SB 0098_Food Desert Study_signed.pdf
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Position: FAV

MARYLAND COMMUNITY ACTION PARTNERSHIP
A NETWORK OF COMMUNITY ACTION AGENCIES SERVING MD, DC & DE

2/5/2024

Re: Support of SB 0098 – Department of Housing and Community Development – Food Desert Study

Dear Honorable Chair Beidle and Members of the Senate Finance Committee,

I am writing on behalf of the Maryland Community Action Partnership (MCAP) to urge your support of SB 0098 – Department of Housing and Community Development Food Desert Study.

The Maryland Community Action Partnership (MCAP) is a statewide non-profit organization comprised of Maryland's 17 Community Action Agencies (CAAs), which collectively serve every Maryland county. Together, we work toward eradicating homelessness and poverty to realize our vision of ensuring that all Maryland individuals and families are stable, economically secure, and live in safe and thriving communities.

As significant providers of food and nutrition services for Marylanders with low-incomes, the MCAP network of CAAs supports SB 0098 because of its impact on the individuals and families that our network serves.

If passed, the bill would:

- Require the Department of Housing and Community Development to study food deserts in the state and make recommendations to reduce the number of food desserts.
- Determine the impact of food deserts on the local population and economy.

It is MCAP's position that this legislation will facilitate the collection and analysis of critically important information about the existence and impact of food deserts in Maryland. This data will better equip state and local agencies, private non-profit organizations, and community partners to address the persistent issue of food insecurity for Marylanders with low-income. The importance of studying and addressing the root causes of inadequate access to food cannot be overstated, as access to nutritious food is an essential step on the pathway to stability and economic security in all Maryland communities.

If there is any additional information that I can provide for you as you consider this bill, I would be happy to help. You can contact me at amartin@maryland-cap.org, or by calling 205-757-0764.

Sincerely,

Angela Martin

Angela Martin, Executive Director

SB98_FoodDesertStudy_LOS.pdf
Uploaded by: Brian Sims
Position: FAV

Maryland
Hospital Association

February 8, 2024

To: The Honorable Pamela Beidle, Chair, Senate Finance Committee

Re: Letter of Support - Senate Bill 98 - Department of Housing and Community Development - Food Desert Study

Dear Chair Beidle:

On behalf of the Maryland Hospital Association's (MHA) member hospitals and health systems, we appreciate the opportunity to comment in support of Senate Bill 98. Access to nutritious food is essential to achieve optimal health and ensure health equity for all Marylanders. SB 98 would require the Department of Housing and Community Development to study food deserts in the state and suggest solutions to increase access to nutritious options. The resulting report will provide insights into the extent of food insecurity, supporting initiatives to improve overall population health and health equity.

One in three Marylanders face food insecurity, which includes individuals living in food deserts lacking access to nutritious foods.[1] A 2021 study by the Johns Hopkins Bloomberg School of Public Health found that nearly half of Hispanic respondents experienced new and persistent food insecurity.[2] Marylanders on the Eastern Shore have the highest percentage of households statewide with food insecurity among those who are Black, Indigenous, and people of color. A person's food selection and spending are influenced by the accessibility and affordability of food retailers—including distance, selection, and price.[3] For low-income and/or rural communities, for example, lack of transportation could make it difficult to travel to a grocery store. As a result, people in the community may go to smaller stores that are closer to their home but lack affordable, healthy food options.[4]

Food insecurity prevents people from consuming a balanced diet and harms overall health. Unhealthy diets contribute to chronic diseases like diabetes, while malnutrition can lead to

[1] Maryland Food Bank. "Hunger in Maryland." mdfoodbank.org/hunger-in-maryland/ (accessed February 7, 2024).
[2] Bradley, Brianna, et al. "Food security and food access for People of Color and Hispanic/Latinx households in Maryland during the first four months of the COVID-19 pandemic." clf.jhsph.edu/publications/food-security-and-food-access-people-color-and-hispanic/latinx-households-maryland (accessed February 7, 2024)
[3] USDA Economic Research Service. "Food Access." ers.usda.gov/topics/food-choices-health/food-access/ (accessed September 24, 2020).
[4] Rhone, Alana, et al. "Understanding Low-Income and Low-Access Census Tracts Across the Nation: Subnational and Subpopulation Estimates of Access to Healthy Food." Economic Information Bulletin Number 209. (May 2019). ers.usda.gov/webdocs/publications/93141/eib-209.pdf?v=8920.1.

diseases like hypertension and behavioral health issues like depression or anxiety.[5] For children, food insecurity may cause developmental problems. Maryland hospitals recognize that food is medicine and partner with community organizations to provide stopgap healthy meal delivery services to patients living in food deserts with conditions impacted by nutrition. However, these measures are limited and require significant resources to expand to wider populations. SB 98 allows the Department of Housing and Community Development to explore recommendations for sustainable programs to reduce the number of food deserts statewide.

For these reasons, we request a ***favorable*** report on SB 98.

For more information, please contact:
Brian Sims, Vice President, Quality & Equity
Bsims@mhaonline.org

[5]American Hospital Association. "Social Determinants of Health Series: Food Insecurity and the Role of Hospitals." aha.org/ahahret-guides/2017-06-21-social-determinants-health-series-food-insecurity-and-role-hospitals (accessed February 7, 2024).

SB98_DHCD_SUPPORT.pdf
Uploaded by: Chuck Cook
Position: FAV

Maryland
DEPARTMENT OF HOUSING
AND COMMUNITY DEVELOPMENT

WES MOORE
Governor

ARUNA MILLER
Lt. Governor

JACOB R. DAY
Secretary

JULIA GLANZ
Deputy Secretary

DATE: **February 8, 2024**

BILL NO.: **Senate Bill 98**

TITLE: **Department of Housing and Community Development - Food Desert Study**

COMMITTEE: **Senate Finance Committee**

Letter of Support

Description of Bill:
Senate Bill 98 tasks DHCD with studying food deserts in Maryland and, by November 30, 2024, submitting its findings and recommendations for reducing the number of food deserts in the state to the Senate Committee on Education, Energy and the Environment and the House Environment and Transportation Committee.

Background and Analysis:
A "food desert" is a geographic area with limited access to affordable and nutritious food. Food deserts are frequently found in low-income urban and rural areas that lack supermarkets and grocery stores, or where many residents have inadequate transportation options for reaching such stores. According to Johns Hopkins University researchers, 1 in 4 Baltimore City residents live in a food desert. Living in a food desert is correlated with below-average health outcomes and life expectancies, and Black Marylanders are disproportionately affected.

DHCD is actively working to pursue new funding and to better adapt existing tools to create more food resources in low-income communities. The Neighborhood BusinessWorks program, which provides flexible financing to new or expanding small businesses and nonprofit organizations, has supported multiple projects anchored by grocery stores. An up-to-date food desert study would allow DHCD and the General Assembly to enhance existing lending and grant tools to better meet the unique needs of businesses that provide fresh foods. Additionally, it will support the agency's objective to promote additional policies that increase Maryland residents' access to fresh, affordable, nutritious food.

DHCD Position:
The Department of Housing and Community Development respectfully requests a **favorable** report on SB 98.

Maryland Catholic Conference_FAV_SB98.pdf
Uploaded by: Jenny Kraska
Position: FAV

MARYLAND CATHOLIC CONFERENCE

February 8, 2024

SB 98
Department of Housing and Community Development – Food Desert Study

Senate Finance Committee

Position: Favorable

The Maryland Catholic Conference (MCC) offers testimony in support of Senate Bill 98. The Catholic Conference is the public policy representative of the three (arch)dioceses serving Maryland, which together encompass over one million Marylanders. Statewide, their parishes, schools, hospitals and numerous charities combine to form our state's second largest social service provider network, behind only our state government.

SB 98 requires the Department of Housing and Community Development to conduct a study and make recommendations on reducing food deserts in the State of Maryland.

Access to nutritious food is a basic human right, and yet, far too many individuals in our communities, especially those in low-income areas, are living in what are commonly known as food deserts. These areas lack sufficient access to fresh and healthy food options, contributing to higher rates of malnutrition, chronic illnesses, and food insecurity. As Catholics, we are called to prioritize the needs of the vulnerable and work towards creating a more just and compassionate society.

This legislation is a commendable step towards understanding and addressing this issue. By requiring the Department of Housing and Community Development to study the root causes of food deserts and propose recommendations, Maryland would be taking a proactive stance in fulfilling our duty to care for those in need. Pope Francis, in his encyclical "Laudato Si," emphasizes the interconnectedness of environmental and social justice issues. Food deserts not only impact the physical health of individuals but also contribute to systemic poverty and inequality. This study would demonstrate a commitment to integral human development, addressing the universal well-being of individuals and communities.

The MCC appreciates your consideration and, for these reasons, respectfully requests a favorable report on Senate Bill 98.

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Spatial access to food: Retiring the food desert metaphor

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A B S T R A C T

The food desert metaphor has been widely used over the past few decades as a way to identify regions as being at risk for having little or no access to healthy food. While the simplicity of the metaphor is attractive, this article argues that its usefulness to researchers interested in understanding the relationship between the geography of healthy food opportunities and dietary behaviours is limited. More nuanced approaches to incorporating geography into food access studies, like including transportation, economic factors, and time use, in addition to considering other dimensions of accessibility, are warranted.

1. Introduction

Researchers, politicians, community groups, and activists have been increasingly interested in how the built environment impacts the health of individuals in a range of geographic and social contexts. This "spatial turn" in health research [1] has resulted in many health-related disciplines explicitly considering spatial variations in the distribution of positive and negative influences and outcomes. One recent area where geographic thinking was applied was the study of spatial access to healthy food, a necessary but not sufficient component to maintaining a healthy diet.

"Food deserts," a term reported to have arisen from the United Kingdom in the early 1990s [2], are generally reported to be regions in which access to food retailers that stock fresh, affordable, and healthy food options are lacking or nonexistent. While there is no universally agreed upon definition, early definitions included those put forward by government ministers, like the UK's health minister Tessa Jowell in 1997, who identified food deserts as areas "where people do not have easy access to healthy, fresh foods, particularly if they are poor and have limited mobility" [3,4]. The lack of geographic access is a problem, the reasoning goes, because those without the ability to physically acquire healthy foods will be less likely to incorporate such foods into their diets, leading to the consumption of food from readily available retailers (e.g. fast food restaurants and convenience stores) that typically supply options with lower nutrient and higher energy densities [5]. This ultimately can result in a range of health issues like hypertension, diabetes, and other obesity-related comorbidities [6].

The use of the word desert is appealing, as it lends an explicit spatiality to the concept of food inaccessibility, evoking a barren landscape, devoid of food for the people within. In practice, it also simplifies the issue of food accessibility to a binary – regions where people are in food deserts, and regions where people are not in food deserts. Early on, Cummins and Macintyre critiqued this simplification, noting that the food desert concept is a factoid – an assumption or speculation "reported and repeated so often that" it is "popularly considered true; they are simulated or imagined facts" [2]. The authors go on to discuss the social and political context that can propel a factoid into government health policy, and emphasize that, despite the term's popularity, there is a lack of empirical evidence.

A clear example of the reliance on this simplification was found in early iterations of the US Department of Agriculture's Food Access Research Atlas, originally called the "Food Desert Locator" [7]. This mapping tool presented the locations of census tracts they defined to be food deserts because a sufficient number of residents are considered low-income and live more than one mile away (in urban areas) from the nearest grocery store. In a press release in 2011, the then Agriculture Secretary Tom Vilsack is quoted as saying the mapping tool "…will help policy makers, community planners, researchers, and other professionals identify communities where public-private intervention can help make fresh, healthy, and affordable food more readily available to residents." The tool's purpose was to pinpoint discrete regions for spatially targeted interventions intended to improve diets of residents.

This rough approach disregarded the evidence that food shopping and urban mobility are complex. Research has shown that many people do not shop at the closest food retailer [8,9] and transportation mode can drastically change levels of spatial accessibility to supermarkets [10,11]. Later iterations of the USDA's atlas have taken a more careful and general approach by, for example, including a census tract-level food access measure that incorporated car ownership, and also moved away from the term "food desert." However, the USDA's platform still

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0031-9384/

takes an all or nothing approach, designating the people within tracts that meet specified criteria as residing in a region with low levels of spatial access to healthy food options [12].

This simplification gets to the fundamental problem with the food desert metaphor: it overemphasizes space in a multidimensional problem, where its role varies depending on a range of other factors like income, household characteristics, transportation options, and time use, to name only a few. For the low-income parent working two jobs, living within walking distance to an affordably priced supermarket may not matter because of constraints on their time and activity space. Conversely, a high-income couple where only one partner works may live a great distance from the nearest healthy food retail option, but have no issues accessing and consuming healthy food because the non-working partner has the time and resources to make the trip. The food desert concept, an inherently spatial representation of healthy food access, implicitly leads those developing targeted interventions aimed at improving the nutritional content of diets to focus on the geographic characteristics of food retail and discard the many other important factors linked to dietary behaviours.

This is not to say that the geography of food retail and spatial accessibility has no marginal effect on diets and nutrition. Much good work has been done on measuring the food retail environment by researchers in geography, planning, nutrition, and public health [13–15], and a review of the literature does find that there are inequities in spatial access to food retail in the United States, if not in other high-income nations [16]. Rather, it is important to retire the food desert metaphor and consider spatial access as one component of a more holistic accessibility framework. For example, work by Penchansky and Thomas from 1981, more than a decade before the rise of the food desert, describes overall access to health services as a function of availability (the number of opportunities), accessibility (the spatial configuration of opportunities), accommodation (how clients are accepted), affordability (the cost of the service or product), and acceptability (clients' attitudes about the characteristics of providers) [17]. While their focus was on patients' interaction with the healthcare system, their generalized framework maps nicely to access to healthy food, without overemphasizing any one component. For example:

- Availability: the quantity of retailers stocking healthy food options,
- Accessibility: the spatial configuration of food retailers with healthy food,
- Accommodation: the ability of food retailers to accept alternative payments (e.g. WIC),
- Affordability: the price of healthy food options, and
- Acceptability: the stock of culturally appropriate foods.

From this list, it is apparent that the food desert metaphor emphasizes one of the five aforementioned dimensions ([spatial] accessibility), and can only generally account for the others through simplifying characteristics about aggregated populations and retail within some region.

In the next two sections of this piece, the cartographic limitations of relying on the food desert metaphor to identify regions with little or no access to healthy food and alternative practices for measuring the geography of food retail access are briefly presented. The geography of access to food is an important topic to study, but to achieve the desired outcome of identifying populations with a need for improved dietary outcomes, the food desert concept's utility is questionable. As a tool designed to identify the geography of populations who face barriers to maintaining a healthy diet, a more comprehensive approach is needed, and a more nuanced treatment of space is required.

2. Cartographic limitations to the food desert metaphor

There are a range of challenges faced by researchers and policy makers trying to.

understand and communicate the spatial distribution of any phenomena via mapping. For centuries, geographers and cartographers have struggled with the limitations of maps and sought ways to overcome them; maps are models and should be interpreted as such. In regard to food deserts, the fallacy of division [18], the modifiable areal unit problem [19], and boundary effects [20] must all be accounted for if an accurate representation of spatial access to healthy food for at risk populations is to be achieved.

More recently, advances in geographic information systems (GIS) have allowed for representations of food deserts to become less rigid. In particular, interactive maps let users shift time frames, choose different political boundaries (e.g. census blocks to census tracts), and dynamically select the criteria that determine categorization as a food desert (for example, see work by Chen and Clark [21]). While these new abilities provide increased flexibility in selecting regions as food deserts, the fundamental issue of generalizing arbitrarily defined zones remains.

In addition, it is difficult for any food desert measure to capture the importance of the dynamics of everyday life. For example, shifts in the distribution of the population as they move through their activity spaces, the opening and closing of food retail options, and broader seasonal and annual trends in availability [22–24] all contribute to a moving target when it comes to pin pointing discrete spatial units (typically only focussing on residential locations) with lower levels of access. It is important to note again that it is not necessarily a problem that food deserts are simplifications of access. However, because they are intended to serve as a means for identifying populations inside of areas where there is an increased risk for maintaining unhealthy diets, it is expected that this could be achieved somewhat reliably. Nevertheless, in multiple review articles [25,26] and a cross-sectional study [27] that have examined exactly this issue, this has not been the case. For example, Caspi et al. [26] point out that the reason for some of these inconsistent findings could be related to an overreliance on GIS-based measures that fail to account for the many non-spatial variables that explain the relationship between the food environment and diet.

3. Alternative means for measuring the spatial access to food

Where do the limitations of the food desert metaphor leave researchers interested in spatial patterns of inaccessibility to healthy food retailers? Given the increase in spatial and temporal data availability on a range of topics, from food retail locations to transit networks, and widely available and easy to use GIS software packages, it is becoming easier to incorporate some of the complexities that may be responsible for the weak relationships found when studying the links between food deserts and nutrition. A number of potential approaches, all focused on a more comprehensive accounting of exposure and access to food retail across space, are described here.

Beginning in the later 2000s, numerous academics have integrated some of the aforementioned spatial dynamics into their studies of spatial access to healthy food. In some cases, this involved the use of data collected on travel patterns [10,28–31]. With these data it was possible for researchers to map routine trips (e.g. daily commutes) as a way to provide a more complete approach to understanding what food retailers were spatially available to populations in various study areas. While these studies do provide more information about various populations' space-time paths, they are limited by the data's focus on a limited set of activity spaces (e.g. only work and home), which discounts other commonly travelled places or over emphasizes those with fulltime employment.

Similar to this work, there has been an increase in the number of food environment studies that utilize global positioning system (GPS) devices [32–34]. The ubiquity of smart phones with GPS technology has made it much easier to collect large amounts of spatial trajectory data alongside other types of potentially useful information (e.g. pictures of receipts) on-the-fly. This data collection method provides more

information about where and when people move through their activity spaces, allowing for a detailed accounting of exposure as well as activities that involve an interaction with a food retailer. These studies, however, are also limited by the fact that exposure to food retail increases when a person makes a choice to interact with a food retailer. This is a problem of endogeneity which researchers should attempt to correct for in their analyses by, for example, comparing access to food retailers for all trips that do not involve a food shopping activity. Additionally, it is less feasible to describe the level of access to healthy food retailers for entire populations, as collecting detailed GPS and food-behaviour data can be time consuming and expensive.

An alternative approach to collecting data that is explicitly spatial is to explore how people perceive their food environment [35,36]. As an example, Caspi et al. [37] measured study participants' perceived access to supermarkets by asking if a supermarket was within walking distance to their homes, and then cross referencing this with a GIS-derived distance measure to the nearest supermarket. Interestingly, this research found that those participants who reported no supermarket within walking distance to their home, but where a supermarket was in fact nearby, consumed fewer fruits and vegetables compared to those who reported the presence of the store. While asking about perceptions of the food environment may not allow researchers to directly map food retail, it does provide a useful means for capturing information about how people experience what food opportunities are around them. The perceived food environment implicitly accounts for factors like economic accessibility, cultural appropriateness, and the temporal availability of stores, though, depending on the data collection tools, it can be difficult to disentangle all of these factors.

Finally, it is worth emphasizing the importance of continuing research that examines healthy food access without a spatial component. As previously mentioned, other dimensions like time scarcity [38] and economic context [39] are important drivers of behaviours related to food shopping. Together, these studies and more geographically oriented research can complement each other so as to improve our understandings of why people buy food at certain locations, and how policy makers and public health officials can encourage healthier dietary activities.

4. Conclusions

Food deserts were intended to serve as a way to identify regions where populations were at risk of maintaining unhealthy diets due to a lack of spatial access to food retailers with nutritious options. Unfortunately, the metaphor emphasized an overly generalized conceptualization of the geography of food retail, and many studies have found food desert indicators to inconsistently relate to less desirable dietary patterns. While incorporating mobility and spatial dynamics into measures of food access comes with its own set of problems and limitations, it also provides a more accurate representation of who has access to what, allows researchers to link specific space-time patterns to diet and health, and can easily be associated with other dimensions of (non-geographic) access. These capabilities, and evidence that the usefulness of the food desert concept is questionable, should lead us to the retirement of the term, as well as to a new focus on more nuanced forms of understanding how the geography of food retail and people contribute to dietary outcomes.

Acknowledgments

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The Public Health Effects of Food Deserts: Workshop Summary

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THE PUBLIC HEALTH EFFECTS OF FOOD DESERTS

WORKSHOP SUMMARY

Paula Tarnapol Whitacre, Peggy Tsai, and Janet Mulligan, *Rapporteurs*

Food and Nutrition Board

Board on Agriculture and Natural Resources

Board on Population Health and Public Health Practice

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Willing is not enough; we must do."
—Goethe

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* Institute of Medicine and National Research Council planning committees are solely responsible for organizing the workshop, identifying topics, and choosing speakers. The responsibility for the published workshop summary rests with the workshop rapporteurs and the institution.

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This workshop summary report has been reviewed in draft form by individuals chosen for their diverse perspectives and technical expertise in accordance with procedures approved by the National Research Council's Report Review Committee. The purpose of the independent review is to provide candid and critical comments that will assist the institution in making its published report as sound as possible and to ensure that the report meets institutional standards of objectivity, evidence, and responsiveness to the study charge. The review comments and draft manuscript remain confidential to protect the integrity of the deliberative process. We wish to thank the following for their review of this report:

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Although the reviewers listed above have provided constructive comments and suggestions, they were not asked to endorse the conclusions or recommendations, nor did they see the final draft of the report before its release. The review of this report was overseen by **Dr. Eileen Kennedy,** Friedman School of Nutrition Science and Policy, Tufts University, Boston, Massachusetts. Appointed by the National Research Council and Institute of Medicine, she was responsible for making certain that an independent examination of this report was carried out in accordance with institutional procedures and that all review comments were carefully considered. Responsibility for the final content of this report rests entirely with the authors and the institutions.

Contents

Summary

The term "food desert" describes neighborhoods and communities that have limited access to affordable and nutritious foods. In the United States, those who live in urban and rural low-income neighborhoods are less likely to have access to supermarkets or grocery stores that provide healthy food choices. While many food desert studies have focused primarily on their socioeconomic determinants, less is known about their public health impacts—including the prevalence of obesity and the incidence of chronic diseases—on local populations.

As part of a year-long congressionally mandated study coordinated by the Economic Research Service (ERS) of the U.S. Department of Agriculture, the Institute of Medicine (IOM) and the National Research Council (NRC) were asked to convene a two-day workshop to understand the public health effects of food deserts. On January 26-27, 2009, workshop speakers provided presentations on how to measure and understand the extent of food deserts, their impact on individual behaviors and health outcomes in various populations, and effective ways to increase the availability of fruits and vegetables and to improve the food environment. Workshop participants also identified areas where additional research could be helpful to inform future efforts to increase the availability of affordable and nutritious foods. It was beyond the workshop's scope to examine ways to decrease access to unhealthy food options.

Although larger food stores are not the only outlets able to sell healthy food, their presence (or lack) is used as a proxy for access to healthy lower-cost food options. Using national-level data and community-level

research, presenters confirmed that food deserts do exist in the United States, particularly in lower-income, inner-city and rural areas with few supermarkets and numerous smaller stores that stock very limited healthy food items such as fruits and vegetables. Mapping shows that these are also frequently areas with high rates of obesity and chronic, diet-related diseases. However, presenters emphasized that food retail is only one component of the total food environment that affects how people eat and, more fundamentally, their health. Another caveat is that the supply of healthy food will not suddenly induce people to buy and eat such food over less-healthy options, especially when relative prices of the healthier foods are high.

To better understand the public health implications of food deserts, speakers reviewed the evidence on the link between different foods and health outcomes. The research showed that the increased consumption of fruits and vegetables, whole grains, and healthy fats slows weight gain but does not reduce weight unless they are substituted for other more energy-dense foods, and it does have benefits in terms of cardiovascular disease (CVD) risk and some cancers. Consumption of sweetened beverages has doubled since 1965, and this has had a harmful effect on weight, CVD, and some cancers. Perhaps not coincidentally, the relative price of these beverages has decreased over time. The evidence linking diet to health outcomes discussed at the workshop points to the reality of the complex relationships between interventions and health outcomes, therefore there is no magic bullet for improving health and those limitations need to be kept in mind.

Research-based experiments and policy interventions to mitigate food deserts have included working with supermarket chains to determine new store sites in underserved areas, providing incentives to small-store owners to improve offerings, and encouraging the growth of farmers' markets that can improve access to fresh produce and possibly also accommodate payment with government nutrition assistance programs from the Supplemental Nutrition Assistance Program and the Special Supplemental Nutrition Program for Women, Infants, and Children.

A number of specific research needs were identified throughout the course of the workshop. These include the need for longitudinal research to track the same population over time as changes in their food environment occur, a focus on multiple outcome measures given the complexity of the food environment, and the role of price in food choice. Solving the food desert problem might not alone improve health or necessarily change what individuals eat. However, understanding where food deserts exist in the United States can provide guidance on where changes can be made to improve the availability of affordable healthy food options.

Marshaling resources to help alleviate food deserts in this context will be a step toward better health for all Americans.

This report is a summary of workshop presentations and discussions. Meeting transcripts and presentations served as the basis for the summary. The planning committee served as the organizing body for the workshop, and they identified themes for the workshop and invited speakers from the United States and the United Kingdom to address the various issues. The biographical sketches of members of the planning committee can be found in Appendix A, and the workshop agenda is found in Appendix B. Appendix C provides biographical sketches of invited speakers and moderators listed on the agenda. More than 75 stakeholders from the general public attended the workshop, and a list of those participants from the public is found in Appendix D.

The reader should be aware that the material presented here expresses the views and opinions of individuals participating in the workshop as either speakers, moderators, or audience members, and not the deliberations or conclusions of a formally constituted IOM or NRC committee. The invited speakers provided presentations based on their research or perceptions of research in the field. The purpose of the workshop was not to reach consensus on any single issue, but to gather information to inform the ERS food desert study in its report to Congress. These proceedings summarize only the statements of workshop participants and are not intended to be an exhaustive exploration of the subject matter nor a review of all empircal evidence on the topic.

1

Introduction

BACKGROUND

The term "food deserts" describes neighborhoods and communities that have limited access to affordable and nutritious foods. The term was first used in Scotland and characterized neighborhoods that can encompass many thousands of people and/or an extensive land area as defined by city blocks or square miles. In the United States, food deserts tend to be located in urban and rural low-income neighborhoods, where residents are less likely to have access to supermarkets or grocery stores that provide healthy food choices. For communities with few food retailers or supermarkets that stock little or no fresh produce, low-fat dairy, whole grains, and other healthy foods, those populations may be more likely to suffer from high rates of diabetes, cardiovascular disease, and obesity.

Research into the health implications of food deserts began in the United Kingdom in the 1990s, although economists and geographers had been studying spatial determinants of firm location, transaction costs, and differential prices of food for the poor since at least the 1960s. Sponsor representative Laurian Unnevehr, of the U.S. Department of Agriculture's Economic Research Service, pointed out in the introductory workshop session that community organizers have seen local food and food access as a powerful vehicle for social change for many decades. The study of food deserts, both here and in the United Kingdom, has since evolved to include public health researchers and practitioners, economists, planners, community activists, and others.

Researchers are looking at the effect of food deserts on health out-

comes, as well as examining which interventions have the greatest potential to improve conditions.

CONGRESSIONAL MANDATE

The 2008 Farm Bill directed the U.S. Department of Agriculture (USDA) to undertake a study of food deserts in the United States to assess their incidence and prevalence, to identify characteristics and factors causing and influencing food deserts and their effect on local populations, and to provide recommendations for addressing the causes and effects. The Economic Research Service (ERS) is the lead agency on this effort and is collaborating with other agencies within USDA, such as the Food and Nutrition Service and the Cooperative State Research, Education, and Extension Service. Legislation also instructed USDA to work with other organizations, including the Institute of Medicine (IOM) and the National Research Council (NRC).

WORKSHOP ORGANIZATION

At the request of ERS, the IOM and the NRC convened a workshop to examine the public health implications of food deserts and to examine promising strategies for mitigating their impacts (see Box 1-1 for the Statement of Task). A six-person planning committee[1] was appointed by the IOM and the NRC, and biographical sketches of the planning committee are found in Appendix A. To address the Statement of Task, the planning committee developed a meeting agenda, found in Appendix B, and identified and invited experts to provide presentations at the workshop. Biographical sketches of the invited speakers and the session moderators are found in Appendix C. The workshop agenda was organized as a representative but not exhaustive overview of food deserts: It examined current research findings on the public health impacts of food deserts and explored ways to potentially mitigate those impacts.

At the January 26-27, 2009, workshop in Washington, DC, invited speakers gave presentations on how multidisciplinary approaches can be used to measure where and how food deserts occur as well as potential health impacts and strategies to ameliorate them. The invited speakers based their presentations primarily on their research or perceptions of research in the field. Speakers also addressed the common premise that increasing the availability of healthy foods will affect diet and produce health outcomes. The results of some research interventions and promis-

[1] The planning committee's role was limited to planning the workshop; this summary has been prepared by the workshop rapporteurs as a factual summary of what occurred.

BOX 1-1
Statement of Task

An ad hoc committee will plan and conduct a two-day workshop on the public health implications of food deserts. In this context, "food desert" is defined as a rural or urban low-income neighborhood or community with limited access to affordable and nutritious food. The workshop will include presentations and discussions that will focus on the health effects on local populations (including both adults and children) of limited access to affordable and nutritious food. Invited workshop presentations will discuss the impacts of food deserts on such outcomes as overall dietary intake (including examination of specific foods, such as fruit and vegetable consumption and intake of high-energy, low-nutrient foods); the prevalence of obesity and overweight; the existence of micronutrient deficiencies; food insecurity; and the incidence of chronic diseases associated with poor diets. In addition, presentations will cover promising strategies for mitigating the impacts of food deserts that have been suggested or implemented, or are in the planning stages. An individually authored summary of the workshop will be prepared, along with an unedited transcript of the workshop presentations.

ing policies and programs were discussed on how to alleviate problems related to the accessibility, availability, affordability, and quality of foods. More than 75 stakeholders from the general public attended the workshop, and a list of those participants is found in Appendix D.

DEFINING FOOD DESERTS

Shelly Ver Ploeg, of USDA ERS, noted that the definition of food desert contained in the Farm Bill is helpful (Box 1-2), but also raises questions. "Limited access," she said, "is not a well-defined measure: It could relate to distance, to price, and/or to time cost." "Affordable and nutritious food" is more of a continuum of foods. For example, fresh fruits and vegetables might be ideal, but frozen and canned fruits and vegetables, as well as prepared meals and food away from home, also provide nutrition and, in many situations, more practically. She also stressed that the focus of the study is on low-income *areas*, not individuals with low income who may or may not live in a food desert.

Planning committee chair Barry Popkin, of the University of North Carolina at Chapel Hill, stressed that the food people purchase in stores is but one aspect of their total food environment, a point reiterated by many presenters throughout the workshop. As noted in Figure 1-1, we eat

BOX 1-2
What Is a Food Desert?

In the 2008 Farm Bill, Section 7527 defines a food desert as "an area in the United States with limited access to affordable and nutritious food, particularly such an area composed of predominantly lower-income neighborhoods and communities."

In developing the framework and selected topics for this workshop, the planning committee believed it was important to specify geography and quality as factors describing a food desert and defined it more accurately as the following:

Food desert: a geographic area, particularly lower-income neighborhoods and communities, where access to affordable, quality, and nutritious foods is limited.

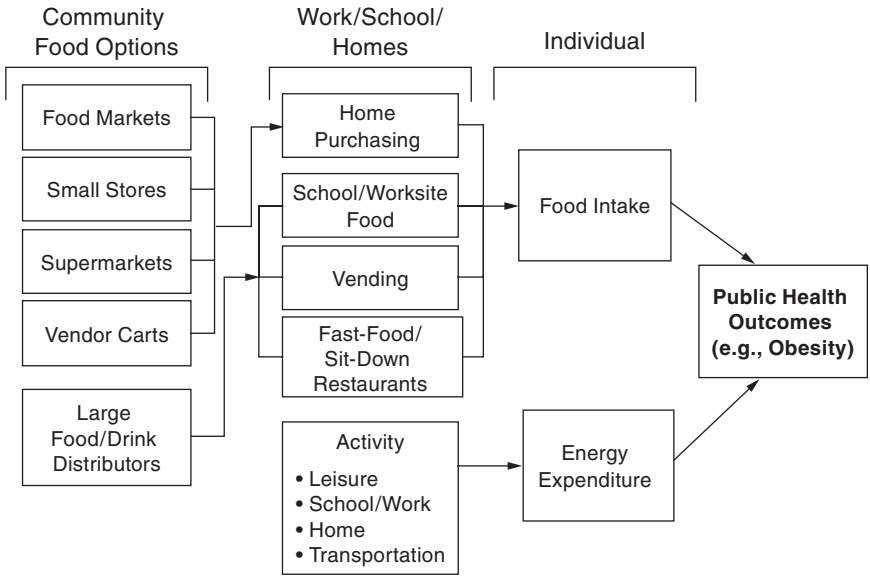

FIGURE 1-1 Causal web: role of the food environment on diet-related problems. SOURCE: B. Popkin, 2009.

in restaurants, at school, and at work. We purchase food and beverages at fast-food restaurants and from vending machines, in school cafeterias and in sit-down restaurants. Food retailers are an important piece of the puzzle, but they only contribute to one factor affecting choice in the American diet. While it was important to note the multiple aspects of the food environment to explain the how complex the issues are, Popkin reiterated that it was outside the workshop scope to address the increased access to unhealthy food options beyond the community food options setting. There is much potential for improving the situation of food deserts—providing oases of healthy food in areas without it, to extend the analogy—however, Popkin and other presenters warned against oversimplified definitions and solutions from the start of the workshop.

ORGANIZATION OF THE WORKSHOP SUMMARY

The workshop consisted of sessions discussing how food deserts can be measured (Chapter 2), the challenges and different approaches to identifying effects of the food environment on health (Chapter 3), the potential health consequences of changes in diet (Chapter 4), lessons from current intervention research to mitigate food deserts, and policy and program options that, although promising, have to date been less rigorously evaluated (Chapter 5). Many of the researchers' work cut across several themes, and the chapters are organized around presentations rather than strictly around themes. After each set of presentations within those sessions, speakers participated in moderated panel discussions with questions from the audience. In the final session of the workshop, various discussion threads mentioned by speakers and participants about additional research needed on the topic of food deserts were tied together by rapporteurs who summarized the current research gaps and future research activities necessary to fully characterize and understand the extent of food deserts and methods to address those issues (Chapter 6). This publication summarizes the presentations and discussions of the workshop.

