The Neighborhood Food Resource Environment and the Health of Residents with Chronic Conditions

The Food Resource Environment and the Health of Residents

Arleen F. Brown, MD, PhD¹, Roberto B. Vargas, MD, MSPH^{1,2}, Alfonso Ang, PhD¹, and Anne R. Pebley, PhD^{2,3}

¹ UCLA Division of General Internal Medicine and Health Services Research, Los Angeles, CA, USA; ² RAND, Santa Monica, CA, USA; ³ Division of Community Health Sciences, UCLA School of Public Health, Los Angeles, CA, USA.

BACKGROUND: Residence in disadvantaged neighborhoods is associated with poorer access to healthy foods.

OBJECTIVE: To understand associations between the neighborhood food resource environment and residents' health status and body mass index (BMI) for adults with and without chronic conditions.

DESIGN: Cross-sectional multilevel analysis.

PARTICIPANTS: 2,536 adults from the 2000–2001 Los Angeles Family and Neighborhood Survey.

MEASUREMENTS: The food resource environment was defined as the number of chain supermarkets, independent supermarkets, small markets, or convenience stores per roadway miles in the census tract. The main dependent variables were self-rated health, dichotomized as excellent or fair/poor, and body mass index (BMI). Multilevel regression models examined the association between the food resource environment and both BMI and the odds of reporting excellent health after adjustment for neighborhood SES and individual characteristics.

RESULTS: More chain supermarkets per roadway mile in a census tract was associated with higher adjusted rates of reporting excellent health (33%, 38%, and 43% for those in the lowest, middle, and highest tertiles of chain supermarkets) and lower adjusted mean BMI (27, 26, and 25 kg/m²) for residents without a chronic condition, but not those with a chronic condition. In contrast, having more convenience stores per roadway mile was associated with lower health ratings only among adults with a chronic condition (39%, 32%, and 27% for the lowest to highest tertile of convenience stores).

CONCLUSION: Health status and BMI are associated with the local food environment, but the associations differ by type of market and presence of a chronic condition.

KEY WORDS: chronic diseases; community health; health status.

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There is growing evidence that the food resource environment, defined here as the number and type of food stores in an area, may influence health behaviors and outcomes. Several recent studies indicate that barriers to healthy eating are greater in economically disadvantaged areas than in wealthier neighborhoods^{1–8}, and there is evidence that the types of food stores available vary by neighborhood characteristics^{9,10}. Low-income communities have one third to one half the number of supermarkets found in more affluent neighborhoods, but twice as many small markets or grocery stores^{10–12}. Supermarkets generally have a broader selection of items, are more likely to carry healthy items, and charge lower prices than smaller stores¹³. Consequently, residents of low income areas must often purchase food in stores that stock fewer healthy options¹⁴ but at higher prices^{13,15–17} than those who live in more advantaged areas. The local food environment may also influence the eating patterns and weight of residents^{10,12,18–23}.

The food resource environment may be a particularly salient neighborhood feature for residents with chronic conditions. Appropriate management of conditions such as diabetes, hypertension, asthma, osteoarthritis, and heart disease often involves complex self-care regimens that require both clinical and community support²⁴. There is increasing recognition that adhering to dietary recommendations can be extremely difficult in some communities and facilitated in other neighborhood settings. For example, access to foods recommended for adults with diabetes mellitus and cardiovascular disease, e.g., fresh fruits and vegetables, whole grains, diet sodas, and low-fat milk, is limited in low-income and predominantly minority areas^{5,9,23,25}. There is also evidence that the socioeconomic environment of the area where one shops for food and the distance traveled to grocery stores are associated with rates of obesity^{26,27}.

