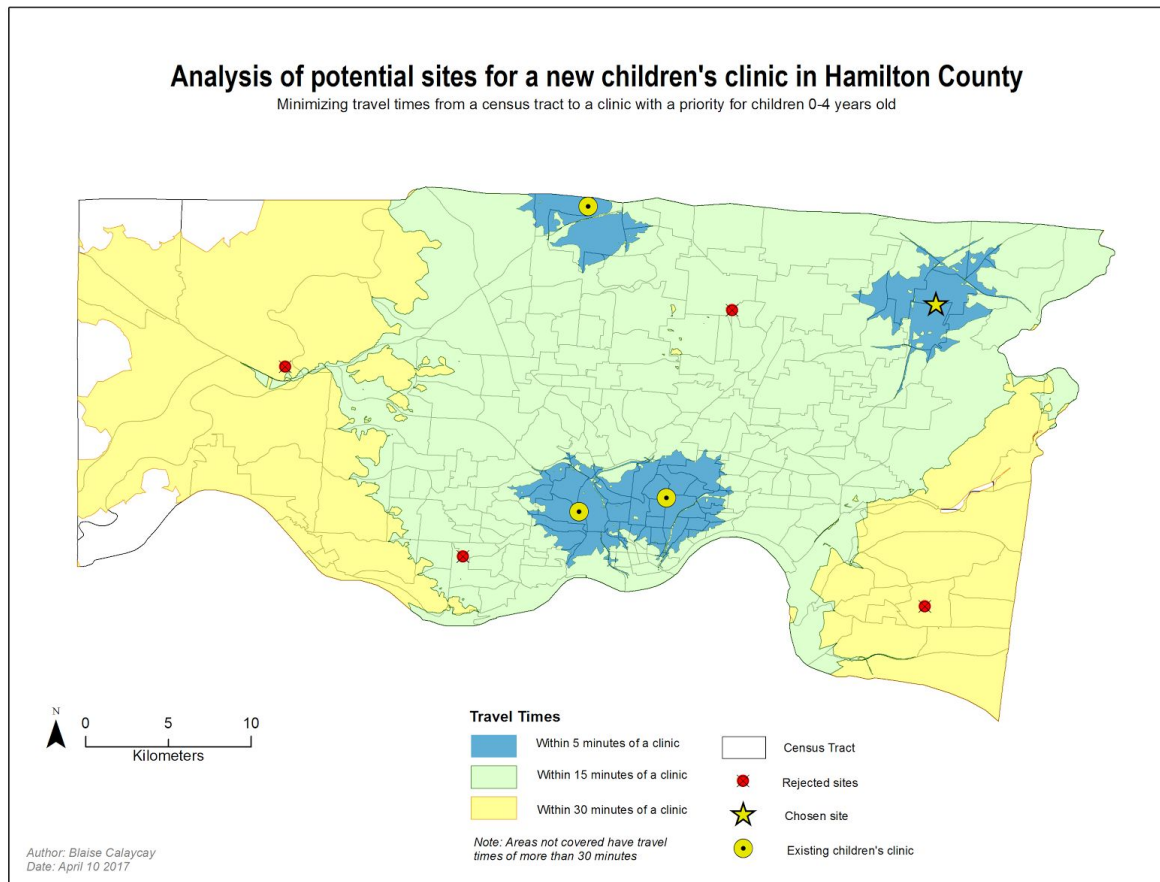# GGR372 Lab 5 Report

Blaise Calaycay
April 10 2017

# Analysis of potential sites for a new children's clinic

We have identified five potential sites in Hamilton County to open a new children's clinic. Out of all these sites, our preliminary analysis predicts that the northeast location would be the best site to open a new clinic.

