I. Executive Summary

Type 2 diabetes is one of the fastest growing diseases in Canada. Some ethnic groups (people of African, Asian, and Hispanic descent) have an elevated risk of diabetes compared to the general population. While type 2 diabetes normally occurs only in adults, today more children and youth are being diagnosed with type 2 diabetes and facing the long-term health problems that come with the disease. The good news is that type 2 diabetes can be prevented or delayed. Some steps that will prevent or delay the onset of type 2 diabetes are increasing physical activity, eating a healthy diet, controlling weight, reducing stress, and not smoking.

The fact that Canadian studies dealing with type 2 diabetes in ethnic youth are limited has made dealing with the current situation difficult. The Canadian Ethnocultural Council's project, *Strategic Engagement of Youth in Ethnocultural Communities on Diabetes Awareness*, is an attempt to address this lack of information. It endeavours to assess the knowledge of type 2 diabetes among youth from high-risk ethnocultural communities and to work to increase individual and community capacity for prevention or delay of this disease. This project was funded by the Public Health Agency of Canada.

The goal of the project was to increase awareness among high-risk ethnocultural communities in Canada about the risk factors for type 2 diabetes and to foster healthy lifestyle habits that will prevent or delay the onset of type 2 diabetes in youth by:

- Gathering information on knowledge of type 2 diabetes and issues related to type 2 diabetes from high-risk ethnocultural communities.
- Providing information on diabetes and data on effective approaches to prevent type 2 diabetes in youth.
- Building partnerships and linkages in the communities affected.

The target populations are youth from African, Asian, and Hispanic backgrounds; their families and communities; and healthcare professionals that are from or that serve these communities. For the purpose of this project, the African population consists of people of African descent; Asian includes those from China, Philippines, Vietnam, and South Asia (India, Bangladesh, Pakistan, and Sri Lanka); and Hispanic includes those who have Latin, Central, and South American origins.

The main activities of the project were:

1. National consultations to assess community awareness of type 2 diabetes in youth conducted in five Canadian provinces with the participation of 234 individuals from the target groups.
2. A national symposium to provide background data on type 2 diabetes in youth and strategies for prevention gained from experts in the fields of medicine, dietetics, and sports.
3. A national community briefing to share the information from consultations with youth, communities, and media, and to develop appropriate strategies for distribution and dissemination within each of the target communities.

National consultations or focus groups were conducted in Ottawa, Toronto, London, Winnipeg, Vancouver, Montreal, and Dartmouth. In total, 15 focus groups were conducted and 234 individuals participated in these consultations. Data from respondents were gathered through questionnaires.

Some of the salient results are as follows:

- Only 6 percent of youth and 17 percent of adult respondents claimed to be "very knowledgeable" about diabetes.
- Few respondents knew the difference between type 1 and type 2 diabetes.
- One half of the youth respondents and 44% of the adults perceived that older people are more prone to be diabetic than younger people.
- Close to three quarters of both youth and adults considered that type 2 diabetes is something that young people have to worry about.
- A large percentage of adults and youth believed that women were not more likely than men to be affected by diabetes.
- A significant number of youth and adults thought that immigrant youth were not at a higher risk for diabetes than other youth living in Canada.
- Both youth and adults considered a family history of diabetes and obesity to be the most important predictors of diabetes.
- Both youth and adults believe that a healthy diet and exercise can control type 2 diabetes and that overweight people were more likely to suffer from it.
- The main reasons for practicing a sport or physical activity were physical health and weight reduction. Respondents did acknowledge a "fun" component to physical activities, giving high scores for pleasure, relaxation, and fun.
- The biggest impediment to youth participation in physical activities or sports was workload at school/work. Also rated high were a lack of access to activities they enjoyed, the expense, and a lack of services in the community. Discrimination was ranked higher by youth than adults.
- 75 percent of the adults rated their eating habits "good," "very good," or "excellent" as compared to 55 percent of the youth.
- Youth rated themselves as less healthy than adults. Respondents who rated themselves as healthy exercised more than those who did not.
- The three major sources of health-related information were physicians, the Internet, and medical clinics.
- The youth consumed more poultry, grain, milk products, and food with sugar and salt than did the adults.
- A large percentage of the adults cooked frequently: conversely, a large segment of youth stated that "someone else cooked." Both adults and youth claimed not to have enough time to cook.
- A majority of both adults and youth shopped at supermarkets. A sizeable number shopped at specialty stores and farmers' markets.

It was clear from the consultations that the lifestyle habits among these youth were directly contributed to an increase in the predisposition to type 2 diabetes. The communities from which these youth come do not appear to be sufficiently informed about type 2 diabetes in youth or about ways to prevent or delay its occurrence.

The consultations were followed by the national symposium. Its focus was to provide background data on type 2 diabetes in youth and give strategies for prevention from professionals and experts in the fields of medicine, dietetics, and sports.

Based on the input from the target population during the consultations and the symposium, three reports were prepared. The purpose was to increase awareness of type 2 diabetes in the selected communities and to provide information on minimizing risk factors for developing diabetes and to give some primary prevention strategies. The reports are:

1. Demographic Analysis (a separate report)

2. Community Awareness Report

3. Resource Guide for Youth, and their Families, and Caregivers (a separate report)

Through the national community briefing with youth, families, communities, and media, it was possible to share these three reports and to develop appropriate strategies for distribution and dissemination within each of the target communities. The response to the reports from youth, communities, and healthcare providers has been very positive and the process involved in distributing and disseminating the information was highly rated. Throughout the process youth involvement and contribution were noteworthy. In order to reach a large segment of the youth population, short messages on type 2 diabetes and methods for prevention were developed to be posted on YouTube.

The reports provide an overview of knowledge and skills that professionals and communities require to increase their capacity to help youth at risk of type 2 diabetes make necessary lifestyle changes. They will help to build partnerships and collaborations that are critical for the success of community programs. Further, the knowledge from this study will help to reduce the financial burden to individuals, families and communities, and the Canadian healthcare system.

The resources developed in the study are not exhaustive but are intended as tools for stimulating discussion on strategies for future action. The study raises awareness of effective interventions and will help to share the best practices, fill gaps in knowledge exchange and transfer, promote healthy living, and counter the rising rates of obesity and type 2 diabetes.

II. Introduction

Type 2 diabetes is one of the fastest growing diseases in Canada. Normally, type 2 diabetes occurs predominantly in adults. Today, however, children and youth in high-risk populations are increasingly being diagnosed with type 2 diabetes. The International Diabetes Federation[1] characterizes this increase as "alarming."

Several ethnic groups (people of African, Asian, and Hispanic descent) have an elevated risk of diabetes, as compared with the general population. Unfortunately, specific data on these populations in Canada is limited. Though type 2 diabetes occurs most frequently in adulthood, it has been increasing in children and youth from high-risk ethnic groups. Physical inactivity and unhealthy eating, lead to obesity, which is a recognized risk factor for diabetes. Obesity is a growing problem among youth, as more and more youth are physically inactive.

Diabetes can result in severe complications such as blindness, kidney failure, limb amputation, heart disease, stroke, and premature death. Because of the serious consequences of diabetes for individuals, their families, and communities, it is imperative to take action to prevent the disease and reduce the diabetes epidemic[2]. The good news is that type 2 diabetes can be prevented or delayed by making healthy lifestyle choices[3]. Medications can effectively reduce blood glucose levels for those individuals whose blood glucose levels cannot be normalized by lifestyle changes[4].

It is important to note that people with type 2 diabetes may exhibit no symptoms. For this reason, the Canadian Diabetes Association recommends that everyone 40 years and older should be tested for diabetes every three years. Individuals with multiple risk factors for diabetes, should be tested earlier and more frequently[5]. No recommendations are currently available for youth who are at risk for type 2 diabetes.

It is important for the population at risk of developing type 2 diabetes to receive culturally appropriate education and lifestyle support, both to prevent and to reduce the effects of diabetes. Individuals in ethnic communities need guidance and supportive environments to help them make the lifestyle changes necessary for prevention.

This study focuses on the primary prevention of type 2 diabetes in youth from high-risk, ethnocultural communities (people of African, Asian, and Hispanic descent). Primary prevention aims to prevent the disease from occurring by changing environments or modifiable risk factors, such as weight and exercise[2]. Increasing physical activity, eating healthy foods, controlling weight, reducing stress, and not smoking are important steps in prevention.

III. Review of Literature

Background

Currently, more than 2 million Canadians have been diagnosed with diabetes. This number is expected to reach 3 million by 2010. The figures show that 4.1 percent of the Canadian population who are age 12 and older have diabetes. The occurrence of diabetes is highest in Atlantic Canada: in Newfoundland and Labrador the proportion of the population with diabetes is 5.8 percent, in Nova Scotia it is 5.2 percent, in New Brunswick 5.1 percent, and in Prince Edward Island 5 percent[6].

In Canada, the rates of type 2 diabetes in Aboriginal children are rising[7]. This rise in occurrence of type 2 diabetes has been observed in areas around the world where the children most affected have been Hispanic, African-American, and Asian/Pacific Islanders. Although Canada does not have comparable data on these populations, Canadian Diabetes Association research in 2006 showed that Canadians of African descent are at risk of developing type 2 diabetes. Further, Zdravkovic et al.[8] studied the multi-ethnic population of children and teens diagnosed with type 2 diabetes at the Hospital for Sick Children in Toronto, Canada, examining charts of patients diagnosed with type 2 diabetes between January 1994 and November 2002. The results showed a steady increase of type 2 diabetes among children 18 years and younger, with an over-representation of African-Canadian and Southeast Asian children. Although African-Canadians represent approximately 6 percent of the Toronto and area population, 27 percent of all diabetes cases in the study were among African-Canadians. This suggests that African-Canadians and Southeast Asian children are more likely to develop type 2 diabetes than their Caucasian counterparts.

The Cost of Diabetes

Complications arising from diabetes – such as vision loss, amputations, and dialysis – take a heavy toll on individuals, family members, and communities. Diabetes affects quality of life, productivity, and relationships[9]. Over time, the high blood glucose levels can cause damage and failure of heart, kidneys, and eyes. The average life expectancy of adults with type 2 diabetes is reduced by 5-10 years[2].

In addition to the heavy toll on individuals with diabetes, the disease also has a high financial cost. Diabetes and the effects of diabetes-related illnesses are estimated to cost 9 billion dollars a year in Canada[3].

Types of Diabetes

Three main types of diabetes exist: Type 1, Type 2, and Gestational Diabetes Mellitus. Another condition that must be considered in any discussion of diabetes is Prediabetes.

Type 1 diabetes, usually diagnosed in children and adolescents, occurs when the pancreas cannot produce insulin, the hormone that ensures that body energy needs are met. Approximately 10 percent of individuals with diabetes have type 1 diabetes.

Type 2 diabetes occurs when the pancreas does not produce enough insulin or the body does not effectively use the insulin produced. Although it usually occurs only in adults, statistics show that the incidence of type 2 diabetes in youth is increasing. Approximately 90 percent of the people with diabetes have type 2 diabetes[2].

In ethnic minority groups, one in two children born in the USA will develop type 2 diabetes. Among young people, type 2 diabetes is thought to account for up to 3 percent of all cases of diabetes. A diagnosis of diabetes means that a young person's life expectancy is shortened by 10-20 years[10].

Gestational Diabetes Mellitus (GDM) refers to a glucose intolerance that occurs in some women during pregnancy. Often it ends after birth[2]. One risk factor in developing this condition is belonging to a population at high risk for diabetes – Hispanic, African, Asian, and South Asian[11]. The publication, *Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada*[12], encourages using the Glucose Tolerance Test to screen pregnant women with multiple risk factors for GDM during the first, second, and third trimesters of pregnancy.

GDM diagnosis is important because it poses a threat to both mother and child. The child may be excessively overweight at birth, which may lead to trauma for both mother and baby during delivery. These babies also have a high risk of hypoglycemia after birth and the possibility of severe breathing problems. In the long term, they may also have a greater risk of obesity and glucose intolerance[2]. Additionally, women who have had this condition have an increased risk of developing type 2 diabetes later in life.

Prediabetes, also known as Impaired Glucose Tolerance (IGT) or Impaired Fasting Glucose (IFG), occurs before type 2 diabetes has developed. In prediabetes, blood glucose (sugar) levels are higher than normal but not high enough to be diagnosed as diabetes. Prediabetes is silent – a disease with no symptoms (www.canadian-health-network.ca) – and individuals with prediabetes have an increased risk of developing type 2 diabetes. Risk factors for prediabetes are a family history of diabetes, belonging to a high-risk population, abdominal obesity, high blood pressure, and high cholesterol.

Prediabetes is a serious medical condition, and people who have this condition can prevent the development of type 2 diabetes by changing their diet and increasing their physical activity. Two large studies – the Finnish Diabetes Prevention Study[13] and the Diabetes Prevention Program[4] – have proven the benefits of a healthy lifestyle in preventing the development of type 2 diabetes. The studies showed that a low-calorie meal plan with reduced fat intake and moderate physical activity of at least 150 minutes per week reduced the onset of diabetes. Even though weight loss was modest, the studies showed a 58 percent reduction in the number of individuals with prediabetes who developed diabetes over a period of four years.

Youth in Canada

The Canadian working definition of youth includes individuals who are between 15-24 years old. Comparative definitions of youth age, age of majority, and age of right to vote are presented in Appendix 1.