In this cross-sectional analysis of the Los Angeles Family and Neighborhood Survey (L.A. FANS), we examined associations between the neighborhood food resource environment and health status for adults with, and those without, a chronic condition. Lower availability of healthy foods and easier access to less nutritious foods in disadvantaged areas may contribute to poorer health status through several mechanisms, including higher body mass index (BMI), stress associated with

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having to travel further and plan more carefully to obtain healthy foods, and time lost from other self-care activities²⁸⁻³⁰. We hypothesized that residence in an area with easier access to supermarkets would promote access to healthy foods, resulting in both lower rates of obesity and better self-rated health. In contrast, residents of areas with higher concentrations of small markets or convenience stores, which may have a poorer selection of nutritious foods, would have higher BMI and poorer health ratings. We further hypothesized that these associations would be strongest for those with a chronic condition, who report substantially poorer health in poor compared to wealthier areas³¹.

METHODS

The analyses used data from L.A. FANS Wave 1, a longitudinal study of families in a stratified probability sample of census tracts in Los Angeles County conducted in 2000-2001, whose design and sampling are described elsewhere^{32, 33}. Briefly, 1652 census tracts in Los Angeles County were stratified based on the proportion of residents with annual income below the poverty level (referred to here as very deprived, deprived, and not deprived). In a representative sample of 65 tracts (20 very deprived, 20 deprived, and 25 not deprived), 40-50 dwelling units were sampled at random, with an oversample of households with children. Within each household, L.A. FANS randomly sampled 1 adult (age 18 years or older) who was interviewed in person. These analyses include data only from the randomly sampled adults in the L.A. FANS Wave 1 cohort.

Neighborhood Level Variables

The main neighborhood variable was the number of food stores per roadway miles in the census tract, which may be a better measure of accessibility of resources in urban areas than either simple distance or a supply measure such as store concentration^{34,35}. Food stores for L.A. County were identified using commercial data obtained through InfoUSA from 1999 and 2000 and categorized using the 2000 North American Industry Classification System (NAICS) codes (<http://www.census.gov/epcd/www/naics.html>), the Food Marketing Institute (FMI) (<http://www.fmi.org>) definitions of food retail stores, and review of store names. Stores were categorized as supermarkets (NAICS Code 445110), small local markets (Code 445110), and convenience stores (codes 445120 and 447110 for convenience stores and snack shops, such as 7-Eleven's or mini-marts in gas stations) using a modification of methods described previously^{36,37}. We further categorized supermarkets into large chain stores (e.g., Ralph's, Von's, or Anderson's) and independent or ethnic supermarkets (ethnic name or operated fewer than 11 stores) in L.A. County²⁷. Roadway miles in a census tract were obtained from the 2000 U.S. Census.

Neighborhood deprivation was assessed using each tract's Socioeconomic Status (SES) Index³⁸, also obtained from the 2000 U.S. Census. The SES Index is the unweighted average of the standardized values of 5 census tract variables that represent education (% 25+ years without a high school degree), income (median family income), wealth (median home value), occupational status (% blue collar), and employment (% unemployed), with the direction reversed for education, occu-

pational status, and employment status. The SES Index was analyzed both as a continuous variable and in tertiles that reflected the original sampling strategy (very deprived, deprived, or nondeprived tracts).

Individual Level Variables

The presence of a chronic condition was defined as physician diagnosis of hypertension, arthritis, diabetes, or a chronic lung problem (asthma, chronic bronchitis, or chronic obstructive pulmonary disease [COPD]). We excluded the 8 respondents who reported that they regularly shopped in small markets or convenience stores, restricting the analyses to those who shopped in a large chain or independent/ethnic supermarket. Age, sex, race/ethnicity, income, education, smoking, and alcohol use were also measured at the individual level.

The dependent variables were self-rated health and self-reported BMI (weight/height²). Self-rated health was measured with the question: "How would you rate your overall health?" Response categories were poor, fair, good, very good, or excellent. These 2 outcomes were examined because they are closely associated with morbidity^{11,39,40}, functional decline, and mortality⁴¹⁻⁴⁵, and determinants of health ratings have been shown to differ for individuals with a chronic condition compared to those with no chronic conditions^{31,46-48}.

