

Food Deserts
The Issue and Possible Solutions

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Abstract

Areas in which residents lack access to low-priced, nutritious food are called food deserts. Typical characteristics of food deserts include residents with limited income, high concentrations of ethnic minorities, difficulty accessing grocery stores with a produce section, and high exposure to fast food restaurants and convenience stores. The reason limited access to healthy, minimally processed foods is an issue is because foods that are highly processed typically have higher levels of fat, sugar, and salt content which have been linked to obesity, coronary artery disease, and other chronic diseases. Many different types of interventions have been attempted to combat this multifaceted issue, including changes in policy, community, and interpersonal factors. Since food deserts are such complex issues, each community needs individualized attention before a policy or intervention is developed. Currently, there is no standardization for defining a “food desert.” Each community is different, and a standard method to measure a community’s food access status, resources, and needs is the first step in determining what action policymakers and health promotion specialists need to take in order to combat this widespread problem.

Food Deserts: The Issue and Possible Solutions

The issue of food deserts is not new, but more and more health educators are becoming aware of the issue and creating solutions. “Food deserts” are areas in which residents lack access to low-priced quality food. People who live in these areas typically consume mostly cheap, energy-dense food sold from fast food restaurants and convenience stores, and very small amounts of fruits and vegetables. They eat these foods because they do not have access to stores with a produce section and other minimally processed food items (Drewnowski & Specter, 2004). These cheap foods are often high in sodium, sugar, and fat (Block, 2004). The problem with eating foods with these nutritional properties is they are linked to numerous chronic diseases, such as type 2 diabetes and coronary artery disease (Beaulac, Kristjansson, & Cummins, 2009). Lack of access to nutritious food is an issue of which policymakers and citizens are becoming increasingly aware. Different types of interventions have been implemented to combat this multifaceted issue. The purpose of this thesis is to review various interventions and factors influencing food choices in order to gain a well-rounded sense of the components required in a successful food desert intervention.

Food Desert Definition

No standards for determining a food desert have been established, but the most popular definition of a food desert is a neighborhood where the residents lack access to low-priced, good quality food stores (Graham & Bennison, 2004). The definition varies based on who is researching it, so it is difficult to compare studies and results and thus, come to concrete conclusions regarding food deserts. Other terms which are frequently

used when defining food deserts, such as *poor neighborhood* and *limited food access*, are often poorly defined and not standardized (Curtis & McClellan, 1995).

All food deserts share at least a few commonalities. People who live in low-income areas of the United States with a high proportion of minorities typically have limited access to fresh fruit and vegetables. Food deserts have fewer grocery stores and supermarkets with produce sections and minimally processed food per capita than wealthier areas. They also have a higher concentration of convenience stores and corner markets which lack a produce section and minimally processed foods. People who live in food deserts typically have to travel further to grocery stores than people in wealthier areas. In addition, some studies show that food prices in limited income and minority areas are higher than middle and high income areas (Beaulac, Kristjansson, & Cummins, 2009).

Another reason standardization in food desert definition is to place proper attention on the important factors. Researchers Ver Ploeg, Dutko, and Breneman (2015) believe that the typical standards for determining food access often either overestimate or underestimate certain characteristics. These researchers believe that the current literature focuses on income, transportation access, and proximity to nutritious food. They believe too much focus is placed on changing the area and not enough on changing the individuals who lack access and determining where they live (concentrated in neighborhoods or dispersed and isolated). They noted that an assumption of low-income areas is that everyone in the area is receiving a limited income. However, some of the people who live in these areas have adequate resources and access to proper nutrition. The same is true of medium and high income areas. Not everyone who lives in these

areas has adequate income, resources, and access to food, but typically medium and high income areas are ignored when determining an area's food desert status.

