

Corner Store Purchases in a Low-Income Urban Community in NYC

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Abstract We assessed purchases made, motivations for shopping, and frequency of shopping at four New York City corner stores (bodegas). Surveys and purchase inventories ($n = 779$) were collected from consumers at four bodegas in Bronx, NY. We use Chi square tests to compare types of consumers, items purchased and characteristics of purchases based on how frequently the consumer shops at the specific store and the time of day the purchase was made. Most consumers shopped at the bodega because it was close to their home (52 %). The majority (68 %) reported shopping at the bodega at least once per day. The five most commonly purchased items were sugary beverages, (29.27 %), sugary snacks (22.34 %), coffee, (13.99 %), sandwiches, (13.09 %) and non-baked potato chips (12.2 %). Nearly 60 % of bodega customers reported their purchase to be healthy. Most of the participants shopped at the bodega frequently, valued its convenient location, and purchased unhealthy items. Work is needed to

discover ways to encourage healthier choices at these stores.

Keywords Choice behavior · Diet · Food · Obesity · New York City

Introduction

Low-income minority neighborhoods have higher rates of obesity, possibly in part due to lower access to full-service supermarkets [1] and more access to small corner stores [2–4] than other neighborhoods. The density of corner stores is associated with an increased likelihood of consuming high-energy foods [5], including sugar sweetened beverages [6], and an increased risk of obesity among children and adults [7–9]. Corner stores tend to stock an abundance of inexpensive and high-calorie, unhealthy food items [10–12]. Given their high demand and shelf stability,

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these products are more profitable for small stores than healthier options like fruits and vegetables [13, 14], particularly if store owners do not have the resources and knowledge to make selling fruits and vegetables profitable [15]. Unsurprisingly, purchases at these stores often consist of unhealthy snacks, such as potato chips, desserts, and sugar sweetened beverages [14, 16, 17].

Though most customers purchase the bulk of their grocery items from supermarkets [18], corner stores receive a high volume of foot traffic. A typical store in New York City (NYC) gets upwards of 700 customer visits between 8 a.m. and 8 p.m. [19]. Recent work in Baltimore [2] and New Orleans [5] found that residents of low-income minority neighborhoods visit corner stores upwards of three times per week on average, and five or more times per week in NYC [20]. The most frequently cited reasons for their popularity include proximity [2, 21] and convenience [22]. They are also popular due to a poor proximity to supermarkets [18], and a lack of other food stores in the neighborhood [2].

While there is a growing body of research examining corner store purchases in low-income areas [23–25], there has been limited research examining shopping frequency. As best as the authors can discern, no study has specifically examined the relationship between shopping frequency and the type of items purchased at corner stores. In addition, no study has looked at how corner store customers view their purchases with regard to their healthfulness, and only a few confirmed purchases made at these stores with a bag check or direct observation (vs relying on self-reports) [16, 17, 20].

In an effort to expand the literature, the current study examines what corner store customers purchase most frequently, whether these purchases differ among customers who report shopping at these stores more versus less often, and how customers rate their purchases in terms of healthfulness. We collected point-of-purchase surveys from customers exiting four corner stores (generally referred to as “bodegas” in NYC) in low income neighborhoods in the Bronx, NYC as part of an evaluation of an intervention to improve the availability of healthy snack options within bodegas. This paper focuses on the purchasing patterns of consumers at these bodegas.

