

# *Living Well With Diabetes*

## **Diabetes Overview**

### ***Diabetes: A Serious Health Problem***

Diabetes is the fifth-deadliest disease in the United States, contributing to more than 224,000 deaths in 2002. There are more than 20 million children and adults in the United States who have diabetes. An estimated 14 million have been diagnosed, but 6 million people are unaware that they have the disease. In 2007, approximately 9 percent of adults in Arkansas were told by a doctor that they had diabetes.

Diabetes is a costly, chronic disease that has no cure. Direct and indirect costs of diabetes to the nation account for about 10 percent of the total health care costs. The prevalence of diabetes is rising with the aging of the U.S. population, the growth in minority populations—those most susceptible to type 2 diabetes—and the increasing prevalence of obesity among Americans. Diabetes is the leading cause of adult blindness, end-stage kidney disease and non-traumatic lower limb amputations. In addition, people with diabetes are at increased risk of heart disease and stroke.

### ***What Is Diabetes?***

Diabetes is a metabolic disease in which the body does not produce or properly use insulin, a hormone necessary to move blood sugar into cells where it can be used for energy. Diabetes is characterized by high levels of blood glucose (sugar).

### ***What Are the Main Types of Diabetes?***

**Type 1** is an autoimmune disease in which the body does not produce insulin. Type 1 diabetes accounts for 5 to 10 percent of diabetes and occurs most often in children and young adults.

**Type 2** or non-insulin dependent diabetes, is the most common form of diabetes. It usually occurs in people over age 45, but a person can develop type 2 diabetes at any age. In recent years there has been an increase in type 2 diabetes diagnosis in children. Type 2 diabetes is a metabolic disorder in which the body either does not make enough insulin or cells do not respond to the insulin. Most people with this type of diabetes do not need insulin injections. They can usually control their diabetes by achieving or maintaining a healthy weight, being physically active, and following a sensible diet. However, sometimes it is necessary for these treatment options to be used in combination with oral medications and/or insulin.

**Gestational diabetes** occurs in about 4 percent of all pregnancies, but usually disappears after pregnancy. This is a temporary form of insulin resistance which occurs during pregnancy due to excessive hormone production or the inability of the pancreas to make the additional insulin needed during some pregnancies. Women with gestational diabetes are at increased risk for developing type 2 diabetes later in life.

**Pre-diabetes**, also called impaired glucose tolerance (IGT) or impaired fasting glucose (IFG), is a condition that raises the risk of developing type 2 diabetes, heart disease, and stroke. People with pre-diabetes have blood glucose levels higher than normal, but not high enough to be classified as diabetes.

**Other** less common types of diabetes may account for 1 to 2 percent of all diagnosed cases of diabetes and result from specific genetic syndromes, surgery, drugs, malnutrition, infections and other illnesses.

### ***Warning signs of diabetes***

- Extreme thirst
- Frequent urination
- Extreme hunger
- Fatigue
- Unintentional weight loss
- Slow healing sores
- Dry, itchy skin
- Tingling or numbness in hands or feet
- Blurred vision

Often people with diabetes may have one or more these symptoms before they find out they have diabetes. Or they may have had no symptoms at all. A blood test to check glucose levels will show if a person has pre-diabetes or diabetes.

### ***A person is at greater risk for type 1 diabetes if they:***

- Have a sibling with type 1 diabetes
- Have a parent with type 1 diabetes

## ***Problems of Type 1 Diabetes***

People with type 1 diabetes should be prepared for these three problems:

- **Hypoglycemia** or low blood sugar occurs when blood sugar drops too low.
- **Hyperglycemia** or high blood sugar occurs when blood sugar is too high.
- **Ketoacidosis** is a serious condition which can occur when ketone levels become dangerously high. Ketones are acids that build up in the blood. They appear in the urine when the body does not have enough insulin. Ketones can poison the body. Ketoacidosis can lead to diabetic coma or even death.

A person with type 1 diabetes should discuss such problems with his or her diabetes health care provider to learn the warning signs of these conditions and what to do if these problems should occur.

### ***A person is at greater risk for type 2 diabetes if they:***

- Are age 45 or older
- Are overweight
- Are physically inactive
- Have a family history of diabetes
- Have high blood pressure or high cholesterol
- Have low HDL or high triglycerides
- Have blood glucose levels that are higher than normal but not high enough to be called diabetes
- Are African American, American Indian, Alaska Native, Asian American, Pacific Islander, or Hispanic/Latino American
- Had gestational diabetes during pregnancy or gave birth to a baby weighing 9 or more pounds
- Have polycystic ovary syndrome
- Have dark, thick, velvety skin around their neck or in their armpits
- Have blood vessel problems affecting their heart, brain, or legs

## ***Diagnosis***

Doctors diagnose diabetes by measuring glucose in the blood. There are two types of tests—screening and diagnostic tests. Screening tests are done on individuals who have no symptoms of diabetes and persons at risk for developing diabetes. Screening tests are inexpensive and easy to do. They require a drop of blood from the fingertip and take only a minute or two to complete.

Diagnostic tests are used to confirm a diagnosis suspected from a patient's symptoms. Diagnostic tests require a larger blood sample drawn from a vein and is analyzed in a laboratory. Types of tests used to diagnose diabetes include fasting plasma glucose, random plasma glucose, and oral glucose tolerance tests.