Methodology

We generated a Location-Allocation model using the tools provided in ArcMap 10.3. We based our analysis on census tract centroids in Hamilton County as patient origins. For these origins, we used the population of children under 5 as the weight for the respective travel times to the potential sites. We chose the option to **Minimize Impedance** (with the existing clinics as required clinics and the potential sites as candidates) with no impedance cutoff. This is because we want to maximize the convenience for EVERY PATIENT in the county. We used a **power impedance transformation** with parameter 2 to calculate the least impedance from all census tract centroids. We used this so as not to disadvantage patients who live far from a facility (however, we get the same results when using a linear impedance transformation).
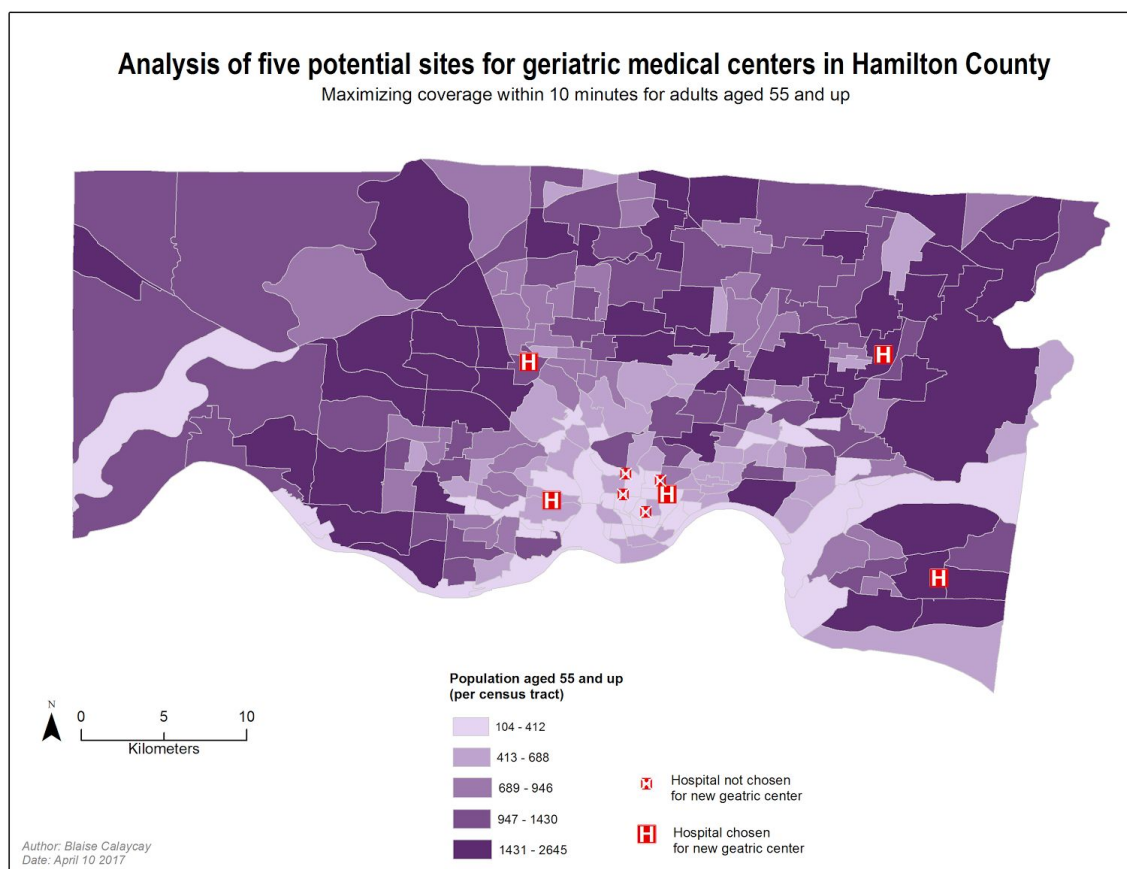
Findings