Young people under age 25 are a large part of the Canadian population. In 2004, approximately a third of all Canadians were children and youth[14]. Canadian youth are culturally and linguistically diverse. The three largest groups of visible minority children and youth under age 25 are South Asian, Chinese, and African Americans. Of the more than one million children and youth with Asian origins, the majority are from East and Southeast Asia. In Canada, the largest numbers of children in visible minority groups live in Vancouver, Montreal, and Toronto.

Type 2 Diabetes in Ethnic Minorities

More than 200 different ethnic origins are recognized in Canada[14]. The projection is that by 2017 one of every five people in Canada will belong to a visible minority[14].

Type 2 diabetes is a rapidly emerging health threat in minority populations. As previously noted, African-Americans and other ethnic minority groups have a disproportionately higher occurrence of type 2 diabetes, and its complications, than do White Americans. Genetic and environmental factors contribute significantly to this disparity[15]. Obesity, a risk factor for non-insulin dependent diabetes mellitus, is also more common in these ethnic groups[16].

Risk Factors for Type 2 Diabetes in Youth

Risk factors for the development of type 2 diabetes in youth include a history of type 2 diabetes in a first- or second-degree relative and being a member of a high-risk ethnic population[17]. Other factors are being overweight[18] and having impaired glucose tolerance[19]. Individuals with prediabetes and women who have or have had gestational diabetes also have an increased risk of developing type 2 diabetes later in life[9].

Minimizing Risk of Type 2 Diabetes in Youth

The following measures can help to prevent or postpone the onset of type 2 diabetes:

- Not smoking
- Achieving and maintaining a healthy weight
- Becoming physically active – at least 60 minutes of regular, moderate-intensity activity on a daily basis
- Eating the recommended amounts and types of food each day
- Limiting the intake of foods and beverages high in calories, fat, sugar and salt[5].

Incorporating these lifestyle changes is important in helping to reverse the trend to obesity, a risk factor in developing diabetes.

Screening for Type 2 Diabetes in Youth

Diabetes can be diagnosed early through relatively inexpensive blood testing. The first step is to screen the vulnerable population for undetected cases. Researchers believe screening is important because of the rapid increase in new cases among youth each year and the fact that people often do not realize that they have diabetes. At this point, not enough evidence exists to support mass screening, which is also costly. Additionally, the resources to deal with a large number of new cases are not currently available.

In 2003, the Canadian Diabetes Association published consensus recommendations that screening in children should only be considered for those "at risk"[12]. At risk is defined as obese children more than 10 years old who also have a family history of type 2 diabetes, in utero exposure to diabetes, and belong to a high risk ethnic group (Aboriginal, Hispanic, South Asian, Asian or African).

In 2005, The Canadian Paediatric Society[20], supported establishing an "opportunistic screening" guideline for type 2 diabetes in Canadian aboriginal children. Opportunistic screening is for a child who meets several predetermined risk factors for type 2 diabetes[21].

Obesity and Ethnicity

Analysis of the data from the Canadian Community Health Survey (CCHS) shows strong associations between ethnicity and the prevalence of overweight and obese individuals in the population aged 20-64 years[22]. The CCHS survey shows that in 2004, 1.1 million boys and girls in the 2-17 year-old group (18 percent) were overweight and half a million (8 percent) were obese[23]. This means that 26 percent of Canadian children are obese or overweight. One in four Canadian children is overweight and one in 10 is obese.

Beyond genetic predisposition, ethnic groups have different social pressures and norms in defining an "acceptable" body weight[24]. Cultural norms related to physical activity (age, sex, or sport-specific) and nutrition (dietary customs, acceptable food, and quantities of food) may also contribute to being overweight and obese.

Few studies on ethnicity and the prevalence of overweight and obese youth are available. This information is essential to help pinpoint cultural groups that are at risk and to target prevention strategies. The Canadian Clinical Practice Guidelines on the Management and Prevention of Obesity in Adults and Children recommend that doctors use tape measures, in addition to their normal diagnostic tools, to fight the growing problem of obesity in Canada[12].

Socio-Economic Status and Obesity in Children

Oliver and Hayes[25] discovered that the occurrence of overweight children and youth in Canada is directly related to neighbourhood socio-economic status. In short, neighbourhood characteristics are strongly tied to the odds of being overweight.

This suggests that effective strategies to promote health and prevent disease must be based on neighbourhood structures and opportunities.

The basic finding is that children in neighbourhoods with a lower economic status are often overweight or obese[26]. Additionally, children who live in neighbourhoods with higher unemployment rates, lower average family incomes, or fewer post-secondary educated neighbours had a greater risk of being overweight or obese. The percentage of overweight children in areas with high socio-economic status was 24 percent; in low socio-economic neighbourhoods it was 35 percent. The study found that children in low socio-economic neighbourhoods had a lower participation rate in organized physical activities than did children in higher socio-economic neighbourhoods. This disparity can be partly explained by the lack of opportunities for physical activity offered in lower socio-economic neighbourhoods.

Hydrie et al.[27] studied the risk factors for diabetes in children from two different socio-economic groups in Karachi. They discovered that the low-income group, as compared to the middle-income group, spent more time viewing TV and had both a higher Body Mass Index and a positive family history of diabetes. Knowledge of a healthy lifestyle was lacking. Both groups consumed inadequate amounts of calories, and the diet lacked enough vegetables, fruits, and milk; it also had a high fat content. The middle-income group also had a higher risk of developing diabetes. Trevino et al.[28] reported that Mexican-American children from low-income families ate higher than recommended amounts of fat and saturated fat, while their daily intake of fruits and vegetables was half the recommended amount. Their percentage of body fat was higher than that of non-Hispanic White children. Further, 60 percent of the children had a first- or second-degree relative with diabetes. Changes in lifestyle and behaviour, including diet, are needed in this high-risk group to prevent future generations from developing diabetes.

The exact burden and true cost of overweight and obese individuals on the healthcare system is difficult to assess. This is due, in large part, to the fact that related physical health problems only show up later in life.

Physical Activity and Ethnicity

The first study that provides population-based estimates of the prevalence of physical activity for specific ethnic groups in Canada comes from the CCHS and deals with adults, not youth. The study showed that in both men and women (20-64 years old) the leisure-time moderate physical activity was lowest in the South Asian and West Asian or Arab groups. The figures break down as follows: White, 49 percent; other, 48 percent; NA Aboriginal, 47 percent; Latin American, 40 percent; East and Southeast Asian, 39 percent; Black, 38 percent; West Asian/Arab, 36 percent; and South Asian, 34 percent. Among all ethnic groups, moderate physical activity, moderate to high physical activity, and high physical activity were higher in men than in women[29].

The CCHS study shows that walking was the most popular physical recreational activity for both men and women 20 years and older. This is followed by gardening and yard work, and home exercises (Canadian Fitness and Lifestyle Research Institute, 2005)[30].

Aerobics was more popular with women than men; weight training, fishing, bowling, and basketball were more popular with men than women.

Physical Inactivity and Obesity

As previously noted, physical inactivity and obesity are established risk factors for developing type 2 diabetes[31]. Approximately two-thirds of children and youth are physically inactive, and there are distinct gender differences in physical activity levels, intensity of physical activity, and participation in sports.

Between 1981 and 1996, the prevalence of obesity in children has tripled. The general belief is that environmental, not genetic, factors explain this increase in childhood obesity[32]. In a representative sample of Canadian children, the authors examined the relation that physical activity or sedentary behaviour had on the occurrence of obesity and overweight, after controlling for socio-economic status and family background. Their findings proved that physical activity did indeed provide protection from being overweight or obese, while TV watching or video game use, which act as stimuli for excessive eating and sedentary behaviour[33], are risk factors. Their results also showed that the benefits of participation in unorganized sport and physical activity increase with age and are more important than involvement in organized sport. According to the *Health and Health Behaviour Among Young People* survey, conducted between 1990 and 1998[34], few Canadian students aged 11-15 years exercised two or more times a week outside of school hours. Additionally, the percentage of Canadian students who watched TV four or more hours a day increased and more Canadian children reported playing videogames > 4 hours per week. These statistics, higher than most other countries surveyed, show that Canadians spend about three times more time on passive leisure than on active leisure[35].

These findings were corroborated by the 2007 Report Card on Physical Activity for Children and Youth[36] (the third annual overview of physical activity levels of Canada's young people), which gave Canada a failing grade for the third straight year. This shows that progress to improve physical activity among children and youth has stalled, and child and youth physical inactivity is an even larger health concern than previously believed. Highlights from the 2007 Report Card are as follows:

- Activity significantly decreased as children grow older; teenagers, especially teen girls, are less active than ever before.
- Children and youth spend twice as much time in front of a TV or computer screen as they do engaged in physical activity.
- Decreases in physical activity and increases in screen time contribute to overweight and obesity, and also to anxiety, depression, and low self-esteem.

A large proportion of Quebec's population is not involved in a high level of physical activity during leisure time[37]. In 2003, this was true for 63 percent of those 18 and older and 56 percent of those 12-17. Furthermore, 7 percent of 12-17 year-olds were completely sedentary during their free time. A substantial difference between genders was noted in the 12-17 year-olds: 52 percent of the boys and 35 percent of the girls reached the recommended level of activity.

Another study notes that obese children have a tendency to remain obese as adults[38]. It is important, therefore, to change physical activity behaviours and nutrition practices in the young to reduce the obesity epidemic in Canada.

In 2002, Health Canada released *Canada's Physical Activity Guide for Children*[39] and *Let's Get Active! Magazine for Youth 10-14 Years of Age*[40]. These publications recommend increasing physical activity levels and decreasing time spent in sedentary activities for all Canadian children and youth. Further, the guides provide assistance in developing physical activities for children and youth.

The SHAPES report[41] on 19 Ottawa schools provides information on physical activity that will help educators, students, and public health professionals increase physical activity levels in schools by promoting healthy lifestyles. Increasing awareness through education, and creating a supportive school environment and services, can help to increase youth physical activity. Schools can work with local public health and community agencies to increase physical activity[41].

An example of school involvement comes from China, which is anxious to promote more physical activity among students[42]. The Chinese Ministry of Education has designed seven sets of dance steps to suit the physical and psychological characteristics of students of different ages. The dances, lasting about 5 minutes each, can be performed between classes, during breaks, or in extracurricular periods; but they do not replace physical exercise classes. Officials hope that a combination of dance and sport in school will tackle the rise in youth obesity in China. The ministry has proposed that for students to gain a place in university, they need both good grades and proof of physical fitness.

Eating Habits of Canadians

The 2004 CCHS nutrition survey[43], which provided an overview of Canadian eating habits, showed that the calorie consumption was highest during adolescence, ages 12-19 years. Grain products provided most of the daily calories for ages 4 and older. Snack foods, beverages (soft drinks), and foods high in fat, sugar, and salt ranked second. The survey showed that 7 out of 10 children aged 4 to 8 ate less than the recommended five servings of vegetables and fruits per day[44]. Among the 9 -13 year-olds, neither boys (68 percent) nor girls (62 percent) met the minimum allowance recommended for the day. The 4-9 and the 10-16 year-olds also did not meet their recommended minimum of 3 servings of milk per day. The average daily consumption of meat and meat alternatives was equal to or higher than the minimum recommended. However, 14-18 percent of girls aged 9 to 18 consumed less than 100 grams (the listed requirement is at least 200 g per day). The proportion of daily calories eaten as snacks peaked among the 14-18 year-olds.

Among both 14-18 year-old males and females, only 44.5 percent ate at home and 33.5 percent ate at least some fast food[45]. The highest income households were more likely than lower income groups to eat from a fast-food outlet.

In the Quebec population, 36 percent of 13 year-olds and 34 percent of 16 year-olds do not eat breakfast every day. Most of those in the 6-16 year age group do not eat the amount of fruits and vegetables recommended by Canada's Food Guide to Healthy Eating[44]. About 25 percent of 6-16 year-olds are overweight or obese[37].

Diet and Level of Acculturation

Nutrition programs for immigrant/minority groups are likely to be more effective if they are tailored to the level of acculturation to the Canadian diet, which is generally higher in fat than immigrant groups are accustomed to eating. Increasingly, acculturation and the consequent higher fat intake have negatively affected immigrant groups. This has been shown to have a direct effect on the fat-related diets of Chinese Americans.

A study of Mexicans living in Washington State[46], showed that a greater acculturation produced a higher fat intake and lower fruit and vegetable intake. This study compared the diets of highly acculturated Hispanics and Hispanics with low acculturation. Highly acculturated Hispanics ate fewer servings of fruits and vegetables per day and had a higher fat intake than those who were not highly acculturated.

This shows the importance of assessing dietary acculturation as an important component of nutrition education, interventions, and counseling in these populations.

Diet and Income

CCHS also reported that food consumption among adults is linked to household income. Among children and adolescents, however, the percentage of calories derived from fat generally did not differ by household income. For adults, the percentage of calories from fat tended to increase with income[43].

A report based on the CCHS also found that more than 40 percent of people in low-or lower-middle-income households reported some degree of food insecurity[47]. While food insecurity was much less common in higher income households, it was not unknown.

The well-being of children aged 4-15 years almost always appears to be associated with the household income of the family, according to a study published jointly by the Human Resources and Social Development Council of Canada and the Research Data Centre Program[48]. The study found that higher income tends to be related to better physical, social/emotional, cognitive, and behavioural well-being among children.