Methods

Site Selection

This study was designed through a community-academic partnership. Researchers from NYU School of Medicine partnered with Bronx Health REACH (BHR), a community-based coalition located in the Bronx, New York and led by the Institute for Family Health, a network of federally qualified health centers. Since 1999, the Centers for

Disease Control and Prevention has funded the BHR coalition as part of the Racial and Ethnic Approaches to Community Health (REACH) program, to reduce racial and ethnic disparities in diabetes outcomes in the Bronx. For many years, BHR has focused on understanding and improving nutrition and dietary behavior among Bronx residents. To this end, BHR, in collaboration with NYU School of Medicine researchers, collected data from four bodegas located in the South and Central Bronx, NYC. Stores were selected based on proximity (on average, one city block away) to elementary schools participating in a BHR school wellness intervention. The intervention gave parents tools to make local bodegas healthier, closely following the model of the NYC Department of Health and Mental Hygiene’s (DOHMH) Adopt a Bodega toolkit [13, 26]. No significant changes were made at any of the sites in either food availability, or purchases. We report data from all of the sites and both time periods together. The study was approved by both the NYU School of Medicine and the Institute for Family Health Institutional Review Boards.

Data Collection

Surveys were administered in English and Spanish to adult (at least 18 years) bodega shoppers at two points in time: April 22 through May 31, 2012 and October 2–24, 2012. Data collection took place on weekdays between 7 a.m. and 4 p.m. Individuals who exited the bodegas and appeared to be over the age of 18 were approached by trained research assistants and asked to participate in a short survey in exchange for a round trip NYC MetroCard (valued at \$4.50).

Survey

The survey consisted of 26 multiple choice questions, allowing only one answer choice, on participants’ food shopping behaviors as well as key demographic characteristics. Before completing the survey, each participant took part in a bag check, during which participants were asked to show the research assistants what they bought at the store, to determine what food and beverage items were purchased. The survey tool, including the bag check, was a modified version of evaluation materials used by the NYC DOHMH in another bodega intervention evaluation. The surveys were available in English and Spanish, which are commonly used languages in the Bronx community.

Statistical Methods

In this paper, we focus on the bag check and the following survey questions: “How often do you shop at this bodega?”, “What’s the most important reason for why you

shopped here today?”, and “How would you rate the healthfulness of what you bought here today?” We calculate the percentage of the sample that purchased specific types of items, and responses to the three questions mentioned above. We classify food items as being “healthy” based on a list from the NYC DOHMH used in other bodega-related work to assess the availability of healthy food and beverage items [27]. Further, we differentially examine frequent bodega shoppers (those who visit the bodega at least once a day), and calculate their most commonly purchased items versus those who shop at the stores less often. Finally, we determine the most frequently purchased items by the self-reported perceived healthiness of the purchase. Specifically, we compare those who report that their current purchase is “very healthy” or “somewhat healthy” to those who classified it as “very” or “somewhat unhealthy.” We used a Chi square test to measure differences between shoppers that report shopping at the bodega at least once a day and those who shop there less often. We limited all of our analyses to the five most commonly purchased items in the sample and were done using Stata version 12.0 (StataCorp, College Station, Texas, USA).

Results

A total of 779 surveys were collected. In Table 1 we report results for the full sample, a subsample of “frequent bodega shoppers,” ($n = 528$, 68 %), and a subsample of “less frequent bodega shoppers,” ($n = 251$, 32 %). Just over half of the full sample was female (52 %); the majority identified themselves as Hispanic/Latino (57 %), or as Black/African American (35 %). The mean age was 39 ($SD = 14$). The majority (69 %) of the full sample reported a high school diploma or less as the highest level of educational attainment. Over half (52 %) of the full sample had a household income of $< \$25,000$, and 44 % reported being currently unemployed. The sample is consistent with Census data for the neighborhoods [28]. Lastly, 63 % of the full sample was overweight or obese (based on self-reported height and weight), consistent with overweight and obesity rates for the borough [29].

Table 2 details the frequency of shopping at the specific bodega. In all, 21 % reported visiting the bodega once per day, and nearly 47 % reported a frequency of more than once per day. These individuals were classified as “frequent bodega shoppers.” Table 2 also lists the reported reasons the participants chose to shop at the bodega. The store’s close proximity to home was the overwhelming response, with over half (52 %) of the full sample reporting shopping at the store for this reason. The subsequent most common responses were that it was near a destination the participant was visiting (13 %) or near their worksite (12 %).

