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Assessment of community food resources: A Latino neighborhood study in upstate New York

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Abstract

This study aims to assess availability, affordability, and accessibility of food items in a low-income Latino neighborhood within a small city using an on-site food store survey. Store locations were identified by on-site GPS. Results showed the Latino neighborhood had limited availability and above average cost of high-fiber bread. Fresh vegetables were more expensive compared to the non-Latino neighborhood, and more stores in the Latino neighborhood participated in Supplemental Nutrition Assistance Food Program. The lack of supermarkets, fewer stores with disability access, and the lack of public transportation left Latino residents without a vehicle or with physical disabilities with few food shopping options.

Latinos make up the largest minority population in the United States, representing nearly 15% of the total population (U. S. Bureau of the Census, 2000a). By 2050, this group is expected to constitute about 25% of the total U.S. population (U. S. Bureau of the Census, 2000a). Many low-income Latino communities experience significant food insecurity, including decreased access to recommended nutritionally important foods when compared to higher income and non-Latino communities (National Council of La Raza, 2006). Additional contributors to food insecurity stem from the food purchasing pattern for many low-income families who rely on government food benefit (Kaufman & Karpati, 2007). Large quantities of food are purchased at the beginning of the month without careful dietary planning. Resources for food purchase dwindle as the month passes, leaving families without sufficient food at the end of the month (Kaufman & Karpati, 2007; Curtis & McClellan, 1995). The limited and overpriced food items in the local environment bring economic difficulties and unhealthy eating patterns for families dependent on a monthly food cycle (Kaufman & Karpati, 2007; Curtis & McClellan, 1995). The exploration of diverse methods for understanding equitable food access is necessary, especially given the increasing number of Latinos and typically the high concentration of this ethnic group in economically disadvantaged communities.

Studies have found that stores in middle-class or wealthy neighborhoods, defined by median household income (above $45,000 or $80,000 depending on the region) or percent of the population above the poverty level, are more likely to stock foods that are healthful and nutritionally important compared to stores in low-income, predominantly African-American or Latino neighborhoods (Sloane, Diamant, Lewis, et al. 2003; Horowitz, Colson, Hebert & Lancaster, 2004; Baker, Schootman, Barnidge & Kelly, 2006). Researchers have also affirmed that poor and minority communities have limited access to supermarkets (Morland, Wing, Diez-Roux & Poole, 2002). Low-income individuals who have limited access to supermarkets are more likely to report decreased intake of nutritionally important food such

as fruits and vegetables than those with access to a supermarket (Moreland, Wing, Diez-Roux, 2002; Rose & Richards, 2004; Zenk, Schulz, Israel, et al. 2005). Low-income households tend to pay less for foods by selecting more economical yet nutritionally poor foods (Curtis & McClellan, 1995). Although some studies that examine food store availability in Latino neighborhoods in large metropolitan areas (Horowitz, Colson, Hebert & Lancaster, 2004; Osypuk, Diez Roux, Hadley & Kandula, 2009; Galvez, Moreland, Raines, et al., 2008; Powell, Slater, Mirtcheva, Bao, & Chaloupka, 2007), there seems to be a scarcity of studies that address food availability, affordability, and access in a low-income Latino community in a small city (Sheldon, Gans, Tai, et al., 2010).

In terms of methodology, Geographic Information System (GIS) techniques are increasingly important in assessing food resources in communities. GIS has been utilized for community health assessments (Acevedo-Garcia, 2001; Gaffney, Curriero, Strickland, et al. 2005; Schlundt, Hargreaves & McClellan, 2006) and for understanding community resource distribution (Pearce, Witten & Bartie, 2006). Several food environment studies have also used GIS techniques, but most of these studies employed automated geocoding of addresses to depict spatial positions of food stores (Morland, Wing & Diex-Roux, 2002; Larais, Siega-Riz, Kaufman & Jones, 2004; Zenk, Shulz, Israel, et al. 2005; Algert, Agawal & Lewis, 2006; Baker, Schootman, Barnidge & Kelly, 2006). The automated geocoding method often relies on street centerline files as geographic reference, which can lead to positional error (Cayo and Talbot, 2003). To minimize positional errors, recent literature strongly suggests using direct measurement of store locations using a Global Positioning System (GPS) receiver while driving or walking through the community (Sharkey and Horel, 2008).

