not improved by the new store [35]. One reason for the noted mixed results may be because supermarkets increase availability of *both* healthful and unhealthful foods, which may translate into more purchases of both healthy and unhealthy foods [38].

On the other hand, results from studies assessing the impact of intervention strategies placed *within an already existing supermarket*, including increasing availability of healthful foods and making healthful foods more affordable, tend to be positive. A review of 58 articles published from the late 1940’s to July 2012 evaluating the impact of interventions to promote healthful food choices and eating practices implemented in supermarkets found that the combination of pricing, increasing availability of healthful foods, points-of-purchase, and advertising strategies is an effective strategy to increase healthful dietary behaviors [39]. A recent study by Waterlander et al. (2013) also found that a 50% discount on fresh F&V throughout a six-month period in supermarkets resulted in a significant increase in F&V

purchases and consumption [40]. At three month follow-up, after price discounts had ceased, the impact on F&V purchasing and consumption had ceased as well, suggesting that price adjustments must be maintained to maintain purchasing behaviors, especially since F&V tend to be more price elastic than other foods [41].

In summary, evidence from the literature review suggests that increasing geographic access by simply placing supermarkets in food deserts may not increase the purchase and consumption of healthful foods. However, altering costs of foods and increasing availability of healthful foods in already-existing stores does seem to positively impact consumers' purchasing and consumption behaviors. Given that placing a grocery store in a low-income area can be a lengthy and complicated process, and is not always an economically practical option for retailers [42], improving the quality of already-existing grocery stores, if available, may be the most viable option. If no supermarket or grocery stores are already available, then introducing a new supermarket with competitive prices and offering a variety of affordable, high quality foods will increase access and potentially increase healthy dietary behaviors.

*Convenience stores:* When participants were specifically asked about their use of convenience stores for food purchasing, the overall sentiment was very negative. Convenience stores were typically perceived to be too expensive, reflected by a participant who stated “...*I'd prefer to grab my car and go to HEB instead. It's more economical*” and another who felt that convenient stores “*conveniently make that price ridiculous.*” They also were perceived as having limited, very low-quality food products, especially produce. One participant was put out by having to go to corner stores since there weren't enough large grocery stores where they lived, since “*most of them have processed foods.*” Participants reported a general feeling of frustration and mistrust

towards convenience store businesses as one participant expressed, “*My thing is that I don’t [shop at] the convenience store, even though I’m wasting 5 or 6 bucks worth of gas not going in, I’m still not going to give him \$5 or \$6 for a pack of bacon. I can’t do it. I would rather spend the \$5 or \$6 on gas and go to [store A]. Them knowing there is no access to this type of stuff so they mark the food up real high. That’s not cool.*”

Transformation of convenience stores to sell healthier foods has been posited as an alternative or interim solution to the introduction of chain supermarkets. Gittelsohn et al (2012) published a review of 16 original articles examining the impact of strategies to increase access to more healthful foods in convenience stores [43]. The most common strategies tested in the reviewed studies focused on increasing the availability of healthier foods, reducing the availability of unhealthy foods, reducing the cost of healthy foods either through provision of vouchers or coupons for, discounting healthful foods, or providing cash incentives. Results of the review found that food purchasing and consumption patterns improved in 9 of the 10 trials that assessed this outcome [43]. In addition, results from a more recent study showed that greater exposure to the intervention (i.e. increasing healthy food availability in local food stores and promotion of these foods through point--of-purchase and community media interventions) was associated with significantly reduced body mass index ( $p \leq 0.05$ ) and improved healthy food intentions ( $p \leq 0.01$ ), healthy cooking methods ( $p \leq 0.05$ ) and healthy food purchasing ( $p \leq 0.01$ ) [44]. Another recent study assessed the effectiveness of an initiative to increase the availability and promotion of healthier food options in 55 convenience stores in New York City. The percentage of consumers surveyed who purchased healthier options that were promoted through the initiative increased from 5% to 16%.<sup>45</sup> In summary, evidence from the literature review suggests that implementing strategies that increase the availability and affordability of healthful

foods in convenience stores can be effective in increasing healthier food purchasing and consumption.

Although published studies have shown positive outcomes of strategies tested within convenience stores, participants of our focus group study perceived convenience stores as offering lower quality foods and preferred to go without or drive the extra distance to access larger stores that offered more variety at a more reasonable cost. Our focus group results are different than another study conducted with mostly African American participants in New Orleans which shows that this sample was highly likely to shop at convenience stores [46]. These mixed results could be due to a lack of community investment of store owners perceived by participants. It is also possible that car ownership is greater in Texas compared to cities outside of Texas. Having a car gives one the ability to forego an undesirable store for one that is further away in distance [47]. However, since gas money was a big expense for our participants, owning a car may not necessarily solve the issue of lack of a proximal supermarket.

