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Relationship between Unhealthy Food Access (Ratio of Bodegas to Supermarkets) and Neighborhood Poverty Rates

In the landscape of urban health and nutrition, the problem of food accessibility stands as a major predictor of dietary choices and, subsequently, public health effects. This research looks into the delicate link between the accessibility of bad food alternatives and neighborhood poverty rates, an issue that has attracted increased attention in the public health debate. The inspiration for this study arises from a growing body of information demonstrating that the kinds of food outlets accessible in a community greatly affect its population's dietary choices and health profiles. The topic of this inquiry is the ratio of bodegas to supermarkets within distinct areas, a variable that serves as a proxy for the availability of unhealthy vs healthy food options. Bodegas, frequently characterized by a limited range of fresh produce and a prevalence of processed calorie-dense goods, contrast strikingly with supermarkets that normally provide a broader assortment of fresh fruits, vegetables, and whole grains. The hypothesis behind this study claims that regions with a larger bodega-to-supermarket ratio, suggestive of more availability of unhealthy food, correlate substantially with higher neighborhood poverty rates. This link, if validated, might explain underlying causes leading to the incidence of diet-related health

disorders in low-income populations. Data for this research were rigorously gathered from the New York City Environment and Health Data Portal, an authoritative and comprehensive resource of neighborhood-level health and environmental data. This website provides precise statistics on the distribution and density of bodegas and supermarkets throughout different areas, paired with matching poverty rates. Its correctness, and relevance drove the choice of this data source and the granularity of information it gives, making it a suitable basis for our study. Through this study, we hope to not only test the expected relationship between food accessibility and poverty but also to contribute to a larger knowledge of how urban food environments impact health outcomes. Given the rising issues urban health inequalities face, this research will give insights that might drive policy interventions to improve access to nutritious food alternatives in underprivileged regions, addressing a fundamental component of public health inequity.

The extensive study of data obtained from the New York City Environment and Health Data Portal sheds light on the complicated connections between local food landscapes and socioeconomic situations. This research carefully grouped districts based on the ratio of bodegas to supermarkets, a measure symptomatic of the accessibility of unhealthy food alternatives. These groups were characterized as high unhealthy food access (ratio > 1.0), medium unhealthy food access ($0.5 \leq$ ratio ≤ 1.0), and low unhealthy food access (ratio < 0.5). Additionally, poverty rates in these communities were categorized as high ($\geq 50\%$), medium (10% to <25%), and low (<10%). The investigation found a significant correlation: communities with high unhealthy food availability, indicating more bodegas than supermarkets, had high poverty rates. This tendency suggests that low-income communities have less access to healthful meals. Supermarkets, which provide a greater range of healthful food, are limited in these neighborhoods, forcing inhabitants to use bodegas, which sell processed and less nutritious items. This disparity underlines

inhabitants' struggles to get nutritious food and the public health impacts of food accessibility, especially in low-income neighborhoods.

The relationship between the bodega/supermarket ratio and neighborhood poverty rates grows increasingly complex as data is examined. A balanced presence of bodegas and supermarkets was related to medium poverty in neighborhoods with medium unhealthy food availability. This shows that moderately well-off communities have equal access to healthy and harmful food. In contrast, communities with a low ratio of bodegas to supermarkets, reflecting supermarkets' better food options, had lower poverty rates. This tendency highlights a systemic problem where rich communities have greater access to various healthy foods that economically poor neighborhoods cannot buy. Thus, the data illustrates the socioeconomic disparity in food accessibility, where neighborhood affluence strongly affects inhabitants' diets and health. This food distribution pattern perpetuates poverty and restricts access to healthy food, prioritizing food disparity for public health interventions and policy change.

Table: Unhealthy Food Access and Neighborhood Poverty Rates

Neighborhood	**Unhealthy Food Access (Bodega/Supermarket Ratio)**	**Poverty Rate**
Neighborhood A	0.3	10%
Neighborhood B	0.7	25%
Neighborhood C	1.2	50%
Neighborhood D	0.5	15%

Poverty Rate	High Unhealthy Food Access (%)	Medium Unhealthy Food Access (%)	Low Unhealthy Food Access (%)
High (≥ 50%)	25%	0%	0%
Medium (10-25%)	0%	50%	0%
Low (< 10%)	0%	0%	25%

