

# RESEARCHING THE BALTIMORE CITY FOOD ENVIRONMENT:

*Contributions From The Johns Hopkins  
Bloomberg School Of Public Health*

2015 Update

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## Introduction

A growing body of public health evidence suggests that differential access to healthy food – and the health disparities that arise from such conditions – is influenced by environmental and socioeconomic factors. Across the country, interdisciplinary studies by public health, sociology, geo-spatial analysis, and urban planning professionals have revealed the complex relationships between food environments and public health.

Speaking broadly, food environments can refer to the entirety of factors that influence individual food choices: the physical built environment (stores, restaurants, markets, etc.), marketing and advertising, and social environments. These aspects of the food environment are themselves influenced by even broader forces including government policy, cultural norms and market forces. In this report, we primarily focus on the built food environment, sometimes referred to as the food retail environment, and the term “food environment” references these aspects only. Some cultural factors are also addressed in Chapter 2.

To understand these issues within the local context of Baltimore City, academics, residents, city government, community organizations, and local businesses have worked in partnership to research many aspects of the food environment over the past decade. Differential access to healthy food has been characterized both quantitatively through epidemiological studies and analysis of national data, and qualitatively through geographic analysis and in-depth interviews. Results of most studies revealed significant disparities in access to healthy food in Baltimore.

During this same decade, food system stakeholders have initiated a number of projects and interventions aimed at understanding and tackling these disparities (Santo, Yong, and Palmer, 2014). Baltimore City government implemented one of the largest food policy efforts in the

country, the Baltimore Food Policy Initiative (BFPI), after it launched in 2009, initially with foundation support. Non-profits and community groups organized to address gaps in healthy food access. Researchers from local universities began investigating the impacts of such policy and programmatic interventions. The Johns Hopkins Center for a Livable Future (CLF) at the Bloomberg School of Public Health (JHSPH) played – and continues to play – a leading role in these efforts.

The inaugural version of this document (Haering and Franco, 2010) helped to shape the initial collaboration between CLF and the BFPI, and framed future efforts including the creation of the first city-approved Baltimore Food Environment Map, outlining food deserts for the first time. Since that report’s release, new research has been conducted to further analyze the food environment, implement past recommendations, and improve healthy food access throughout the city. This report summarizes results of the latest research at JHSPH, new case studies and maps, and interventions aimed at improving the food environment in Baltimore.

## Chapter 1: Visualizing Baltimore City's Food Environment

### A. The Maryland Food System Map Project

In 2007, the CLF undertook a community food assessment in Southwest Baltimore in partnership with Operation ReachOut South West (OROSW), a local community organization. This assessment generated an interest in developing a food system map to better understand the geography of the built food environment throughout Baltimore, and to identify opportunities to connect with the surrounding region to address gaps in access to healthy food. As a result, the CLF decided to create a statewide map of the local food system as a resource for academics, policymakers, food system activists, and other stakeholders. Through the [Maryland Food System Map Project](#) (MFSMP), the CLF developed its interactive mapping resource tool to analyze Maryland's food system from farm to plate utilizing Geographic Information Systems (GIS) technology. The project involves the collection, compilation, and dissemination of new and existing data about relevant aspects of the state's food system, including local food production, processing and distribution, retail food outlets, nutrition and agricultural institutions, and other pertinent food system and public health information. The MFSMP's primary purpose is to serve as a resource that supports efforts to understand and strengthen components of the local food system through data and maps.

The MFSMP dedicates extra attention to in-depth information on Baltimore City, specifically on the food retail environment. Key data layers include retail food stores, farmers' markets and urban farms, as well as public health indicators and community assets (schools, recreation centers, WIC clinics, etc). Since 2010, the CLF has worked in partnership with the Baltimore Food Policy Initiative to develop a map that will guide how and where the City focuses its resources

to positively change the food environment. In 2012, the first city-approved food environment map, which displayed food deserts and key food assets, was released. In the ongoing partnership with BFPI, the CLF plans to update the map regularly; an updated 2015 food environment map was released in June.

The MFSMP's portrayal of the Baltimore City food environment encompasses other features to help tell the stories behind the map and the experience of the food environment on the ground. Its "Voices of Food Insecurity in Maryland: Hunger in a Wealthy State" project, made in collaboration with the Marc Steiner Show on WEAA, shows residents around Maryland, including Baltimore, sharing their experiences through a story map with embedded audio clips. There are plans to add new stories in partnership with Maryland Hunger Solutions, an advocacy organization dedicated to ending hunger in the state. Another special project, the Baltimore Food History Map, uses a timeline feature to portray a historical analysis of food production and processing in Baltimore dating back to 1706, fostering a better understanding of the transformation of our food production and processing industries over time.

### B. Classifying Food Stores

Over the past 20 years, the food retail environment in many cities has become increasingly competitive. Food is readily available at myriad retail establishments, although the quality and healthfulness of those products varies widely. Retail outlets such as pharmacies, dollar stores and gas stations offer increasing amounts of food products and now accept Supplemental Nutrition Assistance Program (SNAP) benefits (formerly known as food stamps). Limited as-

sortment discount supermarkets such as Aldi's and supercenters such as Walmart have also increased their food sales. These emerging new "food store" models, where stores that haven't traditionally sold food are now entering food retail, make defining the food retail sector a moving target. Industry standards exist for defining and differentiating sectors of food retail, and these often rely on square footage and food sales. Industry data on individual stores, however, is not publicly accessible or is only available for a fee. Based on the Food Marketing Institute industry standards (FMI, 2013) and its own research, the CLF has developed a working classification system for food stores for internal use.

In studies conducted from 2006-2008 in Baltimore City, food stores were initially categorized according to the US government coding system, the Standard Industrial Classification (SIC). This taxonomy does not adequately describe features unique to stores that heavily influence the Baltimore City food retail environment. The CLF developed its own modified coding system in 2010, remaining flexible in order to capture changes in the ever-evolving food retail environment. The descriptions below lay out the CLF's current classification system:

Supermarkets: Large format grocery stores with all food departments present, including produce, dairy, meats, seafood, canned goods, and packaged foods. Typically chain operated, these stores have annual sales of \$2 million or more, and have 3 or more cash registers. A few of the stores in our list are small chains or independently owned, and thus not recognized outside of Baltimore, but they otherwise fit the criteria.

Small Groceries and Corner Stores: Small format grocery stores that are typically independently owned and operated. They have annual sales of less than \$2 million, mostly due to limited food

departments and offerings. Store names are not usually recognized outside of the neighborhood where they are located. Many of these stores are literally the corner unit on a city street, the size of the first floor of a typical row house. Typically, little fresh or frozen food is available, with most of the food offerings being made up of snacks, soda, and candy. However, stores in this category that focus on international foods, or where food is their main business, do carry proportionately significant amounts of food and may be potential targets for increasing healthy food sales from this category.

"Behind Glass" Corner Stores: A sub-category of the "Small Groceries and Corner Stores" classification, these stores meet the same criteria as explained above. In addition, all of the products for sale and the clerk are physically behind plexiglass (or similar material) because they are located, or once were located, in high-crime areas. Because there are over 40 of these stores in Baltimore, the CLF chose to identify them in a distinct category to track their existence and impact on communities.

Convenience Stores: A broad category, these food stores includes a variety of stores that sell food products, but food is not their main business. They include chain convenience stores (such as 7-11), gas station convenience stores, pharmacies, and discount/dollar stores. They are typically chain operated. The types of foods these stores carry vary widely depending on ownership and store format, from minimal snack offerings to limited produce, staple foods, and packaged grocery items.

