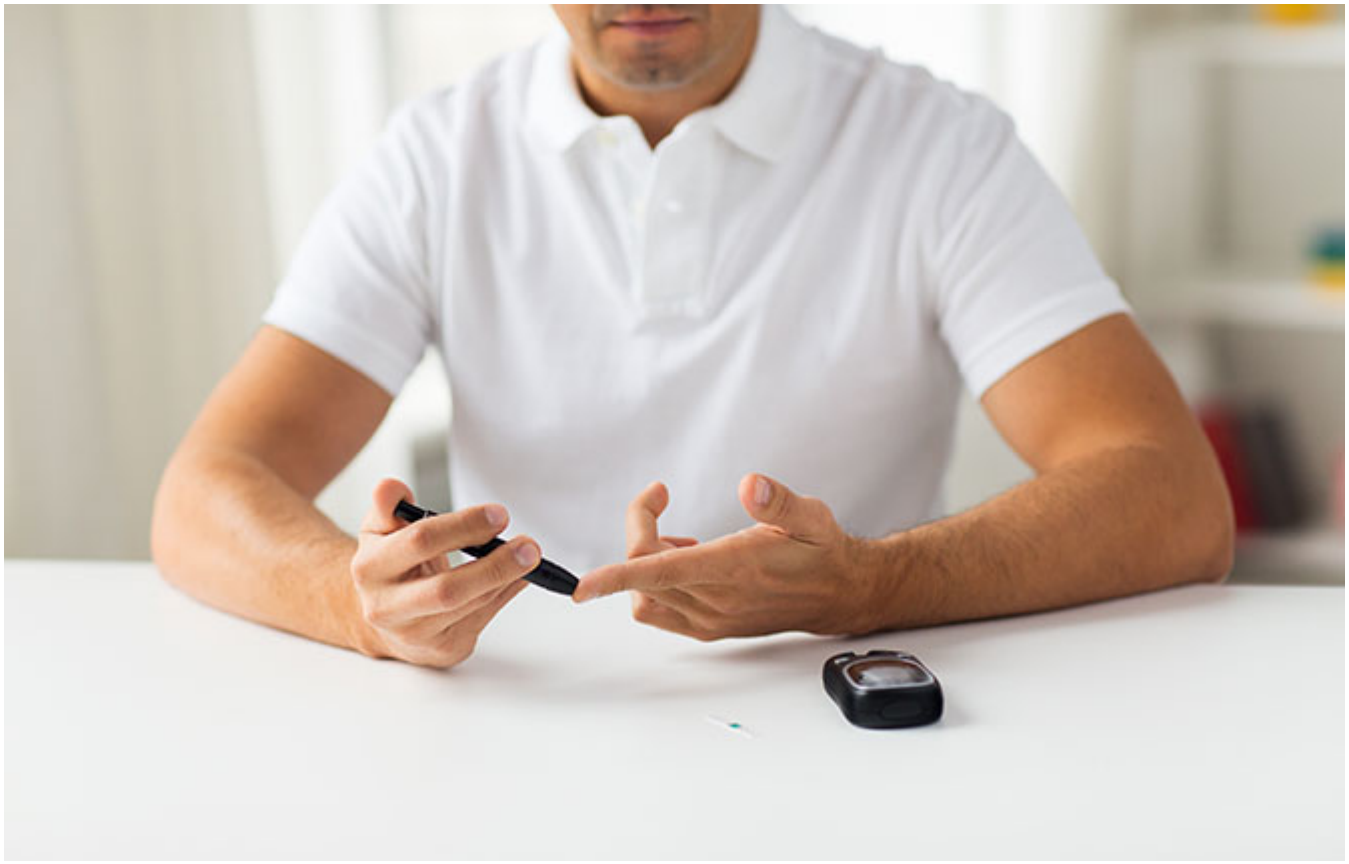

Diabetes is a serious condition affecting around 9.2 percent of the Canadian population. By 2026 that percentage is expected to climb to 11.6 percent. The World Health Organization (WHO) reported that approximately 422 million adults were living with diabetes as of 2014. According to the Canadian Diabetes Association, one in ten Canadians die due to diabetes complications. Those are alarming figures, particularly since type 2 diabetes (affecting around 50 percent of diabetics) can often be prevented or managed with exercise and healthy eating.

There are four types of diabetes.

Types of Diabetes

Type 1 Diabetes

Also known as Insulin Dependent Diabetes Mellitus (IDDM) or juvenile diabetes. This type typically strikes before the age of 30. It occurs when the pancreas no longer produces sufficient insulin, a crucial hormone in the transportation of sugar to our cells. Type 1 accounts for an estimated 10 percent of diabetes cases. In over 85 percent of those with type 1 diabetes, the immune system destroys the pancreatic insulin-secreting beta cells. The inability of the pancreas to produce insulin causes glucose to build up in the bloodstream. Because glucose is not transferred to the cells, the cells starve.

