



Patient education: Type 2 diabetes: Overview (Beyond the Basics)

AUTHOR: Deborah J Wexler, MD, MSc

SECTION EDITOR: David M Nathan, MD

DEPUTY EDITORS: Zehra Hussain, MD, FACP, Katya Rubinow, MD

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INTRODUCTION

Type 2 diabetes (also called type 2 diabetes mellitus) is a disorder that is known for disrupting the way your body uses glucose (sugar); it also causes problems with the way your body stores and processes other forms of energy, including fat.

All the cells in your body need glucose to work normally. Glucose gets into the cells with the help of a hormone called insulin. If there is not enough insulin or if your body stops responding to insulin, sugar builds up in the blood. This is what happens to people with diabetes. High blood sugar levels can lead to problems if untreated.

There are many "types" of diabetes. The two major types of diabetes are type 1 and type 2:

- In **type 1** diabetes, the problem is that the pancreas (an organ in the abdomen) stops making insulin.
- In **type 2** diabetes, the body stops responding to normal or even high levels of insulin, and over time, the pancreas does not make enough insulin.

In the United States, Canada, and Europe, approximately 90 percent of all people with diabetes have type 2 diabetes. This is a chronic medical condition that requires regular monitoring and treatment throughout your life in order to keep your blood sugar levels in the target range. This involves lifestyle changes (including your diet and exercise habits), self-care measures, and sometimes medications. Often, medications are directed both at

managing blood sugar and reducing the risk of heart disease and other problems that are more common in people with type 2 diabetes. Taken together, these treatments can minimize your risk of developing complications.

This topic provides a general overview of type 2 diabetes.

THE IMPACT OF DIABETES

Being diagnosed with type 2 diabetes can be a frightening and overwhelming experience, and you likely have questions about why it developed, what it means for your long-term health, and how it will affect your everyday life. Your doctor or nurse can help answer your questions and talk to you about what to expect. They can also direct you to resources for medical, as well as psychological, support. These may include group classes; meetings with a registered dietitian, social worker, or nurse educator; and other educational resources such as books, websites, or magazines. Several of these resources are listed below. (See '[Where to get more information](#)' below.)

For most people, the first few months after being diagnosed are filled with emotions. If you have just been diagnosed with diabetes, you and your family should use this time to learn as much as possible so that caring for your diabetes (including testing your blood sugar, going to medical appointments, and taking your medications) becomes a part of your daily routine. (See "[Patient education: Glucose monitoring in diabetes \(Beyond the Basics\)](#)".)

Type 2 diabetes can lead to health complications, some of which can be serious. However, there are things you can do to reduce your risk of developing these problems (see "[Patient education: Preventing complications from diabetes \(Beyond the Basics\)](#)"). Most people with diabetes lead active lives and continue to enjoy many of the foods and activities that they previously enjoyed. Diabetes does not mean an end to "special occasion" foods like birthday cake, and most people with diabetes can (and should) enjoy exercise in almost any form. (See "[Patient education: Type 2 diabetes and diet \(Beyond the Basics\)](#)" and "[Patient education: Exercise and medical care for people with type 2 diabetes \(Beyond the Basics\)](#)".)

TYPE 2 DIABETES CAUSES

Type 2 diabetes is thought to be caused by a combination of genetic and environmental factors.

Genetic causes — Many people with type 2 diabetes have a family member with either type 2 diabetes or other medical problems associated with diabetes, such as high cholesterol and triglyceride levels, high blood pressure, or obesity.

The lifetime risk of developing type 2 diabetes is 5 to 10 times higher in first-degree relatives (ie, sibling or child) of a person with diabetes compared with a person with no family history of diabetes. The likelihood of developing type 2 diabetes is greater in certain ethnic groups, such as people of Hispanic, African, and Asian descent.

Lifestyle factors — Eating an unhealthy diet and not getting enough exercise can lead to weight gain, which increases your risk of developing type 2 diabetes.

Pregnancy — Some people develop diabetes during pregnancy; when this happens, it is called "gestational diabetes." Gestational diabetes is similar to type 2 diabetes, but it usually resolves after the woman delivers her baby. Women who develop gestational diabetes during pregnancy are at increased risk for developing type 2 diabetes later in life. (See "[Patient education: Gestational diabetes \(Beyond the Basics\)](#)".)

TYPE 2 DIABETES DIAGNOSIS

The diagnosis of diabetes is based upon your symptoms and the results of blood tests.

