



# Marketing Sustainability Analysis of Stores Participating in a Healthier Retail Food Program

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## ABSTRACT

**Objectives:** To examine how food retailers completing *Shop Healthy NYC*, a healthy food retail program, (1) changed availability, placement, and promotion of healthier food immediately after participation and (2) sustained changes 1-year postintervention.

**Methods:** From 2014 to 2017, stores in 2 high-poverty New York City neighborhoods participated in a low-intensity intervention focused on in-store advertising or a high-intensity intervention to meet 7 criteria related to availability, placement, and promotion of healthy items. Stores were assessed preintervention (Pre), 1-month postintervention (Post 1), and 12–16 months postintervention (Post 2). Analyses were restricted to stores that completed the intervention and were assessed at all time points ( $n = 64$ ). Changes were compared across time points.

**Results:** Across stores participating in the low-intensity intervention, the ratio of unhealthy-to-healthy ads decreased from Pre to Post 1, and by Post 2 remained improved over baseline. Among stores participating in the high-intensity intervention, the median number of healthy criteria met increased from 3.5 to 6 from Pre to Post 1 and decreased to 5 at Post 2.

**Conclusions:** Improvements in the marketing and availability, placement, and promotion of healthy products are feasible but may require reinforcement and additional support over time.

**Key Words:** food environment, corner store intervention, unhealthy food promotion, marketing (*J Nutr Educ Behav.* 2023;55:205–214.)

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## INTRODUCTION

Urban neighborhoods across the US have been shaped by structural racism and wealth inequality. Intentional policies and practices such as redlining have created racially segregated urban areas and deprived predominately Black and Latino neighborhoods of the resources and opportunities in predominately White neighborhoods.<sup>1,2</sup> These processes have shaped neighborhoods in a number of ways, including the food environment.<sup>3</sup> Black and Latino neighborhoods often have fewer supermarkets than White neighborhoods and feature an overabundance

of small corner stores (also called bodegas), which tend to offer low-nutrition, high-calorie foods.<sup>4</sup> Historically, some federal policies encouraged the proliferation of unhealthy retailers in such neighborhoods, for example, through loans and tax incentive programs for fast food restaurants.<sup>5</sup> In addition, neighborhoods that are low-income and neighborhoods of color often experience a relatively high density of outdoor advertising overall and for unhealthy products in particular.<sup>6</sup>

With support from the New York City (NYC) Mayor's Office for Economic Opportunity, *Shop Healthy NYC* was launched in 2012 as part of a

portfolio of NYC Department of Health and Mental Hygiene's (Health Department) programs to improve access to and consumption of fresh produce and other healthier foods.<sup>7</sup> The program grew out of almost a decade of Health Department efforts to work with food retailers,<sup>7,8</sup> and takes a holistic approach to food retail change, impacting multiple aspects of the food environment by: (1) working with food retailers to increase stock and promotion of healthier products (ie, food retailer component), (2) collaborating with suppliers/distributors to promote healthier foods and facilitate wholesale purchases of these foods (ie, distributor component), and (3) engaging community members to support participating retailers and increase demand for healthier foods (ie, community engagement component).

Food retail efforts have been developed around the country to create more equitable food environments. Such interventions have focused on modifying food retail spaces, particularly corner stores and supermarkets. Common strategies

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have included working with stores to increase the stock of fruits and vegetables,<sup>4,9,10</sup> posting shelf labels to promote healthy products,<sup>10</sup> and rearranging stores to make healthy items more visible.<sup>11,12</sup> Food retail interventions have been found to increase availability<sup>8,13–19</sup> and sales<sup>13,20</sup> of healthy products and to increase customer knowledge of and consumption of healthier foods.<sup>21,22</sup>

Existing evidence on the long-term sustainability of such interventions is limited. One quasi-experimental study examined the sustainability of an intervention in Baltimore City. In this intervention, stores stocked and promoted healthy foods while receiving nutrition education and technical assistance.<sup>16</sup> The study found that increases in the stock of some but not all promoted products were sustained 6 months postintervention. In this study, we evaluated the food retail component of *Shop Healthy* to assess whether participating stores (1) improved product availability, placement, and promotion of healthier foods immediately after participating in the program and (2) sustained improvements 1 year after the intervention. We considered improvements to have been “sustained” if, across stores, changes made during the initial intervention remained significantly improved over baseline when assessed at least 1 year after completion of the intervention. This study is one of a few to examine the sustainability of improvements 1 year following the completion of a food retail intervention.

