

Food Insecurity and Immigrant Status in Somerville MA

Introduction

This project explores the topic of food insecurity in the Somerville area in correlation with immigrant status. Food insecurity is defined as the inability “to consistently access or afford adequate food” (Merriam-Webster). The risk factors which will be used to assess food insecurity in this densely populated area of Massachusetts are income and distance to grocery stores and farmers markets. Alternate sources of food exist for residents of Somerville, such as convenience stores, but the access to fresh food (i.e produce) provided by grocery stores and farmers markets complies best with my interpretation of “adequate food” (Merriam-Webster). Income is also crucial in determining the ease with which populations can “afford adequate food”. These two vital factors give a basic understanding of food security in this region. There are many other factors which contribute to this issue of adequate food access (i.e age, vehicle access, public transportation access, food quality and familiarity), and should be taken into account in future deeper analyses of food security in this region. Food security is important as physical health and quality of life are seriously impacted by malnutrition and stress caused by inadequate food access. The ethical concerns of inadequate food access compel further study into this area, as well as the negative economic effects resulting from decreased productivity of those suffering from food insecurity. Immigrants are often assessed as having a higher risk of food insecurity (2009 Child Trends), and this correlation is pertinent to the “strong presence” of the immigrant population in Somerville (Robinson, 2018, p. 15). Somerville has a population of approximately 80 thousand, making it the most densely populated city in New England, with 24.8% of residence “born outside of the country” (Data USA, 2017). The national average of foreign-born citizens stands at 13.7%. The immigrant population in Somerville is consequential to the economy and culture of this municipality (Robinson, 2018). Thus, it is of great importance to evaluate the correlation of immigrant status and at risk populations for food insecurity in order to better understand the intricate factors which affect foreign born individuals and food access. It is also notable that Somerville’s cost of living and population are increasing, which will only exacerbate issues of food insecurity. This GIS analysis allows for the spatial analysis necessary to study the issue of food insecurity correlated with immigrant status, through its location-specific factors.

Discussion

A general trend relating immigrant status to increased rates of food insecurity was found through this project analysis (See Figures 1 and 3). This finding corresponds to existing literature citing immigrant populations as more vulnerable to food insecurity (Capps et al, 2009). However, several other factors which impact food security were not included in this analysis, limiting the scope of its application. This food insecurity risk analysis provides a basic understanding of trends around food access and immigration in the Somerville area. Deepening this analysis would require reevaluating the distance metric to food access points. A more realistic and useful distance measurement would be walk time (taking in consideration walkable routes), as well as drive time (taking into consideration vehicle access). Alternative forms of travel such as biking and public transportation could also be included for a fuller picture of travel time to food access points. In addition, it is important to note that other food access points exist outside of the collected grocery stores and farmers markets. Many households acquire foods from convenience stores, group food facilities (dining halls, cafeterias), and various local organizations/food pantries. Another factor which impacts food access is food familiarity and preparation. For immigrant populations particularly, food is less accessible if it is foreign and requires unfamiliar cooking techniques. There is extremely limited data for this aspect of food insecurity, though it is particularly relevant within the scope of this project. Overall, Somerville retains relatively low levels of food insecurity, and residents report “relatively good access to affordable foods in Somerville” (Robinson, 2018, p. 26). This issue is complicated by the current housing crisis in Somerville and growing living expenses. These factors will only increase the risk of food insecurity among existing

Figure 1: The spatial distribution of income in the greater Somerville area.

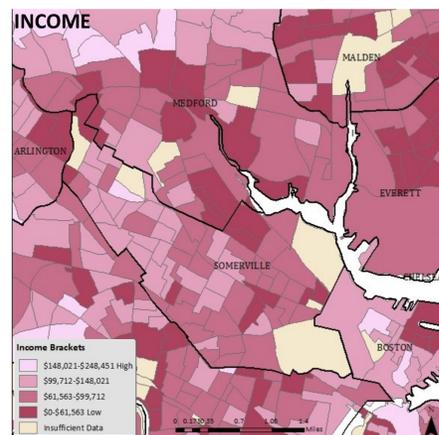
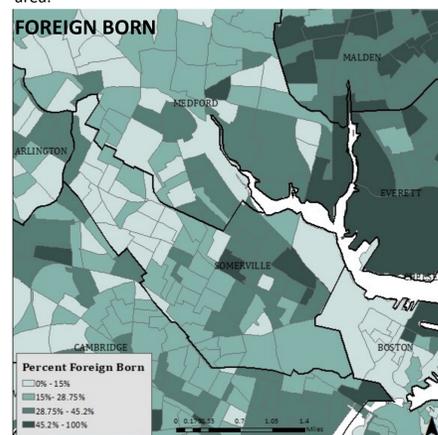


Figure 2: The spatial distribution of percentage of foreign born individuals per block group in the greater Somerville area.



