

Using GIS Mapping to Examine the Equity of Spatial Accessibility to Community-Based AIDS Organizations (CBAOs) in the Greater Toronto Area

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Our Approach

- We mapped the locations of the 42 CBAOs in the GTA using the first three digits (FSA) of postal codes.
- We extracted census tract level data for the Toronto Census Metro Area from the 2006 Census for selected major socio-demographic variables including:
 - population size
 - education
 - unemployment
 - income
 - visible minority
 - recent immigrants
 - non-official languages spoken
 - mobility
- We used the two-step floating catchment area method to compute spatial accessibility to CBAOs.
- We calculated a straight line distance between locations of CBAOs and centroids of FSAs and used a distance of 20 km as the maximum distance that people are willing to travel to access CBAOs.
- We used a factor analysis to extract factors that describe common socioeconomic and population characteristics of communities.
- We mapped spatial accessibility and sociodemographic characteristics and examined whether communities in the region have equitable accessibility to CBAOs.

Limitations

- The 2SFCA method assumes that CBAOs located beyond the travel distance threshold (i.e., 20 km) are inaccessible. On the other hand, it assumes CBAOs within this distance are equally accessible regardless of their location. Therefore, it does not take into account distance decay in examining geographic accessibility to CBAOs.
- Straight line (Euclidean) distance between CBAOs and Census Tract Centroids was used to compute spatial accessibility index. Analysis with a transportation network distance or travel time would reveal a more accurate spatial accessibility pattern.
- Three-digit postal codes were used for mapping CBAOs, instead of X and Y coordinates of CBAOs.

The Challenge

How equitable is spatial accessibility to community-based AIDS organizations (CBAOs) in the Greater Toronto Area (GTA)? Do all communities have equal access? Do communities with high concentration of vulnerable population have better access?

The GTA is home to more than 5.1 million people including an estimated 18,210 people with HIV. Because of the better availability of health and social services in the GTA, the region also attracts people with HIV from other parts of the province.

42 CBAOs provide various health and social services for people with HIV and their families. Almost all are located in the City of Toronto, which may affect their geographic accessibility.