## METHODS

### Setting

*Shop Healthy* concentrates on 1 NYC neighborhood at a time to saturate the area with consistent messaging and create positive changes across the neighborhood’s food environment. Neighborhoods are selected from areas of focused attention for the Health Department in the South Bronx, East and Central Harlem, and North and Central Brooklyn.<sup>23</sup> These areas have been subjected to racist practices such as redlining and disinvestment, which have contributed to

deep health inequities between these and other NYC neighborhoods.<sup>24</sup>

Here we present findings from the implementation of *Shop Healthy* in 2 ZIP codes in NYC between 2014 and 2017 from 2 neighborhoods with more than 110,000 residents (ZIP code 10457 in East Tremont in the Bronx: 75,668 residents; ZIP code 10035 in East Harlem in Manhattan: 35,366 residents).<sup>25</sup> These neighborhoods have high rates of diet-related chronic disease, including heart disease (East Harlem, 50.2; East Tremont, 61.9;<sup>26</sup> compared with citywide, 32.9 per 100,000 people).<sup>27</sup> They are also home to many bodegas, which typically stock fewer healthy food options than supermarkets.<sup>4</sup> In East Tremont, there are 37 bodegas for every supermarket<sup>26</sup>; in East Harlem, there are 17.<sup>27</sup>

### Intervention Description

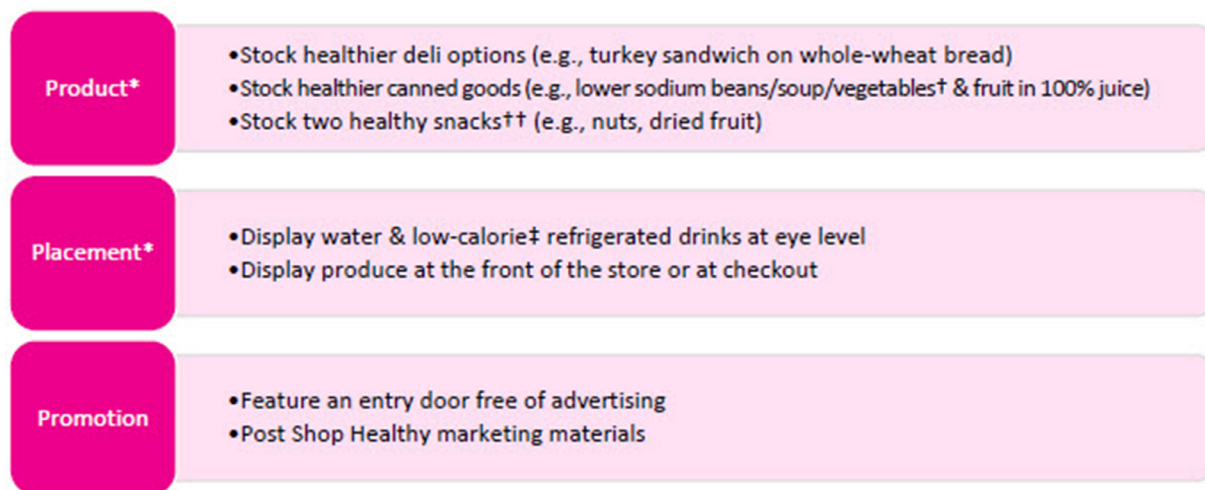
Initially, Health Department staff conducted a food retail audit, walking block-by-block in the selected zip codes to identify supermarkets and bodegas that were potentially eligible to participate in *Shop Healthy*. Supermarkets and bodegas were identified on the basis of their names and outside appearance. Supermarkets are often apparent by their size and name (in the case of larger chain supermarkets). In contrast, bodegas are typically significantly smaller than supermarkets and often have visual cues, such as store name (eg, deli). When cases were unclear from the outside, staff entered stores and used the definitions below to determine store type.

After completing the audit, staff visited stores that were considered potentially eligible. For this program, bodegas were defined as having at most 2 cash registers, carrying a range of basic grocery items, and not specializing in any one product (eg, produce, meats, baked goods). Supermarkets were defined as a chain or independent stores larger than corner stores, with at least 2 cash registers and a wide variety of fresh produce and other grocery items. Stores were eligible to participate if they sold (or were willing to sell), at minimum, fresh produce, bread, and milk. After determining eligibility,

staff invited the store (via the owner or manager) to participate in the low-intensity intervention to increase in-store marketing of healthier products that stores already stock. Staff returned to stores up to 3 times over 3–4 months to recruit them. At participating stores, staff conducted an observational assessment preassessment [Pre]; see description below). Next, staff posted *Shop Healthy* branded marketing materials, including shelf-talkers and refrigerator decals to promote produce, low-sodium canned goods, whole wheat bread, water, and low-fat milk. Stores with delis were also asked to post menu signs for healthier deli options, such as sandwiches on whole wheat bread and meal combos with fruit and/or water.<sup>28</sup> After the low-intensity intervention (3–4 months), stores were invited to participate in the high-intensity intervention.

