

## Green Carts (Mobile Produce Vendors) in the Bronx—Optimally Positioned to Meet Neighborhood Fruit-and-Vegetable Needs?

Sean C. Lucan, Andrew Maroko, Renee Shanker,  
and William B. Jordan

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**ABSTRACT** *Poor access to fresh produce likely contributes to disparities in obesity and diet-related diseases in the Bronx. New York City's Green Cart program is a partial response to the problem. We evaluated this program (permitting street vendors to sell fresh produce) by canvassing the Bronx for carts, interviewing vendors, and analyzing their locations and food offerings. Green Carts were clustered in areas of probable high pedestrian traffic, covering only about 57% of needy areas by liberal estimates. Some carts sold outside allowed boundaries; a few sold sugary snacks. Vendor locations and their food offerings suggest possible areas for program improvement.*

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### INTRODUCTION

Obesity and diet-related diseases disproportionately affect urban, low-income, minority communities.<sup>1</sup> The Bronx—New York City (NYC)'s poorest borough with large Hispanic/Latino (52%) and Black (34%) populations<sup>2</sup>—provides a clear example. The Bronx has alarming rates of obesity, diabetes, heart disease, and cancer, and the worst health outcomes in New York State, particularly among its racial and ethnic minorities.<sup>3,4</sup>

Reasons for disproportionate disease are likely multifactorial, but unfavorable diet almost certainly contributes. For instance, diets low in fruits and vegetables are thought to contribute to obesity, chronic disease, and early mortality,<sup>5,6</sup> and the Bronx has the highest percentage of NYC residents reporting no fruits or vegetables consumed the previous day (18.2% vs. 9.1% in Manhattan, for example).<sup>4</sup>

A substantial and growing body of evidence relates low fruit-and-vegetable intake with having limited nearby sources of fresh produce.<sup>7,8</sup> In the Bronx, 35% of residents report having to walk more than 10 minutes to buy fresh produce,<sup>4</sup> and most households have no car.<sup>9</sup>

Recognizing poor health outcomes likely exacerbated by limited access to fresh produce, NYC's Department of Health and Mental Hygiene (DOHMH) has pursued several strategies to increase access. A prime example is the Green Cart program.<sup>10</sup> The program, started in 2008, aims to increase fresh fruit-and-vegetable availability in the city's most underserved areas by way of street carts (which up until 2008, did not deal appreciably in produce vending in poor neighborhoods). Street carts selling whole fresh produce (i.e., "Green Carts") are granted permits to

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Lucan, Shanker, and Jordan are with the Department of Family and Social Medicine, Montefiore Medical Center/Albert Einstein College of Medicine, Bronx, NY, USA; Maroko is with the Department of Health Sciences, Lehman College, City University of New York, Bronx, NY, USA.

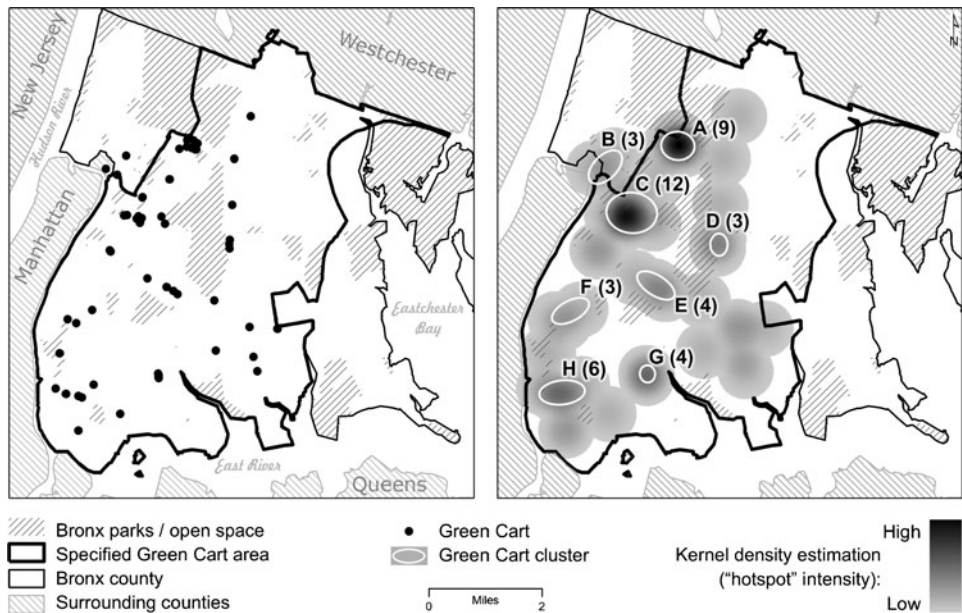
Correspondence: Sean C. Lucan, Department of Family and Social Medicine, Montefiore Medical Center/Albert Einstein College of Medicine, Bronx, NY, USA. (E-mail: slucan@yahoo.com)

