Preliminary Assessment of Diabetes Programs for Métis Peoples

Métis National Council
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Introduction

It is estimated that the cost of diabetes (Type 1 and 2) in Canada is approximately $9 billion annually. While the onset of Type 1 diabetes is usually not preventable, Type 2 diabetes (often referred to as adult onset diabetes) on the other hand is an often preventable disease where the risk of contraction, progression and complications of the disease can be reduced through a combination of good nutrition and physical activity.

While diabetes is a problem for all Canadians, it is of special concern for Métis peoples as they have a much higher rate of developing the disease than the general population. Therefore, there is an increased need within the Métis community, at both the national and provincial level, to have in place proper policies and programs to effectively address diabetes.

The following report and supporting annexes provide an inventory (as of March 2006) of diabetes-related programs that are, or could be, accessible to Métis peoples in the provinces of British Columbia, Alberta, Saskatchewan, Manitoba and Ontario. The purpose of this project was to assemble information that would allow the Métis National Council (MNC) (including its governing members) to understand and examine options on how to best address the problem of Type 2 diabetes among the Métis. A necessary prerequisite for understanding available options is to develop a conceptual framework of Type 2 diabetes. This conceptual framework provides a common “mental model” to help understand the disease and to identify potential leverage points for intervention.

This report is comprised of seven volumes. The first volume contains the main report providing a preliminary assessment of diabetes programs for Métis peoples. The main report includes several supporting analytical annexes, described below. The remaining 6 volumes provide comprehensive listings and detailed information on diabetes-related programs at the national level and in the five regions of the Métis Homeland: British Columbia, Alberta, Saskatchewan, Manitoba, and Ontario. The programs covered in these volume are not limited to those specifically for Métis peoples or aboriginal peoples generally.

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1 Child-onset Diabetes is thought to develop through a cross-reaction between protein in milk and beef and a protein in the pancreas. This can occur if genetically susceptible infants are fed dairy products or beef in their first few months, before their digestive tract and immune system are fully matured.

The information contained in the analytical annexes to the main report and in the supporting 6 volumes of program listings have also been incorporated into the “Programs & Services” area of the Métis National Council Health Portal website.

The main report, presented in this volume, is comprised of five parts. **Part 1** provides background information on the nature and scope of the “diabetes epidemic”, both in Canada in other countries.

**Part 2** provides an overview of the conceptual framework of Type 2 diabetes in the form of a Disease Process Model. The Model is based on diabetes modeling work carried out by the US Centers for Disease Control and Prevention. The framework presents a System Dynamics treatment of the Type 2 diabetes disease process, which provides an integrative and holistic framework for examining the complex facets of diabetes prevention and treatment.

Drawing on the conceptual framework provided in the Disease Process Model, **Part 3** then presents a selection of research findings relating generally to risk factors that influence the dynamics of the disease.

**Part 4** provides a discussion of key considerations that will be relevant in designing Métis-specific programs that adopt a holistic approach to preventing and managing Type 2 diabetes in Métis peoples. Again, linkages are made (as appropriate) with elements of the Disease Process Model presented in Part 2.

**Part 5** provides information on a selection of notable programs and strategies that were designed specifically to address diabetes in Aboriginal populations. Information on several notable non-aboriginal programs is also included.

**Part 6** of the report presents a review and analysis of the Canadian-based diabetes-related programs that have been identified through this research project. The review focuses on whether the programs are specifically designed for and delivered to Métis peoples, whether programs are located in areas that make them accessible to Métis peoples, and which elements of the disease model they address. The report does not attempt to assess sufficiency of funding levels nor does it attempt to determine the effectiveness of the programs identified.

Two analytical annexes provided detailed information in support of Part 6. The first annex utilizes the Disease Process Model provided in Part 2 as the framework for a scope assessment of every diabetes-related program at the national level and in the five regions of the Métis Homeland. This annex is incorporated into the “Programs & Services” area of the MNC Health Portal. Future development of the Portal could allow the program listings and scope analysis to be editable by MNC staff at national or regional levels, allowing the database to be refined and maintained on an ongoing basis with greater and greater levels of detail and accuracy.
The second annex addresses (in part) the issue of accessibility of the programs for the Métis population by providing a geographic proximity analysis of the national and regional-level diabetes programs. This annex identifies all programs that fall within a 30km and 100 km radius of communities that contain at least 100 Métis individuals. (Communities were identified through StatsCan data derived from the 2001 census.)

This proximity analysis was created through custom-engineered web-based GIS software developed specifically for this project. The software identifies the geographic coordinates of each Métis community, compares those coordinates to the coordinates of each program, and then calculates the distance between the location of the community and the location of the program. The software then groups the programs for each community by reference to two standards (programs within a 30km radius and program within a 30-100km radius). It should be noted that the proximity analysis simply provides an “as the crow flies” calculation of distance between communities and programs. It does not take into account geographic factors that could significantly affect travel time and, therefore, accessibility, such as road access, water bodies, mountains, climatic conditions, etc. The geographic proximity analysis information is available on-line in the “Programs & Services” area of the MNC Health Portal.
Part 1

Background Information on Type 2 Diabetes

A Global Diabetes Epidemic

Type 2 diabetes is a global problem that has reached epidemic proportions. Sources predict diabetes cases will more than double, from 170 million currently to 370 million over the next 30 years. Especially alarming is the growth of diabetes among the young, where rising rates of obesity worldwide put children at an unprecedented risk for developing the disease. Even more worrisome is the fact that diabetes is an underlying cause for many other fatal illnesses; for example, more than 65% of people with diabetes die from heart disease or stroke. Because of its broad impact, diabetes is estimated to account for nearly 10% of all healthcare expenditures.

In response to the growing number of cases of diabetes in the United States, the Centers For Disease Control and Prevention (CDC) has recently been developing computer simulation models of the diabetes epidemic. These models allow the CDC to not only project how the number of U.S. cases of diabetes will progress over the next several decades, but also to assess the potential effectiveness of different disease control strategies and to establish realistic performance targets for diabetes-related public health policies and program.

The most recent CDC modeling work projects that diabetes prevalence in the U.S. will more than double over the next 50 years, rising from 4.4% in 2000 to 9.7% in 2050. Such rapid growth will inevitably lead to increased demand for healthcare resources among people with diabetes and to increased need for preventive and therapeutic interventions, thereby potentially placing a heavy burden on the U.S. healthcare system.

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2 Type 2 diabetes reaching pandemic proportions worldwide, doctors write http://www.newstarget.com/007831.html

3 The American Diabetes Association http://www.diabetes.org/type-2-diabetes.jsp


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Type 2 Diabetes in Canada

In Canada, more than 60,000 new cases of diabetes are diagnosed each year, many of which are not properly diagnosed until complications arising from the disease become acute. Diabetes is the seventh leading cause of death in Canada; forty percent of Canadians with diabetes develop long-term complications. In nearly 1 in 10 hospitalizations, diabetes is listed as the main or underlying condition responsible for admission.

Diabetes is not a gender-neutral disease; it affects both men and women, with women accounting for two-thirds of diabetes cases in Canada (Diabetes in Canada 2000). Recent analysis published in the Canadian Journal of Diabetes suggest that if the increase in the prevalence of diabetes follows current trends, healthcare costs for people with diabetes in Canada will increase by 75% between 2000 and 2016. The major area of increase in the number of diabetes cases (for both the Aboriginal and non-Aboriginal population in Canada) will be with Type 2 diabetes.

Métis and Other Aboriginal Peoples are Disproportionately Affected

Although diabetes represents a significant health risk for all Canadians, it is of particular concern to aboriginal peoples. In 2001, 5.9% of off-reserve Métis reported having diabetes as a chronic health condition, compared with 4.3% for non-Aboriginal Canadians. The high rate of under-reporting on statistical surveys in the Métis population means that the actual prevalence of diabetes may be considerably greater (A study by Health Canada on Métis Nation Health Needs suggests that the age-standardized prevalence rate for diabetes could be as much as three times higher.)

Aboriginal peoples experience earlier onset, greater severity at initial diagnosis, higher rates of complications, and comparative lack of accessible services, and increasing prevalence of risk factors.

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6 PHAC - Diabetes

7 The Projection of Prevalence and Cost of Diabetes in Canada: 2000 to 2016 - Arto Ohinmaa1,2 PhD, Philip Jacobs1,2 PhD, Scot Simpson1 PharmD MSc, Jeffrey A. Johnson1,2 PhD. Canadian Journal of Diabetes. 2004;28(2):00-00.

8 Ibid.


10 Health Canada: Diabetes Among Aboriginal People in Canada- The Evidence. 2000

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Ninety percent of all Aboriginal diabetes cases are Type 2 diabetes. Aboriginal people are thought to be at greater risk for diabetes because they are “genetically predisposed to store energy from the diet very efficiently, due to the nomadic lifestyles and feast/famine cycles of their ancestors”. This genetic predisposition results in greatly increased incidence of type 2 diabetes when coupled with the (not aboriginal-specific) societal trends that are prevalent in North America such as higher-fat diets, sedentary lifestyles and reduced physical activity, all of which result in increased rates of obesity. Obesity is a key risk factor for Type 2 diabetes.

The First Nations and Inuit Health Branch of Health Canada reports that the annual health care costs per person for status Indians with diabetes is $3,657 (age-adjusted cost) compared with $1,359 per person for those without diabetes.