2

Determining the Extent of Food Deserts

The food environment is a dynamic one and can change rapidly due to many factors, such as prices and preferences. To understand why food deserts are a problem and what they impact, the first session of the workshop featured presentations on the multiple dimensions used to define the food environment and the various cross-cutting ways to measure impact on both the macro and the micro levels. Lisa Powell provided a national overview and discussed price and outlet availability as aspects of access to healthy food. Mari Gallagher focused on the urban environments in Chicago and Detroit, while Joseph Sharkey pointed out the changing food retail environment in rural Brazos Valley, Texas. Lastly, Ephraim Leibtag discussed the dynamics of the food shopping environment and how it affects access to affordable and healthy foods.

NATIONAL OVERVIEW OF FOOD DESERTS BY DEMOGRAPHICS AND SOCIOECONOMIC STATUS

Lisa M. Powell, of the University of Illinois at Chicago, presented national data categorized by U.S. zip codes to provide a bird's eye view of areas that do not have access to a supermarket or a grocery store. In doing so, she acknowledged that there is a trade-off between using data available on a national level versus the greater detail available from onsite data collection across smaller geographic areas.

Access to healthy foods means that the food is available and affordable. Powell defined availability as the number of food-related outlets

within a measured geographic area assessed on a per capita and/or a per land area basis, with healthy foods associated with grocery store and supermarket availability and less-healthy foods associated with convenience store and fast-food restaurant availability. Availability gets at the time costs associated with food shopping (e.g., a convenience store that is a five-minute walk away versus a supermarket that is a half-hour bus ride away), whereas affordability is the monetary cost or purchase price of various items. Based on their available price data, the affordability of healthy foods is represented by the prices of fruits and vegetables and of less-healthy foods by the prices of fast food and soft drinks. Taken together, Powell mentioned that availability and affordability determine the total cost of food, or its accessibility.

To provide an overview of accessibility, Powell and her team use data from the American Chamber of Commerce Researchers Association (ACCRA) for food prices and from Dun and Bradstreet (D&B) for outlet density. Drawing on D&B data, supermarkets and grocery stores are distinguished from convenience stores by the assumption that access to a convenience store alone does not provide access to quality food. Supermarkets are substantially larger food stores than grocery stores and are more likely to have onsite food preparation such as a butcher, a baker, and a deli. Chain stores are studied because they often benefit from economies of scale in terms of purchasing power, distribution, and other factors that contribute to lower prices. A validation study is under way to ensure that the outlet data available from D&B and infoUSA, another proprietary business database, do not contain biases across neighborhoods of different socioeconomic status and racial or ethnic characteristics.

Availability

Using D&B data, 29 percent of zip codes nationwide do not have a grocery store or supermarket, and 74 percent do not have a chain supermarket. Powell stressed that using zip codes alone is misleading, given that some zip codes contain no or very few people, and therefore she narrowed in on more densely populated urban areas. Of these urban areas, 7 percent have no grocery store or supermarket and 53 percent do not have a chain supermarket.

When her team looked at food availability by linking D&B data in 28,050 zip codes with U.S. Census data on race, ethnicity, income, population, and degree of urbanization for the year 2000 (Powell et al., 2007), based on multivariate models, quite significant differences emerged:

- African-American populations had half as much access to chain supermarkets as Caucasians, controlling for other factors;

- Hispanic populations had one-third the access to chain supermarkets as non-Hispanics, controlling for other factors;
- Lower-income neighborhoods overall had less access to chain stores than middle- and upper-income neighborhoods; and
- Independent, non-chain stores were more prevalent in predominantly African-American and Hispanic communities than in predominantly Caucasian communities.

As observed throughout the workshop, longitudinal data on various aspects of research on food deserts are scarce. However, Powell has done some national-level comparisons of changes in food availability in 1997 versus 2008. Looking at predominantly African-American (defined as 70 percent and higher), predominantly Caucasian (70 percent and higher), and mixed neighborhoods, the predominantly African-American neighborhoods had the smallest increase in overall availability and the largest decrease in number of grocery stores since 1997. When looked at by income, lower-income neighborhoods had the smallest growth in overall access to food stores and the largest decrease in number of grocery stores (Figure 2-1).

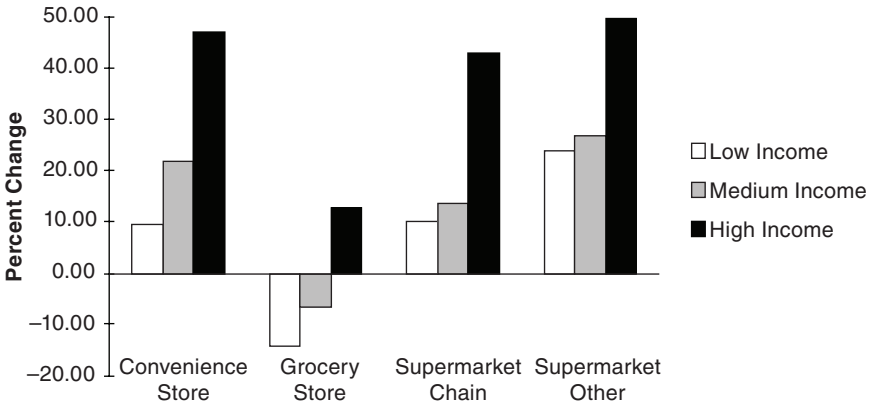

FIGURE 2-1 Change in food store availability by income, 1997-2008.
SOURCE: Lisa M. Powell, ImpacTeen Project, University of Illinois at Chicago. Data drawn from Dun & Bradstreet, 1997 and 2008.

Affordability

Real (inflation-adjusted) prices for fruits and vegetables, dairy, and meat were generally flat from 1990 through 2007, based on ACCRA data. Yet, over the same period, real prices for soft drinks and fast foods—as noted earlier, the proxies for less-healthy foods—declined significantly (soft drinks by one-third, fast food by 12 percent), making them seem increasingly less expensive relative to healthier alternatives. Powell noted that people operate in terms of relative prices, so it has become relatively cheaper over time to purchase energy-dense foods such as fast food items like burgers and fries.

Powell and Bao (in press) recently linked price and outlet density data with longitudinal data from 1998 through 2002 on the children of mothers from the 1979 National Longitudinal Survey of Youth. They found that food pricing is likely to have modest but measurable effects on weight outcomes of children ages 6 to 17 and that greater access to supermarkets, when defined on a per land area basis, is associated with a reduction in weight. Price elasticities were stronger for children in families of lower socioeconomic status: for example, among children in the bottom quintile of the income distribution, a 10 percent reduction in the prices of fruits and vegetables was associated with a 1.4 percent reduction in body mass index and a 10 percent increase in fast food prices was associated with a 2.6 percent reduction. This evidence, she concluded, suggests a multi-pronged approach of changing relative prices by both subsidizing fruits and vegetables and taxing fast food to improve weight outcomes among children and adolescents.

MEASURING FOOD DESERTS: FOCUSING ON URBAN AREAS

Mari Gallagher, of Mari Gallagher Research & Consulting Group, helped create the nonprofit National Center for Public Research. Through that group, she and others focus their research efforts on food deserts, and she presented findings from work in Chicago and Detroit. Gallagher pointed out that there are untrue stereotypes about food deserts—that food deserts only affect inner-city, African-American, or poor people—and these false notions may discourage investment by retailers.

Gallagher differentiated between two different types of food venues: mainstream and fringe. Mainstream food venues are grocery stores or supermarkets, both small and large, where healthy foods can be purchased. On the other hand, Gallagher mentioned that fringe food venues—including fast-food restaurants, gas stations, and convenience and liquor stores—do not have healthy food options available on a regular basis. A community will usually have both types of food venues. The key, however, is a term Gallagher calls *food balance*, so that consumers can easily

choose between a mainstream or a fringe food store. A food balance score is a ratio of the distance to the closest grocer versus distance to the closest fringe food establishment. When fringe food venues are handy but mainstream stores are not, a community is out of balance.

Food Balance Effect

Gallagher and her associates derive a food balance score for a neighborhood, then pair a food balance score with health-outcome data. To determine food balance, they conduct block-level analyses to find the location of the closest grocer and fast-food (since modified to fringe food) establishment, which they then pair with tract-level data on diet-related deaths. A food balance score reflects the fact that there is no perfect distance to a grocery store, given the different characteristics of different markets such as transportation options and geography. Rather, a food balance score gets around these characteristics to provide a relative measurement.

Using these methods in Chicago, three key food deserts became evident, comprising about 500,000 people and the city's highest concentration of single mothers and children. These areas were the most "out of balance," using the definition above, with fringe food far closer than mainstream venues, especially for majority African-American areas (see Figure 2-2).

Residents of food deserts face nutritional challenges evident in diet-related community health outcomes. Gallagher stated that her unpublished research shows communities with out-of-balance food environments having statistically significant higher rates of residents' dying prematurely from diabetes, when income, education, and race are controlled for. Gallagher found that African-American communities are most likely to experience the greatest total years of life lost from diabetes as a result. Furthermore, through an analysis of body mass index (BMI) based on drivers' license data in Chicago, the areas with the highest BMI are roughly the same areas indicated as food deserts. Gallagher's unpublished regression analysis shows that opening in a grocery store has a better impact on reducing obesity than closing a fast-food restaurant.

In Detroit, the team studied 50,000 blocks and found that very few had mainstream grocery stores. They more likely had various types of convenience or fringe stores, particularly liquor or party stores that sell a few food items along with cigarettes, alcohol, and soft drinks. In some cases, some of the fringe outlets were classified as grocery stores in USDA data, which the team recoded after visiting the establishments. After this recoding of 1,300 retailers that accept USDA Food Stamps in the Detroit neighborhoods studied, 92 percent were fringe retailers, including liquor

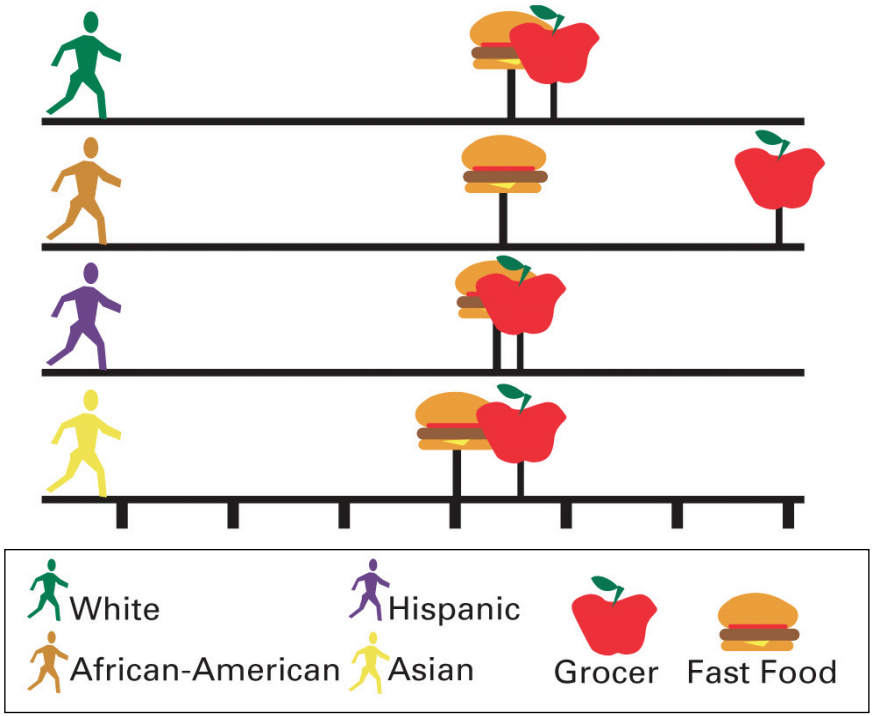

FIGURE 2-2 Relative distance to grocers and fast food in Chicago.
SOURCE: M. Gallagher, 2009.

stores, party stores, gas stations, and buy-and-fry shops, and only 8 percent, or fewer than 100, were grocery stores of any size.

The Role of Convenience

Gallagher asserted that people generally buy food at the places closest to them, even if the stores do not have the foods they may prefer or need. Thus, concentrating on the price, quality, and range of healthy food choices in existing locations is important. In her opinion, a store that "crosses" from a mainstream to a fringe store, or vice versa, has a big impact on a community, since nearby shoppers may rely on it for their primary food source. Similarly, the addition or removal of a new store is significant, especially a mainstream grocery store. For example, after the Chicago study was completed, a Food 4 Less opened in the community of Englewood, one of the food deserts identified. Returning to the block-by-

block analysis, the addition of the new store improved the food balance effect for more than 40,000 people, including almost 14,000 children.

Gallagher said her data raised interest among Chicago officials and supermarket executives. The data showed where in the city the impact of a new store would be greatest and, thus, helped the city prioritize six sites for grocer recruitment and incentives. The grocery representatives she has spoken with were intrigued by the possibilities of locating in underserved areas. However, they were also worried about the spotlight on food deserts because they were concerned about being swayed by political concerns for the poor. Data on food deserts could ease some of those concerns and be helpful for decision making and useful in developing policy to alleviate food access disparities.

MEASURING FOOD DESERTS: FOCUSING ON RURAL AREAS

Joseph R. Sharkey, of Texas A&M University, suggested that while each rural area is different, a study of food access in the six rural counties of Texas's Brazos Valley can be helpful to understand food deserts in rural America. The sparser population and lack of public transportation mean that low income and lack of a vehicle—or in the case of some seniors, the inability to drive their vehicles—complicate access to a store with healthy foods.

Rural Shopping Options

Borrowing from healthcare access literature (Khan and Bhardwaj, 1994; Guagliardo, 2004), Sharkey said potential consumers make decisions about where and what food to buy based on many factors. He introduced a conceptual model of food access that considers the food environment (including stores' location, price, quality, and availability) combined with consumer variables (including their own food preferences, income, transportation options, and other factors) that together determine the barriers or facilitators to healthful eating. In many rural areas, including the six Texas counties, the food environment is rapidly changing. In addition to more traditional supermarkets and grocery stores, supercenters (such as Super Wal-Mart and Super Kmart) are expanding into rural areas. These supercenters are very large stores that engage in retailing a general line of groceries in combination with general lines of merchandise. Convenience stores, or food marts, are including more food items in their product selection. Nontraditional food stores, such as mass merchandisers (including Wal-Mart, Target, and Kmart), dollar stores, and chain pharmacies are entering the food business. In Brazos Valley and other rural counties,

these places are often in central locations, such as along a highway, to reach the maximum number of shoppers.

The counties studied by Sharkey and his team span 4,500 square miles and 101 census block groups. There are five small urban clusters and no public transportation. To observe the location of food stores and the availability of fresh or processed fruits and vegetables, they drove all the major roads and conducted in-store surveys of food items available in all traditional, convenience, and nontraditional food stores. Residents' mean distance to a supermarket is 9.9 miles, with grocery, convenience, and nontraditional stores somewhat closer. Most neighborhoods do not have any type of food store within a mile, but for those that do, the store is most likely a convenience store.

Rural Access to Fruits and Vegetables: Fresh and Processed

Different types of stores offer a range of fresh and processed (canned or frozen) fruits and vegetables. Supermarkets, supercenters, and grocery stores offer fresh produce, while convenience and nontraditional food stores, with few exceptions, offer only canned fruits and vegetables. To access fresh fruits and vegetables, about one-third of the population must travel 10 miles or more, although that percentage is halved if processed food is included (see Figures 2-3 and 2-4).

The residents who live in urban clusters—about 25 percent of the total population in five clusters of between 3,500 and 11,950 people—are among the most socioeconomically deprived households in the Brazos Valley. Even in these five towns, there is limited access by walking and there is no public transportation. Thus, these residents have difficulty accessing healthy food.

Sharkey summed up what his research in the Brazos Valley shows about food deserts in rural areas: Access is particularly problematic for rural residents without vehicles or sufficient financial resources. Most rural neighborhoods are not near supermarkets or even smaller stores that stock fruits and vegetables. As elsewhere, store formats are changing, with superstores, convenience stores, dollar stores, and even pharmacies getting into the food business. The older population, with more limited mobility, is increasing. Sharkey said that these factors from his model of food access suggest focusing efforts on stores that people currently use, the frequency with which they shop, and the types of products they purchase.

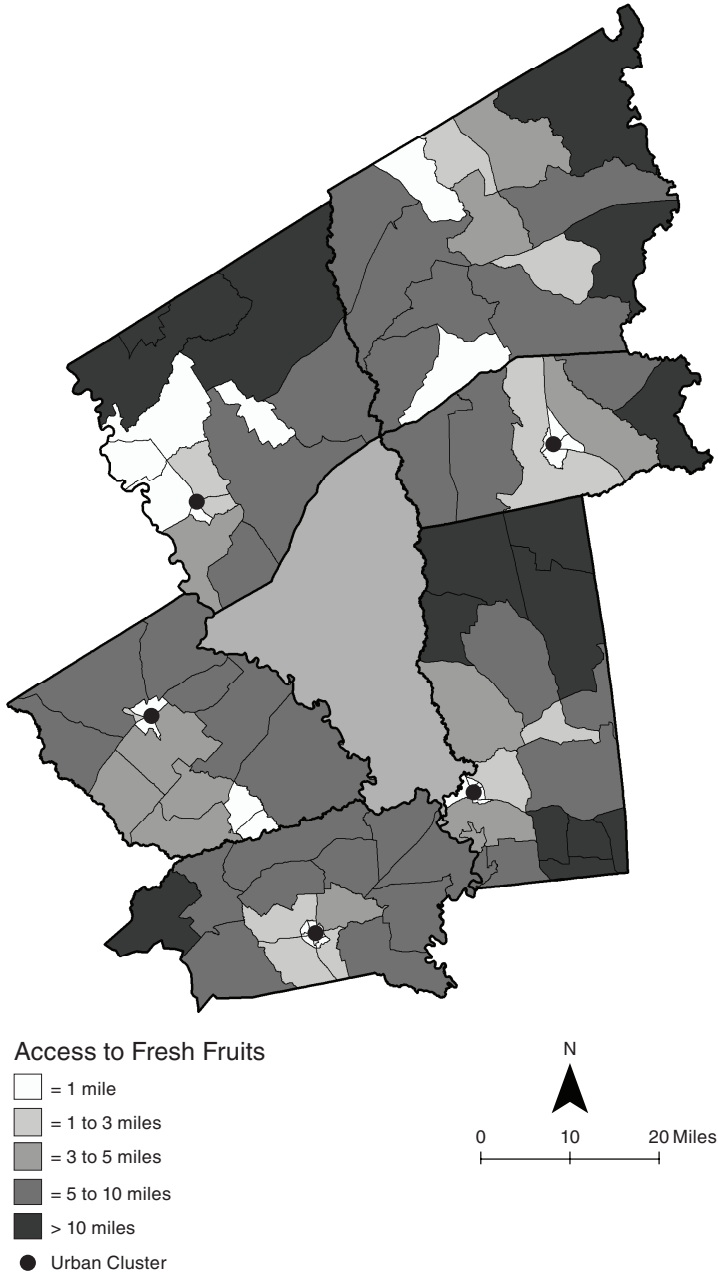

FIGURE 2-3 Access to fresh fruits by distance to nearest vendor.
SOURCE: Sharkey, 2009.

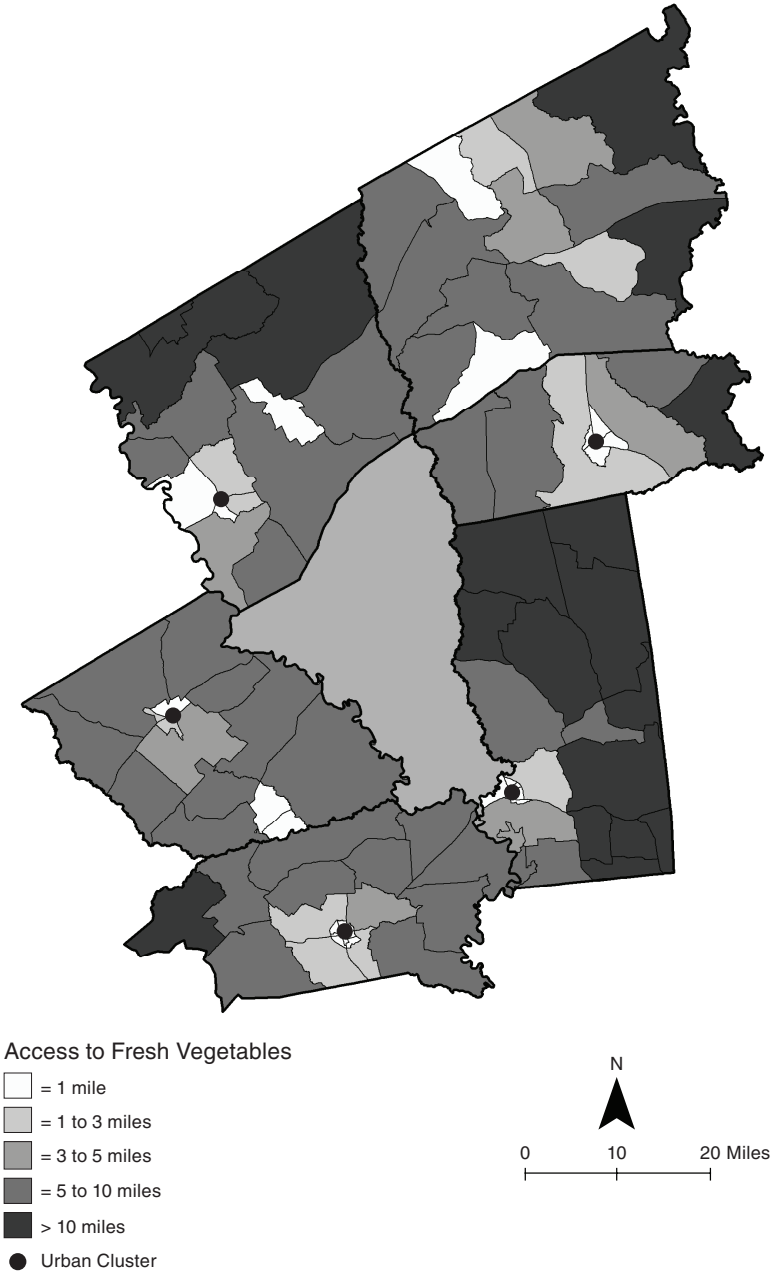

FIGURE 2-4 Access to fresh vegetables by distance to nearest vendor.
SOURCE: Sharkey, 2009.

DYNAMICS OF THE FOOD SHOPPING ENVIRONMENT

To provide a national perspective, Ephraim Leibtag, of the U.S. Department of Agriculture's Economic Research Service, summarized government and proprietary data to discuss current trends in the retail food environment. The government data include producer and consumer price information from the Bureau of Labor Statistics and geocoding of store locations from the Census of Retail Trade. Consumer-based data include the Consumer Expenditure Survey, American Time Use Survey, and National Health and Nutrition Examination Survey. Nielsen's Scantrack and Information Resources, Inc.'s Infoscan databases track store sales for major grocery store chains, while consumer shopping and eating information can be analyzed using the NPD Group's National Eating Trends and Consumer Reports on Eating Share Trends data along with Nielsen's Homescan data. Neighborhood and local economies were not discussed in this presentation on the national overview.

Price Stability and Volatility

After a relatively stable period of 20 years, when prices were flat or even falling in real terms, commodity prices spiked in 2008, with most basic food crops and energy costs at record highs. However, with the recession, prices fell in late 2008-early 2009. One legacy of price stability was the advantage of mass production, in which suppliers centralized operations to set up large distribution chains.

Three of the main factors that determine retail food prices are the costs of goods sold and operating costs, the dynamics of competition in the market, and consumer demand. Almost 40 percent of every dollar that a consumer spends on food goes for labor, with less than 20 percent going to the agricultural sector and the rest for expenses that range from advertising to rent to energy (see Figure 2-5).

Until the late 1980s, the Consumer Price Index for food and the Producer Price Index for finished consumer foods tracked closely, and traditional food retailers were by far the dominant players in the marketplace. Comparing these indices in the past two decades explains why the retail environment has become more crowded. As the indices diverged, with consumer prices rising faster than producer prices, new types of retailers saw a business opportunity—and joined traditional grocery stores and supermarkets in selling food to consumers.

The Rise of Nontraditional Retailers

As recently as 1998, grocery stores and supermarkets accounted for 80 percent of the consumer food dollar. Nontraditional stores now get 40

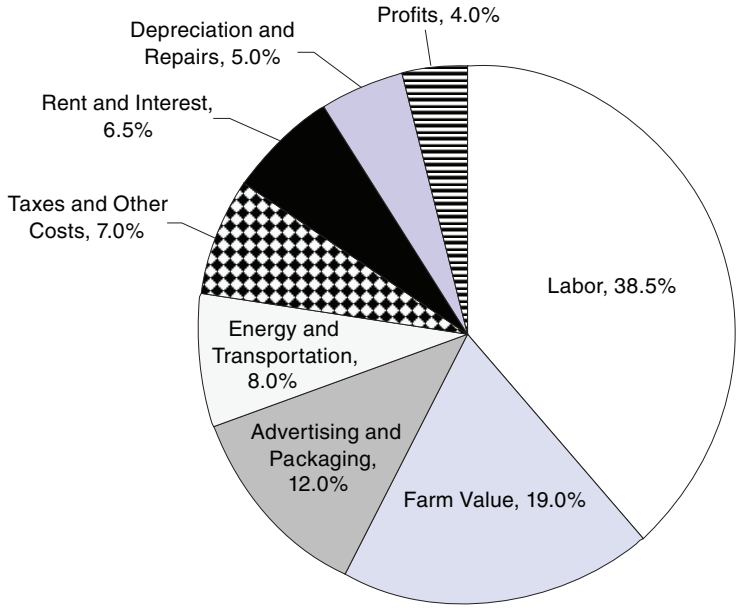

FIGURE 2-5 Breakdown of a consumer dollar spent on food.
SOURCE: Leibtag, 2009.

percent of Americans' food dollars, and the percentage has been increasing. For example, in 2003, about 1,000 Wal-Mart Supercenters operated around the country; by 2008, that number had more than doubled to 2,400. Traditional stores are squeezed in the middle and are trying to determine their niche. Wal-Mart and warehouse stores offer lower prices and large quantities. Dollar and other discount stores offer a more limited item assortment, have lower expenses than some supermarkets, and oftentimes focus on selling to low-income households. Meanwhile, gourmet and organic stores target more upscale consumers.

The traditional retailers must figure out their niche and determine optimum size in terms of scale and efficiency. As Leibtag observed, a "plain old grocery store does not really cut it anymore." Retailers are looking to distinguish themselves in terms of price, special items such as organic produce or fresh meats, or other characteristics. Some are building smaller stores that are more amenable to urban locations.

Overall consumer food prices rose 5.5 percent in 2008, which was the largest increase since 1990. Although prices have declined from their record highs, the situation remains uncertain, increasing the difficulty of making predictions about the retailing environment. Yet it seems evident

that the more competitive diversity of stores selling food and the wider range of consumer food options are not going to change any time soon.

DISCUSSION: MEASURING FOOD DESERTS

Heidi Blanck, of the Centers for Disease Control and Prevention, moderated the discussion period after the speakers' presentations. The questions were submitted by workshop participants invited from the general public. Many questions centered on data collection and the most effective ways to interpret and use the available data.

Prices and Child BMI

Several questions centered on the effects of fruit and vegetable prices on children's weight. Powell explained how her research linked price and outlet density data by geocodes with individual-level data to examine relationships between these economic contextual factors and food consumption behavior and weight outcomes. Higher prices for fruits and vegetables are expected to decrease consumption of these foods and increase weight. She cautioned against assuming that the presence of a supermarket that sells healthier food will always lead to better diets, especially without taking account of prices. Whereas cross-sectional models rely on comparisons across different people, a longitudinal framework examines the same individuals over time, which helps to disentangle causal relationships.

Sharkey noted that the variety of items stocked in stores poses a challenge to research into the effect of price on consumption. Meaningful comparisons are difficult when stores carry different items, although agricultural economists at his institution are attempting to devise common measures. He also suggested that the access point for food shopping, in many cases, is not where people live, but where they work or engage in other daily activities.

Gallagher shared findings from two focus groups of participants who live far from mainstream grocers, with one group slightly better off economically. She said both groups were distance-sensitive, but much more price-sensitive. They desired different fruits and vegetables, but, she said, "they were pretty much price shopping all the time."

Role of Qualitative Research

Most panelists agreed that more qualitative research is needed, in which people living in food deserts describe their access and how it might impact their food choices. For example, Gallagher said even the

BOX 2-1
Listening and Learning

In addition to understanding how socioeconomic and demographic determinants impact food deserts, it is important that qualitative research also consider other contextual factors that influence people and their food choices. For example, a low-income mother was concerned about her teenage son's unscheduled time after school and contracted with him to come home after school to care for a younger sibling. He agreed if his friends could also come over. His mother soon found that an unexpected consequence was that she had to provide snacks to a group of hungry teenage boys. The economic imperative favored providing them with energy-dense snacks. In this case, a mother with limited resources needed to address child-care needs while balancing the household food budget. The bottom line is that it is imperative to link quantitative data with the context of people's lives because socioeconomic factors are interconnected with other variables that may be overlooked.

quickly organized focus groups mentioned above highlighted that the respondents would not welcome a grocery delivery service, because of bad experiences with spoiled or rotten food purchased from local stores, whereas an outsider might have considered such a service a viable option. Powell said her team used focus groups to conduct qualitative research with adolescents in terms of when and what they ate during the day. Sharkey incorporates quantitative and qualitative methods, such as observing participants within their own homes. It is imperative, he said, especially when policy decisions are in the mix, to link quantitative data with an understanding of the context in which people live (Box 2-1).

Agglomeration of Stores

A topic touched on in this panel, and returned to throughout the workshop, is what Gallagher termed the agglomeration of stores: "Grocers do not go where grocers do not go already," with the converse being true as well. One concern often expressed is that a supercenter will drive out other stores. In contrast, Gallagher's research in urban areas has shown that businesses thrive when they are located near each other, and in fact, other retailers do well in locations near supercenters. The highest level of retail helps shape the environment of the commercial district, which is why a proliferation of fringe stores will discourage a more mainstream store from entering a market.

Consumer Shopping Patterns

A member of the audience noted that the presence of a supermarket provides access to healthier options, but it also increases access to lower-cost, energy-dense or "junk" foods. Gallagher said the Food 4 Less that opened in Chicago has found it difficult to sell some healthier foods, such as low-fat versus whole milk. Powell reminded the group that the mere presence of a store may not change consumption patterns and related weight outcomes if unhealthy energy-dense foods are substantially cheaper than healthy less-energy-dense foods. Observing what is inside customers' shopping carts confirms that they often buy less-healthy foods, both because of price and because they have tastes that have developed for many years. Supply and demand must match up: the food must be on the shelf, but people have to buy it. Blanck added that product placement within stores can also help influence decisions.

In reply to a question about whether different racial or ethnic subgroups have different kinds of stores they prefer, Leibtag said the work he has seen on this topic does not show a large difference—people usually shop close to where they live—although there are differences in shopping behavior by demographic group. Unless a tax or subsidy were extreme, he does not think it would alter food choice by much, because of taste preferences. Gallagher suggested there might be an opportunity to tighten the rules of inclusion for Supplemental Nutrition Assistance Program (SNAP; formerly known as the federal Food Stamp Program) retailers so that participating outlets will have to offer healthier foods. However, she warned about some pushback, as residents expressed concern that fringe food retailers would shut down or stop accepting SNAP vouchers if rules were too stringent.

Using Data in Policy Making

Gallagher mentioned that many organizations around the country, such as the Chicago Food Policy Advisory Council, have done excellent work providing data for policy formation. Regular tracking helps direct limited resources. As she noted, "We need to keep the data honest, keep it live, and make sure that we are looking at the full picture of what is going on and not just certain neighborhoods." In terms of presenting data, maps have been most useful in informing policy makers and the public about the scope of the situation.

Population and Economic Changes

Referring to Powell's presentation about store growth over the last decade, a participant asked whether population decline in low-income or

underserved neighborhoods might be the reason behind the less vigorous growth of stores. Powell had used 2000 census data and will update the information when new census figures are available. However, she said she did not think this was a significant factor except perhaps for cases on the margin.

As the recession deepens, local employment will be affected and customers may purchase more energy-dense, relatively cheaper foods. Some stores, including food outlets, will go out of business or curtail services. In that regard, said Gallagher, two food stores in close proximity to each other can keep the market competitive and this would benefit consumers. In contrast, a store without competition, faced with dwindling profit margins, may not maintain cleanliness and service, thus exacerbating its problems.

3

Studying Food Deserts Through Different Lenses

The food environment is complex, as are people's decisions about where to live and shop, and what to buy and eat. As discussed in Chapter 2, the availability of healthy foods affects food choice, but supply alone does not guarantee that healthier foods will be purchased, especially by price-conscious shoppers. Presenters in the next session looked at food deserts with some complementary methodological approaches—epidemiology, geography, and economics and urban planning—and discussed what they can and cannot tell us about the link between food access and health.

EPIDEMIOLOGICAL APPROACH

As researchers investigate ways to improve people's health, they have turned to the local food environment. Ana Diez Roux, of the University of Michigan, described aspects of the food environment as "features of the local physical environment that facilitate the consumption of certain types of foods and detract from the consumption of others." She suggested several health-related reasons for this approach:

- Focusing exclusively on individuals, without taking account of their surrounding environment, has led to disappointing results;
- Neighborhoods serve as the context for physical and social exposures that may be related to health;
- Neighborhoods may have causal effects and/or constraints on prevention efforts; and

- Neighborhood differences, including race, ethnicity, and socioeconomic factors, may contribute to health inequalities and have public health and policy relevance.

Space as a Health Determinant

Space—as defined by place, neighborhood, or environment—is a key dimension across which health is patterned. For example, there is a fivefold difference in diabetes prevalence rates across New York City neighborhoods, according to calculations by the New York City Department of Health & Mental Hygiene, the U.S. Centers for Disease Control and Prevention, and the World Health Organization. These differences could occur because residents are segregated by factors that research has shown are health-related (such as income, race, or ethnic group), but the features of the places themselves may contribute to the problem. However, Diez Roux emphasized that environmental constraints and reinforcements, such as local food availability and affordability, are just some of many factors that affect health.

As discussed by the previous panel, researchers have used many different databases and instruments to understand local food environments. Two important points emerged: (1) the local food environment is patterned by areas of socioeconomic, race, and ethnic composition; and (2) features of the local food environment have been cross-sectionally associated with the diet of residents and with related health outcomes. In an ancillary study of the Multiethnic Study of Atherosclerosis (MESA), in which Diez Roux was the principal investigator, supermarkets were less common in low-income areas, and liquor stores and small grocery stores were more common (Moore and Diez Roux, 2006). The smaller stores did not stock many healthy foods. Moreover, even supermarket offerings can vary by location. A comparison of two supermarkets—one in predominantly African-American Baltimore City and one in predominantly Caucasian Baltimore County—showed that the inner-city store offered far fewer healthy options (see Table 3-1).

