2015 Report on Diabetes –

Driving Change

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The vision of the Canadian Diabetes Association for the Diabetes Charter for Canada is a country in which people with diabetes live to their full potential. The Charter was built by hundreds of people across Canada and contains indicators for measuring progress in the care and support of people with diabetes. This report examines the state of diabetes in Canada and recommends priorities for urgent action to achieve this vision.

### Canadian Living with Diabetes Have the Right to:

- Be honest and open with health providers about their current state of health.
- Be an active partner in decision making with their health care providers.
- Be treated with respect, dignity, and be free from stigma.
- Be an active partner in decision making with their health care providers.
- Have their eyes, feet, kidneys, blood glucose control, cardiovascular risk factors and mental health checked as often as recommended by current clinical practice guidelines.
- Collect data on diabetes burden, such as costs and complications.
- Be an active partner in decision making with their health care providers.
- Form comprehensive policies and plans for the prevention, diagnosis, and treatment of diabetes and its complications.
- Be an active partner in decision making with their health care providers.
- Support the rights of other people with diabetes and health care providers.
- Actively seek out education, information and support to live well with diabetes.
- Be honest and open with health providers about their current state of health.
- Be an active partner in decision making with their health care providers.
- Have their eyes, feet, kidneys, blood glucose control, cardiovascular risk factors and mental health checked as often as recommended by current clinical practice guidelines.
- Collect data on diabetes burden, such as costs and complications.
- Be an active partner in decision making with their health care providers.
- Form comprehensive policies and plans for the prevention, diagnosis, and treatment of diabetes and its complications.
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- Have their eyes, feet, kidneys, blood glucose control, cardiovascular risk factors and mental health checked as often as recommended by current clinical practice guidelines.
- Collect data on diabetes burden, such as costs and complications.
- Be an active partner in decision making with their health care providers.
- Form comprehensive policies and plans for the prevention, diagnosis, and treatment of diabetes and its complications.
Reason for Concern (Where We Are Now)

The burden of diabetes

- The burden of diabetes is rapidly increasing in Canada.
- Diabetes prevalence has more than doubled since 2000 and, in the next 10 years, both prevalence and direct healthcare costs for diabetes will grow by 40%.
- Diabetes and pre-diabetes affect over 10 million Canadians and costs our healthcare system $3 billion annually in direct costs.

The personal cost of diabetes

- High out-of-pocket costs compromise the ability of Canadians to manage their diabetes.
- These costs vary across Canada, and are particularly difficult for lower-income earners.
- Some must choose between paying for food and rent and buying medications and supplies.

Gaps in care for people with diabetes

- Care that people with diabetes receive often does not conform to recommendations.
- Care varies across jurisdictions and is limited in remote, rural, and Aboriginal communities.
- Some forms of specialist care, such as foot care, are not universally covered by government health plans.

Diabetes and mental health

- Daily management can cause distress, depression and anxiety for people with diabetes and their families.
- Many people with diabetes feel stigmatized and hesitate to disclose their disease, which can compromise their self-management.
- There is a lack of knowledge about the psychological impact of diabetes.

The risk of type 2 diabetes

- Many Canadians are at risk for type 2 diabetes because of being overweight or obese, food insecurity and physical inactivity.
- These risk factors are more prevalent in some populations, and screening for diabetes is insufficient.

Areas for Immediate Action (What Can Be Done)

Working together

- All diabetes stakeholders need to work together to realize the vision of the Charter, including:
  - Federal/provincial/territorial governments and Aboriginal communities.
  - People with diabetes and their caregivers.
  - Healthcare providers.
  - Schools, preschools and daycares.
  - Long-term care facilities/special care homes.
  - Workplaces.

Diabetes in Aboriginal communities

- Governments must work with Aboriginal communities to improve access to nutritious and affordable foods.
- Culturally appropriate diabetes programs and services, sensitive to traditional practices and language, should be developed in Aboriginal communities.
- Regular surveillance data about Aboriginal health should be collected.

Stigma and diabetes

- The Canadian Diabetes Association should continue to raise awareness of and reduce public misconception about diabetes.
- Child-centred spaces and workplaces should provide accommodation for people with diabetes and eliminate discrimination.
- Governments should implement policies to support schools and workplaces in accommodating people with diabetes.

Children with diabetes in school

- Provinces and territories without policies for children with diabetes in school should implement such policies in accordance with CDA's Guidelines for the Care of Students Living with Diabetes at School. Policies should include:
  - Individual care plans.
  - Emergency care plans.

Amputation prevention

- Governments should ensure access to medications, devices, education and care to prevent diabetes complications, including amputation.
- Healthcare professionals should screen for foot complications in people with diabetes and educate those with the disease about proper foot care. People with diabetes should check their feet daily.
The burden of diabetes is rapidly increasing in Canada. The prevalence of diabetes has more than doubled since 2000, and this trend is projected to continue, impacting the health of millions of Canadians and costing our healthcare system billions of dollars. In the next 10 years, both prevalence and direct healthcare costs for diabetes are projected to grow by more than 40%.

Diabetes places a severe financial burden on many people with diabetes and their families. For some Canadians, the high out-of-pocket costs for medications, devices and supplies can compromise their ability to manage their diabetes. The burden of out-of-pocket cost varies considerably across Canada, and it is particularly severe for low-income Canadians and those without adequate insurance coverage. Government financial assistance programs have helped to reduce some of the burden for people with diabetes, but many still struggle with catastrophic out-of-pocket expenses and must choose between paying for food and rent and buying medications and supplies.

The daily complexities and challenges of diabetes management can place a tremendous burden on people with diabetes and their families. Poor mental health—including diabetes-related distress, depression and anxiety—is reported by a high percentage of Canadians with diabetes and their family members. People with diabetes do not have adequate psychological support for diabetes-related issues: the report shows that stress management is discussed the least often compared to other aspects of diabetes management between people with diabetes and their doctors, and the majority of Canadians with diabetes did not receive a psychological assessment in the past year. This may be due in part to the stigma associated with poor mental health, and/or lack of resources or training for healthcare professionals related to the psychological aspects of diabetes. Further exacerbating this issue is the stigma associated with diabetes itself.
Many people feel stigmatized and hesitate to disclose that they have diabetes. Given that most diabetes management is performed by individuals with diabetes and their caregivers, stigmatization and poor mental health can compromise self-management and lead to the development of serious complications.

There are gaps between the care people with diabetes receive and the recommendations outlined in evidence-based guidelines: a high percentage of Canadians with diabetes do not receive regular foot and eye exams, urine protein tests to screen for kidney disease, or A1C tests as recommended by the Canadian Diabetes Association’s 2013 clinical practice guidelines. There are marked variances across jurisdictions in the proportion of individuals who receive all four recommended tests. While most people with diabetes indicate they receive regular care, access to care is limited in remote and northern areas and in Aboriginal communities, where the rates of diabetes and its complications are disproportionately higher than in the general population. Moreover, specialist care from chiropodists/podiatrists and offloading devices to address diabetic foot complications are not universally covered for people with diabetes by government public healthcare plans. As such, people who cannot afford these supports may be less likely to seek treatment, which puts them at greater risk of amputation. These kinds of suboptimal healthcare practices also contribute to poor diabetes outcomes.

In addition to the overwhelming numbers of people who have diabetes, many more are at risk for developing type 2 diabetes. The high prevalence of overweight and obesity, insufficient intake of fruits and vegetables, food insecurity, inadequate physical activity and high rates of tobacco use will continue to fuel the growing burden of type 2 diabetes and its complications in Canada. The prevalence of these risk factors is higher in some populations, such as Aboriginal peoples. However, risk assessment and screening for diabetes is insufficient. Almost one million Canadians have diabetes but do not know it, and yet a high proportion of Canadians aged 45 years and over have never been screened for type 2 diabetes or discussed their risk factors for type 2 diabetes with their doctor.

This report presents the most current Canadian national data available about people with diabetes and those at risk of developing type 2 diabetes, including data that describe the disparities in the burden of disease and access to supports as related to social determinants of health.

Four policy priorities are highlighted in the report for immediate action:

1) prevention of diabetes and its complications in Aboriginal communities;
2) reduction of stigma related to diabetes;
3) support for children with diabetes in school; and
4) improved diabetes foot care.

Data presented in this report speak to the need for urgent action on these priorities, as well as the need to address the lack of surveillance information for diabetes and its complications in Canada.

The Canadian Diabetes Association released the Diabetes Charter for Canada in April 2014, with its vision of a country in which people with diabetes can live to their full potential. The Charter was built by hundreds of people across Canada and contains indicators for measuring progress in the care and support of people with diabetes. The Canadian Diabetes Association urges the diabetes community to work together toward that vision by implementing policies and programs aimed at preventing diabetes and its complications, and by ensuring equitable access to diabetes education, services and support.
Chapter 1: Diabetes in Canada and supports available

• The number of people with diabetes has more than doubled since 2000. In 2015, diagnosed diabetes affected an estimated 8.9% (3.34 million) of the Canadian population, leading to $3 billion in direct healthcare costs. In the next 10 years, both prevalence and direct healthcare costs are projected to grow by over 40%.

• The prevalence of diabetes and its complications is disproportionately higher among lower-income earners and Aboriginal groups (three to five times higher among First Nations than in the general population).

• Despite the high prevalence of undiagnosed diabetes among Canadians, 63% of Canadians without diabetes reported that they had never discussed their risk factors for type 2 diabetes with their doctor, and 22% aged 45 years and over had never been screened for type 2 diabetes.

• Canadians with diabetes are not receiving recommended care: 49% did not receive annual foot exams, 26% did not receive urine protein tests and 17% did not receive an A1C test in the past 12 months; 25% have never received a dilated eye exam. The proportion of people with diabetes receiving recommended care varied across provinces.

• About 64% of Canadians with diabetes reported they had not receive a psychological assessment over the previous 12 months, which may be the result of lack of resources: 63% of healthcare providers want to see major improvements in terms of increased resources to provide psychological care, and 56% want more training for managing the psychological aspects of diabetes.

• While the majority of Canadians with diabetes indicated they had a regular doctor, 30% reported they did not have insurance to cover eye care, 51% reported having no dental insurance, and specialist foot care is not universally covered for people with diabetes in provinces and territories.

• Stress management is the least discussed topic between healthcare providers and their patients with diabetes, followed by diet, weight management and physical activity.
The majority of people with diabetes were satisfied with the quality of diabetes education they received. However, access to education needs improvement—22% said they were not directed to diabetes programs upon diagnosis; 26% reported not receiving education; and 25% had to wait more than 3 months to see an educator. Over 60% of patients did not access diabetes education or fitness programs in the previous 12 months. Fifty-seven percent of healthcare professionals would like to see improvement in the availability of self-management education.

Fifteen percent of Canadians with diabetes reported that they did not have insurance for prescription medications, and 30% indicated that they had no insurance to cover blood glucose monitoring supplies or equipment. Lack of insurance impacts lower-income earners more severely.

In most provinces, people with type 1 diabetes, on average, need to pay between $1,074 and $4,909 a year out of pocket to manage their diabetes. People with type 2 diabetes need to pay, on average, $723 to $1,914 a year for their treatment. Seniors with type 2 diabetes need to pay 36% to 70% of treatment costs out of pocket. There is more public coverage for type 1 diabetes treatment, and yet the cost burden remains high. Many people with diabetes have to put over 3% of their annual income toward purchasing diabetes treatment and supports.

Twenty-five percent of people with diabetes reported that the cost of medications, supplies and devices affected their adherence to treatment; many must choose between paying for food/rent/utilities and buying medications, or do not fill prescriptions because of the cost.

Chapter 2: Mental health and perception of diabetes

Diabetes has significant impact on life and work, and contributes to poor mental health among people with diabetes and their family members: 13% of people with diabetes reported signs of likely depression, 28% have diabetes-related distress, and 33% experience anxiety. People with diabetes do not have adequate emotional support: 33% reported that they had no one to talk to about their diabetes-related stress.

People with diabetes face stigma and discrimination: 15% of people with diabetes feel discriminated against due to their diabetes, and 33% are hesitant to disclose their diabetes to others.

The majority of Canadians (with and without diabetes) view a person’s own behaviour as the most important contributing factor to the increasing rate of type 2 diabetes.

About half of Canadians without diabetes do not know that diabetes can lead to heart attack, stroke, heart disease or depression; 30% do not know diabetes can cause kidney failure; and 20% do not know that people with diabetes may become blind or have a limb amputated.

People with diabetes show more awareness about diabetes-related complications than people without diabetes; still, 48% of people with diabetes do not know about the risk for depression, and 25% are unaware or uncertain of the risk for cardiovascular disease.
Chapter 3: Modifiable risk factors and diabetes self-care

- Obesity and overweight are a major risk factor for the development of type 2 diabetes. In Canada, 62% of adults and 31% of children and youth are overweight or obese.
- Overweight and obesity are more prevalent in Atlantic Canada, the Prairies, Ontario and the Territories (except Nunavut). British Columbia and Quebec have the lowest prevalence of obesity.
- Overweight and obesity rates are higher in Aboriginal groups than non-Aboriginal groups, particularly in on-reserve First Nations: 74% of adults and 43% of children and youth are overweight or obese.
- Canadians are not eating enough fruits and vegetables, and many experience food insecurity, which limits their access to needed nutrition. Four million Canadians (13% of Canadian households) struggle to put food on the table; the situation is worse in the north, in Atlantic Canada and in Aboriginal communities.
- In Canada, only 22% of adults and 9% of children and youth are achieving the recommended level of physical activity.
- Tobacco use is an independent risk factor for type 2 diabetes. Smoking also accelerates the development of complications in people with diabetes. Higher rates of tobacco use occur in Atlantic Canada and among men, young adults, Aboriginal groups and lower-income earners.
- The prevalence of modifiable risk factors decreases as education and income levels increase; people living in urban areas have lower prevalence of these risk factors than those living in rural areas.
- Self-care practice is suboptimal: 30% to 32% of people with diabetes have never checked their feet. Following a diabetes diagnosis, most people with diabetes attempt lifestyle change related to food, physical activity and weight control, but 71% of those with diabetes who used tobacco after they were first diagnosed continue to smoke.

Chapter 4: Population-level interventions

- All jurisdictions in Canada have established plans or strategies to address diabetes or chronic diseases in general: Saskatchewan, Ontario, New Brunswick, Prince Edward Island and Nova Scotia have a diabetes strategy; Newfoundland and Labrador and British Columbia have a chronic disease framework; Alberta, Nunavut and Northwest Territories are developing a chronic disease management strategy. British Columbia, Saskatchewan, Manitoba, Ontario and Nova Scotia are also addressing diabetes and other chronic diseases by improving primary care.
- Primary and secondary prevention programs for vulnerable populations—particularly for the prevention of type 2 diabetes in Aboriginal communities—are reported in most jurisdictions. However, there are gaps in surveillance information related to diabetes in Aboriginal populations.
- All provinces and territories contribute diabetes-related administrative data to the Canadian Chronic Disease Surveillance System. All jurisdictions conduct their own surveillance activities and/or produce public reports.
- Recommended care as per the CDA’s clinical practice guidelines for people with diabetes is insured by most public plans, including A1C tests, dilated eye exams, urine protein tests, and visits to certified diabetes educators. There is some coverage for visits to exercise professionals and psychological assessment/services, as reported in a survey of provinces and territories. Podiatry/chiropody for people with diabetes is not universally covered in jurisdictions.
- Five jurisdictions have implemented policies and/or guidelines to address the management needs of children with diabetes in school (Nova Scotia, New Brunswick, Newfoundland and Labrador, Quebec and British Columbia).
INTRODUCTION

Diabetes is an epidemic of the 21st century. Today, more than 10 million Canadians are living with diabetes or prediabetes, costing our publicly funded healthcare system billions in direct healthcare spending every year. Rising overweight and obesity rates, sedentary lifestyles, unhealthy eating and other factors have all contributed to the growing prevalence of diabetes. The burden of diabetes and its complications is particularly pronounced in neighbourhoods with lower socioeconomic status, and in rural and remote areas. Certain ethno-cultural groups also bear a heavier burden of the disease, including people of South Asian, Asian, Hispanic and African descent, and those in Aboriginal communities.

Diabetes is a metabolic disorder that occurs when the body does not produce enough insulin or cannot properly use the insulin it produces. There are three types of diabetes: type 1 diabetes, which generally develops in childhood or adolescence, and occurs when the body does not produce insulin (or produces very little); type 2 diabetes occurs when the body does not make enough insulin or cannot properly use the insulin it produces; gestational diabetes is a temporary condition that develops during pregnancy and leads to increased risk of developing type 2 diabetes for both mother and child. Diabetes results in hyperglycemia, or high blood sugar, which can lead to serious complications that affect the eyes, kidneys and nerves, as well as to increased risk for cardiovascular disease. Diabetes is also linked to depression. Ontario studies have indicated that diabetes causes 30% of heart attacks and strokes, 50% of kidney failure requiring dialysis and 70% of non-traumatic amputations; it is also a major cause of blindness.1 Effective diabetes management can prevent or delay the onset of these complications. For people with diabetes and their caregivers, management involves receiving care as clinically recommended; being able to access needed supports; and learning about optimal self-management and self-care practices such as regular blood glucose monitoring, insulin administration, carbohydrate counting, healthy eating and regular physical activity. For the healthcare system, management involves supporting self-management activities and organizing care around the person living with diabetes.

There are disparities across Canada in terms of the level of care and support people with diabetes receive. Not all Canadians with diabetes receive recommended care components such as A1C tests, urine protein tests, and foot and eye exams, and the proportion of people with diabetes who do receive this care varies across jurisdictions. Where there is no insurance or partial insurance to cover prescribed medications, devices, supplies, or specialist visits and services, people with diabetes need to
pay thousands of dollars out of their own pockets every year. Many cannot afford to adhere to their treatment plans because of these costs, and this lack of adherence compromises their self-management.

The challenges of management weigh on people with diabetes and their family members and are further compounded by stigma and discrimination of diabetes in society. As a result of stigma, many children with diabetes attending school in Canada are unable to participate in school activities and/or not given a safe environment in which to self-manage their diabetes. Many parents and guardians are frequently required to leave work temporarily or stop working altogether so that they can be present at school to assist their children with their daily diabetes management. Some parents have no option but to keep their children at home due to a lack of school policies supporting children's diabetes management. People with diabetes also face discrimination in the workplace; blanket policies about diabetes may limit employment opportunities for many Canadians with diabetes.

Governments in Canada are working to tackle diabetes as a top health issue through policies and programs aimed at preventing diabetes and helping people who have diabetes. Many programs have succeeded in providing better care and better access to supports for people with diabetes. However, too many Canadians still struggle every day trying to manage their diabetes with limited support and resources.

Need for change

To address the urgent need for change, the Canadian Diabetes Association (CDA) released the Diabetes Charter for Canada (the Charter) in 2014 to advocate for equitable access to needed supports for all Canadians with diabetes, regardless of where they live in Canada. The Charter was born out of a common vision and need for consistency of supports for all Canadians with diabetes. It outlines the rights and responsibilities of people with diabetes and their caregivers, governments, healthcare providers, schools, pre-schools and daycares, workplaces, and the CDA itself. The vision of the CDA in developing the Charter is to ensure that people with diabetes in Canada can live to their full potential.

About this report

The 2015 Report on Diabetes: Driving Change builds on previous CDA publications that have described diabetes prevalence and costs, as well as government diabetes policies, programs and services (e.g. Diabetes: Canada at the Tipping Point—Charting a New Path, published in 2011). This report is an inaugural one that establishes a baseline for information about diabetes and diabetes management across Canada. The CDA will issue further reports in the future to provide updates and highlight areas for improvement. These reports will be based on the most current and accurate Canadian data, and they will measure progress on the state of diabetes in Canada, including the provision of needed supports for Canadians with diabetes.

As the first report by the CDA that examines priorities specific to the Charter, the 2015 Report on Diabetes is based on four dimensions of diabetes care and support that are highlighted in the Charter. An equity lens is applied to all four dimensions, highlighting disparities in access to supports and health outcomes across the social determinants of health. This framework was informed by existing national frameworks such as Statistics Canada and the Canadian Institute for Health Information’s health indicators and performance measurement framework; the Public Health Agency of Canada’s Chronic Disease Indicator Framework; Health Quality Ontario’s reporting framework; and the Organization for Economic Cooperation and Development’s Health Care Quality Indicator Project Conceptual Framework, as well as information commissioned by the CDA about out-of-pocket costs, and attitudes and perceptions about diabetes in Canada.
The four dimensions addressed in this report are:

1. **Diabetes trends and access to support**, including epidemiological trends, accessibility of care and other supports, and diabetes outcomes.

