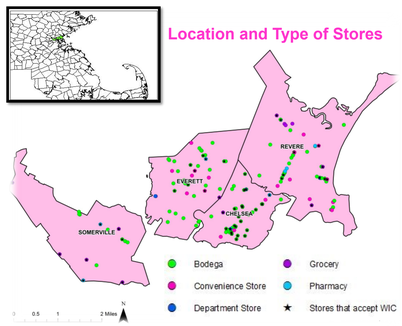
Food Environment Analysis in Somerville, Revere, Chelsea, and Everett, MA

Background

Obesity rates are rising in the Unites States, and the food environment is a contributing factor to this epidemic. The food environment consists of the number, type, location, and accessibility of food outlets, and the availability of healthy food options in these outlets (Glanz, 2009; Glanz, Sallis, Saelens, & Frank, 2005). Food environments that lack adequate food outlets or have limited healthy food options are known as food deserts or obesogenic environments. These environments are correlated with poor diets and obesity for consumers living in these areas.



The health departments of Somerville, Revere, Chelsea, and Everett, MA are currently working to improve the food environments in these towns. Through their separate programs Shape Up Somerville, Revere on the Move, Healthy Chelsea, and Everett's Mass in Motion, these four towns are working with different versions of the Healthy Corner Store Initiative to improve the availability of healthy food options in corner stores. The purpose of this project is to map out the stores in these four towns in comparison to relevant Census information, land use, and availability of stores that accept the Supplemental Nutrition Program, Woman Infants and Children (WIC). The following maps can be used to compare the progress of nutrition promotion programs in the four towns, and to highlight areas of needed improvement.

Methodology

Store Locations

Complete lists of all food outlets and stores that accept WIC in Somerville, Revere, Chelsea, and Everett were obtained from the town health departments. This data was geocoded into Arcmap and was displayed using select by attribute to highlight different types of outlets and WIC vendors.

Census Data

To highlight the demographic, socioeconomic status, and housing units of the relevant populations in the four towns, Census tract level data was downloaded from American Fact Finder (AFF) for Middlesex and Suffolk Counties. Data was joined with the Census tract polygons for Massachusetts, and clipped to the four towns of study. Percent Latino population and housing units were displayed using graduated colors, and median household income was displayed using graduated symbols.

Density of Stores and WIC Stores

Density of stores and WIC stores by Census tract was analyzed using the kernel density tool on Arcmap. Further density analysis was calculated using zonal statistics to determine the mean of stores per Census tract and mean of WIC stores per Census tract. Results were displayed using graduated colors.

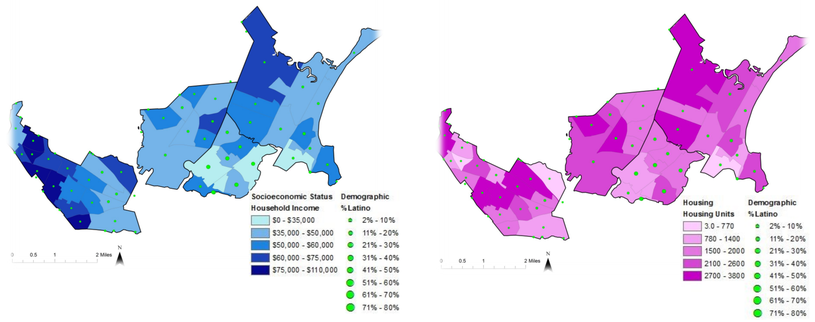
Land Use

To provide context for store locations, land use data was downloaded from 2005 MassGIS impervious cover. Data was clipped to the four towns of interest, and grouped to relevant land use categories.

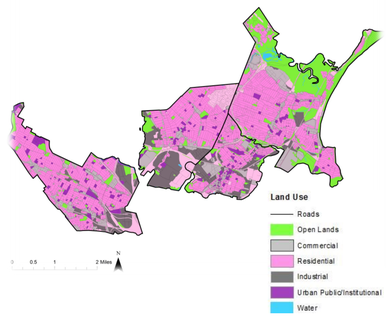
Network Analyst

Walking distance to stores is relevant to determine accessibility of stores to members of the community. The network analyst tool- new closest facility- was used to determine the walkable distance 500 meters from stores.

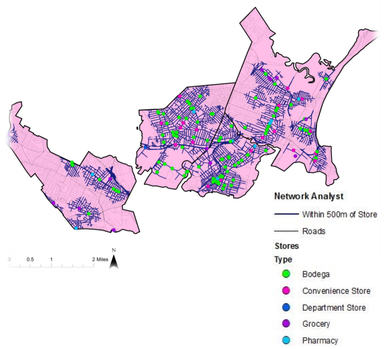
Census Data



Land Use



Network Analyst



Results

Results reveal interesting information regarding the concentration and type of stores in the four towns of interest. The most common food outlet is bodegas, followed by convenience stores. Grocery stores, where there is the usually the largest selection of healthy food choices, are lacking, especially in Chelsea.

