Proposal for a New Walk-in Clinic: Identifying a Suitable Area for a New CVS MinuteClinic

ConceItual Overview

Walk-in clinics provide quick and efficient access to healthcare and are useful for college and university communities that do not have access to university health centers but may need fast and reliable care for minor health concerns. CVS MinuteClinics provide an added benefit of being located next to a CVS pharmacy for easy purchase of prescriptions. Brooklyn has three CVS MinuteClinics at present (Google Maps). In light of the recent measles outbreak in Brooklyn, this GIS project seeks to conduct a spatial relationship analysis to investigate the feasibility of using several easy-to-obtain data-sets for exploring potential gaps in the existing network of CVS MinuteClinics and for comparing potential new clinic sites based on these criteria: 1) located near higher educational institutes; 2) located near subway stations; and 3) situated away from competing walk-in pharmacies [such as Walgreens] and existing CVS clinics; and 4) located on commercial land around residential areas.

Methods

The real-world spatial mechanism is an accessibility model that utilizes raster overlay analysis. Using map algebra, Figure 1 displays the composite evaluation based on a weighted map (Mcargian) overlay analysis that averages the scores for each of the four criteria mentioned above for a potential new clinic site (see Figure 2). A land use suitability model is introduced to identify commercial/residential land that would be preferable. Categories within each of the data layer is scored on a scale of 0-3 (0=worst; 3=best). For example, the best score for a new CVS MinuteClinic is defined as being within a walking radius of 0-100m from existing colleges, while the worst scenario would be if it lies 500-1,000m away.

Similar to Mansour’s (2016) work on analyzing accessibility of existing public health facilities in Riyadh, this project primarily uses Euclidean distance tool to measure straight-line distance between two points. However, unlike Mansour’s and Baskin et al.’s (2015) work, this GIS model does not consider population density and travel distances, zonal statistics or near analysis. This results in only an evaluation of crow-flight distance (not accurate walking distance on sidewalks).

Data Sets

Data for this project was collected from the New York State GIS Program Office, U.S. Geological Survey (USGS), U.S. Environmental Protection Agency, NYC OpenData, Baruch College of the City University of New York, and Google Maps. Information on some of the important layers include: 1) polygon data of New York State from 1990 (as collected by USGS) which is categorized into 14 land use categories; 2) longitude and latitude coordinates of existing CVS MinuteClinics in Brooklyn from Google Maps; and 3) 2016 data on New York City subway lines and stops based on Metropolitan Transportation Authority data. Errors of omission and accuracy are major issues with these datasets as the ‘College/University’ and the ‘Locations Providing Seasonal Flu Vaccinations’ datasets were taken from open data sources that did not have good metadata on how the data was collected and where the data originated from. Furthermore, the metadata on land use does not elaborate on the various land use classifications, introducing errors related to categorical precision and spatial granularity. As such, we can expect bias in the data in either directions that can over-estimate or under-estimate the conditions presented in reality.

Results and Evaluation

The composite evaluation in Figure 1, shows that all potential CVS MinuteClinics are located in north Brooklyn; most of which have a composite score of “ok” (1). Analyzing the combination of individual layer scores, the red dot indicates a “good” location for a clinic that is located near Prospect Park and between Franklin Avenue and Botanic Garden metro stops. Compared to the information on the existing CVS MinuteClinic in Figure 1, we can see that the score for the potential clinic is better. However, we can also see from the street map that the feasibility of constructing a clinic in this area is challenging as several food services (e.g. dunking donuts) already exist in this location.

References

Baskin et al. (2015) work, this GIS model does not consider population density and travel distances, zonal statistics or near analysis. This results in only an evaluation of crow-flight distance (not accurate walking distance on sidewalks).