Expanding WIC Access for Eligible Mothers:

Accessibility Evaluation of an additional WIC Clinic Location in Springfield, MA

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Background: What is WIC?

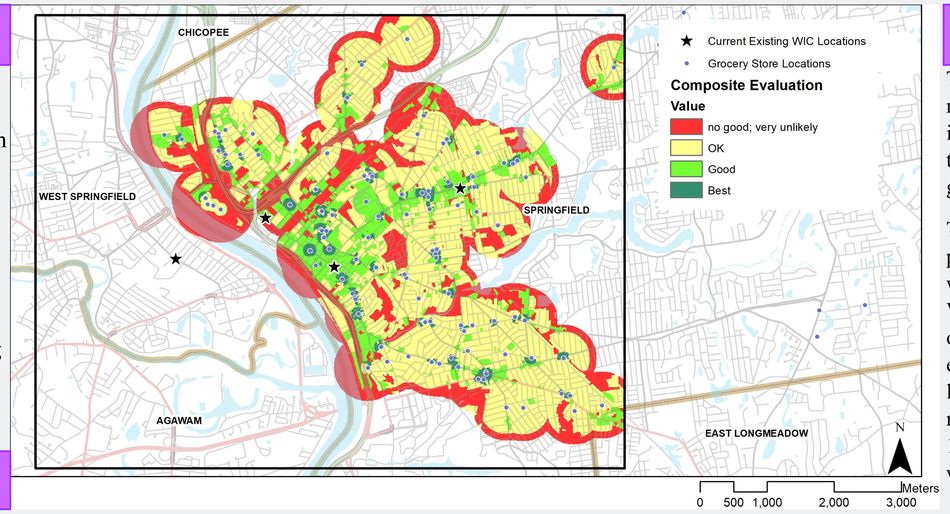
The WIC (Women, Infants, Children) Program is a USDA-funded, state-administered nutrition assistance program specifically eligible to low-income women and children up to five years of age. WIC participants receive a specified food package, nutrition education, breastfeeding support, and medical service referrals. The food package assigned is based on many factors including mom's stage of pregnancy (including post 6 months), mom's breastfeeding status, and age of the child. Women receive a WIC EBT card to purchase approved foods at WIC accepting grocery stores.

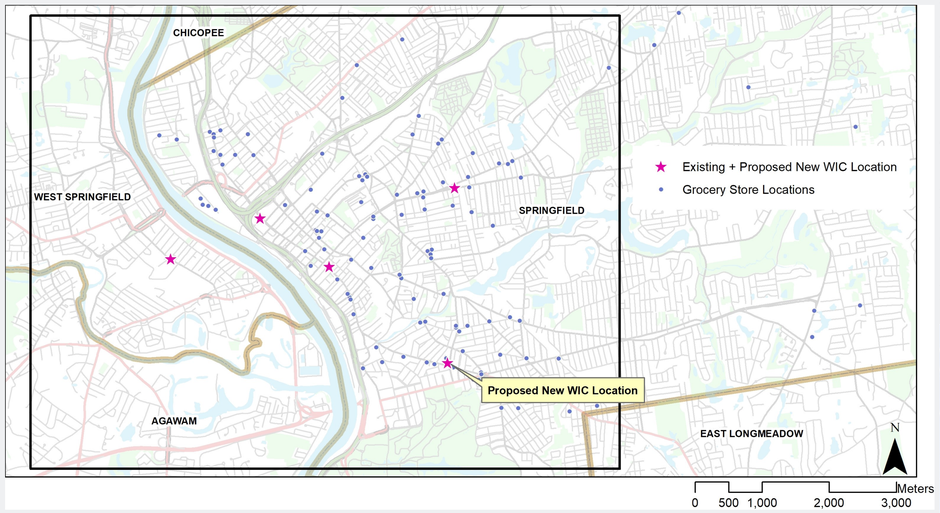
Contextual Model & Spatial Mechanism

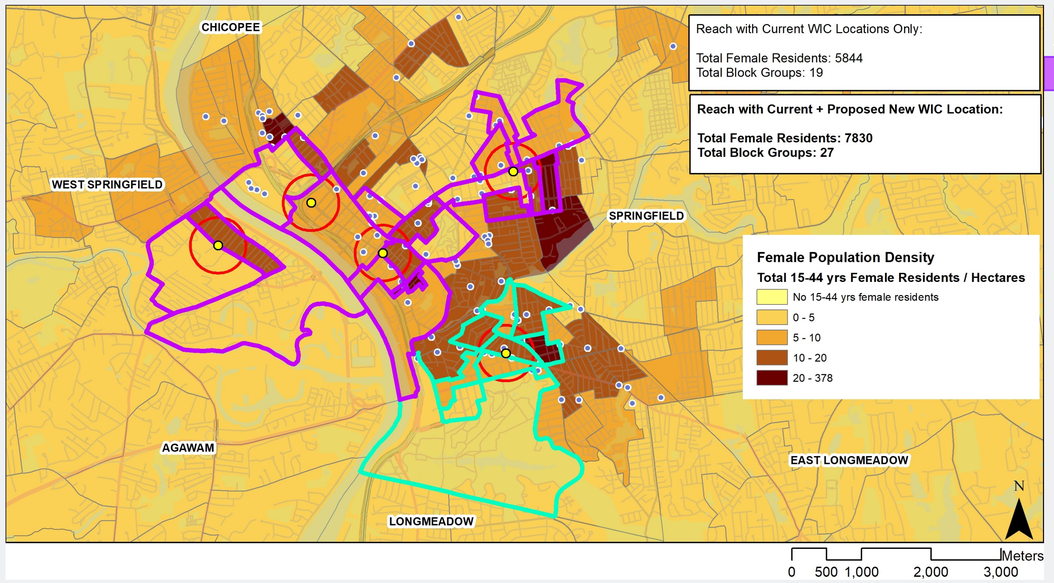
This pilot project seeks to explore the feasibility and consequences of adding an additional WIC clinic in Springfield, MA. Although there are currently four operating WIC clinics in Springfield, most of the clinics are located in the metro and eastern parts of the city. Adding a new WIC clinic in South Springfield could possibly increase accessibility of the WIC program to a new set of eligible mothers and their children.

