

A Community-Driven Urban Acupuncture to Address The “Micro-Food Desert” In A Relatively Affluent County

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A growing number of studies recognize the impact of living in a “food desert” on residents’ health outcomes such as obesity, diabetes and higher risk of heart disease. However, most research has focused on underserved areas with clear racial and economic stratification and associated disparities. It is challenging to identify communities with limited access to healthy food located in highly populated and more affluent counties. These communities are surrounded by resource rich neighborhoods and have less clear geographically delimited concentrations of poverty; Johnson County, Kansas is such an example. This manuscript reports our research on healthy food access in Johnson County through the urban acupuncture approach.

The project included three phases. Phase I identified “micro-food deserts” using ArcGIS mapping and analysis. Secondary data from several sources were compiled and analyzed. Various food outlets (e.g. grocery stores, farmers’ markets, cultural food stores, convenience stores, food pantries, soup kitchens, and community gardens) were associated with demographics and neighborhood socioeconomic status at the census tract level. The public transportation system and the road network system (using 0.5 mile circular buffer and a 5 minute driving distance as thresholds) were added to the map

profiles. An interactive web map application engaged a community food policy council to facilitate local policy and decision making in prioritizing catchment communities.

Phase II engaged targeted catchment communities using focus groups, key informant interviews and PhotoVoice to gain a better understanding of community level responses to micro-food desert environments. These qualitative strategies were augmented by conducting a food inventory profile of nearest food access retailers. Crystallization/immersion identified key themes and unique attributes of each of the catchment communities that can guide community-informed policy to improve healthy food access.

The first two phases of the project are complete. Phase III translated community perspectives and preferences into policy recommendations that can impact planning and design interventions. Further, a joint studio is proposed for students in the Department of Architecture at the University of Kansas and in the Master’s of Public Health program at the University of Kansas Medical Center to generate design solutions to improve access to healthy food and develop audit tools to monitor improvement on behavior and health outcomes. This project is a result of collaborations among public

health researchers, planning, design architects and the local citizens and community organizations. The urban acupuncture and community engagement approach allowed the multi-disciplinary team to pinpoint areas in need of improvement and provide specific recommendations for food access tailored for local communities. These improvement recommendations can ultimately lead to behavior change, reduction in chronic disease and improved health outcomes.

INTRODUCTION

The term “food desert” was first introduced in the United Kingdom (UK) during the early 1990s. In 1996, the UK Low Income Project defined a food desert as “areas of relative exclusion where people experience physical and economic barriers to accessing healthy food” (Reisig and Hobbiss 2000). The United States Department of Agriculture (USDA) defined a food desert as “A low-income tract with at least 500 people or 33 percent of the population living more than 1 mile (urban areas) or more than 10 miles (rural areas) from the nearest supermarket, supercenter, or large grocery store”(USDA. 2013)

In the United States (U.S.), there is a growing public health concern about “food deserts” on residents’ diet-related health outcomes, such as an increase in obesity (Auchincloss et al. 2012, Kegler et al. 2014, Osei-Assibey et al. 2012), diabetes and a higher risk of heart-disease (Astell-Burt and Feng 2015, White 2007, Schafft, Jensen, and Hinrichs 2009, Salois 2012). For instance, Schafft’s (2009) study in rural Pennsylvania found a positive relationship between increased rates of children being overweight and the percentage of the district population residing in a food desert.

Factors that contribute to a food desert are multi-faceted and involve geographical, economic, sociological, and psychological factors (Shaw 2006). Studies in the U.S. have shown that many people living in deprived neighborhoods have limited access to grocery stores and/or supermarkets (Algert, Agrawal, and Lewis 2006, Zenk et al. 2011), which decrease their opportunities to purchase a variety of healthy foods in their neighborhood. The indexes for deprived areas include low incomes, unemployment rates, education attainment, and the qualification for social welfare benefits. However, such research findings have resulted in a focus on deprived areas with clear racial and economic stratification.

It is challenging to identify communities with limited access to healthy food, located within highly populated and more affluent counties. These communities are surrounded by resource rich neighborhoods and have a less clear geographically delimited concentration of poverty. These “micro-food deserts” are easily overlooked when trying to identify and address access to healthy food.