For both Tables 1 and 2 Chi squared tests compared the frequent bodega shoppers and the less frequent bodega shoppers. These tests showed that frequent bodega shoppers were more likely to be male ($p < 0.01$), have a lower income ($p < 0.01$), be older ($p < 0.01$), lower educated ($p < 0.05$), and report different reasons for shopping at the bodega ($p < 0.01$). Specifically, frequent bodega shoppers were more likely to shop at the bodega because it was close to home and less likely to shop at the bodega because it was close to their destination or they were just passing by.

Participants’ bag checks revealed the frequency with which specific types of items were purchased at the bodegas (Table 3). Most participants (57 %) purchased only one item. Unhealthy items were purchased most often, specifically sugar sweetened beverages (including regular soda) (31 %); sweets (cookies, cakes, candy, and ice cream) (22 %); and regular potato chips (not low fat or baked) (12 %). Coffee (14 %) and sandwiches (13 %) were also among the top five purchased items. When multiple items were purchased they mostly consisted of combinations of items from these five categories. There were no differences in the number of items purchased between frequent versus non-frequent bodega shoppers, 1.96 (± 4.04).

Items that were classified as “healthy”, per the NYC DOHMH materials mentioned earlier [27], were rarely purchased. Healthier snacks, such as baked potato chips, pretzels or nuts were included in 8 % of all purchases. About 9 % of all respondents purchased a fruit or a vegetable. Of these, bananas and plantains were the most commonly purchased. Diet sodas, low or no calorie beverages, water and 100 % fruit juice were purchased by 10 % of respondents.

Frequent consumers and less frequent consumers had similar responses about how healthy or unhealthy they considered their purchase to be. Approximately 33 % of all participants, and 31 % of frequent bodega shoppers, reported that their purchase was somewhat or very unhealthy (Table 2). However, 59 % of all customers and 60 % of frequent bodega shoppers reported their purchase to be somewhat or very healthy.

Discussion

The South and Central Bronx, where the corner stores in the present study are located, is highly saturated with bodegas and has high rates of obesity [21, 29, 30]. Most participants in our study reported visiting the bodega at least once per day, and almost all cited the store’s proximity to their home, work, or other destination as the most common reason for shopping at that store. Consumers who shop at the bodega at least once a day could be the most

Table 1 Demographic characteristics of survey participants

| | All purchases | Frequency of visits | | <i>p</i> value |
|--|---------------|---|-----------------------------------|----------------|
| | | Frequent bodega shoppers ^a (%) | Less frequent bodega shoppers (%) | |
| n | 779 | 528 | 251 | |
| Respondent gender | | | | 0.001 |
| Female | 51.50 % | 47.20 % | 60.60 % | |
| Male | 48.00 % | 52.50 % | 38.60 % | |
| Race/ethnicity | | | | 0.577 |
| Hispanic or Latino | 57.00 % | 58.10 % | 54.60 % | |
| Black or African American | 34.90 % | 34.30 % | 36.30 % | |
| Other | 8.10 % | 7.60 % | 9.20 % | |
| Income | | | | 0.001 |
| <\$25,000 | 52.60 % | 55.90 % | 45.80 % | |
| \$25,000–\$50,000 | 21.10 % | 20.80 % | 21.50 % | |
| \$50,000 and up | 4.90 % | 3.00 % | 21.50 % | |
| Employment | 21.40 % | 20.30 % | 23.90 % | 0.432 |
| Not employed | 43.60 % | 45.10 % | 40.60 % | |
| Employed full-time | 32.90 % | 31.30 % | 36.30 % | |
| Employed part-time | 16.30 % | 17.00 % | 14.70 % | |
| Retired | 6.40 % | 6.10 % | 7.20 % | |
| Age | | | | 0.011 |
| 18–24 | 15.70 % | 13.40 % | 20.30 % | |
| 25–34 | 27.50 % | 28.20 % | 25.90 % | |
| 35–44 | 19.40 % | 17.80 % | 22.70 % | |
| 45–54 | 23.90 % | 27.70 % | 15.90 % | |
| 55+ | 12.30 % | 12.10 % | 12.70 % | |
| Mean age (SD) | 39.14 (13.64) | 39.99 (13.53) | 37.33 (13.73) | |
| Education | | | | 0.047 |
| <HS | 29.40 % | 31.60 % | 24.70 % | |
| Graduated high school | 38.90 % | 40.00 % | 36.70 % | |
| Some college | 19.80 % | 18.80 % | 21.90 % | |
| Graduated college | 8.00 % | 6.40 % | 11.20 % | |
| Post graduate degree | 2.80 % | 2.30 % | 4.00 % | |
| BMI category | | | | 0.663 |
| Underweight—BMI 18.5 | 1.40 % | 1.10 % | 2.00 % | |
| Normal weight—BMI 18.5–24.9 | 32.20 % | 34.10 % | 28.30 % | |
| Overweight—BMI 25.0–29.9 | 36.50 % | 35.60 % | 38.20 % | |
| Obese and extremely Obese—BMI 30 and above | 26.70 % | 25.90 % | 28.30 % | |
| Missing | 3.20 % | 3.20 % | 3.20 % | |