Healthy Living

Healthy living for youth involves a wide range of behaviors, such as following a healthy diet, being involved in both organized and casual physical activities, and trying to maintain optimum weight. The *Health Behaviour of School-aged Children*[49] survey examined patterns in the determinants of health of children and youth as well as selected trends in their health behaviours and attitudes[49].

The Integrated Pan-Canadian Healthy Living Strategy[50] envisions a healthy nation in which all Canadians have attained good health. The strategy aims to improve overall health outcomes and reduce health disparities. The initial emphasis is on healthy eating and physical activity and the relationship of these factors to healthy weight. The Healthy Living Strategy, designed to attain 20 percent improvement in ten years, includes:

- Increasing the proportion of Canadians who make healthy food choices
- Increasing the proportion of Canadians who participate in regular physical activity based on 30 minutes/day of moderate to vigorous activity
- Increasing the proportion of Canadians at a "normal body weight" based on BMI of 18.5-24.9.

Prevention of Obesity and Type 2 Diabetes in Youth

Childhood obesity is a global epidemic and the increases in overweight and obesity in children are seen in both developed and developing countries. In Canada, estimates for the period between 1980 and 1990 show that overweight and obesity among boys increased from 11 percent to more than 30 percent[51].

Obesity results from both genetic and behaviour-related factors. Genetic factors are non-modifiable. The modifiable behaviour-related factors include environments that give people easy access to too much food – particularly inexpensive foods high in fat and sugar and low in nutrients – and insufficient physical activity[1].

Studies in China, Finland, and the USA have shown that type 2 diabetes can be prevented by helping people lose between 7 to 10 percent of their body weight, and by increasing their physical activity to a moderate level[1].

A recent study in Canada looked at the impact of dietary and lifestyle intervention on weight reduction, activity levels, and lipid profile[52] in a group of children. With intervention, they observed a 60-70 percent decrease in lipid levels, a 76 percent improvement in childrens' activity levels, and a 42 percent decrease in the BMI of the subjects.

In response to the acknowledged increasing rate of obesity and consequent health issues for children and youth, the Advertising Standards of Canada[53] and Concerned Children's Advertisers[54] have recently initiated a voluntary project. In this project, advertisers develop advertising aimed at children and youth that emphasizes healthy food choices and healthy lifestyles, including physical activity. The results of this project have yet to be determined.

Role of Schools

The role of schools in creating awareness of diabetes risk factors and working to prevent the onset of type 2 diabetes has not been sufficiently studied. Conducting careful studies in schools to document diabetes-associated risk factors and to target interventions that could prevent type 2 diabetes is a critical step. Preventing obesity and type 2 diabetes requires multiple modes of prevention and collaboration across professions and sectors[55].

Ng and coworkers[55] conducted a study of selected school-based obesity and type 2 diabetes prevention efforts to assist in program and policy development. Their study showed that, over the short term, primary prevention in both general and high-risk school populations has had only modest success in promoting lifestyle changes and increasing awareness of the potential for developing diabetes.

In the study, Ng et al. identified the importance of public health programs in studying comprehensive school health. They also stressed the value of including families and communities in planning and implementing programs. For policy development, they stressed the value of examining ways in which environmental, cultural, and economic factors contributed to obesity. The authors recommend additional studies on ways to promote critical and long-term lifestyle changes that will reach into maturity.

Community Action and Primary Prevention of Type 2 Diabetes in Youth

Though considerable research has been done on diabetes, research on developing effective primary prevention strategies is just beginning. One aspect of primary prevention is to delay the development of type 2 diabetes by reducing the prevalence of overweight individuals. This is important because of the increase in Canada, as previously noted, of obesity and also pre-diabetes and type 2 diabetes.

Community-based diabetes prevention campaigns for children and youth in Canadian Native communities are notable for the active community participation, the collaborative relationship between communities and researchers, and the use of traditional Native culture and beliefs in the intervention design[56]. This phenomenon has affected the success of the projects and enhanced long-term sustainability.

The Kahnawake Schools Diabetes Prevention Program is an ongoing model program for a variety of reasons[57]. It involves the active participation of the community, and it takes a holistic approach in dealing with diabetes prevention. The culture, language, and beliefs of the Mohawks are central to the program. The program emphasis on healthy lifestyles, healthy eating, physical activity, and basic education on diabetes have been incorporated into the school curriculum.

Many Manitoba and Saskatchewan communities[58, 59] have also started programs that focus on healthy eating, healthy lifestyles, and basic information on diabetes. They include manuals for teachers, and resource kits with videos and other useful aids. Within Manitoba, governments, health authorities, and communities are working at many levels to create conditions and integrate programs that promote physical activity and health[60].

In 2000, a study was conducted in Atlantic Canada to record the existing infrastructure for the primary prevention of type 2 diabetes[61]. Initiatives aimed at children include early childhood intervention programs, school food programs, and physical activity promotion programs. Most initiatives aimed at youth promoted physical activity. Three programs targeting children and youth are Physically Active Children and Youth; Sharing Strengths: A Child and Youth Strategy; and Collaborative Action for Healthy Weights.

A study of young Francophones living in a minority environment in New Brunswick showed that the most effective intervention for the 5-13 year-old group should target healthy eating habits and physical activity. For the 14-18 year-old group, the emphasis should be on preventing diabetes[62]. In this study, community groups worked with health care professionals to address the issue.

Some successful school-based preventive programs for children have been implemented in countries as diverse as the US, UK, Japan, and Singapore. In these programs, obese children experienced significant weight loss[1].

The Trim and Fit program, launched in 1992 by the Singapore Ministry of Education, targets students from primary schools to pre-university levels. It emphasizes achieving a healthy lifestyle through a balance of suitable physical activity and counseling in proper nutrition and diet. The program aimed to encourage schools to develop strategies to reduce obesity and improve the physical fitness of their students[63].

Move It! And Reduce Your Risk of Diabetes is a school kit helpful in any general intervention promoting physical activity among youth. Although designed as a school-based intervention, it can be easily adapted for community use for primary prevention of type 2 diabetes among high-risk individuals and for reducing obesity through increased physical activity[64].

Until recently, the CDA was not active in primary prevention; instead it focused on preventing the complications of diabetes and finding a cure for diabetes. The CDA is now expanding its role in primary prevention at the provincial and national levels through public awareness and education programs, public events, and community outreach. However, it has still not had an effect on many ethnic communities across Canada.

Challenges to Primary Prevention

Some of the major barriers to primary prevention include a lack of resources, both human and financial, a lack of the understanding and skills necessary to promote population health, and a lack of a coordinated strategic action[61].

Recognizing the impact of culture in disease management and self-care practices can improve diabetes care. Diabetes educators and healthcare providers need to take into account specific ethnic beliefs, customs, food patterns, and healthcare practices, with the goal of incorporating these cultural factors into a practical and beneficial treatment regimen[16].

A recent study in Nova Scotia identified the barriers and enablers to healthy eating and active living for children in grades 5-8. This study emphasized the importance of parents and community leaders in the lives of youth and how important it is to educate the broader community about measures to prevent and control diabetes. It also identified strategies for improving the physical activity and healthy eating behaviours of each group[65].

Action

The good news is that lifestyle changes can prevent or reverse GDM and type 2 diabetes[11]. These changes can be best achieved under a doctor's supervision. Healthcare systems are faced with the major challenge of developing innovative approaches to improving the prevention of type 2 diabetes and associated complications, particularly among high-risk ethnic groups.

Prevention of type 2 diabetes in youth requires a multi-pronged approach. Families, communities, and schools play critical roles in creating awareness of diabetes and its complications, educating, and providing support for lifestyle changes. A healthy meal plan, weight control, and physical activity are important prevention steps.

The complex task of prevention also requires cooperation among many organizations – schools, community centres, ethnic organizations, governments at many levels, health sectors, and voluntary sectors. Leadership is needed at each level to raise awareness about the impact of type 2 diabetes on children and youth and to build a commitment to address this serious health problem on a long-term basis. Partnerships and collaborations are critical to the success of prevention programs.

Social Marketing

Social marketing has become an essential means of spreading information gained from research and various programs. It is a deliberate means of bringing about change that is quite similar to the traditional marketing of products and services carried out by organizations. The essential elements of social marketing include consumer research, promotion, advertising, and marketing. These allow social marketing to perform a vital role in important issues such as health and the environment. One such social marketing campaign is the *Vitality* campaign, which has a focus on helping Canadians to develop a positive and healthful approach to understanding body weight[66].

The Eat Well, Be Active, Have Fun[67] Diabetes Campaign was developed for Canadian families and it focuses on educating women between the ages of 25-39. The campaign works to educate these individuals about diabetes, stressing the role of families in prevention through lifestyles that include activity and healthful eating. By providing Canadian families with information about diabetes and how to prevent it, the campaign hopes to develop environments that support Canadian families in becoming more physically active and eating healthfully. The campaign used television advertising and fact sheets, pamphlets, and posters distributed through pharmacies, clinics, and partner networks.

To further disseminate this information, the campaign works closely with the private sector, non-governmental organizations, and all levels of government. Making lifestyle change resources available at the local level is an important complement to a national advertising campaign. Using existing programs and activities already in progress is an essential way to communicate information about diabetes through trusted local resources, and this is essential to the success of any national campaign.

IV. Goal of the Study

The goal of this study is to increase awareness among high-risk ethnocultural communities in Canada of the risk factors and lifestyle habits that will prevent or delay the onset of type 2 diabetes in youth by:

- Gathering information on knowledge of type 2 diabetes and issues related to type 2 diabetes from high-risk ethnocultural communities,
- Providing facts and data on effective approaches to prevent type 2 diabetes in youth, and
- Building partnerships and community linkages.

V. Target Populations

The target populations include youth from African, Asian, and Hispanic backgrounds; their families and communities; and healthcare professionals that are from or that serve these communities.

For the purpose of this project, the African population includes individuals whose origins are from Africa; Asian includes those from China, Philippines, Vietnam, and South Asia (India, Bangladesh, Pakistan and Sri Lanka); and Hispanic includes those from Latin, Central, and South America.

VI. Methodology

(a) Working Group

A working group was set up to provide guidance and review the project process. The members of the working group included representatives from the target communities, the Canadian Diabetes Association, the public health department, healthcare professionals (doctors and nurses), and a youth representative (Appendix 2). Two face-to-face meetings were held in Ottawa. The first meeting was to review the goals and work plan. The second meeting focused on reviewing the reports developed for the project and providing input on them.

Additionally, the members of the working group were invited to attend two meetings. The first was a symposium held in Toronto where the medical doctors from the working group served as panelists. The second meeting was a community briefing in Toronto where the project reports were distributed and members of the target communities developed a communication strategy to reach their ethnic communities.

(b) Activities

The study involved three major activities:

1. National consultations with target groups to gather information on awareness of type 2 diabetes in high-risk ethnic communities.

2. A national symposium to provide information on type 2 diabetes in ethnic youth, strategies for prevention, and the scope to develop partnerships and community linkages.

3. A national community briefing to share information from consultations with youth, families, communities, and the media, and also to develop appropriate strategies for distribution and dissemination within each of the target communities.

1. National Consultations

Consultations, or focus group meetings, with the target groups were held across Canada from April-June 2007. Their purpose was to gather information on type 2 diabetes as well as on issues related to the physical activity and eating habits of youth from high-risk ethnic communities.

Purpose: To collect data from selected youth and support persons (family, community members, and healthcare professionals) on awareness of type 2 diabetes in Asian, South Asian, Black and Hispanic communities and to gain their perspectives.

Process: A detailed interview guide (questionnaire) was developed to focus discussion on issues related to knowledge of type 2 diabetes, activity patterns, eating habits, and issues related to access to services and acceptability of services. The questionnaire was pre-tested with individuals in the targeted communities and modified using their input (Appendix 3).

Focus group meetings were set up in cities across Canada where the CEC's established network of contacts could be used to gather participants from the selected communities within a short period of time. On-site coordinators in each city helped the CEC to identify facilitators, recruit participants, select appropriate locations for the meetings, and arrange for food and other requirements.

All facilitators were provided with information to conduct focus group meetings in a culturally appropriate and professional manner. The following documents were prepared and discussed with each facilitator: (1) Guiding Principles for Focus Groups, (2) Facilitator's Guide, (3) Tips for Facilitators, and (4) Consent Form.

Each focus group session was divided into two parts. In the first part, each focus group participant completed the questionnaire under the guidance of the facilitator. In the second part of the session, participants asked questions, shared experiences, and provided suggestions for increased awareness, education, and outreach.

Focus Group Details: 15 focus group meetings were held in seven cities covering five provinces of Canada. The meetings were held in Ottawa (4); Toronto (4); London, ON (1); Winnipeg, MB (1); Vancouver, BC (2); Montreal, QC (2); and Dartmouth, NS (1).

Each focus group consisted of 12-15 participants except for the few cases where there were more attendees. The duration of the session was about two hours. The general characteristics of the focus groups and participants' comments are shown in Appendix 4.

Limitations

Although the instructions given to the participants were uniform, there was considerable latitude in the responses. The relatively small number of youth and the subjective nature of the data gathered, though rich in content, limit the scope for generalizing the results. Additionally, a detailed discussion of the data was not possible because of time constraints.

