

**USING PARTICIPATION IN VOLUNTARY
ORGANIZATIONS TO IMPROVE THE SELF-RATED
HEALTH OF DIABETICS AT VANCOUVER'S MID-MAIN
COMMUNITY HEALTH CENTRE**

by

Neil Braun

Bachelor of Science in Pharmacy, University of British Columbia, 2001
Bachelor of Arts (Honours), University of British Columbia, 2005

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APPROVAL

Name: Neil Braun
Degree: M.P.P.
Title of Capstone: Using Participation in Voluntary Organizations to Improve the Self-Rated Health of Diabetics at Vancouver's Mid-Main Community Health Centre

Examining Committee:

Chair: Nancy Olewiler
Director, Public Policy Program, SFU

Kennedy Stewart
Senior Supervisor
Associate Professor, Public Policy Program, SFU

Nancy Olewiler
Supervisor
Director, Public Policy Program, SFU

Doug McArthur
Internal Examiner
Professor, Public Policy Program, SFU

Date Defended/Approved: April 2, 2007



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Abstract

This study examines why certain diabetic patients rate their health higher than that of others. Using original survey data from diabetic patients receiving treatment at Vancouver's Mid-Main Community Health Centre, the study shows that almost 60 per cent of Mid-Main's diabetic patients self-rate their health as Very Good or Good. Moving further, logistic regression analysis indicates that diabetic patients with higher self-rated health scores tend not to speak English at home, not to have mobility problems, not to require emergency room visits, but more frequently participate in voluntary organizations. Taking into account this information and Mid-Main's capacity to directly influence those variables found to be significant, this study recommends Mid-Main can best improve self-rated health scores among its diabetics by having associated doctors advise their diabetic patients to participate in voluntary organizations during individual appointments.

Executive Summary

Several studies have demonstrated that self-rated health is a strong predictor of mortality regardless of context. This finding is especially troubling for individuals of low socioeconomic status as they often do not rate their health as well as those of higher socioeconomic status. Individuals who suffer from chronic health conditions are also more likely to rate their health less well than individuals who do not. If these individuals do not have access to programs that improve self-rated health, then their mortality rates will likely be higher than that of individuals without these characteristics.

One type of organization that administers programs aimed at improving the self-rated health of patients with chronic conditions and of low socioeconomic status is a community health centre (CHC). CHCs are locally governed, not-for-profit organizations that often operate in neighbourhoods of low socioeconomic status which have a history of delivering innovative programs for their patients. To better understand why some patients suffering from chronic disease might self-rate their health higher than others, this study examines the determinants of self-rated health among diabetic patients receiving treatment at a Vancouver's Mid-Main CHC. Located at 24th and Main in Vancouver, the Mid-Main CHC is an ideal location for this study as it recruits a variety of patients from a low socioeconomic status area who also suffer from diabetes.

A survey of 84 diabetic patients receiving treatment at the Mid-Main CHC contained questions pertaining to four different groups of independent variables, including patient demographic variables, health status variables, variables measuring participation in Mid-Main's unique diabetic programs, and variables measuring participation in voluntary organizations and sense of belonging. The results from the survey show that while almost 60 per cent of Mid-Main's diabetic patients rate their health as Very Good or Good. Logistic regression analysis further demonstrates that patients who rate their health as Very Good or Good tend not to speak English at home, not to have mobility problems, not to require emergency room visits, but participate in voluntary organizations at a higher frequency than those not rating their health as Very Good or Good.

These findings are then used to develop policy alternatives that Mid-Main could implement to improve the self-rated health of the 40 per cent of its diabetic patients who do not

rate their health as Very Good or Good. This study bases these alternatives on the capability of Mid-Main to directly influence significant variables. Five alternatives are initially considered, including: the Status Quo; doctors discussing participation in voluntary organizations with patients during individual doctor appointments; inviting a representative of a voluntary organization to speak to the diabetic support group; developing a volunteer program for Mid-Main; and administering a patient participation package for diabetic patients. This study then evaluates the feasibility of each alternative with three criteria: operating cost, implementation cost, and patient uptake. Doctors discussing participation in voluntary organizations with patients is the recommended policy alternative as it entails low operating costs, could be easily implemented, and targets most diabetic patients who do not currently participate in voluntary organizations.

Dedication

For Mom and Dad.

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Glossary

- CCHS** Canadian Community Health Survey. A national survey administered by Statistics Canada that measures health status and health determinants of Canadians.
- CDM** Chronic Disease Management. The CDM Toolkit is a program operated by the British Columbia Ministry of Health that allows physicians to track patients with chronic health conditions according to various clinic indicators.
- CHC** Community Health Centre. A not-for-profit health clinic governed by an elected board of community members.
- CIHI** Canadian Institute for Health Information. An independent, non-profit, data analysis organization.
- EMR** Electronic Medical Record. Computer software into which doctors enter patient data. Replaces handwritten patient charts.
- VCHA** Vancouver Coastal Health Authority. The regional health authority serving Vancouver, Richmond, North Vancouver, West Vancouver, and the coastal mountain communities.

1 Introduction and Background

1.1 Introduction

Several studies since the early 1980s have shown self-rated health to be a strong predictor of mortality regardless of context. This finding is of significant concern for individuals of low socioeconomic status, as they often do not rate their health as well as individuals of higher socioeconomic status. Individuals with chronic health conditions are also less likely to rate their health as well as those who do not (Cott, et. al., 1999, 731; Public Health Agency of Canada, 2003a). If these individuals do not have access to programs that improve their self-rated health, then their mortality rates will likely be higher than that of individuals without these characteristics. This study of diabetics at Vancouver's Mid-Main Community Health Centre (CHC) begins with the premise that the self-rated health of some CHC patients receiving is too low and can be improved. To test this general hypothesis, this study surveys all diabetic patients receiving treatment at Mid-Main to determine their self-rated health. This study then uses logistic regression to determine why some diabetic patients self-rate their health as Very Good or Good while others do not.

The remainder of this section explains the concept of self-rated health and its importance as a predictor of mortality. It then provides further background summaries of diabetes, community health centres, the Mid-Main CHC, and the socioeconomic status and self-rated health of areas of Greater Vancouver. Section 2 describes the variables studied and explains the methodologies employed. Section 3 uses a logistic regression to develop statistical models and to explain what variables indicate which patients are more likely to rate their health as Very Good or Good. Section 4 uses these results to recommend policy alternatives that Mid-Main could implement to improve the self-rated health of its diabetic patients who do not rate their health as Very Good or Good. This study develops alternatives based only on the variables correlated with Very Good and Good self-rated health that Mid-Main can influence, given its resources. This section also develops criteria with which to evaluate these alternatives. Finally, Section 5 concludes the study and proposes topics for future research.

1.2 Policy Problem

Several studies have found self-rated health to be a better predictor of mortality, morbidity, and primary care utilization than medical records or objective health measures (Idler and Benyamini, 1997, 21). Many studies have also found a positive correlation between self-rated health and socioeconomic status and a negative correlation between self-rated health and chronic health conditions (Cott, et. al., 1999, 731). These findings suggest that some diabetic patients receiving treatment at the Mid-Main Community Health Centre in Vancouver, British Columbia, will attribute lower ratings to their health than individuals without those characteristics. Therefore, this study initially hypothesizes that some diabetic patients at the Mid-Main Community Health Centre do not self-rate their health as well as others. This study uses survey data from these patients to test this hypothesis and to suggest policy alternatives that Mid-Main could implement that may increase these patients' self-rated health.

1.3 Self-Rated Health

Researchers study self-rated health, as determined by asking patients to rate their health according to a scale, because it is an excellent predictor of mortality (Idler and Benyamini, 1997, 21), health care utilization, and functional ability (Meurer, et. al., 2001, 35). Mossey's and Shapiro's 1982 analysis of the Manitoba Longitudinal Study on Aging generated much of the initial interest in self-rated health (Idler and Benyamini, 1997, 21). This analysis found that self-rated health was the second-best predictor of mortality in the early time period studied and the best predictor of mortality in the later period studied (Mossey and Shapiro, 1982, 805). Numerous subsequent studies have arrived at similar conclusions. Idler's and Benyamini's 1997 analysis of 27 studies found that 23 of those studies demonstrated that self-rated health predicted mortality (Idler and Benyamini, 1997, 26). As these studies took place in different countries, used different methodologies, and assessed self-rated health by asking different questions in different languages (Idler and Benyamini, 1997, 22, 25), Idler and Benyamini also assert that the relationship between self-rated health and mortality is not context dependent.

Researchers also study self-rated health because it captures subjective and objective components of health in one variable (Manderbacka, 1998, 145). Though often similar, a patient's rating of their health may differ from that of their physician. Patients deemed to be in excellent health by their physicians but who rate their own health less well are more likely to experience a variety of mental health problems (Meurer, et.al., 2001, 38). Thus, determining a patient's assessment of their health serves two purposes: 1) it allows the patient to weight selected

subjective and objective factors according to their own values to determine their health (Zimmer, et. al., 2000, 466), and 2) it allows researchers to consider all these factors reliably and simultaneously with a single question (Idler and Benyamini, 1997, 22).

Researchers also analyze self-rated health because it conforms to health promotion and population health discourses. Starting with the Lalonde Report in 1974, health discourse in Canada shifted from improving accessibility to promoting healthy lifestyles that contribute to a longer lifespan and functional capacity (Robertson, 1998, 156; Miilunpalo, et. al., 1997, 517). Self-rated health conforms to this health promotion paradigm because behaviour and attitudes are possible determinants of self-rated health (Meurer, et. al., 2001, 35; Goodwin and Engstrom, 2002, 325), and self-rated health predicts mortality rates. These two findings suggest that self-rated health relates to both lifestyle and lifespan. In the 1990s, health discourse in Canada again shifted to an examination of all determinants of health, including non-health determinants like education and socioeconomic status (Robertson, 1998, 157). Self-rated health also fits well with this paradigm as research suggests that these non-health factors correlate with self-rated health (Cott, et. al., 1999, 731; Goodwin and Engstrom, 2002, 325; Veenstra, 2000, 628). This relevance of self-rated health to new health discourses has thus ensured continuous interest in it by researchers since the 1980s.

Despite their interest in it, researchers have not determined what variables affect self-rated health nor the mechanisms by which these variables affect self-rated health in all contexts. As previously indicated, researchers believe that self-rated health is related to objective health factors such as chronic diseases (Damian, et. al., 1999, 412) and non-health factors like socioeconomic status and lifestyle behaviours (Cott, et. al., 1999, 731). However, self-rated health is more strongly affected by different factors in different populations and settings. Damian, et. al. (199, 412), find that age, chronic disease and functional ability are the most important determinants of self-rated health for an elderly Spanish population. Cott, et. al. (1999, 731), find that self-esteem and coping ability were more strongly associated with self-rated health than demographic factors amongst Canadians with chronic diseases. Hyypä and Mäki (2003, 770), find that higher rates of social participation amongst the Swedish-speaking minority in Finland is associated with higher self-rated health. Finally, Zimmer, et. al. (2000, 477), find that individuals in Thailand and Taiwan are more likely to report a higher self-rating of health than individuals in the Philippines who possess similar health and non-health characteristics. Therefore, the determinants of self-rated health and the mechanism by which they affect self-rated health are not universal in all contexts.

Researchers have also not conclusively determined how people calculate their self-rated health. Analyzing semi-structured interviews conducted for the 1994 Finnish Survey on Living Conditions, Manderbacka finds that individuals can understand health to mean one or more of the following: absence of illness, restrictions on daily functioning, experience with the health conditions affecting the individual, and actions taken to improve health (Manderbacka, 1998, 145). Additional research suggests that certain definitions and factors may be more strongly correlated with individuals who rate their as poor than with those who rate their health as good than those who rate their health as excellent (Manderbacka, Lahelma and Martikainen, 1998, 208). Because individuals consider different definitions of health and then weight these definitions differently according to their values and cultural background, each individual will generate a unique definition of their self-rated health. Therefore, the determinants of self-rated health are also not universal for all individuals.

This dependency on context and individuals validates the study of the determinants of self-rated health in different patient populations and in different locations. Of interest to this study, there are only two other studies available that examine self-rated health in a diabetic population, both of which use data from the Wisconsin Epidemiologic Study of Diabetic Retinopathy. The first study finds that self-rated health is an excellent predictor of mortality in patients diagnosed with diabetes after turning 30 years old (Dasbach, et. al., 1994, 1775). The second study finds functional ability, cardiovascular disease, and sensory neuropathy are determinants of self-rated health in diabetics (Klein, et. al., 1998, 236). No available studies examine the determinants of self-rated health strictly among diabetics in Vancouver (or anywhere else in Canada). Given the association between self-rated health and mortality and given that self-rated health is context- and individual-dependent, discovering the determinants of self-rated health within a specific population group from a specific location could suggest policy options to improve the self-rated health of individuals among that population.

1.4 Diabetes

Diabetes prevents the body from properly storing and using dietary glucose sugar. In Type II (or adult-onset) diabetes, the body's cells and tissues cannot properly use insulin, the hormone that processes glucose. Ninety per cent of diabetics in Canada are Type II diabetics (Canadian Diabetes Association, 2006). In Type I (or juvenile-onset) diabetes, the body's immune system destroys the pancreatic cells that produce insulin, requiring the patient to self-inject insulin for the rest of their life. Diabetes considerably shortens life expectancy; Type II

diabetics have a life expectancy five to ten years shorter than non-diabetics and the life expectancy of Type I diabetics is fifteen years shorter than non-diabetics (Canadian Diabetes Association, 2006).