Type 2 Diabetes

Type 2, also called Non-Insulin Dependent Diabetes Mellitus (NIDDM), affects about 90 percent of those diagnosed with diabetes. Type 2 diabetics tend to be overweight and over the age of 40. However, the rate of type 2 diabetes in young children is increasing every year. In type 2 diabetes the peripheral organs and tissues have become resistant to insulin's effects, or the pancreas may produce lower amounts of insulin. However, insulin resistance is the most common cause of type 2 diabetes.

Type 3 Diabetes

Diabetes type 3 is a newly discovered form of brain diabetes causing increased brain aging. The term describes insulin resistance in the brain that triggers dementia or Alzheimer's disease. While the links are still being researched there are compelling studies showing how insulin levels affect the brain. Having type 2 diabetes increases the chance of developing Alzheimer's by 50 to 60 percent.

Gestational Diabetes

Gestational diabetes occurs in about 3 to 8 percent of pregnancies. Women who develop gestational diabetes, and their offspring, are at much higher risk of diabetes later in life. Breastfeeding after delivery is especially important for babies born to mothers with gestational diabetes as it will decrease chances of diabetes and obesity later in life.

Symptoms

Type 2 diabetes is an insidious condition, with symptoms appearing so gradually that they often go unnoticed.

Symptoms of diabetes:

- Blurred vision
- Cuts and bruises that are slow to heal
- Excessive hunger and thirst
- Extreme lack of energy
- Fatigue
- Frequent and copious urination
- Irritability
- Skin tags that grow on the neck, face, armpit, groin and the folds under the breasts are also a sign of diabetes. Sixty percent of those with skin tags have type 2 diabetes.
- Tingling or numbness in hands and feet
- Weight loss or gain

Complications of diabetes include:

- Blindness
- Erectile dysfunction
- Gangrene
- Heart disease
- Kidney disease

Type 3 diabetes shares symptoms with dementia and Alzheimer’s:

- Forgetting how to do normal daily tasks
- Forgetting where one is going or getting lost
- Losing items and not being able to retrace steps
- Memory loss
- Personality changes
- Poor judgment

Causes

Type 1 Causes

Type 1 diabetes results from damage to the cells in the pancreas responsible for insulin production as a result of a virus, infection or other immune system destruction. It is also possible that an allergy to the albumin in milk promotes destruction of the insulin-producing cells. Mothers are encouraged to breastfeed their children, as clinical research shows that breastfed infants do not develop type 1 diabetes as often as those on non-human milk-based formulas. Researchers have found that the introduction of gluten-containing foods before the age of 6 months may also increase the risk of developing type 1 diabetes in childhood. Genetics; only people with a specific HLA complex can develop type 1 diabetes.

Type 2 Causes

Diet and lifestyle play a huge role in the development of type 2 diabetes, and genetics is another important factor. There are many DNA variations that contribute to the risk of developing type 2 diabetes. In addition, some people's DNA actually reduce their risk of developing the disease. Certain ethnic backgrounds are at a much higher risk of developing the disease such as those whose origins are African (includes African-American, Afro-Caribbean, etc.), Hispanic, or First Nations.

The Western diet of high sugar and high fat processed foods, coupled with reduced consumption of fruits, vegetables, and fiber leave many people undernourished and overweight. Insulin is the main hormone that contributes to weight problems. The standard high-carbohydrate, low-protein diet disrupts the body's ability to regulate blood sugar adequately. When the body pumps out too much insulin in its attempt to reduce high blood glucose, a person typically gains weight and becomes stout. In addition, cells become resistant to insulin and weight loss.

Being overweight greatly increases the chance of becoming insulin resistant. Resistance to insulin increases the risk of diabetes, as well as cancer and heart disease. Those with an apple-shape or "beer belly," with excess weight around the middle, are at serious risk of disease. In North America, one in four children between the ages of two and five are obese. Over 60 percent of adults are overweight, and 15 to 30 percent are considered obese.

While about 90 percent of those who develop type 2 diabetes are overweight, thinly built people with a strong genetic predisposition may still develop diabetes. In addition to their

genetics, slimmer people who live sedentary lives and have low muscle mass are at a greater risk of becoming insulin resistant and diabetic. Stress, inflammation, and fatty liver disease may all contribute to diabetes in people who are not overweight.

Type 3 Causes

The inflammation caused by diabetes can damage the brain. There may be a genetic link to this form. A specific gene variant of Apolipoprotein E, which is found in 50 percent of people living with Alzheimer's disease, known as ApoE4, has been shown to indicate memory impairment in mice. When combined with a high fat diet the mice also showed insulin resistance in the brain, which led to brains cells becoming damaged. The ApoE4 gene is found in up to 20 percent of the human population.

