DIABETES CANADA

Diabetes 360º:
A Framework for a Diabetes Strategy for Canada

Recommendations for Governments, July 2018

DIABETES CANADA

Diabetes 360° Recommendations
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1 Executive Summary

Canada has an unprecedented opportunity to implement innovative policy and exercise global leadership with bold action on diabetes, paralleling what Finland, Sweden, Denmark, India and other progressive countries have done.

These nations have decisively addressed what Canada can no longer afford to ignore: the impact of diabetes on people, families, employers, healthcare and the economy is devastating and will continue to escalate at an alarming pace without coordinated action.

The trend is indisputable: Since 2000, the number of Canadians with diabetes has doubled. This means about 11 million Canadians now live with prediabetes or diabetes. Canadians 20 years of age now face a 50% chance of developing the disease in their lifetime. For First Nations Peoples in Canada, that risk is up to 80% and in some subgroups within this population, it is even higher.

It may not be surprising then that the International Diabetes Federation lists Canada among the worst OECD (Organisation for Economic Co-operation and Development) countries for diabetes prevalence. Beyond the immeasurable human costs of this, if prevalence grows by 40% in the next decade as projected, the health care costs associated with treating people with diabetes in Canada will top $39 billion by 2028.

Something must be done urgently to turn the tide. Canada needs a strategy to coordinate the efforts underway in all provinces and territories to combat this epidemic. More importantly, Canada needs to adopt global best practice to reduce the human burden of this rapidly escalating disease and the unsustainable pressure on the health care system.

Diabetes is a challenging disease, but one that we can prevent in many cases by modifying risk factors and better managing diabetes. Recognizing this, Diabetes Canada convened more than 115 individuals representing more than 100 stakeholder organizations over the past year to build a new strategy for diabetes in Canada. This flexible blueprint – modelled on the proven, ambitious approach used for HIV/AIDS and other global disease prevention and management strategies – is set up to deliver results in just 7 years by focusing on the following key targets:

Diabetes 360° Targets:

90% of Canadians live in an environment that preserves wellness and prevents the development of diabetes

90% of Canadians are aware of their diabetes status

90% of Canadians living with diabetes are engaged in appropriate interventions to prevent diabetes and its complications

90% of Canadians engaged in interventions are achieving improved health outcomes.

These targets are based on extensive consultation and rigorous analysis of research. The actions required for their achievement are detailed in this report, as are the unique considerations of people with type 1 diabetes and Indigenous peoples in Canada.

In Budget 2019, Diabetes Canada recommends that the federal government should establish a national partnership and invest $150 million in funding over seven years to support the development and implementation of a new nation-wide diabetes strategy[i], based on the Diabetes 360° framework, and should facilitate the creation of Indigenous-specific strategic approaches led and owned by Indigenous groups.

With federal government support in Budget 2019, implementation of this national strategy could begin in 2020 and continue through 2021 – a milestone year that marks the 100th anniversary of Dr. Banting's discovery of insulin. This would allow Canada to mark the occasion with another critical achievement in the prevention and management of diabetes, and once again improve the lives of millions.

[i] The terms "national" and "nation-wide" are sometimes used in this document to describe this strategy or the recommended partnership to implement it. These terms should be understood to recognize and embrace the critical role played by provinces, territories and municipalities in delivering health policy and care, and the importance of open and respectful collaboration among all parties, including any Indigenous nations choosing to participate in a manner they deem appropriate, in delivering on this strategy.

2 The Problem

In Canada today, close to 11 million people live with prediabetes or diabetes. Every three minutes, someone new is diagnosed with this progressive, chronic disease. Many factors have contributed to a greater than 50% increase in diabetes prevalence within the last 10 years. And rates are expected to continue to rise over the next decade. Once thought to be a disease of older individuals, type 2 diabetes is now being diagnosed in young Canadians, impacting people in the prime of life. Canadians now 20 years old face a 50% chance of developing the disease in their lifetime. For First Nations Peoples in Canada, that risk is up to 80% and in some subgroups within this population, it is even higher.

By any definition, a disease affecting that proportion of the population is an epidemic. In the case of diabetes, which affects close to 425 million people worldwide, it is a *pandemic*.

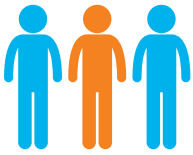
As alarming as these numbers are, statistics only tell part of the story. Behind every diagnosis is a name and a face, a family and a community. It is a mother waking multiple times every night to check her preteen's blood sugar for fear of them having a seizure. It is a father who is terrified his kids will find him unconscious one day due to low blood sugar. It is a professional who must give up his job because of a debilitating heart attack. It is an athlete who can't run anymore because of nerve damage in her feet. It is an uncle who is wheelchair-bound due to amputations that could have been prevented. It is a neighbour who must choose between paying rent and purchasing diabetes medications. It is a senior who loses his driver's license and independence because of his disease. It is a teenager who feels anxious, depressed and doesn't know where to turn. It is a child who is ostracized at school because she wears an insulin pump.

It is critically important not to overlook the human side of this disease. The personal toll it takes on patients and their families is enormous and can be completely overwhelming.

2.1 What is Diabetes?

Diabetes is a chronic disease in which the body has difficulty regulating the amount of glucose (or sugar) in the blood. Elevated levels of blood glucose over time can lead to organ, blood vessel and nerve damage. Diabetes-related complications can be very serious and even life-threatening.

Diabetes by the numbers:



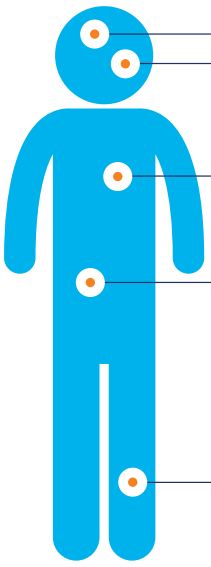
1 in **3** Canadians – 11 million – have diabetes or prediabetes today

Another Canadian is diagnosed **every 3 minutes**

1.5 million Canadians have type 2 diabetes – and don't know it

6 million Canadians live with prediabetes – half will develop type 2 diabetes if nothing is done

Health impact – from head to toe



30% of strokes

Leading cause of blindness

40% of heart attacks

50% of kidney failure requiring dialysis

70% of all non-traumatic leg and foot amputations

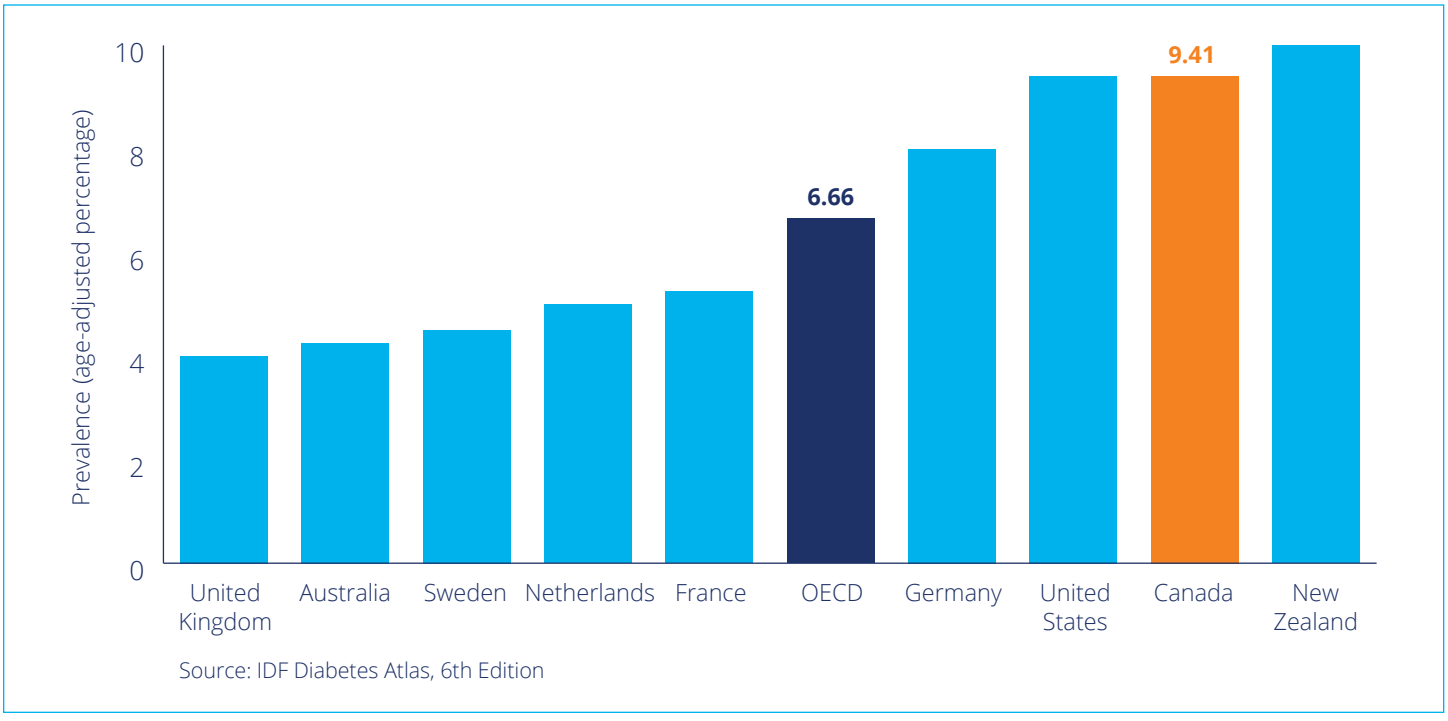
That's why diabetes is the sixth leading cause of death worldwide, and a key contributor to people developing heart disease, stroke and some cancers – the top three causes of death. Properly managing the disease reduces the risk of dying from these conditions. Moreover, interventions aimed at preventing diabetes through healthier environments will also directly reduce the incidence of these other high impact diseases.

Type 1 is caused by an auto-immune reaction that causes the body to kill its insulin producing cells. The reason this occurs is not fully understood. People with type 1 diabetes produce very little or no insulin, causing an abnormal amount of glucose to accumulate in the blood. To keep glucose levels under control, people with type 1 diabetes must administer insulin daily and carefully monitor their lifestyle habits. If people with type 1 diabetes do not have access to insulin, they will die. Between five to 10% of people with diabetes have type 1 diabetes.

About 90% of people with diabetes have type 2 diabetes. It is most prevalent in adults, but, alarmingly, the incidence in children has been on the rise in recent years. Although individuals who develop type 2 diabetes are also genetically susceptible to this condition, it is largely the result of poor nutrition and lack of physical activity driven by environmental and socio-economic factors. Type 2 diabetes occurs when blood glucose levels increase because the body does not make enough insulin or cannot properly use the insulin that is produced. Type 2 diabetes can often be prevented by a high-quality diet and by regular physical activity andIt can be treated with lifestyle measures with or without medications, including insulin. A third type of diabetes, gestational diabetes, is a temporary condition that occurs during pregnancy. It affects approximately 2 – 4% of all pregnancies (in the non-Indigenous population) and involves an increased risk of developing diabetes for both mother and child. Poorly managed gestational diabetes can mean serious health consequences for both mother and child.

Many people also meet the criteria for prediabetes, and in Canada today it is estimated that 6 million people have it. Prediabetes refers to blood glucose levels that are higher than normal, but not sufficiently high to constitute a diagnosis of type 2 diabetes. If left untreated, more than half of people with prediabetes will go on to develop type 2 diabetes within eight to 10 years. Weight management and lifestyle changes can help reduce blood sugar levels. Those with prediabetes are more predisposed to heart disease or stroke and should be regularly monitored to avoid health complications. There are proven lifestyle strategies to reduce by nearly 60% the risk of those with prediabetes developing diabetes, and this strategy contains a number of recommendations to help realize the human and cost savings that would bring.

Diabetes (types 1 and 2) prevalence in Canada and OECD peer countries



Source: IDF Diabetes Atlas, 6th Edition

2.2 The international context

Globally, the number of adults living with diabetes has quadrupled since 1980, from just over 100 million to 425 million. In 2017, diabetes was responsible for one death every eight seconds worldwide in the adult population. That represents about 4 million people, far more than were killed by HIV/AIDS, tuberculosis and malaria combined.

The International Diabetes Federation lists Canada among the worst OECD (Organisation for Economic Co-operation and Development) countries for diabetes prevalence.[1] More than twice as many Canadians live with diabetes today as did in 2000. Both prevalence and direct costs of treating the disease in Canada have been rising at a rate of 4% and 10% respectively per year and show no signs of slowing down. Diabetes or prediabetes affects 1 in 3 Canadians and yet 30% of people – a whopping 7 million – don't even know it.

Canada is in the top 10 OECD countries for both total and mean healthcare expenditure related to diabetes and its related complications. In 2015, Canada spent a total of $15 billion in direct health care costs or a mean of $5,718 (international dollars) per person with diabetes, which places it in the top 10 countries in the world for level of expenditure.[2]

The Diabetes health toll

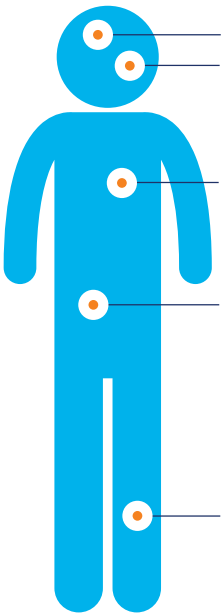
Living with diabetes is a 24-hour a day job.

No vacations, no days off. It's a lifelong balancing of diet, exercise, blood sugar testing and medication.

Many people live well with diabetes – with the help of a supportive team of family, friends and health-care providers. Others lack what they need to live well or struggle with the daily demands of diabetes.

Regardless, it puts your health at risk in the following ways:

Health impact – from head to toe



30% of strokes

Leading cause of blindness

40% of heart attacks

50% of kidney failure requiring dialysis

70% of all non-traumatic leg and foot amputations

People with diabetes are:

25 times more likely to experience vision loss

12 times more likely to be hospitalized for kidney failure needing dialysis

3 times more likely to be hospitalized for heart attack, stroke and heart failure

20 times more likely to be hospitalized for non-traumatic toe, foot and leg amputations

Vision

- Diabetes is the leading cause of blindness in Canadians under 50
- 500,000 Canadians have diabetes-related eye damage that can lead to blindness

Diabetes reduces lifespan by 5 to 15 years

However, Canada has similar rates of amputations and deaths due to diabetes, indicating we are not deriving better patient outcomes for our increased spending.