During the high-intensity intervention, stores received 5 additional visits, approximately 1 per month. During visits, stores were provided technical assistance to help them meet up to 7 criteria related to the availability, placement, and promotion of healthy items (Figure 1). The 7 criteria were informed by the Health Department’s previous food retail work and were designed to be feasible and impactful.<sup>29,30</sup> Stores received incentives, including baskets and floor stands for displaying produce or healthier foods and reusable shopping bags for customers. Stores that met all 7 criteria were recognized in a ceremony with a certificate from their Borough President’s Office and promoted throughout the community through fliers, online promotions, and events.

Throughout the high-intensity intervention, staff also engaged community partners and residents through activities designed to increase demand for healthier food, such as schools adopting a local bodega and requesting that they stock healthy items.<sup>28</sup> On the supply side, staff, developed relationships with regional food distributors to ensure the availability of requested healthier products and posted *Shop Healthy* marketing materials at distribution sites to draw attention to these items.



**Figure 1.** Shop Healthy criteria for bodegas and supermarkets. \*For shelf-stable items like snacks, canned goods, water and low-calorie drinks, store had to meet a minimum stock requirement of 3 units to be counted as stocking that item. †Canned beans and vegetables must contain  $\leq 290$ mg sodium per serving; soup must contain  $\leq 480$ mg sodium per serving. ††Snacks must contain, per serving,  $\leq 200$  calories,  $\leq 7$ g total fat,  $\leq 2$ g saturated fat, 0g trans fat,  $\leq 200$ mg sodium,  $\leq 10$ g sugar, and  $\geq 2$ g of fiber; specific exceptions apply for nuts, seeds, and nut butters; fruit and vegetable products with no added sugar; and granola bars with nuts or seeds as the main ingredient. ‡Beverages must contain  $\leq 25$  calories per 8 oz.

All stores that participated at either intervention level received a final follow-up visit approximately 1 month following the implementation of the high-intensity intervention. At this visit, staff completed another in-store observational assessment (postassessment [Post] 1) and replenished healthy marketing materials. Therefore, stores that only participated in the low-intensity intervention received at least 2 visits, whereas stores that participated in both levels received 7 visits or more. The full intervention period spanned 1 year. *Shop Healthy* returned to these stores approximately 12–16 months after the Post 1 assessment to assess the extent to which improvements were maintained (Post 2).

### Assessment Tool

Staff used the same assessment tool for visits at Pre, Post 1, and Post 2. The assessment tool was adapted from tools used in previous Health Department food retail programs and informed by reviewing assessment tools created by other programs.<sup>8,31–33</sup> The assessment included sections on produce, the deli, canned goods, whole wheat bread, snacks, beverages, and advertising. Staff counted the

number of types of fresh fruits and vegetables available and answered yes/no questions to record the promotional placement of produce. Yes/no questions were used to indicate the availability of low-sodium and no-sugar-added canned goods, whole wheat bread, healthier snacks, and healthy deli items, as well as promotional placement of refrigerated water and low-calorie beverages (ie, at eye-level). For shelf-stable items such as snacks, canned goods, water, and low-calorie drinks, stores had to meet a minimum stock requirement of 3 units to be counted as stocking that item. Staff counted the number of advertisements for unhealthy and healthy products (including Shop Healthy promotional materials) inside and outside the store, recording the number of ads by category.

Before conducting assessments, staff received a 2-part training. The first part consisted of a classroom-style session during which the trainer reviewed the assessment tool item by item, accompanied by PowerPoint slides that included photographs of examples, especially for items that might be difficult to assess. The second part consisted of in-store training, during which the trainer typically trained 2 staff. During the

first store assessment, the evaluator explained each item as the group completed the assessment. At the next stores visited, the group completed assessments separately and compared responses to help identify and address further areas that needed training and clarification. An effort was made to visit both a supermarket and bodegas during training. Staff received supplementary reference materials to ensure high-quality data collection, including a measures and definitions document that clarified each item on the assessment, and a produce list to help with produce counts, especially at supermarkets which carried many varieties of fruits and vegetables. Finally, staff used regular team meetings to clarify data collection issues.