The results of the analysis predicts that the northeast location (represented by a star) minimizes impedance for patients. We see that residents in the western area of the county are still disadvantaged, with a few areas having travel times of more than 30 minutes (white
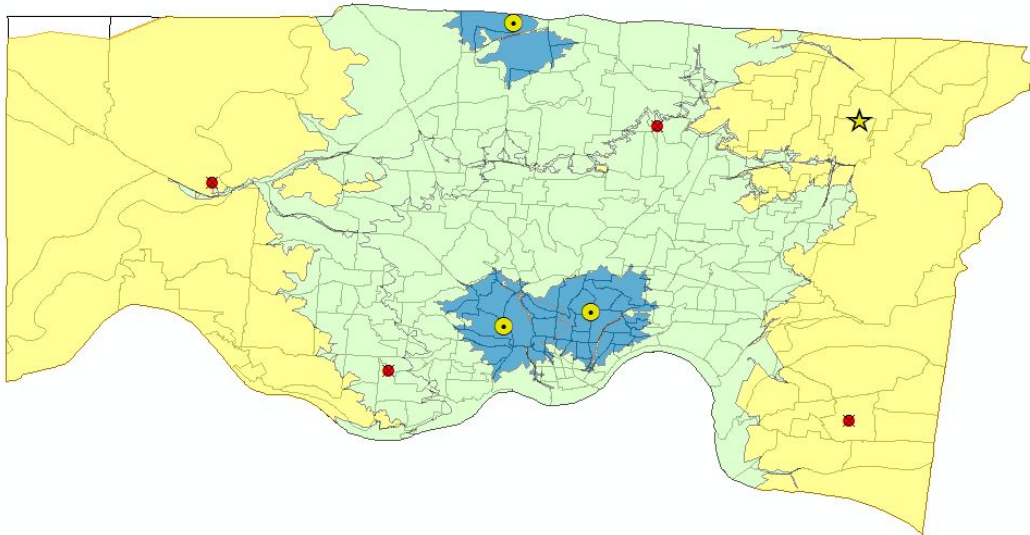
Service Area of the three existing clinics (same legend as main map)

areas). However, we see an improvement in the East. If we compare the service area of the four clinics to the service area of just the three existing clinics, we see that a huge portion of the northeast now has travel times of fifteen minutes or less, an improvement from the previous travel time of 15 to 30 minutes. The new average (weighted) travel time from all the census tract centroids is now 10.5 minutes compared to the previous 11.8.

Analysis of hospital locations for five new geriatric centers

Analysis of five potential sites for geriatric medical centers in Hamilton County
Maximizing coverage within 10 minutes for adults aged 55 and up

Population aged 55 and up
(per census tract)

104 - 412
413 - 688
689 - 946
947 - 1430
1431 - 2645

Hospital not chosen
for new geatric center

Hospital chosen
for new geatric center

0   5   10
Kilometers

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Date: April 10 2017

We analyzed nine hospitals and have picked five sites to best locate our new geriatric centers. These hospitals accomplish our goal of maximizing the number of patients (adults aged 55 and up) within 10 minutes of the new centers. The hospitals are ST FRANCIS-ST GEORGE HOSPITAL, BETHESDA HOSPITAL, PROVIDENCE HOSPITAL, MERCY HOSPITAL ANDERSON, and JEWISH HOSPITAL KENWOOD.

Methodology

We generated a Location-Allocation model using the tools provided in ArcMap 10.3. We based our analysis on census tract centroids in Hamilton County as patient origins. For these origins, we used the population of adults over 55 as the weight for the respective travel times to the potential sites. We chose the option to **Maximize Coverage** with an impedance cutoff of 10 minutes. We used a **linear impedance transformation** to determine coverage.

Findings

The results of the analysis generated the five hospitals above as the combination of locations that maximize the number of older adults within 10 minutes. These hospitals cover 126,385 older adults. That is 62% of all the adults aged 55 and up (202,802) in Hamilton

County. We see that the two westernmost hospitals were chosen. This is expected since there is a huge population of older adults in the center-west area of the county.

Limiations and Recommendations for both location-allocation analyses

The location-allocation analyses presented previously uses census tract centroids as a basis for patient origins. This could be somewhat problematic and prone to overgeneralization. Smaller, specialized population clusters can be helpful but plenty of resources must be spent to have an accurate representation of populations. Furthermore, the analyses do not account for modes of transportation available to the populations. The travel time for a home may be a lot more than the travel time calculated by ArcGIS. Hence, we present the results as preliminary, with room for further studies.

Max travel time to nearest clinic: 28 minutes
Min travel time: 1.56

Total travel cost: 2214.468856 (unweighted) 558190.804044 (weighted)
Total 0-4: 53269
Avg: 10.48

Total before: 628586
Avg: 11.8