2.3 The Canadian reality

In Canada, one person is diagnosed with diabetes every three minutes. One in three Canadians already lives with prediabetes or diabetes, and that prevalence is getting worse with time.[3] It is a disease that is enormously burdensome both to those who live with it and to health care systems. It is also a disease experienced much more acutely by the most vulnerable members of our society.

2.3.1 A crippling disease, physically and financially

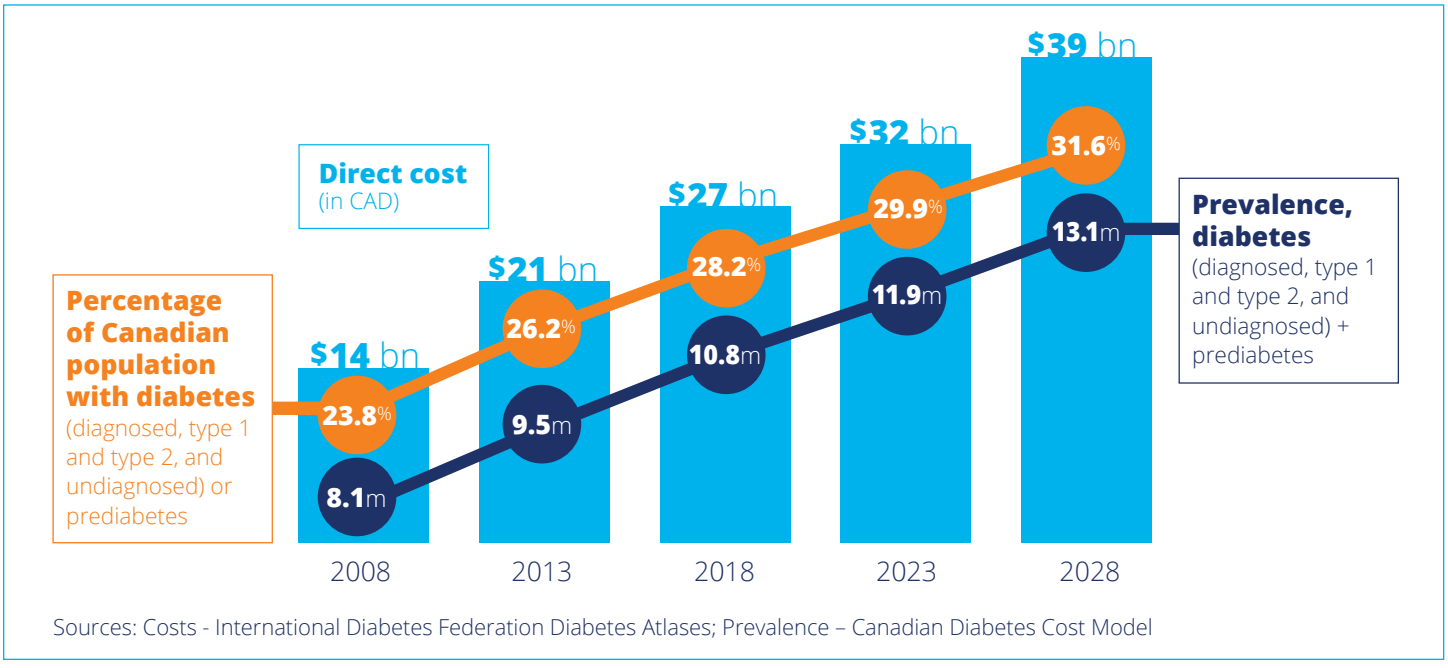
Few people fully realize the devastating consequences that diabetes can have on the health, mind, relationships and finances of those afflicted. Diabetes-related complications are serious and can often be life-threatening. At every age group, the death rates of Canadians with diabetes is at least double that of Canadians without.[4] The life expectancy of a person with diabetes is shortened by an average of 13 years.

Diabetes contributes to 30% of strokes, 40% of heart attacks, 50% of kidney failure requiring dialysis and 70% of non-traumatic limb amputation.[5] It is also the leading cause of vision loss and blindness in working age (aged 20-65 years) Canadians. People with diabetes are three times more likely to develop gum disease than the general population, and therefore at greater risk of losing their teeth.[6] People with diabetes typically struggle more with fertility issues, and men commonly experience erectile dysfunction as a complication of the disease.[7] Furthermore, those with diabetes are at much greater risk of depression and other mental health challenges compared to the general population.[8]

It is an unrelenting disease that people live with 24 hours a day, seven days a week, 365 days a year. It is a constant complex balancing act to try to manage blood sugar levels, and what works one day almost invariably does not work the next. There are no days off, ever. Medication, equipment, devices and supplies required to treat diabetes can cost people thousands of dollars annually. These costs are typically highest for those with type 1 diabetes. Most Canadians with diabetes pay more than 3% of their income or over $1,500 per year for prescribed medications, devices and supplies out of their own pocket.[9] Out-of-pocket costs that exceed 3% or $1,500 of a person's annual income are defined as catastrophic drug costs by the Kirby and Romanow Commissions on healthcare. 25% of Canadians with diabetes report that these costs affect their adherence to their prescribed treatment regimens, which risks their short- and long-term health.[10]

Diabetes is equally expensive to Canadian healthcare. If we continue with the current growth rate of about 40% in the next decade, the direct costs associated with treating diabetes in Canada will top $39 billion by 2028.[11, 12]

Economic Impact:



Sources: Costs - International Diabetes Federation Diabetes Atlases; Prevalence – Canadian Diabetes Cost Model

And the human suffering involved is incalculable, particularly for the most vulnerable in our society.

Today alone, in Canada, 480 people will receive a diagnosis of diabetes.[13] 14 people will suffer lower limb amputations due to diabetes.[14] Our healthcare system will spend almost $75 million treating Canadians with diabetes in the next 24 hours, dozens of whom will experience medical crises necessitating a hospital visit today.[15] Many will even die of diabetes complications.[16]

Employees with type 2 diabetes cost employers an estimated $1,500 annually per employee due to reduced productivity and missed work.[17] Drug plan spending for employees treating type 2 diabetes is four times the amount for all other claimants, and for employees who must take disability leave because of their diabetes, the leaves are on average 15% longer in duration, and many of these employees remain on disability for the maximum benefit period or until death.[18]

An additional consequence of diabetes on the labour pool in Canada is that it primarily affects small and medium sized businesses (SMEs), which are a main engine of economic growth for Canada's economy. Many SMEs are not able to offer the same level of group health benefits as Canada's larger employers, and as a result, their ability to access the full spectrum of talent in the workforce is restricted. Employees with diabetes rely so heavily on group health benefits to manage their disease that they necessarily limit their employment prospects, and contributions, to those that can offer these benefits, thereby indirectly disadvantaging Canada's SMEs.

2.3.2 A disease of inequities

Diabetes is a disease that brings with it many serious health challenges and that disproportionately affects certain Canadian sub-populations, many of whom are vulnerable economically or physically to begin with.

Inequities in diabetes risk across Canada are driven by social determinants such as income, education level, employment and working conditions, food security, early childhood development, social support and connectedness, the built environment, and access to prevention and care services.[19]

Addressing the diabetes epidemic is largely reliant on rectifying health inequities. This epic problem cannot be resolved by encouraging Canadians to exert more will power or by shaming them into lifestyle changes. Although diabetes is sometimes considered a 'lifestyle' disease, the capacity of Canadians to live a healthy lifestyle is not equally distributed among the population.

The cost of diabetes in Canada every 24 hours:

To blame, shame or stigmatize those living with type 2 diabetes for their disease is not only unhelpful, it is a vast oversimplification. Type 2 diabetes is caused by an array of factors including genetics, lifestyle and environmental factors such as poverty, food insecurity, and a disease-promoting food and physical environment.

Diabetes in Indigenous populations is complex and socially mediated, with the common thread being a shared history of colonization. The impacts of colonization continue to disadvantage, exclude, and marginalize Indigenous people in Canada to this day.

Seniors make up over half of the people living with diagnosed diabetes in Canada, and close to 40% of new diagnosed cases of diabetes in 2018 will occur in the senior population in Canada.[20] Canadians with lower incomes have a much higher prevalence of diabetes and greater challenges accessing supports.

And 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.[21]

People of certain ethnic backgrounds are at greater risk of developing type 2 diabetes, specifically people of African, Arab, Asian, Hispanic, Indigenous and South Asian descent.

For First Nations peoples living on reserve, diabetes prevalence is 3 – 5 times greater than in the general population, and the rates of complications are higher than in non-First Nations Canadians[22]. 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.[23] Indigenous individuals are diagnosed at an increasingly younger age, have greater severity at diagnosis, and experience poorer treatment outcomes.

A diabetes strategy for Canada that is inclusive of the needs of Indigenous groups is overdue. Diabetes 360° will provide a framework for stakeholders to work with Indigenous leaders and communities wishing to embrace and implement a similar strategic framework that works for their populations.

However, a strategy for Canada such as Diabetes 360° cannot and should not speak to the diverse needs of individual Indigenous communities across the country.

We endeavor to collectively design a strategy that is inclusive of Indigenous groups and respects the principles of doing no harm. To that end, the collaboration of the Assembly of First Nations, the National Aboriginal Diabetes Association, other Indigenous governments and community organizations, and Indigenous patient advocates, is essential to the future design of Diabetes 360°.

Summary of Diabetes Inequalities[24]

Increase in prevalence by population

ETHNICITY	
First nations adults living off reserve vs. non-Indigenous adults	**1.9**
Métis adults vs. non-Indigenous adults	**1.5**
South Asian adults vs. White adults	**2.3**
Black adults vs. White adults	**2.1**
INCOME	
Lowest income vs. highest income	**2**
EDUCATION	
Adults who have not completed high school vs. with a university education	**2.1**
Women with lowest education vs. women with highest	**2.9**
Men with lowest education vs. men with highest	**1.7**

3 The Opportunity

Bold action is urgently needed, now more than ever, to bring about necessary change in Canada that will help stem the tide of diabetes.

While extensive effort is being made to address this epidemic, it is not coordinated or comprehensive enough to address the complex issues involved. The present approach that sees the provinces and territories each working on diabetes in their own way has not facilitated economies of scale or rapid knowledge-sharing. The lack of such hallmarks of transformative change has resulted in a patch-work approach to prevention and treatment and great health inequities for people with diabetes across Canada. Our health system is more focused on the treatment of poorly managed diabetes and its related conditions than on the prevention and better management of diabetes that would result in less cost to personal health and to the health system.

Other national health strategies have proven to provide a clear focus for action, concentrate scarce human and financial resources and improve the effectiveness of public health efforts. A strategy for diabetes in Canada would also set out specific outcomes, against which progress could be measured to ensure the accountability of our healthcare system and to monitor the efficacy of our nation-wide approach to this disease.

Many of the benefits of this strategy could likely be realized within the existing health care budget by using resources more efficiently and with a greater focus on outcomes. Embracing a coordinated strategy could result in huge savings in human and other costs:

- Implementation of proven diabetes prevention programs across the country could stop 110,000 cases of diabetes from developing and save up to $322 million in healthcare costs in one year. Those benefits grow exponentially each year.25
- With more effective diabetes management for those who do have diabetes, studies show we could avoid 35,000 hospitalizations each year, greatly reducing the burden on our healthcare system26
- A multi-disciplinary, integrated approach to care can prevent 85% of the 5,000 amputations of lower limbs currently performed due to diabetes in Canada each year.27
- Early detection and treatment can reduce by 95% the risk of blindness due to diabetes.28

Other nations have benefitted greatly from adopting national strategies on diabetes. Most countries in the European Union have such strategies, and those strategies are paying dividends. Finland, for example, implemented a national approach in 2000 that provided an overarching framework, but left specific design to local partners. This approach included testing a lifestyle modification program of diet and exercise interventions that supported weight-loss, which was shown to reduce by 58% the risk of developing diabetes.[29] This model's success led to a range of new models and practices being developed from the bottom-up, taking account of local needs, resources and initiatives. It is recognized as an international success in reducing the burden of diabetes on the Finnish people. Similar successes are stemming from national strategies in place in Sweden, Denmark, India and Portugal, among many other countries.

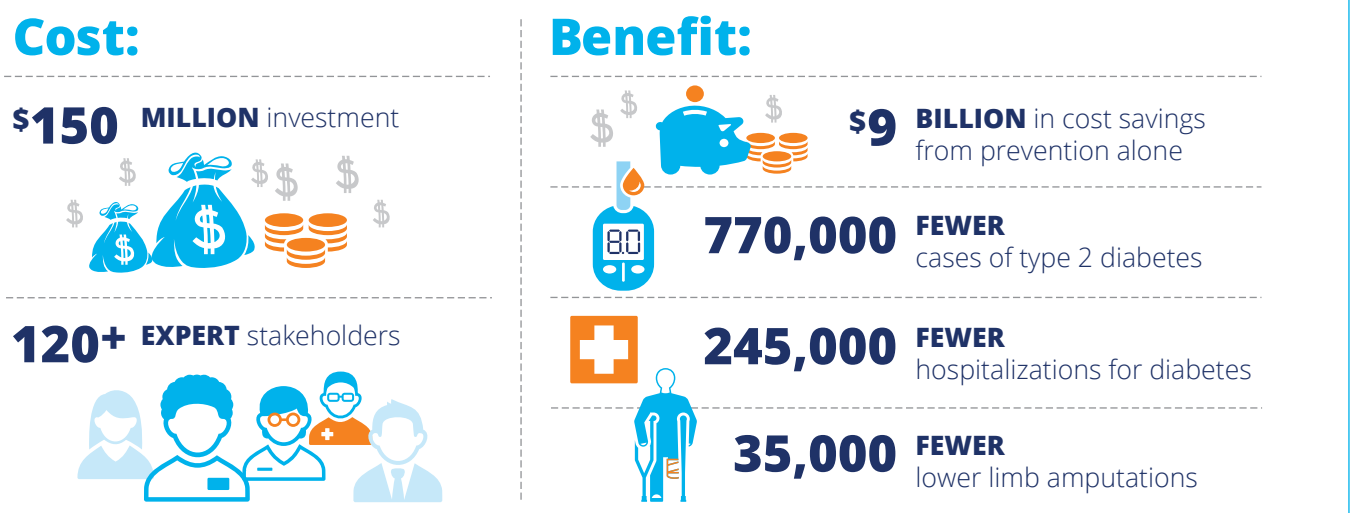
To really stem the tide of diabetes, we need a nation-wide approach that helps all Canadians know their risks of diabetes, reduces individual risk factors for both diabetes and its complications, promotes healthier environments and creates measurable, attainable health outcomes.