Ways to improve the classification of a food desert and food access, however, are available. To determine food access, the characteristics should include more comprehensive and specific information on the limitations of food access, distance to grocery stores, transportation access, and income data. The distance component of a food desert definition could be

An estimate of the number of low-income households without vehicles that are a specific distance from a supermarket or a number of supermarkets...is likely to be a very credible indicator of individual access limitations. Such a measure would be based on what is considered outside of a reasonable walking distance. For example, estimate the number of households without a vehicle outside of .05 and 1 mile from the nearest supermarket. This measure is applied evenly to the entire United States without adjusting for rural and urban distinctions. Such a measure provides estimates of those with limited food store access, regardless of whether they live in low-income areas or moderate and higher income areas, which would provide a more accurate picture of the extent of food access problems than measures that only focus on low-income neighborhoods. (Ver Ploeg, Dutko, & Breneman, p. 220)

To measure an area's food desert status, Ver Ploeg, Dutko, and Breneman took the percentage and number of households that have neither access to transportation nor live within walking distance (within .05 miles) to a grocery store. They also took the percentage of households that live so far from a supermarket (more than 20 miles away)

that driving to it is a burden. This data, being measured according to specific parameters, can be used across the United States, regardless of income in that area, to aid in the definition of an area's food access status. A way to improve more on this idea is to combine the transportation availability data with income data for small geographic areas. Combining the data will allow health educators to get a clearer picture of what individuals in specific areas are facing when it comes to food access barriers (Ver Ploeg, Dutko, & Breneman, 2015).

Ver Ploeg, Dutko, and Breneman (2015) emphasized several key points in their research. First, before more policies regarding food access are made, more research about food access barriers needs to be done. Doing more research will make the policies better directed at the populations in need and better focused on what problems need to change. Second, these researchers suggest the best way to measure an individual's food access is through taking one's self-reported access and combining the data with one's transportation access, distance to a store, and income. They also suggest that creating policies focused on individuals may be more beneficial than policies altering existing stores or creating new stores. Ways to improve an individual's access are providing grocery stores with the capability of delivering groceries to those without transportation or providing people with travel vouchers to cover the cost of transportation to a grocery store. To summarize, the demographics of the United States are very diverse, which is something that needs to be taken into account before policies are developed based on generalization and better research needs to be conducted and standardized methods need to be created in order to really understand the complexity of food deserts.

Traits of Food Deserts

The definition of a “food desert” depends on different economic, socioecological, and other factors that determine an area’s food access status. One study, examining areas of rural and urban Arkansas, identified some of the economic and socioecological determinants of food deserts, and also attempted to understand what food options these deserts offer. Defining a “food desert” as areas with low-income residents and low access to grocery stores with a produce section, the researchers measured grocery store access, the density of convenience stores and fast food restaurants in the area, the distribution of minorities, and education levels in these areas. This study determined that low-income areas typically have higher populations of minorities and individuals with lower education levels compared with those in high-income areas. Out of all the low-income areas studied, the researchers determined that 13% of urban areas and 43% of rural areas qualify as food deserts. The low-income areas typically had decreased access to grocery stores with nutritious options than high-income areas. Urban residents who receive a limited income also had greater access to convenience stores and fast-food restaurants. Therefore, food deserts create a twofold problem for residents: ease of access to unhealthy options and hindered access to healthy options (Alviola, Nayga, Thomsen, & Wang, 2013).

Increased Exposure to Fast Food

Overall, researchers believe one’s environment plays a big role in nutrition choices. The fast-food industry has grown exponentially, which means its environmental influence is growing. In the past 30 years, Americans’ spending on fast food has increased from \$6 billion to \$110 billion. Fast-food restaurants are generous in their

portions and relatively low in price, which makes them ideal for many people, especially those with little time to prepare meals and those with limited incomes. Fast food is also very high in fat content, which has been linked to weight gain and increase in one's BMI (Block, Scribner, & DeSalvo, 2004).

