Journal of Urban Affairs
The Journal of the Urban Affairs Association

COMMUNITY DEVELOPMENT AND THE INFLUENCE OF NEW FOOD RETAIL SOURCES ON THE PRICE AND AVAILABILITY OF NUTRITIOUS FOOD

RICHARD C. SADLER
University of Western Ontario

JASON A. GILLILAND
University of Western Ontario

GODWIN ARKU
University of Western Ontario

ABSTRACT: *Studies have demonstrated links between the accessibility of food and multiple health outcomes. Policymakers engaged in local community development may use public health concerns as a strategy to procure funding for food retail initiatives. Few studies to date have demonstrated the impact that a new food retailer can have on geographic and economic access to nutritious food in a community, evidence which could support the case for new food retail. This paper examines the price and availability of food before and after the opening of two new grocery stores in a former food desert in Flint, Michigan. The results indicate a substantial improvement in both geographic and economic food accessibility, and show no statistical difference between prices at average grocery stores and the new stores. Discussion suggests that investment in poorer neighborhoods can be beneficial to the local population and the community at large by creating a local multiplier effect through increased spending in the community.*

The evolution of North American food retailing has created gaps in the community food environment in some urban neighborhoods. Furey, Strugnell, and McIlveen (2001) discuss how social, economic, and health-related consequences combine to create social exclusion among residents living in these "food deserts." Food retailers could effect change in food environments, but there is often a gap between the plans of large-scale retailers and local-level economic development strategies (Pothukuchi, 2005). Thus, researchers have suggested an increased role for planners and policymakers, who are tasked with promoting public welfare (Pothukuchi, 2004). Planners and policymakers can encourage local economic development in disadvantaged areas to make use of unique features like proximity to major transportation routes and existing social amenities (Porter, 1995). Despite a growing popularity of food policy councils among planning

Direct correspondence to: Jason A. Gilliland, Department of Geography, University of Western Ontario, 1151 Richmond St., London, ON, Canada N6A 5C2. E-mail: jgillila@uwo.ca.

JOURNAL OF URBAN AFFAIRS, Volume 00, Number 0, pages 1–21.
Copyright © 2012 Urban Affairs Association
All rights of reproduction in any form reserved.
ISSN: 0735-2166. **DOI: 10.1111/j.1467-9906.2012.00624.x**

and other municipal departments, the research to date is merely suggestive of the impact they can have on nurturing new food retail initiatives (Campbell, 2004). Additionally, most planners still regard economic development in the food system as the domain of the private market (Pothukuchi and Kaufman, 2000).

This paper demonstrates the geographic and economic impact of two new food retail sources in a disadvantaged neighborhood of Flint, Michigan, one developed through a public/private partnership, and the other through traditional private investment. Food basket pricing in the neighborhood indicates a substantial improvement in the cost of groceries for residents due to lower prices at the new food retailers. Over one year, these cost savings translate into between 2- and 3-month's rent for an average apartment in the city. This case demonstrates the potential for multi-tiered benefits: for the investors (who are profitable), the neighborhood residents (who have improved geographic access and economic buying power), and the planners (who are responsible for policy-making that made investment attractive in the neighborhood). The article suggests that food retail should be considered as a development policy in socioeconomically disadvantaged neighborhoods underserved by current food retail patterns, both from a profit-motivated and community development standpoint.

The Built Environment and Health

The concern for geographic accessibility to food arises from research demonstrating inequalities from living in food deserts, or areas where nutritious, affordable food is unavailable (Beaumont, Lang, Leather, & Mucklow, 1995). Increased prevalence of obesity and related illnesses have been found in these neighborhoods (Morland, Diez-Roux, & Wing 2006; Wang, Kim, Gonzalez, MacLeod, & Winkleby, 2007). Some suggest that these disparities are created in part by the evolution of retail to larger store formats frequently found in suburban locations, leaving urban areas without nutritious food options (Lavin, 2000; Pothukuchi, 2005; Wrigley, 2001). These inequalities, however, are not simply locational issues. Poorer dietary habits among low-income residents may be linked to larger social inequities (Travers, 1996).

Healthy diets are more expensive in food deserts (Drewnowski, Darmon, & Briend 2004; Furey et al., 2001; Larsen and Gilliland, 2009); studies have indicated a considerable premium paid—up to 76% higher—by residents shopping at local convenience stores rather than larger chain stores (Block and Kouba, 2006). This price disparity equates with less purchasing power, contributing to poorer diets among residents with limited mobility (Laraia, Siega-Riz, Kaufman, & Jones 2004; Morland et al., 2006), since low-mobility residents are less able to travel great distances to access goods and services (Hanson and Schwab, 1987).

Poor dietary habits are correlated with higher rates of obesity (Binkley, Eales, & Jekanowski 2000) and obesity-related health issues such as type-2 diabetes and cardiovascular disease (Mokdad et al., 2003). Obesity rates are lower among people living near healthy food outlets (Lewis et al., 2005; Morland et al., 2006), and higher among those living nearer to fast food restaurants and convenience stores (Morland and Evenson, 2009; Poston and Foreyt, 1999). Further links show a negative correlation between income and fast-food consumption (Paeratakul, Ferdinand, Champagne, Ryan, & Bray 2003) and a positive correlation between low-income neighborhoods and location of fast-food outlets (Gilliland, 2010; Cummins and Macintyre 2002; Reidpath, Burns, Garrard, Mahoney, & Townsend 2002). This suggests that low-income residents in distressed neighborhoods are most at risk of developing poor eating habits due to increased exposure to unhealthy foods. This elevated risk increases the likelihood of social and health-related problems.

Despite heightened exposure to unhealthy food options, many residents in low-income, food insecure communities are aware of the options for healthy eating near their homes (Freedman and Bell, 2009), but may be hindered by mobility or economic constraints (Darmon, Ferguson, &

Briend 2002). Residents in communities without supermarkets tend to perceive fewer nutritious food options, suggesting the importance of larger, more visible grocery stores (Moore, Diez-Roux, & Brines 2008). Although people are aware of the benefits of nutritious food, they may lack the political clout or economic capital to bring nutritious food retailers to their neighborhoods. Thus, this public health and urban planning issue merits further attention.

Quantifying the Food Environment

Because of the economic implications of living in neighborhoods without grocery stores, it is important to quantify variations in price of groceries within and between different neighborhoods. Many studies have employed nutritious food basket surveys to determine the affordability of foods in neighborhoods (Chung and Myers, 1999; Cummins and Macintyre, 2002; Friel, Walsh, & McCarthy 2006; Larsen and Gilliland, 2009; Pearson, Russell, Campbell, & Barker 2005). While residents do not always shop at the nearest grocery store (Rose and Richards, 2004), the most socioeconomically distressed populations are far more likely to shop near home (Clifton, 2004). Thus, food basket pricing is particularly useful for determining the prices of groceries for residents with mobility constraints or those in low-income communities.

Food basket surveys have ranged from only 9 fruits and vegetables (Pearson et al., 2005) to 146 items from all food groups (Friel et al., 2006). Some used food baskets pre-tested by public health authorities (Chung and Myers, 1999; Cummins and Macintyre, 2002; Furey et al., 2001). Many simply used the cheapest price for each basket item (Cummins and Macintyre, 2002; Donkin, Dowler, Stevenson, & Turner 1999; Jetter and Cassady, 2006; Larsen and Gilliland, 2009; Morland and Filomena, 2007; Winkler, Turrell, & Patterson 2006), representing the lowest price a household could expect to spend. Others collected multiple prices for the cheapest brand, the leading brand and outlet brands (Friel et al., 2006), or prices for the most popular brand and package size (Chung and Myers, 1999).

In every case, the goal is to determine price differences between and within store types and neighborhoods. Groceries are frequently more expensive at convenience stores than at grocery stores, and prices at independent grocers are higher than at larger chain grocery stores (White, 2007; Winkler et al., 2006). Thus, the presence of a grocery store may not alleviate a disadvantage in the affordability of nutritious foods. But being in a poorer neighborhood does not necessarily equate with higher prices, since prices tend to vary more by store type than store location (Larsen and Gilliland, 2009).

GIS analysis and food basket pricing are used to quantify the contribution of two new grocery stores in a former food desert in Flint, Michigan. Because food basket studies typically only examine the price or availability of food with cross-sectional study designs (Cummins and Macintyre, 2002; Jetter and Cassady, 2006; Morland and Filomena, 2007; Pearson et al., 2005), this before-and-after study represents an important contribution to knowledge on the literature regarding food accessibility and availability. Other researchers and cities can use this information to justify plans for retailers of nutritious foods in disadvantaged neighborhoods.

