

Fast Food Restaurants:

Density and Proximity to Children at High Risk

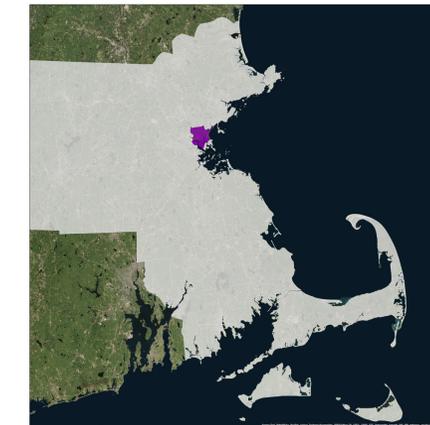
Introduction

Child obesity rates have risen dramatically over the past three to four decades and although we are seeing rates plateau and, in some cases, decline, rates among black and Hispanic children continue to rise. Excess weight gain in childhood can lead to numerous negative health and economic outcomes for both the individual and society. Several environmental, social, and physical factors contribute to excess weight gain, but at its most basic form obesity is caused by the imbalance of calories consumed versus calories

expended. Restaurants are one setting in which children consume excess calories. Additionally, research shows that children are eating out more frequently than they used to and are consuming more calories on days when they eat food from restaurants than on days when they do not. The goal of this project is to examine the relationships between fast food restaurant density and density of children at higher risk for child obesity and provide recommendations on possible areas for a obesity intervention with restaurants.

Pilot Area: Metro North Boston, MA

The metro area north of Boston in this analysis, includes the towns of Chelsea, Everett, Revere, and East Boston. This area is surrounded by several bodies of water including the Atlantic Ocean, Mystic River, and Chelsea River. In addition, several major roads that cut through the area including Highway 1 & 1A and Interstates 90 & 93.



Map Projection: NAD 1983 Massachusetts State Plane Projection, Mainland Zone



775 Eastern Ave, Malden, MA (Image Source: Google Maps)



1 Maverick Square, Boston, MA (Image Source: Google Maps)



Everett Ave. and Revere Beach Pkwy, Everett, MA. (Image Source: Google Maps)

Discussion

In the final pilot map, there is a moderate relationship between density of children at high risk for obesity and proximity to a high concentration of restaurants. The highest concentration of both variables is in East Boston and between Chelsea and Everett. In this model we see several restaurant environment types including:

- Strip mall restaurants (Eastern Ave)
- Drive-thru restaurants (Everett Ave and Revere Beach Pkwy)
- Pedestrian restaurants (Maverick Square)

how far a person is willing to travel for fast food and which fast food restaurants they visit. Thus it is difficult to determine from these maps alone if a restaurant intervention would assist in reducing calorie consumption for children at high risk of obesity. In addition this model does not account for:

- Restaurants near schools
- Driving distance
- Misclassification of restaurant type
- Inaccurate addresses

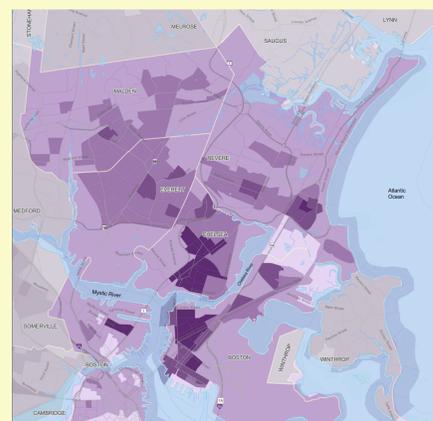
It is possible that restaurant environments in other areas would look different. However, the basic functions of this model would be useful in determining if children at high risk of obesity live in close proximity to high concentrations of restaurants. Unfortunately it is difficult to determine

In general, this model has potential to be useful as a decision tool but needs some changes in order to use at a larger scale. High risk child population and fast food restaurant density do seem to be concentrated in similar areas.

Data Sources
 Hydrography: MassGIS, 2010
 Openspace: Massachusetts Department of Energy and Environmental Affairs, 2014
 Town Boundaries: MassGIS, 2014
 Roads: Massachusetts Department of Transportation, 2014
 Child Population Density: US Census, 2010
 Restaurants: Reference USA, 2014

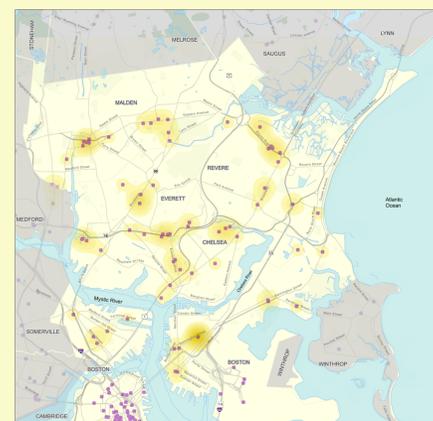
Cartography & Writing by
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 December 18, 2014
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Methods



Child population density was calculated using number of Black and Hispanic children 5 to 9 years old divided by hectares in the Census Block groups. Black and Hispanic children tend to visit fast food restaurants more frequently than full service restaurants (Powell et al, 2012). They also tend to eat more calories, fat and sugar from fast food restaurants as compared to their white peers. In addition, some studies show that these racial/ethnic groups live and go to school in areas with a high density of fast food restaurants (Walker, Block, & Kawachi, 2014; Sanchez et al, 2012).

Child Density: black and Hispanic 5-9 year olds



Kernel Density: A 500 meter walking distance buffer was used when calculating kernel density of fast food restaurants in Malden, Everett, Revere, Charlestown, and East Boston. The NAICS code for Limited Service Restaurants was used to identify all the points on the map. Limited Service is classified as a restaurant where you receive your meal after paying for it. NAICS codes are self-reported

Restaurant Density: Fast Food Restaurants