### Analysis

We analyzed to assess improvements immediately after participating in the program and  $> 12$  months following the completion of these interventions. The analytic sample included stores that completed either the low- or high-intensity interventions and received assessments at the Pre, Post 1, and Post 2 time points. We assessed changes from Pre to Post

1 and Pre to Post 2. Store changes that were significantly improved at Post 2 compared with baseline were considered to be sustainable. Post 1 and Post 2 were compared with compare any changes after completing the intervention.

To assess the impact of the intervention on in-store marketing, we tallied the number of unhealthy and healthy ads at the Pre, Post 1, and Post 2 time points. For each time point, we calculated the ratio of unhealthy-to-healthy ads on the basis of total counts across all stores. We used odds ratios (OR) to compare ad ratios across time points; Fisher's exact tests were used to test changes across time points. We stratified by low-intensity and high-intensity stores to assess how the intervention type may have affected changes.

Among stores participating in the high-intensity intervention, 2 sets of analyses examined changes in the 7 criteria related to product availability, placement, and promotion of healthy items. First, we compared changes in the median number of criteria met across time points using a Wilcoxon signed rank test. Then, McNemar's test was conducted to assess whether changes in the percentage of stores meeting each criterion were statistically different across time points. We conducted the same analyses for stores that participated only in the low-intensity intervention to understand to what extent stores might make these changes without the store commitment, technical assistance, and support that are part of the high-intensity intervention. All analyses were conducted in SPSS (IBM Corp), and statistical significance was set at  $\alpha = 0.05$ .

This study was reviewed by the NYC Department of Health and Mental Hygiene's Institutional Review Board, which determined that the project did not constitute human subject research and was, therefore, not under the purview of the Institutional Review Board.

## RESULTS

Of 147 eligible stores in the intervention zip codes, 115 (78%) permitted staff to conduct the Pre, and 94 completed the intervention and received

Post 1. Of these, 64 received Post 2, which comprised our final analytic sample (Figure 2). This sample included 14 stores that had completed the low-intensity intervention only and 50 that had completed the low- and high-intensity interventions. All stores that did not complete Post 2 were bodegas, several of which had changed management or closed.

### Ad Counts

At Pre, 579 ads were counted across 64 stores; 479 were for unhealthy products (445 were for sugary drinks), and 100 were for healthy products. At Post 1, the number of ads for unhealthy products had decreased to 245, whereas the number of ads for healthy products had increased to 668 because of primarily the placement of *Shop Healthy* ads as part of the *Shop Healthy* intervention. At Post 2, the number of ads for unhealthy products had increased to 613, and those for healthy products had decreased to 433, 85% of which were *Shop Healthy* ads (Table 1).

### Ad Ratio

At Pre, there were 47.9 unhealthy ads for every 10 healthy ads. Immediately following the intervention at Post 1, the ad ratio dropped by 97% (OR, 0.08; 95% CI, 0.06–0.10;  $P < 0.001$ ) to 3.7 unhealthy ads for every 10 healthy ads. At Post 2, there were 14.3 unhealthy ads for every 10 healthy ads, which was significantly higher than at Post 1 (OR, 3.86; 95% CI, 3.2–4.7;  $P < 0.001$ ) but still significantly lower than at Pre (OR, 0.30; 95% CI, 0.23–0.38;  $P < 0.001$ ). Examining low and high-intensity stores separately did not yield notably different results with respect to changes in the ad ratios across time points (Table 1).

### Shop Healthy Criteria

Among stores that participated in the high-intensity intervention, the median number of criteria met increased from 3.5 (interquartile range [IQR], 1; range, 0–5) at Pre to 6 at Post 1 (IQR, 1.75; range, 3–7;  $P < 0.001$ ). At Post 2, the median number of criteria had decreased to 5 compared with Post 1 (IQR, 1;