Analysis of Data

The questionnaires distributed at the focus group meetings were collected, analysed, and the results are presented. For the purpose of this study, youth included those 15-24 years old and adults were 25 years and older.

Background Information

A total of 234 respondents participated in this study. Two of the questionnaires were discarded because they were incomplete.

Gender

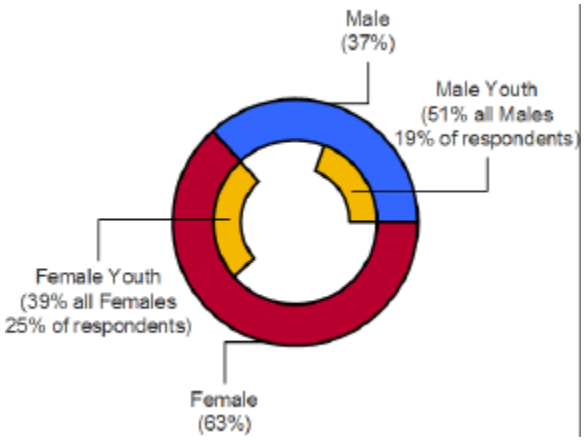

Figure 1. Percentage of male and female respondents

There were more female respondents than males by a ratio of 63% to 37%. However, only 39% of the female respondents were below 25 years of age, compared with 51% of the males who were under 25.

Age Group

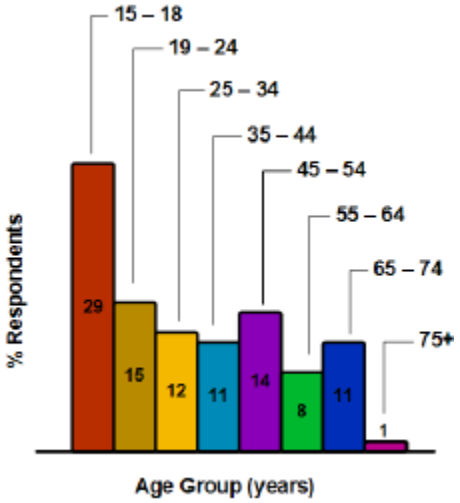

Figure 2. Age range of respondents

The largest number of respondents were in the 15-18 years age group.

Language Spoken

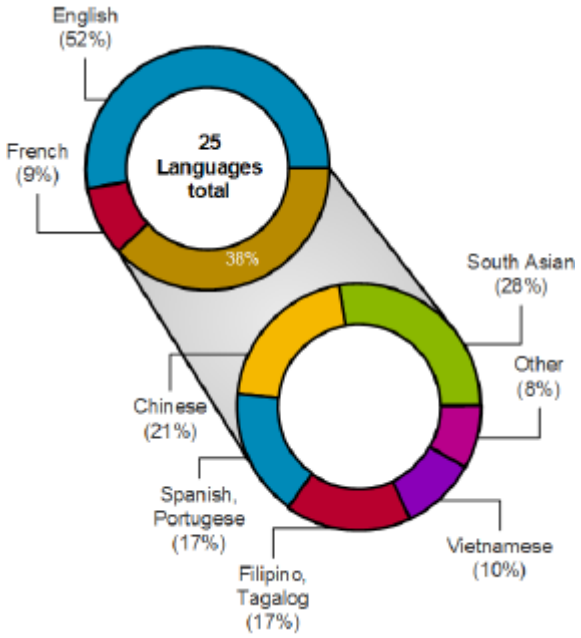

Figure 3. Languages spoken by respondents

The respondents spoke a total of 25 languages and dialects but all of them spoke English. When all languages spoken by respondents were expressed as a percentage, 52% of all languages spoken was English, 9% was French, and the remaining 38% were other languages. Of the "remaining," 28% were South Asian languages, 21% were Chinese, 17% were Spanish and Portuguese combined, 17% Filipino (Tagalog), and 10% were Vietnamese. The other (8%) languages spoken were Somali, Arabic, Iranian, Kurdish, Japanese, Urdu, Patois, Bengali, Hindi, Punjabi, Turkish, Gujarati etc.

Ethnic Community

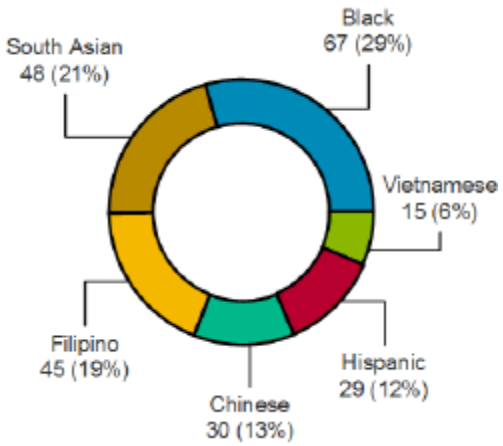

Figure 4. Ethnic background of respondents

The largest ethnic community represented in this survey self-identified as Black and was 29% of the respondents. South Asians and Filipinos were next, at 21% and 19%

respectively. Chinese and Hispanics followed with 13% and 12% respectively, and Vietnamese made up 6% of all respondents.

Employment Status

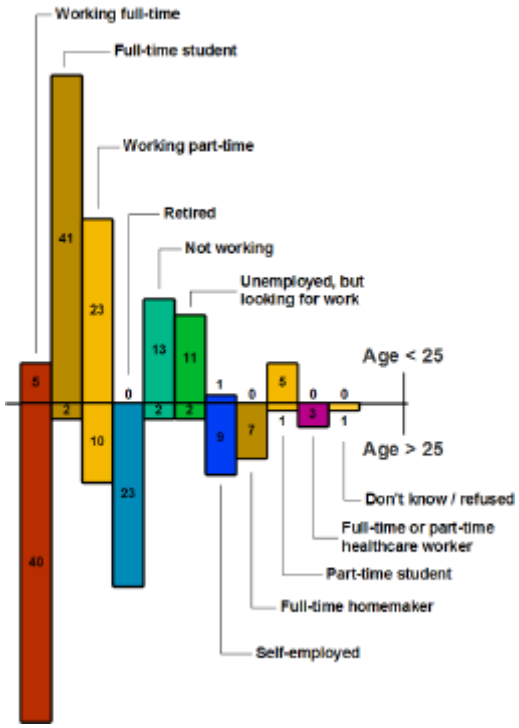

Figure 5. Employment status of respondents (expressed in percentage)

As expected, there was a difference in the responses of youth and adults. Youth were more likely to be full-time students, work part-time, be unemployed, or be part-time students. Adults were more likely to be working full-time, retired, or working part-time.

Highest Level of Formal Education Completed

Grade school or some high school was the highest level of formal education for 28.5% of the respondents. Almost an equal percentage (27.2%) had completed a university degree (Bachelor's). Some of the others had completed high school (12.9%). 11.2% had some community college or university education without going on to a degree or a diploma, and another 11.2% had a post-graduate degree.

Knowledge of Diabetes

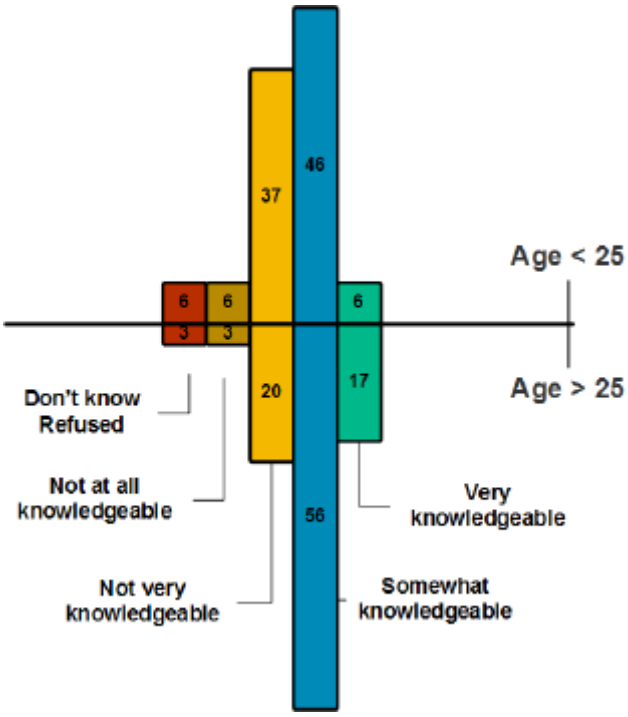

Figure 6. Knowledge of diabetes (expressed in percentage)

The data were parsed separately for young respondents (below 25) and older respondents (above 25). There was an 86% correlation between the response of the adults and youth, suggesting that age was not a major factor affecting knowledge of diabetes. Very few (3-6%) respondents claimed to be "not at all knowledgeable" about diabetes. A much larger percentage (20-37%) of the respondents claimed to be "not very knowledgeable" about diabetes. The majority of the respondents (46-56%) claimed some knowledge about diabetes, while a small number (6-17%) of respondents claimed to be "very knowledgeable" about diabetes. About 3-6% of respondents did not answer or did not know how much diabetes knowledge they had.

There was a variety of answers to the question on "the first thing that comes to your mind when you think about diabetes." Answers covered a wide spectrum of common concerns associated with diabetes such as: high sugar level, needles, death, sickness, blindness, shaking, thirst, life-long illness, heredity, coma, insulin injections, amputations, etc. It was apparent that youth and adults knew that it had something to do with high sugar levels but adults were more inclined to consider complications of diabetes such as renal disease, heart problems, neuropathy, etc. A few mentioned lifestyle changes, such as eating habits and physical activity.

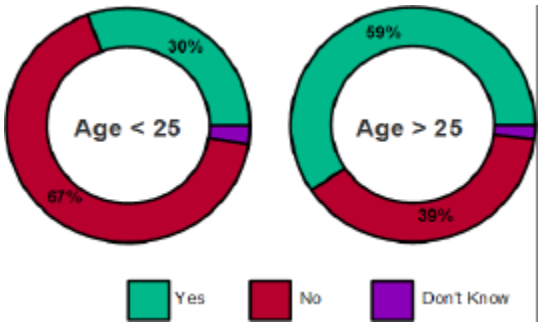

Figure 7. Knowledge of difference between type 1 and type 2 diabetes

In general, few respondents knew the difference between type 1 and type 2 diabetes. Fewer youth (30%) than adults (59%) knew the difference between type 1 and type 2 diabetes.

Genetic Predisposition to Type 2 Diabetes

Nearly equal proportions of respondents had one or the other parent or a sibling with diabetes. But those with parents and siblings free of diabetes outnumbered the diabetics. A larger number of respondents had grandparents who were diabetics, in comparison with parents or siblings.

Causes of Diabetes

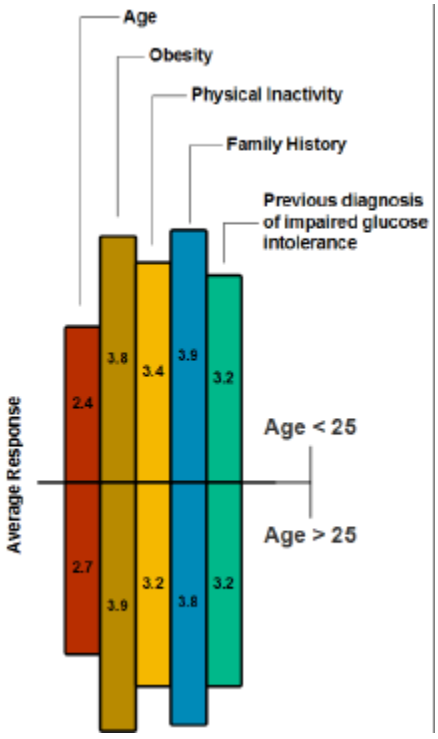

Figure 8. Causes of diabetes according to the respondents (average scores on a 1-5 scale)

Respondents rated the causes of diabetes on a scale of 1 to 5 where 5 is the most important and 1 the least important. When average scores were taken, family history of

diabetes and obesity were considered as the most important causes of type 2 diabetes. Age was indicated to be the least important cause of diabetes. Youth and adults gave similar rankings for the causes of type 2 diabetes.

A number of statements were given on type 2 diabetes and the respondents were asked to rate them as true or false.