The preferred way to diagnose diabetes is the fasting plasma glucose (FPG) test. This test requires an overnight fast of at least eight hours and a single blood sample drawn and sent to the laboratory for analysis. With the FPG test, a fasting blood glucose level between 100 and 125 mg/dl signals pre-diabetes. A person with a fasting blood glucose level of 126 mg/dl or higher has diabetes.

In the oral glucose tolerance test (OGTT), a person's blood glucose level is measured after a fast and two hours after drinking a glucose-rich beverage. Glucose tolerance tests may result in one of the following diagnoses:

- **Normal response** – glucose level is less than 140 mg/dl at the two-hour measure.
- **Impaired glucose tolerance (IGT)** – fasting glucose level is less than 126 mg/dl and the two-hour glucose level is between 140-199 mg/dl.
- **Diabetes** – two diagnostic tests performed on different days show that the blood glucose level is 200 mg/dl or greater.
- **Gestational diabetes** – female has any two of the following: fasting plasma glucose of more than 95 mg/dl, a one-hour glucose of more than 180 mg/dl, a two-hour glucose level of more than 155 mg/dl, or a three-hour glucose level greater than 140 mg/dl.

Once a patient has been diagnosed with diabetes, the doctor may order a blood test called glycated hemoglobin (GHb) or hemoglobin A1c. The doctor uses this test to monitor the patient's diabetes control. Hemoglobin is the protein in red blood cells that transports oxygen. GHb forms when glucose in the blood attaches to the hemoglobin. The more glucose there is in the blood, the more glucose attaches to hemoglobin. Blood cells remain in circulation for two to three months. Therefore, GHb is a good measure of a person's average blood glucose over the prior two to three months. High percentages of hemoglobin A1c mean a person's blood glucose has been high over a period of time.

### ***Complications of Diabetes***

About 224,000 people die annually due to diabetes and its complications. Many people only learn they have diabetes when one of the following complications develops:

- **Blindness** due to diabetic retinopathy. Diabetes is the leading cause of new cases of blindness in persons 20 to 44 years old.
- **Kidney disease** due to diabetic nephropathy, the most common cause of end-stage renal disease, a condition that requires dialysis or a kidney transplant.
- **Heart disease and stroke** – people with diabetes are 2 to 4 times more likely to have coronary heart disease or stroke than people without diabetes.
- **Nerve disease and amputations** – about 60 to 70 percent of people with diabetes have mild to severe forms of diabetic nerve damage which may lead to lower limb amputations. People with diabetes have a 10 times greater risk of amputation than people without diabetes.
- **Sexual dysfunction** – Men with diabetes are twice as likely to experience erectile dysfunction as men without diabetes. Women with type 1 diabetes are twice as likely to experience prevalence of sexual dysfunction compared with women without diabetes.

### ***Diabetes Management***

Diabetes is a self-managed disease that requires daily adherence to diet, physical activity, blood sugar self-monitoring, and medicine regimens. Treatment for type 1 diabetes requires a strict regimen that typically includes a carefully calculated meal plan, planned physical activity, self-testing of blood glucose and multiple daily insulin injections.

Treatment for type 2 diabetes typically includes diet management, exercise, self-testing of blood glucose and, in some cases, oral medication and/or insulin. Research has confirmed that intensive treatment to control blood glucose levels can significantly prevent or delay the progression of diabetes complications.

### ***Diabetes Care Plan***

It is important that people diagnosed with diabetes receive good medical care from a diabetes care team. The diabetes health care team will work with the patient to design a diabetes care plan. A diabetes care plan should include:

- A list of goals
- A list of medications to help control diabetes
- A healthy meal plan developed by a registered dietitian
- A list of lifestyle changes
- A physical activity program
- Diabetes educational classes for the patient and the family
- A plan for seeing specialists—eye, foot, dental, others

- Instructions for follow-up visits to the doctor
- A birth control and pre-pregnancy plan, if appropriate

**Patient education is vital.** People with diabetes can reduce their risk for complications if they are educated about diabetes, learn and practice skills needed to better control their blood glucose levels, and have regular checkups from their diabetes health care team.

**Setting goals is important.** With the help of their health care team, people with diabetes should set goals for better control of blood glucose levels as close to normal as is safely possible. There are two tests to measure your blood sugar levels:

- **Hemoglobin A1c test** is a simple lab test that measures the average amount of sugar that has been in the blood over the last three months. It is the best test for your health care provider to know if blood sugar is under control. The test is recommended at least twice a year, and more often if blood sugar stays too high. The hemoglobin A1c goal for people with diabetes is less than 7 percent. Research shows that maintaining hemoglobin A1c levels at less than 7 percent may reduce the risk of diabetes complications by 50 to 80 percent.
- **Finger-stick test** is a self-test the patient does using a blood glucose meter to measure blood sugar at the time of the test. Suggested goals for self-testing using a blood glucose meter are 90-130 mg/dl before meals and less than 180 two hours after starting a meal. Due to other factors, the doctor may set different goals for different individuals.

**Diabetes health care team education is critical.** Diabetes is a multi-system chronic disease. Therefore, it is important to have a highly skilled health care team, trained with the latest information on diabetes to ensure early detection and appropriate treatment of serious diabetes complications.

## **References**

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