In a study performed in New Orleans to determine the prevalence of fast food restaurants, researchers mapped each restaurant using geographic information system software. The study determined that predominantly black, low-income neighborhoods have an average of 2.4 fast food restaurants per square mile, whereas mostly white neighborhoods had an average of 1.5 fast food restaurants. This increased exposure to fast-food restaurants may help explain the cause of obesity in these neighborhoods, but no conclusive evidence was drawn (Block, Scribner, & DeSalvo, 2004).

Grocery Store Availability and Cost

Lack of availability of grocery stores and high cost of groceries are other characteristics of food deserts. Larger grocery stores are reluctant to open stores in urban areas for many reasons including higher operational costs, higher production costs, difficulty finding a location to build, and misconception regarding purchase power and crime rates. Stores are more focused on building in suburban areas because of the perceived benefits of building there. Because of this, those living in urban areas with limited incomes typically shop at small convenience stores that have a small selection of healthy items, if any and these stores typically charge anywhere from 10-50% more than larger supermarkets (Graham & Bennison, 2004).

A new way to shed light on issues faced by people who do not typically have a voice in politics and policies is Photovoice. Photovoice is, "a participatory action

approach in which individuals use photographs to identify and address issues in their community” (Valera, Gallin, Schuk, & Davis, 2009, p. 300). Photovoice is useful for a wide variety of problems, but one particular Photovoice study focused on nutritional access and issues surrounding food insecurity of low-income women in New York City. The study told the stories and opinions of 9 women recruited from Sisterlink, a program developed from the Community Action for Prenatal Care. Sisterlink’s purpose is to reduce the risk of adverse birth outcomes by seeking out women with high-risk pregnancies and connecting them with appropriate prenatal care. The women recruited for this study ranged from ages 20-45 and were mostly racial minorities. Each woman had children ranging in age from 6 months to 16 years. After being selected for the study, each woman was given a camera and asked to take pictures that answered the research question, “Can we afford to eat healthy in Central Harlem?” Afterward, in a focus group, the women discussed the photos they took and answered questions including, “How did you feel when you took this photo?”, “What would you say about this picture to someone who is not from your neighborhood?”, and “What possible solutions do you have to address food insecurity?”

It is important to note that these women had a general knowledge of nutrition, were familiar with the food pyramid, and knew they needed to eat more whole grains and vegetables and less foods from the top of the pyramid, such as meats, but stated they did not eat healthy because they could not afford to.

The photos taken found high prices for fruits and vegetables within Central Harlem when compared with other grocery stores. For example, one woman photographed the price of tomatoes at \$3.99 for 8 tomatoes. The woman was incredulous

at such high prices for tomatoes. The women commiserated together; they knew they needed to feed themselves and their children nutrient-dense food, but couldn't afford the sky-high prices of fruits and vegetables and their families were suffering from the effects of poor nutrition. One woman, only 37 years old, was already at risk for a heart attack. Another woman shared her son was 150 pounds overweight, and another mother was concerned for her 3-year-old daughter who wasn't gaining the right kind of weight. Other health concerns were high blood pressure and diabetes, among other chronic diseases.

The women also discussed other problems that compounded their nutrition issues. Some of the women were homeless, so they had to rely on whatever soup kitchens and shelters were serving. Other women in the study relied on food stamps, but oftentimes the food stamps arrived weeks later than expected, and were not enough to feed the entire family. The women said that relying on food stamps to purchase enough fruits and vegetables for their families was "unrealistic" at the high prices in their neighborhoods.

After commiserating over the difficulties of eating well in Central Harlem, the women were asked how they can become agents of change both in their families' lives and in their community. The women discussed ideas such as shopping in other neighborhoods that offered reasonable prices, cooking at home instead of eating out, and increasing awareness of this issue to their policymakers and community members. Through documenting their surroundings, the women gained greater understanding of their surroundings and confidence to search for better food options. While this subject group was small, this project empowered and encouraged women, and the results could be taken to the policymakers in Central Harlem in order to initiate change to the environment (Valera, Gallin, Schuk, & Davis, 2009).

