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Benefits
CANADA

OVERVIEW

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1. Introduction

Diabetes is a key driver of benefit plan costs and can lead to reduced productivity, absenteeism and disability. Although plan sponsors are concerned about the impact of diabetes on their bottom line, they may not fully understand the complexities of diabetes and the implications for plan members.

Left unmanaged, diabetes can lead to significant short- and long-term health complications and may potentially be fatal. One in three Canadians lives with prediabetes or diabetes. There has been more

than a 50% increase in diabetes prevalence over the past 10 years, and this figure is expected to continue to rise.

Although type 1 diabetes cannot be prevented or cured, it can be better managed, which can reduce the risk of related complications. Evidence shows that positive interventions may reduce the risk of developing or delay the onset of type 2 diabetes and associated complications.

The workplace can influence an employee's ability to manage their health. Plan sponsors and insurers play an

important role in helping members navigate their health and better manage or prevent diabetes, which can positively impact the bottom line while improving health outcomes.

This guide will help plan sponsors understand the importance of diabetes management and provide practical tips on how to provide a supportive environment for plan members with diabetes or caregivers of people with diabetes.

2. Diabetes Basics

Diabetes is a chronic condition where the body has trouble regulating the amount of glucose (or sugar) in the blood or can't produce or use insulin properly.^{1, 2}

Glucose is the main source of energy for the body's cells and is a sugar that the body creates by breaking down carbohydrates

in food and drink. Insulin is a hormone produced by the pancreas and is like a key that unlocks cells so that glucose can leave the bloodstream and enter the cells for use as energy.^{3, 4, 5}

Without insulin, glucose stays in the blood instead of entering the cells, and

if it accumulates, glucose levels rise and people can become very ill. If there is not enough insulin, the glucose can't get into the cell, which is like having fuel that can't get into the engine. Too much glucose can damage organs, blood vessels and nerves.⁶

A. Types of Diabetes

Type 1 diabetes is an autoimmune condition where the body's immune system attacks and destroys the cells in the pancreas that make insulin. ⁷ Approximately 10% of Canadians with diabetes have type 1. ⁸	Type 2 diabetes occurs when the pancreas does not make enough insulin or when the body can't use the insulin it makes (insulin resistance), both of which can prevent the glucose in the blood from entering cells to be used for energy. ⁹ Approximately 90% of Canadians with diabetes have type 2. ¹⁰
Gestational diabetes occurs when hormone changes in pregnancy result in the pancreas not making enough insulin. ¹¹ One in 10 women who gives birth experiences diabetes while pregnant. ¹²	Prediabetes is when glucose levels are higher than normal, but not high enough to be diagnosed as type 2 diabetes. ¹³ Currently, 6.1% of Canadians live with prediabetes. ¹⁴

B. Diabetes in Canada

One in three Canadians lives with prediabetes or diabetes, and there has been a greater than 50% increase in diabetes prevalence over the past 10 years.¹⁵ These numbers are expected to continue to rise due to the aging population and Canadians with diabetes who are living longer.

Analysis indicates that a 20-year-old Canadian has a 50% chance of developing diabetes.^{16, 17}

C. Diabetes-Related Complications

People with well-managed diabetes achieve stable blood glucose levels and manage their risk of chronic complica-

tions. Managing diabetes may be costly; however, diabetes that is not well managed can be even more expensive because it can lead to complications that require more healthcare and additional spending.¹⁸

Poorly managed diabetes is the root cause of short- and long-term health complications, such as 30% of strokes, 40% of



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heart attacks, 50% of kidney failure requiring dialysis, and 70% of all nontraumatic leg and foot amputations.¹⁹

Diabetic retinopathy is the leading cause of blindness in Canadian adults. Cardiovascular disease occurs two to four

times more often than in people without diabetes. Diabetes is the leading cause of end-stage kidney disease and nontraumatic amputation in Canadian adults.²⁰

People living with diabetes are over three times more likely to be hospitalized with cardiovascular disease, 12 times more likely to be hospitalized with end-stage kidney disease and almost 20 times more likely to be hospitalized for a nontraumatic lower limb amputation.²¹

Unfortunately, poorly managed diabetes can sometimes be fatal. Cardiovascular disease remains the leading cause of death for individuals with diabetes.²² Diabetes can reduce life expectancy by 13 years,²³ and death rates of Canadians with diabetes are at least double those of Canadians without. It is estimated that 1 in 10 deaths in Canadian adults is attributable to diabetes.²⁴

3. Workplace Impact of Diabetes

Employees with type 2 diabetes cost employers an estimated \$1,500 annually per employee due to reduced productivity and missed work. Drug plan spending for employees with type 2 diabetes is four times the amount of all other claimants. Employees who take disability leave because of their diabetes have an average of 15% longer leaves and remain on disability for the maximum benefit period or until death.²⁵

Diabetes is rarely the primary diagnosis in a disability claim, according to Lianne Clarke, principal, VP, wellness and disability innovation and growth, Cowan Insurance Group. “Although it may contribute to longer recoveries, it often goes unnoticed in disability claims.” In addition, says Clarke, casual or incidental absences are often not measured, “but could be a sign that an employee is struggling with symptoms of prediabetes or diabetes, and may not be properly managing their disease.”

Don't Forget Caregivers

It should be noted that most of these figures do not account for the impact on diabetes caregivers. The toll on those who support loved ones with diabetes should not be ignored.

A. Diabetes Impact on Drug Plan Costs

Benefit plan diabetes drug spend is usually one of the first areas of concern for plan sponsors. This is just the tip of the iceberg in terms of costs, says Clarke. “Underneath the surface, there are a multitude of associated hard and soft costs to the organization, including increased absenteeism and presenteeism, and reduced productivity.”

According to TELUS Health, diabetes drugs were the second most costly therapeutic class for employee benefit plans, accounting for 11.4% of costs and 7.5% of claims in 2020.²⁶ Claimants with diabetes take an average of seven medications for an annual cost of \$3,020, and approximately

half of the costs are attributable to drugs to treat diabetes.²⁷ Over the past five years, the total eligible cost of drugs and supplies to treat diabetes grew 12.9%. This, in part, is attributable to the 7.5% growth in the number of claims and 5.1% increase in the number of claimants.²⁸

The significant impact of diabetes on drug costs may be attributable to the increasing prevalence of diabetes in Canada; however, it may also be due to poorly managed diabetes.

