

Assessing Resource Environments to Target Prevention Interventions in Community Chronic Disease Control

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Abstract: The recent emphasis in public health and medicine on the environmental determinants of chronic illness has created the need for a more comprehensive way to assess barriers and facilitators of healthy living. This paper reports on the approach taken by a Centers for Disease Control and Prevention (CDC)-funded project whose goal is to reduce disparities in diabetes and cardiovascular disease in Los Angeles' African American communities. Findings from this community-based participatory research project suggest that while location is an important variable in evaluating nutritional and physical activity resources, quality and price considerations are at least as useful. We argue that every community or neighborhood is located within a *resource environment* for medical care, recreation, food, and other health-promoting or health-compromising goods and services that affect the lives and health of its residents.

Key words: Community health assessment, community-based participatory research, resource environments, nutrition, physical activity, African American, Black, minority, health promotion.

African Americans in Los Angeles County suffer disproportionately from cardiovascular disease and diabetes, with prevalence rates twice those of Whites. African American adults experience very high rates of overweight and obesity, with dramatic and rapid increases in prevalence, from 59% in 1997 to 66% in 2005.¹ In the South Service Planning Area (SPA), the region of the county with the greatest

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proportion of African Americans, overweight and obesity rates rose from 61% to 69% between 1997 and 2005, compared with an increase from 39% to 42% during that period in the predominantly White West SPA.¹ Over one third of African American adolescents in California are at risk for being overweight or are already overweight compared with less than one-quarter of White adolescents (36.5% vs. 23.6%), with the highest rate among African American adolescent girls (42.3%).²

Public health and medical literature has focused increased attention on environmental determinants of disease. This interest signals a broadening in theory from the individual-level intervention models that dominated twentieth-century practice to a social ecological model that emphasizes the role of environment in the causation of illness.³⁻⁴ New approaches to community-based participatory research and university-community collaboration refer back to the origins of urban health reform in the nineteenth century⁵ and offer new methods of addressing crucial policy and practice issues.⁶⁻⁷ This shift is particularly timely given the rising epidemics of obesity, sedentariness, and obesity- and inactivity-related medical conditions.

In this evolving approach, the question is not Do individuals have the will to change? Instead, it is Does an individual's environment encourage or discourage a healthy lifestyle? Improving the environment may result in opportunities for acceptance of personal responsibility for choices influencing health.⁸⁻¹⁴

Nevertheless, defining the environment is complicated. Any social environment must be parsed into categories of activity. We use the term *resource environment* to assess the organizational network of neighborhood residents. Each community is situated within a web of resource environments for medical care, recreation, food, and other health-promoting or health-compromising goods and services. These resource environments consist of networks of organizations and institutions that residents depend on to fulfill specific needs, such as the availability of low-fat milk and a health clinic for a sick child. Defining, describing, and measuring these resource environments would help practitioners target interventions for priority populations and better judge the successes and failures of specific interventions.

Many published studies have posed the crucial first question for assessing resource environments around healthy eating and active living, i.e., Are resources such as public parks and supermarkets conveniently located for residents?¹⁵⁻¹⁷ In the 1990s, British researchers defined *food deserts* as those areas of inner cities where cheap, nutritious food is virtually unobtainable.¹⁸⁻¹⁹ The researchers developed elaborate mathematical formulae to assess the impact of location and identify those areas most affected.

Scottish scholars Cummins and Macintyre²⁰ followed with a study of the comparative price and availability of 57 types of food, ranging from bread and cereals to juice and chocolate bars. They discovered that foods that were less expensive in poorer areas tended to be high in fat and sugar. This last finding is particularly suggestive of an approach that documents and describes comparative nutritional systems in our nation's cities. However, they did not consider whether perishable items were fresh and of high quality nor whether healthier items were inequitably distributed.²¹

Neighborhood assessments of physical activity have typically looked either at the

physical environment for barriers and opportunities to engage in physical activity or the location of public parks. The literature on the *walkability* of neighborhoods and *safe routes to school* has reported that a range of factors contribute to the environmental context influencing peoples' decisions to walk or not to walk.^{22–24} Studies have found that even when fewer physical barriers are evident, African American walking rates are lower than those of the general population.^{25–27} Other studies have assessed the proportion of public park space in relationship to the racial and economic characteristics of a neighborhood.^{28–29} The results have shown that inequities do exist, with poorer, minority communities generally having fewer parks and recreational facilities than other communities.^{30–31}

