ACCESSING INFORMAL AND FORMAL SOCIAL SUPPORTS AMONG OLDER IMMIGRANTS IN TORONTO: A MIXED-METHODS APPROACH

by

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Accessing informal and formal social supports among older immigrants in Toronto:
A mixed-methods approach

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Abstract

Older immigrants represent 30% of the older adult population in Canada (Statistics Canada, 2016). They are more likely to experience social isolation and loneliness than non-immigrant older adults due to loss of informal social support, language barriers, financial barriers and geographic barriers (Guruge et al, 2010; Lai & Chau, 2007). This paper examines the access of Arabic-, Mandarin- and Spanish-speaking populations to language-specific services in the City of Toronto. A qualitative GIS framework was employed, integrating E2SFCA accessibility measures with qualitative data in order to provide insight into gaps in service, lack of awareness, older immigrant concerns and the unification of qualitative analysis and geospatial techniques.

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1 Introduction

The shifting age-sex structure of the Canadian population has placed an increased pressure on the working-age cohort (population ages 20 to 64) due to the growing older adult (aged 65 and older) population. The youth dependency ratio is projected to decrease to 34 youth for every 100 working-age individuals by 2056. In contrast, the senior dependency ratio is projected to increase from 21 older adults (in 2006) to 50 older adults for every 100 workers by 2056 (Statistics Canada, 2016). While immigrants represent 21% of Canada's total population, they represent 30% of its older population (Statistics Canada, 2016).

The experiences of immigrants of racialized groups, when intersected with age, gender, race and class identities, often include compounded and nuanced marginalization (Bilge & Denis, 2010; Huang & Fang, 2019; Hankivsky & Christoffersen, 2008). Older immigrants are more socially isolated than non-immigrants, which limits their participation in community and civil society, increases income insecurity, affects health and wellbeing and increases their risk of elder abuse (Matsuoka et al, 2012; Dong et al, 2011; Fiori et al, 2006; Glass et al, 2006).

Older immigrants face declining health and mobility issues with additional challenges including loss of social support and financial barriers (Guruge et al, 2010). Older immigrants who do not speak English have difficulty finding language-specific services, such as health services, and thus have to navigate Canadian systems without the full capability to advocate for themselves in their native language. They often rely on informal social supports, such as friends or family, to provide help accessing formal social supports, such as social services, settlement agencies and legal clinics (Guruge & Humphreys, 2009). Older immigrants who have small social networks, live alone and do not speak English become more vulnerable.

The purpose of this study is to investigate the formal and informal social supports of Arabic-, Mandarin- and Spanish-speaking older immigrants in the City of Toronto, specifically what their experiences were as they age-in-place. This study aims to address the following research questions, developed in part with the *Aging Well: Partnering to optimize social network and support for older immigrants in Ontario* project:

> 1. What are the settlement patterns of each language group and distributions of language-specific services they frequently utilize?
>
> 2. What are the patterns of spatial accessibility to these services in the City of Toronto?

3. What is the relationship between calculated potential access and perception of access to language-specific services?

A mixed-methods approach was undertaken in order to address each research question. Thematic mapping was utilized to identify the spatial patterns of language groups and their respective language-specific services. Spatial accessibility to each service was calculated using the enhanced two-step floating catchment area measure at the census tract level. Qualitative data analysis was conducted on group interview transcripts using deductive coding in order to retrieve insight regarding their perceived social support service access. Lastly, qualitative GIS was employed through a cross tabulation of group interview quotes and standardized accessibility scores to uncover issues with existing service provision in the City of Toronto.

Several terms used throughout the study require clarification. Older adults and older immigrants refer to individuals aged 65 and older. Social support services refer to social services that provide a range of benefits and programming for the public. This includes community centres, community health centres, non-profit organizations and settlement agencies. Language-specific social support services refer to a facility or organization that provides such support for a specific language group. Senior programs refer to services, activities or programs specifically targeted towards older adults (individuals aged 65 and older). Senior programs often operate out of community centres or other non-profit organizations. Participants refer to individuals that participated in group interviews and completed surveys for the study.

The structure of this paper is as follows. The literature review provides a summary of literature concerning issues older adults, immigrants and older immigrants face, as well the role of geography in quantifying the accessibility of vulnerable populations to social (support) services. Sections three to five provide an overview of the study area and study population, data used for analyses and descriptions of quantitative and qualitative methods that were used. Sections six to eight provide results of quantitative, qualitative and qualitative GIS methods conducted. Lastly, section nine is comprised of a discussion on key findings and addresses each of the research questions.

2 Literature Review

2.1 Social Networks and Older Adult Wellbeing

Social gerontological literature suggests that an active social network and engagement in social activities benefit older adults (Adams, Leibbrandt & Moon, 2011). The quality of such relationships and engagements, in particular, governs impacts on their well-being (Adams & Blieszner, 1995, Litwin & Shiovitz-Ezra, 2006). Associations between social engagement and increased mortality risk have been studied (Dong et al, 2011; Thomas, 2012). Probabilistic models created with survey data suggest social isolation is directly related to satisfaction with one's social network and indirectly related to perceived quality of local amenities or services (Kemperman, van den Berg, Weijs-Perrée & Uijtdewillegen, 2019). In Canada, similar findings have been drawn when Levasseur et al (2015) studied the disparities between older adults living in urban or rural areas and proximity to neighbourhood resources and social networks using a statistical approach. The geographies of older adults, health status and their living status, whether living alone or in an institutional setting, has an impact on feelings of loneliness, social isolation and those with poor social capital (Nyqvist et al, 2013).

Furthermore, immigrants and refugees in Canada face additional vulnerability and social isolation due to their displacement, marginalization and loss of social network (Braveman & Gruskin, 2003; Wang, 2018). The loss of social networks created in their native countries can have a greater impact on older immigrants in particular than their younger, newcomer counterparts (Guruge et al., 2015; Lee & Edmonston, 2013). Social isolation can lead to a decline in the mental health and wellbeing of older immigrants as well (Kim, Sangalang & Kihl, 2011; Zou & Fang, 2017). In addition, racialized older immigrants are more vulnerable than white older immigrants due to discrimination and lower socioeconomic status (Dunn & Dyck, 2000; Stewart et al, 2011).

2.2 Barriers to Accessing Social Support Services

Social support plays a critical role in immigrant resettlement and a lack thereof can have negative impacts on newcomer health. (Simich et al, 2005). Formal social support services can provide employment or financial assistance, legal support and free English-as-a-second language (ESL) classes for immigrants and newcomers. Older adults can enroll in adult day programs and other social activities in order to improve their social support and

overall wellbeing. They can participate in activities that result in positive mental and physical health outcomes (Aday, Kehoe & Farney, 2005; Rote & Markides, 2014; Wong et al., 2007).

Unfortunately, older immigrants face many barriers when accessing formal social support services. Language, cultural, financial and geographic barriers contribute to the further marginalization of older immigrants and make access to services more difficult (Sadavoy et al, 2004; Lai & Chau, 2007; Matsouka & Sorenson, 1999). Although smaller immigrant groups are frequently underserviced and have to rely on a smaller community for social support (Srirangson et al, 2013; Wang, 2018), members of larger immigrant groups may also face challenges when seeking language-based services due to an inadequate supply for the higher demand (Asanin & Wilson, 2008; Wang & Hu, 2013). Discrimination, social isolation and lack of awareness are also critical challenges that older immigrants face when attempting to access services in Canada (Stewart et al, 2011).

Language barriers are primarily discussed in literature regarding the challenges that immigrants and older immigrants face in Canada (Stewart et al, 2011; Zou & Fang, 2017). This impacts their health literacy, ability to advocate for themselves, and ability to navigate the Canadian healthcare system (Todd & Hoffman-Goetz, 2011; Kim et al, 2011). Qualitative approaches are often utilized in literature to enhance understandings of the older immigrant experience in Canada, particularly as it relates to access to health services and social isolation (Lai & Surood, 2010; De Jong Gierveld, Van der Pas & Keating, 2015).

2.3 Measuring Spatial Access to Services

The distribution of social support services in major cities varies across space and access to services is influenced by multiple spatial factors. Transportation modes and networks, travel distance, travel time and mobility of an individual can influence the access, service utilization and social networks of a population (Currie & Stanley, 2008; Kim, 2013; Stewart et al, 2011). Quantitative GIS methods, or geospatial techniques, have been used in order to quantify accessibility. Spatial accessibility to social services can be approached in multiple ways. Common methods include measuring distance to a service, identifying the number of services within a certain distance or travel time, the gravity model, and creating indices (Apparicio et al, 2009; Parks, 2004). Proximity has been used to investigate the accessibility of low-income populations to social services (Allard, 2004; Allard et al, 2003). This involved retrieving summary statistics of populations within a specified radius from a

service provider. Interactions between service providers and target populations are more likely if they are closer in proximity.

The two-step floating catchment area (2SFCA) measure (Luo and Wang, 2003) is a simplified gravity model frequently utilized to calculate access to primary health care physicians (PCPs) in urban settings (Okuyama et al, 2019; Shah, Bell & Wilson, 2016). The 2SFCA measure creates an accessibility score per areal unit based off of supply-to-demand ratios (i.e. physicians to patients) and a catchment area, defined by the researcher, that represents an individual's travel impedance in time or distance units. Variations of this measure (i.e. 3SFCA, Enhanced 2SFCA, etc) have been employed to account for distance decay within calculations (Gilliland et al, 2019; Guagliardo, 2004; Lo & Whippo, 2012). Social service accessibility for immigrants, language groups and older adult populations have been evaluated using geospatial techniques (Luo et al, 2018; Shah, Milosavljevic & Bath, 2017; Wang, 2007).

Qualitative GIS frameworks have been developed to integrate qualitative data with geospatial methods. Alone, quantitative GIS can provide results that do not fully explain a spatial phenomenon, such as access to services. Spatial behaviour and patterns are often generalized and findings are reduced solely to the researcher's interpretation of the data. By utilizing a qualitative GIS approach, spatial phenomena have been studied using both spatial reasoning and location-based qualitative information (Boschmann & Cubbon, 2014, Yeager & Steiger, 2013). Such mixed-methods approaches can expand the analytical capabilities of GIS environments and provide a thorough understanding of data and results (Jung & Elwood, 2010). It can also prompt further research into complex results that would otherwise be undiscovered or overlooked if solely analyzing quantitative data. Qualitative GIS frameworks often utilize geospatial techniques with focus group data (Wang, 2018; McCray & Brais, 2007, Bell & Reed, 2004). Although Wang (2018) integrated the E2SFCA measure and focus group data to evaluate the spatial accessibility of Tamil-speaking immigrants to language-specific resources, there still exists a gap in literature that utilizes qualitative GIS frameworks to evaluate the access of older immigrants to language-specific social support services.

3 Study Area and Population

The study area is defined by the Toronto Census subdivision (Figure 1), commonly referred to as the City of Toronto. This is the most populous municipality in Canada with a population of 2.73 million in 2016, 47% of whom are immigrants (Statistics Canada, 2017a). About one out of five individuals are aged 60 or older (Statistics Canada, 2017a). The high immigrant population in both count and proportion highlights this area's suitability for this study.

Mandarin, Spanish and Arabic are amongst the most spoken non-official languages in the City of Toronto. These languages comprise 10.29%, 8.34%, and 3.27%, respectively, of the population that has knowledge of a non-official language (Statistics Canada, 2017a). Including English- and French-speakers, they represent 5.61%, 4.54% and 1.78% of the total population (Table 1). These three language groups represent immigrant groups with diverse socioeconomic backgrounds and varying immigrant trajectories. Chinese individuals comprise the second largest racialized group (South Asian being the first) and is the most commonly reported ethnic group overall (Statistics Canada, 2017b). It is imperative to contrast experiences of immigrants that can settle within large, economically established ethnic enclaves, such as Chinese immigrants, to those who must seek social support using smaller networks in Toronto, such as Lebanese immigrants. Considering over 200 distinct ethnic origins have been reported in Toronto (City of Toronto, 2015) this study uses language as the social dimension that creates barriers for older immigrants when accessing informal and formal social supports, encompassing multiple ethnicities in the data.

Figure 1: Study area: City of Toronto

Table 1: Demographics of City of Toronto (Statistics Canada, 2017a)

Region	Population in private households		Immigrant status (% of total population)	Knowledge of non-official language (% of total population)		
	Total Population	Aged 65+ (%)	Immigrants	Arabic	Mandarin	Spanish
TORONTO	2,725,208	15.62	47.03	1.78	5.61	4.54
East York	118,071	13.93	40.89	1.50	1.57	2.97
Etobicoke	359,529	17.09	45.47	2.11	1.22	4.93
North York	672,955	17.00	55.85	2.33	7.76	5.37
Old Toronto	796,893	13.12	33.27	1.33	4.30	5.39
Scarborough	632,098	16.90	56.59	1.86	9.32	1.65
York	145,662	15.01	48.17	0.73	0.82	8.90

4 Data

This study makes use of both primary data and secondary data for analyses (Table 2). Group interview transcripts and surveys were provided by Dr. Sepali Guruge (2015-2019) collected for a larger, ongoing research project on older immigrants in Ontario. This included data from group interviews conducted with older immigrant women and men, their family members and community leaders in four study areas within Ontario: Greater Toronto Area (GTA), Ottawa, Waterloo and London. Research assistants interviewed groups of older adults in the language of their choice (Arabic, Mandarin or Spanish) to engage them in a critical discussion of the social needs, networks and supports among older immigrants. Two to four sessions were conducted for each language group. Group sessions involved four to ten participants responding to predetermined and open-ended questions for a duration of one to two hours. Participants were recruited through collaborations with community partner agencies, service providers (including settlement workers and social workers) and community leaders. All sessions and surveys were transcribed and translated to English for further analyses.

