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Reliability of a Retail Food Store Survey and Development of an Accompanying Retail Scoring System to Communicate Survey Findings and Identify Vendors for Healthful Food and Marketing Initiatives

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ABSTRACT

Objective: To develop a retail grocery instrument with weighted scoring to be used as an indicator of the food environment.

Participants/Setting: Twenty six retail food stores in low-income areas in California.

Intervention: Observational.

Main Outcome Measure(s): Inter-rater reliability for grocery store survey instrument. Description of store scoring methodology weighted to emphasize availability of healthful food.

Analysis: Type A intra-class correlation coefficients (ICC) with absolute agreement definition or a κ test for measures using ranges as categories.

Results: Measures of availability and price of fruits and vegetables performed well in reliability testing ($\kappa = 0.681-0.800$). Items for vegetable quality were better than for fruit (ICC 0.708 vs 0.528). Kappa scores indicated low to moderate agreement (0.372-0.674) on external store marketing measures and higher scores for internal store marketing. "Next to" the checkout counter was more reliable than "within 6 feet." Health departments using the store scoring system reported it as the most useful communication of neighborhood findings.

Conclusions and Implications: There was good reliability of the measures among the research pairs. The local store scores can show the need to bring in resources and to provide access to fruits and vegetables and other healthful food.

Key Words: food supply, built environment, reliability, fruit, vegetable, marketing (*J Nutr Educ Behav.* 2011;43:S104-S112.)

INTRODUCTION

Professionals in the field of public health have become increasingly interested in how community environments support or hinder healthful behaviors, including behaviors related to the food environment,^{1,2} physical activity barriers,³⁻⁸ and marketing practices.⁹⁻¹¹ The Centers for Disease Control and Prevention have put forth recommended community strategies and measures to prevent

obesity that address access to healthful local food, incentives for food retailers to carry more healthful options, and limits on advertisements of less healthful food.¹² Providing incentives for food retailers to offer more healthful food and beverages or to establish new locations in underserved areas is among strategies recommended by the Centers for Disease Control and Prevention.¹² Identifying retailers suitable for interventions to increase and/or promote healthful op-

tions can present a challenge for community organizations, health departments, and other stakeholders ready to initiate change.

Evidence is increasing to establish the relationship between residential proximity to supermarkets and healthful eating.^{13,14} Large chain grocery stores with the greatest variety and lower prices are more available in middle- and higher-income neighborhoods.¹⁴⁻¹⁹ It has been well documented in low-income areas that there are fewer large food stores and more convenience and small markets.¹⁹ Point-of-sale marketing and product placement cannot be ignored as critical influences on consumer behavior.²⁰⁻²² Data on the quality and types of retail food stores in low-income neighborhoods can provide crucial information that exposes inequities such as food deserts, the lack of access to healthful food by neighborhood

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STATEMENT OF POTENTIAL CONFLICT OF INTEREST AND FUNDING/
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residents, and level of egregious marketing of less-healthy food and beverages or to highlight vendors that contribute to a healthy neighborhood. Store-level data can provide useful information for intervention development or promotion of stores offering healthful choices and marketing practices.

Communities of Excellence in Nutrition, Physical Activity, and Obesity Prevention (CX³) was designed by the California Department of Public Health, *Network for a Healthy California (Network)* as a framework of healthy community indicators. Local health departments implemented CX³ to involve stakeholders and examine environmental conditions present in low-income neighborhoods that affect obesity. One of the goals of CX³ is for data from surveys of food retailers to advance local action through neighborhood improvement projects, redevelopment efforts, coalitions, nutrition educators, health advocates, and local governments. Documenting the availability of healthful food and marketing practices in retail stores is valuable for understanding the conditions that could positively or negatively influence consumer choices.

The *Network* is a social marketing initiative for nutrition education services to assist current and potential participants in the Supplemental Nutrition Assistance Program (SNAP), formerly known as Food Stamps. The *Network* serves California's estimated 7.1 million parents and children from households with incomes below 185% of the federal poverty level through a wide range of local assistance contracts.²³ *Communities of Excellence in Nutrition, Physical Activity, and Obesity Prevention* offers *Network*-eligible communities the opportunity to connect neighborhood environments to nutrition education activities. The presence or absence of particular conditions provides a way to target nutrition education delivered in conjunction with the *Network Fruit, Vegetable, and Physical Activity Retail Program (Network Retail Program)* or other consumer-based activities, especially when paired with community-based participatory research. *Communities of Excellence in Nutrition, Physical Activity, and Obesity Prevention* was designed to examine

environments where people live, work, learn and play as a means of targeting nutrition education efforts and offering expanded methods that lead to community action.