The prevalence of diabetes is increasing in Canada. Over two-and-one-quarter million Canadians have diabetes (Public Health Agency of Canada, 2003b), and projections forecast three million Canadians will have diabetes by 2010 (Canadian Diabetes Association, 2006). Recent research finds that 8.8 per cent of Ontarians had diabetes in 2005 and predicts that over ten per cent of Ontarians will have diabetes by 2010 (Institute for Clinical Evaluative Sciences, 2007). If these results are indicative of diabetes prevalence in Canada, then Canada already exceeds the World Health Organization's projections for the global diabetes rate in 2030 (6.4 per cent) (Institute for Clinical Evaluative Sciences, 2007). This increasing prevalence of diabetes emphasizes the need for strategies to help diabetics manage their condition and maintain their quality of life.

Many diabetics present with long-term complications alongside of and because of their diabetes. Between 60 and 65 per cent of diabetics have high blood pressure, which is associated with other complications such as strokes, heart attacks, and kidney disease (Public Health Agency of Canada, 2003c). Diabetics between 35 and 64 years old are six times more likely to have a heart attack or stroke compared to non-diabetics (Public Health Agency of Canada, 2003c). Diabetes can also cause vision loss from diabetic retinopathy, amputation of lower limbs from poor circulation and infection, and tingling, numbness, or pain in the extremities from nerve damage caused by diabetic neuropathy. Finally, possibly because of these long-term complications, diabetics are also more likely to report lower self-ratings of health compared to non-diabetics (Public Health Agency of Canada, 2003a).

Despite the increasing prevalence of diabetes and the likelihood of complications resulting from it, diabetics and primary care providers can manage the disease and slow the progression of its complications. The Public Health Agency of Canada states that diabetics can self-manage their blood glucose levels with diet and exercise, but also states that diabetics require "a multi-disciplinary team approach" with help from "various service providers" to fully manage their diabetes (Public Health Agency of Canada, 2003d). Though some requirements, such as eye examinations and kidney function tests, require individual attention from a physician, other health professionals or fellow diabetics could perform the other requirements, such as education and lifestyle management, in a group setting. Primary care providers, such as a regional health authority or hospital, currently administer programs to bring groups of health professionals and

diabetics together to accomplish these other requirements. For example, the Vancouver Coastal Health Authority (VCHA) offers different classes in different languages that provide diabetes management education (Vancouver Coastal Health Authority, 2007a). If primary care providers also administer programs that improve the self-rated health of their diabetics, then they could further reduce their mortality.

1.5 Community Health Centres

Because it offers a multi-disciplinary group of health professionals and offers health promotion services (Albrecht, 1998, vi), an ideal primary care provider for administering programs that improve the self-rated health of diabetics is a community health centre (CHC). Interest in CHCs in Canada began with the Hastings Report in 1972 (Albrecht, 1998, v). This report defined CHCs as non-profit organizations that provide primary healthcare and social services to a defined local community (Albrecht, 1998, vi). The report also emphasized community involvement in CHCs; it stated that CHCs should have community members govern its operations and shape its programs rather than members appointed by a level of government (Albrecht, 1998, vi). This definition of CHCs is still relevant as the Canadian Alliance of Community Health Centres currently uses the Hastings Report's description as its definition of a CHC (Albrecht, 1998, vi).

CHCs in Canada have a reputation for innovation and provision of non-health programs because of this structure. CHCs administer programs that its patients need and want because of the close relationship it has with its patients (Albrecht, 1998, viii). This development of population-specific programs can lead CHCs to collaborate with other agencies and providers more often than normally occurs in the health system (Albrecht, 1998, ix). CHCs also respond to patient feedback with the creation of social programs beyond strictly medical care. The Ontario government acknowledges that its CHCs have bought medications in bulk for its low-income patients, established outreach clinics, provided transportation for preschool programs, and assisted landlords and tenants in improving low-income living spaces (Shah and Moloughney, 2001). Both its innovative medical and non-medical programs suggest that CHCs may improve the self-rated health of some of its patients. Shi, et. al. (2002, 544-45), find that patients who experience better primary care, specifically better accessibility and interpersonal relationships with providers, are more likely to rate their health higher than those who do not. This history of innovation and the benefits it provides to its patients indicate that CHCs may improve self-rated health and may be likely to develop programs that further improve it.

However, CHCs are not widespread in Canada. Ontario currently has the most CHCs in Canada (54) (Association of Ontario Health Centres, 2006, 14), but only five per cent of that province's doctors work in CHCs (Hutchison, Abelson, and Lavis, 2001, 122). Quebec had funded CHCs (known as *centres locaux de services communautaires*, or CLSCs) since 1971 and had had the most CHCs (174) (Rachlis, 2004, 84), but the provincial government integrated these organizations into larger structures without local governance in 2004 (Association of Ontario Health Centres, 2006, 15). Other provinces have a small number of CHCs and these provinces have not increased funding or the number of CHCs in recent years (Association of Ontario Health Centres, 2006, 5). For example, British Columbia only has ten CHCs, two of which (the Mid-Main CHC and REACH CHC) are located in Vancouver (Association of Ontario Health Centres, 2006, 8). These CHCs are subject to funding shortfalls because the British Columbia provincial government does not prioritize CHCs (Association of Ontario Health Centres, 2006, 9).

Rather than create new, locally governed CHCs, regional health authorities have established their own CHC-like organizations. The Vancouver Coastal Health Authority (VCHA) has created eight CHC-like organizations since the late 1990's (Vancouver Coastal Health Authority, 2007b; Rowe, 2000). These organizations offer a multi-disciplinary team of health professionals and patient education classes similar to a CHC, but the local community does not govern them and can only provide feedback through a Community Engagement Framework that operates separate of the CHC-like organizations (Association of Ontario Health Centres, 2006, 9). Because they designed their organizations to emulate the two CHCs in Vancouver (Rowe, 2000; Association of Ontario Health Centres, 2006, 9), VCHA has had a history of involvement with these CHCs. When initially creating their CHC-like organizations, VCHA unsuccessfully attempted to bring REACH and Mid-Main under their control (Rowe, 2000; Association of Ontario Health Centres, 2006, 9); currently, VCHA, recognizing their potential for innovation, provides funding to both Mid-Main and REACH (Association of Ontario Health Centres, 2006, 9).

1.6 The Mid-Main Community Health Centre

One of the two locally governed CHCs in Vancouver is the Mid-Main Community Health Centre. Opened in 1988, Mid-Main is located at 24th Avenue and Main St. Mid-Main serves patients who live or have lived in the area of Vancouver bounded by Cambie St., Knight St.,

Broadway and Marine Drive (Mid-Main CHC, 2006).¹ Like other CHCs, Mid-Main is a non-profit organization with a Board of Directors elected from the local community (Mid-Main CHC, 2007a). Mid-Main houses a multi-disciplinary team of medical professionals, including doctors, dentists, nurse practitioners, and a clinical pharmacist (Mid-Main CHC, 2007b). It also adheres to a philosophy similar to that of many CHCs; it develops and administers programs based on community input and addresses social determinants of health with its programs (Mid-Main CHC, 2007c).

Mid-Main is an ideal venue for research into the self-rated health of diabetics because of its record-keeping capacity. Mid-Main uses electronic medical record (EMR) software to record and store patient data, including age, gender, and reason for visit; VCHA's CHC-like organizations do not currently use EMR software. Mid-Main also registers all its diabetics with the provincial government's Chronic Disease Management (CDM) Toolkit. This software allows the Ministry of Health and the patient's doctor to track each diabetic's progress according to various clinical indicators. Aside from allowing doctors to track their diabetics' progress more easily, Mid-Main also registers all its diabetics because the Ministry of Health pays Mid-Main \$75 for each patient it registers (Clarence, 2007). Given its susceptibility to funding shortfalls, Mid-Main has considerable incentive to register all its diabetic patients; it is not clear if VCHA's CHC-like organizations register all their diabetic patients. Researchers can therefore study Mid-Main's diabetic patients with a mail survey because i) researchers can easily identify all diabetics in Mid-Main by their registration in the CDM Toolkit, and ii) once identified, the addresses of the diabetic patients can then be accessed with the EMR. Researchers cannot currently conduct a similar study of VCHA's CHC-like organizations or compare these organizations to Mid-Main because they lack these two criteria.²

Mid-Main is also an ideal venue for research on diabetics because it currently operates two unique diabetic programs. The first such program is group doctor visits. In many primary care settings, diabetic patients see their physician individually every three months to renew their medications and receive a check-up. Mid-Main's group doctor visits bring five to eighteen diabetic patients together every three months to receive a check-up and nutrition advice from a nurse practitioner, information about their medications from the clinical pharmacist, and

¹ The map in Appendix B displays both the location of Mid-Main and its patient recruitment area within Greater Vancouver.

² VCHA refused to participate in a study comparing its CHC-like organizations to Mid-Main. VCHA officials stated they did not have the ability or resources with which to conduct such a study and refused to allow access to any information that may aid with such a comparison. A Freedom of Information request for this information from VCHA is ongoing as of 2 April 2007.

medication renewals and an evaluation of their current health status from the physician (Clarence, 2007). The only patients Mid-Main does not invite to the group doctor visits are those that have been newly diagnosed with diabetes, those who are new to Mid-Main, and those who have other complications or health problems that make an individual doctor appointment the ideal venue for care (Clarence, 2007). The group visits are also unique because the patients ask questions of the health professionals and of each other. The patients often answer their peers' questions from their own experiences with diabetes (Rachlis, 2004, 110). The group visits usually last 90 minutes, longer than a typical patient visit with their physician, but less time than five to 18 individual physician appointments lasting 15 minutes each (Clarence, 2007). The result is a significant savings to Mid-Main in salary paid to its health professionals and a new form of clinical interaction which many patients enjoy (Clarence, 2007).

The second diabetic-specific program Mid-Main administers is the diabetic support group. The diabetic support group is similar to group doctor visits only in that it creates a forum in which diabetics can ask questions of a health professional (either the nurse practitioner or the clinical pharmacist). It is separate and unique from group doctor visits because it meets more frequently (usually once a month), it allows all diabetic patients at Mid-Main to attend, and it offers presentations on specific aspects of diabetes as requested by the group members (Clarence, 2007). Mid-Main does not determine the topics covered at each support group meeting nor does it book the guest speakers; the diabetic patients are responsible for both these tasks (Clarence, 2007). As such, the only resource Mid-Main invests in these meetings is payment of the attending health professional's salary (Clarence, 2007). Because programs like group doctor visits and the diabetic support group educate patients on diabetes and provide opportunities to interact with other individuals, they may represent programs that may improve the self-rated health of diabetics both at Mid-Main and potentially at other primary care settings.

1.7 Self-Rated Health in Vancouver

No published studies examining the self-rated health of diabetics in Vancouver exist. Additionally, VCHA either does not have self-rated health data for diabetics receiving treatment from its CHC-like organizations or refuses to share this data with this study. Therefore, a comparison between the aggregate self-rated health scores of diabetic patients from Mid-Main and VCHA's CHC-like organizations is not possible.

The only existing and accessible information that reports self-rated health in Vancouver comes from the Canadian Institute for Health Information (CIHI) report, *Improving the Health of*

Canadians: An Introduction to Health in Urban Places, published on 21 November 2006. The report assigns each census tract in Greater Vancouver into one of five categories based solely on socioeconomic variables: income, education, immigration, and living characteristics.³ After establishing these five categories of census tracts, the report then determines the self-rated health scores of these five categories using weighted data from cycle 2.1 of the Canadian Community Health Survey (CCHS). The CCHS is a cross-sectional Canada-wide survey conducted by Statistics Canada through telephone and personal interviews; it is intended to assess the health determinants and health status of Canadians (Statistics Canada, 2003).

The CIHI report finds that census tract categories characterized by a low number of post-secondary graduates and a low median income relative to the other census tracts in Greater Vancouver have the lowest percentage of respondents (52%) rating their health as either Excellent or Very Good (CIHI, 2006, 31). Many of these census tracts from this category are located in East Vancouver, Surrey, and east Richmond, areas the report describes as “socio-economically disadvantaged” (CIHI, 2006, 28). Table 1 compares the self-rated health scores of these five categories as extrapolated from the combination of census and broad survey data.

Table 1 Self-Rated Health Scores of Categories of Census Tracts in Vancouver

Census Tract Category	Average Percentage of Respondents Ranking their Health as Excellent or Very Good
1 (Dark green) ⁴	67
2 (Light green)	63
3 (Red)	63
4 (White)	56
5 (Orange)	52

Source: CIHI, 2006, 31.

Almost all the census tracts located in Mid-Main’s patient recruitment area are from Category 5. Of the eighteen census tracts in the recruitment area, thirteen are Category 5, three are Category 4, one is Category 3 and one is Category 2. These findings suggest that many of Mid-Main’s diabetic patients live in areas of low socioeconomic status and, hence, low self-rated

³ See Appendix B for a map of the distribution of the five census tract types in Greater Vancouver.

⁴ The colour corresponds to the colour of each census tract category on the map found in Appendix B.

health. However, this weighted population-level data does not describe how individual diabetic patients receiving treatment at Mid-Main rate their health. Therefore, this study conducts a survey of these patients to determine how they rate their health and what factors correlate with better self-rated health.