Results

The final analysis of food insecurity in Somerville MA is displayed in Figure 3. This map shows the risk for food security by block group, and it is based on income and distance to food access points. The northwestern, and eastern areas of Somerville are most at risk of food insecurity, while the east southeastern region is at particularly low risk. The key neighborhoods most at risk are parts of West Somerville and Spring hill, East Somerville, and Winter hill. Winter hill, located near the Medford border in the northeastern region, notably includes the mystic housing development, “one of Somerville’s densest and lowest income neighborhoods” (Robinson, 2018, p. 28). Comparisons of this visual representation of food insecurity risk and foreign born individual concentration reveals a complex relationship. Key neighborhoods such as Winter hill and East Somerville, include greater percentages of foreign born individuals (over 28.75%) and also experience higher risk of food insecurity. This seems to indicate that being of immigrant status may increase risk of experiencing food insecurity. Areas nearer to northern Cambridge (i.e Davis square) experience markedly less risk of food insecurity and also have much lower percentages of immigrants (0%-15%). However, there are block groups around central and southern Somerville for which this trend is not true, indicating the importance of extraneous factors. Income was weighed slightly higher than distance in this food insecurity risk analysis due to the relative abundance of food access points present in Somerville. Income thus becomes a greater barrier to food access.

Food Insecurity Risk Analysis

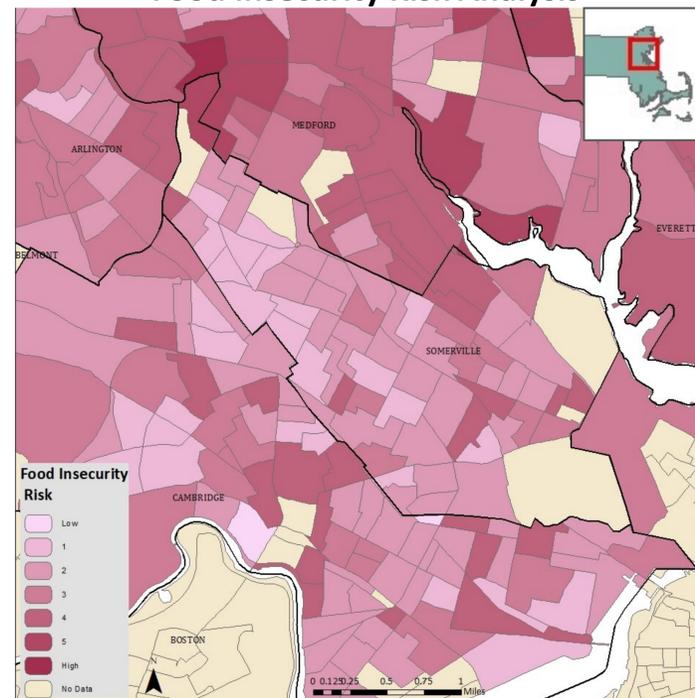


Figure 3: This map displays the final risk analysis of food insecurity in Somerville, based on income and distance to food access points. Darker colors indicate greater risk of experiencing food insecurity.