Multilevel Models

We constructed weighted multilevel models to assess the association between the food resource environment and both self-rated health (logistic models) and BMI (linear models). Self-rated health was dichotomized as either excellent or fair/poor (combined because only 4% indicated poor health) and assessed in logistic models. At the neighborhood level, the models included a separate variable for the population density adjusted prevalence of each type of food store (large chain supermarkets, independent or ethnic supermarkets, small markets, and convenience stores) and the neighborhood SES index as continuous variables. At the individual level, the models included the presence of a chronic condition and individual covariates, including sociodemographic characteristics (age, sex, race/ethnicity, household income, education, whether the participant owned or had access to a car), health behaviors (smoking and alcohol use), and the type of store where the participant regularly shopped. To assess whether BMI mediated the observed associations between the food resource environment and self-rated health, this model was also constructed with BMI as a covariate.

We tested for cross-level interactions (i.e., interactions between variables measured at the individual and neighborhood levels) between the number of stores per census tract roadway mile and the presence of a chronic condition. We also tested for interactions between having a chronic condition and where participants shopped. The models incorporated sampling weights that take into consideration both non-response and the oversample of poor households and households with children³³.

To determine the expected proportion of residents reporting excellent health, we derived the relative risks and the 95% confidence intervals using bootstrapping with replacement, over 1,000 repetitions^{49,50}. SAS version 9.1 (SAS Institute Inc., Cary, NC) and Stata version 10 (Stata Corp, College Station,

Table 1. Participant and Census Tract Characteristics Among Adults in the Los Angeles Family and Neighborhoods Survey, 2000–2001

	Very Deprived	Deprived	Non-Deprived	P
N (Participants)	1,285	632	619	
Demographic Characteristics				
Mean age (SD)—years	37.7 (14.3)	39.9 (14.2)	43.6 (14.2)	<.001
Female	58.4%	60.9%	58.3%	.54
Race/Ethnicity				
White	9.0%	29.7%	66.5%	<.001
Latino	77.2%	50.6%	15.2%	<.001
African American	11.9%	6.8%	5.7%	<.001
Asian or Pacific Islander	2.0%	12.9%	12.6%	<.001
Education				
0–8th Grade	16.4%	7.0%	1.6%	<.001
9th–11th Grade	36.2%	19.6%	4.7%	<.001
High School Graduate	42.8%	57.1%	44.3%	<.001
College Graduate	4.6%	16.3%	49.4%	<.001
Income				
\$0	27.7%	20.1%	26.4%	.002
\$1–\$20,000	36.2%	27.0%	10.2%	<.001
\$20,001–\$40,000	23.3%	23.0%	11.5%	<.001
>\$40,000	12.8%	29.9%	52.0%	<.001
Clinical Characteristics				
Body mass index kg/m ² (SD)	27.8 (6.4)	27.0 (6.2)	25.3 (5.9)	<.001
Smoker				
Current Smoker	16.7%	19.2%	9.9%	<.001
Past Smoker	23.4%	23.7%	24.8%	.78
Never Smoked	59.9%	57.1%	65.4%	.009
Binge drinking in past 30 days	15.1%	11.9%	12.8%	.11
Any Chronic Condition				
Hypertension	20.1%	19.8%	15.5%	.05
Arthritis	11.7%	12.3%	9.7%	.30
Diabetes	7.9%	7.8%	5.2%	.08
Asthma or Chronic Obstructive Pulmonary Disease	7.0%	8.5%	8.9%	.27
Unadjusted Self-Rated Health				
Fair/Poor	29.0%	21.8%	9.4%	<.001
Good	35.2%	31.0%	24.6%	<.001
Very Good	20.2%	27.5%	32.0%	<.001
Excellent	15.6%	19.6%	34.1%	<.001
Shop outside your census tract	24.4%	26.5%	25.7%	.58
Shops in large chain supermarket (vs independent or ethnic store)	43.5%	73.9%	90.8%	<.001
Census Tract Characteristics				
Median Socioeconomic Index Score (Range)	−0.85 (−1.72, 0.37)	−0.094 (−1.44, 0.42)	0.84 (−0.81, 2.43)	<.001
Residence in census tract ≥5 years	50.7%	50.9%	59.6%	.003
Store Type				
Large chain supermarkets	15.9%	20.1%	44.3%	<.001
Independent or ethnic supermarkets	17.3%	16.2%	11.0%	<.001
Small markets	32.1%	31.4%	23.2%	<.001
Convenience stores	35.2%	31.3%	21.0%	<.001
Number of Stores per Roadway Mile in the Census Tract				
Large chain supermarkets (SD)	0 (0)	0.050 (0.27)	0.827 (0.52)	<.001
Independent or ethnic supermarkets (SD)	0.272 (0.33)	0.156 (0.24)	0.159 (0.44)	<.001
Small markets (SD)	0.635 (1.8)	0.348 (0.45)	0.406 (0.79)	<.001
Convenience stores (SD)	0.588 (0.84)	0.587 (0.73)	0.391 (0.55)	<.001