Table 2: Datasets used in the study

Name	Type	Description	Nature	Year	Source
Group interview transcripts	Primary	Transcripts of 13 group interviews	Qualitative	2015-19	Guruge et al.
Group interview surveys	Primary	Surveys completed by 95 participants. Postal code level.	Quantitative; Spatial	2015-19	Guruge et al.
Total population; Population aged 65+ years; Arabic, Mandarin and Spanish Mother tongue	Secondary	Population counts and percentages in the City of Toronto by census tract	Quantitative; Spatial	2016	Census of population – Statistics Canada
Network Data Set	Secondary	Road network dataset	Spatial	2018	DMTI Spatial Inc
Multiple Enhanced Postal Codes	Secondary	Precision point file representing postal codes in Canada	Spatial	2015	DMTI Spatial Inc
Former municipality boundaries	Secondary	Boundaries of the former six municipalities in the City of Toronto: Etobicoke, York, former Toronto, North York, East York and Scarborough)	Spatial	2012	Data catalogue – City of Toronto
211Toronto	Secondary	Social services available in the City of Toronto	Qualitative; Spatial	2017	211Toronto.ca

Thirteen interviews were conducted with Arabic-, Mandarin- and Spanish-speaking, immigrant women and men aged 55 or older in the GTA, eleven of which were conducted within the City of Toronto. A total of 95 individuals participated, 73 of whom resided in the City of Toronto. During these sessions, participants completed a short survey with regards to their demographic information, length of residence in Canada, transportation use, social activity participation, social support service utilization and informal social support availability (such as friends or family). Interviews were translated and transcribed. Survey attributes were coded and surveys were compiled into a dataset. The data collection was

approved by Ryerson University Research Ethics Board (REB). Secondary data retrieved for analyses included 2016 Census data and a social service dataset (2017) obtained from the 211Toronto website. This dataset contains a list of all social services available, with attributes including service name, address, description, areas served, languages in which services are provided and coordinates. Census data and other datasets were essential for thematic mapping, descriptive statistics and geospatial techniques performed.

5 Methods

This study employed a collaborative, mixed-methods approach to investigate potential accessibility to social support services in contrast with the perceived accessibility of older adult immigrants (Guruge et al, 2015-2019). It followed a fully mixed, sequential, equal status design (Leech & Onwuegbuzie, 2009), where quantitative and qualitative methods were conducted sequentially before being integrated and which both elements hold equal weight in the analyses. Survey responses were classified and three types of social support services were selected for analyses: community centres, health services and senior programs. Visual analysis was conducted through thematic mapping. Spatial analysis was performed with multiple enhanced two-step floating catchment area (E2SFCA) models. Transcripts were then analyzed and placed into themes, determined by the larger ongoing research project (Guruge et al, 2015-2019), using a deductive approach to code group interview data. Participants' perceptions regarding access to the three selected social support services were then cross-tabulated with E2SFCA results to retrieve insight on the current state of older immigrant access to language-specific services in the City of Toronto.

5.1 Spatial/Quantitative Analysis

A dataset of participants' locations, identified by postal code, were joined to a precision point file of all Canadian postal codes in order to spatialize their data for use in GIS. This resulting dataset was used to map the distribution of each language group in conjunction with the proportion of Arabic, Mandarin or Spanish-speaking population per census tract in Toronto.

Survey responses from interviews with a locational attribute (i.e. postal code) concerning what social support services participants utilized and what social activities they participated in were aggregated into themes. The 211Toronto dataset was also reduced and categorized based on existing taxonomy and service descriptions. These attributes provided

formal service names, as defined by Ontario 211 Services, available at each location and a description of the type of activities that took place as well as target demographic. Social support service themes to be used for analysis were selected based on three criteria: must be reported by participants in surveys, must be discussed in further depth by participants during group interviews and must have a comparable category in the reduced 211Toronto dataset. Community centres, health services and senior programs met all three criteria and were selected for analyses. These services were also visualized thematically in order to investigate the distribution of services against the spatial patterns of Arabic, Mandarin and Spanish language groups in Toronto.

Potential spatial accessibility to the three selected social support services per language group was calculated using the enhanced two-step floating catchment area (E2SFCA) measure. The 2SFCA measure, a widely used gravity- type spatial interaction measure (Luo & Wang, 2003; Guagliardo, 2004; Lo & Whippo, 2012), calculates spatial accessibility by considering competition (or demand) for a service and the availability of service providers (supply). Ann accessibility score for each spatial unit of a larger area is calculated, using two steps:

$$\text{(Step 1)} \quad R_j = \frac{S_j}{\sum_{j \in \{d_{ij} \leq d_0\}} P_k} \qquad \text{(Equation 1)}$$

$$\text{(Step 2)} \quad A_i = \sum_{j \in \{d_{ij} \leq d_0\}} R_j \qquad \text{(Equation 2)}$$

where R_j is the service-to-population ratio of service location j calculated from population cluster i that falls within the travel threshold d_o from j. The summation of service-to-population ratios that fall within the same threshold, or catchment area, d_o from each population cluster i provides the accessibility score A_i. In previous research, variations of the 2SFCA measure incorporate an additional parameter to account for distance decay within the catchment area (Luo & Qi, 2009; McGrail, 2012; Vadrevu & Barun, 2016; Pan et. al., 2018; Delameter, Shortridge & Kilcoyne, 2019; Bryant Jr & Delameter, 2019). A continuous Gaussian function was used to model distance decay within the catchment area of service locations (Dai, 2010; Langford, Fry & Higgs, 2012; Deborah, Chiu & Cao, 2018) defined by the following equation:

$$W_{kj} = e^{\frac{-d_{kj}^2}{\beta^2}} \qquad \text{(Equation 3)}$$

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where $\beta = d_0/2$ and d_{kj} is the shortest distance between population location k and service location j. This results in the final E2SFCA equation used (Deborah et. al., 2018):

$$A_i = \sum_{j \in \{d_{ij} \leq d_0\}} \frac{S_j}{\sum_{j \in \{d_{ij} \leq d_0\}} P_k W_{kj}} \qquad \text{(Equation 4)}$$

This calculation was reiterated for each social support service and language group using an E2SFCA add-in tool within ArcMap 10.6.1 (Langford, Fry & Higgs, 2014) at the census tract level. The parameters for each scenario are shown in Table 3. The selected social support services were designated as service locations or the "supply" variable for the calculation. Since social support services are available to the general public, total population was used as the "demand" variable in the calculation for community centres and health services, while population aged 65 and older was used as demand for senior programs.

A standard catchment area of five kilometres (network distance) was used to model the travel behaviours of older adults in Toronto. Access to primary care physicians in highly urbanized areas has been measured at less than five kilometres (Ng et al, 1997) or ten minutes travel time (Green et al, 2017). Both health conditions and socioeconomic status can impact an older adult's access to personal vehicles or public transit use, limiting their mobility. Estimates of distance traveled by older adults in Toronto have ranged from zero to five kilometres with or without a vehicle (Morency et al, 2011). Geographic variations in access to transit exist between the downtown core (which has high transit accessibility and high walkability) and the residential outskirts of Toronto. Five kilometres was determined to be a suitable threshold for all three language groups in recognition of differing settlement patterns in Toronto and thus, disparities in access to public transit or personal vehicle use (Paez et al, 2010).

Table 3: E2SFCA measure tool parameters for each iteration

Language Group	Scenario Name	Service Supply (211 Toronto, 2017; Interview Data)	Service Demand (Statistics Canada, 2017a)	Network (DMTI, 2018)	Distance Decay Function
Arabic	A_CC	Community centres offering services in Arabic	Total population	Road Network data set	Gaussian (Bandwidth: 50)
	A_HS	Health services offered in Arabic	Total population		
	A_SP	Senior programs offered in Arabic	Population aged 65 and older		
Mandarin	M_CC	Community centres offering services in Mandarin	Total population		
	M_HS	Health services offered in Mandarin	Total population		
	M_SP	Senior programs offered in Mandarin	Population aged 65 and older		
Spanish	S_CC	Community centres offering services in Spanish	Total population		
	S_HS	Health services offered in Spanish	Total population		
	S_SP	Senior programs offered in Spanish	Population aged 65 and older		

Lastly, the resulting accessibility scores were standardized to make results comparable. Accessibility scores were transformed into z-scores, expressed as standard deviations from the mean, using the following equation:

$$Z\ score = \frac{A_i - \mu}{\sigma}$$ (Equation 5)

where A_i is the accessibility score for a given census tract, μ is the mean and σ is the standard deviation (Wang, 2018; Sedgwick, 2012). Accessibility scores are visualized in maps to identify spatial patterns of high or low accessibility to language-specific social support services in the City of Toronto and discuss their location in relation to settlement patterns of each language group.

5.2 Qualitative Analysis

Group interviews enabled diverse views on the social networks, social support services and aging in the City of Toronto to be investigated, generating nuanced data through group dynamics in conversation (Rabiee, 2004). Information that arose through synergy between participants and moderators (who were community members themselves) would have been non-existent if collected survey data and spatial datasets were solely used for analyses.

Eleven transcripts of group interviews with 73 participants that resided in the City of Toronto were analyzed (Table 4). Predetermined questions asked by moderators regarding spatial access and awareness of language-specific services provided a framework for transcripts to be analyzed. A deductive approach was employed and responses regarding community centres, health services and senior programs were coded and organized into their respective themes, sometimes overlapping. Other comments regarding barriers to access were also retrieved. A table of statements regarding community centres, health services and senior programs was also created and preserved at the open coding stage and identified as a "positive" or "negative" perception to enable further analysis.

Table 4: Group interviews included in analysis

Language Group	Interview Name	Stakeholder Group	Number of Participants
Arabic	AF1	Older men	8
	AF2	Older women	7
	AF3	Older men	6
	AF4	Older women	5
Mandarin	MF1	Older women	8
	MF2	Older men	7
Spanish	SF1	Older men	6
	SF2	Older men	7
	SF3	Older women	10
	SF4	Older women	4
	SF5	Older women	5
			Total: 73

5.3 Mixed-methods: Qualitative GIS

A mixed-methods approach establishes a thorough and better understood set of results in research (Moffat et al., 2006). Mixed-method frameworks integrate the strengths of both qualitative and quantitative approaches, designed to pursue complex research problems (Clark & Vicki, 2017). Data are analyzed through such frameworks since quantitative and qualitative techniques produce different types of results which can become complimentary in empirical research. Qualitative data create opportunity for insight and explanation of quantitative results that are directly relevant to the research question. Together, these approaches can guide research or decision-making further in addressing nuanced or underlying issues on the given topic.

Qualitative GIS in particular makes it possible for a furthered understanding of complex spatial phenomena to be pursued. The main advantage of a qualitative GIS framework is the utilization of spatial reasoning with location-based qualitative information (Boschmann & Cubbon, 2014, Yeager & Steiger, 2013). It allows for engagement with qualitative information to be achieved within GIS environments, expanding the analytical range and capabilities of GIS itself and the research being conducted (Jung & Elwood, 2010). Additionally, when qualitative GIS results in conflicting findings, it can increase awareness of a complex phenomena that is limited by quantitative data and must be further studied in order to investigate it. This is especially critical when studying health geographies of vulnerable populations with intersecting identities (i.e. older adults, immigrants, racialized groups and non-English speakers) in diverse areas with increasing costs of living such as Toronto.

Participant identifiers in group interview transcripts, survey data and qualitative findings were kept consistent in order for qualitative GIS to be pursued. Adopted from Wang's (2018) mixed-method qualitative GIS approach, census tracts were classified into four groups (high, good, low, very low) based on their standardized accessibility scores (≥ 1, $(1,0)$, $(0,-0.5)$, ≤ -0.5, respectively). This standard classification was created based on the distribution of all nine E2SFCA indices calculated. Standardized accessibility scores were spatially joined to participants based on the census tract they reside in. The qualitative summary table of key statements from group interviews regarding the three selected social support services was joined, based on participant ID, to the spatial database file of participant locations and E2SFCA scores. A cross-tabulation was generated for each social support

service in order to investigate the relationship between perception of access and calculated access (Table 5).

Table 5: Concept of cross tabulation of E2SFCA scores and qualitative data

Participant's Perceived Level of Access to Service	Standardized E2SFCA Score	Consistent (C) or Inconsistent (IC)
Positive	≥1 (High)	C
Positive	1 to 0 (Good)	C
Positive	0 to -0.5 (Low)	IC
Positive	≤ -0.5 (Very Low)	IC
Negative	≥1	IC
Negative	1 to 0	IC
Negative	0 to -0.5	C
Negative	≤ -0.5	C

6 Quantitative Analysis and Results

6.1 Classification of Social Support Services

Each participant reported up to five social support services used or social activities that contributes to their wellbeing at the postal code level. Across the four original study areas, 254 participants provided 402 responses, each of which were reviewed and placed into one of thirteen themes (Figure A1; Table B1). Amongst the 95 GTA participants, the largest cohort, 186 answers were collected representing 46.2% of total responses. The most frequent social support services reported utilized by Toronto participants were community centres, health services and senior programs (Figure A1).

A dataset of social support services was obtained from the 211Toronto website (2017). Services were aggregated into classes based on existing taxonomy and service descriptions (Table B2). Three class types were comparable to group interview survey responses concerning social support services utilized by older adults. Community centres and agencies providing general and immigrant services were aggregated into the *Community Centre* class. Services such as developmental disabilities support, community health centres, mental health support, sexual and reproductive health support as well as chronic disease education were classed as *Health Service*. Programming targeted towards older adults including adult day programs, elder abuse programs and social support were classified as *Senior Program*. Language attributes were also created for each service location, indicating whether services were provided in English, French, Arabic, Mandarin, Spanish and/or other

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languages. Class type and language were not mutually exclusive; a health service can be targeted toward older adults and offered for multiple language groups. The refinement of the dataset allowed for language-specific services to be extracted in order to calculate each study population's potential access to services.

6.2 Settlement Pattern of Study Populations and Distribution of Services

In order to reflect foreign-born population, percent mother tongue of non-official languages (excludes English- and French-mother tongue populations) was utilized to illustrate the distribution of languages. Each language group within the City of Toronto show different clustering but are overall comparable to the behaviour of immigrants settling closer to individuals that share their culture or ethnicity, or within their respective ethnic enclave (Siemiatycki & Isin, 1997). Due to loss of data, some participants were unable to be mapped (Table B3). A total of 62 participants were mapped.

The Arabic-speaking population clusters largely in the east end of Toronto around the shared boundary of North York and Scarborough (Victoria Park Avenue). Many participants were also from this area, as shown in Figure 2. There is also a cluster in Old (downtown) Toronto and a small cluster in northern Etobicoke. Of non-official languages spoken in these areas, Arabic represents up to 11.6%.

These clusters show similarities to the spatial patterns of social support services available in Arabic (Figure 2). Health services are clustered in census tracts with high Arabic mother tongue percentage in downtown Toronto and scattered amongst the high Arabic cluster running south around Victoria Park Avenue. Community centres offering services in Arabic displayed a similar pattern. They were mostly located in Scarborough close to the large Arabic-speaking population and a few around the population cluster in downtown Toronto but not within it. Senior programs in Arabic were near the Arabic language cluster in Etobicoke and some were along Victoria Park Avenue, but no senior programs were found within the central core of downtown Toronto.

