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DOES WHERE YOU LIVE MATTER?
PHYSICAL CHARACTERISTICS OF NEIGHBOURHOODS
AND TYPE 2 DIABETES IN TORONTO:

A CROSS SECTIONAL SURVEY OF ETHNORACIAL GROUPS LIVING IN
ST. JAMES TOWN AND FLEMINGDON PARK

by

Anne-Marie Tynan, BA, University of Toronto, 1982

A Major Research Paper
presented to Ryerson University

in partial fulfillment of the requirements for the degree of

Master of Arts
in the Program of
Immigration and Settlement Studies

Toronto, Ontario, Canada, 2009

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ABSTRACT

The purpose of this study is to explore the impact of neighbourhood on type 2 diabetes among a sample of immigrants attending diabetes education programs in Toronto. Flemingdon Park (FP) has higher overall rates of diabetes than does St. James Town (SJ), even though both areas share similar socio-economic and immigrant profiles. A cross-sectional survey administered to participants of Diabetes Education Programs at Flemingdon and Sherbourne Health Centres asked questions about proximity of resources such as grocery stores, walking, biking trails, parks, access to and availability of recreation sites, public transit, social support and self-reported health status. The results provide individual-level information on the impact of neighbourhood and other social determinants on type 2 diabetes among a sample of immigrants. While the results support the notion that 'where you live' does matter, a bigger sample size and further study are needed.

Key words: Diabetes, neighbourhoods, environments, resources, immigrants.

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Dedication

In memory of my parents,

Francis Joseph Tynan and Mary Ellen Brick

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Chapter 1

Introduction

Diabetes: A Growing, Global Epidemic

Like many other countries around the world, Canada has experienced a substantial rise in the prevalence of obesity over the past two decades. As a result, rates of type 2 diabetes, a major consequence of obesity, are soaring. Type 2 diabetes is a chronic disease that is characterized by the presence of high blood glucose (hyperglycemia) due to defective insulin secretion, insulin action or both (Canadian Diabetes Association, 2008).[1] Poor dietary habits and an increasingly sedentary lifestyle are major factors fuelling these trends. The main prescription for type 2 diabetes is to eliminate unhealthy, high-fat foods and to increase physical activity levels. Given the "obesogenic" (Swinburn, 1999) nature of modern urban society – where fast food and quick snacks are available in abundance and driving a car to run an errand a block away is the norm – it has been difficult to achieve broad scale improvements in healthy eating and exercise patterns among the general population.

Part of the problem is in the way our cities and urban centres are designed. In fact, a growing body of evidence suggests that where people live has a significant impact on their health. Neighbourhoods that are 'activity-friendly' (i.e., contain more green space, walking trails, bike paths, recreation centres) and encourage healthy food choices may

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[1] Diabetes is generally defined as an inappropriate elevation of blood sugar, also known as glucose, that arises when our bodies can no longer regulate the uptake and disposal of glucose in an efficient manner. There are two principal types of diabetes: Type 1 diabetes, formerly known as Juvenile Diabetes; and Type 2 diabetes, formerly known as non-insulin-dependent diabetes. Patients with Type 1 diabetes develop the disorder as a result of an immune-mediated destruction of the insulin-producing cells of the pancreas. The vast majority of Canadians and persons worldwide with diabetes have Type 2 diabetes. This disease arises when sufficient insulin can no longer be produced to meet our body's demands.

impact residents' health in important ways such as decreasing their risk for obesity and diabetes through opportunities to walk and access healthy food. According to the 2008 World Health Organization (WHO) Social Determinants of Health Report, communities and neighbourhoods that are designed to promote access to basic goods, physical and psychological well-being and protective of the natural environment are essential for health (SDH Report, WHO, 2008).

A recent research study entitled, *Neighbourhood Environments and Resources for Healthy Living – A Focus on Diabetes in Toronto* (Glazier, Booth, et al. 2007) quantified the relationships between neighbourhood characteristics and the prevalence of diabetes across Toronto's 140 neighbourhoods. Two innovative tools: the *Activity-Friendly Index* (AFI) and the *Healthy Resource Index* (HRI)[2] were developed to measure how conducive a neighbourhoood was to providing residents with health-promoting opportunities such as proximal places to walk and exercise.

The Activity Friendly Index (AFI) was created for each City of Toronto neighbourhood using the following variables: population density (derived from the 2001 Census of Canada); density of and access to retail services (from the City of Toronto's 2004 Employment Survey); car ownership rates (based on the 2001 Transportation Tomorrow Survey); and rates of drug-related and violent crime (from the 2001 Toronto Police Services Report).

Four factors were equally weighted and combined to create the Healthy Resources Index (HRI). These factors were: the average walking time to the nearest store selling fresh fruits and vegetables; the average walking time to the nearest recreational space; the

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[2] For full details of the methods employed to develop the AFI and HRI, refer to chapters 9 and 11 of *"Neighbourhood Environments and Resources for Healthy Living – A Focus on Diabetes in Toronto: ICES Atlas" Toronto*: Institute for Clinical Evaluative Sciences.

average walking time to the nearest park or schoolyard; and the average travel time by public transit to the nearest family physician. Other elements of 'neighbourhood health' included access/availability of public transit and the age and physical structure of the neighbourhood. Because diabetes is a complex disease linked to social disadvantage and ethnicity, the authors also analyzed socioeconomic and ethno racial data.

Key findings from The Diabetes Atlas were that neighbourhoods located in the northwest and northeast ends of Toronto had the highest rates of diabetes; these areas also had lower average annual household income levels and higher proportions of residents who belonged to a visible minority or had recently immigrated. These areas were built largely after World War II, were sparsely populated, and had poorer access to public transit and retail services. They also had fewer reported walking, biking and pubic transportation trips per day and a higher reported number of car trips (Glazier, Booth, et al. 2007). High diabetes neighbourhoods ranked lower on the AFI and HRI indices.

In contrast, downtown sections of Toronto had lower diabetes rates and higher incomes. By and large, central neighbourhoods were constructed in the pre-war era, had higher population density, excellent and frequent public transit, a greater mix of residential and retail services, lower reported car trips and more frequent reported walking and bicycle trips. Even socially disadvantaged neighbourhoods in this part of the city had lower-than-expected diabetes rates and ranked high on the AFI and HRI. A key question that emerged from the Atlas was "what is happening in downtown, older neighbourhoods that is protecting residents from diabetes?"

In this study, I will explore the impact that resources and environments have on type 2 diabetes in two neighbourhoods in Toronto. Social disadvantage such as low

income, and visible minority status are risk factors for the disease. The Diabetes Atlas demonstrated that lower income neighbourhoods had a higher prevalence of diabetes particularly those located outside the central core of the city. These same areas had higher rates of immigration and unemployment and lower levels of education attainment. In addition, a greater proportion of their population identified themselves as belonging to a visible minority (Glazier, Booth, et al. 2007). However, the researchers found that the effect of socioeconomic status and ethnicity was modified by the activity-friendliness of a neighbourhood and proximity to resources such as parks and recreation centres, stores selling fresh fruits/vegetables, and primary health care services.

This study seeks to understand the effect of neighbourhoods on health by comparing a downtown neighbourhood with a similar 'outer' suburb to try to understand the reasons for lower rates downtown. Expanding on the findings from the Diabetes Atlas, it would appear that retail-dense, activity and resource-friendly urban centres provide more opportunities for residents to exercise and buy healthy food than their counterparts northeast and northwest of them. According to the findings, older more activity-friendly central neighbourhoods have lower rates of diabetes regardless of socio-economic and racial status.

This research project will compare St. James Town, an downtown area with low average household income, high numbers of recent immigrants (visible minority) and low rates of type 2 diabetes to Flemingdon Park, located outside the downtown core and having low(er) average income, high visible minority rates and very high diabetes rates. Through a cross-sectional survey administered to visible minority residents attending diabetes education classes in St. James Town and Flemingdon Park I seek to determine if

physical characteristics of neighbourhoods are related to the presence of type 2 diabetes

in high risk populations. Throughout this paper, the study by Glazier, Booth et al (2007)

will be referred to as the Diabetes Atlas. The term 'diabetes' refers to type 2 diabetes

(definition above).

The first chapter of the paper will set the context for this study by providing

background information on the emerging diabetes epidemic and risk factors for the

disease. Chapter two is a literature review on the impact of urban design on health. The

study design and methods in chapter three, outline the reasons for this study,

neighbourhood profiles, the sample population, design of the survey instrument,

limitations, and statistical methods employed in the analysis. The data analysis is

described in chapter four. The final two chapters, five and six include a discussion of the

findings and conclusion.