METHODS

An on-site food store survey was conducted to assess and compare the levels of food resources in Latino and non-Latino neighborhoods. Six specific indicators were used in this study, including types of food stores, store size, disability access, availability (presence) and affordability (price) of selected nutritionally important foods, and store density per 1,000 residents. Information of food stores' participation in major nutrition assistance programs was also obtained, as these programs can incentivize food purchase and increase affordability of essential food items among low-income residents. This study employed direct measurement of store locations using a GPS receiver. GIS mapping techniques were applied to depict neighborhood boundaries and store locations, and to measure physical distances between residential neighborhoods and food stores.

Setting

The study took place in a Latino and surrounding neighborhoods in a city located in East Central New York, on the Mohawk River. This city has a population of about 18,000, with 16% of Latino origin (US Bureau of the Census, 2000b). Of those reporting ethnicity as Latino, 72% are Puerto-Rican (US Bureau of the Census, 2000b).

This city is ethnically divided into four geographic areas commonly known as Cork Hill, the South Side, the Projects, and the East End. The northeastern Cork Hill section is predominately Polish. The South Side area, located south of the Mohawk River, is mostly Italian. The Latino section of the city is found along the northern shore of the Mohawk River: The Projects area is located on the west side of state Highway 30, and the East End area is on the other side of the highway. A strip of Latino households also extends northward along Highway 30, forming a reversed L-shaped Latino section in the heart of the city.

The Projects, the East End, and the Highway 30 extension (hereafter the "Latino neighborhood") are predominantly Puerto Rican (US Bureau of the Census 2000b). Other

smaller Latino groups, including Colombians and Argentineans, live elsewhere in the city (US Bureau of the Census, 2000b). In the most economically deprived East End section (i.e. census tract 709, block group 1), the median household income is below $20,000, compared to $27,517 for the city as a whole, and $43,393 for New York state. Percentage of individuals living below the poverty line in this section is also high at 31.1%, compared to 16.3% for the city as a whole and 14.6% for the state (US Bureau of the Census, 2000b). There is no public transportation system that operates on a regular basis.

To delineate the Latino neighborhood on the map, geographic data from U. S. Census TIGER (Topologically Integrated Geographic Encoding and Referencing) files and demographic data from Census Summary Files 3 (SF3) were obtained. We identified five census block-groups within the city boundary where a Latino population was greater than 20%. These census blocks represent the most urbanized section of the city. We further narrowed down the Latino neighborhood using the block level information. Census blocks with a Latino population greater than 30% (high Latino blocks) were automatically retained. Blocks with a Latino population between 15–30% were retained if they shared two sides with the high Latino blocks. A small number of low Latino (< 15%) blocks were also retained if they were surrounded by the high or medium Latino blocks. We identified the nonresidential area that connected the two Latino residential districts in a darker shade in the map (Figure 1). This area was primarily industrial/commercial but heavily utilized by nearby Latino residents, and often recognized as part of the Latino neighborhood. An estimated 1,700 Latinos live in this area. A comparison non-Latino community was defined as the remainder of the five census block-groups, with a population of about 3,200.

Data Collection

In this study a food store was defined as a retail store that was open for business for at least 5 days a week during day or evening hours and that stocked at least one of the following food items: milk, bread, or fresh produce. This definition was used in previously published studies (Hosler, Varadarajulu, Ronsani, Fredrick, & Fisher, 2006; Hosler, Rajulu, Fredrick & Ronsani, 2008). A list of food stores was compiled from three sources: the New York State Department of Agriculture and Markets' inspected stores list, farmers' markets list, and online Yellow Pages. Ground-truthing was employed to locate additional stores not on the list and to verify store eligibility. Ground-truthing involves an in-person neighborhood canvass and enumeration of food stores using systematic driving, walking or both.

An in-store survey was conducted for all eligible food stores within the study community using the tested survey tool and protocol developed in previous studies (Hosler, Varadarajulu, Ronsani, Fredrick, & Fisher, 2006; Hosler, Rajulu, Fredrick & Ronsani, 2008). The individual (ML) who conducted ground-truthing and store assessment attended survey protocol briefings and completed on-site training during these previous studies.

