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The Links Between the Neighborhood Food Environment and Childhood Nutrition

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ABOUT PREVENTION INSTITUTE

Prevention Institute is a national nonprofit dedicated to improving community health and well-being by building momentum for effective primary prevention through a strong commitment to community participation and promotion of equitable health outcomes among all social and economic groups. The Institute is a nationally recognized expert in improving nutrition and physical activity access through an environmental and policy approach and has created several tools in this arena, including the Environmental Nutrition and Activity Community Tool (ENACT). ENACT offers concrete strategies and local level policies to improve nutrition and physical activity in a number of key settings. Prevention Institute staff also conceptualized and edited *Prevention is Primary: Strategies for Community Well-Being*, a text for students and practitioners co-published by Jossey Bass and the American Public Health Association in March 2007. In addition to nutrition and physical activity, the Institute focuses on injury and violence prevention, traffic safety, health disparities, community health and youth development.



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Introduction

More families than ever before are suffering the consequences of unhealthy eating. There has been a dramatic and alarming increase in type 2 diabetes in children, a disease once seen almost exclusively in adults, while indications of cardiovascular disease are showing up earlier and earlier. In response to this growing threat, everyone from nutritionists to the U.S. Surgeon General is urging Americans to eat healthier foods. However, research is increasingly showing that those at greatest risk for dietary-related diseases—low-income children and families¹—face a significant but little understood impediment to getting healthy foods: their neighborhood food environment.

The “neighborhood food environment” refers to both, the availability of healthy foods within a community and how easily residents can access those foods. There is a growing understanding that barriers to accessing healthy foods play a role in poor dietary decisions. Quite simply, it’s hard to make healthy choices if healthy foods aren’t available or require more effort or expense to obtain.

Getting supermarkets and healthy foods into low-income neighborhoods has been a priority for community food activists and local residents who see a link between food accessibility and overall community health. However, the emergence of research measuring the associations between food environments and eating habits is a recent occurrence.

This paper identifies key investigations of the neighborhood food environment, examines current efforts to bring about improvements, and discusses new research and policy priorities.

Specifically, this research focuses on how the neighborhood food environment influences the food choices of low-income children, ages 3 to 12, and their families. The neighborhood food environment includes not only as the food sources children encounter on their way to and from school and on the

weekends, but also the options available to their parents and caregivers for preparing and purchasing family meals.

Children’s dietary behaviors, like those of adults, are influenced by the realities of where they live, including the availability of food both inside and outside the home.^{2,3} Inside the home, children’s eating habits are subject to family influence.⁴ Outside the home, children’s diets are influenced by foods offered in institutional settings, such as schools and after-school programs.

This paper focuses on the neighborhood environment, including after-school settings, an arena that has received relatively little research attention. Children no longer eat only the foods prepared by their parents and caregivers. Far removed from the idylls of the home-cooked family meal, the latest results from the U.S. Department of Agriculture’s (USDA) *Continuing Survey of Food Intake by Individuals 1994–96*⁵ reveal that children are increasingly eating more meals and snacks outside the home.ⁱ

Children are also entering the consumer marketplace at increasingly younger ages and are the target of millions of dollars worth of food advertising.⁶ This increasing focus on children as consumers may be affecting the quality of their diets. The child food market notably includes frozen dinners aimed at 3- to 10-year-olds and other child-specific meals, like bubble gum-flavored yogurt.

In addition to influencing family food purchases, many children shop for groceries and prepare their own meals. One set of focus groups conducted in 1993 with 235 African-American and Caucasian 9- and 10-year-olds, predominantly from low-income families, revealed that a great majority reported participating in food preparation.⁷ Almost all of the children routinely prepared their own breakfasts, and a vast majority reported that they prepared their own lunches when at home. A majority of children also reported preparing their own dinners.ⁱⁱ

Finally, it is not only how and where children eat, but also what they eat that is changing. A study by the American Dietetic Association reports that French fries are the most common “vegetable” eaten by all children 15 months and older.⁸

Eating habits are shaped early in life. Healthy habits formed during childhood and carried into adulthood decrease the future risk for chronic disease.^{9,10} An understanding of the neighborhood food environment—and its influences on where, how and why children eat certain foods—takes us one step closer to improving the diets and health of low-income children and their families.

i Nearly half of 3- to 5-year-olds in 1994 ate a meal outside the home. Consumed primarily at someone else’s house, followed by fast-food restaurants and then day care, these outside meals contributed to 20 percent of the caloric intake for this group. One-quarter of the calories consumed by 6- to 11-year-olds were outside the home, most often at the school cafeteria, followed by someone else’s house and fast-food restaurants.

ii It is unclear how often, or to what extent, children prepared dinners for themselves, their siblings and families or what degree of supervision they received (e.g., how much preparation was involved, whether they are reheating/microwaving, etc.)

Relationship Between Food Environment and Eating Behavior

It is well established that food choices are influenced by many factors, including taste, knowledge of the health values of certain foods, cost, availability and cultural norms. Although anecdotal experience suggests that limited access to healthy foods makes it harder for people to meet their dietary needs, only recently have researchers sought to measure the relationship between local conditions and eating behavior.

Increasingly, researchers are finding that many barriers to healthy eating can be found in the neighborhood food environment.^{11, 12} Their research suggests that a scarcity of healthy foods makes it more difficult for residents of low-income neighborhoods to adhere to a nutritious diet compared with their counterparts in wealthier, resource-rich neighborhoods.¹³

- A landmark 2002 study by Morland et al. based on more than 10,000 residents in 221 census tracts (from Maryland, North Carolina, Mississippi and Minnesota)ⁱⁱⁱ shows a link between where people live and what they eat.¹⁴ The authors found that African-American residents increased their fruit and vegetable consumption by an average of 32 percent for each supermarket in their census tract. Although 73 percent of African-American residents had small neighborhood grocery stores in their neighborhoods, these establishments had little association with nutritious diets.
- A 2006 study in St. Louis found that both, residents in high poverty areas and predominantly African-American areas (regardless of income) were less likely than primarily white, higher-income communities to have access to healthy food options.¹⁵
- In another study, the fruit and vegetable consumption of low-income women living in Detroit was lower for those who shopped in independent grocery stores compared with those who shopped in supermarkets and specialty shops.^{16, 17}

Although none of these studies focused on children specifically, it is reasonable to conclude that the same relationship will be found between children's eating behaviors and their neighborhood food environment.

