

Food environment factors and obesity prevalence among low-income preschool children, New York State

Introduction

The prevalence of obesity among children ages 2 to 5 years has decreased significantly from 13.9% in 2003-2004 to 8.4% in 2011-2012.¹ While the downward trend is commendable, obesity prevalence remains high and large health disparities exist among lower socioeconomic and racial/ethnic minority groups. Although the determinants of childhood obesity are multifaceted, factors related to the food environment—such as prevalence and proximity to supermarkets and restaurants, food prices, and federal food and nutrition assistance programs—are thought to contribute to the obesity epidemic by influencing diet quality and behavior. It is particularly important to understand the food environment of the youngest and most vulnerable population: low-income children. Thus, the objective of this project was to explore thematic geographic associations between obesity prevalence among low-income preschoolers (ages 2 to 4 years) and three factors related to the food environment in New York State (NYS): prevalence of fast-food restaurants (FFRs), children's access to grocery stores, and WIC redemptions (Special Supplemental Nutrition Program for Women, Infants, and Children). NYS was chosen due its diverse food environment landscape, in addition to the high prevalence child food insecurity (9.5%) and obesity among low-income preschoolers (14.3%).²

Methods

Data were obtained from the 2014 Food Environment Atlas: a database of county-level data compiled from the CDC, US Census Bureau, USDA Economic Research Service, USDA Food and Nutrition Service, among others.² Data quality was high with few null values per US county. Thematic/choropleth maps were created to show obesity prevalence (defined as BMI-for-age > 95th percentile) of low-income children ages 2-4 years across NYS (defined as ≤ 200% poverty threshold based on family size), overlaid with graduated symbols for: a) number of FFRs per 1,000 population; b) percent of children younger than 18 years with low access to grocery stores or supermarkets (defined as > 1 mile in urban areas or > 10 miles in rural areas); c) WIC redemptions per capita. Categories for graduated symbols were created using natural breaks. All maps were created in ArcMap 10.2.2.



Tufts GIS Expo
 Date: May 6th, 2015
 Author: Ariella Korn
 Class: GIS for Public Health (PH 262)
 Data source: USDA Economic Research Service, Food Environment Atlas (2014)

- References**
- Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of childhood and adult obesity in the United States, 2011-2012. *JAMA*. Feb 26 2014;311(8):806-814.
 - Economic Research Service (ERS), U.S. Department of Agriculture (USDA). Food Environment Atlas. <http://www.ers.usda.gov/data-products/food-environment-atlas.aspx>.

Results

The mean prevalence of obesity among low-income preschoolers in NYS was 15.0% (standard deviation = 2.1%), with the highest and lowest prevalence in Nassau (21.6%) and Rockland (11.0%) counties. Suffolk (20.9%) Putnam (20.3%) ranked 2nd and 3rd in highest obesity prevalence. No obesity data were available for Hamilton county. New York, Warren, and Albany had greater than 1 FFR per 1,000 people. Montgomery, Putnam, and Schenectady had the highest percentages of children with low access to grocery stores or supermarkets (11.0%, 9.3%, and 8.4%). Bronx, Kings, and Rockland had the highest WIC redemptions per capita (\$48.00, \$47.85, and \$32.27). Of the counties with obesity prevalence greater than 20%, Nassau and Suffolk ranked 4th and 7th in number of FFRs. Putnam and Suffolk ranked 2nd and 7th in greatest percentage of children with low access to grocery stores. While Rockland had the lowest obesity rate, it ranked highly among the three food environment factors. Future research is warranted in Rockland to better understand the contributing factors to such low obesity rates among preschoolers, while also having high prevalence of FFRs and low access to supermarkets. It is possible that Rockland has strong childhood obesity prevention efforts at the environment and policy level in childcare and preschool settings.

Discussion

There are geographic disparities of obesity prevalence among low-income preschoolers across NYS. While this project shows a thematic association between obesity rates and three factors related to the food environment, a deeper analysis would incorporate BMI data for smaller geographic areas, more indicators of the food environment (food price, location of restaurants and stores, fast-food expenditure, etc.), and incorporate spatial epidemiological methodologies to see statistical associations from cross-sectional data. Project strengths include use of robust and comprehensive data from the 2014 Food Environment Atlas. Overall, policy-based interventions within the food environment are warranted for counties with high obesity rates among such a young and vulnerable population.

Obesity rate, low-income children ages 2-4 years