Information collected by the survey included store type, disability access, number of cash registers, availability (presence) and prices of selected food items. Store type was based on industry classification codes developed by the North American Industry Classification System (NAICS). We selected off-street parking, clearly marked handicap parking space, automatic store doors, and a ramp or curb cuts at the entrance level to the ground as indicators of disability access, based on the Americans with Disabilities Act of 1990 public accommodation recommendations. The number of cash registers was used as a measure for store size, as suggested by published studies (Horowitz, Colson, Hebert & Lancaster, 2004; Hosler, Rajulu, Fredrick & Ronsani, 2008). The prices of the selected food items were based on the lowest regular (not on sale) standardized unit prices.

For this study, we focused on nutritionally important foods, including low-fat (≤1%) milk, high-fiber (≥2g per slice by the nutrition panel) bread, fresh fruits, dark green or orange-colored vegetables, and seafood indicated by fresh or frozen fish fillets. These items were selected based on the recommendations by members of the Albany Prevention Research Center Community Advisory Board, who used the Dietary Guidelines for Americans (U.S. Department of Health and Human Services and U.S. Department of Agriculture, 2005) and the Healthy People 2010 dietary objectives (U.S. Department of Health and Human Services, 2000) as references.

In addition, food stamp (currently called Supplemental Nutrition Assistance Program or SNAP) and WIC participation information was obtained from the United States Department of Agriculture and New York State Department of Health through special requests, respectively.

To obtain spatial positions of stores, coordinates (latitude and longitude) were measured at the front door of the store using a hand-held GPS receiver. The geographic information was downloaded into MapInfo Professional (Mapinfo), desktop mapping software for processing.

A total of 35 stores were visited, and 32 stores were determined to be eligible. All 32 eligible stores granted permission to conduct in-store assessment. The entire data collection activities took place during June and July, 2004.

DATA ANALYSIS

Store characteristics, including type of stores, number of cash registers, disability access, food assistance program participation, and store density (per 1,000 residents) were compared between stores located inside and outside the Latino neighborhood. For the assessment of availability, proportions of stores stocking nutritionally important foods were compared between the Latino and non-Latino neighborhoods. Pearson's chi-square test was used to assess the statistical significance of the differences in proportions. Additionally, for the assessment of affordability, the average prices of low-fat milk, high-fiber bread, and most commonly available seasonal fruits and vegetables were compared between the Latino and non-Latino stores. The unit price was converted to the price for the most common standardized volume, weight, or size for each item. Student's *t-test* was used to test the statistical significance of the differences. Statistical significance was determined at $p<0.05$ due to the small sample size and its reduced statistical power.

RESULTS

As illustrated in Table 1, characteristics of stores in the Latino neighborhood were generally less favorable compared to stores in the non-Latino neighborhood. In the Latino neighborhood, there were 4 grocery stores, 6 gas station convenience stores, and 3 other types including a drug store, a dollar store, and an antiques shop with a grocery section. There was no supermarket, and 12 out of 13 stores (92.3%) were small, with one or two cash registers. The non-Latino neighborhood had a total of 19 food stores, including four (21.1%) supermarkets (three regional chain supermarkets and one national superstore without a produce department). There were also seven gas station convenience stores, two farm produce stores, a grocery store and five other types including two drug stores, a natural food store, a meat shop, and a dollar store. Three stores (15.8%) in the neighborhood had more than five cash registers.

The disability access measures, including presence of off-street parking, handicap parking, curb cuts at entrance, automatic front door, and having all these four items, were also lower

in the Latino neighborhood stores. Although these differences were not statistically significant, it is important to point out that there was no store with all four disability access features in the Latino neighborhood, compared to five such stores in the non-Latino neighborhood.

The food assistance program participation was the only characteristic the Latino neighborhood stores that had a significantly higher rate. Ten stores (76.9%) participated in the food stamp program (SNAP) and three stores (23.1%) participated in the WIC program in this largely low-income neighborhood. In the non-Latino neighborhood, five (26.3%) were food stamp (SNAP) stores and three (15.8%) were WIC stores. There was no statistically significant difference in store density measured by the number of stores per 1,000 residents.