In 2001, Health Canada began working toward developing an effective diabetes prevention and control strategy for Canada, with 50% of the funds allocated to First Nations, Inuit and Métis populations. At present, there are numerous Aboriginal-specific diabetes programs such as The Healing Trail Program, which is targeted at diabetes prevention for aboriginal peoples living in urban settings. However, despite such programs, the rate of diabetes among Canada’s Aboriginal population continues to grow.

**Prevention vs. Treatment**

In general, most programs aimed at treating diabetes tend to focus more on disease management rather than prevention. Although a focus on prevention rather than disease management offers greater leverage in mitigating the diabetes epidemic, (causing the rate of increase in diabetes to be much less than it would be otherwise) prevention is arguably the most difficult aspect of the problem to address. Most preventative measures for Type 2 diabetes involve behavioural ("lifestyle") changes which many individuals may be resistant to make.

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11 ibid

12 National Diabetes Information Clearinghouse : Diabetes Prevention Program

13 Health Canada: Aboriginal Diabetes Initiative - First Nations On-Reserve and Inuit in Inuit Communities Program

14 Health Canada: Aboriginal Diabetes Initiative Métis, Off-reserve Aboriginal and Urban Inuit Prevention and Promotion Program
http://www.hc-sc.gc.ca/dc-ma/diabete/aborig-autoch/index_e.html

15 ibid.

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Social Determinants of Health Play a Major Role
Also, there is a growing recognition that Type 2 diabetes is not solely an individual disease, but rather a disease that affects, and if affected by, the well-being of the entire community. Powerful social determinants of health within a community (for example income, education, accepted social norms, etc.) influence behavioural and lifestyle choices of individuals within the community. For the individual to experience health, the community must also be healthy.

Designing and Delivering Effective Programs for Métis Peoples
Based on the factors mentioned above, Métis-specific diabetes programs will provide the most leverage if such programs are aimed at preventing the onset of diabetes, and subsequently slowing the rate of progression for those afflicted with the disease. To be effective however, it is essential that such programs be grounded and delivered in a culturally relevant manner that connects with, and builds on, the values, perspectives, and goals of the Métis community. Such programs can be most effectively designed by integrating the latest scientific knowledge of the disease, with an understanding of the specific causal factors and the relevant cultural context that constitute the “system” of the disease for Métis peoples. Such integration will allow for a more holistic treatment of diabetes and will allow interventions to address the wide range of causal factors (both physical and social).
Part 2

Conceptual Framework for Type 2 Diabetes

Type 2 Diabetes Disease Process Model

The inventory and assessment of diabetes-related programs for Métis people provided in this report is framed against a Type 2 Diabetes Disease Process Model, presented in Figure 1, below. The model provides a simplified, but scientifically sound conceptual framework for understanding the epidemiological dynamics of Type 2 diabetes, and therefore the ‘operational logic’ of how programs aim to change the trajectories (i.e., the behaviour over time) of those dynamics.

The model, which is comprised of “stocks” (the blue rectangles) and “flows” (the arrows), provides the foundation for the organization of the literature review of diabetes-related programs and also the inventory and analysis of existing programs that are potentially accessible to Métis people in Canada. The “stocks” in the model represent measures of the severity of the problem (for example, the number of patients affected with Stage 3 Diabetes). Since stocks tend to accumulate over time, and given the fact that it is not possible to cure diabetes, these measures of the diabetes problem are relatively slow to change. In fact, due to inertia within the diabetes disease “system”, the diabetes problem for the Métis population may continue to worsen for some time, despite the implementation of enhanced prevention and treatment programs.

Policies and programs aimed at controlling diabetes in the Métis population do not operate directly on the “stocks”, but rather manage the problem by changing the rates at which the disease develops and progresses in patients. These rates are represented in the model as numbered flows (1-6). The “flows” are potential intervention points for diabetes policies and programs specifically designed and delivered to the Métis community. Since “flows” are much less resistant to change, as compared to “stocks”, changes in the rate of the flows will provide early indications (i.e., performance indicators) of the success (or failure) of diabetes-related programs aimed at reducing the rate at which new cases of Type 2 diabetes develop and the rate at which the severity of the disease progresses in the Métis population.
Figure 1 illustrates a Disease Process Model for Type 2 diabetes.\textsuperscript{16} The model builds on a System Dynamics treatment of Type 2 diabetes initially developed to address possible policy and program interventions to treat the disease in Whatcom County, Washington.\textsuperscript{17} The model examines how Type 2 diabetes develops within a specific population (due to risk factors leading to the onset of the disease), as well as how the disease progresses as symptoms and complications worsen, ultimately leading to death. An explanation of each sector of the model, as well as the dynamics associated with the causal factors influencing Type 2 diabetes, is provided below.


\textsuperscript{17} Ibid.
In any population a certain percentage of individuals are, or will become, at risk of developing Type 2 diabetes (transition to “at risk” status is represented by flow 1 in the model), primarily due to risk factors such as being overweight, physically inactive, or having a family history of diabetes.

Of those individuals who are at risk, some will develop a condition known as “pre-diabetes” (transition is represented by flow 2 in the model), assuming that there is no knowledge of, or action taken to prevent the onset of the disease. In these individuals, physiological changes progressively weaken and eventually cause failure of insulin-secreting beta cells in the pancreas, which leads to elevated blood glucose levels. As the disease progresses, the insulin-secreting beta cells overcompensate for the elevated blood glucose, and pump out too much insulin, weakening the body’s ability to maintain normal blood sugar levels. In some of the “pre-diabetic” individuals this process will develop into full-blown Type 2 diabetes as progressive insulin resistance results in increased blood sugar levels (Stage 1 Undiagnosed Diabetes stage). 18

Over time, some cases of Stage 1 diabetes will be screened and properly diagnosed (transition represented by flow 3 in the model) and will become part of the “Diagnosed Population”. 19 (Note that a significant portion of the overall diabetes disease “system” would not be reflected in data that focuses solely on diagnosed cases.)

Screening is vital because it shifts the flow of diabetics in the disease system from the less desirable flow 4 (Organ Involvement) to the more desirable flow 3 (Diagnosis). This means that a diabetic will first be diagnosed as a Stage 1 diabetic without organ complication and thus have a much longer period of time without complications that may lead to death. Typically, a long period of glucose intolerance precedes the development of diabetes. Screening tests can identify persons at high risk.

18 It is estimated that forty-one million people in the United States, ages 40 to 74, have pre-diabetes. Recent research has shown that some long-term damage to the body, especially the heart and circulatory system, may already be occurring during pre-diabetes. There is also growing evidence that at glucose levels above normal but below the threshold diagnostic for diabetes, there is a substantially increased risk of cardiovascular disease (CVD) and death.

19 Warning signs of diabetes include frequent thirst, frequent urination, gaining or losing weight, tiredness, blurred vision, persistent infections, cuts and bruises that heal slowly, erectile dysfunction, and tingling and numbness in hands and feet. It is important to note, however, that an individual can have none of these signs and still have Type 2 diabetes. CDN Diabetes Assoc. http://www.diabetes.ca
risk. There are safe, potentially effective interventions that can address modifiable risk factors.\textsuperscript{20}

The diabetes literature demonstrates that the incidence, progression, and complications of the disease can be reduced significantly through concerted intervention.\textsuperscript{21} Once diagnosed, some individuals may succeed in making the changes that will control their diabetes and will move to the stock, “Stage 1 Controlled” (transition represented by flow 5 in the model). Others, however, may choose not to seek treatment or may not succeed in achieving control (represented by the stock, “Stage 1 Uncontrolled”). Whether or not those who are diagnosed seek treatment (controlled), the disease in these individuals may still progress through the various stages in the model in a similar fashion as cases that are not properly diagnosed, as explained below.

Studies show that approximately two-thirds of individuals with Stage 1 diabetes will not exhibit any outward symptoms of the disease, and as many as half of pre-diabetes cases will go undiagnosed. Of those individuals who are not properly diagnosed, most will eventually progress to Stage 2 Diabetes (transition represented by flow 4 in the model) and become part of the “Diagnosed Population”. The onset of Stage 2 Diabetes is usually accompanied by organ disease as blood flow disturbances impair the functioning of organ systems, potentially leading to problems such as a heart attack, stroke, kidney disease, etc.

At this stage it is still possible to reduce the severity of complications through a combination of diet and exercise and/or glycemic/blood pressure control medication (transition represented by flow 5 in the model).

However, if an individual suffers irreversible organ damage or organ failure as a consequence of Stage 2 Diabetes, the individual will progress to Stage 3 Diabetes (transition represented by flow 6 in the model).

\textsuperscript{20} The Diabetes Prevention Program A Randomized Clinical Trial to Prevent Type 2 Diabetes in Persons at High Risk \hspace{1em} www.bsc.gwu.edu/dpp/dppmain2.ppt

At Stage 3, individuals are at the greatest risk of developing further complications leading to death (transition represented by flow 7 in the model). Despite the advanced state of their disease, Stage 3 diabetics may benefit from dietary changes and/or glycemic/blood pressure control medication (transition represented by flow 5 in the model).

**Understanding the System Dynamics of the Disease Process**

Note that medical science does not yet have a cure for diabetes, which means that individuals who have the disease will always have it. The rate at which individuals with the disease progress through the various stages can be controlled, but the flows in the system cannot be made to run backwards. This has significant implications for performance expectations (targets) concerning diabetes policies and programs.

As long as the inflow rate exceeds the outflow rate for the disease, the prevalence of diabetes in a population will increase. There are only two ways to reduce the prevalence of diabetes in a population. The first is to speed up the ultimate outflow rate from the system (i.e., “deaths”). This is, clearly, an unacceptable solution but it is one that may be implicitly adopted by governments through failure to provide adequate healthcare system capacity for treatment of patients with diabetes.