Communities of Excellence in Nutrition, Physical Activity, and Obesity Prevention is implemented by local health departments to link residents and community organizations and to guide local planning. Health departments are trained with standardized CX³ methods using Geographic Information System mapping²⁴ and field surveys to examine food sources including stores, fast food, food banks, emergency food outlets, and tracking methods to gather alternative sources of healthful food such as community gardens, produce stands, or community-supported agriculture in selected low-income neighborhoods. Health department staff members were encouraged to involve community members and youth in the data collection and/or interpretation process, build partnerships, and collaborate with a variety of other organizations and leaders to combine efforts that encourage healthful lifestyles. These partnerships are important to the success of obesity reduction efforts since Supplemental Nutrition Assistance Program Education (SNAP-Ed) resources to affect local policies and environments have been limited in scope.

METHODS

Store Survey Instrument Reliability Testing

The CX³ Food Availability and Marketing Survey was pilot-tested among other instruments in 2006 by 6 local health departments in 21 low-income neighborhoods that ranged from dense urban to rural, with over 180 stores surveyed. Use in the field by health departments continued in 2007, which generated more refinements to the survey. The store survey was designed to be implemented by groups of varying abilities, specifically, youth or community members, making a reliable tool critical for moving forward with CX³. In 2008, reliability testing of the store instrument was conducted in 26 stores by 2 pairs of *Network* research staff to test inter-rater reliability among measures.

Two separate pairs of researchers followed typical survey methods included in training scenarios for safety and quality control purposes. Staff surveyed a store sample comparable with the mix of store types among previously surveyed neighborhoods and used methods that matched those from trainings and survey protocols.

Because the data captured conditions present in the food environment rather than with humans as subjects of research, it did not require institutional review by the common rule.²⁵ Surveyors were trained on ways to approach store owners, managers, or employees upon entering the store to conduct the survey. A letter of explanation was provided for use as needed and was available in Spanish. Surveyors were careful not to collect data during busy times or to interfere with store customers. There was 1 instance during reliability testing of a store owner who did not want the store to be surveyed, and there have been very few cases of this situation for local health departments collecting data in the field.

The survey reliability testing covered all areas of the instrument, including exterior and interior marketing conditions, availability, quality and price of produce, and availability of other healthful food. The availability and quality of fresh fruit and vegetables were collected using items with ranges of the number of types available adapted from the Food Stores Survey for the Girls Health Enrichment Multi-Site Study.²⁶ Quality was recorded overall for fruit and vegetables using a scale of 1-4. Better quality received a higher rating, with guidance for quality provided through training and protocol descriptors of wilting, decay, shrivel, brown or dry stem cuts, and color changes. Prices of 7 common nutritious fruits and vegetables were collected, and the lowest price posted for each was recorded. The presence or absence of national or statewide fruit and vegetable campaigns, or other health promotion messages in the produce area, were identified. The survey also collected the availability of 26 different types of healthful food. The majority of these food items aligned with those in the 2008 proposed WIC food package, including nonfat or low-fat milk,

whole-grain products, and canned or frozen fruits and vegetables.

Exterior marketing conditions were assessed by the number, size, and type of posted advertisements in windows and doors; the types of ads displayed on other parts of the property; the types of food products visible from the outside windows; and the presence of produce bins and vending machines in front of the store. Interior marketing was assessed through the presence of ads and products for healthful and less healthful food next to the checkout counter.

Two unique series of measures for capturing ads and products at the checkout counter were tested. One set of measures tested collection of ads and products present within 6 feet of the checkout counter; the protocol defined the height of an average man as a guide for estimating distance. Another set of measures tested survey items that captured products and ads directly next to or attached to the checkout counter.