TX) were used to clean the data and to create multilevel datasets, preliminary results were run in Stata, and the final models were run in HLM 6 (Scientific Software International, Lincolnwood, IL).

The multilevel logistic models with random intercepts were constructed using Predictive Quasi Likelihood approximation procedures⁵¹. The intraclass correlation (ICC) measures between group variation in the outcome as a percentage of total variation in the outcome (which is comprised of within- and between-group variance) and was calculated using the HLM estimates for binary outcomes. Our null (or empty) model found that 16.7% of the variance in self-rated health and 25.3% of the variation in BMI was between census tracts. In

the final adjusted models, the variance in self-rated health between census tracts was reduced to 11.9% in the self-rated health model and 18.9% in the BMI model, indicating that a substantial proportion of the variance in both measures was at the neighborhood level.

RESULTS

The sample included 2,536 adults (response rate 70%), 848 of whom reported 1 or more chronic condition. Compared to the randomly sampled adults included in L.A. FANS, non-responders did not differ by race/ethnicity, sex, income, or education,

Table 2. Multivariate Models of Self-rated Health Among Adults in the Los Angeles Family and Neighborhoods Survey, 2000–2001*

	Weighted Odds of Reporting Excellent Health (vs Fair/Poor Health)			
	No Interaction Terms		With Interaction Terms	
	OR (95% CI)	P	OR (95% CI)	P
One or more chronic conditions [†]	0.45 (0.36, 0.56)	<.001	0.59 (0.46, 0.77)	<.001
Neighborhood SES Index	1.05 (1.00, 1.10)	.04	1.05 (1.00, 1.10)	.05
Shop in an independent or ethnic supermarket (vs large chain supermarket)	0.63 (0.51, 0.80)	<.001	0.74 (0.56, 0.98)	.04
Chronic × shop in an independent or ethnic supermarket (vs large chain supermarket)			0.71 (0.49, 1.02)	.06
Number of markets per roadway mile				
Chain supermarket	1.06 (0.79, 1.43)	.70	1.48 (1.01, 2.17)	.05
Independent or ethnic supermarket	0.96 (0.69, 1.34)	.81	0.90 (0.64, 1.26)	.53
Small market	0.95 (0.88, 1.02)	.18	0.95 (0.88, 1.02)	.15
Convenience store	0.81 (0.71, 0.92)	.001	0.91 (0.77, 1.07)	.23
Chronic condition × Number of large supermarkets per roadway mile			0.54 (0.34, 0.87)	.01
Chronic condition × Number of convenience stores per roadway mile			0.77 (0.60, 0.98)	.03

*Models also adjusted for age, sex, race/ethnicity, income, education, smoking, alcohol use, BMI, and car ownership or access to a car.