B. Workplace Impact of Hypoglycemic Events

Studies have shown that hypoglycemia costs employers \$850 annually per person with type 1 diabetes, due to reduced work productivity. When a hypoglycemia event occurred at work, 18% of people left work early or missed a full day, or 9.9 hours of work per month. A nocturnal hypoglycemia event resulted in 23% of people arriving late or missing a full day of work, or 14.7 hours of missed work per month.²⁹

C. Mental-Health Impact of Diabetes

i. Depression³⁰

People with diabetes are twice as likely to experience depression, which can lead to worsened blood glucose levels and diabetes complications.

ii. Diabetes Distress^{31, 32, 33, 34}

Approximately 40% of people with type 1 diabetes experience diabetes distress, which is the mental burden and negative emotion of living with and managing diabetes. It is different from depression because people don't have these feelings about other parts of their life; however, diabetes distress can turn into depression if these feelings last for an extended time.

“Stress plays a huge part in managing diabetes,” says Nicole Pelcz, who lives with type 1 diabetes. “Increased levels of stress for extended periods of time can

lead to insulin resistance, which makes it more difficult for the body to keep blood glucose levels in range.”

iii. Diabetes Burnout^{35, 36}

Long-term diabetes distress can lead to diabetes burnout. At first, people with diabetes may feel frustrated and exhausted by the daily management of diabetes, and if they don't resolve their negative feelings, they begin to change their behaviour. They may no longer be motivated to follow their diabetes management plan and may stop taking care of themselves and their diabetes.

iv. Diabetes Stigma^{37, 38, 39, 40}

“Perceived diabetes stigma can cause disempowerment, increased psychological distress and poor outcomes,” notes Krisel Quiambao, a Registered Nurse, Certified Diabetes Educator and the director of clinical services, Ellerca Health Corp., a digital health firm focused on supporting chronic disease management. “It's important that communication related to diabetes is neutral, objective and non-judgmental and that employers fight stigma related to diabetes in the workplace.”

Most people with diabetes say they've been stigmatized, blamed or shamed for having the condition, which can lead to far-reaching consequences. The resulting guilt, shame and self-stigma can contribute to diabetes distress or compromising self-care and ultimately poorer health outcomes. Diabetes stigma is primarily due to a lack of understanding, negative stereotypes, and myths and misconceptions, which result in misplaced judgment, blame and disrespect toward people with diabetes. Education and awareness are the best ways to fight stigma. Those dealing with guilt and self-stigma may benefit from access to mental-health professionals who can help them perceive themselves and their diabetes in a more positive way.

Diabetes – Language Matters^{41, 42}

Inappropriate language can contribute to diabetes stigma. People with diabetes internalize insensitive messages they hear, which can lead to self-stigma and guilt, and impact their motivation, behaviours, and outcomes. Experts have recommended appropriate language for enhanced communication about and with people who have diabetes.

Diabetes Canada⁴³ believes that people living with diabetes deserve to be spoken with and about in ways that are respectful, inclusive and value based, and recommend language used:

- | | | |
|------------------------------------------------------------------------------------------------|------------------------------------------------------------------|------------------------------------------------------------|
| 1. Is accessible and understandable | 3. Is empathetic and compassionate | 5. Is sensitive to the type of diabetes |
| 2. Frames thoughts, ideas and suggested directions in ways that are motivating and encouraging | 4. Is realistic and avoids judging, shaming and/or placing blame | 6. Aligns with the preferences of the person with diabetes |

4. Managing Diabetes

A. Living with Diabetes

Nicole Pelcz was diagnosed with type 1 diabetes when she was a teenager. “I have lived with diabetes for almost half my life.” She works for a charitable organization in Ontario managing healthy living programs.

“Living with type 1 diabetes is a 24/7 job. I have to think about diabetes all the time. It’s not something I can take a vacation from.”
–NICOLE PELCZ

“Living with type 1 diabetes is a 24/7 job. I have to think about diabetes all the time. It’s not something I can take a vacation from, opposed to most people who can walk away from their job for a weekend getaway,” explains Pelcz. “Diabetes impacts everything I do, this is why a positive outlook is vital,” she says. “I have to think about diabetes before I go to sleep, to make sure my blood sugars are in range when I’m sleeping, and just as I wake up before I even head off to work. I have to consider what I’m eating, because different foods affect my body and blood sugars differently. I have to think if I’m able to exercise at the time I want to, or sometimes I even have to wait to drive because a low blood glucose level can impact thinking, alertness and cognition.”

B. Caregiver Challenges

Being a working parent caring for a child with type 1 diabetes can be challenging. Cyndi Orth works for a school district in Abbotsford, BC, and is a caregiver for her daughter Sophia who lives with type 1 diabetes. Sophia was diagnosed at three years of age and is now 18 and off to university. “When Sophia was young, I didn’t have

any support for her in school and I had no family that lived close by. I had to go give her insulin injections at school. At that time, I was very fortunate and had an amazing boss. If I got an emergency call or text from the school that Sophia was running low, he would just say ‘go.’”

Sophia was hospitalized with diabetic ketoacidosis three times during her primary school years. When she was in hospital, Orth says, “I used up my sick days to be there with her. Fortunately, I had the flexibility to use them in that way and was never sick during her younger years.” When she ran out of sick days, Orth had to take days off without pay.

When Sophia was younger, either Orth or her husband would wake every day between 1:00 a.m. and 2:00 a.m. to check her blood sugar. “We were tired because of our interrupted sleep, which, of course, impacted our performance at work,” says Orth. “You try to get used to it, but you don’t, because sleep is important.”

Sophia is always top of mind for Orth and her husband. When Sophia was younger, they asked themselves, “How do we work today knowing that she is safe?” “We always arranged our schedule so one of us would be able to get to the school and look after her. I always had to have my phone on standby and close to me.”

Sometimes when Orth was presenting at work, she’d get a text or phone call. “I’d think, Sophia might be experiencing a low. Do I take it, or do I continue?”

When Orth knew that she wouldn’t be able to take a call, her husband, who used to be a travelling salesperson, arranged his schedule so he would be in the community that day in case Sophia needed help at school.