Analysis was conducted with the Statistical Package for the Social Sciences/Predictive Analytics Software (version 17, SPSS, Inc, Chicago, IL, 2009) by CX³ research staff. Type A intraclass correlation coefficients (ICC) with absolute agreement definition or a κ test with measures using ranges as categories were the analyses conducted. Significance of results at $P < .001$ can be assumed unless otherwise stated.

Scoring System Development

In 2007-2008, *Network* and local health department staff worked together to develop a store scoring system to accompany the CX³ Food Availability and Marketing Survey. The scores were weighted to emphasize the availability of healthful food in retail stores and would succinctly communicate the data about low-income neighborhoods. A roundtable discussion between state and local staff refined the scores developed by the *Network* research team. Store owners were not involved in development of the scoring system, however, an expert in retail environments from tobacco control research provided a unique perspective regarding work with store owners to change environ-

ments. Scores only reflected the presence of positive conditions recorded on the survey.

Nine main categories were organized to group similar conditions or factors. The 9 categories fed data findings from stores into a 100-point total score, selected because 100 possible points would be straightforward to communicate. More points were allocated for survey elements with more importance in supporting healthful behaviors. Access and availability were the most crucial factors and therefore were assigned 70 points, the majority of points. Marketing and product placement received 30 points of the possible 100 points.

Points were awarded for participation in SNAP and the Supplemental Nutrition Program for Women, Infants and Children (WIC) and the display of exterior signage for these federal nutrition assistance programs, food availability and quality, reasonable prices for common fruits and vegetables, presence of fruit and vegetable promotions, marketing of healthful food and beverages, product placement, and walkability within 2 blocks of the store. Two survey instruments supplied data for the scores: the CX³ Food Availability and Marketing Survey and the Walkability and Safety Survey, adapted from the Pedestrian and Bicycle Information Center Walkability Checklist.²⁷

Stores received points for desired conditions and positive attributes such as carrying more than 7 types of fresh fruits or vegetables, maintaining good quality produce, carrying items by food group category of the 26 types of healthful food, as well as for the types and sizes of interior or exterior advertisements or product placement. Points for reasonable produce prices were assigned when prices found in stores were under a "county average" calculated price. Calculated prices for the county where the survey was conducted were created for each of 7 produce items using commercially available retail scanner data for comparable varieties.²⁸ Scanner data were from supermarkets and large grocery stores with annual sales volumes above \$2 million for the designated county. Points were not deducted for practices or conditions not supportive of healthful choices.

Using Microsoft Excel (version 2003, Microsoft, Inc., Redmond, WA, 2003), algorithms were constructed to calculate scores from the raw data collected in the field for a localized analysis particular to each store and each neighborhood. Coded items from the store and walkability surveys were linked to the algorithms to generate assignment of points. Conditions that support healthful behaviors automatically received points when raw data was entered into the spreadsheets.

There were 9 subscore categories calculated from groupings of the survey items. The subscore categories added up to a total score. Besides having a maximum number of possible points allocated for each subscore category, each subscore category had a minimum number of points identified for a "meets standards" designation to help indicate a level of quality for supporting healthful eating. Subscores provided a way to identify areas in which individual stores are doing well or need improvement. Point assignments for the subscore categories are provided in Table 1. The total number of points or overall score received by a store, however, was considered the most important indicator of a quality retail food store that can be viewed as an asset to consumers in the neighborhood. A standard of 75 points was established to indicate a "quality" store.

RESULTS

Reliability of the Store Survey

Results of inter-rater reliability between pairs of *Network* research staff (Table 2) showed findings that supported use of the majority of the measures. Measures showed generally better results for exterior ads for healthful products compared to ads for less healthful products. Overall methods to capture ads on exterior doors and windows showed low to moderate results, with a range of κ from 0.372 to 0.674. Methods to capture other exterior promotions or conditions performed well (ICC 0.857). Interior store marketing reliability measures were generally more reliable for less healthful food ads or products next to the checkout counter than for healthful food ads