1.8 The Mid-Main Diabetic Self-Rated Health Survey

To determine the self-rated health of diabetics at the Mid-Main Community Health Centre and test why some diabetics rate their health better than others, this study administers the Mid-Main Diabetic Self-Rated Health Survey.⁵ Mid-Main identified its diabetic patients by their registration in the CDM Toolkit and prepared address labels for these patients using its EMR software. All 198 diabetic patients first received the survey by mail after 22 December 2006; the survey requested that patients complete and return it to Mid-Main either in person or by mail. Thirty-three patients returned surveys by 31 January 2007; on this date, Mid-Main mailed the survey again and included a self-addressed stamped envelope to encourage more patients to return the survey. By 14 March 2007, 84 patients had returned their completed surveys to Mid-Main, representing a 42.4 per cent response rate. This relatively high response rate is similar to the response rate Rada (2005, 7) received after two mailings of a survey for a study researching response rates to mail surveys.

Previous studies researching self-rated health have conducted surveys of different size and scope. Some studies, like the CCHS, have used data from large-scale regional surveys for their analysis; other researchers administered new surveys specifically intended for their studies and tested a much smaller population. One such small-scale study is Damian, et. al.'s 1999 survey of older Spaniards. This study used an original survey to assess the determinants of self-rated health of individuals from this group (Damian, et. al., 1999, 412). Like Damian, et. al., the Mid-Main Diabetic Self-Rated Health Survey is an original survey designed to study a specific population; additional information needed to develop the policy problem, hypotheses, and survey come from background research.

⁵ See Appendix A for a copy of the Mid-Main Diabetic Self-Rated Health Survey.

2 Methodology

This study examines variables affecting the self-rated health of diabetics receiving treatment at the Mid-Main Community Health Centre in Vancouver. It aims to determine the self-rated health of Mid-Main's diabetic patients and to determine why some of these patients rate their health better than that of others. This section describes the methodology used to study the self-rated health of Mid-Main's diabetic patients, the variables and measures used, and how each variable is used in a logistic regression to determine its effect on the dependent variable.

2.1 Dependent Variable

Though many surveys have measured either the correlation between self-rated health and mortality or the determinants of self-rated health, researchers have not agreed on how to ask patients to rate their health. Idler's and Benyamini's study presented several different wordings of the self-rated health question. Some wordings suggest no criteria to the patient by which to assess their health. Examples of these questions include, "All in all, you would say your health is...", "Would you say your health in general is...", "Would you say your overall health is..." (Idler and Benyamini, 1997, 23-25). Conversely, other wordings of the question suggest a criteria to patients ("How would you rate your health compared to others your age...", "How would you describe your health status at present...") (Idler and Benyamini, 1997, 23-25). Dasbach, et. al. suggested that assessments of self-rated health required patients to compare themselves to others of their age group to establish a correlation between self-rated health and mortality (Dasbach, et. al., 1994, 1778). Idler and Beyamini later determined that 23 of the 27 studies they examined found a correlation between self-rated health and mortality, regardless of the wording of the self-rated health question (Idler and Benyamini, 1997, 22, 26). Using Idler's and Benyamini's finding, the Mid-Main Diabetic Self-Rated Health Survey asked patients "In general, you would say your health is..." to both keep the question straightforward and to allow patients to develop their own criteria for assessing their health without researcher bias. This wording is also the same as is used in the CCHS.

Researchers also have not agreed on the options patients have for responding to the self-rated health question. Again, Idler and Benyamini provided examples of the range of possible

responses researchers have offered respondents in their surveys. Fourteen of the 27 surveys Idler and Benyamini studied offer respondents a five-point scale Likert scale from which to choose their answers (Idler and Benyamini, 1997, 23-25). The CCHS also used a five-point Likert scale (CIHI, 2006, 101). The CCHS and many of the surveys examined in Idler's and Benyamini's study offered respondents the following five answers on their Likert scales: excellent, very good, good, fair, poor. This structure offers respondents three positive answers and two negative ones. Like these surveys, the Mid-Main Diabetic Self-Rated Health Survey also uses a five-point Likert scale; however, this survey's Likert scale offers respondents two positive answers (very good, good), two negative answers (fair, poor), and one neutral answer (neither good nor bad). This set of responses improves upon previous surveys by offering respondents an equal number of positive and negative answers from which to choose.

The position of the self-rated health question on the survey can also affect how respondents answer the question. Damian, et. al., specifically describe how their survey asked their self-rated health question before any other health-related question so as not to bias the respondents' answers (Damian, et. al., 1999, 413). If a survey asked respondents a variety of health-related questions before asking the self-rated health question, the respondents may believe they should use the previous questions as criteria for determining their self-rated health. Additionally, if a respondent does not give positive answers on the health-related questions preceding the self-rated health question, they may rate their health lower than if they had been asked the self-rated health question earlier in the survey. The only question the Mid-Main Diabetic Self-Rated Health Survey asked before its self-rated health question is how much total care the patient received from Mid-Main. Similarly, the CCHS only asked questions regarding the respondent's satisfaction with the health system before their self-rated health question (Statistics Canada, 2005, 3).

When reporting the results of their self-rated health question, some studies present the percentage of respondents selecting each of the five answers and some present an aggregation of more than one answer. Damian, et. al.'s study reported its findings in this manner (Damian, et. al., 1999, 413) and the CIHI report quantified the self-rated health of each census tract by combining the percentages of the respondents who answered Excellent or Very Good (CIHI, 2006, 31). This study both reports self-rated health as the percentage of patients selecting each answer and as the aggregate percentage of respondents who answered Very Good or Good. Aggregating self-rated health responses in this manner is necessary for this study to perform the logistic regression in Section 3.

Most research examining the determinants of self-rated health reviewed for this study does not fully explain the how a patient determines their health rating. Instead, they offer an explanation similar to Idler’s and Benyamini’s: “[g]lobal self-ratings, which assess a currently unknown array of perceptions and weight them accordingly to equally unknown and varying values and preferences, provide the respondents’ view of global health status” (Idler and Benyamini, 1997, 34). Most studies establish the importance of self-rated health by describing its strong correlation to mortality (Dasbach, et. al., 1994, 1775; Goodwin and Engstrom, 2002, 325; Shi, et. al., 2002, 536). This study follows the methodology of these other studies and does not attempt to determine how the diabetic patients arrived at their assessment of their health; it instead builds upon other research that finds a strong correlation between self-rated health and mortality in several contexts by studying the determinants of self-rated health within a specific population.

Table 2 presents the responses of Mid-Main’s diabetic patients to the self-rated health question. It is worth noting that the percentage of respondents answering Very Good or Good is higher among the 33 respondents who returned their surveys before 31 January 2007 and were not given a self-addressed stamped envelope with which to return the survey. Of those 33 early respondents, 57.6 per cent (nineteen respondents) rated their health as Good and 18.2 per cent (six respondents) rated their health as Very Good. This finding suggests that including a self-addressed stamped envelope when mailing the survey to Mid-Main’s diabetic patients was necessary to receive responses from patients who rated their health less well.

Table 2 *Frequencies, Self-Rated Health*

Answer to Self-Rated Health Question	%	(N)
Very Good	13.1	11
Good	46.4	39
Neither Good nor Bad	16.7	14
Fair	17.9	15
Poor	6.0	5
Total	100.0	84

Table 3 presents the aggregation of the responses to the self-rated health question. The table places respondents who answered Very Good or Good into the *Good* category and those who answered with one of the lower three categories into the *Not Good* category. Almost sixty60

per cent of respondents rate their health as *Good* and just over 40 per cent of respondents rate their health as *Not Good*. These results suggest that many diabetic patients at Mid-Main could benefit from programs that improve self-rated health.

Table 3 *Frequencies, Aggregation of Self-Rated Health Answers*

Self-Rated Health Aggregation	%	(N)
<i>Good</i>	59.5	50
<i>Not Good</i>	40.5	34

This study conducts a logistic regression with the aggregated self-rated health percentages to determine which variables have a statistically-significant relationship with self-rated health. This study uses a logistic regression analysis because, by dichotomizing the dependent and independent variables, it reduces the number of responses for each variable, which then increases the degrees of freedom. This increase allows this study to include more variables in a single logistic regression model. This increase is necessary for this study given the limited number of surveys returned. This study henceforth refers to respondents rating their health amongst the top two answers on the five-point Likert scale as having *Good* self-rated health and those not rating their health in this manner as having *Not Good* self-rated health. The independent variables must also be dichotomous in a logistic regression; the forthcoming section will describe how the study dichotomized independent variables when necessary. Section 3 contains the explanation of the logistic regression used in this study and its results.

2.2 Independent Variables

The following subsections describe the independent variables researched in the study and explain how they are measured. The subsections also describe why the survey measured each independent variable and offer hypotheses predicting the effect each independent variable (positive or negative) will have on the dependent variable. This study groups each independent variable into four categories: patient demographics, health status, Mid-Main diabetic programs, and voluntary organizations and sense of belonging.

2.2.1 Patient Demographics

This group consists of nine independent variables and tests if age, education, household income, living situation (homeowner or renter), number of years lived in Vancouver, marital status, the language spoken at home (English or otherwise), gender, and ancestry (White/Caucasian or otherwise) are correlated with the dependent variable. Mid-Main’s EMR software records the ages and genders of its patients, but does not store information on these other variables. Measuring these variables therefore helps to better describe the diabetic patient population at Mid-Main and allows this study to test if these variables explain why some diabetics at Mid-Main have *Good* self-rated health. Table 4 lists the patient demographic variables and the hypothesized effect each variable will have on self-rated health (a positive or negative correlation).

Table 4 *Patient Demographics Variables and Hypothesized Effects*

Variable Name	Hypothesized Effect
Age 65 and older	N/A
Post-secondary education	+
More than \$20,000 household income	+
Homeowner	+
More than seven years lived in Vancouver	+
Married	+
English spoken at home	N/A
Female	-
White/Caucasian Ancestry	N/A

This study hypothesizes that education and household income are positively correlated with *Good* self-rated health. Cott, et. al.’s study of the 1994/95 Canadian National Population Health Study determined that respondents “with lower education or income [were] less likely to report excellent or very good health” (Cott, et. al., 1999, 733). Similarly, this study also hypothesizes that homeowners are more likely to rate their health as *Good* because homeowners generally have higher household incomes than do renters. Logically, patients with lower education and lower income would have less knowledge and resources with which to ensure good health. This study classifies patients as having an annual household income of either below \$20,000 or \$20,000 and above. Cott, et. al. (1999, 732) grouped patients into “low-middle” and

“upper” classes for its income analysis without specifying the definitions of these groups. Because many of the census tracts in Mid-Main’s patient recruitment area are considered “Vancouver’s more socio-economically disadvantaged areas” (CIHI, 2006, 28), this study uses \$20,000 as the threshold by which to separate patients. However, similar to Cott, et. al. (1999, 732), this study dichotomizes patients as either possessing some post-secondary education or no post-secondary education.

This study also hypothesizes that patients who are married and who have been long-term residents of Vancouver will also be more likely to rate their health as *Good*. Because researchers have found a positive relationship exists between frequency of socialization and self-rated health (Veenstra, 2000, 619), marriage may have a positive relationship with self-rated health because it ensures regular socialization. Similarly, this study also hypothesizes patients living in Vancouver seven years or more will be more likely to rate their health as *Good* than those living in Vancouver for a shorter period because long-time residents will have had more time to develop and maintain social networks. Despite Veenstra’s finding, this study does not hypothesize a relationship between either ethnicity or language spoken at home and self-rated health. This study could hypothesize that patients who do not speak English at home and are of ethnicities other than White may be subject to isolation or poor social integration into Canadian society. However, Hyypä and Mäki (2003, 777) find that the Swedish-speaking minority in Finland rate their health more highly than the Finnish-speaking majority and “have a greater stock of social capital.” Therefore, this study does not make hypotheses regarding these two variables.

From the remaining two variables, this study hypothesizes that only gender is related to self-rated health. Damian, et. al. observe in both their study and others that women are more likely to report lower self-rated health than men (Damian, et. al., 1999, 415). Damian, et. al. (1999, 415) also observe that patients older than 85 rated their health higher than those aged 65 to 74. However, because Damian, et. al.’s study examines an exclusively elderly population, this study cannot hypothesize whether elderly patients are more likely to rate their health as *Good* compared to non-elderly patients. This study divides patients into groups, one aged 64 and younger and a second aged 65 and older, to determine if elderly patients rate their health differently than do non-elderly patients. Following the development of hypotheses for the patient demographic variables, Table 5 presents the frequencies for these variables from the completed surveys.⁶

⁶ See Appendix D for a more detailed breakdown of the ethnicities of the respondents.

