
Neighborhood Characteristics Associated with the Location of Food Stores and Food Service Places

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Background: Although the relationship between diet and disease is well established, sustainable dietary changes that would affect risk for disease have been difficult to achieve. Whereas individual factors are traditional explanations for the inability of some people to change dietary habits, little research has investigated how the physical availability of healthy foods affects individuals' diets. This study examines the distribution of food stores and food service places by neighborhood wealth and racial segregation.

Methods: Names and addresses of places to buy food in Mississippi, North Carolina, Maryland, and Minnesota were obtained from respective departments of health and agriculture. Addresses were geocoded to census tracts. Median house values were used to estimate neighborhood wealth, while the proportion of black residents was used to measure neighborhood racial segregation.

Results: Compared to the poorest neighborhoods, large numbers of supermarkets and gas stations with convenience stores are located in wealthier neighborhoods. There are 3 times fewer places to consume alcoholic beverages in the wealthiest compared to the poorest neighborhoods (prevalence ratio [PR]=0.3, 95% confidence interval [CI]=0.1–0.6). Regarding neighborhood segregation, there are 4 times more supermarkets located in white neighborhoods compared to black neighborhoods (PR=4.3, 95% CI=1.5–12.5).

Conclusions: Without access to supermarkets, which offer a wide variety of foods at lower prices, poor and minority communities may not have equal access to the variety of healthy food choices available to nonminority and wealthy communities.

Medical Subject Headings (MeSH): diet, food, minority groups, prejudice, residence characteristics (Am J Prev Med 2002;22(1):23–29) © 2001 American Journal of Preventive Medicine

Introduction

A growing number of articles in the medical literature indicate that individuals' health and behaviors are affected by their social and physical surroundings.^{1–6} More than a decade ago, medical geographers found that physical proximity to a doctor or medical facility affected utilization of healthcare resources.⁷ More recently, investigators in Canada found that in areas in which the number of places selling wine had increased, wine consumption by residents had also increased.⁸

The role that diet plays in the causation and preven-

tion of heart disease has been studied for several decades. The relationship among serum cholesterol, high- and low-density lipoproteins, and heart disease has led researchers to suggest that the amount and type of fat consumed may influence risk for cardiovascular disease.⁹ Although the mechanisms by which foods and nutrients interact to affect cardiovascular disease risk is not well understood, recommendations for the prevention of cardiovascular disease include diets low in fat and sodium, as well as diets high in fiber, fruits, and vegetables.^{10,11}

People's ability to meet these recommendations for a healthy diet has been a concern of public health researchers and practitioners for many years. Many intervention studies that focused on individuals' behavior did not result in long-term dietary changes that would affect risk for cardiovascular disease.^{12–14} Dietary choices may be influenced by a variety of factors, such as taste, nutrition, weight control, convenience, and cost.¹⁵

Some studies show that cost is the most significant predictor of dietary choices, making healthy eating

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habits difficult to achieve for the poor.^{16–18} Research indicates that low-income people generally cannot afford healthier foods.¹⁹ Other research suggests that food costs more for people of low socioeconomic status because purchases are made in smaller quantities and there is more reliance on processed food. It has been shown that urban dwellers pay 3% to 37% more for groceries in their local community compared to suburban residents who buy the same goods at large supermarkets.²⁰ Such findings led researchers to speculate that the migration of supermarkets to suburbs and the lack of transportation available to low-income communities are contributing to malnutrition among the poor.^{21,22} Other studies concur with these findings, reporting that because of the sharp decline of supermarkets in low-income areas, residents are forced to depend on small stores with limited selections of foods at substantially higher prices.²³

Although the cost of food is an important barrier, fewer studies have attempted to address locality as a factor that may hinder people's ability to achieve a healthy diet. A study that compared supermarkets, neighborhood groceries, convenience stores (such as 7-Elevens), and health food stores in San Diego, California, found that supermarkets had twice the average number of "heart-healthy" foods compared to neighborhood grocery stores and 4 times the average number of such foods compared to convenience stores.²⁴ Another study conducted in Australia found that an equal proportion of all income groups shopped at large supermarkets exclusively. However, the lowest socioeconomic group studied was least likely to have private vehicles to use for food shopping, making the location of food stores more critical for the poor.²⁵

The impact that the location of food stores and food service has on individuals' diets remains unclear. The few studies that have addressed locality have not investigated the similarity of the number and types of food stores and food service places in American neighborhoods. Therefore, this study describes the prevalence of places where people can obtain food in their neighborhoods. In addition, we test the hypotheses that fewer supermarkets and more corner markets are located in low-wealth neighborhoods compared to higher-wealth neighborhoods.