A Gap: Longitudinal Studies and Better Understanding of Causality

How do these differences in food availability relate to health outcomes? Studies show that respondents living in neighborhoods with the lowest availability of healthy food, as indicated by surveys of residents or lower density of supermarkets, were 32 to 55 percent less likely to have a good-quality diet than those with greater availability (Moore et al., 2008). In addition, measures of the availability of healthy food in stores are also related to the diet of residents (Franco et al., 2009). Diez Roux stressed that

TABLE 3-1 Healthy Food Availability Index, Comparing Two Supermarkets

Location:	**Baltimore City**		**Baltimore County**	
Racial composition:	97% African American		93% Caucasian	
Median household income:	$20,833		$57,391	
Foods	**Availability**	**Points**	**Availability**	**Points**
Skim milk	Yes	2	Yes	3
Fruits	17	2	59	4
Vegetables	38	3	74	4
Lean meat	No	2	Yes	3
Frozen foods	No	0	Yes	3
Low-sodium foods	No	0	Yes	2
100% whole wheat bread	Yes	2	Yes	4
Low-sugar cereals	Yes	2	Yes	2
Modified NEMS-S (0-27)		18		25

NOTE: NEMS-S = Nutrition Environment Measures Survey in stores.
SOURCE: Franco et al., 2008.

research has focused mostly on cross-sectional data, comparing different people living in different neighborhoods. A great need is longitudinal evidence relating changes in healthy food availability to changes in diet over time.

A few longitudinal studies have taken place, even though causality is not yet clear. For example, using MESA data, people who live in neighborhoods with higher healthy food availability scores had a 45 percent reduced incidence of diabetes over a five-year period (Auchincloss et al., unpublished). Another study (Sturm and Datar, 2005, 2008) confirmed that higher prices of fruits and vegetables were linked to greater increases in children's weight over time. In the Moving to Opportunity study of families who had moved from poor to non-poor neighborhoods (Kling et al., 2007), BMI was significantly reduced, although the reasons for this are not understood. Also, as discussed further in this chapter and in Chapter 5, "natural experiments" occurred in Glasgow and Leeds in the United Kingdom, where supermarkets opened in public housing areas and the areas could be studied before and after.

Challenges to understanding the causal links remain, including determining which aspects of the local food environment (e.g., availability, price, convenience) are most relevant to health, how to measure and what to use as a proxy, the scale at which changes to the local food environment are most effective, and reasonable time lags and critical periods in which to expect any effects to occur. In addition, dynamic processes are

involved because just as healthy food availability may impact dietary patterns, the diets of residents may impact the kinds of foods that are available. The complex and dynamic nature of these processes means that multiple kinds of evidence will be needed to identify the best strategies for intervention, said Diez Roux. These might include improved observational studies and qualitative research, evaluation of natural experiments, and dynamic simulation approaches. Ultimately, it may be necessary to act based on the best available evidence and then rigorously evaluate the impact of these actions so that they can be improved or modified.

Diez Roux concluded by stressing why it is worth focusing on locations. Place-based and individual inequalities are mutually reinforcing, and neighborhood differences that result from specific polices are amenable to intervention. Ultimately, the goal is not just to understand causation, but to facilitate change for health and non-health benefits. The new paradigm is an interdisciplinary one and integrates transportation, urban planning, food access, and community development policies as part of dealing with people's health.

GEOSPATIAL APPROACH

Steven Cummins, of Queen Mary, University of London, brought a geographic perspective to the food desert discussion, given that space, place, and distance are features that may affect the food environment and thus become determinants of diet and health. Research into food access began in the 1960s, stemming from concern about social disparities in access to basic services, rather than from the perspective of health. In the 1990s, he said, residents in a deprived urban housing scheme in west Scotland coined the term "food desert" to describe the lack of access to a healthy, reasonably priced food supply. During this period, food stores were leaving urban centers for outlying areas, resulting in fewer, larger stores concentrated in edge-of-town sites (see Figure 3-1). A recent systematic review of 48 studies from 1966 through 2007 (Beaulac et al., in press) shows equivocal findings about the existence of food deserts in many European countries—but clear evidence of disparities in food access in the United States by income and race.

Natural Experiments

The underlying conceptual model behind why food deserts affect health is that of "deprivation amplification": Residents of low-income neighborhoods are exposed to poor-quality local food environments that amplify their individual risk factors for poor health (Macintyre, 2007). Exposure to these environments may contribute to the development of

FIGURE 3-1 Comparison of two urban food environments: Springburn and Shettleston, Glasgow, 1 mile apart.
SOURCE: S. Cummins, 2009.

socioeconomic and spatial inequalities in diet-related diseases, such as obesity, diabetes, and heart disease.

The opening of two large supermarkets in Glasgow and Leeds, both in deprived areas in the United Kingdom, provided the opportunity to study the effect of increasing access to food retail opportunities as a solution (the Leeds study was discussed by Neil Wrigley during the second day of the workshop and is summarized in Chapter 5). In Glasgow, a large Tesco supermarket was opened in an area of multiple deprivation with high concentrations of public housing and very few food options.

Cummins reported that the Glasgow Superstore Study (Cummins et al., 2005) did not show that the new store resulted in positive impacts on healthy food consumption. Although disappointed with the findings of a study that had obvious intuitive policy appeal, he has since sought to understand why these negative results occurred. Follow-up qualitative work revealed community behaviors that had not been revealed through surveys. For example, some residents purposefully chose not to shop at the new store out of concern that they would be tempted to spend too much. Additionally, what constitutes "local" was clearly different for different people, whose spatial behaviors are affected by their daily routines. For instance, some people had always preferred to shop in other neighborhoods, perhaps where they had grown up, previously lived, or worked, and thus continued to do so.

Understanding what drives spatial behavior is of paramount importance in strengthening causal inference. Instead of just focusing on the supply side, Cummins stated that researchers need also to focus on demand and the geographic choices that people make that shape their

health behaviors. Learning what does not work also provides valuable lessons.

Systems approaches may further understanding of food deserts and public health. The spatial patterning of health as an outcome could be conceived as an emergent property of a complex system incorporating both demand- and supply-side behaviors. Individuals affect and are affected by the environment around them in a complex dynamic system. Spatial microsimulation tools can help model and predict the effect of system change, rather than just describing it, if they are based on a solid theoretical framework. For example, Cummins has been involved in developing a spatial microsimulation model to predict the spatial patterning of diabetes changes due to age in Leeds. The next step is to try to predict what would happen to future diabetes prevalence if plausible, policy-relevant, contextual factors were modified.

Better theories are required to inform better empirical research to elucidate causal processes and predict the public health effects of food deserts. Multiple approaches and methods, including better-quality basic theory and data, qualitative methods, natural experiments, and simulations, can help triangulate the evidence base and provide a fuller picture. Better understanding of spatial behaviors harnessed to advanced spatial methods will allow the development of possible levers for environmental interventions.

ECONOMIC APPROACH

One critique of cross-sectional studies linking food access to health outcomes is that those studies do not account for access as a factor; residents choose where they live and are not randomly assigned to neighborhoods. Yan Song, of the University of North Carolina at Chapel Hill, presented perspectives from economics and urban planning as a third way to look at the food environment. Urban economics looks at issues of selectivity in how residents choose where to live, and could help explain links of food access to consumption and health outcomes. Urban planning has established principles about the mix between retail and commercial space, which can include the food environment. Song focused on how retail food outlets affect choices of where residents locate.

Since the 1960s, economists have used hedonic price models and discrete choice models to explain residential location choice, focusing on characteristics related to housing and the surrounding community. Little research has been done on how food access may enter into people's choices, although new urbanism or smart growth, in which a mixture of land uses are located in the same neighborhood within walking distance, would include food outlets.

Hedonic Price Model

A hedonic model examines the individual value-added factors in the total price of an item, such as the convenience of a residence to stores or work locations. This approach enables a researcher to identify the marginal price of any given feature, potentially including the location or size of food establishments. Research into how people value mixed-use development shows a positive price premium for having a neighborhood café and a walkable network of stores: about $6,500 in one study in Portland, Oregon (Song and Knapp, 2003, 2004; Song and Sohn, 2007). A negative premium was attached to commercial uses not in scale with the rest of the neighborhood, including big box stores.

Discrete Choice Model

In the discrete choice model, people are presumed to make a choice from a fixed set of alternatives. They decide where to live based on their own household's characteristics and the characteristics of potential dwellings. Is the food environment one of these characteristics? At this point, Song is not aware of any published studies on food environment as a factor in residential choice.

Urban Planning and Food Environments

Song explained that planners distinguish between basic, revenue-generating land use and nonbasic, service-related land use. The current curriculum at urban planning schools favors planning small-scale food stores in mixed-use development for easy access by local households. Economies of scale, consumer preferences, and existing zoning ordinances, however, can make this goal unrealistic.

In summary, the research on food environment and residential selection activity shows evidence of a price premium associated with healthy neighborhood stores, but these premiums have been observed only in high-income neighborhoods. No study has explicitly looked at how food retailers affect residential location choice. More refined surveys and more data, including natural experiments, may provide some answers.

DISCUSSION: DIFFERENT APPROACHES

Jill Reedy, of the National Cancer Institute at the National Institutes of Health, moderated the discussion that followed this panel. Many of the questions and comments related to the complexity of causes, making it difficult to separate the impact of the food environment from other variables.

Food Access from the Workplace

The research on food deserts looks at access from where people live versus where they work. One workshop participant said opposition by institutional review boards makes it difficult to collect data from workplaces. In any event, Diez Roux cautioned against extrapolating too much from a current situation: people might buy food closer to work, for example, because there is no alternative closer to home. Some groups are combining data on a variety of aspects of the built environment, including food venues and their relationship to transportation routes, to see how they connect.

Supermarkets as One Proxy

Song was asked about the emphasis on large supermarkets from a planning perspective, given the emphasis on keeping buildings at a similar scale. She observed that spatial planning may not take household characteristics sufficiently into account. Cummins said that what planners want and what a local population wants might diverge. Often a successful local retail economy has a mix of different-sized stores. Diez Roux stressed the issue is access to healthy foods, not necessarily access to a supermarket. Environments have many features that interrelate, which implies thinking through the positive and adverse effects of a particular intervention.

Role of Simulations

Simulations are valuable, said Diez Roux, because they require thinking through processes to create a valid model and may point out knowledge gaps that may have been overlooked by other research methods. Cummins noted that simulations can utilize existing observational data in a better way, perhaps linking together unconnected data sets. Song noted that in urban planning, simulations are used to build scenarios to observe the effect, holding everything else constant, of a specific policy intervention.

Mixed Land Use

Whether mixed land use promotes positive health effects is, according to Song, a debatable topic. It seems to depend on what the mixed uses actually entail. If they are appropriate and decrease automobile use, that would be healthy. Diez Roux said the literature is difficult to summarize because the measures have been so different. Proximity of destinations promotes walking, but the long-term health impacts are less known.

Realistic Expectations

An issue that came up several times during the workshop, including in this discussion, centered on realistic expectations from introducing a new supermarket into a food desert, in terms of changes in food intake and ultimately BMI or other health outcomes. The natural experiments with which Cummins has been involved led him to realize, he said, that robust underlying theoretical models and the time frames in which we might realistically see effects are still not fully known. One successful outcome could simply be increasing the number of food stores available, but a secondary outcome would be to see changes in health behaviors and then impacts on obesity or the prevalence of diabetes. Changes in important health behaviors and outcomes may take longer to ascertain than most current funding mechanisms allow. Diez Roux suggested looking at proximal outcomes in the short term, rather than trying to detect more distal effects.

Cummins also suggested making more use of complementary activities, such as mailings to residents or incentives, and evaluating the effect of these initiatives combined with changes in supply.

One workshop participant questioned whether food desert health outcomes are really due to limited food access or perhaps more likely to limited healthcare access. Diez Roux agreed the issues are confounded because the real world is complex, and it is difficult to separate the causal effect of food access. Methodologically, researchers attempt to create boundaries through a variety of statistical controls. Cummins said spatial analytic approaches to measure access using GIS (geographic information systems) in longitudinal studies may help avoid the problem of using administrative boundaries, which may shift over time, as a proxy for neighborhoods. People have different perceptions of neighborhood boundaries. Using census tracts as a proxy, in his opinion, also has weaknesses that qualitative research reveals. Questions remain about what is the most relevant and comparable spatial environment. Diez Roux agreed that a census tract is not ideal, but may serve as a useful although imperfect proxy for the most relevant spatial context.

Community and Interdisciplinary Initiatives

Reedy summarized several questions from workshop participants related to work within communities. Partnering with community groups to conduct research is important in this kind of research, said Diez Roux, particularly in evaluating natural experiments and conducting qualitative studies.

Studies have looked at various community benefits of addressing food issues. Urban agriculture is promoted in some cities to increase local

food production, as well as to increase physical activity. Other studies have looked at the effects of using local government subsidies to encourage the opening of retail outlets that carry healthy foods: for example, if housing prices increase as a result, the tax base grows and the public investment has a positive fiscal return. Similarly, in the United Kingdom, retail leverage generation (planning gain) is considered a tool to improve the local economy through providing employment and upgrading public facilities such as sidewalks and other infrastructure. Despite concerns about the impact of a large store on smaller Glasgow retailers, the same number of small stores were in business 18 months later in the area that Cummins studied.

To close the session, Diez Roux emphasized the need for interdisciplinary research among epidemiologists, geographers, economists, and urban planners. Reedy expressed agreement on behalf of the other panelists and workshop participants.

4

Diet and Health Evidence to Support Improved Food Access

The interventions to improve food deserts center on increasing the intake of healthy foods. Those healthy foods include whole grains, fruits and vegetables, fat-free rather than whole milk, and drinking fewer calorically sweetened beverages. The excess availability of energy-dense snacks and fast foods in food deserts is a concern because both have been linked to obesity, and current interventions have attempted to increase the availability of healthy foods to mitigate those effects in food deserts; thus, presentations in this session addressed the possible public health outcomes of increasing healthy food intake. The speakers in this session focused on evidence-based health consequences of these changes in terms of obesity, cancer, and cardiovascular diseases.

EFFECTS OF SELECTED DIETARY FACTORS ON OBESITY

Richard Mattes, of Purdue University, stated that an increase in the consumption of healthy foods will not necessarily reduce body weight. In fact, only the case of reducing caloric beverage intake showed consensus on the link between change in diet and weight loss. Culture and learned associations often govern what people prefer to eat. He counseled caution in making the best choices about the interventions to pursue if the goal is reducing obesity. In short, there are no easy fixes.

Healthy Food and Changes in Weight

Fruits and Vegetables

Mattes suggested that the message in the media to "load up" on fruits and vegetables as a way to lower weight is misleading without considering overall energy intake. The Nurses Health Study, for example, which tracked almost 75,000 people over a 12-year period, showed that greater fruit and vegetable intake led to lower weight gain in women but not reduced weight for participants or for their children (He et al., 2004). Greater fruit and vegetable consumption alone will not reduce weight without the qualification to moderate energy intake.

Whole Grains

The next food category that Mattes discussed was whole versus refined grains. The line of reasoning behind encouraging consumption of whole grains is that they are higher in fiber and increase satiety, and therefore, people will eat less. Data from the Nurses Health Study indicate that greater intake of whole grain products was associated with reduced weight gain but provided little or no benefit for weight loss compared to consumption of refined grain products over the course of the 12-year study period (Liu et al., 2003). Other recent studies, both short and longer term, have shown similar results.

Milk

Drinking reduced-fat versus whole milk does not benefit weight management. Higher-income people purchase more low-fat milk and lower-income people purchase more whole milk, even when prices are the same, according to the Continuing Survey of Food Intake by Individuals (CSFII). The prevailing belief is that weight improves by switching to lower-fat dairy products. However, the Growing Up Today study (Berkey et al., 2005) and the National Health and Nutrition Examination Survey (Beydoun et al., 2008) actually show an increase in body mass index among children who drink fat-free and low-fat milk. This may reflect reverse causality in that heavier individuals choose lower-fat products to manage their weight, but it cannot be concluded that simply including lower-fat dairy products in the diet or substituting them for higher-fat products will promote weight loss.

Sweetened Beverages

Whereas eating or drinking these healthier foods does not reduce weight, evidence is stronger that drinking caloric beverages has a detrimental effect. Consumption of sweetened beverages is now about 40 gallons per capita and has clearly gone up in concert with the rise in BMI and obesity in the population (see Figure 4-1). On average, Americans now get about 21 percent of their total energy intake from beverages, almost double the amount in 1965 (Duffey and Popkin, 2007).

Beverages of all types seem to increase energy intake. In a study in which participants consumed various foods in liquefied and whole form, total energy intake was higher over the course of a day with the beverage form. The consumption of energy-yielding beverages seems to lead to a lack of dietary compensation, positive energy balance, and weight gain, although he acknowledged some controversy about whether there are sufficient data to move forward in terms of policy. Data specific to soft drink consumption from the Nurses Health Study showed that the weight

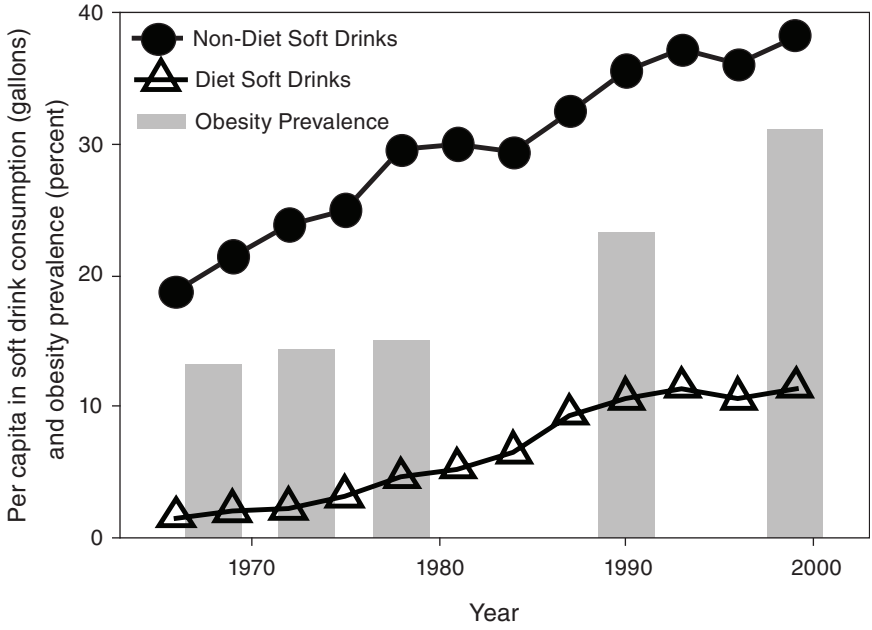

FIGURE 4-1 Soft drink consumption, 1970-2000.
SOURCE: USDA ERS, 2000. Reprinted with permission from Susan E. Swithers, Purdue University.

of individuals who drank nutritively sweetened beverages increased, while those who switched to nonnutritive "diet" drinks had a weight plateau (Schulze et al., 2004).

EFFECTS OF SELECTED DIETARY FACTORS ON CARDIOVASCULAR DISEASE AND CANCER

In contrast to obesity, research into the effects of diet on cardiovascular disease and cancer has shown a more positive link, said Frank Hu of Harvard University. Before discussing different categories of foods, he reviewed the hierarchy of evidence that nutrition researchers use in making clinical recommendations. The strength and consistency of evidence across different studies, biological plausibility, and responsive relationships are all needed to assess causal relationships between a food and a health outcome.

Fats and Carbohydrates

"Good" and "bad" fats have received much attention, with Americans encouraged to eat, for example, more healthy fats from plant-based oils and nuts rather than deep-fried food and stick margarine. The type of fat—the quality of the fats consumed, rather than total fat—has been shown to have a relationship to coronary heart disease (Hu et al., 1997) (see Figure 4-2). Fats have not generally increased breast cancer risk. There is fairly consistent evidence that higher consumption of red and processed meats is associated with increased risk of colorectal cancer, although it may not be due to the saturated fat in those products.

The study of carbohydrates has shifted from classification by their chemical structure to a focus on glycemic index and glycemic load. In this paradigm, the greater the amount of refined carbohydrates and sugar, the higher the glycemic load. He reported on research that found a strong positive association between a high glycemic load diet and the risk of coronary heart disease (CHD), especially among overweight and obese individuals who are more insulin resistant (Liu, 2000).

Plant-Based Foods

A systematic review of nuts, fruits, vegetables, and whole grains consistently showed that higher consumption of these foods is significantly associated with decreased risk of both coronary heart disease and stroke (Hu and Willett, 2002). They have not been associated with overall reduced cancer mortality, but have shown benefits for some individual types of cancers, including mouth, lung, and stomach cancers. The World

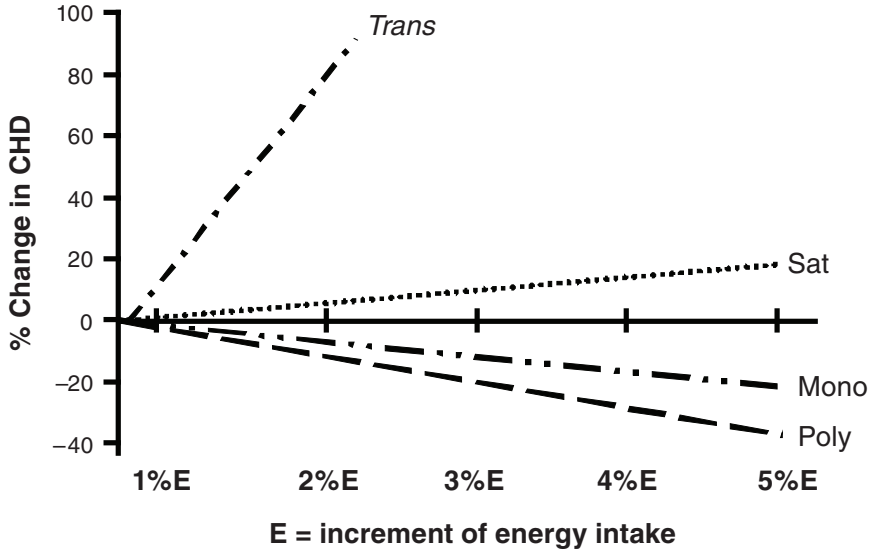

FIGURE 4-2 Effect of types of fat on coronary heart disease.
SOURCE: Hu et al., 1997.

Cancer Research Fund concluded that some non-starchy fruits and vegetables may protect against specific cancers.

Dairy Products

Hu characterized dairy as a "much more complicated story," with potential benefits and potential problems. Although they are a good source of many important nutrients, dairy products have also been associated with higher body weights among children and may increase risks of some hormone-related cancers. He distinguished between fat-free and whole milk. Replacing high-fat dairy with low-fat was associated with lower risk of CHD and Type 2 diabetes.

Soft Drinks

Hu concurred with Mattes about the problems of soft drinks. In addition to weight gain, the Nurses Health Study and other research has shown an association between soft drink consumption and the risk of diabetes and CHD. Limited evidence from that study and several others showed an association with pancreatic cancer, although those findings were not unanimous.

The Bottom Line

Hu said the evidence is "pretty solid" that plant-based foods—including whole grains, fruits and vegetables, nuts, legumes, and healthy vegetable oils—are beneficial for cardiovascular disease (CVD) prevention. These foods are basically an indication of a high-quality diet. Diets high in saturated fat, trans fat, or refined sugars, including some starchy food, are detrimental for both diabetes and CVD. Sugar-sweetened beverages increase the risk of obesity, diabetes, and perhaps CVD.

The findings are less specific about the link between diet and cancer. The recommendation of the World Cancer Research Fund focuses on body weight and physical activity because these are more important than individual foods and nutrients in terms of cancer prevention.

DISCUSSION: HEALTH CONSEQUENCES

Wendy Johnson-Askew, of the National Institute of Diabetes and Digestive and Kidney Diseases at the National Institutes of Health (NIH), moderated the discussion on health consequences of healthy foods and, particularly among the less healthy options, sweetened beverages. Understanding the science can help guide the policy-making process, by either encouraging or discouraging the intake of specific foods.

Small Changes

Johnson-Askew launched the session by suggesting to Mattes that even the slightly reduced intake caused by eating more fiber, as reported in the Nurses Health Study, may have some significance in the long term. Mattes replied that small imbalances do add up over time, but not to as great an extent as reported in the popular media. Because the initial weight gain also increases the energy needed to sustain that weight, the original small positive energy balance does not continue to increase weight gain.

Along these lines, a participant noted that since the interest in weight stems from an interest in people's health, maybe separating the two does not move the conversation further. Any action, said Mattes, has positives and negatives. So a particular dietary intervention may cause weight gain at the same time that it reduces the risk for certain chronic diseases. The role of scientists is to provide policy makers with this information so that they can make evidence-based decisions.

Healthy Eating

One workshop participant suggested focusing on the Healthy Eating Index (HEI, developed by the U.S. Department of Agriculture), rather than BMI, as a proximal indicator of access to good food. Hu agreed that the revised HEI is a good measure of overall diet quality, and it is overall quality, rather than just individual nutrients, that contribute to our health. Mattes said from an obesity perspective, the time has come to abandon the idea that there is a single cause of obesity that a particular diet will correct. Just as it was once believed that a single treatment for cancer could be possible, it is now clear that obesity is caused by diet composition for some people, energy expenditure for others, and eating frequency or portion size for someone else. Mattes mentioned that more individualized interventions may be more appropriate for changing health outcomes. Another concern about more generalized recommendations is that some people have counterreactions to various changes: for example, about 15 percent of people with elevated cholesterol or blood pressure show an increase when they eat a fat-restricted or low-sodium diet, so this recommendation actually runs counter to this subgroup's good health. Hu agreed that there may be no silver bullet for curing obesity, and the data suggest that diet quality is more important than a specific type of low-fat or low-carbohydrate diet. Johnson-Askew noted that the issue of BMI as a marker of health is under debate by her and her colleagues at NIH.

Taxes and Subsidies

Should soda and other sugar-sweetened beverages be taxed? Mattes said the issue from an obesity perspective needs to be more about caloric beverages in general, not just soft drinks. Although sweetened soft drinks and fruit drinks are the largest source of refined carbohydrates and thus are a good target, the probability of a positive energy balance is likely to be as great from consuming milk, sports drinks, sugary gourmet teas and coffees, or fruit juice. The issue stems from the medium in which the energy is derived. Beverages, for reasons still unknown, seem to escape regulatory mechanisms. Mattes noted that people do not reduce their food intake when they consume beverages with calories.

Hu supported a soda tax for sweetened soft drinks, but not for diet soda, fruit juices, or other beverages for two reasons: (1) the evidence is more solid for sugar-sweetened beverages, and (2) these drinks are a clear and easily defined target.

Given the situation with food deserts and the prices of many healthy foods, one participant wondered about the fairness of promoting foods that not everyone can afford. Hu acknowledged that the prices of fruits and vegetables have increased, which perhaps should be addressed on a

policy level. To make the consumption of healthier foods more affordable, government subsidies could be provided to specialty crops rather than to commodity crops such as corn. Employers perhaps could reward workers who follow a healthy diet and exercise regularly. Mattes said fairness is one reason he is not in favor of a soda tax, because it differentially isolates low-income populations, even though he recognizes the role of these beverages in the energy-balance problem.

Snacks and Extra Calories

Mattes said his review of the literature indicates that meal frequency, particularly snacking, may be a substantive contributor to weight gain. Americans are eating perhaps an extra half-meal or so per day, often a high-calorie snack. Hu said reducing soft drinks and unhealthy snacks are two main problems to address in improving health.

5

Ameliorating Food Desert Conditions

Most of the second day of the workshop focused on interventions to change food deserts. Some of these interventions were designed as research intervention trials and these were discussed in session 4. Session 5 addressed several promising, although less formally evaluated, programs and policies that are currently under way to improve the food environment. These interventions range from incentives for grocery stores and supermarkets to locate in underserved areas, to city-wide programs to encourage healthier eating, and extend to support for small, corner-type stores and neighborhood-based farmers markets.

RESEARCH INTERVENTIONS

Researchers have been evaluating different interventions to ameliorate food desert conditions. These include efforts aimed at changing the food environment in many different ways.

Overview of Efforts to Change the Food Environment

Joel Gittelsohn, of Johns Hopkins University, presented an overview of efforts to change the food environment and reminded the group that food outlets—including supermarkets, small food stores, restaurants, and school and worksite cafeterias—are all part of the larger community nutrition environment. Policy, environmental, and individual variables

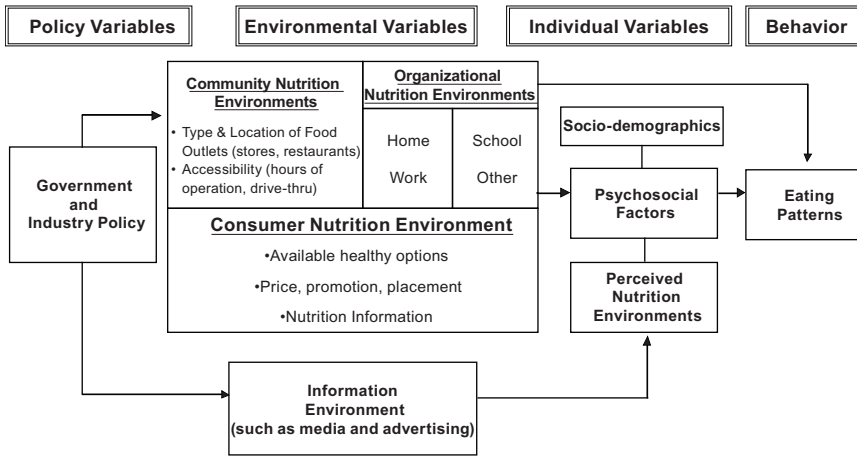

FIGURE 5-1 Model of community nutrition environments.
SOURCE: Glanz et al., 2005. Reprinted with permission from the *American Journal of Health Promotion*.

combine to affect eating patterns on an individual and collective basis (see Figure 5-1).

Given this caveat, changing the food environment has many potential benefits. Among these benefits, such changes can limit or expand the range of choices available to consumers, increase access to healthy foods, complement individual behavioral change programs, reach large numbers of people, and provide long-term sustainability if efforts are institutionalized. It is a practical way, perhaps the only practical way, to address the obesity epidemic. In addition to altering access, the food environment can also be changed within stores, within neighborhoods, and in other settings through provision of information and promotions to consumers. In all cases, the link between supply and demand is key to determining whether changes in the environment will be linked with healthier eating. As Gittelsohn termed it, the "trifecta" is to increase availability, reduce price, and promote healthier choices.

Availability in Large and Small Stores

Seymour et al. (2004) reviewed 11 supermarket intervention studies, 8 of which provided information about healthy foods to consumers and 3 of which combined information with changes in access, availability, and incentives. Six of the studies (four with information only) showed increases in sales of healthier foods, while five did not show a change. Of

the three studies that also examined dietary data, one showed increased consumption of healthier foods and two did not register impacts. Based on this review, Gittelsohn concluded that informational shelf labeling seems to work, while incentives, in the form of coupons, had little impact. However, a longer duration of up to two years may be needed to show any significant change.

Since 2004-2005, researchers have conducted a number of intervention trials in small stores, which are often the main source of retail food purchases among low-income, ethnic, minority populations. Gittelsohn and a colleague are now in the process of reviewing 14 such studies: 5 studies confined to the stores and 9 that combined in-store interventions with community social marketing. These studies indicate a potential for success, as measured by reported improvements in fruit and vegetable sales, consumer psychosocial behaviors, healthy food purchasing patterns, and consumer diet. Challenges to increasing fruit and vegetable availability in small stores include convincing store owners to stock healthier foods, especially fresh fruits and vegetables that are perishable and require special handling. He suggested first trying to convince small store owners to stock less risky (e.g., nonperishable) healthy foods, such as low-sugar or high-fiber cereals. In many cases, store layouts pose a barrier; some are so enclosed that customers cannot touch a food item until they purchase it. These closed settings also severely limit social engagement between the customer and the clerk and therefore create barriers for nutrition education opportunities.

Price Manipulation

Types of price manipulation include lowering prices of healthy foods, offering coupons and other incentives, and increasing prices of unhealthy foods to subsidize lowering the costs of healthy foods. The CHIPS (Changing Individuals' Purchase of Snacks) study (French et al., 2001) showed that modifying the prices of low-fat snacks in vending machines increased sales and did not decrease profits. Other studies have looked at price subsidies in school cafeterias and showed that healthier food intake continued even when the subsidies stopped. Gittelsohn stated that research on price manipulation in stores as a public health intervention is needed, but one difficulty in setting up a price trial in a food store is that retailers are reluctant to share their pricing strategies or to give up control over this key aspect of their business.

Other questions to resolve in changing the food environment include how to build and sustain community support, the role of locally produced foods, and the optimal combination of institutions to involve. Certain aspects of the food environment have been commonly measured, while

others still need examination. For example, sales of selected foods, such as fruits and vegetables, are commonly measured, while total sales, which represent total intake, are not; it is difficult to measure impacts without knowing the numerator and denominator. Psychosocial considerations that influence store manager decisions, which could affect their expectations for stocking healthy foods, are rarely measured. On the consumer side, the impact on behavior and on health, in terms of actual food preparation and diet and in terms of BMI, is rarely measured.

Studying the Introduction of a New Supermarket in a Food Desert

Neil Wrigley, of the University of Southampton, United Kingdom, reported on a "natural experiment" first mentioned on day 1 of the workshop: the opening of a new supermarket in a food desert—in this case, a supermarket regenerated in an urban underserved area of Leeds, England. In the late 1990s, he said, the metaphor of a "food desert" captured British policy makers' attention. Reports and inquiries linked trends in retail development in which food stores were moving outside of urban areas and toward the edge of town to the development of food deserts and to public health consequences. However, empirical evidence on key aspects of these linkages was limited.

The Leeds Urban Regeneration Supermarket Intervention Study (Wrigley et al., 2003) was set up to link the policy debate to an evidence base and to assess the impact of a non-healthcare intervention, specifically a retail provision intervention, on food consumption patterns. The study was developed rapidly in response to an opportunistic possibility to conduct a "natural experiment" when one of the UK's first urban regeneration partnership stores was being constructed. Although possibly overly ambitious, Wrigley said the study established important benchmarks for subsequent retail provision intervention studies and was characterized by high-quality social survey data collection.

The focus was Seacroft, an area of about 15,000 households in one of the most deprived wards of England. By the 1990s, it had a crumbling shopping center with poor levels of food retail provision. Buying food entailed either leaving the area or using a limited range of smaller stores. In partnership with the city, a labor union, and a government agency, a large Tesco supermarket plus 10 smaller shops and other facilities opened in 2000, amidst much fanfare including a visit from then-Prime Minister Tony Blair. The intent was to improve food access along with increasing employment and revitalizing the local economy.