The analysis for the availability of nutritionally important foods had fewer clear-cut results. (Table 2) Significantly higher proportions of stores in the Latino neighborhood stocked dark or orange-colored vegetables (61.5% vs 26.3%). Fresh fruits were also more available in the Latino neighborhood stores (46.2% vs 26.3%). High-fiber bread, in contrast, had very low availability in the Latino neighborhood stores, with only one store stocking this item (7.7%). Seven stores (36.8%) in the non-Latino neighborhood had high-fiber bread. The availability of low-fat milk and fish fillets was similar between the two neighborhoods.

In terms of affordability, there were significant differences between the stores in two neighborhoods, with the Latino neighborhood stores generally having higher average prices (Table 3). The most notable price difference was high-fiber bread, where the standard 24 ounce price was $3.89 in the Latino neighborhood store and $2.72 in the non-Latino neighborhood stores. Prices of fresh produce items were also higher in the Latino neighborhood stores except tomatoes: Both apple (39 cents vs 28 cents) and cucumber (54 cents vs 39 cents) had significant price differences. Prices of milk were similar between the two neighborhoods.

The spatial distribution and physical distances of types of stores are visualized using GIS mapping (Figure 1). The distance of 0.8km (1/2 mile), which equals 15 minutes walk, is considered as the maximum that a pedestrian would be willing to travel to stores to obtain groceries (Algert, Agawal & Lewis, 2006) . In this study all supermarkets were located approximately 2 miles north of the center of the Latino neighborhood, four times the maximum distance tolerated by pedestrian grocery shoppers.

DISCUSSION

The on-site survey findings suggested that the Latino neighborhood had limited availability and a high cost (low affordability) for high-fiber bread. In addition, fresh fruits and vegetables were more available in the Latino neighborhood, but their prices were generally higher. The higher prices of fresh produce items in the Latino neighborhood appeared to be from the lack of large-volume retailers. Pricing of fresh produce is very complex, and only large-volume chain stores can offer low prices by spreading the overhead costs of fresh produce in other merchandise (McLaughlin, 2004). Fruits and vegetables are main ingredients of traditional Latino cuisines, and a demand to these products can be high in the Latino neighborhood. But with higher prices of these items, Latinos with very limited income may not be able to maintain their traditional dietary habits and adopt the American diet which is characterized as high in fat and total calories and low in fiber.

There was no difference in availability of low-fat milk and fish fillets between communities. This could be an indication that Latino residents are aware of the nutritional benefits of these products and purchase them regularly at the rate similar to non-Latino residents. The very

low availability of high-fiber bread in the Latino neighborhood may be due to their cultural preference towards white bread or other types of starches such as rice.

Food purchasing also can be influenced by disability access. In this study, the Latino neighborhood had no food stores with all four disability access features, while non-Latino neighborhood had five. According to a published study, access concerns exist for individuals in wheelchairs when visiting shopping centers: These facilities were not 100% compliant according to the American with Disabilities Act, 1990 (McClain, 2000). The Latino neighborhood residents with physical disabilities or debilitating chronic illness were likely to encounter difficulties accessing food stores in their own community due to a lack of stores with disability access features.

The high rate of participation in the (SNAP) and WIC programs among stores in the Latino neighborhood may provide some financial relief to its low-income residents. Based on our findings, many stores in the Latino community participated in food assistance programs. At the time of this study, however, WIC program did not include fresh fruits and vegetables in its food plan. Furthermore, a study reported that even among food stamp recipients, increased consumption of fruit and vegetables was associated with the closeness to a supermarket (Laraia, Siega-Riz, Kaufman & Jones, 2004).

The presence of a supermarket within the low-income neighborhood is crucial for improving dietary behavior and health outcomes in vulnerable populations; however, in our study all supermarkets were located outside the Latino neighborhood well beyond the pedestrian reach. Residents in the Latino neighborhood may experience difficulties reaching a supermarket if they lack personal transportation. Public transportation in this upstate community is very limited and buses usually ran on an as-needed basis where residents requiring transportation have to call a local number for pick-up. This potential transportation barrier could necessitate the residents to rely on neighborhood small stores that offer higher prices and fewer choices for some items. Research suggests that underresourced families' dietary consumption can be met with the existence of community gardens and neighborhood-based farmers' market (Armstrong, 2000), but our study found that these resources were nonexistent in the Latino neighborhood.