### **C. Spatial Distribution of Food Retail Outlets**

The following maps characterize the overall food retail environment in Baltimore City geograph-

ically. When the first city-approved Food Environment Map was released in 2012, the CLF and BFPI developed a locally-specific working definition of food deserts (updating previous efforts). Both the map and definition continue to be refined, and the latest was released in June 2015 (Buczynski, Freishtat, and Buzogany, 2015). The current definition uses methodology that considers four factors: 1) Distance to Supermarkets, 2) Household Income, 3) Vehicle Availability, and 4) Supply of Healthy Food in retail food stores (See sidebar on page 12 for a detailed explanation of how healthy food supply is measured). Factors one and two are also used in the national food desert measures being used by USDA in the Food Access Research Atlas (ERS, 2013). The third factor – Vehicle Availability – has been used in other urban healthy food availability analyses, but the threshold is specific to Baltimore. Supply of Healthy Food is unique to Baltimore, developed to incorporate a more complete depiction of the food retail environment.

#### The factors explained:

*Distance to Supermarket:* The walking distance to a supermarket typically considered in food desert analyses is one mile; however, urban planning research often cites that the acceptable walking distance to public transportation is ¼ mile. Based on empirical studies, it can be assumed that households that do not have access

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<sup>1</sup> The term "food desert" is a popular term for conveying the idea that there is inequality of access to healthy foods, but it oversimplifies the complexity of a food environment. Best research strategies accept such complexity and explore its many aspects, using alternative terms such as "food swamps" (see page 11) to further describe the phenomenon at hand.

to vehicles, and must use public transit or walk to get groceries, would not walk farther than ¼ mile with groceries. Bearing this in mind, a ¼ mile distance measure was chosen for this map.

A new concept was introduced in the 2015 food desert report – "supermarket alternative." This category was developed after researchers observed that some food outlets that are not traditional supermarkets can offer a market basket of healthy food equivalent to a supermarket. This

category may include small groceries and corner stores or public markets that have an HFAI score of 25 or higher (25 was the median score of supermarkets). In the 2015 analysis, no store yet qualified as a supermarket alternative, however, three public markets scored very high for their category and could reach this threshold with only a few improve-

ments to healthy food offerings. The intention of creating this category is to assist and encourage stores/markets to reach this healthy food threshold, and it presents an opportunity to positively impact food deserts over time.

*Household Income:* Low-income areas are included in food desert analyses, as they have fewer means by which to access food stores. In the food desert analysis, low-income areas are identified by median household income at the block group level, specifically areas where the median household income is equal to or less than 185 percent of the Federal Poverty Level. This threshold is used by USDA for qualification in federal nutrition assistance programs. In 2013, 185 percent



of the Federal Poverty Level for a family of four was roughly equal to \$43,567.50.<sup>2</sup>

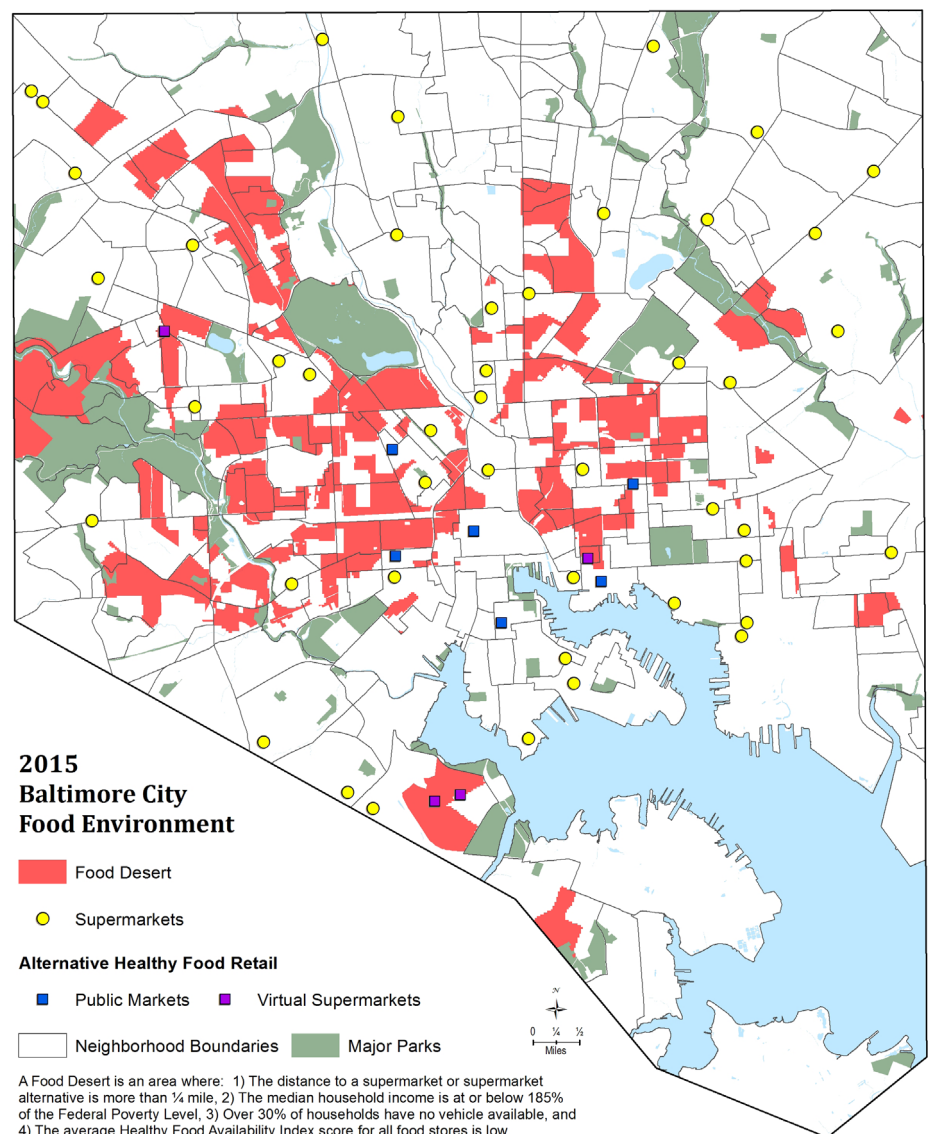
**Vehicle Availability:** A comprehensive literature review was completed to determine an appropriate percentage or threshold of the population negatively impacted by the lack of access to a vehicle. A wide range was found, with little justification. Most studies cited 10-35% or more of the population as a significant percent. In Baltimore City, on average 26.56 percent of residents are without access to a vehicle. To conservatively reflect this average, 30% or more was chosen as the threshold for this analysis.

**Supply of Healthy Food:** In an effort to more accurately characterize the food environment beyond the presence or absence of a supermarket, CLF developed a Healthy Food Availability Index (HFAI) scoring tool for all food stores (supermarkets, small groceries and corner stores, convenience stores, and public markets). The HFAI tool was derived from the Nutrition Environment Measurement Survey (NEMS), developed at Emory University, which quantifies the amount of healthy foods sold in stores using a market basket approach (Glanz et al., 2007). For more information on this tool, see page 12.

**Developing the Food Environment Map:** Using Geographic Information System (GIS) software, each of the above factors were mapped individually and then layered based on

geographic locations. Data analyzing each factor are available at different geographies, such as block groups versus census tracts. In order to examine the four factors on a common scale, the data were aggregated into grid cells roughly equivalent to the size of a city block. To qualify as a food desert, a cell had to meet all four factors discussed above. Figure 1 shows those areas that met the food desert criteria mapped with neighborhood boundaries defined by the Baltimore Department of Planning and key food asset locations.