Given the negative perception of convenience stores by members of our focus groups, efforts to incentivize convenience stores to carry a larger variety of healthier produce may not be the most effective solution in communities similar to the communities where our focus group study was conducted. In order for our participants to shop at convenience stores, negative perceptions about convenience store businesses need to be improved first. If perceptions are not changed, individuals may not perceive conveniences stores as a viable option for the purchase of foods and thus will not be affected by the strategies implemented within the convenience stores.

*Farmers' Markets:* Farmer's markets as a point of access for purchasing fresh produce were discussed among participants with varied reactions. Conceptually, farmers' markets were

appealing, with the provision of easily accessible, fresh, and often organic produce. However, there was also resistance to farmers' markets as a solution based on reactions to previous experience with the existing farmers' markets. A majority of the participants reported that current markets were too expensive, too far away, and operated at inconvenient times. Although many of the participants had heard about farmers' markets, only a few were familiar with their current location, which was not convenient for the majority of the focus group participants. Produce at farmers markets was seen as high quality, however also as cost-prohibitive. One community member remarked: *I've been and I liked it because the veggies taste different, the tomatoes taste different, everything is fresh...but it's more expensive.* Farmers' markets were also critiqued for the undesirable quantities of produce and lack of other goods compared to grocery stores: *There is not a lot of variety, I have been but there is not too much variety, just like tomatoes and peppers.* Additionally, the preset quantities of produce offered at some farmers' markets were either too large or too small for what participants needed. One person remarked, *The thing is that they [farmers' markets] already have the quantity that they want to sell. Like how they have the tomatoes in a little basket...sometimes you can't buy the tomatoes because they are \$3, and so you don't have enough money left to buy the peppers. I can't just buy what I need... On the other hand, if you go to [store B] you can just buy one tomato.* Convenient locations given for new farmers' markets included local schools or parking lots of grocery stores.

Past studies indicate that introducing new farmers' markets or farm stands in low income communities can increase F&V intake among the residents who live close to the farmers' market [48]. Additional studies have also examined the impact of farmers' market-based economic strategies on nutrition-related outcomes. McCormack et al (2012) reviewed 12 studies which all

focused on providing economic incentives for specific populations to purchase F&V at farmers' markets. In general, the results from these studies suggest that providing economic incentives for purchasing produce at farmers' markets does increase purchasing of produce at farmers' markets and vegetable intake among participants [49]. Another study by Freedman et al (2013) examined the effect of placing farmers' markets at federally qualified health clinics along with a financial incentives among low-income diabetics and found a marginally significant increase in F&V consumption [50]. Thus, in summary, farmers' markets may serve as an alternative venue to offer fresh, high quality produce. When combined with financial schemes such as Double Dollar, or the Farmers' Market Nutrition Program, the dollars spent at the farmers' market can be stretched and more produce can be bought at a lower price [51].

Evidence from both the published literature review and the focus groups suggest that adding more farmers' markets can be a positive improvement for fresh and high quality F&V access, as long as the markets operate at consistent and convenient times and at convenient locations. Adding strategies to increase economic access to markets may be especially effective.

*Community gardens:* Although not a direct point of access for food purchasing, gardening and community gardens were brought up by focus group participants as alternative ways to have access to fresh produce. The notion of growing one's food was tangible, and to some participants represented a waning generational skill: "... like we did many years ago, you know, right out of the garden. Right there from your farm, your own animals, your own vegetables too." However, the issue of a lack of time was often connected to the idea of gardening to supplement healthy foods: "Growing your own veggies, I have always wanted to do that but I never have time." At the same time, gardening carried with it other intangible benefits, especially for their children,

that seemed to outweigh the challenge of time: *“I think it’s important...it’s important to find a way to have the time to teach kids how to cultivate plants and take care of them, love them, and then eat them...it would be a different and new culture in the kids’ lives.”* Parents in many of the focus groups favored the idea of school gardens as a viable option for increasing food access and teaching children about healthy foods, and several parents shared stories about the impact existing school gardens had on their children.

A recent review article measuring the nutritional effects of community gardens found that community garden participants reported a higher likelihood of F&V intake compared to non-gardeners [49]. A more recent longitudinal study reported the results of an intervention designed to support Hispanic farmworker families to grow a home garden. The intervention provided home garden materials, group educational and social activities, and volunteer assistance to participating families. Results indicated that at the end of the study, participants reported increased vegetable intake compared to baseline measurement [52].