In addition to neighborhood wealth, residential racial and ethnic segregation are structural features of U.S. society.²⁶ Black Americans face barriers that prevent residential mobility at all income levels, resulting in racially distinct neighborhoods. For this reason, we also investigated whether the prevalence of food stores and food service places is associated with the proportion of black residents. We tested the hypothesis that fewer supermarkets and more corner markets are located in predominately black neighborhoods compared to racially mixed or predominately white neighborhoods.

Methods

Because U.S. census data for 2000 had not yet been released, 221 census tracts defined in the 1990 census were used as proxies for neighborhoods in the following areas: Jackson City, Mississippi; Forsyth County, North Carolina; Washington County, Maryland; and selected suburbs of Minneapolis, Minnesota (Brooklyn Center, Brooklyn Park, Crystal, Golden Valley, New Hope, Plymouth, and Robbinsdale). This research is ancillary to the Atherosclerosis Risk in Communities (ARIC) study, an ongoing study of atherosclerosis based on sample populations from these areas.²⁷ Census tracts with ten or fewer housing units were excluded. Of the remaining 216 tracts, 56 were located in Mississippi, 78 in North Carolina, 28 in Maryland, and 54 in Minnesota.

Housing, transportation, and demographic characteristics of census tracts were obtained from the 1990 Census of Population and Housing Summary Tape Files 3A.²⁸ Block group data were summed for each census tract within places.

Measurement of the Local Food Environment

Business addresses of places where people can buy food were collected from the local departments of environmental health and state departments of agriculture. Of the 3987 business addresses obtained, 99.5% (3969) were geocoded to census tracts. Eighty businesses were excluded because the census tract for that business did not fall within the geographic boundaries of the study areas or the census tract had been excluded. Finally, 548 duplicate records were deleted, resulting in 3341 businesses where people can obtain food in the four study areas (Mississippi, 871; North Carolina, 1492; Maryland, 417; and Minnesota, 561).

Defining the Type of Food Store and Food Service Place

The 1997 North America Industry Classification System (NAICS) codes and definitions were modified to describe the types of food stores and food service places located in each census tract (Table 1).²⁹ For instance, within the "food and beverage stores" subsector, supermarkets are not distinguished from other grocery stores. Since supermarkets have been found to have the most healthy food items²⁴ at lower prices,²³ it is important to distinguish supermarkets from smaller food stores. Therefore, supermarkets were defined as large, corporate-owned "chain" stores (e.g., Food Lion, Albertsons, Harris Teeter, Kroger, and Piggly Wiggly), whereas grocery stores were defined as smaller noncorporate-owned food stores. In addition, because convenience stores attached to gas stations contribute to the local food environment, we added this category to the food and beverage stores subsector. All specialty food stores (e.g., meat markets and fruit/vegetable markets) were grouped together. In addition, within the NAICS subsector of "food service and drinking places," cafeterias were grouped with full-service restaurants. Franchised fast-food restaurants were not distinguished from other limited-service restaurants; however, because these establishments may offer different foods than those available at other limited-service restaurants, this food service category was added. Carryout eating places (e.g., delicatessens, and bagel or sandwich shops) sell fast food but are not franchised

Table 1. North America Industry Classification System (NAICS) codes and examples of food stores and food service places