Table 1. CX³ Standardized Scoring Criteria for Retail Food Stores

Scoring Criteria	Points Assigned
<i>Store accepts WIC and FS, displays signage</i>	Maximum score = 10 Meets standards ≥ 5
Accepts WIC	Yes = 4 No = 0
Displays WIC signage	Yes = 1 No = 0
FS vendor	Yes = 4 No = 0
Displays FS signage	Yes = 1 No = 0
<i>Store sells wide range and good-quality fruit</i>	Maximum score = 20 Meets standards ≥ 18
Availability of fresh fruit	None = 0 Limited = 4 Moderate = 8 Wide variety = 12
Quality of fruit	Poor = 0 Mixed/poor = 0 Mixed/good = 6 Good overall = 8
<i>Store sells wide range and good-quality vegetables</i>	Maximum score = 20 Meets standards ≥ 18
Availability of fresh vegetables	None = 0 Limited = 4 Moderate = 8 Wide variety = 12
Quality of vegetables	Poor = 0 Mixed/poor = 0 Mixed/good = 6 Good overall = 8
<i>Store prices for fresh fruits and vegetables are below county averages plus 10% margin of error</i>	Maximum score = 10 Meets standards ≥ 7
<i>Store sells wide range of other healthful food</i>	Maximum score = 10 Meets standards ≥ 8
Availability of other healthful food	Any of the following categories: low / reduced fat dairy or soy beverage = 1 lean meat protein or canned fish = 1 non-meat protein category = 1 skim milk = 2
Availability of other healthful food	Any of the following categories: Whole grain (whole-wheat bread or high-fiber cereal or plain oatmeal) = 2 Canned fruit or vegetables (no added fat or sweetener) = 1 Frozen fruit or vegetables (no added fat or sweetener) = 1 Baby food (WIC authorized) = 1
<i>Nutrition information score</i>	Maximum score = 4 Meets standards ≥ 3
Participates in <i>Network Fruit, Vegetable, and Physical Activity Retail Program</i>	Yes = 3 No = 0
Any health promotional items around fruit and vegetable displays	Any = 1 No = 0

(continued)

or products. Measures using “next to” the checkout counter were more reliable than measures within 6 feet of the checkout, and thus the “next to” measures were selected for use in the survey instead of the measure capturing ads or products within 6 feet of the counter. Candy was present next to or below the checkout for all but 3 stores and thus was noticeably a constant. Reliability of the measures for availability of fresh fruit or vegetables was good, with κ of 0.681 for fruit and 0.704 for vegetables. Measures for quality of vegetables were better, with ICC of 0.708, than for fruit, with ICC of 0.528. Pricing measures showed strong reliability performance with ICC of 0.80 for the price per pound when recording the lowest priced variety in stores that were surveyed.

The items that individually showed less robust results attempted to capture words for healthful products (ICC 0.399, $P < .05$) and words for less healthful products (ICC 0.540, $P < .05$) not in ads that were elsewhere on the property, such as words pasted with vinyl letters on windows. These measures were removed from the survey. Other modifications based on findings were made to instructions, protocols, and training methods following reliability testing. Photographs of generic cartons of specific percentages of milk fat and examples of high-fiber cereals in alignment with the WIC food package were added to the protocol and training presentations.

Several of the tested survey items were seen as emerging issues because the condition in the environment was rarely found (5 or fewer recorded) or not present for the stores sampled. A few of the items were retained to track for possible appearance under circumstances that could elicit local action. Table 3 provides data showing measures and results of items with no variance because of either a constant or rare presence in the retail food stores surveyed.

Store Scores

A sample of 340 store scores with data collected by local health department staff, youth, and community members in 2008-2009 was analyzed to

standards” of more than 60 points, but fewer than 75.

DISCUSSION

Reliability

Other reliable instruments to gather the availability of foods in stores have been developed,³⁰⁻³³ however, many of them do not attempt to evaluate marketing practices. Despite the use of measures from tobacco studies that capture ads and promotions in the retail environment³⁴ to inform development of CX³ survey items, determining size and categorization of ads for healthful or less healthful food and beverages appears to be difficult. Areas that are cluttered and contain visual disorganization in the store environment, such as on the exterior doors and windows and around the checkout area, pose a challenge to reliable recording. This is particularly an issue with the small market and convenience stores that dominate the landscape of California, and are present in low-income neighborhoods.²⁹ The entrance and the checkout are the inescapable points of exposure for cues³⁵ to purchase and consume a multitude of types of food. The conditions rarely observed in the field, such as ads, promotions, and product placement for healthful food will be important to follow for changes and there is a need for measures to reliably capture these conditions as food stores include marketing for healthful products and items on the exterior of the store and at the checkout.