The Leeds study involved a two-wave household panel survey: the first in summer 2000, five months before the supermarket opened, with 1,009 respondents; the second in summer 2001, seven months afterward, involv-

ing 615 of the original group. A separate repeatability survey and focus groups were also carried out. Of the respondents, 45 percent switched to using the new store as their main food source, and 31 percent (nearly three times more than before) reported that they walked to the store to foodshop rather than relying on vehicles (often either taxis or borrowed cars) to travel to places further away. Small but significant increases in fruit and vegetable consumption were found among users of the new store. Qualitative evidence from focus groups found that people appreciated the benefits relating to ease of access, affordability, quality, and safety, although some were worried about temptations to overspend and were concerned about more affluent shoppers coming from outside areas.

Wrigley reviewed the Leeds study, as well as the Glasgow study described by Steven Cummins (see Chapter 3), to draw conclusions about supermarket intervention studies. He recommended that future studies should take sample size-statistical power and endogeneity-simultaneity issues more seriously; attempt to assess unintended consequences of the intervention; try to separate the impacts of physical access, economic access, and choice on food consumption; and appreciate the linkages between existing intervention studies and the dynamics of the food environment. Natural experiments, he said, change reality. They do not take place in a scientific vacuum and can fundamentally change the public discourse. Retailers in the United Kingdom are sensitized to the issue of food deserts to further their "enlightened self-interest." There are now 35 urban regeneration partnership stores in the United Kingdom, and Tesco is opening up stores in south-central Los Angeles under its Fresh & Easy brand.

Wrigley concluded by noting that some academics in the United Kingdom are more comfortable with alternative food network solutions, rather than supermarkets, in addressing food deserts. While solutions such as farmers' markets have a role to play, he disagreed with his UK colleagues and questioned the extent to which they can penetrate socially excluded areas, at least in the United Kingdom, and have an impact on public health problems.

Working with Small Stores to Promote Healthy Eating

Guadalupe Ayala, of San Diego State University, described her research with *tiendas*, which she described as small Latino-Hispanic grocery stores with at least 50 percent of store shelf space devoted to food products, including fruits and vegetables, ready-to-eat foods, and meat. Also called *bodegas* by some Spanish speakers, these stores are very plentiful in Latino communities. They play important social and economic roles in both new and established immigrant-receiving communities, and for

new immigrants they often serve as a gateway into U.S. communities. In studies funded by the USDA and the National Cancer Institute, Ayala found that households shop at these types of stores an average of eight times per month, and they represent 33 percent of a family's total food basket and 84 percent of a family's total produce purchases, with much of the rest purchased at supercenters.

Ayala said her research shows that working with tiendas and other small grocery stores may be an effective method to address the problem of food deserts. The study, Vida Sana Hoy y Mañana (Healthy Life Today and Tomorrow), examined the efficacy of a food marketing and environmental change intervention to promote sales and consumption of fruits and vegetables. Although Latinos eat more fruits and vegetables than other demographic groups, acculturation has a negative impact: the longer people have been in the United States, the lower is their fruit and vegetable intake (Duffey et al., 2008). The primary outcome measured in the study was the number of daily servings of fruits and vegetables. It secondarily measured their total variety, behavioral strategies to increase fiber, and psychosocial factors, such as perceived self-efficacy to purchase more produce.

The intervention was a randomized controlled trial in four North Carolina tiendas. It included employee and manager training, structural changes in the stores, and store-centered food marketing campaigns. The training enabled store personnel to become "fruit and vegetable specialists," as well as strengthen their selling and marketing strategies. The stores received $1,000 each to prepare and display packages of fruits and vegetables called "Pronto Paks." The food marketing campaign included recipes, point-of-purchase materials, and a radio program.

Consumer fruit and vegetable intake increased with this intervention by about one additional serving per day (see Figure 5-2). Self-efficacy in terms of purchasing and using fruits and vegetables declined, possibly because respondents felt less capable as more was learned and awareness heightened, especially in the short run.

Ayala noted some challenges in small-store interventions. The owners may be reluctant to participate in government programs. For example, researchers first suggested tapping into a program sponsored by the North Carolina Department of Agriculture to link food retail businesses with local farmers, but the tienda owners did not want to get involved. They have no mechanism for electronically tracking sales data, which makes it hard to know what is sold. Follow-up is especially difficult with new immigrant populations, with only about two-thirds located for follow-up 10 months after the intervention. Ayala said that in terms of identifying what foods to target in future interventions, Latino stores tend to stock far less low-fat dairy (and at higher relative prices) and more

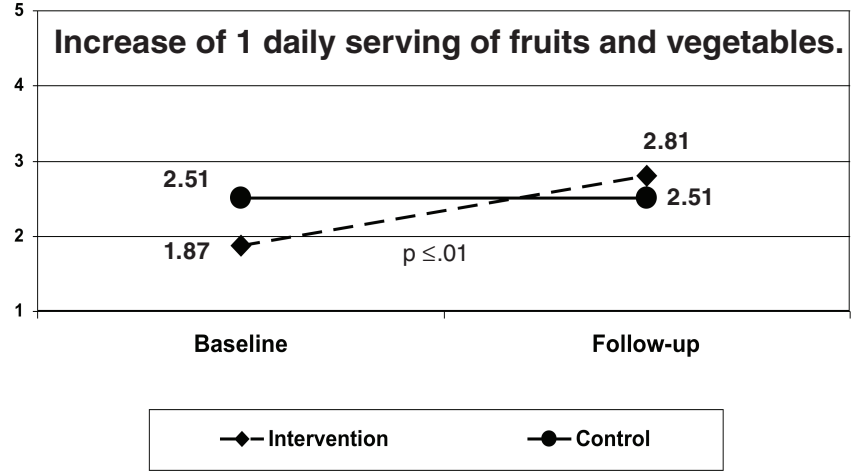

FIGURE 5-2 Effect of tienda intervention on consumption.
SOURCE: G. Ayala, 2009.

sugar-sweetened beverages and sweet and savory snacks, compared to non-Latino stores.

Farmers Markets in Low-Income Communities

Farmers markets, although a tiny percentage of the overall food environment, are expanding (see Box 5-1). Research from East Austin, Texas, shows some of the elements to consider in food deserts.

Andrew Smiley, of the Sustainable Food Center (SFC), discussed its experiences in establishing farmers markets in East Austin, Texas. A well-intentioned effort to establish a central market did not succeed in the long term. Instead, SFC has found that smaller markets near Women, Infants, and Children (WIC) clinics are meeting the community's needs.

A 1996 study of food access in East Austin found food desert conditions (SFC, 1995): two supermarkets, other retail food outlets with poor variety and generally higher prices, and transportation to outlets outside the neighborhood expensive and difficult to arrange. The targeted area is a predominantly minority low-income community, with about 25 percent of the 24,000 residents under age 12. Of the 38 convenience stores in the neighborhood, fewer than half stocked milk and only 5 stocked all of the ingredients for a well-balanced meal. One solution, still in operation, was a bus route, specifically designed to reach supermarkets, that has not been evaluated for its impact.

BOX 5-1
Farmers Markets: Small But Growing Market Segment

Farmers markets occupy a small, but growing share of the U.S. food environment. According to workshop participant Debra Tropp, of the USDA Agricultural Marketing Service, farmers markets accounted for about $1.2 billion in sales in 2007, up from $812 million in 2002, or a 30 percent increase after adjusting for inflation. In 2008, there were 4,685 markets operating, up from 1,755 in 1994, with more than 135,000 farms involved.

Consumers are also using farmers markets as a source of fresh fruits and vegetables. Workshop participant Heidi Blanck, of the Centers for Disease Control and Prevention (CDC), mentioned a recent consumer survey conducted by the CDC and the National Cancer Institute on the use of farm-to-consumer venues and food attitudes and behavior. The survey showed that in 2007, one in five adults self-identified as primary food shoppers reported shopping at farmers markets (20.1 percent). When asked how often in the summer they purchased fruits and vegetables from a farm-to-consumer venue (i.e., farmers market, farm stand, pick your own farm, community-supported agriculture), 56.1 percent of primary food shoppers reported at least monthly use and 27.1 percent reported weekly use. Weekly use was higher among middle-aged and older adults and lower in the South and Northeast compared to the West. Weekly use did not differ by sex, race or ethnicity, education, or income.

SOURCES: H. Blanck, 2009; D. Tropp, 2009; USDA NASS, 2009.

Another proposed solution was a centrally located farmers market. SFC already operated a large market in downtown Austin and several smaller ones at WIC clinics in other neighborhoods. To open a large market in East Austin's Saltillo Plaza in 2003, SFC recruited vendors, promoted the market, took out insurance, managed operations, and carried out a host of other tasks. Despite outreach, special events, and other efforts, evaluation indicated that the market lacked sufficient support for the resources expended. The majority of sales were due to WIC Farmers' Market Nutrition Program (FMNP) vouchers, but these went only to fruit and vegetable farmers. Surveys and focus groups indicated that word of mouth generated awareness about the market, but people felt it was inconvenient for regular shopping. Those who did come especially valued the fruits and vegetables and, across income levels, the idea of supporting local farmers. However, there just were not enough customers to justify SFC or farmers' costs, and SFC decided to close the market in 2005.

Produce sellers were still interested in additional sales outlets, and customers with FMNP vouchers still wanted to purchase their products.

In an alternative and still successful approach, SFC decided to support very small (one or two) farmers markets located next to WIC clinics. WIC clinic markets are not as staff-intensive, and WIC staff members are good partners in outreach. Six of these clinics are now operating.

Discussion: Research Interventions

Terry Huang, of the National Institute of Child Health and Human Development at NIH, moderated the session on food desert intervention research. Main points included the need for multicomponent interventions, formative research, and more robust price manipulation trials.

Making Farmers Markets Viable

Huang related questions about setting up farmers markets, especially near WIC clinics. Smiley said that the state FMNP program made it easier for individual clinics to participate. SFC has liability insurance for the markets it coordinates, which greatly eased liability concerns. Some neighborhood convenience stores saw the markets as a threat. This required some outreach to explain that the small markets take FMNP vouchers almost exclusively and did not pose any competition. In answer to a question about locating markets so that they simultaneously straddle more and less affluent neighborhoods, Smiley noted that determining new sites is both a physical and a psychological issue. In the case of Austin, for example, location vis-à-vis a highway that runs through the city makes a big difference psychologically and logistically.

Incentives

Gittelsohn noted that incentives can go to shoppers or to store owners. In addition to coupons, he has been involved with trials in which, for example, a shopper gets one free (healthy) item for every four purchased. However, these have not been successful in small stores, in part because owners worry about consumers abusing the incentives. Ayala said she was involved in an experiment in which a customer would get one free pound of produce for every 10 pounds purchased. It became too much of a burden for the store owners and was not sustainable.

In contrast, incentives to small-store owners, such as $25-50 gift cards they can use with wholesalers, have been promising, Gittelsohn said. Ayala said interviews with tienda owners in California revealed that they try to make every square foot of the store as profitable as possible. They are willing to try something for a month to see if it will bring in more customers or profit.

The cost for small stores to equip themselves to sell fresh produce varies. In California, store owners told Ayala it would cost between $5,000 and $10,000 for refrigeration units to stock fruits and vegetables. However, even with small additions that cost $1,500 to set up, changes were seen in customers' dietary intake. In addition, states and counties may have different policies and regulations, which have an impact on implementation costs for store owners. Defraying theses costs would help store owners that usually operate on thin profit margins.

The Role of Price

As noted throughout the workshop, price matters. Gittelsohn said literature is scarce on food store price manipulations for public health interventions, making it difficult to arrive at definitive conclusions about what does and does not work. That is, although it is widely known that lowering price is used to increase sales volume, there is little documentation or evaluation of the use of prices to improve the healthfulness of diets. Intuitively, increased availability and point-of-purchase promotion encourage people to try new foods, but they have to cost less or at least about the same price as less healthy alternatives. Wrigley observed that improved access and improved price frequently go together, so it is hard to distinguish one from the other. He suggested that urban regeneration stores could perhaps carry out pricing experiments. Smiley noted that testing perceptions is important, too. For example, a survey found some people do not shop at farmers markets because they perceive them to be more expensive, even when prices are comparable.

Ayala said that low-fat milk is consistently more expensive than whole milk across Latino stores, which is not the case in other communities. Latino households drink more whole milk, and the price differential may be because of market demand. Another factor that may discourage sales of lower-fat products relates to packaging: low-fat products sometimes do not have "Vitamin D" on their labels. While there are many barriers to changing learned behaviors and preferences, the price difference would have to be resolved first before educational campaigns are considered.

Popkin noted that food processors continually manipulate price as part of their business practices. For example, food processors have found prepackaged vegetable servings to be successful, but these items are also priced well and highly promoted, which makes the separate elements difficult to evaluate. Wrigley reiterated findings from focus groups about worries from exposure to the temptations of full-scale retailers. The issue of being tempted to overspend fixed budgets is a big issue, and obviously a price-related issue.

Multicomponent Approaches

Multi-institutional, multicomponent approaches are a natural extension of current research looking at single parts of the food environment. Formative research that involves community participatory processes would help plan interventions. The type of foods to focus on may vary by location and culture, but sweetened beverages seem to be a key problem across many low-income settings. Huang asked whether beverages should be addressed from both the demand and the supply sides: discouraging their purchase but also working with companies to reformulate the product. Gittelsohn has done some preliminary work with local manufacturers and distributors in terms of changing the mix offered to stores. Customers claim they do not eat healthy foods because the foods are not available, cost too much, or are of poor quality; on the other hand, store owners claim they do not stock the healthy foods because nobody buys them. Almost as a mediator, public health and other specialists can concurrently convince store owners to increase supply and work with consumers to increase demand.

Another need, according to Ayala, is to better enumerate stock inventory. The type and number of products in tiendas is far different than those in convenience stores, and Ayala asserts that food desert conditions may not exist in predominantly Latino Hispanic communities. It would be interesting to understand whether the food environment is one of the factors that explain the "Hispanic paradox," which suggests that first-generation Latinos have better health outcomes than their acculturated counterparts despite greater poverty and lower socioeconomic status.

E-commerce

The question was raised about using the telephone or Internet to place orders to lower costs and increase access. Smiley said the SFC operates a Farm-to-Work program, a subscription program for employees at partner work sites. In another project in Austin, WIC families pre-order their full mix of groceries for delivery to centralized locations. Gittelsohn said cell phones are so widespread that using them in this way could offer an interesting possibility. Wrigley said the origins of e-commerce in the United Kingdom were to reach underserved markets. An experiment in Newcastle from 1980 to 1982 involved computer access from public libraries in underserved areas of the city to place grocery orders. Ayala observed that the digital divide is not as pronounced as it was a few years ago, but interpersonal relationships are too strong to make e-commerce for food a viable option, at least in the Latino community. Diez Roux warned about creating new problems while supposedly fixing others. For example, having a store or other destination to travel to promotes physical activity and

social interactions. The much bigger problem is the way in which environments affect a variety of health behaviors at the same time.

Huang asked workshop attendees for further observations. Sarah Trehaft, of PolicyLink, urged listening to community voices in discussing food desert measurements, policies, and interventions. Popkin agreed that community participation and feedback are essential to successful approaches and outcomes.

POLICY INTERVENTIONS

Research interventions to modify the food environment are attractive because they are fundable and measurable, however, research interventions are merely one solution to solving food deserts in communities. The policies and programs discussed by the next session also aimed at improving access to healthy food in food deserts through supermarkets, corner stores, farmers markets, and other outlets. While these interventions were not set up as research experiments, they are, nevertheless, an interesting mix of initiatives launched by government agencies and grassroots efforts that began at the community level and became more widespread (see Box 5-2). Most have or are planning some types of formative research and evaluation.

Determining Sites for New Supermarkets

In developing strategies to increase the number of supermarkets in food deserts, it is important to understand the prevailing business model of U.S. supermarket chains. According to William Drake, a former supermarket executive now with Cornell University, most food retailers are aware of the issues of food security and urban food deserts. However, a combination of internal capabilities, external trade area characteristics, economic realities, and intolerance for risk raises difficult barriers to overcome and hence the difficulty for supermarkets to site new stores in food deserts.

Drake described the prototype for most supermarkets in the United States today: large (48,000 square feet), with plentiful parking (250 spaces), and sales volume of $400,000 per week, all difficult to achieve in most core urban areas. About two-thirds of the nation's 34,000 supermarkets belong to a chain, defined as stores with at least 11 units. The profit margin is thin, in the range of 1.5 to 1.75 percent of sales. To maximize profit, the most successful chains are "finely tuned machines" that know their target consumers and operate in ways to attract them to buy. To diverge from their model, he said, is very inefficient and more likely to fail. Supermarkets in the past 20 years have tended to locate in middle- and upper-

BOX 5-2
Top-Down and Bottom-Up Approaches

Top-down and bottom-up approaches have been used to launch and coordinate efforts to improve food access. "Top down" refers to initiatives emanating from a government agency or other institution; "bottom up" refers to initiatives that begin in neighborhoods or in community-based organizations and become larger programs or policies.

For example, in 2002 the New York City Department of Health initiated a concerted effort to focus health intervention in the South Bronx, Central and South Brooklyn, and East and Central Harlem. These were areas with high rates of poor health outcomes, including obesity and diabetes. Survey data also show that these areas have the lowest rates of fruit and vegetable consumption in the city. These District Public Health Offices have been the central point for four food access projects: (1) improving food choices in corner stores, (2) increasing the number of farmers markets, (3) increasing or at least maintaining the number of supermarkets, and (4) encouraging fruit and vegetable vendors. Although involving the community, these initiatives began at "the top."

In Philadelphia in 1992, the nonprofit Food Trust began a community-level mission to "ensure that everyone has access to affordable, nutritious food." The organization helped set up farmers' markets in low-income neighborhoods to improve access to affordable nutritious food and now manages 30 markets in the greater Philadelphia area.

income suburban locations where they have a good chance of meeting their targets. Chains also tend to site new stores relatively close to their existing outlets for a number of economic and logistic advantages.

Once a general geographic area is identified, the chain makes site-specific decisions. Its business analyses rely on variables such as projected sales, occupancy costs, and labor expenses, among others. These models work less well in urban settings because the underlying data are often underestimated or misrepresented. For example, it is difficult to gauge sales when the current competitors are small corner stores rather than other supermarkets. Without good knowledge of an area, Drake said, siting decisions are more prone to fail.

State and local governments can assist retailers in entering urban markets by providing real estate or establishing public transportation stops to commercial locations and food stores, particularly in inner cities. Yet the fact remains that locations in urban food deserts do not fit the positioning strategy of most large chain supermarket operations. As an alternative, he suggested working with voluntary and cooperative food wholesalers, the segment of the industry that serves independent retailers. Independent

retailers are better able to customize a positioning strategy and adapt to local conditions than the larger chains. Another idea is to target specific retail stores that have a business model with a better chance of success in urban inner-city markets. Known as limited assortment hard discounters, these stores offer healthy foods at competitive prices but with a more limited assortment.

Policies to Encourage Supermarket Entry

As reported by Drake, the average supermarket in the United States is about 48,000 square feet and is set in a suburban location with plentiful parking. However, several presenters reported on variations that fit better in urban environments: smaller stores, perhaps 12,000 to 15,000 square feet, with more limited parking and convenient public transport or shuttles to help shoppers take their food home.

John Weidman, of the Philadelphia-based the Food Trust, described how the nonprofit built on its many years of community food work to help develop the Fresh Food Marketing Initiative in Pennsylvania. As in Chicago, New York City, and other places, mapping in Philadelphia showed the coincidence of a lack of supermarkets with a high incidence of diet-related diseases. The mapping study sparked the interest of the City Council, which requested that the Food Trust convene a group of public health, economic development, government, and supermarket industry representatives to understand why stores did not locate in these communities and what policies could fix the problem. The State of Pennsylvania also held hearings, and in 2004, this work culminated in the Fresh Food Financing Initiative (FFFI), the nation's first public–private funding initiative set aside for retailers to open and update stores in underserved food deserts.

The FFFI is a $120 million initiative that funds food retail projects in underserved areas. It provides grants of up to $250,000 per store and loans of up to $2.5 million per store. Since 2004, it has funded 58 stores of various sizes that have provided almost 3,500 jobs. Most of the larger stores are independent or small, locally based chains. Spatial analysis confirms that these stores have gone into many areas with the greatest need. The Food Trust is now working on evaluating the health outcomes and expanding its efforts in other states, including New York, Louisiana, Illinois, and New Jersey.

Cathy Nonas, of New York City's Department of Health & Mental Hygiene, described how the city is trying to increase, or at least maintain, the number of supermarkets operating in high-need neighborhoods. A city planning standard was set to aim for a store of 15,000 square feet to serve on average 10,000 people living in a five-block radius. A super-

market commission was established, with assistance from the Food Trust, to look at zoning regulations and tax incentives. Some city-owned spaces have been identified as potential sites for new stores. At the same time, community-based organizations and unions are working with city and state officials to stop the closing of supermarkets, and they have had some success in Harlem.

SMALL STORES

A point brought up throughout the workshop is that improving the food offerings of existing stores in a community can be a feasible solution to accomplish the goal of making healthy foods convenient and affordable. For example, on the first day of the workshop, Joseph Sharkey suggested focusing on where people currently shop when he presented an overview of the rural Brazos Valley. Gittelsohn reported that research into small-store interventions has greatly increased since 2004, and Ayala shared her findings from small stores in Latino communities. In this session, Nonas and Weidman explained several small-store programs in New York and Philadelphia.

Healthy Bodegas in New York City

The New York City Department of Health & Mental Hygiene has targeted areas in three parts of the city where it is trying to improve food access, as previously reported in Box 5-2. Nonas explained that through the Healthy Bodega Initiative, the department is encouraging existing stores in these areas to improve their offerings of healthy foods. In a first phase, three district public health officers worked with about 350 bodegas each (more than 1,000 total) to increase availability and purchases of low-fat milk. Extensive consumer education accompanied outreach to the bodegas (Figure 5-3). In the next phase targeting fruits and vegetables, more than 450 bodegas participated; the smaller number was chosen based on the store's interest in selling and increasing its quantity of fresh produce. Depending on the store's characteristics, the department helped bodega owners increase quantity, improve quality, provide prepackaged items, market healthy foods better, or obtain the appropriate permits to sell processed produce and produce in front of the store or on the stoop.

The two campaign phases saw large increases in sales of low-fat milk and fruits and vegetables, although Nonas acknowledged that it is hard to evaluate the effect apart from other factors, such as offering WIC participants coupons for low-fat milk. She listed challenges in sustaining the initiative: not enough staff to reach out to so many stores and visit them sufficiently, the need to balance outreach efforts between community

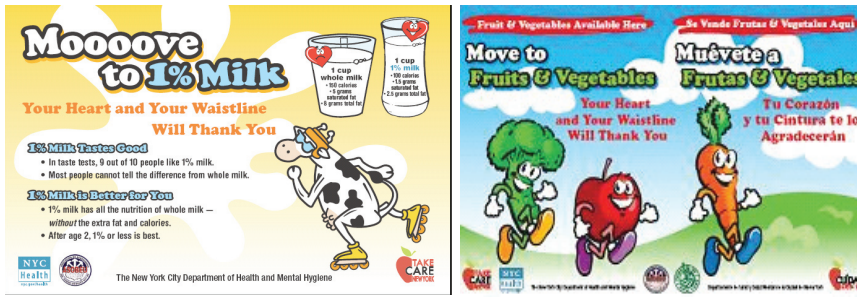

FIGURE 5-3 Consumer materials used in the Healthy Bodega Initiative. SOURCE: C. Nonas, 2009.

buy-in and bodegas, limited infrastructure in many bodegas (such as refrigeration and storage), haphazard distribution systems, and the need for micro-loans and education to make the necessary improvements.

The department is now working more closely with fewer bodegas to make more sustainable and substantive changes and to increase healthy food options in those stores. Each district public health officer works with 20 bodegas, chosen to ensure that each resident is within walking distance of at least one healthier bodega, which they can visit at least twice a month. As Nonas said, if three bodegas are located on a block, maybe only one needs to carry fruits and vegetables. Nonas noted that the department also works with these stores to decrease tobacco ads and identify healthier items in the store with promotional materials, and works with other city agencies and organizations (such as milk distributors, produce distribution sites, micro-loaners, and permitting centers) to make it easier for city bodegas to stock and sell healthier items.

Making Healthy Food at Corner Stores Kid Friendly

John Weidman reported that the Food Trust works with Philadelphia corner stores where children stop for snacks. After starting a school nutrition program, the Food Trust did research on the role of corner stores in children's nutritional status. They found that children consumed about 600 calories in snacks, almost all of them unhealthy, spending about $2 per day. In a pilot program in five stores in North Philadelphia, refrigerated coolers were set up with fresh fruit. The attention-grabbing coolers and attractive packages appealed to kids, and sales were brisk. A private operator has taken on and expanded distribution to 50 stores, which solves the problem of a sustainable distribution network. A plan to create kid-pleasing water bottles is next.

Initial evaluations show kids purchasing items with less fat and fewer calories. The owners are purchasing more healthy items, and the children's knowledge of healthy eating is improving. The Food Trust is currently midway through a more rigorous randomized study to track a group of children for three years and look at BMI and calorie reduction.

FARMERS MARKETS AND OTHER ALTERNATIVES IN LOW-INCOME COMMUNITIES

As described above, farmers markets are a small but growing part of the food environment in the United States. Across income levels, consumers have shown they are willing to frequent these markets and, in many cases, they prefer the social interaction and direct contact with the growers. At the same time, as Smiley described, they need to be convenient and worthwhile from the point of view of both the buyer and the seller. Panelists shared their experiences from markets in several cities, as well as more cross-cutting lessons about community buy-in and the vital connection with government programs.

Health Bucks for Fresh Fruits and Vegetables

Nonas described how the New York City Department of Health & Mental Hygiene has looked for ways to support low-income residents in purchasing fresh produce at farmers markets, in part by increasing the number of farmers markets in the target areas and enabling them to accept Electronic Benefit Transfers (EBT) from participants in the USDA's Supplemental Nutrition Assistance Program (SNAP, formerly know as the Food Stamp Program).

As an incentive to shop at neighborhood farmers markets, the city distributes "Health Bucks," which are $2 coupons for the purchase of fresh fruits and vegetables. In 2005, the program began by distributing these coupons to community-based organizations for their constituents. The original program was so successful that in 2007, additional Health Bucks were distributed in the form of a $2 bonus for every $5 spent using EBTs at a farmers market. In addition, the department encouraged farmers to sell different types of healthy produce (such as peaches and plantains), and sales have been good. Health Bucks have been a major source of income for farmers selling at these markets and have ensured that markets profit in these low-income areas. Nonas mentioned that EBT sales have also skyrocketed since their introduction.

Nonas said it takes a multiagency effort to make Health Bucks successful and, more generally, to keep farmers markets in low-income communities thriving. An ongoing challenge is how to pay for EBT machines

at the markets, as well as a market manager to oversee the machine and coordinate reimbursement to farmers. Also, she noted the need to continue access to fruits and vegetables when the farmers market season is over because most markets in these areas are not year-round.

Lessons from Philadelphia

The Food Trust's work with farmers markets has been successful in neighborhoods at all income levels, mentioned Weidman. In annual surveys, customers report significant vegetable intake and more frequent snacking with fruits and vegetables. He identified key components in making farmers markets successful in low-income communities:

- Strong management
- Site selection to locate a market in a place that works for the community and the vendors
- Strong community partnerships
- Connections with government programs
- Marketing

A pilot program in which each vendor stand had its own EBT machine resulted in increased usage. The machines processed credit cards too, so the farmers and other shoppers also benefited. Weidman suggested that this is maybe the future of vendor transactions as the economy becomes more "electronic."

Involving Communities in California

Andrew Fisher, of the Food Security Coalition, described the 250-member coalition as the connective tissue between advocacy and technical assistance. He discussed three projects in greater Los Angeles to provide insights about the role of the community in food desert projects: the Villa Parke Center Farmers' Market in Pasadena, Market-to-School project in Santa Monica, and urban agriculture project in Watts.

The Villa Parke Center Farmers' Market has operated in a low-income part of Pasadena for more than two decades. A benefit of this and other successful markets is that they build social capital as people interact with vendors and each other more so than in a supermarket. Many farmers hire helpers from within the community. Accepting government subsidy benefits is important to success in low-income communities: For this particular market, farmers agree to participate so they can also sell at a more lucrative market in downtown Pasadena.

Price is an issue at farmers markets in low-income communities for

both shoppers and farmers. Shoppers are price-sensitive, but farmers also need to see a return on their labor. Product mix is crucial. Language and culture can create barriers between vendors and shoppers and affect sales, which is one reason that a community-organizing approach and local hiring are important.

The market-to-school project in Santa Monica also succeeded through community support. Although Santa Monica is generally a well-off community with no food deserts, Fisher noted that a large percentage of the school population is low income. The project began in 1997 when a parent worked with a local farmers market to improve the offerings of his child's cafeteria salad bar. It has since spread to all the schools in the district, and one-third of children now regularly eat salad for lunch. The project was successful because it had the support of the school district and food service personnel. The logistics have been time-consuming but not insurmountable.

Less successful, but a valuable lesson nonetheless in terms of the role of community support, was an urban agriculture project to provide vegetable gardens on a 2-acre plot near a housing project in Watts. The goal was to provide low- to no-cost healthy foods that could be grown year-round in the temperate Los Angeles climate and foster community interaction. Fisher said the project did not succeed because it was too top-down. The plan was presented to gardeners, some of whom were already tending plots, rather than involving them in planning how it would work. The gardeners were supposed to grow tomatoes and carrots when they knew growing herbs was more lucrative. In addition to poor design, friction between the staff and the gardeners worsened the situation.

Fisher noted that planners often see food as a private good, rather than a public benefit, or if so, under the purview of the federal government. As he commented, "There are no [local] departments of food in the country." Some policy solutions that could increase access on a community level include transportation changes, such as buses or shuttles, or a ban on lease restrictions that prevent new supermarkets from replacing those that close down. Public–private councils, now operating in about 100 communities around the country, also bring diverse stakeholders to the table to find ways to enhance food access.

Tapping into Public Funding

The benefits provided through SNAP and WIC, as well as Supplemental Security Income (SSI) and other federal and state assistance programs, are critical elements in making farmers markets a going concern in low-income communities.

August Schumacher, Jr., a former USDA undersecretary of farm and foreign agriculture services and now consultant with the Kellogg Foundation, elaborated on how changes in the SNAP and WIC Programs could further reduce rural and urban food deserts. SNAP retailers (such as corner stores and farmers markets) do not have to represent the bleak picture described in Detroit by Mari Gallagher (see Chapter 2).

Federal and state nutrition funding is evolving. Starting in 2009, more than 6 million WIC mothers and children nationwide will receive vouchers to buy fruits and vegetables in supermarkets and farmers markets. WIC mothers will receive $8 per month, and WIC-eligible children will receive $5 per month for fruit and vegetable purchases. He expressed hope that the amount increases. Schumacher noted that Congress will be reauthorizing the vital Child Nutrition legislation later in 2009 and 2010. He believes that increasing the provisions for healthy food purchases in this legislation—particularly, increasing the monthly funding for WIC mothers and children to purchase fruits and vegetables—would be exceptionally helpful in partially alleviating the growing incidence of obesity and diabetes among America's vulnerable children, many who live in food deserts.

Schumacher also reviewed the status of new funding to promote healthy food incentives in the 2008 Farm Bill. The provision within Section 4141 is for a $20 million pilot program under SNAP to explore how the immense program can improve the dietary and health status of eligible households. Regulations are being developed within USDA to set up pilot programs.

To support these evolving federal nutrition improvement programs, Schumacher cited a combination of foundations, states, and cities that fund healthy food incentives—such as those in Holyoke and Boston, Massachusetts, and San Diego, California—that allow SNAP, WIC, and SSI clients to receive "double vouchers" to increase their purchases of fruits and vegetables using SNAP EBT cards or WIC vouchers. He also noted that EBT cards could be an effective way to track fruit and vegetable purchases. Foundations such as the Wholesome Wave Foundation and the Humpty Dumpty Foundation provided funds in four states (California, Massachusetts, New York, and Connecticut) in 2008 and, with additional foundation partnerships, are considering expansion to eight more states in 2009.

Schumacher said the diversity of the American food system, in terms of farmers and shoppers, will lead to growth in the sector. Data from the USDA's Agricultural Census (USDA NASS, 2009) indicated 100,000 new farmers in the United States, with strong growth of Hispanic, Asian, Native American, and African-American farm operators. He is also optimistic about new demand drivers for fruits and vegetables, including an

emphasis on child nutrition, healthier lunches and breakfasts at school, and expansion of SNAP and WIC use. He urged that new WIC vouchers add roadside stands to their permitted retail stores because many WIC mothers live in rural areas where farmers markets and full-service supermarkets are less prevalent. In addition, Schumacher suggested that funding for the Section 4141 Healthy Food Incentive program increase from $20 million to $100 million. He also said making it easier for farmers markets to get waivers to accept federal benefits would help them expand in low-income areas.

DISCUSSION: POLICY INTERVENTIONS

Robin McKinnon, of the National Cancer Institute at NIH, served as moderator for this panel discussion. The need for a connection between communities and food outlets ran through the questions and comments.

Supermarket Incentives

Drake said incentives at the state and local levels are especially important, such as helping to assemble real estate, job assistance, and training. Stores are only as good as their employees, and preventing turnover, which can be in excess of 100 percent per year in some inner-city stores, is a huge task. Transportation for shoppers and employees helps. Weidman suggested a federal-level equivalent to the FFFI for public–private funding initiatives.

Farmers Markets

One workshop participant expressed concern about a relationship between farmers markets and gentrification. Weidman said this has not occurred in Philadelphia, but rather there is a revitalization factor that benefits the community. Schumacher said that sellers or employees from within the community help make markets successful. Fisher noted that certified farmers market in California must work with the community. Successful markets take about a year to get organized, including a process of amassing community support.

The cost of setting up a farmers market varies. The Food Trust operates a network of markets, which helps consolidate the workload. Nonas pointed out that it makes a difference whether the market accepts EBT, which adds costs. Often middle-sized farmers have the hardest time dedicating the resources to sell at markets, and they need to make enough money for this to be worthwhile. Weidman said that there was some concern about whether the Philadelphia area had enough farmers to set up

at all the markets. He said recent experience has shown there are plenty, including many younger farmers under the age of 30, an encouraging sign for the future of farming.

Community Outreach

As noted above, community acceptance is important to the success of farmers markets. Instilling ownership and buy-in is also important with supermarkets. Fisher said joint ventures have been helpful, such as a Pathmark in Newark, New Jersey, that partnered with the nonprofit New Community Corporation. Weidman noted that the bigger chains have not participated much in the FFFI, for reasons explained by Drake and others, but smaller independents have. Those that pay attention to community needs find it pays off. He cited the example of the Brown Family Shoprite, which heeded community requests to offer halal meats, now a best-selling item.

