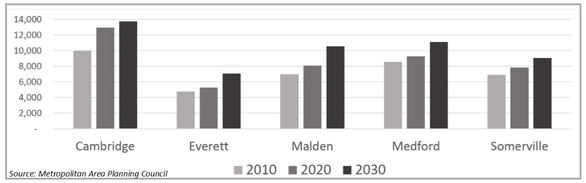
SECOND HELPINGS

Senior Food Access in Five Boston-Area Municipalities

INTRODUCTION

Food insecurity and poor food access have become an increasingly critical issue for seniors across the nation. Nearly 1 in 12 seniors across the nation have limited or uncertain access to food, while it is estimated that 10,000 Baby Boomers will turn 65 every day until 2030. (National Foundation to End Senior Hunger, 2014) Food insecure seniors are 60% more likely to experience depression, 53% more likely to suffer a heart attack, 52% more likely to develop asthma, and 40% more likely to experience congestive heart failure. (NFESH, 2014) According to the Metropolitan Area Planning Council's (MAPC) 30-year regional plan, MetroFuture, the senior population of the Metro Boston region is also projected to skyrocket in the next 15 years. (Figure 1) They calculate that the population over the age of 55 will increase by 78% between 2008 and 2030. At that point, the over-55 population is projected to account for fully a third of the Metro Boston population. (MetroFuture, 2008)

Senior population projections: 2010-2030



In response to this demographic shift, MAPC is currently developing a multi-year project to assist Massachusetts decision makers in improving senior food access across their service area. As a precursor to this project, this vulnerability analysis looks at current senior food access conditions in five cities in the Boston area -- Cambridge, Everett, Malden, Medford, and Somerville -- and identifies potential locations of senior food insecurity. To complete this analysis, I looked at access to food retailers by walking, driving, and public transport. I also looked at factors associated with greater senior food insecurity and limited food access, such as having low income, being black or Hispanic, and living alone. By combining these factors, and weighting areas with large senior populations more heavily, I was able to develop a vulnerability score and identify areas where more on-the-ground research should be carried out.

METHODS

Data Collection

Data on food retailer locations was collected from the ReferenceUSA database, while data on transit stops, elevations, open space, and water were collected from MassGIS. Age, race, income, and living situation data were provided by the Metropolitan Area Planning Council.

Food Retailer Accessibility

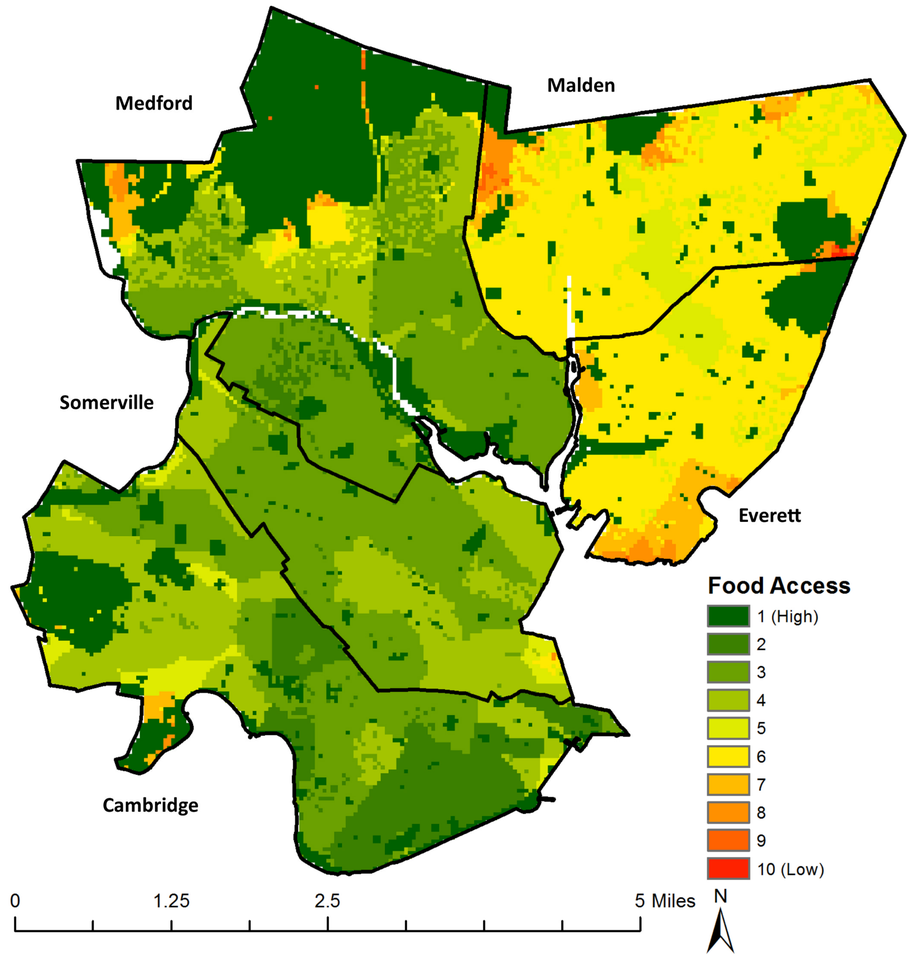
To assess food retailer accessibility, Euclidean buffers were drawn around data points. Distances were determined by the USDA's definition of low food access combined with considerations for lower physical mobility and driving potential for seniors.