Food Choices

Typically, households with higher incomes buy more fruits, vegetables, quality meats, seafood, and convenience foods; whereas those with lower incomes buy lower cost items but spend a greater share of their income on food. Several surveys have shown that those with limited incomes spent their money on foods with high energy density, which means foods higher in fat and sugar content (Drewnowski & Specter, 2004). The problem with eating foods with these nutritional properties is they are linked to numerous chronic diseases such as type 2 diabetes and coronary artery disease (Beaulac, Kristjansson, & Cummins, 2009).

Perceptions

Personal situations, characteristics, circumstances, and mobility play a huge role in perception of food choice. Some stores and choices may be theoretically accessible, but because of a person's perceived limitations, her or she may believe the stores and choices to be inaccessible and unattainable (Kirkup et al., 2004). Often the biggest perceived barrier to healthy eating is cost. As previously mentioned, individuals consume fast foods because of low prices with adequate portions. Coinciding with this behavior is the common belief that in order to eat healthy, people have to pay more. While few studies have found that eating healthier is not always more expensive, one study, evaluating families with obese 8-12 year-old children, actually found that a healthier diet is less expensive, dropping from \$6.77 to \$5.04 a meal. These results indicate that eating healthy foods is not always more expensive than unhealthy foods (Drewnowski & Specter, 2004).

Interventions

Despite a lack of standardization in the definition of food deserts, policymakers and health promoters nationwide have created and implemented various creative interventions to eliminate food deserts. Interventions include research and education regarding food costs and choices, establishment of grocery stores and farmer's markets, revolutionizing government funded food assistance programs, and school education programs.

USDA Research

The United States Department of Agriculture (USDA) did a study on the most and least expensive ways of purchasing fruits and vegetables, and how much it costs to meet the daily recommended amount in one's diet. Typically, the least expensive way to purchase fruits and vegetables is fresh and not frozen, in juice, dried, or canned. The USDA put together a list of seven ways one can get the recommended three servings of fruit and four servings of vegetables in a day for a dollar or less. For example, a person can eat ½ cup of fresh watermelon, ½ cup of fresh apple, a little less than ½ cup grapefruit juice and ⅛ cup of raisins for only \$.37 and ½ cup each of fresh cabbage, potatoes, broccoli, and carrots for only \$.27. So for only \$.64 a person can meet the recommended daily allowance of fruits and vegetables. A typical American spends \$5.50 a day on food, so someone spending \$.67 for vegetables leaves 88% of their food allowance for the other food groups. For someone with an income of less than 130% below the poverty line who typically spends \$4.07 a day on food, that person can spend \$.67 for fresh fruits and vegetables which leaves him with 84% of his food allowance to spend on the other food groups (Reed, Frazão, & Itskowitz, 2004). Health promoters can

use this information in interventions after grocery stores or farmer's markets have been established in order to educate people how to make cheap but healthy choices.

Grocery Stores

Studies have shown that just the presence of grocery stores with healthy options plays a role in increasing vegetable and fruit intake. One study by Story, Kaphingst, Robinson-O'Brien, and Glanz (2008) found that each additional supermarket increased fruit and vegetable intake in a given area, and that intake was three times as great for African Americans. Increased access to supermarkets has been linked with lower adolescent BMI, but greater access to convenience stores was linked to higher adolescent BMI. This data suggests that increasing the amount of grocery stores within food deserts can help improve health outcomes.

Wrigley (2002) believes that availability combined with affordability, not just availability alone, of food are the two biggest determinants of a person's diet. To study this viewpoint, a before-and-after food desert study, conducted in Britain, evaluated the food consumption habits of residents in a food desert both before and after a supermarket was put in.

