

**The Diabetes Self-Management Program
In British Columbia**

Project Evaluation

Submitted to

**The Canadian Diabetes Strategy Prevention and
Promotion Contribution Program**

By

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DIABETES SELF-MANAGEMENT PROGRAM EVALUATION

INTRODUCTION

The Diabetes Self-Management Program was funded through the Canadian Diabetes Strategy Prevention and Promotion Contribution Program. The 28-month project took place in British Columbia between December 2001 and March 2004, and addressed two areas of activities previously identified in the provincial diabetes consultation workshops: Improved Support to Families, and Public Awareness and Education. The primary target population of this project were persons with type 2 diabetes living in British Columbia communities, their family members and significant others.

The goal of the project was to enhance and promote the health and well being of those affected by diabetes, including their families and community. It addressed key risk factors that can exacerbate diabetes complications. The project also coordinated community action with volunteer groups and health professionals; stimulated multi-sectoral action; and integrated diabetes care into the existing community infrastructure. The project intervention (i.e., the Diabetes Self-Management Program) is identical to the Chronic Disease Self-Management Program that was developed by Dr. Kate Lorig at Stanford University. In this project we wanted to target persons with type 2 diabetes and therefore called it the “Diabetes Self-Management Program”. This evaluation describes the progress in achieving the project’s objectives.

DESCRIPTION OF THE DIABETES SELF-MANAGEMENT PROGRAM

The Diabetes Self-Management Program (DSMP) is a lay-led patient education program. It is presented by pairs of trained lay leaders to groups of 10-12 persons. The group meets once a week for 2 1/2 hour sessions over six consecutive weeks. Course participants are persons who are experiencing type 2 diabetes. The program teaches the following content: how to develop a personal exercise program; cognitive symptom management; healthy eating; breathing exercises; problem solving; communication skills (with family, friends, and health care providers); use of medication; how to deal with negative emotions of anger, frustration and fear; and how to manage depression. The DSMP does not take the place of the traditional doctor-patient relationship, or of professional-patient education; it is complementary to, and reinforces such education. In the program participants obtain new information, learn new skills and abilities, and develop higher levels of self-efficacy to manage and cope with chronic health conditions. Participants give and receive support from others who are experiencing similar health conditions. As well, they realise they are not alone and the difficulties they are experiencing are normal. The sessions are highly interactive, with emphasis on strategies to help individuals manage life more effectively. It includes skills mastery (accomplished through weekly contracting to do specific behaviours and through feedback) and modelling (accomplished by lay leaders with chronic conditions). There is frequent use of group problem-solving sessions.

The program is led by pairs of trained lay leaders who follow a scripted manual. Each leader has successfully completed a four-day training workshop where he/she learns to follow the DSMP Leader's Manual. The courses are then delivered in community settings (senior centres, libraries, and recreation centres).

ACHIEVEMENT OF PROJECT OBJECTIVES

There are two types of objectives: a) process objectives which specified the type and amount of activity that would be carried out in the project; and b) impact objectives which indicated the impact the project will have on those who participate.

A) PROCESS OBJECTIVES

During the 28-month project, we planned to:

1. Conduct 19 four-day Leader-Training Workshops throughout BC;
2. Train 190 persons to be program leaders;
3. Deliver the Diabetes Self-Management Program 55 times;
4. Deliver the program to 550 persons;
5. Train 8 – 10 persons as Master Trainers; and
6. Establish an infrastructure to ensure program sustainability beyond the 28-month project period.

B) IMPACT OBJECTIVES

After participating in the Diabetes Self-Management Program we indicated that participants would:

1. Experience better health outcomes;
2. Have improved hemoglobin A1c levels; and
3. Utilize the health care system more effectively.

This evaluation report describes the project's success in achieving both the process and impact objectives.

