

TREATMENT BULLETIN

A comprehensive guide to health and well-being for people living with HIV/AIDS

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DIABETES & HIV: WHAT YOU NEED TO KNOW

Toronto People With AIDS Foundation

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Disclaimer: The Treatment Resources Program at the Toronto People With AIDS Foundation provides information and resources to empower people living with HIV/AIDS to be proactive around their health by working in partnership with their health care providers. We do not recommend or promote any treatment in particular. We strongly urge those interested in any specific treatment to consult a wide range of resources, including a qualified medical and/or complementary therapy practitioner who has experience in working with HIV+ individuals.

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Diabetes mellitus (commonly just referred to as diabetes) is a condition that results from high levels of glucose (sugar) in the blood. Diabetes has become a global epidemic, with over 285 million people worldwide being affected. According to the Canadian Diabetes Association, more than 9 million Canadians are diabetic or pre-diabetic. In a country with a population of approximately 34 million, 9 million is no small number!

Diabetes is a concern for individuals living with HIV/AIDS since studies have found that antiretroviral medications can make people more at risk for developing type 2 diabetes, the main type of diabetes present globally. This treatment bulletin will provide you with an overview of diabetes, including its causes, management, and prevention, with a specific focus on type 2 diabetes.

BLOOD SUGAR CONTROL 101

Sugar, and more specifically glucose, is the main source of energy used by the body. Blood sugar levels are very tightly regulated in our bodies, ensuring that a relatively constant amount is present to meet our energy needs. The pancreas is the main organ involved in blood sugar regulation.

When we eat, the carbohydrates (which are made of sugar) in our meal quickly get broken down and enter our blood stream. Glucose is the only form of sugar that can be used by the body for energy and so other sugars, like fructose, which is found in fruits, get converted to glucose. The pancreas quickly releases a hormone called insulin in response to rising blood glucose levels and allows blood sugar to be taken up by cells to be converted to energy. Any glucose not being immediately used for energy is stored for later use. It can be stored in the liver and muscles as a large molecule called glycogen, or converted to fat tissue.

When our blood sugar begins to run low, such as between meals, the pancreas will release another hormone called glucagon, which works opposite to insulin and raises blood sugar levels. It does this by causing the liver to turn its stored glycogen back into glucose and release it into the blood. The body can turn fat back into sugar, but it is a much more complex process.

TYPES OF DIABETES

There are 3 types of diabetes, type 1, type 2, and gestational, all with different causes.

Type 1 diabetes can occur anytime before the age of 30, but is most commonly diagnosed in children and adolescents. It occurs when the pancreas cannot produce insulin, which results in blood sugar levels that are high. We know that type 1 diabetes happens when the immune system destroys cells in the pancreas that produce insulin (an autoimmune reaction), but don't know why this occurs. Type 1 diabetes isn't preventable and accounts for about 10% of diabetes cases.

Type 2 diabetes is the most prevalent form of diabetes worldwide and is the one responsible for rising rates of diabetes globally. It is usually diagnosed in adulthood and accounts for 90% of diabetes cases. It happens when the pancreas does not produce enough insulin or when the body cannot use insulin you make (insulin resistance). There are certain risk factors that increase your chances of getting type 2 diabetes that will be discussed later in this bulletin. This is the form of diabetes which most affects people living with HIV/AIDS.

Gestational diabetes is diabetes that occurs during pregnancy. It is temporary and usually resolves after birth but does place both the mom and the baby at risk of developing diabetes later in life. Babies born to mothers with uncontrolled diabetes are often quite large and required a caesarian section to be delivered.

Pre-diabetes is a condition where blood sugar levels are higher than normal but not high enough to be given a formal diagnosis of diabetes (which occurs when fasting blood glucose are 7.0 mmol/L or higher). Pre-diabetes further increases your risk for developing type 2 diabetes, and many individuals do. This is where dietary and lifestyle interventions aimed at reducing risk factors for diabetes can be most effective.



RISK FACTORS

There are several factors that put you at increased risk for type 2 diabetes, some of which can be modified. Risk factors for type 2 diabetes include:

- * Being over the age of 40
- * Having a family history of type 2 diabetes
- * Being of Aboriginal, Hispanic, Asian, South Asian, or African descent since these populations have a higher risk for diabetes
- * Having heart disease, high blood pressure, and/or high cholesterol
- * Having a history of gestational diabetes
- * Being overweight, particularly abdominal obesity

While you can't alter your age, family history, or descent, the other risk factors can be changed and prevention of type 2 diabetes is largely focused around reducing risk factors.

HOW IS DIABETES DIAGNOSED?

SYMPTOMS

Your doctor may discover that your blood sugar is high before you notice any symptoms. With type 1 diabetes, symptoms usually come on quite rapidly, whereas with type 2 diabetes the symptoms usually come on gradually, if at all.

When symptoms of diabetes are present they include:

- * Excessive thirst
- * Excessive eating
- * Frequent urination
- * Difficulty healing (e.g. wounds)
- * Unexplained weight loss
- * Fatigue

BLOOD TESTS

Diabetes is diagnosed using blood tests that measure the amount of glucose present in your blood. Often times it is discovered during routine screening as part of your physical exam. If you are at increased risk for developing diabetes, such as can occur with some HIV medications, your doctor may monitor you more frequently.

To get the most accurate results, blood glucose is best measured after you have been fasting for 8-12 hours. This ensures that a recently eaten meal doesn't affect the results. Normal fasting blood glucose results should fall between 3.6 and 6.0 mmol/L. When results lie between 6.1 and 6.9 mmol/L this indicates pre-diabetes and your doctor may choose to send you to a diabetes clinic for monitoring and education on dietary ways to keep blood sugar under control. Values of 7.0 mmol/L or higher are considered diagnostic of diabetes.