Chi squared test of association for categorical variables, and Student's *t* tests were calculated for continuous variables between AM purchases and PM purchases, and between frequent bodega shoppers and less frequent bodega shoppers

^a If an individual reported visiting the bodega at least once per day, s/he was classified as a frequent bodega shopper

affected by any changes to the store. Therefore it is essential to understand why these individuals shop at the bodega, which items they purchase and their motivations for the specific purchase. Frequent bodega shoppers in our sample were more often male, older and had a lower socioeconomic status, which is consistent with other work [20]. Very few participants shopped at the bodega for a

reason particular to the specific store, such as its price, selection, service, or cleanliness. These results are also similar to work conducted in a low-income NYC neighborhood also citing proximity as the most important reason for why customers shop at these stores, despite being more expensive and having less healthy food options than supermarkets [21].

Table 2 Shopping Characteristics of the Survey Participants

| | All purchases | Frequency of visits | | <i>p</i> value |
|--|---------------|---|-----------------------------------|----------------|
| | | Frequent Bodega Shoppers ^a (%) | Less Frequent Bodega Shoppers (%) | |
| n | 779 | 528 | 251 | |
| How often do you shop at this bodega | | | | |
| More than once a day | 46.60 % | 68.60 % | – | |
| Once a day | 21.40 % | 31.40 % | – | |
| 5–6 times/week | 4.40 % | – | 13.50 % | |
| 3–4 times/week | 10.20 % | – | 31.50 % | |
| 1–2 times/week | 8.60 % | – | 26.70 % | |
| 2–3 times/month | 1.40 % | – | 4.40 % | |
| Once a month | 2.10 % | – | 6.40 % | |
| Almost never/never | 5.10 % | – | 15.90 % | |
| Most important reason for shopping at this bodega, today | | | | |
| Close to home | 51.90 % | 62.10 % | 30.30 % | 0.000 |
| Close to destination | 13.10 % | 6.80 % | 26.30 % | |
| Close to work | 11.80 % | 11.60 % | 12.40 % | |
| Good service | 6.30 % | 7.20 % | 4.40 % | |
| Just passed by | 5.00 % | 1.90 % | 11.60 % | |
| Good prices | 2.60 % | 2.30 % | 3.20 % | |
| Good selection of food | 1.20 % | 0.90 % | 1.60 % | |
| It's clean | 1.70 % | 1.90 % | 1.20 % | |
| Know staff here | 1.70 % | 1.90 % | 1.20 % | |
| How would you rate the healthiness of what you bought here today | | | | |
| Very healthy | 27.10 % | 29.00 % | 23.10 % | 0.165 |
| Somewhat healthy | 32.00 % | 31.30 % | 33.50 % | |
| Neither healthy nor unhealthy | 4.60 % | 5.50 % | 2.80 % | |
| Somewhat unhealthy | 16.60 % | 16.50 % | 16.70 % | |
| Very unhealthy | 15.70 % | 14.20 % | 18.70 % | |
| Don't Know | 2.60 % | 2.50 % | 2.80 % | |
| Number of items (mean/SD) | 1.96 (4.04) | 1.95 (4.01) | 1.97 (3.87) | 0.954 |