Results from the published literature and our focus group found positive results for the use of community gardens on individuals’ F&V consumption. Although community gardens can rarely feed entire communities, these results suggest that community gardens and possibly school gardens can serve as way to both educate and create higher demand for locally-grown produce. Thus, additional efforts in creating more of these points of access and providing additional education on how to grow produce could be relatively easy and inexpensive strategies to implement in low-income communities.

### **Increasing economic access to healthful foods:**

When asked for potential solutions to the high cost of food, participants provided several strategies that they currently use to help stretch their food dollar. Participants reported always seeking out sales or specials and comparing store prices in order to be able to purchase more for less. One participant referred to herself and her friends as “couponaholics” in order to save money. Similar findings were reported in a study with limited-resource individuals who identified strategies such as coupons, limiting variety, gardening, purchasing dented cans, and diluting as ways to stretch a food dollar [53]. Another way that participants save money is to prepare meals for their families at home. Responses from the focus groups and to the survey questions indicate that most participants consistently prepare at least one meal per day, mainly dinner, at home. Over 52% of respondents report that their family eats dinner together at home almost every day while another 31% eat together more than 50% of the time. Eating at home was reported to be both more economical and healthier. Lastly, in order to save money on produce, respondents reported buying produce in season only.

### ***Limitations and Strengths***

As with any study, this study had limitations. First, the study utilized a convenience sample and included only adults living in low-income communities with limited access to healthful foods. However, because the purpose of this study was to specifically obtain more in-depth information from this specific population, our inclusion criteria were fairly specific. Because the focus groups were not conducted according to ethnic/racial groups, it is not possible to discuss any cultural or ethnic/racial differences, which may have provided some interesting results. A strength of this qualitative study is the large number of participants which increases the generalizability of the findings. Future studies should be designed to allow for the

examination of cultural, and ethnic/racial differences among the focus group participants. In addition, examining differences according to access to transportation are needed as well.

## **CONCLUSION**

Findings of this study suggest that solutions to the issue of inadequate access to healthful foods need to be multifaceted, and approached from a system-level framework. The first step is to ensure geographic access to a retail store that provides healthful, quality and, most importantly, affordable food. Affordability of healthful foods can be addressed by the price of the food, or through incentives such as Double Dollars. In addition to providing healthful foods, the retail store itself needs to be physically attractive, clean and safe. In-store marketing of healthful foods and education will also increase accessibility. Farmers' markets and community gardens can serve as less expensive complementary solutions and can serve to increase demand to more locally-grown and fresh produce. A higher demand for fresh produce can benefit local farmers, a traditional low-income population group, as well. In addition, increased demand will possibly increase willingness of larger retailers to place new stores in the community, which ultimately can bring both economic and health benefits to the community.

## References

- [1] Coleman-Jensen A, Nord M, Andrews M, Carlson S: *Household food security in the United States in 2010*; Washington, D.C. United States Department of Agriculture, Economic Research Report; 2011.
- [2] Rose D: **Economic determinants and dietary consequences of food insecurity in the United States.** *J Nutr* 1999, **129**(2):517S-520S.
- [3] Walker JL, Holben DH, Kropf ML, Holcomb JP, Anderson H: **Household food insecurity is inversely associated with social capital and health in females from special supplemental nutrition program for women, infants, and children households in Appalachian Ohio.** *J Am Diet Assoc* 2007, **107**(11):1989-1993.
- [4] Grimm KA, Moore LV, Scanlon KS, National Center for Chronic Disease Prevention and Health Promotion, CDC: **Access to healthier food retailers: United States, 2011.** *MMWR Surveillance Summary* 2013, **62**(Suppl 3):20-26.
- [5] Beaulac J, Kristjansso E, Cummins S: **Peer reviewed: a systematic review of food deserts, 1966-2007.** *Prev Chron Dis* 2009, **6**(3):A105.
- [6] Morland K, Wing S, Roux AD, Poole C: **Neighborhood characteristics associated with the location of food stores and food service places.** *Am J Prev Med* 2009, **22**(1):23-29.
- [7] Morland K, Diez Roux AV, Wing S: **Supermarkets, other food stores, and obesity: the atherosclerosis risk in communities study.** *Am J Prev Med* 2006, **30**(4):333-339.
- [8] Morland KB, Evenson KR: **Obesity prevalence and the local food environment.** *Health & Place* 2009, **15**(2):491-495.
- [9] Powell L, Slater S, Mirtcheva D, Boa Y: **Food store availability and neighborhood characteristics in the United States.** *Prev Med* 2007, **44**(3):189-195.
- [10] 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.
- [11] Kumar S, Quinn SC, Kriska AM, Thomas SB: **Food is directed to the area: African Americans perceptions of the neighborhood nutrition environment in Pittsburgh.** *Health & Place* 2011, **17**(1):370-378.
- [12] Inagami S, Cohen DA, Finch BK, Asch SM: **You are where you shop: Grocery store locations, weight, and neighborhoods.** *Am J Prev Med* 2006, **31**(1):10-17.