STUDY SETTING

Johnson County is the most affluent county of Kansas. According to the Robert Wood Johnson Foundation (RWJF) county health rankings, Johnson County is ranked first in health outcomes out of 105 counties, and first for health factors such diet and exercise, low tobacco use, and low alcohol and drug use. Aggregated data for the county as a whole make it difficult to detect subgroups or geographic pockets of communities that might struggle to get access to healthy food resources. According to David Shipler’s (2008) on the working poor, these are the forgotten Americans, who live in the shadow of prosperity. There are communities of individuals that have rarely been above the radar of healthy food initiatives. A closer examination of the profiles of Johnson County residents who are poor can further reveal the issue. The majority of Johnson County residents who are poor are white, U.S. Citizens; have families that include at least one employed individual (75%); the adults have at least some college education; and they are not qualified to receive many public assistance benefits.

JOHNSON COUNTY FOOD POLICY COUNCIL

In recognizing the unique challenge of healthy food access in its own community, Johnson County Department of Health and Environment (JCDHE) embarked on a six-year effort to develop a food policy council to improve the health and well-being of its citizens, communities and environment through a just, equitable and sustainable food system (Figure 1).

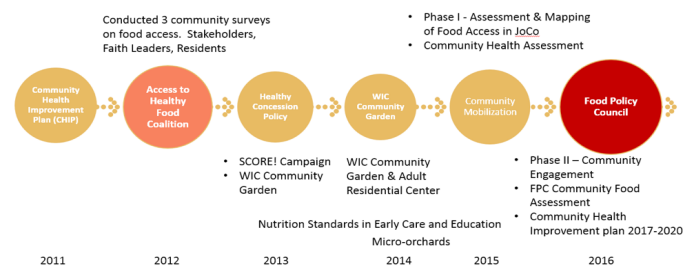


Figure 1: Timeline of Johnson County Access to Healthy Foods

Informed by a Community Health Assessment Process (CHAP) and a Community Health Improvement Plan (CHIP), the county identified physical activity/nutrition as one of three top priorities. In 2012, JCDHE formed the “Access to Healthy Food Coalition” and conducted 3 comprehensive community surveys on food access. In 2015, the Access to Healthy Foods Coalition conducted Phase 1-Assessment & Mapping of “micro-food deserts” and JCDHE’s CHAP gathered primary and secondary research data to complete another community health assessment. In 2016, as a result of these community mobilization efforts the Access to Healthy Food Coalition garnered political support to establish an appointed Food Policy Council (FPC). The recently established FPC completed its Phase II Community Engagement study in partnership with KUMC, initiated its Comprehensive Food Assessment and CHAP began the process of developing a 2017-2020 CHIP.

RESEARCH AND COMMUNITY ENGAGEMENT

In order to support the FPC in evaluating the “micro-food desert” issue in the unique context of Johnson County, JCDHE partnered with researchers at the University of Kansas Medical Center and the University of Kansas School of Architecture, Design and Planning to conduct a multi-phase research and community engagement process beginning in 2015. The project was developed in three phases. Phase I identified “micro-food deserts” using ArcGIS mapping and analysis. Phase II engaged targeted community members using focus groups and key informant interviews. Phase III is proposing to use community-based design methods to translate policy recommendations into potential planning and design interventions.

PHASE I: MAPPING TO IDENTIFY MICRO-DESERTS

BUILDING ORIGINAL DATA MAPS USING SECONDARY DATA

The mapping was developed in three steps. Step 1 acquired and organized secondary data to build original data maps in ArcGIS. The team conducted an initial assessment of available secondary data sources relevant to describing the population and accessibility to healthy foods, specifically to fresh fruits and vegetables. Data came from the following sources: Automated Information Mapping Systems (AIMS) Department (Johnson County), Mid-America Regional Council’s (MARC) Data & Economy Division, U.S. Census data, Environmental Systems Research Institute’s (ESRI) Community Analyst data and Google Maps. Multiple data sets were compiled and filtered to focus on Johnson County. The geo-locations of food outlets were obtained from AIMS, MARC, and Google Maps. Inconsistent information was checked through in-person site visits. The transportation data was provided by AIMS. The demographic information was based on ESRI USA Demographics and Boundaries 2015. The secondary data sources were at the census tract level, defined as relatively permanent statistical subdivisions within a county, typically with a population size between 1,200-8,000 (optimal size being 4,000).