Figure 1: Baltimore Food Environment Map 2015



<sup>2</sup>The most recent American Community Survey data that is available is a 5-year average from 2009-2013, so 2013 is the reference year.

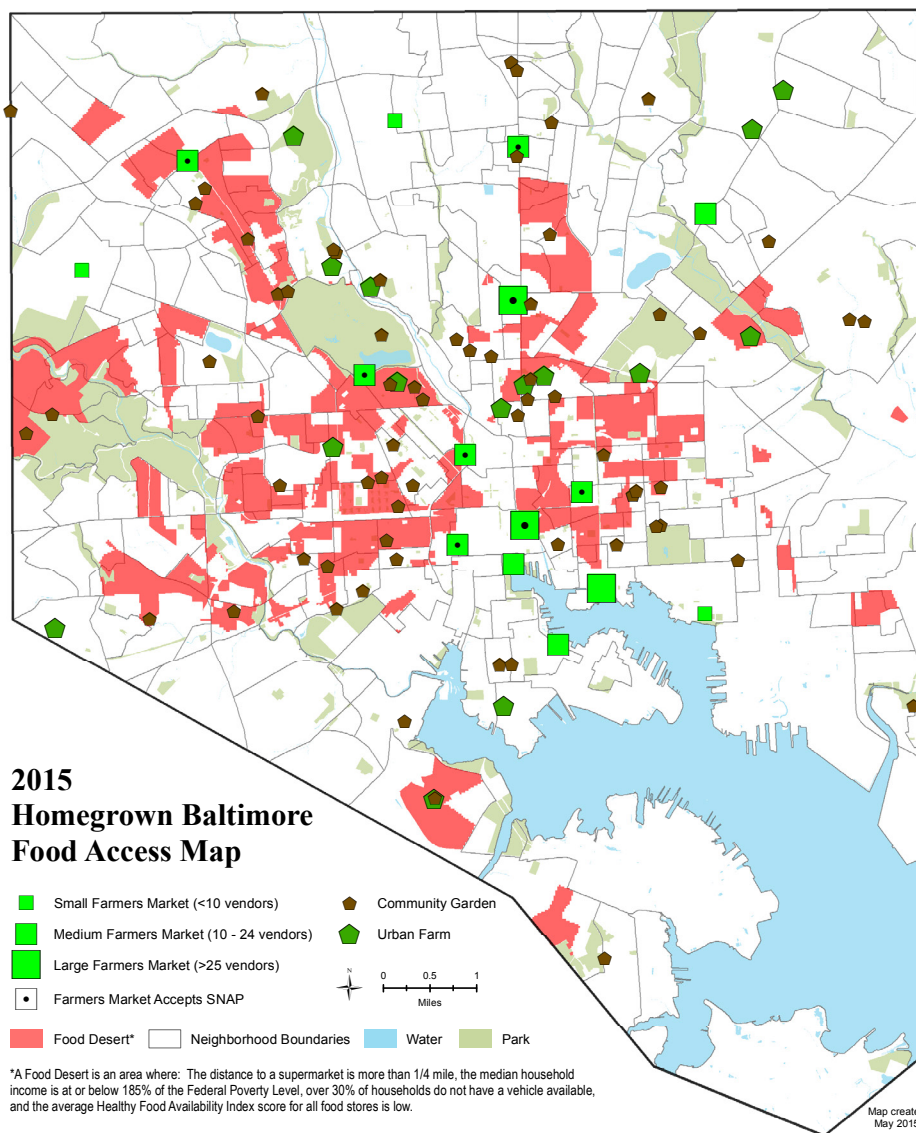
**Key Food Assets:** In an effort to illustrate some of the unique assets Baltimore City has in terms of access to healthy food, the Food Environment Map also shows healthy food retail locations in addition to supermarkets. These locations include Baltimore’s Virtual Supermarket Program (Baltimarket) and public markets. They are defined as follows:

- **Baltimarket Virtual Supermarket:** Baltimarket has pioneered the first community-based program that uses an online grocery ordering and delivery system to bring food to neigh-

borhoods with low-vehicle ownership and inadequate access to healthy foods. It enables residents to place grocery orders at their local library, senior/disabled housing, or public housing venues, or from any computer, and pick up their order at a nearby community site with no delivery cost. Customers may use SNAP benefits for purchases, as well as cash, credit, or debit. The program ran in partnership with Santoni’s Super Market from its inception in 2010 until Santoni’s went out of business in October 2013. The program was re-launched in partnership with ShopRite in July 2014. As of April 2015, the Virtual Supermarket Program has served 514 unique customers, who placed over 3,700 orders totaling over \$140,000 (L. Flamm, personal communication, April 24, 2015).

- **Public Markets:** Baltimore boasts one of the oldest continuously operating public market systems in the United States. There are six markets in Baltimore: Lexington, Northeast, Hollins, Avenue, Cross Street, and Broadway. They are open six days a week, 9 am-6 pm, and offer a range of fresh produce and meats, as well as many prepared foods. A new city initiative to promote healthy alternatives at the public markets is discussed on page 24.

Figure 2: Map of farmers markets and local food production



Farmers’ markets were not part of the food desert analysis in Figure 1 as they are not directly comparable to traditional food stores due to their seasonality, limited hours of operations during the day and week, and limited product assortment. Nevertheless, they can be significant sources of healthy food

and can represent alternative solutions to food deserts. Attracting and building new supermarkets in a city setting takes time, money, and planning, and cities typically offer limited incentives to the supermarket industry to locate in low-income areas. Most chain supermarkets will not consider opening in low-income neighborhoods, as community need is not a core criteria for industry site selection; instead they look at population density, market demand, cost of construction and operating, zoning requirements, and available land parcels (Treuhalt and Karpyn, 2010)