Study Area and Research Context

Flint, Michigan, exemplifies the declining medium-sized american city portrayed by Mayer and Greenberg (2001). Once reliant on a major industry for jobs (General Motors), Flint suffered from severe deindustrialization, resulting in an economic depression and substantial job losses. A 77% decline in manufacturing employment in Flint since 1980 has translated into a 41% overall decline in jobs (Jacobs, 2009). The city peaked at nearly 200,000 residents in the 1960s and at the time was expected to nearly double in size within 50 years (Segoe and Associates, 1960). Instead,

the current population has shrunk to 102,434 (U.S. Census Bureau, 2010), a 48% decline. This decline was exacerbated by long-standing preferences by both city and county residents alike for home rule over annexation of surrounding municipalities, stymieing the capture of suburban tax bases for city services (Zimmer and Hawley, 1956a). Paradoxically, many of these suburban municipalities had better attitudes toward tax increases, but resisted annexation to the central city (Zimmer and Hawley, 1956b). Thus, while out-county municipalities remained stable or grew in population, the city was increasingly "choked" by the surrounding municipalities with nowhere to grow, and a declining housing stock contributing to the population loss (Highsmith, 2009). The result of this decline is quantified in a recent study on Flint's urban form, which indicates that many neighborhoods have lost so many residences as to be at near-rural levels of density by units per acre (Hollander, 2010).

An expected outcome of this decline in residential population is an accompanying decline in the quantity and quality of services, both public (e.g., schools, parks) and private (e.g., retail, commercial employment). Based on network analysis of occupied residential parcels in 2009, 73% of the city's population resided more than 1000 meters (0.6 miles, or a 10-minute walk) from a grocery store (Figure 1).

Because of the sharp decline of industrial jobs and corresponding resources, Flint has continued to rely on traditional models of economic development. As past research has shown for other localities (Mayer and Greenberg, 2001), city leaders in Flint likely believed the problem would remedy itself or that little could be done to ameliorate the problem. Many redevelopment strategies have failed due to unrealistic scale or an inability to focus on local economic development, as Krumholz (1991) has suggested with other cities. Thus, the abandonment of traditional retail from established neighborhoods in Flint has been long established and persistent.

Despite this decline, certain neighborhoods in Flint have remained stable or are seeing revival. These locations exhibit several elements important for economic and community development—including lower crime rates, the presence of health care services, institutions of higher learning, and transportation connectivity (Reese and Ye, 2011). Sustained public investment in the education and health care sectors in and near downtown has created demand for private investment in the form of retail, apartments, lofts, and student residences. The influx of capital and residential population into the neighborhood increased the demand for a food retail outlet.

With the financial backing of non-profit agencies, an independent grocery called Witherbee's Market opened a 10,000 square foot store in June 2010 in the heart of the downtown food desert. Another grocery store (Mr. B's Foodland) opened just south of downtown in January 2010. Prior to this, downtown had not had a grocery store since the Farah Brothers Supermarket burned down in 1999 (Polk & Co., 1998, 1999). These stores reflect a change in the mentality toward reinvestment downtown; previous economic development plans included the failed Autoworld, Water Street festival marketplace, and the Hyatt Regency Hotel (Highsmith, 2009). Incentives were given to Witherbee's store operators to aid in development, including a brownfield tax incentive, three EDA loans from the local economic development corporation, and a commercial revitalization deduction (City of Flint, 2010). The opening of these stores has major implications for economic development strategies, since they can serve as catalysts for additional initiatives. Their stability can be instructive to other interested retailers that local economic development can succeed.

There are also implications for neighborhood viability in terms of quality of life, since two grocery stores now lie within a 10-minute walk (0.6 miles, or 1,000 meters) for many residences. This improvement in a former food desert can be quantified through GIS analysis and by evaluating any changes in the price and availability of nutritious food.

This study makes several important contributions useful to retailers and planners: first, the development of an empirical method for locating food deserts in urban areas; second, the comparison of the cost of groceries via nutritious food basket pricing throughout the Flint metropolitan

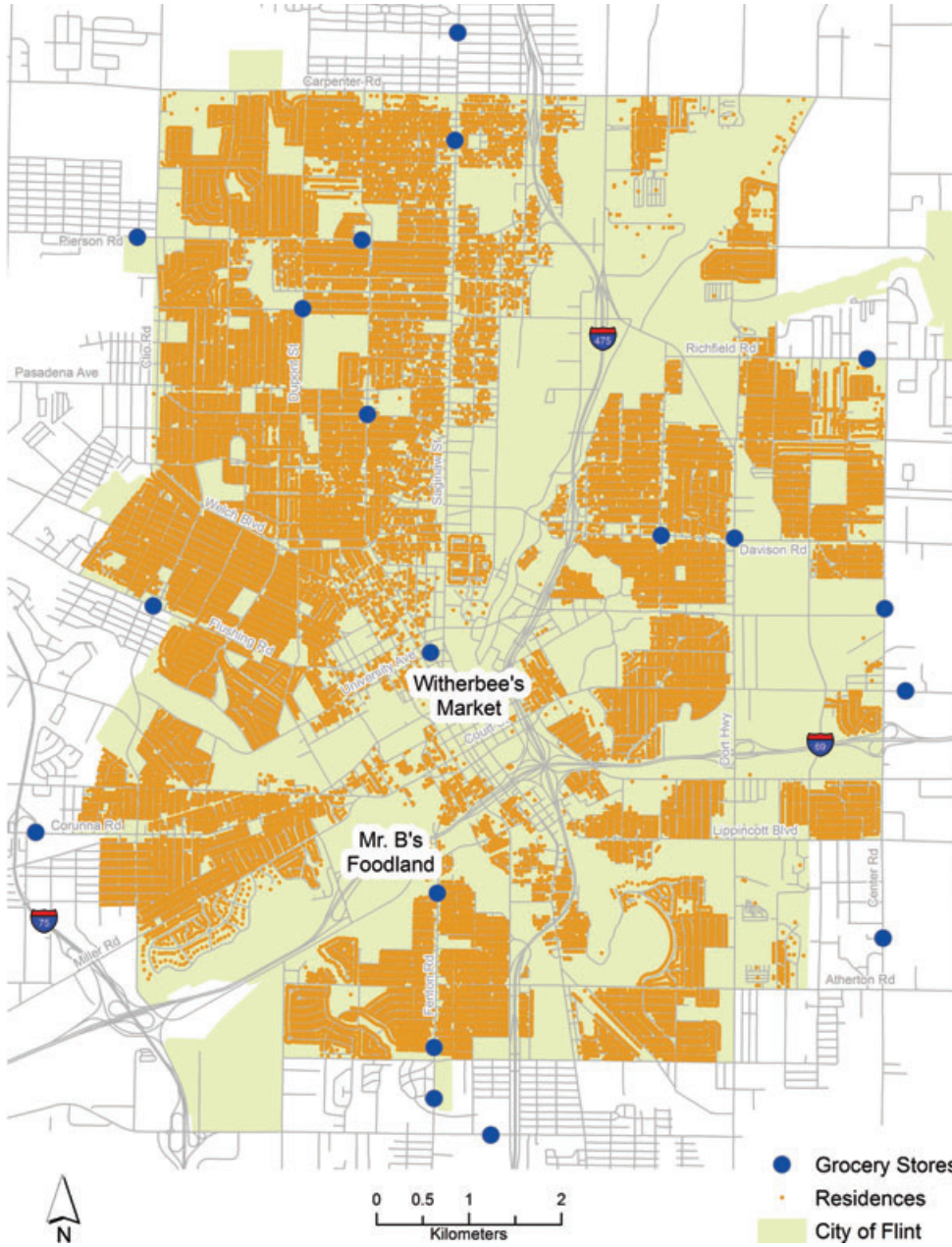

FIGURE 1

Locations of grocery stores and occupied residential address points in Flint, Michigan, 2011

area; and third, the before-and-after comparison of the cost of groceries in the former food desert. The results of this pre/post-evaluation will help determine the geographic and economic impact of the new stores. In turn, this provides evidence for planners, policymakers, and investors interested in pursuing community and economic development partnerships of this nature in other communities.

METHODS

The primary objective of this study is to demonstrate the effect of two new grocery stores on the price and availability of nutritious foods in a former food desert. Implications of these benefits on community development are drawn throughout. To study food deserts, however, it is important to have an empirical method for locating them. The methods suggest an innovative approach for using geographic information systems to locate food deserts, and employ an established method for determining the price of nutritious foods.

Determining Food Deserts

Several criteria must be met to substantiate the existence of a food desert. First, residents must have poor geographic access to grocery stores or other nutritious food sources. The presence of alternative food retailers may provide some nutritious foods but, in general, the price will be considerably higher (Eisenhauer, 2001) and availability will be lower than at grocery stores (Chung and Myers, 1999). Occupied residential address points for the City of Flint were used as the geographic unit of analysis, since all trips originate from the home. Address points were then classified based on whether city residents were within a 1,000 m network distance (along the street network) to the nearest full-service grocery store (both within and outside the city of Flint). This distance is a common threshold to determine neighborhood walkability, a concept that encompasses the greatest distance someone would walk to reach a local amenity (Apparicio, Cloutier, & Shearmur, 2007; Larsen and Gilliland, 2008; Smoyer-Tomic, Spence, & Amrhein 2006). Stores outside the city limit boundary were included in the analysis, to account for an error in spatial analysis known as the boundary or edge effect (Gatrell & Löytönen, 1998; Sadler, Gilliland, & Arku 2011) and since many residents are likely to shop at these stores (Figure 1). The percentage of address points with access to a grocery store was calculated for each census block group (CBG). These CBGs were then categorized into four groups by the percentage of parcels with access to a grocery store. CBGs where 0%–1% of parcels had access met the first criterion for defining food deserts, since few people could walk to a grocery store.

