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Neighborhoods and Health in Hawai'i: Considering Food Accessibility and Affordability

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Introduction

Recent research has underscored the importance of community context to personal health. The neighborhood in which an individual lives has been associated with health behaviors and health outcomes.[1,2] This relationship persists in many, but not all, studies even after individual risk factors and characteristics have been considered.[2,3]

One health related activity that often takes place within the community context is the purchase and consumption of food.[4] Recently, dramatic differences in the accessibility and affordability of healthy foods across communities along with the possible health consequences from these differences have become very active areas of research and policy action.[5-8]

In Hawai'i, few empirical studies have specifically considered the health outcomes associated with neighborhood food accessibility and affordability. A much larger body of research describes the unique characteristics of food accessibility and affordability in Hawai'i overall and specifically within distinct communities.[9-12] Many of these studies reflect concern about Hawai'i's need for local, self-sustaining, and diversified agriculture.[13] A number of programs currently focus on improving accessibility and affordability of healthy foods across Hawai'i's diverse populations and communities. This article provides an overview of the research and some innovative interventions pertaining to neighborhood food environments and health outcomes in Hawai'i.

Studies on the Relationship Between Neighborhoods and Access to Healthy Foods

Studies outside of Hawai'i have found that local food environments vary widely. Factors associated with local food environment include neighborhood socioeconomic status (SES), rural, suburban, or urban location, and neighborhood racial/ethnic composition. Residents in poorer, inner-city neighborhoods are less likely to have proximate access to supermarkets, which typically have the most high-quality, healthy food items (eg, fresh fruits and vegetables, low-fat dairy foods, and whole-grain products), at the lowest prices.[14,15] The small convenience stores commonly found in inner-city neighborhoods often sell more prepared, high-calorie foods and less affordably-priced fresh produce.[16] Controlling for income and other associated variables, neighborhoods with greater proportions of African American residents have approximately one- half the number of supermarkets seen in counterpart White neighborhoods.[16] Some areas particularly devoid of healthy food options have been termed "food deserts" and tend to be poorer areas with higher concentrations of minorities.[8,17] Many of these areas also have high numbers of fast food establishments. Having higher numbers of proximate fast food restaurants is associated with a greater likelihood of eating a poorer diet.[18] The lack of affordable, healthy food options within low-income neighborhoods is believed to contribute to health disparities across communities. Community differences in the availability of healthy food have been linked to health-related outcomes such as poor diet quality,[19] obesity,[14] and diabetes.[20] More research on the strength and characteristics of the relationship between food accessibility and health status is ongoing. This area of research is also somewhat controversial,[21] particularly as this topic has led to a number of high profile policy initiatives.[6,7]

Interestingly, in studies of health outcomes, neighborhood context has generally been found to have a stronger impact on the health of vulnerable populations, including children, racial/ethnic minorities, low-income populations, and the elderly.[3] One mediating factor that may explain the differential impact of the community context on the health of different populations living within the same community may be the level of access to community services factors, such as public transportation.[22] Because food shopping involves transporting multiple shopping bags or making frequent shopping trips, reliable transportation is an important aspect of access to healthy food options, particularly for communities that are a substantial distance from supermarkets. As poorer or less mobile groups within communities may be even less likely to have access to reliable transportation, limited food access within a neighborhood may differentially impact certain groups within that neighborhood.

Studies in Hawai'i on the Relationship Between Neighborhoods and Access to Healthy Foods

Approximately 90% of Hawai'i's food supply is imported,[23] leading to the highest food costs in the country. The cost of monthly meals prepared at home for a family of four in Hawai'i is $1,016[24] compared to $796[25] in the rest of the United States. While Hawai'i has an excellent climate for home and/or community gardens, growing one's own food demands time and garden space, which are luxuries for many Hawai'i families.

Hawai'i has 109 farmers' markets,[26] which sell healthy foods, although access to these markets can be limited. In Honolulu, farmers' markets are open less than any other store types, and tend to be located in higher SES areas.[27] Also, most farmers' markets in Hawai'i do not accept Electronic Benefit Transfer (EBT) cards, limiting accessibility for those with Supplemental Nutrition Access Program (SNAP) benefits (formerly known as food stamps). These environmental constraints suggest that Hawai'i's excellent agricultural climate and locally grown fresh fruits and vegetables may preferentially benefit individuals or communities with the time, resources and/or land to take advantage of these.