Requiring that the surveyor make a judgment call regarding what is marketing for healthful or less healthful food at the point of collection presents an additional challenge and may be seen as a limitation to the methods. However, in community-based participatory research, which is becoming common for this type of data collection,³⁶ addressing this point of decision making through education, training, and potentially advocacy for improving neighborhood conditions can contribute to the educational component of the experience. Identifying the point of influence and developing the skills to inform decision making may contribute to an enhanced learning process for participants. Training and instructions were provided to determine

Table 1. Continued

Scoring Criteria	Points Assigned
<i>Store has limited exterior marketing</i>	Maximum score = 8 Meets standards ≥ 4
Number of ads for healthful products	None = 0 Any small = 0.5 Any medium = 0.5 Any large = 1 Maximum = 4
Store exterior conditions (produce bins, other food products on sidewalks, vending, advertising, images, painted murals)	
Number of ads for unhealthy products	None = 2 No large = 0.5 (and ≤ 2 small and ≤ 2 medium) ≤ 2 medium = 0.5 (and ≤ 2 small and ≤ 2 large) ≤ 2 small = 0.5 (and ≤ 2 medium and ≤ 2 large)
<i>Store has limited interior marketing</i>	Maximum score = 8 Meets standards ≥ 5
Presence of ads or promotions for healthful products	None = 0 1 or 2 items = 1 3 or 4 items = 2
Healthful products at checkout	None = 0 1 or 2 items = 1 3 or 5 items = 2
Presence of ads or promotions for unhealthy products	None = 2 1 - 2 items = 1 3 or 4 items = 0
Unhealthy products at checkout	None = 2 1 or 2 items = 1 3-5 items = 0
<i>Store located in safe, walkable areas</i>	Maximum score = 10 Meets standards ≥ 7
Walkability score	< 5 = 5 5-9 = 3 10-14 = 1 > 15 = 0
Safety question on walkability survey	0 = 2
Bars on windows or doors	Yes = 0 No = 2
Lee Law: If store sells alcohol, store in compliance (1/3 window area covered by ads)	Yes or n/a = 1 No = 0
<i>Subtotal store score</i>	Maximum score = 100 Meets standards ≥ 75
<p>CX³ indicates <i>Communities of Excellence in Nutrition, Physical Activity, and Obesity Prevention</i>; FS, Food Stamp Program (now known as the Supplemental Nutrition Assistance Program or SNAP); WIC, Special Supplemental Nutrition Program for Women, Infants and Children.</p>	

examine distribution of scores across low-income areas and by store type; results are reported elsewhere.²⁹ Store score results showed that nearly all supermarkets and most large grocery

stores received quality scores of 75 or higher. Very few small markets and no convenience stores received this quality score. Yet, over a third of small markets were approaching “quality

Table 2. CX³ Food Availability and Marketing Survey Inter-Rater Reliability Results

Store Survey Measures		κ
<i>Store exterior: ads on windows and doors of store front</i>		
Number of small ads for <i>less healthful</i> food and beverages	0.556***	
Number of small ads for <i>healthful</i> food and beverages	0.674***	
Number of medium ads for <i>less healthful</i> food and beverages	0.372*	
Number of medium ads for <i>healthful</i> food and beverages	0.523**	
Number of large ads for <i>less healthful</i> food and beverages	0.496**	
Number of large ads for <i>healthful</i> food and beverages	0.649***	
		Intraclass Correlation
<i>Store exterior promotions and conditions</i>		0.857
Food products and vending on sidewalk, painted images on windows or doors, murals promoting healthful foods, bars on windows, WIC, or FS signage		
<i>Store interior: presence of ads or promotions for less healthful products</i>		0.830***
Next to, below, on floor, hanging above checkout counter		
<i>Store interior: presence of ads or promotions for healthful products</i>		0.697***
Next to, below, on floor, hanging above checkout counter		
<i>Store interior: presence of less healthful products next to checkout counter</i>		0.669***
<i>Store interior: presence of healthful products next to checkout counter</i>		0.466**
<i>Produce section</i>		
Produce sold		0.516**
		κ
Overall availability of fruit inside and outside the store		0.681***
Overall availability of vegetables inside and outside the store		0.704***
		Intraclass Correlation
Overall quality of fruit inside and outside the store		0.528***
Overall quality of vegetables inside and outside the store		0.708***
<i>Availability of specific fresh fruits and vegetables</i>		
Apples	0.776**	
Bananas	0.746***	
Oranges	0.759***	
Carrots	0.664***	
Tomatoes	0.671***	
Broccoli	0.870***	
Cabbage	0.664***	
<i>Fresh fruits and vegetables: price per pound</i>		0.797***
<i>Aggregation of list "other healthful food"</i>		0.890***