The second way to reduce the prevalence of diabetes is to slow down the inflow rate from the at-risk population, (“disease onset”). This approach is do-able but, as will become evident in the discussion that follows, it is also non-trivial in both its scope and its complexity due to the combination of physiological and social/psychological factors that operate to “fuel” the Type 2 diabetes epidemic.
Part 3
Risk Factors for Type 2 Diabetes

This section of the report examines risk factors that influence the progression of Type 2 diabetes, namely flow 1 (at-risk factors in the general population), flow 2 (the onset Stage 1 or pre-diabetes) and flow 3 (screening of Stage 1 or pre-diabetes).

Type 2 diabetes is a disease that occurs when the body is unable to produce enough insulin or when body tissue has a resistance to insulin. Also known as adult onset diabetes, non-insulin dependent diabetes mellitus (NIDDM), Type 2 diabetes mostly affects adults, however children are also prone to developing the disease. Some of the most common risk factor associated with developing Type 2 diabetes include:

- being overweight/obese;
- being 45 years old or older;
- having a family member who has diabetes;
- being of African American, American Indian, Asian American, Hispanic American/Latino, or Pacific Islander descent;
- having gestational diabetes or giving birth to at least one baby weighing more than 9 pounds;
- having a blood pressure that is 140/90 or higher;
- having an HDL cholesterol level that is 35 or lower, or having a Triglyceride level that is 250 or higher;
- being inactive or exercising fewer than three times a week.

While most cases of Type 2 diabetes are usually the result of the risk factors mentioned above, there is a growing recognition that Type 2 diabetes is also a social disease. Social determinants of health operating within a community shape the lifestyle choices and behaviour of individuals. These choices, in turn, may lead to an increased risk in developing the disease. Programs aimed at preventing Type 2 diabetes should not only attempt to educate and communicate individual-focused risk factors. To be effective on a broader scale, these programs should also use community-wide interventions aimed at fostering cultural changes that will support

22 National Diabetes Information Clearinghouse: Diabetes Prevention Program

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the necessary behavioural changes required by individuals to eliminate or reduce risk factors.

The next section examines in greater detail some of the more common risk factors associated with Type 2 diabetes, as well as certain preventative measures that may help to reduce the risk of Type 2 diabetes.

**Diet**

Research shows that consuming large amounts of processed foods and also consuming larger portions of food contribute to obesity and subsequently can cause complications such as diabetes and heart disease. When compared to individuals who consume a relatively balanced and generally healthy diet, individuals who have a diet consisting largely of red meat, processed meat, high-fat dairy products and refined sugar are almost twice as likely of developing diabetes.

**Behavioural/Cultural Influences on Diet**

Although one of the most effective methods to prevent Type 2 diabetes involves making dietary changes, there may be behavioural and/or cultural inertia affecting individuals that may make it difficult to make such a lifestyle change on a community-wide basis:

- individuals may distance themselves from messages about healthy eating, which are not perceived to be relevant to them;
- Individuals' ideas about balanced diets may be much more complex than commonly understood by professionals in a position to offer advice; and

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24 [Diabetes Prevention](http://www.medicinenet.com/diabetes_prevention/page2.htm)
• there is a cultural context of eating, and it must be recognized that food choices are made in relation to everyday priorities and demands, such as family life. 

Sleep
It appears that the risk of Type 2 diabetes can be increased by poor sleep patterns which, in turn, can be associated with causal factors such as depression and inactivity. Complications of diabetes can also exacerbate sleep problems, which then reinforce the power of the underlying causal factors of the disease. The resulting fatigue causes the body to miscalculate how much insulin should be produced, further exacerbating the problem.

Recent research also suggests that sleep deprivation increases rates of obesity, which is a key causal factor for onset of Type 2 diabetes. When glucose levels are out of balance, sleep quality is compromised. Many Type 2 diabetics have a difficult time initially getting to sleep and do not respond well to sleep. They may be awakened from sleep by symptoms arising from their diabetic conditions. If the cause is from low blood glucose (hypoglycemia), they often experience feelings of

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25 Feeding families and influences on healthy eating in Scotland: findings from a qualitative study
http://www.chs.med.ed.ac.uk/ruhbc/research/pdf/finding_docs/findings1.pdf

Nuts contain monounsaturated and polyunsaturated fats, high fiber and high amounts of magnesium, all of which have been associated with insulin sensitivity. The Nurses’ Health Study, established in 1976 has found that women who eat an ounce of nuts or peanut butter five times a week are less likely to develop Type 2 diabetes than women who never or almost never include nuts in their diet.

Rui Jiang, M.D., (Harvard School of Public Health) Journal of the American Medical Association (Nov. 27/05)
http://www.inuitdiabetes.ca/reduce-risk-prevent.html

Recently published research has shed light on how a high fat diet can lead to the onset of Type 2 diabetes. Scientists found that insulin production can be disrupted by eliminating the gene encoding the enzyme GnT-4a glycosyltransferase (GnT-4a). A high-fat diet apparently has essentially the same effect, suppressing the activity of this enzyme, which then causes pancreatic beta cells to fail. The failing cells are unable to sense glucose levels properly, which leads to impaired insulin production and increases the risk of developing Type 2 diabetes.

The discovery of the (systems) linkages between diet and insulin production offers new information that may aid in the identification of “at risk” individuals and in the development of treatments that target the early stages of Type 2 diabetes in those individuals. The new studies suggest that variations in the gene for GnT-4a might indicate an inherited predisposition to Type 2 diabetes.

Researchers discover how a high-fat diet causes Type 2 diabetes.

26 Association Between Sleep Problems And Diabetes
http://www.fenadabetes.com/newsletters/article1.html

27 Forget the crash diets, the pills, the fruitless vows of exercise: just hit the sack
Joel Kom,, CanWest News Service; Ottawa Citizen, March 09, 2006
hunger. A diabetic who is awakened by high blood glucose often experiences headaches, night sweats or frequent urges to go to the bathroom.

Because the causal linkages between sleep and diabetes appear to operate in a closed, self-reinforcing loop, gaining control over sleeping disorders can be a high-leverage approach to controlling both the onset and the progression of Type 2 diabetes. After remediating poor sleep patterns, many diabetics find that the severity of their condition is reduced.

**Smoking**

Smoking is now recognized as a risk factor for developing Type 2 diabetes. It is believed that tobacco use is a causal factor for hyperglycemia (i.e., "prediabetes"). A study of 41,810 middle aged men found that those who smoked more than 25 cigarettes daily were almost twice as likely to develop Type 2 diabetes as non-smokers. Smoking also contributes to the severity of many of the complications experienced by tobacco users who have Type 2 diabetes, increasing the risk of premature death. Perversely, cessation of smoking can also increase the risk of diabetes because it is often accompanied by a weight-gain.

It is estimated that approximately one-quarter of diabetes cases among Canada's First Nations individuals could be attributed to smoking. (Comparable analysis for Métis peoples has not been produced, but the prevalence of smoking is greater among Métis than non-aboriginal Canadians.)

**Breastfeeding**

According to the Infant Feeding Action Coalition (INFACT Canada), in a paper entitled ‘Nutrition for Healthy Term Infants’ epidemiological data has shown that breastfeeding reduces the risk of both juvenile and non-insulin dependent diabetes melitus. Recent research conducted by the Harvard Medical School sheds light on how this risk reduction occurs, finding that breast-feeding may prevent obesity in

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28 *Diabetes in Canada’s First Nations*, Bruce N. Leistikow, CMAJ  
http://www.cmaj.ca/cgi/content/full/164/8/1126-a

29 *Action on Smoking & Health* U.K. – Fact Sheet #23  


31 Infant Feeding Action Coalition - INFACT Canada: *Nutrition for Healthy Term Infants*  
http://www.infactcanada.ca/healthyterm.htm
Breastfeeding also appears to have beneficial effects for mothers as well as their children. Other research conducted in the US found that a mother's chance of developing Type 2 diabetes was reduced by 15% for each year of breast feeding. INFACT Canada reports that in New Mexico, exclusive breastfeeding for at least two months was associated with a lower rate of non-insulin dependent diabetes mellitus.

Health Canada views breastfeeding as a key element in “creating an enabling environment for ‘at risk’ childbearing women to change their health behaviors and to facilitate them breastfeeding their infants to provide the protective effects of breast milk to their infants from birth.” During the childbearing period, women are more likely to successfully make necessary lifestyle changes.

The growing knowledge about the beneficial effects of breastfeeding on Type 2 diabetes risk is particularly important for Aboriginal peoples. Because breastfeeding rates tend to be lower among Métis peoples, they have a comparatively greater potential for reducing the risk of Type 2 diabetes by increasing breastfeeding rates.