McKinnon asked about farmers markets in more dispersed rural areas. Schumacher said markets have been growing in rural areas, as he has seen in his work in Alabama and Mississippi. Weidman said that rural counties have also accessed the FFFI program.

6

Research Gaps and Needs

As described throughout the two days of the workshop, the purpose of food desert research is to understand factors that contribute to food deserts and ultimately to identify ways that facilitate change for health and non-health benefits. This is an emerging field that brings together a variety of disciplines, including public health, nutrition, economics, geography, and urban planning. The final session of the workshop summarized how additional research is essential for clarifying the causal link between the food environment and health and for informing researchers when they develop the most promising interventions. The study of food deserts and determining their impact on public health is extremely complex and requires multidisciplinary research approaches.

An overriding message of the workshop was that evidence shows food deserts exist in the United States along income, ethnic, and racial lines, both in urban and in rural areas. There are rich data on the local level and more general information on the national level, but it is yet to be determined if these findings from one area can be broadly applicable to areas with similar demographics.

The food environment is dynamic. New players are taking a growing percentage of the consumer's food dollar; these include supercenters, in particular, as well as farmers markets, dollar stores, convenience stores, and other outlets. Focusing only on supermarkets and grocery stores ignores the places where millions of Americans purchase some or all of their food.

Below are topics that were raised during the panels and summarized in this final wrap-up session.

DEVELOPMENT OF METHODOLOGY AND TOOLS

"Food access" was defined by presenters in various ways. A standard definition could help in making appropriate comparisons and furthering insight. One challenge is to resolve how the definition should incorporate such factors as geography, economics, and choice. If food access is determined using a spatial scale, the definition of "neighborhood" would benefit from further clarity and refinement.

Researchers reported on complementary instruments to measure food availability and affordability, including GIS, market basket surveys, other survey instruments, census data, and the Consumer Price Index. There is a strong desire (1) to develop and/or refine rigorous measures that are sensitive to the needs of diverse populations, and (2) to incorporate qualitative methods into research, in order to provide better information about issues such as consumer perceptions of food access.

Currently available data about food outlets from both public and private sources lack validation. Several presenters uncovered errors within national databases (such as those from Dun & Bradstreet and infoUSA) when they validated the measurement of these spatial data sets against actual visual measurements in specific neighborhoods, but it is unknown whether errors are random or somehow skewed to bias results. In addition, new census data, when available, will need to be used to investigate whether changes in the number of food outlets reflect population shifts. As noted above, the generalizability of local studies needs to be known before interventions can be applied on a broad scale.

Epidemiological Methods Combined with Multidisciplinary Approaches

Qualitative methods are also important for understanding the nuanced interaction between personal preferences and perceived access to quality food, which can then be compared to what is actually available. Challenges to understanding the links between food and health remain; they may best be met with multiple types of evidence from rigorous observational studies, natural experiments, simulations, and evaluations of evidence-based actions. Methods and tools from geography, demography, economics, psychology, sociology, urban planning, and policy can all help inform epidemiological research.

Longitudinal Studies

To date, most studies have been cross-sectional in that they compare different areas with different food environments. Longitudinal studies are crucial because they provide valuable information as the research follows the same population over time. Natural experiments can provide good information, but it is important that the experiments are theory driven and nuanced by population and other variables. Longer time frames are often critical for judging the effect of different interventions and possibly linking a population's food environment to its health. For natural experiments and other interventions, better surveillance methods can help researchers track information to see how an area is changing over time.

Policy and Program Evaluation

Policy and program interventions—such as those described in session five of the workshop (see Chapter 5)—were not generally set up by researchers. However, these activities may provide important opportunities for evaluation. To learn from both the successful and the unsuccessful elements, researchers could set up benchmarks for performance, sampling strategies, pre-testing of instruments, measurement of impacts on different sociodemographic groups, and process evaluations during interventions.

APPROACHES TO MEASURING FOOD DESERTS AND OUTCOMES

A theme that ran throughout the workshop was recognition of the complex physical and social environments in which food deserts are located. Approaches to understand some of the barriers can come from different disciplines working together.

Epidemiological

The causal links between food deserts and health have not been firmly established. Researchers may need to look at more proximal behavior changes, such as shopping behavior, and then look at dietary behavior and ultimately disease outcomes and weight. Understanding the link between food availability and changes in obesity requires a better understanding of these intermediate steps, particularly the effect on dietary intake and shopping and eating behaviors.

Research shows that people do not adjust caloric intake when they consume calories via beverages. It is not understood why this is so, nor

are the implications clear for dietary recommendations. Randomized controlled trials on the effects of low-fat versus whole milk could be conducted, especially because children over age 2 and adults are currently advised to drink lower-fat milk.

Individual foods, overall diet quality, dietary patterns, and meal size and frequency play different roles in health outcomes. Because it is important to select the right interventions on which to focus resources, it makes sense to understand better which ones make the most difference.

Geospatial and Demographic

Although researchers aggregate and analyze data by geography, people may define their neighborhoods differently, in both urban and rural settings, which makes a difference in how they define food access. Their definitions may or may not coincide with administrative boundaries, census tracts, or other top-down categories. A better understanding of spatial behavior moves from merely the supply of stores, or of food within stores, to how people make decisions based on the spatial features around them. In addition, research to date has used the home as the central point, yet some people shop after work or in combination with other places they frequent during their day.

Formative research, with participation by community members, can help explore what stores can reasonably offer as healthier options that satisfy the preferences of consumers from diverse cultures. An example is the food dynamic in Latino communities, in terms of whether tiendas mitigate against food deserts more than small stores in other communities, as well as the relatively high use of whole milk.

Different issues across the lifespan came to light during the workshop. These issues include:

- the connection between food deserts and child BMI;
- teenagers' sensitivity to price, marketing messages, and eating patterns that fit their schedules;
- parents' purchasing decisions for themselves and their families; and
- aging adults with limited mobility, especially in areas without public transport.

Economic

The presentations underscored consumers' responsiveness to price. Additional research is necessary to gauge the impact of changing the prices of healthy and less healthy foods, as well as how purchasing behaviors vary by income, age, racial, and ethnic group. Will there be improved

food and beverage choices if we increase the prices of caloric beverages, whole milk, or other unhealthy food choices or conversely reduce the prices of water, diet beverages, and low-fat milk? Research on price manipulation within stores as a public health intervention is limited, in part because of stores' reluctance to share pricing data. Urban regeneration stores in the UK may be more willing partners in this research than other commercial enterprises.

In addition, many argue that it is important to evaluate how individuals' perceptions affect their food access. People may have physical access, but not perceive they have economic access to healthy food.

Endogeneity is another issue that could benefit from further exploration. An endogenous factor or variable is one whose outcome is predicted by many of the same factors that arise within the model being studied. There are usually many unmeasured factors that affect both the endogenous factors and the outcome. For instance, access is endogenous to food deserts and health outcomes: those with access to supermarkets may have better diets because they choose to live near supermarkets, as healthy eating and nutrition are part of the decision-making for where residents locate. Alternatively, another endogenous factor might be the existence of a genetic susceptibility that enhances the taste of fat, increasing intake of fried fast foods and also affecting weight gain. Endogeneity may explain a great deal of the cross-sectional associations between measures of the food environment inside food deserts and food choices, obesity, and other health outcomes.

As presented at the workshop, small stores are abundant in urban and rural areas, yet usually carry little healthy food. The cost of purchasing new refrigerators and sinks in which to prepare and store perishable items is often prohibitive for many small store owners. Fear of unsold or spoiled stock may also contribute to their reluctance to purchase perishable food inventory. Finding ways around these barriers could benefit both consumers and storeowners. Finally, the effect of the recession on consumer food choice and store survival may require more clarification, because the state of the economy is uncertain.

Development of a method to assess total cost, to include price, food access, preparation time, and convenience, would assist in understanding the situation in a particular community and ways to improve it.

Social Sciences

The social, cultural, and psychological factors that influence human behavior are clearly relevant to explain how consumers interact with the food environment. The most effective interventions will be those that are sensitive to the needs of diverse populations.

On the supply side, in addition to the economic issues, there may also be a psychological component to why supermarket executives are reluctant to site stores in food deserts and why a store does not want to be the first of its kind in a neighborhood. This is in contrast to their UK counterparts that seem to be more willing partners in regenerating urban stores. If data can back up this perception, perhaps more targeted policies can ensue.

Psychosocial factors that affect small-store owners and shoppers are also important to explore, such as feelings of self-esteem, stress, and locus of control. As examples, these factors may affect how store owners and employees interact with customers, as well as how willing customers are to purchase and prepare healthy foods that might be new to them. The roles that food venues play in the community and for individuals go beyond places for commercial transactions.

Urban Planning

The public health implications of zoning and transportation are additional areas in which urban planners can contribute their expertise. The lack of transportation to existing stores is an issue for some because people do not have the means to travel outside food deserts, yet the population may be too small and dispersed to support new markets. This is an area of study where urban planners could help develop useful approaches to improving transportation infrastructure so that those lacking private transportation could gain access.

The current planning paradigm favors mixed-use "smart growth," an urban planning concept that clusters growth in the center of a city to create more walkable, lively neighborhoods and urban areas. Still to be understood is the role the food environment plays in where people choose to live and how smart growth affects health.

Policy

Policy makers could use the available findings to develop policies at federal, state, and local levels that are intended to improve dietary behavior while recognizing that many unknowns may affect final outcomes. Some of the policies identified in the workshop that will benefit from filling research gaps include the following:

- How federal and other government benefit programs can encourage healthier eating;
- The effect of taxing unhealthy food (especially sweetened beverages) and/or subsidizing healthy food; and

- The best mix of financial and other incentives to site supermarkets in food deserts and to encourage existing stores to stock healthy items.

In concert with additional research, it is important to connect conceptual data with the context of people's everyday lives and to fully explore the consequences, often unintended, of decisions around such a pervasive, personal issue as food choice.

NEXT STEPS AND CLOSING THOUGHTS

Improvements in the methodology of food desert research will be helpful for developing evidence-based, locally appropriate interventions. The interplay between supply and demand is complex. Many workshop participants expressed that a supply of healthy food needs to be available and affordable for consumers to purchase and prepare on a regular basis. However, focusing only on supply, especially when healthy items cost relatively more than less healthy options, may not have a significant impact on the health of individuals or broader communities; consumer demand—in the forms of preferences and knowledge—also affects consumption decisions and subsequently health outcomes. In addition, a caveat ran throughout the workshop that retail is but one part of a larger food environment in which both healthy and less healthy choices abound. Consumers get food messages from sources that range from the media, to family and friends, schools and other educational outlets, and underlying cultural norms. Businesses operate on thin profit margins and they constantly balance customer demand for both healthy and less healthy (but often good-tasting) choices.

To close the workshop, Barry Popkin, planning committee chair, thanked staff, speakers, and participants. Understanding food deserts is the beginning of a long set of issues to understand how to improve the diets of Americans.

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Appendix A

Planning Committee Biographies

Barry M. Popkin, Ph.D. (*Chair*), is the Carla Steel Chamblee Distinguished Professor of Global Nutrition at the University of North Carolina, Chapel Hill, where he directs the Interdisciplinary Center for Obesity. Dr. Popkin has an active U.S. research program in understanding dietary behavior with a focus on eating patterns, trends, and sociodemographic determinants; the nutrition transition and the rapid changes in obesity; dynamic changes in diet, physical activity, and inactivity; body composition changes (and the factors responsible for these changes); consequences of these changes; and program and policy options for managing change. He is active in research in the United States, as well as in studies of countries around the world funded by the National Institutes of health (NIH), including detailed longitudinal studies that he directs in China and Russia. His U.S. work includes a series of NIH grants to study how socioeconomic change linked to shifts in the built environment affects diet, activity, and obesity in the Add Health and a second 20-year long longitudinal study—CARDIA.

Ana V. Diez Roux, M.D., M.P.H., Ph.D., is professor of epidemiology, director of the Center for Integrative Approaches to Health Disparities, and associate director of the Center for Social Epidemiology and Population Health at the University of Michigan. Dr. Diez Roux is an epidemiologist whose work has focused on the examination of the social determinants of health. Her empirical work has focused on the social determinants of cardiovascular disease with special emphasis on the examination of how

residential environments shape the distribution of cardiovascular risk. She has also published on multilevel analysis and on the methodological challenges faced by epidemiology as it integrates population-level and individual-level determinants in understanding the causes of disease. Recent work also focuses on the role of air pollution exposures and psychosocial stress. Dr. Diez-Roux has been an international leader in the application of multilevel analysis in epidemiology and in the investigation of neighborhood health effects.

Joel Gittelsohn, Ph.D., is associate professor of international health at Johns Hopkins University. He is a medical anthropologist who specializes in the use of qualitative and quantitative information to design, implement, and evaluate health and nutrition intervention programs. Dr. Gittelsohn integrates both qualitative and quantitative approaches to better understand culture-based beliefs and behaviors regarding dietary patterns, and how these factors influence the success or failure of dietary and lifestyle modification strategies. He applies these methods and interventions for the prevention of obesity and diabetes among different indigenous and ethnic groups, to nutrient deficiencies of Nepalese children and women, and to improve infant feeding in diverse settings. He is currently working on chronic disease interventions among the White Mountain and San Carlos Apache (obesity prevention), the Ojibwa-Cree (diabetes prevention), African-American churchgoing women (cardiovascular disease prevention), and children and adults in the Republic of the Marshall Islands (prevention of obesity and undernutrition).

Barbara A. Laraia, M.P.H., Ph.D., R.D., is assistant professor in the Department of Medicine at the University of California, San Francisco, and co-director of COAST. Dr. Laraia is a public health nutrition investigator with a special interest in the relationships between food policy, the food environment, and health. She has expertise in qualitative methods, program evaluation, community-based research, and nutritional epidemiology. Her research focuses on household food security status and neighborhood effects on diet, weight, perinatal outcomes, and other maternal and child health issues, especially among vulnerable populations. Her current projects include measurement issues of the food and physical activity environments; influences of the food environment on diet and weight among postpartum women; and understanding the role that tiendas (Latino grocery stores) play in diet quality among Latinos.

Robin A. McKinnon, M.P.A., Ph.D., is health policy specialist at the National Cancer Institute. Dr. McKinnon works on activities intended to advance policy-relevant research on diet, physical activity, and weight.

Her research interests focus on public policies intended to reduce obesity incidence and prevalence and include: The effects of food and physical activity environments on individual diet and physical activity behavior, measurement of the food and physical activity environments, and the economic and societal effects of increased obesity rates. Dr. McKinnon earned her Ph.D. in public policy and administration at the George Washington University in Washington, DC. She also received a master of public administration from Harvard University, and a bachelor of arts degree from the Australian National University.

Joseph R. Sharkey, M.P.H., Ph.D., R.D., is associate professor of sociology in the School of Rural Public Health (SRPH) at Texas A&M University System Health Science Center. He is also director of the Texas Healthy Aging Research Network (TxHAN) and director of the Program for Research in Nutrition and Health Disparities, SRPH. One of his current research projects, "Behavioral and Environmental Influence on Obesity: Rural Context & Race/Ethnicity," aims to examine the interplay of behavioral (individual and family) and environmental (home, social, and neighborhood-community) factors, food choice, and healthful eating among African-American, Hispanic, and non-Hispanic white families of rural Central Texas. The study will use a mixed-methods approach that includes qualitative (key informant interviews, focus groups, and participant observations), quantitative (in-home surveys and household food audits), and geographic information system (GIS) technology research methods.

Appendix B

Workshop Agenda

Workshop on the Public Health Effects of Food Deserts
January 26-27, 2009

Keck Center of The National Academies
500 Fifth Street, N.W., Washington, DC
Keck 100

Monday, January 26

8:00 a.m.	Registration and check-in
8:30-8:40	Welcome and introductory remarks *Barry Popkin, Planning committee chair*
8:40-9:00	Congressionally mandated study of food deserts: Work of the U.S. Department of Agriculture (USDA) Economic Research Service *Laurian Unnevehr and Shelly Ver Ploeg, USDA Economic Research Service*
9:00-9:10	Overview of workshop *Barry Popkin, Chair*

SESSION 1: Measuring "food deserts": Demography and the dynamics of food accessibility, availability, affordability, and quality

9:10-9:30	National overview of demographics and socioeconomic status *Lisa Powell, University of Illinois at Chicago*

9:30-9:50	Urban food deserts: Perspective from Chicago and Detroit *Mari Gallagher, Mari Gallagher Research and Consulting Group*
9:50-10:10	Rural food deserts: Perspective from rural Texas *Joseph Sharkey, Texas A&M University*
10:10-10:30	The current and future dynamics of the food shopping environment *Ephraim Leibtag, USDA Economic Research Service*
10:30-10:45	Break
10:45-11:45	Moderated Panel Discussion *Moderator: Heidi Blanck, Centers for Disease Control and Prevention (CDC) National Center for Chronic Disease Prevention & Health Promotion*
11:45-1:00	Lunch on your own

SESSION 2:	**Challenges in identifying causal effects of food environment on health**
1:00-1:20	A view from an epidemiological approach *Ana Diez Roux, University of Michigan*
1:20-1:40	A view from a geospatial approach *Steven Cummins, University of London*
1:40-2:00	A view from an economic approach *Yan Song, University of North Carolina at Chapel Hill*
2:00-2:45	Moderated Panel Discussion *Moderator: Jill Reedy, National Cancer Institute, National Institutes of Health (NIH)*
2:45-3:00	Public Comment Period
3:00-3:15	Break

SESSION 3: The potential health consequences of changes to diet

3:15-3:35	Effects of select dietary factors on obesity *Richard Mattes, Purdue University*
3:35-3:55	Effects of select dietary factors on cardiovascular diseases and cancer *Frank Hu, Harvard School of Public Health*
3:55-4:45	Moderated Panel Discussion *Moderator: Wendy Johnson-Askew, National Institute of Diabetes and Digestive and Kidney Diseases, NIH*
4:45-5:00	Wrap-up for the day *Barry Popkin, Chair*
5:00	Adjourn
5:00-6:00	Conversation and light refreshments

Tuesday, January 27

8:00 a.m.	Registration and check-in
8:30-8:40	Welcome and overview of day 2 of the workshop *Barry Popkin, Planning committee chair*

SESSION 4: Changing food deserts: Lessons from current intervention research

8:40-9:00	Overview of efforts to change the food environment *Joel Gittelsohn, Johns Hopkins University*
9:00-9:20	Effect of introducing new supermarkets *Neil Wrigley, University of Southampton*
9:20-9:40	Intervening in small Hispanic grocery stores (tiendas) *Guadalupe "Suchi" Ayala, San Diego State University*
9:40-9:50	Break to set up videoconference

9:50-10:10	Developing and supporting farmers markets *Andrew Smiley, Sustainable Food Center (via videoconference)*
10:10-10:30	Break
10:30-11:30	Moderated Panel Discussion *Moderator: Terry Huang, National Institute of Child Health and Human Development, NIH*
11:30-1:00	Lunch on your own

SESSION 5: Policy and program options to increase food accessibility in a dynamic food environment

1:00-1:15	Top-down approach—New York as a case study *Cathy Nonas, New York City Department of Health & Mental Hygiene*
1:15-1:30	Bottom-up approach *John Weidman, The Food Trust*
1:30-1:45	Community-level food environment *Andy Fisher, Food Security Coalition*
1:45-2:00	Evaluation of the SNAP (Supplemental Nutrition Assistance Program) and WIC (Women, Infants, and Children) pilot program changes *August Schumacher, Jr., Kellogg Foundation*
2:00-2:15	How do grocers site store locations? *Bill Drake, Cornell University*
2:15-2:30	Break
2:30-3:15	Moderated Panel Discussion *Moderator: Robin McKinnon, National Cancer Institute, NIH*
3:15-3:45	Break

SESSION 6: Research gaps and needs

(To provide input about gaps and future research needs, please submit notecards to staff by 2:30 p.m. prior to the panel discussion in session 5.)

3:45-4:15	Summary of research gaps and needs discussed at workshop and standards needed for evaluating interventions *Robin McKinnon, National Cancer Institute, NIH*
4:15-4:30	Closing remarks *Barry Popkin, Chair*
4:30	Adjourn

Appendix C

Speaker and Moderator Biographies

Guadalupe X. "Suchi" Ayala is an associate professor in the Division of Health Promotion in the Graduate School of Public Health, San Diego State University. She is co-principal investigator (co-PI) of the San Diego Prevention Research Center and a co-investigator on the Hispanic Community Health Study (Proyecto SOL). Dr. Ayala's primary areas of research include: (1) examining sociocultural and environmental determinants of Latino health, specifically diet, physical activity, and risk of overweight and obesity; and (2) developing family- and community-based interventions to promote Latino health, including working with tiendas to promote healthy eating. She has received more than 10 grants as a PI, including funding from the National Cancer Institute, the Centers for Disease Control and Prevention (CDC), the American Cancer Society, and the United States Department of Agriculture (USDA), which have resulted in 41 manuscripts and 9 book chapters.

Heidi Blanck is the team lead for Nutrition Research and Surveillance at the CDC in the Division of Nutrition, Physical Activity, and Obesity. Dr. Blanck is an epidemiologist and oversees CDC's monitoring of nutrition behavior and environmental and policy supports for fruits and vegetables and breastfeeding target areas. Her research interests include the effects of the environment on individual dietary behavior, measurement of the community and consumer food environment, and policies intended to improve access to healthy foods. She coordinates the State Food Environment Workgroup, a forum for states and researchers to share food

environment tools. She also serves on the planning committee for the upcoming Food Systems and Public Health Meeting and on the National Collaborative on Childhood Obesity Research (NCCOR) Policy Surveillance Workgroup. Her current projects include a population-based assessment of American's perceptions of affordability, access, and availability of fruits and vegetables and assessment of state policies intended to improve the access and availability of fruits and vegetables.

Steven Cummins is a geographer with training in epidemiology and public health. He is currently senior lecturer and National Institute for Health Research (NIHR) fellow in the Department of Geography, Queen Mary, University of London, where he leads the Healthy Environments Research Programme. Dr. Cummins' primary research interests are in the contextual and socioenvironmental determinants of health and the design and evaluation of community social and policy interventions to improve population health. He is currently a member of the UK Food Standards Agency Social Science Research Committee and the NIHR Public Health Research Programme Funding Board. In 2007, he was awarded a Philip Leverhulme Prize for his work on the socioenvironmental determinants of health.

Bill Drake is a senior extension associate and director of executive education with the Food Industry Management Program (FIMP) at Cornell University. Mr. Drake developed and directs the National Association of Convenience Stores Leadership Executive Program and the National Grocers Association Executive Leadership Program. In addition, he teaches in the Food Executive Program, United Fresh Executive Leadership Program, and FIMP's various international food executive programs. Prior to Cornell, Mr. Drake spent 20 years as an executive with SuperValu Inc., a large U.S. food retailer.

Andy Fisher is co-founder and executive director of the Community Food Security Coalition (CFSC), a national association of 260 organizations working to create a just and sustainable food system. CFSC has spearheaded the development of a national food and farming movement centered on connecting farmers and consumers and improving access to healthy foods in low-income communities. Mr. Fisher is a leading expert in the field of food security and has coauthored numerous articles and studies on the topic. He has served on the board of the National Campaign for Sustainable Agriculture and the California Sustainable Agriculture Working Group. He holds graduate degrees from the University of California at Los Angeles (UCLA) in environmental policy and Latin American studies.

Mari Gallagher is president of the Mari Gallagher Research & Consulting Group and the newly formed National Center for Public Research. Ms. Gallagher authored *Examining the Impact of Food Deserts on Public Health in Chicago*, a breakthrough study that popularized the term "food desert" nationally and encouraged Congressman Bobby Rush to enter food desert language into the Farm Bill. She was the first to develop a block-by-block metric for food deserts and food balance linked with health measures and has since done similar work in Detroit; rural Michigan; Louisville, Kentucky; Harlem; Richmond, Virginia; and other areas.

Frank Hu is professor of nutrition and epidemiology at the Harvard School of Public Health. He also serves as director of the Boston Obesity and Nutrition Research Center Epidemiology and Genetics Core. His research is focused primarily on epidemiology and prevention of Type 2 diabetes and metabolic diseases through diet and lifestyle. He is also interested in gene-environment interactions in relation to obesity, Type 2 diabetes, and cardiovascular complications.

Terry Huang is director of the Obesity Research Strategic Core at the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHHD), National Institutes of Health (NIH). Dr. Huang plays a major role in developing new research directions and funding priorities in the area of pediatric obesity at the NICHHD and across the NIH. He is currently leading an agenda on global multilevel research in pediatric obesity and has special interest in society-biology interactions in obesity and chronic disease, multilevel prevention strategies, international health, pediatric metabolic syndrome, fetal and childhood antecedents of obesity and metabolic abnormalities, and the translation of science to policy in the prevention of obesity and chronic disease. Dr. Huang is a fellow of the Obesity Society (TOS) and councilor on the Pediatric Obesity Section of TOS. In addition, he serves on the Senior Leadership Group of the NIH Obesity Research Task Force and represents the NICHHD nationally and internationally on panels related to pediatric obesity. Dr. Huang received his Ph.D. in preventive medicine and M.P.H. in epidemiology and biostatistics from the University of Southern California. Prior to joining the NIH, he served on the faculty of the University of Kansas Medical Center and Tufts University's Friedman School of Nutrition Science and Policy.

Wendy Johnson-Askew is public health nutrition and health policy adviser for the Division of Nutrition Research Coordination within the National Institutes of Health. Prior to coming to NIH, Dr. Johnson-Askew held a number of clinical nutrition management positions and nutrition faculty

positions. Dr. Johnson-Askew received her Ph.D. and M.P.H. degrees from the School of Public Health at the University of North Carolina at Chapel Hill. Her areas of research interest include community nutrition intervention strategies, community efforts to reduce or eliminate health disparities, effective nutrition communication strategies, and community-based anti-hunger efforts. Dr. Johnson-Askew has been actively involved in follow-up actions to the Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity, and she speaks to a wide variety of audiences on the topic.

Ephraim Leibtag is a senior economist with USDA's Economic Research Service. He researches retail food prices and the dynamics of retail food markets. His research interests include tracking, forecasting, and analyzing trends in retail food markets, and his work is used in presentations to government officials, policy analysts, the research community, and other public audiences. Dr. Leibtag has conducted television, radio, and newspaper interviews on retail food price trends. He has M.A. and Ph.D. degrees in economics from the University of Maryland.

Richard Mattes is professor of foods and nutrition at Purdue University, adjunct associate professor of medicine at the Indiana University School of Medicine, and affiliated scientist at the Monell Chemical Senses Center. His research focuses on the areas of hunger and satiety, regulation of food intake in humans, food preferences, human cephalic phase responses, and taste and smell. At Purdue University, Dr. Mattes is the director of the Ingestive Behavior Research Center; director of the Analytical Core Laboratory for the Botanical Center for Age-Related Diseases, and chair of the Human Subjects Review Committee. Dr. Mattes earned an undergraduate degree in biology and a master's degree in public health from the University of Michigan as well as a doctorate degree in human nutrition from Cornell University. He conducted postdoctoral studies at the Memorial Sloan-Kettering Cancer Center and the Monell Chemical Senses Center.

Cathy Nonas is director of Physical Activity and Nutrition Programs for the New York City Department of Health & Mental Hygiene. A clinical dietitian by training, she has a long history in working with and writing about patients with obesity and Type 2 diabetes, both at the federally funded Obesity Research Center and as assistant clinical professor at Mt. Sinai School of Medicine. Concerned that good treatment techniques are not sustainable within an environment that promotes obesity, for the last two years she has been working on policy changes to increase access to healthy foods in underserved neighborhoods and create opportunities for physical activity for young children. Changes in daycare regulations,

permitting of 1,000 fresh fruit and vegetable vendors for city streets, and calorie posting in chain restaurants are some of the policies she has been working on.

Lisa Powell is senior research scientist in the Institute for Health Research and Policy and research associate professor in the Department of Economics at the University of Illinois at Chicago. Dr. Powell has extensive experience as an applied microeconomist in the empirical analysis of the effects of public policy on a series of behavioral outcomes. As director of the ImpacTeen Youth Obesity Research Team funded by the Robert Wood Johnson Foundation (RWJF) and as principal investigator on a Nutritional Research Initiative (NRI) USDA-funded project, much of her current research is on assessing the importance of economic and environmental factors (such as food prices and access to food stores, eating places, and parks, gyms, and other facilities for physical activity) on food consumption and physical activity behaviors and as determinants of body mass index (BMI) and the prevalence of obesity. Dr. Powell's research also examines school-level food and fitness policies and the association of school meal participation and children's weight status. In other health-related work, Dr. Powell has examined the importance of peer and parental influences on teen smoking, while other studies have highlighted the role of prices and public policies with regard to alcohol use among college students and educational and violence-related outcomes.

Jill Reedy is a program director at the National Cancer Institute in the Risk Factor Monitoring and Methods Branch in the Applied Research Program. She is a program lead for the Diet and Physical Activity Program of NIH's Genes, Environment, and Health Initiative—this program aims to develop innovative technologies to measure diet and physical activity in large-scale population studies. Dr. Reedy is a nutritionist whose research focuses on dietary patterning, dietary assessment, dietary monitoring, and the food environment. She is currently working on a comparison of different methodological approaches in dietary pattern analysis (including factor analysis, cluster analysis, and index analysis) and an ongoing compilation of measures of the food environment (available at https://riskfactor.cancer.gov/mfe).

August Schumacher, Jr., is adviser to SJH and Company and consultant with the Kellogg Foundation. He is the former under secretary for Farm and Foreign Agricultural Services at USDA. He was responsible for the domestic commodities, insurance, and farm credit operations of USDA. In addition, he was in charge of USDA's international trade and development programs. Prior to his appointment in August 1997, he was the

administrator of the Foreign Agricultural Service for three years. Before coming to USDA, Mr. Schumacher served as commissioner of the Massachusetts Department of Food and Agriculture and as a senior agricultural project officer at the World Bank. From a farm family in Lexington, Massachusetts, Mr. Schumacher attended Harvard College and the London School of Economics, and was a research associate in agribusiness at the Harvard Business School.

Andrew W. Smiley has more than 15 years' experience working in sustainable agriculture and food systems, including on-farm production, agricultural marketing, micro-enterprise development, food journalism, farmer training and technical assistance, and even food service management. Mr. Smiley received his B.A. in political science from Louisiana State University in Baton Rouge. He is the former executive director of Baton Rouge Economic and Agricultural Development Alliance, Inc. (BREADA). Andrew is an active supporter and volunteer of the Southern Sustainable Agriculture Working Group (Southern SAWG) and Texas Organic Farmers and Gardeners Association (TOFGA), and has applied his passion for organic gardening, sustainable food systems, small-scale farming, and healthy cooking to his work with Sustainable Food Center since 2005. Andrew currently works with Sustainable Food Center in Austin, Texas, as farm projects director, which includes management of several farm marketing and food systems education initiatives, including Sprouting Healthy Kids—SFC's farm-to-school pilot project.

Yan Song is assistant professor in the Department of City and Regional Planning at the University of North Carolina. Dr. Song's research areas include urban spatial structure, location choice of households and residents, smart growth and urban growth management, comparative evaluations of urban development, and urban system modeling. Dr. Song has published extensively in journals such as the *Journal of Urban Economics*, *Regional Science and Urban Economics*, *Journal of American Planning Association*, *Urban Studies*, and *Journal of Regional Science*. Her articles have regularly been among the top-downloaded articles from these journals.

John Weidman works closely with the executive director, the founder, and the senior staff of the Food Trust to oversee all programs and provide strong leadership for the organization. He develops and advances public policies at the local, state, and federal levels; and educates local, state, and federal policy makers about the factors impacting the nutrition of lower-income people. John oversees a comprehensive communications strategy, and he provided executive leadership in the successful start-up of the Headhouse Farmers' Market, Philadelphia's largest open-air

farmers market. John has 15 years of experience in public policy advocacy and nonprofit communications. He holds a master's degree in political science from the University of Pennsylvania.

Neil Wrigley is professor of geography, University of Southampton, UK, and editor of the *Journal of Economic Geography* (Oxford University Press). He is an economic geographer whose research over the past 15 years has focused on issues of retailing and consumption but who is also widely known for his earlier contributions to quantitative social science. During 1999-2003, together with colleagues in public health, he conducted and published pioneering research on issues of food poverty, diet-related health inequalities, and food retail access in underserved low-income neighborhoods of British cities. In particular, his Economic and Social Research Council (ESRC) Leeds food deserts study provided one of the first attempts to assess the consequences of the amelioration of access problems in an unsupportive local food environment following the opening of one of the UK's initial urban regeneration-focused supermarkets. Dr. Wrigley is academician of the Academy of Social Sciences; served for eight years as a member of the Research Resources & Methods Committee of the UK Economic & Social Research Council; has held Leverhulme, ESRC, and Erskine fellowships; and was senior research fellow, St. Peter's College, Oxford. Among several prizes he has received, he was most recently awarded the Royal Geographical Society's Murchison Award 2008 for his publications on the geographies of retailing and consumption.