The study will not include examination of the possible role that genes play in the

incidence of diabetes. McDermott argues that the evidence for such a role is limited as

compared to issues of social and material deprivation. She also considers how an

emphasis on biological determinism as an explanation of the late 20th century epidemic of

diabetes distracts from consideration of the types of economic and social issues (such as

neighbourhood environments and socioeconomic factors) that we raise in this study.

(McDermott, 1998).

Background: Why Diabetes?

Diabetes affects 246 million people worldwide and is a rapidly growing cause of disability and premature mortality (WHO). Due to the aging of the population and increasing rates of obesity, the prevalence of type 2 diabetes is expected to double over the next 20 years in both industrialized and developing countries. In Ontario, the prevalence of diabetes rose 69 percent (from 5.2 percent to 8.8 percent) between 1994/95 and 2004/05 (Lipscombe, 2007). This rate of increase was not expected until 2010. People in Ontario with diabetes account for one-third of all heart attacks and strokes, one-half of all people starting kidney dialysis and two-thirds of all non-traumatic amputations (Booth, 2003; Hux, 2003). These complications place a huge burden on Canada's healthcare system, as well as on individuals and their families. The obesity epidemic is one of the major causes of the observed rise in diabetes incidence. The World Health Organization identified obesity and physical inactivity as among the greatest health challenges and risk factors for chronic disease in the 21st century (WHO).

Over the last 50 years the typical North American or "western" lifestyle has been typified by lower levels of physical activity and the consumption of excess calories. The increasing number of fast food outlets and portion sizes contribute to the intake of excess calories. In the US, portion sizes in restaurants have increased substantially since the 1980s in parallel with increasing body weights (Young, 2002). The increasing amount of time spent in sedentary behaviours such as television viewing or sitting at a desk has also been associated with the risk of obesity diabetes (Hu, 2003).

Individual risk factors for diabetes are not distributed evenly across society. Diabetes is more common in certain ethno-cultural populations. Persons of African, Hispanic, South or East Asian descent have a greater predisposition to diabetes than persons of European descent (Branacati, 1996; Abate, 2003) due in part to ethnic differences in genetic susceptibility. Studies from the UK have illustrated a higher burden of diabetes among people of South Asian descent (Indian, Pakistani and Bangladeshi), in whom the prevalence of diabetes appears to be three to six times that of the white, British population (Dhawan,1994; Barnett, 2006). In Ontario, South or West Asians compose 12 percent of the diabetic population despite contributing less than 4 percent to the overall population (Hux, 2003).

Ethnicity largely alters the risk of diabetes through genetic factors, which can influence the propensity to gain weight, the pattern of weight gained and the likelihood that increased body fat will result in insulin resistance. The higher risk experienced by some ethnic groups may be further compounded by differences in socioeconomic status. In Canada, recent immigrants and visible minorities increasingly tend to have lower incomes than Canadian-born people of European descent and this may further exacerbate health disparities (Census of Canada 2001; Heisz, 2004). Socioeconomic status is also associated with health and healthy lifestyle behaviours. Populations with low income and less formal education are more likely to smoke and be overweight and physically inactive (Heisz, 2004). In the 1998/1999 National Population Health Survey, 21 percent of people with diabetes reported low income compared with only 13 percent of the general

population. Moreover, two-fifths of those with diabetes did not complete secondary

education compared with only one-fifth of the general population (Heisz, 2004).

Chapter 2
Physical Characteristics of Neighbourhoods and Their Impact on Health: A Review of the Literature

Aside from individual-level risk factors, other factors can play a part in the disease such as the physical environment or neighbourhood in which you live. There is increasing awareness that features of the urban environment can serve as barriers or facilitators to physical activity. A growing body of research shows a link between the way communities are designed and their impact on residents' physical activity levels (Heart and Stroke Foundation, 2005). Compared to rural areas, residents living in major urban centres are more likely to find their community convenient to walk or bike in, to walk or bike to do daily chores, to walk, bike or take public transit as their primary means of getting to work and to be at a healthy weight. Individuals living in moderate-to-high density neighbourhoods that have community and commercial services within walking distance of where they live are 2.4 times more likely to meet the 30-minute daily minimum of physical activity (Heart and Stroke Foundation, 2005). Within urban areas, there is evidence that greater residential density, mixed land use and greater street connectivity are features of walkable neighbourhoods (Ewing, 2003; Saelens, 2003). Given this paper's focus on neighbourhoods environments and resources, it is worthwhile to examine the literature on the connections between urban form, physical activity and health.

There is a rich and growing body of literature related to the physical environment and health and the role that neighbourhood plays in the health and well-being of residents. Schlundt's (2006) study of geographic clustering of obesity, diabetes and hypertension in Nashville, Tennessee showed that areas with poor health were

characterized by unhealthy behaviours (such as smoking) but concluded that the inability to walk to nearby resources such as grocery stores contributed to obesity and its attendant disease, diabetes, in some neighbourhoods in Nashville.

The geographic analysis of diabetes prevalence in an urban area in Winnipeg, Manitoba by Green (2003) pointed out that low socioeconomic status (SES) may contribute more to the development of diabetes than do genetic factors, but that fewer lifestyle choices such as time and access to places to exercise were increasingly recognized as a pathway to poor health outcomes for persons living in urban areas.

Several studies point to the link between increase in body mass index (BMI), obesity and environment in metropolitan areas (Ross 2007; Frank 2004; Oliver, 2005; Lopez, 2004). Modern suburban neighbourhoods that are not easily accessible on foot or bicycle can constrain the amount of time spent in physical activity, as compared to the time spent in more compact neighbourhoods, thus contributing to weight gain among inhabitants (Ross, 2007). Frank (2004) demonstrated that mean BMI for White men decreased significantly across neighbourhoods as land-use mix, density, and street connectivity increased. Lisa Oliver's study (2005) of neighbourhood socioeconomic status and the prevalence of overweight Canadian children and youth found evidence that as neighbourhood SES declined, fewer children participated in physical activity. This was due in part to a lack of local facilities as well as fears about safety in local playgrounds and parks. She concluded that to understand the determinants of obesity in children required an understanding of the places/neighbourhoods children live.

Lopez (2004) examined the association between urban sprawl and the risk for being overweight among US adults and observed that there is significant heterogeneity

between older inner suburbs and newer outer suburbs. Urban sprawl (outer

neighbourhoods with dispersed resources requiring a car, fewer parks, bike paths etc.)

affects the propensity for physical activity because the distance to parks or fitness

facilities is further, and this may impact on diet and shopping for healthy food for the

same reasons.

Two studies demonstrated the association between the built environment and

health. Hill (1998) found that an individual's body weight and body composition are

determined by the environment and genetics but that we must cure the environment in

order to combat the epidemic by working on making the environment more conducive to

physical activity. Srinivasan's (2003) review of the built environment revealed that the

places we live affect our health and pointed to the links between health and low SES

observing that limited access to outdoor activities and healthy food options emerged as

major factors influencing health.

Law (2005) discovered neighbourhood is significantly related to healthcare access

and utilization in Hamilton, Ontario. Location was a significant predictor of accessibility

to healthcare downtown. However, while she found that availability was higher in the

city core than outer suburbs, there was higher unmet health use by residents in the city.

This finding may be true in the inner core of Toronto where a plethora of medical

practices are to be found but accessibility and utilization of health services by residents

may be low resulting in underreporting of diabetes.

A study on stress and urban environments (Matheson, 2006) found that stressors,

defined as conditions of threat, demands, or structural constraints, can include reduced or

lack of access to opportunity or to the necessary means to achieve ends as well as

structural reduction in available alternatives or choices. While this study focused on the link between neighbourhoods and depression, it illustrated the notion that environment may influence feelings of despair or helplessness if resources are inadequate. While not directly linked to physical characteristics, the theory could hold true for individuals residing in places where the environment is not favourable to physical and mental health.

Saelens (2003) conducted a systematic review from the transportation, urban design and planning literatures to identify features of the urban environment that encourage walking. Of many findings, the choice to use motorized transport instead of walking is based on proximity (distance) and connectivity (directions of travel). The more compact and intermixed an urban environment is, the shorter the distances between destinations. The probability of walking decreases (drops off) as distance increases between destinations such as residences, shops and transit services increases to more than half a mile. The design of street networks between households, shops and places of employment strongly facilitates walking if there is a lack of barriers (such as freeways) and where there are a number of options for travel routes. Streets organized along grid patterns (rather than dead-end cul-de-sacs) facilitate walking as a mode of transport.