Currently, women must go to their local WIC clinic in person in order to enroll and receive WIC benefits (there is no online application). WIC-participating mothers go to their local WIC clinics frequently to receive services and recertify for the program. As WIC participating mothers will be going to grocery stores to use their WIC benefits, this project builds on the idea that walking distance to grocery stores should be considered when determining the location for a new WIC clinic. Mothers could benefit from reduced transportation costs if they could reach a WIC clinic and WIC participating grocery store in one driving trip, as mothers could walk from the WIC clinic to the grocery store easily.

This model predicts that a 400 meter or less walking distance of a nearby, high traffic grocery store to a WIC clinic will make an additional WIC clinic location (and the overall WIC program) more accessible to eligible low-income mothers living in Springfield.







Results

The proposed new WIC clinic location was chosen based on results produced by the composite evaluation raster (land use + grocery store distance) as well as the population density and poverty estimates using 2013 ACS 5-year data.

References

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*WIC Image from: WIC Image Gallery: Clinic Environment, Nutrition Education, Clinic Image 1 (300DPI), Developed by USDA, Food and Nutrition Service.

WIC Background Information: fns.usda.gov

Datasets & GIS Procedures

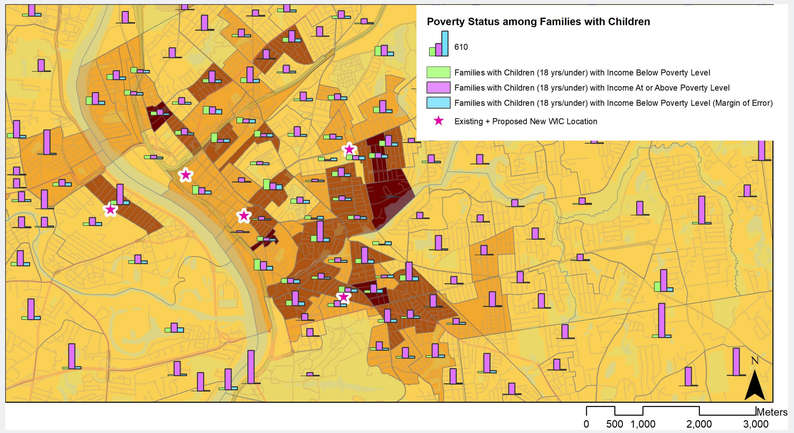
The MassGIS (2005) Land Use data layer was used to produce a rasterized and reclassified land use layer of Springfield and show areas that were most feasible and realistic to include a new WIC clinic. Areas that were categorized as commercial were given the highest land use evaluation score, with the Urban Open/Institutional land use category given the second highest score.

The Reference USA database was used to gather grocery store and existing WIC clinic point data. Only grocery stores with U.S. Census Bureau primary NSAICS code 445110 were included to limit the inclusion of smaller, unfit stores that most likely were not a WIC -EBT accepting store (limit errors of commission). The ReferenceUSA database only had 2 of the current WIC clinics operating in Springfield listed; the other two existing locations included on mass.gov were manually inputted (4 total existing locations). A raster was generated using the Euclidean distance function, and then reclassified to create a grocery store distance evaluation score raster. Locations that were 100 meters or less from a grocery store were given the highest distance evaluation score, while locations 100-200 meters from a grocery store were given the second highest score.

A final Composite Evaluation raster was generated using the ArcGIS Raster Calculator tool, specifically with land use given 2X the weight of grocery store distance in the map algebra expression used. Land use was given a higher weight because I thought land use was more indicative of where a WIC clinic could actually be built (considering zoning, land availability, etc.). Walkable distance to a grocery store will be a bonus consideration for mothers in this scenario. Also, as many grocery store points were detected, walking distance from a grocery store was less restrictive/selective.

A Vector-Relational GIS Simple Sum and Select Model was created using 2013 ACS data to compare "before new clinic" and "after new clinic" estimated reach of female residents (15-44 yrs).

A bar chart using 2013 ACS Poverty estimates was overlaid on top of the 2013 ACS block groups to visualize block groups that had higher counts of families below poverty.



Limitations

Using 2013 ACS data, there are errors of representation of overall population as only 2% of American households are surveyed annually. Also, population density in the block groups can be easily visualized as uniformly distributed/homogeneous, when in reality, there is uneven population distribution within block groups.

For the Vector GIS modeling, population reach was overestimated. Block groups "crossed by the outline of" the 400m buffer layer were selected and included in the summary statistics; even the block groups that barely touched the buffer were included.

(2005) Land Use categorization could have led to both errors of omission and commission when determining an ideal WIC clinic location. Although commercial areas are best suitable, the availability of mapped commercial areas are not known. Many of the commercial areas are most likely occupied currently (errors of commission). Residential and Open Space areas were given a lower evaluation score in my model; however, some of these lands could be available (errors of omission).