For the study, the researchers conducted a detailed survey before the supermarket was established and a year after it was established. Before the intervention, nearly 70% of people living in the area had limited access to nutritious food. Post-intervention assessment found that those who had the poorest diets and only shopped at small stores with few nutritional options before the intervention shopped more at the supermarket and increased their fruit and vegetable intake significantly (Wrigley, 2002).

These researchers had to take into consideration many different factors impacting food choices. They noted that physical access alone does not mean economic access to healthier options, which could lead to no change in the food consumption habits of consumers. For example, those with low incomes may distance themselves from superstores with a lot of options so they will not be tempted to spend more money than is in their budget. Other factors that the researchers suggested impacted the food choices of people with limited incomes were nutritional knowledge, access to food preparation materials and facilities, motivation for health, and cultural/social norms. With all of these factors in play, the researchers knew it would be hard to determine how the addition of the superstore would affect the population. Sadly, the researchers were unable to draw definite conclusions from this study, but only provide more speculations and hope for future studies. While this study only scratched the surface of the complex issue of food deserts, this is a step in the right direction for health coordinators who want to eradicate food deserts and change eating habits of those in food deserts (Wrigley, 2002).

Kyureghian and Nayga (2013), however, believe that convenience is more influential on grocery purchases than both availability and affordability. They believe that people are not more likely to shop at a certain supermarket simply because it offers fruits and vegetables at a lower price. Instead, Kyureghian and Nayga found that the availability of produce at convenience stores made it more likely for people to buy fruits and vegetables from that store, implying that people generally value convenience over a better selection and lower prices. Health promoters and policymakers need to keep in mind all three factors, namely convenience, affordability, and availability when determining an area's food access status and creating food desert interventions.

Besides the direct physical aspects that grocery stores provide in improving dietary choices, they can also impact food choices in other aspects. Grocery stores have a huge platform to teach their customers how to eat healthy. Supermarkets offer many different varieties of take-out foods and now account for 1/5 of all take-out food purchases. They also make pre-washed and pre-cut vegetables to appeal to customers who believe vegetables to be too much work in food production. Pricing, policy, and environmental interventions for fruit and vegetable consumption are interventions that aim to increase knowledge of nutritional information and fruit and vegetable information for all people, not just minority or high-risk groups. Policy and environmental interventions are more effective because they are less costly than small group or individually focused interventions, reach large groups of people, and impact the overall environment of the shoppers. Supermarkets commonly implement four pricing, policy, and environmental interventions: point-of-purchase information, coupons and reduced prices, increased convenience, variety, and availability, and advertising and promotion (Glanz & Yaroch, 2004).

Point-of-purchase (POP) information includes signage which shows foods that have certain nutritional benefits or values. Often POP information comes in the form of posters, flyers, and brochures. For example, POP includes signage signifying which foods are good sources of specific fruits and vegetables, and may even include cooking demonstrations or recipes customers can take with them. While POP has been shown to increase the knowledge of customers, and has made a slight impact on their shopping habits (i.e., consuming more reduced-fat foods), it has not been shown to make a big difference in shopping and eating patterns (Glanz & Yaroch, 2004).

Coupons and price reductions have been used for all types of food items, and now nutritional programs have been making coupons more available for certain grocery stores and farmers' markets. One intervention offered coupons to low-income senior citizens over a five-year period and reached more than 20,000 people every year. However, the researchers could not determine whether or not the program increased the fruit and vegetable intake of senior citizens, because the study only included those who used the coupons and not all 20,000 recipients. Another intervention offered farmers' markets coupons to women enrolled in WIC. These women were more likely to shop at farmers' markets, but the coupons were not shown to increase their overall fruit and vegetable consumption. These two studies show that while coupons and price reduction are good tools, their potential has not yet been realized and more research needs to be done in this area to fully understand the impact of coupons (Glanz & Yaroch, 2004).