C. Diabetes Management

People living with diabetes must manage their blood sugar levels through

lifestyle choices, diabetes technology and medication. The objective is to avoid life-threatening hypoglycemia (low blood sugar) and the potential of long-term damage of hyperglycemia (high blood sugar).^{44, 45}

- Diabetes management includes:^{46, 47, 48}
1. A healthy eating plan
 2. Physical activity
 3. Taking medicines that doctors prescribe to manage blood sugar, blood pressure, cholesterol levels
 4. Losing weight, if a person has overweight or obesity

A 5%-7% weight loss can lower the risk of type 2 diabetes complications.⁴⁹

Diabetes Canada ABCDES of Diabetes Care^{50, 51}

- A** A1C targets
- B** Blood pressure (BP) targets
- C** Cholesterol targets
- D** Drugs for decreasing heart disease risk
- E** Exercise goals and healthy eating
- S** Screening for complications
- S** Smoking cessation
- S** Self-management, stress, other barriers

D. Diabetes Care – A Team Effort

“Diabetes support takes a healthcare team,” explains Quiambao. This may include family doctors, endocrinologists, nurses, dietitians, chiropractors, mental-health practitioners and pharmacists, along with social support from family and caregivers. “Coordinated care may be required because healthcare providers often work in silos, which can be challenging for people living with diabetes,” she says.

E. Diabetes Educators

Diabetes educators are a key member of the diabetes care team. They are health professionals who specialize in diabetes treatment who partner with people with diabetes and their families to teach, coach and guide them to develop behaviour-change goals to improve their health and to develop a management plan that fits their lifestyle, beliefs and culture.

“The approach of diabetes educators has been changing,” says Ontario-based Certified Diabetes Educator and Registered Nurse Connie Tanner. In the past, a diabetes educator would tell the person with diabetes what they needed to do and expect them to follow the instructions, she says. “Our role now is to provide the person with diabetes with the skills and knowledge they need to manage their condition, to help access resources they need, and support behaviour change and empowerment. In essence, we help the person with diabetes to identify what is important to them and support them in working toward their priorities.”

F. Whole Person Model for Holistic Care⁵²

To deliver a better experience and generate positive outcomes, diabetes care should consider the whole person and look beyond simply their medical condition(s). Although a medical prognosis may be the same for two people, the best support could be vastly different for each of them. Knowing the whole person allows their care plan to be tailored to the individual, and results in better outcomes.

“Our experience demonstrates that people living with diabetes have a higher incidence of being treated for heart disease, gastrointestinal issues and mental-health issues,” says Colleen Adams, manager, health & digital product solutions, Medavie Blue Cross. “This demonstrates the need to treat people living

with diabetes holistically, with solutions that address more than just monitoring blood sugar levels.”

G. Glucose Levels^{53, 54, 55}

Checking blood glucose levels is important for people with diabetes because the results help guide decisions about what to eat, physical activity and medication use to ensure that blood sugar levels are stable and in the healthy range.

There are over 40 factors that affect glucose levels, many of which are impossible to manage, remember or even account for, and not every individual will respond in the same way. The best way for people with diabetes to determine their impact is by monitoring their glucose and looking for patterns.⁵⁶

Extreme blood sugar highs and lows can lead to major problems:

- **Hypoglycemia** (low blood sugar) can happen quickly and is important to treat right away. It can cause confusion and disorientation, or be more severe and cause loss of consciousness, seizure or coma.^{57, 58}

Fear of hypoglycemia is when some people living with diabetes keep their blood glucose high to avoid severe hypoglycemia. This may lead them to make poor diabetes-management decisions, which can be a barrier to achieving their target glucose levels and lead to increased risk of diabetes complications.⁵⁹

Hypoglycemia unawareness (or impaired hypoglycemia awareness) is when a person with diabetes doesn't notice they have low blood sugar, as they do not experience usual early warning symptoms. Without warning, they lapse into severe hypoglycemia and may become confused or disoriented, experience convulsions or, in rare cases, fall into a coma.^{60, 61}

- **Hyperglycemia** (high blood sugar) can cause long-term health complications caused by damage to blood vessels and nerves such as heart disease, kidney failure, stroke, heart attack, blindness and lower limb amputation as well as diabetic ketoacidosis, which is a potentially life-threatening buildup of acids in the blood.^{62, 63}

i. Monitoring Glucose Levels

There are a variety of ways to monitor glucose levels^{64, 65, 66}

Capillary blood glucose meter (formerly known as blood glucose meter) uses a finger prick to check blood glucose levels.⁶⁷

Intermittently scanned continuous glucose monitoring (isCGM) (formerly known as flash glucose monitoring) measures interstitial fluid glucose levels* with a handheld scanner swiped over the sensor. Some systems are equipped with optional alarms to alert for low and high blood sugar.

Real-time continuous glucose monitoring (rtCGM) (formerly known as continuous glucose monitoring or CGM) also checks interstitial fluid glucose levels*; however, it provides a continuous display of blood sugar and uses an alarm to alert for low and high blood sugar.

A1C, also known as HbA1c, is a laboratory blood test that measures average blood sugar over the past three months.

*Works via a small sensor that is inserted just under skin that reads the glucose level in the surrounding interstitial fluid, which is a thin layer of fluid that surrounds the body's cells.



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Glucose Targets

According to Diabetes Canada, the recommended glucose targets for most people with diabetes are listed below, but they may be individualized based on discussions between a person with diabetes and their healthcare team.

Targets for most people with diabetes ^{68, 69}	
A1C	7.0% or less
Fasting blood glucose (sugar) – blood sugar before eating	4.0 to 7.0 mmol/L
Blood sugar two hours after eating	5.0 to 10.0 mmol/L (5.0 to 8.0 mmol/L if A1C targets not being met)
Time in Range (TIR) – % of time that person's blood glucose level is in their recommended target range	% of values between 3.9-10.0 mmol/L >70%

ii. Time in Range^{70, 71, 72, 73, 74, 75}

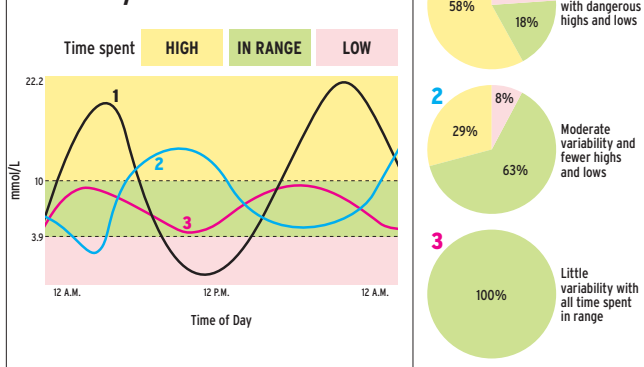
Instead of measuring average blood sugar via the A1C test, there is growing interest from diabetes experts in tracking time in range (TIR): the percentage of time that a person's blood glucose level is in their recommended target range (see Glucose Targets).

The A1C average does not capture glycemic variability, the fluctuations in glucose values of people living with diabetes. Two people can have the same A1C value but have a wide range of high and low blood glucose values, which results in a different TIR (see Figure 1).