PROCESS OBJECTIVES 1 AND 2 - TRAINING PROGRAM LEADERS

Process objectives 1 and 2 specified that we would conduct a total of 19 four-day Leader Training Workshops to train 190 program leaders throughout B.C. To become a qualified course leader, participants must successfully complete a four-day Leader-Training Workshop delivered by a certified Master Trainer. In the four-day training workshop, people learn how to follow a scripted protocol (i.e., a Leader's Manual) to deliver the course. This program is presented for 2 ½ hours per week for six consecutive weeks. Each weekly meeting has five or six activities, which must be delivered as specified in the Leader's Manual.

During the training period, all activities are demonstrated by the Master Trainers, and then discussed with the trainees. As well, each trainee must demonstrate he/she can follow the Leader's Manual by conducting two practice teaching sessions. The Master Trainers evaluate the trainees and a certificate is awarded to those participants successfully demonstrating their understanding of the Leader's Manual, following it to deliver the course. Table 1 lists dates, locations, and the number of persons in the Leader-Training Workshops.

Table 1

Communities where Leader-Training Workshops were held and number of Leaders

Date	Community	Trained Leaders
January 2002	Vancouver	12
February 2002	Williams Lake	10
March 2002	Tofino	11
March 2002	Nanaimo	5
April 2002	Victoria	19
June 2002	Alkali Lake	5
June 2002	Prince George	10
August 2002	Parksville	13
September 2002	Sechelt	13
September 2002	Prince George	8
September 2002	Campbell River	6
October 2002	Squamish	11
January 2003	Vernon	13
February 2003	Kelowna	17
February 2003	Nanaimo	9
February 2003	Surrey	8
March 2003	Victoria	7
April 2003	Penticton	8
June 2003	Castlegar	7
June 2003	Fort Nelson	2
July 2003	Kamloops	14
September 2003	Chemainus	11
September 2003	Powell River	7
Total	23	226

In total, the team conducted 23 Leader-Training Workshops in 20 communities, training 226 DSMP Leaders. Therefore, process objectives 1 and 2 were exceeded. We were able to conduct four additional Leader-Training Workshops and train an additional 36 program leaders.

PROCESS OBJECTIVES 3 AND 4 - DELIVERING THE PROGRAM

Objective 3 and 4 specified that the trained leaders would deliver the six-session Diabetes Self-Management Program 55 times to 550 persons. Table 2 lists the communities, number of programs and number of participants who participated in the Diabetes Self-Management Program.