Research by Jones in 2002 explored food-security issues among Hispanic women in North Carolina.¹⁸⁻²⁰ Participants said the over-abundance of fast-food restaurants and the intensive marketing of such foods in their local environment made it very difficult to control their children's eating habits. For these Hispanic mothers, the reality of the neighborhood food

iii Washington County, Maryland (29); Forsyth County, North Carolina (80); Jackson City, Mississippi (58); Minneapolis, Minnesota (54).

environment meant that, as their children became accustomed to American fast food, they rejected traditional, healthier Hispanic foods. The mothers felt that easy access to fast-food restaurants and their children's insistence on eating in these places contributed to negative changes in their children's diets.

Based on initial research and anecdotal findings, it is reasonable to suggest that resource-limited, low-income families cannot develop healthy eating habits without affordable and accessible healthy foods.

The question that remains, however, is whether there is a demand for high-quality, affordable and healthy foods in low-income neighborhoods. Shankar and Klassen conducted structured interviews (N=230) and focus groups (N=20) with low-income women living in Baltimore public housing to assess food purchasing behaviors and barriers to fruit and vegetable consumption.²¹ The initial findings suggest that while the participants *wanted* to increase the fruit and vegetable consumption of their families, they cited significant barriers to achieving that goal, including the cost of fresh produce.

Examining conditions associated with fruit and vegetable consumption among children and adolescents is a popular area of study. The findings consistently have shown an association between the availability and accessibility of fruits and vegetables and consumption.²² The Project EAT (Eating Among Teens) analysis of nearly 5,000 adolescents indicates that home availability had the strongest association with fruit and vegetable intake.²³ Furthermore, availability led teens to include more fruits and vegetables in their diets, even though taste preference was low. This suggests that, if quality produce is in the home, teens will eat it.

Studies on food pricing indicate that price reductions may be an effective way to increase the purchase of healthy foods, particularly fruits and vegetables.²⁴ These studies suggest that reduced pricing may be especially important for low-income purchasers, who may be more concerned about cost and receiving a good value for their dollar than the nutritional quality of foods.

Combined with anecdotal experience, the findings above suggest that the availability of affordable, high-quality, healthy foods removes some, but not all, of the dietary intake barriers faced by low-income families and their children. And while many factors influence food choices in low-income families, changing the neighborhood food environment offers one way to increase the consumption of healthy foods.

Current Food Environment in Low-income Neighborhoods

Several aspects of the neighborhood food environment influence the accessibility of healthy foods for families with limited financial resources. Factors determining accessibility include types of local retail outlets, the product mix offered, the quality and cultural appropriateness of available foods, and whether foods are affordable. For example, when examining price as a barrier, newly emerging data suggest that healthy diets consisting of lean meats, whole grains and fresh produce may be more expensive than high-fat, energy-dense diets.²⁵ Most likely it is the interplay among the various elements of the neighborhood food environment that is affecting the food choices of low-income children and their families.

Supermarket gap

The lack of full-service supermarkets, grocery stores and farmers' markets in neighborhoods with low-income, minority or immigrant residents is well documented.²⁶⁻³³ The phenomenon of supermarket flight from inner cities and other low-income neighborhoods over the past 40 years has left the typical low-income neighborhood with 30 percent fewer supermarkets than higher-income areas.^{iv, 34} The supermarket gap is even more pronounced in certain low-income neighborhoods across the country.

- The Morland study mentioned earlier found an average of four times as many supermarkets in predominately white versus African-American neighborhoods; only 8 percent of African-American residents in the study lived in a census tract with at least one supermarket.^{35, 36}
- A recent study in Detroit found neighborhood disparities in the availability of nutritional resources. In predominantly African-American, low-income Detroit neighborhoods, there were no chain grocery stores, while in middle-income, racially heterogeneous neighborhoods there were eight stores.³⁷ In contrast, the low-income Detroit neighborhoods had five times the number of liquor stores compared with middle- and high-income areas.
- Another study shows that the greater Philadelphia region needs an additional 70 supermarkets (measured per 10,000 residents) in low-income neighborhoods to equal the proportion of supermarkets in higher-income neighborhoods.³⁸
- In Austin, Texas, a study conducted by the Sustainable Food Center revealed that a primarily Latino, low-income community had only one supermarket for every 3,910 households, compared with one supermarket per 3,170 households in the county as a whole.^{v, 39}

iv Based on a 1995 analysis of 21 major U.S. metropolitan areas.

v Three stores serving low-income residents in the area have closed, while another three have opened in the affluent suburbs.

Fewer supermarkets in urban, low-income neighborhoods mean less access to fresh, healthy, affordable foods. Despite the increasing variety of retail options, supermarkets and other grocery stores (excluding convenience stores) remain the primary retail venues for most U.S. shoppers, accounting for 86.4 percent of annual food and beverage sales.⁴⁰ Moreover, supermarkets have become the primary source of fresh produce for most American families.

A 1997 nationwide study by the United States Department of Agriculture (USDA) found that 77 percent of food stamps are redeemed in supermarkets,^{vi} and supermarkets accounted for nearly 80 percent of total food store sales in 2002.⁴¹ In neighborhoods with the lowest incomes (more than 20 percent of the population living in poverty) supermarkets provide 64 percent of food stamp redemption.⁴² Forty percent of food stamp recipients who did not shop in their immediate neighborhoods cited a lack of supermarkets as the reason they went elsewhere.⁴³

Transportation

Most low-income families do not live within walking distance of their nearest supermarket and have to travel further than higher-income residents to buy food.⁴⁴ National food stamp participant survey data suggest that low-income households are six to seven times less likely to own a car, yet the lack of supermarkets within walking distance means they are also more likely to need a car to buy food.^{45, 46} More than half of low-income families that own a car and require one for their food shopping say they cannot rely on the car they own.⁴⁷

Public transit is frequently set up to help commuters get to work rather than to help urban residents reach shopping destinations.⁴⁸ Low-income shoppers frequently face long walks, laden with groceries and small children, between their homes, bus stops and food stores. Although low-income families do shop at supermarkets, they average one trip per month, compared with an average of 2.2 weekly trips for the general population in 2002.^{49, 50} It is the forced dependency of many low-income families on public transit for supermarket shopping trips, that causes the purchase of groceries and especially perishable foods to be less frequent. Lack of transportation further limits the ability to shop in bulk, translating into higher prices paid per item.

vi Grocery stores, convenience stores and gas stations account for the remaining 26 percent of food stamp redemption.