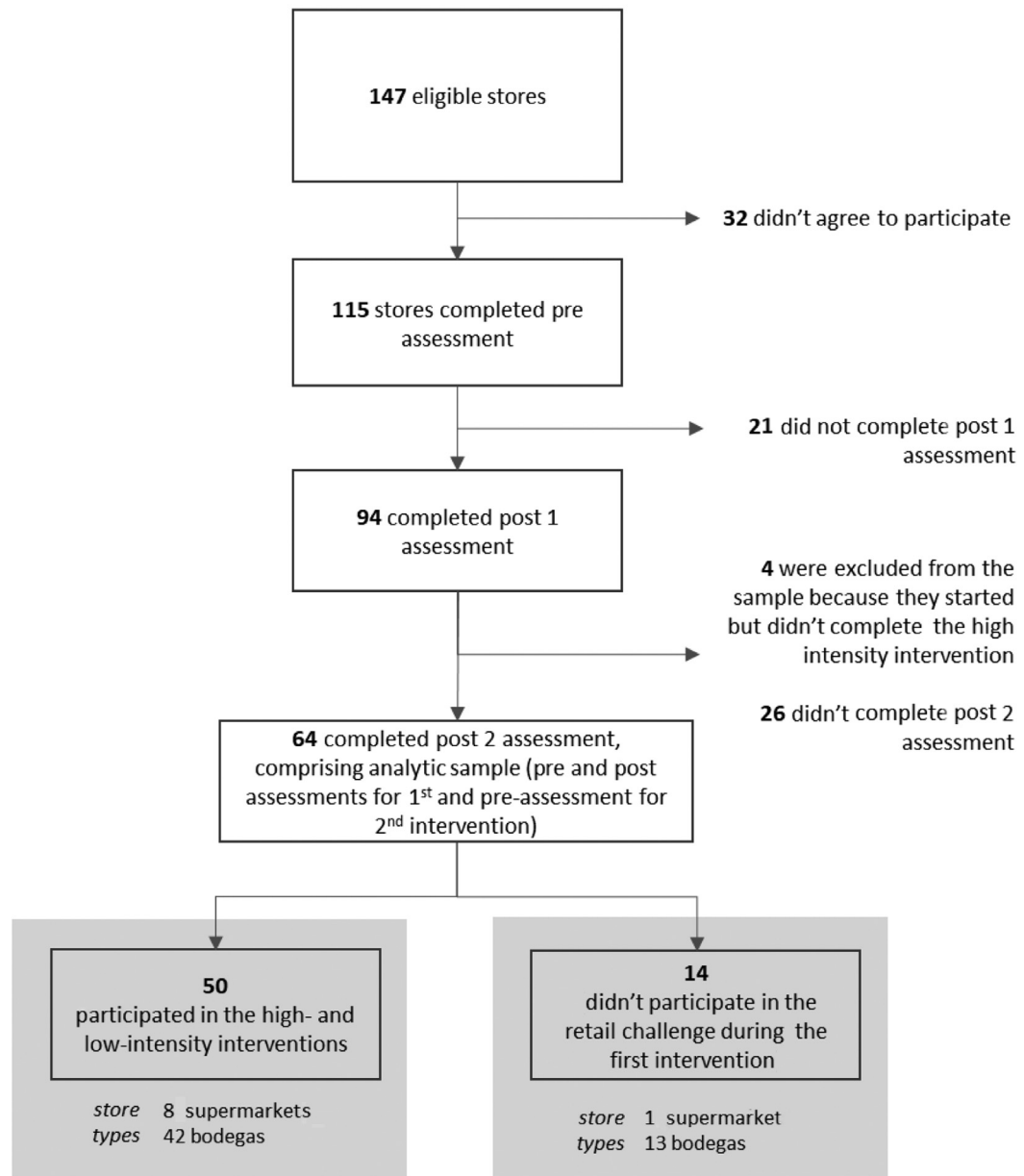
range, 2–7;  $P < 0.001$ ) but was still significantly higher than Pre ( $P < 0.001$ ). Of the 14 stores that only participated in the low-intensity intervention, the median number of criteria met was 3 Pre, which remained similar across assessment points.

When examining criteria individually, the percentage of high-intensity stores meeting each criterion increased from Pre to Post 1 for 6 out of the 7 *Shop Healthy* criteria; the only criterion with no significant change was having an entry door free of advertising (Table 2). Only the percentage of stores promoting healthy deli items significantly decreased from Post 1 to Post 2 (72% to 30%;  $P < 0.001$ ); the difference between Pre and Post 2 in this criterion was not significant (30% vs 12%;  $P = 0.089$ ). When comparing the Pre to Post 2 for the remaining criteria, 2 demonstrated significant improvements: the percent of stores stocking healthier canned goods (46% vs 70%;  $P = 0.014$ ) and posting *Shop Healthy* marketing materials (22% vs 92%;  $P < 0.001$ ).

Among low-intensity stores, there were no detectable changes in any criteria from Pre to Post 1 or Post 1 to Post 2. From Pre to Post 2, among low-intensity stores, only the percentage of stores posting *Shop Healthy* marketing materials increased (7.1% vs 57.1%;  $P = 0.027$ ).