The second requirement for determining food deserts is neighborhood socioeconomic distress. The price or availability of groceries has little influence on residents in affluent neighborhoods, since these households simply drive to the desired store. To resolve this, neighborhoods were characterized by socioeconomic status using U.S. Census Bureau data for census block groups (2000a). CBGs were used as the unit of aggregation since they represent the smallest geographic unit for which sociodemographic variables are available. It is important to consider the smallest possible unit of analysis when dealing with aggregated data, since higher levels of aggregation are more likely to misrepresent some neighborhoods, due to higher variability of populations in larger agglomerations (Gatrell & Löytönen, 1998).

Four socioeconomic variables were considered in building a socioeconomic distress index, following methods outlined in past research (Gilliland and Ross, 2005; Pampalon, Hamel, Gamache, & Raymond, 2010). These variables include low educational attainment, incidence of low income, lone parenthood, and unemployment. Each variable was included for its impact individually, and for the minimal collinearity seen when variables were grouped. Standardized z-scores were obtained for each variable, and these were summed to obtain a composite socioeconomic distress score for census block groups within the urbanized region. These CBGs were then classified into five groups by natural breaks, and the two highest quintiles were isolated to obtain those CBGs most likely at a disadvantage due to socioeconomic distress.

While the focus of this study is on the city of Flint, this distress index was calculated for a geographic unit more appropriate to the study of urban areas: the urbanized area of the Flint

metropolitan area as defined by the U.S. Census Bureau (2000b). Thus, the values for the distress index are contingent on all CBGs within the urbanized area of Flint. This area includes many suburban municipalities in Genesee County.

Because urbanized areas are defined independently from census agglomerations, the urbanized area for Flint did not match neatly with census block group boundaries. To determine urban census block groups, the urbanized area was buffered at 1,000 meters. Census block groups completely contained by that buffer were included as urban. All other CBGs were considered non-urban and excluded from analysis. This technique included CBGs that lay mostly within the urbanized area rather than only including CBGs within the city limits of Flint. Distress scores thus represent the relative disadvantage based on the entire urbanized area of Flint and transcend municipal boundaries (which in Michigan rarely coincide neatly with urban areas). Figure 2 displays the distress levels for much of the urbanized area.

Finally, since grocery stores generally require a large population to support large economies of scale, only census block groups with a density of 1,000 people per square mile were considered in the analysis. This threshold is used by the U.S. Census Bureau to define urbanized areas (2000b). While areas with lower densities may exhibit the first two characteristics of a food desert, it is practical to consider the densest areas first, since retail-led interventions are possible here. In urban regions, CBGs and census tracts with low densities are frequently industrial parks. For the study area, one CBG in a vacant industrial zone was excluded due to the absence of a population. In this way, spatial analysis privileges populated neighborhoods.

Nutritious Food Basket Survey

The Ontario Nutritious Food Basket (ONFB) survey (found in the appendix) was used to determine variations in the cheapest available price of groceries at various grocers in the Flint metropolitan area. This list has been utilized in recent and geographically proximate research (Larsen and Gilliland, 2009; Nathoo and Shoveller, 2003), and is a well-respected and systematic tool created by Health Canada to measure the price of groceries contributing to a nutritious diet (including 66 items representing every food group) (Health Canada, 1998). The potential to compare these results with past results in Canada presents future opportunities for cross-border comparison, as Jacobs (2009) did with economic development policies.

Phase one of the survey was conducted in spring 2009. Food baskets were priced at 15 grocery stores around the city and county purposefully selected to represent a cross-section of grocery store types. Because prices within food retail chains were remarkably consistent for all the stores visited (between 2% and 4% within chains), the average food basket value for that chain was applied to other stores that were not visited. This resulted in food basket prices for 38 of 51 grocery stores in the county. Additionally, a food basket was priced in the food desert downtown (in anticipation of the opening of the new grocery stores) by visiting convenience stores and the city farmers' market to ensure all items were found, since no single downtown establishment had all 66 items.

Phase two was conducted in spring 2010, immediately after the opening of Witherbee's Market and Mr. B's Foodland in the food desert. For this phase, the same 15 stores were visited, as well as Witherbee's and Mr. B's. Mr. B's is a part of a two-store chain, so pricing was also conducted at the other Mr. B's location. By extrapolating basket prices to other stores as before, this resulted in food basket prices for 41 of 53 grocery stores.

Phase three was conducted in spring 2011 to determine how increases in food prices might affect grocery stores. A suburban store (half of a two-store chain) visited previously burned down between the 2010 and 2011 food basket pricing events. In place of these prices, two independent grocery stores were added to the database, one each in suburban and urban neighborhoods.

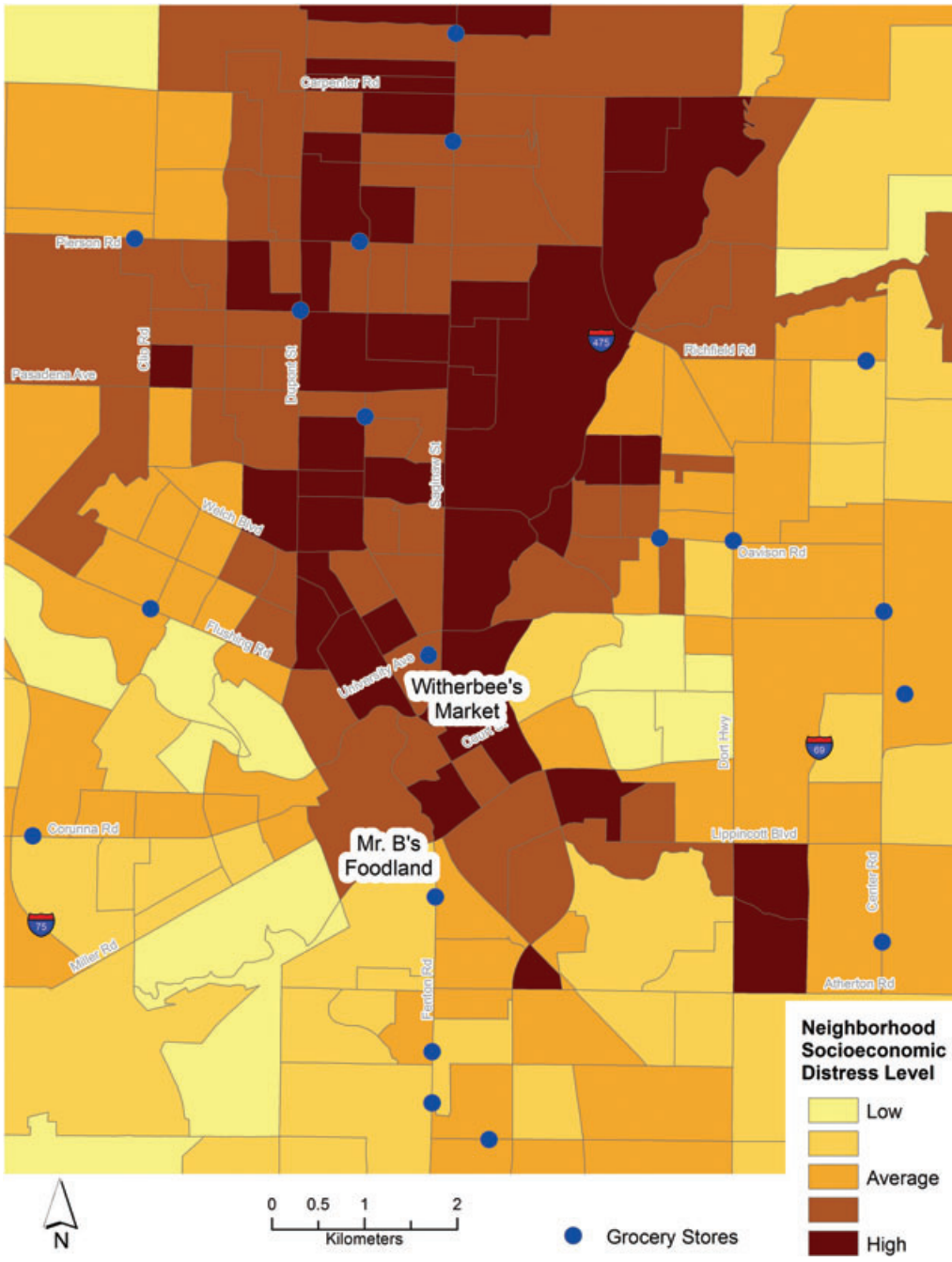

FIGURE 2

Census block groups within Flint urbanized area by socioeconomic distress level

In total, prices were collected for 44 of 52 stores in the county, including 12 of the 13 grocery stores within the Flint city limits.