Studies have found that communities in Hawai'i vary in their access to supermarkets, farmers' markets, public transportation, and other factors that might be associated with health. One study in Honolulu found that, similar to findings in the continental US, supermarkets were most likely to be situated in higher SES locations while convenience stores were most likely to be found in the lowest SES locations.[28] Mau, et al, [29] found a more obesogenic environment in O'ahu communities with higher percentages of Native Hawaiians. The researchers defined an obesogenic environment as one that contributes to obesity by encouraging overconsumption of calorie-dense, low-nutrition foods and inhibiting adequate physical activity levels. Local research on the relationship between the environment and obesity is still limited. For instance, although the USDA offers an interactive map of food deserts in the United States. (http://www.ers.usda.gov/data/fooddesert/fooddesert.html), Hawai'i is not included in the maps.

The few studies examining neighborhood-level food accessibility and affordability in Hawai'i found both similarities and interesting differences when compared to studies in the continental US. For example, a study in Honolulu found that, in contrast to studies in other locations, the availability of fresh fruits did not systematically vary by the percentage of ethnic minority residents.[27] However, given Hawai'i's complex racial/ethnic mixture, with no predominant group, and with some minority groups (ie, Japanese and Chinese) having a better health profile than Whites, percent minority may not be the most useful metric for evaluating neighborhood differences. A more detailed consideration of racial/ethnic composition will be important to fully understand food accessibility and affordability by neighborhood. Also, the Honolulu study also did not assess rural or neighbor island locations, which may have different access issues than urban Honolulu.

Although health outcomes, especially those associated with diet, do vary by community, few empirical studies have been conducted to study the direct relationship between individual health and community food accessibility in Hawai'i. This would be interesting research to perform as some of Hawai'i's unique characteristics might lead to stronger neighborhood effects than those seen in the continental US. For instance, gas prices in Hawai'i are notably high. The high cost of gas, coupled with limited public transportation options, may augment the importance of neighborhood determinants of healthful food options. As a result, neighborhood effects on food-related behavior and health outcomes might be stronger in Hawai'i, particularly for lower income residents and those in rural communities. Hawai'i also has a distinctive racial and ethnic composition, which may impact the relevance of racial/ethnic community-level effects.[30,31]

Other Factors

There are limitations to the study of neighborhoods and health generally and in considering food accessibility and affordability specifically. A person's primary community, and the location where they purchase and/or consume food, may not only reflect where they live, but also where they attend school, go to work, or travel for that purpose.[2] Individual and social-network factors also affect the relationship between community context and health,[32] and may influence purchase and consumption of food, regardless of neighborhood availability. Family-level factors are important, particularly in Hawai'i, as are state and federal policy factors. Interaction effects may be seen between these predictors as well. Certain factors may be particularly relevant to a specific community or a demographic group. These considerations underscore the importance of more local research assessing Hawai'i's unique cultural, geographic, and ethnic/racial composition in neighborhood health effects.

Comparison of Three Communities

Figure 1 shows the supermarkets, farmers' markets, and transportation options available in 3 diverse communities in Hawai'i: urban Honolulu (Kaimuki/Palolo/Waikiki), rural O'ahu (Waianae), and rural Big Island (Puna). Supermarkets are defined according to the United States Department of Agriculture definition as offering a full line of groceries, meat, and produce with at least $2 million in annual sales.[33]

Kaimuki/Palolo/Waikiki, approximately 8 square miles and home to 80,838 people,[34] is an urban environment of many neighborhoods in the city of Honolulu. Supermarkets are generally well within reach; there are approximately 23 in urban Honolulu. However, housing costs are much higher in urban neighborhoods. The median gross rent in urban Honolulu is $1,135 and nearly half the renters (44.9%) spend at least 35% of their income on rent,[35] placing a great financial strain on residents, and making healthful food and other necessities less affordable. Many urban rentals do not come with a full kitchen; some are equipped with a hot plate or microwave, while others have no kitchen at all, increasing reliance on prepared foods.[27] Bus transportation is plentiful, with many bus lines running through the neighborhoods, and operating at all hours of the day and night.[36] In Kaimuki/Palolo/Waikiki, diabetes prevalence is 4.6%[37] and 12.9% of adults are obese.[38]

In contrast, the Puna district of the Big Island has a median gross rent of $644. The downside of living in a rural community is the scarcity of supermarkets. Puna is 499.5 square miles,[39] comparable to the size of O'ahu at 601 square miles, and home to 45,326 people.[40] Despite its large size, Puna only has 2 supermarkets. Fortunately, Puna is rich in agriculture and hosts 6 farmers' markets.[26] Public transportation in Puna