Fruits and vegetables have become easier to find, use, and eat because grocery stores have increase the convenience, availability, and variety of products. A study done four decades examined the quality of fruit and vegetable locations in grocery stores. This study found that when fruits and vegetables located in an area with high customer visibility, people were more likely to buy these items (Glanz & Yaroch, 2004). Because of the great impact grocery stores have on their customers' consumption patterns, advertising and promotion of fruit and vegetables could prove to be a useful way to increase fruit and vegetable consumption.

One way to implement this in food deserts is increasing the availability of produce in corner stores and creating advertisements and promotions for the produce. These marketing strategies can attract the attention of people who shop at those stores on a

regular basis and encourage them to make healthier choices without having to shop at a different store.

Farmer's Markets

Farmer's markets are a viable way to increase the purchase and consumption of fruits and vegetables to those in food deserts. For example, the establishment of farmer's markets increased access to fruits and vegetables in 25% of urban food deserts in Washington. This means that those who once were considered *low access* now have *high access* to fruits and vegetables when taking into account both farmer's markets and supermarkets as sources of food. In rural areas, taking into account farmer's markets helped increase access to food, but not enough to bring the area out of food desert status (Sage, McCracken, & Sage, 2013).

Government Programs & Policies

Government involvement in the welfare of its citizens has been going on for many years, but this was strengthened in 2001 with the Surgeon General's report: "A Call to Action to Prevent and Decrease Overweight and Obesity." This report acknowledged that obesity was a person's fault, but only to an extent. This report says obesity is also a community responsibility, which is one reason the food desert environment is so dangerous for health.

The first time federal funds were used specifically for food desert purposes was in 2011. In this year, \$25 million in grants was given to Community Development Financial Institutions to create plans that would increase access to nutritionally dense foods (Karpyn, Young, & Weiss, 2012). Another government sponsored intervention is the USDA's Thrifty Food Plan (TFP), which is a collection of meal plans that are cheap,

nutritious and thus more accessible for people with low incomes (Drewnowski & Specter, 2004).

The Food Trust. The Food Trust is one of the most widespread and diverse interventions in the United States whose purpose is to ensure all people have access to and information about nutritious, affordable food (“The Food Trust,” n.d.). The Food Trust began 20 years ago with a Farmer’s Market in Philadelphia, Pennsylvania. This project, called the Pennsylvania Fresh Food Initiative, brought a variety of fruits and vegetables to southern Philadelphia that the residents had never seen before. Expanding beyond its first initiative, the Food Trust has partnered with schools, neighborhoods, policymakers, farmers, and grocers across the nation to eliminate food deserts (“The Food Trust,” n.d.).

One way The Food Trust has worked to eliminate food deserts is by making produce available in corner stores. Corner stores are on every block in most large cities, but often only offer a variety of cheap foods high in salt and fat. The Food Trust partnered with these stores by providing shelving and refrigeration for produce, teaching the employees how to market healthier options, providing signage showing what foods are a good choice, what foods you can eat occasionally, and what foods should be avoided. Partnering with a store with established customers and reputation has been an effective way to provide those in inner cities with greater access to nutrient dense foods. While no measurable follow-up information is available regarding these stores, supermarket owners, who have been aided by The Food Trust, state they have benefited from these partnerships when interviewed (“The Food Trust,” n.d.).

Besides partnering with corner stores, The Food Trust has also partnered with grocery store chains such as Shoprite. Oftentimes grocery stores face barriers to locating in inner cities. These barriers include the high cost of property or rent and a high risk of vandalism. The Food Trust helps these grocery stores with startup costs to encourage these stores to open locations in food deserts. While no formal follow-up information is available regarding these stores, The Food Trust interviewed supermarket and convenience store owners who have been aided by The Food Trust. These business owners feel as though they have benefited from the help of The Food Trust (“The Food Trust,” n.d.).