32 Breast-Fed Babies Less Likely To Be Overweight Children, Teens May 16, 2001
http://www.sciencedaily.com/releases/2001/05/010516080931.htm

33 Breast-Feeding May Lower Mom’s Risk of Diabetes  By Serena Gordon of Forbes Magazine Nov.’05

34 INFACT Canada: Cost of Diabetes
http://www.infactcanada.ca/diabetes.htm
In case-control studies, patients with Type I diabetes were more likely to have been breast-fed for < 3 months and to have been exposed to cow’s milk before 4 months. Early cow’s milk exposure may be an important determinant of subsequent Type I diabetes and may increase the risk approximately 1.5 times.
Cow’s milk exposure and Type I diabetes mellitus. A critical overview of the clinical literature
http://care.diabetesjournals.org/cgi/content/abstract/17/1/13?ijkey=5e1cb4e935a48edd46238483e97fb6df13e3443f&keytype2=tf_ipsecsha

35 Breastfeeding, Healthy Eating and Active Living: Natural Tools for Diabetes Prevention

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Obesity
Obesity, which increases the body’s resistance to insulin, is the single most important risk factor for Type 2 diabetes. Reversal of obesity through weight reduction improves insulin sensitivity and regulation of blood sugar.\(^{36}\)

Pear vs Apple Shape
The distribution of fat is important. “Pear-shaped” individuals (i.e., smaller waist than hips) have a lower risk of developing Type 2 diabetes than those who are “apple-shaped” (i.e., larger around the waist). The exact reason for this difference is unknown, but it is thought to have something to do with the metabolic activity of the fat tissue in different areas of the body.\(^{37}\)

Childhood Obesity
Overweight in a child under three years of age does not predict future obesity, unless at least one parent is also obese.\(^{38}\) After age three, however, the likelihood that obesity will persist into adulthood increases with the advancing age of the child and is higher in children with severe obesity in all age groups. After an obese child reaches six years of age, the probability that obesity will persist exceeds 50 percent, and 70 to 80 percent of obese adolescents will remain so as adults. The presence of obesity in at least one parent increases the risk of persistence in children at every age.


Watching too much television has been shown to increase obesity because people that watch more television than others tend to have a poorer diet, and exercise less. A new study discovered that men who watched over 21 hours of television a week, had twice the risk of developing Type 2 diabetes than men watching 1 hour of television a week.

\(^{38}\) Child Obesity  http://www.childobesity.com/

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Part 4
A Holistic, “Systems” Approach to Designing and Delivering Diabetes Programs

In part, due to the long time delays required before results can be observed, there is relatively little empirical evidence on comparative effectiveness of different strategies and program designs for preventing and managing Type 2 diabetes. (See, “Challenges in Assessing Program Performance”, below.) However, the fact that the incidence (inflow rates) and prevalence (stocks of people in various stages of diabetes) are increasing means that, on a collective basis, existing diabetes prevention and disease maintenance programs are either not working, or are not of a sufficient scale to reach the relevant portion of the population and accomplish the desired results. The reasonable conclusion is that we need better programs that are designed and delivered in a way that increases their effectiveness and that we need programs that are accessible and welcoming to the relevant populations, particularly Métis peoples.

Although there are many unanswered questions surrounding diabetes there is enough knowledge and experience in the worldwide community to allow a Métis specific diabetes prevention program to be developed that should, with time and patience, make a significant difference in the quality of life for Métis individuals throughout the Homeland and in the demand on health care systems.

This section of the report discusses some important insights gained by academics, health care professionals, and experienced aboriginal health program designers and administrators into a variety of factors that should be considered when designing and delivering diabetes programs, particularly for aboriginal peoples. The central, unifying concept is that prevention and the management of diabetes is most effective when approached holistically, taking into consideration the individual’s physical, social, emotional, mental, spiritual and cultural well-being, factors that will likely evolve over time, particularly if there is a progression in the disease and in the complications that develop.39

39 ibid,
Shut-Down the “Inflow” - Preventing Onset of Diabetes Through Education

As is suggested by in the Disease Process Model, primary prevention of Type 2 diabetes needs to focus efforts on screening the “at-risk” population and educating pre-diabetics about the lifelong diet and activity changes needed to prevent or slow the progression to diabetes.

Experience has shown that intensive preventive programs for pre-diabetics can reduce the incidence of Type 2 diabetes (i.e., the “disease onset” flow - Flow 2) by 50–60 per cent.\(^{40}\) It is true that in the short-term, a reduction of this magnitude would have relatively little effect on the prevalence of diabetes in the Métis population as whole, since substantial number of Métis already have the disease, which cannot be cured.

In the long-term, however, a major reduction in the “disease onset” flow rate would yield significant reduction in the number of individuals afflicted by the disease and its complications. This, in turn, would have major benefits for reducing demand on health care systems, both for primary care and for programs aimed at helping individuals manage the progression of the disease through changes in lifestyle and dietary measures.

High-Leverage Intervention - Combatting Childhood Obesity

The epidemic of Type 2 diabetes throughout the world, but particularly in North America, is being fueled by the problem of childhood obesity. Obesity represents the single most powerful variable driving the growth in the number of people with Type 2 diabetes. For this reason, programs that are able to reduce the rate of childhood obesity will provide high-leverage intervention points to combat the disease. The self-reinforcing effect of obesity, inactivity, sleep disorders, and Type 2 onset adds to the benefit that can be gained by making progress on this causal factor. Although the benefits in terms of reducing the prevalence of Type 2 diabetes would be time-delayed, they would be significant, both in societal and economic terms.

The Canadian Institutes of Health Research reached the following conclusions regarding approaches for reducing obesity in children:


Preliminary Assessment of Diabetes Programs for Métis Peoples
1. There is currently no systematically reviewed evidence to support a specific approach to obesity prevention through childhood.

2. Behaviour modification is an important component of obesity treatment interventions and is strongly associated with improved outcomes.

3. School-based physical activity interventions can effectively increase regular physical activity and are useful in obesity treatment.

4. School-based nutrition programs focused on changing dietary behaviour may be useful in obesity treatment.

A review of the current research on childhood obesity made the following recommendations for the prevention of obesity in children.41

<table>
<thead>
<tr>
<th>Area</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment of obesity</td>
<td></td>
</tr>
<tr>
<td>Overall treatment effect</td>
<td>It is strongly recommended that treatment be advised for obese children, as treatment confers significantly increased chance of improvement or resolution of obesity.</td>
</tr>
<tr>
<td>Exercise strategies</td>
<td>It is recommended that exercise incorporated into childhood obesity treatment be adapted to the needs and preferences of the individual children without emphasis on a particular exercise strategy or approach to motivation.</td>
</tr>
<tr>
<td>Parental involvement</td>
<td>It is recommended that childhood obesity programs focus resources toward interventions directed at the child. This does not imply a lack of parental involvement, but rather parental involvement directed toward the critical tasks of supporting and reinforcing the child's emerging behaviour change, without being directly responsible for directing it.</td>
</tr>
</tbody>
</table>

41 CIHR, Institute of Nutrition, Metabolism and Diabetes: *Addressing Childhood Obesity: The Evidence for Action* http://www.cihr-irsc.gc.ca/e/23293.html#exec
**Behaviour modification strategies**

It is strongly recommended that obesity treatment interventions include behavioural components, both to support the development of adaptive behaviours around diet and physical activity and to facilitate the maintenance of those changes.

**Initial weight status**

It is recommended that treatment for obesity be undertaken as soon as possible after recognition, based on the circumstances of the child and family, but without regard for the degree of obesity.

**Diet and physical activity or behaviour change outcomes**

<table>
<thead>
<tr>
<th>Strategies which promoted increased physical activity</th>
<th>Interventions to increase physical activity in the school setting are strongly recommended.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategies which promoted dietary change</td>
<td>The implementation of school-based nutrition programs aimed at changing nutrition related behaviour is recommended, and a behavioural approach should be considered.</td>
</tr>
</tbody>
</table>

The National Aboriginal Diabetes Association provides a Handbook for Grade 4-6 as they recognize that education of the young is the key to diabetes prevention.\(^{42}\) An example of a program that focuses on the reduction of youth obesity is “Just for Kids”.\(^{43}\)

**Diabetes Programs in Schools**

Diabetes prevention programs in schools have been built around two principles: increased physical activity and a change in food available. Physical activity is increased by increasing the number mandatory gym classes. The dietary aspect has been addressed in some school districts by banning junk food in school cafeterias and vending machines.\(^{44}\) In the US, recent initiatives have been mounted on a national level to remove soft-drinks from vending machines in public schools. In New Haven, Connecticut, vending machines in city public schools now sell only 100 percent juice beverages, milk, water and low-fat chips and snacks, while cafeteria

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42 *NADA Handbook for Grade 4-6* [http://www.nada.ca/resources/pdf/April5_ActivityBook_Gr%204-6.pdf](http://www.nada.ca/resources/pdf/April5_ActivityBook_Gr%204-6.pdf)

43 *Obesity Program for Kids* [http://www.just-for-kids.org/program.htm](http://www.just-for-kids.org/program.htm)

44 *Schools limit junk food - City-wide junk-free school zone policy is recently implemented* [http://www.yaledailynews.com/article.as?AID=30402](http://www.yaledailynews.com/article.as?AID=30402)

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menus have changed to offer healthier lunch alternatives. Similar initiatives have been implemented in the U.K.

**Slow Down Disease Progression Flows**

Management of Type 2 diabetes (flows 4, 5 & 6) focuses on maintaining blood sugar levels as close to normal as possible, thus reducing the risk of long-term complications of diabetes. In people with Type 2 diabetes, either the body does not produce enough insulin, or the cells ignore the insulin. The first treatment for Type 2 diabetes is often meal planning for blood sugar control, weight loss, and exercising. Sometimes these measures are not enough to bring blood sugar down near the normal range. The next step is taking a medicine that lowers blood glucose levels. After that, insulin injections are required.