Table 5 *Frequencies, Patient Demographics*

Variable Name	%	Valid %	(N)
<u><i>Age 65 or Older</i></u>			
Yes	31.0	31.3	26
No	67.9	68.7	57
Refused	1.2	-	1
<u><i>Post-Secondary Education</i></u>			
Yes	58.3	61.3	49
No	36.9	38.8	31
Refused	4.8	-	4
<u><i>Household Income \$20,000 or More</i></u>			
Yes	45.2	55.9	38
No	35.7	44.1	30
Refused	19.0	-	16
<u><i>Homeowner</i></u>			
Yes	40.5	44.2	34
No	51.2	55.8	43
Refused	8.3	-	7
<u><i>Lived 7 Years or More in Vancouver</i></u>			
Yes	84.5	86.6	71
No	13.1	13.4	11
Refused	2.4	-	2
<u><i>Married</i></u>			
Yes	38.1	38.1	32
No	61.9	61.9	52
<u><i>English Spoken at Home</i></u>			
Yes	75.0	75.9	63
No	23.8	23.8	20
Refused	1.2	-	1
<u><i>Gender</i></u>			
Female	70.2	72.0	59
Male	27.4	28.0	23
Refused	2.4	-	2
<u><i>White/Caucasian Ancestry</i></u>			
Yes	59.5	60.2	50
No	39.3	39.8	33
Refused	1.2	-	1

More than two-thirds of respondents are younger than 65; however, 34 of these 57 patients are between 55 and 64. This age breakdown appears reasonable given that 90 per cent of diabetics are Type II diabetics and would develop the disease in middle-age. Approximately 60 per cent of respondents have some post-secondary education, which is significantly higher than the average number of post-secondary graduates (43 per cent) found in Category 5 census tracts (CIHI, 2006, 28). Many patients (38) also have household incomes larger than \$20,000; however, 17 of these 38 patients have incomes below \$40,000. Respondents are somewhat more likely to be renters (55.8 per cent) than to be homeowners (44.2 per cent), which is almost a mirror opposite of the Riley Park neighbourhood⁷ in 2001, where 45 per cent of housing was rental housing (City of Vancouver, 2007). Slightly more than 60 per cent of respondents are not married; twenty-three of these 52 respondents are single, seventeen are divorced, and ten are widowed or widowers. Seventy-two percent of respondents are female, which closely matches the 70:30 female: male ratio for all patients at Mid-Main (Clarence, 2007). Approximately 60 per cent of respondents are White and a little over 75 per cent of patients speak English at home. This study will discuss these findings later in this subsection.⁸

This study does examine how closely data from the completed surveys match that of all of Mid-Main's diabetic patients. This study did not obtain a random sample of data because all diabetic patients at Mid-Main received the survey. Because it did not obtain a random sample, this study must estimate the likelihood that the survey data are representative of all the diabetic patients at Mid-Main. Though this study cannot compare the frequencies of some patient demographics like ethnicity and household income with Mid-Main because Mid-Main does not record that information, it can compare age and gender. 65.6 per cent of Mid-Main's diabetics are female and at least 20.1 per cent⁹ of Mid-Main's diabetics are aged 70 or older (Mid-Main CHC, 2007d). Compared to these figures, this study's non-random sample has a small percentage more females (72 per cent) and has a larger percentage of patients (31.3 per cent) in its oldest age category, though these two categories do not measure the same ages. Additionally, the second-oldest age group is also the largest in this study (41 per cent of respondents are aged between 55 and 64) and for all of Mid-Main's diabetic patients (50.5 per cent are aged between 50 and 69).

⁷ The City of Vancouver defines the Riley Park neighbourhood as being bounded by 16th Avenue, 41st Avenue, Cambie St., and Fraser St.

⁸ Of note for the logistic regression analysis is the residency variable. Almost 90 percent of respondents report living in Vancouver for seven years or more, and nine of the remaining eleven respondents who have not lived in Vancouver that long have lived in Vancouver for between four and six years. As a significant majority of respondents have lived in Vancouver for several years, this study does not analyze what effect length of residency has on self-rated health in Section 3.

⁹ 7.7 percent of Mid-Main's patients are assigned to the "Other" group. Based on the other groups in the sample, these patients are either aged 90 and older or aged 29 and younger.

The age and gender distribution of this study's sample is comparable to that of all Mid-Main's diabetic patients.

Though comparisons of the distributions of age and gender can be made between this study's sample and Mid-Main, the same comparison cannot be made with ethnicity between this sample and the general population of patient recruitment area. Only two respondents to the survey identify themselves as Chinese, but 28.2 per cent of the residents of the Riley Park neighbourhood spoke Chinese as their first language in 2001 (City of Vancouver, 2001). However, explanations exist for why there are fewer Chinese respondents than in Riley Park. The percentage of Chinese patients receiving treatment at Mid-Main may be lower than in Riley Park because Mid-Main does not currently employ any Chinese-speaking doctors (Clarence, 2007). Individuals of Chinese ancestry are also less likely to develop Type II diabetes than individuals of South Asian, Southeast Asian, African or Aboriginal ancestries (Kelly and Booth, 2004, S16); this finding may explain why Filipino respondents (9) and Aboriginal and Métis respondents (7) outnumber Chinese respondents. Though Mid-Main does not track the ethnicities of its patients, it would be a mistake to compare the distribution of ethnicities among the survey's respondents with that of the nearby neighbourhood.

2.2.2 Health Status

Not surprisingly, an individual's health is a predictor of their self-rated health. Researchers have found negative correlations between self-rated health and health status indicators such as chronic conditions, functional status (Cott, et. al., 1999, 731, 733; Damian, et. al., 1999, 412, 414), and emotional distress (Meurer, et. al., 2001, 35). This study uses six variables to assess a patient's current health status: absence of chronic conditions (aside from diabetes), absence of mobility problems, absence of diabetes-related complications, absence of a depression diagnosis, absence of cardiovascular conditions, and emergency room visit(s) in the past year. Logically, this study hypothesizes that each of these variables is positively correlated with *Good* self-rated health except for emergency room visits, which this study hypothesizes is negatively correlated with self-rated health.

This study developed the survey questions used to measure these health status variables from previous research. To test for chronic conditions, the survey asks patients to choose from a list any chronic conditions with which they had been diagnosed (they could also select "Other")

and specify a chronic condition)¹⁰; this study adapted the list of chronic conditions from Damian, et. al.'s study (1999, 413). This study also adapted Damian, et. al.'s (1999, 413) list of movement tasks and Dasbach, et. al.'s (1994, 1777) list of diabetes-related complications for similar questions that assess whether a patient had mobility problems¹¹ and diabetes-related complications¹², respectively. The survey determined if a patient has or had a depression diagnosis by their selection of that chronic condition from the list of chronic conditions for the previously described question. Similarly, this study identified patients with cardiovascular conditions if they indicated that they had high blood pressure, heart disease or had had a stroke from the list of chronic conditions.

This study then dichotomized the chronic conditions, mobility problems, and diabetes-related complications variables to indicate either a presence or absence of these indicators. This method is similar to the one used by Damian, et, al. (1999, 413). These researchers did not create a qualitative ranking of chronic conditions or mobility problems; instead, they distribute patients into groups based on how many conditions or problems they possess. This study uses the same approach, but creates only two groups of patients for each variable: a group for patients who had one or more of that variable (i.e. chronic condition, mobility problem, or diabetes-related complication) and a group for those who had none of that variable. This study dichotomized responses in this manner to increase the degrees of freedom available to each logistic regression model that includes these variables. This study also attempted to isolate patients diagnosed with depression, cancer, and cardiovascular conditions from the chronic conditions question for analysis in the logistic regression; however, because only six respondents had been diagnosed with cancer, this study only analyzed depression and cardiovascular conditions. Table 6 shows the frequencies of these dichotomous variables.

¹⁰ See Appendix A, Question 5 for an example of this survey question.

¹¹ See Appendix A, Question 6 for an example of this survey question.

¹² See Appendix A, Question 8 for an example of this survey question.

Table 6 *Frequencies, Health Status Variables*

Variable Name	%	(N)
<u><i>Absence of Chronic Conditions</i></u>		
Yes	15.5	13
No	84.5	71
<u><i>Absence of Mobility Problems</i></u>		
Yes	60.7	51
No	39.3	33
<u><i>Absence of Diabetic-Related Complications</i></u>		
Yes	42.9	36
No	57.1	48
<u><i>Absence of a Depression Diagnosis</i></u>		
Yes	72.6	61
No	27.4	23
<u><i>Absence of Cardiovascular Conditions</i></u>		
Yes	35.7	30
No	64.3	54
<u><i>Emergency Room Visits in the Past Year</i></u>		
Yes	22.6	19
No	77.4	65

The results describe the health status of Mid-Main’s diabetics. A large majority of Mid-Main’s diabetics (84.5 per cent) have at least one chronic condition in addition to diabetes; specifically, almost two-thirds (64.3 per cent) of diabetics have some type of cardiovascular condition. A little more than half (57.1 per cent) of diabetics also have at least one diabetes-related complication. However, more than half (60.7 per cent) of diabetics do not have any mobility problems, almost three-quarters (72.6 per cent) do not have depression, and more than three-quarters (77.4 per cent) have not been to the emergency room in the past year. These results suggest that many patients must manage additional chronic conditions and diabetic symptoms that affect their daily life. Both Mid-Main and the Ministry of Health already acknowledge this finding, as they are both aware that many of Mid-Main’s diabetics are complicated patients that require extra care to control their diabetes and accompanying health problems (Clarence, 2007).

2.2.3 Mid-Main Diabetic Programs

These variables determine how many diabetic patients attend Mid-Main’s two diabetes-specific programs: group doctor visits and the diabetic support group. The questions on the survey ascertaining attendance of these programs asked patients to write the number of times they had attended each program in the past six months.¹³ The survey required patients to answer these questions with a number because patients would then need to spend extra time determining exactly what the group doctor visits and diabetic support group are before answering. To allow for the logistic regression in Section 3, this study dichotomizes patients as having either attended these programs or not attended. Logically, this study hypothesizes that patients who attend the group doctor visits or diabetic support group will be more likely to have *Good* self-rated health than those patients who do not. Table 7 shows the frequencies of these variables.

Table 7 *Frequencies, Mid-Main Diabetic Programs Variables*

Variable Name	%	Valid %	(N)
<u><i>Attendance of Group Doctor Visits</i></u>			
Yes	44.0	45.7	37
No	52.4	54.3	44
Refused	3.6	-	3
<u><i>Attendance of Diabetic Support Group</i></u>			
Yes	53.6	56.3	45
No	41.7	43.8	35
Refused	4.8	-	4

A little under half (45.7 per cent) of diabetic patients attend the group doctor visits while a little over half (56.3 per cent) of patients attend the diabetic support group. These results indicate that many diabetic patients attend these unique programs but attendance is not universal and several patients are either not eligible to participate or choose not to. It is important to note that the survey also asked patients if they attended diabetes support groups outside of Mid-Main or any other health-related group either inside or outside of Mid-Main. These questions intended to determine if Mid-Main’s diabetic patients received additional support for their illnesses in different groups and, if so, if these other groups made patients more likely to rate their health as *Good*. Only six patients attended a diabetes support group outside of Mid-Main and ten patients

¹³ See Appendix A, Questions 9 and 12 for examples of these survey questions.

attended health-related groups inside or outside of Mid-Main. Attendance in these groups is not included in the logistic regression analysis in Section 3.

2.2.4 Voluntary Organizations and Sense of Belonging

The final category of independent variables measures which patients participate in voluntary organizations and possess a strong sense of belonging to their community. Research shows that these characteristics are often correlated with beneficial health effects (Hyypä and Mäki, 2003, 770). Specifically, Cattell found that social participation was positively correlated with well-being (Hyypä and Mäki, 2003, 771). Additionally, Veenstra found that elderly individuals who participated in clubs were more likely to have higher self-rated health (Veenstra, 2000, 619). These findings suggest that Mid-Main's diabetic patients may be more likely to rate their health as *Good* if they participate in groups or have a sense of community.

This study tests participations in voluntary organizations and sense of belonging to one's community based on the findings of Hyypä and Mäki and of Veenstra. Unlike the studies by Hyypä and Mäki and by Veenstra, this study does not measure the type of social organization in which the Mid-Main patient participates; the survey question simply measures the frequency with which the patient participated in any voluntary organization.¹⁴ Measuring participation with only one question allowed the survey to be more concise. The survey also assessed asked patients to rate their sense of belonging on a five-point Likert scale.¹⁵ The survey asked this question to determine if patients needed to participate in voluntary organizations to improve their self-rated health or if a feeling of belonging was all that patients required.

This study used two different procedures to dichotomize these variables. First, the study grouped all patients who participated in a voluntary organization at least once a year into one group and patients who did not participate (referred to as 'non-participants' throughout this study) into the other. This dichotomy acknowledges that some participation in voluntary organizations, even if infrequent, likely have more benefit than no participation at all. Second, the study places patients who rated their sense of belonging to their neighbourhood as Very Strong or Strong in one group and all other patients into another. This aggregation method is consistent with that of the other self-ranked variable in this study, self-rated health. Regardless of the different dichotomies for both these variables, this study hypothesizes that a Very Strong or Strong sense of belonging to one's neighbourhood and any participation in voluntary organizations is

¹⁴ See Appendix A, Question 13 for an example of this survey question.

¹⁵ See Appendix A, Question 14 for an example of this survey question.

positively related to *Good* self-rated health among Mid-Main’s diabetics. Table 8 displays the frequency distributions for these two variables.

Table 8 *Frequencies, Voluntary Organizations and Sense of Belonging Variables*

Variable Name	%	Valid %	(N)
<u><i>Participation in Voluntary Organizations</i></u>			
Yes	66.7	66.7	56
No	33.3	33.3	28
Refused	-	-	0
<u><i>Strong Sense of Belonging to One’s Neighbourhood</i></u>			
Yes	51.2	52.4	43
No	46.4	47.6	39
Refused	2.4	-	2

These frequencies indicate that a majority of Mid-Main’s diabetic patients either perform activities or possess feelings corresponding to these two variables. Two-thirds (66.7 per cent) of respondents participate at least once a year in a voluntary organization and just over half (52.4 per cent) of respondents have a Very Strong or Strong sense of belonging to their neighbourhood.