Chi squared test of association for categorical variables, and Student's *t* tests were calculated for continuous variables between AM purchases and PM purchases, and between frequent bodega shoppers and less frequent bodega shoppers

^a If an individual reported visiting the bodega at least once per day, s/he was classified as a frequent bodega shopper

The majority of purchases made by our respondents were of unhealthy items—sugar sweetened beverages, sweets, and regular potato chips. Nearly one-third of the customers purchased a sugary beverage. Very few participants purchased healthier items, possibly because not all stores offered healthy snacks or beverages. Almost all shoppers purchased just one or two single-serving snack-type items, meant for immediate consumption. Rarely were typical grocery items or ingredients for meal preparation purchased. In spite of the fact that most of the individual food items purchased were classified as unhealthy, 59 % of customers reported their purchases as healthy, indicating a lack of knowledge.

As described earlier, this study was conducted through a community/academic partnership. BHR coalition leaders

have a long history of sponsoring a range of health promotion activities focused on nutrition and fitness education in the Bronx. This history of community health promotion facilitated the selection of bodegas, piloting of survey questions, and subsequent collaboration with bodega owners to allow our research staff to gather information from their customers. After the study finished, results were presented to community stakeholders in a coalition meeting. Results from this study are currently informing future food retail interventions in the South Bronx.

Limitations

This study had several limitations. First, we surveyed adults at these bodegas. Our results will not reflect the

Table 3 Five most commonly purchased items at the Bodegas, across periods

| Item Purchased ^a | All purchases (%) | Frequency of visit | |
|----------------------------------|-------------------|---|-----------------------------------|
| | | Frequent Bodega Shoppers ^b (%) | Less Frequent Bodega Shoppers (%) |
| Regular soda and other SSBs | 29.27 | 30.49 | 26.69 |
| Cookies, cakes, candy, ice cream | 22.34 | 21.4 | 24.3 |
| Coffee | 13.99 | 15.72** | 12.75** |
| Regular sandwich | 13.09 | 14.02 | 10.76 |
| Potato chips (not baked) | 12.2 | 13.07 | 10.36 |
| Sample | 779 | 528 | 251 |

Chi squared tests were calculated between AM purchases and PM purchases, and between frequent bodega shoppers and less frequent bodega shoppers

^a Food categories are not mutually exclusive

^b Frequent bodega shoppers were defined as those who reported shopping at least once per day at the bodega where they were surveyed

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

volume or purchase characteristics of customers under the age of 18, of which there are a significant number. Secondly, we focused on a single shopping experience of a sample of customers; it is unclear how representative these purchases were of overall shopping patterns at these and other bodegas. Thirdly, while we know that the four stores offered typical corner/convenience store fare (a large variety of packaged foods and beverages, cigarettes, coffee and tea, as well as a limited number of grocery and dairy items), we did not collect detailed data on product availability within each store. Finally, it is not known whether the results can be generalized to areas beyond the Bronx, NY.

Implications for Research and Practice

This study identified the most frequently purchased items at bodegas in low-income, largely minority underserved neighborhoods in the Bronx, NYC. Researchers gained critical information about purchasing patterns at bodegas in the Bronx, the identity of frequent shoppers, and their motivation for purchasing products at bodegas. With interventions targeting the food environment of corner stores on the rise, future research should focus on identifying customers' motivations for purchasing these items over other, potentially healthier, offerings. Research should also examine how to incentivize owners to offer healthier options, and how to encourage customers to select healthier options over unhealthy options.