Quality and cost: Supermarkets vs. neighborhood stores

Many low-income residents are increasingly reliant on local “mom-and-pop” or corner liquor stores^{vii} for day-to-day food necessities. This results in lower quality and higher prices for food compared to what is available in supermarkets.

- The Detroit food study by Zenk et al. compared the availability, selection, quality and price of fresh produce, and found that the predominately African-American, low socioeconomic position (SEP) community had significantly lower mean quality of fresh produce compared with the racially heterogeneous, middle SEP community.⁵¹
- California Food Policy Advocates (CFPA) published a study of food access issues in three low-income neighborhoods in the San Francisco Bay area. Their research found that small stores carry mostly processed foods and some milk and fruit, the latter often over-aged and highly priced.⁵²
- A 2003 study in Los Angeles compared the nutritional environment of a lower-income, predominantly African-American neighborhood with a wealthier area that had fewer African-American residents.⁵³ The stores in the lower-income neighborhood were significantly less likely to carry “important [food] items for living a healthier life,”^{viii} and the quality and variety of fresh fruits and vegetables in these stores was significantly lower.

A separate study of 25 stores in Los Angeles and Sacramento found that access to whole-grain products, low-fat cheeses and low-fat ground meats was limited in neighborhoods served by small stores.⁵⁴ Researchers also found in both cities that the healthier market basket was significantly more expensive than the standard market basket, based on the USDA’s Thrifty Food Plan. Specifically, the healthier basket cost between 17 percent to 22 percent more than the standard market basket, adding approximately \$850 to \$960 in annual food costs for a family of four.

Studies consistently show that prices offered by smaller neighborhood stores can exceed prices at chain supermarkets by as much as 48 percent.⁵⁵ A 1999 study conducted in Minnesota found that produce prices were on average 10 percent higher in inner-city neighborhood stores compared with suburban supermarkets.⁵⁶ The USDA has confirmed this finding, placing small store prices 10 percent above those of large supermarkets.⁵⁷

vii The corner liquor store typically sells basic packaged and canned food items but very little, if any, fresh produce (onions are the most predominant vegetable sold in these establishments). Note the term “corner liquor store” does not apply to states with state control alcohol policies, such as Pennsylvania.

viii These food items included: 1% milk, skim milk, low-fat and nonfat cheese, soy milk, tofu, whole grain pasta and breads, and low-fat meat and poultry.

The USDA's Economic Research Service found that the total grocery bill for many low-income households is lower than the national average.⁵⁸ However, these cost savings resulted from selecting more economical foods (i.e., store and generic brands), larger package sizes and foods of lower nutritional quality. When comparing the prices of a fixed market basket (containing identical or very similar items), lower-income households spend more on average due to the higher food prices in their neighborhoods.⁵⁹ Furthermore, low-income households spend a higher proportion of their annual income on food than do other households.

One study published in 2005 found no association between density of food outlets (restaurants and grocery stores) and changes in body mass index among elementary school children.⁶⁰ However, the study did not take into account the size or quality of food outlets. Because smaller neighborhood stores often do not have the space, equipment or staff expertise needed to offer fresh produce on a daily basis, the quality of the foods they offer suffers.

According to the USDA, smaller neighborhood stores typically offer 5 percent to 10 percent less variety in brand/package type as compared with most major supermarkets.⁶¹ Supermarkets are able to offer lower prices and larger selection, regardless of their location, due to economies of scale. Supermarkets are able to buy in bulk and have the floor space to stock both generic and brand names. Neighborhood stores are increasingly stocking alcohol, cigarettes and junk food rather than perishable produce, dairy and meat. These non-perishable items are easier to maintain, requiring less attention on the part of store clerks.

Fast food

Fast food increasingly dominates the American food culture, both in high- and low-income households. Fast-food outlets are found in most neighborhoods, regardless of income, but research results looking at the concentration of fast-food restaurants by neighborhood are mixed.

The Morland study, one of the larger studies to date, found fast-food restaurants to be fairly evenly dispersed across predominantly white and African-American neighborhoods.⁶² However, a different study in North Carolina considering three measures of fast-food accessibility^{ix} found an inverse relationship between neighborhood income and fast-food restaurants:

ix These measures included: (1) the cumulative count of fast-food restaurants within a half-mile radius, (2) the potential of accessing a fast-food restaurant, and (3) the ratio of fast-food supply to demand.

as the median income of the neighborhood increased, the number of fast-food restaurants decreased.^{63–65}

This supports the anecdotal experience of many low-income community residents who cite an overabundance of fast-food restaurants in their immediate neighborhoods.^x

- Seventy percent of residents surveyed in one Los Angeles neighborhood felt that the supply of fast food in their neighborhoods outweighed demand.⁶⁶
- A study of restaurants in South Los Angeles showed that residents in poor, predominantly African-American neighborhoods have fewer healthy options at restaurants in terms of menu items and food preparation methods. Further, restaurants in the target neighborhoods promoted unhealthy food options to customers more than in the comparison area.⁶⁷
- A small-scale study conducted by the Hartford Food System in Connecticut found fast-food restaurants to be more concentrated in the lower-income city of Hartford, with Hartford housing 44 percent of all fast-food establishments in the immediate area. A study mapping environmental factors in six ethnic-specific communities found that neighborhoods that tended to be predominantly low- or lower-income typically were within half a mile from a fast-food outlet, and in many cases, residents of those neighborhoods were within a short walk to the nearest fast-food outlet.⁶⁸
- Similarly, a study of fast-food restaurants in New Orleans, showed that fast-food restaurant density was independently correlated with median household income and percentage of African-American residents in the census tract.⁶⁹

While fast-food restaurants in general may be equally accessible to both low- and high-income families, supermarkets are not. Therefore, fast-food restaurants may exert a greater influence on the diets of low-income families because there are fewer healthy alternatives in their immediate neighborhoods.

Contrary to popular belief, taste is not the only determinant of fast-food consumption—price and time figure prominently in the decision to eat fast food.⁷⁰ Incentives of price and time are particularly salient for low-income families, who often work multiple jobs and long hours to provide for their

x Fast-food concentration is, in part, a result of zoning laws. More affluent neighborhoods are frequently zoned entirely for residential use, while less affluent neighborhoods have mixed-use zoning, allowing businesses (like fast-food restaurants) to co-exist with residential housing.

families and face higher grocery prices in their own neighborhoods. Based on economic modeling, one set of economists has even hypothesized that fast-food consumption is higher in relation to home-cooked ethnic foods due to time constraints.⁷¹ This model hypothesizes that the time required to prepare ethnic foods at home ends up favoring fast-food consumption.