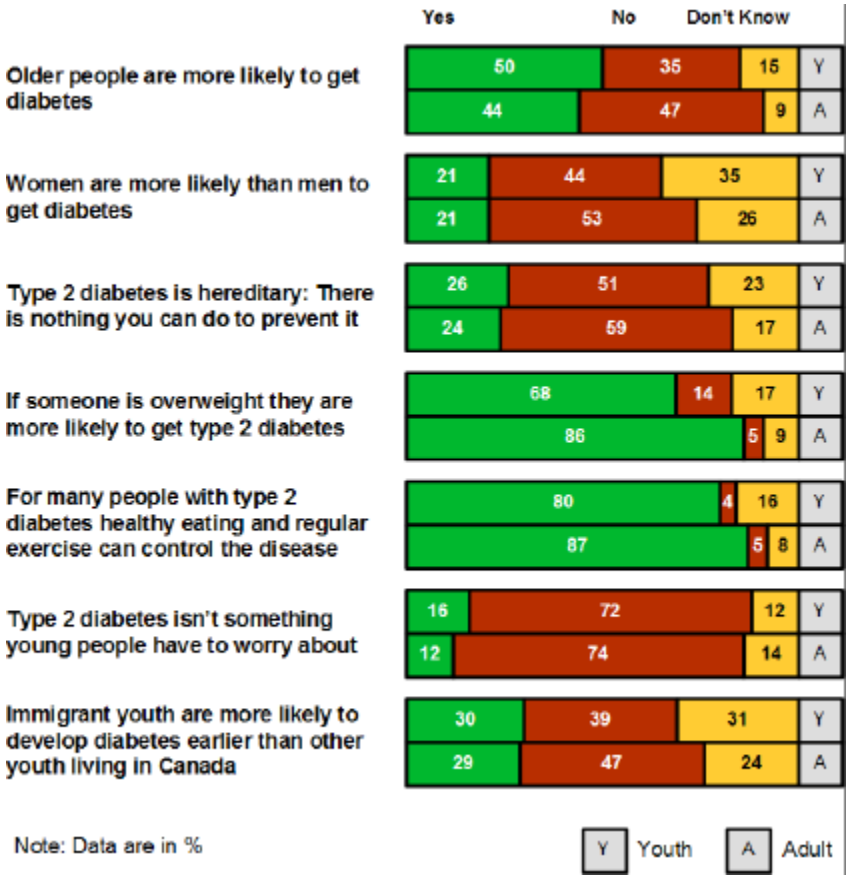

Figure 9. Responses to true and false statements

Youth and adults gave similar responses to the true and false statements. They believe that type 2 diabetes could be controlled by a healthy diet and exercise, and that overweight people were likely to suffer from it. They were ambivalent about whether old people could get type 2 diabetes. One half of the youth respondents and 44% of adults believed that older people are more prone to be diabetic than younger people. Close to three quarters of both adults and youth thought that type 2 diabetes is something that young people have to worry about. A large percentage of adults (53%) and youth (44%) believed that women were not more likely than men to be affected by diabetes. A significant number of youth and adults thought that immigrant youth were not at a higher risk for diabetes than other youth living in Canada.

Participation in Physical Activities and Sports

Exercise and physical activity have invaluable benefits for youth and adults whether they are obese or of normal weight. The respondents gave a variety of answers to the question about the average number of hours per week they participated in exercise or physical activity. The respondents were not clear about the difference between sports and physical activity, even though the facilitator had explained this to them.

The physical activities most commonly practiced by both youth and adults from all the communities were walking, running, swimming, dancing, jogging, and bicycling. Skating and roller-blading were practised by some youth while some adults did yoga, tai chi, weight training, took care of children, and used a treadmill and weights.

The types of organized sports included basketball, badminton, football, squash, table tennis, volleyball, softball, soccer, and tennis. There was marginal difference between youth and adults and among the selected communities.

Since many of the respondents had not grasped the distinction between sports and physical activities, despite efforts to explain the difference to them, the responses to the questions on sports and physical activities have been grouped together. The hours per week they were involved in physical activity and sports varied a great deal among individuals. Many of them did not answer this question. Even among those who answered, it was difficult to come to any reasonable conclusion.

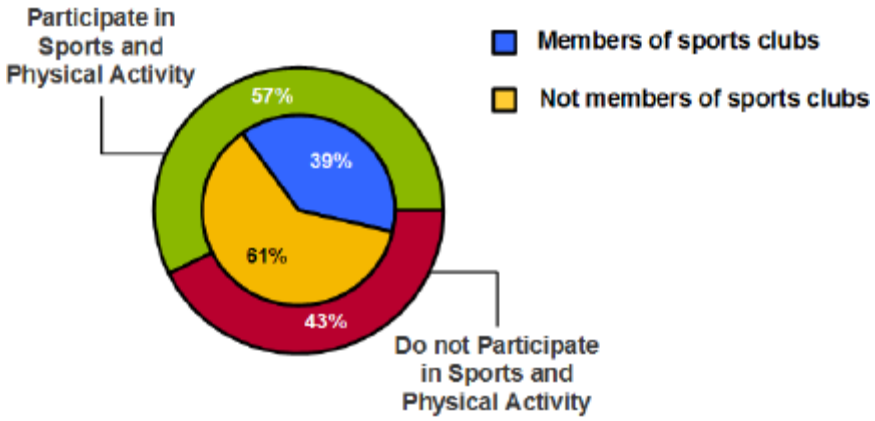

Figure 10. Participation in physical activity/sports and membership in sports clubs

A majority (57%) of respondents participated in sports and physical activity. Only 39% of respondents stated that they had membership in a sports organization; the vast majority of them used their membership to participate in sports. 61% of the respondents had no membership in sports clubs, but a large number participated in sports anyway.

Reasons for Practicing Sport or Physical Activity

People have many reasons for practicing a sport or a physical activity. Respondents were asked to rate the reasons on a scale of 1 to 5 with 5 being most important and 1 least important. Average scores were taken for each of the reasons and are presented in Figure 11.

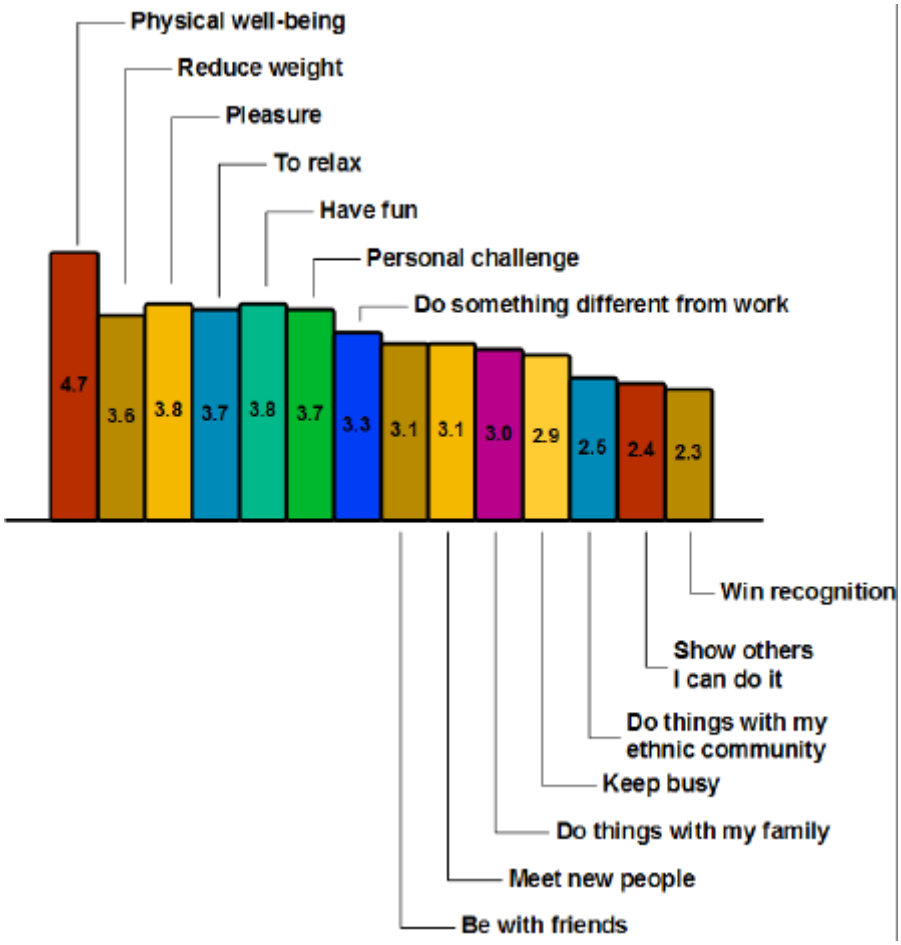

Figure 11. Need for exercise as identified by respondents (average scores)

Participants rated physical health and weight reduction as the main reasons to participate in physical activities. They also acknowledged a "fun" component to physical activities, giving pleasure, relaxation, and fun high scores. Though personal challenge ranked high, physical activities did not appear to be a means of obtaining recognition or showing others that they could participate in certain sports.

There was a definite social component to physical activity, since respondents chose meeting people, and doing things with family, friends, and ethnic community as reasons for exercise. The social component may have been diluted by splitting the responses between several choices.

Reasons for Not Participating in Sports or Physical Activity

The biggest impediment to youth participation in sports and physical activities was the workload at school/work. They also rated lack of access to activities they enjoyed, expense, and lack of infrastructure as reasons for not participating in sports. Discrimination was ranked higher by youth than adults. The biggest impediment listed by adults was workload.

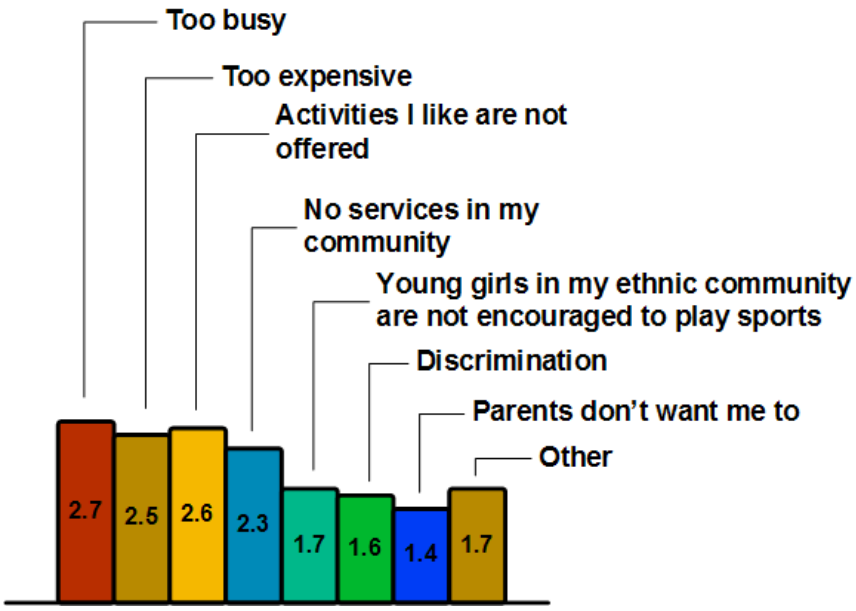

Figure 12. Reasons for not participating in sports and physical activity (average scores)

People who did not participate in sports or physical activities were too busy at work/school, did not find activities they liked being offered or "found it too expensive." The youth who did not participate in sports cited workload, parental disapproval, expense, and racial discrimination as some of the reasons for not participating. There was a dichotomy between those who participated in sports and those who did not, when it came to racism. People who did not participate in sports were more likely to cite racism as a cause, while those who did participate did not mention racism, suggesting that if the perception of racism in sports were addressed, more people might participate in sports. This needs to be further investigated in order to best determine ways of dealing with racism as a reason for not participating in physical activity and/or sports.

Eating Habits

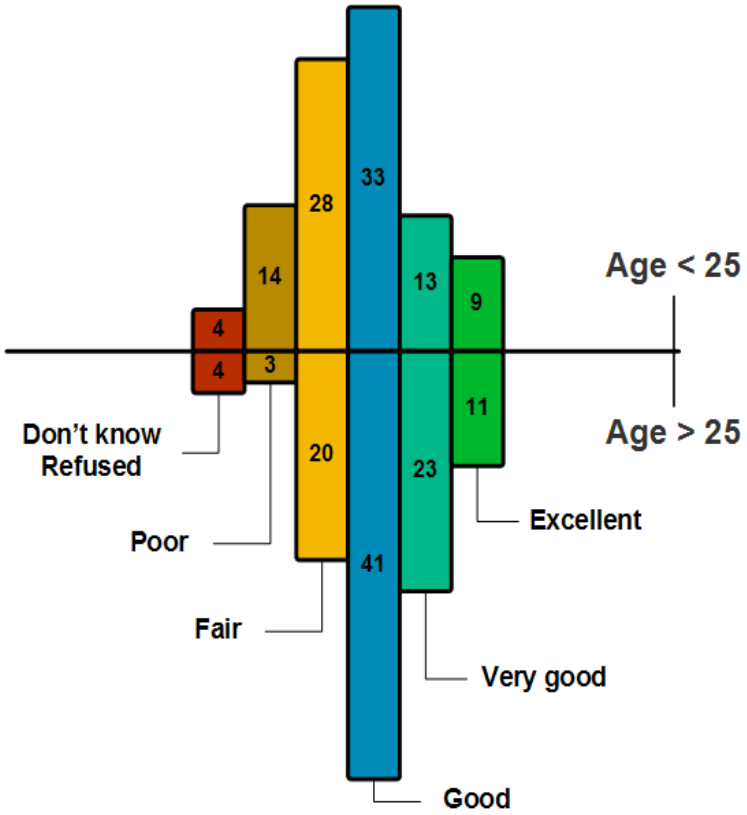

Figure 13. Eating habits of respondents (expressed in percentage)

The respondents were asked to rate their eating habits. From the results, it appears that more adults claim to eat better than youth (Figure 13). About 75% of the adults rated their eating habits to be good, very good, or excellent as compared to 55% of the youth.

A large number of youth described their eating habits as poor or fair, suggesting that they have less healthy eating practices. Overall, there was an 80% correlation between the responses of youth and adults, suggesting that their eating habits were more similar than different.