This paper reports on the examination of resource environments within a CDC-funded Racial and Ethnic Approaches to Health (REACH) 2010 project, African Americans Building a Legacy of Health (AABLH), directed by Community Health Councils, Inc. (CHC) in partnership with researchers from the University of Southern California and the University of California at Los Angeles. This project has developed a methodology for assessing environments that integrates measures of location, quality, and cost in evaluating a community's access to nutritious foods and physical activity opportunities.

Methods

The CHC's AABLH project began in 1999 with a one-year planning grant from the CDC. Funding for a four-year intervention demonstration project began in 2000 and was then extended for three years, from 2004–2007. The project aims to reduce health disparities related to diabetes and cardiovascular disease among African Americans living in the target area, which includes portions of South Los Angeles, Inglewood, and North Long Beach (see Figure 1). Thirty-seven percent of the target area's 900,000 residents are African Americans, representing the highest concentration of African Americans in Los Angeles County. The target area findings were contrasted with assessments done in an adjacent comparison area with 222,000 residents, of whom only 8% are African American.

The CHC's AABLH project developed and implemented several intervention strategies. A community advisory committee was established for each area of focus to inform and participate in the assessment process and development of a series of community intervention strategies. In an *organizational wellness* strategy, CHC staff provides training and technical assistance to community-based organizations to promote the integration of physical activity and healthy food choices into the routine conduct of business, e.g., encouraging management to integrate structured physical activity breaks into long meetings, posting signs promoting the use of stairs, hosting walking meetings and improving the nutritional value of cafeteria, food vendor, and vending machine selections.^{32–33} A second intervention strategy considers gaps in the medical care delivery system, and challenges those deficits, e.g., by advocating for organizational policy and practice changes by providers, regulatory agencies, and insurers. Efforts earlier in the project, such as consumer support groups, provider education, and general health education programs led

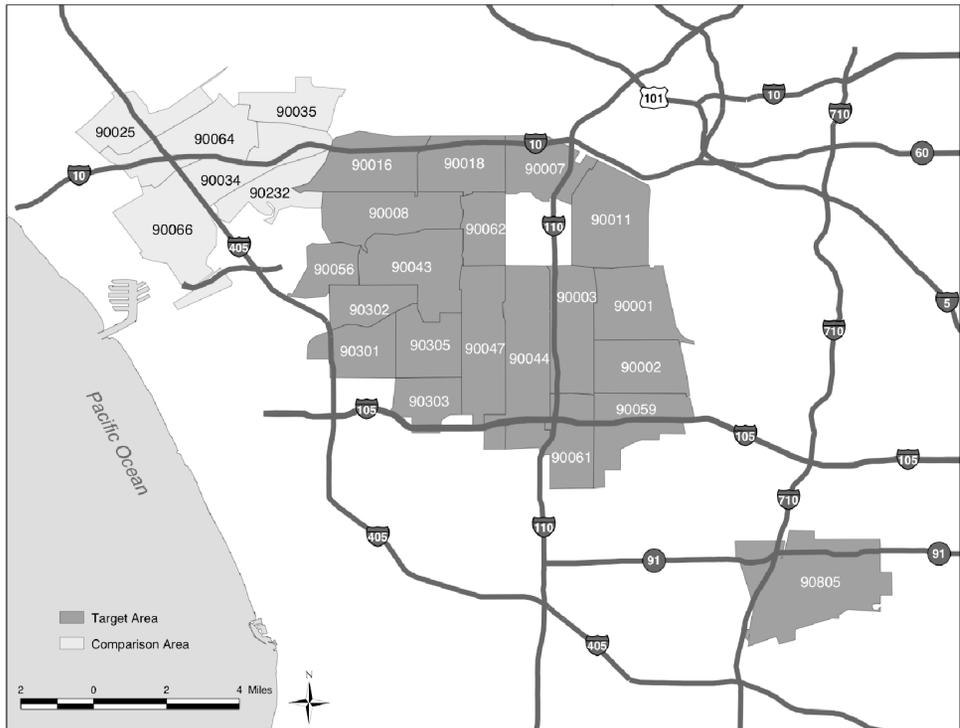


Figure 1. Map of the CHC AABLH Target Area and Comparison Area.

to the formation of the Disparities in Healthcare Advisory Committee, a group of health care providers, consumers, and researchers meeting to challenge disparities and integrate these and other interventions within the existing health care infrastructure.