In 2018, Diabetes Canada is spearheading the development of such an approach. We're building on a successful model implemented in the HIV/AIDS community that has been credited for transformational breakthroughs in the treatment and management of HIV/AIDS and adapting it to tackle diabetes in Canada.

3.1 The UNAIDS Model

In late 2014, The Joint United Nations Programme on HIV/AIDS (UNAIDS) adopted a galvanizing new target to end the HIV/AIDS epidemic – 90-90-90. This model was based in significant part on the Treatment as Prevention (TasP) model developed by Dr. Julio Montaner at the University of British Columbia. UNAIDS noted when adopting the target, "whereas previous AIDS targets sought to achieve incremental progress in the response, the aim in the post-2015 era is nothing less than the end of the AIDS epidemic by 2030."[30]

Costs and benefits of Diabetes 360° 2018 - 2025



This 90-90-90 target set out that, by 2020, 90% of all people living with HIV will know their HIV status, 90% of those will receive sustained antiretroviral therapy and 90% of those will have viral suppression.

When this three-part target is achieved, at least 73% of all people living with HIV worldwide will be virally suppressed – a three-fold improvement in estimates of viral suppression from before 90-90-90.

While ambitious, the 90-90-90 target was embraced by the world HIV/AIDS community as a catalyst for action given its focus on outcomes and the potential savings in human costs associated with illness and death and financial costs to global healthcare systems and economies. The model was deemed so effective that the same target was embraced in December 2014 for tuberculosis. And in 2015, the World Health Organization (WHO) called for such a target to be adopted for hepatitis.

The adoption of the 90-90-90 target for HIV/AIDS just a few years ago has already delivered benefits. Many countries (various European countries, Canada, etc.) already report that they are at or approaching the target ahead of the 2020 deadline. It is early yet to accurately quantify the full range of benefits, but they are significant.

Against this backdrop, there is a great opportunity for Canada to embrace a strategy for diabetes that incorporates, as UNAIDS' strategy does, a focus on measurable patient outcomes. This would channel the necessary effort and energy on this growing epidemic, decreasing the rise in prevalence of diabetes and improving health outcomes for those who live with it.

Hallmarks of the UNAIDS approach that can be adopted and implemented in Canada for diabetes include that it:

- Entailed extensive consultation and collaboration with a wide range of stakeholders to inform development
- Put much greater focus on prevention than previous approaches
- Relied upon high level government accountability
- Was wholly focused on measurable improvements in patient outcomes.

These key attributes of earlier successful models have guided the development of this recommendation for diabetes in Canada.

Progress towards UNAIDS 90–90–90 targets:

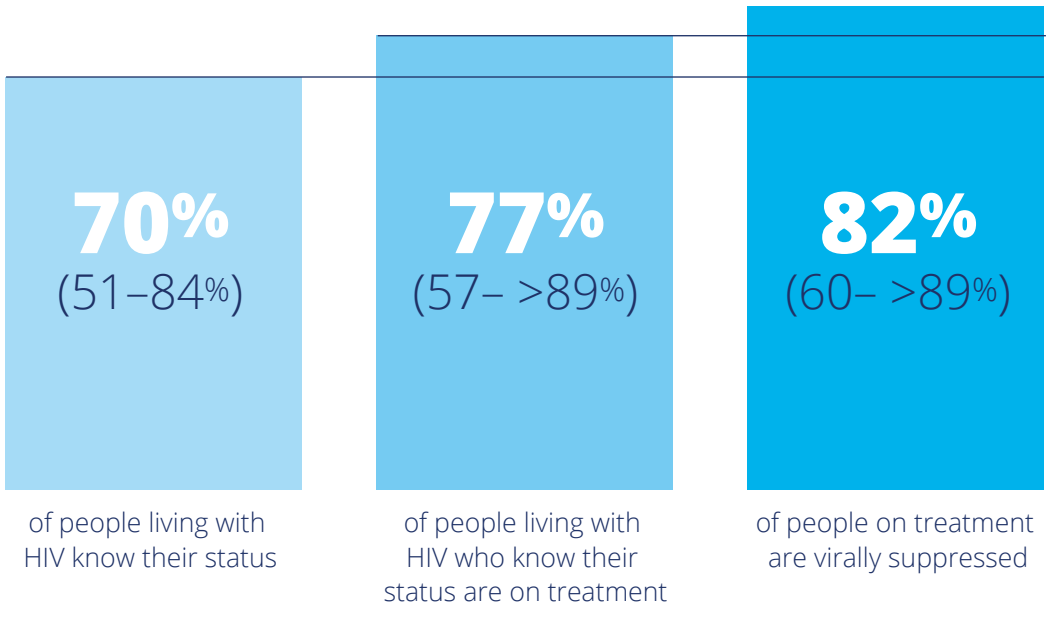


Figure XXX PROGRESS TOWARDS THE 90–90–90 targets, global, 2016
Source: UNAIDS special analysis, 2017; see annex on methods for more details.

4 The Methodology

To identify lessons learned from the UNAIDS' 90-90-90 target, and to determine how this model can be adapted to benefit diabetes in Canada, Diabetes Canada convened a meeting of high-level, multi-sectoral stakeholders in September 2017. At the workshop, 46 participants from 30 stakeholder organizations from across Canada (see Appendix 8.1 for a list of participants in that workshop) engaged in a facilitated discussion about the model's merits and high-level considerations for implementation. Following a robust dialogue, participants agreed that an approach to diabetes in Canada leveraging learnings from 90-90-90 should be developed. They also agreed to a set of principles that should guide the development of this approach (see Appendix 8.2).

Diabetes Canada, in its capacity as project secretariat, then convened a Steering Committee and six Working Groups (see Appendix 8.3 for the mandates and membership of each). Membership in these Working Groups was established via extensive consultation with stakeholders. More than 115 individuals representing nearly 100 stakeholder organizations came together to build a new strategy for diabetes in Canada. Organizations represented included a mix of academia, healthcare providers, governments, NGOs and private industry from across Canada and the world.

Through workshops, teleconferences and file sharing in the first half of 2018, the Steering Committee and Working Groups contributed to the recommendations contained in this document, which is a companion piece to the Diabetes Canada's submission to the federal government's 2019 pre-budget consultations.

With federal government backing for these recommendations in Budget 2019, implementation could begin in 2020 and continue through 2021 when Canada will celebrate the 100th anniversary of the discovery of insulin.

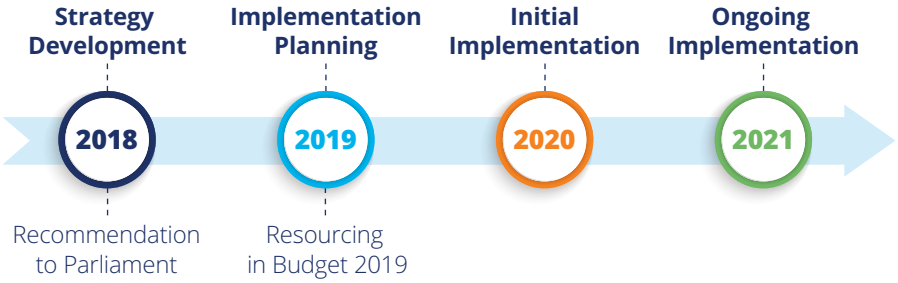
5 The Recommendations

While participants in the development of these recommendations initially sought to develop a 90-90-90 target for diabetes in Canada, it quickly became apparent that a fourth "90" was needed to reflect the critical importance of primary prevention to combatting the diabetes epidemic. Primary prevention is only possible right now for type 2 diabetes, but this target can encompass research efforts into prevention or a cure for type 1 diabetes. With the addition of that fourth 90, the initiative became known as Diabetes 360°.

Below is a detailed description of the Diabetes 360° Steering Committee's recommendations, which include a high-level target and supporting actions. Evidence for these recommendations is also provided.

Throughout the process of developing these recommendations, the principles of a value-based health care system that improved patient health outcomes without increasing overall health care costs were kept in mind. It is the belief of the Steering Committee that much of this work can be accomplished in time within the current envelope of health care spending in Canada through greater coordination of care and best practices.

The intent is that interventions consistent with this framework be implemented with sensitivity to the varying priorities of different communities and subgroups of those affected by the disease. Given the high proportion of people with diabetes who have type 2 diabetes, much of this framework is aimed at addressing their needs. Unique needs of those with type 1 diabetes (T1D) are outlined below. Similarly, any Indigenous nations wishing to embrace this approach will likely wish to adapt it to address their priorities and perspectives.



5.1 Summary of Recommendations

Detailed explanations of these targets, actions, measures and outcomes[ii] can be found on the next page. This table summarizes our recommendations for a Diabetes 360° approach.

5.2 Prevention

Diabetes is a challenging disease, but one that we can prevent in many cases. While we currently know of no means of preventing Type 1 diabetes, a significant majority of type 2 diabetes cases and 60% of complications are preventable by modifying risk factors and better managing diabetes.[31]

Research from around the world has shown that intensive intervention to change the diet, physical activity and body weight of those at risk can prevent or delay as many as 58% of those individuals from developing type 2 diabetes.[32] Weight loss of 5% - 10% of initial body weight – approximately 4.5 to 9.0 kg for a 90-kg person at high risk – can significantly reduce the risk of diabetes.[33] Benefits to their glycemic and cardiovascular outcomes are anticipated to last for 10 to 20 years, halting or significantly delaying the development of diabetes.[34] Additionally, many other benefits are associated with a healthier lifestyle, including reduced cardiovascular risk and avoidance of obesity-related complications such as cancer.[35]

Many aspects of the social, physical and food environments in which Canadians live promote the development of type 2 diabetes. These must be addressed to prevent the millions of cases of diabetes that are emerging in Canada.

5.2.1 Health inequities and food insecurity must be eliminated

We know that poverty and food insecurity are major contributors to the risk of people developing type 2 diabetes. In Canada, 1 in 8 households, or more than 4 million Canadians including 1.15 million children, are food insecure.[36] People living in food-insecure households report poorer physical health and are more vulnerable to a wide range of chronic conditions including diabetes, heart disease, hypertension, and arthritis.[37] Household food insecurity is significantly more common among Canadians with diabetes (9.3%) compared to Canadians without diabetes (6.8%).[38] And individuals living with diabetes who are food insecure face many challenges that greatly impact their ability to self-care.[39] For these reasons, addressing poverty, food insecurity and other key health inequities must form a core part of any Canadian approach to the primary prevention of type 2 diabetes. Many measures can be considered in this regard, including subsidizing healthy foods, supporting basic income to make healthy foods more affordable and/or subsidizing community greenhouses, gardens or hydroponic facilities to make fresh produce more readily available.

5.2.2 Healthy options are always available

Valuable efforts are under way as part of Canada's Healthy Eating Strategy, which respects that "healthy eating can be challenging due to several factors, some beyond the control of the consumer."[40] To help prevent millions of Canadians from developing type 2 diabetes, Canada should implement its planned measures to restrict the marketing of unhealthy foods and beverages to children, limit the consumption of saturated fat, salt and sugar, and help Canadian consumers make healthy choices through Canada's Food Guide revisions and food labeling amendments.

Governments at all levels should prioritize ensuring that healthy foods and beverages are available in all municipal facilities (e.g. schools, hospitals, gyms) and limit the availability of unhealthy foods. As part of ongoing policy measures to improve Canada's healthy eating environment, the government should closely consider implementing a manufacturers' levy on sugar-sweetened beverages to reduce consumption and subsidize healthy living programming.

In addition to making affordable healthy food available to all Canadians and creating an environment where most Canadians eat a diet recognized to be healthy, federal, provincial and municipal governments should collaborate and implement a comprehensive array of policies that are effective in creating an environment where Canadians obtain the recommended daily physical activity, live in a smoke free environment, do not drink excessively and maintain a healthy body weight.

[ii] Metrics measure processes that are linked to improved patient outcomes. Outcomes are patient centered health outcomes, improvement of which are the goals of this strategy.