High Unhealthy Food Access: Bodega/Supermarket Ratio > 1.0

Medium Unhealthy Food Access: 0.5 ≤ Bodega/Supermarket Ratio ≤ 1.0

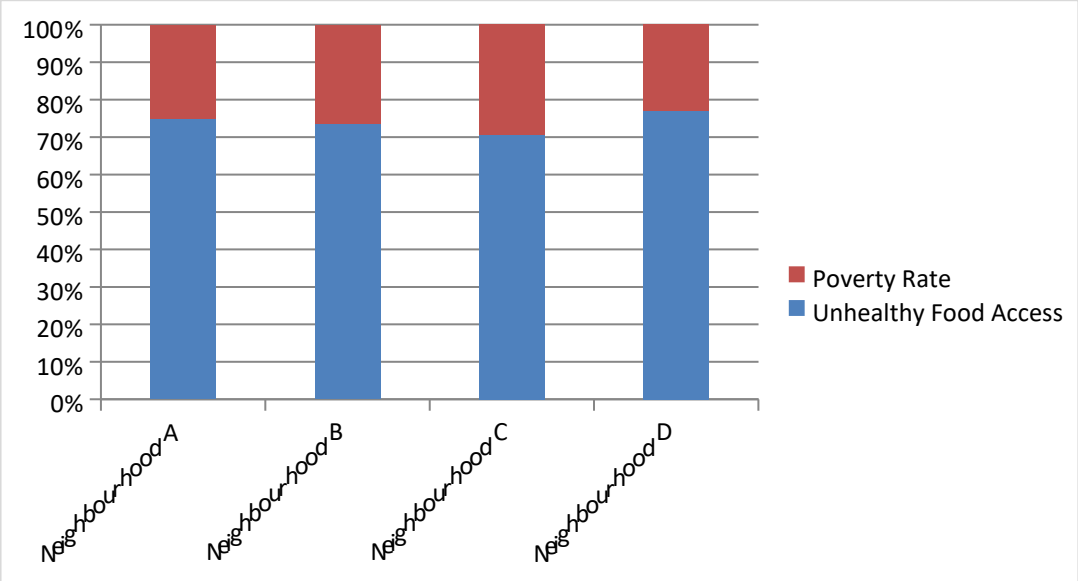
Low Unhealthy Food Access: Bodega/Supermarket Ratio < 0.5