A national study by the Canadian Institute for Health Information (CIHI, 2005) revealed that the amount of green space, how safe people feel on the streets, and the availability of public transportation have an impact on health. A finding of interest pointed out that 53 percent of residents living in St. James Town, Toronto, a socio-economically disadvantaged urban neighbourhood, reported their health to be excellent or very good.

The Diabetes Atlas demonstrated a strong correlation between neighbourhood infrastructure and diabetes. The authors mapped diabetes rates across 140 Toronto neighbourhoods. The highest rates were found in the northeast and northwest sections of Toronto. These neighbourhoods were constructed from 1950 onward and were developed with the car in mind. Residential areas were separated from commercial areas thereby necessitating the use of a car to run errands, buy groceries and to get to work.

The study analyzed data from the Ontario Food Terminal, the Toronto Transit Commission, Toronto Parks and Recreation Centres, and Medical Data. These data revealed that the northeast and northwest areas of the city had fewer stores selling fresh fruits and vegetables, public transit was less frequent, there were fewer parks and recreation facilities including walking and bike trails, and diabetes education centres and family doctors were sparse. Not only were these neighbourhoods more car dependent and less 'activity' friendly, they also had much higher pockets of lower income and high recent (visible minority) immigration.

In contrast, lower rates of diabetes were found in the older downtown Toronto neighbourhoods such as St. James Town and in areas just slightly to the southwest of downtown Toronto (High Park) and south, (The Beach). The older sections of Toronto, built prior to 1946-1950, combined commercial and residential dwellings. Using the same administrative data sets and mapping techniques, it was found that areas of the city located in the downtown core, contained a good mix of retail and residential enclaves so residents relied less on a car, had more frequent and accessible public transit, more walking and bike paths, more doctors and diabetes centres and closer proximity to stores and services including parks and recreation centres.

In summary, the literature revealed that urban design has an effect on physical activity, body mass index, mental stress, propensity to walk or use a car and healthcare utilization. In this review, there was a good mix of Canadian and American research, however there were no reports or studies at the individual-level and none that focused on a specific ethno-racial group and diabetes. While the Diabetes Atlas contains macro-level information on environments and diabetes, it does not review conditions at the local level.

Chapter 3

Study Design and Method

Why This Study?

Given the increasing evidence of the role that neighbourhood plays in shaping and promoting the health and well-being of its residents as illuminated by the literature on urban infrastructure and health and confirmed by Glazier and Booth (2007), this paper expands on the findings from the Diabetes Atlas. This research seeks to uncover the correlation between neighbourhood-level attributes and diabetes and will examine the relationship between physical characteristics and the presence of diabetes among a sample of visible minority residents living in two neighbourhoods in Toronto. For the purposes of this study, I have adopted City of Toronto neighbourhood definitions developed to assist government and community agencies with local planning and policy decisions. These are established geographic areas using Statistics Canada census tracts as building blocks and are described by the City of Toronto (City of Toronto). Neighbourhood descriptions are provided in the next section.

In the case of this research, I chose two neighbourhoods that share a set of common socio-demographic characteristics. Both of these neighbourhoods have higher (than Toronto as a whole) numbers of visible minority residents and both areas have lower (than Toronto as a whole) income levels. However, one neighbourhood, Flemingdon Park (FP), has a much higher diabetes prevalence rate than St. James Town (SJ). Thus, shared characteristics – ethnicity and income, both risk factors for diabetes, cannot explain why FP has higher rates. As described in the Diabetes Atlas, other factors,

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such as the neighbourhood structure itself, the availability of healthy food and the overall environment seem to affect diabetes rates regardless of ethnicity and income.

According to Landman (2003), the method known as *'most similar systems design'* seeks to identify the key features that are different among similar areas and which [may] account for the observed outcomes, in this case diabetes rates. Based on this logic, we can assume there are factors, other than the similar ethnic and income profiles of the two neighbourhoods that account for community differences in rates of diabetes. And we will examine the extent to which differences in community-level characteristics explain the differences in health outcomes. For example, one neighbourhood may provide better walking paths or healthy food sources – two factors, according to the Diabetes Atlas – that are protective of diabetes for residents.

This research is exploratory in nature and was undertaken to better comprehend the nature of the local environment. While we know some facts about neighbourhoods and health, more information is needed in order to develop a viable theoretical framework for future research and testing. Thus, the objective of this study is to gather preliminary information using a survey instrument to provide insight into the differences between the two neighbourhoods. Accordingly, surveys were administered to participants of diabetes education programs in Flemingdon Park and St. James Town, Toronto to gather answers to standard questions.

Methods of the Study

The two neighbourhoods were chosen through a combination of quantitative methods. Socioeconomic and demographic data located on the City of Toronto neighbourhood profiles site from the 2001 Census of Canada were reviewed in order to

find two similar profiles. Diabetes prevalence rates and factors related to healthy and activity-friendly neighbourhoods were adapted from the Healthy Resource and Activity Friendly Indices from the Diabetes Atlas. For this study, I was interested in certain variables that comprised the indices such as the location and proximity of stores and services, recreation centres, and walking/bike trails. The objective was to identify two neighbourhoods that represented a combination of: low/medium income, high visible minority and high/low diabetes rates.

Neighbourhood Profiles

Flemingdon Park, Toronto:
(low/medium income, high visibile minority, high diabetes rates)

Flemingdon Park (FP) is a mid-Toronto neighbourhood not considered part of the older city bound by Don Mills Rd., the Don Valley Parkway, Eglinton Ave. E., and Gateway Blvd. In comparison to Toronto, the percentage of immigrants and visible minorities is higher in FP. Top four home languages spoken are Tamil, Chinese, Persian and Gujarati. Recent immigration includes persons from Sri Lanka, Pakistan and India which compose the largest visible minority population in FP. The incidence of low income (persons living below the low income cutoff) for all persons in FP was 35 percent in 2001. (Neighbourhoods, City of Toronto n.d.). The age and sex adjusted diabetes rates for Flemingdon Park are: 6.36 percent (Toronto Community Health Profiles Partnership, 2007). (Appendix 1).

St. James Town, Toronto:
(low/medium income, high visible minority, low diabetes rates)

In comparison to Flemingdon Park, St. James Town (SJ) is an older inner-city neighbourhood located between Mount Pleasant Rd., Bloor St. E., Parliament St., and Wellesley St. In comparison to Toronto, the percentage of immigrants and visible minorities is higher. The top four home languages spoken are Tamil, Chinese, Tagalog and Korean. Recent immigration to SJ includes persons from the Philippines, Sri Lanka, China and Pakistan. SJ has the same visible minority profile as FP with the South Asian population making up the majority of the visible minority population in the community. The incidence of low income for all persons in SJ was 40 percent in 2001 (Neighbourhoods, City of Toronto, n.d.) The age and sex-adjusted diabetes rates for St. James Town are: 4.39 percent (Toronto Community Health Profiles Partnership, 2007). (Appendix 2).

Survey questions were adapted from an on-line physical activity questionnaire on the Heart and Stroke Foundation of Canada (HSF) website. HSF questions were adapted from a comprehensive questionnaire developed by the University of South Carolina (SIP 4-99 Research Group). This questionnaire was used to develop and test questions for a Behavioral Risk Factor Surveillance System (BRFSS) module to assess individual perceptions of physical activity supports in the social and physical environment in the state of South Carolina. The questionnaire was administered to adults by telephone then was tested for validity and reliability. In the case of the USC questionnaire, a Geographic Information System (GIS) was used to validate the environmental surveillance items against objective measures of the social and physical environment.

I developed my survey instrument using pre-existing data from both HSF/University of South Carolina surveys and questions arising from the Diabetes Atlas

that had been tested for reliability and validity (Kirtland, 2003). The survey used in this research was modified for a Toronto audience by using terminology such as TTC (Toronto Transit Commission) that would be familiar to respondents.

The survey consisted of three sections: 1) socio-demographic information, 2) information about the physical attributes of the neighbourhood and 3) self-report health questions. The survey asked respondents to answer questions about the number, proximity to, and accessibility of social/community resources such as grocery stores, public transit, parks, biking/walking trails and recreational facilities, as well as their perception of neighbourhood safety and years lived in the neighbourhood. The health section included a question about confirmed diagnosis of type 2 or pre-diabetes. Given the higher rates of diabetes in Flemingdon Park, it was hypothesized that residents may have longer distances to travel to and less availability of grocery stores, parks and recreation facilities, walking or biking paths and public transit to explain the rates. In addition, the questionnaire gathered socioeconomic characteristics from respondents such as income, education and ethnicity. The average time to complete the survey was 15 minutes. The survey is attached as Appendix 3. Ethics approval was granted by Ryerson University's Ethics Board (Appendix 4).