[†]Chronic conditions: hypertension, arthritis, diabetes, asthma, or chronic obstructive pulmonary disease

but were more likely to be the head of household³³. Characteristics of the study sample stratified by level of neighborhood deprivation based on the SES index are presented in Table 1.

The distribution of food stores in the 65 census tracts in our sample did not differ from their overall distribution in L.A. County, and included 48 large chain supermarkets, 228 independent or ethnic supermarkets, 114 small markets, and 94 convenience stores. In the most deprived census tracts, convenience stores comprised 35%, small markets 32%, independent supermarkets 17%, and chain supermarkets only 16% of all stores (Table 1). In contrast, in the census tracts with the least neighborhood deprivation, a lower proportion of markets were convenience stores (21%), small markets (23%), or independent supermarkets (12%), and large chain supermarkets comprised a much higher proportion (44%) of the total.

In adjusted analyses of self-rated health (Table 2, first model), the odds of reporting excellent health were lower for persons who had a chronic condition OR=0.45, $P<.001$), shopped in independent or ethnic supermarkets (OR=0.63, $P<.001$), or resided in more advantaged areas (OR=1.04, $P<.04$) or areas with more convenience stores per roadway mile (OR=0.81, $P=.001$).

In the final self-rated health model (Table 2, second model), there was a significant cross-level interaction between the presence of a chronic condition and the number of large, chain supermarkets per roadway mile (OR=0.54; $P=.01$). There was also a significant interaction between having a chronic condition and the number of convenience stores per roadway mile (OR=0.77 for the interaction, $P=.03$). These associations are presented graphically in Figure 1. Among adults without a chronic condition, rates of reporting excellent health were 33%, 38%, and 43% in areas with the lowest, middle, or highest tertiles of large chain supermarkets ($P=.01$ for test of trend), whereas among those with 1 or more chronic conditions, rates were 26%, 28%, and 30% respectively ($P=.09$ for test of trend) (Fig. 1a). For each tertile of convenience stores per roadway mile, 41%, 40%, and 40% of those without a chronic condition reported excellent health ($P=.41$ for test of trend), whereas among those with 1 or more chronic conditions, rates were 39%, 32%, and 27% respectively ($P=.01$ for test of trend) (Fig. 1b). Removing BMI from the models was not associated

with substantial change in the main findings. At the individual level, there was an interaction, which did not reach statistical significance, between the presence of a chronic condition and shopping in an ethnic or independent supermarket (OR=0.71, $P=.06$). Among adults without a chronic condition, excellent health was reported by 24% of those who shopped in a large chain market compared to 22% of those who shopped in an independent or ethnic supermarket ($P=.16$ for test of trend). In contrast, for those with a chronic condition, these numbers were 11% and 6%, respectively ($P<.001$ for test of trend) (Fig. 1c).

Higher BMI was associated with having a chronic condition ($\beta=2.07$, $P<.001$) and greater neighborhood disadvantage ($\beta=2.07$, $P=.02$) (Table 3, first model) when no interactions were assessed. A significant interaction was observed between having a chronic condition and the number of supermarkets per roadway mile, ($\beta=2.91$, $P<.001$ for the interaction term) (Table 3, second model). The mean BMI for adults without a chronic condition who lived in areas with the lowest, middle, and highest tertiles of supermarkets per roadway mile were 26.7 kg/m², 25.8 kg/m², and 24.6 kg/m² ($P=.05$ for test of trend) (Fig. 1d). Among those with a chronic condition, mean BMI did not differ: 28.6 kg/m², 28.3 kg/m², 27.9 kg/m² ($P=.39$ for test of trend). In the BMI models, interactions between chronic conditions and either convenience store access or where one shopped did not reach statistical significance (Fig. 1e and 1f).

SENSITIVITY ANALYSES

There were no differences from the main results when store concentration in the census tract of residence or in surrounding tracts replaced the number of stores per roadway mile, nor when distance to the supermarket where participants shopped or an indicator term for shopping outside the residential census tract was included in the model.