Figure 2: Arabic-speaking participants, social support services available in Arabic and Arabic mother tongue population by census tract

The largest cluster of the Mandarin mother tongue population was found spanning across North York and Scarborough along the border of Toronto and the City of Markham (Figure 3). Mandarin had the highest proportion of non-official languages spoken between all three language groups, reaching about 90.8%. The majority of Mandarin-speaking participants reside in this ethnic enclave. There are also two prominent Mandarin-speaking populations in downtown Toronto, appearing as small clusters near West Chinatown and East Chinatown.

The clustering of language-specific services nearby their target population is more noticeably evident for this language group. All three service types were clustered in the downtown core within the two Chinatowns (Figure 3). Many health services and senior programs were also located within the large Mandarin mother tongue cluster in North York-Scarborough, although there was only one community centre in this area. Community centres, health services and senior programs were scattered across the rest of the city to serve other Mandarin-speaking populations that represent 0-15% of non-official languages spoken.

Figure 3: Mandarin-speaking participants, social support services available in Mandarin and Mandarin mother tongue population by census tract

Spanish mother tongue populations were predominantly found in Toronto's west end, with the highest percentages (up to 16%) east of Humber River in North York and York (Figure 4). Group interview participants were predominantly recruited from this large cluster. Distinct from Arabic and Mandarin service distribution, the largest cluster of services offered in Spanish is not located within the large Spanish mother tongue cluster itself but just south of it in downtown Toronto. Although there exists services scattered within the high Spanish-speaking cluster, there is a disproportionate number of social support services within census tracts with lower Spanish mother tongue percentages. Similar to Mandarin services, there were additional Spanish services scattered in other areas North York and Scarborough with lower Spanish mother tongue populations, particularly health services and senior programs.
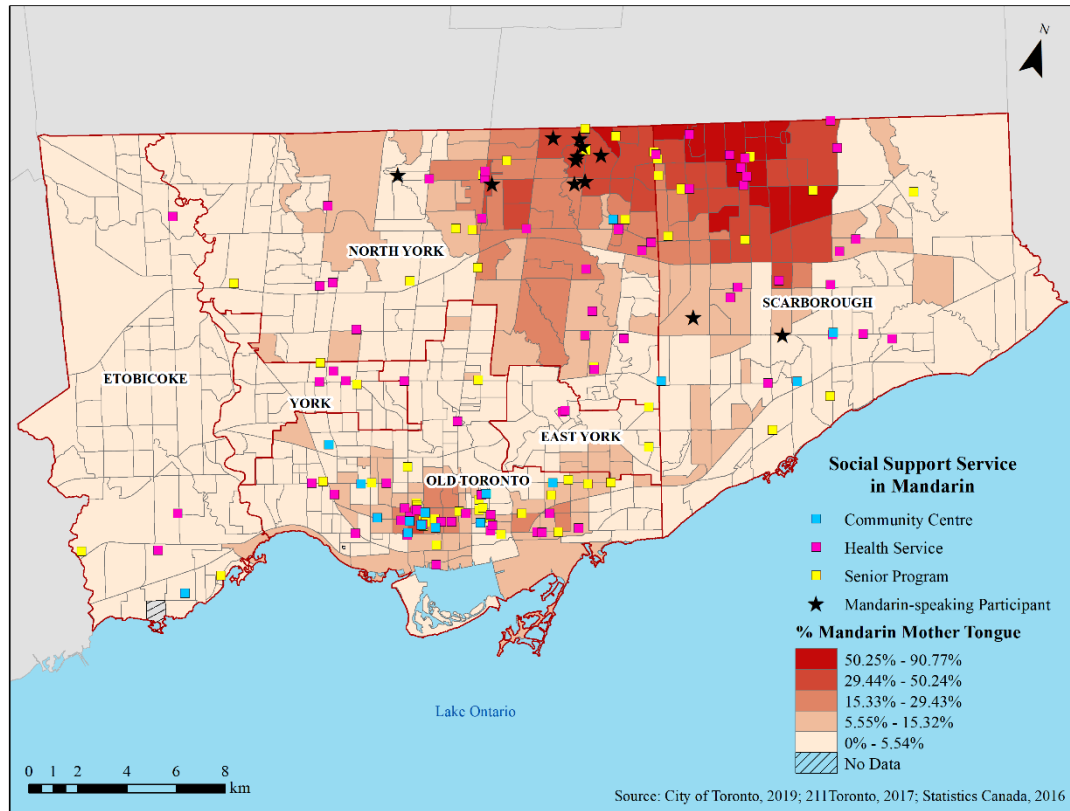
Figure 4: Spanish-speaking participants, social support services available in Spanish and Spanish mother tongue population by census tract

6.3 Calculated Potential Accessibility to Services

6.3.1 Accessibility to services provided for the Arabic-speaking population

Access to community centres offering services in Arabic were found to be high in Scarborough and following the border of North York-Scarborough, and East York-Scarborough down Victoria Park Avenue. High scores were also found in southern Etobicoke along Lakeshore as well as bordering the City of Mississauga, which has a higher percentage of Arabic speakers overall than Toronto (5.59% versus 1.78%; Statistics Canada, 2017a). Moderate accessibility is located in the downtown core, while low to very low accessibility exists elsewhere.

High and moderate accessibility to health services offered in Arabic cluster in the same areas as high community centre accessibility (Figure 5), being along Victoria Park where a cluster of high Arabic mother tongue populations exist (Figure 2), the downtown core and south Etobicoke. In addition, there census tracts with moderate accessibility appear in northeast Etobicoke, York and North Toronto. Health services offered in Arabic appear to serve a larger area than community centres.

Low accessibility scores were found across most of the City of Toronto concerning access to senior programs offered in Arabic. Three distinct clusters appeared (Figure 5). A large high accessibility area is located in North York, again at the border of North York-Scarborough. A smaller, high accessibility area is located at the east end of North York, close to Humber River (North York-Etobicoke border). Lastly, the final high accessibility cluster was found in the west side of downtown Toronto.

Figure 5: Potential accessibility (standardized) by census tract to various social support services offered in Arabic

6.3.2 Accessibility to services provided for the Mandarin-speaking population

Access to community centres offering services in Mandarin were highest in downtown Toronto, presumably serving both East and West Chinatown populations (Figure 6). High accessibility was also found in Scarborough and southern Etobicoke. There is a small cluster of high access census tracts just south of the cluster of group interview participants. Low accessibility is experienced in the majority of York, North York Etobicoke and northern Scarborough along the boundary of Steeles Ave. Overall, high accessibility exists primarily in the southern and central parts of Toronto.

In contrast, high accessibility to health services were found along Steeles Ave in Scarborough, bordering Markham (Figure 6). Of the total population in Markham, 12.5% speak Mandarin compared to 11.8% in Toronto (Statistics Canada, 2017a). Mandarin-speaking population in Markham represents approximately 21% of non-official languages. This area has a considerably high percentage of Mandarin mother tongue population, as was illustrated in Figure 3.1. Likewise, high accessibility is found in Toronto's downtown core which also had clusters of a high Mandarin mother tongue population (Chinatowns). High accessibility is also shown in the eastern portion of North York and a moderate cluster is found in York and southwest North York.

Lastly, Mandarin senior programs show a similar pattern to Arabic senior programs, in that the majority of the city is underserviced (Figure 6). High scores are indicated in the area of group interview participants. Another small, high access cluster is located near the border of York-Old Toronto. This map shows that there are low scores in the downtown core and Scarborough.
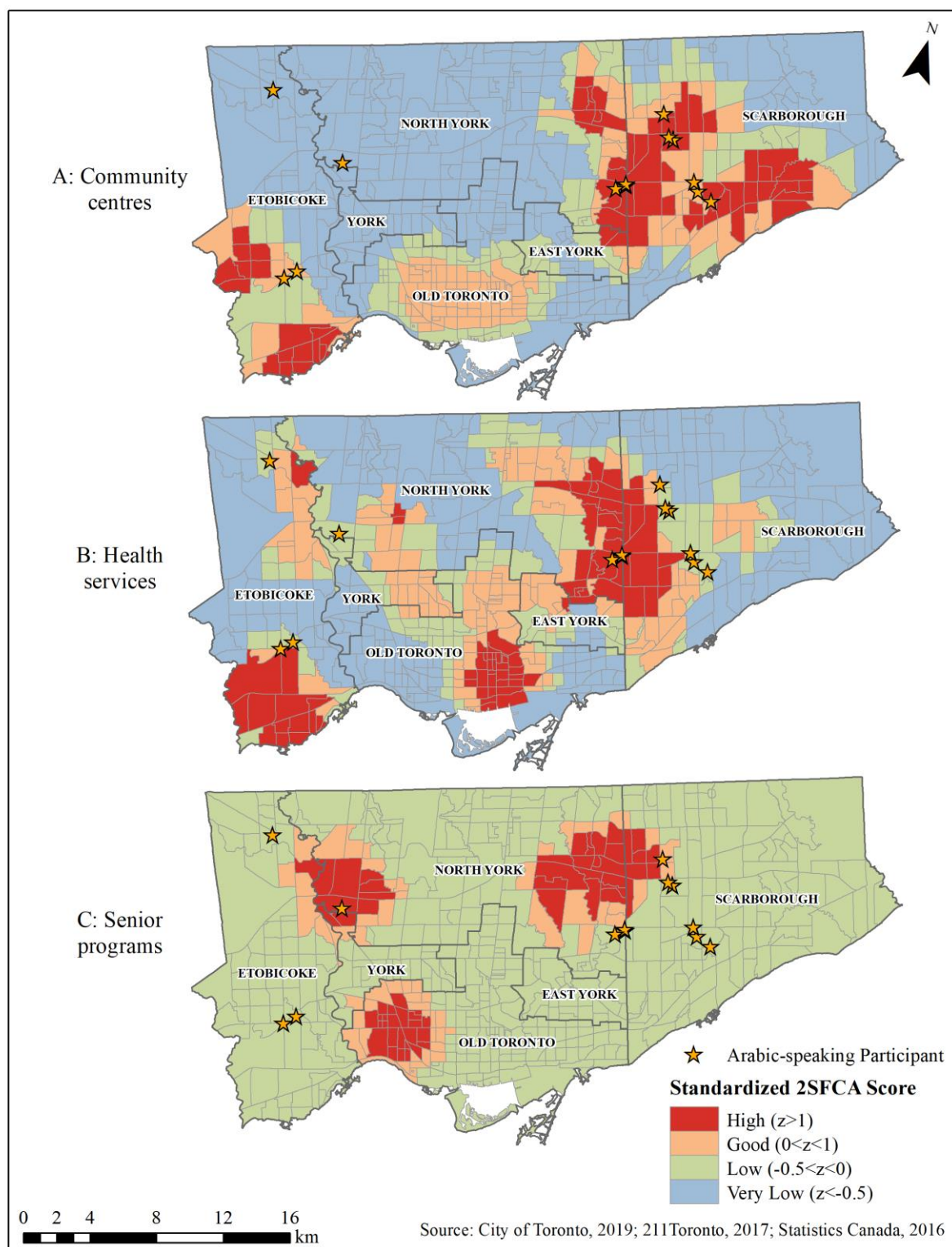
Figure 6: Potential accessibility (standardized) by census tract to various social support services offered in Mandarin

6.3.3 Accessibility to services provided for the Spanish-speaking population

Results show that access to community centres are highest in the west end of Toronto, specifically in downtown Toronto, York and North York (Figure 7). Two small high access clusters are found in southern Etobicoke and in Scarborough. As described in Figure 4, high accessibility is found in downtown Toronto, just south of high mother tongue populations in North York and York. This indicates that areas in North York and Etobicoke that had high Spanish mother tongue percentage is underserviced, represented by low scores towards the northern portion of Humber River.

In regard to health services, high accessibility is found again in the west end of Toronto (Figure 7). In North York, high clusters are found around highway 401, just east of high Spanish mother tongue clusters in Figure 4. The totality of York has moderate accessibility, extending southeast to the downtown core which has high accessibility. A small cluster of high access census tracts is found again in southern Etobicoke. The majority of Scarborough and East York are underserviced.

Ultimately, language-specific senior programs in Toronto for all three language groups of this study are very localized and leave the majority of the city underserviced. High access to senior programs targeting the Spanish-speaking community are found in North York further east than previous clusters of community centres and health services and east of high Spanish-speaking mother tongue populations (Figure 7). This large cluster spans North York from Steeles Avenue south to York, which has moderate to high access. This moderate-high access pattern continues southwest through the west end of downtown Toronto and crossing Humber River into the southeast portion of Etobicoke. The rest of the census tracts experience low accessibility.
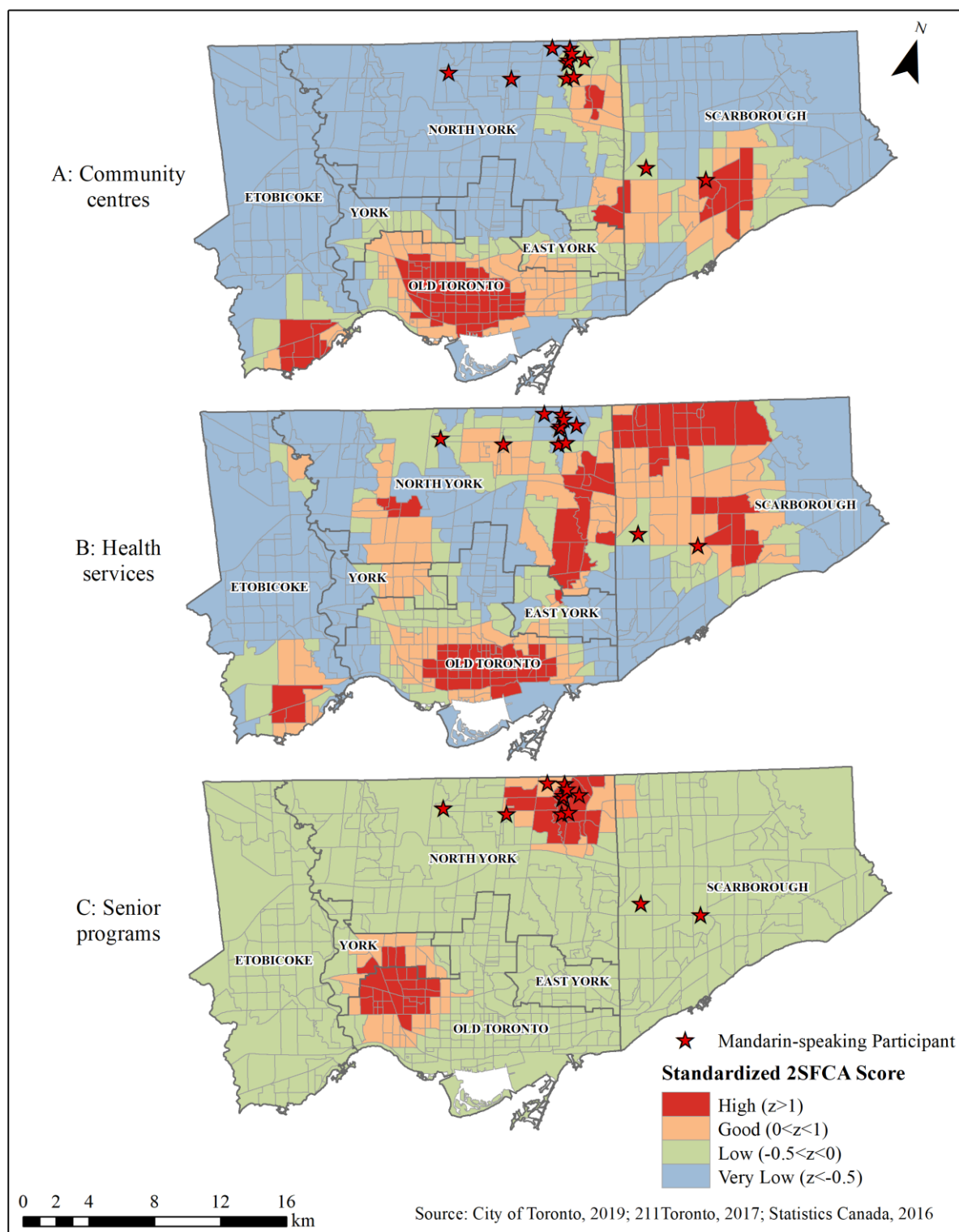
Figure 7: Potential accessibility (standardized) by census tract to various social support services offered in Spanish