The Public Health Agency of Canada (PHAC) states to keep diabetes under control patients must:

- Maintain diligent control of blood sugar levels; and
- pay close attention to foot care, blood pressure, blood lipids (cholesterol, triglycerides), the state of the kidneys (test for microalbuminuria), and the state of the eyes (examination by ophthalmologists).\(^\text{45}\)

**Regular Monitoring by Health Care Professionals**

Regular monitoring and testing by health care professionals is an important part of any effective regime for managing Type 2 diabetes. The National Aboriginal Diabetes Association (NADA) has developed the following guidelines for on-going testing: \(^\text{46}\)

- Routine Clinical Care (2-4 months)
- Routine visit every 2-4 months with health care provider
- Blood pressure and foot examination at each visit
- Changing of treatment plans, trying to find balance in all the parts of treatment
- Blood Sugar Control
- Test the level of fat in the blood - Glycated hemoglobin, every 3 months.
- Check meter glucose measurements, blood sugar, with a laboratory once a year to make sure they are the same and glucose meter is working well.

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\(^\text{45}\) National Diabetes Information Clearinghouse : Diabetes Prevention Program

\(^\text{46}\) NADA Resources http://www.nada.ca/resources/resources_pathways.php

Preliminary Assessment of Diabetes Programs for Métis Peoples
More Emphasis on Self-Monitoring of Blood

Self-monitoring of blood (SMBG) is considered to be an underutilized but integral part of disease management for patients with both Type 1 & 2 diabetes. Guidelines on the recommended frequency and timing of SMBG vary among International diabetes associations, and patients are often unaware of actions they should take in response to SMBG results.47

Reducing the Rate of Organ Involvement

An underemphasized part of most diabetes prevention programs are attempts to reduce the flow of people directly to Stage II diabetes (flow 4); that is, they begin their life with diabetes with organ failure. Health Canada's Primary Prevention of Diabetes initiative reports that 40% of people with diabetes develop long term complications, such as:48

- Cardiovascular disease
- lower limb amputations
- retinopathy
- kidney disease
- high blood pressure
- nervous system disorders

It is estimated that 60% of heart attacks are due to diabetes.49 People who have diabetes, age 35-64, have six times the risk of heart disease and stroke compared to the rest of the population.50

For confirmed diabetics, a comprehensive disease management approach can increase the fraction of patients under control from the 40 per cent typically seen without a program up to nearly 100 per cent for those patients who make the required lifestyle changes and take the required medications. The benefits of control

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48 In motion Primary Prevention of Diabetes initiative http://www.in-motion.ca/diabetes/


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are substantial: disease progression is reduced by perhaps two-thirds, and the hospitalization rate at each stage of the disease cut by about half.\textsuperscript{51}

While the flow of diabetes victims to stage 3 and, ultimately to death (flows 6 & 7) cannot be stopped, it can be slowed down considerably if the disease is managed effectively. Diabetes complications, such as heart disease, kidney failure and blindness are major contributors to the burden of disability experienced by individuals. A large proportion of the financial cost of chronic disease is due to end-stage diabetes.\textsuperscript{52}

**The Importance of Foot Care**

Individuals that have diabetes are at risk of getting a foot ulcer, particularly when diabetes has resulted in a loss of sensation in the feet. This often happens when someone has lived with diabetes for some time. As a result, it is possible to injure the foot, causing an ulcer without realizing it. Foot ulcers can lead to amputation.

Unfortunately, the chances of amputation are far higher for a person with diabetes than a person without the condition. Every 30 seconds a lower limb is lost to diabetes throughout the world. The diabetic foot is a significant economic problem. Ministry of Health figures for the year ended 30 June 2004 show there were 516 lower limb amputations for people with diabetes in New Zealand; 50\% of all lower limb amputations. The health cost excluding out-patient care was $5.8M, an average of $11,000 each.\textsuperscript{53} The experts on on feet are of course podiatrists, and yet they are not included in the *Canada Health Act*.

**Addressing Underlying Belief Structures That Shape Behaviour**

Diabetes is a societal disease. The determinants of health for diabetes: physical activity, healthy eating and weight are well entrenched into the social fabric of Canadian communities, including Métis communities.\textsuperscript{54} Any program designed for the Métis must work at both the social and individual level to have successful long

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\textsuperscript{51} Models for collaboration: how system dynamics helped a community organize cost-effective care for chronic illness, Jack Homera*, Gary Hirschb, Mary Minnitic and Marc Pierson, System Dynamics Review Vol. 20, No. 3, (Fall 2004): 199–222

\textsuperscript{52} The Diabetes New Zealand Balanced Scorecard

\textsuperscript{53} Diabetes New Zealand

\textsuperscript{54} National Diabetes Information Clearinghouse : Diabetes Prevention Program
term behaviour changes that can stop and/or slow down diabetes progression. As a general rule, individuals can sustain change only when the group around him/her approves of and supports that change.

Current research points to the importance of the beliefs that pre-diabetics and diabetics have about diet and exercise. It is essential that program designers and front-line program personnel understand the power of these beliefs and have strategies to address those that present impediments to behavioural change. Unless underlying attitudes towards exercise and diet are changed, the information they are provided through education-oriented programs will not be effective in influencing their behaviour.

A Health Canada-funded study “Understanding the Forces That Influence Our Eating Habits” addresses significant issues raised by the continued rise in rates of diabetes around the world and identifies the need for research on the following questions that are pivotal to sound program design:

- How do advertising and the mass media affect the nutrition knowledge and perceptions of Canadians? How do young people, in particular, act on the ads they see on TV? How does the value and validity of information gleaned through the media compare to information from other sources, such as health professionals, school, family, friends and the food industry?
- What is the relationship between socio-economic status and diet? Studies would need to explore the many aspects of socio-economic status (including income, age, housing, time constraints, nutrition knowledge and ethnic background) to better evaluate their impact on dietary choices and health?
- What are the interactions between individual and collective determinants of healthy eating that are unique to older adults?
- How are the dietary habits of Aboriginal people influenced by concern over pollutants in their local food sources? Fresh and processed foods are costly or scarce for people in remote communities, but do Aboriginal traditions of mutual responsibility and sharing affect how food insecurity impacts food selection?
- What impact do self-esteem and body image have on food selection and eating behaviour? How do dieting and weight loss affect mental health and eating?

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55 Understanding the Forces That Influence Our Eating Habits

Preliminary Assessment of Diabetes Programs for Métis Peoples
Fatalistic View of Diabetes
In a 2004 study entitled Social and Cultural Barriers to Diabetes Prevention in Oklahoma American Indian Women researchers found that the women presented a fatalistic view of diabetes, regarding the disease as an inevitable event that destroys health and ultimately results in death. If a perception of the inevitability of diabetes is prevalent in a population, diabetes prevention programs are unlikely to be successful.

Discounting Risk in Absence of Physical Symptoms
The researchers found that older Indian women residing in urban areas considered themselves to be healthy in the absence of any outward, perceivable sign of illness. The respondents believed, mistakenly, that long-term complications of diabetes were symptoms of the disease (instead of the consequences of poor diabetes control). When the study participants faced a clinical diagnosis of diabetes, they delayed self-care until long-term complications — accompanied by a decrease in physical function — became evident.

In any population, strong reliance on the existence or absence of physical symptoms will constitute a significant obstacle to diabetes prevention, screening, and care. In addition to conflicts between healthy lifestyle behaviors and family obligations, avoidance of diabetes screening serves as an additional barrier to diabetes treatment. The Indian women expressed an inclination to avoid screening even if they harbored suspicions of having the disease. If a clinical diagnosis was made, denial was likely, especially when no physical symptoms are apparent.

Communicate with People When They are Open to Change
Significant behavioural change like diet and exercise regimes needed to prevent, delay and/or being able to live with diabetes without complications only happen during specific ‘windows of opportunity’ when a person is receptive to hearing and acting upon recommendations from ‘experts’. Such crises times include:

- birth The childbearing period is an optimum time for women to make lifestyle changes as a primary prevention intervention that can have long-term effects for themselves and their infants, children and other family members.


• teenage years: What they do/eat is what they will think of as ‘normal’ for the rest of their lives. Thus any diabetes prevention program would be wise to target those in their high school years
• death/extreme poor health in the family/friendship circle from diabetes e.g. Sudden death of parent at early age
• forced job change/loss
• move to another city/town
• divorce/death of a child

Research shows that recreation programs that teach behavioural change techniques are more effective than standard recreation programs for:  

• changing participants’ attitudes about recreation activities;
• increasing their confidence about physical activity;
• reducing dropout rates; and
• motivating people to maintain an active lifestyle.

Thus, when participants design their own plan, they are more likely to persist

Approaches to complex behaviour change focus primarily on the five main influences on behaviour:  

Subjective Norms: The perceptions a person has of the expectations of significant others regarding the behaviour and the motivation to comply with these expectations.

Attitudes: The positive or negative evaluations of the possible consequences of performing a behaviour.

Self-efficacy for the behaviour or change of behaviour: The situation-specific confidence a person has that they are able to change their behaviour and maintain this behaviour change. A common argument is that people cannot be expected to engage in a behaviour, or even to form intentions to engage in a behaviour unless they believe that they have the necessary skills and abilities to perform the behaviour.


Peer support: The availability of support from peers and particularly the extent to which peers also demonstrate or model the relevant behaviour. In the case of engaging men as EEO partners, it is essential to look for ways to facilitate men supporting each other and to presenting alternative role models for advocating gender issues at the workplace.

Knowledge from information/education: The extent to which a person has knowledge of the causes and consequences of their current behaviour and possible alternative behaviours.

The most frequently used model of behaviour change literature is the transtheoretical model (Prochaska, DiClemente & Norcross).60 (see Appendix 4 for details.)

