

Food Insecurity Indicators and Health Effects In Massachusetts

Introduction

There has been much study recently in the field of food security in the United States and around the world. The WHO defines food security to be access at all times to “sufficient, safe, nutritious food to maintain a healthy and active life.” Current research is examining the effects of food insecurity on physical, mental, and social capacities. These studies have found that people who are food insecure report lower health statuses. Conditions such as heart disease, diabetes, and high blood pressure are more likely when an individual suffers from food insecurity. Diabetics and people with chronic diseases seem particularly affected. Chronic diseases often require specific diets, yet when food is not readily accessible for any number of reasons, it is much more difficult to manage these diseases. Women appear to be more affected by food insecurity and are more likely to be morbidly obese. Obesity has been a primary health concern in the United States in the past decade, with 35.7% of the adult population now considered obese. The CDC estimates that in 2008, \$147 billion was spent on obesity related medical costs. Due to results of recent studies on the relationships between obesity, chronic disease including diabetes, and food insecurity, more research needs to be done to better understand their interconnected effects. There are several factors considered indicators for food insecurity such as income, home ownership status, and level of educational attainment. These maps and analyses attempt to indicate patterns amongst food availability, health status, and demographic indicators to better guide further research about where food insecurity occurs and its resulting effects on the community.

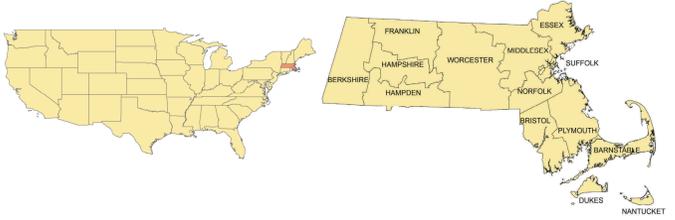
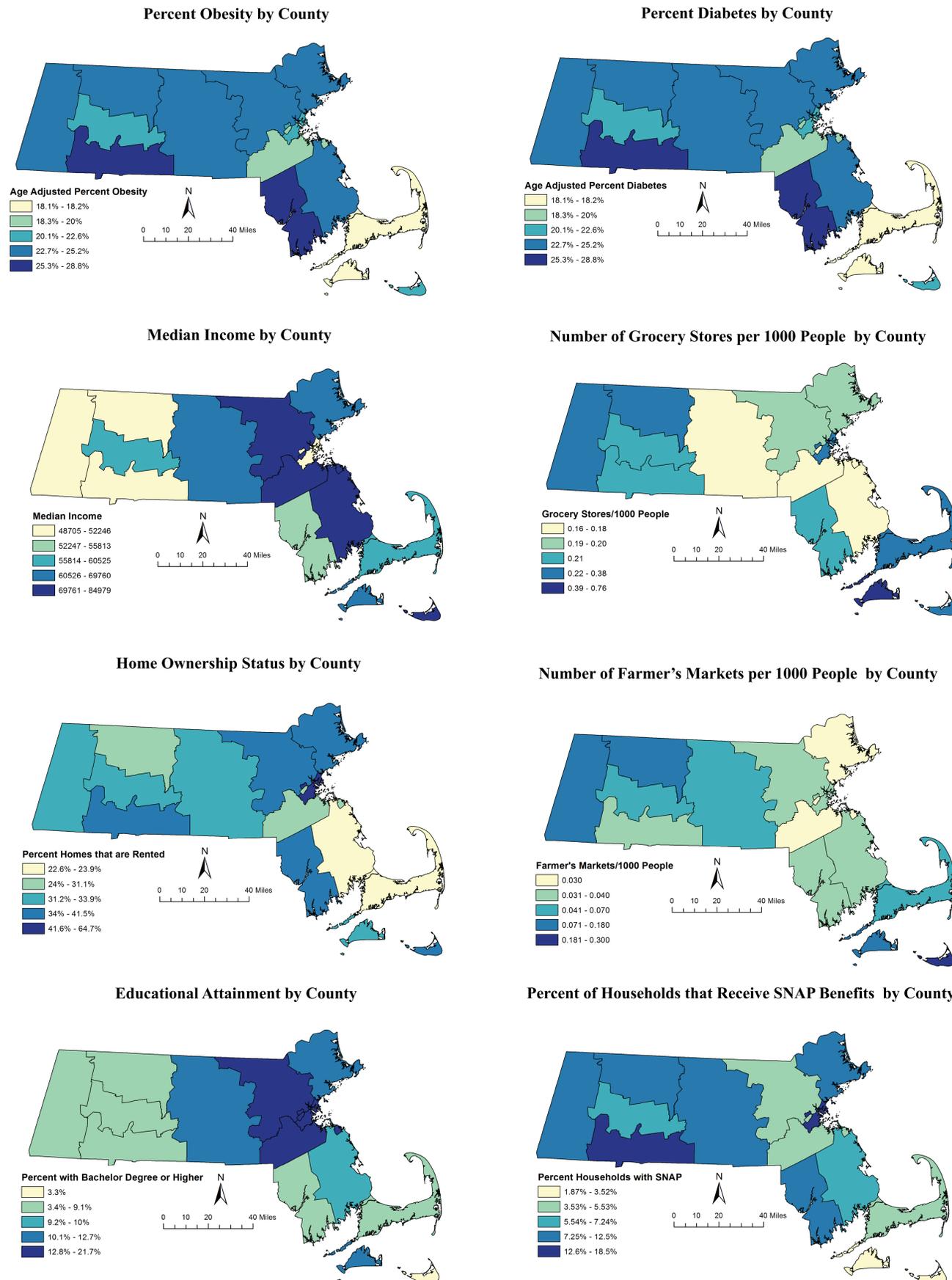