Future work should investigate the other reasons for making frequent visits to corner stores. Youth (<18 years of age) purchases should be examined; in particular, purchases made at stores that are in close proximity to schools. Finally, researchers should investigate store owners' ability

to identify and source healthy foods, sell them at prices that are competitive with other foods, and make necessary infrastructure changes.

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References

- Larson, N. I., Story, M. T., & Nelson, M. C. (2009). Neighborhood environments: Disparities in access to healthy foods in the U.S. *American Journal of Preventive Medicine*, *36*, 74–81.
- Gittelsohn, J., Franceschini, M. C. T., Rasooly, I. R., Ries, A. V., Ho, L. S., Pavlovich, W., et al. (2008). Understanding the food environment in a low-income urban setting: Implications for food store interventions. *Journal of Hunger and Environmental Nutrition*, *2*, 33–50.
- Graham, R., Kaufman, L., Novoa, Z., & Karpati, A. (2006). *Eating in, eating out, eating well: Access to healthy food in North and Central Brooklyn*. New York, NY: New York City Department of Health and Mental Hygiene.
- Gordon, C., Ghai, N., Purciel, M., Talwalkar, A., & Goodman, A. (2007). *Eating well in Harlem: How available is healthy food?*. New York, NY: New York City Department of Health and Mental Hygiene.
- Bodor, J. N., Rose, D., Farley, T. A., Swalm, C., & Scott, S. K. (2008). Neighbourhood fruit and vegetable availability and consumption: The role of small food stores in an urban environment. *Public Health Nutrition*, *11*, 413–420.
- New York City Department of Health and Mental Hygiene. (2012). Retail audit of sugary drinks in six New York City neighborhoods. *Epi Data Brief*, *17*, 1–2. <http://www.nyc.gov/html/doh/downloads/pdf/epi/databrief17.pdf>.
- Powell, L. M., Auld, M. C., Chaloupka, F. J., O'Malley, P. M., & Johnston, L. D. (2007). Associations between access to food stores and adolescent body mass index. *American Journal of Preventive Medicine*, *33*, S301–S307.
- Gibson, D. M. (2011). The neighborhood food environment and adult weight status: Estimates from longitudinal data. *American Journal of Public Health*, *101*, 71–78.