BUILDING OVERLAY AND ANALYSIS MAPS

The second step built overlay and analysis maps that guided the team to identify catchment areas. Food retail outlets were classified by healthy food resources such as large grocery stores, farmer markets, and cultural food stores, and unhealthy food outlets such as convenience stores and dollar stores. We included charity and community food support programs including food pantries, soup kitchens, and community gardens. The geographic distribution of these food outlets were associated with demographics and neighborhood socioeconomic status at the census tract level. The public transportation system and the road network system (using a 0.5-mile circular buffer and a network distance using 5-minute driving and 10-minute walking distances as thresholds) provided a way to assess accessibility. The data was further analyzed using ArcGIS metrics of density, buffer area, and road network distance to compare with various thresholds of food deserts.

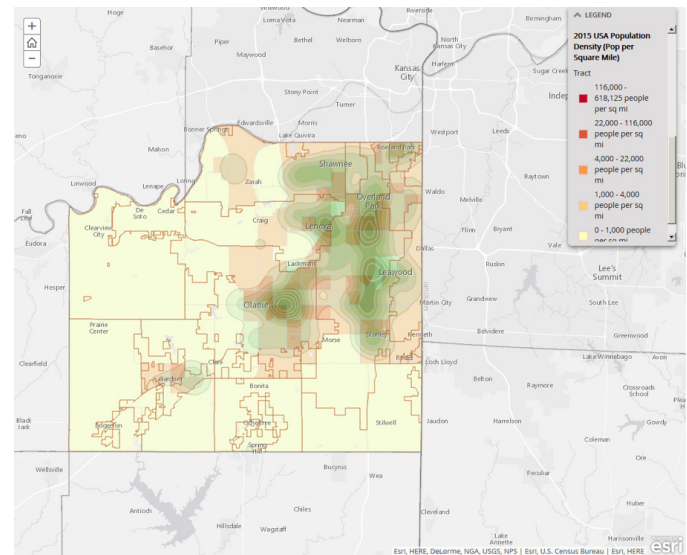


Figure 2: Overlay of density of population and density of combining grocery stores, farmer markets, and cultural food stores

INEQUITY IN FOOD RESOURCES

Mapping analysis revealed an inequity in healthy food resource distribution. Based on the combined density of grocery stores, farmer markets, and cultural food stores in Johnson County, most of these food resources are concentrated in northeast areas, such as areas of Overland Park, Shawnee, and Leawood. In general, only a small portion of Johnson County has resources of grocery stores, farmer markets, and cultural food stores. Food retail outlets are largely absent in the western and southern part of the county, including De Soto, Edgerton, Spring Hill, and Stillwell. Similarly, the food pantries, soup kitchens, and community gardens have unbalanced distribution throughout the county. Only a small portion of Johnson County has resources of pantries, soup kitchens, and community gardens. These resources are absent in the western and southern counties, including De Soto, and Lexington Township. In addition, the unbalanced distribution is not consistent with population density (Fig.2). For instance, some areas with high or medium population density, such as areas between northeastern side of Olathe, southwest corner of Lenexa, and Bonner Springs, have limited food resources.

BARRIERS IN PUBLIC TRANSIT

The mapping exercise highlighted barriers in the public transportation system that impede access to healthy food. Aside from the personal automobile, the main source of transportation among residents in Johnson County is a bus transit service. Regarding the bus routes and schedules, only Route 556 and Route 575 are in service through Johnson County in the daytime. When the current bus transit service of Route 556 and Route 575 were overlaid with the groceries, farmer market, and cultural food stores in Johnson County, it shows that it only provides service to a small portion of Johnson County, including Westwood, Shawnee, Overland Park, Lenexa and Leawood. Bus transit is absent in the middle and southern portion of the county, areas which have comparatively higher

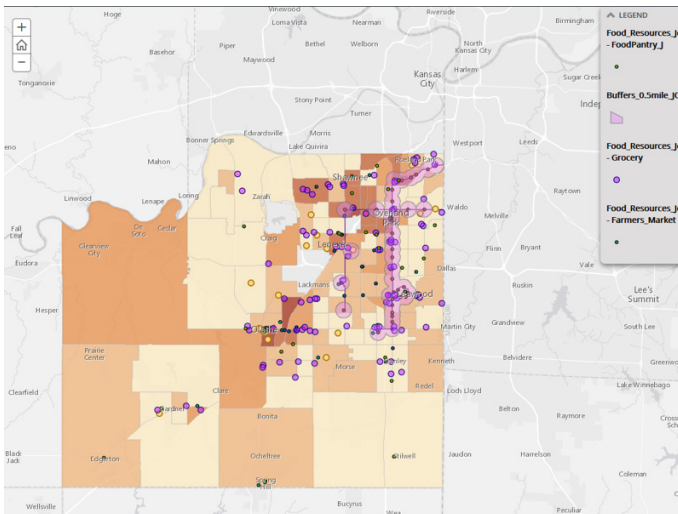


Figure 3: Overlay of 0.5 mile from bus transit station with JoCo Food resources and poverty