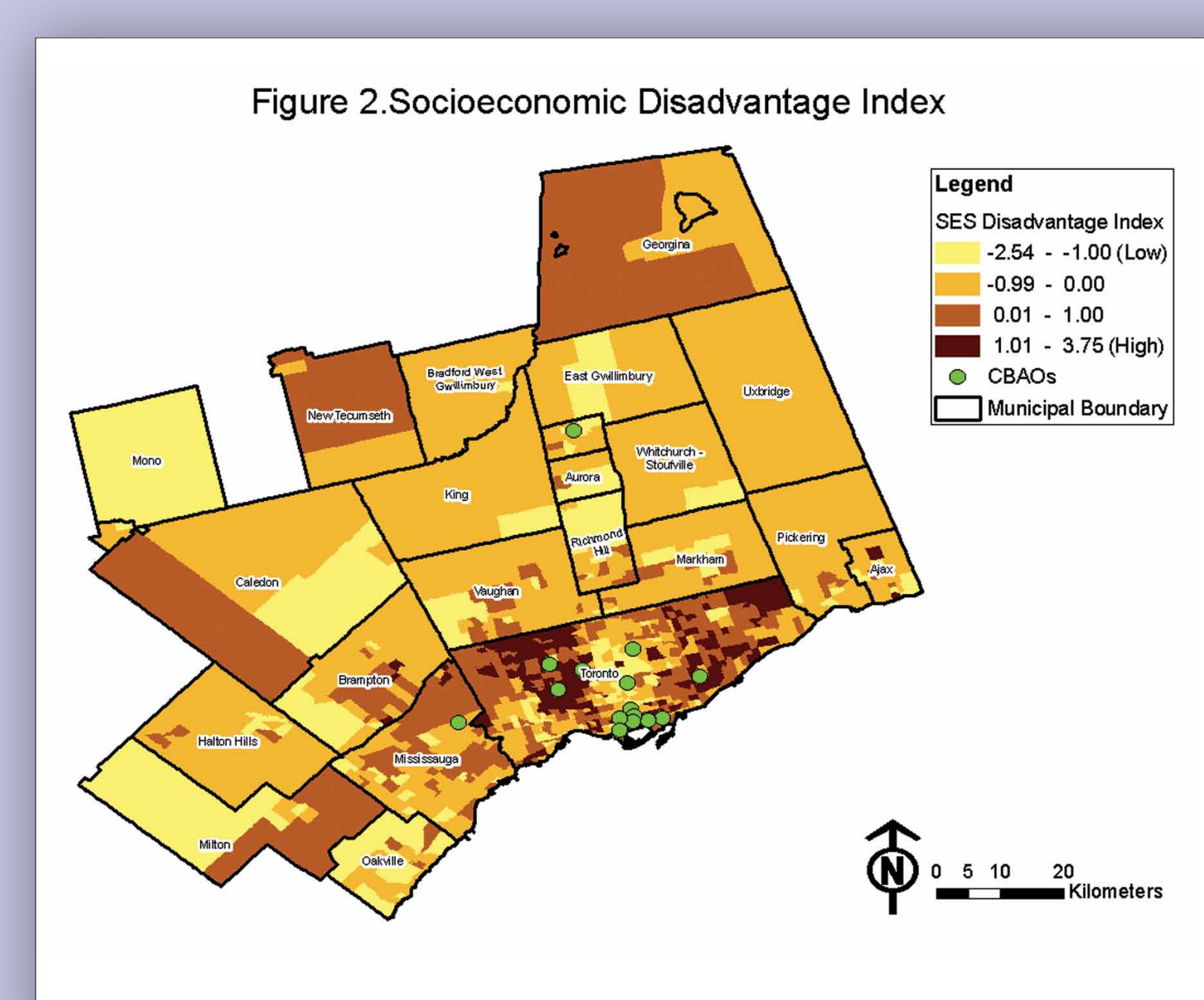