2. **Mental health and perception of diabetes**, including the mental health of people with diabetes and family members, public beliefs and perceptions of diabetes, and stigma and discrimination related to diabetes.

3. **Modifiable risk factors and self-care**, including behaviours related to modifiable risk factors that increase the risk of type 2 diabetes and associated complications, and self-care and self-management practices.

4. **Population-level interventions**, including diabetes/chronic disease strategies, policies, legislations, regulations, programs, services and surveillance activities.

At the core of the framework is an understanding that all four dimensions need to be addressed to fully support people with diabetes in achieving their full potential, and that equity is a fundamental Canadian value to be incorporated into these supports.

The dimensions described in this report are based on input from stakeholders who helped develop the Charter, advice from an expert advisory committee, existing data in Canada and new data commissioned by the CDA. Updates in subsequent reports will reflect new data as they become available.

2015 Report on Diabetes: Driving Change describes key issues identified by the diabetes community as important challenges that face Canadians with diabetes and their caregivers. The CDA commits to working with governments and all stakeholders in the diabetes community to improve the lives of people with diabetes, and to achieve the standard of optimal diabetes support as outlined in the Charter.
1. Out-of-pocket costs for Canadians living with diabetes

Out-of-pocket costs are what people with diabetes need to pay for diabetes management, including but not limited to medications, devices, supplies, specialized care and services, and medical travel. These costs vary across Canada depending on public and private insurance, income level, age and other factors. Since 2001, the Canadian Diabetes Association (CDA) has been using two composite case studies (“Janet” for type 1 and “Peter” for type 2) to estimate out-of-pocket expenses regarding medications, devices and supplies for Canadians with diabetes living in each province and territory. Estimates included in this report are based on three income levels ($20,000, $40,000 and $80,000), two age groups (18 and 30 years for type 1; 55 and 65 years for type 2) and whether an insulin pump is used for type 1 diabetes. The therapies in these case studies are based on the CDA’s 2013 clinical practice guidelines. The total out-of-pocket costs include premiums, deductibles, co-payments and dispensing fees on covered drugs and supplies, plus the costs of non-covered drugs and supplies, taking into account any government subsidy to offset costs.

- Janet is an 18- or 30-year-old female with type 1 diabetes. She takes insulin four times daily and tests her blood glucose five times daily. She does not require additional medications to manage, treat or avoid complications. Janet lives alone. She has no private health insurance plan and relies on government assistance. In an alternate scenario for the analysis, Janet uses an insulin pump to manage her diabetes and tests her blood glucose seven times daily.

- Peter is a 55- or 65-year-old male with type 2 diabetes. He is self-employed. Neither he nor his wife Mary has private health insurance. Mary works full-time, earning $25,000 annually. Peter’s only support for his medications and supplies is a government program (if available). He takes two antihyperglycemic medications to lower his blood glucose levels and two antihypertensive medications to regulate his blood pressure, including one to protect his kidneys from complications; he uses a statin to lower his lipids. He tests his blood glucose levels roughly 30 times a month.
2. Canadian Diabetes Cost Model

The Canadian Diabetes Cost Model was developed by Informetrica Limited and publicly released in 2009 in the report *An Economic Tsunami: the Cost of Diabetes in Canada.* The forecasting model provides projections about the prevalence, incidence and economic burden of diabetes for Canadian society based on national surveillance data from the Canadian Chronic Disease Surveillance System and diabetes cost data from the *Economic Burden of Illness in Canada* report produced by the Public Health Agency of Canada. The cost model was last updated in 2015, using 2010 data from the Chronic Disease Surveillance System to project diabetes prevalence, and cost data from the 2005-2008 *Economic Burden of Illness in Canada* report to project both direct healthcare costs (hospitalization, visits to general practitioners and specialists, and medications) and indirect costs (lost productivity due to long-term disability and premature death).

Note: Across Economic Burden of Illness in Canada reports, direct healthcare costs related to diabetes have remained consistent. However, because of methodological changes in the calculation of lost productivity, indirect costs have been considerably reduced in more recent EBIC data (2005–2008).

3. Canadian Diabetes Association’s 2015 survey: Diabetes Supports, Attitudes and Perceptions

In July 2015, the CDA commissioned an online public survey with the following objectives:

- To gauge Canadians’ awareness of and knowledge about diabetes.
- To measure perceived risk and diagnosis of diabetes.
- To assess the perceived timeliness and appropriateness of diabetes care.
- To measure perceived stigma and discrimination related to diabetes.
- To measure the financial burden of diabetes.
- To gauge perceptions of the CDA as leader in diabetes advocacy.
- To compare changes in perceptions between 2011 and 2015.

Canadian adults (aged 18 years and older) were surveyed, including 881 people with diabetes, 119 people with prediabetes and 1,000 people from the general public (people who have not been diagnosed with diabetes and do not have prediabetes).

4. Canadian Community Health Survey (2007 and 2014) and the Diabetes Care module

The Canadian Community Health Survey is an annual cross-sectional survey conducted by Statistics Canada to collect information related to the health status, health care utilization and health determinants of Canadians. It includes Canadians aged 12 years and older living in the 10 provinces and three territories. It excludes people living on reserves and other Aboriginal settlements; full-time members of the Canadian Forces; the institutionalized population and people living in the Quebec health regions of Région du Nunavik and Région des Terres-Cries-de-la-Baie-James. The sample size was approximately 65,000 for year 2014. The Canadian Community Health Survey has a smaller sample size for Aboriginal populations than the Aboriginal Peoples Survey, which specifically surveys these populations.

Data from the Diabetes Care (DIA) module of the 2014 Canadian Community Health Survey are based on a sample size of 507 people with diabetes (type 1 or type 2). Voluntary and available for provinces, the 2014 DIA module was administered only in New Brunswick and Newfoundland and Labrador. The 2007 DIA module was administered in all provinces and territories except for Quebec, Manitoba, Saskatchewan, Alberta and Nunavut.
5. Canadian Health Measures Survey 2012/2013

Launched in 2007 and conducted every 2 years, the Canadian Health Measures Survey collects key information relevant to the health of Canadians by means of direct physical measurements (such as blood pressure, height, weight and physical fitness) at a mobile clinic. In addition, the survey collects blood and urine samples to test for chronic and infectious diseases, nutrition and environment markers.

Through household interviews, the Canadian Health Measures Survey gathers information about nutrition, smoking habits, alcohol use, medical history, current health status, sexual behaviour, lifestyle and physical activity, the environment and housing characteristics, as well as demographic and socioeconomic variables.

The Canadian Health Measures Survey includes the population aged 3 to 79 years in the 10 provinces. Excluded from the survey’s coverage are people living in the three territories; people living on-reserve and in other Aboriginal settlements in the provinces; full-time members of the Canadian Forces; the institutionalized population; and residents of certain remote regions. The physical tests were administered to 5,700 people to produce national estimates.

6. Aboriginal Peoples Survey 2012

The Aboriginal Peoples Survey (APS) is a national survey conducted by Statistics Canada and administered every 5 years. The survey collects data from First Nations people living off-reserve, Métis and Inuit aged 6 years and over. The 2012 APS was administered to the population of Aboriginal identity in Canada. It included people 6 years of age and over as of February 1, 2012, who were living in private dwellings; it excluded people living on Indian reserves and settlements and in certain First Nations communities in Yukon and the Northwest Territories. Aboriginal identity refers to identifying with at least one Aboriginal group: First Nations (North American Indian), Métis or Inuit, those who reported being a Status Indian (Registered Indian or Treaty Indian, as defined by the Indian Act of Canada), or those who reported being a member of a First Nation or Indian band. The 2012 APS selected its sample from reported answers to the 2011 National Household Survey questionnaire. More than 50,000 individuals from the National Household Survey were selected to participate in the 2012 APS. The total number of Aboriginal respondents included in the 2012 APS database was 28,410.

7. First Nations Regional Health Survey 2008/2010

The First Nations Regional Health Survey is the only First Nations-governed cross-sectional national health survey of First Nations living on-reserve and in northern First Nations communities in Canada; so far, two phases have been conducted, in 2002/2003 and 2008/2010. The survey collects detailed data on the health and well-being of First Nations adults (aged 18 years and older) who live on-reserve and are Registered Indians or recognized by their band as members of their community. The 2008/2010 survey collected data between June 2008 and November 2010 in 216 First Nations communities across Canada. A total of 21,757 surveys were administered, including 11,043 adults aged 18 and over, 4,837 youth aged 12 to 17 and 5,877 children under age 12. The survey sample was designed to represent the First Nations population living in First Nations communities in all provinces and territories, except Nunavut.
8. Survey on Living with Chronic Disease in Canada, diabetes component 2011

The Survey on Living with Chronic Disease in Canada is a cross-sectional survey sponsored by the Public Health Agency of Canada that collects information related to the experiences of Canadians with chronic health conditions. The survey takes place every 2 years and describes two chronic diseases in each survey cycle. The purpose of the survey is to provide information on the impact of chronic disease on individuals, as well as how people with chronic disease manage their health condition. The 2011 survey is the most recent survey with a focus on diabetes. The survey was administered to people living with diabetes in the 10 provinces, excluding people living on-reserve and in other Aboriginal settlements; full-time members of the Canadian Forces; the institutionalized population; and people living in the Quebec health regions of Région du Nunavik and Région des Terres-Cries-de-la-Baie-James. The sample for this survey based on 2,912 respondents who reported they were diagnosed with diabetes in the 2010 Canadian Community Health Survey.


The Canadian Chronic Disease Surveillance System uses linked administrative data from every province and territory to estimate the incidence and prevalence of chronic conditions, the use of health services and health outcomes. Some national-level data are publicly available online.

10. DAWN2 study

Initiated in 2011, the second Diabetes Attitudes, Wishes and Needs Study (DAWN2) is a global study that surveyed people aged 18 or over with diabetes; family members of people with diabetes; and healthcare professionals. Its objectives were to:

- Advance understanding and awareness of the unmet needs of people with diabetes and their families.
- Facilitate dialogue and collaboration to strengthen patient involvement and improve self-management and psychosocial support in diabetes care.
- Establish a multi-national scientific benchmarking system for person-centred diabetes care and health policy.

A total of 15,438 people from 17 countries (Algeria, Canada, China, Denmark, France, Germany, India, Italy, Japan, Mexico, the Netherlands, Poland, Russia, Spain, Turkey, the United Kingdom and the United States) responded to the DAWN2 surveys, including 8,596 people with diabetes, 2,057 family members and 4,785 healthcare professionals.

In Canada, DAWN2 surveyed 902 people, including 500 with diabetes, 121 family members and 281 healthcare professionals.
CHAPTER 1: Diabetes in Canada and supports available

This chapter describes diabetes prevalence and incidence of diabetes; the availability of screening, care and education; the accessibility of medications, devices and supplies; and diabetes health outcomes in Canada. Data were obtained from sources that included published administrative data, Statistics Canada population surveys, the 2015 Canadian Diabetes Association (CDA) public survey, and a large-scale international study on diabetes attitudes and impact on mental health (second Diabetes Attitudes, Wishes and Needs survey [DAWN2]). Information about Aboriginal communities came from the Aboriginal Peoples Survey and the First Nations Regional Health Survey.

This chapter includes four sections:
1. Diabetes prevalence and incidence.
2. Availability of care and education.
3. Accessibility of medications, devices and supplies.
4. Diabetes outcomes.

SECTION 1: DIABETES PREVALENCE AND INCIDENCE

Published data from the Canadian Chronic Disease Surveillance System show that diabetes prevalence doubled between 2000 and 2010 from 1.2 million to 2.4 million (crude prevalence). In 2010, 7.6% of the total population had diabetes. However, these estimates do not include undiagnosed diabetes: the Public Health Agency of Canada has reported that prevalence may be underestimated by 30% as a result of undiagnosed diabetes. A more recent Canadian study (2015) found that 1.13% of the Canadian adult population (20+) had undiagnosed diabetes based on fasting plasma glucose levels.

In 2010, 185,430 people were newly diagnosed with diabetes, translating to an incidence rate of 6.3 per 1,000 people—an equivalent of one person diagnosed every 3 minutes.

1 Undiagnosed diabetes was defined as not having self-reported type 2 diabetes but having blood glucose measures that met Canadian guidelines for diabetes diagnosis (i.e. a fasting plasma glucose level of ≥ 7.0 mmol/L or an hemoglobin A1C level of ≥ 6.5% [≥ 48 mmol/mol]). According to fasting plasma glucose levels, the prevalence of undiagnosed diabetes was 1.13% of the total adult population, or about 20% of diabetes cases, based on self-report. When A1C was used as a criterion, undiagnosed diabetes was found in 3.09% of adults.
Trends

Diabetes is often thought to occur mostly in the elderly, and in 2010, seniors made up about half (49%) of people living with diabetes. However, many (47%) were people between the ages of 35 and 64 (Figure 1.1). Among the 185,430 newly diagnosed cases in 2010, 36% were in seniors, but 58% were in people between 35 and 64 years of age—those of working age (Figure 1.2). There were more men than women in this newly diagnosed age group (Figure 1.3). The burden of diabetes among Canadians of working age has implications for the people diagnosed with the disease and their families, as well as for employers and the Canadian economy.

An analysis of data from 2010 to 2012 shows that employer benefit plan spending on prescription drug claims for employees treating type 2 diabetes is about $2,000 per capita, compared with $478 for all other claimants. The average duration of disability leave for people with diabetes is 15% longer than for those without (http://www.miraculins.com/images/roi-one-life-diabetes-en-final-low.pdf).

Figure 1.1 Diabetes prevalence, by age, 2010

Figure 1.2 Diabetes incidence, by age (newly diagnosed), 2010

Figure 1.3 Diabetes incidence, by age and gender, 2010
Estimates and projections

The most recent population-based national data available on diabetes prevalence and incidence are 2010 data from the Canadian Chronic Disease Surveillance System. Estimates for current diabetes prevalence and projections are available through the Canadian Diabetes Cost Model, a forecasting model commissioned by the CDA that provides projections on the prevalence, incidence and financial burden of diabetes in Canada based on the Canadian Chronic Disease Surveillance System and the Economic Burden of Illness in Canada report.

According to the Diabetes Cost Model, the prevalence rate of diagnosed diabetes is estimated to reach 8.9% (3.34 million people) in 2015 and 11.4% (4.77 million people) by 2025, a 43% increase (Figure 1.4). In 2015, an estimated 232,000 people will be newly diagnosed with diabetes, representing a rate of 6.8 per 1,000. The estimated number of new cases (incident cases) will increase to 268,000 by 2025 (7.2 per 1,000) (Figure 1.5).

In addition to people with diagnosed diabetes, millions more Canadians also have prediabetes, a condition that puts them at high risk of developing diabetes and its complications. In 2015, when undiagnosed diabetes and prediabetes cases were included in prevalence figures, over 10 million Canadians (28.7% of the population) are living with diabetes or prediabetes.

Figure 1.4 Diabetes prevalence in Canada, 2000–2025

Note. The graph presents crude prevalence rates.

Figure 1.5 Diabetes incidence in Canada, 2000–2025

Note. The graph presents crude incidence rates.
The cost of diabetes

Diabetes and its complications constitute a serious financial burden for the publicly funded healthcare system. Direct healthcare costs due to diabetes and its complications have been estimated at $3 billion for 2015, including $1.8 billion in drug costs, $721 million in hospitalization costs and $717 million in physician visits. Drug costs make up about 56% of direct expenditures. By 2025, the direct costs are expected to grow by 41%. Indirect costs associated with lost productivity and premature death are estimated at $228 million for 2015 (Figure 1.6).

Aboriginal communities

The prevalence of type 2 diabetes among First Nations people has been consistently reported at three to five times higher than that of the general Canadian population.24 Aboriginal women in Canada also experience gestational diabetes at rates two to three times higher than non-Aboriginal women.24 Despite the disproportionately higher burden of diabetes in this population, surveillance data are limited.13,24 The most current national data describing diabetes in Aboriginal communities come from three national surveys: the 2008/2010 First Nations Regional Health Survey,16 the 2012 Aboriginal Peoples Survey23 and the 2014 Canadian Community Health Survey.26 However, responses to these surveys likely underestimate the true prevalence of diabetes in Aboriginal communities, because of limited access to healthcare professionals to diagnose diabetes, limited access to screening27 and stigma associated with diabetes that prevents people from disclosing their diabetes on a survey.

Note: The CDA previously estimated diabetes costs to be significantly different, based on the Health Canada 1998 Economic Burden of Illness in Canada report and its methodologies.23 The 2005–2008 Economic Burden of Illness in Canada report11 used different methodologies to estimate the cost of diabetes in Canada, leading to the difference between estimates.
According to the 2008/2010 First Nations Regional Health Survey, 15.3% of on-reserve First Nations adults reported being diagnosed with diabetes (excluding gestational diabetes)—much higher than the non-Aboriginal self-reported rate for the same time frame (6%).

Off-reserve First Nations and Métis adults also reported a higher prevalence of diabetes (Table 1.1). Canadian studies of diabetes in Aboriginal peoples have shown prevalence in some communities to be as high as 26%.

In the 2008/2010 First Nations Regional Health Survey, comparisons with the general Canadian population showed that First Nations adults across all age categories had higher rates of diagnosed diabetes. In contrast to the general Canadian population (in which the prevalence is higher in men than women), First Nations women bear a heavier diabetes burden than First Nations men, across most age groups (Tables 1.2 and 1.3).

### Table 1.1 Prevalence of self-reported diabetes, by status

<table>
<thead>
<tr>
<th>STATUS (AGE), n</th>
<th>CRUDE PREVALENCE (SOURCE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Aboriginal (12 years +), n = 65,000</td>
<td>6.0% (Canadian Community Health Survey 2009/2010)</td>
</tr>
<tr>
<td></td>
<td>6.5% (Canadian Community Health Survey 2012)</td>
</tr>
<tr>
<td></td>
<td>8.4% (Canadian Community Health Survey 2014)</td>
</tr>
<tr>
<td>First Nations, on-reserve (18 years +), n = 11,043</td>
<td>15.3% (First Nations Regional Health Survey 2008/2010)</td>
</tr>
<tr>
<td>First Nations, off-reserve (18 years +), n = 366,440</td>
<td>10.6% (Aboriginal Peoples Survey 2012)</td>
</tr>
<tr>
<td>Métis (18 years +), n = 320,130</td>
<td>8.8% (Aboriginal Peoples Survey 2012)</td>
</tr>
<tr>
<td>Inuit (18 years +), n = 33,850</td>
<td>5% (Aboriginal Peoples Survey 2012)</td>
</tr>
</tbody>
</table>

Note: Data presented do not include gestational diabetes. Prevalence of diabetes in First Nations on-reserve that excludes gestational diabetes is based on the Public Health Agency of Canada’s Diabetes in Canada report (2011).

### Table 1.2 Prevalence of self-reported diabetes among First Nations adults living on-reserve (25 years +) by age and gender

<table>
<thead>
<tr>
<th>AGE, YEARS</th>
<th>GENDER</th>
<th>PREVALENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>25–34</td>
<td>Female</td>
<td>8.5%</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>3.4%</td>
</tr>
<tr>
<td>35–44</td>
<td>Female</td>
<td>16.7%</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>12.9%</td>
</tr>
<tr>
<td>45–54</td>
<td>Female</td>
<td>25.2%</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>20.8%</td>
</tr>
<tr>
<td>55–64</td>
<td>Female</td>
<td>33.8%</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>34.7%</td>
</tr>
<tr>
<td>65+</td>
<td>Female</td>
<td>42.9%</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>34.9%</td>
</tr>
</tbody>
</table>


### Table 1.3 Prevalence of self-reported diabetes among First Nations adults living off-reserve and Métis adults (18 year +) by age and gender

<table>
<thead>
<tr>
<th>AGE, YEARS</th>
<th>GENDER</th>
<th>PREVALENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FIRST NATION OFF-RESERVE</td>
<td>MÉTIS</td>
</tr>
<tr>
<td>18–34</td>
<td>Female</td>
<td>2.0%</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>1.0%</td>
</tr>
<tr>
<td>35–54</td>
<td>Female</td>
<td>11.3%</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>11.6%</td>
</tr>
<tr>
<td>55+</td>
<td>Female</td>
<td>24.8%</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>22.4%</td>
</tr>
</tbody>
</table>

SECTION 2: SCREENING, CARE AND EDUCATION

Screening for type 2 diabetes

A recent Canadian study (2015) using Canadian Health Measures Survey data estimated that approximately 1.13% of the adult population had undiagnosed diabetes, based on fasting plasma glucose tests.22 The proportion of people with undiagnosed diabetes speaks to the importance of regular risk assessment and screening, especially for people at high risk. Roughly one-third (32%) of people without diabetes reported being checked for type 2 diabetes at least once a year, while another third (34%) reported that they had never been checked. There was a strong relationship between age and frequency of screening. While those aged 45 years and over were more than twice as likely as those under 45 to be screened at least once per year, 22% of people over age 45 were never screened for diabetes (Figure 1.7).