SNAP. The Supplemental Nutrition Assistance Program, commonly known as SNAP, and formerly known as “food stamps,” “offers nutrition assistance to millions of eligible, low-income individuals and families and provides economic benefits to communities” (Supplemental nutrition assistance program, 2016). This nationwide program provides people in need with an Electronic Benefits Transfer (EBT) card loaded with the amount of money the person qualifies for each month. To qualify, the person must meet certain requirements, such as having a monthly income lower than \$150 a month and having less than \$100 in the bank. With the EBT card, a person can purchase breads, cereals, meats, fish, poultry, fruits, vegetables, and dairy products. SNAP benefits cannot be used for alcoholic beverages, cigarettes, tobacco, non-food items (i.e., soap and medicines) (Supplemental nutrition assistance program, 2016).

A complaint people have voiced about SNAP is that people can use it to purchase “unhealthy” items. Because no set standards exist for defining a food as “unhealthy” or “healthy,” SNAP cannot place value on one food’s healthfulness over another’s. If SNAP

was to implement restrictions, it would greatly increase the cost and complexity of the program (Supplemental nutrition assistance program, 2016).

When reviewing other food assistance programs, Block and Subramanian (2015) suggest that incentives can be created for purchasing healthy foods as opposed to unhealthy foods in order to decrease diet quality disparities for those who rely on food assistance programs. For example, in the program Women, Infant, and Children (WIC) more fruit and vegetable allowances were added to the designated financial packages received, and in turn grocery stores increased the amount of healthy foods they stocked. As a result, the amount of fruit and vegetables purchased increased by 29% and 18% respectively, whole grain bread purchases increased 3-fold, and brown rice purchases increased 5-fold. The stores also observed a 50% decline in whole milk purchases and 24% decrease in juice purchases. The changes in types of items purchased implies that WIC's efforts to increase the purchase and consumption of fruits and vegetables was working. "If WIC can do this, why can't SNAP?" wondered Block and Subramanian. They suggested increasing the EBT value for families who purchase healthier foods.

The theory of incentivizing healthy food purchases was actually tested by the United States Department of Agriculture (USDA) through the Healthy Incentive Pilot in Massachusetts. Families received \$.30 for every \$1.00 spent on fruits and vegetables. After one year, families receiving this incentive spent about \$1.19 more per month on fruits and vegetables and consumed an average of one-fourth cup more fruits and vegetables in a day than the control group. While this monetary incentive only had a slight increase on the amount of fruits and vegetables a person ate in a day, that increase is still important. Coupled with other interventions, monetary incentive in SNAP

purchases could prove to be a valuable way of improving the diet of those with limited access to food (Block & Subramanian, 2015).

Another suggestion Block and Subramanian made was to eliminate sugar sweetened beverages from the list of items available for purchase from SNAP. The researchers estimated that removing sweetened beverages from SNAP could decrease rates of diabetes, obesity, and cardiovascular disease because of the anticipated 15% decrease in calorie intake from these beverages (Block & Subramanian, 2015).

School Programs

Children eat lunch every day at school, and some may even receive breakfast and snacks depending on their school and food assistance programs. While not every student purchases the lunch prepared by the school, that's the only option students on food assistance programs have. Improved nutritional quality of school food is one way to increase access to nutritious options for children. The USDA has recently updated the standards for school meals to make serving nutritious foods for students a requirement. Massachusetts did a study on four of their low income, urban school districts to evaluate the update. The results of this study found a 16% increase in the consumption of vegetables and a 23% increase in the selection of fruit (Block & Subramanian, 2015).

The Food Trust also prioritizes the health of children, especially when it comes to school nutrition. The Food Trust combines nutrition and physical activity education, environments that encourage healthy eating, and leadership development in its school health intervention called Healthy You, Positive Energy (HYPE). The Food Trust has a diverse team of educators, including farm to school specialists, leadership developers, and health educators. This team works to expose children to healthy options, both in the

classroom and in the cafeteria, and train food prep workers on how to acquire and prepare healthy options (“The Food Trust,” n.d.).