Summary of Recommendations

TARGET	ACTIONS	MEASURES AND OUTCOMES
Prevention: 90% of Canadians live in an environment that preserves wellness and prevents the development of diabetes.	• Eliminate health inequities and food insecurity. • Healthy options are always available. • Physical activity is facilitated. • Healthy living is taught. • Research is supported.	• People are not living with food insecurity. • Canadians eat a healthy diet, are a healthy body weight, achieve recommended physical activity and live in a smoke free environment. • Canadians achieve 150 mins physical activity per week. • School children receive enhanced health education. • The CIHR's diabetes research program is implemented.
Screening: 90% of Canadians are aware of their diabetes status.	• Screen for diabetes per Guidelines. • Make screening more widely available. • End stigma.	• Most Canadians screened per Clinical Practice Guidelines (CPGs). • Screening available in most communities outside clinic setting. • Fewer people with diabetes feel stigmatized.
Treatment: 90% of Canadians living with diabetes and prediabetes are engaged in appropriate interventions to prevent diabetes and its complications.	• Care should conform to Guidelines. • Patients get the right treatment. • Make lifestyle medicine programs available. • Improve access to drugs, devices and technologies. • Patients supported in managing their diabetes.	• Most people with diabetes screened for complications per CPGs. • More Canadians can access right treatment. • lifestyle medicine programs available in all major centers and digitally. • Greater access to drugs, devices and technologies is provided. • Repository of patient's supports exists.
Outcomes: 90% of Canadians engaged in interventions are achieving improved health outcomes.	• Reduce the sharp increase in rates of diabetes. • Reduce the rate of complications. • Improve sense of wellbeing.	• < HbA1c levels. • < rate of complications. • > wellbeing reported.
Foundational Elements	• Enhance national diabetes repository. • Use of value-based approach. • Deliver continuous improvement. • Integrate best practices.	• Enhanced repository fully in place by 2025. • Systems maps exist. • Continuous improvement mechanisms in place. • Canada has best practices.
Type 1 Diabetes-specific	• PREVENTION: Research is supported. • SCREENING: End stigma and promote early diagnosis. • TREATMENT: Improve access to drugs, devices and technologies; improved transitional care • OUTCOMES: Greater time spent in glucose range	• Increased funding for autoimmunity and prevention research is provided. • Fewer newly diagnosed T1Ds in diabetes crisis (diabetic ketoacidosis). • Greater access is provided. • More time is spent in range.
Unique considerations of Indigenous Peoples	• Address Truth and Reconciliation's Calls to Action • Development of an Indigenous diabetes strategy by Indigenous Peoples • Prioritize health and wellness • Prioritize the determinants of health • Address the discrepancies in care and health outcomes • Ensure cultural safety and responsiveness • Resolve issues of jurisdiction over health affairs • Ensure stable and sustainable program capital funding	To be determined by Indigenous groups choosing to implement an Indigenous diabetes strategy

5.2.3 Regular physical activity should be facilitated for all Canadians

Regular physical activity is extremely important for the prevention of diabetes and its complications. That's why Diabetes Canada's Clinical Practice Guidelines recommend "regular physical activity of a minimum of 150 minutes per week over 5 days a week should be implemented to reduce the risk of type 2 diabetes."[41] To maximize every Canadian's ability to achieve this goal, government should partner with NGOs, communities and the private sector to encourage regular movement by making urban environments more walkable, by resourcing physical education in schools, incenting workplace fitness programs and by preserving natural environments. In addition, measures should be undertaken to reduce screen and sedentary time for children, youth and adults.

5.2.4 Children and families must be taught about healthy living from birth

According to the World Health Organization, the global disease burden due to non-communicable diseases (such as diabetes) affecting children is rapidly increasing, even though many of the risk factors can be prevented.[42] The number of 5 – 19 year olds living with obesity rose more than tenfold globally, from 11 million in 1975 to 124 million in 2016.[43] Yet we know that children are particularly receptive to learning about healthy living measures. And adults who are caring for children are frequently highly motivated to ensure healthy lifestyles for their whole family in support of children's health. For that reason, to prevent the development of chronic disease such as diabetes, wellness education programs that improve awareness of diabetes and its prevention through lifestyle measures should be implemented in schools and community programs across Canada.

5.2.5 Support research into all types of diabetes

Finally, a key pillar supporting primary prevention and control of diabetes (as well as the entirety of this approach to the disease) is funding for research. As part of this strategy, research into the prevention and treatment of both type 1 and type 2 diabetes must be expanded. Additional research should be funded in areas where there are acute gaps, such as mental health as it relates to diabetes, substance use/abuse and diabetes, the management of type 2 diabetes in children and youth, and beta cell autoimmunity and insulin dependence.

The Canadian Institutes for Health Research (CIHR) are convening a workshop in October 2018 to craft an aspirational research program to celebrate the 100th anniversary of the discovery of insulin in Canada. Given CIHR's preeminent role in funding and overseeing health research in Canada and as that workshop is anticipated to include many of the primary stakeholders to a research program for diabetes in Canada, we recommend that this initiative follow the program designed by the forthcoming workshop.

Prevention

TARGET #1:
90% of Canadians live in an environment that preserves wellness and prevents the development of diabetes.

ACTIONS:

1. Health inequities and food insecurity must be eliminated.
2. Healthy options are always available.
3. Regular physical activity should be facilitated for all Canadians.
4. Children and families must be taught about healthy living from birth.
5. Research into causes of and preventive measures for all types of diabetes must be supported.

5.3 Screening

Unfortunately, because it is often asymptomatic, Canadians can live for some time with undiagnosed diabetes (especially type 2). As many as 46% of the more than 420 million people world-wide who have diabetes are unaware they have it. That's 193 million people with undiagnosed diabetes.[44] In Canada, 1.5 million people are unaware they currently have diabetes, and a further 5.6 million have prediabetes (therefore are not yet living with diabetes but are on a path to developing it) and may also be unaware.[45]

Screening for diabetes implies testing for diabetes in individuals without symptoms based on the presence of additional risk factors. This would enable healthcare providers to detect and diagnose those living with diabetes and those at high risk for developing it (prediabetes), providing an opportunity to prevent the development of diabetes, and to manage the disease and prevent complications.

5.3.1 Screen more Canadians for risk of diabetes per Canada's Clinical Practice Guidelines

Screening based on the current Diabetes Canada guidelines should be performed more consistently in Canada.[46] Screening for diabetes should be performed every 3 years in individuals over 40 years of age or at high risk using a risk calculator that incorporates a range of risk factors. Earlier or more frequent testing can be considered for people with additional risk factors, such as a family history of diabetes, being a member of a high-risk population, a history of prediabetes or gestational diabetes, and/or having overweight.

Notwithstanding the benefits of risk-based screening for diabetes and the guidelines recommending it, in a recent survey 63% of Canadians without diabetes reported never having discussed their risk factors for type 2 diabetes with their doctors.[47] Promoting uptake of the guidelines and ensuring physicians follow these evidence-based recommendations would be a great step forward.

Diabetes awareness could be bolstered through administering the Diabetes Test (CANRISK) as broadly as possible. Currently, approximately 1 million Canadians have been tested using the Diabetes Test. Continued efforts to administer it broadly may support increased clinical screening and support efforts at preventing diabetes and its complications in those at risk.

5.3.2 Make screening more widely available

Screening and risk assessment can be performed in certain non-clinical settings. Alternative venues such as pharmacies, grocery stores and workplaces may provide valuable opportunities to screen people where they are, reducing the burden on the primary healthcare system. Further research into such alternative delivery models should be done and acted upon as quickly as possible. In addition, governments should continue to watch for new screening methodologies (e.g. a saliva test for periodontitis and risk of diabetes is under development) and evaluate them for implementation as they are proven effective. It will be important to develop non-clinical approaches to screening in a way that ensures that information on an individual's risk of diabetes is shared with their health care provider.

5.3.3 End stigma

Finally, efforts must be redoubled to end the stigma associated with diabetes. This applies, of course, not only to screening, but to all aspects of this strategy, as stigma can prevent people from getting screened and from obtaining optimal care.

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. Most 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.[48]

Much of this stigma relates to myths and misconceptions about obesity and type of diabetes. Type 2 diabetes is a metabolic disorder with many complex causes, many of which cannot be fully controlled by the individual. Genes and environment play an important factor. Blaming and stigmatizing individuals for developing diabetes works at cross-purposes to supporting them in preserving and protecting their health.

While blaming and shaming people with diabetes for their illness must be stopped, we must also guard against viewing the disease as an inevitability, as do some high-risk communities. Efforts to destigmatize diabetes must be undertaken with a view to empowering people to know that there are measures they can take reduce their risk of the disease or its complications.

General efforts to raise awareness of diabetes and its causes in the general population will be key to the successful implementation of these recommendations. Not only will increased awareness help encourage people to participate in screening and to avoid behaviours that increase the risk of diabetes, it will also help to minimize judgement and stigma by increasing understanding of the genetic and environmental risk factors.

Screening

TARGET #2:
90% of Canadians are aware of their diabetes status.

ACTIONS:

1. Screen more Canadians for risk of diabetes per Canada's Clinical Practice Guidelines.
2. Make screening more widely available.
3. End stigma.

5.4 Treatment

A significant portion of our recommendations are in the target area of improving the treatment of prediabetes and diabetes.

This section describes recommendations for enhancing the treatment of prediabetes and diabetes. It should be recognized that there are therefore two major objectives of treatment: 1) preventing the development of type 2 diabetes among those with prediabetes, and 2) preventing complications in those with prediabetes or diabetes.

Effective treatments improve day-to-day quality of life for those with diabetes; minimize the chance of at-risk people developing diabetes; and decrease the chance that those with diabetes will develop complications. They include: prescription medication, medical supervision and treatment of diabetes and/or its complications, education and counselling on nutrition and physical activity to support healthy behaviours and counselling on self-management and counselling for psychological impacts of diabetes.

For those who are diagnosed with prediabetes and diabetes, a series of cost-effective interventions can improve outcomes. These interventions include blood glucose control, through a combination of diet, physical activity and, if necessary, medication; control of blood pressure and lipids and support in smoking cessation to reduce micro and macrovascular complications; and regular screening for damage to the eyes, kidneys and feet, to facilitate early treatment. Innovative technologies are increasingly important to support patients in self-management of diabetes. Smartphone apps help users log and track food, physical activity, blood sugar and medications over time. Continuous glucose (blood sugar) monitoring has also become increasingly popular; this uses a sensor under the skin to measure glucose levels every few minutes.

It is well understood that active treatment and management of diabetes reduces the risk and severity of complications and improves quality of life. Treatment programs enable those with diabetes to engage in active and effective self-monitoring and decision-making. Many studies show that patients who practice active management of their diabetes experience improved outcomes, including improved average blood sugars, sustained weight loss, better cardiovascular health and overall sense of well-being.[49]

For example, the Diabetes Control and Complications Trial demonstrated that intensive therapy for those with type 1 diabetes reduces long-term complications such as neuropathy, retinopathy and kidney disease and improves prospects for a healthy life span. Specifically, the rate of these complications was reduced by more than 50% over 15 years following the trial.[50] Good blood glucose control also improves health outcomes in patients with type 2 diabetes.[51] Active and intensive multi-factorial intervention to improve blood pressure, cholesterol and glycemic control can reduce cardiovascular events by 60% and mortality by 56% in patients with type 2 diabetes.[52] Current treatment of diabetes cannot prevent all complications, but the progress of complications can be slowed by early interventions.[53]

Unfortunately, fewer than half of Canadians with type 2 diabetes are at the recommended HbA1c target (HbA1c is an average of three months of blood glucose values) – and more than half do not know what their recommended target level should be. Fewer than half of all people with type 2 diabetes are regularly tested for HbA1c, blood pressure and cholesterol levels, kidney function or risk of foot ulcers. Surveys indicate that people with diabetes receive too little education and support.[54] According to these surveys, 22% of those with diabetes were not directed to diabetes education programs upon diagnosis, 26% reported not having received education and 25% had to wait more than 3 months to see an educator.[55]

If Canada is truly committed to turning the corner on the diabetes epidemic and reducing burden on the healthcare system, we must make treatment more widely accessible to those with diabetes, preventing morbidity and premature mortality.

5.4.1 Care should conform to recommendations

Care that people with diabetes receive often does not follow recommendations.lvi Even though Diabetes Canada's Clinical Practice Guidelines advise the screening of diabetes patients for complications with their feet, kidneys and eyes, a significant portion of patients are not receiving this care. A 2015 study of diabetes patients in Canada showed that 49% did not receive annual foot exams, 26% did not receive urine protein tests,17% did not receive an HbA1c test in the past 12 months, and 25% have never received a dilated eye exam.lviiFinally less than a third of primary care physicians in Canada discuss nutrition with their patients with type 2 diabetes and less than 20% of them raise the issue pf physical activity.[57]

A starting point for Canada's approach to diabetes should be modifying the organization of care and services to facilitate all healthcare providers to follow these guidelines. For example, multi-disciplinary teams, care pathways and electronic medical records combined with laboratory management systems could be integrated to prompt care providers to order these tests regularly and report the proportion of patients who are being screened appropriately.

5.4.2 Patients need the right care at the right time

We know that there are unacceptable gaps in the care available to Canadians with diabetes right now, which will grow as the prevalence of diabetes does unless we take a different approach. We also know that the healthcare system is overburdened and under-resourced. Thus, any reasonable strategy for addressing diabetes must make every attempt to improve patient outcomes with more efficient use of existing healthcare dollars. Diabetes 360° participants agree that there are many opportunities to better use existing healthcare resources and augment them with other supports to ensure that patients get the right care at the right time.

An important step in ensuring that patients can access the right care at the right time is to define clear and efficient pathways to accessing care, which understand the differing needs of different patient populations and which reduce, delay, prevent the progression of diabetes with timely access to care. This approach would breakdown the silos of a more reactive acute care model and structure a more proactive, patient-centered, chronic disease model.

Over 80% of the care received by people with diabetes occurs in a primary care setting.[58] This means that primary care providers need education and resources to be confident and effective in providing high-quality diabetes care for their patients. But family physicians do not always have the resources they need to care for patients with diabetes, so many refer their patients to specialists. In 2010, a person with diabetes received physician and specialist care roughly twice as often as someone without diabetes.[59] Limited access to specialist care remains a major barrier to healthcare in Canada, affecting patients and primary care providers alike, in terms of both long wait times and inequitable availability. These specialist referrals may not always be necessary with better primary care support (except for people with complications present)[60] and the scarce specialist resource can be reserved for complex patients who will benefit most. A recent Canadian study found that an electronic consultation system whereby general practitioners could consult with diabetes specialists as an alternative to face-to-face consultations provided better patient care and minimized unnecessary specialist referrals.[61] We recommend the broader implementation of a similar e-consultation model for primary care providers.

Access to interprofessional, specialized teams has been shown to lower the risk of developing complications through improved access to care and coordination of care. That's why Diabetes Canada's Clinical Practice Guidelines recommend that diabetes care should be:[62]

- Organized around the person living with diabetes and their supports. The person with diabetes should be an active participant in their own care, be involved in shared-care decision making and self-manage to their full abilities.
- Facilitated by a proactive, interprofessional team with training in diabetes and the ability to provide ongoing self-management education and support.
- Provided by the least specialized health care provider who can meet the needs of that patient (i.e. if a nurse can provide the care, no need to involve a doctor; if a general practitioner can meet a patient's needs, no need to involve an endocrinologist), to maximize benefit from all health care providers.
- Organized within the context of the expanded chronic care model and delivered using as many of the components of the model as possible (self-management education and support; interprofessional team-based care with expansion of professional roles; collaboration with the primary care provider and monitoring with medication adjustment and case management).