A mean speed of 80 km/h over the past three months of commuting will never reflect times when a vehicle is racing at 150 km/h and far in excess of the speed limit or is slowed to 15 km/h in traffic congestion. Similarly, the clinician receives only the most basic of information from the HbA1c measurement and masks the occurrence and frequency of dangerous highs and lows.⁷⁶

Time in range goals may be individualized for each person; however, generally people with diabetes should aim to be in-range as much as possible, with a recommendation of at least 70% TIR. Evidence is growing that increased TIR reduces the likelihood of diabetes complications. Experts indicate that a TIR of 70% equates to an A1C of about 7%, and each 10% increase in TIR equates to a 0.5% decrease in A1C.

**Figure 1:
The Many Faces of a 7% A1C**



Adapted from Adam Brown, et al. diaTribe, August 2016. <https://diatribe.org/BeyondA1C>

iii. Evidence-Based Guidance for Blood Glucose Monitoring

Diabetes Canada recently updated its blood glucose monitoring recommendations^{77, 78} for Canadians living with diabetes to reflect new and emerging

research that has been conducted within the past few years. The recommendations on glucose monitoring type and frequency prioritize safety and improved outcomes for people living with diabetes. These recommendations offer healthcare providers evidence-based guidance on the types of devices that are best suited to people living with diabetes based on their disease type, medications and treatment goals.

Benefit plan managers may find it helpful to refer to these recommendations to determine coverage of glucose monitoring devices for employees or their family members living with diabetes.

iv. Benefits of Glucose Monitoring Devices^{79, 80, 81, 82, 83, 84, 85}

According to Diabetes Canada, glucose monitoring devices such as intermittently scanned continuous glucose monitoring (isCGM) (formerly known as flash glucose monitoring) and real-time continuous glucose monitoring (rtCGM) (also known as continuous glucose monitoring or CGM) “have the potential to improve blood sugar management and quality of life for people living with diabetes, resulting in physical, social, emotional, and functional benefits.”⁸⁶

Glucose monitoring technologies allow the person with diabetes to collect more data about their glucose, says Tanner, and “drive behaviour and lifestyle changes to improve their condition and make the day-to-day life with diabetes easier.”

Not only do the devices eliminate many

of the finger pricks required by more traditional glucose meters, but they also help people with diabetes stay within their target blood sugar range. Traditional blood glucose monitoring and A1C tests don't capture glucose variability (the ups and downs of sugar levels) and don't provide any indication of trends.

The devices may have alarms that alert people or their caregivers when their levels drop too low, for example, overnight while sleeping or while a child with diabetes is at school. This can be particularly helpful for people with hypoglycemia unawareness.

Glucose monitoring devices can track and report glucose historical trend information, which allows the person with diabetes and their healthcare team to analyze glucose patterns and adapt treatment as needed. The devices allow remote tracking by healthcare providers to support digital diabetes care. In addition, real-time continuous glucose monitoring (rtCGM) can be integrated with insulin pumps to develop hybrid closed-loop insulin delivery systems (HCL), which automatically adjust insulin delivery based on rtCGM input.

Small Reduction Offers Significant Benefits

Reducing a person's A1C by as little as 1% can lead to significant short- and long-term clinical benefits.

Interventions or programs that reduce a person's A1C by as little as 1% can lead to significant short- and long-term clinical benefits, including a 37% reduction in microvascular complications,⁸⁷ 43% reduction in amputations, 14% reduction in heart attacks and 12% reduction in strokes, and up to 21% reduction in deaths related to diabetes.⁸⁸

v. Insulin Treatment⁸⁹

Insulin therapy is required for the management of type 1 diabetes and sometimes type 2 diabetes. It is prescribed by healthcare providers based on people's goals, lifestyle, meal plan, age and general health, as well as social and financial factors.

Insulin is injected by pen, syringe or insulin pump, and healthcare providers work with people with diabetes to determine the number, timing and dose of daily injections needed per day and whether an insulin pump is appropriate. The objective is to achieve blood glucose levels that are as close to target as possible to decrease hyperglycemia and avoid hypoglycemia.

vi. Insulin Pumps^{90, 91, 92, 93}

Insulin pumps⁹⁴ are an alternative to multiple daily insulin injections, and their clinical effectiveness is well documented. Diabetes Canada's Clinical Practice Guidelines state that insulin pump therapy can be beneficial for some people with type 1 diabetes.

Pumps can closely mimic the normal action of a healthy pancreas and allow glucose levels to be managed more precisely. They can be programmed to increase or decrease the amount of insulin delivered for a specified period or can calculate recommended insulin correction doses.

Insulin pumps can be life-changing for individuals living with type 1 diabetes, says Tanner. “Imagine having diabetes from a very young age, needing insulin injections four or more times per day. In one year alone, you would need a least 1,460 injections. An insulin pump takes away some of this burden.”

An insulin pump also allows flexibility with insulin delivery, explains Tanner. “A person can adjust their insulin depending on what they are doing and what they are eating, allowing them to match their insulin more precisely to their individual needs.”

Evidence shows that insulin pump users can achieve lower blood sugar levels, more time in range, less risk of hyperglycemia and hypoglycemia, and fewer associated long-term diabetes complications.

5. Reducing the Risk of Type 2 Diabetes

Although type 1 diabetes cannot be prevented or cured, there are opportunities to reduce the risk of developing type 2 diabetes and related complications. “Fortunately, many of the risk factors for type 2 diabetes are modifiable,” says Joanne Jung, pharmacy practice leader, Willis Towers Watson.

“We may not be able to prevent all type 2 diabetes.”
–KRISSEL QUIAMBAO

“It is important to note,” says Quiambao, “that we may not be able to prevent all type 2 diabetes. Given that some of its non-modifiable risk factors include age, ethnic background and genetics, one can still develop type 2 diabetes despite leading a healthy lifestyle. However, the development of type 2 diabetes can be delayed and managed, given the right knowledge and support.”

The number of Canadians with type 2 diabetes is increasing dramatically because of the aging population, rising

vii. Type 2 Diabetes Glucose-Lowering Medications⁹⁵

As a complement to healthy behaviour interventions and lifestyle modifications, there are a variety of medications that may be used to treat type 2 diabetes that can help people achieve their target blood

glucose levels. Diabetes Canada provides medication recommendations and encourages healthcare providers to work together with their patients to determine which medication(s) can help them achieve their best health.