There were limitations in this study. First, the survey was a point-of-time, cross-sectional design, and it did not adjust for the variability of inventories caused by new delivery, reshelving, or sales. Food stores also come and go over time. Since 2004, a few large supermarkets opened in the non-Latino neighborhood, which may have contributed to widening disparities in food availability and affordability. Second, due to the lack of standardized field methodologies, we were not able to accurately measure quality of various kinds of foods. Third, we did not assess other staple foods (e.g., rice, plantains, empanadas) that are common in the Latino culture. Finally, prices of food items were not adjusted for the income levels of residents. The actual affordability of certain foods could be lower for Latino residents, whose income level was generally lower than residents in the non-Latino neighborhoods. It is also possible that food acquisition is influenced by other factors, such as Latino's attitudes regarding food shopping and preparation as affirmed in the Dubowitz et al (2007) study.

Additionally, there were some limitations with GIS in depicting certain spatial information. GIS may not show topographic features such as steep hills, surface conditions of streets, and volume and speed of traffic. Therefore, proximity to a store may not always mean access to the store for pedestrians.

Despite the limitations, the current study was able to objectively assess availability, affordability, and accessibility of nutritionally important foods by using a food store survey

and the application of GIS, and to highlight difficulties of obtaining affordable healthy foods in this low-income Latino neighborhood within a small city.

Implication

Residents of low-income neighborhoods tend to have limited options in nutritionally important foods, and pay higher food prices. In this study we were able to directly measure and compare indicators for availability, affordability, and accessibility of food resources in Latino and non-Latino neighborhoods in a small city, and illustrate spatial distribution of food stores on the map using GIS techniques. Future research should apply these methodologies with other low-income communities to objectively assess food environment and formulate health promotion interventions.

REFERENCES

Acevedo-Garcia D. Zip-code level risk factors for tuberculosis neighbourhood environment and residential segregation in New Jersey, 1985–1992. American Journal of Public Health. 2001; 91:734–741. [PubMed: 11344881]

Algert SJ, Agrawal A, Lewis DS. Disparities in access to fresh produce in low-income neighborhoods in Los Angeles. American Journal o Preventive Medicine. 2006; 30(5):365–370.

Armstrong D. A survey of community gardens in Upstate New York: Implications for health promotion and community development. Health & Place. 2000; 6:319–327. [PubMed: 11027957]

Baker EA, Schootman M, Barnidge E, Kelly C. The role of race and poverty in access to foods that enable individuals to adhere to dietary guidelines. Preventing Chronic Disease. 2006; 3(3):1–11.

Cayo MR, Talbot TO. Positional error in automated geocoding of residential addresses. International Journal of Health Geographics. 2003 Dec. 19.2(1):10. [PubMed: 14687425]

Curtis KA, McClellan S. Falling through the safety net: poverty, food assistance and shopping constraints in an American city. Urban Anthropology. 1995; 24:93–135.

Dubowitz T, Acevedo-Garcia D, Salkeld J, Lindsay AC, Subramanian SV, Peterson KE. Lifecourse, immigrant status and acculturation in food purchasing and preparation among low-income mothers. Public Health Nutrition. 2007; 10(4):396–404. [PubMed: 17362536]

Galvez MP, Morland K, Raines C, et al. Race and food store availability in an inner-city neighborhood. Public Health Nutrition. 2008; 15:1–8.