Gestational Diabetes Causes

Gestational diabetes occurs due to, at least in part, hormones produced by the placenta. These hormones contribute to insulin resistance, causing blood sugar to rise.

It is not fully understood why some women develop gestational diabetes but there are known risk factors, such as:

- Being over 25 years of age
- Being overweight
- Having a family history of type 2 diabetes
- Having a non-white ethnic background

Testing

Blood Glucose Monitoring:

According to the American Diabetes Association, the diagnostic standards for diabetes are:

- A fasting plasma glucose level equal to or greater than 126 mg/dL
- A plasma glucose higher than 200 mg/d after ingesting 75 g glucose
- Sugar in the urine when blood glucose levels are around 160–180 per 100 mL blood

There are two tests to determine prediabetes: the fasting plasma glucose test (FPG) and the oral glucose-tolerance test (OGTT). If blood glucose level is abnormal after the FPG, impaired fasting glucose (IFG) is indicated; if blood glucose level is abnormal after the

OGTT, one is said to have impaired glucose tolerance (IGT).

Prescription for Health

Diet

A healthy diet is essential for those with diabetes.

Carbohydrates – Adopt the simple rule of not eating any white foods – white sugar, white flour, white pasta, white rice, white potatoes, etc. Avoid all processed foods. Processed foods often contain sugars, trans-fatty acids and refined carbohydrates which take only a few minutes to cause a rapid increase in blood sugar, and a corresponding release of insulin. A complex or non-refined carbohydrate can take hours to convert to glucose and is therefore a healthier choice. Grains in their whole form make great breakfast porridges and work well in savoury meals as a replacement for rice or other starches. The foods below also increase the amount of fiber in the diet, which is important for diabetics.

Include:

- Brown rice
- Buckwheat
- Millet
- Quinoa
- Steel cut oats or whole oat grouts
- Whole grain pastas

Fats – Avoid sources of poor-quality saturated fats such as deep-fried foods (chips, crackers, doughnuts), margarine, poor-quality oils (canola, safflower, sunflower, peanut and soy oils), hydrogenated and trans-fats. Research published in the *American Journal of Clinical Nutrition* stated that women eating a diet high in trans-fatty acids have an increased risk of developing diabetes. Reduce consumption of cheese and red meats. To increase intake of EPA and DHA, add regular servings of fish, such as salmon, herring or mackerel. Insulin levels normalize or decrease when saturated fats (the bad ones) are replaced with essential fats from quality sources.

Include:

- Avocado oil

- Borage oil (do not heat)
- Coconut oil
- Extra virgin olive oil
- Flax oil (do not heat)
- Grass-fed butter or ghee

Protein – Avoid or greatly reduce processed meats such as hot dogs and bologna. Aside from increasing cancer risk, research has shown that eating processed meats five or more times per week is a risk factor for developing diabetes. Eat small amounts of protein throughout the day. Protein, when consumed in small amounts, inhibits the rise of glucose and stimulates glucagon to release stored carbohydrates in the liver. However, too much protein has been shown to increase insulin, especially when consumed with certain types of carbohydrates. When simple, refined carbohydrates are combined with too much protein—for example, the burger with the white flour bun—insulin increases. Consume good protein sources with excellent carbohydrate sources low on the glycemic index, while adding good fats and avoiding sugars.

Include:

- Nuts and seeds
- Organic, free-range chicken and eggs
- Organic, pasture-raised beef in small quantities
- Wild fishes (Mackerel, sardines, anchovies, salmon)

Dairy – Avoid low-fat and skim milk and fruit yogurts as they are high in carbohydrates. The following organic, grass-fed items are okay in moderation for those who are not sensitive to dairy:

- Butter or ghee
- Goat’s milk, cheese, or butter
- Plain sugar-free, whole milk yogurt

Vegetables and fruit – Eat brightly coloured fruits and vegetables because they are high in vitamins and minerals and low on the glycemic index. Regular consumption of fruits and vegetables reduces the risk of developing diabetes. Be sure to include lots of vegetables, especially the cruciferous vegetables (cauliflower, cabbage, broccoli, Brussels sprouts) and vegetable/fruits that encourage healthy liver function, such as artichokes, rhubarb, Chinese white radish, black radish, apples, and rolled oats. The Finnish Diabetes Prevention Study Group found that lifestyle modifications using diet and exercise reduced the incidence of

diabetes in high-risk men and women by almost 60 percent.

Sweeteners – Eliminate artificial sweeteners (aspartame, saccharine, sucralose) and use stevia (containing no sugars and having zero calories). Stevia has been shown to have a positive effect on the pancreas. Xylitol (which has been researched to prevent periodontal disease) is another sweetening option for those with diabetes.