After-school programs

Children from all income backgrounds spend an increasing amount of their day outside the home in institutional child-care settings, including after-school programs. Although these programs represent an opportunity to integrate healthy snacks and foods into children's diets, data on regulated^{xi} child-care settings indicate that the nutritional quality is often lacking.⁷²

Specifically, improvements are needed in the variety of foods offered, including vegetables, and in the fat content of snacks and meals. Program reimbursement for after-school snacks and meals is not substantial; at the highest reimbursement level (day care homes in low-income areas and those run by low-income providers), snack reimbursements are only 58 cents per child.^{xii,73} Thus, even programs receiving federal funding may still find it difficult to provide healthier (but frequently more expensive) snack options. In addition, child-care workers often have limited nutrition knowledge, which seriously impairs their ability to offer healthy meals and snacks.⁷⁴

xi Regulated child-care programs receive government funds and are required to follow established guidelines, including nutrition guidelines. However, a great number of child-care programs are independently owned and operated and are thus not subject to the federally regulated guidelines.

xii Tier I reimbursements for breakfast and lunch are \$1.06 and \$1.97, respectively. Tier II reimbursements are 39 cents for breakfast, \$1.19 for lunch and 16 cents for a snack.

Efforts to Improve Neighborhood Food Environments

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Efforts to improve neighborhood food environments, both on a community and policy level, have grown during the past 15 years. Many of these efforts fall under the rubric of enhancing “community food security,” a concept that refers to the notion that all communities have the right to steady access to nutritious, culturally acceptable foods. Although some approaches have been utilized more than others, there is no single solution to the problem of improving neighborhood access to healthy foods. A variety of options may be suitable given the specific neighborhood characteristics.

The return of the supermarket

Supermarkets are the primary source of fruits and vegetables for most households, and bringing supermarkets back to underserved areas has been widely explored as a means of improving the neighborhood food environment. Understanding the best strategies for doing so requires a researched, systematic approach. An exploratory study by Pothukuchi of grocery retail investment in 32 communities across the United States examined successful and unsuccessful attempts to attract supermarkets to urban areas.⁷⁵ Pothukuchi’s study and others⁷⁶ identify several common elements in communities that have successfully attracted supermarket investment. These include:

- **Strong community advocacy and involvement:** Community Development Corporations and other nonprofits can provide entrée into the neighborhood and help stores promote confidence among residents. A New Jersey Pathmark store successfully opened in 1990 in a low-income Newark neighborhood only after its partnership with the faith-based New Community Corporation gained the trust of the community residents. A decade later, the store had become the most profitable of all Pathmark stores and one of the most profitable grocery stores on the entire East Coast.
- **Strong political leadership, public advocacy and informed action:** Active involvement of the mayor and responsive action by the city’s planning and economic development agencies can aid store development. Public agencies that actively recruit stores and provide financial and regulatory incentives and site-related assistance can make potential locations more attractive. In Rochester, New York, Mayor William Johnson successfully wooed a large supermarket chain after contributing public money to the project and working with the chain to develop a plan for improving areas around supermarket sites.⁷⁷

Only one published study could be found examining the link between introducing a supermarket into a community that lacks retail food sources and resulting improvements in dietary behaviors.⁷⁸ Conducted in the United Kingdom, the study used fresh fruit and vegetable consumption as proxy measures for healthy diets before and after the introduction of a large chain supermarket in the community. A significant increase was noted in participants with the poorest “before” diets; 75 percent increased their fruit and vegetable consumption after the supermarket opened, doubling their mean weekly fruit and vegetable portions. These same participants also switched their main source of fruit and vegetable purchasing from limited-range/budget stores to the new supermarket. These preliminary results indicate that locating a large supermarket in a community can improve the diets of those most at risk.

Transportation to food outlets

Transportation to food retail sources offers another means of improving the accessibility of healthy foods. Transportation strategies include: (1) store-initiated van services that transport customers from the store back to their homes; (2) store-initiated van services with a pick-up and drop-off at home; and (3) enhanced transit programs, including alternate or added bus routes to increase access to food retailers. Of these three general strategies, the first two are the most common, and the food retailer offering the service is typically a supermarket.

Mohan and Cassady examined the feasibility of supermarket shuttle programs, focusing on California.⁷⁹ The authors found supermarket shuttle services to be feasible in low-income, transit-dependent communities, and they note that supermarkets offering such services generate two to three times the revenue from produce and other perishable items compared with the industry standard. (However, the increased consumption of these perishables by consumers was not explicitly studied.) Successful shuttle services benefited from adequate public transportation (stores located on/near a major public transit route focused on free shuttle rides home for grocery-laden shoppers), extensive publicity of these services, and evaluation based on supermarket sales.

Los Angeles is the home of two successful shuttle programs: one that is store-owned and operated and one contracted shuttle program. Both supermarket chains, Numero Uno Markets and Ralph’s, say that the service is cost-effective and extremely popular with customers—and that it generates increased sales.

Another program, run by Fiesta Markets in Houston, Texas, caters to a predominantly Latino customer base and has proved remarkably successful at attracting immigrant shoppers to the market.⁸⁰

Enhancing small neighborhood stores

While a fair amount of research has been published on the impact of fruit and vegetable promotion in stores and restaurants, the literature remains scarce on projects seeking to improve the product mix at establishments serving primarily low-income individuals. Nonetheless, improving the product quality and availability in small neighborhood stores remains an important strategy, given the day-to-day patronage by low-income families and the potential to influence consumption patterns.

The California Food Policy Advocates (CFPA) conducted a small-scale pilot project to seek market-based models for bringing healthy foods to low-income neighborhoods.⁸¹ The project provided technical assistance with purchasing and handling produce to one small store owner in a predominantly low-income neighborhood in Oakland, California. The store also received assistance with refrigeration, signage and other store improvements. The store went from negligible produce sales to ringing up \$600 to \$700 in produce purchases per week. The Alameda County Public Health Department is currently replicating the CFPA model in other stores.

In addition, CFPA has conducted a broad analysis of small neighborhood stores that points to specific ways to increase the availability of healthy foods. CFPA recommendations include:

- providing support to store owners in the form of tax benefits, small business loans, appropriate zoning rules and adequate law enforcement.
- offering owners training and technical assistance in the selection, maintenance and storage of fresh produce and other perishables.
- promoting collaboration among owners to facilitate bulk purchases of group health insurance and other viable benefits.
- educating customers on the benefits of good nutrition.