7 Qualitative Analysis and Results

7.1 Description of Group Interviews

Eleven interviews were conducted with 73 participants. Each group consisted of four to ten participants of the same sex. The nationalities of participants for each language group can be found in Figures A2-A4. About 47% of participants were male and 53% of participants were female. The majority of participants (84%) lived with their spouse and/or their children, while 16% lived alone. In terms of length of residence, 69% of Arabic-speaking participants have lived in Canada for less than ten years, 47% of Mandarin-speaking participants have lived in Canada for ten to twenty years and 84% of Spanish-speaking participants have lived in Canada for over twenty years.

7.2 Informal Social Networks and First Point-of-Contact

Participants stated that their social networks primarily consisted of friends, family and neighbours. These actors contribute to their lives in multiple ways, be it running errands, providing companionship, participating in activities or having conversations. When facing a personal issue, they would rely on these individuals for support:

> *"I have some friends that I can open up to and I know that they are here to help me so I feel comfortable to tell them my stories."* – AF4-P1

> *"I feel comfortable to ask my daughter for help when I have a personal problem."* – AF1-P8

As the population ages, the Ontario government intends for primary health care physicians (PCPs) and community-based services to be the first and most frequent point-of-contact for older adults (Ministry of Health and Long-Term Care, 2008). When encountering a health issue in particular, many participants specified their children, daughters more often than sons, as their first point-of-contact to receive help. Their children can accompany them to PCPs or hospitals, making transportation easier for older adults. English-speaking children also overcome language barriers, allowing older immigrants to actively advocate for their health and receive a better understanding of their health status that they otherwise would not receive (Zanchetta & Poureslami, 2006):

> *"My children always help me when I have a personal and health issue they are my first contact point."* – AF3-P4

> *"If I need to go to a doctor I call my daughter. Other than that she helps with all the things I need."* – AF3-P2

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"[Our children] have [a limit] of how many days they can take [off]. After, that's all." – MF1-P2

"We have to plan ahead. If we know that we are going to have an appointment that needs English, we will ask our friends, can you come with me next week?" – MF1-P2

"Many of us are afraid to speak up [to doctors about our condition]. He will say a [word] and we [sit there] just wondering because we don't know what it means. And we won't ask him anything, because we don't want to look like we are ignorant. Or maybe it's because the doctor does not have enough time." – SF2-P1

Fortunately, for those who have developed rapport and trust with their primary healthcare physicians (PCPs) or see physicians that speak their native language, it was unnecessary for children or other individuals in their social circle to be used as a gateway to the healthcare system. They have no apprehension towards visiting their physician immediately when a health concern arises. Some Arabic-speaking participants also share their personal problems with their physicians as well:

"We feel more confident to have an Arab family doctor because we can easily express our concerns to him." – AF1-P7

"When I feel sick I contact my family doctor that lives in my area." – AF1-P8

"I really trust [my doctor] and feel comfortable to seek her help whenever I don't feel well. I have developed a strong relationship with my family doctor that I consult her also when I face a personal problem." – AF2-P4

7.3 Accessing Formal Social Support

Language- and culture-specific support is integral in maintaining a positive quality of life for older immigrants, especially in Toronto where about half the population is foreign-born. There was variation between the language groups' views on awareness, affordability and accessibility of formal support services (i.e. community centres and social programs) in Toronto. All participants valued the role that formal support plays in their lives and community.

7.3.1 Awareness of services

Many participants felt that information about services targeted towards them is shared primarily through word of mouth. They felt that the government was not effectively informing populations about what activities or services were available to them:

"Older men and women that arrive to Canada need to actively ask for information and details that can make their lives easier afterwards. I believe that formal support

services such as the Arabic Community Centre need to inform newcomer seniors actively about the Canadian system and how things work." – AF1-P1

"The problem is we don't know what services are available. I've been here for almost twenty years but there are still many things I don't know. When someone mentions about some social benefits, I don't know it exists and have no idea how to apply for it. So, I think information is important. I used to visit the mental health clinic and received some information from there. I suggest they publish this information in local newspapers and websites to broadcast to us. We have many free Chinese papers. The key is to know about this information. If you don't, you don't know from where to access these benefits."– MF2-P4

"Nevertheless, talking about social support in particular, we only learn about these activities late. Perhaps we learn about specific programs a week later after these have taken place. So that's a gap in the service that we can see." – SF2-P1

On the contrary, some Spanish-speaking participants were made aware of services available to them through newspapers and radio. They also mentioned a hotline that connects Spanish-speaking individuals to community centres and other services named *Asociación de Seniors de Habla Hispana del Gran Toronto (ASHTOR)* or Association of Spanish Speaking Seniors of the Greater Toronto Area. Although 211 is available in over 150 languages, a language-specific hotline seemed to be more effective in connecting thee participants:

"I learn about these from the newspapers… These newspapers inform you about everything." – SF1-P5

"Also, the Latin radio… someone has a program for seniors and there, he talks about the Centre." – SF1-P1

"people call 'Ashtor'. And say: "Hello miss, I need to go to the doctor's – do you have anybody?" And so, Ashtor gets in touch with a centre which can help out that person. And they put both of them in touch." – SF3-P3

7.3.2 Value of services

All participants expressed their appreciation for social support services, programs, staff and social workers. They confirmed that these individuals and services contribute positively to their overall health and wellbeing. These services were highly valued by participants:

"I went to the Arabic Community Centre in Toronto as I needed their translation services for welfare and disability cases. What I like is that the services provided are for free and this makes my life easier." – AF3-P3

"There's one person I know that comes here every Tuesday to help us. That person helps us with pension, health benefits, bill payments among many other things. This is

why I said North York is decent. Other areas don't have this kind of service. We all love our community center." – MF2-P1

"Yes, and above all, I am very happy with those centres where Spanish is spoken, because one feels as he/she is part of a family. Like… it's similar to being back in your own country, right? I say that, because, I hardly speak any English. Well, to be more precise, I don't understand English at all." – SF3-P4

"The Centre for us is not only (a place) where we come exercise… it's socializing. It's forgetting about our sadness and about depression… It's all about talking to others and… And the government will save on anti-depressant meds and on other costs." – SF5-P3

7.3.3 Costs of participation

The underlying cost for participating in social programs or using social support services is transportation. In many cases, older adults do not receive any subsidy or reimbursement for using public transportation to reach services. Spanish-speaking participants shared their experiences:

"Well, if you go to a special Yoga class. Or if you want to go to some pools… you need to pay for all that." – SF3-P2

"Before, the government would give us two tickets and a snack. These days, we've got none of that." – SF3-P6

"That's my concern. I don't go to all those places because I have to pay $2 and something. And to come back, the same. So that's a bit more than $4. I go to three activities during the week - and that's more than $12, $13. I want to go every day because I am very active but I don't have enough money to pay for that. If at least transportation was $2 in total… but it's $4. So that's what hinders me. It makes me stay at home…That's our main constraint. So, if we take the car… there's the gas. And parking. If from here, they take us to the theatre or somewhere else, you've got to pay again." – SF5-P3

7.3.4 Increasing demand for services

The Chinese community represents the largest ethnic group in Toronto (Statistics Canada, 2017b). Group interviews revealed that there was a high demand for services in their community even though they are the most serviced amongst the three language groups. Service availability is not keeping up with the growing Mandarin-speaking population:

"Not enough, the supply is smaller than the demand for the services." – *MF1-P4*

In the past I have been to CICS, CareFirst, those organizations for Chinese people. But now there are too many people looking for their services. We are still on the queue for the services." – MF1-P2

Disdain was shown by other language groups for services as well. There is growing pressure on social support services in Toronto. Some participants spoke on the inefficiency of services, which created friction and resentment:

> *"I currently use [ODSP's] income support services but I have noticed that there is a long waiting time in order to get the information I request. I have to call them back and forth in order to ask for things that I am supposed to have quickly."* – AF2-P4

> *"I went initially to COSTI and I asked for a translator to help me with a welfare application. We filled in the application and sent requested documents but it was returned to me twice with reasons such as missing documents and uncompleted information. At the end of the day I had hard time [trusting] people providing formal services and I feel that there is a lot of improvement to be done on their end."* – AF4-P5

> *"When I had to have a medical scan for my eyes before surgery, they made me wait for three months"* – MF2-P7

> *"The healthcare system has changed a lot over the last few years. Back in the day, you could go see your doctor without an appointment. But now, you need to book an appointment and wait for too long. And even there, once you get to the waiting room, they keep you waiting for hours."* – SF2-P3

7.4 Critical Issues for Older Immigrants: Financial and Language Barriers

Both financial and language barriers emerged when participants reflected on the older immigrant experience in Toronto. There were various elements that contributed to financial instability for participants, including housing costs and health care, but the most frequent overarching theme was transportation:

> *"Rent is expensive. Food is expensive. Medicines are expensive. Transportation is expensive. Life here is expensive."* – SF3-P7

7.4.1 Transportation costs

Transportation was the largest and most pressing concern that emerged during group interviews, without any questions or talking points made by moderators. As previously mentioned, transportation costs to and from social support services such as community centres and social activities for older adults were unaffordable for older immigrants. Comparisons were made between Toronto and other municipalities, as well as participants' native countries:

> *"And the transportation in Mississauga is $1 for seniors."* – SF5-P3

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"In China, as long as you are 60-year-old, or above, the transport is all free."
– MF1-P2

"Especially in Toronto, the public transportation fare is so expensive, more expensive than any other [major] Canadian city. For example, in Vancouver, although the living costs are higher there, their public transportation fare is cheaper. This makes mobility for elders inconvenient… More people will actually want to take public transportation if it's cheaper." – MF2-P7

7.4.2 Housing costs

The rising cost of living is an obstacle many marginalized groups are facing in Toronto. This issue is compounded for older immigrants with restricted incomes and reliance on pensions and family members for financial support. As rent per square foot increases, living costs dominate expenditure while the amount of pension one receives remains stagnant. Older immigrants in Canada alone are much more vulnerable since they may not have the financial support of family. Some must cut back on other expenses to afford rent. This can include cutting back on participating in social activities or utilizing social support services:

"The issue that we should talk about, because it's affecting me directly, is that of housing. The rent… the prices are too [high]. I was reading on the paper that the government may step in, because this is just an abuse. One bedroom, $400, $500… That, for a small room where only a table and a bed fit in. $550, $600, $700. Those who need to rely on social aid, how are they going to afford that? They just run out of money. They run out of money and, as such, they start experiencing all these problems." – SF2-P3

"Many seniors want to live on their own, right? They don't want to live with their children anymore. So, they have to submit an application to [Toronto] Housing. And, after that, maybe they need to wait for some 10 years." – SF3-P9

7.4.3 Dental and eye care coverage

Ontario Health Insurance Plan (OHIP) covers complex dental surgeries performed in a hospital and one major eye exam per year for adults aged 65 and older (Government of Ontario, 2019; Health Insurance Act, R.S.O. 1990). Essentially, many older immigrants are uncovered for dentistry and optometry services if they are retired (not receiving private insurance coverage from an employer) or are ineligible for additional support from other programs (i.e. Ontario Disability Support Program).