Figure 1: Type of Stores in Somerville, Revere, Chelsea and Everett, MA

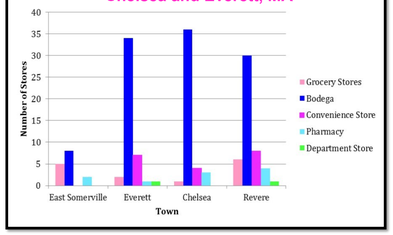
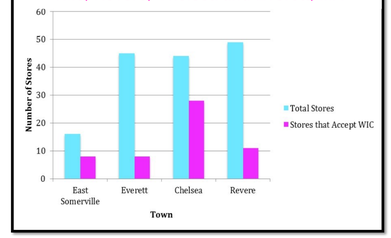


Figure 2: WIC Acceptance in Stores in Somerville, Revere, Chelsea and Everett, MA



Interestingly, Chelsea has the highest percentage Latino population, and the lowest median household income of the four towns. But Chelsea also has the highest density of stores and stores that accept WIC. Stores in all towns tend to be concentrated walking distance from residential areas, but there are areas of the towns that do not have close access to stores.

Conclusions

It appears as though the Healthy Chelsea initiative has been the most successful in working with stores to have them accept WIC. Although Chelsea has the lowest income levels of the four towns, more than half of the stores accept WIC, allowing the lower income population access to affordable healthy food options. The Health Departments of Somerville, Revere and Everett should be advised to collaborate with the Chelsea Health Department to implement similar methods in expanding WIC acceptance in food outlets to increase access of healthy foods to the populations of lower socioeconomic status, which are widespread in all of the towns of interest. Additional research is needed to determine the availability of healthy food options within the stores in these towns to supplement present food environment data.

Figure 3: Woman Infants, and Children (WIC) Logo

Cartographer: Emily Caplan **Project Date:** May 1, 2014

Course: Intro to GIS, Tufts University

Scale: 1:42,458

Data Sources: 2010 American Fact Finder (Census.gov), Tufts M drive, Somerville, Revere, Chelsea, and Everett Health Departments, 2005 MassGIS Impervious Cover, TIGER Geodatabases

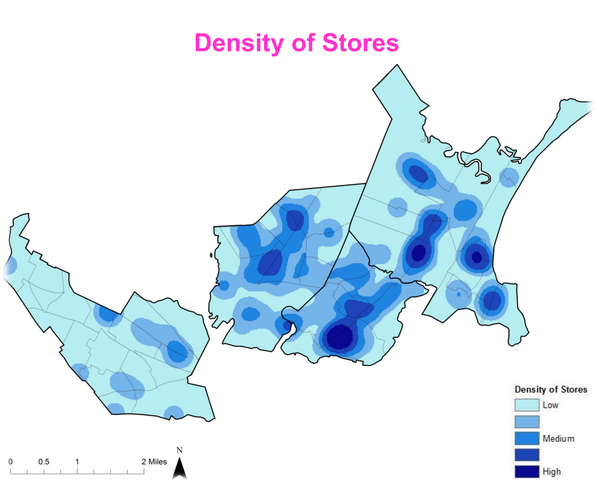
Citations:

1. Glanz, K. (2009). Measuring food environments: A historical perspective. *American Journal of Preventive Medicine,* 32(4), S93-S98
2. Glanz, K., Sallis J. F., Saelens, B. E., & Frank, L. D. (2005). Nutrition environment measures survey in stores (NEMS-S): Development and evaluation. *Public Health Nutrition,* 13(11), 1764

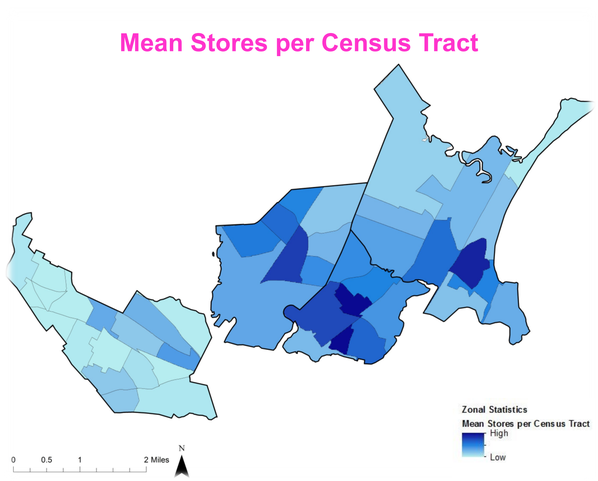
Photo Credit: www.wicprogram.org

Tufts University Gerald J. and Dorothy R. Friedman School of Nutrition Science and Policy

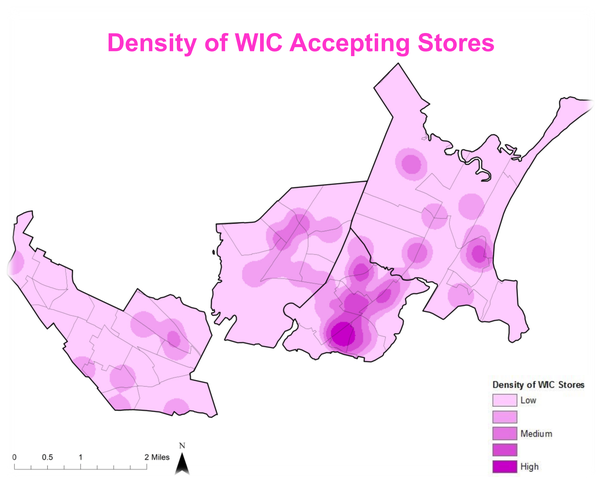
Density of Stores



Mean Stores per Census Tract



Density of WIC Accepting Stores



Mean WIC Accepting Stores per Census Tract