Price of Groceries and Neighborhood Distress

Since food is not a comparison shopping good for all consumers, many shop close to home (Jones and Simmons, 1990). Thus, the neighborhood around a grocery store likely embodies the average store patron. Using existing socioeconomic distress data (including variables on low educational attainment, incidence of low income, lone parenthood, and unemployment) and nutritious food basket prices for a majority of the grocery stores in the county, it is possible to examine correlations between the cost of groceries at neighborhood grocery stores and the neighborhood socioeconomic distress score. One-thousand-meter buffers were created around each grocery store for which food basket pricing was available. CBGs with a majority of their area within the store buffer were grouped, and the average distress score from these CBGs was applied to the store.

RESULTS

Food Deserts in Flint

Figures 3 and 4 show high-distress CBGs categorized by the percent of residents with access to a grocery store in 2009 and 2010, respectively (before and after the opening of two new grocery stores). As anticipated, Flint's downtown was classified as a food desert due to the absence of a grocery store in 2009. Figure 3 illustrates that 24 CBGs in or immediately adjacent to downtown met the three criteria for a food desert: poor geographical access to nutritious food, high socioeconomic distress, and high, urban density. Additional food deserts include distressed areas near Bassett Park in the west, Hasselbring Park in the northwest, St. John Industrial Park in the north, Carpenter Road Elementary and the Kearsley Reservoir in the northeast, and Evergreen Regency and Howard Estates in the southeast.

The opening of Witherbee's downtown and Mr. B's just south of downtown wholly or partly ameliorated spatial food deserts in 8 CBGs, as shown in Figures 3 and 4. Initially, only 28% of residential addresses in the city were within 1,000 meters of a grocery store. This number increased to 31%, or an additional 1,300 homes, after the opening of Witherbee's and Mr. B's. In addition, 13% of all residential addresses in the city experienced an improvement in individual accessibility, based on network analysis of address points to the nearest grocery store. The added presence of two grocery stores near downtown lessened the burden of travelling unwalkable distances to reach nutritious food retailers.

Figure 5 indicates the average distance to a grocery store by socioeconomic distress level. Before the opening of the new stores, highly distressed neighborhoods were somewhat closer to a grocery store than less distressed neighborhoods. Since only 28% of residences in the city were initially within 1,000 meters of a grocery store, however, food deserts existed in many neighborhoods (i.e., downtown). For residents with constrained mobility, distance is a considerable obstacle to accessing food. With the addition of the new stores, these distances were substantially reduced, improving accessibility in much of the former food desert downtown. Although food deserts still exist, some poorer neighborhoods have better access to grocery stores. The spatial analysis shows areas of geographic disadvantage but does not suggest whether the addition of these grocery stores solved the economic issue by lowering the price of nutritious foods—a topic addressed in the next section.

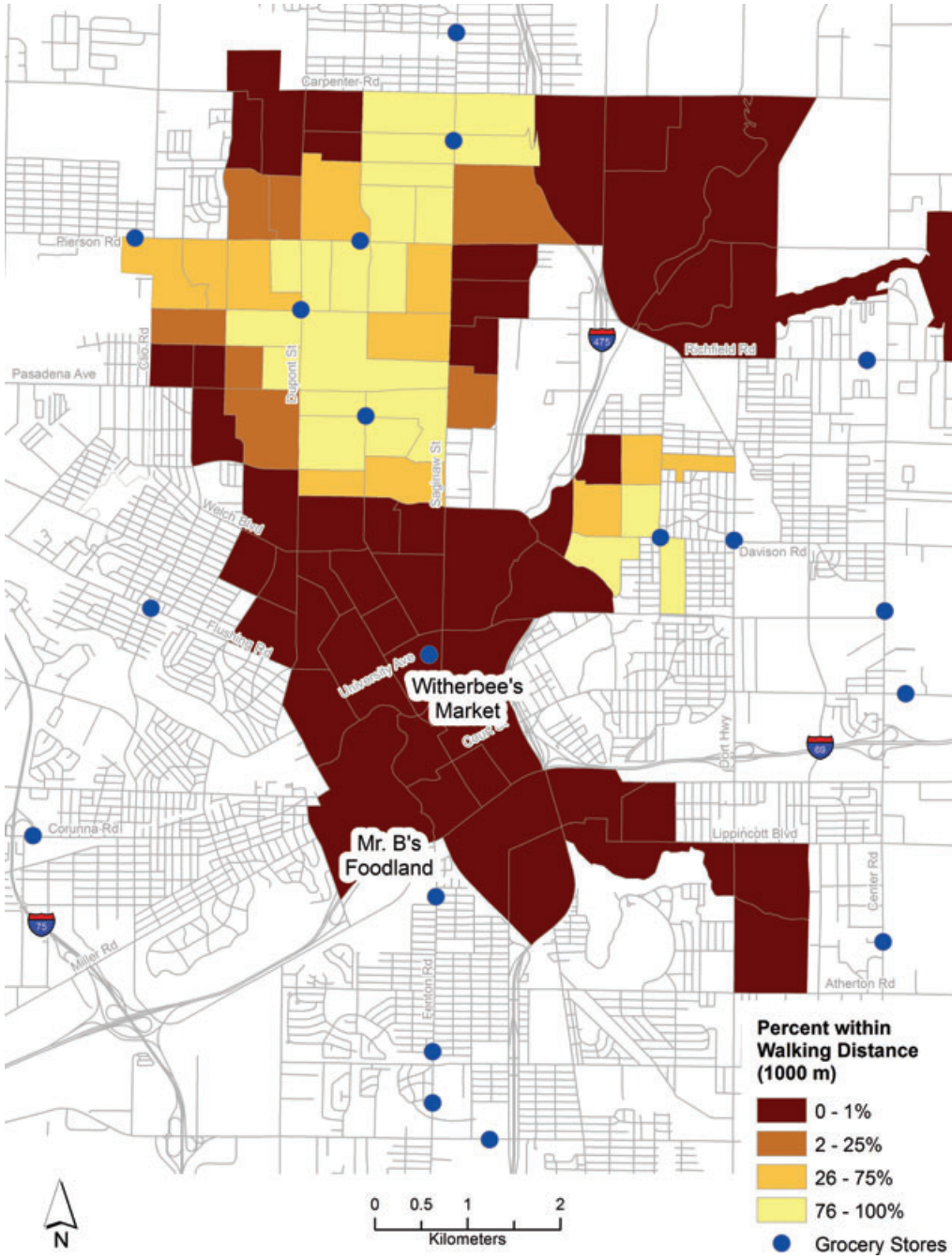

FIGURE 3

High-distress CBGs by percent within walking distance to a grocery store, Flint, MI, pre-intervention (2009)

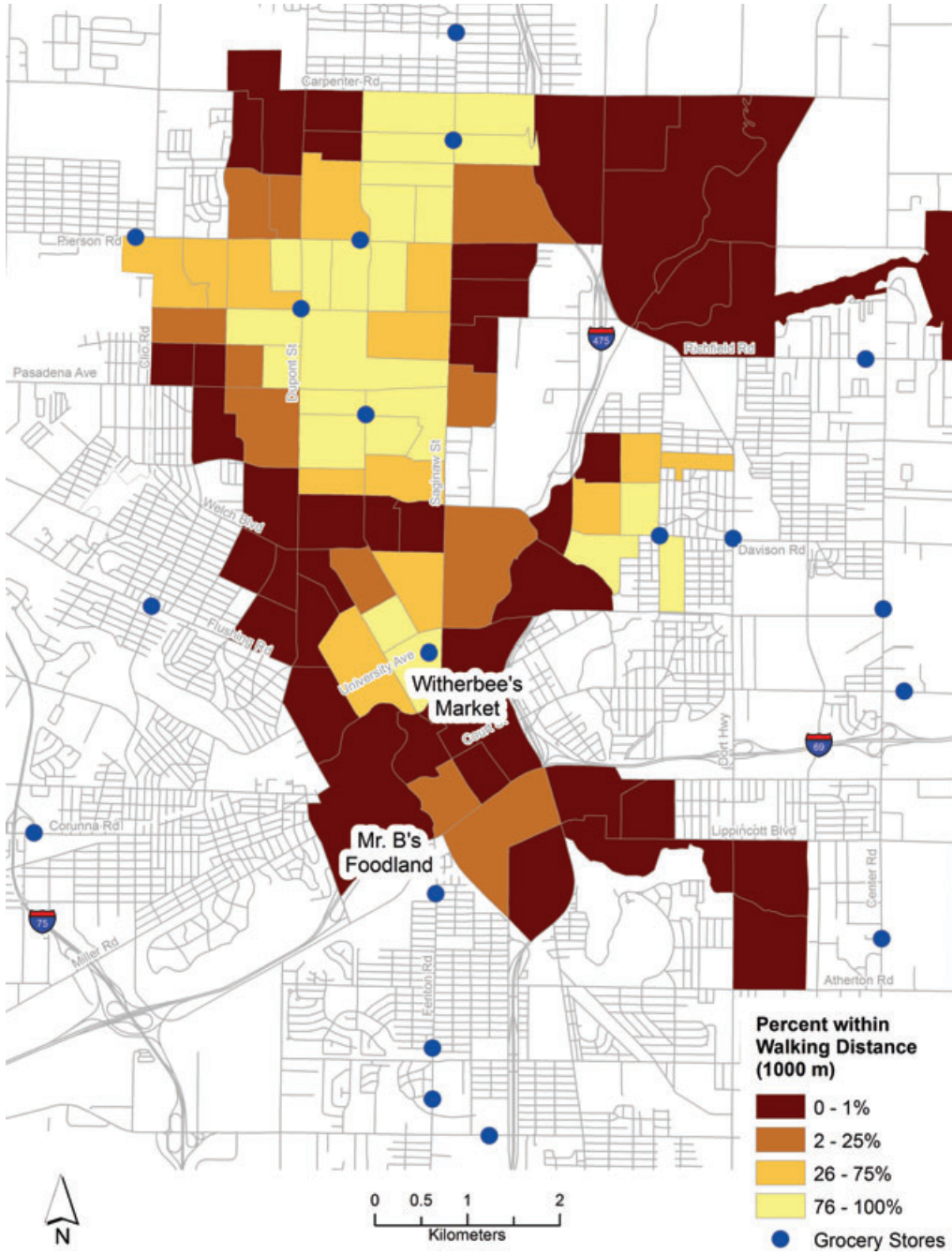

FIGURE 4

High-distress CBGs by percent within walking distance to a grocery store, Flint, MI, post-intervention (2011)