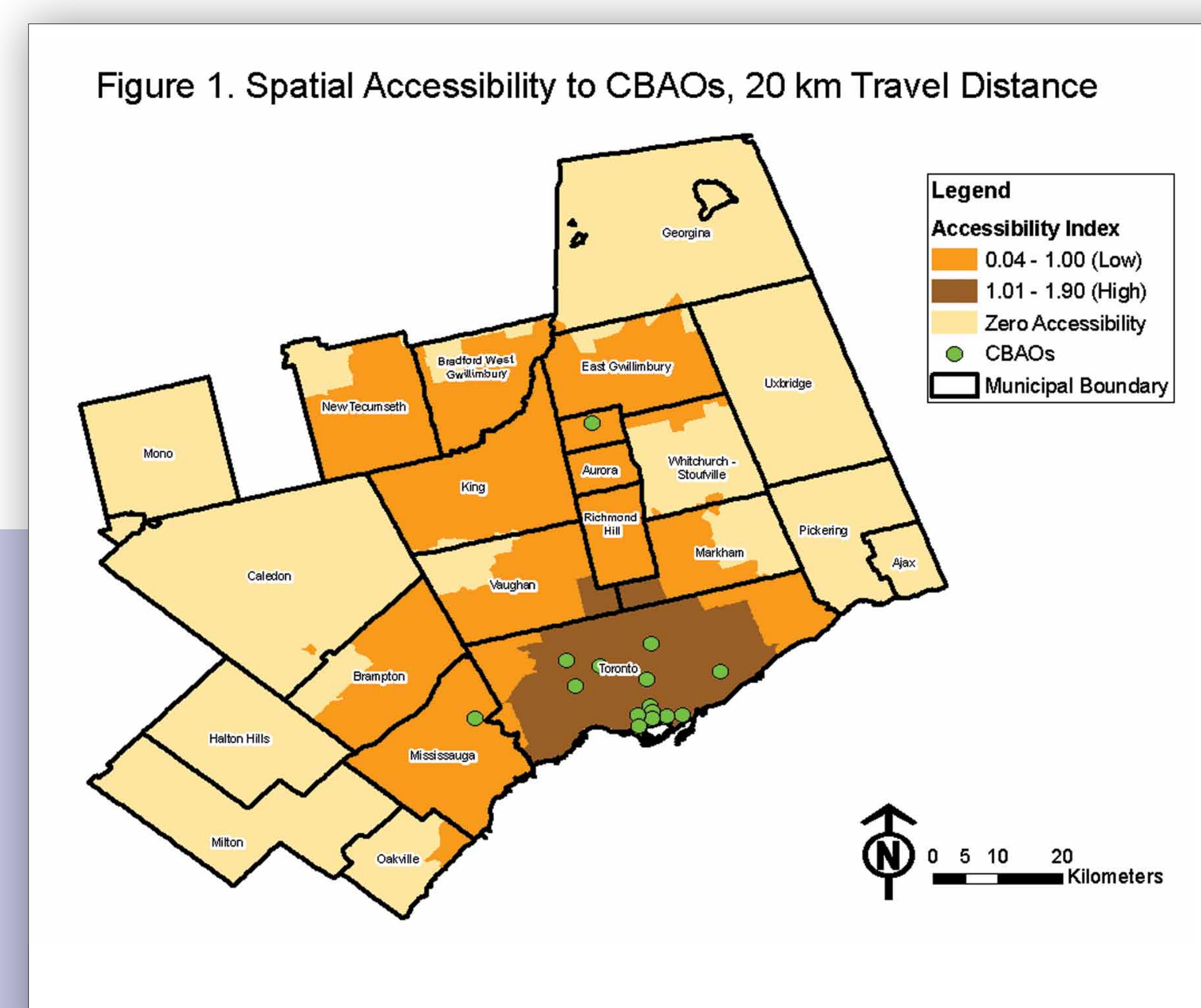
Our Findings