Industry group	1997 NAICS definitions	NAICS index	Examples
Supermarkets	445110 Supermarkets and other grocery (except convenience) stores	445110 Supermarkets	Food Lion, Albertson's, Kroger, Piggly Wiggly, Safeway
Grocery stores	445110 Supermarkets and other grocery (except convenience) stores	445110 Grocery stores 445110 Food stores	Beatty Street Grocery, Arkady's Market, West Side Market, Potomac Grocery, JC Morris Grocery, Ken's Grocery
Convenience stores	445120 Convenience stores	445120 Convenience stores	7-Eleven, 4 Brothers Convenience Store
Convenience stores with gas stations	447110 Gasoline stations with convenience stores	447110 Gasoline stations with convenience stores	Amoco, Chevron, Shell, Texaco, Sunoco, BP, Citgo, Mobile, Conoco, Exxon, Phillips 66
Specialty food stores	4452 Specialty food stores	445210 Meat markets 445220 Fish markets 445230 Fruit/vegetable markets 445291 Baked goods 445292 Confectionery/nut stores 445299 All other	Davis's Meat Market, Boonsboro Produce Market, Asia Market, 66 Produce, Holsinger's Meat Market, Baron's Gourmet, Valley Street Fish
Full-service restaurants	722110 Full-service restaurants	722110 Restaurants, full service 722110 Steak houses 722110 Pizzerias, full service 722110 Fine dining restaurants 722110 Family restaurants 722110 Diners, full service 722212 Cafeterias	Applebee's, Baker's Square, Benihana, Bennigan's, Bonsai Japanese Steakhouse, The Thai House, Ruby Tuesday, View Street Diner
Fast-food restaurants	722211 Limited-service restaurants	722211 Fast-food restaurants 722211 Pizza parlor, limited service 722211 Pizza delivery shops	Arby's, Biscuitville, Bojangles, Burger King, Domino's, Blimpies, McDonald's, Wendy's, Krystal
Carryout eating places	722211 Limited-service restaurants	722211 Delicatessens 722211 Sandwich shops 722110 Bagel shops, full service	Carla's Deli, Harle's Subs, Silver Streak Sub & Deli, Bagel-Lisious, Mr. George's Sandwich World, Country Deli
Carryout specialty items	722213 Snack and nonalcoholic beverage bars	722213 Beverage (e.g., coffee) bars (nonalcoholic) 722213 Doughnut shops 722213 Ice cream parlors 722213 Pretzel shops	Baskin Robbins, Colonial Bakery Store, Papa Vic's Gelato, Monroe's Donuts, Smoothie King, TCBY Yogurt, Dunkin', Donuts, Starbuck's Coffee, Gloria Jean's Coffee, Fanny Farmer's Candies
Bars and taverns	72241 Drinking places (alcoholic beverages)	722410 Alcoholic beverage drinking places	McBare's Pub, South End Tavern, Club City Lights, Eddie's Disco, Sportsmen's Den, Funktown Tavern

fast-food places. Specialty carryout eating places (e.g., smoothie shops and espresso bars) specialize in only one type of food. Each business was assigned to only one industry group.

Sixty-one percent (2058) of the businesses were assigned an industry code based on name recognition. An additional 970 (29%) industry codes were assigned using the category assigned to the business in the *Yellow Pages*.³⁰ Ten percent of the businesses had undefined industry codes and were excluded from the analysis.

We were interested in the availability of food stores and food service places through local, routine sources. Therefore, churches, community groups, hospitals, schools, and

nursing homes (395) were excluded. Department stores (85) and places that exist primarily for entertainment (56), such as bowling alleys, may offer food that resembles carryout food. However, these places were also excluded because it is assumed that few people rely on these places for a significant portion of their diet. Catering businesses (41) were also excluded since they are not places where people regularly obtain food. Finally, liquor stores (14) were excluded because data collection was incomplete. Based on these criteria, an additional 591 businesses were excluded from the analysis.

Our analysis was based on 2437 food stores and food service places in the 216 census tracts. Of these, 609 were located in

Table 2. Housing and demographic characteristics of census tracts by neighborhood wealth category

Characteristics	Neighborhood wealth				
	Low (n=44)	Low-medium (n=43)	Medium (n=42)	High-medium (n=43)	High (n=44)
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Population	2772 (1147)	3745 (1448)	4280 (1609)	3868 (1762)	4224 (1613)
Area (sq Km)	8 (22)	7 (12)	19 (33)	15 (21)	20 (31)
Population density (persons/sq Km)	1456 (1012)	1335 (1044)	895 (703)	588 (458)	619 (479)
Number of single family homes	1169 (467)	1578 (630)	1716 (576)	1642 (800)	1687 (618)
Percentage of residents who are renters	0.46 (0.20)	0.41 (0.20)	0.29 (0.14)	0.30 (0.20)	0.22 (0.15)
Percentage of residents who are black Americans	0.53 (0.42)	0.36 (0.38)	0.18 (0.29)	0.13 (0.21)	0.06 (0.14)
Percentage of households without a vehicle					
White	0.19 (0.24)	0.17 (0.22)	0.06 (0.05)	0.05 (0.06)	0.03 (0.04)
Black	0.32 (0.26)	0.20 (0.17)	0.11 (0.19)	0.10 (0.13)	0.06 (0.11)

Mississippi, 1192 in North Carolina, 315 in Maryland, and 321 in Minnesota.