First-line medication	
Metformin	Makes the body respond better to insulin and use it more effectively. Reduces liver’s glucose production.
If metformin and healthy behaviour changes are not enough to manage blood glucose levels, second-line medications can be added.	
Second-line medications	
DPP-4 inhibitors	Lower blood glucose by increasing insulin levels after meals and lowering glucagon levels (a hormone that raises blood glucose).
GLP-1 receptor agonists	Act when blood glucose increases after eating. Increase insulin levels, which helps lower blood glucose and lower glucagon levels (a hormone that raises blood glucose). Slow digestion and reduce appetite.
SGLT2 inhibitors	Eliminate glucose into the urine.
Insulin secretagogues (meglitinides, sulfonylureas)	Help the pancreas release more insulin.
Thiazolidinediones	Make the body’s tissues more sensitive to insulin.
Insulin therapy	Some people with type 2 diabetes need insulin therapy as well. Healthcare providers prescribe based on individual needs.

obesity rates, increasingly sedentary lifestyles, and the higher risk of diabetes in Indigenous people and new Canadians.⁹⁶

A. Risks for Developing Type 2 Diabetes⁹⁷

1. African, Arab, Asian, Hispanic, Indigenous or South Asian descent
2. Age ≥40 years
3. Low socioeconomic status
4. Physically inactive
5. Overweight
6. Abdominal obesity
7. Smoking
8. Previous diagnosis of gestational diabetes

B. Prediabetes^{98, 99, 100, 101}

Prediabetes is when glucose levels are higher than those of a person without diabetes or prediabetes, but not high enough to be diagnosed as type 2 diabetes. It is estimated that 6 million Canadians have prediabetes, and if left untreated, more than 50% of them will develop type 2 diabetes within 8 to 10 years. Type 2 diabetes can be delayed or prevented by reducing blood sugar levels, which

can often be accomplished with lifestyle changes such as following a healthy diet, exercising regularly and losing weight. According to experts, a loss of 5%-7% of body weight can reduce the risk of type 2 diabetes by almost 60%.

A loss of 5%-7% of body weight can reduce the risk of type 2 diabetes by almost 60%.

Research shows that for many people, making major lifestyle changes works better than taking metformin (a drug to treat diabetes) to help delay or prevent type 2 diabetes for up to 10 years, and at 15 years, major lifestyle changes were about equal to taking metformin.¹⁰²

Prediabetes can be part of metabolic syndrome, which is when high blood sugar is associated with high blood pressure, high levels of LDL cholesterol (the “bad” cholesterol) and triglycerides, low levels of HDL cholesterol (the “good” cholesterol), and excess fat around the waist. People with metabolic syndrome are at significant risk of developing type 2 diabetes.^{103, 104}

Prediabetes May Fly Under the Radar^{105, 106}

People may have prediabetes for years but show no symptoms. It may go undetected until serious health problems show up. It's important for people with risk factors to get their blood sugar tested and consult a physician.

Risk factors for developing prediabetes include:

- Having overweight or obesity
- Being 45 years or older
- Having a parent or sibling with type 2 diabetes
- Being physically active fewer than 3 times a week
- Ever having gestational diabetes or giving birth to a baby that weighed more than 9 pounds
- Descending from one of the following high-risk groups: African, Arab, Asian, Hispanic, Indigenous, South Asian

Research indicates that positive life-style interventions that include healthy eating, physical activity and other components (e.g., counselling, smoking cessation, stress reduction, group therapy, behaviour modification) have been shown to reduce the risk of or delay the onset of type 2 diabetes by more than 50%, with the benefits extending beyond the active intervention stage.^{110, 111}

Reducing the Risk of Developing Type 2 Diabetes¹¹²

There are several interventions that can reduce the risk of developing type 2 diabetes:

1. Nutrition therapy and counselling
2. Dietary changes
3. Moderate weight loss
4. Physical activity
5. Pharmacotherapy for individuals with prediabetes
6. Bariatric surgery
7. Targeted programs for high-risk groups, including African, Arab, Asian, Hispanic, Indigenous and South Asian populations

Diabetes and Obesity

"Diabetes and obesity are commonly seen together," says Tanner. "Diabetes cannot be fully managed without also considering the management of overweight and obesity."

Individuals with obesity are three to seven times more likely to develop type 2 diabetes, and those with severe obesity have up to 20 times the risk compared with those of a healthy weight.¹⁰⁷

Individuals with obesity are three to seven times more likely to develop type 2 diabetes.

Canadian Adult Obesity Clinical Practice Guidelines^{108, 109}

The Canadian Adult Obesity Clinical Practice Guidelines reflect "the current scientific understanding of the development and maintenance of obesity and its effect on health." The objective of clinical practice guidelines is to summarize the current scientific and expert knowledge and provide practical recommendations to guide healthcare providers, but they may also provide guidance for benefit plan and workplace program design. Some highlights that might be of interest to benefit plan managers:

- Obesity is "a chronic disease characterized by excessive or abnormal body fat that impairs health."
- "Obesity treatment should focus on improving health, not weight loss alone."
- "Healthcare professionals should support patients 'where they are at' and offer individualized treatment that "support(s) them in their own journey to health."
- "There is no treatment that will work for everyone. Selecting a treatment must be done in collaboration with the patient, address root causes of obesity, and focus on achieving improved health."

To find out more about the Canadian Adult Obesity Clinical Practice Guidelines, read: <https://obesitycanada.ca/guidelines/>

For more information and resources about obesity, check out the Obesity Canada website: <https://obesitycanada.ca/>

Positive lifestyle interventions have been shown to prevent or delay the onset of type 2 diabetes by more than 50%.

Consider Early Intervention

It's easier to assist employees in delaying progression of diabetes when they are in the early stages or even have prediabetes. "Many employers only consider diabetes as a serious issue that needs to be tackled once someone is already using a lot of medications or insulin," says Quiambao. "This perspective will end up costing both employers and employees more in the future. It would be great for people to have support, programming and benefits when they are at risk or at the prediabetes stage."

6. Innovation in Diabetes Management

A variety of innovations in diabetes management have improved healthcare and outcomes.

A. Diabetes Medications^{113, 114}

When insulin was first used 100 years ago, it transformed diabetes from a fatal illness into a chronic one. Since that time, the lives of people living with diabetes have been transformed by many treatment innovations.

Insulin has evolved from animal insulin, taken from the pancreases of pigs or cows, to human-made, or human insulin. Additional innovations have made insulin treatment more flexible with varying durations of action or more flexibility in injection timing. For example, there are longer-acting insulins that lasts close to two days and ultra-rapid insulins that start acting within minutes of injection.