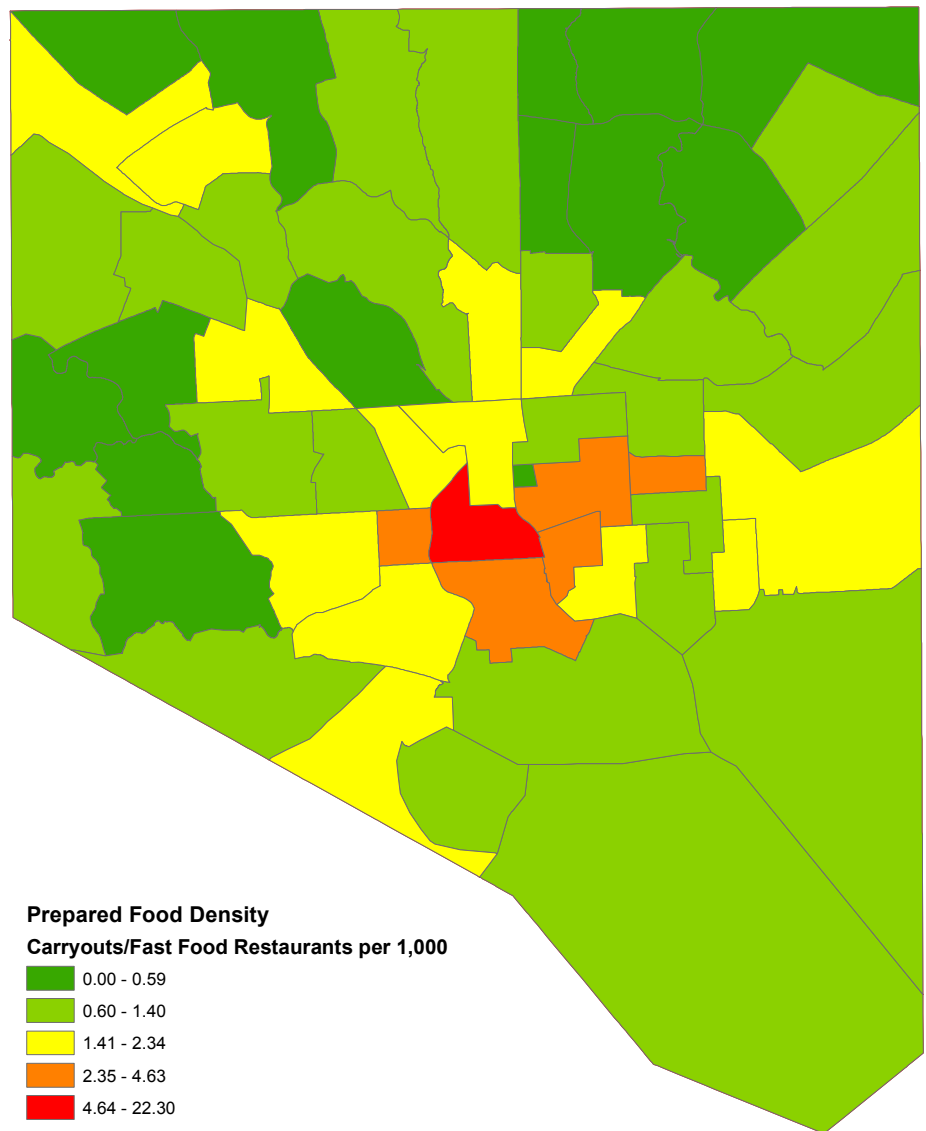
Other food retail outlets, such as farmers markets, can more quickly “fill the gap,” and in some cases, may be a more scale-appropriate solution to addressing unequal access to healthy food. The City recognizes their contribution and the CLF has created an additional map (see Figure 2) that looks at farmers markets and local food production in relation to food deserts, to examine their potential impact.

Prepared Foods Density: The term “food swamp” has been introduced to describe the confounding problem an area faces when it features both a dearth of healthy food while at the same time an overabundance of unhealthy food. It emerged out of frustration that the term “food desert” does not adequately explain the phenomenon under scrutiny. That is, in most cases and especially in urban locales, those areas identified as food deserts do in fact have food

available, but few if any healthy food options (in rural food deserts, there are often no food retail options available).

As there is no agreed upon definition of “food swamps,” CLF has attempted to examine the issue by looking at the density of prepared foods. For these purposes, prepared foods are ready-made or made-to-order meals and snacks, as opposed to full service restaurant meals or whole foods purchased for home preparation. In Baltimore City, prepared foods are typically found

Figure 3: Prepared Foods Density map



in fast food chain restaurants and independently owned carryout restaurants. Foods sold at these locations tend to be calorie dense and higher in fats and salt, making them less healthy than other foods, especially foods prepared at home. As of December 2014, there were 707 carryout restaurants and 152 fast food chain restaurants in Baltimore. There were also an additional 106 carryout vendors selling prepared foods inside Baltimore City's public markets (a situation that the City is addressing with their Get Fresh campaign, discussed in the following chapter). Figure 3 shows the density of these prepared food locations in each neighborhood, in relation to food deserts. The pattern confirms that in many cases, the same areas where there is a lack of healthy food options, there is a concentration of unhealthy food options.

#### **D. Healthy Food Availability**

As described in the original version of this report, CLF-supported research conducted from 2006-2009 by Dr. Manuel Franco found significant racial disparities in the availability of healthy food in Baltimore City and County stores (Franco et al., 2008). Franco visited 177 food stores in select neighborhoods in Baltimore and used an adapted version

of the Nutrition Environment Measurement Survey (NEMS), developed at Emory University, to

quantify the amount of healthy food available in each store. This survey notes the presence of healthy food available and gives you a "Healthy Food Availability Index" (HFAI) score for each store, allowing for store-to-store research comparisons. Franco found a correlation between the scores of types of food stores in neighborhoods of the same racial composition (predominantly white, predominantly black or mixed), such that in Baltimore, racial composition and store type were strong indicators of the HFAI score. He used this information to impute HFAI scores for the stores that were not visited based on the store type and the racial composition of the census tract (2000 US Census) in which the store was located.

With a predominantly black population in inner city areas and a predominantly white population in areas closer to the coun-

ty, inner city stores by and large had much lower scores, meaning that they carried fewer healthy foods (Franco et al., 2008). In fact, 24% of black study participants lived in neighborhoods with overall low healthy food availability, compared with only 5% of white participants (Franco et al., 2009).

#### **Healthy Food Availability Index (HFAI)**

CLF developed its own HFAI tool, a one-page survey to quantify the presence of healthy food available in stores.

Scores range from 0-28.5, with a higher score indicating a greater availability of healthy foods. Using a market basket of whole foods - milk, fruits, vegetables, meat, frozen foods, low-sodium foods, bread, beans, rice and breakfast cereals - the scores indicate the presence of these foods as well as healthy options (based on USDA nutrition standards). For example, a store will get one point for carrying any bread, and an additional point for carrying 100 percent whole wheat bread.

The average score of all food stores was calculated for each block group. Those block groups with scores in the lowest range, 0-9.5, were considered food desert areas (if the other three factors were met), allowing a more full picture of the total food environment to be measured. This makes CLF's analysis unique, as it goes beyond the mere presence of a supermarket or not and considers the total food retail environment.

In the 2012 Baltimore food desert analysis, the CLF used Franco's 2008 HFAI scores. Shortly after that map was released, the CLF and BFPI refined the HFAI survey and physically visited *all* food stores in the city, rather than rely on a sample proxy score. This research began in the summer of 2012. In order to make it feasible to visit all food stores, the HFAI survey tool was further modified (see sidebar on page 12), paring it down to one page. The eight food groups from the original HFAI tool (milk, fruits, vegetables, meat, frozen foods, low-sodium foods, bread, and breakfast cereals) remained in the survey, and additional groups were added: juice, beans (dried), rice, and corn tortillas. Prices and percentages of shelf space were no longer collected.

As the new tool, by nature of its brevity, focuses on the mere presence of healthy foods, and does not account for quality of those foods, price or shelf space, all supermarkets scored very high. From the CLF's multiple quantitative and qualitative research projects, however, it has been noted that there are important differences between supermarkets in the city. The CLF will work with BFPI to further examine differences among supermarkets and develop a means to account for these differences.

While time-consuming to conduct, HFAI scores prove their worth, as they give city planners and policymakers a tool to compare stores and engage storeowners in discussions to improve their offerings. In addition, the new supermarket alternative concept hinges on this survey, as a way to encourage small groceries and corner stores to strive to offer more healthy food. The CLF plans to update the HFAI scores and the food desert map every two to three years in order to continually monitor the food retail environment and evaluate progress toward eliminating inequity in access to healthy food.



## Results from a Community Food Assessment : Clifton Park

### What is a Community Food Assessment?

A Community Food Assessment (CFA) is a collaborative and participatory process that systematically examines a broad range of community food issues and assets, to take action to make the community more food secure. CFAs discover challenges in the local food system and food environment and also identify community assets to improve these weaknesses.

### Assessment Objectives

- Recognize residents' current habits regarding how and where they currently access food.
- Identify reported barriers and

## Results from a Community Food Assessment : Greater Govans

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- Recognize residents' current habits regarding how and where they currently access food.
- Identify reported barriers and readiness for change at the neighborhood level.
- Describe residents' satisfaction with food available in their neighborhood.