Healthcare systems in Canada should be reoriented to embrace a model of interdisciplinary, community-based diabetes care that ensures patients have access to support for the physical, mental, emotional and spiritual aspects of diabetes. As part of this, people with diabetes should get improved access to specialized healthcare providers such as dentists, psychologists, dieticians, kinesiologists and physiotherapists who are trained in the specific implications of living with diabetes.

Telehealth is a delivery mechanism that can greatly improve patient outcomes and support the provision of interdisciplinary care to more people with prediabetes or diabetes. Also called telemedicine or telecare, telehealth is the provision of healthcare remotely by means of a variety of telecommunication tools, including telephones, smartphones and mobile wireless devices, with or without a video connection.

Research shows telehealth to be effective in providing increased access to care (e.g. to those living in rural or remote areas with limited physical healthcare resources) and in helping patients to achieve improved health outcomes (such as lower HbA1c values).[63] Given that access to quality healthcare services is known to be poor in remote, northern regions of Canada and among Indigenous peoples,[64] an approach to addressing the diabetes epidemic in Canada should include efforts to expand the use of telemedicine in the care of diabetes.

A key enabler of telehealth and a systems-based approach to delivering improved patient outcomes is electronic medical records with inherent decision support modules. Structured, evidence-based decision support systems including patient registries, clinician and patient reminders have been shown to facilitate relay of information, audits, feedback and benchmarking.[65] Canada's diabetes strategy should therefore leverage approaches such as task sharing, registries with performance reporting, simple diagnostic and therapeutic algorithms to deliver better patient outcomes with more efficient use of resources.

It will be important to ensure that all Canadians with diabetes have access to culturally safe and relevant, community-based programs to support them in living with diabetes. This is particularly important for Indigenous peoples and newcomers to Canada. Community-based volunteer supports with cultural awareness and training can significantly increase access to safe and relevant support and should be enabled as part of this strategy.

Finally, in support of improved patient care, governments should collaborate to ensure that standards for diabetes care and diabetes education are more broadly followed and tracked. Approximately every five years, Diabetes Canada produces Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada. This is a compilation of evidence-based recommendations for healthcare providers and is intended to highlight best practice care, treatment goals and care quality. In 2014, the Diabetes Educator Section of the former Canadian Diabetes Association (now Diabetes Canada) developed Standards for Diabetes Education in Canada, outlining structure, process and outcome standards. Abiding by set care and education standards helps assure consistency in the type and quality of care that is provided across settings and jurisdictions. Providers should be incented to follow these standards and their performance measured and tracked.

5.4.3 Make lifestyle medicine programs (such as the Diabetes Prevention Program) available

A proven approach to preventing those with prediabetes from developing type 2 diabetes is the Diabetes Prevention Program (DPP). This small-group program, which has been implemented in 200 YMCA centers across the United States, as well as certain hospitals, clinics and community centers, helps participants form healthier eating habits, increase physical activity levels (to 150 minutes a week), and lose 5-7% of their body weight to delay or prevent the onset of type 2 diabetes. The program is facilitated by a lifestyle coach, with 25 one-hour sessions delivered over the course of a year.[66]

Positive lifestyle interventions that include healthy eating and physical activity and other components (e.g., counselling, smoking cessation, stress reduction, group therapy, behaviour modification) have been shown to prevent or delay the onset of type 2 diabetes by more than 50% with the benefits extending beyond the active intervention stage.[67] In both the Finnish National Diabetes Prevention Program (FIN-D2D)[68] and the US DPP Trial, participants who received intensive education on weight reduction, healthy diet, and increasing physical activity experienced a 58% reduction in the incidence of diabetes relative to control participants. This outcome was achieved despite only modest weight loss among participants (5-10% of baseline weight).

Prevention programs in the workplace modelled on the US DPP have been successful. In these programs, participants who received lifestyle interventions showed significant reductions in overall mean body weight, waist circumference and mean BMI; reductions in overall average mean arterial blood pressure; increases in overall mean physical activity level; improved glucose tolerance and blood lipids; reductions in overall mean diabetes risk score and averted progression from prediabetes to T2D.[69, 70, 71, 72]

Studies of the experience of participants also demonstrate positive results: 94% of study participants feel the program helped them to reduce their portion sizes, 88% say the program helped them increase their level of physical activity, 84% report an increase in energy, and 91% state the program helped improve their overall health.[73] Participants detailed the ways in which group support, counsellor phone calls, tips from facilitators, and organized exercise activities helped them make healthy lifestyle changes.

Not only do these benefits reduce participants' risk of developing type 2 diabetes, but also other illnesses such as cardiovascular disease or hypertension. Thus, lifestyle support programs can deliver widespread health benefits not limited only to diabetes.

Canada's diabetes strategy should include the broader roll out of DPP-style integrated approaches to promote healthy living/healthy weights and prevent type 2 diabetes. Multi-sectoral collaborations offer promising opportunities to make such programs available broadly and quickly. And work on this is already well underway - DPP programs will be running through LMC Endocrinology (with the support of the Public Health Agency of Canada) practices throughout the Greater Toronto Area starting in 2018. This pilot is also using a digital DPP-based program that is demonstrating effectiveness and could be applied more broadly. The government and private sector should partner with Diabetes Canada in rolling these programs out so that Canadians can benefit from this evidence-based program.

5.4.4 Improve access to beneficial diabetes medicines, devices and technologies

Currently, cost can be a significant barrier to people with diabetes being able to manage their disease. Managing diabetes can cost some Canadians up to $15,000 annually out-of-pocket depending on their needs and where they live. Many people with diabetes must put over 3% of their annual income toward purchasing diabetes treatment and supports. And 25% 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.[74] The cost burden of diabetes is therefore a threat to the health of Canadians living with diabetes and must be reduced.

For that reason, the strategy for diabetes in Canada must strive to improve coverage for diabetes drugs, devices, supplies and health providers through public and private insurance programs. A minimum improvement could be to make the various types of insulin free. Insulin is essential to the survival of many people with diabetes (all those with type 1 and many of those with type 2) and should be available free of charge to anyone who needs it. In addition, the medications that help people manage their diabetes and any complications should be made more broadly and more consistently available across Canada.

In Canada, only 45% of prescription drug costs are covered by public funds, much less than the OECD average of 73%. Private insurance plans cover 35% of the remaining costs and 20% are covered by out-of-pocket payments.[75] In line with Diabetes Canada's Clinical Practice Guidelines, Canada's Commission on National Pharmacare should ensure the right medications required by people with diabetes are made available at low or no cost to all those who need it. And this approach should also provide enhanced appropriate coverage for devices and supplies including insulin pumps or glucose monitors that can greatly improve blood glucose control and reduce diabetic complications.[76]

It is important to note that additional resources should also be provided to educate patients in the full use of these devices so they can derive their maximum benefits.

5.4.5 Ensure each patient is fully supported in managing their diabetes

Diabetes is a disease that requires ongoing and frequently intensive self-management to achieve good control and minimize risk of complications. Given the complexity and variability of diabetes management, people living with the disease need to be continuously educated in how best to manage the disease as both their health and best practice in diabetes management evolve. Sustained self-management is the foundation of good health for those living with diabetes.

In addition to access to drugs, devices and supplies, people with diabetes need improved access to resources that support self-management. Such resources include medical and paramedical practitioners (e.g. psychologists, podiatrists, etc.) specializing in diabetes care, educational programs on aspects of living well with diabetes, and community or online support networks that can connect people with diabetes.

Employers can also provide meaningful supports to employees with diabetes through offering workplace programs. The strategy for diabetes should include an initiative to curate a wiki-style repository of patient resources and peer support networks to help people with diabetes access the resources they need to effectively self-manage. It should also research the efficacy of programs like Carrot Rewards[77] to incent people to engage in healthy living behaviours. The strategy should also ensure ongoing research is conducted into the most effective means of supporting patients in managing this disease.

Treatment

TARGET #3:
90% of Canadians living with diabetes and prediabetes are engaged in appropriate interventions to prevent diabetes and its complications.

ACTIONS:

1. Administer screening for complications per Canada's Clinical Practice Guidelines.
2. Make lifestyle medicine programs (such as the Diabetes Prevention Program) available.
3. Ensure each patient gets the right care for their situation.
4. Improve access to beneficial diabetes drugs, devices and technologies.
5. Ensure each patient is fully supported in managing their diabetes.

5.5 Outcomes

Urgent adoption of a new strategy for Canada is required to improve the health outcomes of Canadians at risk of or living with diabetes. The human and financial costs are unacceptable and will get significantly worse in the coming years. Canada's strategy on diabetes must therefore aim squarely at improved patient outcomes and regular evaluation of how supporting initiatives contribute to those improved outcomes. Beyond glucose control, for patients with type 2 diabetes, we want to reduce their risk of complications by addressing all their risk factors, including level of physical activity and fitness and diet quality.

5.5.1 Reduce the sharp increase in rates of diabetes

The primary outcome the strategy should aim for is to reduce the rate at which the incidence of diabetes is growing. A primary way to do that is to lower the average blood glucose levels of affected Canadians. Diabetes Canada's Clinical Practice Guidelines can be followed to individualize glycemic targets for each patient and to generalize population targets. In people without diabetes, HbA1c values should be ≤5.5%. In most people with type 1 or type 2 diabetes, an HbA1c ≤7.0% should be targeted to reduce the risk of complications. For those who are less aware of hypoglycemia or the frail elderly an HbA1c of between 7.1%–8.5% is a better target.[78]

5.5.2 Reduce the rate of complications of diabetes

Currently, diabetes is associated with 30% of strokes, 40% of heart attacks, 50% of kidney failure requiring dialysis and 70% of amputations in Canada each year.[79] It is the leading cause of vision loss in working age adults in Canada. The strategy for diabetes in Canada and all its component initiatives should strive to reduce these rates of complications as quickly as possible.

5.5.3 Improve the sense of overall wellbeing of people living with diabetes

In addition to driving towards improved empirical measures of patient health, the care of people with diabetes in Canada should strive to ensure that patients' sense of overall wellbeing is enhanced and supported by all interventions. This can be evaluated by patients' responses to questions about mental, emotional and spiritual aspects of living with diabetes as reported in the Canadian Community Health Survey (CCHS).

Outcomes

TARGET #4:
90% of Canadians engaged in interventions are achieving improved health outcomes.

ACTIONS:

1. Reduce the sharp increase in rates of diabetes
2. Reduce the rate of complications of diabetes.
3. Improve the sense of overall wellbeing of people living with diabetes.

5.6 Foundational Elements

Several foundational elements will need to be put in place to support this report's recommendations. These include a national diabetes data repository, a systems approach and continuous improvement mindsets and methodologies.

5.6.1 Canada needs a National Diabetes Repository

A critical difference between the proposed nation-wide strategy on diabetes and previous ones is its focus on changing measurable patient outcomes. Measurement and monitoring will enable governments to evaluate interventions to ensure they deliver the intended value.

The former Canadian Diabetes Strategy included national surveillance as one of its key objectives. The National Diabetes Surveillance System (NDSS) was established to track administrative health data (e.g. healthcare provider billing, hospital discharges) across the country related to diabetes. It was eventually expanded into the Canadian Chronic Disease Surveillance System (CCDSS) and was intended to help monitor the state of diabetes in Canada

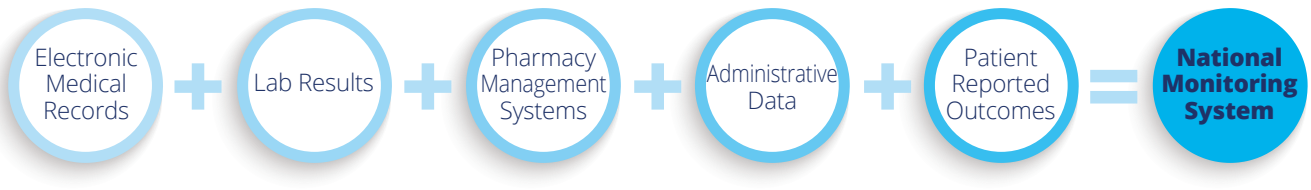
as activities were being delivered through the Strategy. The 2013 Spring Report of the Auditor General of Canada, however, was highly critical of the Strategy's performance measurement.[80] Indicators to track progress and measure outcomes were not sufficiently developed and without these, it was uncertain what progress had been made. The Auditor General noted gaps in diabetes surveillance and strongly recommended changes and enhancements to data collection.

Currently in Canada, we are still using the CCDSS to provide national diabetes data, along with various other sources. This has resulted in a patchwork of data that prohibits us from having an accurate and current picture of the impact this disease is having on our citizens and changes over time. Provinces like Alberta, Ontario or some of the Atlantic provinces have fairly comprehensive data sets using administrative data (e.g. healthcare utilization; procedures undertaken; medication use). Provinces have varying levels of integration of electronic medical records, which link patients' laboratory results to records of the clinical care they received. There's some integration of data from pharmacy management systems that lets us know how many Canadians filled prescriptions for specific medications in Canada's pharmacies. But what is missing is a coordinated system that integrates various types of data, providing a comprehensive picture of diabetes in Canada and a meaningful way to measure and improve outcomes.

There is currently no standard in place for this kind of information to be gathered consistently across Canada. This leaves us with major gaps in reporting on diabetes in Canada, including number of people with the disease who are undiagnosed, control of the disease, prevention and screening for complications, the proportion of the population receiving specific programs or supports, and the health outcomes they're experiencing as a result. Canada should develop a national "repository" or monitoring system as quickly as possible, built to draw upon existing data systems and facilitate public reporting in a timely manner. This would enable governments at all levels to better understand the health burden of diabetes and the impact of policies and programs.

This is consistent with the approach recommended by the International Consortium for Health Outcomes Measurement (ICHOM), which is leading international collaborations to define "standard sets" that combine administrative, clinical and patient-reported data. These standard sets can be implemented by building data collection into existing electronic medical record systems, by manual charting or by a combination of these. These data can then be reported back to clinicians and policy makers to drive continuous improvements in patient care. They can also be analyzed and compared among provinces or other jurisdictions to share best practices.