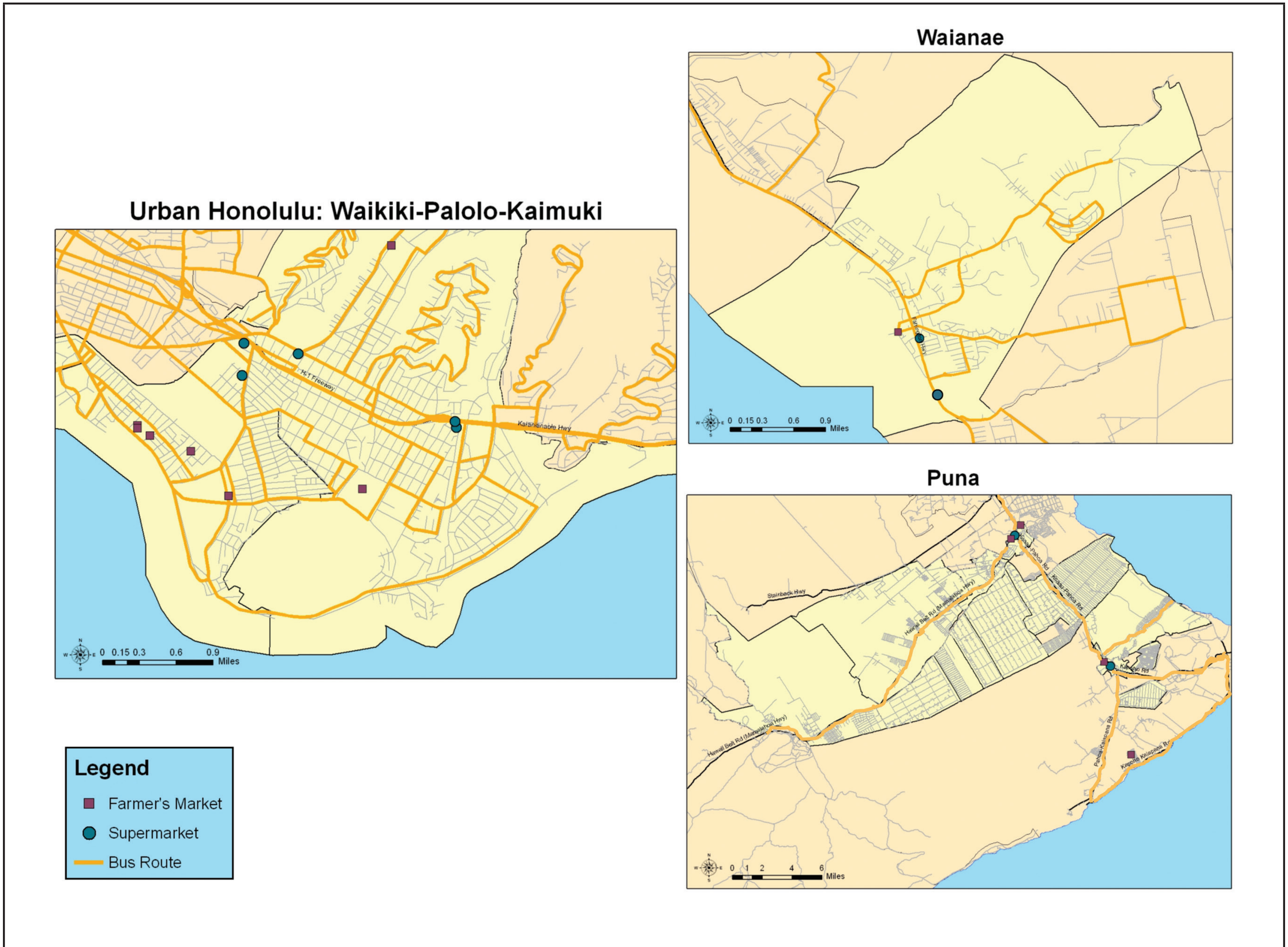

Figure 1: Supermarkets, Farmers' Markets, and Bus Routes in Three Hawai'i Communities

is very limited, however. There are two bus lines, which are infrequent and operate only in the early morning and late afternoon hours.[36] The poor road infrastructure in Puna, with few paved roads and limited connectivity between neighborhoods, creates substantial challenges to the development of effective public transportation systems. In Puna, diabetes prevalence is 7.7%[37] and 28.8% of adults are obese.[38]