Self-Rating of Health

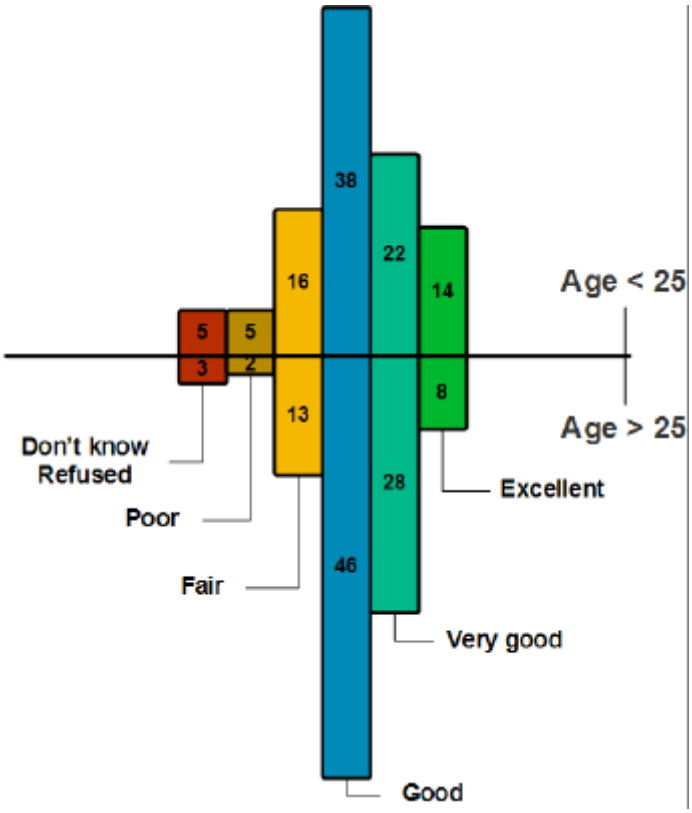

Figure 14. Self-rating of health by respondents (expressed in percentage)

The distributions show that youth rated themselves as slightly less healthy than adults with one exception: "the excellent health" category, where there was a smaller percentage of adults than youth. A larger percentage of youth rated themselves as having "poor," "fair," or "unknown" health than adults. A smaller percent of youth rated themselves as having "good" or "very good" health. Overall, there was a 98% correlation between the responses of adults and youth.

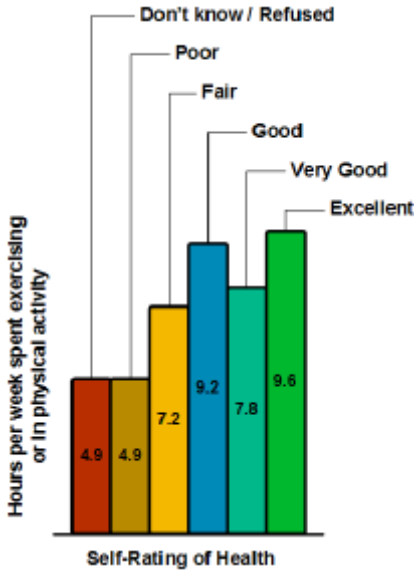

Figure 15. Self-rating of health in relation to duration of physical activity

In general, people who rated themselves as healthy exercised more than people who did not. Interestingly, people who did not know how good their health was, claimed to exercise 5 hours per week.

Health-Related Information

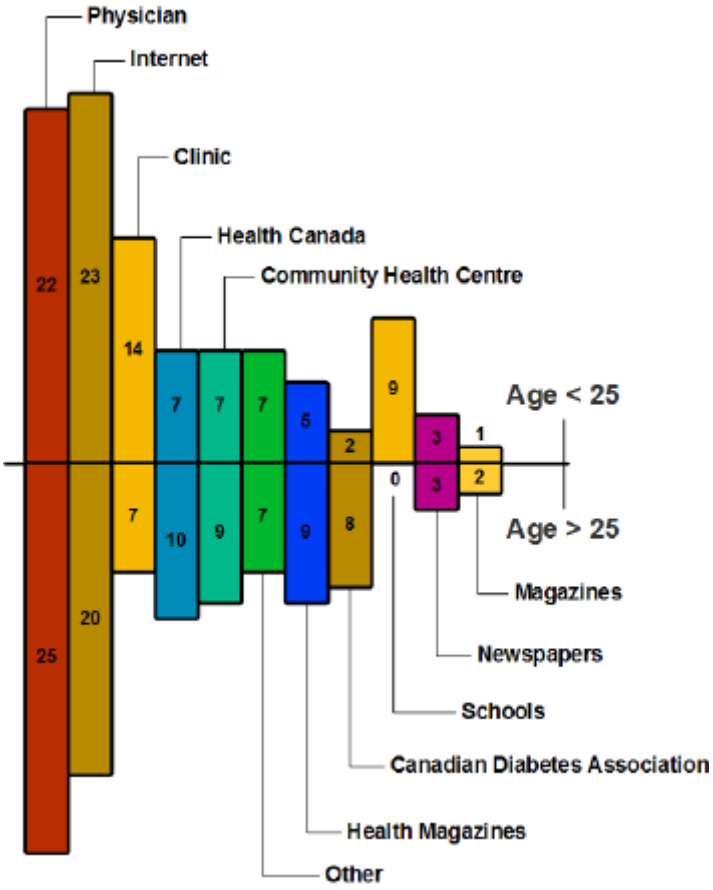

Figure 16. Health-related information (expressed in percentage)

The largest three sources of information were physicians, the Internet, and medical clinics. The data were fairly symmetric, suggesting that adults and youth got their information from the same sources; but there was one notable exception: schools. No adult got health-related information from schools reflecting, perhaps, the lack of involvement of adults in school programs.

The Canadian Diabetes Association was the preferred source of information on diabetes for 56% of the respondents, followed by family physicians (53%), Internet (49.6%), medical clinics (32.3%), etc. The least preferred was the individual's ethnic organization (48.7%) (Table 1).

Table 1. Preferred source of information on diabetes

	5 (most)	4	3	2	1
Family physician	53.0%	19.8%	10.8%	3.9%	12.5%
Medical clinic	32.3%	25.9%	14.2%	11.2%	16.4%
Health Canada	28.0%	23.7%	18.5%	7.8%	22.0%
Community health centre	26.3%	20.3%	21.1%	10.8%	21.6%
CDA	56.0%	11.6%	7.8%	6.5%	18.1%
Health magazines	12.1%	24.1%	25.0%	12.9%	25.9%
Newspapers	6.0%	10.3%	22.8%	19.4%	41.4%
Magazines	5.2%	11.2%	24.6%	20.7%	38.4%
Schools	9.9%	15.1%	19.4%	15.1%	40.5%
Internet/Website	49.6%	19.8%	9.9%	3.4%	17.2%
My ethnic Organization	7.3%	12.1%	17.2%	14.7%	48.7%

Awareness of Diabetes in the Community

Respondents were asked if they felt that people in their community heard and knew enough about diabetes and whether information met their needs. Nearly one half of the respondents (47.4%) strongly disagreed with the idea that young people in their community know enough about diabetes. In effect, many respondents felt strongly that young people in their community did not know enough about diabetes. However, 40% of the respondents were somewhat satisfied with the healthcare they received in their community.

Source of Health-related Information and Knowledge of Difference between Type 1 and Type 2 Diabetes

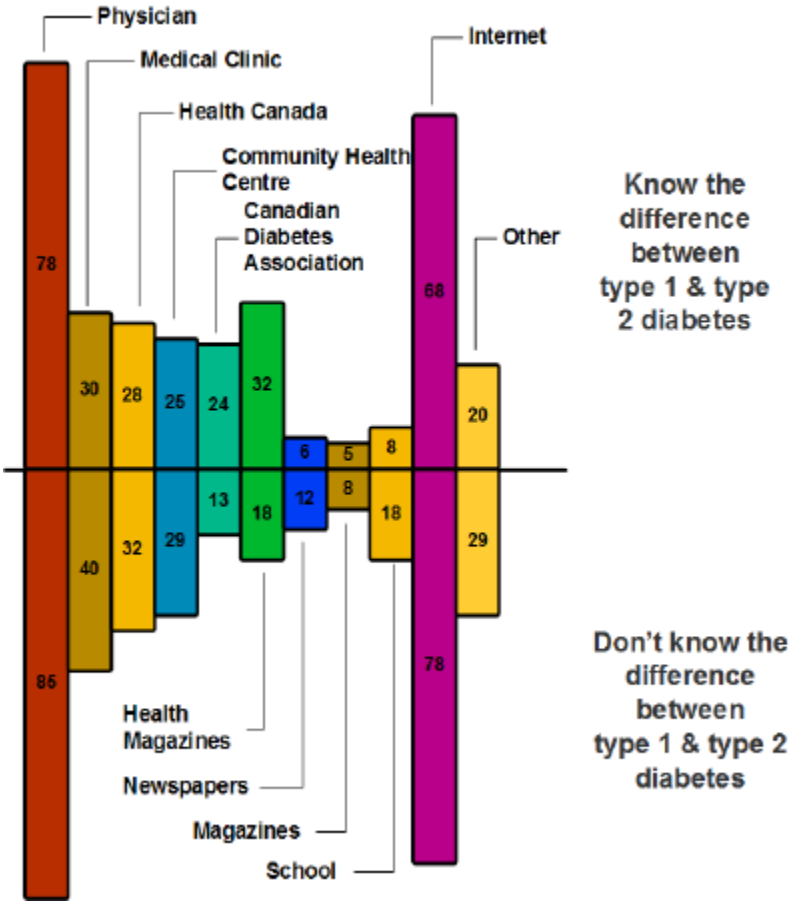

Figure 17. Knowledge of difference between type 1 and type 2 diabetes vs source of health-related information (expressed in percentage)

There was good correlation (about 90%) between those who knew the difference between type 1 and type 2 diabetes. However, people who claimed to know the difference used the Canadian Diabetes Association and health magazines more often than those who did not. Respondents were consistent in their choices of family physician, Internet, and medical clinics as places to go for health-related information.

Two-thirds (66%) of the respondents had never attended a course, seminar, or support group on diabetes.

Frequency of Consuming Different Foods

Among the food items most often consumed were grains or grain products such as bread, cereal, pasta, and rice, by 58.2% of respondents; chicken and poultry by 40.5% of respondents; fruits by 38.4% of respondents; and vegetables including salads by 34.5% (Table 2). Milk and dairy products were eaten often by 34.1% of respondents and 32.3% ate fish and seafood often. As many as 13.8% of respondents never ate processed meats and 12.9% did not consume any beef, mutton, or pork, suggesting that they were vegetarians.

Table 2. Frequency of consuming different foods

	most often	often	sometimes	rarely	not at all
Vegetables/salad	34.5%	34.1%	23.3%	3.9%	4.3%
Fruits	38.4%	31.9%	23.7%	1.7%	4.3%
Chicken & poultry	40.5%	39.7%	12.1%	1.3%	6.5%
Beef/mutton/pork	17.7%	28.0%	29.3%	12.1%	12.9%
Fish and seafood	22.8%	32.3%	29.7%	7.8%	7.3%
Processed meat such as sausages and burgers	8.6%	13.4%	35.8%	28.4%	13.8%
Grains (bread, pasta, rice)	58.2%	26.3%	11.2%	2.6%	1.7%
Milk and dairy products	30.6%	34.1%	24.6%	5.2%	5.6%
Nuts, beans, chickpeas, etc.	14.7%	23.3%	32.3%	21.6%	8.2%
Foods/drinks containing sugar (sweets, soft drinks)	23.7%	25.9%	31.5%	10.8%	8.2%
Salt in your food (either in the food product, or added)	25.9%	28.0%	29.3%	9.9%	6.9%
Foods containing fat (fried foods, butter, margarine)	12.5%	23.3%	42.2%	16.8%	5.2%
Snack foods/fast foods	16.4%	12.1%	40.1%	23.3%	8.2%

There were noticeable differences in the eating habits of those above and below 25 years of age. The younger age group said that they consumed relatively more poultry, grains, milk products, and food with sugar and salt. They ate fruits and vegetables, fish, processed meats, and fast foods some of the time. On the other hand, those over the age of 25 years consumed fruits, vegetables, grains, and milk products more frequently and fish and poultry fairly frequently.