The Bayview-Hunters Point neighborhood in San Francisco, is a low-income, predominantly African-American area that lacks a supermarket for its 33,000 residents. Students participating in the Youth Envision Program led by the nonprofit Literacy for Environmental Justice (LEJ) became involved in

increasing access to fresh produce within the neighborhood after determining that only 2 percent to 5 percent of the shelf space in neighborhood food retail establishments was devoted to fresh fruits and vegetables. A neighborhood survey revealed that most residents either relied on corner markets for their shopping or had to travel several miles, often by bus, to supermarkets in other neighborhoods. Respondents also expressed concern about the lack of safety and poor sanitation at the local markets.

After helping one pilot store improve its produce selection to account for 30 percent of overall sales, students and LEJ staff recruited public and private support for an incentive program for area merchants. Concurrent with the pilot, city agencies launched a redevelopment effort in the neighborhood. LEJ worked with the Redevelopment Agency to see what types of business incentives could be “bundled” for corner market merchants who agreed to devote 10 percent to 20 percent of their shelf space to fresh produce. With the active support of a city supervisor, LEJ staff took their proposal for an incentive-based program to several city agencies and community foundations.

This effort resulted in creation of the Good Neighbor Project, which offers qualifying neighborhood merchants incentives including in-store energy efficiency retrofits, local advertising, business training, cooperative buying, in-store promotions and participation in a branding campaign. In turn, the merchants must agree to minimum produce stocking requirements, remove the majority of tobacco and alcohol advertising and keep premises clean.

Creating healthy restaurant menus

Another strategy focuses on neighborhood restaurants. As more and more families consume a greater proportion of their calories away from home, the variety and quality of prepared restaurant food influences consumption patterns.

Research among African-American Boy Scouts in Texas found a possible link between vegetable consumption by children and the availability of vegetables in neighborhood restaurants.⁸² The research suggests that restaurants are an important element of the neighborhood food environment and are potential mediators in the patterns of vegetable consumption in particular.

In Montreal, one low-income neighborhood made an effort to encourage healthy menu interventions.⁸³ Promoted in two local restaurants, a family style restaurant and a fast-food outlet, the intervention changed menu items to reduce fat and increase fiber from fruits and vegetables and whole grains,

labeling these as healthier choices on the menu. Over 77 percent of customers surveyed at the family style restaurant and 18 percent of customers at the fast-food restaurant ordered the entrée labeled healthier. The researchers conclude that menu interventions might be a useful, albeit still limited, strategy for offering customers healthier food choices.

Introducing farmers' markets to low-income neighborhoods

Research shows that access to farmers' markets increases fruit and vegetable consumption among low-income participants.⁸⁴ However, the National Food Stamp Program Survey reveals that farmers' markets account for only a small share of total food purchases by low-income households.

The Community Food Security Coalition's report, *Hot Peppers and Parking Lot Peaches: Evaluating Farmers' Markets in Low-Income Communities*, describes what is needed to successfully operate farmers' markets in low-income communities. The report concludes that operating markets for primarily low-income customers can be difficult and notes that several elements are keys to success. These include price and availability of familiar products, community ownership, establishing transportation to markets, flexible market hours, hiring sales staff from the neighborhood, utilizing a community organizing approach to outreach and conducting promotions or sales that match the monthly cash flow of the community. One significant challenge is the lack of an adequate consumer base in low-income communities. Establishing farmers' markets on the edge of low-income communities or in places with a mixed-income consumer base have proved more successful.

Examples of farmers' markets successfully serving low-income communities abound. New York State recently revamped its Farmers' Market Nutrition Program (FMNP), increasing the number of coupons redeemed by Women, Infants and Children (WIC) program participants.^{xiii, 85} The Food Trust in Philadelphia successfully operates 14 markets in primarily lower-income neighborhoods throughout the greater Philadelphia area.⁸⁶ The markets are accessible to low-income families and children in part through the fruits and vegetable checks provided by the FMNP. Prices, signage and product displays are designed to keep the market accessible to everyone. Food Trust staff offer nutrition education during the markets, providing customers with information about nutritional content, seasonality, healthy food preparation and culturally appropriate recipes. External funding support is necessary for maintaining the infrastructure to manage the markets.⁸⁷

xiii Established in 1992, the Farmer's Market Nutrition Program (FMNP) is a special supplement to the Program for Women, Infants and Children (WIC). FMNP is designed to improve the health of nutritionally at-risk women, infants and children while supporting the economic vitality of small farmers by providing WIC participants with coupons redeemable for fresh fruits and vegetables from authorized farmers.

One emerging obstacle for low-income families is the lack of electronic benefits transfer (EBT) systems at many markets. Several states have adopted EBT systems for their food stamps users, and investments in large-scale EBT capabilities at farmers' markets are sorely needed.

Street vendors

Street vendors are a less common, but innovative method for bringing healthy foods to low-income neighborhoods. While vendors selling produce and other grocery items have disappeared from most urban streets, they still thrive in some neighborhoods, where fresh items and lightly prepared foods are available from movable stands. Street vending programs seek to build on these indigenous enterprises and provide for the support of the safe preparation and distribution of authentic traditional recipes.

The MacArthur Park Sidewalk Vending District Program was initiated in 1998 by the Institute for Urban Research and Development in Los Angeles and includes both a micro-enterprise and cultural component.⁸⁸ The program allows street vendors selling traditional Latin American foods to obtain legal permits to operate their carts and creates viable employment opportunities for low-income immigrants in the MacArthur Park district. The program also seeks to preserve culture through food. During the program's inception, the Health Department agreed to grant legal permits for the operation of healthy tamale carts.^{xiv} The program evolved to include Mama's Hot Tamales Café, an apprentice-operated restaurant providing job training for the tamale street vendors.

Mama's Hot Tamales Café and the MacArthur Park Sidewalk Vending District Program have been widely successful in reflecting the culture and traditions of the surrounding community through the increased availability of authentic, affordable prepared foods. Older immigrant residents are grateful for the opportunity to eat the foods they ate in their home countries. However, the program still has to compete with fast food for the attention of children. In fact, the local McDonald's is located across the street from Mama's Hot Tamales Café. According to the program manager of Mama's Hot Tamales Café, the presence of the tamales carts has not dissuaded children from eating fast food, but they have given children and families options that were previously unavailable. And while it is not uncommon for children to eat from the café or tamale carts, "sometimes families come into [the café] and the children are eating Happy Meals while the parents and grandparents order tamales."⁸⁹

xiv With the stipulation that bones and lard are omitted from the tamales.