poverty rates, such as Stilwell, Olathe, Bonner Springs, and Gardner. The 0.5 mile from bus stops buffer analysis further reveals the challenge to populations experiencing poverty and their ability to access healthy food using public transit (Fig.3). A study in King County, Washington demonstrated that for every quarter mile increase in distance to transit, the likelihood of using transit fell by 16% (Ewing and Kreutzer 2006). An analysis using 10-minute walking distance from food resources to overlaid poverty was also conducted. Among the three census tracts with the highest poverty rate, only two are within walkable distances to the food resources. Many food pantries and soup kitchens are difficult to access for people without personal vehicles.

VULNERABLE POPULATION

When food resources were overlaid with demographics, social economic, and poverty, it became clear that vulnerable subgroups such as the elderly who are poor experience substantial barriers in geographical food accessibility. For instance, when the 20 minutes' walking distance from food resources (combining grocery stores, farmer markets, and cultural food stores) was overlaid with areas with more than 10% senior population, it was clear that parts of Shawnee, Olathe, and Stillwell have limited general food resources to support the elderly population (Fig.4). By Overlaying charity food resources (food pantries, soup kitchens, and community gardens) with the intersection of areas with high rates of poverty (10% of population are below 100% poverty line) and high rates of population above 65 (>10%), it revealed inconsistencies between distribution of these resources with the areas with concentrated vulnerable group of poor, older citizens (Fig.5).

BUILDING ONLINE WEB MAP APPLICATION

The third step of the mapping activity was building an online web application to host the maps and share with the community. An interactive web map application was developed to engage

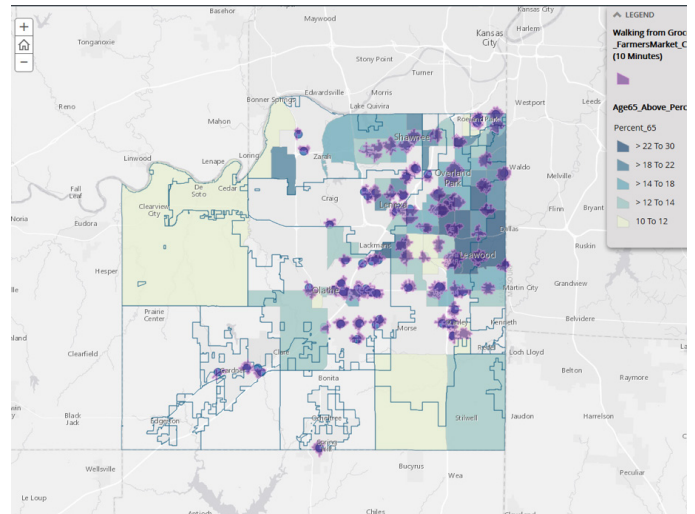


Figure 4: Overlay 10 minutes' walking distance from food resources (combining grocery stores, farmer markets, and cultural food stores) with areas with more than 10% senior population

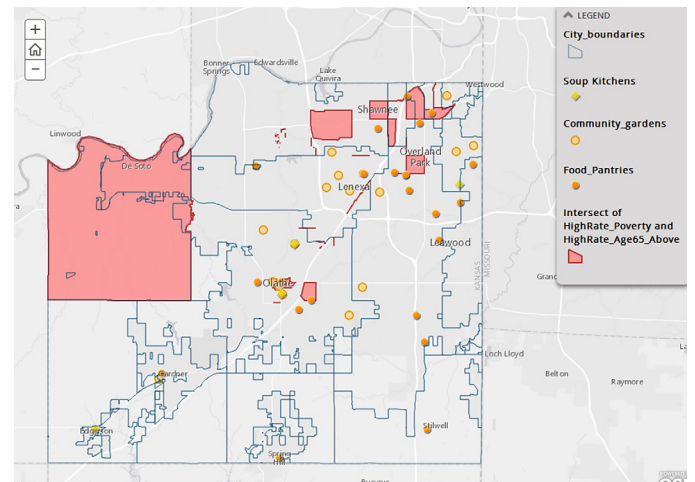


Figure 5: Overlay charity food resources (food pantries, soup kitchens, and community gardens) with the intersection of areas with high rate of poverty and high rate of population above 65

stakeholders in a way that could facilitate addressing barriers in prioritizing catchment communities to improve healthy food access. The power of data and several years of community mobilization efforts led to the success in garnering political support in establishing an appointed FPC in Johnson County.