Waianae (5.36 square miles) is located on O'ahu, 33 miles from Honolulu, and is home to 13,177 people.[41] Food access and affordability in Leeward O'ahu more closely resembles rural Puna with only 2 supermarkets, although accessibility of fast-food outlets is higher. Gross rent is $1,120, almost as much as urban Honolulu.[41] Bus service, while less convenient than in downtown Honolulu, is much more available than in Puna. At least six bus lines serve the Waianae area between 4 am-10 pm; three hourly circulator buses connect neighborhoods to the Waianae transit center, and three express buses provide half-hour and hourly transportation from the Waianae transit center to major shopping and employment centers in more urban centers such as Ewa, Pearl City, and downtown Honolulu.[36] In Waianae, diabetes prevalence is approximately double the Hawai'i average at 15.2%[37] and 50.1% of adults are obese.[38]

The food environment of communities in urban Honolulu, Waianae, and Puna differ greatly in terms of access to supermarkets, public transportation, and farmers' markets. They also vary across many other factors beyond the scope of this article (eg, fast food restaurants, SES, racial/ethnic composition, population size) that impact both the food environment and the use of that food environment within a community. There are also stark differences in diabetes and obesity rates between these neighborhoods. Further research should consider how the food environment is linked to these and other health effects within Hawai'i neighborhoods.

Policy Options

Adding more supermarkets to underserved areas is an option for improving food environments. This can add local jobs while increasing access to cheaper produce and healthier foods.[42] However, this option has many barriers. Large chain supermarkets often have difficulty operating profitably in low-income communities.[43] Other challenges to opening supermarkets in underserved areas can include higher operating costs, more demanding regulations, and greater risk of crime, particularly in some urban environments.[44] Also, adding more supermarkets involves large-scale development that may be ill-suited for, and undesirable in, many of Hawai'i's communities. Finally, supermarkets may provide, on average, the cheapest access to many healthy foods, but they also provide a myriad of unhealthy choices. Thus, they may not be the most targeted means to improve access to healthy foods.

Smaller food establishments, such as farmers' markets, mobile markets, and grocery and convenience stores can have a major role in improving access to healthy foods. The recent federal initiative to expand EBT options within farmers' markets is an important new development that can help address the cost challenges.[45] Small pop-up[46] or mobile markets[47] have a number of advantages compared to traditional supermarkets, including lower overhead, the possibility to focus on an inventory of healthy staples, and a smaller footprint. A study of a mobile market system in Buffalo, New York, found that by decreasing the average travel distance to healthy foods to less than one mile, residents had greater access to fresh fruits and vegetables.[47] Efforts to provide pop-up markets in Hawai'i's underserved communities are underway,[48] and, importantly, these do accept EBT cards.

Ensuring that nutritious options are available in the many mom-and-pop grocery or convenience stores already located in many lower income neighborhoods may be another means of improving access to healthy food and supporting local businesses without increasing development or out-of-state, corporate involvement. Examples of this type of initiative on the mainland include the Healthy Corner Stores' Network.[49] Other useful efforts may involve increasing the visibility of the healthy products within such stores.[50]

Addressing structural and built environment factors, such as transportation infrastructure, is also a possible solution, particularly for those who live in areas with limited healthy food options, so that they are able to travel to other locations more readily. Other efforts to improve the food environment have included banning fast food restaurants within a geographic boundary.[6]

Nevertheless, it is essential to recognize that the existence of food establishments such as supermarkets, farmers' markets, and fast food restaurants within a community are significant, but not singular, determinants of the quality of the food environment or the healthy food that people with a community consume. Examining consumer practices and preferences in tandem with designing a healthy food environment is critical to fully resolving our obesity and health crisis.[51] Nutrition education, coupled with cultural sensitivity and knowledge of community preferences, is particularly important.[50]

Further, rather than creating new projects, supporting, expanding, and evaluating our many innovative community projects aimed at promoting healthier nutrition in Hawai'i, many of which were created and sustained through community involvement, may be a particularly feasible and fruitful way to address healthy food environments and behaviors.