Sweden has had a national diabetes registry in place since 1996. The objectives of the "Nationella Diabetesregistret" (National Diabetes Registry, NDR) are to promote evidence-based, high-quality, cost-effective diabetes care and reduce morbidity and mortality. The NDR is maintained by the Swedish Society for Diabetology and the Swedish Association of Local Authorities and Regions and provides information about individual treatment outcomes and rates of complication in those living with the disease. The NDR has been online since 2002 and can be accessed by clinics (to monitor their activities regularly and compare results with national statistics), the Swedish Diabetes Association (a national advocacy group), and patients (who can monitor their interactions with healthcare providers). The NDR is "an instrument to facilitate...monitoring and to disseminate findings in an accessible, transparent, comparable and timely manner. [It] is both a repository of results and an educational tool for improving local quality assessment efforts... [and] enables a focus on national quality indicators while following various process measures that are important at the local level."[81]



There are national diabetes registries in other countries worldwide, including Malaysia, Hong Kong, Israel and Saudi Arabia. Other jurisdictions are currently working to establish their own national registries for diabetes.

The benefits of a national monitoring system can be seen in the example of the Veterans Health Administration (VHA) in the United States, which moved from "worst to first" in about 10 years. The VHA is America's largest integrated healthcare system, providing health services to veterans and their families. In the mid-1990s, it was informally rated as having the worst healthcare delivery and outcomes in the country. While the VHA serves a population in which optimal outcomes are challenging to achieve, VHA leadership felt its patients deserved better and launched a transformation project. Ten years later, the VHA had chronic disease outcomes (including for diabetes) that were equivalent to, or better than, those for patients in private insurance plans. By deploying an EMR that tracked many key indicators, it provided active prompts to clinicians to guide their patient care. Administrators actively audited the delivery of care and managed it. This drove impressive outcomes: HbA1c testing rates that were 51% in 1995 rose to 94% in 2000 (compared to 83% in commercial managed care) and annual eye exams that had risen from 48% to 91% (versus 75% in commercial plans). Similar measures of improvement were seen in lipid and blood pressure control.

In Canada, efforts are already underway to work towards a national monitoring system for diabetes. Diabetes Action Canada has launched a proof-of-concept national Diabetes Repository that contains primary care electronic medical record (EMR) data of patients with diabetes. This could be a starting place and enhanced over time and combined with existing and future provincial and territorial data sets to provide a comprehensive, transparent picture of the burden of diabetes in Canada. The diabetes strategy for Canada should prioritize the creation of a national repository as soon as possible.

5.6.2 Employ a value-based approach to healthcare delivery

To better address the diabetes epidemic, the healthcare delivery system should be based on a value-based healthcare delivery model, a framework for restructuring health care systems around the globe with the overarching goal of value for patients.[82] Organizations that provide systems-based care based on quality-improvement interventions that are focused on their practitioners and patients provide better care than those who do not.[83] It is for this reason that the World Economic Forum is leading a pilot project to explore implementing a value-based healthcare approach for type 2 diabetes in Ontario. Learnings from this pilot project should be incorporated into the implementation of this strategic framework.

Similarly, this strategy and related interventions should be designed and implemented with a true systems approach and should leverage Lean Six-Sigma methodologies. This can help ensure that programs deliver intended benefits (not unintended consequences) and that the system is focused on and incenting patient wellness throughout. For example, a Lean Six Sigma project at Brampton Civic Hospital's Diabetes Education Clinic in 2011 generated a 58% increase in overall patient interactions per clinician, a 20 % increase in gestational diabetes management capacity and a 45 % increase in impaired glucose tolerance class capacity.[84] It did so by reviewing and streamlining processes and forms to ensure they we as efficient and patient-centric as possible.

Health care providers are already working hard, but the system must adapt to changing health challenges of today. System efficiencies will be essential to providing higher standard of care. The new approach to diabetes should feature a clear focus on continuous improvement. Clear evaluation criteria should be established from the outset for every component program, and process measures should be regularly assessed to ensure continuous improvement in support of better patient outcomes. Metrics measure processes that are linked to improved patient outcomes. Outcomes are patient centered health outcomes, improvement of which are the goals of this strategy. Technology and data should be leveraged in support of this goal. The approach should undertake to map information systems as they pertain to the care of diabetes and its complications and develop an action plan to Implement and integrate electronic medical records and leverage data throughout Canada.

5.6.3 Integrate international best practice

Finally, just as these recommendations have been informed by international best practice, the future development and implementation of the strategy for diabetes in Canada should continue to monitor and integrate international best practice in diabetes screening, education and management.

Foundational Elements

In support of a diabetes strategy Canada should:

1. Develop a national diabetes repository to facilitate measurement of impacts and outcomes of this Strategy.
2. Employ a value-based approach to healthcare delivery.
3. Continuously improve patient interventions and outcomes.
4. Integrate international best practice.

6 Recommendations specific to people with type 1 diabetes

When Frederick Banting discovered insulin at the University of Toronto in 1921, he saved the lives of millions of people with type 1 diabetes, which up until that time killed all its sufferers, usually within a year. Type 1 diabetes requires multiple daily injections or infusions of insulin and multiple blood glucose tests each day, along with careful management of other variables such as exercise, sleep and stress levels to manage effectively.

Many of the actions recommended above will address the needs of all people with all forms of diabetes. However, because type 1 diabetes is managed somewhat differently than type 2, there are a few actions and recommendations specific to people with type 1.

6.1.1 Prevention: Research specific to type 1 diabetes is supported

As mentioned above, as part of this strategy, research into the prevention and treatment of both type 1 and type 2 diabetes must be expanded. In the case of type 1 diabetes, there is particular need for additional research in the areas of beta cell autoimmunity and prevention research. We recommend that additional funding for this research be provided to CIHR and the recommendations of the forthcoming CIHR research plan be implemented in support of those with all types of diabetes.

6.1.2 Screening: End stigma and promote early diagnosis of type 1

Type 1 diabetes has long been thought of as a disease of childhood – in fact, it used to be commonly referred to as "juvenile diabetes." But that is a misnomer. Research has shown that 42% of people with type 1 diabetes were diagnosed between the ages of 31 and 60.[85]

Misconceptions around who can develop type 1 diabetes are just the tip of the iceberg, though. Like people with other forms of diabetes, Canadians with type 1 face stigma and false beliefs from the community, including many of their health care providers. Misplaced beliefs range from the idea that people with type 1 can't have any sugar or can't consume alcohol to the idea that they caused themselves to develop diabetes by eating too much sugar.

Perhaps more dangerous than the misconceptions, though, is the general lack of awareness that type 1 is as different from type 2 as it is. People with type 1 diabetes are generally at greater risk of severe low or high blood sugars than those with type 2, because they lack any natural insulin production. Part of Canada's strategy for diabetes should include raising awareness about the differences between type 1 and type 2 diabetes and what that can mean for day-to-day management of the disease.

Significant gaps in screening and early diagnosis of type 1 persist. Studies show that a third of children diagnosed with type 1 diabetes receive that diagnosis while in a life-threatening diabetic ketoacidosis crisis, which could be avoided with greater awareness of the signs and symptoms of type 1 diabetes among healthcare providers and the general public.[86] And although adults are equally as likely to develop type 1 diabetes as children, adults frequently go misdiagnosed as having type 2, at significant cost to their health.[87] Increased measures to educate healthcare providers about the prevalence of type 1 diabetes developing in adulthood should factor in to Canada's approach.

6.1.3 Improve access to beneficial diabetes drugs, devices and technologies and improve transitional care

People with type 1 diabetes are particularly dependent on drugs, devices and technologies to manage their disease. While some individuals with type 2 diabetes can manage their disease with diet and exercise, testing their blood sugar only every few days, everyone with type 1 diabetes must take multiple blood glucose readings and injections or infusions of insulin every day from the first day they are diagnosed. This means they need access not only to insulin itself, but also to glucometers and in many cases, blood ketone meters, continuous or flash glucose monitoring systems, blood sugar tracking applications and insulin pumps.

Thus, improved coverage for diabetes drugs, devices, supplies and health providers through public and private insurance programs is important for Canadians with type 1 diabetes. A minimum improvement could be to make the various types of insulin free. Insulin is essential to the survival of many people with diabetes (all those with type 1 and many of those with type 2) and should be available free of charge to anyone who needs it.

People with type 1 diabetes would also benefit from increased access to specialized health care, including for complementary therapies such as counseling or physical rehabilitation. Yet there are not only few such specialized health care providers, there is also no repository that patients can access to find those there are. This should be addressed as part of this strategy.

One important gap in care that should be addressed as part of this strategy is support for young adults with diabetes transitioning from pediatric to adult care. Current approaches to pediatric care are highly effective, but critical gaps emerge in young adulthood. Between the ages of 18-25, care of Canadians with diabetes is characterized by "inadequate medical follow up and self-management, deteriorating glycemic control, and an increased risk of adverse outcomes."[88] This gap emerges at a vulnerable time in many peoples' lives: when they are under-employed or under-insured, and may lack the financial and social supports needed to effectively manage the disease, which puts patients at greater risk of dangerous diabetic ketoacidosis. Organized transition services may decrease the rate of loss of follow up and the risk of adverse outcomes and should feature in the approach to this disease.[89]

Support networks and programs such as youth D-camps or programs like Connected In Motion[90] can provide great benefits at low or no cost to the government by partnering with non-governmental organizations.

6.1.4 Outcomes: Greater time in glucose range

People with type 1 diabetes may be more susceptible to low or high blood sugars given their lack of natural insulin production and the risk that they may inadvertently inject too much or too little insulin at any given time. Both low and high blood sugars can be debilitating in the short term and can increase the risk of serious complications. So, for many people with type 1 diabetes, their goal should be increased time spent in range (fewer incidences of hypo- and hyper-glycaemia), not just improved HbA1c.

Recommendations specific to people with type 1 diabetes

1. Prevention: research specific to type 1 diabetes is supported.
2. Screening: end stigma and promote early diagnosis of type 1 diabetes.
3. Treatment: Improve access to beneficial diabetes drugs, devices and technologies and improve transitional care.
4. Outcomes: greater time in glucose range.

7 The Unique Needs of Indigenous Populations

Canada's Indigenous populations continuously demonstrate great strength and resilience. Survivors of colonialism and residential schools have endured oppression, cultural erosion, forced relocation, forced assimilation and institutionalized racism. When considering the number of challenges these communities have endured, Indigenous groups' current status as well-functioning cultural and political entities is remarkable.

Still, the history of colonialism and residential schools has had long lasting effects on the physical, spiritual, emotional and mental health of Indigenous peoples. In Canada, they are among the highest risk populations for diabetes and related complications. National survey data have consistently shown that the age-adjusted prevalence of diabetes is 3 to 5 times higher in Indigenous populations than the general population. Moreover, their age of diagnosis is younger.

The higher rate of adverse health outcomes in these communities is associated with many factors, including lack of access to healthy, affordable food, genetic susceptibility, and historic-political and psychosocial factors which stem from the history of colonization and residential schools that severely undermined Indigenous values, culture, and spiritual practices.

Barriers to care that are unique to Indigenous settings further exacerbate the prevalence and management of diabetes for Indigenous groups, such as fragmented healthcare, poor chronic disease management, high healthcare staff turnover, chronic underfunding of health services for Indigenous communities, unavailability of culturally appropriate care and limited surveillance. Inequities in the social determinants of health, brought about through colonization, also contribute to the main risk factors associated with the development of diabetes and its complications. An approach that is inclusive of the perspectives of Indigenous groups must address the broader determinants of health and the impacts of their interrelatedness, including income, food security, safe water, education, employment, and safe living conditions.

7.1 Diabetes 360° and Indigenous Groups

A diabetes strategy for Canada that is inclusive of the needs of Indigenous groups is overdue. Diabetes 360° will provide a framework for stakeholders to work with Indigenous leaders and communities wishing to embrace and implement a similar strategic framework.

Should Indigenous groups elect to embrace or implement a strategy for Indigenous Diabetes referencing the model of Diabetes 360°, certain considerations specific to the unique needs of Indigenous peoples will need to be addressed.

What follows are the recommendations of members of the Working Group on the inclusion of Indigenous peoples and groups for the Diabetes 360° initiative.

7.1.1 Support the development of an Indigenous diabetes strategy

We recommend devising a plan to support the development of a separate Indigenous designed and led diabetes strategy, in accordance with the governing principles self-determination and OCAP: Indigenous ownership, control, access and possession of information. This could include Indigenous diabetes registries, provided they are led, developed and controlled by Indigenous peoples themselves.

7.1.2 Truth and Reconciliation's Calls to Action

Diabetes 360 must ensure that the Truth and Reconciliation Committee's calls to action are used as a foundation on which to build in all work on this initiative (see Appendix 8.4).

7.1.3 Prioritize health and wellness

Overall health and wellness must be prioritized within the strategy. The factors that affect the prevention and management of diabetes also impact the development of many other chronic diseases. Moreover, they underpin the capacity to thrive and attain a sense of wellness, including mental, spiritual and emotional health. Moving beyond a purely disease focused solution and providing a healthy environment that will help keep people well and free of diabetes is essential. Adopting this perspective will also address the disconnect between the biomedical model, which centers the disease within the individual, and the wholistic, collective social experience of health and illness/wellness, which is valued by Indigenous peoples (see appendices 8.5 and 8.6).

7.1.4 Prioritize the determinants of health

We recommend incorporating interventions that address the determinants of health, including the historical and ongoing impacts of colonization as well as income, education, employment, food security, safe water and living conditions.

7.1.5 Address the discrepancies in care and health outcomes

In Canada, there is a stark contrast between Indigenous and non-Indigenous health outcomes. Indigenous communities suffer higher rates of infant mortality, suicide, chronic disease (including diabetes) and overall life expectancy. The higher prevalence rates of these conditions are influenced directly and indirectly by disparities in the social determinants of health that exist between Indigenous and non-Indigenous Canadians.[91, 92, 93] We therefore highlight the need for population-level strategies aimed at health equity, as well as more tailored therapeutic approaches.