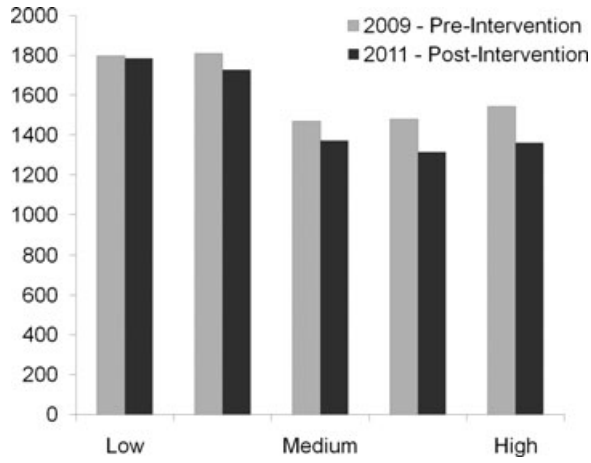

FIGURE 5

Average distance (meters) to grocery stores by socioeconomic distress level, pre- and post-intervention (2009 and 2011)

TABLE 1

Cost of groceries by access to public transit, by type of store, and by grocery stores vs. food desert, 2009–2011

Access to Public Transit at Store?	2009	2010	2011
Yes	$128.24	$124.11	**$137.40**
No	$125.64	**$120.86**	$134.04
Type of grocery store	**2009**	**2010**	**2011**
National	$114.45	$111.88	$126.63
Local	$130.20	$124.22	$139.62
Independent	$144.59	$140.66	**$147.22**
Food desert	$182.95	**$142.57**	$156.75
Overall average vs. cost in (Former) food desert	**2009**	**2010**	**2011**
Grocery stores	$125.50	$121.88	**$135.18**
Food desert	$182.95	**$142.57**	$156.75

Bold indicates that the cost decreased the most (or saw the smallest increase) among values in its group for the corresponding year.

Food Basket Results

Results of food basket surveys in 2009 and 2010 (adjusted for inflation) are shown alongside 2011 results in Table 1 and Figure 6. Table 1 demonstrates no statistical difference in price due to the presence or absence of public transit lines. But there are significant differences based on the type of store and on the price of groceries in the food desert (in 2009) versus the average at other grocery stores.

There is no significant difference in the price of groceries by neighborhood socioeconomic distress. Figure 6 shows a scatter-plot of food basket prices at individual stores by socioeconomic distress. The R-squared values for 2009 to 2011 are 0.063, 0.085, and 0.005, respectively, suggesting no systematic relationship between high distress and high prices for groceries. The only outlier in Figure 6 represents the price of the basket in the food desert neighborhood in 2009.

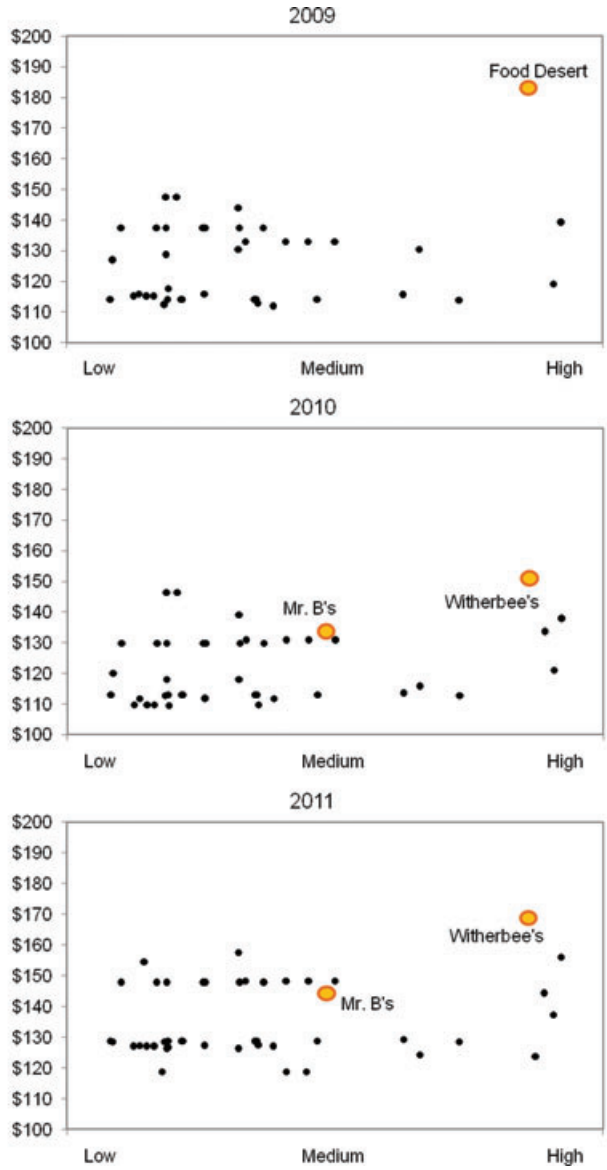

FIGURE 6

Cost of groceries at grocery stores by neighborhood distress score, 2009–2011

In 2009, the cost of a nutritious basket of food in the food desert was $182.95 (in 2011 dollars). In 2010, the cost at Mr. B's was $133.66 while the cost at Witherbee's was $151.48. This pattern held for pricing conducted in 2011, with prices of $144.37 at Mr. B's and $169.12 at Witherbee's.

t-Tests were run on the public transit section of Table 1, and one-way ANOVA tests were run on the remaining values. Results from the *t*-tests indicate no statistical significance in the price differences between stores on public transit lines and those not on transit lines. Tukey's tests were run as a post hoc evaluation of the ANOVA analyses for the cost of groceries by the type of store and in the food desert versus grocery stores.

Results of Tukey's tests revealed that in 2009 prices at national chains were significantly lower than at other stores, while local chains and independent grocers had significantly similar prices. The food desert was significantly more expensive than all types of grocery stores. In 2010, after the opening of the new stores, the price of groceries at independent grocers and the new stores in the former food desert were statistically similar. Prices at national chains were still significantly cheaper than prices at local chains, and local chains were cheaper than independents. In 2011, prices at local chains and independent grocers were once again statistically similar, and prices at independent grocers and the stores in the former food desert were also statistically similar. Inequalities in the price or availability of nutritious food are thus contingent on the store type, not on neighborhood socioeconomic status.

As noted, there is a significant difference between the price of groceries at grocery stores versus the price of groceries in the food desert in 2009 (bottom of Table 1). Food desert residents shopping within the neighborhood in 2009 would have paid a 46% premium to procure a nutritious basket of food. The cost of groceries in the former food desert is now statistically similar to the cost at other independent grocers. This is important for two reasons. First, research has shown that most people (regardless of mobility status) shop within two miles, or about 3,200 meters, of their homes (Eisenhauer, 2001). Since there were initially no grocery stores within two miles (or 3,200 meters) of the center of the neighborhood, if actual shopping patterns were similar to this research, residents would have been forced to shop at stores that were not full-service grocers. Second, a recent report conducted on downtown Flint indicated that 30% of residents in this neighborhood did not have a car available at their household (ESRI, 2007). This suggests that many residents either walk or take public transit to shop. It is likely, then, that many people were paying a premium in price due to constraints on time, mobility, or resources.

The bottom of Table 1 illustrates the decline in the price of nutritious foods seen by the opening of Witherbee's Market and Mr. B's Foodland in the former food desert. The combined effect of the new stores translates into only a 5% premium over the average cost at other grocery stores around the county in 2011. Thus, while residents are still paying slightly more for groceries, they are paying considerably less than they were before the stores opened. This reflects a recent similar finding where the opening of a farmers' market in a food desert considerably reduced the price of groceries (Larsen and Gilliland, 2009).