- [13] Zenk SN, Schulz AJ, Israel BA, James SA, Bao S, Wilson ML: **Fruit and vegetable access differs by community racial composition and socioeconomic position in Detroit, MI.** *Ethnic Dis* 2006, **16**(1):275-280.
- [14] Larson N, Story M. **A review of environmental influences on food choices.** *Ann Behav Med* 2009, **38**(Suppl 1):S56-S73.
- [15] Moore LV, Roux AVD, Nettleton JA, Jacobs DR: **Associations of the local food environment with diet quality comparison of assessments based on surveys and geographic information systems: the multi-ethnic study of atherosclerosis.** *Am J Epidemiol* 2008, **167**(8):917-924.
- [16] Grimm KA, Moore LV, Scanlon KS. **Access to Healthier Food Retailers in the United States, 2011.** *CDC Health Disparities and Inequalities Report in the United States*, 2013;62(3):20.
- [17] White House Task Force on Childhood Obesity: *Solving the problem of childhood obesity within a generation: White House task force on childhood obesity report to the President*; Washington, D.C. 2010.
- [18] Keener D, Goodman K, Lowry A, Zaro S, Khan LK: *Recommended community strategies and measurements to prevent obesity in the United States: implementation and measurement guide*; Atlanta. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention; 2009.
- [19] 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):272-279.
- [20] Karpyn A, Manon M, Treuhaft S, Giang T, Harries C, McCoubrey K. Policy solutions to the 'grocery gap'. *Health Affairs* 2010, **29**(3):473-480.
- [21] Flournoy R: *Healthy food, healthy communities: promising strategies to improve access to fresh, healthy food and transform communities*; New York. Policy Link; 2010.
- [22] Banks K. *Central Texas Foodshed Assessment*. Sustainable Food Center; Austin, TX, 2011.
- [23] Krueger RA: *Analyzing and reporting focus group results*. Thousand Oaks: Sage Publications; 1998.
- [24] Evans A, Chow S, Jennings R, Dave J, Scoblick K, Sterba KR, Loyo J: **Traditional foods and practices of Spanish-speaking Latina mothers influence the home food environment: implications for future interventions.** *J Am Diet Assoc* 2011, **111**(7):1032-1038.
- [25] Center for Public priorities. <http://forabettertexas.org/data.html>. Accessed Dec 20, 2013.

- [26] Zachary DA, Palmer AM, Beckham SW, Surkan PJ. **A Framework for Understanding Grocery Purchasing in a Low-Income Urban Environment.** *Qualitative health research* 2013,23(5):665-78.
- [27] Lindsay AC, Sussner KM, Greaney ML, Peterson KE: **Influence of social context on eating, physical activity, and sedentary behaviors of Latina mothers and their preschool-age children.** *Health Ed Behav* 2008, **36**(1):81-96.
- [28] Tsang S, Holt AM, Azevedo E: **An assessment of the barriers to accessing food among food-insecure people in Cobourg, Ontario.** *Chronic Dis Inj Can* 2011, **31**(3):121-128.
- [29] French SA, Story M, Jeffery RW: **Environmental influences on eating and physical activity.** *Annu Rev Publ Health* 2001, **22**:309-335.
- [30] Zenk SN, Schulz AJ, Hollis-Neely T, Campbell RT, Holmes N, Watkins G, Nwankwo R, Odomes-Young A: **Fruit and vegetable intake in African Americans: income and store characteristics.** *Am J Prev Med* 2005, **29**(1):1-9.
- [31] 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 Nutrition* 2009,12(10):1726-34.
- [32] Glanz K, Basil M, Maibach E, Goldberg J, Snyder DAN: **Why Americans eat what they do: taste, nutrition, cost, convenience, and weight control concerns as influences on food consumption.** *J Am Diet Assoc* 1998, **98**(10):1118-1126.
- [33] Furst T, Connors M, Bisogni CA, Sobal J, Falk LW: **Food choice: a conceptual model of the process.** *Appetite* 1996, **26**(3):247-266.
- [34] Wrigley N, Warm D, Margetts B: **Deprivation, diet, and food-retail access: findings from the Leeds Food Deserts' Study.** *Environment and Planning A* 2003, **35**(1):151-188.
- [35] Sadler RC, Gilliland JA, Arku G: **A food retail-based intervention on food security and consumption.** *Int J Environ Res Public Health* 2013, **10**(8):3325-3346.
- [36] Wang MC, MacLeod KE, Steadman C, Williams L, Bowie SL, Herd D, Luluquisen M, Woo M: **Is the opening of a neighborhood full-service grocery store followed by a change in the food behavior of residents?** *J Hunger Environ Nutr* 2007, **2**(1):3-18.
- [37] Cummins S, Petticrew M, Higgins C, Findlay A, Sparks L: **Large scale food retailing as an intervention for diet and health: quasi-experimental evaluation of a natural experiment.** *J Epidemiol Community Health* 2005, **59**(12):1035-1040.
- [38] Volpe R, Okrent A: *Assessing the healthfulness of consumers' grocery purchases;* Washington D.C. United States Department of Agriculture, Economic Research Service; 2013.