Spatial Accessibility in the GTA

Most communities in the City of Toronto and some neighbourhoods in the cities of Vaughn and Markham have a high accessibility index. Accessibility decreased in the inner suburban and northern central areas of the GTA, including Mississauga, Brampton, Vaughn, King, Richmond Hill, Newmarket, Aurora, East Gwillimbury, and New Tecumseh. Neighbourhoods in the peripheral areas of the GTA lack access to services within 20 km and residents of these communities have to travel farther to access a CBAO. (Figure 1)

A factor analysis using selected socio-demographic variables resulted in three major factor indexes:

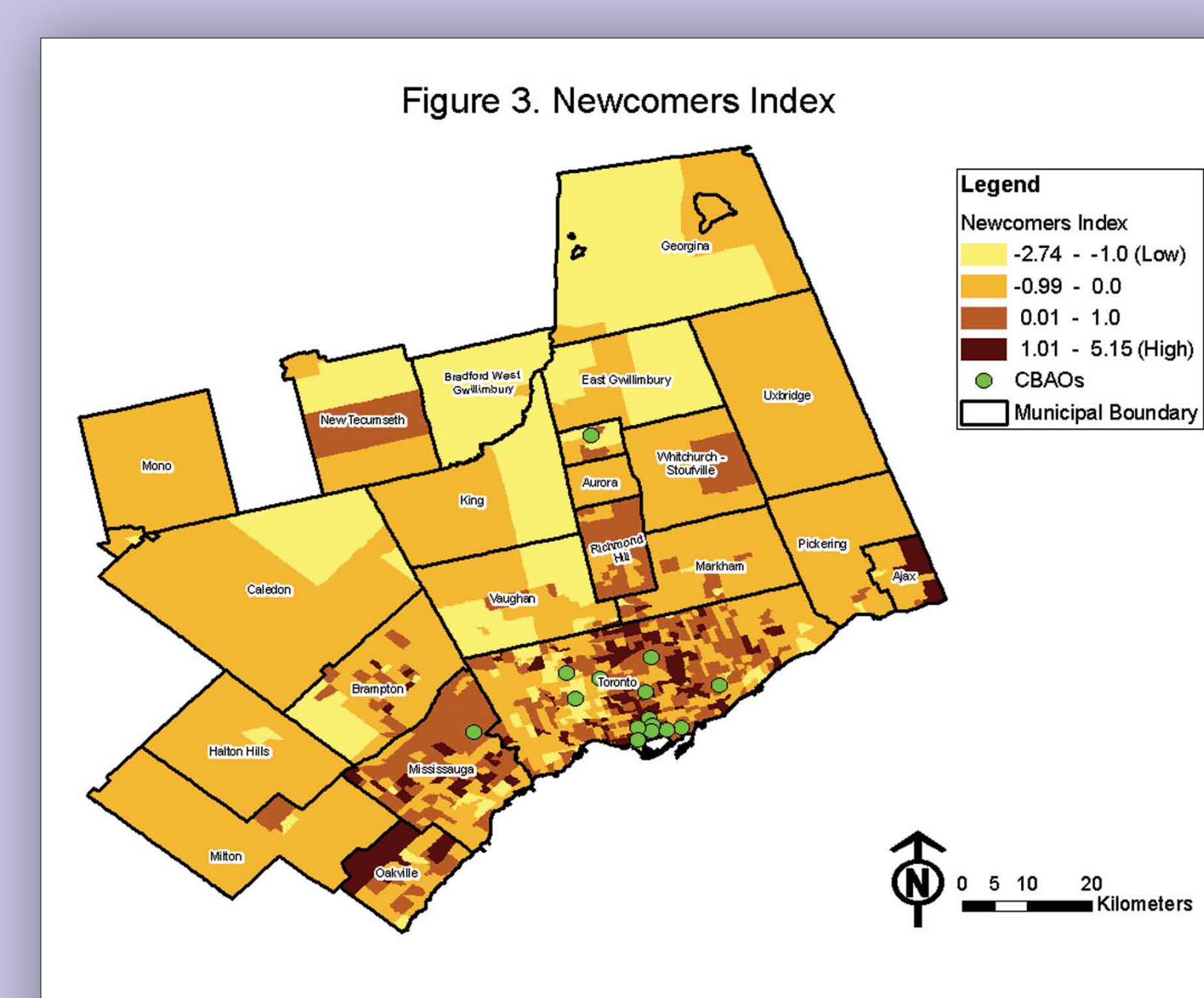
- Socioeconomic disadvantage
- Newcomers or people who have moved in the past 12 months
- Population size and non-official languages



Socioeconomic Disadvantage

The spatial distribution of socioeconomic disadvantages index (Figure 2) shows that highly disadvantaged communities were concentrated in the City of Toronto whereas communities in the suburban part of the region were relatively more affluent.