Appendix D

Workshop Participants

Jennifer Abel, Virginia Cooperative Extension
Mariela Alarcon-Yohe, Directors of Health Promotion and Education
Guadalupe Ayala, San Diego State University
Lindsey Baker, Feeding America
Jodi Balis, Capital Area Food Bank
Neil Bania, University of Oregon
Jim Barham, United States Department of Agriculture
Heidi Blanck, Centers for Disease Control and Prevention
Daniel Block, Chicago State University
Covington Brown, Summit Health Institute of Research and Education
Erin Caricofe, Northeast Midwest Institute
Judith Chambers, Emerging Market Solutions
Susan E. Chen, Purdue University
Kay Cherry, Eastern Virginia Medical School
Cindy Chiou, Urban Design Lab at the Earth Institute at Columbia University
Dan Christenson, U.S. Senate Committee on Agriculture, Nutrition & Forestry
Andrea Collier, W.K. Kellogg Foundation Food and Society Policy Fellow
Steven Cummins, University of London
Valerie Darcey, Drexel University
Judith Dausch, American Heart Association
Adam Diamond, United States Department of Agriculture

Lorelei DiSogra, United Fresh Produce Association
Karen Donato, National Heart, Lung, and Blood Institute, National Institutes of Health
William Drake, Cornell University
Megan Elsener, Food Research and Action Center
Christa Essig, Centers for Disease Control and Prevention
Jessie Fan, University of Utah
Tracey Farrigan, United States Department of Agriculture, Economic Research Service
Andy Fisher, Community Food Security Coalition
Rachel Fisher, National Institutes of Health
Paula Ford, Kansas State University
Mari Gallagher, Mari Gallagher Research & Consulting Group
Karen Glanz, Emory University
Sonya Grier, American University
Barbara Harrison, Affliation Unknown
Arnell Hinkle, California Adolescent Nutrition and Fitness
Frank Hu, Harvard School of Public Health
Terry Huang, National Institutes of Health
Wendy Johnson-Askew, National Institutes of Health
Eugene Kim, Affliation Unknown
Kelly Kinnison, United States Department of Agriculture, Food and Nutrition Service
Rebecca Klein, Johns Hopkins Center for a Livable Future
Vivica Kraak, Save the Children
Michael LeBlanc, United States Department of Agriculture, Economic Research Service
Laura Leete, University of Oregon
Ephraim Leibtag, United States Department of Agriculture, Economic Research Service
Angela Liese, University of South Carolina
Richard Mattes, Purdue University
Meredith McGehee, California WIC Association
Ruth Morgan, Altarum Institute
Kelly Morrison, World Hunger Year
Annie Moss, Montefiore School Health Program
Suzanne Murphy, University of Hawaii
Kathryn Neckerman, Columbia University
Ronnie Neff, Johns Hopkins Bloomberg School of Public Health
Jonathan Nomachi, Community Health Councils
Cathy Nonas, New York City Department of Health & Mental Hygiene
Julie Obbagy, N. Chapman Associates
Lisa Marie Powell, University of Illinois at Chicago

Rose Pribilovics, Summit Health Institute of Research and Education
Marnie Purciel, Columbia University
Jill Reedy, National Cancer Institute
August Schumacher, Kellogg Foundation
Naomi Senkeeto, American Diabetes Association
Andrew Smiley, Sustainable Food Center
Robert Andrew Smith, The Leaflight, Inc.
Yan Song, University of North Carolina at Chapel Hill
Andrea Sparks, United States Department of Housing and Urban Development
Kathryn Strong, Physicians Committee for Responsible Medicine
Linda Thompson, Howard University
Sarah Treuhaft, PolicyLink
Debra Tropp, United States Department of Agriculture, Agricultural Marketing Service
Elizabeth Tuckermanty, United States Department of Agriculture, Cooperative State Research, Education, and Extension Service
Laurian Unnevehr, United States Department of Agriculture, Economic Research Service
Shelly Ver Ploeg, United States Department of Agriculture, Economic Research Service
Wendy Wasserman, Farmers Market Coalition
John Weidman, The Food Trust
Neil Wrigley, University of Southampton, UK

CARLA SCHROYER TESTIMONY 1.pdf
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Position: FAV

CAN
Community Assistance Network
Helping People. Changing Lives.

February 6, 2024

Attention: Members of the Maryland Senate Finance Committee

Thank you for the opportunity to provide written testimony considering SB 98.

My name is Carla Schroyer, and I am the Director of Community Choice Pantry Services at Community Assistance Network. Community Assistance Network (CAN) is the designated anti-poverty organization serving all of Baltimore County, Maryland. Born from President Lyndon B. Johnson's war on poverty, and established in 1965, CAN's Mission is to work in partnership with the community to develop, operate, and support programs that reduce vulnerability and empower personal growth, dignity, stability, and self-sufficiency among people in Baltimore County experiencing economic challenges. We are part of a network of over one-thousand community action agencies and one of seventeen in Maryland. CAN provides programs to address food, housing, income security and self-sufficiency.

CAN is in support of Senate Bill 98 which calls for the Department of Housing and Community Development to conduct a Food Desert Study to analyze the location of food deserts in the State, make recommendations to reduce the number of food deserts in the State and determine the impact of food deserts on the local population and economy. As Director of Community Choice Pantry services, I see the impact that food insecurity has on the neighbors that we serve as evidenced in the neighbor impact statements that I have attached. Based on my daily interaction with Baltimore County neighbors, feedback from partner agencies and calls received indicating a need for pantry service, we know that there are countless other constituents with barriers to food access such as lack of transportation, lack of funds needed to travel to agencies like CAN, grocery or drug stores, and the absence of grocery stores, drug stores and Community Based Organizations (CBOs) in close proximity to their residence.

Turner's Station is a community in Dundalk within CAN's 21222 service area that is a food desert. So far, this fiscal year CAN served 2058 households, 772 of which reside within the 21222-zip code. There is no grocery store or drug store in the community which makes it difficult for individuals to access healthy, nutritious food and medicine. There is a "dollar store" near the community, however, neighbors cannot access meat, eggs, cheese, milk, fresh produce, or other healthy food options. The cost of food when purchased at "dollar stores" is higher than if the same product was purchased at a grocery store. In addition to lack of access to healthy food and an increased cost, neighbors living in food deserts are not

afforded the same dignity of choice that neighbors who do not live in a food desert are afforded, especially when we consider religious and cultural observations.

Conducting a food desert study will empower communities to make lasting changes. Based on positive improvements that CAN has made to our facility and food access processes I have several recommendations. Provide access to healthy, nutritious food and medicine in communities where these resources are lacking. Over time we will observe improved physical health of the community members. Provide community members with the dignity of choice in their local grocery store so that they are afforded the opportunity to feel a sense of ownership and pride in their community. Over time I submit to you that in neighborhoods where these changes are made, we will observe improved mental health and a decline in crime. The findings of this study will also allow us to learn what additional resources such as community-based organizations are needed in food desert communities throughout Maryland and ultimately, agencies like CAN and those working on the front lines to alleviate poverty will be able to best serve the constituents of Maryland.

I urge you to vote in favor of SB 98. We can make a difference in the lives of all Marylanders and plant the seed of change.

2/18/23

Neighbor Impact Statement

CAN Food Pantry is a great asset and help to many in the community. I work with many in the community who are not able to afford many basic necessities. The food pantry not only offers food assistance, but help with household items as well. With the rising cost of living, a monthly visit to the food bank is the difference between balanced meals and less nutritious options. The pantry also offers a sense of dignity and ownership by allowing those in need to shop and select items. Overall, the pantry serves the community in many different capacities and is a beneficial resource to the many who use it.

Erin Ghant
LCSW-C

CAN FOOD Network has helped my family monthly with food when we ~~like~~ may have been a little short on food for that week. my kids enjoy the snacks that is always availabl whenever I go shop at CAN. The staff is also amazing. They will go out of their way to make sure that we recive the services that we need and theyre always really nice. Thank you & for everything that yall do to help families in need. :)

Dear Neighbors at Can,

I have been coming here for a few years now, since you were in the old building. Your staff have been so kind & so sweet. And I have told my family & friends about Can. In these hard times, it's a blessing to know that there is a such place to go when in need.

Sincerely,
Sandra

Merry Christmas!
& A Happy New year!

I'M very grateful for CANS. I started coming during COVID before the store part was open. It was so helpful with getting food especially during that time. Now, that the store is open inside its been really nice to be able to gett whatever I want myself. Everyone is always nice and helpful. I'm very grateful for the ladies upfront and Carla for all that they do the help keep this place going.

Thanks for having us.

Jherese Mearkle

12-18-2023

Dear Neighbor At CAN (Community Assistance Network)

I Lost my Job During COVID when my Company shut down, After 28 year working for Them.

I WAS 63 years old I have (Peteroenthelmy Disc Disorder) of the spine.

Did not qualifie for ANY Med. ASSITANCE Unemployment ran out. Did not get ANY Foodstamps.

I Thank God for CAN And the Employees There, They did send me To The right place to get Help. I Apply for S.S.I. And got It

When I was walking load They gave me A walker To keep!!

I AGAIN Thank God for The Food AN Help from Them.

Cynthia J. SNAPP.

Loretta Krausz

The food pantry helps me with food after my food Stamps run out in the middle of the month. Also extra help from food pantry with Holiday help. Believe just buying Christmas dinner and the little side dishes that are good to have. Thanks to all of you that helps. Merry Christmas

Loretta Krausz

416 982 4615

Michele Alston
201 Ash Ave.
Dundalk, MD 21222

CAN:

To whom it may Concern,

I want to thank the Community Service Network for helping me and the members of my household with food, personal supplies, ~~and~~ clothes and household items. This support has made it easier to get through the month. Your staff is amazing. I thank God for this much needed support.

Sincerely,

Michele Alston-Agreimel

CoU is Very helpFul
to me and my FAmily
I enJoy CommiNG
heare the StaFF
are Very Nice heAre
FroUt Desk are Nice
I reAlly like Kala
She is So Sweets

THANK YOU
FOr all my
help
Merry Christmas
and hAPPY New YeAr.
See YOU Next YeAr
Valerie Mae

(/REPORTS)

VISIT COUNTS REPORT

2023-10-01 - 2024-02-05

Date	Households Served	Individuals Served	New Households
10/1/2023	0	0	0
10/2/2023	30	50	5
10/3/2023	4	4	3
10/4/2023	23	47	3
10/5/2023	26	39	2
10/6/2023	29	40	4
10/7/2023	0	0	0
10/8/2023	0	0	0
10/9/2023	0	0	0
10/10/2023	24	34	5
10/11/2023	37	60	0
10/12/2023	18	37	1
10/13/2023	30	51	6
10/14/2023	0	0	0
10/15/2023	0	0	0
10/16/2023	30	49	4
10/17/2023	0	0	0
10/18/2023	30	50	4
10/19/2023	23	27	7
10/20/2023	34	51	6
10/21/2023	0	0	0
10/22/2023	0	0	0
10/23/2023	27	51	6
10/24/2023	2	2	0

Date	Households Served	Individuals Served	New Households
10/25/2023	43	64	7
10/26/2023	33	48	11
10/27/2023	41	70	4
10/28/2023	0	0	0
10/29/2023	0	0	0
10/30/2023	38	64	5
10/31/2023	7	7	2
11/1/2023	33	43	5
11/2/2023	24	43	3
11/3/2023	33	67	6
11/4/2023	0	0	0
11/5/2023	0	0	0
11/6/2023	34	57	10
11/7/2023	5	5	3
11/8/2023	30	51	7
11/9/2023	22	45	3
11/10/2023	0	0	0
11/11/2023	0	0	0
11/12/2023	0	0	0
11/13/2023	38	53	3
11/14/2023	6	6	3
11/15/2023	35	54	4
11/16/2023	36	61	9
11/17/2023	37	62	3
11/18/2023	0	0	0
11/19/2023	0	0	0
11/20/2023	45	61	2
11/21/2023	6	6	0
11/22/2023	28	47	3
11/23/2023	0	0	0
11/24/2023	0	0	0
11/25/2023	0	0	0

Date	Households Served	Individuals Served	New Households
11/26/2023	0	0	0
11/27/2023	46	77	5
11/28/2023	6	6	3
11/29/2023	34	59	4
11/30/2023	23	31	5
12/1/2023	20	41	1
12/2/2023	0	0	0
12/3/2023	0	0	0
12/4/2023	25	42	1
12/5/2023	6	6	1
12/6/2023	35	52	4
12/7/2023	20	23	6
12/8/2023	26	52	2
12/9/2023	0	0	0
12/10/2023	0	0	0
12/11/2023	26	46	2
12/12/2023	5	5	0
12/13/2023	45	81	7
12/14/2023	21	33	4
12/15/2023	34	47	5
12/16/2023	0	0	0
12/17/2023	0	0	0
12/18/2023	42	65	4
12/19/2023	5	5	0
12/20/2023	36	54	4
12/21/2023	25	43	5
12/22/2023	27	40	3
12/23/2023	0	0	0
12/24/2023	0	0	0
12/25/2023	0	0	0
12/26/2023	2	2	1
12/27/2023	31	53	1

Date	Households Served	Individuals Served	New Households
12/28/2023	20	31	0
12/29/2023	24	40	5
12/30/2023	0	0	0
12/31/2023	0	0	0
1/1/2024	0	0	0
1/2/2024	20	42	6
1/3/2024	12	19	3
1/4/2024	26	37	4
1/5/2024	35	56	5
1/6/2024	0	0	0
1/7/2024	0	0	0
1/8/2024	35	57	2
1/9/2024	1	1	0
1/10/2024	14	26	2
1/11/2024	24	36	3
1/12/2024	39	63	6
1/13/2024	0	0	0
1/14/2024	0	0	0
1/15/2024	0	0	0
1/16/2024	8	11	1
1/17/2024	16	23	1
1/18/2024	34	58	5
1/19/2024	0	0	0
1/20/2024	0	0	0
1/21/2024	0	0	0
1/22/2024	37	58	5
1/23/2024	6	6	1
1/24/2024	32	43	5
1/25/2024	25	35	3
1/26/2024	24	35	1
1/27/2024	0	0	0
1/28/2024	0	0	0

Date	Households Served	Individuals Served	New Households
1/29/2024	43	66	3
1/30/2024	5	5	2
1/31/2024	30	36	6
2/1/2024	13	19	4
2/2/2024	18	28	5
2/3/2024	0	0	0
2/4/2024	0	0	0
2/5/2024	36	63	4
Totals	**2058**	**3263**	**299**

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I urge you to vote in favor of SB 98. We can make a difference in the lives of all Marylanders and plant the seed of change.

Md. Housing and Community Development Code Ann. _

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Position: FAV

Md. Housing and Community Development Code Ann. § 6-301

Current through all legislation from the 2023 Regular Session of the General Assembly; and including legislative changes ratified by the voters at the November 2022 election.

Michie's™ Annotated Code of Maryland > Housing and Community Development (Divs. I — II) > Division I. Housing and Community Programs. (Titles 1 — 11.5) > Title 6. Division of Neighborhood Revitalization. (Subts. 1 — 11) > Subtitle 3. Neighborhood Business Development Program. (§§ 6-301 — 6-311)

§ 6-301. Definitions.

(a) In this subtitle the following words have the meanings indicated.

(b)

(1) "Development costs" means the costs incurred to develop, redevelop, or expand a neighborhood business development project.

(2) "Development costs" includes the costs of:

(i) necessary studies, surveys, plans, and specifications;

(ii) architectural, engineering, or other special services, including flood plain studies, environmental audits, and critical area or wetland assessments;

(iii) land and improvements;

(iv) site preparation;

(v) construction, reconstruction, and rehabilitation;

(vi) machinery, equipment, and furnishings;

(vii) essential operating costs, including working capital and occupancy expenses;

(viii) indemnity and surety bonds and premiums on insurance;

(ix) temporary relocation expenses; and

(x) other costs determined to be acceptable by the Department.

(c) "Eligible opportunity zone" means an area designated as a qualified opportunity zone under § 1400Z-*1 of the Internal Revenue Code* that is located in Allegany County, Garrett County, Somerset County, or Wicomico County.

(d) "Food desert" means the part of a priority funding area or an eligible opportunity zone designated by the Secretary under § 6-308(c) of this subtitle.

(e) "Fund" means the Neighborhood Business Development Fund.

(f) "Microenterprise" means a business that qualifies as a microenterprise under § 6-302 of this subtitle.

(g) "Priority funding area" means an area designated as a priority funding area under *§ 5-7B-02 of the State Finance and Procurement Article.*

(h) "Program" means the Neighborhood Business Development Program.

(i)

(1) "Project" means a neighborhood business development project that receives financial assistance from the Fund.

(2) "Project" includes:

(i) a microenterprise project that receives financial assistance from the Fund; and

(ii) a food desert project that receives financial assistance from the Fund.

(j) "Small business" means a business that qualifies as a small business under § 6-302 of this subtitle.

(k) "Sustainable community" means the part of a priority funding area that:

(1) as determined by the Smart Growth Subcabinet, satisfies the requirements of § 6-205 of this title;

(2) has been designated as a BRAC Revitalization and Incentive Zone under Title 5, Subtitle 13 of the Economic Development Article; or

(3) has been designated a transit-oriented development under *§ 7-101 of the Transportation Article.*

History

An. Code 1957, art. 83B, § 4-202(a)-(d), (f), (h); *2005, ch. 26, § 2*; *2008, ch. 36, § 5*; *ch. 338, § 1*; *2010, chs. 118*, *487*; *2014, ch. 228*; *2016, ch. 482, § 2*; *2019, ch. 211, § 3*; *2021, ch. 91, § 1*.

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Md. Housing and Community Development Code Ann. _

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Md. Housing and Community Development Code Ann. § 6-308

Current through all legislation from the 2023 Regular Session of the General Assembly; and including legislative changes ratified by the voters at the November 2022 election.

§ 6-308. Business Development Program — Administration.

(a) The Department shall:

(1) administer the Business Development Program;

(2) adopt regulations to carry out the Business Development Program, including a process to designate an area as a food desert under subsection (c) of this section; and

(3) make a reasonable, good faith effort to make 25% of the Business Development Program loans and grants to microenterprises.

(b) The Department may:

(1) sell, assign, or otherwise dispose of a Program loan or revenue from a loan on terms and conditions acceptable to the Department, including selling loans at a discount, if the maximum sale proceeds in any fiscal year do not exceed limits that the Department sets by regulation;

(2) apply the proceeds received from a sale, assignment, or other disposition under item (1) of this subsection to the Fund;

(3) pledge a Program loan as security for any:

(i) business project loan, bond, or security that is issued, made, or purchased by the Community Development Administration under Title 4 of this article; or

(ii) insurance, guaranty, or credit enhancement on a Program loan or business project under § 4-223 of this article; and

(4) without approval or execution by the Board of Public Works, sell or assign any equity interest acquired under § 6-305(d) of this subtitle.

(c) The Secretary, on the recommendation of the Interagency Food Desert Advisory Committee established under § 6-308.2 of this subtitle, may designate an area as a food desert after considering the following factors:

(1) availability of fresh fruit, vegetables, and other healthy foods in the area;

(2) income levels of local residents;

(3) transportation needs of local residents and the availability of public transportation;

(4) comments from local governments; and

(5) any other factors that the Department considers relevant.

History

An. Code 1957, art. 83B, § 4-205; *2005, ch. 26, § 2*; *2014, ch. 228*; *2016, ch. 8*; *ch. 482, § 2*; *2017, ch. 636*; *2019, chs. 572*, *573*; *2022, ch. 380, § 1*.

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Article

Correlates of Healthy Eating in Urban Food Desert Communities

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Abstract: The food environment is well documented as an important emphasis for public health intervention. While theoretical models of the relationship between the food environment and dietary outcomes have been proposed, empirical testing of conceptual models has been limited. The purpose of this study was to explore which factors in nutrition environments are significantly associated with dietary outcomes in two urban, low-income, and minority food desert communities. This study analyzed cross-sectional data based on 796 participants from the Food in Our Neighborhood Study. Participants were recruited based on a random sample of addresses in neighborhood study areas, Philadelphia, PA (n = 393) and Trenton, NJ (n = 403). Main dietary outcomes were Healthy Eating Index (HEI) scores and fruit and vegetable consumption subscores computed from ASA24® assessments. Exploratory factor analysis was conducted and yielded a model of four factors with 22 items. Among four factors that emerged, three factors (Perceptions of Neighborhood Food Availability; and Household Food Challenges) were significantly correlated with dietary outcomes. My Store's Quality and Perceptions of Neighborhood Food Availability were positively correlated with vegetable consumption subscore. The Household Food Challenges factor was negatively correlated with both vegetable subscore and overall HEI score (i.e., more household challenges were associated with lower dietary scores). These findings confirmed the importance of perceived nutrition environments and household food challenges in predicting dietary outcomes among residents of two urban, low-income, and minority food desert communities.

Keywords: food access; food deserts; low-income populations; nutrition environment; community nutrition; healthy eating index

1. Introduction

In an effort to respond to the persistent and costly prevalence of diet-related disease, researchers and practitioners have embraced models of public health intervention that include shifting focus to understand how environments where we live, work, and play impact behaviors and health. One such area is the food environment [1].

Food deserts have received considerable attention, with the United States Department of Agriculture (USDA) estimating that 19 million Americans (6.2% of the U.S. population in 2015) live in low-income and low food access census tracts [2]. Areas where socioeconomic challenges coincide with

a lack of food access have stimulated public health policy, systems, and environmental strategies that specifically seek to expand healthy food access [3], and/or promote healthier in-store environments [4]. Such interventions include: healthy food financing initiatives to stimulate development of supermarkets in underserved communities; efforts to improve corner store product mix; pricing and marketing strategies; policy changes to minimum stocking requirements for Supplemental Nutrition Assistance Program (SNAP)-authorized retailers; and nutrition education in schools and retail environments [5].

Conceptual models guide research on factors that explain how nutrition environments contribute to eating behaviors. In the past decade, these models have applied an ecological framework to diet-related behavior and shifted from a purely individual focus to greater recognition that individuals interact with a complex set of social, cultural, economic, physical, and macro-level environments [6,7]. Despite the usefulness of such models, few have been tested empirically at multiple levels. Thus, the relative contribution of different aspects of the community and consumer nutrition environments on shopping behaviors, home food availability, and dietary patterns are not well articulated due to this lack of empirical research.

More recent models proposed by Green and Glanz (2015) created frameworks for a deeper understanding of the interplay between elements of community, consumer, and home food environments [8]. However, to date, empirical testing of these models has been limited, and as such, the inter- and intra-dependent relationships between neighborhood characteristics, psychosocial factors, perceptions of community food environments, home shopping behaviors, food access, and dietary outcomes are still emerging. This research seeks to address these gaps by assessing the relative contributions of critical factors of the food environment on healthy eating among residents of urban food deserts. The study design uses a multi-level application of the conceptual approach, with both person/household-level and community/store-level data. Specifically, the goal of the present analysis was to examine relative contributions of multi-level factors in the nutrition environment (i.e., perceived and observed; community, store, and household levels) on dietary outcomes in two urban, low-income, and minority food desert communities in the Northeastern United States.

This research advances the understanding of pathways in underserved communities by both testing conceptual models of perceived and observed nutrition environments in a food desert context, and examining the extent to which multi-level factors articulated in the framework contribute to fruit and vegetable intake and healthy eating measures among residents in urban food desert communities. Improved understanding of these dietary pathways is important to support frameworks for intervention in order to ultimately reduce health disparities.

2. Materials and Methods

Data for these analyses are from baseline surveys and contextual data from the Food in Our Neighborhood Study (FIONS). FIONS is a 5-year quasi-experimental natural experiment conducted in two urban, low-income, and minority communities—one in Philadelphia, PA and one in Trenton, NJ—both designated as "low access to supermarket" areas by USDA's 2015 Food Environment Atlas [9]. Neighborhood study areas were matched on socio-demographic characteristics and each comprised a contiguous three-square mile area. Cross-sectional baseline data were collected in 2017, prior to the construction and opening of a new full-service supermarket in the Philadelphia study community in early 2018 [10]. The study protocol was approved by the Institutional Review Board of University of Delaware.

2.1. Sample and Data Collection Procedures

A random sample of 2439 addresses (n = 1264 in Philadelphia; n = 1175 in Trenton) was selected from a Computerized Delivery Sequence File database of residential addresses serviced by the U.S. Postal Service and purchased from Marketing Systems Group, an address based vendor [11]. A sample of approximately 1200 randomly sampled addresses was established in each study area in order to

ensure a final sample of at least 600 participants after attrition, a figure that would power the study to compare and detect changes in dietary outcomes over time.

From the random sample of addresses, participants were recruited using door-to-door (84%) and telephone (16%) methods by trained interviewers. To be eligible for the study, participants had to be 18 years of age or older, speak English or Spanish, be the primary food shopper for the household, and live within one of the study areas. After vacancies, non-responses, ineligibles, and refusals, we enrolled a sample of 796 primary household food shoppers from January through December 2017 (Figure 1).

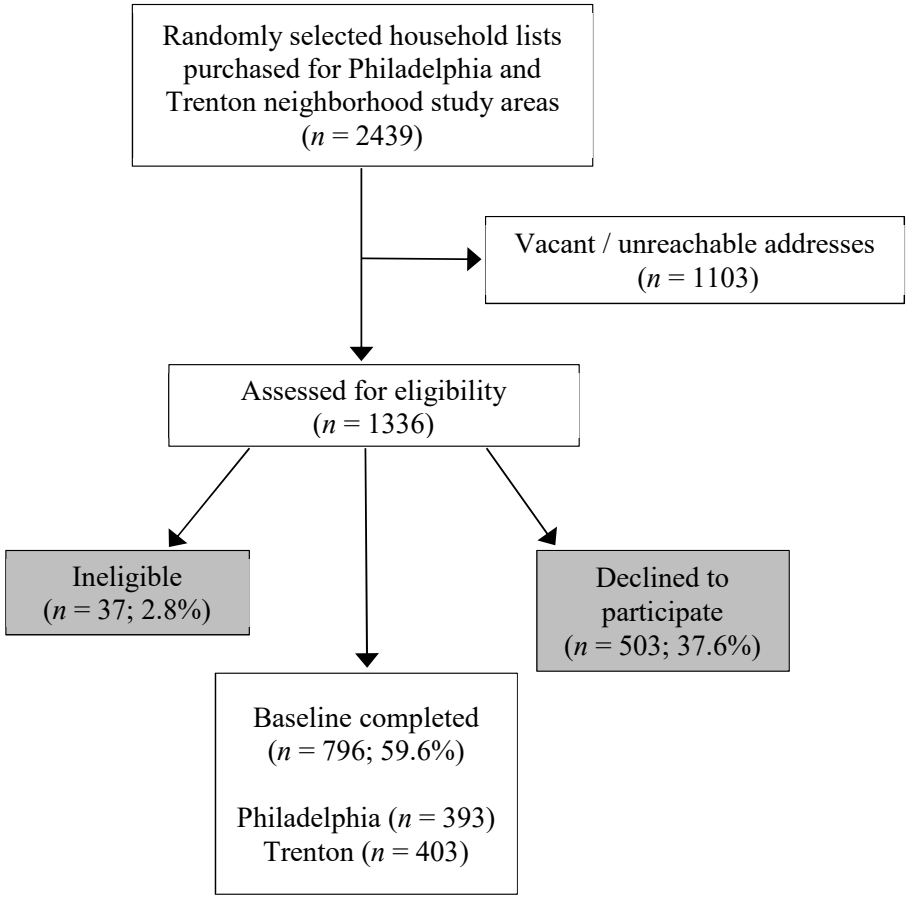

Figure 1. Selection Process for the Food in Our Neighborhood (FIONS) Study Sample.

Ethics approval was provided by the University of Delaware Institutional Review Board, study protocol # 641226 (PI Karpyn). Informed consent was obtained by study staff for all participants.

2.1.1. Participant Surveys (Shopping Preferences, Grocery Spending, Home Food Availability, Perceived Nutrition Environment, and Dietary Outcomes Data)

Study participants responded to an interviewer-administered 65-question survey comprised of ten domains and a total of 120 items. Table 1 outlines survey domains, sources, alignment with previous tests of conceptual models [8,12], and example survey questions. Survey questions were principally sourced from previously validated surveys [8,13,14]. In a few cases, as noted, the research team developed questions based on previously validated surveys. For in-home interviews (84%), heights and weights were measured using procedures from the National Health and Nutrition Examination Survey (NHANES) [15]. For interviews conducted by phone (16%), self-reported heights and weights were recorded.

Table 1. Participant Survey Domains, Sources, and Alignment with Conceptual Models of the Nutrition Environment.

	Survey Domain	Number of Questions (Items)	Sources	Conceptual Model Alignment [8,12]	Example Questions/Details
1.	Main store preferences and perceptions	10 (29 items)	Green and Glanz [8]; Dubowitz et al. [13]	Shopping Behaviors; Perceived Consumer Nutrition Environment	What is the name and address of the main store where you most often do your major food shopping?; How do you usually get to this store?; At [main food store], how hard or easy is it to get [list of food/beverage items]?
2.	Grocery spending and household food security	12	8 spending patterns questions developed based on Dubowitz et al. [13]; 2 food insecurity items from Hager et al. [14]	N/A	How much do you spend per month on groceries? How many people does this amount feed? I worried whether our food would run out before we got money to buy more (often true; sometimes true; never true)
3.	Perceptions of neighborhood food availability	1 (6 items)	Green and Glanz [8]	Perceived Community Nutrition Environment	It is easy to buy fruits and vegetables in my neighborhood (strongly disagree to strongly agree)
4.	Home food availability	4 (31 items)	Green and Glanz [8]	Home Food Environment	Indicate whether each of these food items were available in your home in the past week
5.	Neighborhood satisfaction and safety	4	Dubowitz et al. [13]	Neighborhood	I am satisfied with my neighborhood as a place to live (strongly disagree to strongly agree)
6.	Demographics	17	Dubowitz et al. [13]	Background Characteristics	Household income and size; race/ethnicity; gender; employment status; vehicle access
7.	Participation in food assistance (SNAP and WIC)	6	Dubowitz et al. [13]; 2 WIC questions developed	Background Characteristics	Did any member of your household receive [SNAP / WIC] benefits in the last year?
8.	Health status	9 (15 items)	Green and Glanz [8]; Dubowitz et al. [13]	Background Characteristics	Have you ever been told by a doctor that you have any of the following conditions? [list]; Tobacco/alcohol use; level of physical activity
9.	Height and weight	2	NHANES procedures [15]	Weight	Self-reported if surveys conducted by phone
10.	24-h dietary recall	ASA24® tool	ASA24® Dietary Assessment Tool [16]	Eating Behaviors	ASA24® (administered twice, 2 weeks apart) for dietary outcomes data (HEI score, fruit subscore, and vegetable subscore [17]

The tenth survey domain was a 24-h dietary recall using the Automated Self-Administered 24-Hour (ASA24®) Dietary Assessment Tool (National Institutes of Health, National Cancer Institute, Bethesda, MD, USA) [16]. As indicated by ASA24® protocol and to reduce bias in dietary assessment, a second 24-h dietary recall was interviewer-administered by phone two weeks after the first data collection. The recalls were conducted on weekdays and weekends. An SAS code from the National Institutes of Health was used to calculate dietary outcome measures from ASA24® dietary assessment data [17]. Dietary outcomes data analyzed were healthy eating index (HEI) score, fruit consumption subscore, and vegetable consumption subscore from participant ASA24® dietary assessments.

The majority of survey items in analyses were ordinal level variables asked on either a four-point or five-point scale. Examples of four-point Likert items were "not at all important" to "very important", while others were scaled "never/rarely" to "almost always". All five-point scaled items were on a scale of "strongly disagree" to "strongly agree". Continuous variables (e.g., age, distance from home to main store, grocery spending, and fruit and vegetable spending) were converted to ordinal variables for easier interpretation and to maintain consistency in item type across factor analysis. Cut points for categories were determined in ways that optimized even distribution of responses across categories.

2.1.2. Store Audits (Observed Nutrition Environment Data)

This study also collected data on observed nutrition environments in supermarkets and corner stores from both study neighborhoods using Nutrition Environment Measures Survey (NEMS) tools. NEMS assessments were conducted in a total of 29 supermarkets and 31 corner stores using NEMS-S and NEMS-CS tools, respectively [18,19]. Both types of retail outlets were scored on availability, price, and quality of both healthier and less-healthy food items.

Audits were conducted at all eligible supermarkets in a two-mile buffer around both study areas as well as in a random sample of corner stores within both three-square-mile study areas. A master store list was compiled in 2016 from Nielsen trade data and publicly available lists of SNAP retailers [20]. Supermarkets were eligible if they were conventional, chain-operated supermarkets, not supercenters or warehouses, had at least two checkout areas, and were within the two-mile buffer around the study areas. Twenty NEMS-S assessments were completed in Philadelphia, out of 21 eligible supermarkets (95%; 1 refusal), while nine NEMS-S assessments were completed in Trenton, out of 11 eligible supermarkets (82%; 1 refusal, 1 missing data).

Corner stores were eligible if they were chain or independent convenience stores, or superettes, located within the study areas. Pharmacies (e.g., RiteAid, CVS) and dollar stores (e.g., Dollar General) were excluded. Among eligible corner stores, a random sample of 22 locations was selected per study area. NEMS-CS assessments were completed in 18 of the 22 corner stores in Philadelphia out of 87 eligible (21%; 4 refusals), while NEMS-CS assessments were completed at 13 of the 22 corner stores in Trenton out of 38 eligible (34%; 9 refusals).

In order to analyze observed nutrition environment scores for individual respondents, and not only for each study area, geospatial and Bayesian statistical methods were used. This resulted in calculation of an estimated NEMS score for each study participant address, based on measured NEMS scores. For chain stores where a NEMS score was calculated for at least one location, we assigned the same or average score to other stores in the same chain. Other stores were assigned the average observed NEMS score for that class of store—i.e., supermarket, Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)-authorized corner store, or corner store not authorized by WIC. We then interpolated a raster surface using the Empirical Bayesian Kriging option in ArcGIS 10.6 Geostatistical Analyst [21] to estimate a NEMS value for each individual participant address. Kriging is a geostatistics method often applied in environmental and earth sciences to predict unknown values based on spatial patterns in sampled data [22]. Estimated NEMS scores were assigned to each participant address using the Extract Values to Points tool in ArcGIS 10.6 Spatial Analyst [21]. NEMS scores ranged from 8.3 to 23.9 (mean = 15.6; SD = 3.4).

2.1.3. Statistical Analyses

Analyses were conducted in two stages: exploratory factor analysis (EFA) and use of a Multiple Indicator Multiple Causes (MIMIC) model.

Exploratory Factor Analysis

In the first stage, an EFA was conducted to identify a viable factor structure among over 120 items from participant surveys. We employed EFA over confirmatory factor analysis (CFA) to allow items to load freely onto factors. Utilization of EFA allowed data to define factors based solely on empirical correlations between items. Mplus version 8.3 with default Geomin rotation was used to allow for correlated factor structures [23]. Exploratory factor analyses were repeated until the following criteria were met: (1) items had factor loadings greater than or equal to 0.40; and, (2) items had secondary factor loadings greater than or equal to 0.30. Items that did not meet these criteria were removed one item at a time.

EFA yielded four factors comprised of 22 indicator items. Table 2 shows the four factors, their factor loadings, and corresponding item names that were retained based on goodness of fit statistics. We interpreted factors by examining item content and patterns of coefficients. Items loading onto *My Store's Quality* (Factor 1) include store cleanliness, availability of fresh foods, and store healthy programs. Items loading onto *Perceptions of Neighborhood Food Availability* (Factor 2) include quality, selection and ease of buying healthy foods in the community. Items loading onto *Neighborhood Safety* (Factor 3) characterize neighborhood satisfaction, walkability and violence. Items loading onto *Household Food Challenges* (Factor 4) reflect availability of unhealthy items in the home, lower grocery and fresh fruit and vegetable expenditures, and transportation barriers.

Table 2. Factors, Items, and Factor Loadings Identified in Exploratory Factor Analysis of FIONS Participant Survey [a].