9. Galvez, M. P., Hong, L., Choi, E., Liao, L., Godbold, J., & Brenner, B. (2009). Childhood obesity and neighborhood food-store availability in an inner-city community. *Academic Pediatrics, 9*, 339–343.
10. Cavanaugh, E., Mallya, G., Brensinger, C., Tierney, A., & Glanz, K. (2013). Nutrition environments in corner stores in Philadelphia. *Preventive Medicine, 56*(2), 149–151. doi:10.1016/j.ypmed.2012.12.007.
11. Laska, M. N., Borradaile, K. E., Tester, J., Foster, G. D., & Gittelsohn, J. (2010). Healthy food availability in small urban food stores: A comparison of four US cities. *Public Health Nutrition, 13*(7), 1031–1035. doi:10.1017/S1368980009992771.
12. Lucan, S. C., Karpyn, A., & Sherman, S. (2010). Storing empty calories and chronic disease risk: Snack-food products, nutritive content, and manufacturers in Philadelphia corner stores. *Journal of Urban Health, 87*(3), 394–409. doi:10.1007/s11524-010-9453-5.
13. Haywood, C., & Farley, T. (unpublished data).
14. Dannefer, R., Williams, D. A., Baronberg, S., & Silver, L. (2012). Healthy bodegas: Increasing and promoting healthy foods at corner stores in New York City. *American Journal of Public Health, 102*(10), e27–e31. doi:10.2105/AJPH.2011.300615.
15. The Food Trust, The Philadelphia Healthy Corner Store Network, and Get Healthy Philly. Sell Healthy! Guide. thefoodtrust.org 2012. Accessed March 9, 2014 from http://thefoodtrust.org/uploads/media_items/phcsn-sell-healthy-guide.original.pdf
16. Lent, M. R., Vander Veur, S., Mallya, G., et al. (2014). Corner store purchases made by adults, adolescents and children: Items, nutritional characteristics and amount spent. *Public Health Nutrition, 7*, 1–7. doi:10.1017/S1368980014001670.
17. Borradaile, K. E., Sherman, S., Vander Veur, S. S., et al. (2009). Snacking in children: The role of urban corner stores. *Pediatrics, 124*(5), 1293–1298. doi:10.1542/peds.2009-0964.
18. Cannuscio, C. C., Tappe, K., Hillier, A., Buttenheim, A., Karpyn, A., & Glanz, K. (2013). Urban food environments and residents' shopping behaviors. *American Journal of Preventive Medicine, 45*(5), 606–614.
19. Dannefer, R., MPH, MIA, Sperling, A., MPH, Baronberg, S., MPH, & Abrami, A., MS, RD. (unpublished data, 2009).
20. Ruff, R. R., Akhund, A., & Adjoian, T. (2015). Small convenience stores and the local food environment: An analysis of resident shopping behavior using multilevel modeling. *American Journal of Health Promotion* (Epub ahead).
21. Kaufman, L., & Karpati, A. (2007). Understanding the socio-cultural roots of childhood obesity: Food practices among Latino families of Bushwick, Brooklyn. *Social Science and Medicine, 64*(11), 2177–2188. doi:10.1016/j.socscimed.2007.02.019.
22. O'Malley, K., Gustat, J., Rice, J., & Johnson, C. C. (2013). Feasibility of increasing access to healthy foods in neighborhood corner stores. *Journal of Community Health, 38*(4), 741–749.
23. D'Angelo, H., Suratkar, S., Song, H.-J., Stauffer, E., & Gittelsohn, J. (2011). Access to food source and food source use are associated with healthy and unhealthy food-purchasing behaviours among low-income African-American adults in Baltimore City. *Public Health Nutrition, 14*(9), 1632–1639. doi:10.1017/S1368980011000498.
24. Bodor, J. N., Ulmer, V. M., Dunaway, L. F., Farley, T. A., Rose, D., Bodor, J. N., et al. (2008). Neighbourhood fruit and vegetable availability and consumption: The role of small food stores in an urban environment. *Public Health Nutrition, 11*, 413–420.
25. Song, H.-J., Gittelsohn, J., Kim, M., Suratkar, S., Sharma, S., & Anliker, J. (2009). A corner store intervention in a low-income urban community is associated with increased availability and sales of some healthy foods. *Public Health Nutrition, 12*(11), 2060–2067. doi:10.1017/S1368980009005242.
26. Bloomberg, M. R., & Farley, T. (2010). New York City healthy Bodegas initiative. Retrieved from <http://www.nyc.gov/html/doh/downloads/pdf/cdp/healthy-bodegas-rpt2010.pdf>.
27. New York City Department of Health and Mental Hygiene. (n.d). Healthy food list with pictures.
28. United States Census Bureau. State and County Quickfacts: Bronx County, New York. Retrieved from <http://quickfacts.census.gov/qfd/states/36/36005.html>
29. Obesity in South Bronx: A look across generations. Bronx District Public Health Office. <http://www.nyc.gov/html/doh/downloads/pdf/dpho/dpho-bronx-obesity.pdf>. Accessed January 24, 2014.
30. New York City Department of Health and Mental Hygiene. (2014). Describing the food environment in the South Bronx neighborhood of Crotona–Tremont. *Epi Data Brief, 44*, 1–2. Retrieved from <http://www.nyc.gov/html/doh/downloads/pdf/epi/databrief44.pdf>.