Gaffney HS, Curriero FC, Strickland PT, Glass GE, Helzlsouer KJ, Breysse PN. Influence of geographic location in modeling blood pesticide levels in a community surrounding a U.S. Environmental Protection Agency Superfund site. Environmental Health Perspectives. 2005; 113(12):1712–1716. [PubMed: 16330352]

Horowitz C, Colson KA, Hebert PL, Lancaster K. Barriers to buying healthy foods for people with diabetes: evidence of environmental disparities. American Journal of Public Health. 2004; 94:1549–1554. [PubMed: 15333313]

Hosler AS, Varadarajulu D, Ronsani AE, Fredrick BL, Fisher BD. Low-fat milk and high-fiber bread availability in food stores in urban and rural communities. Journal of Public Health Management and Practice. 2006; 12:556–562. [PubMed: 17041304]

Hosler AS, Rajulu D, Fredrick BL, Ronsani AE. Assessing retail fruit and vegetable availability in urban and rural underserved communities. Preventing Chronic Disease. 2008; 5(4):A123. [PubMed: 18793511]

Kaufman, L.; Karpati, A. Food matters: What Bushwick females' food habits teach us about childhood obesity. New York, NY: New York City Department of Health and Mental Hygiene; 2007.

Laraia BA, Siega-Riz AM, Kaufman JS, Jones SJ. Proximity of supermarkets is positively associated with diet quality index for pregnancy. Preventive Medicine. 2004; 39:869–875. [PubMed: 15475018]

McClain L. Shopping center wheelchair accessibility: ongoing advocacy to implement the American with Disabilities Act of 1990. Public Health Nursing. 2000; 17(3):178–186. [PubMed: 10840287]

McLaughlin EW. The dynamics of fresh fruit and vegetable pricing in the supermarket channel. Preventive Medicine. 2004; 39:S81–S87. [PubMed: 15313076]

Moreland K, Wing S, Diez-Roux A. The contextual effect of the local food environment on residents' diet: the atherosclerosis risk in communities study. American Journal of Public Health. 2002; 92:1761–1767. [PubMed: 12406805]

Morland K, Wing S, Diez-Roux A, Poole C. Neighborhood characteristics associated with the location of food stores and food service places. American Journal of Preventive Medicine. 2002; 22(1):23–29. [PubMed: 11777675]

National Council of La Raza (NCLR). [retrieved August 4, 2008] Significant food insecurity in Latino community can be stemmed by strengthening food assistance programs, [report]. 2006. available at: http://www.nclr.org/content/news/detail/43414/

Pearce J, Witten K, Bartie P. Neighbourhoods and health: a GIS approach to measuring community resource accessibility. Journal of Epidemiology and Community Health. 2006; 60:389–395. [PubMed: 16614327]

Powell LM, Slater S, Mirtcheva D, Bao Y, Chaloupka FJ. Food store availability and neighborhood characteristics in the United States. Preventive Medicine. 2007; 44(3):189–195. [PubMed: 16997358]

Osypuk TL, Roux AV, Hadley C, Kandula NR. Are immigrant enclaves healthy places to live? The Multi-ethnic Study of Atherosclerosis. Social Science & Medicine. 2009; 69(1):110–120. [PubMed: 19427731]

Rose D, Richards R. Food store access and household fruit and vegetable use among participants in the US Food Stamp Program. Public Health Nutrition. 2004; 7 1081-0188.

Schlundt DG, Hargreaves MK, McClellan L. Geographic clustering of obesity, diabetes, and hypertension in Nashville, Tennessee. Journal of Ambulatory Care Management. 2006; 29(2):125–132. [PubMed: 16552321]

Sharkey JR, Horel S. Neighborhood socioeconomic deprivation and minority composition are associated with better potential spatial access to the ground-truthed food environment in a large rural area. The Journal of Nutrition. 2008; 138:620–627. [PubMed: 18287376]

Sheldon M, Gans KM, Tai R, George T, Lawson E, Pearlman DN. Availability, affordability, and accessibility of a healthful diet in a low-income community, Central Falls, Rhode Island, 2007–2008. Preventing Chronic Disease. 2010 7 Mar/08_0257.

Sloane DC, Diamant AL, Lewis LB, et al. (for the REACH Coalition of the African American Building a Legacy of Health Project.). Improving the nutritional resource environment for healthy living through community-based participatory research. Journal of General Internal Medicine. 2003; 18:568–575. [PubMed: 12848840]

U. S. Bureau of the Census. [Retrieved September 5, 2008] Hispanic population in the United States: 1970 to 2050 [online]. 2000a. available at: http://www.census.gov/population

U. S. Bureau of the Census. [retrieved September 5, 2008] Fact Sheet: Amsterdam City, New York, NY [online]. 2000b. available at: http:www.factfinder.census.gov

U.S. Department of Health and Human Services and U.S. Department of Agriculture. The Dietary Guidelines for Americans, 2005. 6th ed.. Washington, DC: U.S. Government Printing Office; 2005.