sell in specified areas (designated by DOHMH based on the reported low-produce consumption of area residents).<sup>10</sup> The specified area in the Bronx is the most extensive of any NYC borough.<sup>10</sup>

While DOHMH is currently conducting its own assessment of Green Carts, there have been no published Green Cart evaluations to date. Our team sought to determine where Green Carts are located and what they sell in the Bronx in order to understand potential implications for program viability and community nutrition and health.

## METHODS

Two pairs of researchers, working separately on distinct projects, canvassed the Bronx in search of Green Carts. One pair rode all city bus routes in the specified Green Cart area, looking down side streets en route. The other pair used a personal vehicle to drive Bronx streets. Together—despite missed side streets by the public-transportation pair, and missed southwestern neighborhoods by the personal-vehicle



**FIGURE 1.** There were 61 Green Carts identified. There were 8 significant Green Cart clusters (minimum of 3 Green Carts with maximum span of 0.5 miles per cluster). Notable adjacent landmarks by cluster were as follows: **A.** Montefiore Medical Center - Moses Division, Children's Hospital at Montefiore, North Central Bronx Hospital, Mosholu Montefiore Community Center, Jerome-Gun Hill Business Improvement District, **B.** New York Presbyterian Hospital - Allen Hospital (Manhattan), River Plaza Shopping Center (Bronx), **C.** James J Peters VA Medical Center, Monroe College, Fordham University, Montefiore Medical Center - Fordham Plaza, New York Public Library, Fordham Road Business Improvement District, 4 / D Subway Lines, 12 Select Bus Line, Metro-North Railroad Station, **D.** Bronx Zoo, **E.** East Tremont Medical Center, **F.** Urban Horizons Family Health, Essen Medical Associates, New York Public Library, **G.** Hunts Point Library, Point Community Center, Hunts Point Recreation Center, Sustainable South Bronx, **H.** Hostos Community College, Lincoln Hospital, St. Barnabas Hospital, College of New Rochelle, 2 / 4 / 5 Subway Lines

pair—the two pairs covered the entire geographic area of the Bronx, with significant overlap for most neighborhoods.

Both pairs of researchers canvassed during business hours on weekdays from June–August 2010, recording the location and permit number for each identified Green Cart. One pair recorded items being sold, and asked vendors about when the cart usually sells or if it ever sells in another location.