FS, indicates Food Stamp Program (now known as the Supplemental Nutrition Assistance Program or SNAP); WIC, Special Supplemental Nutrition Program for Women, Infants and Children.

P* < .05; *P* < .01; ****P* < .001.

whether the food being marketed on the exterior of the store and at the checkout was healthful or less healthful. To inform categorizing and coding, the survey and the protocol provided explicit descriptions for healthful and less healthful food. Specific nutrition content limits were provided for certain food such as granola bars. The availability of fruit and vegetables and other healthful food did not require a judgment call, simply the absence or presence of the specified product.

Revised measures of “attached to or directly next to” the checkout counter to collect marketing practices in this area of the store performed much better for inter-rater reliability, but there is potential for products that are proximate to the register area to be overlooked. Missing some of these cues to action for consumers presents a trade-off for researchers needing to capture products and ads that can trigger impulse buys. Alternatively, the measures capturing the presence or absence of conditions on the interior and exterior of the store are generally reliable and relatively easy to collect. The overall measure of the quality of vegetables performed better than fruit, and other research has shown that a wide range of vegetables was more prevalent in stores in California’s low-income areas as compared to fruit.²⁹

Store Scores

Data about the local food environment help communities set priorities, inform education and communications strategies, and support decisions to determine which neighborhoods have the greatest need for resources. Researchers have documented the use of store measurement instruments^{13,37} to inform policy initiatives and affect local food environments.^{32,38,39} Effective communication of findings and potential to secure local resources by staff and/or community members creates the foundation for partnerships to foster healthy neighborhoods. The store scores improve the ability to describe food markets for more than just the food available, but for the stores’ marketing practices and accessibility.

The main limitation of the scoring system includes the inability to reflect

Table 3. CX³ Food Availability and Marketing Survey Inter-Rater Reliability Results for Measures with No Variance or Rare Conditions

Store Survey Measures with No Variance or Rare Conditions

Intraclass Correlation

<i>Store exterior conditions</i>	
Produce bins on the sidewalk in front of store	No variance - none present
Soda vending in front of store	Rare - only 2, 2 match
Water vending in front of store	Rare - only 2, 2 match
Images of healthful food and/or beverages painted on doors or windows of the storefront	Rare - only 3, no match
Images of unhealthful food and/or beverages painted on doors or windows of the storefront	Rare - only 4, 1 match
Painted murals of healthful food and/or beverages anywhere on the building walls	Rare - only 2, no match
<i>Store interior: presence of less healthful ads or promotions</i>	
On floor (if standing in checkout aisle)	No variance - none present
Hanging from ceiling (directly over register)	No variance - none present
<i>Store interior: presence of ads or promotions for healthful products</i>	
Next to checkout (attached to or directly next to)	Rare - only 4, 3 match
Below checkout level	Rare - only 6, 3 match
On floor (if standing in checkout aisle)	No variance - none present
Hanging from ceiling (directly over register)	No variance - none present
<i>Store interior: presence of less healthful products next to checkout counter</i>	
Gumball or candy machine (next to counter or exit doorway)	Rare - only 5, no match
Candy (next to or below counter/checkout)	No variance- present in all but 3 stores, all match
Chips (next to or below counter/checkout)	Rare - only 5, 2 match
<i>Store interior: presence of healthful products next to checkout counter</i>	
Granola bars, with nutrition content standard	Rare - only 4, 2 match
<i>Produce section</i>	
Health promotion items around fruit and vegetable display	Rare - only 4, 2 match
Nutrition information, <i>Fruit and Veggies: More Matters</i> , <i>Network for a Healthy California: Champions for Change</i> , 5-A-Day signs (not on packaging)	Rare - only 1, no match
Nutrition information	No variance 1 recorded No matches
<i>Other healthful food</i>	
Whole-wheat bread	Rare - only 5, all match
Tofu, plain	Rare - only 5, 2 match
Baby food, jarred, single meat	Rare - only 4, all match

size of the neighborhoods selected to survey and staff commitment, the process can take anywhere from 3-9 months from training to receipt of scores. As the methods were refined and with use of the data entry system connected to the scoring algorithms, turnaround time at the state-level was minimized.