- [39] Escaron AL, Meinen AM, Nitzke, SA, Martinez-Donate A: **Supermarket and grocery store based interventions to promote healthful food choices and eating practices: a systematic review.** *Prev Chron Dis*, **10**:E50.
- [40] Waterlander WE, de Boer MR, Schuit AJ, Seidell JC, Steenhuis IH: **Price discounts significantly enhance fruit and vegetable purchases when combined with nutrition education: a randomized controlled supermarket trial.** *American J Clin Nutr* 2013, **97**(4):886-895.
- [41] Nghiem N, Wilson N, Gen+° M, Blakely T. **Understanding price elasticities to inform public health research and intervention studies: Key issues.** *American Journal of Public Health* 2013,**103**(11):1954-61.
- [42] Ver Ploeg M: *Access to affordable and nutritious food: measuring and understanding food deserts and their consequences: report to congress*; Washington, D.C. United States Department of Agriculture, Economic Research Service; 2009.
- [43] Gittelsohn J, Kim EM, He S, Pardilla M: **A food store based environmental intervention is associated with reduced BMI and improved psychosocial factors and food-related behaviors on the Navajo Nation.** *J Nutr* 2013, **143**(9):1494-1500.
- [44] Dannefer R, Williams DA, Baronberg S, Silver L: **Healthy bodegas: increasing and promoting healthy foods at corner stores in New York City.** *Am J Public Health* 2012, **102**(10):e27-e31.
- [45] 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 Chron Dis* 2012, **9**:E59.
- [46] 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.** *Pub Health Nutr* 2008, **11**(4):413-420.
- [47] Clifton K. Mobility strategies and food shopping for low income families: A case study. *J of Planning Education and Research* 2004, **23**:402-413.
- [48] Evans AE, Jennings R, Smiley AW, Medina JL, Sharma SV, Rutledge R, Stigler MH, Hoelscher, DM: **Introduction of farm stands in low-income communities increases fruit and vegetable consumption among community residents.** *Health & Place* 2012, **18**(5): 1137-1143.
- [49]. McCormack LA, Laska MN, Larson NI, Story M: **Review of the nutritional implications of farmers' markets and community gardens: a call for evaluation and research efforts.** *J Am Diet Assoc* 2010, **110**(3):399-408.

[50] Freedman DA, Choi SK, Hurley T, Anadu E, Hebert JR: **A farmers market at a federally qualified health center improves fruit and vegetable intake among low-income diabetics.** *Prev Med* 2013, **56**(5):288-292.

[51] Fair Food Network. Double Up Food Buck: 2012 Evaluation Report.  
[http://www.fairfoodnetwork.org/sites/default/files/FFN\\_DUFB\\_Evaluation\\_2012\\_sm.pdf](http://www.fairfoodnetwork.org/sites/default/files/FFN_DUFB_Evaluation_2012_sm.pdf).  
Accessed Dec 20, 2013.

[52] Carney et al. **Impact of a Community Gardening Project on Vegetable Intake, Food Security and Family Relationships: A Community-based Participatory Research Study.** *J Community health* 2012, **37**:874-881.

[53] Kempson K, Keenan DP, Sadani PS, Adler A. **Maintaining food sufficiency: coping strategies identified by limited-resource individuals versus nutrition educators.** *J Nutr Educ Behav* 2003, **35**(4):179-188.