Community gardens

Community gardens, defined as places where two or more people can garden together, can provide low-income families with an alternative source of fresh produce. Community gardening may be done on land owned by the municipality, a community group or institution, a land trust or some other entity.⁹⁰ Food grown on community garden plots can be kept for personal consumption, grown as a source of supplemental income, or, less frequently, given away.

Although the impact of community gardening on household fruit and vegetable access and consumption is not well documented, initial inquiries found that community gardeners in Philadelphia consumed significantly more vegetables and less milk products, citrus and sweet foods and drinks.⁹¹ Gardening also was found to be positively associated with community involvement and life satisfaction. While not all low-income households will have an interest in gardening, these data suggest there is potential for gardening to provide a source of fruits and vegetables for low-income households in inner-city areas. Community gardening may be particularly attractive to recent immigrants from farming backgrounds, and may serve as a way of preserving cultural identity and traditions.

Milwaukee, Wisconsin, is the home to Field of Dreams, a successful community gardening project. The majority of Field of Dreams' food production is distributed to local food pantries and soup kitchens. But the food also goes to the Community Health Center and the area's Women, Infant and Children (WIC) program. Low-income families and children can obtain produce by volunteering in the gardens. In 2003 40 percent of individuals receiving vegetables were under age 18, and 94 percent of recipients had family incomes less than \$20,000. Field of Dreams also has established a separate "WIC garden" to which WIC participants and their children are encouraged to come and pick produce. Evaluation results suggest that the program is successfully increasing vegetable consumption among participating low-income children.

Another model for gardening in low-income neighborhoods is the entrepreneurial garden.⁹² Entrepreneurial gardens located in low-income communities generally have multiple goals that go beyond food provision, including building job skills and self-esteem, especially for youth, and contributing to community revitalization. The *Entrepreneurial Community Gardens* study gathered detailed data on the costs and benefits of operating

entrepreneurial gardens.⁹³ The study found that nearly two-thirds of the 27 gardens surveyed had specific goals of donating or selling vegetables (their primary product) at a reduced price to low-income residents. Gardens also gain revenue by selling food to high-end restaurants or at farmers' markets. Generally, these gardens are not self-sustaining and require ongoing resources to provide training and management. Although food production for a particular neighborhood is not the primary goal of such efforts, these market gardens do contribute to the resources of participating households.

Buying clubs/Co-ops

Food cooperatives, including buying clubs and retail cooperative food stores, offer low-income families the opportunity to stretch their food dollars. Buying clubs allow members to pool their money and labor to obtain bulk foods at reduced costs. Retail cooperatives offer members control over the items stocked and a price discount in return for working a set number of hours. Although the National Cooperative Business Association estimates there are 500 retail cooperative stores in the United States, fewer than 3 percent of food stamp users shop at these establishments. The limited success of cooperatives in low-income neighborhoods is primarily attributed to a lack of community support, working capital and federal regulations.^{xv}

The Market Basket program, in operation from 1995 to 1999 in Los Angeles, applied the traditional notion of a buying club to community-supported agriculture, creating a fresh produce subscription service between low-income families and local farmers.⁹⁴ Run by the Southland Farmer's Market Association and the California Center for Sustainable Communities, the program bought bulk produce from participating farmers and distributed affordable produce baskets to low-income individuals and organizational subscribers. It eventually was discontinued due to a lack of funding. While operating, it established a steady source of fresh, affordable and culturally acceptable produce, and it engendered new and valuable community food partnerships between the various organizational subscribers.^{xvi}

Project S.H.A.R.E., an interfaith not-for-profit in Pennsylvania,^{xvii} was formed in 1985 to provide supplementary food to the hungry. Some of these supplementary food needs were met through the FoodSHARE program, a cooperative program in which low-income subscribers received \$40 worth of food by paying \$13 and contributing two hours of community service. However, the subscription-based portion of the program posed several

xv These regulations require cooperatives to stock a full range of staples in order to qualify as a food stamp retailer.

xvi These organizational participants included a child-care service/advocacy agency, a preschool, and a Head Start program.

xvii Serving the communities of Carlisle, Carlisle Springs, Mt. Holly Springs, Boiling Springs, Gardners, Plainfield and Middlesex, Pennsylvania.

challenges, including subscriber discontent with the fact that they did not know what foods they would receive. A second challenge—and one that ultimately ended Project S.H.A.R.E.’s participation in the FoodSHARE program—involved difficulties in transporting the food from Philadelphia to Project S.H.A.R.E.⁹⁵ Similarly, a related program in California found low-income families were reluctant to participate because the program required them to volunteer time and pay in advance for goods they would receive at the end of the month, and, like the Pennsylvania program, the program failed to specify what they would be getting.⁹⁶

Improving children’s meals outside of school: The Child and Adult Care Food Program and Summer Food Service Program

An increasing number of low-income families rely upon institutional child-care settings to provide a substantial portion of their children’s nutritional intake after school and during the summer months.⁹⁷

The Child and Adult Care Food Program (CACFP), administered by the USDA, provides federal reimbursements to participating child-care providers covering costs of up to two nutritious meals and one snack for children 12 and under.^{xviii} Up to 2.6 million children per day participate in CACFP. In addition to providing reimbursement for the provision and preparation of meals and snacks, CACFP provides ongoing training on the nutritional needs of children and onsite technical assistance.

Participating in CACFP is what leads many child-care providers to offer nutritious fruits, vegetables and milk instead of sugary drinks and fatty foods.⁹⁸ Research examining the impact of CACFP meals on the quality of children’s diets in two urban day care centers found that children eating meals from the CACFP center consumed significantly more milk and vegetables and significantly fewer fats and sweets compared with children whose meals came from non-participating day care centers.⁹⁹

The Summer Food Service Program (SFSP), a federally-funded child nutrition program, provides low-income children 18 and younger with free, nutritious meals during summer and holiday breaks. In the summer of 2004, 1.6 million children participated in the SFSP, and the National School Lunch Program served another 1.3 million students.¹⁰⁰

xviii The program serves public or private nonprofit child-care centers, Head Start programs, parks and recreation centers, after-school programs, homeless shelters and preschool child care in family child-care homes (licensed child-care programs taking place in the provider’s home).