Once the neighbourhoods were identified (see above information) the next step was to make contact with diabetes educators at the Flemingdon and Sherbourne Health Centres (St. James Town) to discuss the project and distribute surveys. At both sites, staff were eager to participate. Surveys were made available at the respective health centres to members of diabetes education groups. Information about the study was provided but completion was voluntary.

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The original inclusion criteria stipulated that self-identified South Asian immigrants complete the surveys. In Flemingdon Park the majority of respondents were South Asian but in St. James Town a request to circulate surveys to a South Asian parent group was not granted because the manager of the program was away; thus, surveys from St. James Town were completed primarily by Chinese respondents attending weekly diabetes education classes. In the absence of time, I chose to discontinue circulation of surveys at SJ after one month as the process was slower than anticipated. FP has two diabetes educators who were already familiar with the Diabetes Atlas, hence the response at FP was better than at SJ. Twenty-one surveys were completed in Flemingdon Park and ten in St. James Town.

Limitations of the Study Methods

This study had many limitations. One major limitation was the small sample size in St. James Town. It was difficult to clearly determine the physical environment and resources of SJ with such a small sample. In both cases, a sample of at least 50 surveys from each group would have provided more power to detect significant differences between the neighbourhoods. In the case of SJ, the time frame for the survey was short and occurred during the summer when fewer people were available to participate while in FP the time frame was longer and surveys were distributed in late May which captured more people.

The heterogeneity of the sample posed another problem. The researcher sought to compare two similar ethnic groups to ameliorate possible differences in health-seeking and exercise behaviours. However, since the request to circulate surveys at a South Asian parent group in St. James Town was not granted, the decision to allow any member of the SJ diabetes education program to complete the survey was made. Thus, in Flemingdon

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Park survey respondents were primarily South Asian (as per the original criteria) while in St. James Town respondents were primarily Asian (from China). While the location of and access to resources in a neighbourhood is not linked to ethnicity, there may be certain behaviours that prevail among different cultures. For example, as mentioned above, the propensity to walk to stores may be the norm in some cultures and not in others due to varying perceptions around walking alone and/or safety concerns. Thus, differing responses may be due to other factors and not the location and distance of services.

This study utilized a purposive sampling methodology. I chose to survey individuals attending diabetes education groups that would be representative of the ethno-racial makeup of the area as an exploratory first step in understanding whether the differences in neighbourhood environments could explain differing rates of diabetes among a similar ethnic group. Due to the limitations of this kind of sample, the results from this study cannot be generalized across Flemingdon Park and St. James Town, to explain the differences in prevalence rates. However, the findings from this study suggest that some neighbourhood characteristics appear to protect residents from diabetes. An analysis of the results is described in the next chapter.

Chapter 4

Analysis

The analysis of the neighbourhood survey was conducted by entering individual responses into a ©Microsoft Excel spreadsheet. Simple calculations were performed to provide overall percentages for each answer in each section. The general characteristics of the participants were transcribed from structured and written responses and are contained in Table 1 (Characteristics of Participants) and described below.

As mentioned in the previous chapter, the survey (Appendix 3) was completed by 21 individuals in Flemingdon Park and 10 in St. James Town. The overall response rate was 50 percent and ranged from 70 percent in Flemingdom Park to 30 percent in St. James Town. Response rates were calculated by dividing the actual number of surveys completed by the number of surveys (30) provided to each centre. The overall response rate was calculated by dividing the total number of surveys to each centre (60) by the actual number of completed surveys (31).

Characteristics of the participants

Flemingdon Park:

Twenty-one people completed surveys at FP. There were 15 female subjects, five male subjects and one who did not answer the question on gender. The mean age of the respondents was 58. The top three countries of origin from FP were: India, UK and Colombia with India comprising eight out of 21 responses. Eighty eight (88) percent of the respondents in FP reported total after tax income of $50,000 or less per year.

Nineteen percent of respondents in Flemingdon Park stated they had a university degree.

Four respondents did not have diabetes but were at risk for the disease.

St. James Town:

At SJ, surveys were completed by six females and four males. The mean age of respondents at SJ was 67. At SJ the top three countries of origin were China, Somalia and South Asia (no specific country identified). In SJ, 100 percent of respondents reported after tax income of $50,000 or less per year. Sixty percent of respondents in St. James Town had a university degree. All ten respondents had been diagnosed with diabetes.

Table 1: Characteristics of Participants

St. James Town	Flemingdon Park
Sex Female 60% Male 40% Total 100%	Sex Female 71% Male 24% No Response 5% Total 100%
Average age in years: 67	Average age in years: 58
Country of Origin China 80% Somalia 10% India 10% Total 100%	Country of Origin India 42% Pakistan 16% Tanzania 16% Bangladesh 5% Other 21% Total 100%
Ethnicity Chinese 80% Tamil 10% No Response 10% Total 100%	Ethnicity South Asian 19% Punjabi 19% No Response 62% Total 100%
Education Some high school 20% High school diploma 20% University degree 60% Total 100%	Education Some high school 15% High school diploma 33% University degree 19% No response 33% Total 100%

Percent with income < $50,000
    100%
	Percent with income < $50,000
	    88%

N = 10	N = 21

Analysis of Physical Activities and Resources of Neigbhourhoods

In this section, the responses to six questions from the survey are described. These questions focused on specific neighbourhood environments and resources that are important for maintaining health since they are related to the proximity of retail services, walkability, access to public transit and parks and recreation facilities. All of these factors are cited by the Diabetes Atlas as important neighbourhood characteristics that may be protective for diabetes. For a full description of these six questions (10, 11, 13, 18, 19, 20) see the survey (Appendix 3).

Question 10 asked respondents 'if stores and services were easily accessible within a 10-minute walk?' Stores and services were defined as grocery or drug stores since these two most commonly utilized retail outlets. Twenty-five percent of subjects in FP reported that there was 'none or limited access' to frequently required stores and services within a 10 minute walk from home while in SJ, the number was much greater with 60 percent of respondents stating 'none or limited access.' However, when reviewing the responses to 'some or excellent access', FP reported 70 percent and SJ 40 percent, which narrowed the differential somewhat between the two.

While respondents in SJ reported 'limited access' to stores and services, they reported higher rates of walking/bike paths. Fifty percent reported 'very easy' access to bike paths and walking trails. In Flemingdon Park, only 33 percent of respondents reported 'very easy' access on foot or bike. In both samples, comment was made that walking was difficult during winter months. In a follow-up question asking respondents about the necessity of owning a car to run errands, both samples reported almost equallty that a car was not necessary. Flemingdon Park reported that all/most errands could be

done on foot (43 percent) while 38 percent of SJ respondents said the same. While owning a car is a luxury for many, it can be a necessity if one lives longer distances from shopping areas and where walking or biking is not an option. Similarly, some areas of Toronto do not have access to or reliable public transit which may mean dependence on a car. Survey question 18 asked: Do you have easy and reliable access to public transit? Positive responses were observed in both neighbourhoods: FP reported a 75 percent response to 'easy access to public transit' while SJ reported 60 percent easy access to transit.

While walking, bike trails and good public transit are important to health, public recreation spaces are also important as they often serve as social hubs within neighbourhoods especially for newcomer populations who utilize the spaces for exercise, picnics and cultural gatherings. A question on the survey asked respondents if they had easy access to community recreation centres (including parks, play areas and swimming pools). Flemingdon Park reported good access to physical activity (42 percent) while St. James Town residents reported excellent access (60 percent). In a related question about free or minimal fee access to physical activity resources, 55 percent of FP residents indicated it was free (or minimal charge) to attend local recreation facilities, while 40 percent of SJ residents cited free or minimal fees. While activity fees might deter someone from attending a specific class, access to a facility is more important and both samples reported good access to community recreation spaces.

Analysis of Health Related Questions

Survey respondents were asked several health-related questions to determine the correlation between diabetes and local environment. The answers to these questions were self-reported and not validated through medical records or staff.

In answer to question 25 "do you have a regular family doctor" rates in both areas were high with FP and SJ reporting 90 and 95 percent respectively as having a regular family doctor. This trend continued with 100 percent (FP) and 78 percent (SJ) reporting regular visits to a doctor (at least 1 per year). Over half of the respondents at FP (65 percent) reported that overall they felt they were a healthy person but only half the respondents (50 percent) indicated the same at SJ. In this case, the older age of the respondents at SJ most likely contributed to the lower rating of their health.