When Brent Galardo was first diagnosed with type 2 diabetes, his blood glucose (sugar) was so high that he was given an insulin shot the day he was diagnosed…”I suspect that I had been living with diabetes for several years before my diagnosis … I was often shaky and lethargic… I considered myself healthy, even though I smoked, ate fast food galore, and was about 80 pounds overweight.”

Source: Diabetes Dialogue, Autumn 2015

Figure 1.7 Frequency of diabetes screening among people without diabetes

Source: Canadian Diabetes Association survey, 2015.
The same survey found that 63% of people without diabetes had never discussed their risk factors for type 2 diabetes with their doctors, a percentage that was consistent across age groups. Only a small percentage of people (12%) reported that they had discussed risk factors and made plans to modify their behaviour as a result (Figure 1.8).

Screening for type 2 diabetes

The Canadian Diabetes Association 2013 clinical practice guidelines recommend that all individuals be evaluated annually for type 2 diabetes risk based on their demographic and clinical profile, and that people aged 40 years and over or at high risk be screened for diabetes using fasting plasma glucose and/or A1C every 3 years—more frequently and/or earlier for those at very high risk. Some risk factors for type 2 diabetes include:

- A parent, brother, or sister with diabetes.
- Member of a high-risk group (Aboriginal, Hispanic, South Asian, Asian, or African descent).
- History of prediabetes.
- History of gestational diabetes.

For a full list of risk factors, please visit http://www.diabetes.ca/about-diabetes/risk-factors/are-you-at-risk

The Public Health Agency of Canada has developed the Canadian Diabetes Risk Questionnaire to help Canadians find out their risk of developing type 2 diabetes or prediabetes. To take the test, please visit: https://www.diabetes.ca/take-the-test

Screening for diabetes complications and comorbidities

Among people diagnosed with diabetes, regular screening for complications/comorbidities and for assessment of glycemic control is an important aspect of diabetes management. Survey data consistently show gaps in received care for people with diabetes. While it is recommended that blood pressure be measured at every diabetes clinic visit, 18% of people with diabetes reported that their doctor did not always check their blood pressure; 6% of those surveyed said that their cholesterol had never been checked.29

In the 2007 Canadian Community Health Survey, 83% of people with diabetes reported having received one or more A1C tests, 72% had received a urine protein test and 51% had received a foot exam (checking for sores or irritations) by healthcare professionals in the preceding 12 months (Figure 1.9).30 In terms of eye care, 76% of respondents reported they had received a dilated eye exam at least once, 72% within the last year.31 An analysis conducted by Canadian Institute for Health Information using 2007 Canadian Community Health Survey data showed that only 32% of adults with diabetes reported receiving all four care components recommended by the CDA’s clinical practice guidelines.31

Figure 1.8 Discussions with healthcare professionals about type 2 diabetes risk factors among people without diabetes

Source: Canadian Diabetes Association survey, 2015.
In the 2011 Survey on Living with Chronic Disease in Canada, 80% of people with diabetes had received one or more A1C tests (61% had received 1 to 3 tests, and 39% had received four or more tests within the previous 12 months), and 45% had received at least one foot exam by a healthcare professional in the previous 12 months (Figure 1.9). Eighty-two percent reported they had had an eye exam at least once in the past, 71% of those had received it within the last year, and 19% had received it more than a year ago but within the previous 2 years.²⁹

The Canadian Community Health Survey data from 2014 show similar rates: within the previous 12 months, 83% of people with diabetes had received at least one A1C test in the previous 12 months (40% of whom reported one to two times, 60% reported three times or more); 74% had received a urine protein test in the previous 12 months; and 51% had received a foot check for sores or irritations in the previous 12 months. Among the 75% who reported receiving a dilated eye exam, 66% said they had received it within the last year (Figure 1.9). The DAWN2 study has shown similar results: 75% of Canadians with diabetes reported their healthcare team had measured their long-term blood sugar control level in the previous 12 months, and 55% reported that they had received a foot exam in the previous 12 months.³²

![Figure 1.9 Percentage of adults with diabetes who received recommended care components from a healthcare professional](image)

*The Survey on Living with Chronic Disease in Canada did not inquire about urine protein tests. It described the percentage of people who had ever received an A1C test (not just in the previous 12 months).

CCHS, Canadian Community Health Survey; SLCDC, Survey on Living with Chronic Disease in Canada.

Sources: Canadian Community Health Survey Diabetes Care module, 2007; Survey on Living with Chronic Disease in Canada, 2011; Canadian Community Health Survey Diabetes Care module, 2014
The estimated percentage of people with diabetes who receive the recommended care is similar across surveys and over time, and the gap between recommended screening and actual screening is widest for annual foot checks. As well, a large proportion of individuals have never had an eye exam. Given that the clinical recommendations for rescreening eye exams are every 1 to 2 years, it is not possible to comment on whether the survey data are consistent with recommendations, which describe screening only within the last year. Finally, although over 80% of people reported having at least one A1C test in the previous year across surveys, people may not have received the tests as frequently as recommended.

There are differences in the quality of care received by people with diabetes across Canada. Large variations existed between provinces in the percentage of people with diabetes who received all four screening tests in 2007, from 21% in Newfoundland and Labrador to 39% in British Columbia (Figure 1.10).

In 2011, 51% of Ontarians with diabetes reported having received a foot check in the previous year, followed by 44% in British Columbia, 42% in the Prairies, 40% in Atlantic Canada and 37% in Quebec. Dilated eye exams for screening of diabetic retinopathy were received by 75% of people with diabetes. A1C provides a reliable estimate of blood glucose levels over the previous 3 to 4 months. It is a valuable indicator of treatment effectiveness and fundamental for diabetes management. It is recommended two to four times a year—every 3 months for most people with diabetes, and at least every 6 months for people with diabetes whose glycemic targets have been consistently achieved.

2. Foot exams by healthcare providers should be performed at least annually and more frequently for those at high risk.

3. Urine protein tests are used to detect albumin (protein) in the urine to screen people with diabetes for kidney disease. The screening should be done at diagnosis for type 2 diabetes and 5 years after diagnosis for type 1 diabetes, repeated yearly afterwards.

4. Dilated eye exams are used to screen for diabetic retinopathy (damage to the small blood vessels in the eyes) which can lead to blindness. Eye exams should be performed at diagnosis for type 2 diabetes with rescreening every 1 to 2 years and 5 years after diagnosis for type 1 diabetes (15 years +), with rescreening yearly.

---

Figure 1.10 Percentage of Canadians who received all four recommended screening tests, 2007

<table>
<thead>
<tr>
<th>Province</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>32</td>
</tr>
<tr>
<td>Alberta</td>
<td>32</td>
</tr>
<tr>
<td>British Columbia</td>
<td>35</td>
</tr>
<tr>
<td>Manitoba</td>
<td>31</td>
</tr>
<tr>
<td>New Brunswick</td>
<td>27</td>
</tr>
<tr>
<td>Newfoundland and Labrador</td>
<td>25</td>
</tr>
<tr>
<td>Nova Scotia</td>
<td>28</td>
</tr>
<tr>
<td>Ontario</td>
<td>29</td>
</tr>
<tr>
<td>Prince Edward Island</td>
<td>26</td>
</tr>
<tr>
<td>Quebec</td>
<td>31</td>
</tr>
<tr>
<td>Saskatchewan</td>
<td>30</td>
</tr>
</tbody>
</table>

Note: Data not available for the territories.
Source: Canadian Institute for Health Information Diabetes Care Gaps and Disparities in Canada (2009), using data from the Canadian Community Health Survey, 2007.
with diabetes in Ontario, 69% in the Atlantic and Prairie provinces, 67% in British Columbia and 62% in Quebec.ii

Approximately 36% of Canadians with diabetes reported they had been evaluated in relation to their psychological well-being by their healthcare provider in the previous 12 months.iii,32 The same study showed that 63% of healthcare professionals in Canada want to see major improvements available resources for psychological support or care, and 56% want to receive more training in the management of the psychological aspects of diabetes.33 Mental health is increasingly being considered an important factor in the management of chronic diseases.

Access to health services

Access to health services refers to the ability of individuals to get the health services they seek. Regular and continued access to health services is important in the management of diabetes, allowing for continued patient-provider collaboration—crucial to promoting effective self-care. In particular, access to interprofessional teams has been shown to lower the risk of developing complications through improved access to care and coordination of care. An interprofessional team is a team of healthcare providers with special training in diabetes that works in the primary care setting; the team can include nurses, nurse practitioners, dietitians, pharmacists and psychologists. The team and the primary care provider support each other in caring for people with diabetes, and this model has led to improvement in A1C, blood pressure and lipids compared to care delivered by a primary care provider or specialist alone.24

People with diabetes are heavier users of health services compared to the general public. In 2010, a person with diabetes received physician and specialist care roughly twice as often as someone without diabetes.10 Over 80% of the care received by people with diabetes occurs in the primary care setting.24 According to the 2015 CDA survey, most people with diabetes (91%) had a regular doctor who helped them manage their disease; this is similar to results from the 2011 Survey on Living with Chronic Disease in Canada, in which 93% of people with diabetes reported they did not have difficulty getting routine or ongoing care for diabetes.29 Interestingly, the level of access to regular care for people with diabetes is comparable to that for the general public: the 2008 Canadian Survey of Experiences with Primary Health Care reported that 90% of adults had a regular place of care, and only about 13% reported having difficulty accessing care in the previous 12 months.34

It is important to note that these aggregate data do not describe the experience of all people living with diabetes. Access to quality health services is known to be poor in remote, northern regions and among Aboriginal peoples; geography, lack of infrastructure and staff, language/cultural differences, and lower socioeconomic status are recognized as key barriers.27 Also, although the majority of people with diabetes have a regular doctor, they may have difficulty accessing certain specialty services. Public coverage for some essential diabetes management health services is limited, most notably visits to foot specialists (i.e. chiropodists/podiatrists) or access to off-loading devices, which are not publicly funded in any jurisdiction in Canada. Dilated eye exams are covered by all jurisdictions if performed by ophthalmologists. In jurisdictions where eye care (by optometrists) is readily available and funded through the provincial plan, people may not be aware of the services they are entitled to and may not use them as a result. Accessibility, as well as awareness of available services and supports is important given the current care gap that exists for both foot screening and eye exams and the potential devastating outcomes associated with poor care in these areas for people with diabetes.

iii Based on the percentage of respondents who answered “yes” to the question “in the past 12 months, did anyone from your healthcare team ask if you have been anxious or depressed?” within the DAWN2 study.
The CDA 2013 clinical practice guidelines recommend that diabetes care be organized around the person living with diabetes who is supported in self-management by an interprofessional team with specific training in diabetes. While evidence suggests the importance of multi- and interdisciplinary teams in diabetes care in the primary care setting, data are lacking about the proportion of people with diabetes who have access to such care. Statistics Canada's survey on experience with primary health care showed that 27% of Canadians said a nurse worked with their primary care provider, and 16% reported seeing other health professionals (e.g., nutritionists, dietitians) working in the same office where they obtained regular care.

**Communication between people with diabetes and their healthcare providers**

Most people with diabetes reported a trusting, collaborative relationship with their healthcare providers: 93% felt comfortable discussing all aspects of their diabetes with their doctors; 87% felt their doctors cared about their needs and wishes; and 83% reported that they actively participated in decision-making about their diabetes care and treatment. The majority of people with diabetes also indicated self-confidence in self-management (Figure 1.11). There are no national population-based data specific to diabetes on the level of satisfaction with care.

Discussions between people with diabetes and their healthcare providers about medications, healthy eating, physical activity, weight, stress, blood pressure, self-monitoring, smoking and complications play an important role in self-management. Frequent communication about these topics with the primary care provider—combined with goal-setting and regular check-ins—facilitates a collaborative and effective patient-provider relationship. Effective communication has been shown to improve adherence to recommendations and facilitate self-care behavioural change. However, diabetes care professionals need formal training in the communication skills required to support behavioural change, as indicated by 78% of nurses and dietitians, 50% of general practitioners and 48% of specialists, according to the DAWN2 study.

According to the 2011 Survey on Living with Chronic Disease in Canada, the top two issues healthcare providers discussed with people with diabetes were
prescription drugs and self-monitoring of blood glucose (90%), followed by diabetes complications (81%), smoking cessation (71%), exercise (62%) and weight management (55%).

Less than half of survey participants (46%) indicated that their healthcare providers discussed healthy diet (although diet might have been part of weight management discussions). Only 23% of people with diabetes reported that they talked about stress with their doctors (Figure 1.12), and DAWN2 shows only 14% of people with diabetes in Canada were asked about how their life was affected by diabetes.

Given the high percentage of people with diabetes who report diabetes distress, anxiety or depression, more attention should be given to the psychological aspects of diabetes management. There is also room for healthcare providers to take on a greater role in encouraging lifestyle change such as physical activity, diet and weight management.

Most people with diabetes know their own test results, indicating engagement in their own care: 94%, 97% and 92% said their doctors told them the results of their blood glucose, blood pressure and cholesterol tests, respectively.

**Diabetes education and self-management**

Because diabetes is a complex disease that requires day-to-day self-management, people with diabetes and their families should be offered timely diabetes education upon diagnosis. Diabetes education consists of information on nutrition, physical activity, blood glucose monitoring, medication and the psychosocial aspects of diabetes, as well as motivational techniques for encouraging people to modify lifestyle risk factors. Best provided by an interdisciplinary team of healthcare professionals, diabetes education can enable people with diabetes to manage their diabetes to the full extent of their abilities. Diabetes education can provide great benefits to people with diabetes in supporting optimal management, helping them to either avoid or delay the development of diabetes complications.

According to the 2015 CDA survey, while the majority of people with diabetes indicated they had attended education programs, 26% indicated they had not. This gap may be due to a lack of referrals to these programs at the time of diagnosis: 22% reported they were not directed to a diabetes education program when they were diagnosed. A 2004 analysis from Ontario found 72% of people with diabetes had not accessed structured education programs offered by the diabetes education and care centres (DECCs). The 2011 Survey on Living with Chronic Disease in Canada also found that a high proportion of people with diabetes (over 60%) had not used any programs (education or fitness) to help manage their diabetes in the previous 12 months (Figure 1.13). However, 83% of Canadians with diabetes who participated in the DAWN2 survey (n=500) reported they had participated in diabetes educational programs/activities. Assessment of access to diabetes education reveals a wide range of results. This topic needs to
be further explored in future studies to best describe if education is accessible to those who want to participate in programs.

Wait times can be a barrier to receiving education. While almost half of people with diabetes (45%) reported that they were able to see a diabetes educator within a month of diagnosis, 25% had to wait more than 3 months. Fifty-seven percent of healthcare professionals who manage diabetes also believe improvement is needed in making self-care management education more accessible.33

Among people with diabetes, about 80% surveyed by DAWN232 and 93% surveyed by the CDA indicated they found the education they received helpful. They reported that it suited their cultural and religious background, was not too technical and was useful in their diabetes management, according to the CDA survey.

**Figure 1.13 Percentage of people with diabetes who used services/programs to manage diabetes in the previous 12 months, 2011**

<table>
<thead>
<tr>
<th>Service/Program</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes Centres</td>
<td>61%</td>
</tr>
<tr>
<td>Fitness facilities/programs</td>
<td>17%</td>
</tr>
<tr>
<td>Educational programs</td>
<td>12%</td>
</tr>
<tr>
<td>Walking programs</td>
<td>8%</td>
</tr>
<tr>
<td>Other</td>
<td>8%</td>
</tr>
<tr>
<td>Did not use any</td>
<td>8%</td>
</tr>
</tbody>
</table>

Note: ‘Other’ includes stress management, smoking cessation, support groups, and self-help groups.
Source: Survey on Living with Chronic Disease in Canada, 2011.

**SECTION 3: MEDICATIONS, DEVICES AND SUPPLIES**

The costs of drugs, supplies and visits to specialty health professionals can be covered by government programs and/or private insurance, including insurance through employers. If the costs are not covered, however, the financial burden may limit access to these needed supports for diabetes management. The Canada Health Act states that all Canadians should receive reasonable access to publicly funded, medically necessary hospital and physician services. But medications and supplies used outside of hospitals are not publicly insured, and their cost can take a financial toll on Canadians with diabetes. In Canada, the level of public coverage for diabetes medications, devices and supplies varies significantly across provinces and territories, presenting real barriers to effective diabetes management.

**Insurance coverage**

To keep blood glucose under control and prevent or manage complications, many people with diabetes take multiple medications: 32% reported taking three to four medications, 40% reported taking five to nine, and 12% reported taking 10 medications or more.29 Some people manage their diabetes with insulin pump therapy (continuous subcutaneous insulin infusion), which is a safe and effective method of intensive insulin therapy for type 1 diabetes, and has been shown to lead to better glucose control over other regimens using NPH or long-acting insulin analogues.24 Diabetes medications, devices such as pumps, supplies and essential care for people with diabetes are not always covered by individuals’ insurance: 15% of Canadians with diabetes surveyed said they did not have insurance that paid for their prescription medications; 30% had no insurance coverage for the cost of equipment or supplies to monitor their blood glucose; 51% had
no dental insurance; and 30% had no insurance to cover eye care appointments (Figure 1.14). Dental care is important for people with diabetes; those with poorly managed blood glucose levels can develop serious gum disease, which, in turn, can make it difficult to manage blood glucose levels.38

Varying coverage for medications, devices and supplies across provinces contributes to inequitable access to these supports. For instance, the costs for all people with type 1 diabetes who require a pump are fully covered by programs in the three territories, Ontario and Alberta, and by Non-insured Health Benefits.iv However, age restrictions exist in the programs in all other provinces (Table 1.4).

Table 1.4 Overview of insulin pump and supplies coverage in Canada

<table>
<thead>
<tr>
<th>PROVINCE/TERRITORY</th>
<th>INSULIN PUMPS</th>
<th>PUMP SUPPLIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>British Columbia</td>
<td>25 and under</td>
<td>All ages</td>
</tr>
<tr>
<td>Alberta</td>
<td>All ages</td>
<td>All ages</td>
</tr>
<tr>
<td>Saskatchewan</td>
<td>25 and under</td>
<td>25 and under</td>
</tr>
<tr>
<td>Manitoba</td>
<td>17 and under</td>
<td>17 and under</td>
</tr>
<tr>
<td>Ontario</td>
<td>All ages</td>
<td>All ages</td>
</tr>
<tr>
<td>Quebec</td>
<td>17 and under</td>
<td>17 and under</td>
</tr>
<tr>
<td>New Brunswick</td>
<td>18 and under</td>
<td>18 and under</td>
</tr>
<tr>
<td>Nova Scotia</td>
<td>25 and under</td>
<td>25 and under</td>
</tr>
<tr>
<td>Prince Edward Island</td>
<td>18 and under</td>
<td>18 and under</td>
</tr>
<tr>
<td>Newfoundland and Labrador</td>
<td>24 and under</td>
<td>24 and under</td>
</tr>
<tr>
<td>Yukon/Nunavut/Northwest Territories</td>
<td>All ages</td>
<td>All ages</td>
</tr>
<tr>
<td>Non-Insured Health Benefits program</td>
<td>All ages</td>
<td>All ages</td>
</tr>
</tbody>
</table>

Note: Information accurate as of July 2015. All coverage applies to people with type 1 diabetes.