Addressing Challenges in Assessing Program Performance

New Zealand has developed a Balanced Scorecard Performance Measurement framework to measure the impact of their diabetes programs on the rates of diabetes and associated diseases.61-62 It should be recognized, however, that because of the significant time delays in the diabetes disease system (i.e., delays between becoming “at risk”, being diagnosed with Type 2 diabetes, and transitioning to Stage 3 of the disease process) data would have to be collected and tracked over a significant length of time in order generate direct and reliable evidence regarding the success or failure of existing diabetes programs programs.


61 The Balanced Scorecard Institute http://www.balancedscorecard.org/


Preliminary Assessment of Diabetes Programs for Métis Peoples
Part 5
Notable Diabetes Programs

This section of the report provides information on a selection of notable programs and strategies that were specifically designed to address diabetes in Aboriginal populations. Information on several other notable programs for non-Aboriginal or general populations are also included.

Diabetes Programs for Aboriginal Peoples

Kahnawake Schools Diabetes Prevention Project (KSDPP)
The KSDPP training program was created to offer the experience learned in Kahnawake to other Aboriginal communities. Participants in the training program learn the knowledge and skills to begin a diabetes prevention initiative in their own community. The KSDPP Training Program is geared towards workers in Aboriginal communities involved with health topics, health promotion, nutrition, recreation, wellness or education.

The KSDPP program of intervention activities takes a holistic approach to preventing diabetes in the community by embedding intervention activities which include a health education program, recreational activities, and community based activities all within the overall goal of Living in Balance. The KSDPP school-based intervention involves introducing new lessons (Health Education Program), increasing physical activity and strengthening nutrition policy within community schools. A hands-on, interactive approach....congruent with native culture and learning styles is used. The program also has a community based intervention component. The promotion of healthy family lifestyles outside of the schools was designed to have a ripple effect. The community-based intervention supports the parents who, in turn, reinforce what the children have picked up in school.

63 Kahnawake Schools Diabetes Prevention Project (KSDPP)
http://www.ksdpp.org/aboutus.html

64 ibid.

Preliminary Assessment of Diabetes Programs for Métis Peoples
The KSDPP Community Health Promotion Model includes:

- Understanding Diabetes
- Community Vision and Goals
- School Based Health Education Program in Diabetes Prevention
- Supportive Environments in School & Community
- Planning Healthy Eating Activities and Physical Activities
- Information Dissemination
- Sustainability & Capacity Building
- Evaluation of Activities

There is also a 5 day training that is strongly recommended for anyone interested in how this program has delivered care for 12 years to Aboriginal youth.

**The Healing Trail Program, Dryden, Ontario**

The Healing Trail Program offers expertise to persons with diabetes and community leaders in Aboriginal diabetes education, prevention and promotion. Focusing on Urban Aboriginal and Métis people, the Program’s objectives are to:

- Raise awareness of diabetes, its risk factors, and the value of healthy lifestyle practices;
- Promote Aboriginal ownership of diabetes primary prevention and control;
- Ensure local community access to health promotion programs, education and available resources;
- Provide a passageway to programs that are holistic in nature.

Activities and functions of the Health Trail Program focus on the promotion of diabetes prevention and healthy lifestyles through:

- Public awareness and education;
- The development of partnerships and linkages among stakeholders in community grass root diabetes care and prevention;
- The facilitation of knowledge sharing and communication among health professionals and Aboriginal community partners.

The Healing Trail incorporates the knowledge of western medicine while enabling outreach workers to focus on traditional methods and approaches to develop holistic

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65 The Healing Trail Program, Urban Aboriginal and Métis diabetes prevention and control
http://www.diabeteshealingtrail.ca/
prevention and awareness programs at a grass roots level in the battle against diabetes through:

**Public Awareness** - The Program addresses the knowledge gaps that exist around diabetes and encourage Urban Aboriginal persons at risk of diabetes to speak to a health professional and to practice preventative measures. Sharing of information concerning risks and symptoms of diabetes, access to care and better consumer/professional relations is promoted.

**Communication** - The Program creates linkages among health professionals and other Aboriginal stakeholders to facilitate the sharing of knowledge and expertise around diabetes and to improve access to care for all Aboriginal persons.

**Education** - The Program offers a diabetes education program for individuals working with Urban Aboriginal and Métis people, striving to create a supportive community diabetes health network. Qualified diabetes educators and instructional staff provide a high caliber of learning and educational tools.

**Development** - A team of diabetes educators, community developers and marketers develop community-based workshops that are delivered at the grass roots level to promote and share information concerning ongoing clinical information and to investigate the causes and treatments of diabetes among Aboriginal people.

**Southern Ontario Aboriginal Diabetes Initiative (SOADI)**

SOADI is a part of the Ontario Ministry of Health initiative *The Aboriginal Healing and Wellness Strategy* is a policy and service initiative that brings together Aboriginal people and the Government of Ontario in a unique partnership to promote health and healing among Aboriginal people. The design of the Strategy contains some important features that reflect Aboriginal culture. Community needs and types of services and programs are expressed in an eight-phase continuum of care known as the Healing Continuum. Designed from the Traditional Medicine Wheel, it also addresses all age groups identified in the traditional teachings of the Life Cycle. These concepts are intrinsically holistic and comprehensive and as such, constitute a culturally appropriate alternative to the way "mainstream" services are typically designed and delivered.

The Aboriginal Healing and Wellness Strategy is governed by a Joint Management Committee composed of representatives of 15 First Nations/Aboriginal provincial.

66 Southern Ontario Aboriginal Diabetes Initiative (SOADI) http://www.soadi.ca
67 The Aboriginal Healing and Wellness Strategy http://www.ahwsontario.ca
territorial organizations and four government ministries (Ministry of Health and Long-Term Care, Ministry of Community and Social Services, Ontario Women's Directorate, Ontario Native Affairs Secretariat). It operates on a consensus basis reflecting the traditional decision-making structure of Aboriginal culture.

Here are a few examples of the activities delivered by SOADI:

- Ribbon Life Workshops
- Information sharing on the latest diabetes research
- Nutrition/Art by Traditional Food Speaker
- Parent/Child Fitness Classes with a Personal Trainer Specialist with Parent/Child exercise sessions
- Mother Earth’s Tears Grief/Loss & Renewal workshop
- Walk for Women
- Disability Circles
- Youth Pow Wow
- Spring Feasts; Drumming, Dancing and Pot Luck food
- Diabetes Conferences
- Six Nations Cardio Exercise every week
- Moccasin Walking activities

**Wabano Centre, Ottawa**

An urban Aboriginal diabetes prevention program is integrated into the Wabano Health Care Centre in Ottawa. The diabetes health promotion and primary prevention program promotes awareness of:

- Healthy lifestyle choices
- Risk factors associated with diabetes
- The importance of diabetes screening
- Selection and preparation of a healthy, balanced diet
- A healthy, active, traditional lifestyle in the prevention of diabetes.

Diabetes-related services offered include:

- Diabetes Prevention and Education Series
- Community Garden
- Youth Summer Health Camp for ages 13 - 18

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68 Wabano Centre for Aboriginal Health  http://www.wabano.com/diabetes-prevention.html
• March Break Health Camp 13-18
• Outreach Programming to Youth
• Seasonal Healthy Lifestyle Challenges
• Yearly Health Fair
• Outreach Lunch 'n Learn

Other Notable Diabetes Programs

Canadian Diabetes Association Programs
The CDA has several programs delivered through regional centres to help those with diabetes including:

• Resource Centres with a wide variety of literature on all aspects of diabetes management and prevention, cookbooks for healthy eating and meal planning, lending library of books and videos, and insulin pump supplies.
• The Signature Program is a presentation developed by the CDA, presented by volunteers to community groups and other businesses, and organizations. It emphasizes the benefits of healthy eating and exercise in preventing Type 2 diabetes. It also identifies who is at risk, symptoms and where to go to find out more information. The program is delivered and modified by local Chapters of the CDAA. All presentations and materials are provided free of charge. A special Aboriginal version of the Signature Program has been developed. (See Appendix 1 for details.)
• Pharmacy Outreach Program provides current diabetes prevention, management and educational materials to pharmacists in the Ottawa area.
• Physician Outreach Program provides current diabetes prevention, management and educational materials to physicians in the Ottawa area.
• Live Smart - Diabetes Expo
  International, national and local experts share their knowledge on living well with diabetes. Hundreds of people living with diabetes will have the opportunity to learn and interact with experts and each other.
• Peer-Support Groups give people who share a similar relationship to diabetes, an opportunity to regularly share and support each other enabling them to successfully live with their disease.

70 CDN Diabetes Assoc. Signature Program for Aboriginals
http://www.diabetes.ca/Section_Services/aborPrograms.asp
The Diabetes Prevention Program (USA)
The Diabetes Prevention Program (DPP)\(^7\) was a major clinical trial, or research study, aimed at discovering whether either diet and exercise or the oral diabetes drug metformin (Glucophage) could prevent or delay the onset of Type 2 diabetes in people with impaired glucose tolerance (IGT). The DPP found that over the 3 years of the study, diet and exercise sharply reduced the chances that a person with IGT would develop diabetes. Metformin also reduced risk, although less dramatically.

Participants in the lifestyle intervention group received intensive counseling on effective diet, exercise, and behavior modification. Both males and females reduced their risk of developing diabetes by 58 percent. Lifestyle changes worked particularly well for participants aged 60 and older, reducing their risk by 71 percent. About 5 percent of the lifestyle intervention group developed diabetes each year during the study period, compared with 11 percent in those who did not get the intervention.