7.1.6 Ensure cultural safety and culturally responsive healthcare

Indigenous peoples' interactions and engagement with diabetes care sometimes exposes them to culturally unsafe conditions. Feeling unsafe or stigmatized leads many to avoid disclosing symptoms during healthcare interactions. Healthcare relationships provide an opportunity to address ongoing colonial dynamics in Indigenous healthcare.[94]

We recommend exploring avenues to ensure that healthcare services are provided in ways that are culturally safe for Indigenous people. We recommend that all healthcare professionals working with Indigenous groups receive cultural sensitivity training.

7.1.7 Resolve issues of jurisdiction over health affairs

We recommend exploring ways to enhance relationships between different federal, provincial and territorial health authorities, jurisdictions and organizations, and people involved in diabetes and prevention and management with a goal of developing coordinated healthcare without borders for Indigenous people.

7.1.8 Ensure stable and sustainable program capital funding

Stable and sustainable program funding should be providing to Indigenous communities for programs and services aimed at both attaining and maintaining the health of Indigenous groups.

Unique needs of Indigenous peoples

1. Support the development of an Indigenous diabetes strategy.
2. Truth and Reconciliation's Calls to Action.
3. Prioritize health and wellness.
4. Prioritize the social determinants of health.
5. Address the discrepancies in care and health outcomes.
6. Ensure cultural safety and culturally responsive healthcare.
7. Resolve issues of jurisdiction over health affairs.
8. Ensure stable and sustainable program capital funding.

8 The Plan

To implement the above recommendations, the federal government should establish a national partnership for a period of time (approximately 5 to 7 years). The mandate of this partnership would be to collaborate with provincial, territorial and, if appropriate and agreeable, Indigenous governments along with academia, industry and non-governmental organizations to further plan and implement an approach to the prevention and management of diabetes in Canada. The partnership should facilitate the creation of Indigenous-specific strategic approaches led and owned by any Indigenous groups wishing to embrace this framework. The goal of this partnership would be to collaborate with healthcare systems to optimize disease prevention and healthcare delivery for people with diabetes, with a goal of sunsetting itself as quickly as possible.

Canada has benefited from successful focused national initiatives led by the Canadian Partnership Against Cancer (CPAC) and the Mental Health Commission of Canada (MHCC), which have had proven and measurable impacts. As the recent report on pan-Canadian health organizations (PCHOs) points out: "the federal role in health policy has many dimensions and there is much that can be done within the core of the health portfolio to support system change. But we believe that there are also important roles that organizations at some distance from the core may be able to play more easily." [95]

Diabetes 360º is aligned with the report's recommendation that PCHOs be "recast as shared national tools working to put in place shared infrastructure and resources for capacity development to implement a shared vision for transformed health systems across the country, their impact can be tremendous." [96]

Our recommended approach is aimed at deriving similar benefits as other pan-Canadian health organizations have in past. "Partly as a result of [CPAC's] work, there are now cancer agencies across Canada whose work has moved Canada leaps and bounds ahead of previous generations with respect to cancer care…CPAC's model should now be used to develop similar capacity across other diseases, populations, and policy challenges." [97]

The partnership will require an estimated $150 million in funding for seven years on a gradually increasing basis as per the table below. For reference, CPAC and MHCC receive annual federal grants of approximately $47 and $15 million respectively.

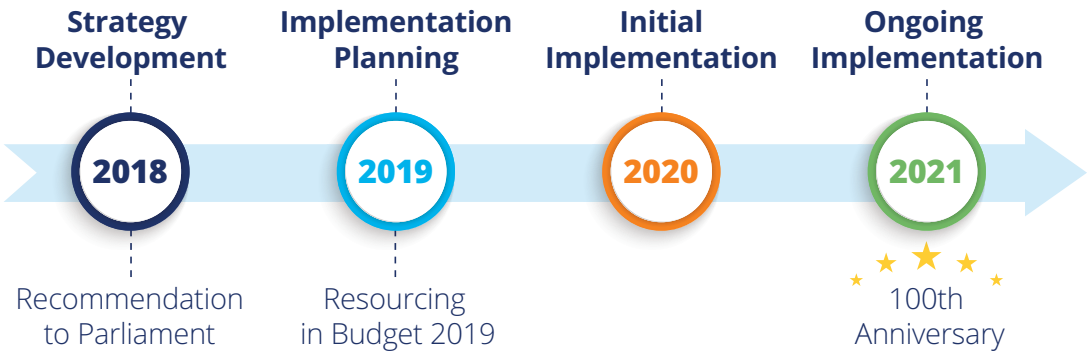
Estimated budget of proposed national partnership 2019-2025

Year	Programs Related to Prevention, Screening, Treatment and Outcomes	Costs of Developing Foundational Elements, Stakeholder Engagement and Operations	Total Budget
2019	$4.2 million	$1.8 million	$6 million
2020	$8.4 million	$3.6 million	$12 million
2021	$12.6 million	$5.4 million	$18 million
2022	$16.8 million	$7.2 million	$24 million
2023	$23.8 million	$6.2 million	$30 million
2024	$24.2 million	$5.8 million	$30 million
2025	$24.8 million	$5.2 million	$30 million
Total	**$114.8 million**	**$35.2 million**	**$150 million**

This partnership should operate independently and report to the Minister of Health and, should Indigenous organizations choose to develop an Indigenous diabetes strategy, to the Minister of Indigenous Services. It should provide regular and transparent reports on its plans and results. To keep its operations as efficient as possible, it should be supported by a Board of Directors and committees of experts volunteering their knowledge in support of the strategy.

In its first year, it is recommended that the partnership develop a detailed implementation plan for this framework, and that it establish baseline data and set interim targets and milestones such that significant progress is made towards reducing the burden of diabetes on Canadians as quickly as possible.

The goal should be to implement much of the recommended strategic framework for the diabetes strategy in time for Canada to celebrate the 100th anniversary in 2021 of the discovery of insulin. While it may take longer to implement all aspects of the framework, every effort should be made to work expeditiously and integrate ongoing implementation and evaluation mechanisms into the existing Canadian healthcare system. With focused, concerted action, Canada can resume its position of leadership in the fight against diabetes in time for 2021.



9 Appendices

9.1 September 26, 2017 Workshop Participants

Participant	Organization
Liora Altman	Government of Ontario
Pauline Armour	Diabetes Canada
Kathy Armstrong	Merck
Carol Barrie	Canadian Frailty Network
Bruno Battistini	New Brunswick Health Research Foundation
Ann Besner	Diabetes Canada
Claire Betker	Ministry of Health, Seniors and Active Living, Manitoba
Rick Blickstead	Diabetes Canada
Connie Cote	Health Charities Coalition of Canada
Irene Day	BC Centre for Excellence in HIV/AIDS
Kim Elmslie	Public Health Agency of Canada.
Isabelle Gagnon-Arpin	Conference Board of Canada
Carolyn Gall Casey	Diabetes Canada
Laurie Gibbons	Public Health Agency of Canada.
Kim Hanson	Diabetes Canada
Jan Hux	Diabetes Canada
Terri Irwin	Health Quality Ontario
Aleks Ivovic	Diabetes Canada
Mark Jeddi	Eli Lilly
Nivitha Jeyakumar	Diabetes Canada
Malcolm King	Aboriginal Peoples' Health
Fiona Kouyoumdjian	Government of Ontario
Charlene Lavergne	Advocate
Lorraine Lipscombe	Women's College Hospital
Joanne Lorraine	Eli Lilly
Lori MacCallum	Toronto General Hospital
Susan Marlin	Clinical Trials Ontario
Julio Montaner	British Columbia Centre for Excellence in HIV/AIDS
Christine Moore	Government of Canada
Seema Nagpal	Diabetes Canada
Craig Proulx	Clinical Trials Ontario
Jake Reid	Diabetes Canada
Laura Rosella	University of Toronto
Ellen Stensholt	Advocate
Jovita Sundaramoorthy	Diabetes Canada
Amanda Thambirajah	Diabetes Canada
Patrick Tohill	JDRF
Anne-Sophie Viard	Novo Nordisk
Shirley Von Sychowski	Heart & Stroke
Melissa Wagner	Diabetes Canada
Tom Weisz	Advocate
Catherine Whiteside	Diabetes Action Canada
Russell Williams	Diabetes Canada
Michelle Woll	Diabetes Canada
Nadia Yee	AstraZeneca
Cindy Yip	Heart & Stroke

9.2 Guiding Principles/Recommendations

- *"Keep it simple."* We must not allow the complexity and scope of adopting a 90-90-90 target for diabetes in Canada to stop us from moving forward. We should strive for simplicity, early wins, and employ the 80/20 principle. Above all, we should just get started!
- *"One size does not fit all."* Programs and interventions can and should be selected, modified or customized for individual regions, cultures, populations and patients. But we can build a framework to assess the impact of these interventions at a nation-wide level to ensure that the country is working together to end the epidemic.
- *"Simple metrics for shared goals."* To ensure the successful and efficient implementation of this initiative, we should articulate shared goals and simple metrics to hold ourselves to account. These can allow for customized approaches that all work together toward the goal of ending the diabetes epidemic. For example, we may agree to a target of lowering the average of all Canadians' HbA1c value, while focusing on a different goal of fewer episodes of low blood sugar with an individual patient.
- *"Don't let perfection get in the way of good."* This approach should be designed to embrace continuous improvement. Rather than strive to ensure the approach is perfect before implementing it, we should get it "roughly right" and then use ongoing evaluation to keep improving.
- *"Change can be scary, so let's manage it."* In order to address concerns about this change, support the behavioural changes that will be required, avoid unintended consequences and combat stigma, a change management mindset and approach should be brought to bear on the development and implementation of this initiative.
- *"Play the short AND long game."* Recognize that, while the prevalence rate of diabetes might actually increase in the short term, if we pursue early diagnosis, they should improve over the long term. Similarly, we should not focus only on short-term problems or solutions, but should consider also the long term implications of decisions.
- "*Don't reinvent the wheel."* We have a lot in place that we can build from, from the CANRISK screening tool to provincial or territorial diabetes strategies to community-based support groups and programs. This approach should leverage and build upon these, not replace or duplicate them.
- *"We can do this together."* This approach must maintain a focus on collaboration among multiple stakeholder groups leveraging one-another's different strengths and perspectives. A list of different stakeholder groups is below. Together, stakeholders can mobilize action, break down barriers and ensure coordination.

9.3 Working Group mandates and membership

WORKING GROUP	MANDATE	MEMBERSHIP
Project Secretariat	Diabetes Canada will act as Project Secretariat for Phase 1. In that capacity, it will perform general project management, oversee consultants, and act as a liaison between the Steering Committee, Working Groups and any other stakeholders. Diabetes Canada will also be responsible for overseeing the development and implementation of an outreach program to ensure the recommendations identified in Phase 1 are considered and implemented by the relevant stakeholders.	Sherry Calder, Diabetes Canada Kimberley Hanson, Diabetes Canada Melissa Wagner, Diabetes Canada Michelle Woll, Diabetes Canada

WORKING GROUP	MANDATE	MEMBERSHIP
Steering Committee	A Steering Committee of multi-sectoral experts will be convened to oversee the development and progress of the 90-90-90 initiative, to guide the efforts of the Working Groups and to ensure the recommendations from Phase 1 have the maximum support of all stakeholders. The Steering Committee will also ensure the Guiding Principles of the initiative are adhered to and the Measures of Success are defined and realized.	Ms. Claire Betker, Manitoba Health Dr. Norm Campbell, University of Calgary Dr. Jean-Pierre Després, University of Laval Dr. Jan Hux, Diabetes Canada Ms. Terry Irwin, Health Quality Ontario Dr. Malcolm King, Simon Fraser University Dr. Julio Montaner, BC Centre for Excellence in HIV/AIDS (special advisor) Ms. Marilee Nowgesic, Canadian Indigenous Nurses Association Dr. Paul Oh, Toronto Rehabilitation Institute Mr. Dave Prowten, JDRF Canada Mr. Mike Swartz, Patient Representative Dr. Catherine Whiteside, Diabetes Action Canada Mr. Russell Williams, Diabetes Canada
Screening, Risk awareness, Early diagnosis	This group will catalogue and evaluate existing approaches to risk assessment, screening and diagnosis, refer to global and national best practices in screening and early diagnosis, and recommend key considerations in developing and implementing a broader approach towards achieving the "first 90" across Canada.	Krista Banasiak. Diabetes Canada Abhishek Chaudhary, Medtronic Deidre Date, Medtronic Sajjad Fazel, advocate Sylvie Jacques, advocate Richard Jonkers, Medtronic Pradip Joshi, Health Sciences Centre (Newfoundland) Leslee Laing, advocate Lori McCallum, Pharmacy Network, Banting & Best Institute Karen McClure. LifeLabs Laura Rosella, University of Toronto Varsha Sugand, advocate
Primary Prevention, Treatment and Support	This group will catalogue and evaluate existing interventions, and recommend key considerations to strengthen and enhance those, and make any further appropriate supports available to Canadians with prediabetes, newly diagnosed or pre-existing diabetes under the first pillar.	Emmanuel Akpakwu, World Economic Forum Harpreet Bajaj, Mount Sinai Ann Besner, Diabetes Canada Gillian Booth, ICES Tala Chulak-Bozzer, ParticipACTION Michelle Corcoran, Horizon NB Sue Evans, Ross Memorial Hospital Shelley Jones, advocate Richard Jonkers, Medtronic Ashley Lyons, LMC Edmond Margawang, Government of BC Karen McClure, LifeLabs Petra O'Connell, Alberta Health Services Naomi Orzech, LMC Ruth Pichora, Medtronic Martha St. Pierre, Health PEI Anne-Frederique Turcotte, advocate Anne-Sophie Viard, Novo Nordisk