Source: Canadian Diabetes Association

iv The Non-Insured Health Benefits Program is Health Canada’s national, medically necessary health benefit program that provides coverage for benefit claims for a specified range of drugs, dental care, vision care, medical supplies and equipment, short-term crisis intervention mental health counselling and medical transportation for eligible First Nations and Inuit people. An eligible client must be identified as a resident of Canada and one of the following: a registered Indian according to the Indian Act, an Inuk recognized by one of the Inuit Land Claim organizations, or an infant less than 1 year of age, whose parent is an eligible client.
The coverage for diabetes supports also differs from jurisdiction to jurisdiction. Results from the 2011 Survey on Living with Chronic Disease in Canada show that variations in insurance coverage are larger for dental and eye care across provinces, and smaller for coverage of medications, devices and supplies (Figure 1.15). Among people in lower-paying jobs, a higher proportion reported no insurance coverage than those earning a higher income, particularly for dental care (Figure 1.16). Difficulty in obtaining private insurance also contributes to the problem: 18% of people with diabetes reported having difficulty getting insurance coverage because of their diabetes, with the highest proportion affected in Saskatchewan and Manitoba, and in people who earn less than $35,000 per year (Figure 1.17).

**Insulin pump coverage in Canada**

Ontario was the first province in Canada to introduce a pediatric pump program in December 2006; the program was expanded to include all people with type 1 diabetes in September 2008. Since then, all other provinces have either introduced pump programs (for children or for all ages) or expanded their programs to cover older age groups. Most recently, Prince Edward Island implemented a pediatric program in July 2014. The Canadian Diabetes Association continues to advocate for coverage for all people with type 1 diabetes who require an insulin pump in all jurisdictions in Canada.
Out-of-pocket costs

Limited access to publicly funded diabetes drugs and supplies contributes to the high out-of-pocket costs incurred by people with diabetes. The CDA’s out-of-pocket cost estimates for 2015, using the Peter and Janet case study scenarios (see Methods and data sources), show that even though public programs are available, they do not provide coverage in some circumstances.

Janet (diagnosed with type 1 diabetes), who requires insulin to survive, needs to pay on average $1,074 to $2,621 annually if she follows a multiple daily insulin injection regimen. Janet pays an average of $1,425 to $4,909 per year if she manages her diabetes using an insulin pump. The average out-of-pocket cost for insulin pump-based regimens is lower for the 18-year-old Janet than for the 30-year-old Janet, because of pediatric/youth-focused insulin pump programs. On average, though, 22% to 81% of what Janet needs to manage her diabetes must be paid for out of her own pocket (Table 1.5).

Table 1.5 Out-of-pocket costs for Janet

<table>
<thead>
<tr>
<th>INCOME</th>
<th>COSTS AND COVERAGE</th>
<th>30 YEARS OLD (MULTIPLE DAILY INSULIN INJECTIONS)</th>
<th>18 YEARS OLD (PUMP)</th>
<th>30 YEARS OLD (PUMP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$20,000</td>
<td>Out-of-pocket, $ / % of income</td>
<td>$1,074 / 5%</td>
<td>$1,425 / 7%</td>
<td>$3,322 / 17%</td>
</tr>
<tr>
<td></td>
<td>Paid by government, % of costs</td>
<td>68%</td>
<td>78%</td>
<td>48%</td>
</tr>
<tr>
<td>$40,000</td>
<td>Out-of-pocket, $ / % of income</td>
<td>$2,130 / 5%</td>
<td>$2,528 / 6%</td>
<td>$4,298 / 11%</td>
</tr>
<tr>
<td></td>
<td>Paid by government, % of costs</td>
<td>35%</td>
<td>60%</td>
<td>32%</td>
</tr>
<tr>
<td>$80,000</td>
<td>Out-of-pocket, $ / % of income</td>
<td>$2,621 / 3%</td>
<td>$3,510 / 4%</td>
<td>$4,909 / 6%</td>
</tr>
<tr>
<td></td>
<td>Paid by government, % of costs</td>
<td>19%</td>
<td>45%</td>
<td>22%</td>
</tr>
</tbody>
</table>

Note: Out-of-pocket costs are provincial averages.
Source: Canadian Diabetes Association 2015 out-of-pocket costs for Canadians living with diabetes analysis, unpublished.

“Every time I pay the co-pay amount on refills of the prescriptions I need to keep me healthy, I’m reminded of the financial burden this disease would be without my health plan. And I’m more fortunate than the many thousands of Canadians who have to choose daily between feeding their children and buying life-saving medications. No Canadian should ever be left in this position.”

— Rob Beck, diabetes advocate
In nearly every scenario in our analysis, Janet and Peter need to pay more than 3% or $1,500 of their annual and/or family income toward diabetes supports—the threshold for catastrophic drug costs defined by the Kirby and Romanow Commissions on health care, respectively.  

The territories offer the most comprehensive coverage of drug/supply costs for type 1 and type 2 diabetes, assuming 90% to 100% of expenses; coverage across provinces varies.

For type 1 multiple daily insulin injection regimens, most Canadian provinces cover 50% or more of costs for people who earn a minimum wage, but at an income of $40,000 or more, most provincial programs pay less than 50% of costs and in some cases offer no funding at all. In contrast, people who are 18 years old and using insulin pumps have much greater support from governments in almost all provinces, across income levels. People who are 30 years old and on pump regimens receive good financial support in British Columbia, Alberta and Ontario, but support is limited in Saskatchewan and the Atlantic provinces. Coverage is low for people with an income of $80,000 or more in all provinces but Alberta and Ontario.

For 55-year-old Peter (diagnosed with type 2 diabetes) earning minimum wage, the average out-of-pocket cost is $1,729; only 15% of his medication, supply and device expenses are covered by public healthcare insurance. At 65 years of age, Peter would pay less for his medications and supplies as a result of seniors’ drug insurance programs, but he would still need to pay 36% to 70% of his expenses out of pocket (Table 1.6).

The cost of treatment impacts people's ability to adhere to therapy, particularly people with a low income. According to the DAWN2 study, 24% of Canadians with diabetes reported difficulty to pay for diabetes medications. The CDA 2015 survey revealed that 25% of all people with diabetes indicated their treatment adherence was affected by cost, but the burden is heavier for lower-income earners: 40% of those earning less than $35,000 per year felt that they were unable to adhere to their treatment because of cost (Figure 1.18).

### Table 1.6 Out-of-pocket costs for Peter

<table>
<thead>
<tr>
<th>INCOME</th>
<th>COSTS AND COVERAGE</th>
<th>55 YEARS OLD</th>
<th>65 YEARS OLD</th>
</tr>
</thead>
<tbody>
<tr>
<td>$20,000</td>
<td>Out-of-pocket, $ / % of income</td>
<td>$1,729 / 9%</td>
<td>$1,210 / 6%</td>
</tr>
<tr>
<td></td>
<td>Paid by government, % of costs</td>
<td>15%</td>
<td>40%</td>
</tr>
<tr>
<td>$40,000</td>
<td>Out-of-pocket, $ / % of income</td>
<td>$1,905 / 5%</td>
<td>$1,310 / 3%</td>
</tr>
<tr>
<td></td>
<td>Paid by government, % of costs</td>
<td>6%</td>
<td>35%</td>
</tr>
<tr>
<td>$80,000</td>
<td>Out-of-pocket, $ / % of income</td>
<td>$1,914 / 2%</td>
<td>$1,416 / 2%</td>
</tr>
<tr>
<td></td>
<td>Paid by government, % of costs</td>
<td>5%</td>
<td>30%</td>
</tr>
<tr>
<td>$16,383 (GIS)</td>
<td>Out-of-pocket, $ / % of income</td>
<td>NA</td>
<td>$723 / 4%</td>
</tr>
<tr>
<td></td>
<td>Paid by government, % of costs</td>
<td>NA</td>
<td>64%</td>
</tr>
</tbody>
</table>

GIS, Guaranteed Income Supplement; NA, not applicable.

Note: Out-of-pocket costs are provincial averages.

Source: Canadian Diabetes Association 2015 out-of-pocket costs for Canadians living with diabetes analysis, unpublished.
Nearly half (45%) of those reported that they had to choose between food/rent/utilities and buying their medications; 18% said they did not fill their prescriptions or take medications because of the cost.

Over the last decade, people with type 1 diabetes have benefited from the introduction and expansion of insulin pump programs across Canada. As a result, the out-of-pocket costs for people with type 1 diabetes who use insulin pumps have decreased over the last several years. However, many Canadians with diabetes continue to face high out-of-pocket costs due to inconsistencies in public coverage for other diabetes supports, including medications, supplies and devices and availability of insurance.

“Because I now have a daughter to look after, I am willing to pay the extra financial burden because I want to be around for her. If I don’t pay those out-of-pocket costs I am robbing her of a mother later on.”

— Stacey Livitski, diabetes advocate

Figure 1.18 People with diabetes who reported that out-of-pocket costs affect their adherence to diabetes treatment

<table>
<thead>
<tr>
<th>Region</th>
<th>All</th>
<th>British Columbia</th>
<th>Alberta</th>
<th>Saskatchewan/Manitoba</th>
<th>Ontario</th>
<th>Quebec</th>
<th>Atlantic provinces</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>25%</td>
<td>28%</td>
<td>32%</td>
<td>22%</td>
<td>25%</td>
<td>24%</td>
<td>21%</td>
</tr>
<tr>
<td></td>
<td>69%</td>
<td>68%</td>
<td>64%</td>
<td>69%</td>
<td>70%</td>
<td>66%</td>
<td>75%</td>
</tr>
<tr>
<td>Region</td>
<td>Yes</td>
<td>No</td>
<td>Don't know/unsure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------</td>
<td>-----</td>
<td>------------------</td>
<td>-------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; $35,000</td>
<td>40%</td>
<td>53%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$35,000-$50,000</td>
<td>27%</td>
<td>68%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$50,000-$75,000</td>
<td>24%</td>
<td>69%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$75,000-$100,000</td>
<td>17%</td>
<td>78%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$100,000+</td>
<td>19%</td>
<td>77%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Canadian Diabetes Association survey, 2015.
SECTION 4: DIABETES OUTCOMES

Diabetes increases people’s risk for many serious health problems. Appropriate and effective treatment, combined with lifestyle change, can help many people with diabetes prevent or delay the onset of complications, including blindness, end-stage renal disease, non-traumatic amputation, cardiovascular disease and depression.

Between 2000 and 2010, people with diabetes were about three times more likely to be hospitalized than people without diabetes. The Public Health Agency of Canada reports that in 2008/2009, ischemic heart disease was the number-one cause of hospitalization for people with diabetes, followed by renal disease and heart failure. People with diabetes were over three times as likely to be hospitalized for cardiovascular disease, including heart attack, stroke, heart failure and ischemic heart disease (narrowing of arteries that supply blood to the heart); 6 times more likely to be hospitalized for renal disease; 12 times more likely to be hospitalized with end-stage renal disease; and over 20 times more likely to be hospitalized for non-traumatic amputation (Figure 1.19). Diabetes is the leading cause of non-traumatic amputation and end-stage renal disease in Canadian adults.

Figure 1.19 Hospitalizations due to complications among people with and without diabetes (20 years and older), 2008/09

Note 1: Rates are age-standardized to the 1991 Canadian population; rate ratios based on rates age-standardized to 1991 population.
Note 2: A person with diabetes hospitalized with more than one complication was counted once in each category, except for cases of acute myocardial infarction (heart attack), where regardless of multiple counts in the acute myocardial infarction category, the individual was counted only once under the broader ischemic heart disease category.
Source: Data obtained from PHAC, using 2008/09 data from the Canadian Chronic Disease Surveillance System (Public Health Agency of Canada)
The 2011 Survey on Living with Chronic Disease in Canada found that 61% of Canadians with diabetes reported at least one complication diagnosed by healthcare professionals: 35% reported eye or vision problems (cataracts, glaucoma, diabetic retinopathy); 24% reported cardiovascular problems (heart disease, stroke/mini-stroke); 24% reported problems with their legs or feet (poor circulation to the feet/legs, ulcers, infections, gangrene or amputation); and 18% reported kidney problems (kidney disease, protein in urine). Figure 1.20 provides a detailed breakdown for each comorbidity or complication.

Health inequities are also present in the distribution of complications and comorbidities: lower-income earners experience poorer health than higher-income earners, especially poor circulation in the lower limbs, glaucoma, heart disease, stroke and gum problems (Figure 1.21).

Note: The percentages of people with diabetes earning $50,000 or more and diagnosed with kidney failure, partial or complete blindness, or low blood glucose (emergency) were too unreliable to be published. Source: Survey on Living with Chronic Disease in Canada, 2011.

“Diabetic foot disease … is routinely underdiagnosed and undertreated.”

– Dr. Perry Mayer, medical director, The Mayer Institute, Hamilton, Ontario

Source: Diabetes Dialogue, Winter 2013
Diabetes complications/comorbidities in Aboriginal groups

Based on Survey on Living with Chronic Disease in Canada 2011 data, the prevalence of diabetes-related complications is higher for Aboriginal people than for non-Aboriginal people, but not for particular comorbidities, such as high blood pressure or poor circulation in the feet or legs (Table 1.7).

In First Nations people living on-reserve, the most common health problems among adults with diabetes are retinopathy (36%), neuropathy (34%), circulation problems (29%), lower limb problems (23%) and kidney problems (18%) (Figure 1.22).

<table>
<thead>
<tr>
<th>COMPLICATION</th>
<th>ABORIGINAL</th>
<th>NON-ABORIGINAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cataracts</td>
<td>35.2%</td>
<td>29.7%</td>
</tr>
<tr>
<td>Protein in urine</td>
<td>20.7%</td>
<td>15.2%</td>
</tr>
<tr>
<td>Heart disease</td>
<td>20.3%</td>
<td>19.7%</td>
</tr>
<tr>
<td>High blood pressure</td>
<td>52.8%</td>
<td>54.7%</td>
</tr>
<tr>
<td>Poor circulation in feet or legs</td>
<td>20.3%</td>
<td>22.2%</td>
</tr>
</tbody>
</table>

Note: Estimates were not available for other complications/comorbidities in the Aboriginal population due to extreme sample variability or small sample size, or estimates were too unreliable to be included.
Source: Survey on Living with Chronic Disease in Canada, 2011.

Figure 1.22 Complications among First Nations adults living on-reserve with self-reported diabetes

Source: First Nations Regional Health Survey, 2008/2010

Assessment of mental health

According to the Canadian Diabetes Association 2013 clinical practice guidelines, people with diabetes should be regularly screened for psychological distress and psychiatric disorders. Psychosocial interventions should be integrated into diabetes care, such as stress management and coping training.
Mental disorders

Psychiatric disorders (major depression, anxiety disorder, eating disorder) are more prevalent in people with diabetes than in the general population: major depression affects 10% of people with diabetes—double the prevalence in people without chronic illness. Symptoms of depression are found in up to 30% of people with diabetes. Survey results indicate that 11% of people with diabetes have self-reported a mood disorder such as depression, bipolar disorder, mania or dysthymia (chronic mild depression), compared to 8% of people without diabetes.

Diabetes control

A large proportion of people with diabetes reported high or borderline blood glucose, blood pressure and blood cholesterol levels: 48% people with diabetes were told their blood glucose level was high or borderline; 34% of people with diabetes were told that their blood cholesterol was not well controlled; and 22% were told their blood pressure level was borderline or high (Figure 1.23).

“It was a feeling of despondency, where I just didn’t really care about life and facing this disease … when I started feeling tingling in my toes and fingers, I knew I had to face it.”

—Robert Lydiate, in reaction to his diagnosis of type 2 diabetes

Source: Diabetes Dialogue, Summer 2015

Figure 1.23 Diabetes control in people with diabetes whose healthcare providers communicated test results

Source: Survey on Living with Chronic Disease in Canada, 2011.
Mortality

Diabetes reduces life expectancy by 5 to 15 years. According to 2010 data from the Canadian Chronic Disease Surveillance System, the death rate was 4.5 times higher for Canadians adults with diabetes than for those without; the rate was 5.8 times higher for all Canadians with diabetes than for those without.\(^\text{10}\)

In people aged 35 to 64 years (working age), the mortality rate was 2.5 to 4.5 times higher among Canadians with diabetes than among those without the disease (Figure 1.24).

**Figure 1.24 All-cause mortality among people with and without diabetes, by age, 2010**

Source: Survey on Living with Chronic Disease in Canada, 2011.
There is a strong link between diabetes and mental health challenges. Both the diagnosis of diabetes and the demands of diabetes management often lead to significant anxiety and stress for people with diabetes, their family members and/or caregivers. The challenges of managing diabetes include changing and monitoring diet and lifestyle (i.e. monitoring carbohydrates and foods with high glycemic index and consistent physical activity for glucose control); weight management; taking diabetes medications as prescribed; monitoring blood glucose; stress management; and changing interpersonal dynamics. Fluctuating blood glucose levels and the resultant psychological strain can affect people’s ability to work, their social interactions and their participation in daily activities. The culmination of all of this is “diabetes distress”—despondency and emotional turmoil specifically related to diabetes, including the need for continual monitoring and treatment, persistent concerns about complications, and potential erosion of personal and professional relationships.24

In addition to the personal daily challenges of living with diabetes, people with diabetes may experience stigma and discrimination as a result of their illness at work, in school and in other public places. Some school children with diabetes are not given a safe and supervised environment in which to self-manage their diabetes, or they are left alone during episodes of hypoglycemia. Others are excluded from extracurricular activities, field trips and other aspects of the full school experience. Policies to ensure safety at school for children with diabetes are lacking in some jurisdictions, and they vary from one jurisdiction to another. In regards to employment, people with diabetes are sometimes denied jobs or promotions due to their disease, and are given no opportunity to discuss their individual circumstances with employers. Discrimination adds to the numerous challenges people with diabetes face when managing their disease, and it contributes to poor mental health in people with diabetes and their caregivers, compromising self-care and self-management. Discrimination may be associated with misinformation and negative attitudes about diabetes in the public sphere.
This chapter describes the state of mental health among Canadians with diabetes; the stigma and discrimination faced by people with diabetes; and knowledge, attitudes and perceptions about diabetes among the Canadian public.

SECTION 1: MENTAL HEALTH, STIGMA AND DISCRIMINATION

The management of diabetes is complex, often involving a range of lifestyle interventions and treatments with medications. The majority of diabetes management is conducted by people with diabetes themselves: maintaining blood glucose control, keeping up with lifestyle modifications, accessing support, and balancing daily activities, work and relationships are all essential components of optimal self-management. Diabetes and the supports needed to manage it may create emotional and financial hardships for individuals, adding to their mental stress. The time it takes to manage diabetes can also impact daily activities and work; this can be difficult for some, compromising their self-management.

Impact of diabetes on work/life

Approximately 22% of people with diabetes said diabetes limits their social activities with family and friends and recreational activities. Approximately 90% of people with diabetes reported they had to adjust their work “a lot” or “extremely” (e.g. hours or nature of work). Some may have had to stop working permanently.29

Mental health in people with diabetes

The daily changes that are required following a diagnosis of diabetes have a negative impact on the mental health of people with diabetes, and these can be exacerbated by discrimination and stigma (negative stereotyping). A high proportion of Canadians with diabetes experience poor mental health, according to the second Diabetes Attitudes, Wishes and Needs study (DAWN2) and the Canadian Diabetes Association (CDA) 2015 public survey of Canadians with diabetes.32 Among people with diabetes, 33% said that they felt anxious thinking about their diabetes, 28% reported diabetes distress, 26% reported feeling overwhelmed, and 15% reported experiencing discrimination due to diabetes.32 A high proportion of people with diabetes reported stress in their life and at work (Figure 2.1). And yet, in the face of the psychological strain of diabetes, emotional support is lacking: 17% of people with diabetes said they “rarely” or “never” have someone to talk to about their diabetes problems,29 and 33% reported not having anyone to talk to about diabetes-related stress. Family members living with people with diabetes likewise described burden and distress related to caring for those with diabetes according to

“My manager and some others know, but I don’t like to make special requests around my diabetes because I don’t want people to see me as not being equal.”

– Frank Ward, person with diabetes

Source: Diabetes Dialogue, Winter 2014
the DAWN2 study; in Canada, 40% of family members surveyed reported feeling frustrated about not knowing how to best help people they live with who have diabetes, and 27% reported experiencing moderate or large burden in helping the person they live with manage diabetes.42

Fear of stigma and discrimination is a reality for people living with diabetes, and it contributes to poor mental health; 33% of people with diabetes indicated that they hesitated to tell others about their diabetes. Similarly, people with prediabetes (38%) and without diabetes (34%) also said they would hesitate to tell others if they had diabetes.

“Diabetes requires so much work that sometimes the person feels ‘I just can’t do it anymore’.”