Table 2

Communities where DSMP courses were delivered and number of participants

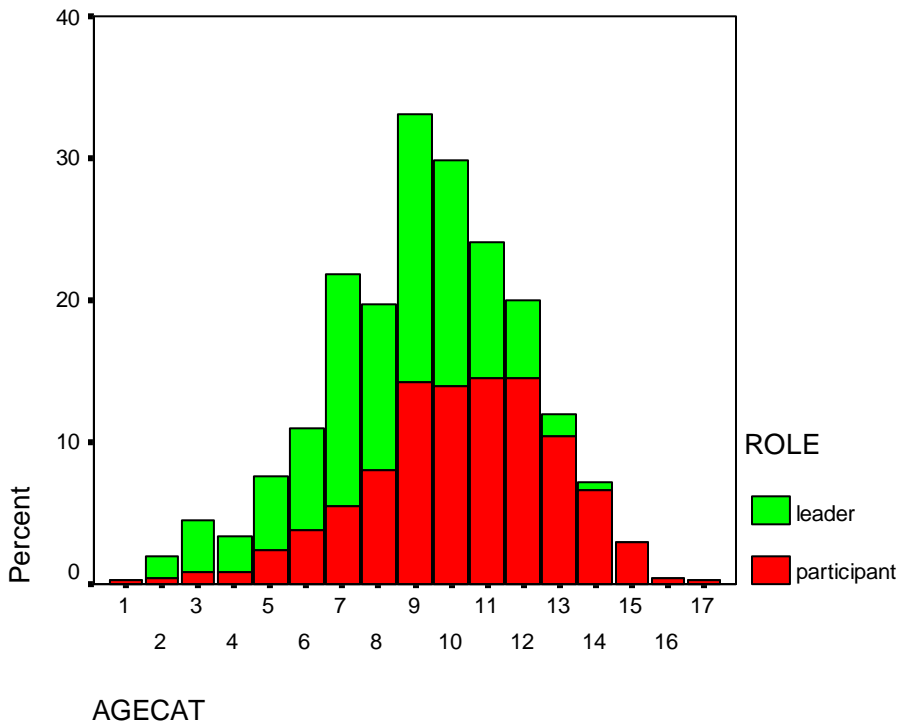
Community	Course Participants
Campbell River (4 courses)	29
Castlegar	15
Chase (2 courses)	17
Chemainus (2 courses)	13
Coquitlam	16
Cowichan	5
Falkland (2 courses)	22
Kamloops (9 courses)	86
Kelowna	12
Ladner	16
Ladysmith	6
Nanaimo (4 courses)	27
Parksville	10
Pemberton	9
Penticton (3 courses)	40
Powell River	7
Prince George (6 courses)	65
Qualicum Beach	10
Richmond	18
Sechelt	20
Sorrento	13
Surrey (4 courses)	53
Texada Island	7
Valemont (2 courses)	18
Vancouver (4 courses)	66
Vernon (4 courses)	48
Victoria (6 courses)	83
Total	731

In total, 66 DSMP courses were delivered in 26 communities involving 731 participants. We were able to exceed our objectives and conduct the program 66 times (11 times more than anticipated) and deliver it to 731 persons (181 more than anticipated).

Participant Characteristics

A total of 658 persons, 199 leaders and 459 participants, completed the pre-program questionnaire. Figure 1 displays age in five-year cohorts with 1 (16 to 20 years) to 17 (96 to 100 years) for program leaders and participants.

Figure 1. Age of leaders and participants in five-year cohorts



As illustrated in Figure 1, leaders tended to be younger than participants. Table 3 lists the gender, age, education level, ethnicity, marital status, and proportion of leaders and participants with diabetes.

Table 3

Gender, age, education level, ethnicity, marital status of leaders and participants (n=658)

Characteristics	Leaders (n=199)	Participants (n=459)
Gender	82% female	73% female
Average Age	55 years (SD=12)	65 years (SD=13)
Average Years of Education	13 years (SD=3)	12 years (SD=3)
Ethnicity	64% English	75% English
Living Situation	62% married or with partner	48% married or with partner
Diabetes	94 (47%) had diabetes	329 (72%) had diabetes

As seen in Table 3, a higher proportion of leaders were female. Leaders were, on average, 10 years younger than participants. A higher proportion participants indicated English was their ethnic origin, and a smaller proportion of participants were married or living with a partner. Forty-seven percent of leaders had diabetes while 72% of participants had diabetes.

PROCESS OBJECTIVE 5 - TRAINING MASTER TRAINERS

Process objective 5 specified that we would train 8 – 10 persons as Master Trainers. In British Columbia, Master Trainers are trained by Patrick McGowan (Centre on Aging).

Ideally, a Master Trainer is a person who:

has a chronic a health condition;

has taken the DSMP course;

has successfully completed the 4-day Leader Training Workshop;

has co-led at least two DSMP courses; and

expresses an interest in taking additional training to become a Master Trainer.