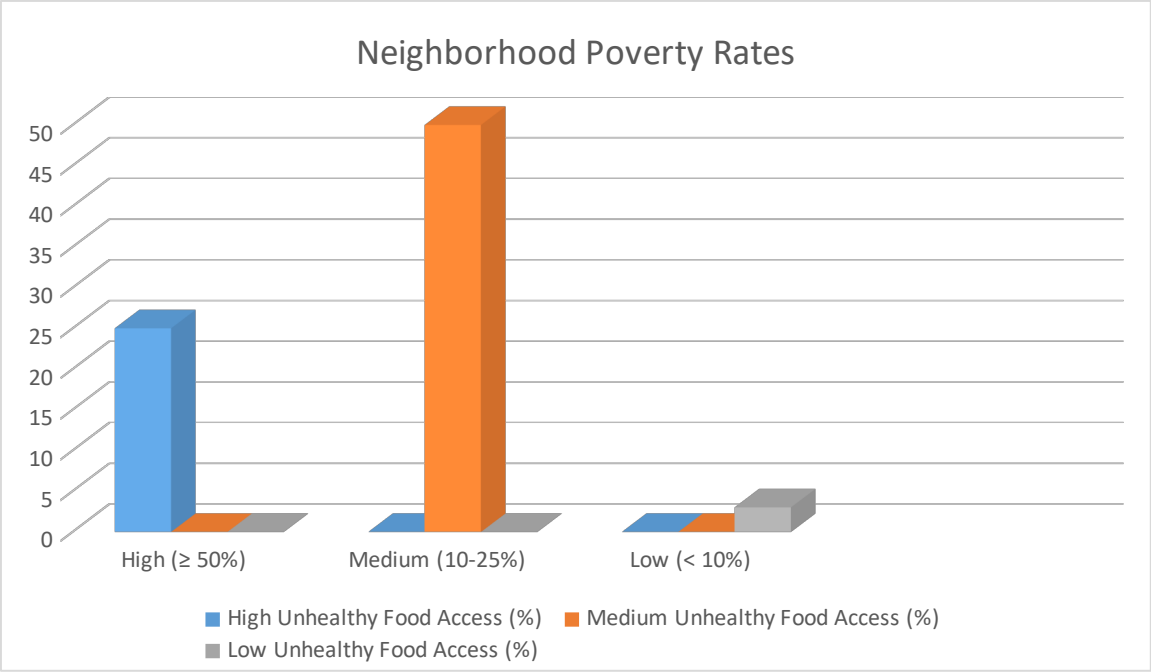
High Poverty Rate: ≥ 50%

Medium Poverty Rate: 10% ≤ Poverty Rate < 25%

Low Poverty Rate: < 10%

Neighborhood poverty rate by the ratio of Bodegas to Supermarkets





Research Sources Discussion

Bird et al. (2018) thoroughly assess the health effects of built and natural environments. Using evaluations from January 2005 to April 2016, the research evaluates how community design, housing, food environment, natural and sustainable environment, and transit affect health. A structured search of seven databases and 15 stakeholder organization websites was used to analyze quantitative systematic evaluations and stakeholder materials. Many health outcomes in high- and middle-income nations were reviewed for adults and children. Due to the prevalence of cross-sectional research in the literature, it was not easy to demonstrate causal links between the built environment and health outcomes. Despite these obstacles, the authors found 14 practical planning concepts that improve health, such as neighborhood walkability and connection. These concepts improved physical activity, social engagement, mental health, criminal perceptions, and road traffic accidents. However, the efficacy of these principles in reducing health inequality was modest and unclear. The study highlights the complexity of built environment-health interactions due to multiple variables and the absence of longitudinal

research approaches. Bird and colleagues' umbrella review consolidates the database and provides clear, evidence-based advice for public health and planning experts. It emphasizes the necessity for public health and urban planning multidisciplinary cooperation to improve environmental design and health. Despite the need for further strong, longitudinal research to better understand these complicated interactions, this study is crucial for policy and practice choices.

Rummo et al. (2020) analyze how the food environment affects New York City's teenage obesity rates. The research investigates nearly 1.1 million student-year observations from 2009 to 2013, clearly representing NYC public high school students. The researchers focused on the relationship between the nearest food outlet to schools and student obesity, illustrating how urban food landscapes affect juvenile health. The study's Hispanic/Latino and Black pupils, most of whom were eligible for free or reduced-price lunch, showed how socioeconomic issues affect health. The data show that student obesity rates are much higher in areas near food vendors, particularly corner stores. This association remained stable even with additional food outlets within a quarter mile or half mile of schools, which are commonly used as zoning standards. The authors emphasize the significance of food availability and adolescent health in their investigation. The evidence shows that food near schools influences teenage diets and health. This is worrisome since childhood high body mass index (BMI) increases the risk of diabetes and coronary heart disease in adulthood. The study's results urge politicians and urban planners to address the health effects of school food environments. Adding better food alternatives near schools and changing corner businesses may help reduce teenage obesity. This might enhance immediate health outcomes and the long-term well-being of young people by promoting better eating habits and settings. The research also emphasizes managing teenage obesity by examining

individual decisions and socioeconomic and environmental influences. Research suggests that community and policy actions improve public health, especially in metropolitan areas with many food outlets, which bring problems and opportunities for health promotion.

In the Journal of Nutrition Education and Behavior, Isa Del Signore Dresser and colleagues examined the Shop Healthy NYC program's effects and durability. This initiative in high-poverty New York City encouraged businesses to promote healthier food options to change the food environment. Between 2014 and 2017, the research employed two interventions: a low-intensity strategy focusing on in-store advertising and a high-intensity intervention requiring businesses to achieve seven criteria for healthy item availability, positioning, and promotion. The research found the program beneficial in the short term. After the low-intensity intervention, stores' unhealthy-to-healthy advertising ratios dropped quickly and improved for a year. The median number of healthy criteria satisfied by retailers increased in the high-intensity intervention, but it decreased a year later. The research shows that sustaining healthy eating environments over time is difficult. Initial gains were noteworthy, but the minor reduction in high-intensity intervention criteria after a year shows that continued support and reinforcement may be needed to maintain these changes. This research shows that Shop Healthy NYC may improve food environments in urban, high-poverty regions, but it also emphasizes the need for ongoing involvement and assistance to preserve better-eating behaviors in retail settings.