– Michael Vallis, PhD, Psychologist and Associate Professor, Dalhousie University (Halifax)

Source: Diabetes Dialogue, Summer 2015
SECTION 2: KNOWLEDGE, ATTITUDES AND PERCEPTION OF DIABETES

Discrimination against people with diabetes is often the result of misinformation about diabetes and negative stereotyping. With increasing public awareness about the link between type 2 diabetes and modifiable risk factors such as physical inactivity and nutrient-poor food intake, an individual’s choices are widely viewed as the most important factor in the development of type 2 diabetes.

Personal responsibility and diabetes

When asked specifically about personal responsibility for diabetes prevention, the majority of Canadians (both people with and without diabetes) agreed that the development of type 2 diabetes is due to people’s failure to take care of their own health. Further, they believed that individuals’ behaviour is the most important factor contributing to the increasing rate of type 2 diabetes, followed by the food industry and the aging Canadian population (Figure 2.2). In addition, a large proportion of people with diabetes (approximately 30%) also attributed their personal risk of being diagnosed with type 2 diabetes and risk for developing complications to their own lifestyle decisions. The survey data demonstrate that the public as well as those with diabetes largely attribute the “fault” of the development of type 2 diabetes to those affected by the disease. It is important to note that many risk factors that contribute to the development of type 2 diabetes may lie outside the control of individuals, and that some people may not be in an environment that supports healthy lifestyles.

**Figure 2.2 Factors most responsible for the increasing rate of type 2 diabetes in Canada, according to people with and without diabetes**

<table>
<thead>
<tr>
<th>Factor</th>
<th>People without diabetes</th>
<th>People with diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual Canadians, for not taking care of their health or that of their children</td>
<td>48%</td>
<td>48%</td>
</tr>
<tr>
<td>The food industry, for its advertising and selling of unhealthy foods that contribute to the development of type 2 diabetes</td>
<td>32%</td>
<td>31%</td>
</tr>
<tr>
<td>The Canadian population, which is getting older</td>
<td>7%</td>
<td>8%</td>
</tr>
<tr>
<td>The healthcare sector, for its failure to help patients prevent the onset of type 2 diabetes</td>
<td>5%</td>
<td>6%</td>
</tr>
<tr>
<td>Governments, for their lack of action to prevent type 2 diabetes</td>
<td>4%</td>
<td>4%</td>
</tr>
</tbody>
</table>

Source: Canadian Diabetes Association survey, 2015.
Awareness of diabetes complications

When asked about diabetes complications, nearly half of the Canadian public surveyed by the CDA (without diabetes) were unaware or uncertain that diabetes can lead to heart attacks, strokes or heart disease; over half (55%) did not know that diabetes is associated with depression. Between 20% and 30% of the public were not aware of other major complications such as amputations, blindness and kidney failure. While people with diabetes generally showed more awareness of complications than people without diabetes, a significant proportion were unaware of the risk for depression and cardiovascular disease (Figure 2.3).

“There is no question that type 2 diabetes occurs more frequently in overweight individuals, but we have to remember that most people who are overweight never develop diabetes and, similarly, many people with type 2 diabetes aren't overweight … there is an important genetic component with type 2 diabetes as well as a lifestyle component.”

- Dr. Andrew Advani, Endocrinologist, St. Michael’s Hospital, Toronto, Ontario

Source: Diabetes Dialogue, Winter 2013
Knowledge/beliefs about diabetes

Approximately 20% of people with and without diabetes surveyed by the CDA believe that diabetes is caused by eating too much sugar; 32% of people without diabetes and 41% of people with diabetes believe that those who are overweight or obese will eventually develop diabetes. About 40% of the public and 30% of people with diabetes said people with diabetes are not allowed to eat sweets. When asked about what lifestyle restrictions are placed on people with diabetes, about 20% of both the general public and people with diabetes said they cannot eat starchy foods or be employed in safety-sensitive positions. In fact, there are very few employment positions that people with diabetes cannot perform, and all foods (including sugars) can be consumed as part of a healthy diet. Without taking into account individual circumstances, such perceptions about people with diabetes may lead to stigma or discrimination in the workplace or social situations.

The Canadian Diabetes Association’s position statement on sugar states that Canadians can consume up to 50 grams of sugar daily as part of a healthy diet. Sugar consumption alone does not lead to the development of type 2 diabetes or complications. However, excessive calorie consumption, which often occurs with foods/drinks that are high in free sugars can lead to weight gain, which can increase risk for type 2 diabetes. Thus, consumption of sugar must be considered by all people who are trying to manage their weight and their risk for type 2 diabetes. There is significant evidence from high-quality observational trials that high consumption of sugar-sweetened beverages can increase the risk of type 2 diabetes and potentially gestational diabetes. Excessive consumption of sugar-sweetened beverages should be avoided by all Canadians. For more information, please see the Canadian Diabetes Association position statement on sugar: https://www.diabetes.ca/about-cda/public-policy-position-statements/sugar
Diabetes is caused by a number of genetic, environmental and biological factors, many of which are not within an individual’s control, such as age, ethnicity, gender and family history. It is important to differentiate between type 1 and type 2 diabetes, as the risk factors for the two types are different. Type 1 diabetes is thought to be caused by both genetic and environmental factors and therefore cannot be prevented, whereas type 2 diabetes may be prevented or delayed with interventions that address some key risks.

Modifiable risk factors (i.e. risk factors that can be controlled and modified) for type 2 diabetes include overweight and obesity, unhealthy diet, physical inactivity and tobacco use. The increase of diabetes prevalence worldwide has been largely attributed to these modifiable risk factors—particularly overweight and obesity and physical inactivity. The World Health Organization estimates that 80% of type 2 diabetes can be prevented by addressing these risk factors with simple, cost-effective interventions. Prevention programs in the United States and Finland have shown that lifestyle-modification programs including exercise and diet resulting in a 5% loss of body weight can cut the risk of type 2 diabetes by almost 60% among people with prediabetes.

Attention to modifiable risk factors also benefits people who already have diabetes. Physical activity has been shown to improve blood glucose control, reduce insulin resistance, and increase cardiorespiratory fitness and energy; it also helps maintain weight loss and reduces blood pressure. Moderate weight loss (5% to 10% body weight) can substantially improve blood glucose control and reduce the risk of cardiovascular disease. Lifestyle modification, combined with appropriate self-care practices such as foot checks and blood glucose monitoring, can help prevent emergencies and long-term complications.

This chapter describes the rates of obesity and overweight, unhealthy diet, physical inactivity and tobacco use in Canada, as well as self-care behaviours among Canadians with diabetes.
SECTION 1: PREVALENCE OF OVERWEIGHT AND OBESITY IN CANADA

Health Canada defines overweight as a body mass index (BMI) of 25 to 29.9 kg/m², and obesity as a BMI over 30 kg/m². Being overweight or obese increases the risk for developing chronic diseases, including type 2 diabetes. Children and youth who are overweight or obese are likely to remain so into adulthood. Weight control is an essential component of diabetes management, given that 80% to 90% of people with type 2 diabetes are overweight or obese.24

National data on overweight and obesity are derived from self-reports (through the Canadian Community Health Survey) or from direct physical measurements (through the Canadian Health Measures Survey). It is observed that prevalence of overweight and obesity based on self-reported data is generally lower than prevalence based on data collected by in-person measurements.

The 2012/2013 Canadian Health Measures Survey showed that 62% of Canadian adults (70% of men and 54% of women) and 31% of children and youth (34% of boys and 28.5% of girls) were overweight or obese47 (Figure 3.1). Compared to 1978/1979, the percentage of overweight Canadians (not obese) has not changed, but the obesity rate has doubled for adults, from 13% to 26%.47

For children/youth, the World Health Organization’s classification system was used to present the findings. Note that BMI does not directly measure body fat; other measurements such as waist circumference are often used to better estimate an individual’s health risk.
Self-reported data from the 2014 Canadian Community Health Survey describe lower rates: 23% of youth (aged 12 to 17) reported that they were overweight or obese (28.5% of boys and 16% of girls), a significant increase from 19.4% in 2005. In adults, about 54% (approximately 14.3 million Canadians) reported that they were overweight or obese (61.8% of men and 46.2% of women). The overweight and obesity prevalence rate was higher than the Canadian average (54%) in Atlantic provinces, the Prairie provinces, Ontario and the territories (except for Nunavut) (Figure 3.2). When evaluating obesity alone, British Columbia and Quebec had a significantly lower prevalence of obesity among adults than the national average (20%). The Atlantic provinces, the Northwest Territories, Manitoba and Saskatchewan had obesity rates that were significantly higher than the national average (Figure 3.3).

Figure 3.2 Overweight and obesity rates among adults (18 years and older) in Canada, by province and territory, 2014

Note: Rates based on body mass index calculated from self-reported height and weight. Source: Canadian Community Health Survey, 2014.

Figure 3.3 Obesity rates in adults (18 and older), by province and territory, 2014

Overweight and obesity rates are much higher in Aboriginal communities than in non-Aboriginal communities. In the 2008/2010 First Nations Regional Health Survey, almost three-quarters of First Nations adults living on-reserve self-reported overweight or obesity (34% report overweight and 40% report obesity). Among children and youth, about 43% were overweight or obese (Table 3.1).

Among First Nations people living off-reserve, 65% reported overweight or obesity, and 58% of Métis and 56% of Inuit were overweight or obese (Figure 3.4). Overweight and obesity rates generally increase with age, and rates are higher in men than women among Aboriginal populations (Figure 3.5).

Table 3.1 BMI† in First Nations on-reserve, adults and youth, 2008/2010

<table>
<thead>
<tr>
<th></th>
<th>FIRST NATIONS ADULTS</th>
<th>FIRST NATIONS YOUTH (AGE 12–17)†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight (BMI &lt; 18.5 kg/m²)</td>
<td>1.4%</td>
<td>57%</td>
</tr>
<tr>
<td>Normal weight (BMI 18.5–24.9 kg/m²)</td>
<td>24.2%</td>
<td></td>
</tr>
<tr>
<td>Overweight (BMI 25–29.9 kg/m²)</td>
<td>34.2%</td>
<td>30%</td>
</tr>
<tr>
<td>Obese (BMI 30–39.9 kg/m²)</td>
<td>34.8%</td>
<td>13%</td>
</tr>
<tr>
<td>Morbidly obese (BMI ≥ 40 kg/m²)</td>
<td>5.4%</td>
<td>—</td>
</tr>
</tbody>
</table>

BMI, body mass index.
†Based on self-reported height and weight.
BMI cut-offs are different for youth, based on age-specific international standards.

Figure 3.4 BMI values of Aboriginal adults (18+) based on self-reported height and weight

BMI, body mass index.

Figure 3.5 Overweight (BMI 25–29.9 kg/m²) and obesity (BMI ≥ 30 kg/m²) in Aboriginal communities by gender and age

BMI, body mass index.
SECTION 2: DIET AND PHYSICAL ACTIVITY

Drawing from national data, this section reports on the consumption of fruits and vegetables, the prevalence of food insecurity as well as the level of physical activity in Canada.

Consumption of fruits and vegetables

Healthy diet generally refers to a diet that contains vegetables and fruit, grains, milk or alternatives, and meats or alternatives based the number of servings as per Canada’s Food Guide. People with and without diabetes are encouraged to eat foods with a low glycemic index, because these foods help control blood glucose and cholesterol levels, and they lower the risk of developing heart disease and type 2 diabetes.

In the 2014 Canadian Community Health Survey, less than half of Canadians aged 12 and over (about 40%) reported consuming fruits and vegetables five times or more per day (note that the data do not show the number of servings). Those aged 12 to 19 years reported the most frequent daily consumption (44%), in contrast to those aged 45 to 64 years (37%); women were more likely than men to eat vegetables and fruits. The consumption patterns varied across Canada: Quebec reported the highest proportion of residents who consumed fruit and vegetables at least five times a day, and Alberta, British Columbia and Yukon were close to the national average (Figure 3.6).

Figure 3.6 Fruit and vegetable consumption, five times a day or more, Canada, by province/territory, 2014

Vegetables, most fruits and low-fat milk products in general have a low glycemic index.
Food security

The World Food Summit of 1996 defined food security as “all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life.” Food security is closely linked to the overall health and well-being of individuals. It is also an important indicator of accessibility to healthy foods, particularly in vulnerable populations, given the critical importance of a healthy diet in the prevention and management of diabetes. Food insecurity can manifest in various ways, including concern about financial constraints, being unable to afford nutritious food or food in general, and missing meals.

In 2012, approximately 13% of Canadian households reported some level of food insecurity, representing 4 million individuals, including over 1 million children. Among them, 2.6% experienced severe food insecurity (missed meals, ate less food or went without food for days), 6% experienced moderate food insecurity (had to make compromises in terms of the quality/quantity of food due to lack of money) and 4% experienced marginal food insecurity (worried about not having enough money to buy food). Food insecurity was more prevalent in the north and in the Atlantic provinces; in Nunavut, almost half of the population reported food insecurity (Figure 3.7). Food insecurity impacts individuals’ capacity to make healthy choices regarding their diet.

Figure 3.7 Food insecurity in Canada by province, 2012

The prevalence of food insecurity is higher in First Nations communities than in the general population. More than half (54%) of First Nations households on-reserve reported experiencing moderate (40%) or severe (14%) food insecurity. Twenty percent of First Nations adults reported they had to reduce the size of their meals or skip meals because there was not enough money to buy food in 2008 to 2010. Results from the 2012 Aboriginal Peoples Survey also showed that about 20% of First Nations people off-reserve reported low/very low food security and about 17% of Métis reported low food security.

How is food security measured in Canada?

The Canadian Community Health Survey collects health-related information, including food security, from about 60,000 Canadians per year who live in 10 provinces and three territories. Homeless people are not included in the survey. Note that First Nations people on-reserve and homeless people are particularly vulnerable to food insecurity. Data used in the report Household Food Insecurity in Canada, 2012 were derived from the 2012 Canadian Community Health Survey Household Food Security Survey Module.

Food insecurity in the north

Seven of 10 Inuit preschoolers in Nunavut live in homes where there is not enough to eat. The median annual income for non-Aboriginal people in Nunavut is $86,600; for the Inuit, it is $19,900. Despite chronic poverty and unemployment, families are expected to pay more to put food on their plates than other Canadians. A survey by the Nunavut government last year found food in the territory cost anywhere from 20% (for eggs) to 287% more (for celery) than in the rest of Canada.

Source: Globe and Mail, January 17, 2014
In the 15 years since Terry McLeod had been diagnosed with type 2 diabetes... his weight crept up to 240 pounds, and he had to take more and more diabetes medications to manage his blood glucose levels... he started walking on the trails around his Langley B.C. home, building up to 18 kilometres a day. He started paying attention to what he ate, making small changes such as eating more vegetables and cutting out soft drinks... Terry now weighs 180 pounds, and has significantly reduced the doses of his oral diabetes medications... “I feel healthier, I have a lot more energy,” he says.

Source: Diabetes Dialogue, Winter 2015

Physical activity

Adequate physical activity leads to many health benefits, including cardiovascular fitness, strength and bone density for children and youth, reduced risk for chronic illnesses for adults, and less bone loss and falls as a result of increased strength, flexibility and coordination for older adults.56 For people with diabetes, exercise can help improve cardiorespiratory fitness, improve blood glucose control, decrease insulin resistance, improve lipid levels and blood pressure, and promote weight loss.24 Self-reported data from 2014 show that just over half of Canadians 12 years and over (54%) were at least moderately activevi during leisure time. 57 Nunavut and most provinces reported physical activity levels that were lower than the national average; residents of Yukon, the Northwest Territories, British Columbia and Alberta were the most active (Figure 3.8).

Measured information from the 2012/2013 Canadian Health Measures Surveyvii showed that 22% of Canadian adults achieved the recommended 150 minutes of moderate-to-vigorous physical activity (in bouts of 10 minutes or more) per week, 58 as outlined in the Canadian Physical Activity Guidelines.59 Younger adults were more likely to meet the guidelines than older adults: 32% of people aged 18 to 39 achieved physical activity levels as per the guidelines, but only 18% of those aged 40 to 59.60 In children and youth,
only 9% were meeting the recommended physical activity levels according to the guidelines (60 minutes of moderate-to-vigorous exercise daily). Youth aged 12 to 17 were less active than younger age groups—particularly teenage girls.62

For First Nations youth living on-reserve, about half (49%) are considered active, 23% moderately active and 28% inactive. The adult population is much less active: 25% are active, 28% are moderately active and 46% are inactive. A higher proportion of men reported being active than women (33% vs. 17%). (Note that these results cannot be compared with the self-reported data for the general population, as the methodologies adopted in the on-reserve First Nations survey were based on energy expenditure instead of time spent on activities.)66

**SECTION 3: TOBACCO USE**

Tobacco use is linked to increased risk for diseases such as lung cancer, heart attack and stroke. Studies have also shown that it reduces insulin sensitivity or induces insulin resistance, and that smokers are at high risk of developing metabolic syndrome.viii,63 Recent studies have suggested that smoking is an independent risk factor for type 2 diabetes, and that those who smoke 25 or more cigarettes daily have double the diabetes risk of non-smokers.64,65,66 People with diabetes who use tobacco face a compounded health risk: its use can contribute to atherosclerosis (hardening of the arteries) which, when combined with elevated blood glucose, accelerates the development of diabetes complications.67 In people with diabetes, tobacco use increases the risk of heart attack three-fold and the risk of stroke by 30%. It also increases the risk of end-stage renal disease and mortality.68,69

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viii Metabolic syndrome is a highly prevalent condition characterized by metabolic risk factors occurring together, including high blood pressure, elevated blood glucose levels, abdominal obesity and high cholesterol. Metabolic syndrome puts people at higher risk for heart disease, stroke and type 2 diabetes. Metabolic syndrome and diabetes often coexist. (Canadian Diabetes Association 2013 clinical practice guidelines; National Heart, Lung and Blood Institute, U.S. Department of Health & Human Services)
A recent report on tobacco use in Canada found that 15% of Canadians were smokers in 2013; close to 11% smoked daily. Prevalence was higher among men than among women (16% vs. 13%), and was highest among young adults (19% in those aged 25 to 34, and 18% in those aged 20 to 24).

Prevalence varied across provinces, ranging from 11% in British Columbia to almost 20% in New Brunswick, Nova Scotia, and Newfoundland and Labrador (Figure 3.9). Although tobacco use has decreased significantly over the past five decades, the decline has slowed in recent years. Prevalence rates have stagnated or even increased in Atlantic Canada.

In First Nations people living on-reserve, 57% reported current tobacco use (cigarettes): 43% smoked daily and 14% smoked occasionally. Rates of tobacco use were similar for men and women, with the highest rate among people aged 18 to 29 (67%). Smoking rates also varied across income levels, from 65% among those earning less than $20,000 to 46% among those earning over $60,000 (Figure 3.10).

A new study that reviewed smoking trends in a Manitoba First Nations revealed a much higher rate: the crude prevalence of current smoking was 80% in 2011/2012, and among those who were not current smokers, 77% reported that at least one person living in the same household was a smoker.
SECTION 4: MODIFIABLE RISK FACTORS AND SOCIAL DETERMINANTS OF HEALTH

The prevalence of modifiable risk factors decreases as education and income levels increase, and people living in urban areas tend to have lower prevalence than those in rural areas. Modifiable risk factors for type 2 diabetes also manifest differently across ethnocultural groups. For example, Caucasian Canadians have the highest self-reported rates of obesity and daily tobacco smoking, and Chinese Canadians have the highest self-reported rates of physical inactivity and inadequate vegetable and fruit consumption (Table 3.2).