Factor and Item Descriptions	Factor Loadings
FACTOR 1: My Store's Quality (8 items)	
Store Cleanliness Score	0.727
Store Availability of Fresh Meats Score	0.713
Store Availability of Fresh Fruits and Vegetables Score	0.682
Store Staff Friendliness Score	0.605
Store Prices Score	0.557
Store Signs to Encourage Healthy Foods Score	0.552
Store Programs to Help Me Buy Healthy Foods Score	0.443
Store Difficulty Getting Lean Meats Score	−0.433
FACTOR 2: Perceptions of Neighborhood Food Availability (6 items)	
Low-fat Products in My Neighborhood are High Quality	0.901
Large Selection of Fruits and Vegetables in My Neighborhood	0.895
Large Selection of Low-fat Products in My Neighborhood	0.892
Easy to Buy Fruits and Vegetables in My Neighborhood	0.871
Easy to Buy Low-fat Products in My Neighborhood	0.867
Fruits and Vegetables in My Neighborhood are High Quality	0.865
FACTOR 3: Neighborhood Safety (4 items)	
I Feel Safe Walking in My Neighborhood During the Evening	0.810
I Am Satisfied with My Neighborhood as a Place to Live	0.703
Violence is a Problem in My Neighborhood	−0.659
I Often Walk Places in My Neighborhood	0.466
FACTOR 4: Household Food Challenges (4 items)	
Amount Spent per Month on Fruits and Vegetables (per person; categorical)	−0.712
Amount Spent per Month on Groceries (per person; categorical)	−0.634
Home Availability of Unhealthy Food and Beverage Items Score	0.422
Does Not Drive Own Vehicle to Main Food Store	0.408

[a] Selection criteria: primary factor loadings ≥ ± 0.40.

Multiple Indicator Multiple Causes Model

In the second stage of analyses, we extended EFA findings to explore relationships between latent factors and covariates using a Multiple Indicator Multiple Causes (MIMIC) model. The MIMIC model allows for simultaneous evaluation of correlations between multiple latent factors and covariates [24]. Moreover, the MIMIC model allowed us to estimate effects of latent factors on dietary outcome measures (i.e., HEI score, fruit consumption subscore, and vegetable consumption subscore). The MIMIC model process followed required steps: (1) confirming fit of the model using CFA on the 22 items that emerged from EFA; (2) adding covariates to the model to examine their effects on latent factors; and, (3) developing regression models between each latent factor and dietary outcomes (HEI score, fruit consumption subscore, vegetable consumption subscore), while controlling for significant covariates [24].

In final analyses, regression models were developed to examine the extent to which the four latent factors were related to dietary outcomes (HEI score, fruit consumption subscore, and vegetable consumption subscore), while controlling for 11 covariates that remained independently and significantly correlated with latent factors: age, gender, Black/African-American race, Hispanic ethnicity, general health status, physical activity, smoking status, alcoholic drinks per month, SNAP or WIC participation, household income category, and household size (education level and household food insecurity were dropped from the model).

3. Results

The study sample reflects demographics of urban, minority and low-income food desert communities. Table 3 shows characteristics of participants by study area. Across the FIONS sample, 60% were African American; 17% were Hispanic; 55% of households had annual incomes less than USD 30,000; 45% reported receiving SNAP or WIC in the past year; 58% experienced at least some food insecurity; 54% had a high school education or less; and mean body mass index (BMI) was in the obese range (mean 30.98). Study participants from Philadelphia and Trenton lived an average of 2.03 and 2.46 miles (median of 1.43 and 1.70 miles, $p = 0.173$), respectively, from the main store where they reported doing major food shopping. Over half the sample (57%) reported getting to their main store by driving their own vehicle.

Table 3. Background Characteristics of Study Participants by Food Desert Area.

Background Characteristics	Total (n = 796) [a]	Philadelphia (n = 393)	Trenton (n = 403)	
	% or Mean (SD)	% or Mean (SD)	% or Mean (SD)	p-Value
Age (mean)	46.93 (15.24)	45.38 (14.64)	48.48 (15.69)	0.005
Gender				
Female	68.93	78.12	59.95	<0.001
Male	31.07	21.88	40.05	
Race/Ethnicity				
Black/African American	60.43	54.96	65.76	0.002
Hispanic or Latino	17.09	18.83	15.38	n.s.
White	25.00	28.24	21.84	0.037
Education				
<High school	14.75	12.76	16.71	n.s.
High school graduate or GED	38.97	37.76	40.15	
More than high school	46.28	49.49	43.14	
Annual Household Income Category				
<USD 10,000	23.04	18.73	27.65	n.s.
USD 10,000–30,000	32.29	31.68	32.94	
USD 30,000–60,000	27.45	30.85	23.82	
>USD 60,000	17.21	18.73	15.59	
Household Size				
Number of people to feed (mean)	3.24 (1.94)	3.58 (2.05)	2.91 (1.78)	<0.001

Table 3. *Cont.*

Background Characteristics	Total (n = 796) [a]	Philadelphia (n = 393)	Trenton (n = 403)	
	% or Mean (SD)	% or Mean (SD)	% or Mean (SD)	p-Value
SNAP or WIC Participation				
Participated in either in past year	45.35	55.06	35.88	<0.001
Household Food Insecurity				
One or both food insecurity conditions sometimes or often true	58.04	54.71	61.29	n.s.
General Health Status				
Poor	6.28	6.11	6.45	n.s.
Fair	31.16	32.06	30.27	
Good	38.32	36.90	39.70	
Very Good	15.70	16.79	14.64	
Excellent	8.54	8.14	8.93	
Physical Activity Level				
Mostly sedentary	12.81	11.45	14.14	n.s.
Moderately active	51.51	53.69	49.38	
Moderately to very active	17.59	19.85	15.38	
Very active (at least 5 days/week)	18.09	15.01	21.09	
Current Cigarette Smoker	36.93	31.81	41.94	n.s.
Alcoholic Drinks Per Month (mean)	9.70 (33.24)	9.91 (37.74)	9.49 (28.19)	n.s.
BMI (mean)	30.98 (8.11)	31.30 (8.23)	30.66 (7.99)	n.s.

[a] Table 3 reflects valid percentages. Data were missing for <2% of the sample for all characteristics listed, except annual household income which was missing ("refused" or "don't know") for 12% of the sample.

The four-factor MIMIC model with 22 indicator items and without background characteristics as covariates yielded the following fit indices: $\Delta CFI = 0.99$; $\Delta TLI = 0.98$; $RMSEA = 0.05$, an excellent fit. Each indicator had a significant relationship at $p \leq 0.05$ with its corresponding factor. This model emerged from over 120 survey items tested.

The fit of this model plus 11 covariates was similar to the initial MIMIC model ($\Delta CFI = 0.98$; $\Delta TLI = 0.98$; $RMSEA = 0.04$). The majority of covariates were not statistically significant in the final model, with the following exceptions. Females were more likely to report higher scores on the My Store Quality factor (Factor 1). Identifying as Black/African American and number of people to feed in the household were significantly and directly related to the Household Food Challenges factor (Factor 4). Household income and having a female food shopper for the household were indirectly related with this this factor (i.e., higher income and female shopper households faced less household food challenges).

In examining relationships between four latent factors and three main dietary outcomes, My Store's Quality and Perceptions of Neighborhood Food Availability (Factors 1 and 2, respectively) had significant positive relationships with vegetable consumption subscore ($\beta = 0.11$, p-value = 0.04; $\beta = 0.12$, p-value = 0.02, respectively). Household Food Challenges (Factor 4) had a significant negative relationship with both HEI score and vegetable consumption subscore ($\beta = -0.23$, p-value < 0.01; $\beta = -0.19$, p-value < 0.01, respectively).

Table 4 shows correlations between the four factors, controlling for covariates. Neighborhood Safety (Factor 3) had statistically significant small to moderate positive correlations with both My Store's Quality (Factor 1) and Perceptions of Neighborhood Food Availability (Factor 2). These same two factors, My Store's Quality and Perceptions of Neighborhood Food Availability, were positively correlated to each other. Other correlations were not statistically significant.

Figure 2 depicts statistically significant factors and confirmatory pathways from this research, as well as alignment with constructs from prior research on the NEMS-P framework [8,12]. This research demonstrates how previous conceptual models of nutrition environments are applicable in urban food desert settings.

Table 4. Correlation Coefficients for Factors Identified from Exploratory Factor Analysis of FIONS Survey Variables.

Title	My Store's Quality	Perceptions of Neighborhood Food Availability	Neighborhood Safety	Household Food Challenges
My Store's Quality	–	–	–	–
Perceptions of Neighborhood Food Availability	0.181 *	–	–	–
Neighborhood Safety	0.164 *	0.243 *	–	–
Household Food Challenges	−0.071	0.079	0.028	–

* $p < 0.05$, two-tailed.

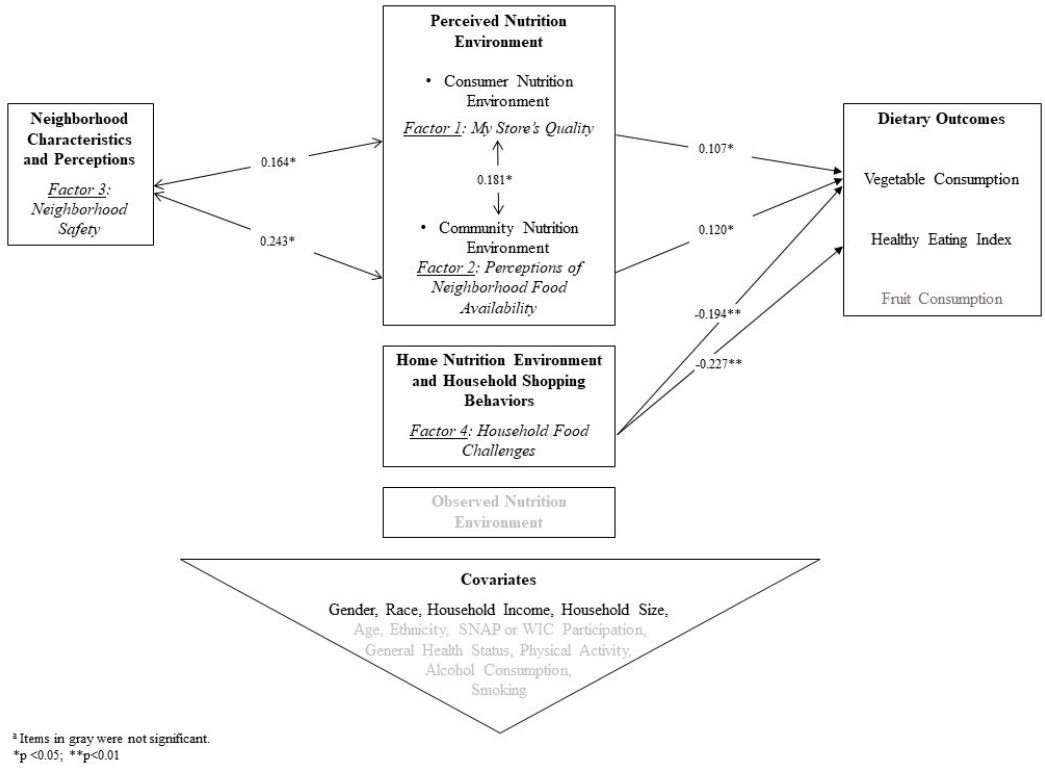

Figure 2. Identified Pathways Among Key Factors Which Contributed to Dietary Outcomes in Urban Food Desert Communities [a].

4. Discussion

This study makes a unique contribution to emerging research on the inter-relationship between perceived and observed nutrition environments, and eating behaviors, as first outlined in frameworks developed by Green and Glanz (2015) and Alber et al. (2018) [8,12]. Alber et al. (2018) found that self-reported perceptions of the food environment were significantly associated with observed measures of the food environment, and that higher perceived prices of fresh fruits and vegetables was moderately associated with BMI [12].

Two latent factors with confirmatory pathways that emerged from this study—perceptions of neighborhood food availability and perceptions of store quality—align with the constructs of perceived community nutrition environment and perceived consumer nutrition environment in the NEMS-P framework. Household Food Challenges (Factor 4) was significantly and negatively associated with both HEI score and vegetable consumption subscore, suggesting more challenging conditions in the home (i.e., less spending per person on groceries, and fruits and vegetables in particular, combined with availability of unhealthy food choices) make it more difficult to achieve a healthy

diet. Further, the confirmatory pathway of the Household Food Challenges factor aligns with parallel constructs from the NEMS-P framework, namely home nutrition environment.

Though the Neighborhood Safety factor (Factor 3) did not have a direct statistically significant relationship to dietary outcome scores, it had significant correlations with two other factors that were significantly related to the vegetable consumption subscore. Therefore, Neighborhood Safety is included as a modifier in the summary model of identified pathways (Figure 2).

We found strong confirmatory pathways for perceived nutrition environment factors and dietary outcomes, except for the fruit consumption subscore. Previous research has documented major deficits in fruit consumption among low-income households [25]. Gregory et al. (2019) found that food insecure households consume only about half the fruit that food-secure households do [25]. The overall low levels of fruit consumption and low variability in this outcome among low-income, urban, and minority food desert communities make it difficult to pinpoint risk factors, apart from household income, that are actionable.

NEMS scores estimated for individual participant addresses did not confirm conceptual pathways of the observed food environment, perhaps because of the variability in shopping patterns. Cannuscio et al. (2013) found that, whenever possible, shoppers in underserved areas of Philadelphia chose supermarkets with higher NEMS scores that offered more variety and more healthful options, even when those stores were further away [26]. However, residents of food deserts disproportionately relied on smaller nearby stores with limited food items and unhealthy immediate food environments [26]. Interventions to improve dietary outcomes must address food store proximity as well as making a diversity of healthful foods available. Future analyses can further explore the link between access to a vehicle and shopping at stores with higher NEMS scores.

This research supports refinement of the NEMS-P model given that Neighborhood Safety (Factor 3) emerged as a significant correlate of My Store Quality and Perceptions of Neighborhood Food Availability (Factors 1 and 2, respectively). Previous conceptual work in the urban health field has hypothesized why neighborhood social environment should be considered a critical pathway for obesity prevention [27]. While Neighborhood Safety (Factor 3) was not a significant predictor of dietary quality scores in the current study, its statistically significant correlations with other confirmed factors in the model (Figure 2) suggest that more research is needed to further elucidate these inter-relationships, especially in urban areas.

This study found that the Household Food Challenges factor (Factor 4) was significantly and negatively associated with HEI score and vegetable consumption subscore. The four components of this factor are: (1) lower household grocery spending per person; (2) lower household fruit and vegetable spending per person; (3) more unhealthy food items available in the home in the past week; and, (4) lack of access to a vehicle to get to the household's main store. Accordingly, this research provides empirical evidence to support previous research that conceptualized these items as predictors of dietary quality. The importance of both grocery and fruit and vegetable spending on dietary quality provides further rationale for healthy food incentive work that is emerging in urban food desert communities to lower prices for fresh fruits and vegetables among low-income households [28,29].

Previous research has shown improvements in perceptions of the healthfulness of a neighborhood food environment following a new supermarket coming into a former food desert community [30]. Perceptions were associated with improved diet, independent of the frequency with which residents shopped at the new store [30]. Future research can further examine these associations given that one of the FIONS study communities received a new full-service supermarket after the first round of data collection [10].

5. Limitations

Some limitations of our study should be noted. First, our participant pool reflects urban residents living in two distinct communities within the northeastern section of the United States and may not be representative of other important food desert communities in other areas of the U.S., including rural

communities. Further, because we only include residents living in food deserts, findings may appear to minimize the potential importance of the nutrition environment, which in the larger context of healthy food access at a national or regional level, may indeed play a more meaningful role. As such, future analyses should investigate the ways in which the factors tested in this model shift in different contexts. Last, while our survey asked participants about meals eaten away from home, restaurants were not included in our measures of the perceived or observed community nutrition environment.

6. Conclusions

This research contributes to the literature on urban, low-income, and minority food desert communities and demonstrates how previous conceptual models of nutrition environments are applicable in these settings. Efforts to improve dietary intake and close gaps in health disparities have focused on communities with limited access to affordable nutritious food, yet few studies have sought to empirically understand the relationship of factors known to impact diet to key dietary outcome measures, specifically among residents experiencing these conditions. Resident perceptions of their nutrition environments and household food challenges (i.e., home availability of unhealthy food and beverages, lower expenditures on fruits and vegetables and groceries, and lack of access to a vehicle) were found to be the most significant factors contributing to dietary outcomes, suggesting a focus for future intervention efforts.

This study confirms the relationship between grocery and fruit and vegetable spending and dietary quality. In the context of low-income communities, this provides a rationale for healthy food incentives and other emerging food policy approaches to increase household income. Poverty and income remain critical determinants of the nutrition environment and ongoing research to understand a broader spectrum of food desert contexts is needed in order to improve generalizability of this model and ultimately inform interventions to close gaps in health disparities.

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Barriers to Food Security and Community Stress in an Urban Food Desert

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Abstract: By analyzing data from focus groups in a poor, mostly African American neighborhood in a large U.S. city, we describe how residents in urban food deserts access food, the barriers they experience in accessing nutritious, affordable food, and how community food insecurity exacerbates prior social, built, and economic stressors. Provided the unwillingness of supermarkets and supercenters to locate to poor urban areas and the need for nutritious, affordable food, it may be more efficient and equitable for government programs to financially partner with ethnic markets and smaller locally-owned grocery stores to increase the distribution and marketing of healthy foods rather than to spend resources trying to entice a large supermarket to locate to the neighborhood. By focusing on improving the conditions of the neighborhood and making smaller grocery stores and markets more affordable and produce more attractive to residents, the social, built, and economic stressors experienced by residents will be reduced, thereby possibly improving overall mental and physical health.

Keywords: food security; food desert; racial segregation

1. Introduction

In a number of recent studies, researchers document that food insecurity and hunger are a substantial and persistent problem in the United States [1,2]. In 2010, 14.5% of American households were food insecure at some point during the year, and 5.4% had very low food security—meaning that the "food intake of one or more household members was reduced and their eating patterns were disrupted at times during the year because the household lacked money and other resources for food" [1]. In addition to household food insecurity, community food insecurity is also prevalent in the United States, particularly in the most rural and urban areas of the country. Community food security takes into consideration how accessible food is to residents as well as how adequate (e.g., nutritious) food is in the community [3]. Over the past six decades, grocery retailers have abandoned the inner city for suburban and exurban locations, thus limiting food accessibility in urban neighborhoods. Retailers can build larger stores and large parking lots in the suburbs because there is more land available. Additionally, these suburban locations are convenient to highways and access roads, making it easier to load and unload trucks [4].

Researchers who examined how the lack of grocery stores (often referred to as food deserts) affect residents found that urban residents typically pay more for groceries, spend more time traveling to distant supermarkets, and incur other costs related to poor food habits [5,6]. According to the "Food Access Research Atlas" constructed by the USDA [7], low access to healthy food is defined as being far from a large grocery store or supermarket. For urban areas, the Atlas tracks low-income census tracts (tracts with poverty rate of 20% or greater) as either being a half mile or one mile from

the nearest supermarket or large grocery store. While researchers linked food deserts to lower fruit and vegetable consumption [8,9] as well as higher child obesity rates [10], fewer scientists examined the physiological effects of food desert created stressors. Researchers show that locating a large grocery retailer in a prior food desert has a minimal effect on residents' fruit and vegetable intake [11]. Because of this, it is important to look at health from a holistic viewpoint. This includes the effect that stress has on residents' physical and mental health and how food deserts exacerbate prior social and economic stressors. We address this gap in research by focusing on the following questions: (a) What are the barriers to accessing nutritious affordable food in an urban food desert? (b) How does community food insecurity exacerbate prior social, built, and economic stressors? By analyzing data from focus groups in a poor, mostly African American neighborhood in a large U.S. city, we describe how residents in urban food deserts access food, the barriers they experience in accessing nutritious, affordable food, and how community food insecurity exacerbates prior social, built, and economic stressors. Thus, in this article we speak to academics, policy makers, and community organizations alike who are concerned with the effects of food deserts on health.

2. Racial Segregation and the Rise of American Suburbs

American cities saw remarkable changes in the 20th century. As early as the late 1800s, transportation advances allowed for the rise of suburban communities. This continued through the early 20th century as the middle class took advantage of the park-like setting of the new suburban neighborhoods but—with the use of train, trolley, or automobile—still had easy access to the city for work and recreation. Suburban growth exploded after WWII, when federal policies such as the Servicemen's Readjustment Act of 1944 (G.I Bill) and the Federal-Aid Highway Act of 1956 allowed veterans and their growing families to access low interest loans to purchase new homes in the growing suburbs.

The rise of accessible suburbs led to a separation by race and by class as only middle and upper class whites were allowed to move to the new suburbs. Federal policy encouraged racial segregation through redlining practices. Neighborhoods with even a small African American population were coded as 'red' and were deemed to be too risky for banks to provide federally insured home loans. Without the ability to receive mortgages due to being a racial minority, African Americans found it very hard to leave the city. Racially restrictive covenants were also instituted in the early 20th century to prevent racial minorities from purchasing homes in white communities. Such covenants were contractual agreements that banned the purchase, lease, or occupation of property by a specific group, most commonly African Americans. These were mutual agreements between property owners in a neighborhood to not sell to certain people and were enforced through neighborhood associations and real estate boards. Racial covenants became common after the 1926 U.S. Supreme Court decision, *Corrigan v. Buckley*, which legalized their use. The practice was so wide-used that by 1940, 80% of property in Chicago and Los Angeles had covenants restricting African Americans [12]. Both redlining by banks and the use of racial covenants existed until the passage of the Federal Fair Housing Act of 1968 that deemed both practices to be illegal.

While no longer a legally sanctioned practice, housing discrimination still occurs today through other means. For instance, through the use of experimental testing, the Fair Housing Center of Greater Boston [12] found that African Americans and Latinos were shown fewer homes, steered to other communities, required to provide longer notices before viewing houses, and quoted higher loan rates than white testers. In addition, mortgage lending discrimination still occurs. For instance, the Massachusetts Community Banking Council found that upper- and middle-income African Americans and Latinos were 10 times more likely to have high interest loans than low income whites. In addition, high-risk lenders were 3.7 times more likely to be in minority neighborhoods than in white neighborhoods [13]. Combined, past and present racial discrimination has led to the continuation of racial and ethnic segregation. High-poverty neighborhoods continue to be disproportionately composed of black residents (37.4%) and Latino residents (30.2%) [14].

3. The Rise of Suburbs, Supermarket Redlining and Urban Food Deserts

The development and expansion of suburbs are directly tied to the history of grocery store locations. As white middle class families left the city for the newer suburbs, the grocery stores followed. Just as the new suburbanites and government were creating communities, supermarkets were also transforming in these new spaces [15]. Suburbs, with their residents with higher buying power, were attractive to chain supermarkets for both their markets and locations [4,16]. Improvements in supply chain logistics, computerized scanning and inventories, and other technological advancements led to the creation of a big-box format targeted towards an auto-dependent society. Chain grocery stores turned to increasingly larger formats to capture even more of the ever growing suburban grocery demand. Mergers and leveraged buy-outs in the 1980s intensified the trend toward fewer, bigger stores outside of the city. For example, in a six-year period between 1978 and 1984, Safeway closed over 600 stores in inner city neighborhoods [15]. At the same time, urban grocery stores, with their much smaller square feet design, were frequently not associated with the large chain stores. They were part of a local chain or independent grocery stores [4].

According to industry representatives, urban neighborhoods presented other challenges not present in suburban markets. Sites to accommodate large big-box stores were, and continue to be, hard to find. Barriers to building in urban communities encompassed costs associated with environmental cleanup, demolition of existing structures, and other site preparation costs along with the building's cost and delays. Other factors that kept large grocery stores out of urban neighbors included depopulating neighborhoods, demanding regulations, and the presence of urban crime [4]. Ultimately, the general attitude with the grocery industry has been that profits come more easily in the suburbs so it does not make financial sense to serve distressed urban areas [15].

This attitude held by the grocery industry has been termed by some as "supermarket redlining" [17,18]. As with residential redlining, decisions about investing in particular neighborhoods are based on stereotypes of gross income, race, and reputation of a neighborhood. This perception of "urban obstacles" has led to a gap in supermarkets in central-city neighborhoods compared to suburban neighborhoods [16,19]. According to Cotterill and Franklin, [19] fewer and smaller grocery stores are located in poorer zip codes than in wealthier zip codes. They found a negative relationship with the percent of people on public assistance and the number and size of grocery stores in an area. Cotterill and Franklin indicated that the poorest zip codes in 21 of the nation's largest metropolitan areas had a little over half (55%) of the grocery square footage that existed in wealthier zip codes [19].

Supermarket redlining can lead to a central-city gap in grocery stores even when there is a market demand. The Initiative for a Competitive Inner City [20] found that there may be as much as a 25% gap between existing demand for food and availability of food in the inner cities. The U.S. Department of Housing and Urban Development [21] calculated an untapped demand of $8.7 billion for the 48 cities that had a retail gap. HUD estimated that if Chicago developed 28 new supermarkets in its economically distressed neighborhoods it could capture just 14% of the untapped retail demand [4].

Pothukuchi [4] indicated that despite local government knowledge of the absence of grocery stores in low-income neighborhoods, city planning and development agencies took a laissez faire approach by tending to wait for proposals for grocery stores to be initiated by developers. Planners tended to not take a proactive role in filling the grocery retail gap and instead were happy that their agencies did not provide additional barriers to development. Thus, if developers did not want to expand into inner city neighborhoods, city planners felt that it must be because market conditions were unsuitable, rather than it being due to discrimination based on perceptions of urban obstacles. This notion is contrary to the studies cited above, which indicated great market demand for retail and grocery stores in many low-income minority neighborhoods in cities across the United States.

4. Effects of Urban Food Deserts

4.1. Physical Effects

Over the past 20 years, several researchers examined the impact of community food insecurity on eating patterns and subsequent diet related health. Scientists that investigated neighborhood effects on diet reported lower fruit and vegetable intakes in poor areas as well as independent relationships between food deserts and reduced fruit and vegetable intake [8,9]. Additionally, researchers reported that nutritious foods are less available and more expensive in deprived neighborhoods compared to their wealthier counterparts [22,23]. Researchers thus theorized that this lack of availability of healthy food in poorer inner-city neighborhoods has contributed to increases in diet related disease within these areas. The U.S. Department of Agriculture (USDA) linked food deserts to an increasing weight problem in the United States with childhood obesity tripling since 1980. The annual cost of treating obesity is nearly $150 million [24].

With respect to racial minorities, studies show that fast food restaurants are more likely to target African American and Latino neighborhoods than white neighborhoods [25]. Urban Black and Latino neighborhoods often represent the characteristics of food deserts, where "it is easier to get fried chicken than a fresh apple" [26]. The prevalence of fast food in racial and ethnic minority urban neighborhoods combined with a lack of large grocery stores may partly explain the higher obesity rates for racial minorities. According to the Center for Disease Control, non-Hispanic blacks have the highest age-adjusted rates of obesity (48.1%) followed by Latinos (42.5%) [27].

Despite the popularity of the "obesogenic environment" thesis [28,29] that claims that people are obese because of easy access to fast food that is cheap and nutritionally inferior coupled with a built environment that deters exercise, results are mixed when researchers evaluate the effect new large grocery stores have on food consumption patterns in food deserts. Wrigley, Warm, Margetts, and Whelan [30], using an uncontrolled before/after experimental design, reported a mean increase in fruit and vegetable consumption of between 0.01 and 0.47 portions per day among shoppers who began shopping at the new local grocery store. The greatest increase in fruit and vegetable consumption occurred amongst shoppers who had the lowest intake per day (two or less portions) as their baseline. While Wrigley et al. [30] showed a significant increase in fruit and vegetable consumption for those that had the lowest baseline measures, their natural experiment did not include a control group for comparison. When comparing a food deprived community that had recently acquired a large supermarket to a comparison community that did not receive a grocery store, Cummins et al. [11] did not find a significant relationship between the acquisition of the new supermarket and daily fruit and vegetable consumption and self-reported health.

With little evidence that community-based retail intervention improves diet and by extension health in the community, solutions to physical health that are framed as bringing nutritious "good" food to others might not work. As Guthman [31] points out, it is easier for public officials to focus on solutions that change the built environment, such as building supermarkets or bike paths, than trying to find solutions that address class and racial inequality, class and race-related stresses, or the pervasiveness of toxins in our environment. Thus, it is important to examine stressors, particularly class and race-related stressors, as they relate to food insecurity.

4.2. Stress and Physiological Effects

The stress process model leads to the hypothesis that social environment and social organization are core factors in the occurrence of mental health disorders and disease. Researchers who adhered to this model suggested that stress is a process that goes through three stages: stress exposure, stress resistance, and stress outcomes. The sources of stress fall under three main categories: negative life events such as a death in the family or divorce; chronic strains, such as gender or racial discrimination; and daily hassles, such as role strain [32–34]. How an individual responds to stressors plays a role in the stress outcome [35,36].

Williams et al. [36] found that high stress levels contribute to negative health outcomes, both mental and physical. They further indicated that general stress, such as financial stress and life events, were positively associated with (a) self-reported ill health, (b) the number of days a person could not work or carry out normal activities because of poor physical health, and (c) emotional distress. They also found that general stress and race-related stress from discrimination led to a decline in well-being and an increase in psychological distress.

While Williams et al. [36] emphasized how stress can lead to both poor physical and mental health, they found stress affected Blacks differently than Whites. Although Blacks are identified to be more exposed to adverse risk factors that lead to stress, these factors have a larger impact on the mental health of Whites than that of Blacks. This is partially due to greater access to coping resources used by Blacks, such as church groups. However, while Blacks have effective coping strategies that lesson the psychological impact of stress, Williams et al. [36] explained that the cumulative effects of being highly exposed to stressors led to more physical health threats and left them more vulnerable to a variety of physical ailments.

With respect to the relationship between food insecurity and stress, several researchers—e.g., [34,37,38]—affirmed that food insecurity was a chronic source of stress that increased stress levels, especially among economically and socially vulnerable populations. Whiting and Ward [38] asserted that food acquisition strategies served as direct sources of stress. They discussed that as economically vulnerable households utilized more diverse and less stable sources of food, stress levels increased. Wu and Schimmele [34] theorized that food insecurity was a source of anxiety that could increase vulnerability to depression. They found that food insufficiency had an independent effect on depression and that it was a better indicator of depression than conventional socioeconomic variables.

In addition to the stress associated with acquiring food, racial minorities also experience higher levels of discrimination when shopping for food, which can also heighten stress and anxiety. Zenk et al. [39] compared unfair treatment when shopping outside of one's neighborhood among African Americans, Latinos, and Whites. They found that African Americans were significantly more likely to report unfair treatment at grocery stores than the other two groups, regardless of the distance the store was from home. While African Americans experience more discrimination than other races or ethnicities while shopping, the level of discrimination may increase the further away they shop from home. Researchers show that when African Americans grocery shop outside of their neighborhoods, the likelihood for them to encounter discrimination (e.g., being watched, followed, or treated with less respect than others while shopping) increases. For example, in one study of shopping behaviors of African-Americans in New York and Philadelphia, researchers found that participants reported higher levels of discrimination while shopping in mostly white neighborhoods than when they shopped in their own predominately African-American neighborhoods [40].

5. Cultural Context of Community Members: Urban Neighborhood

Because living in an urban food desert can pose several sources of stress for residents and stress can lead to other health problems, we believe it is important to explore the nuanced ways that racial minorities in an urban food desert navigate economic, social, and built barriers to access food. To answer the research questions posed at the beginning of this analysis, we conducted focus groups of residents of a poor, mostly Black neighborhood in the southern sector of Dallas, Texas. As shown in Table 1, between 2000 and 2010, the population for the census tract that includes the neighborhood declined by 10% from 2754 residents to 2462 residents. Over the same period, there was a significant increase in the percentage of residents that identified as ethnically Hispanic, from 19.2% in 2000 to 31.6% in 2010. Simultaneously, the number of residents in the tract that identified as Black decreased from 79.6% in 2000 to 67.2% in 2010. The percentage of non-Hispanic white residents remained low at under 1% for the past two censuses [41].

Table 1. Demographic, Economic, and Social Indicators of Neighborhood for 2000 and 2010.

	2000	2010
Total Population	2754	2462
Percent Black	79.6	67.2
Percent Latino	19.2	31.6
Percent non-Hispanic White	<1.0	<1.0
Percent of residents over 25 with <9th grade education	15.0	30.0 [a]
Percent of residents over 25 with at least some college	6.2	19.0 [a]
Median household income	$21,563	$24,865 [a]
Percent of residents who paid 35% or more of gross income in rent	14.0	75.0 [a]
Percent of respondents satisfied or very satisfied with the neighborhood		52.0 [b]
Percent of respondents who felt strongly connected to the neighborhood		39.0 [b]

Note: [a] Data comes from 2006–2010 American Community Survey five-year estimates; [b] Data comes from 2012 survey of neighborhood residents conducted by the local Habitat for Humanity.

5.1. Economic Characteristics

The median household income increased from $21,563 annually in 2000 to $24,865 annually in 2010. Although this appears to be a significant increase, when calculated as a percentage of the area median household income (calculated based on the county median household income) the median household income for this neighborhood only increased slightly. In 2000, the census tract's median household income was 49.8% of the area median income. In 2010, the census tract's median household income was 51.8% of the area median income—a 2 percentage point increase. The census tract median income is still significantly lower than the city's 2010 median income of $41,682 [42].

Over 17% of residents in the census tract received aid from the Supplemental Nutrition Assistance Program in 2010 compared to the national average of 12.9% [43]. In that same year, 51.4% of the residents were in the labor force; of those, 5.5% were unemployed. According to the data, the majority of residents in this area reported working in the construction, manufacturing, retail sales, or social services (healthcare, education) industries. Only 5.7% of working residents reported using public transportation to commute to these jobs, but 22.1% of the residents in that year reported not having any access to a vehicle. Over one-third (36.7%) of the occupied homes in the neighborhood were occupied by renters in 2010. Of the renter-occupied homes in 2010, nearly three-quarters of the households paid 35% or more of their gross income in rent. This amount is staggering compared to just 14% of residents who paid 35% or more of their gross income in rent in 2000 [42].

5.2. Social Characteristics

In spring of 2012, the local Habitat for Humanity conducted a survey in the neighborhood to measure community satisfaction and attachment. Habitat for Humanity reported 52% of respondents were satisfied or very satisfied overall with their community. The top three favorite aspects of living in the neighborhood, according to respondents, were their house, affordable housing, and their neighbors. The three least favorite aspects of the community were concerns about safety, lack of job opportunities, and poor amenities. Sense of neighborliness was strongly correlated with sense of safety among respondents with those who felt more a part of the neighborhood feeling the safest in their home and neighborhood. Overall, 39% of residents felt strongly connected to the neighborhood [44].

With respect to crime, South Dallas, which is where the community is located has a higher than average rate of both violent and property crime. In 2016, the estimated violent crime rate was 1138 incidents per 100,000 people. This was much higher than for the city of Dallas (762 per 100,000 people) and the nation (386 per 100,000 people). The estimated property crime rate was 5076 incidents per 100,000 people. Again, this was much higher than for the city of Dallas (3400 incidents per 100,000 people) and the nation (2451 per 100,000 people). South Dallas is safer than only 13% of the cities in Texas and there is a 1 in 17 chance of becoming a victim of any crime [45].