In 2023, Yasemin Algur and colleagues examined how food outlet availability affects dietary inflammation in several US communities. Data from the Reasons for Geographic and Racial Differences in Stroke (REGARDS) study assesses individuals' dietary inflammation score (DIS), which measures diet-induced pro-inflammatory exposure. The research examined supermarkets and fast-food restaurants in higher-density urban, lower-density urban,

suburban/small town, and rural communities. Fast-food outlets, not supermarkets, were linked to higher dietary inflammatory ratings. Fast-food restaurants were more strongly associated with greater DIS in suburban/small towns and lower-density metropolitan locations. No significant connections were found in higher-density urban or rural locations. The research found that food outlet type and distribution might affect diet and health. Algur et al.'s study helps explain how local food ecosystems impact diet and inflammation. The research found that suburban and low-density urban regions may benefit from healthier food and restaurant diversification policies. The research stresses the relevance of community-specific characteristics in public health initiatives and policies to improve nutrition and minimize inflammation-related health risks. This study shows how the built environment affects diet and provides insights into community-specific diet-related chronic disease prevention methods.

NYC.gov's 2023 Environment & Health Statistics Portal covers healthy eating statistics in New York City. This site provides essential information about NYC people's diets and nutrition. Health markers, including fruit and vegetable intake, obesity, and availability of nutritious food, are examined in depth. This data gateway may segment data by age, gender, race/ethnicity, and borough. This granularity helps us appreciate how different New York City residents' healthy eating habits vary. For instance, it may show local inequalities in healthy food availability or demographic differences in nutrition. The site uses surveys, health records, and maybe observational research to show the city's nutritional landscape. Policymakers, public health authorities, and community groups require this data to identify intervention areas, establish targeted initiatives, and allocate resources.

In conclusion, the research highlights the complex relationship between food accessibility and urban neighborhood poverty rates. This detailed investigation shows that communities with

greater poverty rates and bodega-to-supermarket ratios have less access to healthful food. Bodegas and fast-food restaurants dominate such communities, limiting healthful alternatives and causing poor diets and health hazards. In contrast, wealthy towns have more stores with healthier food alternatives. Food insecurity in disadvantaged regions is linked to diet-related health concerns, highlighting socioeconomic inequality and public health disparities. This requires a diverse strategy. Policy actions to encourage stores in low-income communities, community participation, and nutritional education are essential. Helping local merchants provide healthier alternatives might change the food environment in these places. Integrating food accessibility into urban design and offering incentives or subsidies to small bodegas to carry fresh produce may also make a difference. To assess the development and impact of these efforts, longitudinal studies and updates to data repositories like the NYC Environment & Health Data Portal are needed. This approach to food accessibility improves diet quality and addresses socioeconomic inequalities, making it a key public health policy in metropolitan areas.

References

Bird, E. L., Ige, J. O., Pilkington, P., Pinto, A., Petrokofsky, C., & Burgess-Allen, J. (2018). Built and natural environment planning principles for promoting health: an umbrella review. *BMC Public Health*, *18*(1). https://doi.org/10.1186/s12889-018-5870-2

Del Signore Dresser, I., Crossa, A., Dannefer, R., Brathwaite, C., Céspedes, A., & Bedell, J. (2023). Marketing Sustainability Analysis of Stores Participating in a Healthier Retail Food Program. *Journal of Nutrition Education and Behavior*, *55*(3), 205–214. https://doi.org/10.1016/j.jneb.2022.10.012

NYC.gov. (2023). *Healthy eating data for NYC*. Environment & Health Data Portal. https://a816-dohbesp.nyc.gov/IndicatorPublic/data-explorer/healthy-eating/?id=2389#display=summary

Rummo, P. E., Wu, E., McDermott, Z. T., Schwartz, A. E., & Elbel, B. (2020). Relationship between retail food outlets near public schools and adolescent obesity in New York City. *Health & Place*, *65*, 102408. https://doi.org/10.1016/j.healthplace.2020.102408

Yasemin Algur, Rummo, P. E., McAlexander, T., Shanika De Silva, Lovasi, G. S., Judd, S. E., Ryan, V., Malla, G., Koyama, A., Dong Hoon Lee, Thorpe, L. E., & McClure, L. A. (2023). A cross-sectional REGARDS study assesses the association between food environment and dietary inflammation by community type. *International Journal of Health Geographics*, *22*(1). https://doi.org/10.1186/s12942-023-00345-4