Walk Away from Diabetes Program (Canada)
The City of Ottawa Public Health Department ran a program that is now integrated into their general health program.\(^2\) Part of its delivery model was to use community group health centres that were culturally specific to increase their chances that behaviour changes would be well communicated. (see information on Wabano Health Centre, above). This program focuses on raising awareness by placing ads in the media and on buses, providing workplace health lectures, and by working with schools to change to healthy food choices in school cafeterias and vending machines. It also consolidates Type 2 diabetes prevention into public health and community partner programming.

Go For Your Life Program (Australia)
The aim of the Australian “Go For Your Life” diabetes prevention program\(^3\) is to identify people with pre-diabetes [impaired glucose tolerance and impaired fasting glucose (IFG)] and provide an intervention to support lifestyle changes (Healthy Living Course) to reduce the risk of progression to diabetes. The healthy living course component of the Go For Your Life Program is an evidence-based integrated intervention for people with prediabetes, conducted in groups of approximately 10

\(^1\) National Diabetes Information Clearinghouse: Diabetes Prevention Program

\(^2\) City of Ottawa Public Health Department, April 2005, Walk Away From Diabetes Project, Extension Project 6791-06-2000/0520048

\(^3\) Australia: State of Victoria Go For Your Life Program
people with pre-diabetes. Their course has been designed so that participants that complete it will:

- Know about pre-diabetes and its association with diabetes and cardiovascular disease
- Understand the benefit of preventing diabetes through physical activity, eating healthy foods and weight loss
- Make changes to their behaviour to achieve their physical activity, diet and weight-loss goals
- Have effective self-management and problem-solving skills that will help them maintain positive behaviours in the long term.

Additional information on the program is provided in the Appendix 2.
Part 6
Assessment of Diabetes Programs for Métis Peoples

This section of the report presents a review and analysis of the Canadian-based diabetes-related programs that have been identified through this research project. The review focuses on three questions:

1. whether the programs are specifically designed for and delivered to Métis peoples;
2. whether the programs are designed (individually or collectively) to effectively address the epidemic of Type 2 diabetes by changing the rates of flow in the Disease Process Model, via their operation on relevant causal determinants in the Type 2 diabetes disease system; and
3. whether the programs are located in areas that make them accessible to the Métis population.

The analysis does not attempt to assess sufficiency of funding levels nor does it attempt to determine the effectiveness of the programs identified.

This volume contains two analytical annexes that provide detailed information in support of the analysis, which is presented in a summary fashion in this section of the report. The first annex utilizes the Disease Process Model provided in Part 2 as the framework for a scope assessment of every diabetes-related program at the national level and in the five regions of the Métis Homeland.74

The second annex addresses (in part) the issue of accessibility of the programs for the Métis population by providing a geographic proximity analysis of the national and regional-level diabetes programs. This annex identifies all programs that fall within a 30km and 100 km radius of communities that contain at least 100 Métis individuals. (Communities were identified through StatsCan data derived from the 2001 census.)

74 The Scope Assessment Annex is also incorporated into the “Programs & Services” area of the MNC Health Portal. Future development of the Portal could allow the program listings and scope analysis to be editable by MNC staff at national or regional levels, allowing the database to be refined and maintained on an ongoing basis with greater and greater levels of detail and accuracy.
Detailed listings and information on all diabetes programs at the national level and for each of the five regions of the Métis Homeland are provided in the remaining 6 binders that collectively comprise this report.

**Identification of Métis-Designed and Delivered Diabetes Programs**

The study identified no programs that were designed and delivered by Métis solely for Métis. Most Métis with Type 2 diabetes, or at risk of developing diabetes, must resort to programs that have been designed largely with the non-aboriginal population in mind or that are “pan-aboriginal”. Although these programs are theoretically open to Métis, the distinctive cultural context in which they operate makes them (in some cases) not as comfortable for non-First Nations individuals. This, in turn, reduces their attractiveness for Métis individuals and consequently undercuts their effectiveness, particularly in addressing causal elements of the disease that are highly influenced by cultural or social factors that may differ among aboriginal peoples.

Most of the aboriginal-specific diabetes programs open to Métis peoples are funded through the Métis, Off-reserve Aboriginal and Urban Inuit Prevention and Promotion (MOAUIPP) Program, administered by Health Canada. This initiative provides funding for diabetes primary prevention and health promotion programs. These programs emphasize healthy eating and active living, and build awareness of the risk factors, complications, and what can be done to prevent these from occurring. The MOAUIPP program is intended to serve Métis, off-reserve Aboriginal and urban Inuit who will access diabetes primary prevention and health promotion programming, and want these programs to be culturally appropriate.

A total of 25 projects funded by MOAUIPP in 2005-06 (total funding of $2,355,496) identified Métis in target groups. Seventeen of these projects were located within the Métis Homeland. Details on these programs can be found in the “National Programs” binder.

MNC affiliate organizations funded through MOAUIPP in fiscal year 2005 – 2006 received a total of $381,453 for 4 projects, as summarized below. (Details on the four programs can be found in the “National Programs” binder.)

**Métis Nation of Ontario – Timmins Diabetes and Prevention Program:**

**Prevention and Promotion**

Métis Nation of Ontario – Healing Arms Diabetes Strategy
The Métis Nation of Ontario was granted funding for 2000/2001, 2001/2002, 2002/2003 and 2003/2004. The main objectives of the project were to raise awareness of diabetes prevention and health promotion for Métis people; increase awareness of the seriousness of diabetes and potential strategies to prevent diabetes; enhance understanding of diabetes prevention and health promotion; promote the need for screening; improve Métis health care providers’ understanding of diabetes and promote an integrated approach to health care. The target audience for this program included: Métis, Off-Reserve Aboriginal, and urban Inuit persons.

Manitoba Métis Federation (Southwest Region) – Diabetes, Discovering our Options, Program
The Southwest Region of the Manitoba Métis Federation was granted funding for 2001/2002, 2002/2003 and 2003/2004. The main objectives of this project were to raise awareness of diabetes and its risk factors among the Aboriginal community in order to increase the information on Aboriginal diabetes profiles used for statistical comparison; promote individual and community ownership of diabetes prevention and health promotion programs; and raise awareness of the Aboriginal community on the importance of healthy eating, physical activity and healthy lifestyles. The target audience for this program included: Métis, Off-Reserve Aboriginal, and urban Inuit persons.

Métis Nation of Alberta – Building Healthy Communities, Phase II: Diabetes Education and Awareness

Scope Analysis of National and Provincial Diabetes Programs
This portion of the analysis in this report focuses on assessing the scope of the diabetes programs that are theoretically accessible to Métis peoples.

Policies and programs achieve their objectives by adjusting the flow rates of systems (in this case, the Type 2 diabetes disease system) in the real world. For example, programs aimed at preventing Type 2 diabetes are intended to slow the rates at which individuals become “at risk” and/or develop the disease. The result of reducing the inflow rates is that the total number of individuals with Type 2 diabetes will be less than it would have been otherwise. The overall number of individuals suffering from the disease may still increase if the (reduced) inflow rates exceed the
outflow rate (flow 7 - death), but the extent of the problem will be less than it would have been in the absence of the programs.

The scope assessment conducted for this report was focused on determining which of the disease progression flows within the Type 2 Diabetes Process Model were being addressed through the activities of the various programs. The program-related information for this assessment is set out in detail in the six program description binders (National-level programs, BC Alberta, Saskatchewan, Manitoba, Ontario) that comprise the remainder of this report. The analysis did not attempt to assess sufficiency of funding levels nor did it attempt to determine the effectiveness of the programs identified. Both these considerations would, of course, be highly relevant in any follow-on assessments of program scope.

The first annex to the main report provides the results of the scope analysis, identifying the relevant Disease Process Model flows that appear to be addressed in the diabetes-related program at the national level and in the five regions of the Métis Homeland. This annex is also incorporated into the “Programs & Services” area of the MNC Health Portal. Future development of the Portal could allow the program listings and scope analysis to be editable by MNC staff at national or regional levels, allowing the database to be refined and maintained on an ongoing basis with greater and greater levels of detail and accuracy.

**Accessibility (Geographic Proximity) Analysis of National and Provincial Diabetes Programs**

This portion of the report addresses the issue of accessibility of Type 2 diabetes programs for the Métis population.

In practice, accessibility of the programs would be influenced by a variety of factors including geographic proximity of programs to Métis populations, travel feasibility (including cost and time), and cultural appropriateness of program facilities and service delivery. This study focused on only one aspect of accessibility: geographic proximity.

The Proximity Analysis annex to this report provides a geographic proximity analysis of (aboriginal and non-aboriginal) national and regional-level diabetes programs throughout the Métis Homeland. This annex identifies all programs that fall within a 30km and 100 km radius of communities that contain at least 100 Métis individuals. (Communities were identified through StatsCan data derived from the 2001 census.)

The proximity analysis provided in this section of the report was created through custom-engineered web-based GIS software developed specifically for this project. The software identifies the geographic coordinates of each Métis community, compares those coordinates to the coordinates of each program, and then
calculates the distance between the location of the community and the location of
the program. The software then groups the programs for each community by
reference to two standards (programs within a 30km radius and program within a
30-100km radius).

It should be noted that the proximity analysis simply provides an “as the crow flies”
calculation of distance between communities and programs. It does not take into
account geographic factors that could significantly affect travel time and, therefore,
accessibility, such as road access, water bodies, mountains, climatic conditions, etc.
Also, the size and service coverage of each program is not differentiated in this
research.

The following tables summarize the results of the geographic proximity analysis for
diabetes-related programs.