## DISCUSSION

This evaluation aimed to assess improvements in product availability, placement, and promotion of healthy items in food retailers immediately following participation in the *Shop Healthy* food retail program and the extent to which improvements were sustained more than 1 year after program participation. Changes were examined following participation in (1) a low-intensity intervention to increase in-store marketing for healthier products; and (2) a high-intensity intervention to support stores in meeting 7 criteria around healthy product availability, placement, and promotion. Results show that even a low-intensity intervention consisting of posting healthy ads in



Assessment Type and Timeline	ZIP Code 10035 East Harlem (n=51)	ZIP Code 10457 East Tremont (n=13)	Total (n=64)
	Timeline		
<b>Pre</b>	Jul-Sep 2014	Nov 2015-Feb 2016	Jul 2014-Feb 2016
<b>Post 1</b>	Apr-Jun 2015	Aug-Sep 2016	Apr 2015-Sep 2016
<b>Post 2</b>	Sep-Nov 2016	Aug-Sep 2017	Sep 2016-Sep 2017

**Figure 2.** Flow chart of stores initially eligible for the study, but later excluded because of lack of assessment to make up the final analytic subset used. Timeline of the study is presented in the bottom of the figure.

stores can play an important role in changing the prevalence of marketing for healthy products. Findings also show that stores can improve areas such as product availability

and placement of healthy products with higher-intensity interventions, though not all improvements seen during the intervention period were sustained.

This study found that before the intervention, stores were saturated with unhealthy ads (mostly for sugary beverages) and had relatively few healthy ads. The low-intensity

**Table 1.** Unhealthy and Healthy Ads Among Stores by Intervention Type at Pre, Post 1, and Post 2

Variables	Total (n = 64)			High-Intensity (n = 50) <sup>a</sup>			Low-Intensity (n = 14)		
	Pre	Post 1	Post 2	Pre	Post 1	Post 2	Pre	Post 1	Post 2
Total ads	579	913	1046	462	825	874	117	88	172
Unhealthy ads	479	245	613	368	182	482	111	63	131
Sugary beverages	445	241	588	339	179	457	106	62	131
%	92.9	98.4	95.9	92.1	98.4	94.8	95.5	98.4	100
Healthy ads	100	668	433	94	643	392	6	25	41
Shop Healthy ads	44	652	373	42	632	344	2	20	29
Non-Shop Healthy ads	56	16	60	52	11	48	4	5	12
Ad ratio	47.9	3.7 <sup>b</sup>	14.2 <sup>b,c</sup>	39.1	2.8 <sup>b</sup>	12.3 <sup>b,c</sup>	185.0	25.2 <sup>b</sup>	32.0 <sup>b</sup>

Post 1 indicates postintervention 1; Post 2, postintervention 2; Pre, preintervention.

<sup>a</sup>High-intensity stores refer to stores that underwent the high-intensity and low-intensity portions of the program; <sup>b</sup>Ratio is significantly different to that in the Pre time point ( $P < 0.001$ ); <sup>c</sup>Ratio is significantly different to that in the Post 1 time point ( $P < 0.001$ ).

Note: New York City Department of Health and Mental Hygiene ads or ads previously posted by *Shop Healthy NYC*. Unhealthy-to-healthy ads ratio displayed as the number of unhealthy ads for every 10 healthy ads.

intervention changed the landscape of in-store advertising by increasing the presence of healthy ads and the number of healthy ads relative to unhealthy ads. Although the 1-year follow-up indicated that these positive changes diminished over time, they remained improved compared with the baseline. Although this evaluation did not assess the impact of such ads on individuals, a previous effort to survey residents in *Shop Healthy* neighborhoods found that most residents reported seeing *Shop Healthy* marketing materials in a neighborhood store and that signage may have influenced decision-making for purchases of healthy products.<sup>32</sup> When considering the landscape of advertising overall, it is worth noting between Post 1 and Post 2, whereas healthy ads were maintained by storeowners, the number of unhealthy ads in stores more than doubled, mostly for sugary drinks. This increase is likely because of ads placed by distributors, which visit stores regularly and often provide signage and marketing. A study of corner stores in 4 cities across the US found that most stores had formal or informal agreements with distributors of obesogenic products (including sugary drinks), which included incentives—often display stands, signage, and marketing materials—and expectations for product placement and promotion.<sup>34</sup> Based on conversations the *Shop Healthy*

team has had with store owners and staff, store owners often do not know when ads are being placed by distributors, and some welcome the efforts of *Shop Healthy* to remove unwanted advertising. Our results support the exploration of policies that limit in-store advertisements to address the wide leeway the food and beverage industry currently experiences when placing in-store marketing.