CONCLUSIONS

This work extends prior research on the association between neighborhood characteristics and health by examining the

Figure 1. (a) Expected percentage of residents reporting excellent (versus fair/poor) health stratified by concentration of large supermarkets (in tertiles) and presence of a chronic condition. Models also adjusted for age, sex, race/ethnicity, income, education, body mass index, smoking, alcohol use, car ownership or access to a car, and the neighborhood socioeconomic status index. (b) Expected percentage of residents reporting excellent (versus fair/poor) health stratified by concentration of convenience stores (in tertiles) and presence of a chronic condition. Models also adjusted for age, sex, race/ethnicity, income, education, body mass index, smoking, alcohol use, car ownership or access to a car, and the neighborhood socioeconomic status index. (c) Expected percentage of residents reporting excellent (versus fair/poor) health stratified by where they shop and presence of a chronic condition. Models also adjusted for age, sex, race/ethnicity, income, education, body mass index, smoking, alcohol use, car ownership or access to a car, and the neighborhood socioeconomic status index. (d) Mean BMI of residents stratified by number of large supermarkets per roadway miles (in tertiles) and presence of a chronic condition. Models also adjusted for age, sex, race/ethnicity, income, education, smoking, alcohol use, car ownership or access to a car, and the neighborhood socioeconomic status index. (e) Mean BMI of residents stratified by number of convenience stores per roadway miles (in tertiles) and presence of a chronic condition. Models also adjusted for age, sex, race/ethnicity, income, education, smoking, alcohol use, car ownership or access to a car, and the neighborhood socioeconomic status index. (f) Mean adjusted BMI of residents stratified by where they shop and presence of a chronic condition. Models also adjusted for age, sex, race/ethnicity, income, education, smoking, alcohol use, car ownership or access to a car, and the neighborhood socioeconomic status index. * $P < .05$ for test of trend.

Table 3. Multivariate Models of Body Mass Index Among Adults in the Los Angeles Family and Neighborhoods Survey, 2000–2001*

	Body Mass Index (kg/m ²)			
	No Interaction Terms		With Interaction Terms	
	β (95% CI)	P	β (95% CI)	P
One or more chronic conditions [†]	2.07 (1.28, 2.86)	<.001	1.49 (0.55, 2.42)	.002
Neighborhood SES Index	−0.18 (−0.34, −0.02)	.02	−0.19 (−0.35, −0.03)	.02
Shop in an independent or ethnic supermarket (vs large chain supermarket)	−0.35 (−1.16, 0.46)	.40	−0.86 (−1.85, 0.14)	.09
Chronic × shop in an independent or ethnic supermarket (vs large chain supermarket)			1.05 (−0.22, 2.32)	.10
Number of markets per roadway mile				
Chain supermarket	0.14 (−0.92, 1.20)	.79	−1.26 (−2.57, 0.04)	.06
Independent or ethnic supermarket	0.27 (−0.92, 1.47)	.52	0.39 (−0.80, 1.58)	.52
Small market	0.13 (−0.14, 0.39)	.36	0.12 (−0.14, 0.39)	.36
Convenience store	−0.36 (−0.81, 0.10)	.24	−0.34 (−0.92, 0.23)	.24
Chronic condition × Number of large supermarkets per roadway mile			2.91 (1.28, 4.53)	<.001
Chronic condition × Number of convenience stores per roadway mile			−0.07 (−0.89, 0.75)	.87

*Models also adjusted for age, sex, race/ethnicity, income, education, smoking, alcohol use, and car ownership or access to a car.

[†]Chronic conditions: hypertension, arthritis, diabetes, asthma, or chronic obstructive pulmonary disease

relationship between the residential food resource environment and the health status of persons with a chronic condition, a group for whom access to nutritious foods may be particularly important, and by simultaneously assessing the role of where one shops and available types of food markets.