Both dental health and eye health decline with age. In addition to housing and transportation costs, older immigrants face growing healthcare costs. Some participants go untreated due to costs and wait times for social support services:

> *"I would like the services to focus more on eye care and dental care for seniors. These services need to be improved and affordable for us."* – AF2-P5

> *"There's the issue of the dentist which is really important as well. If they need to do some procedure, that will cost me $300, $500. We don't have that money in our pocket. And dental care is very important."* – SF5-P3

> *"Regarding healthcare [and more specifically] I am talking about the oculist and the dentist clinics. Those visits are very expensive. We are not covered."* – SF3-P2

7.4.4 Language barrier

Lastly, language barrier proved to be a prominent issue amongst older immigrants. When speaking with physicians, pursuing information or utilizing other services, participants faced roadblocks:

> *"I am struggling to communicate with doctors and when I am using other services. So being fluent in English would have made me feel more confident."* – AF4-P3

> *"Regardless of what you do, language is the biggest problem…For example, if I want to get a visa, health card or any card, I have to be accompanied by my children and grandchildren…With the language issue at play, we can't get those legal services done."* – MF2-P7

> *"What you say [doctors] can't understand. What they say you can't understand."* – MF2-P1

> *"I think that the help that the government can provide for those who are alone is very important. But I wish that there were some very basic English lessons too. Something really basic – so that everybody could pick up the phone and ask for help in case they needed it. That's the first thing that we need to think about. This is an English-speaking country. And we need to speak English… because if there is no communication, all is missing. We don't have any help. And that's why it is very important. Basic English."* – SF5-P2

> *"Especially, at the doctor's, and at the bank, that's when one must be the most careful with the language."* – SF3-P2

Language barriers can increase the disadvantages, vulnerability and isolation of older immigrants in Canada (Lai & Chau, 2007; Matsouka & Sorenson, 1999). Despite attending English classes (ESL), participants still found it difficult to learn due to methods of instruction. Participants did not feel comfortable to give feedback because they were

shutdown by instructors and did not know where to turn for help. Many participants shared their frustrations:

"It has been a year that [I have been in] English school and I feel like I do not progress due to the method followed by the teachers… The English teacher should start with the very basics of the language such as alphabet and grammar. They also need to take in consideration that we are old and we need methods that accommodate us." – AF4-P2

"I studied English for 2 months and the major challenge was to understand the teacher. Most of teachers have an accent that is far from the native English and it is hard for us to understand them. In addition, it is very hard for older people that reach their 60's to learn a new language." – AF3-P1

"We need to come up with a different method to teach older people. Our memory isn't as good as before. I am in a different situation. I started learning English in the 1960s actually…I have no communication problem, but I see how the language is troubling other older people. So, I encourage the Canadian government to take initiatives on how to help older immigrants improve their language skills; let it be English or French." – MF2-P2

"[During] class, we aren't allowed to ask [questions]. We only listen." – MF1-P68

8 Integration of Qualitative and Quantitative Data

8.1 Accessibility to Community Centres

Twenty-five participants amongst all eleven group interviews provided their perception of access to community centres and language-specific social support services. The location for twenty-one (84%) of these respondents were able to be mapped and standardized, language-specific accessibility scores attributed to their unique identifiers (Table 6). Views from the remaining four participants can be found in Table B4.

About half of participants were consistent with calculated accessibility in their census tract. Arabic-speaking participants largely referred to the Arabic Community Centre of Toronto (ACCT) in Scarborough as their primary hub for Arabic services (AF3-P3, AF3-P5). For instance, one participant (AF3-P3) stated, "*I went to the Arabic Community Centre in Toronto… what I like is that the services provided are for free and this makes my life easier.*" This participant had "high" access in their census tract. A similar sentiment was shared by Spanish-speaking participants for the Centre for Spanish-speaking Peoples in North York (SF3-P6, SF4-P1). These are two major cultural hubs for these communities. Smaller community centres were seldom referred to by name by participants. This indicates that the level of services offered at ACCT and the Centre for Spanish-speaking Peoples were

favoured by participants, and they held other centres that may be in their area to a higher standard as a result. This could discourage the use of closer services by participants in their census tract, and prompt them to travel further. This was the case with a Spanish-speaking participant (SF3-P2) who, although they had "good" access, regularly traveled from Scarborough to the west end of North York to utilize services. These cross-tabulation results reveal the underlying issues of competition and attractiveness of community centres, or any social support service, that impacts why a participant may want to utilize a service and how far they are willing to travel to reach it.

Mandarin-speaking participants discussed a lack of availability and the need for more facilities to service them (MF1-P1, MF1-P2) which were consistent with their respective census tract scores (community centres offering services in Mandarin). The E2SFCA scores converge with their qualitative data in identifying areas that are underserviced despite high Mandarin-speaking populations. These community centres play a pivotal role in access to services, considering that many other services (senior programs, health services, legal aid, language classes) can be offered within a community centre.

An Arabic-speaking participant stated, *"I sincerely don't know any organizations in my area that provide [community] services,"* despite a "good" ($z = 0.99$) calculated accessibility score in their census. Here, the calculated score and perception conflict with each other. This highlights a failure in services being created alongside awareness of these services increasing. Unfortunately, there is a failure to inform participants of what is available in their area.

Table 6: Cross tabulation of participants' perception of community centre access (qualitative) and potential accessibility to language-specific services in their census tract (quantitative)

Participant ID	Comment	Level of access to Community centres	Community centre E2SFCA Standardized Score	Consistent (C) or Inconsistent (IC)
AF2-P5	The Arabic Community Centre Toronto is one service in my area that provides support for older men and women newcomers in Arabic.	Positive	-0.09	IC
AF2-P6	There is a community centre in the area where I live that helps seniors in Arabic.	Positive	-0.66	IC
AF3-P1	I sincerely don't know any organizations in my area that provide [community] services.	Negative	0.99	IC
AF3-P3	I went to the Arabic Community Centre in Toronto as I needed their translation services for welfare and disability cases. What I like is that the services provided are for free and this makes my life easier.	Positive	1.11	C
AF4-P5	[Frequently visits] Arabic Community Centre of Toronto.	Positive	3.03	C
MF1-P1	[Lack of availability]	Negative	-0.67	C
MF1-P2	[I would like] have more community facilities.	Negative	-0.01	C
SF1-P5	We need more community centres and we need more programs.	Negative	0.08	IC
SF2-P1	We've got plenty of information about hospitals and community centres.	Positive	3.08	C
SF2-P2	No. There are no other services that I use.	Negative	0.71	IC
SF2-P7	This is the only one I go to.	Positive	-0.49	IC
SF3-P1	We have community centres that help us out.	Positive	0.31	C
SF3-P2	[Lives in Scarborough but travels to west end to community centres]	Negative	0.08	IC
SF3-P4	I have been coming here for about a year...I am very happy with those centres where Spanish is spoken, because one feels as he/she is part of a family.	Positive	-0.22	IC
SF3-P6	Here, at the Centre for Spanish-Speaking Peoples, they've helped me very much. This is my home.	Positive	0.08	C
SF3-P10	Sometimes I need to take 2, 3 or 4 buses to get to a centre. I want to change the route, but it takes me longer.	Negative	-0.67	IC
SF4-P1	I take a bus and I can go to the Centre and everywhere else.	Positive	2.06	C
SF4-P3	[Lack of availability]	Negative	-0.32	C
SF4-P4	I could walk a little bit and take just one bus [to come here].	Positive	-0.32	IC
SF5-P4	[Stopped going to centres] because they are far.	Negative	-0.49	C
SF5-P5	The Centre supports us very much.	Positive	3.08	C

8.2 Accessibility to Health Services

Fourteen participants provided their perception of access to language-specific health services. Ten of these respondents (71%) were mapped and both their qualitative data and language-specific accessibility scores were joined and cross-tabulated (Table 7). Views made by excluded participants can be found in Table B5.

The majority participants whose responses concerned access to health services specified the need or use of a language-specific service, such as a physician that speaks their language, with statements such as, *"I wish that, older adults can receive Chinese translator for medical services. This is very important"* (MF1-P4). The calculated accessibilities for Mandarin-speaking participants converged with their perceived difficulty of speaking directly with a physician in Mandarin. This highlights the need for language-specific health services in these Mandarin-speaking areas, as was the case for community centres. Some participants stated that their English was adequate for non-complex health issues (SF1-P4, SF1-P5) and that they would need a companion for more serious health concerns. Despite these instances indicating successful interactions with the healthcare system, the nature of these comments was classified as negative in the context of this study due to the objective of identifying access to health services provided in the participant's native language. It is imperative for older immigrants to be able to communicate with their physicians and advocate for themselves since trusted social supports, such as their children, are sometimes unavailable to help them access health services. Physicians are intended to be the first point-of-contact with primary care in Canada and should be able to support older immigrants who may not have strong English proficiency.

Participants SF2-P2 and SF2-P5 discussed positive interactions with a Chilean physician, implying that they can communicate more effectively in their native language (Spanish), thus removing the language barrier that older immigrants often face. This was consistent with "good" calculated accessibility in their census tracts. This convergence of data demonstrates the benefit of language-specific health services and possibly instances where participants were informed and aware of Spanish-speaking physicians. On the other hand, 20% of participants (SF1-P3, SF1-P5) were unaware of Spanish-speaking physicians in their area despite residing in census tracts with "good" calculated scores. In this instance, it is apparent that participants want physicians that speak their language, but the government and healthcare providers are not adequately informing their target population of their existence.

Table 7: Cross tabulation of participants' perception of health service access (qualitative) and potential accessibility to language-specific services in their census tract (quantitative)

Participant ID	Comment	Level of access to Health services	Health service E2SFCA Standardized Score	Consistent (C) or Inconsistent (IC)
MF1-P4	I wish that, older adults can receive Chinese translator for medical services. This is very important.	Negative	-1.00	C
MF1-P5	When my partner is sick, we don't go to doctors [Difficulty with English]	Negative	-1.09	C
SF1-P3	I only have… (my sister). My wife can't speak English, my children are busy, so the only one who can help me is my sister.	Negative	0.77	IC
SF1-P4	Unless, of course, it's a complicated issue, with very technical words. In that case, my daughter would help me [Difficulty with English]	Negative	-0.29	C
SF1-P5	I do not speak [English very well] but I do understand it. So, when it is something serious, I call my sister – so she accompanies me and talks to the doctor.	Negative	0.81	IC
SF2-P1	Let me please step in. Regarding healthcare services, I can't complain about the doctors or anybody else in this area. I can't.	Positive	0.21	C
SF2-P2	Luckily, I've got a good doctor and I ask him about everything. "Why do I have this? What's the matter with that?" Fortunately, I have got a good doctor, yes. He's Hispanic – Chilean.	Positive	0.18	C
SF2-P4	Normally, I can manage to talk to my doctor.	Positive	0.59	C
SF2-P5	My doctor, when I have some issues, he refers me to these specialists. And, for me, he is a great doctor. He is Chilean.	Positive	0.48	C
SF2-P6	[Had appointment with physician directly before group interview session]	Positive	0.70	C

8.3 Accessibility to Senior (Older Adult) Programs

Eighteen participants provided their perception regarding the availability of programs or activities that specifically target older adults. Ten participants (56%) had adequate location data and were cross-tabulated with E2SFCA scores and their qualitative data (Table 8). Views of the remaining eight participants can be found in Table B6.

Sixty percent of participants who responded were inconsistent with calculated accessibility scores. These conflicting results provided insight into the problems with word-of-mouth awareness rather active marketing to inform older immigrants of what is available to them. One Spanish-speaking participant (SF2-P1) with a "high" calculated score in their census tract stated, *"We only learn about these activities late. Perhaps we learn about specific programs a week later after these have taken place. So that's a gap in the service that we can see."* On the other hand, a Spanish-speaking participant mentioned the use of the senior centre Nueva Era, despite a "low" calculated score. This again highlights the role of attractiveness in a service that reduces the friction of distance that an older immigrant may experience. This was confirmed through mentions of the ACCT by Arabic-speaking participants who resided in census tracts with "low" scores. Consistent with their calculated access, a participant (AF3-P5) stated, *"As far as I know, they are not services in my area that support seniors in Arabic. However, I know that the Arabic Community Centre in Toronto… [provides] help for seniors and [accommodates] their needs."*

Amongst participants with inconsistent cross-tabulations of calculated scores and perceived access, one Arabic-speaking participant (AF3-P5) referred to a service for older immigrants in their area despite their census tract having a "low" score. This can suggest that information regarding language-specific services in this particular area was effectively disseminated, through either informal or formal social networks, despite the scarcity of services that were available. Regardless of "high" or "low" calculated access, this knowledge of available services is ideal for all older immigrants, but particularly for those who live in areas with low populations of people who speak their language in order to circumvent their spatial isolation.

Table 8: Cross tabulation of participants' perception of senior program access (qualitative) and potential accessibility to language-specific services in their census tract (quantitative)

Participant ID	Comment	Level of access to Senior programs	Senior program E2SFCA Standardized Score	Consistent (C) or Inconsistent (IC)
AF2-P5	The Arabic Community Centre Toronto is one service in my area that provides support for older men and women newcomers in Arabic	Positive	-0.43	IC
AF2-P6	There is a community centre in the area where I live that helps seniors in Arabic.	Positive	6.08	C
AF3-P3	There is an organization in my area that provides support for newcomers, older individuals and also youth. They have Arabic-speaking people that serve the Arabic community and support them.	Positive	-0.30	IC
AF3-P5	As far as I know, they are not services in my area that support seniors in Arabic. However, I know that the Arabic Community Centre in Toronto and Church Association provide help for seniors and accommodate their needs.	Negative	-0.43	C
SF1-P5	The young don't feel comfortable (spending time) with the elderly. And so… we need more community centres. And we need more programs	Negative	0.25	IC
SF1-P6	Well, for instance, at the senior's centre called 'Nueva Era', we do all these sorts of activities. We have all that.	Positive	-0.37	IC
SF2-P1	We only learn about these activities late. Perhaps we learn about specific programs a week later after these have taken place. So that's a gap in the service that we can see.	Negative	1.57	IC
SF3-P2	[Lives in Scarborough but travels to west end for senior program Nueva Era]	Negative	-0.37	C
SF4-P4	I could walk a little bit and take just one bus [to come here]	Positive	-0.37	IC
SF5-P3	I have noticed that, here, there are many activities for seniors	Positive	0.42	C

9 Discussion

9.1 Key Findings

9.1.1 What are the settlement patterns of each language group and distributions of language-specific services they frequently utilize?

Settlement patterns confirmed that language groups cluster together in the City of Toronto. Spatial patterns of the 211Toronto dataset indicated that language-specific services did not always align spatially with these populations. This issue was most apparent for the Arabic-speaking population, the smallest population amongst the three language groups, which had language-specific services that were relatively sparse and scattered. Mandarin- and Spanish-speaking populations were generally in closer proximity to language-specific services. These are ideal circumstances, but then arises the further marginalization of older immigrants that do not reside within their respective ethnic enclave and must travel further to receive services or participate in activities within their community. For instance, a Spanish-speaking participant that resides in Scarborough commutes across the city (North York) for services targeted towards the Spanish-speaking community. Older immigrants on the geographic fringes of their language groups may become further isolated if their physical mobility declines or if they are no longer able to afford the commute.

9.1.2. What are the patterns of spatial accessibility to these services in the City of Toronto?

Spatial mismatch was apparent when visually comparing the patterns of high accessibility to settlement patterns of these language groups. Accessibility to programs specifically for Arabic-, Mandarin- and Spanish-speaking older adults (senior programs) were especially sparse in the 211Toronto dataset, hence the majority of census tracts classified as low access. The need for more programming is evident across the City of Toronto as the immigrant population continues to age. This notion was further supported in group interviews and cross-tabulations.