## Results from a Community Food Assessment : Lexington Market

Old as the nation itself, Lexington Market has been a wonderful Baltimore tradition since 1782 at the original site it occupies today, on Lexington Street, between Eutaw and Greene Streets. Today, this west side historic landmark houses one hundred and forty merchants, offering a full range of food and beverage, grocery and non-food merchandise, and is preparing to undergo a major renovation.

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### Assessment Objectives

- Recognize residents' current habits regarding how and where they currently access food.
- Identify reported barriers and readiness for change at the neighborhood level.
- Describe residents' satisfaction with food available in their neighborhood.
- Gauge residents' awareness of the relationship between diet and disease.



### Health Conditions

Reported in the household:

- Diabetes (26%)
- Obesity/overweight (31%)
- High blood pressure (37%)
- Heart disease (8%)
- Cancer (8%)
- No health conditions (33%)

### Gardening

- 18% participate in a community garden.
- 57% of those who do not already would be interested participating if a community garden were available.

### Demographics

- Gender:
  - 45% male
  - 55% female
- Ethnicity:
  - 91% African American
  - 6% White
  - 1% Other
- Average age: 53

### Transportation

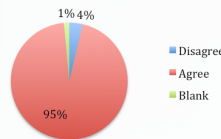
40% of the people surveyed do not have a car to store; 40% take the bus; 15% get a lift and 18% use a bike. 40% of respondents use more than one method of transportation.

### Health Conditions

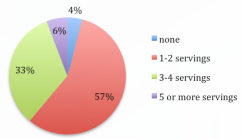
Reported in the household:

- Diabetes (26.5%)
- Obesity/overweight (18.9%)
- High blood pressure (59.8%)
- Heart Disease (6.8%)
- Other health conditions (18.18%)

### Perceived Relationship of Health Conditions to Diet



### Fruit and Vegetable Consumption per day



### Reported Barriers

- Nothing (57.5%)
- Rent (23.1%)
- Utilities (22.4%)
- Medical (12.7%)
- Child Support (2.2%)
- Transportation (19.4%)
- Other (10.4%)

### Lifestyles and Diet

66% are somewhat or very interested in learning to grow their own food, and 47% were aware of the community garden nearby.

Explanations for interest in the community garden included residents who "used to garden and want to

again" and who would be interested "if someone taught me how".

69.23% report that they are sometimes or often unable to buy healthy food because they are out of money or assistance.

In the Spring of 2012, 134 people were surveyed for this report

## Chapter 2. A Neighborhood Perspective: Community Food Assessments

### A. Introduction

Community food assessments (CFA) are a common tool used to measure several facets of a local food system. CFAs can be conducted solely with secondary data or use a combination of primary and secondary data collection. In addition to evaluating the performance of other food system sectors that contribute to community food security — for example, retail environment, transportation, land use, and infrastructure — some CFAs provide baseline measurements of residents' perceptions of food access so that community leaders and public agencies can devise appropriate strategies to improve the neighborhood food environment and measure their progress in doing so. The process of conducting CFAs encourages collaboration across sectors and connections among stakeholders in different parts of the local food system.

In Baltimore, CFAs are being used to gather information about residents' perceptions of their food environment and food shopping behaviors. The CLF has partnered with community organizations, other universities, Baltimore City, and urban farms to conduct the assessments. For the initial CFA conducted in 2007, the CLF sought technical assistance from the Food Trust in Philadelphia, a nationally recognized non-profit that seeks to improve access to healthy, affordable food for all. The original battery of questions remains with minor revisions.

Each survey includes questions pertaining to citizens' experiences of their local food environments, including financial and logistical barriers to accessing healthy foods, store preferences, food expenditures, cooking and eating behaviors, and household prevalence of diet-related diseases. Community partners within some neighborhoods have also added specific ques-

tions to their surveys to inform their own work. For instance, Whitelock Farm in Reservoir Hill included questions about cooking habits and kitchen equipment because they were interested in offering classes to residents.

To date, the CLF has conducted eight CFAs in seven neighborhoods of Baltimore: Clifton Park (2010: 127 surveys; 2013: 100 surveys), Hollins Market (2012: 100 surveys), Reservoir Hill (2012: 125 surveys), Oliver (2009: 50 surveys), Southwest Baltimore (2007: 103 surveys), Curtis Bay/Brooklyn (2009: 50 surveys), and Lexington Market (2012: 100 surveys). The results are used by local community partners in their efforts to design and implement local food projects such as urban farms, by policymakers in the Baltimore City government, and to build the evidence-base of assets and areas of concern in the Baltimore food environment. For most CFAs, residents and students were paid by the CLF and trained in human subjects research protocol to conduct the surveys.

Others have also used the CLF's tool to collect data, such as researchers at Loyola University who conducted a CFA in the Govans neighborhood where they host a farmers' market. The results were used to inform the market and other food-related initiatives being proposed.

### B. Findings

The results from the community food assessments conducted show several trends. Neighborhoods varied in their prevalence of diet-related disease, ranging from 16-50% of households having at least member with diabetes, 12-59.8% with high blood pressure, and 3-13% with heart disease. The majority of residents surveyed did not meet recommended targets for fruit and veg-

etable consumption (five servings a day); most ate two or less servings a day. These results are comparable to national data, which have found that <18% and <14% of adults report consuming the recommended daily amounts of fruits and vegetables, respectively (CDC, 2015). Statewide median daily vegetable intake for adults in Maryland, however, corresponds with the national median intake of 1.7 servings of vegetables and 1.0 servings of fruit per day (CDC, 2015). Respondents reported that the greatest barrier to healthy food access was affordability, with rent, utilities, and medical bills being listed as primary obstacles. Residents stated they were most dissatisfied with availability and price of healthy foods in their communities, but dissatisfaction reached about 40% for overall quality and selection as well. The following summary sheets further describe the data collected during the CFAs:

- [Clifton Park](#)
- [Curtis Bay/Brooklyn](#)
- [Hollins Market](#)
- [Greater Govans](#)
- [Lexington Market](#)
- [Oliver](#)
- [Reservoir Hill](#)
- [Southwest Baltimore](#)

### **C. Results into Action: The Real Food Farm Community Food Assessment**

The CLF worked with Civic Works' Real Food Farm (RFF), an urban farm in Clifton Park, to design and conduct the neighborhood's CFA in 2010. In addition to exploring residents' experiences with food shopping in the neighborhood and their barriers to accessing healthy food, RFF chose to add questions to the survey about good days, times, and locations for farm stands; the

types of produce residents were most likely to buy; and preferred payment methods.

This information has since guided the development of RFF's food access and sales strategies. The CFA results were particularly useful in the creation of its successful Mobile Farmers Market, which was launched in 2011. The Mobile Farmers Market runs from April through December, hosts both market stops (30 minutes to 2 hours in duration at schools, offices, libraries, community centers, residential communities, and other high-traffic areas within the community) and home deliveries to residents within their northeast Baltimore target service area. All food offered is grown either at RFF or other local farms. RFF accepts all forms of payment, including federal food assistance benefits such as SNAP, Farmers' Market Nutrition Program vouchers, and WIC Fruit & Vegetable Checks. Customers making purchases with these benefits are also eligible for a Double Dollars incentive, which provides matching funding – up to an additional \$10 – for produce purchases.