2.2.5 Summary of Independent Variables

The preceding analysis described many of the characteristics of Mid-Main’s diabetic patients. The analysis suggested that many of Mid-Main’s diabetic patients exhibited characteristics that this study hypothesizes are negative correlates with *Good* self-rated health. A majority of the respondents have a household income below \$40,000, which is expected given that most of the respondents live in areas of low socioeconomic status. Most respondents also suffer from chronic conditions other than diabetes, from cardiovascular conditions, and from diabetes-related complications; almost half of respondents report some mobility problems as well. These findings are also not surprising as diabetics often present with health problems in addition to diabetes. Many of the respondents are not married, are female, and are renters, all of which this study also hypothesizes are negative correlates with *Good* self-rated health.

However, many of Mid-Main’s diabetic patients also display characteristics that this study hypothesizes are positive correlates of *Good* self-rated health. A majority of respondents possess some post-secondary education, which would not be expected in areas of low

socioeconomic status. More than 70 per cent of respondents have neither visited an emergency room in the past year nor been diagnosed with depression. More than half of respondents attend group doctor visits and almost half of patients attend the diabetic support group, both of which allow patients to interact and learn about diabetes from one another and may improve self-rated health. Finally, a majority of respondents participate in voluntary organizations and feel a strong sense of belonging to their neighbourhood. The logistic regression analysis in Section 3 determines which of these variables correlates with *Good* self-rated health for the respondents of the survey.

3 Results of Statistical Analysis

This section explains how this study uses logistic regression to determine the effects of the independent variables on the self-rated health of diabetics receiving treatment at Mid-Main. This section also presents the results of the statistical analysis that this study uses to suggest policy recommendations to Mid-Main. This study finds that diabetics who rate their health as *Good* are less likely to speak English at home, are more likely to not have mobility problems, are less likely to have visited the emergency room in the past year, and are more likely to participate in voluntary organizations. This study only uses the finding that participation in voluntary organizations is positively correlated with *Good* self-rated health in developing policy alternatives in Section 4 because it is the only variable Mid-Main could reasonably expect to influence.

3.1 Logistic Regression

This study uses the Enter method of multivariate logistic regression to predict the probability that a patient with certain demographic traits, health conditions, or behaviours will have *Good* self-rated health. Logistic regression holds all other variables constant as it tests the significance of each independent variable and predicts how much more likely a patient conforming to specific traits, conditions, or behaviour will rate their health as *Good* than a patient who does not. This study initially intended to analyze the survey data with individual cross tabulations that would examine the effect of the various independent variables on the dependent variable. This method would permit data analysis even if relatively few patients returned surveys. Because more patients than expected returned completed surveys, this study instead uses logistic regression as its primary method of statistical analysis. Logistic regression is a more robust method of analysis as it determines the effect of an independent variable on the dependent variable while holding other independent variables constant; individual cross tabulations can only control for the effects of one other independent variable at a time. Though this study dichotomizes all its variables to increase the available degrees of freedom, this method of logistic regression is still preferable to individual cross tabulations and other researchers have used this

method to analyze their results (Hyypä and Mäki, 2003, 775; Damian, et. al., 1999, 413; Meurer, et. al., 2001, 37).¹⁶

A limitation of this analysis is that the number of completed surveys restricts the number of independent variables that can be included in one model. The maximum degrees of freedom in a logistic regression model equals one-tenth the number of cases used in the analysis.

Independent variables in a logistic regression each contain one degree of freedom, meaning the models in the survey could only analyze a maximum of eight independent variables assuming there are no missing cases. Meurer, et. al.'s study, with only 100 respondents, experienced a similar limitation; these researchers chose to report one model containing only variables significantly correlated with self-rated health (Meurer, et. al., 2001, 37). This study includes one such model and other models describing the effect of specific groups of independent variables on the dependent variable.

3.2 Overall Fit of Statistical Models

This study develops four logistic regression models to show which variables correlate with *Good* self-rated health and to show what effect specific sets of variables have on self-rated health. Model 1 examines the effect of only patient demographic variables on the dependent variable. Model 2 uses only health status, Mid-Main diabetic programs, and voluntary organizations and sense of belonging variables as determinants of self-rated health. Model 3 combines variables correlated with self-rated health in both previous models at $p < 0.10$ and Model 4 emulates Meurer, et. al.'s model by including only independent variables significant at $p < 0.05$.

Without using any variables, the predicted value of *Good* self-rated health is 59.5 per cent. This percentage means that an observer, with no information about the diabetics, could only predict which diabetics have *Good* self-rated health 59.5 per cent of the time. Model 4, which uses only the variables significantly correlated with self-rated health, has a Nagelkerke pseudo- R^2 of 0.399. This score means that Model 4 explains 39.9 per cent of the variation of the dependent variable. Model 4 has a predicted value of *Good* self-rated health of 73.5 per cent, meaning this model can predict which patients have *Good* self-rated health 73.5 per cent of the time; this percentage is 14 per cent higher than when no variables are used. Table 9 displays the expected

¹⁶ Variance Inflation Factor (VIF) and Tolerance tests suggest that no multicollinearity exists in any of the following four statistical models. This study considers variables with coefficients significant at a 95 per cent confidence interval in the formulation of policy recommendations (in Section 4) intended to improve the self-rated health of Mid-Main's diabetics who rate their health as *Not Good*.

Beta values from the four statistical models that determine which independent variables are significant correlates with *Good* self-rated health.

Table 9 Logistic Regression, Four Models

Variable Name	Model 1	Model 2	Model 3	Model 4
Age 65 and Older	1.454			
Post-Secondary Education	1.730			
Homeowner	1.684			
English Spoken at Home	-0.084***		-0.128**	-0.194**
Female	-0.376			
White/Caucasian Ancestry	1.913			
Married	-0.271*		-0.362	
Absence of Depression		3.171*	2.778	
Absence of Mobility Problems		5.164***	5.176***	6.024***
Emergency Room Visits		-0.248*	-0.198**	-0.207**
Attendance of Support Group		-0.554		
Attendance of Group Doctor Visits		1.303		
Participation in Voluntary Organizations		3.908**	3.261*	3.577**
Strong Sense of Belonging		-0.759		
N	71	77	83	83
Nagelkerke pseudo-R ²	0.229	0.416	0.449	0.399

*Significant at <0.10, **<0.05, ***<0.01

3.2.1 Model 1

Model 1 uses only patient demographics to predict *Good* self-rated health. This model has the lowest Nagelkerke pseudo-R² value of all the models (0.229) and contains the fewest number of variables (two) significant at p<0.10 or less. Only the language variable remains significant in all models, with its expected Beta value decreasing in subsequent models. The model indicates that patients who speak English at home are less likely to rate their health as *Good* compared to patients who do not speak English at home. The second significant demographic variable, Married, does not remain significant in subsequent models. In this model, married patients are less likely to rate their health as *Good* when compared to non-married patients.

This model does not include the Household Income variable due to the limitations of logistic regression and due to the number of completed surveys. Sixteen surveys did not have answers for the Household Income question, meaning an logistic regression model that included Household Income as an independent variable would have 16 missing cases. If included in a logistic regression, the Household Income variable would therefore limit the number of independent variables included in the model to six; missing answers on other questions used in this model would generate more missing cases and limit the number of variables further. The number of variables in this model is already limited to seven due to thirteen missing cases; it is likely that a model containing the Household Income variable could only contain an additional four variables.

This study tested the significance of the Household Income variable to *Good* self-rated health with an individual cross tabulation. The Pearson's Chi-square value for Household Income using this method is 0.355, but it is not significant to at least $p < 0.10$; had it been significant, this study would have included a model to demonstrate the effect of Household Income on self-rated health and on other independent variables. However, because it is not significant, Household Income is not included in Model 1.

3.2.2 Model 2

Model 2 includes only health status, Mid-Main diabetic programs, and voluntary organizations and sense of belonging variables. Model 2 has a Nagelkerke pseudo- R^2 value (0.416) significantly higher than that of Model 1 and has more variables significantly correlated with *Good* self-rated health (four). Of these, only the Absence of Depression variable is not significant in subsequent models; Emergency Room Visits, Absence of Mobility Problems, and Participation in Voluntary Organizations are significant in this and subsequent models. The expected Beta values suggest that patients participating in voluntary organizations are almost three times more likely to rate their health as *Good* than non-participants and patients without mobility problems are four times more likely than those with mobility problems to rate their health as *Good*. Additionally, patients who have been to an emergency room in the past year are 75 per cent less likely to have *Good* self-rated health than those who did not.

Model 2 did not include three health status variables, Absence of Chronic Conditions, Absence of Cardiovascular Conditions, and Absence of Diabetic Complications. This model already contains seven independent variables, the maximum allowed given that the model contains 77 cases. This study did not include both the Absence of Chronic Conditions and the

Absence of Diabetic Complications variables because neither variable is significantly correlated with self-rated health when entered into the model in the place of the Absence of Depression variable. A cross tabulation using Absence of Cardiovascular Conditions as the independent variable and self-rated health as the dependent also showed these two variables are not correlated ($p=0.947$). As with the Household Income variable, had any of these variables been significant to $p<0.10$ or had patients returned enough surveys to increase the degrees of freedom of the model, these two variables would have been included in Model 2.

3.2.3 Model 3

Model 3 combines the independent variables from Models 1 and 2 that are significantly correlated with self-rated health. This model has the highest Nagelkerke pseudo- R^2 value (0.449) of all the models and correctly predicts the dependent variable category 79.5 per cent of the time. The expected Beta values of all the variables have decreased from their previous models with the exceptions of Emergency Room Visits and Absence of Mobility Problems, which both increase. These variables are all also less-significantly correlated with self-rated health than in previous models; the correlations between the Absence of Depression and Marriage variables and the dependent variable are no longer $p<0.10$. The correlation between Emergency Room Visits and the dependent variable is also more significant than in Model 2; the significance of the relationship between Absence of Mobility Problems and self-rated health remains the same.

3.2.4 Model 4

Emulating the description used by Meurer, et. al. in their study, Model 4 only contains the variables from Model 3 correlated with self-rated health with a significance of at least $p<0.10$. The Nagelkerke pseudo- R^2 value drops to 0.399, but this model increases the expected Beta values of the Mobility Problems and Participation in Voluntary Organization variables; the expected Beta value of Emergency Room Visits does not change significantly. The Mobility Problems variable is significant to a 99 per cent confidence level and the other three variables are significant to a 95 per cent confidence level.

3.3 Analysis of Significant Variables

The following subsections analyze the statistically significant variables in Model 4 to assess their compatibility with the hypotheses developed in the previous Section.

3.3.1 English Spoken at Home

The only patient demographic variable correlated with *Good* self-rated in the final model is English Spoken at Home; the Marriage variable is not significant when combined with different classes of independent variables in Model 3. The expected Beta value of the English variable decreases in each subsequent model, declining from -0.084 in Model 1 to -0.194 in Model 4. In Model 4, the English variable suggests that patients who speak English at home are approximately 80 per cent less likely to rate their health as *Good* than patients who do not speak English at home.

The correlation between language spoken at home and self-rated health is surprising given that this study did not hypothesize how language spoken at home would affect self-rated health. There are three possible explanations for the negative correlation. First, only 20 of 84 diabetics do not speak English at home. The correlation may exist only because this study has a relatively small number of respondents who do not speak English at home to analyze. Second, if the patients who do not speak English at home are immigrants to Canada, they may compare their health and the health services available to them in Canada as significantly more favourable vis-à-vis those in their home country (Clarence, 2007). The patient may recognize the impact of better access to higher-quality health services and rate their health more highly. Third, the language and administration of the survey may select against receiving responses from patients who do not speak English at home and who would rate their health as *Not Good*. Because patients only received the survey in English and did not receive assistance in translating the survey from Mid-Main, patients not speaking English at home may have had a barrier to returning the survey that patients who did speak English at home did not have. If patients who do not speak English at home also rate their health as *Not Good*, they may not have invested the resources needed to overcome the survey's language barrier and did not return the survey, artificially increasing the self-rated health score of patients who do not speak English at home. Therefore, this relationship between language spoken at home and self-rated health may become less significant or disappear if researchers use translated surveys in future studies.

It is also worth analyzing the finding that English Spoken at Home is the only patient demographic correlated, either positively or negatively, with *Good* self-rated health among Mid-Main's diabetic patients. Shi, et. al.'s assertion that good primary care may mitigate the effects of low socioeconomic status on self-rated health may partially explain this finding, but other explanations exist. Specifically, ancestry may not be a correlate of self-rated health because, as subsequent models show, social participation is a correlate. So long as patients of various

ethnicities participate in voluntary organizations, their ethnicity will not be correlated with their self-rated health. Table 10 shows that almost the same percentage of non-Caucasians (63.6 per cent) participate in voluntary organizations as do Caucasians (68 per cent) and that the two variables are not significantly related ($p=0.681$), suggesting this explanation may be valid.