Symptoms — Before being diagnosed with type 2 diabetes, most people have no symptoms at all. In those who do have symptoms, the most common include:

- Needing to urinate frequently
- Feeling thirsty
- Blurred vision

Laboratory tests — The main test doctors use to diagnose diabetes is a blood glucose (sugar) test. This can be done in several different ways:

- **Random blood sugar test** – For a random blood sugar test, you can have blood drawn at any time throughout the day, regardless of when you last ate. A normal random blood sugar level is between 70 and 140 mg/dL (3.9 to 7.8 mmol/L).
- **Fasting blood sugar test** – A fasting blood sugar test is a blood test done after not eating or drinking for 8 to 12 hours (usually overnight). A normal fasting blood sugar level is less than 100 mg/dL (5.6 mmol/L).
- **Hemoglobin A1C test** – The "A1C" blood test is a way to estimate your average blood sugar level over the past two to three months. It does this by measuring how much glucose is attached to a protein called "hemoglobin" in your red blood cells. Normal values for A1C are 4 to 5.6 percent. However, people with anemia or other reasons for abnormal hemoglobin levels can have inaccurate results on this test.

The A1C test can be done at any time of day (before or after eating).

- **Oral glucose tolerance test** – Oral glucose tolerance testing (OGTT) is a test that involves drinking a special glucose solution (usually orange or cola flavored). Your blood sugar level is tested before you drink the solution and then again one and two hours after drinking it. Because of its inconvenience, OGTT is not commonly used for testing, except in pregnant women.

Criteria for diagnosis — The following criteria are used to classify your blood sugar levels as normal, increased risk (blood sugar levels that are higher than normal and indicate a higher risk of future diabetes), or diabetes.

Normal — Fasting blood sugar less than 100 mg/dL (5.6 mmol/L) is considered normal, that is, it does not indicate an increased risk for diabetes.

Increased risk — Some test results put a person in the category of "increased risk," meaning they are at higher risk of going on to develop diabetes:

- "Impaired fasting glucose" – This is defined as a fasting blood sugar level between 100 and 125 mg/dL (5.6 to 6.9 mmol/L).
- "Impaired glucose tolerance" – This is defined as a blood sugar level of 140 to 199 mg/dL (7.8 to 11 mmol/L) two hours after an OGTTcc.
- A1C – People with an A1C of 5.7 to 6.4 percent (39 to 46 mmol/mol) are considered at increased risk; the likelihood of developing type 2 diabetes is higher with A1C levels closer to the upper limit of this range.

These categories of increased risk are sometimes called "prediabetes." Approximately one in three American adults can be classified as having prediabetes. If your test results suggest you are at increased risk, your doctor or nurse can talk to you about changes you can make to reduce your risk of developing diabetes. These include improving your diet and exercise habits, losing weight, and quitting smoking (if you smoke). Blood sugar testing is repeated every year.

Although the rate of progression varies, approximately 25 percent of people with either impaired fasting glucose or impaired glucose tolerance will go on to develop type 2 diabetes over three to five years.

Diabetes — Doctors diagnose diabetes if a person has one or more of the following:

- Symptoms of diabetes (see '[Symptoms](#)' above) **and** a random blood sugar of 200 mg/dL (11.1 mmol/L) or higher
- A fasting blood sugar level of 126 mg/dL (7 mmol/L) or higher

- A blood sugar of 200 mg/dL (11.1 mmol/L) or higher two hours after an OGTT
- An A1C of 6.5 percent (48 mmol/mol) or higher

If your results suggest diabetes, your doctor will repeat one of these tests on another day to confirm the diagnosis.

Type 1 versus type 2 diabetes — Doctors can usually tell whether a person has type 1 or type 2 diabetes, but sometimes the diagnosis is difficult to determine. Type 1 diabetes should be suspected in a person without a strong family history of type 2 diabetes who has any of the following risk factors:

- A family or personal history of certain autoimmune diseases such as hypothyroidism, hyperthyroidism, or celiac sprue
- Symptoms such as frequent urination and weight loss
- High blood sugar levels even after starting type 2 diabetes treatments

In such cases, doctors often run additional blood tests to determine which type of diabetes the person has. Doctors may also consider other causes of diabetes, such as genetic causes.

TYPE 2 DIABETES TREATMENT

The treatment of type 2 diabetes is discussed in detail separately. (See "[Patient education: Type 2 diabetes: Treatment \(Beyond the Basics\)](#)" and "[Patient education: Type 2 diabetes: Insulin treatment \(Beyond the Basics\)](#)" and "[Patient education: Hypoglycemia \(low blood glucose\) in people with diabetes \(Beyond the Basics\)](#)".)

More information about lifestyle changes for people with diabetes is also available. (See "[Patient education: Type 2 diabetes and diet \(Beyond the Basics\)](#)" and "[Patient education: Exercise and medical care for people with type 2 diabetes \(Beyond the Basics\)](#)".)

TYPE 2 DIABETES COMPLICATIONS

Over time, type 2 diabetes can lead to various complications, many of which can be serious if they are not identified and addressed promptly. You can lower your risk of many problems by keeping your blood glucose in the goal range, managing related health conditions, and seeing your health care providers for regular checkups. (See "[Patient education: Preventing complications from diabetes \(Beyond the Basics\)](#)".)