Factors for Senior Food Insecurity

Data on factors commonly associated with senior food insecurity were joined to census tract and city layers to represent areas with higher risk.

Food Access Score

The senior food insecurity factor layers were converted to raster layers and combined with the food retailer accessibility layers and a layer representing uninhabitable land (parks, cemeteries, water, etc.) to determine a final food access score representing potential vulnerability for senior food insecurity. To calculate the average score for each city, I recoded the data to remove open space and water from the equation.



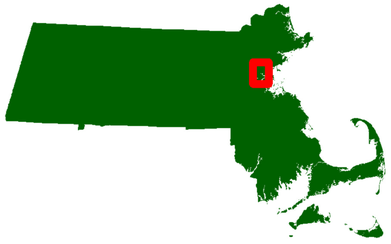


Table 1: Food Insecurity by City

	City	Average Food Access Score
1.	Everett	6.08
2.	Malden	5.98
3.	Medford	3.51
4.	Somerville	3.44
5.	Cambridge	3.21

Sources: MassGIS, ReferenceUSA, MAPC, American Community Survey

RESULTS & CONCLUSIONS

My research question looked at where indicators of senior food insecurity and lower food retailer access overlapped. After removing open space and water, the average food access score in the area was 4.6. From this analysis, we can see that the high vulnerability to senior food insecurity is located in portions of Everett and Malden, with small pockets of high vulnerability in northwest Medford, west Cambridge, and southeast Somerville. (Table 1) This analysis was confirmed by performing a Local Moran's I test. (Moran's I of 0.412452, p-value <0.0000)

A vulnerability analysis can provide only limited results. Any area identified by the model as being high risk for senior food insecurity must be investigated in person to gain any conclusions or make any targeted policy recommendations.

Based on the USDA's definitions, very few residents of these five cities can be said to live in a 'food desert', but the literature has shown that proximity to a food retailer is of little use when you have low physical mobility. Future policies addressing senior food insecurity should focus on programs that either transport seniors directly to food retailers or on those that bring food to seniors' homes, either through Meals on Wheels or some other food delivery program. Given relatively lower incomes for senior householders and higher instances of seniors living alone, regional efforts should focus on the communities of Medford, Malden, and Everett.

LIMITATIONS & FURTHER RESEARCH

Food Retailer Accessibility

The ReferenceUSA dataset on food retailer locations is out of date, given the high rate of turnover in retailers, but it is the best available data and my assumption is that buildings that have been food retailers are likely to remain food retailers in the future. A dedicated, on-the-ground update to the ReferenceUSA data would also be very helpful in assessing food retailer access. It should identify which retailers accept SNAP so that further research can be done on senior SNAP use.

I was not able to access data on sidewalk locations or quality, which I believe could have a large impact on analysis of walkability, especially for those with low mobility, for example, those who use walkers or wheelchairs.

Given my available data and skill level, my maps of food retailer access rely on Euclidean distance calculations, which do not accurately represent walksheds or drivesheds. This likely led to error in the space in which food retailers were deemed highly accessible. This model could be improved by performing network analysis to compute a walkshed, a driveshed, and public transport access information to gain a better sense of food retailer access in the area. It would also benefit from data on how seniors are likely to access food retailers, perhaps with data on senior driver's license possession and Senior Charlie Card usage, in order to better represent the actual mobility strategies used by seniors to access food. My assumption is that senior car ownership and use are both lower in these five cities than they are nationwide, which might affect the weighting of my final model.

Open Space & Water

I included open space and water in my calculations to avoid indicating these areas as areas of low retailer density. However, a number of small points within open spaces (parks, cemeteries, etc.) suggest that there is another data layer on uninhabitable land that I am missing. Future work on this model should include identifying these points of discrepancy and including the relevant data layer in the layer of uninhabitable land and water.