A third strategy, the subject of this paper, involves assessing and challenging the area's nutritional and recreational resource environments. During the planning year, for instance, residents noted repeatedly during community meetings and in qualitative interviews and focus group discussions that their neighborhood sidewalks were not mended, their streetlights did not work, and the area was rife with unleashed dogs. They consistently noted that private recreational facilities were rare in their community, and that they had relatively few neighborhood parks. One sign of the poor nutritional conditions appeared when a local community-based advocacy organization, the Community Coalition for Substance Abuse Prevention, demonstrated that a local supermarket was re-stamping the expiration dates on its meat. This revelation led to community protests that in turn forced the supermarket chain to upgrade and improve the store. The Community Coalition subsequently became a subcontractor in conducting environmental audits, as described below.³⁴

During the planning phase of the project, dot maps were created that showed fast food restaurants, grocery stores, and markets selling meat. Such maps revealed that the target area had a plethora of fast food restaurants and a paucity of grocery

stores. Once the implementation project was funded and the conceptual framework better established, CHC staff, researchers, and community members in the Economic Parity Advisory Committee (EPAC) jointly developed an improved assessment procedure.

The EPAC developed survey instruments to assess markets, restaurants, and consumer preferences related to shopping. The committee usually consisted of 2–3 academic researchers, 2–3 CHC staff, and between 6 and 14 community members. Roughly 12–14 people consistently participated in the development of the instruments and the evaluation of mini-grants for the market, restaurant, and consumer preference surveys. Community residents then participated in discussions of the findings and presentations of the results to neighborhood groups and at academic conferences. Each group that won a mini-grant included other community members in their activities.

Four instruments were developed. The first, the *Shopping List*, was a one-page instrument intended to provide a brief overview of the store's healthy offerings, such as low-fat dairy products and fruits and vegetables. The second, the *Healthy Food Assessment*, was an eight-page instrument that included variation of price and quality within specific categories of food, such as apples and oranges, and broader coverage of healthy items, such as low-fat cheese and skinless poultry. The third instrument, the *Consumer Preference Survey*, was a three and one-half page survey that examined issues such as how far one had to travel to shop, level of satisfaction with the typical place one shopped, and whether one was able to purchase healthy items. The fourth instrument, the *Physical Activity Site Assessment*, examined local recreational facilities through thirty-one items covering thirteen pages. Questions were asked about indoor and outdoor facilities and programs and about the types of consumers and pricing of services. These instruments drew upon existing approaches, such as efforts in Detroit to assess restaurants and local American Heart Association efforts to assess supermarkets (K. Pothukuchi, personal communication, 2000). However, the final instruments reflected the perspectives of local residents, CHC staff, and the academic researchers.

Twenty-two community-based organizations were awarded mini-grants to survey the target area. The organizations received their grants through a competitive review process monitored by CHC staff. The organizations differed for each survey phase, but included a wide range of faith-based organizations, local social service providers, and fraternities and sororities. Each group receiving a grant was evaluated according to its ability to complete the surveys as well as its prior involvement in improving the health of African Americans. University of Southern California urban planning students surveyed the comparison area under the supervision of the lead author. Table 1 shows the final tally of surveys completed by the project.