DISCUSSION

The opening of two new grocery stores in and near a food desert has influenced the price and availability of nutritious foods. The number of residents impacted by the addition of the new stores understates its potential effect for two reasons. First, many changes have occurred downtown in recent years, including new housing developments that have brought new permanent residents to the neighborhood. Second, approximately 1,000 students have moved into the neighborhood in the last three years as a result of the growth of the local university (Flint Journal, 2009). Because many of these students are itinerant year-to-year (and therefore possibly not included in the census count for downtown) future census counts may not adequately reflect the population in this neighborhood. If the stores had not opened, the issues with this food desert may have been exacerbated as new residents and students moved in only to find inadequate sources of nutritious food.

Evidence from a survey conducted prior to the opening of the new stores suggests that living in a food desert can have detrimental effects. The survey found that 21% of residents in the city have at least some degree of difficulty accessing a "grocery store or supermarket that has a good variety of fresh fruits and vegetables" ($n = 730$) (Prevention Research Center of Michigan, 2009). This suggests that, among those outside of walking distance to a grocery store, accessing

nutritious foods can be particularly problematic. The same survey indicated that only 25% of city residents consume at least 5 servings of fruits and vegetables per day ($n = 687$) (Prevention Research Center of Michigan, 2009). Because there is a positive relationship between proximity to grocery stores and dietary quality, the addition of these new stores may make healthy eating easier for those interested in improving their health status.

The addition of the grocery stores in and near the food desert improved food access in both geographic and economic dimensions. Geographic access has been improved because residents can now access a grocery store downtown. Residents previously shopping in the neighborhood were relegated to a handful of convenience stores or the farmers' market. Due to the addition of these two stores, an increase of 3% of the entire city population can now walk to a grocery store. Economic access was also improved by the new stores. For residents originally shopping for groceries entirely within the neighborhood, a considerable premium would have been paid, as this and past research has shown (Drewnowski et al., 2004; Furey et al., 2001; Larsen and Gilliland, 2009). Those shopping outside the neighborhood would have expended additional resources on travel to reach more distant grocery stores. A resident shopping by the nutritious food basket guidelines every two weeks would save approximately $800 at Witherbee's or $1250 at Mr. B's over the course of a year. In Flint, this equates with between 2 and 3 months' rent in a 1-bedroom apartment (Apartment Ratings, 2011). For a low-income family, this cost-savings would result in a considerable change in quality of life.

The farmers' market in itself offers a microcosm of the issue of accessing nutritious food downtown prior to the opening of the grocery stores. It is competitive for some types of fresh produce, but does not offer many staple foods like cereal, and many other products like meats and cheeses are only available with higher mark-ups. Additionally, the farmers' market is only open three days a week, reflecting a common concern that residents were required to "plan ahead" if intending to shop there. Finally, it is also distant from the center of the neighborhood, and is less accessible by bus than Witherbee's or Mr. B's. Thus, while the market serves a vital role in the neighborhood, the contribution of the new grocery stores is significant both geographically and economically.

Still, there are important pieces of evidence that this research does not answer. Cummins, Findlay, Petticrew, and Sparks, (2008) indicate that, even when presented with a new food source, many people do not deviate from their old habits. Because no customer surveys were taken, the present research is unable to state whether people shop at these new stores. Further, even assuming that residents switched stores, this research cannot determine whether dietary habits are improving as a result. Additionally, cultural and social factors may have a stronger influence on what people will choose to purchase even when given so-called healthier choices (Cummins, Curtis, Diez-Roux, & Macintyre, 2007), and environmental cues can cause people to make sub-optimal choices even when intending to act in their self-interest (Just and Payne, 2009).

Policy Implications

The success of these stores is compelling for policymakers. Initially, the development of Witherbee's was a grassroots movement by community members interested in a full-service grocery store for their neighborhood. Using local community groups like the Neighborhood Improvement and Preservation Project and the Local Initiatives Support Corporation to lobby funding from higher-level organizations, sponsors from the State of Michigan, the U.S. Department of Housing and Urban Development, and local community foundations soon joined to provide financial support. The project became a statewide model to support efforts to bring small grocery stores to other under-serviced urban neighborhoods (LISC-Flint, 2008).

This model has been successful in part because of efforts by the Downtown Development Authority of the City of Flint to increase security in the downtown core to entice area residents to frequent the new developments. This strategy echoes Bowes (2007), who indicated that "public policy strategies meant to encourage retail development in a particular part of the city such as downtown need to include efforts to reduce crime" (p. 88).

The small scale of the grocery stores means a smaller percentage of the market is needed to remain profitable. The cost-savings to consumers provided in the results section are in line with the grocer margins projected by Witherbee's financial backers (27–29%), whose plan was to remain competitive with large-scale grocery retailers (20–24% margin) while staying far below the margins expected for convenience stores (40%) (LISC-Flint, 2008). A market analysis of the community prior to the opening of Witherbee's indicated a 60% leakage rate for money spent outside the neighborhood, suggesting a large untapped demand for goods (see also Carr, 1999; Porter, 1995). The report indicates that the market would need to re-capture 4.3% of the leakage rate to remain profitable (LISC-Flint, 2008). If Witherbee's captures this part of the market demand, it could serve as a model for future public/private partnerships to develop grocery stores in other disadvantaged neighborhoods in this region and elsewhere.

Because Witherbee's resulted from a grassroots movement, it is instructive for planners/policymakers and conventional retailers. The attention given to Witherbee's by local investors likely contributed to its opening, since close attention was given to the needs of the neighborhood and neighborhood-based leadership was present throughout. Both of these elements are suggested as necessary components in local economic development (Carley, Kirk, & McIntosh, 2001). The organization that aided Witherbee's (LISC) was also the catalyst for a grocery store in Harlem (Lavin, 2000). Since not all revitalization comes from grassroots movements, however, it is important to engage the public and private sectors in planning for new development. The new grocery stores in Flint demonstrate the policy implication that "public officials cannot rely on regional growth to solve the problems of poor neighborhoods" (Blair and Carroll, 2007, p. 274). Indeed, both stores owe their existence to the local-level investors who observed a need for retail within their neighborhood.

Attracting grocery stores and other retail to urban centers can be difficult where site availability, human resources, or aid programs for new retail are unavailable or sparse (Nayga and Weinburg, 1999; Pothukuchi, 2005), and many governments and would-be investors can be shy of taking the risk. This aversion is a potential reason for metropolitan disparities seen in urban neighborhoods (Blair and Carroll, 2007). Yet, there is clearly potential for retail to locate in urban centers. A government-sponsored initiative in the U.K. recently spurred the development of a supermarket within a designated regeneration area (Mitchell and Kirkup, 2003). By incentivizing development in this disadvantaged neighborhood, the government was able to match retailers with suitable areas to develop stores that would be both profitable from a business standpoint and restorative from a local community development standpoint. This appears to be the case in Flint with the opening of Witherbee's, and additional retail initiatives have flourished in the neighborhood. Witherbee's may serve as a catalyst for multiplier effects on local economic development.

This community-centered strategy is in contrast to the large-scale, tourist-oriented economic development strategies of the 1970s and 1980s. These past projects often did not deliver on their promises of jobs (Krumholz, 1991), and frequently failed due to their reliance on outside populations to sustain their high operating costs.

Investment in retail may not be a catch-all solution for improving health status (Cummins et al., 2008; Cummins & Macintyre, 2002), but the addition of new food retail does lessen the social inequalities created when these areas were initially abandoned by grocery stores (Carley et al., 2001; Dunkley, Helling, & Sawicki, 2004; Williams and Hubbard, 2001). As mentioned earlier, various tax and zoning incentives were given by the City of Flint to the operators of Witherbee's

(City of Flint, 2010), suggesting that municipal governments are beginning to play a larger role in healthy eating. Elsewhere, other initiatives like the FRESH Food Store Program also facilitate the development of nutritious food sellers in distressed communities by providing tax and zoning incentives to qualified retailers in New York (Food Retail Expansion to Support Health, 2011).

Although this paper necessarily cannot consider all prospects for food as local economic development, formal-sector interventions like those seen in this paper will not necessarily occur in all neighborhoods where there is a need. Therefore, it is useful to briefly consider that where investment in retail is not possible or desired, there exist many movements which emphasize local food networks as a form of economic development. The national Growing Power movement is one of many organizations that provide training and support for prospective growers (Growing Power, 2011). Beyond this, the Growing Home movement in Chicago combines job training and organic agriculture to provide employment opportunities for troubled residents (Growing Home, 2011). Given that food is an essential building block of life and many opportunities for growth exist within food systems (including locally), these programs may offer promise as community and economic development strategies, especially in neighborhoods where conventional food retailers are unlikely to invest.

CONCLUSIONS

The contributions of this research will benefit researchers, planners, and investors. An empirical mixed-methods approach was employed to locate food deserts in urban areas. GIS was used to map food retailers and census data to determine potential food deserts, while food basket pricing was conducted to examine variations in the price and availability of nutritious foods. The GIS approach can be used in other urban settings to locate potential food deserts, giving other communities evidence for creating policies to support community development in disadvantaged neighborhoods through food retail.