Figure 1: Massachusetts; general area of study Figure 2: Counties of Massachusetts; specific area of study

Methodology

Income, household ownership status, and educational attainment are shown to be factors in the occurrence of food insecurity. Therefore, this information was acquired and mapped. Grocery stores, farmer’s markets, and the use of food assistance programs such as SNAP are also indicators of food insecurity, as various relief programs have encouraged the creation of stores and markets and the enrollment in SNAP to combat the issue. This information was analyzed to see if there was a relationship to the other demographic characteristics and to health status. Diabetes and obesity have recently been shown to be associated with food insecurity. Individuals who suffer from food insecurity have been observed to have a greater risk for obesity and diabetes. Therefore, health information was compiled with demographic census data and information about grocery stores and farmer’s markets to examine relationships between these three categories. Needed census data were procured and the excel data modified in order to join with the Massachusetts county data layers. New excel documents had to be created with data from the USDA Food Atlas about grocery stores and markets. These tables were also joined to county data layers. The desired information was then applied in the symbology feature to show gradients in the data. Excel was used to find correlations between percent obesity and percent diabetes and the selected factors of: income, home ownership, education, grocery stores, farmer’s markets, and SNAP beneficiaries.



Results

Obesity shows stronger correlations than diabetes in analysis, though the directionality is always the same. The results are shown in Table 1. Obesity shows a negative correlation with income, which is expected. Fittingly, there is a strong positive correlation between obesity and food stamp usage. Higher obesity rates are predicted to be associated with lower income and greater food stamp use. Obesity also has a negative correlation with the attainment of a bachelor’s degree or higher. There is a positive correlation with obesity and rented home ownership status. For grocery stores and farmer’s markets, there are negative correlations with obesity indicating that higher obesity rates are associated with fewer food stores. Overall these findings correspond to research in the field. Also noteworthy, counties with the worst health indicators (Bristol, Hampden, Worcester) also are the lowest for income and education, highest for home renting, lowest amount of grocery stores and farmer’s markets, and highest SNAP use. Counties with the best health indicators have the opposite characteristics.

	Obesity	Diabetes
Income	-0.41418	-0.33188
Home Ownership (Rented)	0.194159	0.569005
Education (Bachelor’s Degree)	-0.026388	0.00032
Grocery Stores (Stores/1000 people)	-0.45858	-0.06001
Farmer’s Markets (Markets/1000 people)	-0.21613	-0.17035
SNAP Beneficiaries	0.689145	0.624725

Table 1: Correlations between obesity, diabetes and selected features

Conclusions

The correlations calculated agree with literature about food insecurity indicators and effects. Income and educational attainment show negative correlations with obesity, meaning lower income and education indicated higher obesity and diabetes rates. Home ownership showed a positive correlation between renting, obesity, and diabetes, as also predicted in existing literature. With food distributors, there were negative correlations between grocery stores and farmer’s markets, indicating higher obesity rates related to lower store availability. This corresponds to the literature which has found food insecurity to be affected by proximity of grocery stores. Solutions to food insecurity have included establishing farmer’s markets and use food stamps. More research should be done exploring the relationship between food insecurity, health status, and farmer’s markets, as this report finds a negative correlation with obesity, diabetes, and presence of markets. Future findings could guide the creation of farmer’s markets, particularly where they are located in order to best serve people in need of healthy, affordable foods. This analysis found a positive correlation with obesity, diabetes, and SNAP use. This was anticipated as beneficiaries of SNAP have lower incomes and therefore higher rates of obesity and diabetes. Food assistance programs have been found to be underutilized by people who suffer food insecurity. This information could further be investigated to provide more information about where farmer’s markets should be located and how to access people who are at-risk of food insecurity. Overall, these findings indicate more study should be done on food insecurity’s effects on health and wellbeing.

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Projected Coordinate System: NAD 1983 State Plane Massachusetts Mainland FIPS 2001 (Meter)
Scale: 1:1,500,000
Data Sources: United States Census, United States Department of Agriculture Food Atlas, Tufts University M Drive