Approved sponsor sites, which include school districts, local government agencies, camps and private nonprofit organizations, are reimbursed by the USDA for the meals they provide. More than half of all SFSP meals are served through local school districts, and one-third are served by government agencies.^{xix} Data from 2001 indicate that, although SFSP meals generally meet the recommended level of key nutrients, breakfasts are lower in food energy and lunches higher in fat than recommended. SFSP providers report that, while they have room in their programs to feed additional children, lack of transportation is a barrier to increasing attendance.

xix Maximum reimbursement rate per meal in most states for summer 2006: breakfast \$1.56, lunch/supper \$2.57, snack \$0.65.

Evaluation of Efforts to Improve Neighborhood Food Environments

The wide range of efforts to improve the neighborhood food environment in low-income neighborhoods has been driven by concerns about food insecurity, poor nutrition and inadequate retail infrastructure. Most of these projects have been accomplished through community activism, and they have not had the resources to conduct formal evaluations.

It is difficult to assess how current neighborhood food interventions may improve children's nutrition or reduce childhood obesity, as these factors rarely have been included as evaluation criteria. By far the most common measures of food intervention success focus on the retailers' ability to sustain a customer base.

In some cases, produce sales have been analyzed as a potential indicator of increased access to and consumption of healthy foods. While increased produce sales suggest that residents are consuming more fresh fruits and vegetables, this connection cannot be taken for granted. Sales data alone do not reveal whether individual households are consuming more produce, and produce is not the only food group that serves as an indicator for nutritional status and obesity risk. Only the U.K. study¹⁰¹ compared the consumption and shopping patterns of low-income residents before and after a supermarket opened. In addition, with few exceptions, interventions are not specifically designed to improve the food environment of children per se; the impact on children must be extrapolated from the benefits gained for the family as a whole.

Nonetheless, neighborhood food environment interventions do serve as valuable models for understanding the infrastructure and participation necessary to bring higher-quality food into low-income communities. Although thorough evaluations of neighborhood food interventions are limited, they can offer lessons about promising approaches, such as the crucial need for active community engagement.

The interventions described thus far all require active buy-in from the local community to be sustainable. From opening up a new supermarket or revamping the produce selection at a neighborhood store to instituting a farmers' market or community gardening project, interventions stand little chance of success if low-income families are not willing to spend their money and/or time to support the effort. Community residents often can provide invaluable insights on the precise needs of their neighborhood and can help planners decide which food intervention strategies would be most suitable. In fact, local food system assessments are becoming increasingly popular as community engagement tools, mobilizing residents in an active and positive way.

Steady funding and the cooperation of local governments also have emerged as markers for success. Sustainability is rarely achieved without proper funding. Although the actual amounts varied, the great majority of the interventions reviewed required money for infrastructure and staffing needs. As previously described, infrastructure is needed for small neighborhood stores, supermarkets and farmers' markets, as well as transportation services. Local governments have a strong role to play in ensuring the survival of many neighborhood food interventions, both through the provision of funding and through advocacy efforts. Further, government actions such as expediting permit processes, relaxing area parking requirements, and allowing expanded hours of operation are all successful incentives for food retailers to operate in low-income neighborhoods.

For example, as evidenced in Rochester, New York, a mayor's advocacy efforts, combined with those of local community groups, can lead a new supermarket to open in a low-income neighborhood. Similarly, the willingness of city officials to subsidize a supermarket's investment in door-to-door transportation for low-income shoppers may be necessary to improve access. Thus far, this type of support from local governments has occurred on an ad-hoc basis, which means there is not a general set of policies that can serve as an adaptable model.

An overarching lesson provided by neighborhood food interventions is that there is not a one-size-fits-all approach. Care must be taken to provide a mix of options and match interventions to the specific needs of the target community.

For instance, although supermarkets are in demand in low-income neighborhoods, they are also extremely costly, time-consuming endeavors that require a suitable building site. Therefore, they may not be a realistic solution to food access challenges in all neighborhoods. Alternatives, such as investing in small neighborhood stores, may offer a less costly opportunity to quickly improve local food offerings.^{xx} Farmers' markets provide a valuable source of fresh, high-quality produce. But because they have limited hours and do not carry other staples, they need to be supplemented with other retail outlets.

While public transportation linking people to food stores and other essential services improves access to healthy, affordable foods, door-to-door van service may be a more realistic intervention for some neighborhoods, as well as a more convenient option for low-income shoppers with small children.

xx It is important to note, however, that working with small neighborhood stores also requires both money and time to train the merchants and provide infrastructure.

Priorities for New Research

The gaps in the current neighborhood food environment in low-income communities suggest that improving access to healthy foods is a high priority for improving childhood nutrition and preventing obesity.

Achieving the greatest impact on children's health requires: 1) systematically measuring the impact of changes in the neighborhood food environment on eating habits; and 2) supporting research that will identify which neighborhood food models hold the most promise for enhancing food access. Although it is important to tailor food interventions to specific neighborhood needs, it is also beneficial to develop an organized body of knowledge that reflects the insights gained from pursuing a variety of strategies.

This research should approach improvements in the neighborhood food environment as part of broader efforts to improve childhood nutrition and reduce obesity. The neighborhood food environment is one of many elements that influence eating behavior. Additional factors include family and cultural traditions, marketing and advertising, and time pressures on parents. Research into the neighborhood food environment would benefit from a consideration of these other influences.

For example, household income would appear to have a critical influence on family food purchases. The millions of U.S. families that regularly visit food pantries and soup kitchens to meet monthly food needs have average incomes below the federal poverty line and report running out of food stamps in the middle of the month.¹⁰² Although income disparities are not directly related to improving neighborhood food environments, they are certainly relevant and should be addressed through policy research. Federal nutrition programs, such as WIC, free or reduced school meals, and the Child and Adult Care Food Program represent opportunities to directly affect what children eat on a daily basis. Understanding how best to deliver and enhance the impact of these programs remains a critical area of research.

Another area that merits research attention is the role of health education and health-promotion efforts in exposing the relationship between increased access to healthy foods and eating behavior. Given the entrenched nature of current eating patterns, it is not clear whether solely changing the neighborhood food environment will sufficiently improve dietary intake for better health outcomes. While access to healthy, affordable, culturally

appropriate foods is a necessary starting point, it would be valuable to conduct research that compares the impact of environmental changes with or without broader community education and health promotion to identify the most effective strategies for changing eating behaviors.