In addition to informing its programming, RFF has used the CFA results for grant applications, as they provide the most detailed statistics available on poverty, diet-related disease, food preferences, and the food environment in Clifton Park and RFF's surrounding neighborhoods. Funders have been impressed by the specificity of this background information, as it clearly demonstrates the need for RFF's efforts, which also include youth education and farm training. The data has also been used to educate new staff and local residents about the community's food environment.



## Chapter 3. Interventions to Change the Supply and Demand

The following section is dedicated to three interventions that were led by researchers at the Johns Hopkins School of Public Health (JHSPH), as well as a follow-up expansion by city government and collaborators to improve healthy food access and consumption. Each is described in detail, and includes summaries of results that have been published using data from the interventions.

### A. Eat Right, Live Well! Supermarket Intervention

In 2010, a local supermarket owner, Benjy Green, approached CLF staff and expressed a desire to address some of the unhealthy purchasing he saw happening in his store. He offered his store as a laboratory for a study that would include strategies to increase the purchase of healthy foods. The CLF decided to fund a supermarket study that resulted in an eight-month intervention to test several strategies. The supermarket is located in an area in which over a quarter of families with children under age 18 have incomes below the Federal Poverty Level, the median annual household income is \$27,158 and the community is approximately 76% African American and 18% white (Ames et al., 2011). According to the definition described on page 8, many of the neighborhoods surrounding the supermarket are considered food deserts.

Extensive qualitative research was conducted to help design the project. A faculty member from Maryland Institute College of Art participated on the team and led the design efforts. Mr. Green contributed significant in-kind (staff time for training) and financial resources (materials development and food) to the project. Dr. Pam Surkan and Anne Palmer led a team that included several students, co-investigators, and a project coordinator over a 3-year period.

Below are brief descriptions of the published research papers from the supermarket intervention:

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1. *A Framework for Understanding Grocery Purchasing in a Low-Income Urban Environment* (Zachary et al., 2013)
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Researchers interviewed low-income customers at a Southwest Baltimore supermarket to understand what factors into shoppers' decisions when grocery shopping for their families, shoppers' views on healthy and unhealthy eating, and their ideas for the supermarket intervention. Thirty-seven in-depth interviews and three focus groups were conducted, engaging a total of 46 participants recruited from local schools, Head Start centers, senior living facilities, WIC centers, churches, substance abuse recovery centers, and other community organizations. The participants were all women responsible for feeding children under age 15, and most received benefits from SNAP and/or WIC. They ranged in age from 20 to 70, and all met the criteria for "low-income" (below 185 percent of the Federal Poverty Level).

Researchers found that the participants were highly knowledgeable about healthy eating and desired to purchase healthier foods if not for certain external constraints. The higher price of healthy foods relative to non-perishable processed foods was a key factor shaping shopping decisions, especially as purchasing processed items on sale in bulk minimize time and transportation expenses. Seeking to provide enough food for their families, participants chose foods that would maximize the number of meals and caloric value obtained per dollar spent. Moreover, participants expressed frustration that the supermarket's produce offerings lacked freshness and a varied selection.

Participants suggested that stores could increase healthy food purchasing through providing taste tests of new/unfamiliar foods that customers may not purchase out of concerns of potential waste, improving the freshness of the produce available to delay spoiling at home, and offering “healthy product” labeling and/or health sections within stores or aisles. Overall, the researchers indicated that systemic intervention approaches are most needed, as simply offering health education, price reductions in healthy foods, or other singular efforts might not affect purchasing behavior.

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2. *Family and Community Influences on Diabetes-Related Change in a Low-Income Urban Neighborhood (Pollard et al., 2014)*

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During some of the aforementioned focus groups and interviews, diabetes-related dietary change emerged as a common theme among participants. Researchers decided to more thoroughly explore this topic, and revised interview guides and recruitment strategies to conduct additional interviews and focus groups with adults with diabetes and their family members. The analysis ultimately included 11 participants with diabetes, one with prediabetes, and 8 family members or close friends of those with diabetes. Information derived from focus groups that included 4 participants with diabetes and 6 family members of those with diabetes was also included.

Researchers found that social environments – including family and community relationships – greatly influenced participants’ diabetes-related dietary change. Household members without diabetes provided reinforcement for healthy eating among those with diabetes by preparing healthy food and/or adopting similar dietary changes. Family and community members served as sources of observational learning, as seeing others’ adverse health outcomes from diabetes mo-

tivated some to making healthy choices. Family and community members also provided knowledge, skills, and support to help individuals with diabetes adopt and sustain a healthy diet.

This study highlights the importance of including family and community members in diabetes management and nutrition education interventions.

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3. *Child as Change Agent: The Potential of Children to Increase Healthy Food Purchasing (Wingert et al., 2014)*

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The same qualitative dataset used in study one, along with the results of two additional focus groups totaling a sample of 62 participants, was used to examine how children influence food purchasing and what would help to increase healthier food purchasing. Caregivers reported that they were more likely to purchase unhealthy items that they did not intend to buy if children accompanied them on shopping trips, which they also reported strained their food budget. Participants indicated that the unhealthy food displays throughout the store encourage children to request unhealthy foods. To cope with children’s demands, caregivers used a variety of strategies including denying the desired foods, offering healthier alternatives, or simply returning them at the register.

Several strategies were suggested to increase healthier purchasing for shoppers with children including: move items away from eye level, avoid unhealthy promotions in high traffic areas, offer taste tests, and develop healthy food preparation activities for children. Food shopping with children can be a challenge and stressful for families. However, knowing how children influence food purchasing could be one mechanism for transforming this challenge into an opportunity for healthier food purchasing.

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4. *“They just say organic food is healthier”:  
Perceptions of Healthy Food Among Super-  
market Shoppers in Southwest Baltimore  
(Rodman et al., 2014)*

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The interview and focus group transcripts from study one were also analyzed to better understand how organic food factors into low-income consumers' overall conception of healthy eating. Previous research has shown that consumers think about healthy eating in the context of nutrition, official guidelines/recommendations, personal goals, physical and psychosocial outcomes, food production methods, culture, and ethnicity. This study was the first to explore how organic fits into such an interpretation.

Participants defined healthy and unhealthy eating in many ways beyond merely nutritional considerations. They discussed cooking habits, daily eating schedules, concerns about food additives and packaging, processing techniques, and production methods. Unprompted, over a third of participants discussed organic food or components of organic food when describing a healthy diet. Some participants were concerned that consuming non-organic foods could lead to cancer, weight gain, allergies, and abnormal development. Participants expressed how different elements of healthy eating may conflict, such as when choosing between nutrient content and organic production methods.

As these findings show, organic is an important component of what makes a food healthy for many consumers despite limited income or access. Diet-related messages and healthy eating programs should take consumer perceptions into consideration to improve their effectiveness.

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5. *Process Evaluation of a Comprehensive Super-  
market Intervention in a Low-Income Urban  
Community in Baltimore (Surkan et al., 2015a)*

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The formative research described in the aforementioned studies was used to inform the design and implementation of the Eat Right, Live Well! (ERLW) supermarket intervention. Conducted between April and December of 2012, the aim of ERLW was to increase the availability and recognition of healthy foods, while reducing costs. A registered dietician selected the 475 promoted food items chosen. ERLW activities included shelf labels, posters, and signage promoting healthy products; healthy product displays; advertising in the weekly circular, taste tests and recipe cards for promoted foods; reduced prices of promoted healthy foods; and employee training in promoting healthy eating. Other outreach events included healthy eating workshops, tabling at school events and health centers, community dinners and discussions, and healthy grocery shopping tours.

JHSPH researchers evaluated the ERLW program implementation through evaluation forms related to the store environment, taste test sessions and community events in addition to an employee impact questionnaire. They found that the different components of the intervention were implemented with varying success.