While good medical care is paramount in diabetes care, it is also essential, especially among immigrant communities, to have strong social networks and support. Social isolation, language barriers and lack of culturally specific programming may prevent individuals from seeking proper medical treatment. Thus a question about adequate social support was added to the questionnaire to determine if this factor might play a role in lower rates of diabetes. In FP, 70 percent of respondents agreed that they had adequate social support in the community in terms of friends and programs while in SJ, 90 percent of respondents agreed there was social and programming support. The high positive response rate to this question among SJ respondents could be one major factor in explaining the lower rates of diabetes there.

Final questions in the survey revealed that 100 percent of the participants in both samples had been told they were *at risk* for diabetes. However only 80 percent of the

respondents in FP had been diagnosed with diabetes while in SJ, 100 percent of respondents had the disease. Four individuals in FP had not yet been diagnosed with diabetes. Among these four individuals, overall education levels were higher than the rest of the FP sample (three of four respondents had a university degree). In addition, three of four of the non-diabetes respondents agreed that social support was excellent in FP (which was the same finding for the diabetic group). Responses to questions around walking/bike paths and parks were split equally among the non-diabetic group with half (50 percent) stating good access and half (50 percent) stating limited access. Among the respondents who did not have diabetes, higher education and social support were correlated to not having the disease. When results for both groups were combined, social support had the highest positive response rate among the participants (70 percent) indicating that support and programming in both neighbourhoods was excellent. Neighbourhood walkability was ranked second (at 50 percent) among the combined groups. While the high ranking of these health promoting factors cannot explain why rates of diabetes are higher in FP (presumably these two variables should ameliorate the impact of the disease) they are important factors in overall health and are important in disease management.

Chapter 5

Discussion

The current study explored the relationship between neighbourhood environments and resources and diabetes in a cross section of immigrants who were members of diabetes programs in Toronto. The results demonstrated that environment and resources, in particular neighbourhoods, may be related to health. However, this study was unable to clearly show how neighbourhood affects diabetes rates in Flemingdon Park and St. James Town since answers to the questions did not differ significantly.

Residents in Flemingdon Park reported much better proximity to grocery stores and amenities than SJ which was contrary to the findings of the Diabetes Atlas that supported the notion that density in older, inner city neighbourhoods provided residents with closer proximity to stores and amenities. However, residents of SJ reported much easier ability to navigate on foot or bike than respondents in FP. The interpretation of this finding is that while stores and services in SJ may be further than a ten minute walk, the area was more accessible for walking and biking. The structure of older downtown neighbourhoods, like SJ, designed in a grid pattern, does allow people to get from one point to another fairly easily. This finding is keeping with the findings of the Diabetes Atlas, namely that central urban neighbourhoods are more conducive to daily activities, largely because streetscapes were designed to allow walking along straight paths rather than navigating through the cul-de-sac, often car-dependent neighbourhoods built later and located in the northeast and northwest corners of the city.

When responses about car ownership were examined, both groups stated that a car was not necessary and that errands could be completed on foot or bike with FP reporting slightly more positive responses to this question than SJ. This is somewhat puzzling given the other responses regarding walkability where SJ reported a higher positive response. One would assume the answer to this question would have been similar to the previous one. Nevertheless, the differential between the two groups (43 percent FP versus 38 percent SJ) was not large and the trend indicated that a vehicle was not necessary for errands. One interesting comment from a respondent in FP noted that walking was only possible during fine weather and not during the winter. The survey itself did not query seasonal differences for walking but since the average age of respondents in both communities was on the higher side (median age FP 58 vs. SJ 67 yr of age), it is possible that questions around proximal access, walking and car dependency was affected by the higher average age of respondents especially in SJ.

Both neighbourhoods reported high satisfaction, accessibility and use of public transportation. Although downtown core neighbourhoods have several transit connections, FP residents indicated higher satisfaction with public transit (75 percent vs. 60 percent) than SJ. Once again, the respondents at SJ were significantly older on average than FP respondents and this most likely affected their answers to questions about transit. Often time seniors are unable or unwilling to take public transit due to mobility as well as safety issues. The residents of FP who completed the survey were likely 'very satisfied' with transit since most of them lived well within the catchment of the health centre which is located in a major hub of the neighbourhood and bounded by a busy intersection with dedicated and frequent bus routes.

On the other hand, Sherbourne Health Centre (SJ) while located on a busy street may not be as well serviced for seniors attending diabetes programs since the Sherbourne Health Centre is perhaps not as central as FP. Despite the higher diabetes rates in FP, it is nevertheless closer to Toronto's core and is densely populated which may place it in a better situation than some of the newer neighbourhoods located in the northeast and west areas of the city also with high rates but much fewer transportation hubs, routes, sparser services and lower density.

Questions about use of and accessibility to physical activity in the neighbourhood varied between FP and SJ. Sixty percent of SJ respondents reported easy (good) access to parks, play areas, swimming pools, running tracks and community recreation centres while only 42 percent in FP agreed this was true; however, FP reported lower fees for participating in programs than SJ.

Physical activity is a key recommendation for persons with diabetes to control and/or maintain weight and halt the progression of the disease. Access to and use of recreation facilities especially for older seniors but especially for immigrants who may otherwise be isolated plays a major role in the control of diabetes and related conditions. Statistics Canada recently reported that Canadians living in large urban centres are much less likely to be obese because of higher use of community fitness facilities (Gandhi, 2006). Correlations between environment and diabetes uncovered in the Diabetes Atlas support this claim. St. James Town, with higher walkability and numerous recreation centres and parks, has lower prevalence of diabetes. However, given the differences in the ethnic make-up of the sample, it is difficult to ascertain whether the predominantly Chinese respondents in St. James Town may use exercise facilities more readily than

their South Asian counterparts in Flemingdon Park. The exercise behaviours of immigrant groups is an area that merits further examination.

Furthermore, depending on the number of years lived in Canada, respondents in SJ may be recent arrivals who are less likely to be obese and healthier than those who have lived in Canada for longer periods of time. Known as the healthy immigrant effect, this is attributed to the rigorous medical screening that new arrivals undergo before emigration and continues for at least five years afterward (Beiser, 2005).

Both samples reported high health-care use. Respondents reported 95 percent (FP) and 90 percent (SJ) having a family doctor though FP participants visited their doctor more frequently (once/yr 100 percent FP) vs. SJ (once/yr 78 percent). Good primary care is key for diabetes management and helps to limit the progression of the disease. The high utilization of primary care among both groups is encouraging. However, given that both samples were members of diabetes groups, they are more likely to make and keep medical appointments and are aware of the importance of diabetes management.

These health-related questions were followed by a sub-category that enquired about social support. Responses to this question are important since social and community support are two main factors in successful newcomer integration and have an impact on health. Residents of SJ reported much higher rates of community and personal support than FP (90 percent vs. 70 percent).

Immigration and resettlement increases the probability of experiencing health and other related stresses. For example, during their first 10 years in Canada, immigrants are much more likely to experience poverty than are native-born Canadians (DeVoretz,1995; Beiser, 2002). In fact, diabetes-related mortality is increasing more quickly among

minorities than among majority populations (Carter, 1996). Barriers to care such as language, and lack of culturally-appropriate health and social services have an impact on how well immigrants care for themselves and the health conditions they develop. The high-level of social support among SJ participants, may be one key factor in the lower rates of diabetes in the neighbourhood. With its higher number of immigrant and social service agencies, diabetes education programs, hospitals and medical clinics, St. James Town provides a wide variety of programming and services. The number of physicians in SJ is approximately 40-106 per 10,000 vs. 4-15 per 10,000 in FP (Diabetes Atlas, 2007). The plethora of medical and health promotion programs located in this area of Toronto is a likely protective for the care and management of diabetes as well as other chronic health conditions.

Apart from the numerous social and medical services available in SJ, another factor that may help explain the lower neighbourhood rates of diabetes in SJ could be attributed to the transience of the population and subsequent under or non-reporting of health status.

SJ is known as a magnet for newcomers with housing that caters to immigrant needs and a myriad of settlement services. However, most immigrants do not stay long in the neighbourhood, preferring to move shortly after arrival to other areas where larger housing and accommodations are available. Thus, lower prevalence rates in SJ could be attributable to the short stay of residents and their relatively good health upon arrival in Canada. After leaving the downtown area for neighbourhoods such as Flemingdon Park where many newcomers end up, their health status declines as they adopt the eating habits and behaviours of the host country. When surveyed, 90 percent of survey

respondents from SJ indicated they planned to move within one to two years from the area thus affirming speculation that the transient nature of the residents in SJ may contribute to lower neighbourhood prevalence rates. The study was not stratified to analyze answers from persons who had lived in Canada for the same approximate time-period. Factors such as time of arrival and acculturation could have biased the replies, since longer-term residents may have adapted to Canadian life and customs more so than recent arrivals.