Table 3.2 Percentage of Canadians (20 years and older) who self-reported modifiable risk factors, 2009–2010

<table>
<thead>
<tr>
<th>Race/ethnicity</th>
<th>Obesity</th>
<th>Physical Inactivity</th>
<th>Inadequate Vegetable and Fruit Consumption</th>
<th>Daily Tobacco Smoking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caucasian</td>
<td>19.7%</td>
<td>45.8%</td>
<td>56.0%</td>
<td>17.5%</td>
</tr>
<tr>
<td>African</td>
<td>18.7%</td>
<td>57.5%</td>
<td>57.8%</td>
<td>9.5%</td>
</tr>
<tr>
<td>Filipino</td>
<td>12.5%</td>
<td>54.8%</td>
<td>62.9%</td>
<td>9.4%</td>
</tr>
<tr>
<td>Chinese</td>
<td>3.3%</td>
<td>61.9%</td>
<td>65.5%</td>
<td>7.8%</td>
</tr>
<tr>
<td>South Asian</td>
<td>9.5%</td>
<td>60.5%</td>
<td>55.8%</td>
<td>6.1%</td>
</tr>
<tr>
<td>Latin American</td>
<td>15.7%</td>
<td>54.9%</td>
<td>57.9%</td>
<td>6.1%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Income quintile</th>
<th>Obesity</th>
<th>Physical Inactivity</th>
<th>Inadequate Vegetable and Fruit Consumption</th>
<th>Daily Tobacco Smoking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>19.4%</td>
<td>58.0%</td>
<td>60.6%</td>
<td>24.3%</td>
</tr>
<tr>
<td>Lower-middle</td>
<td>18.4%</td>
<td>52.1%</td>
<td>58.0%</td>
<td>18.1%</td>
</tr>
<tr>
<td>Middle</td>
<td>19.8%</td>
<td>47.6%</td>
<td>57.1%</td>
<td>17.5%</td>
</tr>
<tr>
<td>Upper-middle</td>
<td>19.1%</td>
<td>42.2%</td>
<td>55.3%</td>
<td>14.2%</td>
</tr>
<tr>
<td>Upper</td>
<td>18.9%</td>
<td>36.5%</td>
<td>52.3%</td>
<td>11.3%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Education level</th>
<th>Obesity</th>
<th>Physical Inactivity</th>
<th>Inadequate Vegetable and Fruit Consumption</th>
<th>Daily Tobacco Smoking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than secondary</td>
<td>23.1%</td>
<td>63.3%</td>
<td>64.0%</td>
<td>26.6%</td>
</tr>
<tr>
<td>Secondary</td>
<td>20.0%</td>
<td>52.5%</td>
<td>61.9%</td>
<td>21.2%</td>
</tr>
<tr>
<td>Some post-secondary</td>
<td>19.5%</td>
<td>46.4%</td>
<td>58.5%</td>
<td>18.4%</td>
</tr>
<tr>
<td>Post-secondary</td>
<td>17.0%</td>
<td>43.2%</td>
<td>53.4%</td>
<td>13.1%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Residence</th>
<th>Obesity</th>
<th>Physical Inactivity</th>
<th>Inadequate Vegetable and Fruit Consumption</th>
<th>Daily Tobacco Smoking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>23.0%</td>
<td>48.2%</td>
<td>58.0%</td>
<td>19.1%</td>
</tr>
<tr>
<td>Urban</td>
<td>17.5%</td>
<td>47.8%</td>
<td>56.3%</td>
<td>16.2%</td>
</tr>
</tbody>
</table>

Overall, modifiable risk factors for type 2 diabetes pose a heavier burden in Aboriginal communities, where there are much higher rates of overweight, obesity and tobacco use than in the general population. The territories experience higher food insecurity than the provinces—particularly Nunavut, which also has the lowest rate of fruit and vegetable consumption and the lowest level of physical activity among all jurisdictions. Residents of Yukon Territory, on the other hand, are among the most physically active and most effective in meeting fruit and vegetable consumption guidelines in Canada. People in Atlantic provinces may be at higher risk for type 2 diabetes than their counterparts in the rest of Canada: they have the highest rates of tobacco use, the highest rates of overweight and obesity, high rates of food insecurity and low rate of fruit and vegetable consumption. British Columbia and Quebec bear a lower burden from overweight and obesity, and they have higher fruit and vegetable consumption; British Columbia also has almost the highest level of physical activity and the lowest rate of tobacco use of all jurisdictions. The heavier burden of diabetes and risk factors in certain populations may be attributed in-part to the effects of the social determinants of health such as income, education and built environment.

SECTION 5: SELF-MANAGEMENT AND SELF-CARE PRACTICE

Self-management is the cornerstone of diabetes care. People with diabetes play an important role in ensuring they reach their health potential by managing their diabetes to the best of their ability. This section provides information on individual responsibilities, including the choice to modify health behaviours (as related to modifiable risk factors); perform self-checks for foot problems to prevent and detect complications; self-monitor blood glucose; participate in diabetes programs; use diabetes services; and find diabetes information to optimize management.

Self-performed foot checks

People with diabetes are at risk for ulceration and infection in the feet due to loss of sensation (neuropathy) and poor circulation; self-performed foot checks are extremely important to keep minor injuries from escalating to serious complications. The Canadian Diabetes Association 2013 clinical practice guidelines recommend that people with diabetes check their feet daily for cuts, cracks, bruises, blisters, sores, infection and unusual markings. National surveys consistently show that a high percentage of people with diabetes never check their feet: the 2014 Canadian Community Health Survey showed that close to 40% of those with diabetes checked their feet daily, but 30% never checked their feet; the 2011 Survey on Living with Chronic Disease in Canada showed that among those who checked their feet, about half did so daily, but 32% said they never checked (Figure 3.12). Results from the 2007 Canadian Community Health Survey showed very similar results: 36% checked daily but almost 30% never checked.

Figure 3.12 Frequency of foot self-checks

Among the 68% of people who perform self-checks...

However, 32% said they never checked their feet

Source: Survey on Living with Chronic Disease in Canada, 2011, (n = 2907).
Blood glucose monitoring

Self-monitoring of blood glucose can be an important and essential tool for the care of people with diabetes. Self-monitoring combined with diabetes education can empower people with diabetes to make behavioural changes and better manage their diabetes. Given that the diabetes population is heterogeneous, the frequency of self-monitoring should be individualized based on individual circumstances, such as type of diabetes, therapy, glycemic control, risk of hypoglycemia, etc.

The majority of people with diabetes (88%) reported checking their blood glucose at home.41 Less than half (42%) checked at least once a day, and 24% checked at least once a week. Over 33% reported infrequent testing: 16% checked at least once a month, 6% checked at least once a year and 12% said they never checked their blood glucose (Figure 3.13).

It is important to note that the survey data on frequency cannot determine appropriateness of testing. Very infrequent checking is recommended for type 2 diabetes who are not treated with insulin and who have attained good glycemic control, or who are not using medications associated with higher risk for hypoglycemia.24 Furthermore, the data on frequency in this section do not address other important aspects of testing, such as how individuals respond to the test results and if behaviour change occurs because of them.

Recommended frequency for self-monitoring of blood glucose

According to the Canadian Diabetes Association 2013 clinical practice guidelines, self-monitoring of blood glucose should be undertaken at least three times a day for people with diabetes who use insulin more than once a day. People with type 2 diabetes on once-daily insulin and diabetes medications should test at least once a day. Frequency of testing should be individualized for type 2 diabetes who are not using insulin, depending on glycemic control and medications used.

Figure 3.13 Proportion of people with diabetes who reported self-checking of blood glucose*, by frequency, 2014

*By self, family or friends (n = 484, including only Newfoundland and Labrador, and New Brunswick).
Source: Canadian Community Health Survey, Diabetes Care module, 2014.

Behaviour change

People with diabetes have reported making behavioural changes subsequent to their diabetes diagnosis. According to the 2011 Survey on Living with Chronic Disease in Canada, 89% reported changing the type or amount of food they eat; 70% reported trying to increase their amount of exercise; and 80% of those who were overweight or obese (77% of respondents) said they tried to control or lose weight to help control their diabetes.29 Among people who regularly consumed alcohol, 52% reported having stopped or limited drinking. About 30% of those who reported tobacco use after diagnosis (24% of respondents) said they had successfully quit smoking.41
CHAPTER 4: Population-level interventions

Population-level interventions refer to policies and programs that are applied to entire populations to promote better health outcomes. In this chapter, we describe current diabetes-related policies, programs and activities in provinces and territories. Information in this chapter was obtained from published reports, government websites and a survey of government officials responsible for diabetes. This chapter also describes the level of self-management support in schools, including existing policies, regulations and guidelines.

Information in this chapter was obtained through a survey of provincial and territorial governments. Governments were asked to confirm, specifically:

- If they had a diabetes policy or strategy or chronic disease framework, including objectives and funding levels, and if there was a self-management component.
- If they had primary and secondary prevention programs for vulnerable populations.
- If they contributed to the Canadian Chronic Disease Surveillance System and if they conducted other surveillance activities.
- If they covered recommended tests and screening as per the clinical practice guidelines.

A summary of population-level interventions by province/territory is provided in Table 4.1. The more detailed responses provided by governments are available upon request.
Diabetes/chronic disease strategy

The majority of provinces and territories have diabetes plans, strategies and/or a chronic disease framework in which diabetes is a focus area. Saskatchewan, Ontario, New Brunswick, Prince Edward Island and Nova Scotia confirmed that they have a diabetes strategy; diabetes management is addressed in a chronic disease framework in Newfoundland and Labrador and British Columbia (Healthy Families BC). Alberta, the Northwest Territories and Nunavut are currently developing a chronic disease strategy.

Ontario and Prince Edward Island reported that their diabetes strategy is aligned with the provincial chronic disease prevention and management framework. Improving access to primary care has been highlighted as a key approach to addressing chronic diseases across jurisdictions in Canada.

Most diabetes strategies have dedicated funding and articulated objectives, including self-management. Ontario and Saskatchewan indicated they have set specific outcome targets, such as access to family doctors, access to screening tests and reduction of hospitalizations.

Primary and secondary prevention

Most jurisdictions reported that there were primary and secondary prevention programs in place for certain vulnerable populations. Preventing type 2 diabetes in Aboriginal groups is a specific focus in all jurisdictions. In British Columbia, a First Nations Health Authority has been established to advance programs delivered to First Nations and Aboriginal communities. The Ontario Aboriginal Diabetes Strategy sets out a long-term approach to diabetes prevention, care and treatment, education, research and coordination. Other vulnerable groups include northern communities, lower-income earners, people with prediabetes, immigrants, pregnant women with diabetes and children. Some provinces have established registries for certain vulnerable populations, such as the prediabetes registry in New Brunswick, which is updated annually.

Social determinants of health are being considered in prevention programming. Nova Scotia, for example, has adopted a population-based approach to assess the psychosocial and material needs of communities to aim for equitable access to primary care. Modifiable risk factors associated with chronic disease are addressed in these programs, which take place in various settings including schools and workplaces. Some jurisdictions are addressing secondary prevention through secondary prevention programs, such as the LiveWell with Chronic Conditions program in Saskatchewan and the Live well! Bien Vivre! program in New Brunswick. All jurisdictions in Canada also have insulin pump programs in place to help people with type 1 diabetes manage their disease and prevent complications.

Surveillance

All provinces and territories contribute data to the Canadian Chronic Disease Surveillance System, a collaborative network of provincial and territorial surveillance systems, supported by the Public Health Agency of Canada. It uses linked administrative data sources from every province and territory to estimate the incidence and prevalence of chronic conditions, and the use of health services and health outcomes. All jurisdictions conduct other surveillance activities or epidemiological analyses. Nova Scotia, for example, reports on specific indicators, including successful transition from pediatric to adult care; rates of gestational diabetes; frequency of measuring blood pressure, A1C, lipids, kidney function, and
annual foot examinations; as well as A1C and blood pressure targets for specific age groups. Jurisdictions such as Alberta, Manitoba, Quebec, New Brunswick and Nova Scotia have targeted surveillance activities for First Nations populations.

**Services and screening tests**

When asked about coverage for services and screening recommended by the clinical practice guidelines for people with diabetes, all provinces and territories reported that A1C, dilated eye exams (to screen for diabetic retinopathy), urine protein tests (to screen for kidney problems), visits to certified diabetes educators and psychological tests/services (by physician or referrals to specialists) are publicly funded. Visits to exercise professionals are publicly funded but not in the Atlantic provinces. Specialty foot care services are not universally covered by provincial health plans, but some provinces/regions use funding from the ministry of health or other sources (such as foundations) to provide podiatry services (e.g. Saskatchewan, Nova Scotia). British Columbia and Alberta provide some podiatry services, and Ontario’s diabetes strategy funds healthcare professionals to offer foot care.

It is important to note that physician-performed psychological tests are publicly funded as indicated by all jurisdictions, but most psychological tests and services (such as cognitive behavioural therapy) are provided by psychologists and social workers, who are not publicly funded in most cases. This is a gap in a needed service for people with diabetes.

**Support for children with diabetes in school**

Some jurisdictions have introduced policy or regulations to specifically address the needs of children with diabetes in schools, including Nova Scotia, New Brunswick, Newfoundland and Labrador, Quebec and British Columbia. These policies and guidelines outline the roles and responsibilities of parents, school personnel and school boards in ensuring optimal management and self-management of diabetes in school children. These policies are essential for providing a safe environment for children with diabetes to manage their disease and reducing hardship for parents. According to the 2015 CDA survey, half of parents with children who have diabetes reported that their children do not have individual care plans where they attend school; 30% felt their children were unable to participate fully in school activities; and 40% did not feel their children were well-supported in self-management at school.

**Summary**

Through diabetes strategies, chronic disease or primary care frameworks, or a combination of these, each jurisdiction has identified diabetes as a key priority and has dedicated funding and resources to provide primary and secondary prevention programs. Some provinces, such as Ontario and Saskatchewan, have reported set targets for measuring progress in diabetes care. Self-management is a key component of diabetes management programs in all jurisdictions, and programs are targeting several vulnerable populations (particularly Aboriginal groups). Only five of 13 jurisdictions have also developed policies to ensure that children with diabetes in school are well supported in their self-management.

Social determinants of health are being considered in addressing the burden of diabetes in many jurisdictions. In most jurisdictions, people with diabetes have access to important screening and services recommended by the Canadian Diabetes Association 2013 clinical practice guidelines for optimal management, such as A1C tests and dilated
SPOTLIGHT ON PROVINCIAL DIABETES PLANS

The Saskatchewan Ministry of Health’s 5-year strategic plan, 2012/2013 to 2016/2017, includes outcomes, targets and actions related to improved access and connection to care, as well as quality of care for chronic disease, including diabetes.

Outcome

• By March 31, 2017, people living with chronic conditions will experience better health as indicated by a 30% decrease in hospitalization related to six chronic conditions (diabetes, coronary artery disease, chronic obstructive pulmonary disease, congestive heart failure, depression and asthma).

Improvement targets

• By March 31, 2020, 80% of patients with six chronic conditions (diabetes, coronary artery disease, chronic obstructive pulmonary disease, heart failure, depression and asthma) are receiving best-practice care as evidenced by the completion of provincial flow sheets available through approved electronic medical records and the electronic medical record viewer.

• By March 31, 2017, there will be a 50% improvement in the number of people who can say “I can access my primary health care team for care on my day of choice either in person, on the phone or via other technology.”

Source: Saskatchewan Ministry of Health.

Ongoing surveillance activities in addition to contributing to the Canadian Chronic Disease Surveillance System—including establishment of diabetes registries and public reporting of diabetes statistics—will aid provinces and territories in understanding the needs of each region/population in their jurisdiction and targeting diabetes investments to meet those needs.
### Table 4.1 Summary of population-level interventions across Canada

<table>
<thead>
<tr>
<th>DIABETES/CHRONIC DISEASE STRATEGY</th>
<th>PRIMARY AND SECONDARY PREVENTION PROGRAMS FOR VULNERABLE POPULATIONS</th>
<th>SURVEILLANCE</th>
<th>SERVICES AND SCREENING TESTS†</th>
<th>SUPPORT FOR CHILDREN WITH DIABETES IN SCHOOL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BRITISH COLUMBIA</strong></td>
<td>• No diabetes strategy&lt;br&gt;• Healthy Families BC Policy Framework (2014) as chronic disease framework</td>
<td>• First Nations Health Authority was established in October 2013 to improve the health of communities by advancing the quality of healthcare, health promotion and chronic disease/injury prevention programs delivered to First Nations and Aboriginal people&lt;br&gt;• Vancouver Coastal Health and Fraser Health offer programs for First Nations and Aboriginal people.</td>
<td>• Contributes data to CCDSS&lt;br&gt;• BC Community Health Atlas, by the Provincial Health Services Authority, maps diabetes, other chronic diseases and risk-factor-related data by local health area</td>
<td>✓ A1C&lt;br&gt;✓ Urine protein&lt;br&gt;✓ Dilated eye exam&lt;br&gt;† Podiatry (some)&lt;br&gt;× CDE&lt;br&gt;× Exercise professionals&lt;br&gt;× Psychological tests/services</td>
</tr>
<tr>
<td><strong>ALBERTA</strong></td>
<td>• Alberta Diabetes Strategy (2003–2013) replaced by the Alberta Health Charter&lt;br&gt;• Currently developing a chronic disease management framework</td>
<td>Supplementary health benefits for low-income people (including medications, insulin, supplies) and for seniors (including diabetes supplies for those on insulin)</td>
<td>• Contributes data to CCDSS&lt;br&gt;• Creates diabetes indicators for First Nations and Métis populations&lt;br&gt;• Publishes Public Health Surveillance Bulletins and Health Trends Alberta</td>
<td>✓ A1C&lt;br&gt;✓ Urine protein&lt;br&gt;✓ Dilated eye exam&lt;br&gt;† Podiatry (some through basic podiatry program)&lt;br&gt;✓ CDE&lt;br&gt;✓ Exercise professionals&lt;br&gt;× Psychological tests/services</td>
</tr>
<tr>
<td>DIABETES/CHRONIC DISEASE STRATEGY</td>
<td>PRIMARY AND SECONDARY PREVENTION PROGRAMS FOR VULNERABLE POPULATIONS</td>
<td>SURVEILLANCE</td>
<td>SERVICES AND SCREENING TESTS$^\dagger$</td>
<td>SUPPORT FOR CHILDREN WITH DIABETES IN SCHOOL</td>
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<tr>
<td>-----------------------------------</td>
<td>-------------------------------------------------</td>
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<td>----------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td>SASKATCHEWAN</td>
<td>• Provincial diabetes plan</td>
<td>• Primary prevention programs for prediabetes, immigrants, Aboriginal groups, low income</td>
<td>✓ A1C ✓ Urine protein ✓ Dilated eye exam † Podiatry ✓ CDE ✓ Exercise professionals ✓ Psychological tests/services</td>
<td>—</td>
</tr>
<tr>
<td>• Saskatchewan Framework for Primary Health Care</td>
<td>• Chronic kidney disease program</td>
<td>• LiveWell with Chronic Conditions (self-management program)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Ministry of Health strategic plan includes outcome targets for diabetes</td>
<td>• Clinical care pathways</td>
<td>• Regularly releases reports on diabetes prevalence and incidence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• The Ministry of Health works with partners to develop nutrition guidelines in schools and childcare facilities.</td>
<td>• Contributes data to CCDSS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MANITOBA</td>
<td>Primary care strategies to improve access to interprofessional primary care teams through the &quot;Family Doctor for All&quot; priority</td>
<td>• Primary prevention focusing on modifiable risk factors (healthy eating, physical activity) across various settings including school and child care nourishment programs</td>
<td>✓ A1C ✓ Urine protein ✓ Dilated eye exam ✓ Podiatry ✓ CDE ✓ Exercise professionals ✓ Psychological tests/services</td>
<td>—</td>
</tr>
<tr>
<td>• Improving access to affordable healthy foods in First Nation and Métis communities through Affordable Food in Remote Manitoba program and the Northern Healthy Foods Initiative</td>
<td>• Improving access to affordable healthy foods in First Nation and Métis communities through Affordable Food in Remote Manitoba program and the Northern Healthy Foods Initiative</td>
<td>• Healthy Together Now focuses on chronic disease prevention in Indigenous populations, newcomers and children.</td>
<td>• Contributes data to CCDSS • Conducts other diabetes and chronic disease epidemiological analyses</td>
<td></td>
</tr>
<tr>
<td>• Healthy Together Now focuses on chronic disease prevention in Indigenous populations, newcomers and children.</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>DIABETES/CHRONIC DISEASE STRATEGY</td>
<td>PRIMARY AND SECONDARY PREVENTION PROGRAMS FOR VULNERABLE POPULATIONS</td>
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<td>SERVICES AND SCREENING TESTS</td>
<td>SUPPORT FOR CHILDREN WITH DIABETES IN SCHOOL</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>------------------------------------------------</td>
<td>--------------</td>
<td>-----------------------------</td>
<td>-----------------------------------------------</td>
</tr>
</tbody>
</table>
| **ONTARIO**                       | • Funding for programs in high-risk populations (e.g. First Nations)  
  • Ontario Aboriginal Diabetes Strategy | Contributions data to CCDSS  
  ✓ A1C  
  ✓ Urine protein  
  ✓ Dilated eye exam  
  † Podiatry (~150 health care professionals provide foot and wound care services as part of the Ontario Diabetes Strategy)  
  ✓ CDE  
  † Exercise professionals  
  † Psychological tests/services | — |
| **QUEBEC**                        | Information unavailable | Information unavailable | Information unavailable | Protocole d'intervention en milieu scolaire pour les élèves atteints de diabète de type 1 (2011) |
| **NEW BRUNSWICK**                | Diabetes strategy with committed funding  
  • Prediabetes registry  
  • Detection programs in First Nations people on- and off-reserve | Contributions data to CCDSS  
  ✓ A1C  
  ✓ Urine protein  
  ✓ Dilated eye exam  
  × Podiatry  
  ✓ CDE  
  × Exercise professionals  
  ✓ Psychological tests/services | New Brunswick Department of Education Policy 704 (Health Support Services) (revised 2008) includes essential routine services for students with diabetes. |
<table>
<thead>
<tr>
<th>NOVA SCOTIA</th>
<th>PRINCE EDWARD ISLAND</th>
</tr>
</thead>
</table>
| • Diabetes Care Program of Nova Scotia with committed funding  
  • Expanded Chronic Care Model, based on interdisciplinary teams in primary care | Diabetes Strategy (2014–2017) aligned with the Chronic Disease Prevention and Management Framework |
| • African-Canadian and First Nations communities  
  • Considers social determinants of health in population-based programs, services | • Prediabetes  
  • Pregnant women with diabetes  
  • Secondary prevention for Aboriginal communities |
| • Diabetes Care Program of Nova Scotia contributes data to CCDSS  
  • Diabetes Care Program of Nova Scotia maintains diabetes registry and reports on the state of diabetes and diabetes care  
  • Currently working to provide specific indicator reports for the First Nations population based on their identified interest areas | • Contributes data to CCDSS  
  • Reports on diabetes prevalence, incidence, complications and health service utilization  
  • Diabetes database to track test results and service utilization |
| ✓ A1C ✓ Urine protein ✓ Dilated eye exam ✗ Podiatry ✓ CDE ✗ Exercise professionals ✓ Psychological tests/services (only if physician referred into health authority funded-services) | ✓ A1C ✓ Urine protein ✓ Dilated eye exam ✗ Podiatry ✓ CDE ✗ Exercise professionals ✓ Psychological tests/services |