This trainee then participates in two additional Leader-Training Workshops, the second of which is taught by Dr. McGowan. During the project, 8 new Leader Trainers completed this process:

Carol MacDonald	Nanaimo
Cheryl Hobson	Victoria
Joan Watterson	Vancouver
Phillis Cole	White Rock
Lee White	Abbotsford
Fran Hensen	Vernon
Joan Jacobson	Vernon
Jennifer Pring	Salmon Arm

PROCESS OBJECTIVE 6 - DEVELOPING PROGRAM SUSTAINABILITY

This objective stated that we would establish an infrastructure to ensure program sustainability beyond the 28-month project period. We have achieved this objective through two developments. The first development occurred in April 2003 when the BC Ministry of Health, as part of the adoption of the “Chronic Care Model”, provided resources to the University of Victoria – Center on Aging to conduct a three-year project to implement and evaluate self-management programs throughout the five provincial Health Authorities. In this project the Centre is working with each provincial health region to train leaders and develop the region’s capacity to sustain the program at the end of the three years.

The second development contributing to program sustainability was a three-year research grant awarded by the BC Medical Services Commission. This grant was provided to conduct a study entitled “*The Effectiveness of Diabetes Patient Education and Self-Management Training for Persons with Type 2 Diabetes*”. The goal of this research is to investigate the effectiveness of a new model of diabetes patient education for persons with type 2 diabetes. The project is a partnership between the Centre on Aging, University of Victoria and the Diabetes Education Centre, located at Richmond Hospital. Research team members are: P. McGowan PhD. (PI), University of Victoria; Fran Hensen, RN, M.Ed., Interior Health Region; Dr. J. Lu, Medical Health Officer, Ann Dauphinee, Health Promotion Coordinator, Moira Bradshaw, Dietitian, and Barb Leslie, Chief Clinical Coordinator, Nutrition Services.

This study is a randomized controlled trial investigating the effectiveness of diabetes patient education in comparison to diabetes patient education augmented by the Chronic Disease Self-Management Program. When doctors refer patients with type 2 diabetes for patient education, patients will be asked to participate in a study testing the effectiveness of two models of patient education. Those who agree and provide consent will be randomly assigned to a group which receives regular diabetes patient education or to a group which receives regular diabetes patient education augmented by the self-management program delivered in the Wellness Centre. We plan to enroll at least 150 patients in each group. Baseline information will be collected three times; when people agree to participate in the study, at six months, and at twelve months.

Outcome measures include: self-report health information; biomedical information (e.g., hemoglobin, microalbuminuria, lipids, cholesterol levels, and blood pressure); and health care utilization information (e.g., doctor visits, visits to Emergency Department, and nights in hospital) over two time periods. The 12 month period occurs before they receive patient education, and the second 12-month period follows the completion of their participation in the patient education program.

This research is important because: it is evaluating the relative effectiveness of two types of diabetes patient education programs for persons with type 2 diabetes; it will also provide valuable information to the National Diabetes Association which is currently re-assessing the way patient education is delivered, and may therefore represent the new model. Additionally, the BC Ministry of Health is advocating that all persons with chronic health conditions participate in self-management education. The information from this study will provide valuable information on the effectiveness of this approach with persons with type 2 diabetes.

IMPACT OBJECTIVE 1 - IMPROVING THE HEALTH OF PARTICIPANTS

Impact objective 1 stated that participants would experience better health outcomes after taking the Diabetes Self-Management Program. To determine if this objective was attained we used the following process. At Session One of the course, leaders gave participants a questionnaire, which they were asked to complete at home and return at the beginning of Session Two. The leaders then mailed the completed questionnaires to the project director. Six months after completion of the course, participants completed a post-program questionnaire which was sent to them by mail.