Neighborhood Wealth and Racial Segregation

The median value for homes in each census tract was used as a measure of neighborhood wealth. We expected the wealth of the environment to be associated with the location of food stores and restaurants; therefore, we used home values to measure neighborhood wealth, instead of income, which is a measurement of individual wealth. The mean and range of home values varied by ARIC location, with Minnesota having the highest home values and Mississippi having the lowest (data not shown). Therefore, site-specific quintiles of wealth were averaged to create a measure of relative wealth. For instance, the lowest wealth category contains 44 census tracts (12 in Mississippi, 15 in North Carolina, 6 in Maryland, and 11 in Minnesota), representing the lowest home values for each of those areas.

The proportion of black residents also varies by ARIC location. The analysis of neighborhood racial segregation was limited to North Carolina and Mississippi because <5% of residents in Maryland or Minnesota were black. The proportion of black residents within each census tract was used to define categories of segregation. Census tracts with >80% black residents were defined as predominantly black (35 tracts). Census tracts with <20% black residents were defined as predominately white (69 tracts), and racially mixed census tracts as 20% to 80% black residents (30 tracts). Few people of racial groups other than black and white live in these locations (data not shown).

Statistical Analysis

Because the dependent variable is expressed as count data, Poisson regressions were used to evaluate the relationship between the number of stores (dependent variable) and neighborhood wealth and racial composition (independent variables).³¹ The Poisson models were not overdispersed. Because the number of stores tended to be higher in more densely populated areas, a linear term for population density (persons/km²) was included in separate models that focus on the effects of neighborhood wealth and racial segregation,

which were represented as indicator variables corresponding to the categories described above. Indicator variables for each ARIC location were used to adjust for geographic difference. Prevalence of food stores (number of food stores/number of census tracts), adjusted prevalence ratios, and 95% confidence intervals (CIs) were calculated from regression coefficients using the lowest level of each dependent variable as the referent. All statistics were calculated using SAS GENMOD procedure.³²

Results

The means and standard deviations of census tract characteristics by neighborhood wealth are shown in Table 2. On average, the lower-wealth groups contain the fewest people, and the areas of these tracts are the smallest. Nevertheless, the population density of the lowest wealth group is the highest. There are fewer housing units in low-wealth areas, and residents of the low-wealth neighborhoods are twice as likely to be renters than wealthy neighborhood residents. As the wealth of the neighborhoods decreases, the proportion of black residents increases, with over 8 times as many black Americans living in the lowest-wealth neighborhoods compared to the highest-wealth areas. Furthermore, the proportion of households without a car or truck available is also higher among black Americans, regardless of wealth.

The number of food stores or food service places, prevalence of food stores or food service places, and population density- and site adjusted-prevalence ratios by neighborhood wealth category are presented in Table 3. The types of food stores and food service places that exist in poor and wealthy neighborhoods are different. For instance, there are over 3 times as many supermarkets in the wealthier neighborhoods compared to the lowest-wealth areas. Convenience stores with gas stations are also more commonly found in wealthier areas, with the medium-wealth neighbor-

Table 3. Population density- and site adjusted-prevalence ratios of food stores and food service places by neighborhood wealth category