This research pinpointed potential food desert neighborhoods in Flint, Michigan. Because the city exemplifies the problems of many post-industrial shrinking cities of North America and Western Europe, the methods employed in this research can be replicated elsewhere. Food basket pricing before and after the opening of two new grocery stores showed that much of downtown Flint is no longer a food desert. This approach included the extrapolation of pricing to all grocery stores within the same chain to provide a view of grocery pricing throughout the county. The finding that spatial and economic accessibility were restored to a food desert is valuable for many parties: the city, since downtown now appears more attractive to prospective apartment tenants and homeowners; the new grocery stores, as they may be seen as the conquerors of the food desert; investors in urban retail, since the stores may provide a multiplier effect in economic development in these neighborhoods; and the residents who have lived in the area for years, since the benefits they see from lower nutritious food costs may contribute to improved dietary habits, and even health.

This research is a valuable starting point for learning more about food-based interventions in impoverished communities. Where communities are aware of future store openings, pre-intervention studies like this will help to identify areas in need of attention. This will allow stores to target their product range to best suit area residents. It is through better understanding the interaction of consumer behavior and the food environment that planners, policymakers, investors, and researchers can make effective changes to improve quality of life and health outcomes in once deprived urban areas through profitable community development initiatives. This article provides a foundation for identifying and evaluating areas for these interventions.

ACKNOWLEDGMENTS: The authors wish to thank the Genesee County Land Bank, Flint NIPP, and Michael Freeman for their time and the use of their data.

APPENDIX
Ontario Nutritious Food Basket Items

	Milk Products		Fruit/Veggies
	2% Milk (gallon)	lb	Oranges
each	Yogurt	64	Apple juice, canned or tetra
24	Cheddar cheese, Medium	12	Orange juice, frozen
pack	Processed cheese slices	lb	Tomatoes
24	Mozzarella cheese	28	Whole tomatoes, canned
2 qts	Vanilla ice cream	46	Tomato juice, canned
	Meat and alternatives	lb	Apples
lb	Round steak	lb	Bananas
lb	Stewing beef	lb	Grapes
lb	Ground beef, medium	lb	Pears
lb	Pork chops, loin	24	Raisins
lb	Chicken legs	14	Fruit cocktail, canned
pack	Wieners, beef & pork	8 lbs	Potatoes, fresh
lb	Sliced ham	32	Frozen french fried potatoes
1 lb	Frozen fish fillets	head	Broccoli
14.75	Pink salmon, canned	head	Cabbage
12	Tuna, flaked, canned	3 lbs	Carrots, fresh
	Large eggs (dozen)	head	Celery
28	Baked beans, canned	1	Cucumber
32	Dry navy beans	head	Lettuce, iceberg
64	Peanut butter	head	Lettuce, romaine
	Grain products	lb	Onions
	Bread, enriched, white	1	Green pepper
	Bread, whole wheat	lb	Turnips
	Hot dog/hamburg rolls	16 oz	Mixed vegetables, frozen
	Flour, white, all purpose	14.5	Kernel corn, canned
	Flour, whole wheat	14.5	Green peas, canned
48	Macaroni/spaghetti		Other
42	Rice, long-grain, white	45 oz	Margarine, tub
	Macaroni/cheese dinner	lb	Butter
42	Oatmeal, regular	48 oz	Canola oil
18	Corn flakes	16 oz	Salad dressing
14	Shreddies (chex)	5 lbs	Sugar, white
16	Soda crackers, salted	18 oz	Strawberry jam
7.5	Social tea biscuits		

REFERENCES

Apartment Ratings. (2011). Flint apartments pricing and Flint MI apartment reviews. Retrieved June 3, 2011, http://www.apartmentratings.com/rate/MI-Flint-Pricing.html

Apparicio, P., Cloutier, M.-S., & Shearmur, R. (2007). The case of Montreal's missing food deserts: Evaluation of accessibility to food supermarkets. *International Journal of Health Geographics*, *6*(4). Retrieved from http://www.ij-healthgeographics.com/content/6/1/4

Beaumont, J., Lang, T., Leather, S., & Mucklow, C. (1995). Report from the policy sub-group to the Nutrition Task Force Low Income Project Team of the Department of Health. Radlett, UK: Institute of Grocery Distribution.

Binkley, J. K., Eales, J., & Jekanowski, M. (2000). The relation between dietary change and rising US obesity. *International Journal of Obesity*, *24*, 1032–1039.

Blair, J. P., & Carroll, M. C. (2007). Inner-city neighborhoods and metropolitan development. *Economic Development Quarterly*, *21*(3), 263–277.

Block, D., & Kouba, J. (2006). A comparison of the availability and affordability of a market basket in two communities in the Chicago area. *Public Health and Nutrition*, *9*, 837–845.

Bowes, D. R. (2007). A two-stage model of the simultaneous relationship between retail development and crime. *Economic Development Quarterly*, *21*(1), 79–90.

Campbell, M. C. (2004). Building a common table: The role for planning in community food systems. *Journal of Planning Education and Research*, *23*, 341–355.

Carley, M., Kirk, K., & McIntosh, S. (2001). Retailing, sustainability and neighbourhood regeneration. York, UK: Joseph Rowntree Foundation.

Carr, J. H. (1999). Community, capital and markets: A new paradigm for community reinvestment. *The Neighborworks' Journal*, *17*(3), pp. 20–23.

Chung, C., & Myers, S. (1999). Do the poor pay more for food? An analysis of grocery store availability and food price disparities. *Journal of Consumer Affairs*, *33*(2), 276–296.

City of Flint. (2010). City of Flint consolidated annual performance and evaluation report. Flint, MI: Author.

Clifton, K. J. (2004). Mobility strategies and food shopping for low-income families: A case study. *Journal of Planning Education and Research*, *23*, 402–413.

Cummins, S., Curtis, S., Diez-Roux, A. V., & Macintyre, S. (2007). Understanding and representing "place" in health research: A relational approach. *Social Science & Medicine*, *65*, 1825–1838.

Cummins, S., Findlay, A., Petticrew, M., & Sparks, L. (2008). Retail-led regeneration and store-switching behaviour. *Journal of Retailing and Consumer Services*, *15*, 288–295.

Cummins, S., & Macintyre, S. (2002). A systematic study of an urban foodscape: The price and availability of food in greater Glasgow. *Urban Studies*, *39*(11), 2115–2130.

Darmon, N., Ferguson, E. L., & Briend, A. (2002). A cost constraint alone has adverse effects on food selection and nutrient density: An analysis of human diets by linear programming. *Journal of Nutrition*, *132*, 3764–3771.

Donkin, A., Dowler, E., Stevenson, S., & Turner, S. (1999). Mapping access to food at a local level. *British Food Journal*, *101*(7), 554–564.

Drewnowski, A., Darmon, N., & Briend, A. (2004). Replacing fats and sweets with vegetables and fruits—A question of cost. *American Journal of Public Health*, *94*, 1555–1559.

Dunkley, B., Helling, A., & Sawicki, D. (2004). Accessibility versus scale: Examining the tradeoffs in grocery stores. *Journal of Planning Education and Research*, *23*(4), 387–401.

Eisenhauer, E. (2001). In poor health: Supermarket redlining and urban nutrition. *GeoJournal*, *53*, 125–133.

ESRI Data & Maps. (2007). *LISC Center for Commercial Revitalization—Neighborhood market snapshot*. Redlands, CA: Environmental Systems Research Institute.

Flint Journal. (2009). Riverfront Character Inn to become residence hall. February 2; http://www.mlive.com/business/mid-michigan/index.ssf/2009/02/former_flint_hotel_to_become_u.html.

Food Retail Expansion to Support Health (FRESH). (2011). Retrieved November 11, 2011, from http://www.nycedc.com/FINANCINGINCENTIVES/TAXEXEMPTIONS/FRESH/Pages/fresh.aspx

Freedman, D. A., & Bell, B. A. (2009). Access to healthful foods among an urban food insecure population: Perceptions versus reality. *Journal of Urban Health*, *86*(6), 825–838.

Friel, S., Walsh, O., & McCarthy, D. (2006). The irony of a rich country: Issues of financial access to and availability of healthy food in the Republic of Ireland. *Journal of Epidemiology and Community Health*, *60*, 1013–1019.

Furey, S., Strugnell, C., & McIlveen, H. (2001). An investigation of the potential existence of "food deserts" in rural and urban areas of Northern Ireland. *Agriculture and Human Values*, *18*, 447–457.

Gatrell, A. C., & Löytönen, M. (1998). *GIS and health*. London:Taylor & Francis.

Gilliland, J. (2010). The built environment and obesity: Trimming waistlines through neighbourhood design. In T. Bunting, P. Filion, & R. Walker (Eds), *Canadian cities in transition* (4th ed, pp. 391–410). Oxford: Oxford University Press.

Gilliland, J., & Ross, N. (2005). Opportunities for video lottery gambling: An environmental analysis. *Canadian Journal of Public Health*, *96*, 55–59.

Growing Power. (2011). Retrieved November 11, 2011, from http://www.growingpower.org/

Growing Home. (2011). Retrieved November 11, 2011, from http://www.growinghomeinc.org/

Hanson, S., & Schwab, M. (1987). Accessibility and intraurban travel. *Environment and Planning A*, *19*, 735–748.