Considerations from Other Interventions

Inner cities are not the only place for food deserts, although this thesis has focused more on the urban food desert due to available research. In fact, the most prevalent type of food desert is the rural food desert. Frustrated people from rural food deserts in Iowa and Minnesota were concerned over the lack of access to nutritious food. Some have even hopelessly expressed that they do not think their situation will ever change. Also, farmers who have traditionally grown their own food have started relying more heavily on alternative sources of food such as gas stations and fast food restaurants (Mader & Busse, 2011).

Mader and Busse (2011), who have focused their efforts on rural food deserts, said, “Because where we live shapes what we eat, strengthening community-based food systems at multiple levels is a necessary strategy to create healthy food environments in rural communities” (p. 46). These researchers suggested using the socio-ecological model to make changes in the policy, community, family, and individual levels regarding food access and nutrition. The USDA has said that before policies are developed, policymakers need to be aware of the community. For example, if development costs are the biggest barrier supermarkets face, policymakers should make efforts to change zoning policies.

The researchers suggested other ways to get to know a community better so as to better serve it. These suggestions included more qualitative assessments, such as attitudes, beliefs, perceived barriers, social norms, and behaviors of the target population.

Such qualitative measurements require significantly more work than quantitative assessments that only look at the factors of income and distance, but this could be a better way of targeting a community than just quantitative measurements alone (Mader & Busse, 2011).

Mader and Busse (2011) believe that a community-based food system that is meaningful to stakeholders, locally driven, and culturally appropriate is the best way of tackling food deserts in rural areas. A community food system is “a collaborative network that integrates sustainable food production, processing, distribution, consumption and waste management in order to enhance the environmental, economic and social health of a particular place” (Mader & Busse, 2011, p. 50). One way to do this is to encourage the residents of rural areas to create healthy food systems by collaborating with farmers. These community food systems invest in the community’s economic development, strengthen food security, preserve natural resources, and invest in the health of the community members.

Policy suggestions for rural areas include zoning restrictions on fast food restaurants and incentivizing the development of supermarkets. Another suggestion is increasing the ease of purchasing produce from local farms. Ways to do this include farmer’s markets, “pick your own” produce, even corporate wellness initiatives. Buying directly from farms cuts costs, as it is a direct purchase, and ensures maximum freshness and nutritional value (Mader & Busse, 2011).

To summarize, rural food desert interventions should be locally driven and include members from the community. Doing this will allow policymakers to understand barriers and perceptions and thus create more effective strategies. Although this research

was solely about rural food deserts, concepts from this research definitely apply to urban food deserts. It is important to include individuals and understand the uniqueness of each community (Mader & Busse, 2011).

Conclusion

It is difficult, if not impossible, to declare best practices for food desert standardization and intervention. Since food deserts are such multifaceted, complex issues, each community needs special attention before a policy or intervention is developed. However, the interventions done in the past give health promoters and policy makers guides and ideas to implement in their own programs. First, a standard way to measure a community's food access status is absolutely necessary even though it will be very difficult to create because each community is different. The measurement needs to include qualitative data (behaviors, perceptions, attitudes, beliefs, walkability of area, etc.) and quantitative (income, access to transportation, distance to grocery store, etc.).

After developing the standard of measurement, the best type of intervention or interventions need to be determined based on the community's resources and needs. For example, for one rural area with land availability and low startup costs, putting in a new supermarket or farmer's market with marketing materials heavily promoting healthy eating is an effective way to eliminate a food desert. On the other hand, an urban area with little land available high startup costs could utilize the corner markets already available. Other, more general, concepts must also be kept in mind while creating a program, intervention, or policy. Mader and Busse (2011) said an intervention needs to be, "Meaningful to stakeholders, locally driven, and culturally appropriate" (p. 45). Convenience, affordability, availability must also be a priority for whatever intervention

is created (Kyureghian & Nayga, 2013) (Story, Kaphingst, Robinson-O'Brien, & Glanz, 2008).

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