In each case, the surveys were conducted by ZIP code as they represent the relative size of the area most residents would travel to eat or exercise. Each survey was conducted using a different sample since each necessitated a different approach. The grocery store and restaurant inventories used samples drawn from local government databases. In each case, a randomly selected, stratified number of sites was surveyed. Overall, the areas had so many restaurants that we confined surveying

Table 1.**RESOURCE ENVIRONMENT ASSESSMENTS BY STUDY AREA**

Survey type	Target area	Comparison area	Total
Nutrition resources			
Shopping list assessment	261	69	330
Healthy food assessment	69	17	86
Consumer preference assessment	1359	218	1577
Physical activity resources			
Physical activity assessments	122	35	157
Total	1811	339	2150

to selected ZIP codes due to funding limitations. Some ZIP codes proved to have so few grocery stores and restaurants that we sampled the entire universe. The physical activity survey sample was drawn from facilities found by community members and students canvassing the area since no comprehensive list of such resources exists. They then surveyed either the entire sample, in some ZIP codes, or a selected number of facilities.

As reported elsewhere, the two areas (i.e., target and comparison) differed significantly in the richness of their nutritional resource environments.³⁴ Location clearly mattered. For example, the Shopping List Survey results indicated that the target area had a much larger percentage of small markets than the comparison area (95% of stores surveyed in the target area were convenience or local markets, while only 71% were in the comparison area).³⁴ Additionally, the target area had fewer markets per resident than the comparison area (one market per 5,957 residents in target area and one per 3,763 residents in the comparison area) according to the 1997 U.S. Economic Census.

The target area also had one-third fewer restaurants per resident than the comparison area (one per every 1,910 residents versus one per every 542 residents). In addition, the restaurants in the target area had a ratio of almost three limited service restaurants (73%) for every one full service restaurant (27%), while the comparison area had fewer limited service restaurants versus full service ones (42% versus 58%).³⁵

Quality measurements also differed between study areas. In the Healthy Food Assessment, the comparison area stores were significantly more likely than those in the target area to sell fresh fruits and vegetables (98% versus 70%). Furthermore, they offered a wider range of fruits and vegetables. The fruits and vegetables in target area stores were more likely to be inferior based on color, consistency, and quality.³⁴ Comparison restaurants were significantly more likely to offer at least five healthy modes of preparations (e.g., broiled instead of fried). They were also

significantly more likely to offer at least five healthier choice items (e.g., brown rice instead of French fries).³⁵

This paper presents the results related to price from the three nutritional surveys, the findings of the Consumer Preference survey, and preliminary findings from the Physical Activity Facility Assessment. The Consumer Preference Survey was a convenience sample with residents and students standing outside grocery stores, car washes, check cashing stores, laundromats, and other places asking for respondents who lived in the target or comparison areas. Surveyors in the target area were asked to interview only African Americans, while those in the comparison area were intentionally asked not to limit their interviewing to any one racial or ethnic group. In both areas, the only screening questions were whether the respondent lived within the relevant ZIP codes and if they were 18 or older.

Physical activity has been difficult to measure in terms of quality and price. The typical published measurement of accessibility counts sites offering physical activity programming in a given area.³⁶ The project's evaluation schema attempted to uncover unconventional sites by canvassing churches and other non-traditional providers of active leisure services and to capture the quality of the active living sites by examining hours of availability of facilities, gender-/age-targeting of activities and services, and utilization patterns by age and race/ethnicity. A full description of this effort to measure physical activity resources is beyond the scope of this paper. However, we have presented a sample of preliminary analyses to complement the nutritional environmental characterization of the Consumer Preference Survey.

Results

Nutrition. The Consumer Preference Survey findings underscored the continued importance of location. Five times as many shoppers in CHC's AABLH target area had to travel more than 20 minutes to their preferred grocery stores than those in the comparison area (16% versus 3%). Quality differences were also present, as twice as many shoppers in the comparison area were satisfied with the availability and quality of food in their store as in the target area (62% versus 33%). Thirty-two percent of respondents in the target area reported that a store or restaurant that they wanted in their neighborhood was not there, while only 19% of comparison area respondents agreed.

We also gathered information on the price of products in the markets. The Shopping List Survey results were that the lowest prices for a loaf of bread, a pound of bananas, a quart of low-fat milk, and a pound of ground beef were found in the target area (see Table 2). However, the highest prices were also found in the target area for a loaf of bread (\$3.19–\$2.99), a quart of low-fat milk (\$3.26–\$2.59), and a pound of bananas (\$1.47–0.99); only the upper end of ground beef prices (\$3.29–\$4.99) was higher in the comparison area.