Group interviews affirmed that older immigrants face many barriers when attempting to utilize formal services, and often rely on their informal social networks to assist them to do so. For instance, English-speaking adult children in particular often accompanied their older immigrant parents to healthcare appointments but if participants were made aware of language-specific services in their neighbourhood they would be able to visit a physician more independently and on their own time. Nevertheless, there is still surmounting pressure

on the Canadian healthcare system resulting in longer hospital wait times, longer waiting lists and further appointments. So, although older immigrants could ideally visit a physician that speaks their preferred language, they are still in vulnerable positions due to their increasing health needs.

In addition to language barriers, older immigrants stated transportation costs as the primary financial burden that they wanted relieved. This barrier prevents older immigrants from participating in social activities, which help maintain their wellbeing. Participants wanted reimbursements or subsidized public transit fare. The cost for public transit in Toronto was too expensive for them to make multiple trips a day when attending senior activities or participating in other social events. In addition, older immigrants expressed that they were already struggling with increasing housing costs in Toronto and finding money for services that were not covered by OHIP, such as dental and eye care.

9.1.3. What is the relationship between calculated potential access and perception of access to language-specific services?

Consistencies and inconsistencies between perceived access and calculated access reveal issues older-immigrants face when utilizing services. Mandarin-speaking participants were generally more aware of community centres and senior programs than Arabic- and Spanish-speaking participants. A critical issue for this population is that they still go underserviced due to programs being over capacity (Asanin & Wilson, 2008; Wang & Hu, 2013). Furthermore, many participants were unaware of health services offered in their language. Some were only able to have basic conversations with physicians in English while others delayed using the healthcare system until they had an English-speaking companion or translator, often their children, accompany them.

The cross-tabulation also provides a deeper understanding of how older immigrants choose the services they utilize. Larger community centres or organizations have more attractiveness than smaller community centres and can create competition in the landscape. This was shown to increase the activity space of older immigrants and their willingness to travel longer distances to preferred facilities, often in areas with a higher density of individuals that speak their language. This creates implications for older immigrants who experience declining mobility and are unable to travel to a particular centre, while being unaware of services in closer proximity. This was found to be true for positive comments by participants in cross-tabulations that were inconsistent with "low" accessibility scores of

census tracts where they resided. Overall, the convergence and conflicting nature of quantitative and qualitative results in cross-tabulations revealed nuanced experiences among older immigrants of all three language groups.

9.2 Contributions

This study produces a greater understanding of the experiences of Arabic-, Mandarin- and Spanish-speaking older immigrants in the City of Toronto. Furthermore, their access to language-specific social support services is explored and calculated using geospatial methods (E2SFCA) primarily used in research concerning healthcare access. The mixed-methods approach in this study builds on existing frameworks of qualitative GIS (Wang, 2018) and was used to integrate the experience of the study populations with geostatistical results. Comparisons of less-established immigrant communities with fewer language-specific social support services to those of better-established communities were made. Overall, the scope of this study contributes the perspectives of three language groups of variable population size and settlement history in a diverse city, through a qualitative GIS lens, to the body of research in health geography, gerontology and immigration studies.

9.3 Study Limitations

Both primary and secondary data sources created limitations in this study. The detailed mother tongue profile from the 2016 census was used to visualize the settlement patterns of language groups in the City of Toronto. A custom dataset of immigrants aged 65 and older by language (cross-tabulation of variables) would have been ideal to identify settlement patterns of the study populations with more precision.

There are some limitations of the primary (group interview and survey) data utilized. Due to data loss and participant response rate, only a subset of participants were able to be mapped and included in analyses. Although thirteen group interviews were conducted, two were Mandarin-speaking groups residing in Richmond Hill (north of Toronto) and were omitted from analyses. Unfortunately, this reduced insights from Mandarin-speaking participants in the qualitative analysis phase but was necessary to keep a consistent study area for all data sources. It cannot be assumed that views from this sample is necessarily representative of each language population.

Relating to secondary data, the 211Toronto dataset is from 2017, and may be missing services that were made available to the study population in 2018. In addition, capacity of

services and cost were not available in 211 service descriptions. Capacity of a location influences the "supply" dimension of the E2SFCA calculation. As previously noted, locations are not alike in services offered, capacity, staff and cost, but each location was treated as such due to the nature of descriptions. Therefore, non-spatial measures of attractiveness could not be considered.

A standard catchment area of five kilometres was used to calculate potential accessibility due to mobility of older adults found in previous literature (Green et al, 2017; Morency et al, 2011). Travel behaviour between the three language groups were treated alike similar to how capacity was treated in calculations. Even so, there are further variances in the level of mobility at the individual level considering older adults have different health concerns or physical disabilities.

The demand variables in E2SFCA calculations do not reflect the language populations themselves, but total populations. Total population was used as demand for accessibility to language-specific community centres and health services and population aged 65 and older was used for accessibility to senior programs. Within the 211Toronto dataset, service descriptions and language attributes were distinct from each other, therefore information on which services were targeted towards a specific language group at a particular location was unavailable. It was assumed that other individuals that don't belong to either of the three study populations could still access services at these locations and impact the location's availability to Arabic-, Mandarin- and Spanish-speaking populations.

Lastly, spatial implications arise due to edge effect and the uncertain geographic context problem (UGCoP). Study populations may have access to social support services outside the boundary of the City of Toronto, depending on eligibility. The edge effect can occur especially with the Mandarin-speaking population located at the northern border of Toronto and Markham, which has a high Chinese population. This is also possible with the Arabic-speaking population located near the border of Etobicoke and Mississauga, which also has a high Arabic-speaking population. UGCoP arises since accessibility was calculated at the census tract level, but subjective perception of the boundaries of one's neighbourhood or community may not coincide with census or political boundaries.

9.4 Conclusion and Recommendations

This study has highlighted gaps in service to Arabic-, Mandarin-, and Spanish-speaking older immigrants, especially as it relates to senior programs. Financial barriers, particularly transportation costs, have also emerged as an issue that older immigrants care about. These findings can help inform decisions made by municipal governments, community leaders and non-profit organizations in order to help improve the quality of life for older immigrants. The effects of rising housing costs and healthcare coverage should also be considered for these vulnerable populations, considering the aging population is growing and increasingly depend on the working-age population.

Additional information on capacity of services and language-specific services would improve calculated accessibility measures. A dataset of social support services provided outside the City of Toronto boundary (such as from 211Ontario) would help reduce edge effect if accessibility is calculated for a buffered City of Toronto. Also, accessibility for Mandarin-speaking participants in Richmond Hill could be reincorporated for a comparative analysis of Mandarin services in urban and suburban contexts.

There is an urgent need for a calculated effort to inform Arabic-, Mandarin- and Spanish-speaking older immigrants of language-specific services that are available in their area. Although the 211 services helpline is available in over 150 languages, many older immigrants in these communities are unaware of how to utilize it. Older immigrants that have contributed to building Canada and shaping culture in Toronto for upwards of twenty years are expressing their struggles as they move into older adulthood. The wellbeing of older immigrants should be prioritized just as highly as the Canadian government prioritizes the immigration of foreign adults to increase the size of the workforce.
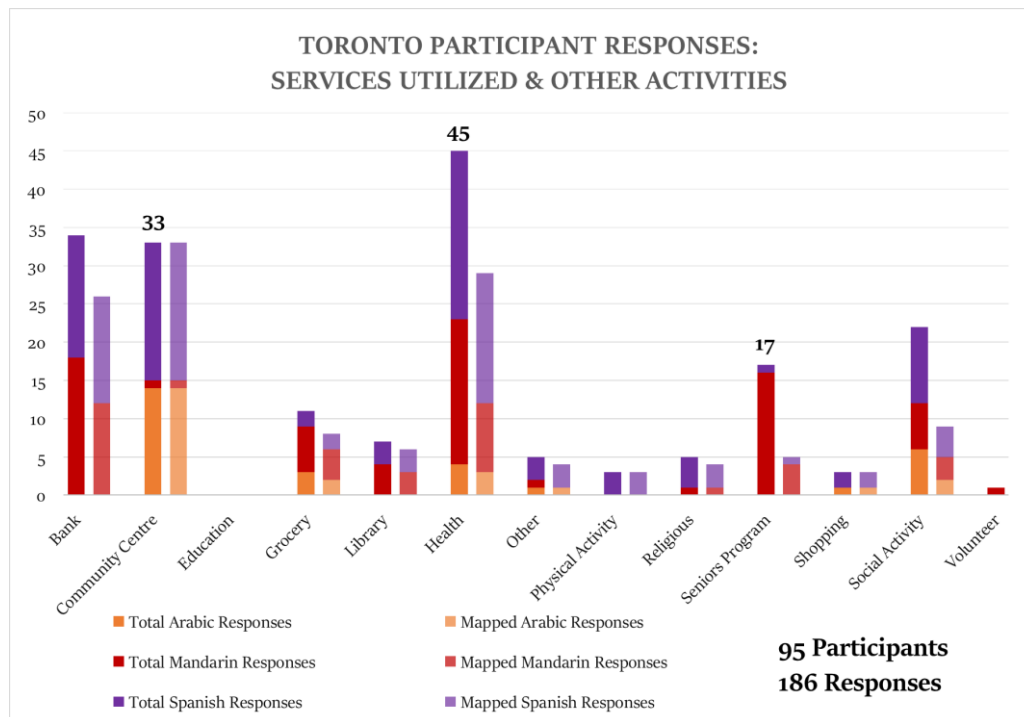
Appendix A: Figures

Figure A1: Survey responses of social support services utilized and social activities by study population
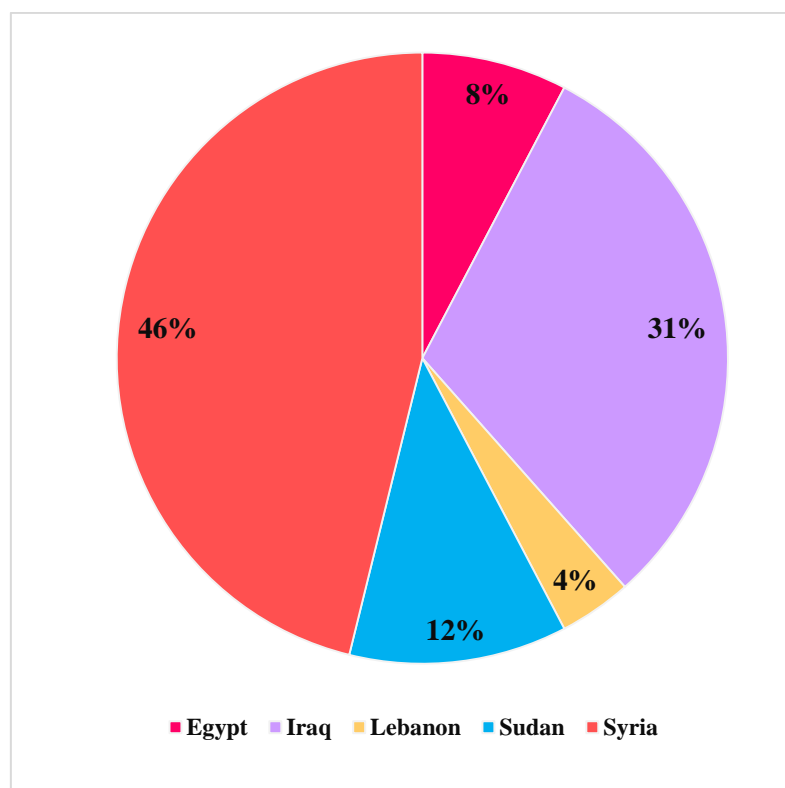

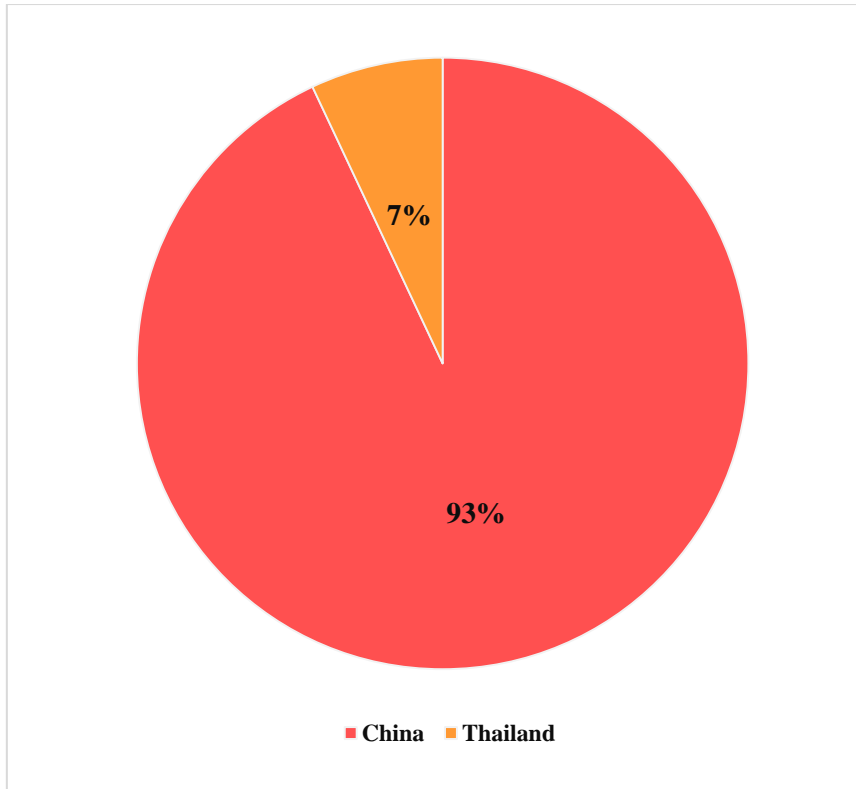*Figure A11: Countries of origin for Arabic-speaking participants*