Health Canada. (1998). *Ontario nutritious food basket*. Ottawa: Ministry of Public Works and Government Services.

Highsmith, A. R. (2009). *Demolition means progress: Race, class, and the deconstruction of the American dream in Flint, Michigan*. Unpublished doctoral dissertation, University of Michigan, Ann Arbor, MI.

Hollander, J. B. (2010). Moving toward a shrinking cities metric: Analyzing land use changes associated with depopulation in Flint, Michigan. *Cityscape: A Journal of Policy Development and Research*, *12*(1), 133–152.

Jacobs, A. J. (2009). The impacts of variations in development context on employment growth: A comparison of central cities in Michigan and Ontario, 1980–2006. *Economic Development Quarterly*, *23*(4), 351–371.

Jetter, K. M., & Cassady, D. L. (2006). The availability and cost of healthier food alternatives. *American Journal of Preventive Medicine*, *3*(1), 38–44.

Jones, K., & Simmons, J. (1990). *The retail environment*. London: Routledge.

Just, D. R., & Payne, C. R. (2009). Obesity: Can behavioral economics help? *Annals of Behavioral Medicine*, *38*(1), 47–55.

Krumholz, N. (1991). Equity and local economic development. *Economic Development Quarterly*, *5*(4), 291–300.

Laraia, B. A., Siega-Riz, A. M., Kaufman, J. S., & Jones, S. J. (2004). Proximity of supermarkets is positively associated with diet quality index for pregnancy. *Preventive Medicine*, *31*, 10–17.

Larsen, K., & Gilliland, J. (2008). Mapping the evolution of "food deserts" in a Canadian city: Supermarket accessibility in London, Ontario, 1961–2005. *International Journal of Health Geographics*, *7*(16).

Larsen, K., & Gilliland, J. (2009). A farmers' market in a food desert: Evaluating impacts on the price and availability of healthy food. *Health & Place*, *15*(4), 1158–1162.

Lavin, M. (2000). Problems and opportunities of retailing in the US "inner city." *Journal of Retailing and Consumer Services*, *7*, 47–57.

Lewis, L. B., Sloane, D. C., Nascimento, L. M., Diamant, A. L., Guinyard, J. J., Flynn, G., & Yancey, A. K. (2005). African Americans' access to healthy food options in South Los Angeles restaurants. *American Journal of Public Health*, *95*, 668–673.

LISC-Flint (Local Initiatives Support Corporation-Flint). (2008). *Witherbee's project information* Flint, MI: Author.

Mayer, H. J., & Greenberg, M. R. (2001). Coming back from economic despair: Case studies of small- and medium-sized American cities. *Economic Development Quarterly*, *15*(3), 203–216.

Mitchell, A., & Kirkup, M. (2003) Retail development and urban regeneration: A case study of Castle Vale. *International Journal of Retail & Distribution Management*, *31*(9), 451–458.

Mokdad, A. H., Ford, E. S., Bowman, B. A., Dietz, W. H., Vinicor, F., Bales, V. S., & Marks, J. S. (2003). Prevalance of obesity, diabetes, and obesity-related health risk factors, 2001. *Journal of the American Medical Association*, *289*(1), 76–79.

Moore, L. V., Diez-Roux, A. V., & Brines, S. (2008). Comparing perception-based and geographic information system (GIS)-based characteristics of the local food environment. *Journal of Urban Health*, *85*(2), 206–216.

Morland, K., Diez-Roux, A. V., & Wing, S. (2006). Supermarkets, other food stores, and obesity: The atherosclerosis risk in communities study. *American Journal of Preventive Medicine, 30,* 333–349.

Morland, K. B., & Evenson, K. R. (2009). Obesity prevalence and the local food environment. *Health & Place*, *15*, 491–495.

Morland, K., & Filomena, S. (2007). Disparities in the availability of fruits and vegetables between racially segregated urban neighborhoods. *Public Health Nutrition*, *10*(12), 1481–1489.

Nathoo, T., & Shoveller, J. (2003). Do healthy food baskets assess food security? *Chronic Disease in Canada*, *24*, 65–69.

Nayga, R. M., Jr., & Weinburg, Z. (1999). Supermarket access in the inner cities. *Journal of Retailing and Consumer Services*, *6*, 141–145.

Pampalon, R., Hamel, D., Gamache, P., & Raymond, G. (2010). A deprivation index for health planning in Canada. *Chronic Disease in Canada*, *29*(4), 178–191.

Paeratakul, S., Ferdinand, D., Champagne, C., Ryan, D., & Bray, G. (2003). Fast-food consumption among US adults and children: Dietary and nutrient intake profile. *Journal of the American Dietetic Association*, *103*(10), 1332–1338.

Pearson, T., Russell, J., Campbell, M. J., & Barker, M. E. (2005). Do "food deserts" influence fruit and vegetable consumption?—A cross-sectional study. *Appetite*, *45*, 195–197.

Polk, R. L. & Co. (1998). *Polk's Flint City Directory*. Detroit, MI: Author.

Polk, R. L. & Co. (1999). *Polk's Flint City Directory*. Detroit, MI: Author.

Porter, M. E. (1995). The competitive advantage of the inner city. *Harvard Business Review, (May–June)*, 55–71.

Poston, W. S. C., II, & Foreyt, J. P. (1999). Obesity is an environmental issue. *Atherosclerosis*, *146*, 201–209.

Pothukuchi, K. (2004). Community food assessment: A first step in planning for community food security. *Journal of Planning Education and Research*, *23*(4), 356–377.

Pothukuchi, K. (2005). Attracting supermarkets to inner-city neighborhoods: Economic development outside the box. *Economic Development Quarterly*, *19*(3), 232–244.

Pothukuchi, K., & Kaufman, J. L. (2000). The food system: A stranger to the planning field. *Journal of the American Planning Association*, *66*(2), 112–124.

Prevention Research Center of Michigan. (2009). *Speak to your health community survey*. Ann Arbor, MI: Author.

Reese, L. A., & Ye, M. (2011). Policy versus place luck: Achieving local economic prosperity. *Economic Development Quarterly*, *25,* 221–236. doi: 10.1177/0891242411408292

Reidpath, D. D., Burns, C., Garrard, J., Mahoney, M., & Townsend, M. (2002). An ecological study of the relationship between social and environmental determinants of obesity. *Health & Place*, *8*, 141–145.

Rose, D., & Richards, R. (2004). Food store access and household fruit and vegetable use among participants in the US Food Stamp Program. *Public Health Nutrition*, *7*(8), 1081–1088.

Sadler, R. C., Gilliland, J. A., & Arku, G. (2011). An application of the edge effect in measuring accessibility to multiple food retailer types in rural Southwestern Ontario, Canada. *International Journal of Health Geographics*, *10*(34).

Segoe and Associates. (1960). *Comprehensive master plan of Flint, Michigan, and environs*. Cincinnati: Ladislas Segoe and Associates.

Smoyer-Tomic, K. E., Spence, J. C., & Amrhein, C. (2006). Food deserts in the prairies? Supermarket accessibility and neighborhood need in Edmonton, Canada. *The Professional Geographer*, *58*(3), 307–326.

Travers, K. (1996). The social organization of nutritional inequities. *Social Science & Medicine*, *43*(4), 543–553.

U.S. Census Bureau. (2010). Census 2010. Retrieved May 25, 2011, from http://2010.census.gov/2010census/

U.S. Census Bureau. (2000a). Census 2000 census block group data. Retrieved February 23, 2011, from http://www.census.gov/geo/www/cob/bg2000.html

U.S. Census Bureau. (2000b). Census 2000 urban and rural classification. Retrieved February 23, 2011, from http://www.census.gov/geo/www/ua/ua_2k.html

Wang, M. C., Kim, S., Gonzalez, A. A., MacLeod, K. E., & Winkleby, M. A. (2007). Socioeconomic and food-related physical characteristics of the neighborhood environment are associated with body mass index. *Journal of Epidemiology and Community Health*, *61*, 491–498.

White, M. (2007). Food access and obesity. *Obesity Review*, *8*(1), 99–107.

Williams, P., & Hubbard, P. (2001). Who is disadvantaged? Retail change and social exclusion. *International Review of Retail, Distribution and Consumer Research*, 11(3), 267–286.

Winkler, E., Turrell, G., & Patterson, C. (2006). Does living in a disadvantaged area entail limited opportunities to purchase fresh fruit and vegetables in terms of price, availability, and variety? Findings from the Brisbane Food Study. *Health & Place*, *12*, 741–748.

Wrigley, N. (2001). Transforming the corporate landscape of US food retailing: Market power, financial re-engineering and regulation. *Journal of Economic & Social Geography*, *93*(1), 62–82.

Zimmer, B. G., & Hawley, A. H. (1956a). Approaches to the solution of fringe problems: Preferences of residents in the Flint metropolitan area. *Public Administration Review*, *16*(4), 258–268.

Zimmer, B. G., & Hawley, A. H. (1956b). Home owners and attitude toward tax increase: Flint metropolitan area. *Journal of the American Planning Association*, *22*(2), 65–74.