Precisely because food deserts and access to healthy foods may be masked by the overall availability of food across a densely populated and geographically large county, the maps provide an essential tool to help target communities and neighborhoods in the effort to improve micro-environmental access to healthy food. While these data are informative. Further mapping of specific neighborhoods is currently in progress for an increased understanding of those areas.

PHASE II METHODS: COMMUNITY ENGAGEMENT

The Phase 1 maps consistently revealed areas in central Johnson County that: 1) are densely populated, 2) have limited food resources and 3) had higher poverty rates compared to other areas of the county, despite unemployment rates being below the national average. Even though Johnson County is classified as urban, large, rural geographic areas experiencing limited access to food resources were identified along the southern border of the county. The research team and Food Policy Council evaluation of the GIS maps led to the decision to focus phase 2 on community-based efforts in specified areas of three communities: Overland Park, Olathe and Edgerton.

Targeted sectors to involve in the qualitative portion of the research project included faith-based organizations, schools, multi-service centers, neighborhood associations, food sources (e.g., farmers), city and county officials, and health institutions. Further, members of the Food Policy Council provided contact information for community members and organizational leaders they believed would be ideal partners for community mobilization and engagement.

An assessment of the identified organizations was conducted by the research team and the groups were ranked depending on type, catchment area location, and having a mission where access to healthy food would be of interest. Organizations were approached to learn if they were working to improve food access. Individuals contacted were provided information about the project purpose, overall goals, and were engaged to recruit citizens to attend focus groups or participate in key informant interviews. The purpose of the focus groups and key informant interviews was to learn from residents where they purchase groceries, their perceptions of the available products in their usual food store, how they access groceries (e.g., personal vehicle, public transportation), how they believe food choices impact their health, and solutions they have to increase access to healthier food choices in their neighborhoods. Focus group attendees were provided a healthy boxed meal for their time and participation; interviewees were provided with a \$10 gift card to be used to purchase (healthy) food.

Focus group attendees were offered the opportunity to participate in the PhotoVoice activity. PhotoVoice is a community-based participatory action research method in which people photograph their environment and experiences surrounding an issue, then share their thoughts about the photographs. Interested individuals were offered a short training, a disposable camera, photograph reflection sheets and a pre-paid envelope to return the camera and materials. Following the development of the photographs, an Exhibit of the photos was planned for public display.

KEY THEMES: COMMUNITY DISCUSSIONS

1. Respondents reported they shop multiple stores for groceries in an effort to save money. Residents routinely conduct price comparisons of the items they typically purchase and know which stores have cheaper prices. Most also “shop the advertisements” in

order to stretch their food budget. This was extremely apparent in Edgerton as residents have to travel miles in order to access any type of food retail outlet. Large supermarkets (i.e., Walmart Supercenter) are convenient when shopping for other needed items (e.g., diapers, cleaning supplies). Residents reported the available options where they shopped carried the items they generally purchase, particularly because they shop in numerous locations. Further, grocery stores are beginning to carry more cultural food items.

2. The current public transportation system is not readily accessible for many residents. Residents have a personal vehicle or they share a vehicle with a close relative. The focus group participants reported that public transportation in the county is virtually non-existent. Many would use a bus if the routes were expanded to include more neighborhoods. Moreover, the days and times of the bus routes are prohibitive for individuals not using public transportation to get to and from work. Most participants stated that walking for groceries is challenging because it is difficult to get the groceries home. Further, those residing in or near Overland Park and Olathe believed the walking routes to stores were dangerous due to the amount of vehicle traffic. In both of these catchment areas, the main supermarkets and grocery stores are along high traffic streets. Rural residents (Edgerton) do not have public transportation service and there are no food outlets within walking distance.

