Assessing the retail food environment surrounding elementary schools across New York City (NYC) neighborhoods undergoing their level of gentrification

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First Bite
We examine the retail food environment surrounding NYC elementary schools for neighborhoods experiencing three levels of gentrification (early, middle, and hyper) and evaluate the social determinants of the food environment, including availability of foods, store satisfaction, price, and support for low-income families, are associated with the level of gentrification.

Abstract
Objective: The retail food environment constrains and supports the ability to purchase healthy foods. We examine the retail food environment from nine NYC neighborhoods. Gentrification appears to be one mechanism through which changes to the retail food environment from nine NYC neighborhoods.

Methods
This descriptive, cross-sectional study examines the retail food environment surrounding urban neighborhoods in New York City, particularly neighborhoods undergoing their level of gentrification. A modified version of the Nutrition Environment Measures Survey-Stores (NEMS-S), completed by graduate-level nutrition students, was used to assess the retail food environment from nine NYC neighborhoods.

Background
There is mixed evidence linking the retail food environment to diet and obesity-related outcomes among children. Most of the available literature is cross-sectional in nature, precluding a cause-and-effect determination. Neighborhood gentrification appears to be one mechanism through which changes to the retail food environment manifest.

Understanding the retail food environment is important because:
- The retail food environment constrains and supports the ability to purchase healthy foods.
- Changes in social determinants of health, such as the retail food environment, can significantly influence behavioral, economic, and health outcomes through childhood obesity.

Results
Table 1. Descriptive statistics of NYC neighborhoods and stores assessed in the study of the retail food environment

<table>
<thead>
<tr>
<th>Neighborhood Type</th>
<th>Fruit type (%)</th>
<th>Organic fruit available (%)</th>
<th>Vegetable types available (mean [SD])</th>
<th>Organic vegetables available (%)</th>
<th>SNAP/WIC eligibility</th>
<th>Customer satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early (22)</td>
<td>22</td>
<td>11</td>
<td>5.83 (3.71)</td>
<td>11</td>
<td>26</td>
<td>3</td>
</tr>
<tr>
<td>Middle (43)</td>
<td>44</td>
<td>22</td>
<td>5.83 (3.71)</td>
<td>37</td>
<td>54</td>
<td>4</td>
</tr>
<tr>
<td>Hyper (35)</td>
<td>43</td>
<td>37</td>
<td>9.00 (0.90)</td>
<td>37</td>
<td>72</td>
<td>5</td>
</tr>
</tbody>
</table>

Conclusions
This descriptive, cross-sectional study found that while a greater level of neighborhood gentrification is associated with increased availability and quality of fruits and vegetables, lean meats and low-fat dairy, there is less support for low-income families on federal assistance, as evidenced by fewer stores accepting WIC and SNAP, and higher food prices for fruits and vegetables, particularly for neighborhoods in the middle level of gentrification.

This study suggests:
- The retail food environment is an observable dimension of the process of gentrification. It may offer the potential for conducting natural experiments.
- Future studies should examine changes to the retail food environment longitudinally and empirically because the process of gentrification manifests at times occur rapidly, and it may offer the potential for conducting natural experiments.