Advances in diabetes treatments have

created a broader range of treatment options to meet peoples' diverse needs, simplify treatment regimens, improve adherence and reduce the risk of hypoglycemia. Some new treatments address comorbidities or complications, including reducing the risk of major cardiac events such as stroke or death.

In the past, reducing glucose levels was the sole priority when choosing diabetes medications, says Tanner, "however,

diabetes management is no longer glucocentric.” In addition to lowering glucose levels, the management of diabetes takes a holistic approach that also prioritizes reducing the risk of complications, lowering the risk of hypoglycemia and taking into consideration the effect on weight. For example, says Tanner, an older medication may work well to lower glucose but may carry the risk of hypoglycemia and cause the person to gain weight. “Imagine having diabetes, receiving counselling to lose weight and being prescribed a medication that makes you gain weight!”

In contrast to the older agents, says Tanner, “some of the newer medications lower the risk for those with or at high risk of heart disease, kidney disease and heart failure.” In addition, some of the newer medications can help with weight loss, a recommended diabetes management strategy.

Newer oral medicines that combine different classes of diabetes medications can reduce pill burden and barriers to treatment adherence. Research shows that people who use these combination medicines use fewer healthcare resources and have an increased life expectancy.

B. Hybrid Closed-Loop Insulin Delivery Systems^{115, 116, 117, 118, 119}

Hybrid closed-loop insulin delivery systems (HCL)¹²⁰ are an emerging technology

for the management of type 1 diabetes. HCLs integrate a real-time continuous glucose monitoring (rtCGM) with an insulin pump and a computer program with a control algorithm that automatically determines insulin needs and keeps the user within their pre-determined blood glucose range. It is called a hybrid system because users must manually occasionally account for insulin needs (e.g., meals or snacks). HCLs can alleviate the mental and emotional burden of around-the-clock diabetes management, and evidence shows that users are likely to experience lower average glucose levels, less hypoglycemia and more time in range.

“I wear a CGM that I rely on a lot,” says Pelcz, “because it will sound an alarm if my glucose levels are rising or falling. My insulin pump and CGM are interconnected, and my CGM sends my glucose readings right to my pump and my phone. Not only will I receive alarms, if necessary, but the system can also suspend my pump from giving me insulin, or if my levels are going higher, give me more insulin.”

C. Digital Diabetes Care

Digital diabetes care combines virtual healthcare with digital health tools and remote connectivity to allow healthcare providers to assist people with diabetes in managing their condition. Although

the tools have been available for some time, they demonstrated their real value when COVID-19 hit.¹²¹

Digital diabetes care technology integrates medical devices, such as glucose monitors and insulin pumps, with physician clinical decision support software. Digital connectivity provides an overview of peoples’ progress, allows healthcare providers to monitor their patients health status, recommend medication adjustments and provide remote coaching.¹²²

Virtual care allows a person to meet where they are at, says Tanner. “With the rates of diabetes increasing, virtual care is seen as a feasible way of improving the ability of healthcare providers to see a large number of people.”

Research shows that digital diabetes care can result in a significant improvement in A1C levels and reduced diabetes complications and healthcare costs. It has been shown to be just as effective as diabetes care received in-person, with no difference in A1C, blood pressure or cholesterol levels.^{123, 124}

“With the emergence of virtual health as a growing employee benefit,” says Adams, “digital diabetes programs are an ideal vehicle to deliver employer-sponsored chronic disease management and health coaching programs.”

7. Managing Diabetes in the Workplace

A. Employers Play a Key Role

Employers are concerned about the impact of diabetes on their bottom line but may not fully understand the complexities of diabetes and the implications for employees. They can play a pivotal role in helping their plan members and families reduce the risk of developing type 2 diabetes, and delay or reduce the risk of type 1 and 2 diabetes complications.

Employers and insurers are a key link to helping members navigate their health, says Adams. “Having a strong diabetes program for employees within benefit plans enables education and access to care. Helping employees and their families better manage or reduce the risk of type 2 diabetes has a positive impact on employers’ bottom lines while improving member health.” Clarke concurs: “I love the saying ‘If you don’t spend on wellness, you’ll have to spend on illness.’”

If you don’t spend on wellness, you’ll have to spend on illness.

“Despite the fact that diabetes is a serious epidemic in Canada and throughout the world, there continues to be a significant gap in the knowledge and awareness of risk factors accompanying this condition,” says Clarke.

“When we identify that diabetes is a significant cost to an employer,” she says, “we’ll review their benefit plan through a lens of diabetes management to ensure access and coverage to necessary medications, supplies and support services to help employees effectively manage their diabetes and function successfully in the workplace.”

The work environment can influence and impact an employee’s ability to manage their condition. “My health is super important to me,” says Pelcz, “and I think that it should also be important to employers, because better diabetes management leads to improved performance

at work.” She feels that employers with knowledge of diabetes, and who show support toward employees living with diabetes, can lead to improved health and performance. “I recommend that employers gain basic knowledge of diabetes and how it can affect an employee’s ability to perform at work. This will assist employees in their well-being and mental health.”

Sometimes employers don’t always know if people have diabetes, but if they do, Pelcz recommends that they talk to them and express their interest and support in order to help them reach their full potential in their role.

Lack of support for employees with diabetes can lead to absenteeism and loss of productivity over the long term. Research shows that workplaces that could not adequately provide support for their employees’ self management increased the risk of diabetes-related long-term complications, in part because employees

would let their blood glucose rise to higher-than-optimum levels to avoid hypoglycemic events.¹²⁵

Workplaces need to recognize the importance of diabetes and provide a supportive environment for employees who have diabetes or parents with a child who has diabetes (see Suggested Workplace Accommodations for Employees with Diabetes).

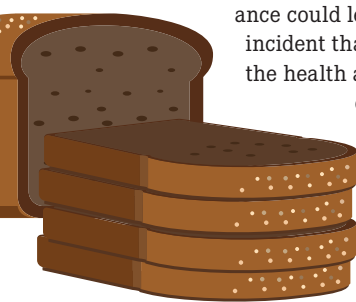
B. Diabetes and Workplace Safety^{126, 127}

Hypoglycemia and hypoglycemic unawareness can be significant, and unwanted treatment side effects present risk of cognitive impairment and potential safety implications.

Some safety-sensitive positions require a determination of medical fitness

because impaired performance could lead to an incident that could affect the health and safety of employees, the public, property or the environment. For most other workers, a supportive

workplace that includes accommodations for employees with diabetes can mitigate many of the risks.