The store survey has been used by 23 of California's 58 local health departments in more than 500 stores from 2007-2009. In 2009, local health departments participating in CX³ were surveyed using an on-line interface to gather information about how projects are using CX³ data, with whom the data were shared, impressions of the value of the process, quality of tools and technical assistance, and skill acquisition by staff. The health departments reported the store scoring system as the most effective data analysis (94%) compared to other types of analysis, such as an index of healthful to less healthful food sources adapted from the Retail Food Environment Index² (82%). The store score card was also reported as being among the most useful of all the communication tools produced (75%). The store score has been used to require compliance by vendors to participate in a healthy store incentive campaign.

IMPLICATIONS FOR RESEARCH AND PRACTICE

The CX³ retail scoring system can be a catalyst for change. It translates store survey findings into a format that empowers community members and other stakeholders to foster meaningful and action-oriented approaches for environmental change. All participating health departments have reported current action or plans to start retail interventions. As a group, *Network* health departments that have participated in CX³ reported they have planned or started a *Network Retail Program* (16 of 22 health departments), created "Where to shop" lists for residents (15), held food demonstrations in neighborhood stores (15), conducted events for stores that meet the quality standards (14), and encouraged quality small stores to become WIC vendors (9). Specific

any additional information collected if the survey is modified to capture unique conditions specific to a certain community. Yet local agencies and other researchers have successfully adapted the survey tool without using

the scoring to meet the needs of their projects. The survey requires training, coordination of field work, and multiple levels of quality control with data collection and entry to ensure the accuracy of the data. Depending on the

examples of county-level initiatives include creation of a local food access coalition with a city incentive program, and the start of a weekly mobile food bank with fresh fruits and vegetables in a food desert while residents try to attract retailers of healthful products.

The survey appears to be strong in usability among varying users, as reported by health department staff; applicable to small and large retailers; and reliable for most survey items. Its usability provides face validity and shows its potential as a practical tool among community members and youth who are ready for education and community-level advocacy. The CX³ store scores go beyond reporting survey data to provide a way for health departments, their partners, and residents to decide and convey which markets could become community champions through interventions such as the *Network Retail Program*, promotion of WIC food, local sourcing, or other approaches.

When store scores are combined with materials, guidance, and assistance for ways to make improvements, efforts can be maximized. Local health departments have been sensitive to potential negative reactions from the business community if publication of store names and scores for a particular neighborhood occurred. To date, store names and scores have not been publicized or reported beyond a community, but some health department staff had received pressure to do so. Typically, a summary of all the stores' scores without the individual store names have been shared with stakeholders. Individual store score cards, which are "personalized" to include the store name and scores, have been used for one-on-one retailer education purposes. The positive aspect of the scoring has been conducive to incentivize stores to gain points to participate in various local efforts or marketing.

The community food environment is an area in which local health departments can help direct local resources and create partnerships among city, county, and local organizations.⁴⁰ Supplied with standardized tools and training, health departments can provide vision, leadership, and resources that elevate community food issues affecting the health of

neighborhood residents. It is critical to develop ways to examine and communicate evidence from the retail food environment, since it is a central focus for many efforts to improve the neighborhoods, specifically in terms of quality of the local food supply, not just the presence of certain types of stores. The store scores communicate detailed store-level data in a practical way for efforts to improve neighborhood food conditions. Scores give clear direction on action needed by communities and store owners to create healthier neighborhoods through the quality of the food available and the types of marketing cues present. As stores shift the products available to more healthful options and reduce marketing of less healthful items, the use of reliable tools and research to gather community-level changes are needed to not only show changes in environments, but to link them to policy initiatives and consumer behaviors.

STATEMENT OF POTENTIAL CONFLICT OF INTEREST

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