Our results show that stores that participated in the high-intensity intervention sustained improvement in some, but not all, of the *Shop Healthy* criteria. For 6 out of the 7 criteria, the percentage of stores meeting these criteria significantly increased immediately following the intervention. This finding is generally consistent with an earlier evaluation of the program, which found immediate improvements in product availability and promotion of healthy food and beverages after the intervention.<sup>35</sup> However, this study found variability in the degree to which improvements were sustained a year after the intervention. Identifying which criteria were maintained over time can help to inform future food retail work.

Stocking healthy canned goods and displaying *Shop Healthy* marketing materials were the most sustainable changes. These may be easier for store owners to implement. Most stores already carry canned goods and can add a low-sodium or

no-sugar-added variety to their purchase orders to meet the criterion. Posting *Shop Healthy* marketing materials also requires minimal effort by store owners/managers yet immediately impacts the store's advertising environment.

Our results suggest that improvements in stocking healthy snacks, displaying water at eye-level, and having healthy deli options may be harder to maintain and underscore the importance of working with distributors in addition to retailers. For example, placing refrigerated water at eye-level requires constant monitoring as refrigerators are frequently restocked, often by distributors who may want their products placed in more visible locations.<sup>35</sup> To address this challenge, *Shop Healthy* developed a healthy beverage placement diagram to help store owners maintain changes to beverage placement.<sup>35</sup> Furthermore, some stores found maintaining signs to promote healthy sandwiches, salads, and combos challenging. In some cases, distributors may replace *Shop Healthy* deli signage with their signs. Recently, deli distributors have provided stores with digital menu boards. *Shop Healthy* is investigating ways to update this criterion to improve sustainability. A Baltimore intervention provided stores with permanent menu boards that highlighted healthy items.<sup>36</sup> The boards featured high-quality

**Table 2.** Percent of Stores Meeting Each *Shop Healthy* Criterion by Intervention Type at Pre, Post 1, and Post 2

Variables	Pre		Post 1		Post 2				
	%	%	Change From Pre <sup>a</sup>	P Value <sup>b</sup>	%	Change From Post-1 <sup>a</sup>	P Value <sup>b</sup>	Change From Pre <sup>a</sup>	P Value <sup>b</sup>
High-intensity stores (n = 50)									
Availability									
Deli	12.0	72.0	60.0	< 0.001	30.0	−42.0	< 0.001	18.0	0.08
Healthy canned food	46.0	80.0	34.0	0.001	70.0	−10.0	0.332	24.0	0.01
Healthy snacks	84.0	98.0	14.0	0.039	96.0	−2.0	0.999	12.0	0.07
Placement									
Produce	84.0	98.0	14.0	0.039	88.0	−10.0	0.063	4.0	0.77
Water/low-calorie drinks	40.0	70.0	30.0	0.001	58.0	−12.0	0.238	18.0	0.06
Promotion									
Clean front door	54.0	58.0	4.0	0.832	44.0	−14.0	0.167	−10.0	0.44
Shop healthy materials	22.0	98.0	76.0	< 0.001	92.0	−6.0	0.250	70.0	< 0.001
Low-intensity stores (n = 14)									
Availability									
Deli	7.1	21.4	14.3	0.625	0.0	−21.4	0.250	−7.1	1.00
Healthy canned food	50.0	35.7	−14.3	0.625	21.4	−14.3	0.625	−28.6	0.22
Healthy snacks	71.4	78.6	7.1	0.999	85.7	7.1	0.999	14.3	0.63
Placement									
Produce	71.4	92.9	21.4	0.250	71.4	−21.4	0.375	0.0	1.00
Water/low-calorie drinks	28.6	35.7	7.1	0.999	42.9	7.1	0.999	14.3	0.63
Promotion									
Clean front door	71.4	35.7	−35.7	0.125	64.3	28.6	0.219	−7.1	1.00
Shop healthy materials	7.1	28.6	21.4	0.250	64.3	35.7	0.125	57.1	0.02

Post 1 indicates postintervention 1; Post 2, postintervention 2; Pre, preintervention.

<sup>a</sup>Change is calculated as the absolute difference between calculated percentages; <sup>b</sup>P value calculated using McNemar's test.

Note: Values are presented as percentages.

photographs and dry-erase price sections to accommodate price changes.<sup>36</sup>

Most bodegas and supermarkets in our sample already stocked produce at the front of the store and carried at least 2 healthy snacks at the beginning of the intervention. *Shop Healthy* may explore increasing the minimum requirements for these criteria to further expand the variety of produce and healthy snack items in stores. The *Apache Healthy Stores* intervention requires stores to stock a few minimum base items and provides a menu of additional options from which to choose.<sup>9</sup> Because adding variety to existing inventories was successful with healthy canned goods, it may also be sustainable for produce and snacks.