We found that both greater accessibility to and shopping in large, chain supermarkets were associated with better self-rated health and trends toward lower BMI. Yet, study participants with a chronic condition benefited less than those without a chronic condition from living in an area with a high concentration of supermarkets, and appeared to be more adversely affected when they lived in areas with a high concentration of convenience stores. Although the interaction between access to convenience stores and the presence of a chronic condition was consistent with our original hypothesis, it is unclear why those with a chronic condition may not receive the same benefit from access to a supermarket as study participants without a chronic condition.

Several factors may explain these findings. The presence of a supermarket in a neighborhood may not be sufficient to guarantee a selection of healthy items. Chain supermarkets may have a broader selection of healthy foods, sell these goods at lower prices, and offer more services (e.g., pharmacies, transportation, and delivery) than smaller stores. As in prior studies, we found fewer chain supermarkets relative to other market types in more disadvantaged neighborhoods. It has been suggested that this reflects a long-standing trend of migration of supermarkets from low-income urban areas to suburban neighborhoods and a rising proportion of independent or ethnic supermarkets and other types of stores in these areas^{11,24,52}. Even among chain supermarkets, researchers have observed differences in the products and services offered based on location. Sloane and colleagues documented poorer availability of fresh fruits and vegetables, whole-grain foods, and low-fat dairy products in large chain supermarkets in African-American communities of Los Angeles than in more affluent, non-African-American areas⁵. In addition, as in other studies²⁸, we found that most residents, including those in areas with lower availability of and access to supermarkets, report shopping in supermarkets. Nonetheless, persons with a chronic condition who reside in less advantaged areas may be

more reliant on small markets and convenience stores for basic services in the intervals between trips to a supermarket. These stores are more likely to sell prepackaged, calorie-dense foods and have few nutritious options.

This study has some important limitations. The analyses are cross-sectional and do not provide evidence of a causal relationship between the availability of supermarkets in a census tract and the health of local residents. There may be unmeasured confounders of the relationship between the type and concentration of food stores and health, although we adjusted for both individual and neighborhood factors that influence health outcomes. Notably, we did not analyze other elements of the food resource environment, such as fast food establishments, other restaurants, or farmers markets, all of which are likely to contribute to chronic condition management and overall health. In addition, although we had data on the name and location of supermarkets used by the study participants, we do not know whether or how often respondents shopped in convenience stores or small markets and the types of goods they purchased in different types of markets. We did not assess the distance to the closest store, but a simple distance measure may not reflect residents' proximity or ease of access to the stores^{34,35}. Further work should include other dimensions of the food resource environment and alternate geographic representations of local food resources. Finally, we did not have specific data on the types of quality of foods provided in these markets. We know, however, from prior research that these associations vary a great deal by neighborhood socioeconomic and racial/ethnic makeup^{11,25}.

Models of chronic disease management^{53–55} stress the importance of community resources to the management of chronic conditions, yet little work has described the role of community factors in supporting self-care behaviors that improve outcomes. We recognize that the availability of healthy food in a neighborhood does not guarantee healthy food consumption among residents. Nonetheless, residents of communities that lack certain types of food resources and have easier access to unhealthy foods may have greater difficulty eating healthfully, and access to food stores that provide nutritious options is an important and necessary step to promoting healthy eating. The social and spatial separation of

poorer persons and racial/ethnic minority groups into economically disadvantaged communities suggests that disparities in chronic disease prevention and management are influenced by the availability of neighborhood resources that support healthy behaviors^{56–58}. Health care providers, policy makers, and community leaders must consider the social and physical conditions of those with, or at risk for, chronic conditions to design more effective chronic disease prevention and management strategies⁵⁹.

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Corresponding Author: Arleen F. Brown, MD, PhD; UCLA Division of General Internal Medicine and Health Services Research, 911 Broxton Plaza, Los Angeles, CA 90024, USA (e-mail: abrown@mednet.ucla.edu).

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