U.S. Department of Health and Human Services. Healthy People 2010 (conference ed., in 2 vols). Washington, DC: U.S. Department of Health and Human Services; 2000.

Zenk SN, Schulz AJ, Israel BA, James SA, Bao S, Wilson ML. Neighborhood racial composition, neighborhood poverty, and the spatial accessibility of supermarkets in Metropolitan Detroit. American Journal of Public Health. 2005; 95:660–667. [PubMed: 15798127]

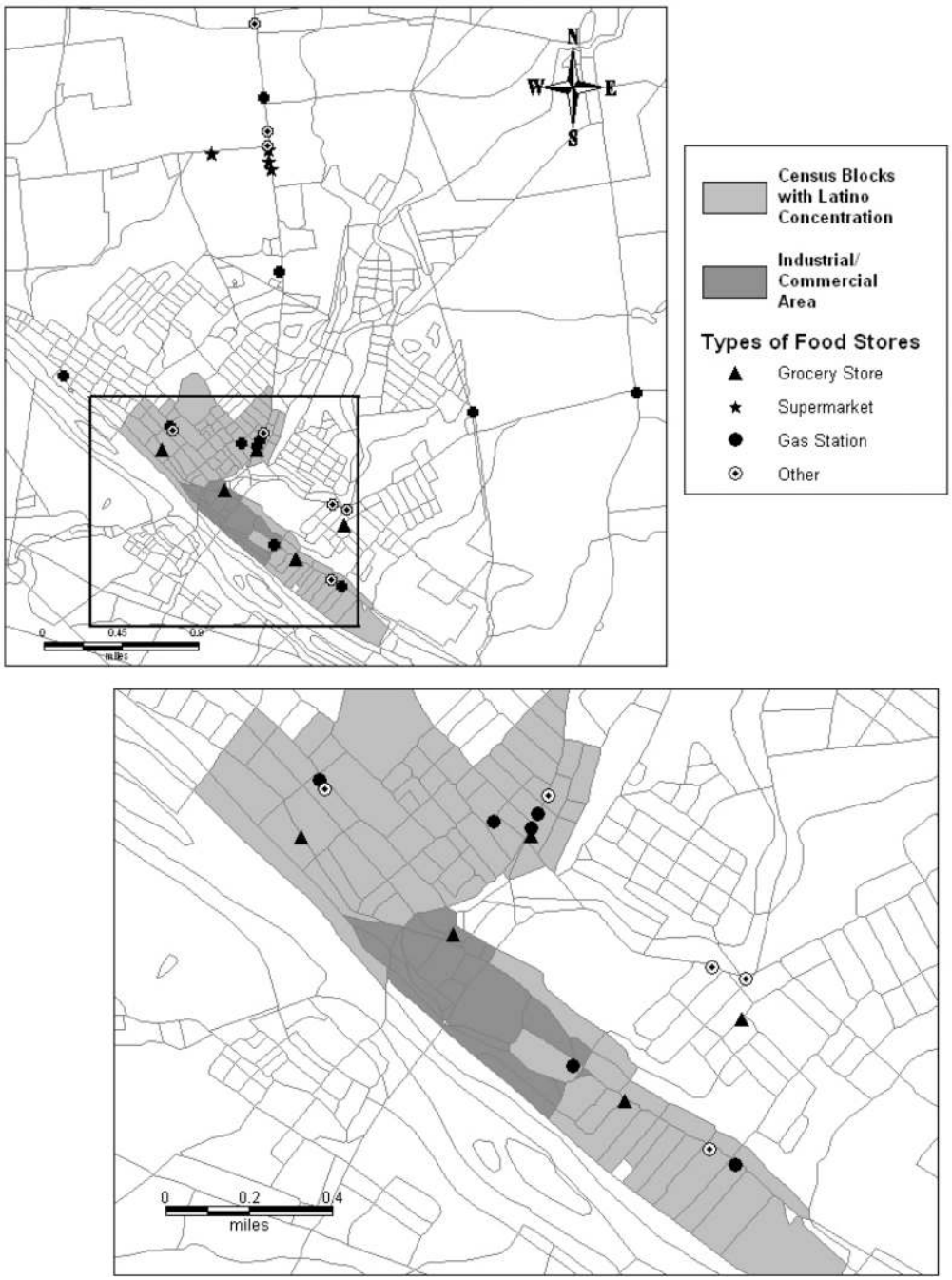

Figure 1.
Visual representation of the types of stores in an upstate New York community

Table 1

Comparison of food store characteristics: Latino and non-Latino neighborhoods

	Latino neighborhood N (%)	**Non-Latino neighborhood N (%)**	**P-value**
Type of store			0.046
Supermarket	0	4 (21.1)	
Grocery store	4 (30.8)	1 (5.3)	
Farm produce store	0	2 (10.5)	
Gas station convenience	6 (46.2)	7 (36.8)	
Other*	3 (23.0)	5 (26.4)	
Number of cash registers			0.128
1–2	12 (92.3)	13 (68.4)	
3–4	1 (7.7)	3 (15.8)	
5 or more	0	3 (15.8)	
Disability access			
Off-street parking	10 (76.9)	18 (94.7)	0.135
Marked handicap parking	6 (46.2)	10 (52.6)	0.719
Curb cuts at entrance	9 (69.2)	15 (78.9)	0.533
Automatic front door	1 (7.7)	5 (26.3)	0.185
Have all four access items	0 (0.0)	5 (26.3)	0.129
Food assistance program			
Food stamp (SNAP)**	10 (76.9)	5 (26.3)	0.005
WIC	3 (23.1)	3 (15.8)	0.604
Total number of stores	13	19	
Number of stores per 1,000 residents	7.6	5.9	0.479