While neighbourhood disadvantage is one determinant in the development of illness, other factors such as lack of cultural competency among health service providers, communication and linguistic barriers (lack of interpretation), neighborhood access (i.e. geographic barriers), economic/financial barriers (e.g., in the case of dental care), inability to access required information, fear of stigmatization, mistrust of the health care system, practical obstacles, (e.g. getting time off work) and discrimination and racism, are also key factors in the development of and management of illness especially among immigrants and refugees.

The questionnaire, while 'tested' before use, could be refined for future research. For example, the question about public transit accessibility should have allowed only two answers: 'excellent' or 'none or limited' which would have provided clearer answers. The intermediary response 'some access' allowed too much choice on the part of respondents and required the researcher to combine some answers.

The language of the survey may have been too difficult for some respondents. In future research, the survey questions should be refined to include simpler, straightforward language. The use of the term 'access,' for example, could have been misunderstood by

the participants. However, the researcher was not informed by diabetes educators conducting the study that the language of the survey was a problem. Both centres reviewed the surveys in advance and translation services, while offered, were not requested by any participants.

Chapter 6

Conclusion

The results of this study revealed that "where you live" may impact your health. Communities and neighbourhoods that provide access to basic goods, are socially cohesive, and are designed to promote good physical and psychological well-being are essential for health and equity among all groups.

In this study, the lower rates of diabetes in Toronto's SJ may be due to the layout and density of the neighbourhood itself. Respondents in SJ reported more opportunities for walking and exercise. Public transit was very good and social support was high. All of these factors play a role in maintaining health since they provide residents with the opportunities and ability needed to access health and social services.

The findings from this study are consistent with the findings of the Diabetes Atlas that demonstrated risk factors such as low socio-economic status and immigration can be ameliorated by neighbourhood design and accessibility of services.

The surprising finding of this study was that residents of Flemingdon Park, despite high rates of diabetes, had positive responses about their neighbourhood especially with regard to availability of resources and public transit although walkability and places to exercise, walk or bike were lower than St. James Town. This could be due to residents' perceptions that the area is not safe for walking.

Overall, the most important finding was the high degree of satisfaction of social support and programming in both neighbourhoods. This is most likely a reflection of the quality and programming of the Flemingdon and Sherboune Health Centres' Diabetes

Programs. This is an important implication since it points to the key role health centres play in neighbourhoods especially where there are higher numbers of newcomers and in the case of FP, higher rates of diabetes.

High risk neighbourhoods require programs aimed at preventing diabetes. Community health centres and diabetes education services play a critical role in the prevention and treatment of diabetes-related complications. Urban and city planners need to take this information into account when designing new areas or allocating resource funding. As an example, a recent tool developed by Peel Region utilizes social determinants of health data in all planning processes in Peel.

Future plans to expand services, especially in low-income, high visible minority neighbourhoods, should consider both the inherent risk for chronic disease within the local population and residents' ability to access these services by public transit. The services need to be accessible to the local populations but providing services in higher-needs areas may not fully solve the issue of overall access.

Special attention must be paid to overcoming additional barriers to access including language and cultural differences, the cost of transportation and services that may be difficult to comply with or that may be inappropriate in the context of local residents' values and beliefs. Research has found that such factors play a key role in determining the overall accessibility of a health service.

In the case of FP it appears that the health centre and diabetes program is providing good quality and consistent care. The positive response noted among participants in SJ around social support also points to the key role the Sherbourne Health Centre plays in diabetes care and management among its members. As Toronto continues

to grow and attract newcomers from across the globe, future plans to expand such services in high risk areas of the city are necessary especially since new immigrants are settling into neighbourhoods where rents may be less expensive but social and medical services are sparse.

In summary, despite some of the limitations of this study, it provided individual-level data on the neighbourhoods and environments in two areas of Toronto. Future studies would benefit from larger numbers among homogenous immigrant groups and among several neighbourhoods in order to determine if specific neighbourhood-level characteristics may be protective against chronic disease. Survey questions should be simpler with fewer options for answers and should also be circulated among community groups as well as in health centres to get a better cross-section of the neighbourhood. A larger sample should also include non-diabetics since it was difficult to determine whether environment was the key factor in the lower rates of diabetes in SJ and may allow for generalizability of the findings across similar neighbourhoods in Toronto. Finally, there are likely a number of other related attributes plausibly related to physical activity such as cultural acceptability for women or men to walk on their own and weather conditions that could be included in a future survey to further refine the reasons and/or barriers to exercise.

The purpose of this study was to find out more about neighbourhood characteristics and their possible relationship to the health of Torontonians. It was a first step in narrowing the larger scope of the Diabetes Atlas in trying to understand the reasons for differing rates of diabetes in Toronto neighbourhoods. The results of future

health policy research could help to inform land use, urban planning and settlement issues that affect newcomers to Toronto with a focus on the impact of environment on health.
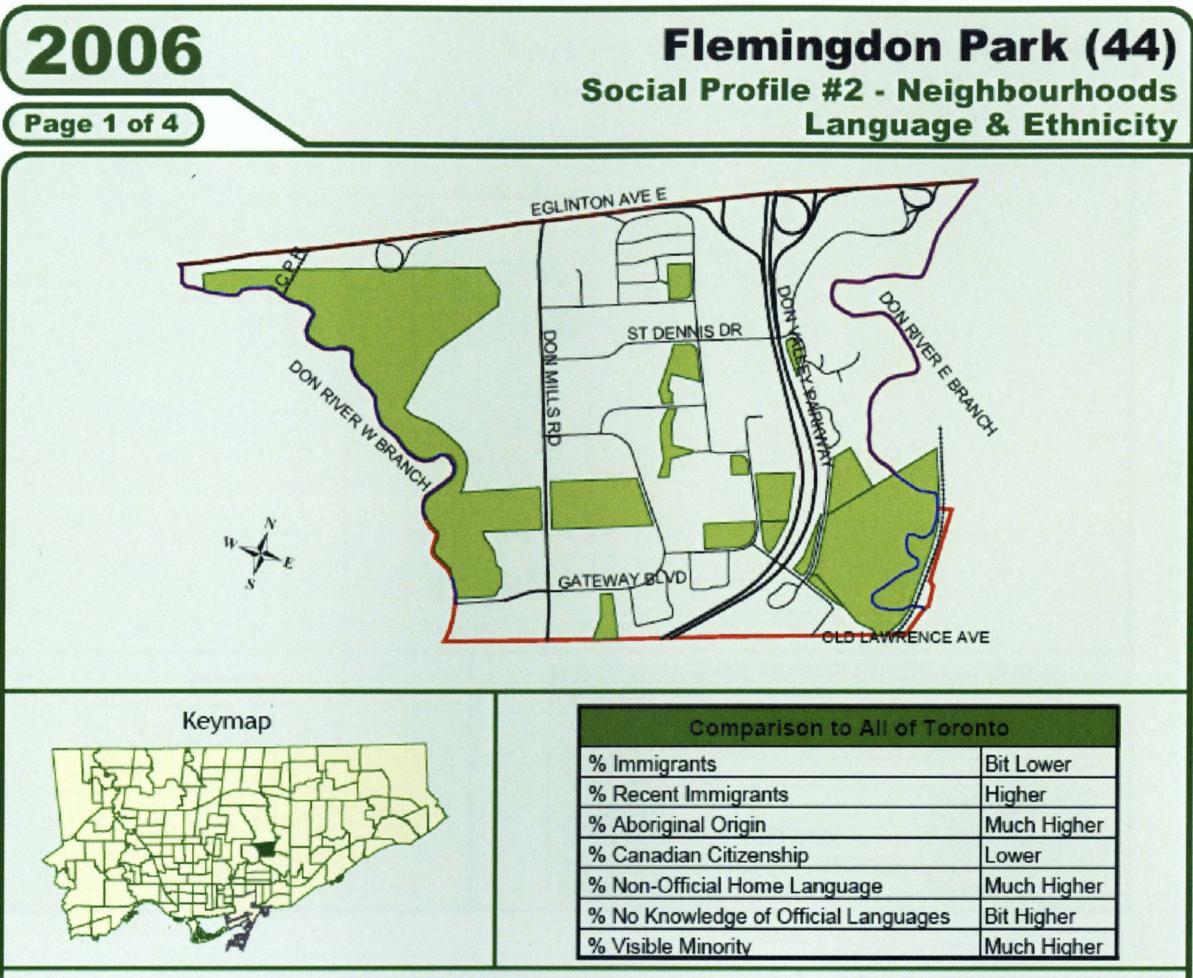
Appendix 1: Flemingdon Park, Toronto: Neighbourhood Profile