Data

In order to complete this analysis, numerous data sets were acquired and manipulated. The significant data sets used in the final analysis included location and attribute data about average income, foreign born populations, and food access locations within each block group. The 2010 Census block groupings were used to spatially locate these estimates in the Somerville area, in the form of vector data. Block groups are the smallest geographical unit used in published Census data. They can include information for 600 to 3,000 people. Data is collected among a portion of households in each block group and then extrapolated to represent the whole block group. The average income data was harvested from American Fact Finder, in a data set titled ACS_17_5YR_B19013. The HD01_VD01 field was utilized for its average income values per block group. Estimates of the foreign born population per block group was also collected via American Factfinder in the data set: AC5_17_5YB99051. The field HD01_VD05 contained foreign born population estimates and HD01_VD01 contained total population estimates. Both attributes were utilized to analyze the correlation of food insecurity risk with immigrant status. Additionally, grocery store location data in the form of addresses was found through Reference USA. In order to maintain a reasonable size for this data set, the extent of the Grocery stores were limited to Somerville and the towns immediately surrounding it: Medford, Arlington, Everett, and Cambridge. Shape files containing Farmers’ Market locations (Farmers_Markets), Massachusetts town boundaries (MA_Town_Boundaries), and Census 2010 block group boundaries (CENSUS2010_Blkgroup) were also gathered from the M drive.

Methods

This GIS analysis was conducted using ArcGIS 10.1 software. The pertinent excel files were converted to numerical values and added to the Arc session. The income dataset (ACS_17_5YR_B19013) was joined to the census block groups attribute table. This join was accomplished based on the GEOID10 and Geoid2 fields. This layer was then exported as a shape file and incorporated into the table of contents. The symbology was altered according to the HD01_VD01 field (average income) quantities. Four natural breaks were used and attribute queries were applied based on these break values. The block groups corresponding to the smallest income bracket (\$9,730-\$61,563) were selected and the field calculator was implemented to assign the aforementioned selection a risk value of 3 in the new field (inc_rank). This process of reclassifying the income breaks was repeated for the other three brackets, with the risk value decreasing with increased wealth (3 to 0). A similar process was used to analyze foreign born population data. The AC5_17_5YB99051 data set was joined onto the census block groups attribute table based on the GEOID10 and Geoid2 fields. This data was exported as a shape file to be incorporated in the map and a new field was created in the attribute table to hold the immigrant percentages (Imm_p). The field calculator was used to divide the foreign born estimate (HD01_VD05) by the total population (HD01_VD05). The symbology was altered according to the foreign born percent field (Imm_p) quantities with four natural breaks. The grocery store dataset was geocoded from addresses to vector points using the Geocoding toolbar. Multiple fields was selected to interpret the data set fields containing different aspects of each address (Address, City, State, ZIP Code). The result was a vector point shape file of the grocery stores in Somerville and the surrounding towns. The existing farmers market shape file was joined with the grocery markets shape file using the merge tool, to create one shape file with all the food access points in the Somerville area. The multi ring buffer tool was then applied to this shape file to form 1/4, 1/2, 3/4 mi dissolved buffers around each market. These polygons were then used in order to visualize distance to food access points, and to rank this quantity for block groups. A new short integer field (Dist_rank) was added onto the food access attribute table. First a selection by attribute was conducted to select the first ring (1/4 mi) of each buffer. Next a selection by location was run to select block groups with their centroids in the current selection (first buffer ring) and the buffer polygons were unselected using the same attribute selection. Ranks were assigned using the field calculator, with 0 as the closest distances, and 3 as the farthest. This process was repeated for each ring of the buffers (1/4 mi, 1/2 mi, 3/4 mi) and then those block groups outside of the buffers (over 3/4 mi). Each of these factors was then incorporated into the various factor maps presented. The final risk assessment was conducted through a weighted combination of the income and distance scores added to a new field (Food_ins). Income was weighted higher at 1.25X, while distance was weighted at .75X. Symbology breaks were established at 0, 1, 2, 3, 4, 5, 6, and 7, with lower scores indicating lower risk of food insecurity.

References

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Figure 4: The spatial distribution of food access points (grocery stores, farmers markets), in the Somerville area.

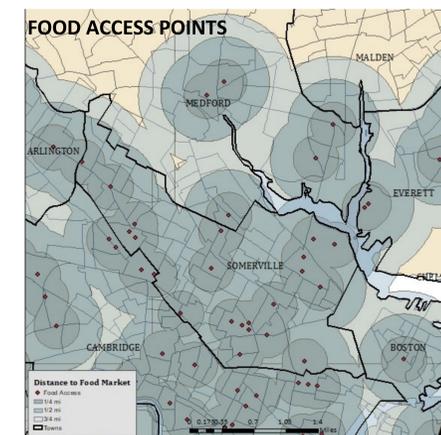


Figure 5: The approximate distance to a food access points for block groups in the greater Somerville area.