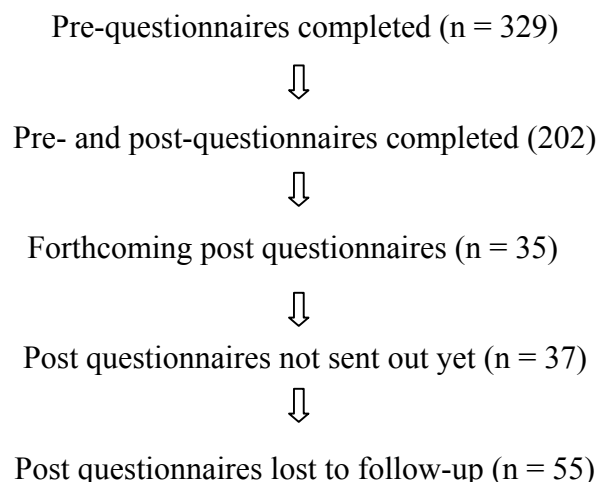
The research incorporated the recommendations made by Norris et al. (2001) and used a one group pre- and post-program design, and included mediating variables (e.g., self-efficacy, problem-solving, and coping skills) and quality of life outcomes. During the period between January 2002 and April 2004, 423 program participants with diabetes, 94 leaders and 329 participants, completed the pre-program questionnaire (Appendix A).

Impact on Program Participants with Diabetes

At the beginning of Session One leaders distributed the questionnaire and asked participants to complete it at home and return it at the beginning of Session Two. The six-month post-program questionnaire was mailed to participants by the project data coordinator along with a stamped, return-addressed envelope. Program leaders were also asked to complete the questionnaires in the same manner.

This analysis is a comparison of pre- and six-month post-program scores contained in the questionnaires and uses a one-group pre- and six-month post-program matched group design. As shown in Figure 2, when the analysis was conducted, pre- and six-month post-program questionnaires had been collected from 202 of the 329 persons with diabetes who had completed the pre-program questionnaire. The research team was still waiting for post-program questionnaires from 35 participants who had recently completed the program, and 37 participants had not been contacted to complete the post-questionnaire because the six-month time period had not been reached. Lastly, due to participant mobility, post-program questionnaires from 55 participants were lost in the follow-up.

As illustrated in Figure 2, the best case scenario is we will be able to re-do the analysis with pre- and post program questionnaires completed by 272 participants with diabetes (83%).



Pre- and post-program questionnaires completed by DSMP participants.

The following analysis was conducted with data from the 202 participants with diabetes who completed both the pre-course and six-month post-program questionnaire. Health measure scores were computed and compared between the two time periods to calculate whether differences were statistically significant. This analysis was conducted in April 2004.

The questionnaire contained seven types of outcome measures:

1) Self-management behaviors:

- amount of time doing cognitive symptom management,
- communication with physician, (summary score of three questions)

When you visit your doctor, how often do you do the following:

- a) prepare a list of questions for your doctor;*
- b) ask questions about the things you want to know and things you don't understand about your treatment;*
- c) discuss any personal problems that may be related to your illness.*

- amount of time doing aerobic exercises, and
- amount of time doing stretching/strengthening exercises.

2) Self-efficacy levels:

- self-efficacy to manage symptoms. (summary score of four questions)

How confident are you that you can...

- a) keep the fatigue caused by your disease from interfering with the things you want to do?*
- b) keep the physical discomfort or pain of your disease from interfering with the things you want to do?*
- c) keep the emotional stress caused by your disease from interfering with the things you want to do?*
- d) keep other symptoms of health problems you have from interfering with the things you want to do?*

3) Outcomes regarding health status:

- self-rated health,

In general, would you say your health is?

<i>Excellent</i>	<i>1</i>
<i>Very Good</i>	<i>2</i>
<i>Good</i>	<i>3</i>
<i>Fair</i>	<i>4</i>
<i>Poor</i>	<i>5</i>

- social/role activities limitations, (summary to four questions),

During the past week, how much has your health interfered with...

- a) your normal social activities with family, friends, neighbors or groups?*
- b) your hobbies or recreational activities?*
- c) your household chores?*
- d) your errands and shopping?*

- health distress, (summary to four questions),

How much during the past week ...

- a) were you discouraged by your health problems?*
- b) were you fearful about your future health?*
- c) was your health a worry?*
- d) were you frustrated by your health problems?*

- fatigue level,
- shortness of breath, and
- pain severity.