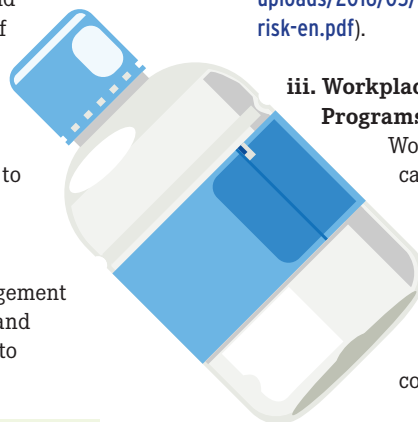
C. Workplace Program Ideas

Consider programming that encourages employees or their family members living with or at risk of developing diabetes to work with their healthcare providers to reduce their risk of diabetes and potential complications.

i. Best Practices for Workplace Diabetes Programs

Medavie's Adams' recommendations for workplace diabetes programs:

- Champion a holistic approach to diabetes – take care of the whole person, rather than just blood sugar
- Ensure benefit coverage for medications, services and tools within the health plan (e.g., supplies, devices, health coaching, mental-health support)
- Embrace solutions that leverage digital health and virtual care, as well as innovation and modernization of treatment
- Design programs that are convenient to access and easy to understand
- Run targeted campaigns to encourage engagement in the program and reduce barriers to accessing care



ii. Employee Diabetes Screening Programs

“Ideally, if we can get past COVID, a diabetes screening program should be offered onsite to employees along with the chance to consult with a diabetes educator,” suggests Clarke. Many people live with prediabetes or diabetes but haven't seen a doctor or been formally diagnosed or treated. “Years of unmanaged diabetes increases an employee's risk of heart disease, nerve damage and kidney disease. Workplace screening programs offer employees a chance to understand their risks in the convenience of their workplace.”

Employers can also offer the Canadian Diabetes Risk Questionnaire (CANRISK), which can help employees find out if they are at higher risk of having prediabetes or type 2 diabetes (available at: <https://canadiantaskforce.ca/wp-content/uploads/2016/05/2012-type-2-diabetes-can-risk-en.pdf>).

iii. Workplace Educational Programs

Workplace diabetes education programs should focus on information, tools and activities that make the connection between healthy behaviours and the reduction of chronic conditions like diabetes.

Suggested Workplace Accommodations for Employees with Diabetes:^{128, 129, 130, 131}

1. Private place to administer medications or conduct glucose checks
2. Storage for food, medication and testing supplies near workstation or break area
3. Flexibility to take breaks or leave meetings to treat or prevent low glucose (e.g., to eat or drink, take medication or check glucose levels)
4. Permission to carry and consume emergency sugar
5. Time off to attend medical appointments
6. Place to rest until glucose levels stabilize
7. “Sharps” disposal for insulin needles
8. Physical activity encouraged
9. Healthy food options provided
10. Structured self-help programs and education in diabetes care
11. Smoking cessation programs
12. Permission to wear a smartwatch or have access to a smartphone when these devices are the display devices for viewing glucose data, alarms and predictive alerts
13. Organizational factors and mental-health factors to reduce stress

Sometimes employees with diabetes might need an unscheduled break, says Pelcz, “because we might have a low blood sugar in the middle of a shift and it is important for us to treat a low blood glucose level, so we return to optimal performance.”

Diabetes Canada has a wide variety of resources and programs for employers who want to offer workplace support and education.

1. The Canadian Diabetes Prevention Program, a free, 12-month digital coaching program that empowers Canadians to lead a healthier life and reduce their risk of developing type 2 diabetes. <https://www.diabetes.ca/diabetes-prevention-program>
2. Ask the Experts Video Series, which provides answers from experts – doctors, clinicians, scientists and key stakeholders – on current priorities for individuals living with and impacted by diabetes. <https://www.diabetes.ca/resources/tools---resources/ask-the-experts>
3. Webinars on numerous diabetes-related topics. <https://www.diabetes.ca/resources/webinars?Categories=&SearchText=&Sort=&Page=1>
4. Diabetes Canada YouTube Channel, which has many resources, including webinars, Ask the Experts, healthy eating and physical activity videos. <https://www.youtube.com/user/CDA1927>

8. Canadian Diabetes Policy Landscape

A. Diabetes 360°: A Framework for a Diabetes Strategy for Canada

Over the past several years, Diabetes Canada and diabetes advocates have been urging the government to commit to support for a nationwide diabetes strategy for Canada. Diabetes Canada's recommendations are published in Diabetes 360°: A Framework for a Diabetes Strategy for Canada,¹³² which includes recommendations for national targets for prevention, screening, treatment and outcomes.

"Canada has an unprecedented opportunity to implement innovative policy and exercise global leadership with bold action on diabetes."

—DIABETES CANADA¹³³

The federal government's 2021 budget committed \$35M over five years for diabetes research, surveillance, prevention, innovation and the development of a comprehensive diabetes framework.^{134, 135}

"A national framework for diabetes in Canada will help prevent millions of cases of diabetes, reduce hospitalizations and improve health outcomes. We look forward to the opportunity to work alongside the governments to help facilitate its implementation and this important step forward in the path towards a world

free from the effects of diabetes," says Amanda Sterczyk, manager of research and public policy, Diabetes Canada.

Benefit plan sponsors will benefit from this framework that aims to improve diabetes incidence and health outcomes.

B. Diabetes Canada's Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada¹³⁶

Diabetes Canada publishes comprehensive, evidence-based clinical guidelines for diabetes care and prevention efforts. They are intended to support decision-making by providing recommendations informed by the best available evidence; however, therapeutic decisions are ultimately made between the healthcare provider and the person with diabetes.

Private benefit plan managers can use these guidelines to create programs to reduce an individual's risk of developing type 2 diabetes, as well as determine criteria for coverage of medications and devices, and provide support to employees with, or caregivers of people with, type 1 and type 2 diabetes.

C. Coverage and Access

i. Private Coverage

Benefit plan coverage can vary greatly; therefore, plan details should be verified directly with the payer.

"Lifestyle modifications, such as diet and exercise, are pillars of diabetes management," notes Quiambao. She recommends "benefit coverage for

paramedical services and programs that provide support and promote lifestyle modifications that are recommended for diabetes self management." This could include dietitian coverage, health-coaching services for chronic disease, wellness support that includes mental-health services, discounts on fitness memberships or even wearable tech that promotes increased physical activity.

"Plan sponsors could consider reducing or waiving co-pays and deductibles for diabetes-related drugs and devices for plan members with diabetes," suggests Sterczyk. "Out-of-pocket costs for people living with diabetes are in the thousands of dollars." Diabetes Canada also recommends that benefit plans offer full vision-care coverage to encourage employees with diabetes to get their recommended annual eye exam.