2006

Flemingdon Park (44)
Social Profile #2 - Neighbourhoods
Language & Ethnicity

Keymap

Comparison to All of Toronto	
% Immigrants	Bit Lower
% Recent Immigrants	Higher
% Aboriginal Origin	Much Higher
% Canadian Citizenship	Lower
% Non-Official Home Language	Much Higher
% No Knowledge of Official Languages	Bit Higher
% Visible Minority	Much Higher
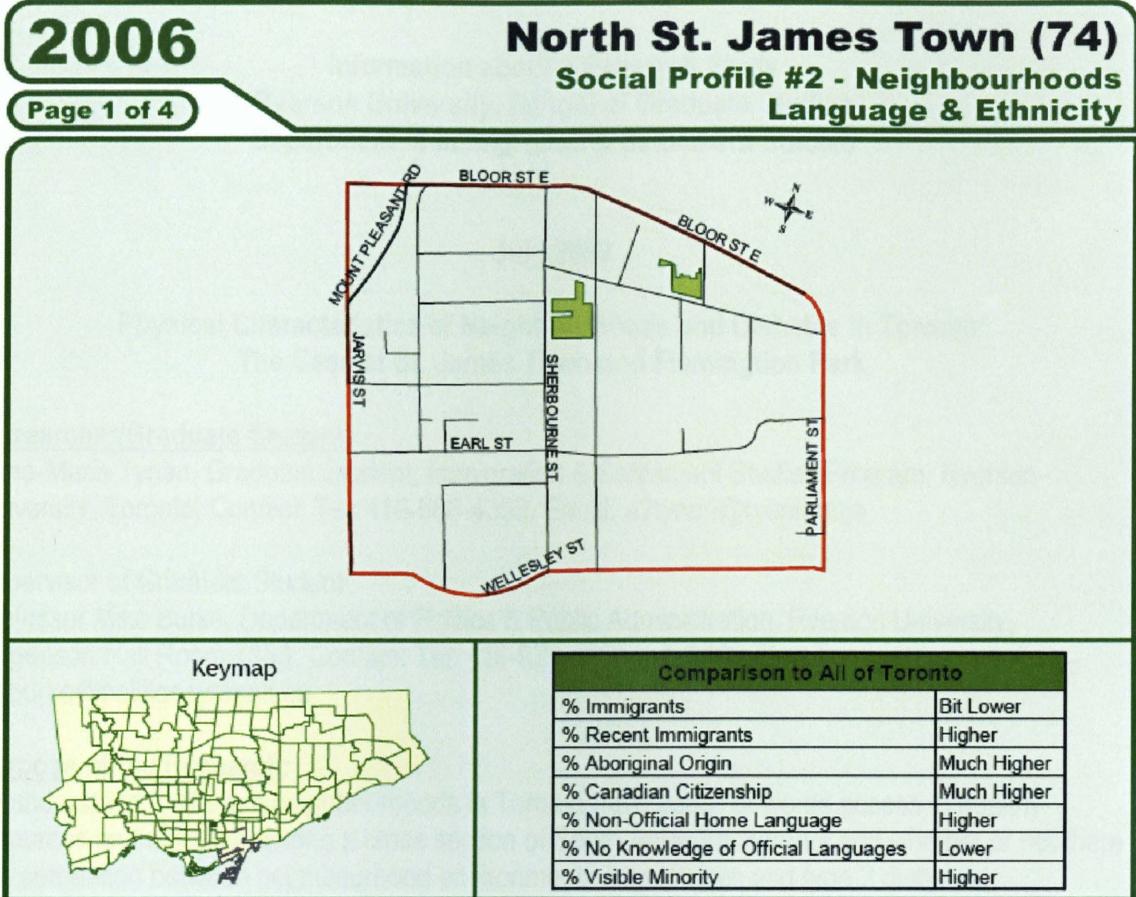
Source: City of Toronto Neighbourhood Profiles/ Toronto.ca

Appendix 2: St. James Town, Toronto: Neighbourhood Profile

Source: City of Toronto Neighbourhood Profiles/ Toronto.ca

**Information about a Research Study
Ryerson University, School of Graduate Studies
Department of Immigration & Settlement Studies**

July 2008

**Physical Characteristics of Neighbourhoods and Diabetes in Toronto:
The Case of St. James Town and Flemingdon Park**

Researcher/Graduate Student:
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Purpose of the Research:
To understand if different neighbourhoods in Toronto have better or worse access to healthy resources and activities among a cross section of South Asian immigrants and whether or not there is a correlation between neighbourhood environments & resources and type 2 diabetes.

Description of the Research:
You are being invited to answer simple questions to find out about the neighbourhood where you live. Like many other countries around the world, Canada has experienced a substantial rise in the prevalence of obesity over the past 2 decades. As a result of these trends, rates of type 2 diabetes (a major consequence of obesity) are soaring and the onset of type 2 diabetes is occurring at younger ages.

There is growing evidence to suggest that neighbourhoods in Toronto with less access and long walks to stores selling healthy food (such as grocery stores selling fresh fruit & vegetables), with few locations to exercise or walk (such as recreation centres or parks), that require residents to have a car to do most errands or where people do not feel safe, have higher rates of type 2 diabetes because residents do not have the opportunities to pursue a healthy lifestyle. We also know that many of the neighbourhoods with higher rates of type 2 diabetes also have higher numbers of immigrants (classified in this study and by Statistics Canada as "visible minority") and lower on average household incomes than other neighbourhoods in Toronto.

Increased weight is one of the leading contributions to developing type 2 diabetes. The answers to the questions from this survey may help the researcher uncover the local resources available to you that may be contributing to good health or may be contributing to poorer health.

Potential Harms (Discomforts or Inconvenience):

None of the survey questions should be upsetting to you. If they are, you can skip those questions. Choosing to be in the study or not be in the study, will not affect the care you get at your health clinic or at any diabetes program in Toronto nor will it affect any relationship or your future studies at Ryerson University, Toronto. You can answer all the questions in the survey, none of the questions in the survey, or some of the questions in the survey.

Potential Benefits:

Being in the study and answering the questions on the survey may help the researcher understand the neighbourhood-level factors that play a large role in how you go about your daily routines, what you can and cannot purchase in terms of healthy food and how the resources and environments in your neighbourhood may contribute to health.

Confidentiality and Privacy:

Your answers to questions will be private and only be seen by the researcher. Confidentiality will be respected and no identifying information will be collected. The information from the study will be stored on a home computer that is password protected and only accessible by the researcher.

Publication of results:

The results of this study may be published or presented at conferences. You will not be identified in any way in any publication or presentation of this research.

When the study is finished, you will be able to get a copy of the research results by contacting the researcher.

Research Ethics Board Contact:

If you have any questions as a research subject, you may contact the Chair of the Ryerson University Ethics Review Board, Dr. Nancy Walton, at 416-979-5000 ext. 6300.

Before you complete the survey make sure:

- The study and survey has been explained to me and my questions have been answered;
- I do not feel pressured to answer the survey questions;
- I know that not being in the study or withdrawing from the study will not affect my care in the Diabetes Education Program or at any health clinic/health program in Toronto or any programs/events associated with Ryerson University;
- The risks and benefits of being in the study are clear to me;
- I understand that I have not waived my legal rights nor released the investigators, sponsors, or involved institutions from their legal and professional duties;
- I know I can ask questions about this study at any time;
- I have been told that all my research files and participation in the study will be kept private and that no identifying information will be collected;
- I have had enough time to think about and understand the above.

Script for survey

Hello. My name is:

I am want to tell you about a project we are doing to see how the neighbourhood in which you live may affect your health and especially the development of type 2 diabetes. To find out the answers to some questions about your neighbourhood we would like you to complete a survey of simple questions.

There are surveys available (**Name the location of the surveys or point to the pile of surveys**) for you to complete. I would be grateful if you could get a survey now and complete it or take one and complete it after this session.

The questions on the survey are designed to provide the information we need to be able to make recommendations and improvements for changes to neighbourhood environments that can help your health.

The survey should only take about 5 minutes or less of your time. All information will be kept confidential.

In order to complete the survey you must:

1) have been told you have type 2 diabetes or pre-diabetes
2) live in this area
3) preferably be of South Asian ethnicity/background

You will be provided with a small token of our appreciation after you complete the survey.