<table>
<thead>
<tr>
<th>Region</th>
<th># of Communities with more than 100 Métis</th>
<th># of Diabetes Programs within the Region</th>
<th>Programs to Communities Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>British Columbia</td>
<td>69</td>
<td>165</td>
<td>2.39</td>
</tr>
<tr>
<td>Alberta</td>
<td>68</td>
<td>130</td>
<td>1.91</td>
</tr>
<tr>
<td>Saskatchewan</td>
<td>40</td>
<td>134</td>
<td>3.35</td>
</tr>
<tr>
<td>Manitoba</td>
<td>59</td>
<td>101</td>
<td>1.71</td>
</tr>
<tr>
<td>Ontario</td>
<td>99</td>
<td>159</td>
<td>1.76</td>
</tr>
</tbody>
</table>

75 The geographic proximity analysis information is available on-line in the “Programs & Services” area of
the MNC Health Portal.
<table>
<thead>
<tr>
<th>Region</th>
<th>Percent of Communities that have programs within 30 km</th>
<th>Percent of Communities that have programs within 100 km</th>
<th>Programs to Communities Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>British Columbia</td>
<td>48%</td>
<td>86%</td>
<td>2.39</td>
</tr>
<tr>
<td>Alberta</td>
<td>28%</td>
<td>48%</td>
<td>1.91</td>
</tr>
<tr>
<td>Saskatchewan</td>
<td>21%</td>
<td>84%</td>
<td>3.35</td>
</tr>
<tr>
<td>Manitoba</td>
<td>80%</td>
<td>95%</td>
<td>1.71</td>
</tr>
<tr>
<td>Ontario</td>
<td>29%</td>
<td>51%</td>
<td>1.76</td>
</tr>
</tbody>
</table>

The analysis suggests that Métis living in Manitoba have the best program coverage. Métis living in Alberta and Ontario must travel greater distances to reach diabetes programs. Only 21% of Saskatchewan communities with more than 100 Métis have access to Diabetes programs within 30 km. However, the program-to-communities ratio in Saskatchewan is 3.35, the highest among other regions. This may indicate that programs in this region are allocated mainly in the major cities, not for the rural areas. This finding should be taken into account in the design and allocation of future programs in Saskatchewan.
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Preliminary Assessment of Diabetes Programs for Métis Peoples
Appendix 1

Canadian Diabetes Association
Signature Program for Aboriginals

The Signature Program of the Canadian Diabetes Association features a series of presentations about basic diabetes information, developed especially for use in and by Aboriginal communities. It is intended to be a tool for Community Health Representatives, bandleaders, and other leaders in Aboriginal communities to use to inform people about diabetes.

The Aboriginal Diabetes Presentation is comprised of three Information Modules and an Expansion Pack. The Information Modules cover the following topics:

**Information Module #1 - What is Diabetes?**
Using the story of an Aboriginal man named Arnold, this presentation reviews who has diabetes, a brief history of diabetes among Aboriginal people, what diabetes is - types, signs, symptoms and risk factors, an overview of the complications of diabetes, and suggestions for action.

**Information Module #2 - Preventing Type 2 Diabetes**
With reference to a young woman named Joanne, this presentation features a brief overview of what diabetes is, and highlights how Type 2 diabetes can be prevented, focusing in risk factors that can be changed - increasing physical activity, making healthy food choices, and tips on getting started.

**Information Module #3 - Living Well with Type 2 Diabetes**
Referring again to Arnold, this presentation reviews myths and facts about diabetes, the importance of learning about diabetes, tips for managing diabetes and living a healthy active lifestyle, talking with your health care professional, becoming more active and making healthier food choices, medications, taking care of your feet and teeth, going to the hospital, blood sugar testing and managing high and low blood sugar levels.

It should be noted that these presentations do not provide direct health care. Rather, they are meant to provide general information and support to augment direct healthcare and information shared by healthcare providers.

**Expansion Pack - Diabetes and Healing Ways**
This add-on to any of the above three modules includes supplementary information allowing the presenter to add additional depth to their presentation. This Expansion
Pack reviews some general information on the role that traditional healing plays in diabetes prevention and management, and can serve as a springboard for additional, more community-appropriate discussion.
Appendix 2

Go For Your Life Program (Australia)

Healthy Lifestyle Course Overview
Available in CD-ROM, each presentation includes:

1. PowerPoint presentation for use with a laptop and LCD projector
2. Speaker’s Notes, with bullet points outlining the information to be covered in the presentation
3. References for the data used in the Speaker’s Notes

In addition, the Aboriginal Diabetes Presentation comes with the Getting Ready Guide - a user’s guide to help presenters make the best use of the program materials. This Guide includes details about the presentations, suggestions on how to use the material and how to tailor it to meet community needs, presentation tips, and evaluation templates. A highlight of the Guide is a comprehensive list of Frequently Asked Questions and answers that can assist the presenter in meeting the particular information needs of their audience.

A complete copy of the program - the Getting Ready Guide, three Information Modules and the Expansion Pack - can be obtained from the Canadian Diabetes Association.
Appendix 3
Kahnawake Schools Diabetes Prevention Project Training Program

The Kahnawake Schools Diabetes Prevention Program has the following features:

- Limit of twelve students per session
- Topics build upon the experiences of the successful Kahnawake Schools Diabetes Prevention Project
- Workshop facilitators have extensive experience with KSDPP
- Workshop content is reinforced with information learned from KSDPP research
- Variety of instructional methods includes lecture, discussion and sharing circles
- Participants develop actual activities to implement in their home community
- Workshop sessions provided by people with extensive experience in KSDPP and related fields
- One-on-one consultations available throughout and after the training

The content of the course includes the following:

- Description of the KSDPP model
- Health promotion theories
- Relationship between nutrition, physical activity and positive attitude
- Implementing a school based diabetes prevention curriculum
- Planning school and community activities in nutrition and physical activity
- Building community coalitions
- Capacity building and sustainability
- Information dissemination program
- Evaluation and assessment
Appendix 4

Transtheoretical Model of Behaviour Change

The transtheoretical model of behaviour change includes six stages and ten processes of change:

Stages of Change

Broadly, individuals are thought to traverse stages of change ranging from “not interested in change” to “sustained change”. These have been described by Prochaska & Velicer in the following way:

Precontemplation: This is the stage in which people are not intending to change or take action in the foreseeable future. This is the case for many men in organisations. People may be at this stage because they are uninformed or under informed about the consequences of their behaviour or the possible benefits of changing their behaviour.

Contemplation: This is the stage where people are intending to change within the foreseeable future. They are more aware of the pros and cons of changing but are also acutely aware of the possible negative consequences of changing. This balance between the costs and benefits of changing can keep people stuck at this stage for long periods of time. These people are not ready for traditional action-oriented approaches to change.

Preparation: This is the stage in which people are intending to take action in the immediate future. They are warmed up to change and can clearly see the benefits for themselves and for others, women and the organisation. They are very aware of the costs and benefits of change and are likely to have taken some significant action recently (e.g. actively sought information on gender issues).

Action: This is the stage in which people have made specific overt recent modifications to their behaviour (e.g. have become more aware of the different ways they respond to women and men and have consciously changed their behaviour).

Maintenance: This is the stage in which people are working to prevent a relapse to the previous behaviour. Compared with other stages, they are also less tempted to relapse and demonstrate more confidence (self-efficacy) that they can continue their changes.

Termination: This is the stage at which people have zero temptation and 100% self-efficacy to maintain their behaviour.
Processes of Change

As described by Prochaska & Velicer, these are the covert and overt activities that people engage in to progress through the stages:

**Consciousness Raising:** This involves increasing awareness about the causes and consequences of relevant behaviours. Interventions that increase awareness include feedback, education, confrontation, interpretation of behaviours and communication campaigns.

**Dramatic Relief:** This initially produces increased emotional experiences followed by reduced affect if appropriate action can be taken. Psychodrama, role playing, personal testimonies and media campaigns are examples of techniques that can move people emotionally.

**Self-evaluation:** This combines both cognitive and affective assessments of one’s self-image with and without a particular behaviour. Value clarification, appropriate role models, and imagery are techniques that can assist people evaluate effectively.

**Environmental Re-evaluation:** This combines both affective and cognitive assessments of how the presence or absence of a personal behaviour affects one’s social or physical environment. It also includes the awareness that a person can serve as a positive or a negative role model for others. Empathy training can be particularly helpful here.

**Self-liberation or willpower:** Involves both the belief that one can change and the commitment and recommitment to act on this belief. Statements of commitment, public testimonies and multiple rather than single choices can enhance willpower.

**Social Liberation:** Involves an increase in social opportunities or alternatives. Advocacy, empowerment procedures and appropriate policy interventions (eg. anti-discrimination laws) can produce increased opportunities for behaviour change.

**Counter-conditioning:** Involves the learning of new behaviours to replace or substitute for current or identified problem behaviours. Examples include relaxation counteracting stress; assertion counteracting peer pressure. This technique would be particularly helpful to enable men to confront other men.

**Stimulus Control:** Involves removing cues for past inappropriate behaviours and add prompts for the changed behaviours. Avoidance, environmental reengineering, and self-help or support groups can provide stimuli that support change and reduce the risks of relapse.
**Contingency Management:** Involves providing consequences for taking steps in a particular direction. While contingency management can include the use of punishments, research shows that self-changers rely on rewards much more than punishments. Contingency contracts, overt and covert reinforcement, positive self-statements, and group recognition are procedures for increasing reinforcement and the probability that more appropriate behaviours will be repeated.

**Helping relationships:** This involves relationships that are based on caring, trust, openness and acceptance as well as support for the behaviour change. Rapport building, peer support and buddy systems can be sources of social support.