*Includes drug store, “dollar” discount store, natural food store, meat shop and an antiques store with a grocery section.

**Supplemental Nutrition Assistance Program

Table 2

Comparison of the availability of selected food items: Latino and non-Latino neighborhoods

	Latino neighborhood N (%)	**Non-Latino neighborhood N (%)**	**P-value**
Low-fat (≤1%) milk, any size	8 (61.5)	13 (68.4)	0.687
High-fiber (≥2g per slice) bread	1 (7.7)	7 (36.8)	0.049
Fresh fruit	6 (46.2)	5 (26.3)	0.246
Dark green or orange colored vegetable	8 (61.5)	5 (26.3)	0.046
Fish fillets, fresh or frozen	4 (30.8)	6 (31.6)	0.961

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Table 3

Comparison of the average prices of selected nutritionally-important foods: Latino and non-Latino neighborhoods (in U.S. Dollars)

	Latino neighborhood		**Non-Latino neighborhood**		
	Range ($)	**Mean ($) (SD)**	**Range**	**Mean ($) (SD)**	**P-value**
Low-fat (≤1%) milk, quart	0.95 – 1.29	1.08 (0.16)	0.80 – 0.99	0.93 (0.09)	0.081
Low-fat (≤1%) milk, ½ gallon	1.09 – 1.75	1.51 (0.19)	1.29 – 1.99	1.54 (0.20)	0.746
Low-fat (≤1%) milk, gallon	1.99 – 2.79	2.59 (0.40)	2.25 – 2.99	2.62 (0.31)	0.888
High-fiber bread (≥2g per slice) bread, 24oz	3.89	3.89 (n/a)	1.44 – 3.84	2.72 (0.94)	0.028
Orange, medium	0.33 – 0.75	0.54 (0.18)	0.32 – 0.50	0.43 (0.09)	0.267
Apple, medium	0.30 – 0.49	0.39 (0.07)	0.15 – 0.36	0.28 (0.08)	0.038
Cucumber, medium	0.49 – 0.59	0.54 (0.05)	0.33 – 0.49	0.39 (0.09)	0.041
Tomato, medium	0.11 – 0.40	0.33 (0.11)	0.24 – 0.99	0.51 (0.29)	0.315