Table 10 Cross tabulation, Participation in Voluntary Organizations and Ancestry

Participation in Voluntary Organizations	White/Caucasian (%)	Non-Caucasian (%)
Yes	68.0	63.6
No	32.0	36.4

Pearson's Chi-square: 0.169. p : 0.681

Though this variable is negatively correlated with *Good* self-rated health, this study does not make policy recommendations based on this finding. First, it is highly unlikely that the act of speaking a language other than English at home in and of itself raises a patient's self-rated health. Second, even if the language spoken does improve self-rated health, Mid-Main does not have the resources to affect its patients' linguistic preferences. Third, as previously suggested, different surveying methods may decrease the relationship between language spoken at home and self-rated health.

3.3.2 No Mobility Problems

Two health status variables are related to *Good* self-rated health, the first of which is the Absence of Mobility Problems variable. As hypothesized in Section 2, the absence of mobility problems is positively correlated with *Good* self-rated health. The expected Beta value increases from 5.164 in Model 2 to 6.024 in Model 4, suggesting that the presence of more health status and behaviour variables in Model 2 weakens the strength of the Absence of Mobility Problems variable. The strong expected Beta value in Model 4 indicates that patients without mobility problems are five times more likely to rate their health as *Good* compared to patients with some mobility problems.

Though this variable positively correlates with *Good* self-rated health, this study also does not make policy recommendations based upon this result. The mobility problems listed in the survey do not necessarily result from diabetes or any other chronic condition. Mid-Main thus cannot develop programs intended to prevent all types of mobility problems. Mid-Main is also not equipped to assist patients in the day-to-day management of and functioning with mobility

conditions; beyond referring patients to an assisted-living facility, Mid-Main is limited in its ability to prevent or reduce functional impediments resulting from mobility problems.

3.3.3 Emergency Room Visits

The second health status variable that is significantly correlated with *Good* self-rated health is the Emergency Room Visits variable. Patients who have visited an emergency room in the past year are 80 per cent less likely to rate their health as *Good*; this negative correlation matches the hypothesis proposed earlier in this study. The expected Beta value of the Emergency Room Visits remains largely unchanged across Models 2, 3, and 4, suggesting the effect of Emergency Room Visits on self-rated health is independent of the other independent variables measured in the three models.

Though emergency room visits suggest which patients are less likely to have *Good* self-rated health, this study cannot make policy recommendations to Mid-Main from this finding. One purpose of the group doctor visits is to limit emergency room visits by patients requiring treatment for diabetes-related ailments; the group doctor visits provide patients with a thorough examination to identify any unnoticed diabetes-related problems and to give patients the knowledge and skills to self-manage their diabetes (Clarence, 2007). To that end, the Ministry of Health has informed Mid-Main that fewer of their patients use emergency rooms for diabetes management (Clarence, 2007). However, it is unclear why respondents visited the emergency room in the past year; diabetes may be the reason for their visits, but unrelated conditions or accidents may have been responsible. Without knowing the reason for these emergency room visits, this study recommends that Mid-Main continue its current strategies to reduce emergency room visits and implement no new programs to reduce emergency room visits further.

3.3.4 Participation in Voluntary Organizations

The Participation in Voluntary Organizations variable is positively correlated with *Good* self-rated health. The expected Beta value decreases from 3.908 in Model 2 to 3.577 in Model 4. The expected Beta values still indicate a strong relationship with *Good* self-rated health in all models; Model 4 states that patients who participate in voluntary organizations are approximately two-and-a-half times more likely to rate their health as *Good* than patients who do not. The finding that Participation in Voluntary Organizations suggests which patients are more likely to rate their health as *Good* corresponds to the hypothesis developed earlier in this study. This study will further examine this variable and its implications for policy alternatives in Section 4.

3.3.5 Non-Significant Variables

The logistic regression performed on the data gathered from the survey shows few variables hypothesized to be related to *Good* self-rated health actually are. All but one patient demographic variables -age, education, home ownership, household income, gender, ancestry, and marital status- had no statistically significant effect on self-rated health. Many health status variables -Absence of Chronic Conditions, Absence of Diabetic Complications, and Absence of Depression- also did not affect self-rated health. Mid-Main's two programs that specifically address diabetes, Group Doctor Visits and Diabetic Support Groups, also had no statistically significant relationship with self-rated health; this study will discuss the implications of this finding on the policy recommendations for Mid-Main in Section 4. Table 11 shows the independent variables that did not significantly affect self-rated health at a 95 percent confidence level or greater.

Table 11 *Non-Significant Variables*

Variable Name
Age 65 and older
Post-secondary education
More than \$20,000 household income
Homeowner
Female
White/Caucasian Ancestry
Married
Absence of Chronic Conditions
Absence of Diabetic Complications
Absence of Depression
Absence of Cardiac Conditions
Attendance of Support Group
Attendance of Group Doctor Visits
Strong Sense of Belonging

3.4 Summary of Major Findings

Of the independent variables tested, the logistic regression analysis indicated that many diabetic patients at Mid-Main who rate their health as *Good* do not speak English at home, have no mobility problems, have not been to an emergency room in the past year, and have participated in a voluntary organization in the past year. Respondents who speak English at home or who have visited an emergency room in the past year are each 80 per cent less likely to rate their health as *Good*. Respondents who have no mobility problems are five times more likely to rate their health as *Good*. Finally, respondents who participate in voluntary organizations are two-and-a-half times more likely to rate their health as *Good*. Of these four correlates, this study will only use participation in voluntary organizations to develop its policy alternatives in Section 4. This study does not use the other three correlates because the Mid-Main could not enact policy alternatives that would influence the presence or absence of these correlates among its diabetic patients.

It is worth noting that patient demographic variables associated with socioeconomic status, such as Household Income and Education, are not correlates with *Good* self-rated health, given that many other studies observe this correlation. However, this absence of correlations between self-rated health and these variables is nonetheless reasonable because research has demonstrated that the determinants of self-rated health vary with location of the study, the individuals studied, and the context of the study. Additionally, socioeconomic variables may not be significant in this population because of its homogeneity. If, for example, Mid-Main served patients with a greater diversity of Household Income, then that variable may have been correlated with *Good* self-rated health. The absence of correlations between *Good* self-rated health and socioeconomic variables also means that policy recommendations to Mid-Main need not address lack of education or lack of household income. Had these correlations existed and had they been strong, Mid-Main likely could not then implement programs to improve the self-rated health of its diabetics who do not rate their health as *Good*.

4 Analysis of Alternatives

Using the results of the logistic regression, this section formulates and proposes policy alternatives intended to improve the self-rated health of the 40 per cent of Mid-Main's diabetic patients who do not rate their health as *Good*. This study bases its alternatives on the finding that participation in voluntary organizations is positively correlated with *Good* self-rated health; it considers only this variable because, of the four variables correlated with *Good* self-rated health, it is the only one that Mid-Main could potentially influence. Policy alternatives are actions that public organizations can undertake to address a specific problem and can assess according to specified criteria.

4.1 Mid-Main's Diabetic Programs

As the logistic regression showed, participating in either of the two diabetic programs offered at Mid-Main, group doctor visits and the diabetic support group, is not correlated with *Good* self-rated health. Policymakers should not interpret this lack of correlation as evidence that Mid-Main should terminate these programs, as this finding does not indicate that the programs have no other benefits. Mid-Main's Executive Director states that many patients prefer group doctor visits to individual visits and believe they receive more care in this setting (Clarence, 2007). The Executive Director also explains that group doctor visits save money over individual visits as seeing five to eighteen patients in one ninety-minute appointment every three months requires less time than seeing these patients individually in 15 minute appointments (Clarence, 2007). The diabetic support group also operate at a relatively low cost as only one health professional (not a doctor) attends and the patients arrange all topics, speakers, and presentations, without assistance from Mid-Main (Clarence, 2007). Because many diabetic patients at Mid-Main participate and support these programs, because these programs either require minimal resources or save money over other methods, and because these programs do not increase the likelihood patients will rate their health as *Not Good*, this study recommends maintaining group doctor visits and the diabetic support group.

4.2 Participation in Voluntary Organizations

Participation in Voluntary Organizations is the only correlate of *Good* self-rated health upon which Mid-Main can base policy alternatives to improve self-rated health. It is difficult for Mid-Main to affect the other three correlates. In many cases, the country and culture of birth dictate the language spoken at home, many factors can influence a patient's mobility, and circumstances beyond one's control often dictate emergency room visits. Conversely, participation in voluntary organizations is a conscious choice that Mid-Main could influence. If Mid-Main could convince their diabetic patients who rate their health as *Not Good* and who do not participate in a voluntary organization to participate, then their self-rated health may improve.

Survey data also suggest how policy recommendations could target diabetic patients not currently participating in voluntary organizations. Comparing the independent variable frequencies of non-participants to the frequencies of all survey respondents shows considerable differences between the two groups in attendance of group doctor visits and of the diabetic support group. Backward logistic regression also shows that patients who do not attend group doctor visits are more likely not to participate in voluntary organizations. A cross tabulation examining the relationship between group doctor visits and self-rated health among non-participant patients also shows the same correlation is significant to a 90 per cent confidence level ($p=0.062$). Non-participants are also slightly more likely to be younger than 65 and to be male than all survey respondents, but this difference is not as considerable. Significant differences between non-participants and all respondents do not occur in other independent variables such as age, mobility, and number of chronic conditions. Table 12 displays the frequencies of select independent variables for non-participants and for all respondents. Table 13 displays the cross tabulation between group doctor visits and self-rated health for non-participant patients. These findings suggest policy alternatives intended to boost participation in voluntary organizations must acknowledge the lower attendance of group doctor visits and the diabetic support group by non-participants.

Table 12 *Frequencies, Non-Participants and All Respondents for Selected Variables*

Variable Name	Non-Participants (Valid %)	All Respondents (Valid %)
<u>Age 65 or older</u>		
Yes	25.0	31.3
No	75.0	68.7
<u>Absence of Mobility Problems</u>		
Yes	60.7	60.7
No	39.3	39.3
<u>Absence of Chronic Conditions</u>		
Yes	17.9	15.5
No	82.1	84.5
<u>Post-Secondary Education</u>		
Yes	55.6	61.3
No	44.4	38.8
<u>Gender</u>		
Female	63.0	70.2
Male	37.0	27.4
<u>White/Caucasian Ancestry</u>		
Yes	57.1	60.2
No	42.9	39.8
<u>Attendance of Group Doctor Visits</u>		
Yes	28.0	45.7
No	72.0	54.3
<u>Attendance of Diabetic Support Group</u>		
Yes	42.3	56.3
No	57.7	43.8

Table 13 Cross tabulation, Group Doctor Visits and Self-Rated Health for Non-Participant Patients

Self-Rated Health	Attendance of Group Doctor Visits (N) (Valid %)	Non-Attendance of Group Doctor Visits (N) (Valid %)
<i>Good</i>	10 (55.6)	1 (14.3)
<i>Not Good</i>	8 (44.4)	6 (85.7)

Pearson's Chi-square: 3.484. p: 0.062.

4.3 Policy Alternative 1: Status Quo

Almost 60 per cent of diabetic patients at Mid-Main currently rate their health as *Good*. Mid-Main staff could contend that this finding indicates that the self-rated health of many of its diabetic patients is *Good* and, given its modest budget, new programs would be too costly for it to implement. Maintaining the status quo would continue the group doctor visits and diabetic support group in their current form, and would continue to monitor diabetic patients with the Ministry of Health's CDM Toolkit software.

4.4 Policy Alternative 2: Doctors Discuss Voluntary Organizations with Patients during Individual Appointments

Table 12 indicates that far less non-participants attend group doctor visits than do all respondents. A policy alternative that targets patients during individual appointments would reach more non-participants than an alternative implemented during group doctor visit.

This alternative has doctors ask patients during individual appointments if they participate in voluntary organizations, and, if not, encourages them to do so. Doctors could treat this patient interaction as similar to discussing a treatment plan like smoking cessation. As with developing a treatment plan, the amount of time the doctor spends encouraging a patient to participate in a voluntary organization depends on the receptiveness of the patient. Research suggests that doctors with good communication skills and a good relationship with their patients produce increased patient compliance with therapeutic regimens (Cameron, 1996, 244). Once doctors establish rapport with a patient, they may convince them to participate in a voluntary organization. To ensure doctors at Mid-Main encourage their patients to participate, the Executive Director of Mid-Main could explain this study's findings at a staff meeting and request doctors discuss participation with their patients. The doctors could then offer feedback from their experiences to the Executive Director and each other at a subsequent staff meeting several months later.

4.5 Policy Alternative 3: Representative from a Voluntary Organization Speaks to the Diabetic Support Group

Though Table 12 indicates non-participants are less likely to attend the diabetic support group than all respondents, a little under half of non-participants still do attend these groups. An alternative intended to convince non-participants to join voluntary organizations implemented at the diabetic support group meeting would still reach a significant percentage of non-participants.

This alternative has members of the diabetic support group request a representative from an organization connected to many voluntary organizations speak to a meeting of the diabetic support group. Ideally, this speaker or the health professional facilitating the meeting would contextualize the speaker's appearance by explaining the findings of this study to the support group before the representative's speech. Because the survey measured participation in voluntary organizations and not volunteering, the representative need only encourage support group members to participate when time permits and in the activities they like. As with other speakers to the diabetic support group, members would book a representative from the organization of their choice themselves. Unlike other speakers, Mid-Main staff would need to convince the most active members of the support group to book a speaker on this subject for the group.