Please deposit the surveys in the big box marked **"Completed Surveys for Diabetes and Neigbhourhoods Project"**

Thank you very much for your participation in this research.

Physical Characteristics of Neighbourhoods and Diabetes in Toronto
St. Jamestown & Flemingdon Park

A research study conducted by
Ryerson University, Graduate Program
Immigration and Settlement Studies
July-August 2008

St. James Town Site ◀
Flemingdon Park Site ☐

Today's Date: _____

Section 1 - Demographic Questions
These are basic questions to find out a little bit about you. If you do not feel comfortable answering the questions, please skip to Section 2.

1. Are you:

Male ☐ Female ☐

2. Please provide your date of birth: _____
(Month/Day/Year)

3. Where were you born? (country of origin) _____

4. What is your ethnic background? Please be as specific as possible (e.g. for persons from South Asia report a specific origin or origins such as "East Indian from India" or indicate the specific group, such as "Punjabi" or "Tamil").

_____

5. What is the highest level of education you have achieved?

   1. Some high school   ☐
   2. High school diploma ☐
   3. University diploma ☐

Other: _____
(please specify)

6. What is your best estimate of the total income, before taxes and deductions, of all household members from all sources in the past 12 months? Check one: (Please note you **DO NOT** have to answer this question if you do not want to):
Was the total household income from all sources:

1. Less than $50,000? ☐
2. $50,000 to less than $60,000? ☐
3. $60,000 to less than $80,000? ☐

4. $80,000 to less than $100,000? ☐
5. $100,000 or more? ☐

Section 2 – Resources & Environments

This section includes questions about the neighbourhood in which you live. Your neighbourhood is the area within a ten-minute walk from your home.

7. How long have you lived at your current address?

1. 12 months or less ☐
2. 1-2 years ☐
3. 2-5 years ☐
4. 5+ years ☐

8. Do you plan to stay in this neighbourhood or do you plan to move in the near future?

1. Plan to stay ☐
2. Will most likely move ☐
in the next six months
3. Will most likely move in ☐
the next 1 year

9. If you are planning to move in the near future, please provide a reason:

1. Want a bigger apartment/house ☐
2. Do not like the neighbourhood ☐

Other _____
(please be specific)

10. Are there frequently required stores and services – such as grocery stores, a drug store – available within a 10 minute walk from your home?

1. ☐None or limited access to services (cannot walk in10 minutes)
2. ☐Some access to services (can walk but longer than 10 minutes)
3. ☐Excellent access to services (can walk in 10 minutes or less)

11. Is it easy to get around in your neighbourhood on foot or on bike? For example, are there sidewalks and bike paths and a variety of routes so you don't have to follow the same route every time?

1. ☐No it is not easy to get around
2. ☐It is somewhat easy to get around
3. ☐It is very easy to get around

12. Do you own a car?

    1. ☐ Yes
    2. ☐ No

13. Is a car required in your neighbourhood to grocery shop, run errands?

    1. ☐ Yes car is very necessary
    2. ☐ Yes car is necessary but often choose to walk to do errands
    3. ☐ No a car is not necessary at all; I can do most of my errands on foot or on bike

14. Is your neighbourhood clean and attractive?

    1. ☐ No, my neighbourhood is not attractive
    2. ☐ My neighbourhood is somewhat attractive
    3. ☐ My neighbourhood is attractive

15. Do you feel safe walking in your neighbourhood? In the daytime? At night?

a)Daytime (daylight hours e.g. early morning around 8:00 a.m.- 9:00 p.m.)
    1. ☐No, I do not feel safe
    2. ☐I feel somewhat safe
    3. ☐I feel very safe

b)Night time (night time is considered after dark, approximately 9:00 p.m.- 11:00 p.m.)
    1. ☐No, I do not feel safe
    2. ☐I feel somewhat safe
    3. ☐I feel very safe

16. How often do you see people walking in your neighbourhood?

    1. ☐Rarely
    2. ☐Sometimes
    3. ☐Frequently

17. Does the traffic in your neighbourhood make walking or biking difficult?

    1. ☐Yes, traffic in my neighbourhood makes it difficult to walk
    2. ☐Traffic makes it somewhat difficult to walk
    3. ☐No, traffic in my neighbourhood does not make it difficult to walk

18. Do you have easy access to public transit? (e.g. buses, subways, street cars)

    1. ☐No I do not have easy access to efficient public transit
    2. ☐I have limited access to public transit
    3. ☐Yes, I have easy access to public transit

19. Does your neighbourhood have easy access to parks, play areas, swimming pools, running tracks, biking or walking trails, fitness facilities and/or community recreation centres?

1. ☐ No, my neighbourhood does not offer these types of services
2. ☐ My neighbourhood offers limited access to these types of services
3. ☐ Yes, my neighbourhood offers many/all of these types of services
4. ☐ Don't know

20. Does your neighbourhood provide free or very little fees to attend fitness facilities and programs?

1. ☐ No, there is no free and/or minimal charge access to fitness facilities and programs
2. ☐ There is some free and/or minimal charge access to fitness facilities and programs
3. ☐ There is a large number of free and/or minimal charge access to fitness facilities and programs
4. ☐ Don't know

21. In general, would you say that the people in your neighbourhood are:

1. ☐ Very physically active
2. ☐ Somewhat physically active
3. ☐ Not very physically active
4. ☐ Not at all physically active
5. ☐ Don't' know/not sure

22. For physical activity, do you use ANY private or membership-only recreation facilities? (including those outside your neighbourhood?)

1. ☐ Yes
2. ☐ No

23. How do you travel (commute) to work? (e.g. take TTC/public transit/drive)

1. ☐ Take TTC
2. ☐ Drive
3. ☐ Carpool
4. ☐ Bicycle
5. ☐ Walk

6. Other (please specify): _____

24. Can you incorporate physical activity such as walking into your daily commute?

1. ☐I have a long commute to work, with few/no options to engage in physical activity along the way
2. ☐I commute, but am able to engage in at least 10 minutes of physical activity along the way
3. ☐I am able to engage in more than 10 minutes of physical activity along the way
4. ☐Not applicable

Section 3 - Health-Related Questions

I would like to finish off this survey by asking you a few questions that refer to your health.

25. Do you have a regular family doctor?

1. ☐Yes
2. ☐No

26. Do you see your doctor on a regular basis? (at least once per year)

1. ☐Yes
2. ☐No

27. Do you feel that overall you are a healthy person?

1. ☐ Yes
2. ☐ No

28. Do you have adequate social support in your community in terms of friends, programs that you can attend?:

1. ☐ Yes
2. ☐ No
3. Explain: _____

28. Have you ever been told you have diabetes or might be at risk for type 2 diabetes?

1. ☐Yes
2. ☐No
3. ☐Don't know

29. I have been diagnosed with:
   1. Type 2 diabetes ☐

RYERSON UNIVERSITY
RESEARCH ETHICS BOARD

To: Anne-Marie Tynan
        Immigration and Settlement Studies

Re: REB 2008-194: Physical Characteristics of Neighbourhoods and Diabetes in Toronto: The
        Case of St. Jamestown and Flemingdon Park

Date: July 29, 2008

Dear Anne-Marie Tynan,

The review of your protocol REB File REB 2008-194 is now complete. The project has been
approved for a one year period. Please note that before proceeding with your project, compliance
with other required University approvals/certifications, institutional requirements, or governmental
authorizations may be required.

This approval may be extended after one year upon request. Please be advised that if the project is
not renewed, approval will expire and no more research involving humans may take place. If this is
a funded project, access to research funds may also be affected.

Please note that REB approval policies require that you adhere strictly to the protocol as last
reviewed by the REB and that any modifications must be approved by the Board before they can be
implemented. Adverse or unexpected events must be reported to the REB as soon as possible with
an indication from the Principal Investigator as to how, in the view of the Principal Investigator,
these events affect the continuation of the protocol.

Finally, if research subjects are in the care of a health facility, at a school, or other institution or
community organization, it is the responsibility of the Principal Investigator to ensure that the ethical
guidelines and approvals of those facilities or institutions are obtained and filed with the REB prior
to the initiation of any research.

Please quote your REB file number (REB 2008-194) on future correspondence.

Congratulations and best of luck in conducting your research.
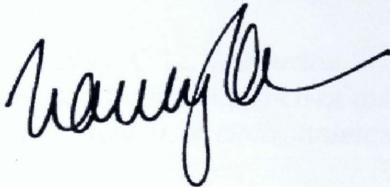
Nancy Walton, Ph.D.
Chair, Research Ethics Board

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