Figure A12: Countries of origin for Mandarin-speaking participants
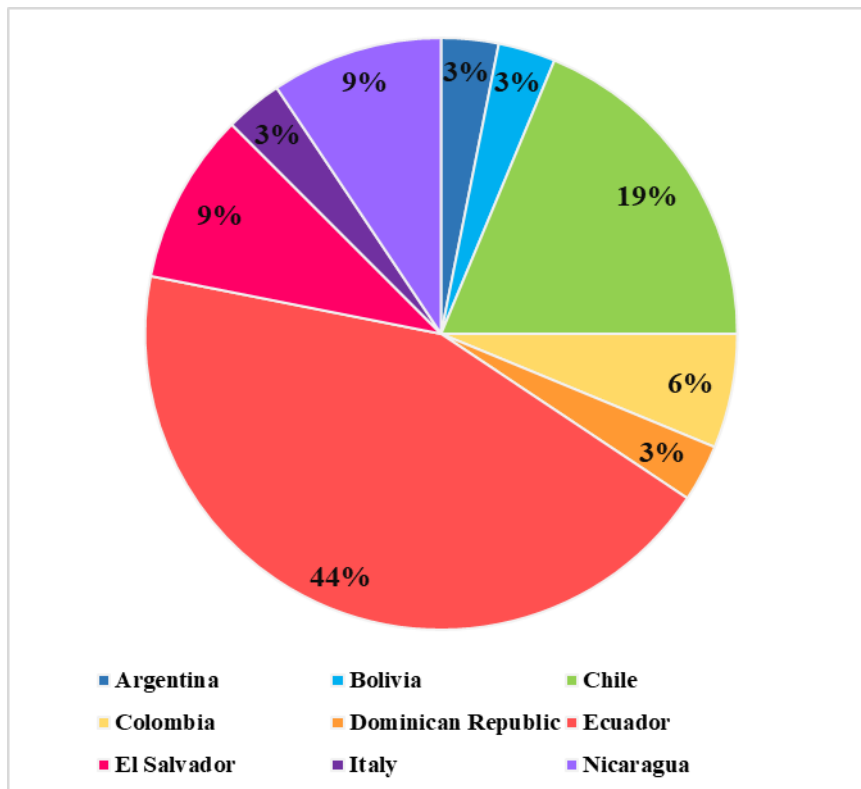

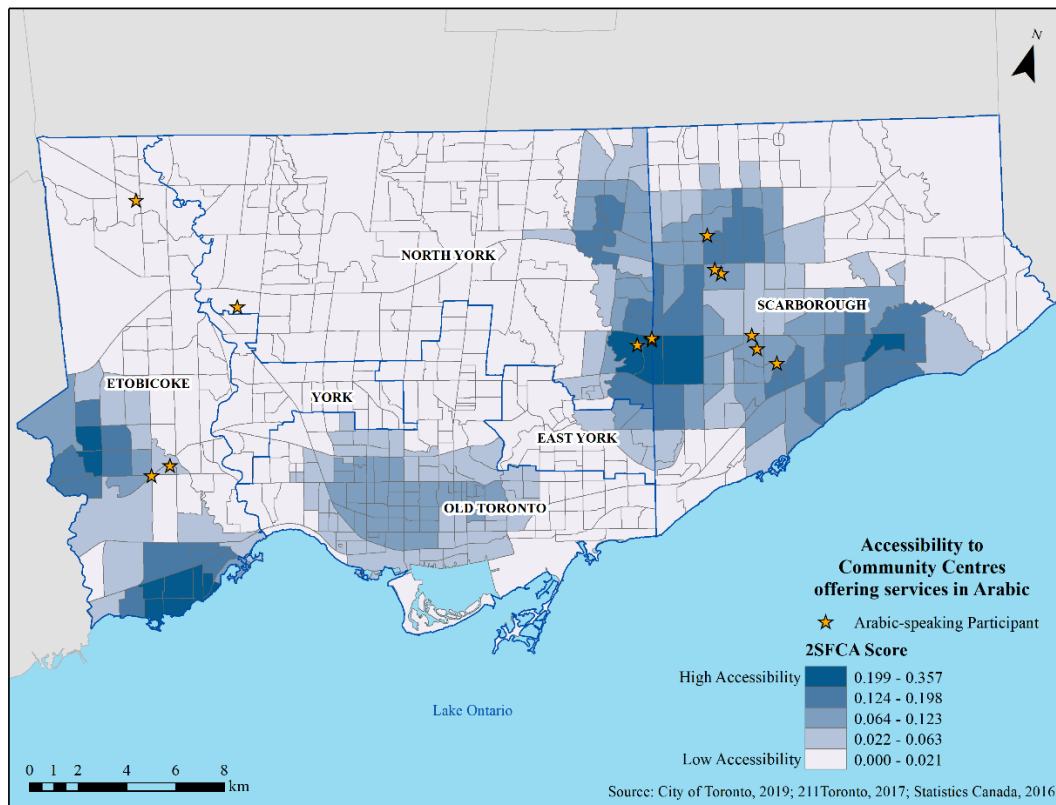*Figure A13: Countries of origin for Spanish-speaking participants*

Figure A5: Potential accessibility (unstandardized) by census tract to community centres offering services in Arabic
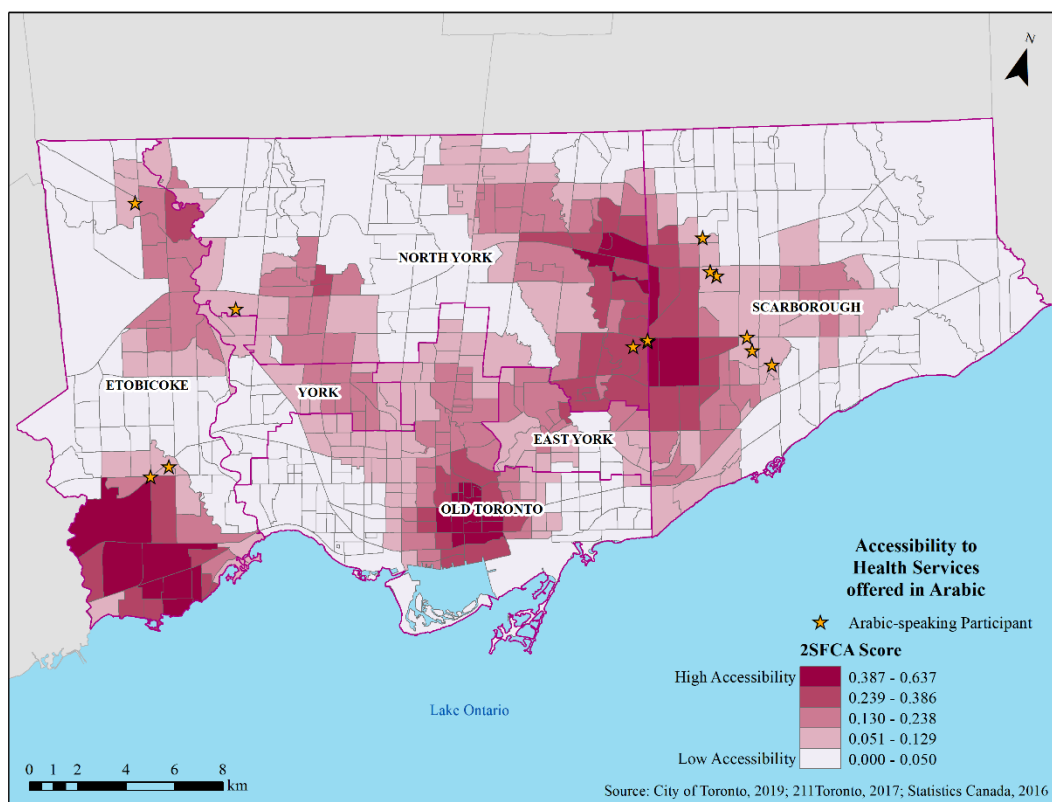

Figure A6: Potential accessibility (unstandardized) by census tract to health services offered in Arabic

Figure A7: Potential accessibility (unstandardized) by census tract to senior programs offered in Arabic

Figure A8: Potential accessibility (unstandardized) by census tract to community centres offering services in Mandarin

Figure A9: Potential accessibility (unstandardized) by census tract to health services offered in Mandarin

Figure A10: Potential accessibility (unstandardized) by census tract to senior programs offered in Mandarin

Figure A11: Potential accessibility (unstandardized) by census tract to community centres offering services in Spanish