WORKING GROUP	MANDATE	MEMBERSHIP
Improved Health Outcomes	This data-driven work will examine how the existing data supports the strategy evaluation measurements and targets, and will identify how existing gaps may be addressed in the framework of basic data architecture to support this strategy going forward.	Ganive Bhinder, BC Better Pharmacare Association Sarah Blunden, LMC Robert DiRaddo, National Research Council of Canada Mark Hewko, National Research Council of Canada Richard Jonkers, Medtronic Michelle Levasseur, National Research Council of Canada Carmen Lovsin, LMC Mary MacSween, Horizon NB Dawn Martin, Astra Zeneca Seema Nagpal, Diabetes Canada David Nilsson, advocate Hamid Sadri, Medtronic Gabriel Seidman, Boston Consulting Group Baiju Shah, ICES Andrew Smith, Boston Consulting Group Martha St. Pierre, Health PEI Matthew Stargardter, advocate Mandana Vahabi, Ryerson
Research and International Context	This working group will survey emergent research relevant to the initiative, identify research required to address gaps in the evidence base, evaluate international best practices relevant to the initiative and identify opportunities to collaborate with international initiatives of relevance.	Dawn Gallant, advocate Annie Garon-Mailer, The Ottawa Hospital Matt Petersen, ADA Jake Reid, Diabetes Canada Fizzah Saeed, advocate Robert Shearer, advocate Jovita Sundaramoorthy, Diabetes Canada Brian Wentzell, IDF Darko Zdravic, advocate
Inclusion of Indigenous Peoples and groups	From the outset, the working group will: • Ensure that the key principle "Nothing about us without us" is respected • Ensure that indigenous peoples are invited and engaged in an open, transparent and culturally appropriate manner throughout the development of this initiative. • Determine the best coordination of this initiative with existing programs such as the Aboriginal Diabetes Initiative. • Reflect upon the health-related calls to action of the Truth and Reconciliation Commission report • Ensure that the needs and priorities of indigenous groups are prioritized throughout the development and implementation of this initiative. It is important to look at the end-goals of treatment and prevention programs (the third 90) from Indigenous and Western perspectives - a Two-eyed Seeing approach to knowledge development. What are the health and wellness goals of First Nations, Inuit and Métis Peoples in terms of prevention and treatment of diabetes?	Roslynn Baird, Indigenous Diabetes Health Circle Jeff Laplante, NADA Charlene Lavergne, advocate Carrie Robinson, Assembly of First Nations Amanda Thambirajah, Diabetes Canada Krista Banasiak, Diabetes Canada Wendy Thomas, advocate Mark Trefiro, McGill University Michael Tucker, Novo Nordisk Rainier Ward, advocate

WORKING GROUP	MANDATE	MEMBERSHIP
Type 1 Diabetes	The Type 1 Diabetes Working Group will have two main functions: 1. To identify priority issues and needs of people with Type 1 diabetes under each target area of the Diabetes 360° approach. 2. To evaluate draft recommendations as part of the Diabetes 360° approach in terms of how well it addresses the needs of those with Type 1 diabetes.	Lara Abramson, Diabetes Canada Pauline Armour, Diabetes Canada Zoe Bowler, Novo Nordisk Lorraine Anderson, LifeScan Dawn Gallant, advocate Marlee Greenberg, JDRF Sarah Hamilton, CHEO Jen Hanson, Connected In Motion Joanne Lewis, Diabetes Canada Elisabeth Moreau, Canadian Pediatric Society Shane Nercessian, True North Disability Services Ruth Pichora, Medtronic Stephanie Shelley, Lilly Michelle Sorenson, Clinical Psychologist Martyn Sugar, Ascensia Pat Tohill, JDRF
Advisory Panel	The Advisory Panel is a group of volunteer advocates, some of whom live with diabetes or have family members who do. Other Advisory Panel members work in fields related to diabetes or are otherwise interested in helping address the diabetes epidemic. The Panel met via teleconference every three weeks to provide their insight and expertise on draft documents and recommendations from the Steering Committee and other Working Groups, and to guide public engagement efforts.	Babita Aery Syed Aqil Lana Beier Rania El Tawil Shelley Epstein Judi Ferne Joan King Nadia Maruschak Abdulraheem Sbayi Qandeel Shafqat Tanushree Singh Dustin Thorsten Amy Tucker Dylan Youngstrom Ann Zhang

9.4 Truth and Reconciliation Committee's Calls to Action on health[98]

18) We call upon the federal, provincial, territorial, and Aboriginal governments to acknowledge that the current state of Aboriginal health in Canada is a direct result of previous Canadian government policies, including residential schools, and to recognize and implement the health-care rights of Aboriginal people as identified in international law, constitutional law, and under the Treaties.

19) We call upon the federal government, in consultation with Aboriginal peoples, to establish measurable goals to identify and close the gaps in health outcomes between Aboriginal and non-Aboriginal communities, and to publish annual progress reports and assess long-term trends. Such efforts would focus on indicators such as: infant mortality, maternal health, suicide, mental health, addictions, life expectancy, birth rates, infant and child health issues, chronic diseases, illness and injury incidence, and the availability of appropriate health services.

20) In order to address the jurisdictional disputes concerning Aboriginal people who do not reside on reserves, we call upon the federal government to recognize, respect, and address the distinct health needs of the Metis, Inuit, and off-reserve Aboriginal peoples.

21) We call upon the federal government to provide sustainable funding for existing and new Aboriginal healing centres to address the physical, mental, emotional, and spiritual harms caused by residential schools, and to ensure that the funding of healing centres in Nunavut and the Northwest Territories is a priority.

22) We call upon those who can effect change within the Canadian health-care system to recognize the value of Aboriginal healing practices and use them in the treatment of Aboriginal patients in collaboration with Aboriginal healers and Elders where requested by Aboriginal patients.

23) We call upon all levels of government to:

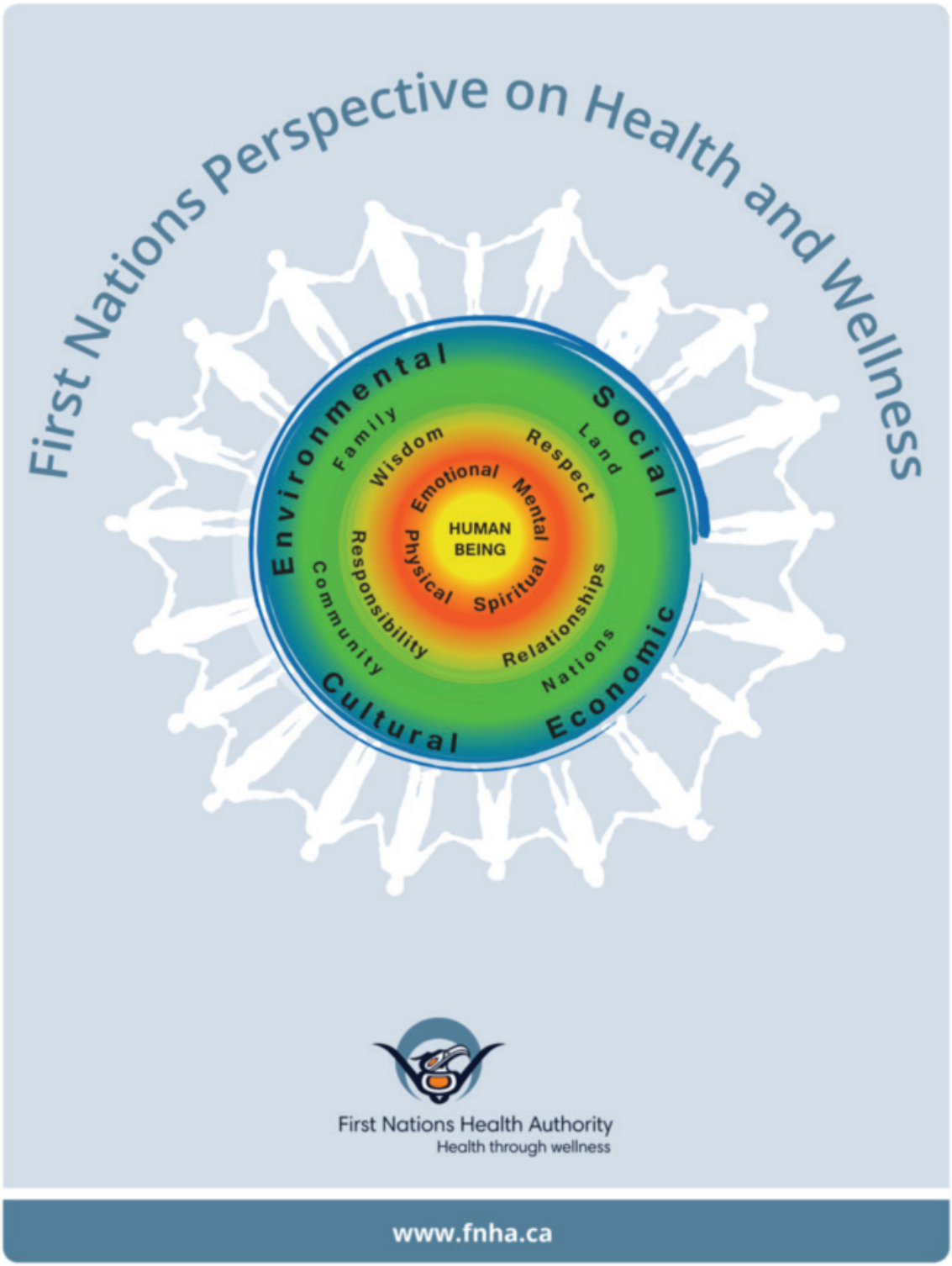
i. Increase the number of Aboriginal professionals working in the health-care field.

ii. Ensure the retention of Aboriginal health-care providers in Aboriginal communities.

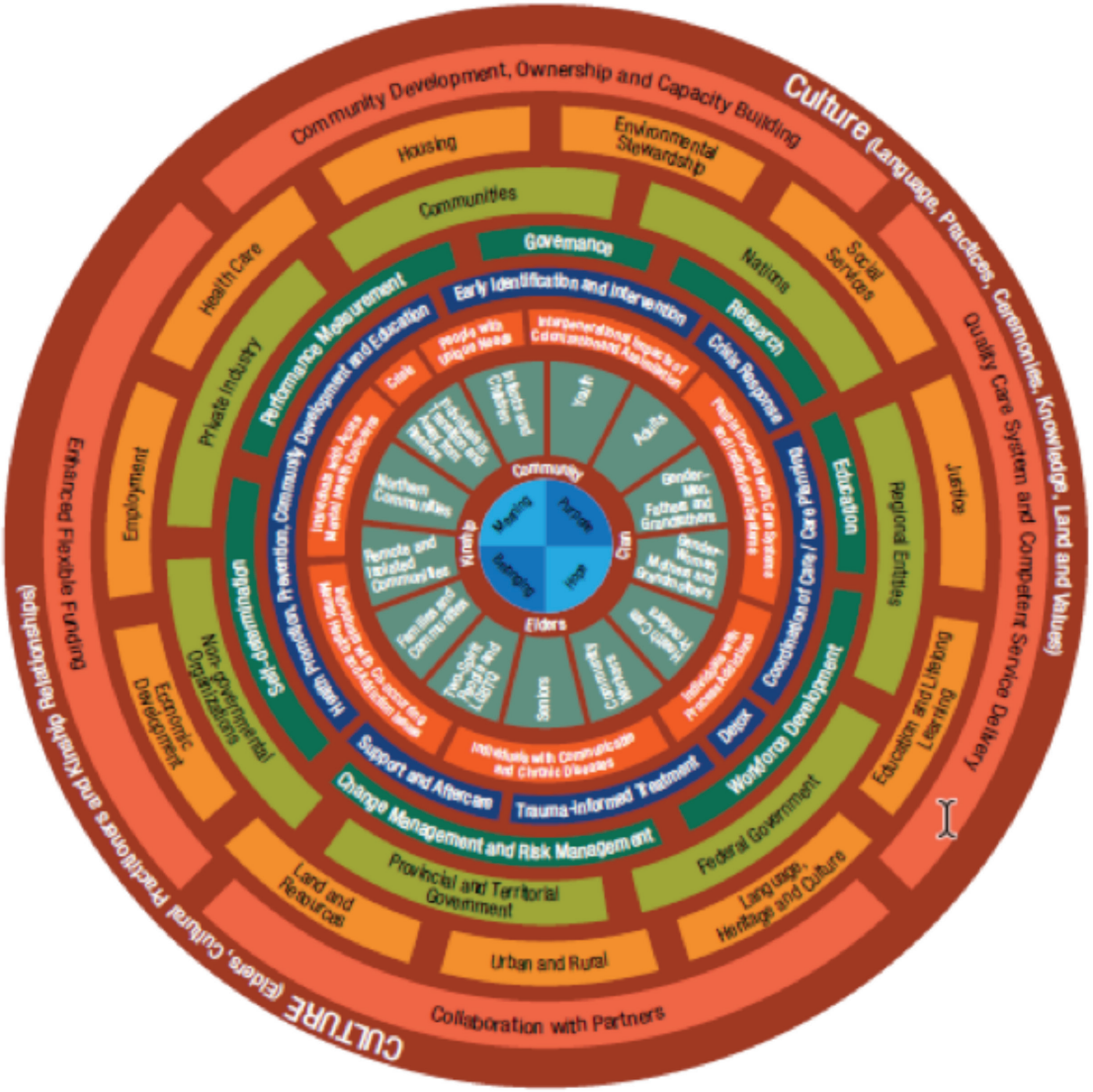
iii. Provide cultural competency training for all health-care professionals.

24) We call upon medical and nursing schools in Canada to require all students to take a course dealing with Aboriginal health issues, including the history and legacy of residential schools, the United Nations Declaration on the Rights of Indigenous Peoples, Treaties and Aboriginal rights, and Indigenous teachings and practices. This will require skills-based training in intercultural competency, conflict resolution, human rights, and anti-racism.

9.5 First Nations Perspective on Health and Wellness



9.6 First Nations Mental Wellness Continuum Model[99]



Legend (from centre to outer ring)	
Four Directions (outcomes)	Supporting Elements
Community	Partners in Implementation
Populations	Indigenous Social Determinants of Health
Specific Population Needs	Key Themes for Mental Wellness
Continuum of Essential Services	Culture as Foundation

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