Industry group	Neighborhood wealth																			
	Low (n=44)			Low-medium (n=44)			Medium (n=41)			High-medium (n=43)			High (n=44)							
	n	P	PR	n	P	PR	n	P	PR	n	P	PR	n	P	PR					
Food stores																				
Supermarkets	7	0.16	1.0	22	0.50	2.8	2.2	6.7	20	0.49	2.6	1.1, 6.4	30	0.70	3.6	1.5, 8.7	27	0.61	3.3	1.4, 7.9
Grocery stores	45	1.02	1.0	38	0.86	0.9	0.6, 1.3	24	0.59	0.6	0.3, 0.9	25	0.58	0.6	0.3, 0.9	26	0.59	0.6	0.3, 0.9	
Convenience stores	25	0.57	1.0	27	0.61	1.1	0.7, 1.9	35	0.85	1.4	0.9, 2.4	27	0.63	1.0	0.6, 1.7	29	0.66	1.0	0.6, 1.8	
Convenience stores with gas stations	26	0.59	1.0	39	0.89	1.5	0.9, 2.5	53	1.29	2.0	1.2, 3.2	45	1.05	1.5	0.9, 2.5	37	0.84	1.2	0.7, 2.0	
Specialty food stores	11	0.25	1.0	10	0.23	0.9	0.4, 2.1	10	0.24	0.9	0.4, 2.1	6	0.14	0.5	0.2, 1.3	10	0.23	0.8	0.3, 1.9	
Food service																				
Full-service restaurants	149	3.39	1.0	197	4.48	1.2	1.0, 1.5	151	3.68	1.0	0.8, 1.2	194	4.51	1.2	0.9, 1.5	162	3.68	1.0	0.8, 1.2	
Fast-food restaurants	63	1.43	1.0	97	2.20	1.4	1.0, 1.9	91	2.22	1.3	0.9, 1.8	87	2.02	1.1	0.8, 1.5	70	1.59	0.9	0.6, 1.3	
Carryout eating places	26	0.59	1.0	44	1.00	1.7	1.0, 2.7	24	0.59	1.0	0.6, 1.8	41	0.95	1.6	0.9, 2.7	24	0.55	0.9	0.5, 1.7	
Carryout specialty items	17	0.39	1.0	29	0.66	1.6	0.9, 3.0	26	0.63	1.5	0.8, 2.7	36	0.84	1.8	1.0, 3.2	33	0.75	1.6	0.9, 3.0	
Bars/taverns	35	0.80	1.0	21	0.48	0.6	0.4, 1.0	22	0.54	0.7	0.4, 1.1	13	0.30	0.4	0.2, 0.7	11	0.25	0.3	0.1, 0.6	

CI, confidence interval; n, number of food stores or food service places; P, prevalence of food stores or food service places; PR, prevalence ratio.

hoods having the highest prevalence of these types of establishments. By contrast, the wealthier neighborhoods contain fewer small grocery stores, convenience stores (without gas stations), and specialty food stores compared to the lowest-wealth neighborhoods.

The most prevalent type of food service place is the full-service restaurant; on average three to four full-service restaurants are located in each neighborhood. Fast-food restaurants are more prevalent in the low-medium and medium-wealth neighborhoods and become less prevalent in the highest-wealth neighborhoods. Carryout specialty eating places are 50% to 80% more prevalent in wealthier neighborhoods. As wealth increases, the number of bars and taverns declines.

Regarding neighborhood racial segregation, supermarkets and specialty food stores are more common in racially mixed and predominately white neighborhoods (Table 4). The greatest difference is in the prevalence of supermarkets, which are 4 times more common in predominately white neighborhoods compared to predominately black neighborhoods. Smaller grocery stores, convenience stores, and convenience stores attached to gas stations are less common in predominately white neighborhoods. Mixed and predominately white neighborhoods are similar in the prevalence of food store types compared to predominately black neighborhoods. The only exception is convenience stores with gas stations, which are more prevalent in mixed neighborhoods than in predominately white or black neighborhoods.

Compared to predominately black neighborhoods, all food service places are more prevalent in racially mixed and predominately white neighborhoods, except bars and taverns, which are less common in white neighborhoods. Full-service restaurants are 2 times more prevalent in white neighborhoods and 3 times more prevalent in racially mixed neighborhoods. Fast-food restaurants and carryout eating places are twice as common in white and racially mixed neighborhoods. Carryout eating places serving specialty items are 9 to 11 times more prevalent in racially mixed and predominately white areas.

Discussion

This study shows that the locations of food stores and food service places are associated with the wealth and racial makeup of neighborhoods and, in the case of supermarkets and small corner grocery stores, this association is in the expected direction. Diez Roux et al.³³ found variation in the dietary intake of neighborhood residents living in the same geographic locations. Therefore, results of this study support previous research that suggests people's dietary choices may be influenced by the availability of food stores and food service places.