4.6 Policy Alternative 4: Diabetic Patients Volunteer for Mid-Main

Instead of encouraging patients to participate in other organizations, Mid-Main could encourage its patients to volunteer for itself. This arrangement would benefit both parties; volunteering for Mid-Main would improve the self-rated health of diabetic volunteers with *Not Good* self-health ratings and would allow Mid-Main to accomplish projects it otherwise could not. Non-participant diabetics at Mid-Main are no more likely than all respondents to have mobility problems that would prevent them from actively volunteering and Mid-Main could place patients in specific tasks based on their physical or time limitations. Mid-Main could notify patients of their volunteer recruitment drive with notices when they arrive for their appointments and with a notice on its website.

4.7 Policy Alternative 5: Participation Resource Package for Diabetics

Though patients may want to participate in voluntary organizations, they and the staff at Mid-Main may not have the information needed to locate an appropriate organization. This alternative would have staff at Mid-Main create a package of participation-related materials to

provide to all diabetics who identify themselves as non-participants. This package would include information explaining why participation in voluntary organizations is important to one's health, how best to approach and participate with a voluntary organization, and include pamphlets from various organizations and volunteer agencies. Mid-Main staff would also update the package with new participation opportunities as needed. Front staff, as opposed to health professionals, would create and maintain this package, which would reduce the salary costs to Mid-Main.

4.8 Criteria for Judging Alternatives

This study uses three criteria to assess these five policy alternatives and ranks the criteria relative to each other as Low, Medium, or High. The three criteria are Operating Cost, Implementation Cost, and Patient Uptake.

Operating Cost: This criterion assesses the time and financial cost required to operate the policy alternative after Mid-Main has implemented it. Because Mid-Main operates with a limited budget provided largely by third-party donors (Clarence, 2007), it cannot afford policy alternatives requiring significant new financial expenditures. This study assesses the cost of each policy alternative to Mid-Main by the amount of additional staff time the alternative would require to operate. Alternatives with a High ranking require little-to-no additional time to operate. Alternatives with a Medium ranking require a staff member to occasionally invest several hours of a work day to operate. Alternatives with a Low ranking require a full-time staff member to operate.

Implementation Cost: This criterion addresses both the ease with which Mid-Main can implement the policy alternative and the acceptability of the alternative to the staff. This criterion differs from Cost as it assesses the difficulty of establishing the alternative and of ensuring Mid-Main's staff enact the alternative. Alternatives with a High ranking already have mechanisms in place through which Mid-Main can establish the alternative. Alternatives with a Medium ranking require a moderate time investment by Mid-Main's Executive Director to establish. Alternatives with a Low ranking require significant initiative of the board of directors and Executive Director to establish and may require staff to be convinced of its importance.

Patient Uptake: This criterion assesses two factors: 1) how many non-participant patients are exposed to the policy alternative, and 2) the likelihood of the non-participant patients will participate in a voluntary organization following exposure to the alternative. This study assesses the first factor with the frequencies listed in Table 12. Rather than conduct patient interviews or surveys to determine the second factor, this survey estimates the likelihood non-

participant patients will participate instead. A High ranking indicates a high likelihood non-participants will be exposed and subsequently participate in a voluntary organization, a Medium ranking indicates a moderate likelihood of exposure and/or participating, and a Low ranking indicates a low likelihood of exposure and/or participating.

4.9 Evaluation of Alternatives

The following subsections list the rankings of each alternative according to the established criteria. The data for the evaluation originates largely from Irene Clarence, Executive Director of Mid-Main; this study uses Clarence's experience and knowledge of the patient population of Mid-Main in place of salary figures to assess Operating Cost and Implementation Cost and large-scale patient interviews to assess Patient Uptake.

4.9.1 Evaluation Matrix

The following matrix measures the rankings of the five policy alternatives according to the three evaluation criteria. This study assigns each ranking a numerical score, with a Low ranking corresponding to a score of one and a High ranking corresponding to a score of three. The evaluation matrix sums the numerical scores for each alternative, with the highest score indicating the most desirable alternative. Explanations of the evaluations for the alternatives follow the table.

Table 14 Evaluation Matrix, in order of Desirability

Policy Alternative	Operating Cost	Implementation Cost	Patient Uptake	Total Score
Doctors Discuss Voluntary Organizations during Individual Patient Appointments	High (3)	High (3)	Medium (2)	8
Status Quo	High (3)	High (3)	Low (1)	7
Representative from a Voluntary Organization Speaks to the Diabetic Support Group	High (3)	Medium (2)	Medium (2)	7
Diabetic Patients Volunteer for Mid-Main	Medium (2)	Low (1)	Low initially; may improve with time (1)	4
Participation Resource Package for Diabetics	Low (1)	Low (1)	Medium (2)	4

4.9.2 Evaluation: Status Quo

Operating Cost: Status Quo ranks High on the operating cost criterion, as it requires no further investment of time by Mid-Main staff or money from the budget. Mid-Main’s board of directors and Executive Director would likely prefer a policy alternative that does not entail costs much higher than the Status Quo as Mid-Main possesses limited financial resources with which to operate any new alternative.

Implementation Cost: Status Quo also ranks High on Implementation Cost because no new programs are established and the health professionals are all familiar with the current programs (Clarence, 2007). The Status Quo does not require Mid-Main to train its staff to administer new programs nor to convince staff of the usefulness of new programs.

Patient Uptake: Status Quo ranks Low on Patient Uptake. Anecdotal evidence suggests that patients do prefer the group doctor visits to the individual appointments and do much of the work necessary to organize the diabetic support group meetings (Clarence, 2007). However, neither of these programs inform patients of the benefits of participation nor specifically encourages diabetic patients to participate in voluntary organizations.

4.9.3 Evaluation: Doctors Discuss Voluntary Organizations during Individual Patient Appointments

Operating Cost: This alternative ranks High on the operating cost criterion, as it would only require the doctor take a couple of minutes per patient to determine if they participate in voluntary organizations and explain the health benefits of doing so. Other than documenting the interaction in the patient's chart and determining participation rates among patients later, the doctor is not required to invest additional time outside of the appointment.

Implementation Cost: This alternative also ranks High on this criterion, as it requires no new organizations or meeting times to establish. The Executive Director explains the study to Mid-Main's doctors during a regularly scheduled staff meeting and requests the doctors discuss participation with their patients. The doctors and Executive Director could then evaluate the results of this alternative at another staff meeting several months later. The Executive Director also expressed interest in this idea and believed it could be easily implemented (Clarence, 2007).

Patient Uptake: This alternative targets diabetic patients in individual doctor appointments only because non-participants are more likely to see their doctor in this setting. This alternative could effectively reach 72 per cent of non-participant diabetic patients. It is not clear how successful doctors will be in convincing non-participant patients to participate; however, if the doctor has rapport with the patient, her ability to persuade the patient may increase. Therefore, this study assigns this alternative a Medium ranking for this criterion.

4.9.4 Evaluation: Representative from a Voluntary Organization Speaks to the Diabetic Support Group

Operating Cost: Diabetic patients schedule guest speakers for the diabetic support group based on their desire to learn more about topics related to diabetes; neither Mid-Main nor its staff are directly involved in the scheduling. This alternative ranks High on the operating cost criterion because it does not require Mid-Main staff to invest the time needed to locate and book the speaker and Mid-Main would not need to pay the speaker.

Implementation Cost: The existence of the diabetic support group means that Mid-Main already organizes the group of diabetics to which the representative would speak. However, because the patients decide what topics their guest speakers address, Mid-Main must convince these patients that participation in voluntary organizations is an important topic to diabetics. The health professionals attending the support group would need to be informed of the findings of this study and would need to determine how best to relay these findings to the support group and how

best to convince them to book a speaker from a voluntary organization. Because of the extra planning required by the health professional to establish this alternative, this alternative receives a Medium ranking for this criterion.

Patient Uptake: This alternative could convince patients to participate because a speaker experienced in voluntary organizations would have considerable information on voluntary organizations and would relate their personal experiences with such organizations. However, less than half of non-participant patients attend the diabetic support group, meaning several non-participant diabetics would not hear the speaker. Additionally, a doctor can follow-up with their patients individually during their appointments every three months; a speaker can convince patients to participate only as often as they are booked. Support group patients would also be less likely to support this option if the representative requests a speaking fee or charges patients for admission. This study therefore ranks this alternative as Medium for the patient uptake criterion.

4.9.5 Evaluation: Diabetic Patients Volunteer for Mid-Main

Operating Cost: A patient volunteer program would require a Mid-Main staff member to assign specific patients to specific tasks before the patients arrive. On the day the volunteers arrive, a Mid-Main staff member would need to direct volunteers and manage any unforeseen difficulties. The Mid-Main staff member need not be a health professional, but the staff member would need to invest several hours to run the program, more time than required by the three previous policy alternatives. This alternative thus receives a Medium ranking for the operating cost criterion.

Implementation Cost: Mid-Main's Executive Director expressed interest in establishing a mechanism by which patients at Mid-Main can periodically volunteer for Mid-Main (Clarence, 2007). However, such a mechanism does not yet exist and its creation would require a significant investment by the Executive Director. Other staff members and the board of directors may also need to be convinced of the benefits and feasibility of creating this mechanism. Because it could not use previously existing groups or procedures in its implementation, this alternative ranks Low on the implementation cost criterion.

Patient Uptake: This alternative receives an initial rank of Low on the patient uptake criterion, though this rank could increase with time. Putnam believes that people continue to volunteer for groups because they share values with their fellow group members and come to trust those members (Fahey, 2003, 14). Though Mid-Main's diabetics interact with one another during group doctor visits and the diabetic support group, they do not yet participate in a group

requiring cooperation and trust to complete a specific task. As such, a sense of community or shared values may not exist among Mid-Main's patients; this lack of community among diabetics may initially reduce the willingness of patients to volunteer for Mid-Main. If a culture of volunteerism does establish itself at Mid-Main, more volunteers may participate. Such volunteerism at a CHC is not without precedent; the REACH CHC requests volunteers for special events, for its dental clinic, and for a multicultural family centre (REACH CHC, 2007). However, even if Mid-Main does achieve a similar level of commitment, diabetics who do not currently participate in voluntary organizations must volunteer with to improve their self-rated health and it is unclear how many of them would do so.

4.9.6 Evaluation: Participation Resource Package for Diabetics

Operating Cost: The participation resource package ranks Low on the operating cost criterion. The Executive Director of Mid-Main states that programs and organizations frequently appear and disappear in the community depending on the availability of funding (Clarence, 2007). Because of the volatile nature of these programs, the Executive Director believes that Mid-Main would require a full-time staff person to administer and update such a package. This alternative would require more time than administering a Mid-Main volunteer program, giving it its Low ranking relative to the other alternatives.

Implementation Cost: Mid-Main has never attempted to put together such a package before (Clarence, 2007). Mid-Main would also require a full-time staff member to contact various voluntary organizations for pamphlets, develop links with other organizations, and research and create material describing how to join an organization and continue participating (Clarence, 2007). Additionally, the Executive Director appeared concerned that this idea would be too costly and offer limited benefit to Mid-Main and its patients (Clarence, 2007). Therefore, this alternative ranks Low for the implementation cost criterion.

Patient Uptake: All diabetic patients who do not currently participate in voluntary organizations would receive the participation resource package as the doctors could identify non-participants in both the group and individual doctor appointments. Patients would not need to research groups (as the doctor discussion alternative would require) and would possess materials educating them on how to participate without attending the diabetic support group (as the speaker alternative would require). However, though it provides the patient more information at less personal cost than all other alternatives, this alternative does not reinforce the value of participation to a diabetic's health with personal interaction. A doctor recommending

participation or a speaker describing personal experiences may produce greater compliance in diabetic patients than a package of pamphlets and instructions. This alternative thus ranks as Medium for this criterion.

4.10 Evaluation Summary

Comparing the five alternatives with the three evaluation criteria suggests that doctor discussions with individual patients is the recommended policy alternative. The Status Quo incurs no additional operating costs for Mid-Main, requires no additional procedures to be implemented, but would not, on its own, improve the self-rated health of its diabetics. By comparison, the doctor discussions alternative would incur a very small time cost above the Status Quo to operate, would require no additional procedures or meetings to implement, and may convince more diabetics to participate in voluntary organizations, thus improving their rating of their health. If nothing else, this alternative would give Mid-Main information as to why its diabetic patients do or do not participate in voluntary organizations and which non-participant patients can be convinced to participate.

Mid-Main may also consider persuading patients attending the diabetic support group to book a speaker, provided this effort does not become time-consuming. This alternative also would entail little operating cost to Mid-Main and would reach almost half of non-participant diabetic patients with detailed information about voluntary organizations. The concern with this alternative is the effort required to convince the diabetic support group patients to book such a speaker. If the nurse practitioner or clinical pharmacist attending the diabetic support group can quickly convince these diabetic patients to book such a speaker, then this alternative may be viable. However, because the health professional may need to invest additional time to convince the group members of the importance of this study's findings, this alternative may become less viable.