We determined spatial coordinates for all Green Cart addresses and plotted locations using ArcGIS.<sup>11</sup> To test for spatial clustering, we used ArcGIS' *average nearest neighbor analysis*. To identify specific clusters, we used Crimestat III<sup>12</sup> for *nearest neighbor hierarchical spatial clustering*, setting a minimum of three Green Carts at a maximum distance of 0.5 miles per cluster. Finally, we used ArcGIS for *kernel density estimations*, to generate Green Cart “hotspots” using a 0.5-mile bandwidth (a likely more liberal “accessibility threshold” than in other studies using, for example, “5-min walk to fruit-and-vegetable markets”).<sup>13</sup>

## RESULTS

Cumulatively, we identified 61 unique Green Carts. Figure 1 shows that identified Green Carts were not evenly distributed. The average-nearest-neighbor-analysis ratio of observed-to-expected distances between Green Carts was 0.54 (<1 = clustered, 1 = random, and >1 = dispersed),  $p < 0.0001$ . Nearest neighbor hierarchical spatial clustering identified eight clusters; these were around medical, academic, transportation, retail, and recreation centers (see footnotes to Figure 1). Nearly 43% of the specified Green Cart area was not within the generous 0.5-mile accessibility threshold around identified carts.

Researchers observed 3 of the 61 Green Carts selling outside the specified area, with other vendors admitting to sometimes doing likewise. Of 21 Green Carts for which we recorded specific foods, three sold cookies and/or sugar-sweetened beverages.

## DISCUSSION

In this first-ever study of NYC Green Carts, we identified 61 carts that tended to cluster near centers of probable high pedestrian traffic. While such centers might offer large numbers of potential customers, competition for business and space in these areas could also constrain vendor profits,<sup>14</sup> thereby threatening program success.

Vendor clustering might also limit the provision of fresh produce to communities most in need. While Green Carts were generally located in disadvantaged neighborhoods, there were often miles of “Green Cart deserts” between “hotspots.” Green Carts were absent from some of the neediest Bronx neighborhoods. Vendor concerns for the volume of foot traffic may have contributed to this absence, as well as to the small number of vendors locating unlawfully in neighborhoods less challenged by access to fresh produce.<sup>4</sup>

We witnessed at least a small number of Green Carts selling expressly disallowed sugary drinks and cookies. These products run counter to the program's intent of improving community nutrition and health.

Our findings highlight opportunities for future research to improve NYC's important Green Cart program. For instance, researchers could explore differences in profits between vendors clustered in high traffic areas and/or selling sugary treats

versus those selling produce only in areas of minimal competition but perhaps less foot traffic.

Opportunities for additional research suggest some of the limitations of our own work. First, we are unable to comment on vendor sales, profitability, or exact customer base (e.g., it is possible that residents of disadvantaged neighborhoods have access to Green Carts around where they work even if there are no Green Carts near their homes). Also, our findings are only a composite snapshot, representing the combination of two separate but corroborating cross-sectional samples. If carts were in locations at different times than either of our two research teams, they would have been missed. While DOHMH has granted more than twice as many permits as the number of Green Carts we identified (113 granted as of June 21; 145 as of August 19) it is unclear how many permittees ever started (or continue) to vend.<sup>15,16</sup> Reassuringly, our final composite list of carts was consistent with a list compiled by the city's consulting firm providing technical assistance to Green Cart vendors.<sup>16</sup>

In spite of limitations, our work points to potential strategies to enhance Green Cart implementation. For instance, to move Green Carts into disadvantaged neighborhoods where carts are absent: (1) the city might expand community partnerships to create local demand, (2) community groups might enlist residents of disadvantaged neighborhoods to become Green Cart vendors, and (3) vendors might explore establishing electronic benefit transfer for potential Supplemental Nutrition Assistance Program customers. NYC could also consider increasing efforts to attract more potential vendors to the Green Cart program: e.g., expanding advertising and informational sessions at community centers, modifying credit-history requirements for microloans for cart purchases, or having a leasing option for carts. Indeed, with less than half of the Bronx's allotted permits having already been granted, issues of geographic maldistribution could self-correct if future vendors take to the streets. Finally, support for Green Cart vendors (often immigrants with limited English proficiency, lower education, and little business experience)<sup>2</sup> might come through community groups, to help vendors spread out, sell within the limits of the law, and still generate sufficient revenue to provide fresh produce where needed.

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