"We need to support members with access to treatments and tools to help alleviate some of the stressors associated with managing diabetes, whether for themselves or their children," says Adams.

"It's not really something we can just not buy, it's not really our choice. We have to buy insulin and the supplies that we need to manage our health and stay alive."

—NICOLE PELCZ

Affordability Affects Outcomes

"I think it's important for employers to cover diabetes treatments and supplies, because diabetes costs a lot," says Pelcz. "It's not really something we can just not buy, it's not really our choice. We have to buy insulin and the supplies that we need to manage our health and stay alive."

For people without benefits coverage, a large portion of their paycheck may go toward diabetes, says Pelcz. "I know people whose money is tight, and they've had to start rationing insulin, which will lead to more complications down the road." If an employee with diabetes is not able to access the supplies and treatments they needed, says Pelcz, "I think it would affect their performance."

Access Impacts the Family

"Unfortunately, I don't think that employers or insurance companies realize how much diabetes costs," says Orth, who explained that their family went through quite a bit of their savings in the first 17 months after their daughter Sophia's diagnosis. "There were a lot of unexpected expenses, and we did not have benefit coverage."

"It can be difficult to afford the costs because we are a paycheck-to-paycheck type of family. It seems like every time there was a little bit of a savings built up, Sophia needed new technology." According to Orth, even when they had benefit coverage, it didn't cover the full cost. "BC PharmaCare may pay the balance; however, if our PharmaCare deductible hadn't been reached yet that year, we had to pay the balance of the cost."

"Once when we could not afford a new insulin pump that Sophia needed," explains Orth, "one of our friends gave us one of their older pumps, which got us through for another year." Another time their son's hockey team sponsored Sophia as a community service and, she says, "they rallied to pay the balance of the cost of the pump that was not covered by my benefit plan."

"There was such a sense of relief for us when we got coverage for the devices Sophia needed," says Orth. "Before that, I just felt like I was always on edge. It really impacted me personally. I was always worried about where that next dollar was coming from. I was always stressed out and the rest of the family could feel it at home."



“I think there is the idea out there that if a person with diabetes is not on insulin, their diabetes is

not serious,” says Tanner, “and that they don’t need advance glucose monitoring devices.” Diabetes is a serious condition with potential long-term consequences regardless of the therapy a person is on, she says, and “tools that can help a person improve their diabetes management may have a cost in the short term; however, we should consider how this cost compares to the long-term

costs of diabetes that has not been managed over time and its costly complications.”

ii. Public Coverage

Public coverage and access to programs, treatments and tools to support people with diabetes varies by jurisdiction. Coverage varies widely and may differ by age, diabetes type and clinical criteria in each province.

Diabetes Canada’s Interprovincial Coverage Comparisons

1. Glucose Monitoring Devices (real-time continuous glucose monitors and intermittently scanned continuous glucose monitors)	https://www.diabetes.ca/DiabetesCanadaWebsite/media/Advocacy-and-Policy/Advocacy%20Reports/Advanced_Glucose_Monitoring_EN_OCT-2020.pdf
2. Insulin Pumps	https://www.diabetes.ca/DiabetesCanadaWebsite/media/Advocacy-and-Policy/Advocacy%20Reports/Insulin-Pumps-Comparison-EN.pdf

9. Plan Sponsor Checklist

A practical checklist for plan sponsors who want to tackle diabetes in the workplace.

Workplace Support

- ☐ Is your workplace environment supportive of employees with diabetes or who are caregivers of people with diabetes?
- ☐ Does your workplace avoid diabetes stigma?
- ☐ Does your workplace accommodate needs of employees with diabetes?

Benefit Plan Design

- ☐ Does your benefit plan coverage for glucose monitoring devices, such as intermittently scanned continuous glucose monitoring (isCGM) and real-time continuous glucose monitoring (rtCGM), align with Diabetes Canada’s blood glucose monitoring recommendations?
- ☐ Does your drug plan:
 - ☐ cover medications employees need to manage their diabetes? Are these medication-coverage decisions and criteria aligned with Diabetes Canada’s Clinical Practice Guidelines?
 - ☐ cover medications for treating obesity? Are these medication-coverage decisions and criteria aligned with Obesity Canada’s Clinical Practice Guidelines?
- ☐ Have you considered reducing or waiving co-pays and deductibles for diabetes-related drugs and devices?
- ☐ Do you offer full vision-care coverage to encourage employees with diabetes to get their recommended annual eye exam?
- ☐ Does your benefit plan provide coverage for paramedical services or chronic disease coaching programs that provide support and promote lifestyle modifications recommended for diabetes management or risk reduction?
- ☐ Does your benefit plan provide mental-health support to employees with diabetes who are facing diabetes distress, burnout, stigma or guilt?
- ☐ Do you offer or cover digital diabetes care?

Workplace Programs

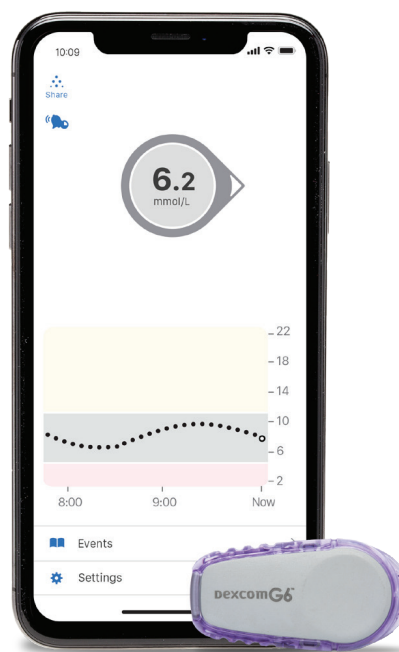
- ☐ Do your programs align with Diabetes Canada’s Clinical Practice Guidelines?
- ☐ Do your programs consider the whole person and look beyond simply their medical condition?
- ☐ Do your programs support employees who are at-risk of type 2 diabetes or in the prediabetes stage?
- ☐ Do you offer programs to support people in the management of overweight and obesity?
- ☐ Do you offer programs to fight diabetes stigma and promote a supportive work environment for employees dealing with diabetes or caregivers of people with diabetes?
- ☐ Do you offer employee diabetes screening programs?
- ☐ Do you offer workplace programs, tools and activities that make the connection between healthy behaviours and the reduction of chronic conditions like diabetes?
- ☐ Have you created targeted campaigns to encourage engagement in your programs?

ENDNOTES

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