The final two alternatives both require a significant investment of time and resources. Of the two, a patient volunteer program at Mid-Main appears more feasible in the long-term. Though such a program requires a significant time investment by administrative staff at Mid-Main to establish and may require funding for a staff person to oversee its establishment and operation, this program would offer benefits to Mid-Main beyond improving self-rated health. Increased volunteer participation would allow Mid-Main to implement new programs, address other concerns of its patients, and raise its profile among the community and potential donors. The program could also create a greater sense of community among its patients that would then

improve the self-rated health of its diabetic patients. By comparison, the participation package alternative would also require Mid-Main allocate significant staff hours and salary to its establishment and operation, but the potential benefits of this investment may not be as far-reaching as that of the volunteer program. The package may give patients the resources needed to participate in voluntary organizations and the connections Mid-Main develops with other organizations may produce collaborations in other areas, but this alternative would be less likely than the volunteer program to foster greater sense of community or increase the capacity of Mid-Main similar to the volunteer program. Regardless, the operating and implementation costs of both these policy alternatives is too prohibitive to recommend them to Mid-Main as alternatives to improve the self-health ratings of the forty per cent of diabetic patients who do not rate their health as *Good*.

5 Conclusion

This study finds that almost sixty per cent of the diabetic patients receiving treatment at the Mid-Main CHC in Vancouver rate their health as Very Good or Good. Conversely, forty per cent of these diabetics do not rate their health this way; the consequence for these diabetic patients is that their mortality rates will likely be higher. This study therefore identified five possible policy alternatives that Mid-Main could implement to improve the self-rated health of these diabetic patients and evaluated these alternatives on their operating cost, their implementation cost, and their likelihood of patient uptake. Of the five, this study recommends doctors discuss participation in voluntary organizations with patients during individual doctor appointments.

This study also recommends Mid-Main maintain group doctor visits and the diabetic support group. Though patients who attended these programs were no more likely to rate their health as *Good* than patients who did not attend, these programs offer several advantages to Mid-Main and its patients. The group doctor visits offer Mid-Main a cost savings over traditional individual doctor appointments. Patients have also expressed their preference for this type of doctor visit and the health professionals have adapted to and embraced this format (Clarence, 2007). The diabetic support group requires little time and cost investment from Mid-Main to operate (Clarence, 2007) and more than half of the survey respondents voluntarily choose to attend this group. These programs may also offer benefits not measured in this study, such as increasing the ability of diabetics to manage their diabetes above those patients who do not attend.

This study had no data with which to compare the aggregate self-rated health of Mid-Main's diabetic patients. No studies of self-rated health among diabetics in Vancouver exist and VCHA refused to share any data from any of its CHC-like organizations. Future studies that determine the aggregate self-rated health scores of diabetics at these CHC-like organizations could then permit policymakers to compare these organizations to each other and to CHCs like Mid-Main. If these studies also determined what variables correlate with *Good* self-rated health scores at each CHC-like organization, then policymakers could propose alternatives that would improve the self-rated health of diabetics at these sites as well.

Appendices

Appendix A: The Mid-Main Diabetic Self-Rated Health Survey

Eighty-four of Mid-Main's 198 diabetic patients completed this survey and returned it either by mail or in person to Mid-Main between December 27, 2006 and March 14, 2007. A copy of the survey is found on the following two pages.

DIABETIC SELF RATED HEALTH SURVEY

About the survey: This survey is being conducted by Simon Fraser University. The purpose of this research is to determine how diabetic patients of Mid-Main Community Health Centre rate their health. In filling out this survey you are consenting to participate in this study. Your responses will be kept confidential and will not be distributed to outside parties. The survey is anonymous - please do not identify yourself. If you have any questions or complaints, you can contact Dr. Kennedy Stewart, Assistant Professor, SFU Public Policy Program, at 604.268.7913. Thank you for your participation.

<p>1. How much of your total care do you receive from Mid-Main?</p> <p>1 <input type="checkbox"/> All 2 <input type="checkbox"/> Most 3 <input type="checkbox"/> Some 4 <input type="checkbox"/> Little 5 <input type="checkbox"/> None</p>	<p>7. Have you been hospitalized or been to the emergency room in the past year?</p> <p>1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No</p>												
<p>2. In general, you would say your health is:</p> <p>1 <input type="checkbox"/> Very good 2 <input type="checkbox"/> Good 3 <input type="checkbox"/> Neither good nor bad 4 <input type="checkbox"/> Fair 5 <input type="checkbox"/> Poor</p>	<p>8. Do you have (or have had) any of these problems? (please check all that apply):</p> <p><input type="checkbox"/> Numbness or tingling in hands or feet <input type="checkbox"/> Loss of sensation in hands or feet <input type="checkbox"/> Reduced ability to feel hot or cold <input type="checkbox"/> Sores or ulcers on feet or ankles <input type="checkbox"/> Pain in legs when walking <input type="checkbox"/> Amputated toe <input type="checkbox"/> Amputated leg</p>												
<p>3. Compared to one year ago, how would you say your health is now?</p> <p>1 <input type="checkbox"/> Much better now than one year ago 2 <input type="checkbox"/> Somewhat better now than one year ago 3 <input type="checkbox"/> About the same as one year ago 4 <input type="checkbox"/> Somewhat worse now than one year ago 5 <input type="checkbox"/> Much worse now than one year ago</p>	<p>9. How many times have you attended a diabetes support group meeting at Mid-Main in the past six months? (please specify): _____</p>												
<p>4. How much control do you feel you have over your health?</p> <p>1 <input type="checkbox"/> Full control 2 <input type="checkbox"/> A lot of control 3 <input type="checkbox"/> Some control 4 <input type="checkbox"/> Little control 5 <input type="checkbox"/> No control</p>	<p>10. How many times have you attended a diabetes support group meeting outside of Mid-Main in the past six months? (please specify): _____</p>												
<p>5. Have you been diagnosed with any of the following chronic conditions? (please check all that apply):</p> <table border="0"> <tbody> <tr> <td><input type="checkbox"/> High Blood Pressure</td> <td><input type="checkbox"/> Asthma</td> </tr> <tr> <td><input type="checkbox"/> Heart Disease</td> <td><input type="checkbox"/> Arthritis</td> </tr> <tr> <td><input type="checkbox"/> Depression</td> <td><input type="checkbox"/> Deafness</td> </tr> <tr> <td><input type="checkbox"/> Eyesight Problems</td> <td><input type="checkbox"/> Hip Fracture</td> </tr> <tr> <td><input type="checkbox"/> Stroke</td> <td><input type="checkbox"/> Cancer</td> </tr> <tr> <td colspan="2"><input type="checkbox"/> Other (please specify): _____</td> </tr> </tbody> </table>	<input type="checkbox"/> High Blood Pressure	<input type="checkbox"/> Asthma	<input type="checkbox"/> Heart Disease	<input type="checkbox"/> Arthritis	<input type="checkbox"/> Depression	<input type="checkbox"/> Deafness	<input type="checkbox"/> Eyesight Problems	<input type="checkbox"/> Hip Fracture	<input type="checkbox"/> Stroke	<input type="checkbox"/> Cancer	<input type="checkbox"/> Other (please specify): _____		<p>11. How many times have you attended any other group meetings related to your health either inside or outside of Mid-Main in the past six months? (please specify): _____</p>
<input type="checkbox"/> High Blood Pressure	<input type="checkbox"/> Asthma												
<input type="checkbox"/> Heart Disease	<input type="checkbox"/> Arthritis												
<input type="checkbox"/> Depression	<input type="checkbox"/> Deafness												
<input type="checkbox"/> Eyesight Problems	<input type="checkbox"/> Hip Fracture												
<input type="checkbox"/> Stroke	<input type="checkbox"/> Cancer												
<input type="checkbox"/> Other (please specify): _____													
<p>6. Do you have difficulty performing any of the following tasks? (please check all that apply):</p> <table border="0"> <tbody> <tr> <td><input type="checkbox"/> Eating</td> <td><input type="checkbox"/> Using the washroom</td> </tr> <tr> <td><input type="checkbox"/> Bathing or showering</td> <td><input type="checkbox"/> Walking</td> </tr> <tr> <td><input type="checkbox"/> Dressing or undressing</td> <td><input type="checkbox"/> Using the stairs</td> </tr> <tr> <td><input type="checkbox"/> Standing up/Sitting down</td> <td><input type="checkbox"/> Going outdoors</td> </tr> <tr> <td><input type="checkbox"/> Shaving or brushing hair</td> <td></td> </tr> </tbody> </table>	<input type="checkbox"/> Eating	<input type="checkbox"/> Using the washroom	<input type="checkbox"/> Bathing or showering	<input type="checkbox"/> Walking	<input type="checkbox"/> Dressing or undressing	<input type="checkbox"/> Using the stairs	<input type="checkbox"/> Standing up/Sitting down	<input type="checkbox"/> Going outdoors	<input type="checkbox"/> Shaving or brushing hair		<p>12. How many times have you seen your doctor with a group of other patients for your diabetes in the past six months? (please specify): _____</p>		
<input type="checkbox"/> Eating	<input type="checkbox"/> Using the washroom												
<input type="checkbox"/> Bathing or showering	<input type="checkbox"/> Walking												
<input type="checkbox"/> Dressing or undressing	<input type="checkbox"/> Using the stairs												
<input type="checkbox"/> Standing up/Sitting down	<input type="checkbox"/> Going outdoors												
<input type="checkbox"/> Shaving or brushing hair													
	<p>13. How would you describe your sense of belonging to your local neighbourhood?</p> <p>1 <input type="checkbox"/> Very strong 2 <input type="checkbox"/> Somewhat strong 3 <input type="checkbox"/> Neither strong nor weak 4 <input type="checkbox"/> Somewhat weak 5 <input type="checkbox"/> Very weak</p>												
	<p>14. How often do you participate in meetings or activities with any voluntary organizations such as church social groups, community centres, ethnic associations or civic clubs?</p> <p>1 <input type="checkbox"/> At least once a week 2 <input type="checkbox"/> At least once a month 3 <input type="checkbox"/> At least 3 or 4 times a year 4 <input type="checkbox"/> At least once a year 5 <input type="checkbox"/> Not at all</p>												

15. Using the following scale, please rank **how much you trust** the following:

	Do not trust at all					Completely trust
a. Family	1	2	3	4	5	6
b. Friends	1	2	3	4	5	6
c. Neighbours	1	2	3	4	5	6
d. Strangers	1	2	3	4	5	6
e. Doctors	1	2	3	4	5	6
f. Nurses	1	2	3	4	5	6
g. Pharmacists	1	2	3	4	5	6

16. Is there anything else that Mid-Main could do to help you manage your diabetes?(please specify):

17. Are you: 1 Female 2 Male

18. Your Postal Code: _____

19. Your marital status:

- 1 Single
 2 Married
 3 Separated
 4 Divorced
 5 Widow/Widower

20. How many years have you lived in Vancouver?

- 1 less than 1 year
 2 1 - 3 years
 3 4 - 6 years
 4 7 years or more

21. What is your current living situation?

- 1 Homeowner 2 Renter

22. Your age:

- 1 18-24 4 45-54
 2 25-34 5 55-64
 3 35-44 6 65 +

23. Do you mainly speak English in your home?

- 1 Yes 2 No

24. What is the highest level of education you have completed (**check one**):

- 1 Did not complete high school
 2 High school
 3 Trade certificate
 4 College certificate
 5 Bachelor degree
 6 Graduate degree

25. What is your annual **household** income?

- 1 \$0-19,999 6 \$100,000-109,999
 2 \$20,000-39,999 7 \$110,000-129,999
 3 \$40,000-59,999 8 \$130,000-149,999
 4 \$60,000-79,999 9 \$150,000-169,999
 5 \$80,000-99,999 10 \$170,000 or more

26. Which best describes your ancestral background?

- 1 Chinese 5 Southeast Asian
 2 Filipino 6 White/Caucasian
 3 Japanese 7 Other: _____
 4 South Asian

27. Were you born in Canada? 1 Yes 2 No

About You

Appendix B: Map of Self-Rated Health in Greater Vancouver

The following presents a representation of CIHI 's depiction of the census tracts in Greater Vancouver (CIHI, 2006, 29). Table 1 matches the colours of the census tracts to their self-rated health score. The yellow dot on the map represents the Mid-Main Community Health Centre and the lighted area surrounded by the black outline approximates Mid-Main's patient recruitment area. The eastern border of the recruitment area on the map is Victoria Drive instead of Knight St. because Statistics Canada does not use Knight St. as a border for its census tracts.

Figure 1 Categories of Census Tracts in Greater Vancouver, Location of Mid-Main, and Mid-Main's Recruitment Area



Appendix C: Model 4 Regression Coefficients (83 Cases)

Table 15 *Logistic Regression, Model 4*

Variable Name	Hyp.	B	S.E.	Wald	Sig.	Exp(B)
English spoken at home	(N/A)	-1.641	0.756	4.711	0.030	0.194
Absence of Mobility Problems	(+)	1.796	0.560	10.268	0.001	6.024
Emergency Room Visit	(-)	-1.575	0.673	5.468	0.019	0.207
Participates in Voluntary Organizations	(+)	1.275	0.601	4.502	0.034	3.577

Percentage dependent variable category predicted correctly: 73.5 per cent

Cox and Schnell Pseudo R²: 0.296

Nagelkerke Pseudo R²: 0.399

Appendix D: Frequencies, Ancestry (84 Cases)

Table 16 *Frequencies, Ancestry (Expanded)*

Variable Name	%	Valid %	(N)
White/Caucasian	59.5	60.2	50
Filipino	10.7	10.8	9
Aboriginal/Métis	8.3	8.4	7
Southeast Asian	7.1	7.2	6
Chinese	2.4	2.4	2
South Asian	2.4	2.4	2
Japanese	1.2	1.2	1
Other	6.0	6.0	5
Refused	1.2	-	1

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