Lifestyle

Walking as little as 30 minutes per day can dramatically reduce the side effects associated with diabetes while aiding the return of normal blood glucose and insulin regulation. Losing as little as 2 to 14 percent of excess body fat has been shown to reduce triglycerides and high cholesterol, as well as normalize fasting blood glucose and plasma insulin. Weight-bearing exercises should also be included as they help to improve insulin sensitivity. Combining aerobic exercise with weight lifting can help to prevent complications associated with diabetes such as high blood pressure and heart disease.

Avoid alcohol and cigarettes. Certain forms of alcohol are high in sugars and are anti-nutrient in that they increase the body's need for nutrients that are essential for those with diabetes. When drinking, avoid beverages high in sugar such as coolers and sugary mixers. Instead, opt for dry wines, unflavoured liquor and sparkling water as a mixer. Those on insulin should be aware that high amounts of alcohol can hinder the release of glucose from the liver into the bloodstream, causing blood sugar levels to become too low.

Cigarette smoking increases insulin resistance and high circulating blood insulin levels. People who smoke are at an increased risk of developing type 2 diabetes compared to non-smokers. Cigarettes destroy nutrients that are needed for optimal health. Smoking is damaging to all bodies, however for those with diabetes there is an even greater risk of damage to blood vessels which can cause serious diabetic complications to occur more quickly.

High levels of mental or physical stress can cause blood sugar levels to rise in those with type 2 diabetes, and may cause high or low blood sugar in those with type 1 diabetes. Reducing stress levels and learning how to manage and cope with stress in healthy ways are important for those with diabetes.

Supplements

Research published in the Journal of Epidemiology 2002 found that by taking a vitamin and

mineral supplement, the risk of developing diabetes was reduced by 30 percent in men and 16 percent in women. Basic nutrients are the foundation on which to build a good personalized anti-diabetes program.

Nutrient	Dosage	Action
Vitamin C (calcium ascorbate, magnesium ascorbate, potassium ascorbate)	1000–2000 mg daily in divided doses	Prevents vitamin C deficiency and reduces sorbitol and aldose reductase (an enzyme that causes many diabetic complications) High sorbitol can damage sensitive tissues in the eyes causing retinopathies Vitamin C protects against retinopathy
D-Chiro-Inositol	600–1200 mg	Mediates insulin, modulates serotonin to reduce food cravings, helps control blood glucose levels Beneficial for building muscle, weight control and conditions associated with hormone imbalance
Alpha-Lipoic Acid	600 mg daily	A potent antioxidant that slows oxidative damage to cells, increases glucose uptake to cells, improves insulin sensitivity and reduces the symptoms of diabetic neuropathy such as cataract formation and nerve and vein damage
Whey Protein Powder	2 scoops daily containing: whey protein 40 g	Revs up fat burning, helps control appetite, and balances blood sugar
Conjugated Linoleic Acid (CLA)	5000 mg	CLA helps diabetics control their blood glucose and insulin levels; CLA also improves insulin’s action and decreases circulating glucose levels
Borage Oil	2000 mg daily	Improves diabetes-related peripheral nerve dysfunction and supplies gamma linoleic acid (GLA) fatty acids that support normal blood glucose and insulin levels
Omega-3 Fatty Acids	500 mg of DHA and 750 mg of EPA	Lowers blood pressure, increases the level of good cholesterol, reduces the level of bad cholesterol and lowers the level of fibrinogen, a protein that makes blood thicker and stickier Also necessary for the formation of prostaglandins

Health Tips to Enhance Healing

- Avoid all processed foods. Processed foods contain sugars and trans-fatty acids, and refined carbohydrates increase blood sugar and a release of insulin.
- Consume complex carbohydrates in the whole grain form. A complex or non-refined carbohydrate is healthier as it can take hours to convert to glucose.
- Consume good protein sources with excellent carbohydrate sources low on the glycemic index, while also adding good fats and avoiding sugars.
- Do not eat any white foods – white sugar, white flour, white pasta, white rice, white potatoes, etc.
- Eat brightly coloured fruits and vegetables; they are high in vitamins and minerals and low on the glycemic index.
- Eat small amounts of protein throughout the day. Protein, when eaten in small amounts, helps to regulate blood sugar.
- Eat small, frequent meals high in protein.
- Eat up to 40 grams of fiber daily.
- Eliminate artificial sweeteners (aspartame, saccharine, sucralose) and use stevia or Xylitol (both contain no sugars and have zero calories).
- Include a mix of moderate and vigorous exercises as well as weight lifting.
- Increase intake of EPA and DHA via fish or fish oils.
- Lose weight. Excess weight may increase insulin resistance.
- Remove trans and saturated fats from diet.
- Take time to relax and recover during stressful periods.