The stocking and advertising of promoted foods were implemented with high fidelity, and the labeling with moderate fidelity (based on the fraction of correctly stocked, labeled, or advertised items). Taste test sessions were implemented with moderate reach (based on the average number of participants per month) and low dose (based on the number of educational giveaways/messages per session). Community outreach events were implemented with high reach and

dose. Supermarket employee training showed no significant effects on employees' knowledge, self-efficacy or behavioral intention for helping customers with healthy purchasing or related topics of nutrition and food safety, though the sample size of employees was small.

Some barriers faced during the ERLW implementation included the unanticipated renovation of the store for two months of the intervention period, high rates of employee turnover, and management issues. A distinguishing characteristic of ERLW, and the primary reason that led to sustainability of many of its components following the intervention period, was that it was initiated and supported by the storeowner. Evaluators concluded that greater buy-in from management and employees could improve implementation.

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6. *'Eat Right - Live Well!' Supermarket Intervention Impact on Sales of Healthy Foods in a Low-income (Surkan et al., 2015b)*

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JHSPH researchers also evaluated the effects of the ERLW intervention on sales of the promoted healthy food items (see study five). To do so, they compared the sales of the 475 promoted food items in the intervention supermarket to the sales of the same items in a control supermarket located 5.6 miles away in a demographically similar neighborhood.

Overall, there was a 28 percent increase in the sale of "high-fidelity" foods in the intervention store compared to a six percent increase in the control store during the study period. If food product was correctly labeled with the healthy attributes more than 75% of the time, it was deemed a high fidelity food. These foods included fruits and vegetables, snack foods, desserts, and condiments. Low-fidelity foods, which included grains and dairy, rose 1.7 percent in the

intervention store and 7.5 percent in the control store over the same period.

## **B. Work in Baltimore's Corner Stores (Baltimore Healthy Stores and Beyond)**

### *Baltimore Healthy Stores*

As described in the first version of this report, research conducted by Dr. Joel Gittelsohn and his team at JHSPH over the past decade has informed city efforts to improve the food environment in many of Baltimore's neighborhoods. The initial Baltimore Healthy Stores project pilot intervention, which began in 2006, assisted corner stores in East and West Baltimore with stocking and promoting healthier foods (Gittelsohn et al., 2009b). Promoted foods included fresh fruits, whole wheat breads, high-fiber and low-sugar cereals, low-fat milk, cooking spray, baked/low-fat chips, low-salt crackers, diet beverages, and 100% fruit juice. The project significantly increased the stocking and sales of the promoted foods with reasonable feasibility (Song et al., 2009), significantly increased consumer purchasing and preparation of healthy foods, and had a modest effect on consumer food-related behavioral intentions (Gittelsohn et al., 2009a).

### *Baltimore Healthy Eating Zones*

The project's successes led to the expansion of these efforts to incorporate other levels of the Baltimore food system. One intervention trial, called Baltimore Healthy Eating Zones (BHEZ), targeted the environmental, behavioral, and individual variables affecting adolescent food consumption in low-income neighborhoods in East and West Baltimore (Gittelsohn et al., 2013). The project focused on improving the food environment in and around 7 recreation centers. Strategies included increasing the availability and pro-

motion of healthier foods in corner stores and carryouts; taste tests, cooking demonstrations, and communications; and a peer educator program to engage youth in healthy behaviors. The BHEZ trial achieved modest success: reductions in BMI percentile among girls who were obese/overweight at baseline in addition to some improvements in psychosocial factors (Shin et al, 2015). However, challenges arose due to communication barriers between storeowners and interventionists; limitations in store size, refrigerator space, and availability at corner stores; and weak engagement and retention of peer educators (Gittelsohn et al., 2013).

### *B'More Healthy Communities for Kids*

Insights from BHEZ informed the design and implementation (currently underway) of an ambitious multilevel childhood obesity prevention trial called B'More Healthy: Communities for Kids (Gittelsohn et al., 2014). Funded as part of the new Global Obesity Prevention Center, this program expands the approach of the BHEZ trial by working in nearly 30 recreation center areas. BHCK works in 3 or more corner stores and carryouts near each recreation center – and has added a food policy working group, a youth mentor-led nutrition program, engagement with wholesalers, and social media and text messaging behavior change campaigns to the intervention components. A key aspect of the policy work is the use of systems science approaches to engage policymakers, and to assist them with their planning. Dr. Gittelsohn recently provided testimony to the Baltimore City Council, presenting results of an agent-based model, to simulate the impact of an urban farms tax credit that is currently under consideration.

### *Applying Research to Stimulate Action: Baltimarket Healthy Stores*

The evidence base and best practices derived from Dr. Gittelsohn's Baltimore-based research helped inform the launch of the Health Department's *Baltimarket* Healthy Stores Program. It is part of a suite of *Baltimarket* efforts, including the Virtual Supermarket Program (see page 10) and the Neighborhood Food Advocates initiative, which use food access and food justice as strategies for health promotion and community transformation in Baltimore's food deserts. The *Baltimarket* Healthy Stores program, which received a \$750,000 three-year grant in February 2014 from the Maryland Community Health Resources Commission, works to reduce and prevent youth obesity through a community-based, multi-level approach to address health equity.

*Baltimarket* Healthy Stores targets its programming and intervention efforts around corner stores located in food deserts and grocery stores near food deserts. The program aims to increase the stocking and purchasing of healthy foods (whole grains, produce, low-fat dairy products, low-sodium snacks, and low-calorie beverages) in 18 corner stores. It will engage 75 youth in afterschool programs to serve as Neighborhood Food Advocates, assisting in the implementation of food system projects and promotion of healthy food consumption, reaching 12,000 people over three years. In addition, 45 community nutrition sessions will be conducted in and around food desert communities. Gittelsohn and his JHSPH colleagues will evaluate the program using the validated tools developed in the earlier trials described above.

## **C. The Baltimore Healthy Carryouts Intervention**

### *Initial Assessment*

Carryouts play an important role in food access for many Baltimore residents. To complement the extensive research on corner stores and other food retail stores in food deserts, JHSPH researchers conducted a comprehensive observational assessment of carryouts and other prepared food sources in low-income neighborhoods in Baltimore City in 2009-2010 (Lee et al., 2010). They found that more than three-quarters of prepared food sources available in low income areas of the city were carry-out restaurants, independently owned establishments which sell ready-to-eat food and beverages for off-site consumption. While they sell items very similar to franchised restaurants such as hamburgers, fried chicken, and soda, carryouts were found to have the lowest availability of healthy options compared to fast-food and sit-down restaurants. Despite the high frequency of visiting and dollars spent at carryouts for adults in low-income urban areas, little attention had been focused on using carryouts as a potential intervention venue for encouraging healthier eating and chronic disease prevention (Hoffman et al., 2013; Lee et al., 2012).

### *Intervention Pilot*

This formative work – and the subsequent research it inspired – helped explore the feasibility and acceptability of changing the carry-out food environment. The Baltimore Healthy Carryouts (BHC) intervention, which began in 2009, was developed from extensive interviews and focus groups with customers and carryout owners to determine which intervention strategies would be feasible and culturally appropriate and would increase demand for healthier carryout food (Lee-Kwan et al., 2013; Noormohamed et

al., 2012). Carry-out owners expressed concerns that significant menu changes might drive away customers. Customers were not initially attracted to the idea of healthy food offerings because they assumed that they would taste bland. To address both sides, BHC decided to implement a 6-month pilot intervention in three phases: 1) Improving menu boards and labeling to promote healthier items; 2) Promoting healthy sides and beverages and introducing new items; and 3) Introducing healthier combo meals and changing food preparation methods (Lee-Kwan et al., 2013).