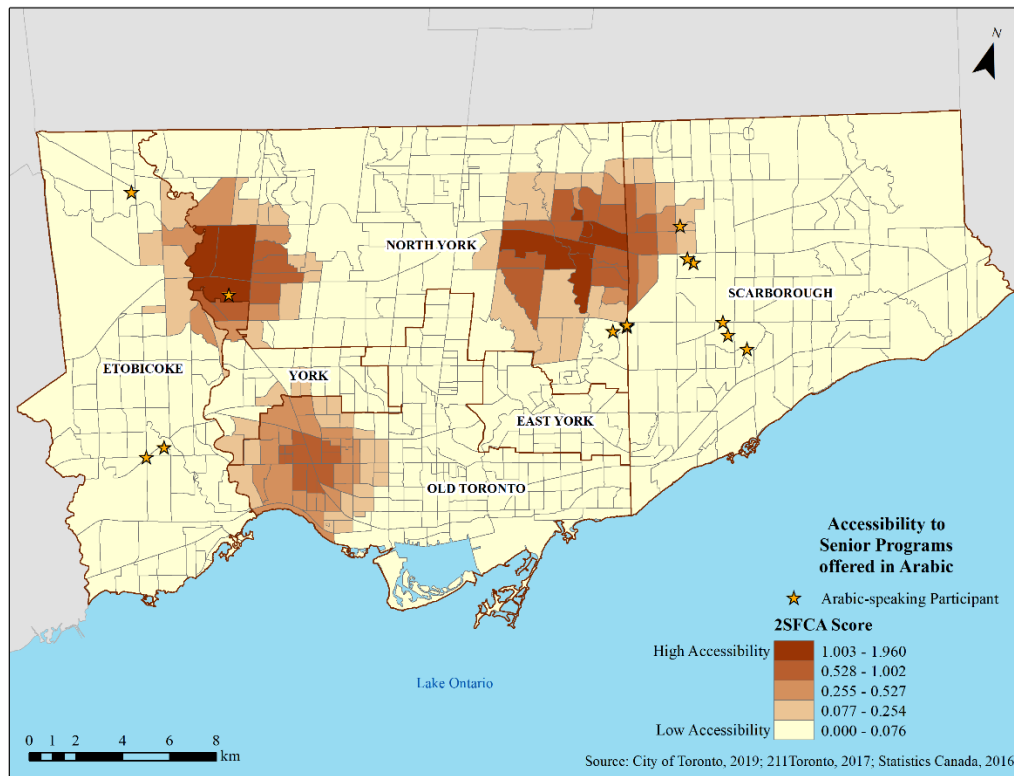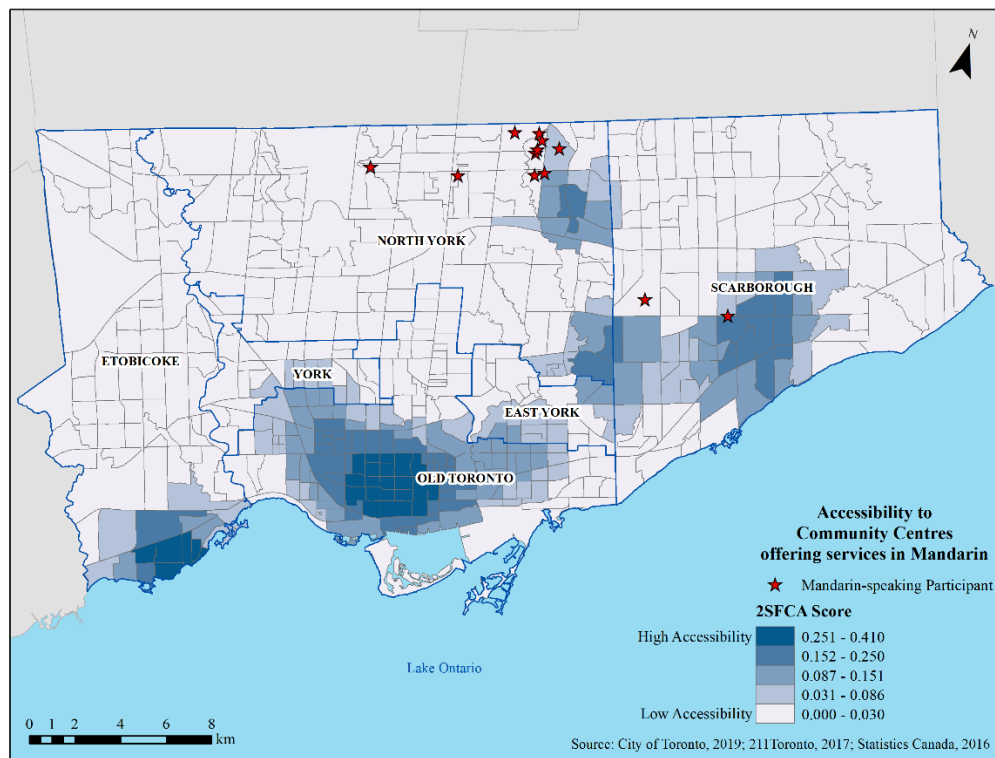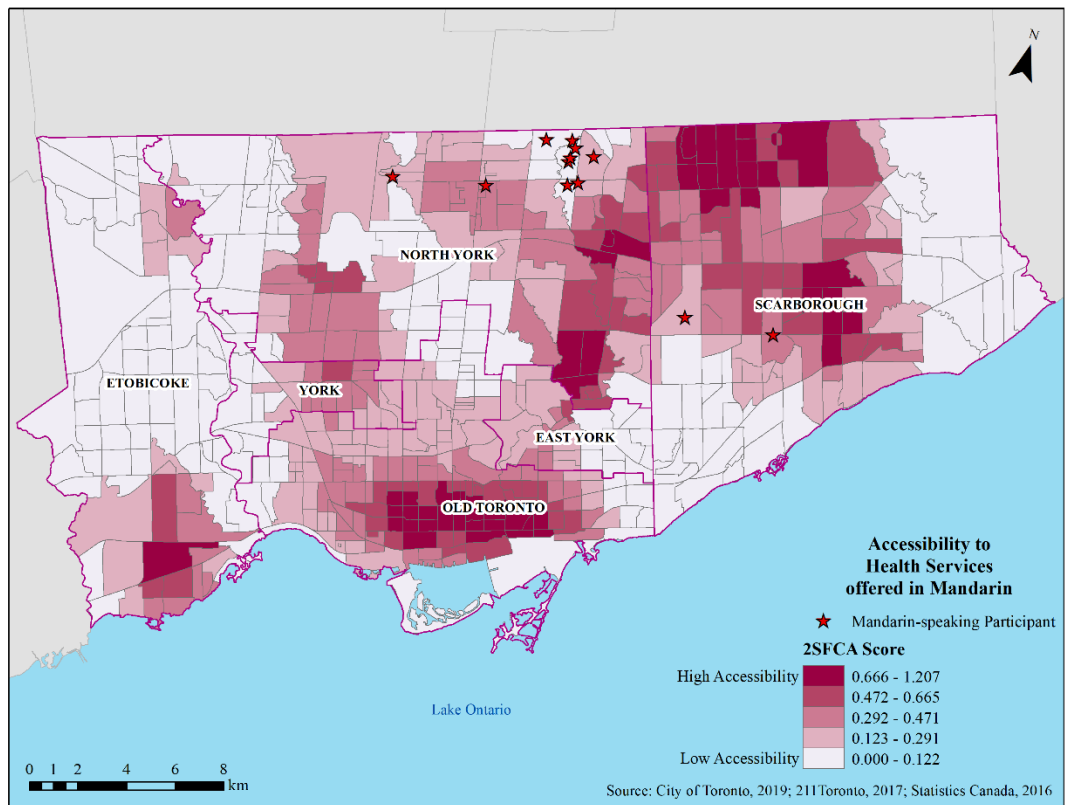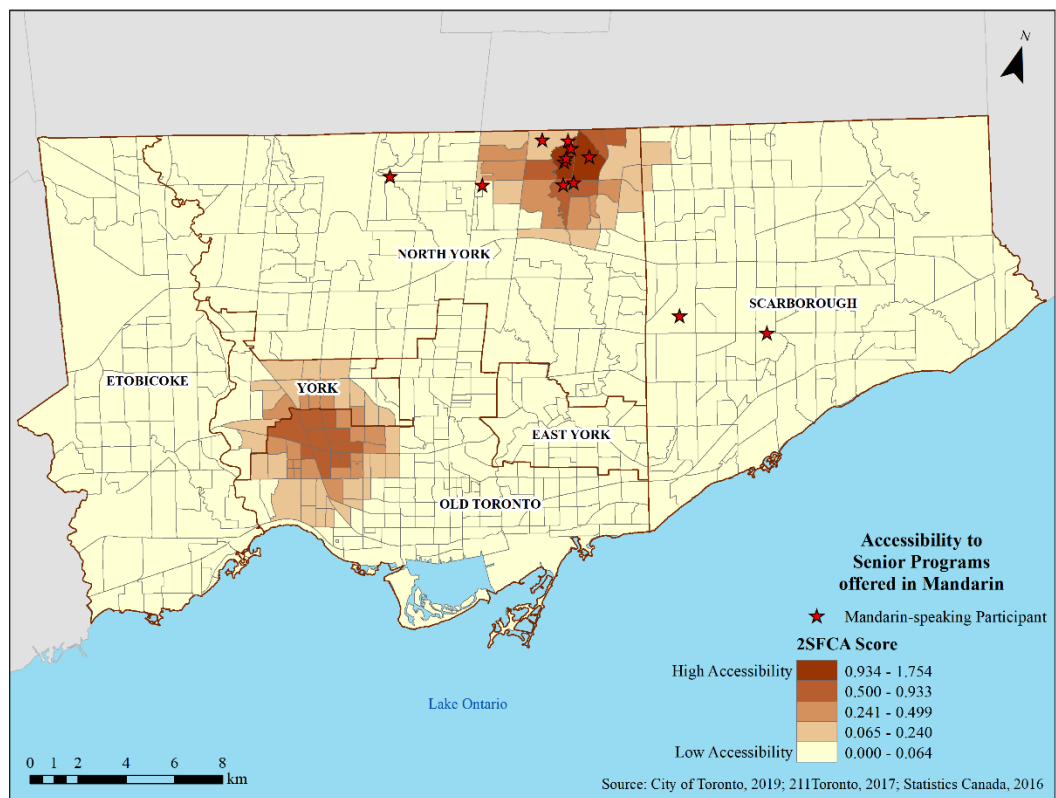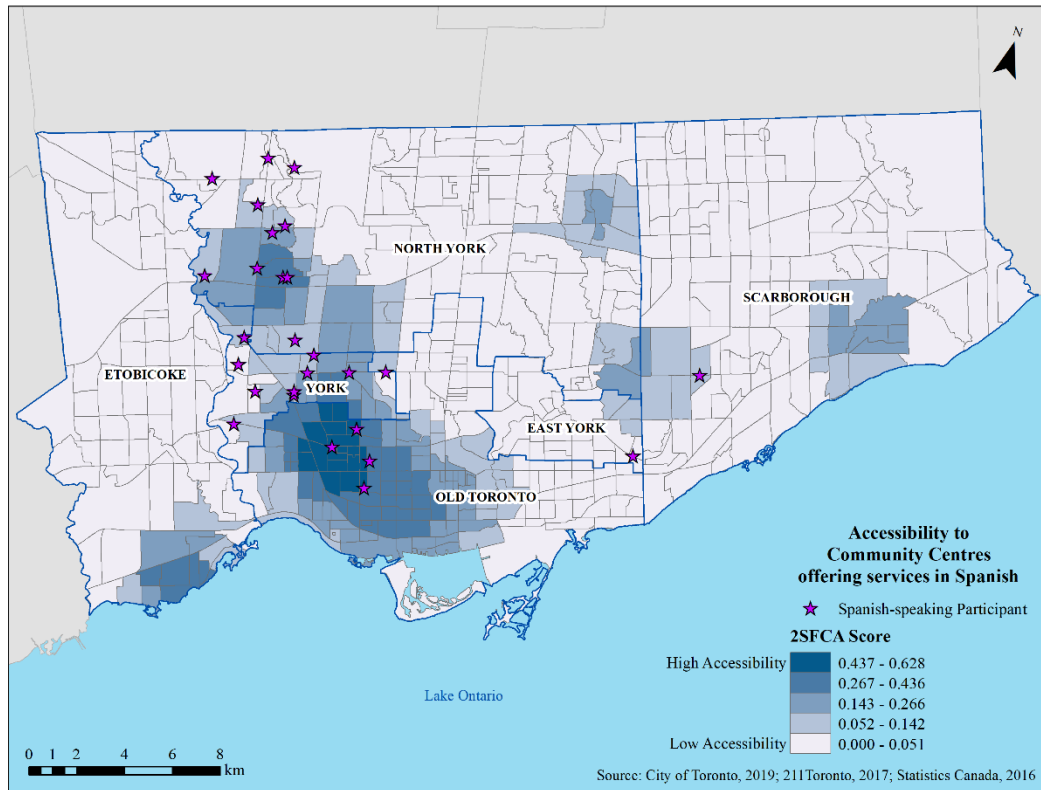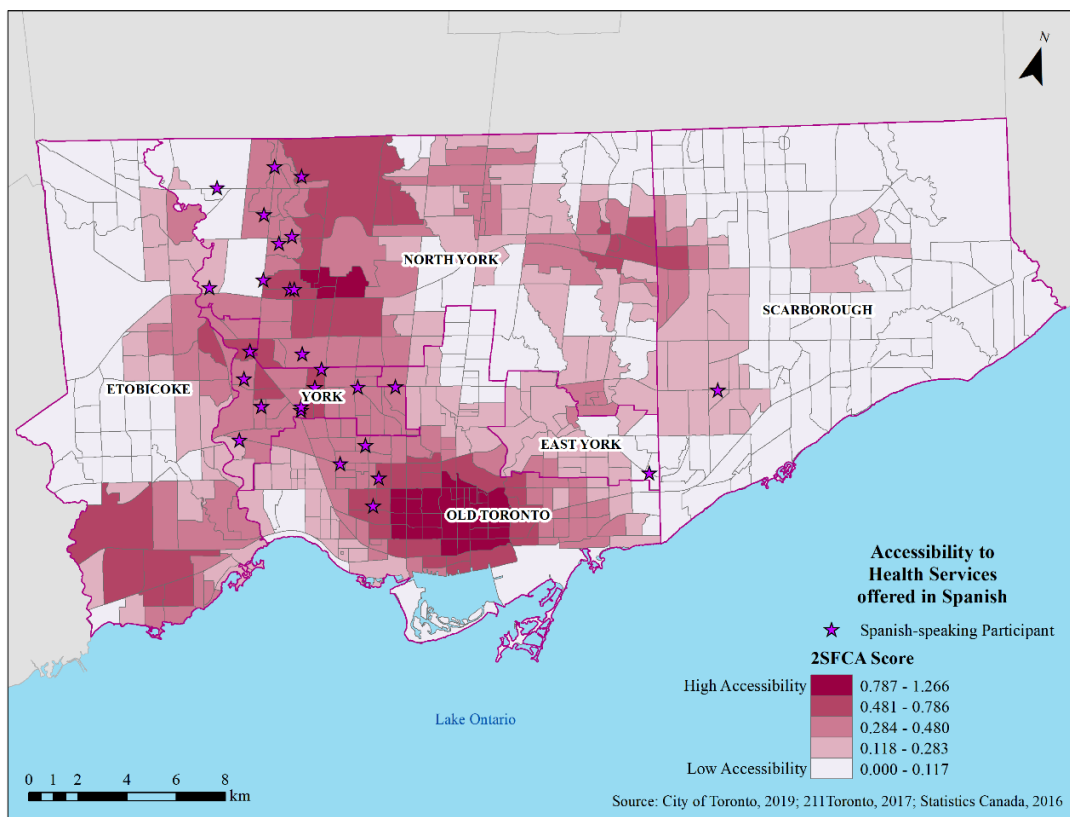*Figure A12: Potential accessibility (unstandardized) by census tract to health services offered in Spanish*

Figure A13: Potential accessibility (unstandardized) by census tract to senior programs offered in Spanish

Appendix B: Tables

Table B1: Survey response classification for Arabic-, Mandarin- and Spanish-speaking participants

Class	Description
Bank	Banks (CIBC, financial institutions, TD Bank etc..)
Medical	Family doctor, acupuncture, hospital, optometry, counsellor,
Grocery	Adonis supermarket, Chinese supermarket, farmer's market
Education	ESL classes
Seniors Program (specified)	Seniors clubs: Red Maple Senior Club, Seniors club, Hong Fook, New Canadian Community Centre Planting Club
Community Centre (unspecified community/settlement services)	Community service, cross culture learning centre, settlement services, ACCT, translation service, Vic park hub, various services, ACSA…
Physical Activity	Sports, swimming pool, dance, ping pong, Columbia lake, kung fu, tai chi
Social Activity	"Social", visit friends, companionship, family visits, visit patients, movies, restaurants, community event, restaurant, santa claus parade, community activity, reading club
Shopping	Shopping malls and clothing retail stores, flea market (could be considered physical activity)
Library	Public libraries
Volunteer	Community meeting, volunteering, environment protection association
Religious	Church, Mosque
Other	Hair salon, traveling, driving, conferences

Table B2: Social service classification for 211Toronto dataset

Class	Description
Social Assistance	Social assistance: services offering employment/financial assistance or legal/housing support. Career counselling, job services, training opportunities, forms assistance, legal information, income tax clinics, information referral. Case management and crisis intervention.
Education	Education services: ESL/FSL, Adult basic education, literacy and financial literacy programs, academic counselling, computer/technology classes
Newcomer	Newcomer/Immigrant Settlement Services: Immigrant issues, information referral, certificates/forms assistance. Multicultural group programs.
Food	Food banks and community meals. Home delivery meals.
Women	Women-only services and services for women/children who have experienced family violence or sexual abuse (domestic violence support)
Health Service	Sexual and reproductive health support: AIDS/HIV prevention, birth control counselling, reproductive health education, pregnancy testing, STI/D screening. General health care (i.e. community health centres, clinics) for those with or without health insurance. Chronic disease education (i.e. diabetes) Mental health support for children/youth/adults. Support groups, Counselling, emotional or behavioural therapy, speech and language pathology, early intervention. Also includes counselling services for substance use disorders.
Older Wellbeing (Senior Program)	Program/services targeted towards older adults: social support, palliative care, assistance for older adults, adult day programs, blood pressure screening, elder abuse programs, assisted living facilities, language-specific services
Shelter	Homeless shelter, domestic violence or transitional housing. Drop-in centres offering services/resources for individuals who are homeless.
Child-Youth	Family resources: Parenting programs and early development programs for children. Adoption services. Day camps, recreational activities and enrichment programming for youth/adolescents. After school programs. Mentoring and career programs for racialized, newcomer or LGBT youth. Family counselling.
General (Community centre)	Community centre or agency providing general services: recreational activities for all ages, internet/telephone access, bathing facilities, community gardens, resource library
Other	Correctional services, advocacy/human rights services, community support and outreach… miscellaneous services

Table B3: Data discrepancies between Greater Toronto Area (GTA) survey data and City of Toronto mapped data

Description	Survey Responses (GTA)	Mapped (within GTA)	Mapped (within City of Toronto)	% of GTA Survey Responses clipped to City of Toronto
Participant Residence Locations	95	91 (-4.2% loss)	62	65.3%
Social Services Utilized	186	135 (-27.4% loss)	70	37.6%

Table B4: Comments on access to community centres by unmapped group interview participants.

Participant ID	Comment	Nature of Comment
AF1-P2	I have a strong connection with the Arab Community Centre and its members. I also [volunteer] with various organizations which opens up doors to meet more people and make good friends.	Positive
AF1-P3	We only know about the Arabic Community Centre but it is not in our area of living	Negative
AF1-P8	There is a community centre in the area I live in that provides services for older people in Arabic as well.	Positive
MF2-P1	[Lack of availability]	Negative

Table B5: Comments on access to health services by unmapped group interview participants.

Participant ID	Comment	Nature of Comment
AF1-P2	My family doctor is Arab	Positive
AF1-P5	My family doctor is Arab too	Positive
AF1-P7	I live near by a walking clinic so my family doctor is there and if I have a complicated health issue he refers me to a specialist physician.	Positive
AF1-P8	When I feel sick I contact my family doctor that lives in my area (Arab)	Positive

Table B6: Comments on access to senior programs by unmapped group interview participants.

Participant ID	Comment	Nature of Comment
AF1-P2	As per my knowledge, there are no services that provide support to seniors in the area where I live	Negative
AF1-P3	We only know about the Arabic community centre but it is not in our area of living	Negative
AF1-P5	My area does not have Arabic services for seniors	Negative
AF1-P7	I am not aware of such services	Negative
AF1-P8	There is a community centre in the area I live in that provides services for older people in Arabic as well.	Positive
AF2-P2	I am not aware that there are services that provide support for seniors in my neighbourhood.	Negative
AF2-P4	I believe that my area is lucking social activities for seniors.	Negative
MF1-P3	More activities [for adults]	Negative

Table B7: Number of social support services available to participants by language and type (inclusive of 211Toronto dataset and mapped survey responses)

	Community centres	**Health services**	**Senior Program**	*Total*
Arabic	13	33	22	*68*
Mandarin	17	81	76	*174*
Spanish	24	81	57	*162*
Total	*54*	*195*	*155*	***404***

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