There is also an opportunity to link efforts to improve neighborhood food environments with strategies for increasing activity levels in communities. In low-income neighborhoods, changing the physical and retail infrastructure can be part of an overall revitalization plan focused on increasing residents' physical activity.

For example, improved retail food outlets can be part of an effort to create more neighborhood destinations that can be reached by walking and biking and to enhance street safety through increased foot traffic. Encouraging street vendors to carry healthy foods may offer an inexpensive way to boost retail activity around transit stops. Research could explore the link between neighborhood food access and active community design. One element of this research should include looking at methods to ensure that low-income residents benefit from neighborhood improvements. Neighborhood revitalization efforts can marginalize current residents when gentrification of previously low-income neighborhoods raises the cost of living. Accordingly, research must be directed towards understanding how to establish effective safeguards to prevent low-income residents from being forced out of their neighborhoods as conditions improve.^{xxi}

When considering the intervention examples provided thus far, and their potential context within larger revitalization efforts, it is clear that the neighborhood food environment can benefit from the skills and participation of a diverse group of players and stakeholders. Understanding the importance of building alliances and coordinating efforts provides another opportunity for investigation. Researchers can help communities understand how to best utilize the skills and attract the participation of local governments, community residents, food retailers and city planners, among others.

Although food interventions typically take place on a project-by-project basis, effective local, state and federal policies have the potential to play a prominent role in their success. There is a strong need to examine how local policy—including land use and zoning policies—can be used to enhance neighborhood food availability, as well as how to develop model policies

^{xxi} See, for example, the PolicyLink Equitable Development Toolkit, which includes tools that have been crafted to help community builders develop diverse neighborhoods that are strong, stable and welcoming to all. Available at www.policylink.org/EquitableDevelopment.

that can be adopted in different communities. A recent article described the potential for local government to apply zoning and other land use controls to regulate neighborhood food environments in ways that promote good nutrition.¹⁰³

A related research question concerns the opportunity to leverage federal and state resources—such as assistance for small business or targeted economic policies—to support access to healthy foods at the neighborhood level. In addition, research is needed to assess the predominance of unhealthy items—such as fast food, soft drinks and high-sugar, high-fat snack foods—in low-income neighborhoods and the policy mechanisms available to limit their presence.

Another area that is not well understood is the relationship between the broader food system and the food that is available at the neighborhood level. There is an emerging understanding that federal agricultural policies have an effect on how foods are produced and distributed. For example, the large government subsidies that support the mass production of cheap corn directly translate into cheap hamburgers and cheap soda, making both of these products more available in the food market.¹⁰⁴

There have been additional reports that other aspects of federal policies (such as tax write-offs for advertising and job-training funds for workers) further support the oversupply of fast food and junk food in low-income neighborhoods.¹⁰⁵ Policy research is needed to explore how government resources can be shifted to subsidize the increased production and availability on a large scale of healthy food products that are readily available in local neighborhoods.

Understanding the neighborhood food environment also requires research into the relationship between transportation infrastructure and food access. Federal transportation policy and funding affects not only the transportation options available to individual shoppers, but also the capacity to move food from farm to table. Small farmers can provide a local source of fresh food to a low-income community. But they face challenges in physically moving their products to these neighborhoods—problems that could be resolved with better transportation policies.

Conclusion

The ultimate goal of understanding the relationship between the neighborhood food environment and children's eating habits is to intervene to provide healthier food choices. Efforts to change neighborhood food environments are an important part of an overall, comprehensive strategy to improve health prospects for lower-income children and their families.

Clearly, neighborhood food environments have not received the research attention they deserve. The need to develop a stronger research base is particularly evident in low-income communities that are disproportionately affected by dietary-related conditions. While there is significant documentation of the degradation of food environments in many low-income communities across the United States, there is little information about how to make changes that will improve diets.

We conclude that a high priority should be placed on applied research that has the potential to more immediately improve neighborhoods. The various food projects described in this report would yield more useful information if they included strong evaluation that rigorously measured the impact of different neighborhood food models on dietary intake and behavior, as well as the process needed to effectively implement the model. Researchers need to creatively consider measures of success because any one intervention—though it may offer benefits—may be unable to yield quantifiable changes in dietary behavior. Ideally, individual projects would be linked within a larger multi-faceted effort to achieve significant changes in behavior.

The importance of addressing neighborhood food environments from a community perspective cannot be overstated. Engaging community residents, essential for project success, is critical for research as well. Historically underserved communities frequently have been the subject of research that offered no benefit to residents. Rather than merely obtaining community *input*, endeavors to improve neighborhood food environments should *belong* to each community. Funding, research-based knowledge and technical assistance should be offered to communities with the goal of facilitating their own solutions for improving the neighborhood food environment.

Priorities for New Research on Neighborhood Food Environments

1. Understanding the impact of neighborhood food environments:

- How do variables in the neighborhood food environment influence eating habits?
- Which specific retail/community models hold the most promise for increasing access to healthy foods in low-income communities?

2. Understanding key individual factors:

- How do health education and promotion efforts affect the relationship between increased access to healthy foods and eating behavior?
- How does household income influence family food purchases?

3. Understanding the role of improved access to healthy foods as part of overall community revitalization efforts:

- What are the linkages between neighborhood food access and active community design (e.g., creating neighborhood destinations for walking and biking, and enhancing street safety through design and increased foot traffic)?
- How can intervention efforts best utilize the skills and ensure the participation of diverse participants (e.g., local government, community residents, food retailers and city planners)?
- What safeguards need to be in place to prevent people of limited means from being forced out of their neighborhoods as conditions improve?

4. Understanding the role of local, state and federal policy regulations in building a successful neighborhood food environment:

- How can local policy—including land use and zoning policies—be used to enhance neighborhood access to healthy foods?
- Can the knowledge acquired through current neighborhood food interventions generate more broadly applicable model policies?
- How can federal, state and local policies be leveraged as resources to support neighborhood access to healthy foods (e.g., support for small businesses, economic development)?
- How should existing federal nutrition programs be delivered and enhanced to improve childhood nutrition?
- What is the best strategy for decreasing the amount of unhealthy foods available at the neighborhood level?

5. Understanding broader food system implications:

- National agricultural policy: how do current national policies and regulations (e.g., USDA, FDA, FTC) impact what foods are available at the neighborhood level?
- Distribution systems: what systems can be put in place to resolve supply-chain challenges?
- How can transportation infrastructure be supported both to get consumers to places that provide healthy foods and to get local agricultural products to low-income markets?

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