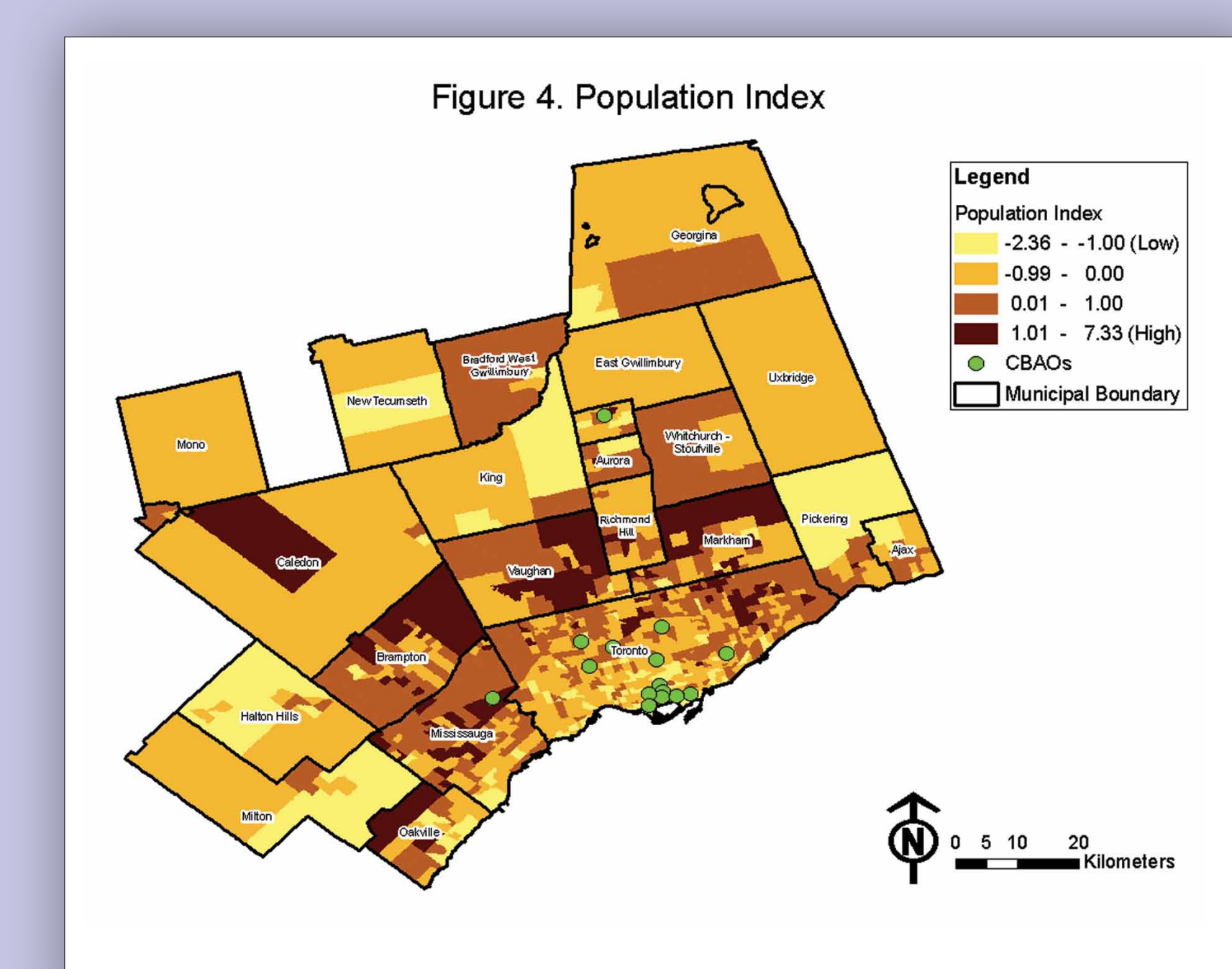
A comparison between spatial accessibility to CBAOs (Figure 1) and socioeconomic disadvantage index (Figure 2) reveals that most neighbourhoods with low socioeconomic status have relatively better access to CBAOs within a 20 km travel distance.



Newcomers

Communities in central, central south, and south western part of GTA had a higher index of newcomers (i.e., recent immigrants) and movers (i.e., people who moved once in the past 12 months) (Figure 3).

A comparison between spatial accessibility to CBAOs (Figure 1) and the newcomers index (Figure 3) reveals that some areas with higher concentration of recent immigrants and visible minorities (i.e., Mississauga, Oakville, Ajax) have low to no access to CBAOs within a 20 km distance.



Population Index

The central north and western part of the GTA have higher population index (Figure 4).

A comparison between spatial accessibility to CBAOs (Figure 1) and the population index (Figure 4) reveals that some cities with high population index have relatively low level of access (i.e., Mississauga) or no access at all (i.e., Oakville) within a 20 km distance radius.

Implications for Policy and Practice

- Geographical information system (GIS) analysis can be used to examine geographic accessibility to CBAOs and identify areas with lower accessibility. It also allows planners to link geographic accessibility with socio-demographic characteristics of neighbourhoods.
- Policy makers can use GIS to ensure HIV-related services provided through community-based organizations are designed and located in the communities with the greatest need.