Our analysis did not take into account the similarity

Table 4. Population density- and site adjusted-prevalence ratios of food stores and food service places by neighborhood racial segregation category

Industry group	Neighborhood racial segregation										
	Predominately black (n=35)			Racially mixed (n=30)				Predominately white (n=69)			
	n	P	PR	n	P	PR	95% CI	n	P	PR	95% CI
Food stores											
Supermarkets	5	0.14	1.0	19	0.63	2.9	1.0, 8.6	68	0.99	4.3	1.5, 12.5
Grocery stores	44	1.26	1.0	27	0.90	0.8	0.4, 1.3	34	0.49	0.4	0.3, 0.7
Convenience stores	38	1.09	1.0	15	0.50	0.6	0.3, 1.1	21	0.30	0.4	0.2, 0.7
Convenience stores with gas stations	32	0.91	1.0	46	1.53	1.6	1.0, 2.6	69	1.00	1.0	0.6, 1.7
Specialty food stores	6	0.17	1.0	8	0.27	1.5	0.4, 5.2	13	0.19	1.1	0.3, 3.7
Food service											
Full-service restaurants	64	1.83	1.0	221	7.37	3.4	2.5, 4.7	374	5.42	2.4	1.8, 3.4
Fast-food restaurants	43	1.23	1.0	106	3.53	2.3	1.5, 3.4	163	2.36	1.5	1.0, 2.2
Carryout eating places	14	0.40	1.0	43	1.43	2.7	1.4, 5.4	76	1.10	2.0	1.0, 4.0
Carryout specialty items	4	0.11	1.0	23	0.77	8.9	2.8, 29.0	62	0.90	11.0	3.4, 39.2
Bars/taverns	17	0.49	1.0	23	0.77	1.7	0.8, 3.5	24	0.35	0.8	0.4, 1.7

CI, confidence interval; n, number of food stores or food service places; P, prevalence of food stores or food service places; PR, prevalence ratio.

of characteristics shared by neighboring census tracts, sometimes referred to as spatial autocorrelation. The clustering of census tracts along lines of race, ethnicity and wealth means that the local food environment can be characterized at larger spatial scales. Information on membership of census tracts in larger neighborhood aggregations similar to the aggregation of census block groups into tracts was not available for this analysis. However, to the extent that census tracts with and without supermarkets are located in clusters of tracts with similar food environments, the impact of the presence or absence of supermarkets on residents was underestimated in our analysis because residents of tracts without supermarkets have access to few supermarkets in adjoining tracts, while residents of tracts with supermarkets have access to additional supermarkets in neighboring tracts.

Racial and wealth segregation remain prominent characteristics of U.S. neighborhoods even though the Fair Housing Act of 1968 prohibits racial discrimination in housing.³⁴ The Fair Housing Act does not govern the placement of food stores or restaurants by private industry. These environmental factors have not been traditionally considered as explanations for individuals' dietary choices. Our findings suggest that some people may be disadvantaged in terms of food availability within their local food environment. For example, five supermarkets are located in 35 predominately black neighborhoods to provide service for nearly 118,000 people. In contrast, there are 68 supermarkets to serve 259,500 residents of predominately white neighborhoods. The ratio of supermarkets to residents for the predominately white areas is 1:3816 versus 1:23,582 for predominately black neighborhoods. Our findings that supermarkets are more prevalent in predominately white and wealthy neighborhoods, while

small corner grocery stores are located in black and poor neighborhoods, support findings by previous researchers.²¹⁻²³

In addition, our results show that fewer households in poor and black neighborhoods have access to private transportation, which support findings by Turrel et al.²⁵ and suggest that residents of these neighborhoods have greater difficulty obtaining healthy food. The choices people make about what to eat are limited by the food available to them.³⁵ The lack of private transportation and supermarkets in low-wealth and predominately black neighborhoods suggests that residents of these neighborhoods may be at a disadvantage when attempting to achieve a healthy diet.

Our findings underscore the importance of including characteristics of individuals' local food environments into future studies to gain a better understanding of barriers to healthy eating. The retail sector has been affected by economic policies that support corporate retail chains, public- and private-sector loan policies that favor home ownership for whites, and land-use policies that facilitate development of predominately wealthy and white suburban neighborhoods.²⁶ These economic trends, from which the race and class patterns of the local food environment observed in our study might be predicted, suggest that creation of more egalitarian local food environments will require fundamental changes in local, state, and national economic and land-use policies.

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