4) Medical care utilization (last four months):

- number of doctor appointments,
- number of visits to hospital emergency room,
- number of times hospitalized, and
- number of nights in hospital.

5) Eating behaviours:

- number of times ate breakfast in last week,
- had milk for breakfast today,
- had cheese for breakfast today,
- had yogurt for breakfast today,
- had eggs for breakfast today,
- had meat, poultry, or fish for breakfast today,
- had beans for breakfast today,
- number of times they ate vegetables yesterday, and
- number of times they ate fruit yesterday.

6) Glucose testing:

- have a machine to measure their blood sugar level, and
- number of days last week they tested blood sugar level.

7) Diabetes medications:

- number of days last week they missed taking pills as prescribed, and
- number of days last week they missed taking insulin injections as prescribed.

Table 5 shows the pre- and post-program scores on each measure as well as t-scores and significance levels.

Table 5

Pre- and six-month post-program scores on CDSMP outcome measures (n=202)

MEASURES	Pre	Post	T	Sig. (2-tailed)
<i>Self-Management Behaviors</i>				
▪ Practiced relaxation exercises	1.65	2.17	-1.66	.111
▪ Communication with physician	2.78	2.95	-2.38	.019
▪ Time doing aerobic exercises	.67	.65	.47	.643
▪ Time doing stretching/strengthening	1.22	1.23	-.18	.860
<i>Self-efficacy Measures</i>				
▪ Self-efficacy to manage disease symptoms	6.28	6.85	-3.25	.001
<i>Health Status</i>				
▪ Self-Rated Health	3.23	3.09	2.66	.007
▪ Social/Role Activities Limitations	1.18	1.12	.83	.410
▪ Health Distress	1.89	1.63	2.74	.007
▪ Fatigue Level	4.63	4.44	1.13	.260
▪ Shortness of Breath	2.43	2.35	.59	.555
▪ Pain Severity	4.25	3.80	2.56	.011
<i>Medical Care Utilization (last 4 months)</i>				
▪ # of doctor appointments	4.09	3.97	.47	.640
▪ # of visits to hospital emergency room	.23	.21	.29	.776
▪ # of times hospitalized	.10	.08	.57	.565
▪ # of nights in hospital	.43	.26	.92	.359
<i>Eating behaviours</i>				
▪ # of times ate breakfast in last week	6.41	6.76	-3.43	.001
▪ had milk for breakfast today	.73	.63	2.61	.010
▪ had cheese for breakfast today	.18	.21	-.87	.386
▪ had yogurt for breakfast today	.07	.13	-2.55	.012
▪ had eggs for breakfast today	.26	.32	-1.07	.287
▪ had meat, poultry, or fish for breakfast today	.07	.10	-1.22	.227
▪ had beans for breakfast today	.00	.02	-1.74	.083
▪ # of times ate vegetables yesterday	2.18	2.22	-.31	.759
▪ # of times ate fruit yesterday.	2.16	2.17	-.08	.939

Statistically significant changes (bolded) were observed in nine outcome measures.

At six-months post-program, participants:

1. had improved communication with their doctor;
2. had a higher level of self-efficacy to manage disease symptoms;
3. believed they had better health;
4. were less distressed by their symptoms;
5. were experiencing less pain;
6. had increased the number days they ate breakfast;
7. were drinking milk fewer times at breakfast;
8. were eating yogurt more often at breakfast; and
9. had fewer days where they missed taking medications as prescribed.

Eight of the changes are in the positive direction, but one change – drinking milk fewer times at breakfast – actually decreased, which cannot be explained. With respect to the Health Care Utilization, even though none of the changes in the five subscales reached statistical significance, all changes were in the desired direction.

When the same analysis was conducted with the DSMP participants who did not have diabetes, we found that at six months they had:

1. improved communication with their doctor; and
2. a higher level of self-efficacy to manage disease symptoms.