HOW IS DIABETES TREATED?

If you have been diagnosed with diabetes it is very important that you do your best to manage it. Poorly controlled diabetes can have some serious long-term consequences, some of which can potentially be fatal.

The following are *long-term complications* of poorly managed diabetes:

- Blindness
- Heart disease
- Kidney damage
- Poor circulation to limbs which may result in amputation
- Nerve damage causing peripheral neuropathy
- Erectile dysfunction
- Stroke

Type 1 diabetes is treated using insulin injections whereas type 2 diabetes is generally treated using medications that control blood sugar. With time, if type 2 diabetes progresses, insulin injections may be needed as well.



One of the most important aspects of treating diabetes involves dietary and lifestyle interventions. You should meet with a dietician who can guide you through making the changes you need to effectively manage your diabetes. Dietary and lifestyle interventions are discussed in the "Preventing and managing diabetes" section found later in this bulletin.

You will be required to check your blood sugar at home. This involves pricking your finger (making sure to change fingers often so that they don't get too tender!) to get a drop of blood, which is placed on a small test strip and measured by a glucose monitor. Technology has advanced significantly and several different types of glucose monitors are available and needles used to prick the skin are thin and virtually painless. Newer monitors even allow you to use alternate test sites such as your forearm or thigh. Your doctor will also monitor your blood sugar and hemoglobin A1c, a test which gives them a picture of what your blood glucose has been, on average, over the last 2-3 months.

DIABETES & HIV

High blood sugar can be a side effect of HIV medications, particularly protease inhibitors. This can increase your risk of developing pre-diabetes or diabetes. Co-infection with hepatitis C appears to further increase the risk. If you are on a protease inhibitor-containing regimen your doctor should check your blood sugar regularly. If your blood sugar becomes elevated he or she may recommend switching regimens, if possible.

Lipodystrophy, a condition affecting fat distribution in the body that some individuals living with HIV/AIDS experience, can also increase your blood sugar as well as your cholesterol and triglyceride levels. It is important to be aware of all the risk factors and conditions you have so that you can make informed decisions that will help lead to optimal health.

PREVENTING & MANAGING DIABETES

While changing your diet and lifestyle can be challenging, it is perhaps the most effective way of both preventing and managing diabetes. If you are pre-diabetic, the changes can bring you back into a healthy blood glucose level, and if you are diabetic, it can reduce the amount of medication you need to take. Always consult with a dietician or a healthcare professional knowledgeable about dietary management of diabetes to ensure you are maintaining an overall healthy diet.

Tips for preventing and managing diabetes include:



Maintaining a healthy weight can prevent you from developing diabetes and losing weight can have a tremendous impact on your diabetes. Use diet changes and exercise to maintain a healthy weight for the long term. Crash diets and many popular weight loss programs and products produce short-term weight loss but often result in increased weight gain once stopped.

Stay physically active. Exercise doesn't have to be torture! Focus on activities you enjoy and be creative – swim, dance, walk, hike, rock climb! It is recommended to exercise for at least 30 minutes, 5 times per week. Make sure to build up gradually though, as you don't want to strain any muscles. Also make sure to check with your doctor before starting any new exercise routine if you haven't previously exercised regularly. Make use of your local community centre or YMCA, which can offer programming for free or a minimal fee.

Eating a well balanced diet is important for everyone, regardless of health status. Try to maintain a diet high in vegetables and whole grains, low in saturated and trans fats, and low in simple sugars (think anything refined or processed). Eating within Canada's food guide recommendations will keep you on the right track. The food guide is available for free on Health Canada's website and you can order a copy at no cost to you.

Watch portion sizes. This is perhaps one of the most important tips to follow and where we often go wrong. When filling your dinner plate, $\frac{1}{4}$ of it should be protein, $\frac{1}{4}$ starch or grain, and $\frac{1}{2}$ of your plate should be vegetables (including salad). We often consume way above the calories we need simply because our portion sizes tend to be much larger than necessary. Eating slowly and consciously and stopping when full can help you stay within a healthy calorie range.

Learn to read food labels. We often buy and consume food without giving a second thought to its nutritional contents or ingredients and this can leave us making some very unhealthy choices. Look for the serving size (which is what the information on the nutrition label is based on), the amount of calories in a serving, and the fat, sugar, and sodium content. Also pay attention the % Daily Value, which tells you how much of each type of nutrient you are getting in one serving from what is recommended for the whole day. It's a quick way to judge whether the food is high or low in different nutrients. Also look at the ingredients list for hidden sources of sugar, for example, high fructose corn syrup.

Keep alcohol intake to a moderate level. Alcohol can cause your blood sugar to drop too low, especially if you are on medication to treat diabetes, which can be dangerous. Discuss alcohol consumption with your doctor, and if your doctor is comfortable, keep alcohol intake to a moderate level; that means one drink per day for women, and two for men.

Don't smoke. Smoking, high blood sugar, and HIV infection on their own each increase risk for heart disease and many other conditions. Together, the risk for heart attack is significantly higher and can contribute to faster development of long-term consequences of diabetes. There are many options available to help you quit. Speak to your doctor to see what might work best for you – you don't have to do it alone!

Visit your doctor for regular check ups. He or she will ensure that your blood sugar, cholesterol, and blood pressure are being kept in healthy range and help you to manage your conditions effectively. You should also get your eyes and feet checked regularly so that any long-term consequences of diabetes can be diagnosed and treated early. Don't be afraid to ask questions or bring up any symptoms that may be bothering you – your doctor is your ally in keeping you healthy!

The Toronto People With AIDS Foundation exists to promote the health and well-being of all people living with HIV/AIDS by providing accessible, direct, and practical support services.

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