Also, maintaining and improving the locally grown supply of healthy foods, particularly fruits and vegetables, will also help to improve prices of these goods and supply jobs. To do this it may be critical to provide incentives, such as subsidies, to farmers, producers, purchasers, and consumers to advance awareness and demand for local nutritious food products.[11] Finding sufficient land for agricultural development is also a significant barrier in Hawai'i where the cost of land is particularly high and agricultural interests must compete with development. Maintaining and/or creating lands to increase local agriculture requires political, regulatory, financial, and infrastructural efforts. Policies that support partnerships between producers, purchasers, schools, and other community organizations

encourage greater access to agricultural lands and availability of healthy food options.[9]

Many efforts have set the stage for a more sustainable food supply in Hawai'i. For instance, the Hawai'i County Food Self-Sufficiency Baseline Study[13] focused on agricultural mapping, summarizing food production and consumption data, and developing a geodatabase for monitoring the progress of current and future agricultural activity. These efforts, which also promote traditional Hawaiian crops, can be extended throughout the state of Hawai'i to determine best agricultural practices. Creating a sustainable, equitable, and culturally-based food system will help to improve the health of Hawai'i's population. While not all efforts toward sustainable food access and food security in Hawai'i explicitly include health considerations, healthier communities and healthier choices within more of Hawai'i's communities are likely outcomes.

Efforts to Improve Food Availability and Affordability in Hawai'i

Although a significant amount of research remains to be conducted on the relationship between the environmental context and obesity in Hawai'i, efforts are currently underway to improve the food accessibility and affordability in low-income neighborhoods in Hawai'i. The majority of these efforts focus on community context, and some of the many projects underway are described here. First, the Roots Project at Kokua Kalihi Valley (KKV) directly addresses food accessibility and affordability in Kalihi Valley, an ethnically diverse, low-income community on O'ahu. This project, funded through a Kresge Foundation grant, uses neighborhood assets to build a stronger community with food as a focus. In Kalihi, closeness of neighbors and ohana are community strengths that can be enhanced through food sharing, growing, and civic engagement. KKV promotes increasing access to nutritious food as a way to strengthen the vitality and health of the community. For more information visit www.hoouluaina.org.

Second, the Waimanalo Food Systems Hui is funded through an agreement between the Hawai'i State Department of Health (DOH) and the Centers for Disease Control and Prevention. The Waimanalo community is partnering with the DOH to promote land stewardship and sustainable production and consumption of food according to traditional Native Hawaiian cultural values. Waimanalo families and other participants learn how incremental changes in production and consumption of fresh foods can positively impact their health. Projects include assembling backyard aquaponics systems, developing bucket gardens and community gardens, and mastering the skills of healthy food production. Through a "learn to teach" model, participants share what they have learned with others in the community. For more information visit http://eaiponokakou.org.

Third, The GreenWheel Food Hub aims to help Hawai'i's low-income residents gain better access to fresh, locally grown food. This organization started the Honolulu Farmers' Market at Blaisdell Center to increase food accessibility in central Honolulu. To improve affordability and access for low-income residents, the GreenWheel Grow Bucks Project allows shoppers to use EBT cards to purchase Greenbucks, which can be used to purchase produce at market vendors stalls. It is also developing the GreenWheel Mobile Market, a produce truck, which will target food deserts, areas with limited access to healthy food options, on a weekly rotating basis. For more information visit www.greenwheelfoodhub.org.

Fourth, the Kauai Nutrition and Physical Activity Coalition (NPAC) and the Kauai Independent Food Bank worked together to solve structural barriers to low-cost fruit and vegetable purchasing among low-income families. The Eat Better Today program allows state SNAP participants to use their EBT cards to purchase fresh fruits and vegetables at farmers' markets throughout the island, and provides bonus coupons to encourage participation and stretch scarce food dollars further. For more information visit www.getfitkauai.com/.

Additional examples of efforts underway include the Healthy Foods Hawai'i (HFH) study which worked to improve children's dietary behavior by modifying the food environment with community-selected foods,[52] Kanu Hawai'i which strives to combat food deserts in specific Hawai'i communities,[53] and school-based garden initiatives which promote sustainable agricultural practices and nutrition education within a community context.[54,55]

Conclusion

Health is affected by a complex interaction of behavioral, social, genetic, and environmental factors. Socioeconomic, cultural, and environmental aspects of neighborhoods impact health. Health interventions that capitalize on the strengths of communities may be important to reducing rates of obesity and the incidence of diabetes. In Hawai'i, much empirical and practical work remains to be done to understand the relationship between neighborhoods and health generally, and the relationship between food accessibility/affordability and health specifically. However, many important initiatives are underway that may be fruitfully expanded, supported, and duplicated.

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