Preparation of Food

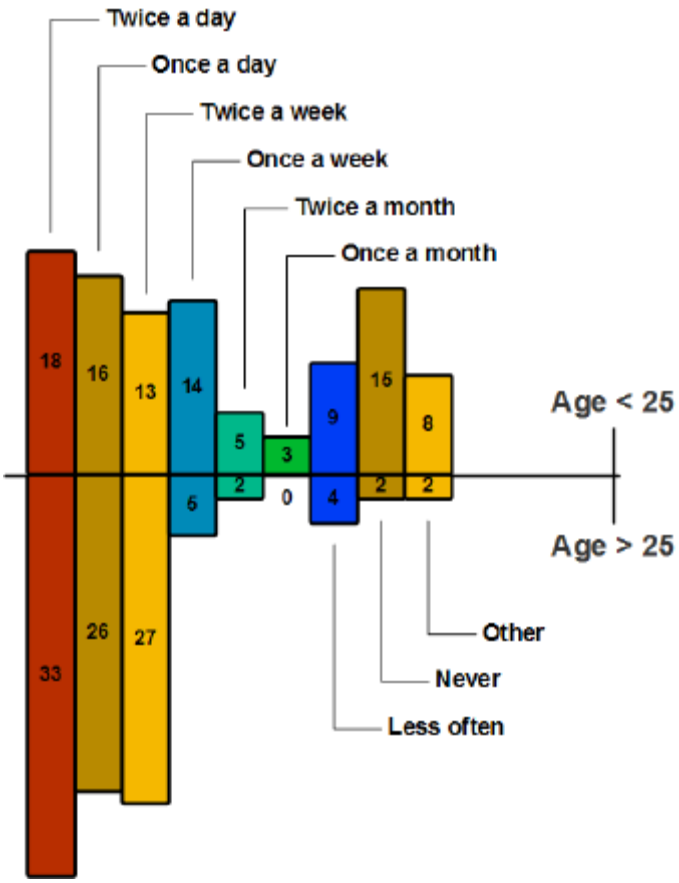

Figure 18. Frequency of cooking meals (expressed in percentage)

The shape of the chart reveals distinct behaviours for adults and youth. The left side of the chart corresponds to high frequency of cooking. The bias of the chart towards adults suggests that a larger percent of the adults cook frequently. The right side of the chart corresponds to low frequency of cooking. Here, the skew is reversed, favouring youth. This suggests that youth are occasional cooks, while adults are regular cooks. Overall, there was only a 70% correlation between the responses of adults and youth.

Reasons for Not Preparing from Fresh Ingredients

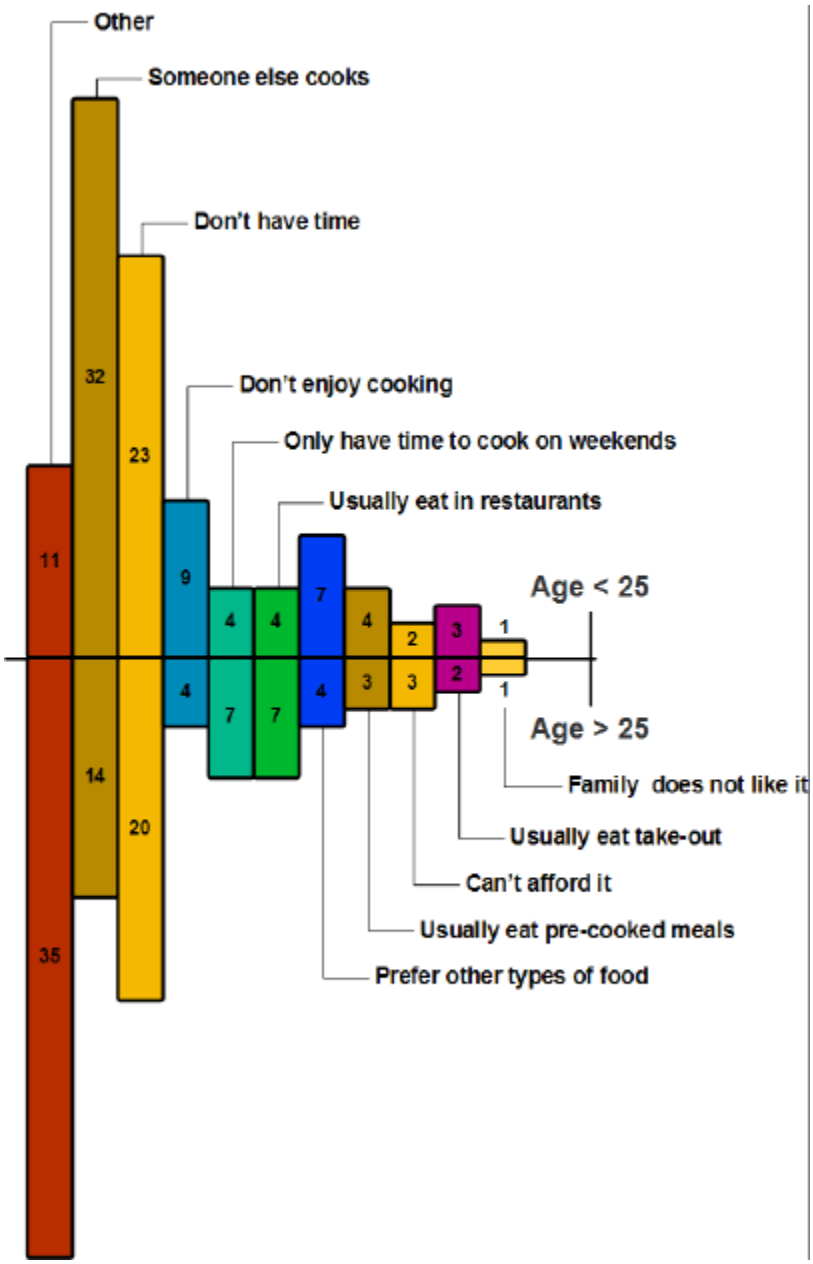

Figure 19. Reasons for not preparing food from fresh ingredients (expressed in percentage)

There was a clear disparity in the responses of adults and youth, consistent with previous data that suggest their cooking habits differ significantly. A large segment of youth said that "someone else cooked," while both youth and adults stated that they did not have enough time to cook. More youth than adults did not like to cook and preferred other types of food. The responses of adults and youth were poorly correlated (52%).

Purchase of Food

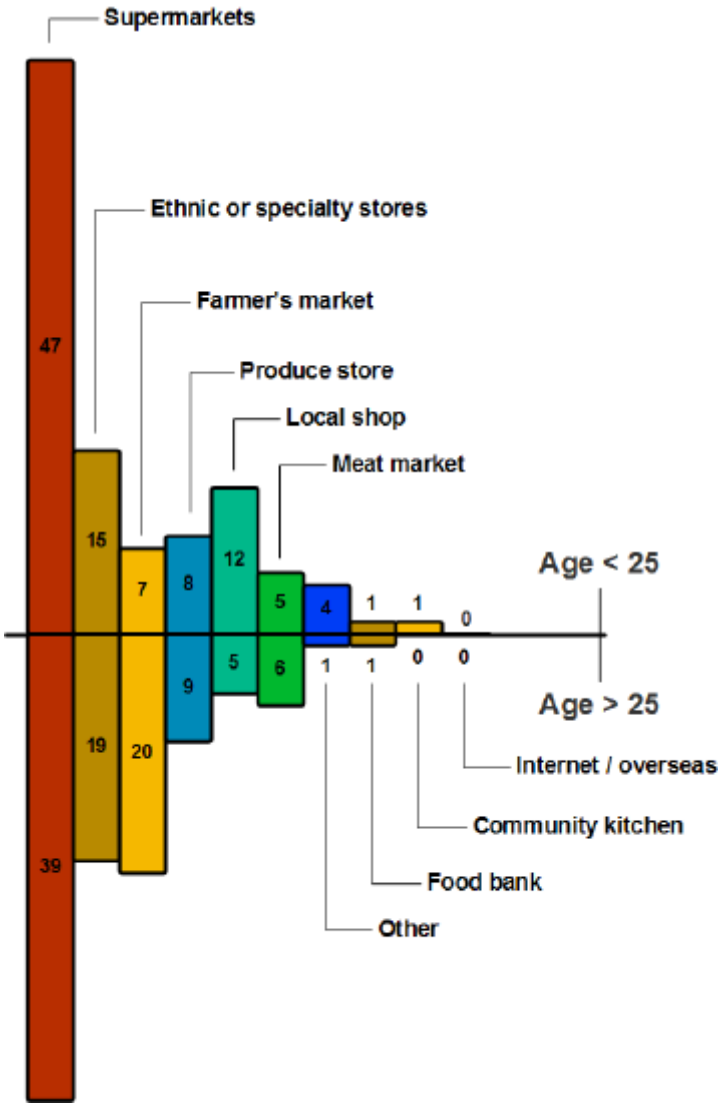

Figure 20. Household food shopping (expressed in percentage)

An overwhelming majority of both adults and youth shopped at supermarkets. However, a sizeable number shopped at specialty stores, farmers' markets, etc. Youth appeared to value the convenience of local shops in larger percentages than adults, who appeared to be more discriminating, shopping in specialty stores for meat, fresh vegetables, or ethnic food. The responses of adults and youth were fairly highly correlated (91%), probably because both categories shopped most often at supermarkets.

Frequency of Buying Food or Groceries

Over one half of the respondents (55.2%) chose to shop once a week for food or groceries. A lower number (22%) shopped every two or three days.

Respondents' Recommendations

At the conclusion of each focus group, participants were asked to present their recommendations. The following points are composite responses from all the groups.

Youth

1. Youth attendance at focus and information groups is an issue. Suggestions to increase attendance include: a- providing refreshments and a small honorarium, b- combining the event with a fun and social activity such as visiting a mall or watching a movie, c- making programs interactive and fun with incentives such as prizes and food, d- combining important subjects that may not interest youth with subjects that do interest them.

2. Use interactive events, such as creative contests, to design and develop informative posters, stories, essays, and videos. To succeed, however, these programs must be well promoted and offer desirable prizes.

3. Increase the amount of peer education, as peer influence is important among youth.

4. Make the information youth friendly – for example, use rappers, comic strips, visual aids, or skits such as the CDA skit.

5. Include diabetes in the school curriculum under health education; this is especially important in schools with high numbers of ethnocultural minority students. The school nurse could be a resource for diabetes education in schools.

6. Use colloquial language, whenever possible, in information targeting youth. The Internet is an important information medium for youth.

7. Ethnocultural youth born in Canada often speak English as a first language, but they require materials in English that are geared towards their ethnic background.

8. Separate time slots for girls to use sports facilities, for example, a public swimming pool, would benefit ethnocultural girls.

9. Make school a focal point for diabetes education and awareness among youth. Use a top-down approach by first training teachers who then educate the students.

10. Focus on teaching the consequences of poor health to young people who have little concern about health. This could be achieved through interaction with peers and others who suffer from diabetes.

11. Bus stops and shelters are good locations for promoting diabetes awareness to youth.

Diet/Exercise – Lifestyle

12. Healthy eating habits and lifestyle changes must be taught at a young age to prevent or slow the development of diabetes among youth in ethnic communities.

13. Use culturally relevant exercises and treatment such as Tai Chi, Qi Gong, and Reflexology.

14. Involve both parents and children in school physical education.

15. Use a practical approach to dietary changes, such as providing healthful traditional ethnic foods at social events that centre around food.

16. Provide cooking classes aimed at different ethnic groups that teach new and healthy ways to prepare tasty and traditional food eaten by the group.

17. Some ethnic groups suggested that planning for healthy food is needed at temples.

18. Provide healthy food choices in vending machines.

Family/Community

19. Community education is essential, as it would benefit the community at large. Make sure that education and public talks are culturally and linguistically relevant.

20. Educate through drama, with plays and stories that address misconceptions and the psychological aspects of diabetes and that also work to reduce stigma.

21. Involve parents through parenting groups, workplace information sessions at lunch, healthy years centres, and information sessions sponsored by faith groups.

22. Use physicians, pharmacies, the CDA, and the Heart and Stroke Foundation as sources of information on diabetes.

23. Develop training initiatives for parents so they can help educate their children.

24. Parents and older individuals need materials translated into their own language.

25. Diabetics should ask their doctor for the Hemoglobin A1c test. (this lab test reveals average blood glucose over a period of 2-3 months.)

26. Hold more community events with a focus on diabetes.

27. Develop a Chinese (and other ethnic group) chapter of the Canadian Diabetes Association and develop programs that encourage regular medical check-ups.

28. Ensure that ethnic service groups providing assistance to those needing help in the community are widely promoted within their communities.

29. Provide more information sessions on many health issues, including diabetes, and more public education.

30. To increase awareness of diabetes prevention among groups, such as the Filipinos, use an intergenerational approach so that important messages and programs reach all generations. Participants who do not want to take time away from their families would be attracted to programs involving the whole family, such as family exercise programs or cooking classes.

Media

31. Use both ethnic and mainstream media to educate the public and increase awareness among all ethnic groups. To be most effective, use knowledge of the local ethnic community's media preference. For example, South Asians use radio most often, followed by Internet and print media.

32. Develop a health column dedicated to diabetes prevention and management for ethnic newspapers. The column could inform and educate, correct misconceptions, work to reduce the stigma of diabetes, share recipes, give tips for staying active, etc.

33. Have health fairs, workshops, and nutrition education for parents.

Public Awareness on Diabetes

All the participants felt there was a need for greater public awareness of diabetes prevention. The need was mentioned in several contexts:

- Some felt people lacked an understanding of diabetes.
- Some were embarrassed for others to know they had diabetes.
- More use should be made of ethnic media to provide up-to-date information on type 2 diabetes and other health issues that affect the communities.
- The Internet should be used to target the youth with appropriate messages.

Education on Diabetes

At-risk youth and their families need to be educated about type 2 diabetes. Physicians should be able to identify those at particular risk of developing diabetes and suggest preventive measures to avoid or delay the onset of diabetes.

It is necessary to establish culturally based and community-managed diabetes prevention programs. To be sustainable, these programs should be for a specific community and run by this community.

Communities should provide access to safe physical activities. One way to do this is to work with neighbouring schools to provide community access to equipment and space after school hours.

For primary prevention of type 2 diabetes to be effective, traditional diets, activities, values, and lifestyles should be carefully interwoven into intervention strategies. Local stores should be encouraged to display larger quantities of traditional healthy foods in prominent locations in the store and food guides for each group should be developed.