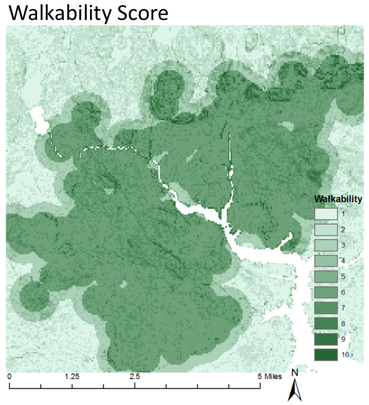
Additional Data

I would also have liked to have incorporated congregate meal sites into the model, as well as participation in food delivery programs. This would include both public programs, like Meals on Wheels, and private companies, like Peapod.

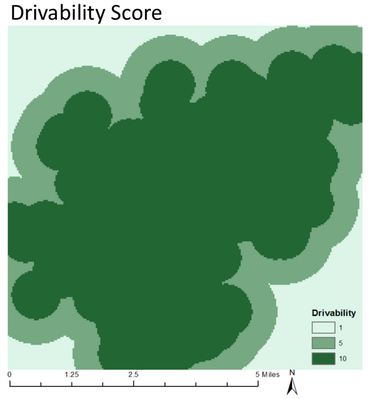
The data provided to me on race, living situation, and householder income specific to seniors used cities as the spatial unit. I would have liked more nuanced data to better identify areas that might have greater need.

Food Retailer Accessibility

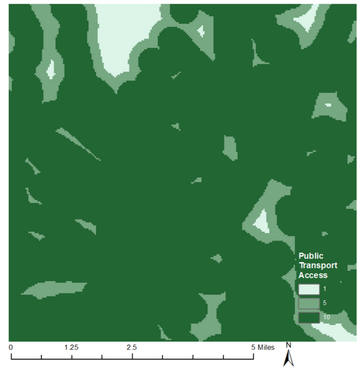
Walkability Score



Drivability Score

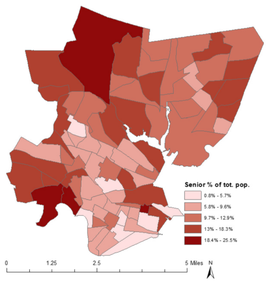


Transit Access Score



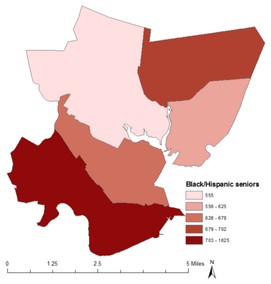
Common Factors for Senior Food Insecurity

Concentration of senior population



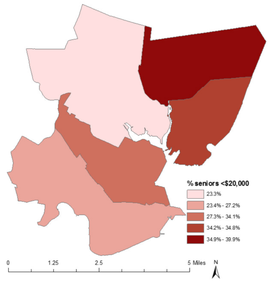
The senior population in this area is largely concentrated in northern Medford and western Cambridge, but Medford, Malden, and Everett all have relatively high proportions of seniors across their cities.

Total black & Hispanic seniors



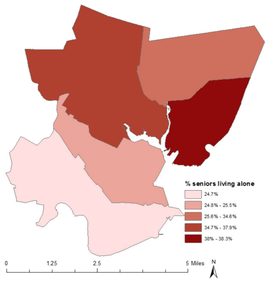
Research into factors affecting senior food security note that seniors belonging to minority groups are more likely to experience food insecurity than white seniors. The AARP found that black seniors were the most vulnerable, while Feeding America found that Hispanic seniors were the most vulnerable (Lee & Frongillo, 2001; NFESH, 2014).

Percentage of senior householders with <$20,000 in annual income



NHANES and NSENY data has identified low levels of income as a major factor for inadequate food access (Lee & Frongillo Jr, 2001). A study conducted in Malden found that those with an income less than $15,000 had the greatest challenges accessing food (Malden Is Moving, 2015). Available data categorized income under $20,000.

Percentage of seniors living alone



Those who live alone are at an increased risk for food insecurity (Strickhouser, Wright, & Donley, 2015). It has been found that between 70% to 93% of this group are at risk for poor nutrition status (Locher, et al., 2009). This indicator is related to marital status, with higher food insecurity amongst those who are divorced, separated, or widowed (Strickhouser, Wright, & Donley, 2015).

Tufts UNIVERSITY

Cartographer: Allison Meyer

Date: December 19th, 2016

Projection: NAD_1983_StatePlane_Massachusetts_Mainland_FIPS_2001

Scale: 1:70,000

Sources: MassGIS, Reference USA, Metropolitan Area Planning Council, American Community Survey 5-Year Estimates 2010-2014

References:

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