5.3. Built Environment Characteristics

According to the USDA's definition of a food desert, the neighborhood qualifies as an urban food desert. The neighborhood is a low income neighborhood and the nearest supermarket is over one mile away. The two closest large chain supermarkets are Wal-Mart at 2.5 miles away and Kroger at 3.5 miles away. Within the neighborhood, there are two small locally-owned food stores and one small local chain store. There are also three locally-owned convenience stores and two 7-Eleven stores. In addition to convenience and small grocers there are three chain fast food restaurants within the neighborhood.

At the time of the study, public transportation in the community was dominated by a public bus route. The bus routes were either local and did not go a large grocery store or led to a transit center in which one had to make several transfers to arrive at a large grocery store or supermarket. Although the city of Dallas had a light rail system at the time, it did not have any nearby stops. Since the time of the study, the city of Dallas built a new light rail line that has a stop on the outer edge of the neighborhood. With respect to walkability, the community has a walk score of 28, which means that the community is dependent on cars and most errands will require a car [44].

6. Method

We selected focus groups as the methodology to gain a comprehensive understanding of issues of major concern for the residents including concerns centered on accessibility of food, barriers to food security, as well as how barriers to food security exacerbate community stress. A team consisting of members from a local university and two non-profit organizations developed recruitment protocols, designed the focus group structure, brainstormed research questions, and strategized methods to ensure safety, inclusion, voice, respect, and confidentiality. We sought to maximize participation and to provide a space where people would feel respected and valued for their contributions.

6.1. Recruiting Participants

We held focus groups in the evening at a local church to accommodate participants' work schedules. A local coordinator from one of the nonprofit agencies created and distributed flyers about the meeting, recruited participants, and reminded them on the day of each focus group. To ensure participation, we provided dinner for participants and one adult member per household received a $20 gift card to Wal-Mart in exchange for his or her participation in the session. We also offered transportation and on-site child care. Security officers were present during each focus group to assist participants, researchers, and students to and from their vehicle and to watch after the church parking lot during the focus groups.

Most participants were residents of the neighborhood; however, a few lived outside of the neighborhood but attended church in the neighborhood. Twenty-two participants attended the first focus group while 17 participants attended the second focus group. Three participants from the first focus group and two participants from the second focus group were Habitat for Humanity homeowners. The majority of participants in both groups were Black (97%), with 16 women and 6 men participating in the first group and 15 women and 2 men participating in the second group.

6.2. Focus Groups

We conducted two focus groups in September 2012 with neighborhood residents and non-residents vested in the community. At the beginning of each session, we provided dinner, with an opening prayer and welcome from the church minister. By having the approval of the local minister, a gatekeeper in the neighborhood, he let it be known to the group that he approved of the research with his welcoming introduction. Following the minister's introduction and dinner, a team member from a local nonprofit, who was familiar with the participants, opened the session by providing a brief overview of the project, its goals, expected outcomes, and introduction of all team members. We then passed out, reviewed, and collected consent forms.

Following the introduction, a facilitator asked participants questions about food accessibility, barriers to food security, safety in the neighborhood, as well as hopes and goals of community residents. The facilitator asked each group to comment on six key topics. Areas of inquiry included: (a) food accessibility and factors influencing where a person acquires food, (b) foods that are difficult to acquire, (c) changes in the community that would make it easier to access food, (d) access to different modes of transportation and barriers to public transportation and walking, (e) concerns about safety in the neighborhood, and (f) positive characteristics about the community and hopes for the future of the community. We constructed questions based on results of a prior homeowner survey conducted in the neighborhood during the spring of 2012 in combination with our interest in food security. The facilitator had previously been trained in leading focus groups, which included the importance of remaining neutral, establishing ground rules, explaining questions, repeating answers for clarification, and managing time.

During the focus groups, students collected data. When seating was available, students sat next to a community member. Students took detailed notes using laptops, video recorded the presentation, and wrote down major themes to display on the wall for community members to view. In order to prepare students for collecting data during focus groups, we introduced 'Participant Observation' as defined by Spradley [46]. During their observations, students included descriptions of the place as well as noting any significant objects, actions, actors, and implicit goals [46]. Students used these cues to guide note-taking.

We designated the remaining team members as "floaters". They could step into the facilitation role in the event that the facilitator needed a break. While floaters never stepped into the facilitator role, the facilitator was assured by their presence. Floaters moved around the room, acted as timekeepers, helped to tape flip chart sheets to the walls of the meeting room, and helped to answer questions after the sessions.

Each session was approximately two hours. After the official end of each session, team members informed participants about the project's next steps and stayed for picture taking and informal conversations with participants.

We transcribed all audio and video recordings. After viewing and listening carefully to the audio and video recordings, a team of two researchers pulled out major themes that participants expressed. We then constructed a coding matrix with the following overarching themes: accessibility of food, barriers to food security, and community stressors. Next, based on the responses, we broke down each overarching theme into several components (e.g., food outlets, available foods, safety stressors). We coded responses for themes and summarized, while using quotes to provide for clarification and support. We compile and report information gained from the analyses in the next section.

7. Results

7.1. Accessibility of Food

With respect to obtaining food, most participants shopped at grocery stores, although sometimes residents shopped at convenience stores on an emergency basis. A few participants mentioned purchasing certain food items at local dollar stores, farmers markets, and local food pantries. Residents did not mention accessing food through meals on wheels, community supported agriculture, or other types of food outlets. However, there was an expressed interest for a community garden and home gardens, but participants expressed a need for training and assistance with the upstart cost.

Participants identified two local grocery stores located within walking distance of the neighborhood. Up until the early 1990s, only a few grocery stores existed in the southern part of the city, with none larger than 20,000 square feet. In 1990, the city of Dallas approached all major supermarket operators that already served the metropolitan area without any success in persuading them to locate in the southern part of the city. The only chain that responded was a smaller grocery store that catered to mixed-income and ethnic minority communities. The city negotiated a comprehensive

package of incentives with the small grocery chain that resulted in three grocery stores being built in the southern sector. The package of incentives also attracted a second grocery store chain, and by 2005 three stores of the local chain were located in the southern part of the city, one of which is located in our study's neighborhood [4].

While a few focus group participants shopped at these local stores, most shopped outside of the community because prices at the local grocery stores were higher, and some claimed the quality of fresh produce was worse than produce in stores further away. Of those that shopped at the local grocery stores, many waited for sales or shopped late at night when prices on some food were reduced. As one participant noted, "to shop at [local grocery store] you have to wait for a real good sale. I only shopped there once or twice. On a motor scooter it took me an hour to get to [local grocery store] and its one mile and a half away." This particular resident was disabled and drove a motorized scooter chair for mobility. Another participant stated, "Let me tell you the secret about [local grocery store]. If you go after 9 o'clock, you get better deals and better meat. That's a secret. You get better quality of meat, better cuts and cheaper prices."

Despite two small grocery stores in the neighborhood, certain types and quality of food were unavailable locally. Residents had the most difficulty accessing fresh meats, fruits, and vegetables, including organic produce. Residents had to leave the community to buy organic produce. The nearest grocery store that offered a good selection of organic produce was a 30-min drive, 45-min train ride, or 2.5-h bus ride from the community. The city's farmers market was a 45-min bus ride. However, only one participant admitted to going to the farmers market to shop for food. Fresh meat was available at one local grocery store, but one had to shop after 9 p.m. because that was when it was made available. According to one resident, the meat the next day at one of the local grocery stores was what did not sell from the previous night. As one participant claimed, "You can't trust [local grocery store's] meat. They keep a lot of meat in the freezer and it gets freezer burnt. With the condition I have, I have to have fresh meat." One resident mentioned buying meat in the northern part of the city because it looked better and was priced better. As one participant noted, "When I am over in North Dallas with my son, I will buy meat because I know that they will change the meat and will bring it over to the Black neighborhood." A clear desire for quality meat existed amongst the participants and the perception was overwhelmingly negative with respect to the quality of meat offered at the local grocery store.

7.2. Barriers to Food Security

7.2.1. Transportation Stressors

Because respondents believed that higher quality and more affordable food were further away, transportation was often a barrier. The less expensive grocery stores were between 10 and 15 miles away. They were located in the suburbs or, in the case of one, on the other side of the city. These stores were a 20-min drive by car. One person even mentioned driving to the northern suburbs, 40 min away, to grocery shop because of better selections and prices. Because it was fastest to travel by car, if one did not own a car, a common strategy was to pay someone $5 to drive them to the grocery store. However, this strategy required knowing someone who had a vehicle and was willing to take them to the store—a luxury that not everyone had.

While most participants traveled to the grocery store by car, several rode the city bus to get groceries. However, it was a much longer ride by bus to these grocery stores—anywhere between two and three hours one way due to a transfer that was needed in the center of the city. For the case of one grocery store outside of the community, it took 1 h and 31 min to get there by bus, despite being seven miles away, due to two transfers that were needed. Participants were limited to where they could shop when traveling by bus. For instance, participants could not shop at membership warehouses like Costco and Sam's Club because one must buy in bulk. This becomes too cumbersome to manage when getting on and off the bus. Some of the older or less abled participants reported having friends drive them to the store. One participant even noted taking a taxi to the store because she did not own a car,

could not walk to the local grocery stores, and was threatened by taking the bus. "I take a cab, if my daughter can't bring me. It's hard to move around on a scooter (motorized chair), because of the hill. It's not safe at all."

Finally, walking or biking in the neighborhood was difficult as there were either no sidewalks or sidewalks in disrepair. Furthermore, it was noted that traffic was heavy in the neighborhood and that people often drove fast. These conditions coupled with the lack of bike lanes made it risky to walk or bike to the store.

7.2.2. Safety Stressors

When shopping locally, conditions outside of the local convenience stores put community members' safety at risk. Participants noted that they were often intimidated by young people hanging outside of the local convenience stores. These people would sometimes beg for money and harass customers as the entered and exited the store. This led some community members to not want to shop at these local stores. However, some did if it was for a couple of items and if they did not have the time to shop at the more distant grocery stores. One participant did not like to be gone long at night for fear of her house being burglarized. On several occasions, someone had busted her outside light while she was gone. This placed limits on where and when to grocery shop.

Several barriers existed to accessing food outside of the neighborhood that also put community members' safety at risk. Participants expressed concerns over safety when traveling by public transportation. Some residents thought that riding the bus to the grocery stores in the suburbs as well as to downtown was dangerous because of threats posed by other riders of public transportation. Others expressed concern about safety with respect to going to the bus stop after dark. While some residents had not personally experienced threats to their safety, others had experienced being bullied by younger individuals and chose not to travel after dark.

Interviewer (I): How long have you been living here?

Participant (P): I've been living in this neighborhood for two years.

I: For two years, and the very first time you rode the bus was this last Thursday. Now what kept you from taking a bus prior to that?

P: Um, my condition, standing up too long, getting back in time before the sun set because of what you might run into.

I: Write that down! What do you mean by what you might run into?

P: The children, the bad children. The one who pull tricks on you. The one who knock you down because they see you with a cane or they want to push you down. The activities that go on in the neighborhood. You might not see what we see, so you want to distance yourself from that.

Another safety barrier that respondents expressed limited riding public transportation was the number of stray dogs in the community. According to participants, the city does little to combat the problem of stray dogs, so many roam freely. These stray dogs, many of which were Pitbull or Pitbull mixes, sometimes hovered around the bus stop. Because they could be aggressive and bite when approached, it led some residents who relied on public transportation going back home, thus delaying their food shopping. According to one participant.

Participant: Ya'll know we have a lot of stray dogs in the neighborhood. Everybody knows that. But I step out of my house in the morning at about 6:30 or 7:00 a.m. and they are all congregated near where the bus stop is, and I go back home [because] I'm not fighting a pack of dogs. So that has really stopped me from getting on the bus to go handle whatever it is that I need to do.

This safety barrier was exacerbated because of the buses sometimes not showing up on schedule. They were supposed to run every 15 to 30 min. During the weekdays, residents noted that they ran close to schedule but on the weekends they were not as reliable. This made the amount of time exposed at the bus stops longer than necessary. In addition to stray dogs around the bus stop, the residents stated that weather conditions often determined whether they were able to get groceries. Because the bus stops

did not have cover, inclement weather made waiting at the bus stop a challenge. By standing at the bus stop during rain and high winds, community residents had to risk getting sick in order to shop for groceries. Other physical barriers in the neighborhood that posed risks to safety, when trying to walk or ride the bus to the grocery store, included the lack of sidewalks, poor street lighting, and bus stops with no seats or broken seats. Additionally, participants reported that many of the streets were in disrepair, and it took a considerably long time to get stop signs and speed bumps installed.

7.2.3. Economic Stressors

The two grocery stores in the neighborhood had higher prices than grocery stores that were some distance away. As one participant noted, "You have to spend an extra $35 or more to have the convenience of shopping close." The local convenience stores in the neighborhood had even higher prices. Residents indicated that an increasing number of convenience stores in the neighborhood had not led to a decrease in their prices. The price of a loaf of bread at the convenience store was double the price at a supermarket outside of the neighborhood. Residents could get some food, such as canned goods, microwavable food, and milk at a Family Dollar nearby. However, the milk was expensive—almost $4.00. This was $2.00 higher than at an Aldi store. For families with children who drank a lot of milk, the difference in price added up quickly. For residents without personal vehicles, this forced them to choose between risking the safety barriers noted above with public transportation or paying the higher prices at the local grocery stores.

Because of the high prices of food at the local grocery stores and convenience stores, participants noted several strategies they employed to navigate the cost of travel, time, and cost of food. Some participants indicated that they generally would go shopping during a particular time in the month—around the 15th of the month or whenever their benefits arrived in the mail. Others mentioned that because they had to drive such a long distance, they would shop only once or twice a month. This strategy of fewer trips minimized cost of travel and time, but it led some to miss out on deals advertised during other weeks. Some chose to minimize the cost of food by driving to many stores (some mentioned upwards of five stores) to get the cheapest prices and sale prices for items such as canned goods and produce but traveling to a further grocery store to buy higher quality meat. With a car, this would take over half a day and use more gas, but the community member would save money on food prices.

7.3. Barriers to Food Security and Community Stress

Because multiple safety barriers to accessing food existed in the neighborhood, this put a mental strain on several residents. Several participants discussed the hardships involved with trying to remove the stray dogs. According to participants, the city would not remove the dogs, but they would supply, for free, a dog trap that one could use to catch the dog. However, if the dog causing concern was owned by someone, the city would not supply a dog trap. In consideration of the dogs, the city would only supply dog traps for day use and in good weather. Because of these restrictions, few dogs were removed. Therefore, residents continued to spend time figuring out how to deal with the dogs so that they could carry out their daily activities, including grocery shopping.

By constantly thinking about stressors that could put their lives at risk, some residents have had to adapt their food shopping routines to minimize such stressors. For instance, participants reported choosing to "take public transportation in the early hours to prevent running into danger in the evenings". When asked if they felt safe riding public transportation at night, all but one participant said, "no". Some residents expressed concerns about "people watching my schedule, watching everyday activity." In these cases, participants were concerned that when they left to go grocery shopping, their houses would be broken into by those people watching. In response to several house burglaries that occurred while people were out during the day, several respondents noted that they were constantly watching the neighborhood for potential robbers. One woman noted that she had confronted men in trucks that were watching empty houses, telling them to "move on". Participants noted that the police would not

come to the neighborhood with just a single phone call. They agreed that it took multiple phone calls, in some cases, over a period of weeks to get the authorities to act on criminal behavior in the community. Several participants noted that they had to call the tip line "over and over again" to keep harassing the police until they responded.

To minimize economic stressors, most residents left the community to do their grocery shopping. To buy more affordable food, many residents expressed that they shopped at Wal-Mart. Even though it was outside of the community and took some time to get there by bus, residents noted that the store policy was to match prices of other stores, and residents could do all of their shopping (food and other) there. Participants overwhelmingly agreed that bringing a Wal-Mart to the community would make things a lot easier and reduce the amount of stress associated with accessing food. They felt that Wal-Mart had better quality meats than the local grocery stores and they could get more food for the price.

8. Discussion

Implications of Findings

Since the 1990s, small grocery chains are more receptive toward locating in urban areas, as illustrated by the two local smaller chain stores built during the late 1990s and early 2000s in the neighborhood used for this study [4]. As the saturation of the suburban grocery market continues, grocery retailers look for new markets to continue growth. Inner cities represent a new frontier for these chain stores to expand, considering the minimal or nonexistent competition in the urban grocery retail sector [4,47]. Researchers also point to the emerging strengths of inner-city markets as places with high spending power per acre [48]. We confirm the demand for high quality, affordable grocery retail stores in urban neighborhoods. Despite having two local grocery chains nearby, most participants claimed to travel much farther to shop at the larger chain grocery stores. This was because they perceived the larger grocery retail chains to provide better quality produce at a less expensive price. Thus, quality and quantity of food were both important when deciding where to shop.

Although participants mentioned both the quality and the amount of food they could buy for a given allowance, they expressed different types of concerns depending on the food item. The only food items that participants expressed a desire for high quality were meat products. Participants wanted fresh meat and were willing to drive long distances or shop at less desirable hours to obtain fresh meat. Whereas participants would drive long distances for fresh meat, only one participant noted shopping at the city's farmer's market for fresh, locally grown fruits and vegetables. In the case of fruits and vegetables, it appears that participants sought quantity over quality. In other words, they were more concerned with how much their food allowance could buy rather than the quality of the fruits and vegetables.

Participants overwhelmingly expressed a demand for a large grocery retailer in the community as they perceived the larger chain retailers as having better quality food and as being less expensive. The demand for more supermarkets to operate in underserved areas, has not gone unnoticed by local and state government officials. In fact, for some states, there have been recent attempts of state officials partnering with local business leaders to provide more fresh, affordable food to low-income and underserved areas. For instance, in Ohio, the Healthy Food for Ohio program was launched in 2016 that provides grants and loans to grocers to encourage them to open new stores in underserved areas. Through this program, grants of up to $250,000 and loans up to $5 million over 10 years are available to grocers to develop in food deserts [49]. According to Ohio Grocers Association's website, "The funding is designed to incentivize the construction of grocery stores by offering financing for costs like land acquisition, construction and equipment that might otherwise be too expensive for a company to consider entering an underserved market" [49].

While these types of programs are encouraging, they need to focus more on providing assistance for smaller markets to provide nutritious, high-quality, yet affordable food to locate to underserved areas instead of trying to target large supercenters and supermarkets. In 2016, the city of Dallas

extended at least $3 million to any grocery store willing to sell fresh produce and healthy food in a "southern Dallas food desert" [50]. They had hoped for a large grocery store chain to open a 25,000-square-foot or greater store in south Dallas, with a preference for one to serve as an anchor for a larger mixed-use development. Despite the seven-figure price tag, there were no takers. Industry representatives cited countless reasons, many matching with supermarket redlining, as to why they would not consider locating in south Dallas. These reasons included demographics, customers' buying patterns, and customer theft [50].

Given the battle of attracting large retailers to poor urban areas coupled with the negative effects that large retailers such as Wal-Mart can have on the vitality of local economies and small businesses [51], more innovative solutions are needed in providing high quality low cost food to residents. For instance, research shows that ethnic markets can have a positive impact in low-income urban neighborhoods [52]. Joassart-Marcelli, Rossiter, and Bosco, in their analysis of ethnic food markets in San Diego, find that ethnic markets can play a large role in providing residents with nutritious, affordable, and culturally acceptable food—thereby contributing to community food security. Provided the unwillingness of supermarkets and supercenters to locate to poor urban areas and the need for nutritious, affordable food, they argue that it may be more efficient and equitable for government programs to financially assist ethnic markets and smaller locally-owned grocery stores to increase the distribution and marketing of healthy foods rather than to spend resources trying to entice a large supermarket to locate to underserved areas [52]. Given the recent failure of the city of Dallas to partner with a large supermarket to open a branch in south Dallas, we agree with this sentiment.

While funding local markets can increase the quality and quantity of food within the community, other stressors must be reduced to make the neighborhood safer and more walkable. For instance, the city and non-profit organizations should invest in creating free or low-cost clinics that spay and neuter dogs and cats as well as increase the number of no-kill animal shelters in the region. Capturing the stray dogs, spaying and neutering them, and housing them in a no-kill shelter can help reduce the number of strays in the short-term. While offering free or low-cost clinics to residents in the area to spay or neuter their pets will cut down on the number of unwanted litters and thus reduce the number of stray animals in the long-term. The city also needs to invest in making the neighborhood more walkable and bike friendly. Repairing sidewalks, creating bike lanes, and adding speed bumps in residential areas can encourage walking and biking while slowing down cars. In addition to making the city more foot and bike friendly, implementing a bike-sharing program can assist able-bodied residents who do not have access to a car to get to the store. A person can leisurely bike to a store two miles away in 12 min. This is much faster than a 1–2 h bus commute. With bike-sharing, one has options as to how to return home. One could either bike back (if one does not have much to carry), or take the bus, a taxi, or a ride-sharing service back home. Making the city more foot and bike friendly has several advantages over the current bus system. Not only is it quicker to bike short distances than to take the bus, but it is better for the environment, and serves as a source of exercise. Nevertheless, the city can also make efforts to improve the bus system by providing shelters over bus stops and offering a route that takes residents of the neighborhood directly to the nearest supermarket or Wal-Mart.

Solutions to reduce overall crime are beyond the scope of this paper. However, it is important to note that continued efforts by the city to invest in the economy of the southern sector of Dallas as well as the education of the residents will lead to lower crime rates. Studies show that when young men have living wage jobs, the overall crime rate decreases [53–55]. Because many private companies choose not to invest in the neighborhood for a variety of reasons previously discussed, the public sector should make a concerted effort to hire and train more disenfranchised workers, including racial and ethnic minorities, ex-convicts, and those in poverty. Indeed, a new economic movement is on the horizon. Several high-profile politicians, such as Senator Bernie Sanders and those endorsed by him, are in favor of an economic bill of rights in which a living-wage job is guaranteed for every person who is able to work [56]. While such a plan is highly controversial and untested in the United States, many argue

that while it may have some negative side-effects, those side-effects can be dealt with and are better than the status quo of rising inequality, concentrated poverty, and high incarceration rates.

By reducing many of the barriers to community food security with the implementation of innovative solutions like those suggested above, several stressors would also be reduced. By reducing these stressors, overall health may increase. According to Williams et al. [36] although African Americans have less psychological distress than other racial groups, "the cumulative effects of high exposure to stress may take a heavy physical toll and leave them more vulnerable to a broad range of physical ailments" (p. 348). Thus, by making it easier to access nutritious, affordable food, mental and physical health may improve. In the future, researchers can investigate the relationship between community-level stressors and individual health problems.

9. Conclusions

We provide insight into how residents of a food desert access food, and how barriers to accessing food can be related to increasing stress and decreasing overall health. By conducting multiple focus groups in a poor, less educated, African American and Latino urban food desert, we were able to gain a comprehensive understanding of these issues as they relate to a very specific demographic. In doing so, it is important to point out that the theoretical contributions can only be generalized to neighborhoods with similar features to the one used in our study. Additionally, we use qualitative analysis in this study relying upon social stress theory to provide an interpretation of the data. Future research with a quantitative approach is needed to test specific hypotheses as they relate to the effect of food deserts on social, built, and economic stressors and mental and physical health. Surveys that quantify shopping behavior and the economic, social, and physical barriers that residents face can enhance the qualitative focus group data. In addition, experimental designs can be performed that test the effect of public private partnerships that assist smaller grocers and ethnic markets in deprived neighborhoods and the reduction of social and economic stressors and increase in overall health.

Food security will continue to be of interest to academics, policy makers, and community practitioners. It will be through continued studies, using both quantitative and qualitative methods focusing on both urban and rural areas, that academics and practitioners gain a greater understanding of the relationship between food accessibility and physical and mental health. By doing so, academics will gain a greater understanding for the various contexts by which theories work and allow policy makers to diverge from ad hoc policy making and one size fits all approaches.

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SB 98_Horizon Foundation_fav.pdf
Uploaded by: Kerry Darragh
Position: FAV

HORIZON FOUNDATION

February 8, 2024

COMMITTEE: Senate Finance Committee
BILL: SB 98 – Department of Housing and Community Development – Food Desert Study
POSITION: Support

The Horizon Foundation is the largest independent health philanthropy in Maryland. We are committed to a Howard County free from systemic inequities, where all people can live abundant and healthy lives.

The Foundation is pleased to support SB 98 – Department of Housing and Community Development – Food Desert Study.

SB 98 would require the Department of Housing and Community Development to conduct a study and make recommendations on reducing the number of food deserts across the state. Food deserts are generally defined as neighborhoods and communities that have limited access to affordable and nutritious foods.[i]

Food insecurity has been a problem across the nation for many years. Like other communities across the state, Howard County families have felt the pain of rising food costs and an increasingly high cost of living. Though we are known as an affluent county, many of our lower- and middle-income families are at risk of, or are already experiencing, food insecurity.

Having current and accurate data about food deserts in our community and across the state of Maryland will help us design solutions to reduce food insecurity and hunger and ensure that everyone can easily access healthy foods. For this reason, the Horizon Foundation **SUPPORTS SB 98** and urges a **FAVORABLE** report.

Thank you for your consideration.

[i] *The Public Health Effects of Food Deserts: Workshop Summary.* National Research Council, 2009. https://www.ncbi.nlm.nih.gov/books/NBK208016/

The Horizon Foundation of Howard County, Inc.
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SB 98_MAP_FAV.pdf
Uploaded by: Mark Huffman
Position: FAV

MARYLANDERS AGAINST POVERTY

Member Agencies:

211 Maryland

Anne Arundel County Food Bank

Baltimore Jewish Council

Behavioral Health System Baltimore

CASH Campaign of Maryland

Energy Advocates

Episcopal Diocese of Maryland

Family League of Baltimore

Fuel Fund of Maryland

Job Opportunities Task Force

Laurel Advocacy & Referral Services, Inc.

League of Women Voters of Maryland

Loyola University Maryland

Maryland Center on Economic Policy

Maryland Community Action Partnership

Maryland Family Network

Maryland Food Bank

Maryland Hunger Solutions

Paul's Place

St. Vincent de Paul of Baltimore

Welfare Advocates

Marylanders Against Poverty

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TESTIMONY IN SUPPORT OF SB 98

Department of Housing and Community Development – Food Desert Study

Finance Committee
February 7, 2024, 1pm

Submitted by Mark Huffman, Co-Chair

Marylanders Against Poverty (MAP) strongly supports SB 98, which requires the Maryland Department of Housing and Community Development (DHCD) to conduct a study on the location and impact of food deserts in the state and later issue a report with recommendations on how to reduce the number of food deserts.

The Maryland Food Bank estimates that 1 in 3 Marylanders is at risk of food insecurity. A person who is food insecure does not have consistent access to healthy and nutritious food on any given day, and this problem persists in every area of the state. There are also communities and populations that are disproportionately affected by food insecurity, including communities of color, families with children, and older adults. The drivers of food insecurity are complex and often include additional factors such as low income, lack of reliable transportation, and access to healthcare.

The State of Maryland designates an area a food desert based on several factors, including availability of fresh fruit, vegetables, and other healthy foods, income levels of residents, transportation availability, and comments from local government. The study authorized by SB 98 on the location of these areas and the impact they have on the local population will allow DHCD to better understand what creates a food desert and identify these issues to help fight the root causes of hunger. Many residents of Baltimore City live in a food desert, but these areas are not limited to urban regions. Though suburban and rural food deserts have different parameters regarding distance to a grocery store - the lack of access to nearby, healthy food options affects Marylanders across the state.

A report outlining the effects food deserts have in generating and sustaining food insecurity across Maryland and how to reduce the number of these areas would be beneficial in locating and addressing root causes of hunger statewide. Marylanders Against Poverty appreciates SB 98 for its inclusion of DHCD into the work of analyzing food deserts and considers this bill a meaningful step towards their elimination.

MAP appreciates your consideration and urges the committee to issue a favorable report for SB 98.

Marylanders Against Poverty (MAP) *is a coalition of service providers, faith communities, and advocacy organizations advancing statewide public policies and programs necessary to alleviate the burdens faced by Marylanders living in or near poverty, and to address the underlying systemic causes of poverty.*

SB 98 - Maryland Food Bank - FAV.pdf
Uploaded by: Matthew Capodanno
Position: FAV

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Senate Bill 98
Department of Housing and Community Development - Food Desert Study
Seante Finance Committee
February 7, 2024

Position: SUPPORT

Senate Bill 98 requires the Maryland Department of Housing and Community Development (DHCD) to conduct a study on the location and impact of food deserts in the state and later issue a report with recommendations on how to reduce the number of food deserts.

The Maryland Food Bank estimates that 1 in 3 Marylanders is at risk of food insecurity. A person who is food insecure does not have consistent access to healthy and nutritious food on any given day, and this problem persists in every area of the state. There are also communities and populations that are disproportionately affected by food insecurity, including communities of color, families with children, and older adults. The drivers of food insecurity are complex and often include additional factors such as low income, lack of reliable transportation, and access to healthcare.

The State of Maryland designates an area a food desert based on several factors, including availability of fresh fruit, vegetables, and other healthy foods, income levels of residents, transportation availability, and comments from local government. The study authorized by SB 98 on the location of these areas and the impact they have on the local population will allow DHCD to better understand what creates a food desert and identify these issues to help fight the root causes of hunger. Many residents of Baltimore City live in a food desert, but these areas are not limited to urban regions. Though suburban and rural food deserts have different parameters regarding distance to a grocery store, the lack of access to nearby, healthy food options affects Marylanders across the state.

The Maryland Food Bank engages in multiple initiatives to address food insecurity caused by food deserts, including the Pantry on the Go program which distributed over 9 million meals to neighbors in need in underserved areas across the state. The Maryland Food Bank recognizes that food deserts are also connected to health outcomes, and that along with a lack of access to nutritious foods, individuals residing in these areas often do not have access to services like banks, healthcare, or recreation spaces. A report outlining the effects food deserts have in generating and sustaining food insecurity across Maryland and how to reduce the number of these areas would be beneficial in locating and addressing root causes of hunger statewide.

For these reasons, the Maryland Food Bank respectfully requests a favorable report on SB 98.

ANNE WALLERSTEDT, ESQ. | Senior Director, Government Relations
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MSCAN SB98 Food Deserts.pdf
Uploaded by: Sarah Miicke
Position: FAV

Maryland Senior Citizens Action Network

MSCAN

AARP Maryland

Alzheimer's Association, Maryland Chapters

Baltimore Jewish Council

Catholic Charities

Central Maryland Ecumenical Council

Church of the Brethren

Episcopal Diocese of Maryland

Housing Opportunities Commission of Montgomery County

Jewish Community Relations Council of Greater Washington

Lutheran Office on Public Policy in Maryland

Maryland Association of Area Agencies on Aging

Maryland Catholic Conference

Mental Health Association of Maryland

Mid-Atlantic LifeSpan

National Association of Social Workers, Maryland Chapter

Presbytery of Baltimore

The Coordinating Center

MSCAN Co-Chairs:
Carol Lienhard
Sarah Miicke
410-542-4850

Testimony in Support of SB 98- Department of Housing and Community Development – Food Desert Study

Finance Committee
February 8, 2024
Support

The Maryland Senior Citizens Action Network (MSCAN) is a statewide coalition of advocacy groups, service providers, faith-based and mission-driven organizations that supports policies that meet the housing and care needs of Maryland's low and moderate-income seniors.

MSCAN supports SB98, which would establish a study on food deserts in Maryland.

Approximately 64.28% of Maryland's zip codes fall into the category of food deserts, where residents are situated 10 miles or more away from the nearest grocery store. Within these areas, over 31% of the population is black, and 30% are families without vehicles. These figures represent how food deserts disproportionately affect lower-income and racially diverse communities throughout Maryland. Addressing the challenge of food deserts through research would not only tackle systematic inequalities but also provide equitable food access to those who deserve it. Passing SB98 wouldn't just signify progress in combating these disparities; it would also enhance our understanding of how food deserts impact residents.

Trapped in these areas of food deserts, individuals resort to gas stations, corner stores, and food pantries for their daily food needs, resulting in a diet dominated by highly processed and pre-packaged or canned foods, largely without fresh produce or proper grocery options. This has significant health implications, particularly for vulnerable groups like young children and older adults who require consistent nutrition for their well-being. Older adults are particularly susceptible to being trapped in food deserts due to additional limits on transportation needs to access proper grocery stores and food pantries. This leads to an increase in diabetes, obesity, high blood pressure, increased intake of sodium, and lack of overall proper vitamins and nutrition that one would normally obtain from fresh produce. These factors then lead to increased health issues in older adults such as increased hospitalizations and higher rates of food related diseases among low-income older adults in food deserts.

Supporting SB98 ensures that families, children, and older adults facing food insecurity receive the nutrition and assistance they rightfully deserve. By delving into research on Maryland's extensive number of food deserts, we aim to unravel the complex issues stemming from food deserts and take a meaningful step towards resolving the broader problem of food insecurity across the state.

For these reasons we support SB98 and ask for a favorable response from the committee.

SB0098 Testimony.pdf
Uploaded by: Sarah Paul
Position: FAV

Statement of Maryland Rural Health Association (MRHA)
To the Senate Finance Committee
Chair: Senator Pamela Beidle
February 7, 2024
Senate Bill 0098: Department of Housing and Community Development - Food Desert Study
POSITION: SUPPORT
Chair Beidle, Vice Chair Klausmeier, and members of the committee, the Maryland Rural Health Association (MRHA) is in SUPPORT of Senate Bill 0098: Department of Housing and Community Development - Food Desert Study

Food deserts are any geographical areas where there is an absence of supermarkets or grocery stores. Food deserts often look different between urban and rural areas, but their impact on community health remains the same. For rural areas, any location where there are no supermarkets or large grocery stores for at least 10 miles is considered to be a food desert. 1 in 3 Maryland residents face food insecurity, many of which are children. According to a Hunger Map created by the Maryland Food Bank, the average percentage of people living in rural counties with food insecurity is nearly 11% (n.d.). From lack of transportation, affordability, to convenience are a few of many factors that prevent people from acquiring nutritious foods. Despite the barriers to food accessibility, action must be taken to ensure that residents of Maryland are able to have access to affordable food. An intricate issue such as food insecurity requires an intentional intervention. In order to serve Maryland residents effectively and efficiently, a study on the nature of food deserts in Maryland should occur. By understanding who is most impacted by food deserts, how geographical location impacts accessibility, what disparities put some residents at a higher risk, or what specific aspects of current programs may or may not be working to address food insecurity in Maryland, the State of Maryland can establish a program to reduce the presence of food deserts across the state. Gathering information from the very communities that live in food deserts (whether they are rural or urban) may also bring to light unforeseen barriers that policy-makers and public health officials can address.

On behalf of the Maryland Rural Health Association,
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Maryland Food Bank. (n.d.) *Maryland Hunger Map*. https://mdfoodbank.org/hunger-in-maryland/maryland-hunger-map/