The story for restaurants is a little different. On average, prices at target area restaurants were lower than those in the comparison area. Among surveyed restaurants, comparison area meals (not just *a la carte*) were more expensive than target area meals. For example, the average "most expensive" lunch in the target area was \$7.38

Table 2.**AVERAGE OF THE LOWEST PRICE ACROSS ALL SHOPPING LIST SURVEYED MARKETS**

Product	Target area price (\$)	Contrast area price (\$)
1 Loaf of bread	1.28	1.55
1 Qrt of low-fat milk	1.26	1.48
1 Lb. of bananas	.51	.54
1 Lb. of ground beef	1.79	1.96

while the “most expensive” lunch in the comparison area was \$12.15. The “least expensive” options showed less of a contrast (\$3.87 in the target area vs. \$4.90 in the comparison area), although the comparison area prices were still higher. The price difference was less dramatic among *a la carte* items, but the comparison area items were still, on average, about fifty cents more expensive. Comparison area restaurants provided more healthy food options with slightly higher prices than target area restaurants. (See Table 3.)

Target area respondents to the Consumer Preference surveys were much less likely to report that price was never a factor in purchasing healthier foods than

Table 3.**COST OF INDIVIDUAL MEALS IN SURVEYED RESTAURANTS**

	LEAST expensive	MOST expensive	Price variation LEAST to MOST expensive
Breakfast			
Target	\$3.16	\$5.75	+2.64
Contrast	\$3.20	\$7.10	+3.90
Price variation by area	+0.07	+1.33	
Lunch			
Target	\$3.89	\$7.40	+3.51
Contrast	\$4.90	\$12.15	+7.25
Price variation by area	+1.03	+4.77	
Dinner			
Target	\$6.27	\$9.48	+3.09
Contrast	\$7.26	\$16.14	+8.88
Price variation by area	+0.94	+6.73	

comparison area respondents (24% versus 55%). Fully 40% of target area respondents answered that price always or usually was a factor in purchasing healthier foods. Still, the nutritional inventories found that prices were generally lower in the target area than in the comparison area.

Physical activity. The two study areas had very different facility profiles, again supporting the importance of location as a first step in assessing resource environments. While almost three-quarters of the facilities surveyed in the target area were publicly owned and operated, more than half of those in the comparison area were privately owned (72% versus 58%).

Location was, however, just the beginning of the necessary assessment. The two areas offered very different programs with varied types of facilities. While the surveyed comparison area sites with indoor facilities all had handball or racquetball courts, fewer than half of the target area facilities had these facilities (100% versus 48%). Similarly, in those sites with outdoor facilities, those in the comparison area were more likely to have tennis courts (46% versus 27%), while target area sites were much more likely to have volleyball (24% versus 0%) and football or soccer fields (23% versus 8%).

In addition, while comparison area facilities offered more programs for adults, such as self-defense classes (44% versus 18%), target area facilities were much more likely to offer after-school (66% versus 5%) and summer programs for youth (60% versus 37%). In the target area, about 65% of the facilities were open all day (about 8 hours a day) and about 35% of the facilities were open only in the afternoon. In the comparison area, over 90% of the facilities were open all day (about 8 hours a day) and fewer than 10% were open in the afternoon only.

Not surprisingly given the much higher percentage of private services offered in the comparison area, facilities there were much more likely to charge a membership fee (62% versus 20%). In the target area, the fees of the smaller number of sites that did charge for membership were more than twice as expensive, on average, as the fees charged in the comparison area (\$88 per year versus \$40 per year). Somewhat surprisingly, the comparison area sites were twice as likely to have cut back on services over the preceding year (18% versus 9%).

Discussion

While the role of quality and price in resource environments seems intuitively understandable, few studies have demonstrated their effects upon the organizational environments within which priority populations live. Studies have counted stores and fast food restaurants as proxies for understanding whether the stores offered fruits and vegetables and healthy preparations such as salads and brown rice. A store might be unclean, unwelcoming, and filled with unhealthy items. Making assessment and evaluation tools more complex creates measurement problems but also increases our understanding of the role resource environments play in contributing to adverse or positive health outcomes.