**Support for Children with Diabetes in School**

Guidelines for Supporting Students with Type 1 Diabetes (and Other Diabetes Requiring Insulin) in Schools (2010) sets expectation for school boards and schools.
<table>
<thead>
<tr>
<th>DIABETES/ CHRONIC DISEASE STRATEGY</th>
<th>PRIMARY AND SECONDARY PREVENTION PROGRAMS FOR VULNERABLE POPULATIONS</th>
<th>SURVEILLANCE</th>
<th>SERVICES AND SCREENING TESTS(^\d)</th>
<th>SUPPORT FOR CHILDREN WITH DIABETES IN SCHOOL</th>
</tr>
</thead>
</table>
| NEWFOUNDLAND AND LABRADOR | Chronic disease framework, with committed funding to provincial self-management program | • Children at risk of developing chronic disease  
• Aboriginal groups  
• Low-income earners | • NL Centre for Health Information contributes to CCDSS  
• Developing provincial diabetes database | ✓ A1C  
✓ Urine protein  
✓ Dilated eye exam  
× Podiatry  
✓ CDE  
× Exercise professionals  
✓ Psychological tests/services | Guidelines for Diabetes Management in Schools (2010)\(^77\) |
| NORTHWEST TERRITORIES | Chronic disease management strategy (under development) | Territorial government engages Aboriginal community and integrates Aboriginal wellness into its chronic disease management strategy | • Contributes data to CCDSS  
• Has set a goal to develop a chronic disease database  
• Currently exploring Northwest Territories Diabetes Registry | Information unavailable | — |
| NUNAVUT | Draft chronic disease strategy is under development | Programs for Nunavummiut | Contributes data to CCDSS | ✓ Dilated eye exam  
× Podiatry  
Information unavailable for other tests/services | — |
| YUKON | • Draft chronic disease strategy (2013)  
• Active Living Strategy that includes diabetes prevention | Territorial government programs include health promotion, weight loss support and chronic conditions support for people with diabetes and those at risk | Contributes data to CCDSS | ✓ A1C  
✓ Urine protein  
✓ Dilated eye exam  
× Podiatry  
✓ CDE  
† Exercise professionals  
✓ Psychological tests/services | — |

A1C, glycated hemoglobin; CCDSS, Canadian Chronic Disease Surveillance System; CDE, certified diabetes educator.

\(^\d\)As recommended by the 2013 Canadian Diabetes Association clinical practice guidelines.
1. Diabetes in Aboriginal communities

The issue

The need to address Aboriginal population-specific risk factors and interventions for type 2 diabetes has become an urgent priority. Incidence and prevalence rates are increasing rapidly, and the need for prevention of diabetes and related complications in this population has become a necessity. In Canada, type 2 diabetes is three to five times more prevalent among First Nations peoples than in the general population. Aboriginal women have risk of developing gestational diabetes that is two to three times higher than non-Aboriginal women.24 The age of diabetes diagnosis is younger in First Nations communities,78,79 and type 2 diabetes is increasingly observed in First Nations children and adolescents.80,81,82 Most recent data show that 16.2% of First Nations living on-reserve have diabetes, compared to 7.6% of total population in Canada. In some Aboriginal communities, the prevalence has been reported to be as high as 26%.28

Aboriginal people with diabetes also have higher rates of complications compared to the general population: retinopathy (36%), cataracts (35%), neuropathy (34%), circulation problems (29%), lower-limb problems (23%), urine protein (21%), heart disease (20%) and kidney problems (18%) are reported in First Nations adults with diabetes, and a high percentage have also reported hypertension (53%).16,29

The cause of type 2 diabetes is multifactorial. However, it is clear that Aboriginal people face significant barriers to appropriate and equitable care because of challenges related to socioeconomic status, geography, lack of infrastructure and staff, language/cultural barriers, jurisdictional issues and factors associated with colonization.24,27 A shortage of healthcare providers may hinder the early diagnosis and treatment of diabetes and its complications; physical barriers to healthcare services (due to remote locations) may limit access to needed specialist care. Behavioural risk factors that contribute to incident diabetes and poor diabetes outcomes are also more prevalent among Aboriginal groups.
Diabetes-prevention strategies for Aboriginal people must address the upstream factors (or determinants of health) within which individualized risk factors of diabetes are generated. Broader determinants and health-system issues are outside the control of the individual and require policies or actions by others. It is important to have effective and culturally appropriate interventions that are based on contextual knowledge and risk factors identified in collaboration with Aboriginal communities. Initiatives that include and incorporate these understandings should support Aboriginal peoples in achieving their health potential.

The Canadian Diabetes Association applauded the decision of the federal government in 2015 to make the Aboriginal Diabetes Initiative permanent. The Aboriginal Diabetes Initiative delivers community-based, culturally appropriate diabetes programs and services to more than 600 communities. But more needs to be done. All people with diabetes should have access to the supports they need to manage their disease, and, as is noted in the Diabetes Charter, government has the responsibility to address the unique needs and disparities in care and outcomes of vulnerable populations, who experience higher rates of diabetes and complications and significant barriers to diabetes care and support. Accordingly, the following recommendations are priorities for Aboriginal populations to build on the Aboriginal Diabetes Initiative and decrease the devastating impact of diabetes.

Policy recommendations

1. Food insecurity must be addressed by federal/provincial/territorial governments, in collaboration with Aboriginal communities. A healthy diet based on Canada’s Food Guide and incorporating traditional diets should be encouraged by improving the availability and affordability of healthy and culturally appropriate food—particularly in rural, remote and northern areas.

2. Culturally based diabetes prevention programs should be available in Aboriginal communities—programs that are sensitive to traditional practices and language, unique to the culture and run by trained community members.

3. Healthcare providers working with Aboriginal populations should have a heightened sensitivity to the high incidence of type 2 diabetes and associated complications in this population, and should initiate screening for type 2 diabetes and complications as per the Canadian Diabetes Association 2013 clinical practice guidelines.

4. Working with Aboriginal communities, federal/provincial/territorial governments must ensure fair access to diabetes care, education, medications, devices and supplies.

5. Advanced and regular surveillance data about Aboriginal health are required to monitor trends in diabetes and risk factors. Federal/provincial/territorial governments should contribute to collection and dissemination of this information in Aboriginal communities.
2. Stigma and diabetes

The issue

Stigma is a form of prejudice that spreads misinformation, labels individuals and perpetuates negative stereotypes. While there are many risk factors for diabetes, including family history, ethnocultural background, age, weight status, physical activity etc., the Canadian Diabetes Association 2015 survey shows that the majority of Canadians (with and without diabetes) believe that individual behaviour is the most important factor responsible for the increasing rate of type 2 diabetes—more than the food industry and the aging population. This perception about the cause of diabetes may mean that individuals with type 2 diabetes are blamed for their disease. The experience of diabetes-related stigma can have a significant negative impact on many aspects of psychological well-being, and may also result in poor clinical outcomes.

Stigma can prevent people from being diagnosed, and from seeking the treatment and supports they need. As a result of experienced or expected stigma, people with diabetes may not disclose their condition to others, leading to distress. In fact, in Canada, a third of people with diabetes hesitate to disclose their diabetes according to the 2015 CDA survey. The fear of stigma adds to the challenges of managing diabetes while balancing life and work. About 22% of people with diabetes said their social life is limited by their disease, and 90% said they had to adjust their work, including quitting their job, because of their diabetes. Among people with diabetes, 13% show signs of likely depression, 26% feel overwhelmed, 28% experience diabetes distress and 33% feel anxious.

People with type 1 diabetes and many people with type 2 diabetes must monitor blood glucose levels, inject insulin, take medications, and monitor and adjust for their diet and physical activity. Researchers noted that injecting insulin is commonly associated with concerns about social embarrassment, rejection, being treated differently or damaging relationships. Among adults with type 2 diabetes, 13% report feeling embarrassed when they refused unhealthy food options at social events, and such embarrassment may act as a deterrent for making healthy choices in the future.

Lack of disclosure also may lead to suboptimal management and then to short- and long-term diabetes complications. For example, evidence suggests that people have feelings of embarrassment when having to perform diabetes self-management tasks in public. This, in turn, may make it less likely that they will adhere to an optimal treatment/monitoring routine.

“They knew I had diabetes—I told them straight out when I got the job—and that day I’d been trying to go for lunch but the boss said it was too late … the boss said these lows were happening too many times.”

– Devon Brown, who lost his seven-year post in a contracting company because of low blood sugar associated with his diabetes

Source: Diabetes Dialogue, Winter 2014
Improved awareness and accurate information about diabetes, combined with government policies and guidelines to support diabetes management (such as for children with diabetes in school), can help reduce stigma and discrimination.

Policy recommendations

1. The Canadian Diabetes Association should continue to raise public awareness about diabetes and work to ensure accuracy about diabetes information in the public domain.

2. Federal/provincial/territorial governments should implement policies to support schools and workplaces in ensuring reasonable accommodation for people with diabetes in their self-management.

3. Schools, preschools, daycares and workplaces must create an environment in which people can reach their full potential by ensuring adequate accommodation and eliminating discrimination.

4. Members of the public should endeavour to seek accurate and credible information about diabetes, its causes and its complications.

5. The media and other public information sources should make sure that the information they convey about diabetes is accurate and credible.

3. Children with diabetes in school

The issue

Type 1 diabetes is one of the most common chronic diseases in children, and the prevalence of type 2 diabetes among school-age children is increasing. In 2008/2009, there were 25,693 children and youth (aged 1 to 19) living with diabetes (both type 1 and type 2), including 3,287 new cases of diabetes diagnosed that year. This represents a prevalence of 1 in 300 children and means that at any given time, most schools will have at least one student with diabetes.

Effective management of type 1 diabetes in children and youth requires intensive daily management of glycemic levels and careful balancing of diet and exercise with insulin intake, which is extremely important for preventing serious short-term and long-term health problems. Because children and youth with diabetes spend 30 to 35 hours per week in a school setting, age-appropriate support and care is paramount for the proper management of diabetes. School-age children with diabetes may experience hypoglycemia (low blood

“You have to advocate for your child at school and be strong in asking for what your child needs. At the same time, you have to recognize that it’s a partnership between your family and the school.”

– Shana Betz, diabetes advocate and mother of Emma, who lives with diabetes.

Source: Diabetes Dialogue, summer 2015
sugar) as a result of too much insulin, delayed or missed meals or snacks, or more physical activity than usual without adjusting food or insulin intake. Severe hypoglycemia is an emergency situation in which a child is unconscious and/or unable to take glucose orally and requires immediate treatment with glucagon injection. Ongoing hyperglycemia that is not recognized and left untreated can eventually lead to serious health problems such as heart disease, blindness, amputation and kidney failure. While most students can manage their diabetes independently at school, some students may require someone to assist with or to administer insulin, monitor blood glucose or supervise food intake and activity.

Currently, the level of diabetes management support is inconsistent across jurisdictions for children and youth with diabetes at school. Many children with diabetes and their parents do not have support for blood glucose testing and insulin administration during regular school hours, extracurricular activities or field trips. Many school personnel do not or may not understand diabetes and/or diabetes management, school rules may lack the flexibility to accommodate the needs of children with diabetes, and emergency protocols are lacking. These challenges have led to burdens for working parents, the withdrawal of children with diabetes from school-related activities, and even life-threatening situations.

In Canada, five of 13 jurisdictions have put policies in place to ensure students with diabetes have access to the support they need to self-manage their diabetes at school. Ontario is also putting regulations in place to address this need. All students living with diabetes have the right to be full and equal participants in school and school-related activities, without being excluded, stigmatized or discriminated against. To this end, the Canadian Diabetes Association puts forth the following recommendations to ensure a safe environment for students with diabetes in school.

**Policy recommendations**

1. In provinces and territories that do not have protections for children with diabetes, the ministry of education should put in place policies and/or guidelines to support diabetes management of children with diabetes in school.

2. School boards should develop and communicate a comprehensive diabetes management policy that includes the roles and responsibilities of the student living with diabetes, their parents/guardians and school personnel, according to the Canadian Diabetes Association Guidelines for the Care of Students Living with Diabetes at School.

3. School boards should be responsible for providing appropriately trained personnel to safely administer insulin and monitor blood glucose, food intake and activity for students who are unable to perform these activities independently.

4. Schools should permit students living with diabetes to monitor their blood glucose (sugar), administer insulin and treat low blood glucose (hypoglycemia) and high blood glucose (hyperglycemia) conveniently and safely wherever and whenever required.

5. School principals should work with each student who has diabetes, parents/guardians and healthcare professionals to develop and communicate an individual care plan to school personnel that complies with the student’s prescribed diabetes management regimen. Each individual care plan should consist of a daily diabetes management plan and a diabetes emergency plan. As part of this, school personnel should be trained to recognize emergency situations and respond appropriately, according to the student’s individual care plan. School personnel should be trained to administer glucagon in the event of a severe hypoglycemic reaction.

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4. Amputation prevention

The issue

Among people with diabetes, loss of sensation in the foot and minor foot injuries, combined with neuropathy (damage to the nerves) and peripheral arterial disease (poor circulation/blood supply to the foot), can develop into foot ulcers and infection, leading to amputation. In Canada, diabetes is the leading cause of non-traumatic lower limb amputations, and was associated with over 60% of all amputations in 2011/2012 (3,826 amputations). Up to two-thirds of people with diabetes die within a year following an amputation; up to 80% die within 5 years due to complications of diabetes.

Diabetes foot complications affect lower-income earners and Aboriginal groups more severely. About 28% of those who earn less than $50,000 suffered from poor circulation to the feet or legs, compared to 14% among those earning over $50,000. Among First Nations people with diabetes living on-reserve, 34% reported neuropathy, 29% reported circulation problems and 23% reported lower-limb problems.

Treating foot ulcers is associated with major costs to the healthcare system; most of the costs are due to lengthy hospital stays. The Canadian Association of Wound Care reports that treating one foot ulcer costs about $8,000 and, if it becomes infected, rises to an average of $17,000.

In light of the significant burden of foot complications for individuals with diabetes, families and society, regular foot exams are essential for detecting foot problems. The Canadian Diabetes Association 2013 clinical practice guidelines recommend annual exams by healthcare providers and more frequent exams for people at high risk. People with diabetes are also encouraged to check their feet daily. Despite these recommendations, however, Canadians with diabetes are not receiving adequate screening for foot problems, nor are they performing daily checks as part of self-care practice. In 2014, only about half of Canadians with diabetes reported that they had received a foot exam in the previous year.
Optimal diabetes management is key to preventing neuropathy and peripheral vascular disease. Currently, the cost burden associated with diabetes medications, devices and supplies varies widely across Canada due to varying public coverage: 15% of people with diabetes have no insurance to cover their prescribed medications, and 30% have no insurance to cover blood glucose monitoring supplies or equipment. Based on our out-of-pocket cost analysis, a person with type 1 diabetes may spend more than $6,000 or 26% of their income per year out of pocket for needed medications, supplies and devices (please see the appendix), and for some people, the cost of their treatments may exceed this amount. The catastrophic cost has prevented at least 25% of Canadians with diabetes from adhering to their prescribed treatment. For those with foot complications, offloading devices (which can help to heal foot wounds faster and prevent recurring wounds) and visits to podiatrists/chiropodists are not covered by any public health plan in Canada. The lack of support for preventing and managing foot problems for people with diabetes is a serious barrier to effective diabetes self-management and leaves those with these complications at greater risk of amputation.