Impact on Program Leaders with Diabetes

Program leaders are community volunteers with diabetes who successfully complete a four-day Leader-Training Workshop. In the workshop and through the process of leading the self-management program they learned new skills and techniques to help others, and by helping others, learned to manage and cope with their own condition. They also were able to transfer these new skills into other areas of their lives. Leaders should also benefit as program participants did, because they also had diabetes. A pre- and six-month post-program matched analysis was conducted with the program leaders.

At six-months post-program, leaders:

1. were less distressed by their symptoms;
2. were experiencing less fatigue;
3. were eating fruit more often; and
4. had improved communication with their doctor.

IMPACT OBJECTIVE 2 - LOWERING HEMOGLOBIN A1c LEVELS

This objective stated that participants would have improved hemoglobin A1c levels after completing the Diabetes Self-Management Program. In the project application we indicated that pre- and six-month post-program hemoglobin A1c readings would be collected from 450 program participants. We planned to compare hemoglobin A1c readings twice, once before people started the program and again six months later. Participants asked their doctor to conduct this test and have the results sent to the study director (Appendix B). As hemoglobin A1c testing is a routine part of recommended diabetes management, it did not require additional or unnecessary lab work.

During the project pre- hemoglobin A1c readings were obtained for 190 cases, but both pre- and six-month post hemoglobin A1c readings were obtained for only 141 cases.

Table 6
Comparison of pre- hemoglobin A1c levels between groups with and without six-month post program levels

Mean Pre-HgA1c for cases with a Post-HgA1c (n=141)	.06995
Mean Pre-HgA1c for cases without a Post-HgA1c (n=49)	.07631
t-test to compare the means:	P-value = .020

The cases with no follow-up hemoglobin A1c scores have a significantly higher mean pre-hemoglobin A1c score. This could explain why the overall test is not significant; that is, the lost cases had greater need for improvement. This is consistent with healthy participant self-selection bias in research studies.

Table 7 shows the mean hemoglobin A1c scores for the 141 persons before and six months after they completed the self-management program.

Table 7
Pre- and six-months post-program hemoglobin A1c scores (n=141)

Pre-program	Post-program	T score	Sig. (2-tailed)
.06995	.06887	1.41	.161

On average, there was a slight lowering of hemoglobin A1c levels over the six-month period, but the result did not achieve statistical significance. However, stratifying by pre-intervention hemoglobin A1c levels reveals that statistically significant reductions were seen among subjects with higher hemoglobin A1c levels (see Table 8). Among people with pre-intervention A1c levels greater than .07, the percentage reductions was 4.5% and the absolute reduction is .004.

Table 8

Changes in hemoglobin A1c levels between groups with varying pre- intervention levels

Cases	N	Pre	Post	P-value
All	141	.06995	.06887	.161
Pre HgA1c \leq .06	34	.05600	.05888	.003
Pre HgA1c $>.06 \leq .07$	51	.06490	.06445	.640
Pre HgA1c $>.07$	56	.08032	.07896	.011

It must be remembered that this analysis used a one group pre- and six-month post – program matched comparison, and did not involve a random sample. As well, these changes occurred over a relatively short time period. The randomized controlled trial currently being conducted at Richmond Hospital will address these methodological concerns.

IMPACT OBJECTIVE 3 – CHANGING HEALTH CARE UTILIZATION OF PARTICIPANTS

Impact objective 3 stated that after completing the program, participants would utilize the health care system differently. Health services utilization is being assessed by examining BC Ministry of Health records for the one-year period before people entered the program, and for the one-year period following completion of the program. In the grant application we specified that we would examine the records of 250 participants. Program participants were asked to give their consent to the researcher to access their utilization records at the BC Ministry of Health (Appendix C). In total, 401 persons gave their consent – 264 participants and 137 program leaders. This analysis has not been completed yet, as the one-year time period has not elapsed from the time all participants completed the program.