3. The cost of fresh fruits and vegetables and healthy food is reported as the most significant barrier to citizens. Most individuals would like to eat more healthy diets, yet healthy food is more expensive. Some believed that education on how to prepare novel foods would assist to increase fruit and vegetable consumption. It was also reported that the lack of affordable housing, and the location of currently available affordable housing impacts financial resources available to spend on healthy food items.

4. Respondents are interested in educational opportunities if located at community-based organizations and the topics are current and relevant. Free, affordable educational classes held in varied locations throughout the community, at community organizations residents frequent. Many thought if the educational opportunities were more accessible, they would be better utilized.

METHODS: FOOD RETAIL ASSESSMENT

A standard food store assessment protocol and data collection sheet² was modified to specifically capture the availability of healthy foods in the three targeted catchment areas, as well as the appearance and cleanliness. Google Maps was used to identify food retail outlets. A brief project description was developed to inform store owners/managers of the purpose of the project. Upon arrival to the food stores, the project staff sought permission from the owner or store manager to conduct an inventory of available food items. Retail food stores were categorized into 6 groups: supermarket/ large franchise or chain grocery store; grocery/small grocery store; convenience store/gas station; liquor/convenience store (store that sells mostly liquor, but carries some food items); pharmacy:/ drug store which has food in at least one aisle, and cultural food store:/

store selling food specific to a region or ethnic group. Stores in the Overland Park and Olathe catchment areas were evaluated and included four supermarkets, five convenience store/gas stations and three pharmacies. There are no retail food outlets in Edgerton so no assessment was conducted in that area.

KEY THEMES: RETAIL ASSESSMENT

1. Supermarkets sell many of the same items; however there is cost variability. The supermarkets sold all of the items on our food store assessment data collection sheet; however, there were differences in cost for essential healthy items. Our assessment confirmed what residents indicated about shopping at multiple stores to save money.
2. Pharmacies vary drastically in the items sold and the items are more expensive than other outlets. Walgreens, for example, carries a wide variety of healthy food, but no fresh fruits and vegetables. The products are more expensive than at area supermarkets. Store managers stated they were addressing a community need by providing essential products to “walking only customers.”
3. Convenience Stores/Gas Stations do not carry many healthy food items, but could be a solution for improving food access. The majority of stores assessed carried minimal healthy food items and those that were available were cost prohibitive. These stores could be an important partner given their proximity to populations who need food access.

PROJECT LIMITATIONS: COMMUNITY ENGAGEMENT

Limitations of the study:

The residents that participated in the focus groups and key informant interviews were not a representative sample of the entire county. While the participants may not reflect the entire population, the key themes and recommendations could prove beneficial to the all Johnson County residents.

- Time restraints related to the overall project timeline limited our ability to engage and develop rapport with some potential collaborators.
- While a robust sample was used to assess food retail outlets, not every food store was assessed. A complete food retail assessment throughout each catchment area could provide additional data.
- Focus Group participants were offered the opportunity to participate in the PhotoVoice activity. While initially of interest, only three individuals participated and their photos were not informative.

PHASE III: INTERDISCIPLINARY DESIGN

Phase III is proposing to use a community-based design method to translate policy recommendations into planning and design interventions. A joint studio is proposed for students in the Departments of Architecture, Design and Planning and Preventive Medicine and

Public Health to collaborate with the county health department, the food policy council and community members. The goal of this collaboration will be to generate design solutions to improve access to healthy food and to develop assessment tools to monitor behaviors and health outcomes.

DISCUSSION AND FUTURE WORK

This project is a result of close collaboration among public health researchers, planning, design, community stakeholders and residents. The multi-disciplinary research team worked closely with elected officials, the community and decision makers to make policy recommendations. The urban acupuncture and community engagement approach allows community members to identify barriers and solutions, and provide specific recommendations for food access improvement that are tailored for the local community. Food access improvements may lead to behavior change, reduction in chronic disease and improved health outcomes.

We plan to continue using quantitative data on geographic accessibility of food outlets with qualitative strategies that include residents' surveys on food shopping behavior to further understand the impact of food environment on diet. A performance evaluation will be in place to track the baseline and monitor the success of community mobilization, environmental intervention, and policy change on food shopping behavior, and diet-related health outcomes. The county health department, food policy council and academic colleagues are working to provide stronger support systems for healthy food and healthy living for Johnson County residents, and to create a more holistic approach to encourage better health outcomes. The research findings from Johnson County are expected to raise the awareness of the “micro-food desert” issue in more affluent counties, and can inform future studies in similar areas in the United States.

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