Complex evaluation tools provide the foundation for targeted interventions and

policy advocacy. As a result of the assessments discussed here, EPAC developed Standards of Quality for grocery stores (see Appendix). The CHC staff facilitated discussions between a large supermarket chain and EPAC around the standards, which the CHC's AABLH project now intends to promote within the community. Furthermore, the CHC staff worked with EPAC to develop a mini-grant program that expands physical activity opportunities for population segments identified as underserved by the assessment process. The CHC staff and advisory committee members have joined broader efforts to affect legislation aimed at improving nutritional and physical activity resources in local schools and neighborhoods. Each effort has been informed by the need not just for new stores and facilities, but for quality products, services, and meals at affordable prices.

The primary limitations of the project are the ongoing improvements in techniques as the public health and assessment literature offers new evidence on the importance of the organizational environment. The result has been a general refinement of assessment techniques, such as ensuring inter-rater reliability and random selection of organizations. These findings will be implemented in the next round of assessments scheduled for late 2006 and early 2007.

A second limitation has been that results related to quality have proven so far to be more reliable than those tied to price. This result suggests that measuring the impact of price in disadvantaged communities is difficult. Store location and market analysis studies rarely consider price in their mathematical equations, presuming that it is too difficult to standardize and that the data are not easily accessible for their type of analysis. Price information, which at the largest aggregated level would seem easy to measure, proves much more difficult at smaller spatial scales since the variation of manufacturer, product size, and other factors confound the collection of data.³⁷ Lower prices may be correlated with fewer options and poorer quality, but confirming that result would require further research.

Studying prices for recreation is particularly daunting. Many programs in disadvantaged areas are free or discounted. Thus, in comparison to wealthier areas, they appear less expensive. Yet the core issue of diminished access may be that facilities and programs requiring capitalization are simply not provided. Furthermore, since these areas rely disproportionately on public programming, price differences may merely reflect public underwriting or subsidization of programming rather than individual costs. Disaggregating these elements is crucial to understanding the roles of public and private providers of recreational services within socio-economically disadvantaged neighborhoods.

Overall, our findings suggest that a comprehensive assessment of neighborhood resource environments depends not merely on a static consideration of location, but on a deeper understanding of the complex relationships between location, quality, and price. Each factor must be considered in relation to the others using refined measurements of each element so we can better target interventions to improve health outcomes and eliminate health disparities.

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Appendix—Quality of Standards, 2005

African Americans Building a Legacy of Health Campaign
REACH 2010 Project

ECONOMIC PARITY ADVISORY COMMITTEE

The Economic Parity Advisory Committee strives to increase the availability, affordability, and quality of healthy food and physical activity options in the target areas through community development strategies. The Advisory Committee conducts community-driven needs assessments and research, provides mini-grants to support organizations that offer affordable physical activity programs to community residents, develops strategies to improve nutrition in under-resourced communities, and encourages corporate and public policies to institutionalize and sustain the goals of the *African Americans Building a Legacy of Health* coalition.

QUALITY OF STANDARDS

The Economic Parity Advisory Committee is dedicated to excellence in service to the residents of South Los Angeles. We therefore endorse and set forth the following Quality of Standards and terms upon which any and all grocery companies in South Los Angeles adhere to as a commitment to residents through providing quality, nutritious products and equitable practices in South Los Angeles.

1. Ensure South Los Angeles County stores provide “top” quality, healthy foods.
2. Support fresh produce consumption through fruits and vegetables demonstrations/samplings.
3. Promote healthy food items through increased visuals, easy to read, and where needed, language appropriate signage, strategic product placement, etc.
4. Direct staff and consumers to websites or other sources promoting healthy nutrition.
5. Acknowledge the diversity of South Los Angeles County communities by providing culturally appropriate fresh food items in all stores.
6. Ensure when possible, competitive, affordable pricing—comparable to price points in surrounding communities.
7. Demonstrate commitment to South Los Angeles County residents through regular interior and exterior store upkeep
8. Provide well trained staff that results in optimal, professional customer service.
9. Establish and maintain a culturally diverse workforce reflective of the community served.

10. Ensure customer safety through all aspects of the shopping experience.
11. Establish and implement criteria for the provision of transportation to and from local stores within a 5-mile radius.
12. Participate in the development of a quality assurance process.

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