BHC staff maintained close contact with the restaurant owners at the four intervention and four comparison (control) carryouts, visiting each site at least once a week throughout the intervention. Through a series of discussions and questionnaires with community members, BHC staff members gauged which healthy foods customers would want, and at what prices (Jeffries et al., 2013; Lee-Kwan et al., 2013; Noormohamed et al., 2012). These led the restaurant owners toward finding culturally and seasonally acceptable side options (Lee-Kwan et al., 2013). With the input from carry-out owners, BHC promoted sides including collard greens, watermelon, yogurt, and fruit cups. Carry-out restaurants eventually began offering healthy combo meals (e.g., a healthy entrée with a healthy side instead of fries, bottled water in place of soda) that matched the price of original combo meals, making them affordable to price-sensitive groups.

BHC also addressed concerns about potential profit loss by helping owners with promotion. Carryouts that agreed to offer healthier items received durable laminated menu signs to replace paper menus (Lee-Kwan et al., 2013). Literacy was considered during menu and poster creation, and high-quality photos were used on the menus to help customers identify healthy

choices. The modified menu boards and posters provided an aesthetic improvement, a co-benefit that business owners appreciated. BHC not only brought healthful foods to Baltimore residents but also supported existing local carryout businesses through these strategies.

### Intervention Evaluation

To assess how well BHC was implemented, process evaluation was conducted by assessing sales receipts, carryout visit evaluations, and intervention exposures. On average, BHC reached 36.8% more customers at intervention carryouts compared to baseline in the intervention carryouts (Lee-Kwan et al., 2013). The menu boards and labels were seen by 100.0% and 84.2% of individuals, respectively (Lee-Kwan et al., 2013). Because carryouts were limited in resources, the high quality laminated menu boards were highly accepted. As one of the BHC staff members quotes, “once the menu board was up, it is going to stay up.” Overall, the BHC intervention implementation was well received by carry-out owners and customers, and was implemented as initially planned (Lee-Kwan et al., 2013).

For the carry-out level impact evaluation, a total of 186,640 menu orders were collected from seven carryouts over an eight-month period (1.5 months baseline collection and 6 months intervention) (Lee-Kwan et al., 2014a). In the inter-

vention group, the odds of healthy item sales increased significantly compared to baseline. Total revenues (dollar amounts of healthy and unhealthy item sales) in the intervention group were significantly greater in all phases relative to baseline, while they significantly declined in the comparison group.

For the customer-level impact evaluation, BHC collected exposure assessment on 180 randomly selected customers after intervention (Lee-Kwan et al., 2014b). Compared to customers in comparison carryouts, customers in intervention carryouts were 4.5 times more likely to purchase promoted healthy items. The intervention exposures were positively associated with the amount of healthy food purchased.

From the very beginning, BHC shared its progress and findings with the Baltimore Food Policy Initiative and Department of

Planning. This partnership proved essential in helping the researchers communicate with policy makers and emphasize to them the need to disseminate such carry-out interventions. Moreover, the collaboration allowed the researchers to demonstrate the cost-effectiveness, short and long-term success, and potential sustainability of the BHC intervention.



**Figure 4. Sample intervention carryout menu board (left: before; right: after)**

## Research in Application: Get Fresh, Get Fit Lexington Market

The research and interventions conducted by JHSPH research has also informed the work of city government. The results of the community food assessments conducted near public markets showed that the public markets play a unique role in city. Baltimore City has thus prioritized working with public markets to increase healthy food access. Six public markets attract about 4.2 million customers per year, and all are located near Baltimore's food desert areas (Yong et al., 2011). It is estimated that Lexington Market alone attracts 2,800,000 customers per year. The Baltimore Food Policy Initiative has partnered with the Baltimore Public Market Corporation; Lexington Market, Inc.; and the University of Maryland, Baltimore to implement the Get Fresh, Get Fit Public Markets campaign, with the goal of increasing healthy food availability and healthy lifestyles within public market venues.

This strategy includes improving healthy carry-outs, promoting health and fitness, and increasing access to fresh produce. Lexington Market is a key part of the culture and history of Baltimore, and Get Fresh Lexington marks one of the many efforts underway. During a food assessment in 2011, it was found that Lexington Market has the most produce vendors (8) of any public market, but also had the highest number (54) of carry-out vendors, contributing to the prevalence of prepared food sources in this area. Furthermore, "22 out of 54 carryouts (41%) did not sell healthier items specified on their leases" (Yong et al., 2011). The Get Fresh Lexington initiative aims to improve this situation.

The Get Fresh Lexington Market initiative has four key strategies, which were informed by the Baltimore Healthy Carryouts study (described on pages 22-23):

- Implement a healthy carry-out strategy: Transform existing carry-out vendors into healthy carryouts offering and promoting healthy, affordable foods.
- Increase demand for healthy food: Increase consumer demand through promotion of

healthy items through healthy menu labeling, combination meal deals, consumer focus groups, community food assessment, and targeted marketing strategies.

- Create local farmer day stalls: Change current lease agreements to allow for day stall leases so local farmers can attend the market on a daily basis during the growing season, replicating the Reading Terminal Model.
- Establish a healthy food fitness hub: Build the market as a central resource for healthy eating and community health through promoting nutrition education and physical activity.

Redesigned carry-out menus featuring healthy options are visible at 18 stalls inside the Lexington Market. A total of 36 carryouts in three public markets had received some/all of the intervention components by August 2014. As a result of the project, the Baltimore Food Policy Initiative has been able to better serve public market merchants and provide technical assistance around federal nutrition policies as they relate to food businesses (A. Huang, personal communication, December, 8, 2015).



## Summary Remarks

This updated report on research on the Baltimore City Food Environment reflects the work that has been undertaken over the past four years by faculty and students at the Johns Hopkins School of Public Health. This work has helped to map the city's food retail environment, capture residents' perceptions of food access, assist with city and storeowners' efforts to improve their healthy food offerings, and to promote these foods at the point of purchase and through various innovative interpersonal and media approaches.

The revised Baltimore Food Environment Map underscores researchers' attempts to refine the concept of a "food desert" to more accurately portray the socioeconomic disparities in access to healthy foods, and the implications such disparities have on rates of preventable diet-related diseases. The new map includes alternative strategies to improving healthy food access, such as the Baltimarket virtual supermarket, which have been increasingly promoted over the past few years. The fact that many low-income neighborhoods in Baltimore are not only characterized by limited access to healthy foods, but also by proportionally higher access to unhealthy food options was further depicted by the Prepared Foods Density map.

Residents of these neighborhoods confirmed through Community Food Assessments and focus group discussions that they faced many challenges to adopting healthier diets – most notably, affordability, but also geographic distributions of food sources, limited access to transportation, poor quality and selection of available food offerings, lack of time and resources for cooking, and limited knowledge of healthy food selection and preparation. The results of this community research prompted collaborative ef-

forts by community members, city government, and researchers to use public markets, carry-outs, and corner stores as venues for encouraging healthier eating and chronic disease prevention in the city.

As further research and collaboration continues, we hope this work will continue to improve the ability of all City residents to enjoy foods that are healthy and benefit the community food and social environment. Baltimore is an example of a city that has significant resources invested in both studying the food environment and in creating policies and programs to improve the food environment. This report provides an update and overview of these efforts. We hope it will inspire other cities to build academic and community partnerships to understand the opportunities and challenges residents face in accessing healthy foods.

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