Community leaders should act as role models in issues relating to diabetes education and awareness and in healthful ways to prevent and treat diabetes. Additionally, they should make a list of organizations where the community can go for help.

2. National Symposium: "Strategic Engagement of Youth in Ethnocultural Communities on Diabetes Awareness"

A national symposium was organized to provide statistical information and scientific data on type 2 diabetes in ethnic youth, strategies for prevention, and opportunities to develop partnerships and community linkages.

This national symposium was held on June 8, 2007, in Toronto with an attendance of 66 individuals. Attendees included 15 youth and 24 adults representing families, leaders, and advocates from the selected communities. In addition, 25 healthcare professionals, many of whom were from the targeted communities, attended. Two representatives from the Canadian Diabetes Association also participated.

Display of Published Materials

There were eight display tables in the meeting area. The CEC displayed all of its previous publications related to diabetes. The CDA had information packages available for distribution. Other organizations displayed brochures and/or publications on their current and previous programs and projects. Participants viewed these materials during breaks and had ample opportunity to network and discuss work being carried out in their communities.

Presentations by Panelists

The initial part of the presentations focused on statistical information and background data on ethnic youth and type 2 diabetes and on strategies for prevention currently being provided by healthcare professionals. This was followed by presentations from representatives of the Chinese and Filipino communities who provided insights into the kinds of interventions and programs in their respective communities. They discussed proposed plans for the future based on suggestions made by participants of earlier focus groups in the project. The last presentations provided a platform for the youth to express their views and perceptions. Six youths from Chinese, Vietnamese, Hispanic, and South Asian communities, who had been participants in focus group meetings in their respective cities, were given the opportunity to express their views and perceptions.

The opening panelist was an endocrinologist from the Ottawa Hospital who presented a detailed account of diabetes in youth, including the risk factors and the importance of adopting prevention strategies in at-risk communities (Appendix 5). She concluded by saying that "we as individuals need to take responsibility and become part of the reality of prevention of diabetes."

The adolescent medicine specialist from Toronto's Hospital for Sick Children gave an overview of obesity in youth and the primary strategies for the prevention of obesity in youth in Canada (Appendix 6). She also outlined the recommendations produced by the Ontario Medical Association.

The school health manager and supervisor of the City of Ottawa discussed the results of the School Health Action, Planning, and Evaluation System (SHAPES) (Appendix 7). She described the city-wide physical activity project, called "Active Ottawa," and described the components and working of the *Live it up* program.

The clinical dietitian from the Hospital for Sick Children listed the reasons for the rising obesity rates in youth in Canada (Appendix 8). She compared the calories and fat content of fast foods commonly consumed by youth with the daily requirement for that age group. She suggested that there is strong evidence linking pop consumption and fruit drinks (generally high in youth) to obesity and type 2 diabetes. Of particular concern to dietitians is the low consumption of fruits and vegetables among youth. She provided dietary strategies for the prevention of type 2 diabetes among youth using the food groups and portion sizes recommended by Canada's Food Guide to Healthy Eating. She also suggested tips for meal planning and reducing the time that youth devote to TV, video, and computers to no more than two hours per day.

The presentations of the two community representatives – Chinese and Filipino – told participants about the work currently being done in the area of diabetes and the kind of infrastructure available in the two communities to carry out more work in the area of diabetes prevention in youth. They suggested ways to reach their respective target groups based on the outcome of the youth focus groups conducted earlier in their communities. The presentations provided the participants with ideas on how to modify existing programs and encourage partnerships to share knowledge and skills at minimal cost to each participating organization. Both the presenters reported, from their own experiences, that involving the youth is a difficult task. However, preventing obesity and type 2 diabetes in youth is a priority that will soon be integrated into their existing programs.

Several youth who had participated in the focus groups were very enthusiastic and anxious to share their ideas with others. Hence, time was allocated for them during the symposium to share their views with healthcare professionals, families, and communities. Their presentations were well received. Involving youth and obtaining their perceptions about type 2 diabetes and about the best ways to reach the youth are crucial factors in developing programs to prevent type 2 diabetes in youth from high-risk ethnocultural communities.

The youth, families, and members of the selected communities said that they had obtained much useful information from the presenters and felt that more meetings of this kind should be arranged to share knowledge and information. However, the participants suggested that in any future meetings more time should be allocated for discussion.

The biographies of the panelists are included in Appendix 9.

3. National Community Briefing - "Strategic Engagement of Youth in Ethnocultural Communities on Diabetes Awareness"

The national community briefing on "Strategic Engagement of Youth in Ethnocultural Communities on Diabetes awareness" was held in Toronto on February 23, 2008. The participants included youth, families, and community representatives of Asian, African, Hispanic, and South Asian origins. The conference was also attended by health professionals, representatives from the Canadian Diabetes Association, and the media. The details of participants are presented in Appendix10.

Purpose: The purpose of the community briefing was to share the information from research and consultations with youth, communities, and the media, and to develop appropriate strategies for distribution and dissemination within each of the target communities.

Process: The morning session involved mainly presentations on different perspectives of type 2 diabetes in youth from high-risk ethnocultural communities. An endocrinologist from the Ottawa Hospital gave a brief overview of type 2 diabetes in youth from high-risk ethnocultural communities. She pointed out that there is a high prevalence of type 2 diabetes in youth from certain communities and emphasized the urgent need for preventing or delaying the onset of type 2 diabetes in youth.

This was followed by presentations based on the three draft reports distributed to the participants in their meeting package. The reports were as follows:

- Demographic Analysis – information compiled from Statistics Canada Census, Ethnic Diversity Survey, and the Canadian Community Health Survey.

- Community Awareness Report – information collected through national consultation of 15 focus groups in 7 cities across Canada to assess community awareness of type 2 diabetes in youth.

- Resource Guide – information on minimizing modifiable risk factors for developing diabetes, some primary prevention strategies, and details about the challenges to primary prevention. The Resource Guide includes a list of publications and programs (including web sites), a compilation of cookbooks with recipes, and a glossary of terms.

Two interesting presentations were made by youth living with diabetes. One was from the Black community and the other from the Hispanic community. Both described their daily challenges and how they continue to cope with the disease. Their message to other youth was to be physically active, eat healthy foods, and follow the advice of their healthcare professionals.

The President of the Progenesis Iberoamerican Organization made a brief report of their very successful diabetes screening program for the Hispanic community in Ottawa. They offered to provide their professional expertise and extend the screening program to other communities in Canada.

During the afternoon session, the participants were divided into separate cultural groups. Each group had a facilitator and a recorder. Initially, the participants in each group reviewed the three reports in their meeting package and provided feedback on each report.

In order to develop appropriate strategies for dissemination within each of the target groups, discussions were focused on three main issues: (1) *where each community would like to share this information, (2) local media contacts enabling CEC to send relevant information, and (3) ways to involve youth within their own community.*

Youth Participation

Youth from the targeted communities were well represented at the community briefing. Some of them had participated in the earlier events–focus group meeting and/or symposium.

More than a third of the 110 participants at the community briefing were youth who were eager to learn about type 2 diabetes and ways to prevent diabetes. They were also interested in sharing their ideas and views on how to reach other youth in their communities with appropriate messages to create awareness about type 2 diabetes.

From the earlier focus group meetings and discussions with youth, it was clear that the most effective ways to create greater awareness of type 2 diabetes in youth would be through the Internet. YouTube or Facebook are two of the most popular channels of information. Facebook is rather complicated to use. YouTube was selected because it is a visual interface and it has an easy point and click architecture.

After attending the morning presentations of the three reports that were prepared, the youth assembled in a separate room and they were briefed on what was expected of them during the afternoon session.

They worked in small groups and developed short messages for posting on YouTube. After the messages were refined, they were filmed by the filming crew (youth from a community college).

Final Presentations

At the end of the day, presentations were made by representatives from each cultural group on the main issues for discussion (Appendix 11). Youth representatives from each group also presented their messages to all the participants.

The evaluator handed out evaluation forms for feedback on the process and outcome of the community briefing to be included in a separate evaluation report.

General Comments from Participants

The day was very productive and the participants felt energized, as evidenced from their feedback. All the participants stated that the approach to disseminating the results of the project at the community briefing was “good” or “excellent.” Youth, in particular, stated that they had learned a great deal from the presentations. They were proud to be involved in the project and in the major activities of the project.

Regarding the reports, the overall impression was that they were very informative and they can be used by youth, families, and communities. The Resource Guide, in particular, was acclaimed as a very useful tool by a majority of the participants. However, the participants felt that more time was required to go through the reports to make appropriate suggestions and do justice to the reports.

Participants felt that they had a great opportunity to network and develop meaningful partnerships. The adults felt that the youth, in particular, did a creditable job considering that they had limited time. Messages for youth are most effective when they are developed by youth.

The participants suggested that the momentum needs to be maintained through more such events that will facilitate further meaningful collaborations between organizations that focus on ethnic youth and type 2 diabetes.

Media Participation

Letters of invitation for the community briefing and a Media Advisory (Appendix 12) were sent to the ethnic media. Separate media packages were prepared and distributed at the meeting. The following participated in the meeting:

- Ben Viccari, President, Canadian Ethnic Media Association (CEMA)
- Csilla Reszegi, CEMA
- Farzana Hussain, CHIN Radio/OMNI TV, CEMA
- Naeem Noorani, The Canadian Immigrant Magazine
- Raji Raj, Tamil Information
- Ram Krishna, Regional Delegate, South Asian Diabetes Chapter, Canadian Diabetes Association (CDA)
- Rosalina Bustamante, Filipino newspaper, *Balita*
- Siva Swaminathan, Chair, South Asian Diabetes Chapter, CDA
- Suresh Kumar Polavarapur, Asian Television Network.

The representatives of the media used different approaches to gather information from the participants for their publication or program. For instance, the Asian Television Network interviewed the youth, presenters, and many of the participants for their TV program while summaries of the presentation were used for the Canadian Immigrant Magazine.

At the time of this report, the Asian Television Network has already aired a program on the event, the Canadian Ethnic Media Association has posted details of the meeting on their website, and articles based on the reports have been included in the Canadian Immigrant Magazine and *Balita,* the Filipino newspaper.

Appendix 13 contains a sample of the efforts by the media to spread the message about the high prevalence of type 2 diabetes in ethnic youth and the need to take action to prevent or delay the occurrence by adopting healthy lifestyles.

VII. Concluding Remarks

Type 2 diabetes, which is known to occur predominantly in adults, has been increasing in youth at an alarming rate. This increase is especially felt among members of Asian, Black, and Hispanic communities. The full impact of diabetes will be felt as youth become adults and develop the long-term complications of diabetes.

The good news is that lifestyle changes can prevent or delay the development of type 2 diabetes in those at risk. A healthy meal plan, weight control, and physical activity are important steps in preventing and delaying the onset of type 2 diabetes.

Through this project, lifestyle habits among youth that may contribute to an increase in predisposition to type 2 diabetes were noted. The communities from which these youth come do not appear to be sufficiently informed about type 2 diabetes in youth and ways to prevent or delay its occurrence. Through our efforts, a beginning has been made to inform and educate the communities whose youth are at high risk for developing type 2 diabetes. The three reports – Demographic Analysis, Community Awareness, and Resource Guide for Community Use – have been highly rated by youth, families, and healthcare professionals. The resources developed are not exhaustive but are intended as tools for stimulating discussion on strategies for future action.

The focus group meetings and the symposium have provided information and promoted strong linkages and partnerships in these communities. The community briefing provided an opportunity to share and discuss the reports with more than 100 participants including youth, members of the communities, and healthcare providers. Each of the cultural groups was engaged in developing its own strategies for dissemination and distribution of the reports. The different groups have recommended ways to involve youth in promoting greater awareness of type 2 diabetes and steps for preventing or delaying the occurrence of type 2 diabetes. Youth contributed by developing short messages on type 2 diabetes for other youth to be posted on YouTube. In addition, the representatives from the media had interviewed certain participants, and some, such as Canadian Ethnic Media Association, Asian Television Network, The Canadian Immigrant Magazine, and *Balita* (Filipino newspaper), have already assisted in spreading the message to the communities at large.

A great deal of work still needs to be done to increase awareness and capability to prevent type 2 diabetes in high-risk ethnic youth. Language and literacy as well as income and cultural differences may prevent some youth and their families from getting the information, healthy foods, and opportunities for physical activity and social support they need to maintain good health.

Community-based education should be the initial intervention for youth at risk of developing type 2 diabetes. Community events should serve as models for inculcating healthy behaviours in youth and their families.

Ethnocultural organizations have an important role to play in promoting activities that will enable healthy living. But these organizations require resources to help them in these educational roles. These resources include culturally appropriate information and the skills to encourage the creation of environments that promote healthy eating and physical activity. Their major task is to build the capacity of individuals and families in those communities so that they can successfully improve eating habits and increase the physical activity levels of the youth in their communities.

To prevent future generations from experiencing increased morbidity and mortality as overweight, obese, and diabetic adults, coordinated efforts must be established at all levels – family, school, community, and government. A long-term commitment to promote healthy nutrition and physical activity in Canadian youth is essential. Youth, their families, and communities who are at high risk for developing type 2 diabetes need guidance and supportive environments to help them make these necessary lifestyle changes.

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