Policy recommendations

Diabetes foot complications are largely preventable. Improved foot screening, risk assessment and access to needed supports are essential to help prevent diabetes-related foot complications. To this end, the Canadian Diabetes Association calls on federal, provincial and territorial governments to ensure the following:

1. Affordable and timely access to the medications, devices, education and care that are necessary for achieving optimal diabetes control and preventing serious complications such as amputation.
2. Access to publicly funded services and devices for all people with diabetes to prevent and treat foot ulcers and avoid amputation, including foot care education, professionally fitted footwear and devices, timely referrals and visits to a foot care specialist.
3. An interdisciplinary approach to the prevention and management of diabetes foot complications, including the coordination of care and communication between healthcare professionals who support people with diabetes.
4. Healthcare professionals to screen for diabetic neuropathy and peripheral vascular disease, perform annual examinations for foot complications (more frequent for those at high risk) and educate people with diabetes about proper foot care as an integral component of diabetes management (outlined in the most current Canadian Diabetes Association clinical practice guidelines.)
5. People with diabetes to check their feet daily for cuts, cracks, bruises, blisters, sores, infection and unusual markings, and have regular conversations with their healthcare providers about self foot care.
## APPENDIX

### OUT-OF-POCKET COSTS BY PROVINCE/TERRITORY: JANET

#### 30 years old (multiple daily insulin injections)

<table>
<thead>
<tr>
<th>Province/Territory</th>
<th>BC</th>
<th>AB</th>
<th>SK</th>
<th>MB</th>
<th>ON</th>
<th>QC</th>
<th>NB</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total cost</strong></td>
<td>$3,179</td>
<td>$3,148</td>
<td>$3,174</td>
<td>$3,056</td>
<td>$3,164</td>
<td>$5,065</td>
<td>$3,143</td>
</tr>
<tr>
<td>$ / % covered by government</td>
<td>$2,415</td>
<td>76%</td>
<td>$2,941</td>
<td>30%</td>
<td>$2,495</td>
<td>79%</td>
<td>$2,212</td>
</tr>
<tr>
<td>$ / % out of pocket</td>
<td>$764</td>
<td>24%</td>
<td>$2,207</td>
<td>70%</td>
<td>$679</td>
<td>21%</td>
<td>$944</td>
</tr>
<tr>
<td>% of Janet's annual income</td>
<td>4%</td>
<td>11%</td>
<td>3%</td>
<td>4%</td>
<td>5%</td>
<td>8%</td>
<td>0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Province/Territory</th>
<th>BC</th>
<th>AB</th>
<th>SK</th>
<th>MB</th>
<th>ON</th>
<th>QC</th>
<th>NB</th>
</tr>
</thead>
<tbody>
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<td><strong>Total cost</strong></td>
<td>$3,179</td>
<td>$3,148</td>
<td>$3,174</td>
<td>$3,056</td>
<td>$3,164</td>
<td>$5,065</td>
<td>$3,143</td>
</tr>
<tr>
<td>$ / % covered by government</td>
<td>$1,415</td>
<td>45%</td>
<td>$713</td>
<td>23%</td>
<td>$1,815</td>
<td>57%</td>
<td>$1,188</td>
</tr>
<tr>
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<td>$1,764</td>
<td>55%</td>
<td>$2,436</td>
<td>77%</td>
<td>$1,358</td>
<td>43%</td>
<td>$1,868</td>
</tr>
<tr>
<td>% of Janet's annual income</td>
<td>4%</td>
<td>6%</td>
<td>3%</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
<td>8%</td>
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<table>
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<th>QC</th>
<th>NB</th>
</tr>
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<tbody>
<tr>
<td><strong>Total cost</strong></td>
<td>$3,179</td>
<td>$3,148</td>
<td>$3,174</td>
<td>$3,056</td>
<td>$3,164</td>
<td>$5,065</td>
<td>$3,143</td>
</tr>
<tr>
<td>$ / % covered by government</td>
<td>$360</td>
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<td>$713</td>
<td>23%</td>
<td>$454</td>
<td>14%</td>
<td>$0</td>
</tr>
<tr>
<td>$ / % out of pocket</td>
<td>$2,819</td>
<td>89%</td>
<td>$2,436</td>
<td>77%</td>
<td>$2,720</td>
<td>86%</td>
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<td>4%</td>
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#### 18 years old (pump)

<table>
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<th>BC</th>
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<th>SK</th>
<th>MB</th>
<th>ON</th>
<th>QC</th>
<th>NB</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total cost</strong></td>
<td>$6,118</td>
<td>$6,329</td>
<td>$6,226</td>
<td>$6,186</td>
<td>$6,106</td>
<td>$7,140</td>
<td>$6,234</td>
</tr>
<tr>
<td>$ / % covered by government</td>
<td>$5,288</td>
<td>86%</td>
<td>$5,704</td>
<td>90%</td>
<td>$5,545</td>
<td>89%</td>
<td>$3,942</td>
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<tr>
<td>$ / % out of pocket</td>
<td>$830</td>
<td>14%</td>
<td>$625</td>
<td>10%</td>
<td>$680</td>
<td>11%</td>
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<th>MB</th>
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<td><strong>Total cost</strong></td>
<td>$6,118</td>
<td>$6,329</td>
<td>$6,226</td>
<td>$6,186</td>
<td>$6,106</td>
<td>$7,140</td>
<td>$6,234</td>
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<td>$5,476</td>
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<td>$4,865</td>
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<tr>
<td>$ / % out of pocket</td>
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<td>30%</td>
<td>$853</td>
<td>13%</td>
<td>$1,361</td>
<td>22%</td>
<td>$3,268</td>
</tr>
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<td>% of Janet's annual income</td>
<td>5%</td>
<td>2%</td>
<td>3%</td>
<td>8%</td>
<td>4%</td>
<td>14%</td>
<td>9%</td>
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<table>
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<tbody>
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<td><strong>Total cost</strong></td>
<td>$6,118</td>
<td>$6,329</td>
<td>$6,226</td>
<td>$6,186</td>
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<td>56%</td>
<td>$0</td>
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<tr>
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<td>8%</td>
<td>2%</td>
<td>7%</td>
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#### 30 years old (pump)

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<th>Province/Territory</th>
<th>BC</th>
<th>AB</th>
<th>SK</th>
<th>MB</th>
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<th>QC</th>
<th>NB</th>
</tr>
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<tbody>
<tr>
<td><strong>Total cost</strong></td>
<td>$6,118</td>
<td>$6,329</td>
<td>$6,226</td>
<td>$6,186</td>
<td>$6,106</td>
<td>$7,140</td>
<td>$6,234</td>
</tr>
<tr>
<td>$ / % covered by government</td>
<td>$3,888</td>
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<td>$5,704</td>
<td>90%</td>
<td>$1,917</td>
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<td>$3,942</td>
</tr>
<tr>
<td>$ / % out of pocket</td>
<td>$2,230</td>
<td>36%</td>
<td>$625</td>
<td>10%</td>
<td>$4,309</td>
<td>69%</td>
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<td>26%</td>
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<th>AB</th>
<th>SK</th>
<th>MB</th>
<th>ON</th>
<th>QC</th>
<th>NB</th>
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</thead>
<tbody>
<tr>
<td><strong>Total cost</strong></td>
<td>$6,118</td>
<td>$6,329</td>
<td>$6,226</td>
<td>$6,186</td>
<td>$6,106</td>
<td>$7,140</td>
<td>$6,234</td>
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<tr>
<td>$ / % covered by government</td>
<td>$2,888</td>
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<td>$5,476</td>
<td>87%</td>
<td>$1,236</td>
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<td>$853</td>
<td>13%</td>
<td>$4,989</td>
<td>80%</td>
<td>$3,268</td>
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<td>8%</td>
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<td>12%</td>
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<td>4%</td>
<td>14%</td>
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<table>
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<th>MB</th>
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<th>QC</th>
<th>NB</th>
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<tbody>
<tr>
<td><strong>Total cost</strong></td>
<td>$6,118</td>
<td>$6,329</td>
<td>$6,226</td>
<td>$6,186</td>
<td>$6,106</td>
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<tr>
<td>$ / % out of pocket</td>
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<td>77%</td>
<td>$853</td>
<td>13%</td>
<td>$6,226</td>
<td>100%</td>
<td>$6,186</td>
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<tr>
<td>% of Janet's annual income</td>
<td>6%</td>
<td>1%</td>
<td>8%</td>
<td>8%</td>
<td>2%</td>
<td>7%</td>
<td>8%</td>
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</tbody>
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### Out-of-pocket costs by province/territory: Janet

#### 30 years old (multiple daily insulin injections)

<table>
<thead>
<tr>
<th>Province/Territory</th>
<th>NS</th>
<th>PEI</th>
<th>NL</th>
<th>NU</th>
<th>YK</th>
<th>NWT</th>
<th>NIHB</th>
<th>NATL AVG</th>
<th>PROV AVG</th>
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<tbody>
<tr>
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<td>$3,888</td>
<td>$360</td>
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<td>$713</td>
<td>$3,179</td>
<td>$2,697</td>
<td>$767</td>
<td>$1,074</td>
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<td>4%</td>
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<td>0%</td>
<td>0%</td>
<td>4%</td>
<td>4%</td>
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<td>$3,179</td>
<td>$1,525</td>
<td>$2,610</td>
<td>$630</td>
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<tr>
<td>% of total cost</td>
<td>46%</td>
<td>51%</td>
<td>0%</td>
<td>0%</td>
<td>4%</td>
<td>4%</td>
<td>46%</td>
<td>23%</td>
<td>65%</td>
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#### 18 years old (pump)

<table>
<thead>
<tr>
<th>Province/Territory</th>
<th>NS</th>
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<th>NL</th>
<th>NU</th>
<th>YK</th>
<th>NWT</th>
<th>NIHB</th>
<th>NATL AVG</th>
<th>PROV AVG</th>
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<tr>
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<td>$5,476</td>
<td>$50</td>
<td>$3,094</td>
<td>$5,545</td>
<td>$5,545</td>
<td>$5,476</td>
<td>$5,476</td>
<td>$5,476</td>
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<tr>
<td>% of Janet's annual income</td>
<td>36%</td>
<td>36%</td>
<td>0%</td>
<td>0%</td>
<td>36%</td>
<td>36%</td>
<td>36%</td>
<td>36%</td>
<td>36%</td>
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<tr>
<td>Out-of-pocket cost</td>
<td>$2,009</td>
<td>$2,621</td>
<td>$50</td>
<td>$0</td>
<td>$713</td>
<td>$3,179</td>
<td>$1,525</td>
<td>$2,610</td>
<td>$630</td>
</tr>
<tr>
<td>% of total cost</td>
<td>32%</td>
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<td>0%</td>
<td>0%</td>
<td>4%</td>
<td>4%</td>
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<td>23%</td>
<td>65%</td>
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#### 30 years old (pump)

<table>
<thead>
<tr>
<th>Province/Territory</th>
<th>NS</th>
<th>PEI</th>
<th>NL</th>
<th>NU</th>
<th>YK</th>
<th>NWT</th>
<th>NIHB</th>
<th>NATL AVG</th>
<th>PROV AVG</th>
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<tr>
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<td>$6,272</td>
<td>$6,229</td>
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<td>$6,339</td>
</tr>
<tr>
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<td>24%</td>
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<td>0%</td>
<td>24%</td>
<td>24%</td>
<td>24%</td>
<td>24%</td>
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</tr>
<tr>
<td>Out-of-pocket cost</td>
<td>$3,268</td>
<td>$3,268</td>
<td>$50</td>
<td>$0</td>
<td>$713</td>
<td>$3,179</td>
<td>$1,525</td>
<td>$2,610</td>
<td>$630</td>
</tr>
<tr>
<td>% of total cost</td>
<td>52%</td>
<td>52%</td>
<td>0%</td>
<td>0%</td>
<td>4%</td>
<td>4%</td>
<td>46%</td>
<td>23%</td>
<td>65%</td>
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</table>
## OUT-OF-POCKET COSTS BY PROVINCE/TERRITORY: PETER

### 55 years old

<table>
<thead>
<tr>
<th>Province/Territory</th>
<th>Cost</th>
<th>BC</th>
<th>AB</th>
<th>SK</th>
<th>MB</th>
<th>ON</th>
<th>QC</th>
<th>NB</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total cost</strong></td>
<td>$20,000</td>
<td>$1,940</td>
<td>$1,905</td>
<td>$1,938</td>
<td>$1,930</td>
<td>$1,874</td>
<td>$2,965</td>
<td>$2,007</td>
</tr>
<tr>
<td>$ / % covered by government</td>
<td></td>
<td>$425</td>
<td>22%</td>
<td>$0</td>
<td>0%</td>
<td>$405</td>
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<tr>
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<td>$1,963</td>
<td>100%</td>
<td>$1,533</td>
<td>79%</td>
<td>$1,930</td>
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<td>10%</td>
<td>8%</td>
<td>10%</td>
<td>8%</td>
<td>9%</td>
<td>7%</td>
</tr>
<tr>
<td>% of family annual income</td>
<td></td>
<td>3%</td>
<td>4%</td>
<td>3%</td>
<td>4%</td>
<td>3%</td>
<td>4%</td>
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<tr>
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<th>BC</th>
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<th>QC</th>
<th>NB</th>
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<tbody>
<tr>
<td><strong>Total cost</strong></td>
<td>$40,000</td>
<td>$1,940</td>
<td>$1,905</td>
<td>$1,938</td>
<td>$1,930</td>
<td>$1,874</td>
<td>$2,965</td>
<td>$2,007</td>
</tr>
<tr>
<td>$ / % covered by government</td>
<td></td>
<td>$5</td>
<td>0%</td>
<td>$0</td>
<td>0%</td>
<td>$0</td>
<td>0%</td>
<td>$0</td>
</tr>
<tr>
<td>$ / % out of pocket</td>
<td></td>
<td>$1,935</td>
<td>100%</td>
<td>$1,963</td>
<td>100%</td>
<td>$1,938</td>
<td>100%</td>
<td>$1,930</td>
</tr>
<tr>
<td>% of Peter's annual income</td>
<td></td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
<td>4%</td>
<td>5%</td>
</tr>
<tr>
<td>% of family annual income</td>
<td></td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
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<th>SK</th>
<th>MB</th>
<th>ON</th>
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<td>$1,938</td>
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<td>$1,874</td>
<td>$2,965</td>
<td>$2,007</td>
</tr>
<tr>
<td>$ / % covered by government</td>
<td></td>
<td>$0</td>
<td>0%</td>
<td>$0</td>
<td>0%</td>
<td>$0</td>
<td>0%</td>
<td>$0</td>
</tr>
<tr>
<td>$ / % out of pocket</td>
<td></td>
<td>$1,940</td>
<td>100%</td>
<td>$1,963</td>
<td>100%</td>
<td>$1,938</td>
<td>100%</td>
<td>$1,930</td>
</tr>
<tr>
<td>% of Peter's annual income</td>
<td></td>
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<td>2%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>% of family annual income</td>
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<td>2%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
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### 65 years old

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<th>MB</th>
<th>ON</th>
<th>QC</th>
<th>NB</th>
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</thead>
<tbody>
<tr>
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<td>$1,905</td>
<td>$1,938</td>
<td>$1,930</td>
<td>$1,874</td>
<td>$2,965</td>
<td>$2,007</td>
</tr>
<tr>
<td>$ / % covered by government</td>
<td></td>
<td>$425</td>
<td>22%</td>
<td>$1,358</td>
<td>71%</td>
<td>$1,054</td>
<td>54%</td>
<td>$0</td>
</tr>
<tr>
<td>$ / % out of pocket</td>
<td></td>
<td>$1,515</td>
<td>79%</td>
<td>$547</td>
<td>29%</td>
<td>$884</td>
<td>46%</td>
<td>$1,930</td>
</tr>
<tr>
<td>% of Peter's annual income</td>
<td></td>
<td>8%</td>
<td>3%</td>
<td>4%</td>
<td>10%</td>
<td>1%</td>
<td>6%</td>
<td>6%</td>
</tr>
<tr>
<td>% of family annual income</td>
<td></td>
<td>3%</td>
<td>1%</td>
<td>2%</td>
<td>4%</td>
<td>1%</td>
<td>3%</td>
<td>3%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Province/Territory</th>
<th>Cost</th>
<th>BC</th>
<th>AB</th>
<th>SK</th>
<th>MB</th>
<th>ON</th>
<th>QC</th>
<th>NB</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total cost</strong></td>
<td>$40,000</td>
<td>$1,940</td>
<td>$1,905</td>
<td>$1,938</td>
<td>$1,930</td>
<td>$1,874</td>
<td>$2,965</td>
<td>$2,007</td>
</tr>
<tr>
<td>$ / % covered by government</td>
<td></td>
<td>$5</td>
<td>0%</td>
<td>$1,358</td>
<td>71%</td>
<td>$1,054</td>
<td>54%</td>
<td>$0</td>
</tr>
<tr>
<td>$ / % out of pocket</td>
<td></td>
<td>$1,935</td>
<td>100%</td>
<td>$547</td>
<td>29%</td>
<td>$884</td>
<td>46%</td>
<td>$1,930</td>
</tr>
<tr>
<td>% of Peter's annual income</td>
<td></td>
<td>5%</td>
<td>1%</td>
<td>2%</td>
<td>5%</td>
<td>1%</td>
<td>3%</td>
<td>4%</td>
</tr>
<tr>
<td>% of family annual income</td>
<td></td>
<td>3%</td>
<td>1%</td>
<td>1%</td>
<td>3%</td>
<td>0%</td>
<td>2%</td>
<td>3%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Province/Territory</th>
<th>Cost</th>
<th>BC</th>
<th>AB</th>
<th>SK</th>
<th>MB</th>
<th>ON</th>
<th>QC</th>
<th>NB</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total cost</strong></td>
<td>$80,000</td>
<td>$1,940</td>
<td>$1,905</td>
<td>$1,938</td>
<td>$1,930</td>
<td>$1,874</td>
<td>$2,965</td>
<td>$2,007</td>
</tr>
<tr>
<td>$ / % covered by government</td>
<td></td>
<td>$0</td>
<td>0%</td>
<td>$1,358</td>
<td>71%</td>
<td>$0</td>
<td>0%</td>
<td>$0</td>
</tr>
<tr>
<td>$ / % out of pocket</td>
<td></td>
<td>$1,940</td>
<td>100%</td>
<td>$547</td>
<td>29%</td>
<td>$1,938</td>
<td>100%</td>
<td>$1,930</td>
</tr>
<tr>
<td>% of Peter's annual income</td>
<td></td>
<td>2%</td>
<td>1%</td>
<td>2%</td>
<td>2%</td>
<td>0%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>% of family annual income</td>
<td></td>
<td>2%</td>
<td>1%</td>
<td>2%</td>
<td>2%</td>
<td>0%</td>
<td>1%</td>
<td>2%</td>
</tr>
</tbody>
</table>

### 65 years old – Guaranteed Income Supplement

<table>
<thead>
<tr>
<th>Province/Territory</th>
<th>Cost</th>
<th>BC</th>
<th>AB</th>
<th>SK</th>
<th>MB</th>
<th>ON</th>
<th>QC</th>
<th>NB</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total cost</strong></td>
<td>$16,383</td>
<td>$1,940</td>
<td>$1,905</td>
<td>$1,938</td>
<td>$1,930</td>
<td>$1,874</td>
<td>$2,965</td>
<td>$2,007</td>
</tr>
<tr>
<td>$ / % covered by government</td>
<td></td>
<td>$635</td>
<td>33%</td>
<td>$1,669</td>
<td>88%</td>
<td>$1,430</td>
<td>74%</td>
<td>$540</td>
</tr>
<tr>
<td>$ / % out of pocket</td>
<td></td>
<td>$1,305</td>
<td>67%</td>
<td>$237</td>
<td>12%</td>
<td>$508</td>
<td>26%</td>
<td>$1,390</td>
</tr>
<tr>
<td>% of Peter's annual income</td>
<td></td>
<td>7%</td>
<td>1%</td>
<td>3%</td>
<td>7%</td>
<td>1%</td>
<td>5%</td>
<td>2%</td>
</tr>
<tr>
<td>% of family annual income</td>
<td></td>
<td>3%</td>
<td>1%</td>
<td>1%</td>
<td>3%</td>
<td>1%</td>
<td>2%</td>
<td>1%</td>
</tr>
</tbody>
</table>
### OUT-OF-POCKET COSTS BY PROVINCE/TERRITORY: PETER

#### 55 years old

<table>
<thead>
<tr>
<th>Province/Territory</th>
<th>NS</th>
<th>PEI</th>
<th>NL</th>
<th>NU</th>
<th>YK</th>
<th>NWT</th>
<th>NIHB</th>
<th>NATL AVG</th>
<th>PROV AVG</th>
</tr>
</thead>
<tbody>
<tr>
<td>$2,057</td>
<td>$1,918</td>
<td>$2,005</td>
<td>$2,015</td>
<td>$2,408</td>
<td>$2,035</td>
<td>$1,980</td>
<td>$2,069</td>
<td>$2,053</td>
<td></td>
</tr>
<tr>
<td>$0</td>
<td>0%</td>
<td>193</td>
<td>10%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>$2,057</td>
<td>100%</td>
<td>$1,725</td>
<td>90%</td>
<td>$2,005</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>5%</td>
<td>4%</td>
<td>4%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

#### 65 years old

<table>
<thead>
<tr>
<th>Province/Territory</th>
<th>NS</th>
<th>PEI</th>
<th>NL</th>
<th>NU</th>
<th>YK</th>
<th>NWT</th>
<th>NIHB</th>
<th>NATL AVG</th>
<th>PROV AVG</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1,251</td>
<td>61%</td>
<td>$125</td>
<td>7%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>$806</td>
<td>39%</td>
<td>$1,725</td>
<td>93%</td>
<td>$2,005</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>4%</td>
<td>4%</td>
<td>4%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
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#### 65 years old – Guaranteed Income Supplement

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<th>NIHB</th>
<th>NATL AVG</th>
<th>PROV AVG</th>
</tr>
</thead>
<tbody>
<tr>
<td>$2,057</td>
<td>$1,826</td>
<td>$2,309</td>
<td>$2,015</td>
<td>$2,509</td>
<td>$2,035</td>
<td>$1,980</td>
<td>$2,098</td>
<td>$2,070</td>
<td></td>
</tr>
<tr>
<td>$1,675</td>
<td>81%</td>
<td>$125</td>
<td>7%</td>
<td>$2,139</td>
<td>93%</td>
<td>$2,015</td>
<td>100%</td>
<td>$2,509</td>
<td>100%</td>
</tr>
<tr>
<td>$382</td>
<td>19%</td>
<td>$1,701</td>
<td>93%</td>
<td>$170</td>
<td>7%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>2%</td>
<td>4%</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>1%</td>
<td>4%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
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</table>

www.diabetes.ca/charter
REFERENCES


53 Statistics Canada. Fruit and vegetable consumption by sex, 5 times or more per day, by province and territory [Internet]. Ottawa, ON: Statistics Canada; 2014 [cited 2015 Jul 23]. Available from http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/health90b-eng.htm.