The number of stores with a front door free of unhealthy advertisements did not improve significantly between any time point. Removing advertisements from the front door can be difficult; it is physically challenging for staff to remove sticker advertisements, and they are often quickly replaced by distributors. This study found that among all stores, the number of unhealthy ads posted inside and outside stores more than doubled between Post 1 and Post 2, demonstrating the aggressive speed with which unhealthy ads are posted. This is particularly true for sugary drink ads, which accounted for more

than 90% of unhealthy advertisements posted across time points. Research conducted in NYC has found positive associations between sugary drink ad density and the percentage of Black, Asian or Pacific Islander residents who had less than a high school diploma.<sup>6,35</sup>

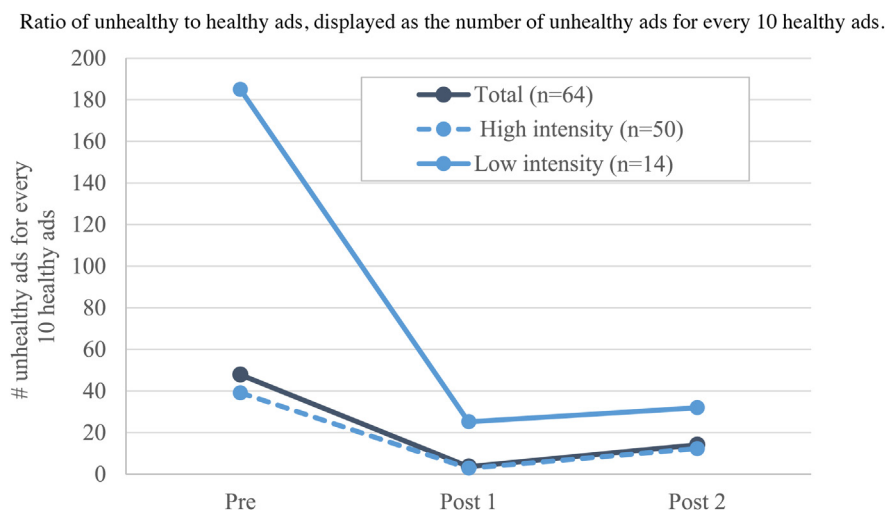
Notably, the study did not find any significant improvements in *Shop Healthy* criteria among stores that completed only the low-intensity intervention, indicating that while this intervention can yield improvements in advertising for healthy foods on its own, it does not influence stores to improve product availability, placement, or promotion. This strengthens existing evidence for implementing multipronged interventions incorporating a mix of approaches and technical assistance.<sup>8,10,13–19,29,37,38</sup>

This evaluation has limitations, including the lack of a control group. There may be selection bias in the final sample of stores as some declined to participate, and others became lost to follow-up. Understanding barriers to stores' ongoing participation is critical to understanding sustainability. Loss of follow-up also affected the sample size and likely affected the ability to detect statistically significant differences. In addition, small sample sizes prevented us from comparing differences between bodegas and supermarkets. Finally, this study did not

assess how *Shop Healthy* impacts consumers and neighborhood residents. Despite these limitations, this study supports the effectiveness and sustainability of a healthier food intervention that can serve as a model for others.

## IMPLICATIONS FOR RESEARCH AND PRACTICE

This study provides evidence of the ability of food retail interventions to make sustained changes to the product availability, placement, and promotion of some healthier items. Findings add to the existing literature on the benefits of incorporating a variety of approaches to achieve significant changes to the food retail environment.<sup>8,13–19,37,38</sup> Further research is needed to understand the optimal dose of the intervention to sustain change. Future interventions exploring the encouragement of store owners to add a healthy variety to preexisting inventory is needed, particularly as this approach may be more sustainable. Approaches like in-store marketing can dramatically increase health advertising but benefit from periodic replenishment to keep pace with the proliferation of ads for unhealthy products. Although more research on the long-term impacts of food retail interventions is needed, this study sheds light on which aspects of the *Shop Healthy*



**Figure 3.** Unhealthy-to-healthy ads ratio among stores by intervention type at Pre, Post 1, and Post 2 displayed as the number of unhealthy ads for every 10 healthy ads. Post 1 indicates postintervention 1; Post 2, postintervention 2; Pre, preintervention.



program may be most impactful and sustainable and provides lessons learned for food retail interventions in low-income, urban neighborhoods.

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