PREGNANCY AND DIABETES

Women with type 2 diabetes are usually able to become pregnant and have a healthy baby. A full discussion of diabetes in pregnancy is available separately. (See "[Patient education: Care during pregnancy for patients with type 1 or 2 diabetes \(Beyond the Basics\)](#)".)

WHERE TO GET MORE INFORMATION

Your health care provider is the best source of information for questions and concerns related to your medical problem.

This article will be updated as needed on our website (www.uptodate.com/patients). Related topics for patients, as well as selected articles written for health care professionals, are also available. Some of the most relevant are listed below.

Patient level information — UpToDate offers two types of patient education materials.

The Basics — The Basics patient education pieces answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials.

[Patient education: Type 2 diabetes \(The Basics\)](#)

[Patient education: Polycystic ovary syndrome \(The Basics\)](#)

[Patient education: Hemochromatosis \(The Basics\)](#)

[Patient education: Hemoglobin A1C tests \(The Basics\)](#)

[Patient education: Metabolic dysfunction-associated steatotic liver disease \(The Basics\)](#)

[Patient education: Preparing for pregnancy when you have diabetes \(The Basics\)](#)

[Patient education: Acromegaly \(The Basics\)](#)

[Patient education: Lowering your risk of prediabetes and type 2 diabetes \(The Basics\)](#)

[Patient education: Diabetic ketoacidosis \(The Basics\)](#)

[Patient education: Hyperosmolar hyperglycemic state \(The Basics\)](#)

[Patient education: Diabetes and infections \(The Basics\)](#)

[Patient education: Health risks of obesity \(The Basics\)](#)

[Patient education: Foot care for people with diabetes \(The Basics\)](#)

[Patient education: Diabetic foot ulcer \(The Basics\)](#)

[Patient education: Checking your blood sugar at home \(The Basics\)](#)

[Patient education: Keeping track of your blood sugar \(The Basics\)](#)

[Patient education: Blood glucose tests \(The Basics\)](#)

[Patient education: Hypomagnesemia \(The Basics\)](#)

[Patient education: Kidney disease caused by diabetes \(The Basics\)](#)

[Patient education: Diabetes and heart disease \(The Basics\)](#)

Beyond the Basics — Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are best for patients who want in-depth information and are comfortable with some medical jargon.

[Patient education: Exercise and medical care for people with type 2 diabetes \(Beyond the Basics\)](#)

[Patient education: Foot care for people with diabetes \(Beyond the Basics\)](#)

[Patient education: Hypoglycemia \(low blood glucose\) in people with diabetes \(Beyond the Basics\)](#)

[Patient education: Preventing complications from diabetes \(Beyond the Basics\)](#)

[Patient education: Glucose monitoring in diabetes \(Beyond the Basics\)](#)

[Patient education: Type 2 diabetes and diet \(Beyond the Basics\)](#)

[Patient education: Gestational diabetes \(Beyond the Basics\)](#)

[Patient education: Type 2 diabetes: Treatment \(Beyond the Basics\)](#)

[Patient education: Type 2 diabetes: Insulin treatment \(Beyond the Basics\)](#)

[Patient education: Care during pregnancy for patients with type 1 or 2 diabetes \(Beyond the Basics\)](#)

Professional level information — Professional level articles are designed to keep doctors and other health professionals up-to-date on the latest medical findings. These articles are thorough, long, and complex, and they contain multiple references to the research on which they are based. Professional level articles are best for people who are comfortable with a lot of medical terminology and who want to read the same materials their doctors are reading.

[Glucose monitoring in the ambulatory management of nonpregnant adults with diabetes mellitus](#)

[Classification of diabetes mellitus and genetic diabetic syndromes](#)

[Clinical presentation, diagnosis, and initial evaluation of diabetes mellitus in adults](#)

[Exercise guidance in adults with diabetes mellitus](#)

[Measurements of chronic glycemia in diabetes mellitus](#)

[Glycemic management and vascular complications in type 2 diabetes mellitus](#)

[Insulin therapy in type 2 diabetes mellitus](#)

[Hypoglycemia in adults with diabetes mellitus](#)

[Management of persistent hyperglycemia in type 2 diabetes mellitus](#)

[Nutritional considerations in type 1 diabetes mellitus](#)

[Medical nutrition therapy for type 2 diabetes mellitus](#)

[Prevention of type 2 diabetes mellitus](#)

[Screening for type 2 diabetes mellitus](#)

[Metabolic syndrome \(insulin resistance syndrome or syndrome X\)](#)

[Treatment of type 2 diabetes mellitus in the older patient](#)

[Pathogenesis of type 2 diabetes mellitus](#)

The following organizations also provide reliable health information.

- National Library of Medicine
(www.nlm.nih.gov/medlineplus/healthtopics.html)
- National Institute of Diabetes and Digestive and Kidney Diseases
(www.niddk.nih.gov)
- American Diabetes Association (ADA)
(800)-DIABETES (800-342-2383)
(<http://www.diabetes.org>)
- Hormone Health Network
(www.hormone.org/diseases-and-conditions/diabetes)

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