



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

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TYPE 2 DIABETES OVERVIEW

Diabetes mellitus is a chronic condition, but people with diabetes can lead a full life while keeping their diabetes under control. Lifestyle modifications (changes in day-to-day habits) are an essential component of any diabetes management plan.

Lifestyle modifications can be a very effective way to keep diabetes in control. Improved blood sugar control can slow the risk of long-term complications. Multiple small changes can lead to improvements in diabetes control, including a decreased need for medication.

Diabetes requires a lifelong management plan, and persons with diabetes have a central role in this plan. Lifestyle modifications are an opportunity for people with diabetes to take charge of their health. Therefore, it is important to learn as much as possible about diabetes and to take an active role in making decisions about health care and treatment.

EXERCISE AND TYPE 2 DIABETES

Getting regular physical activity is very important for good health. Exercise makes the body more sensitive to [insulin](#) (the hormone that allows cells in the body to take up sugar for energy), which helps lower blood sugar levels. Exercise can also help lower high blood pressure and improve cholesterol levels. Other important benefits of exercise may include maintaining a healthy body weight, losing weight (if needed), sleeping better, and improving memory and mood.

General exercise precautions — It is important to balance enthusiasm and common sense when beginning an exercise program. Talk with your health care provider about which types of physical activity may be best for you and which you should avoid. For any type of physical activity, the following precautions should be taken:

- Wear well-fitting, protective footwear. Check your feet for sores and blisters after you complete your exercise. (See "[Patient education: Foot care for people with diabetes \(Beyond the Basics\)](#)".)
- Drink plenty of water before, during, and after exercise. This helps to prevent dehydration, which can upset blood sugar levels.

If you take oral diabetes medications, you probably will not need to adjust the dose of these medications for exercise. If you have diabetes and use insulin, you should also do the following:

- Measure your blood sugar before, during, and after exercise to determine your body's typical response to exercise. If you are exercising for an hour or longer, check your blood sugar at least every 30 minutes during the activity.
- If your pre-exercise blood sugar reading is 270 mg/dL (15 mmol/L) or higher, avoid vigorous exercise until your blood sugar level is lower. You can still do light or moderate activity (eg, brisk walking) if you feel well. If your pre-exercise blood sugar is below 100 mg/dL (5.6 mmol/L), you may need to eat a small snack containing carbohydrates (15 to 30 grams) so your blood sugar does not fall too low during exercise. (See "[Patient education: Hypoglycemia \(low blood glucose\) in people with diabetes \(Beyond the Basics\)](#)".)
- Choose an insulin injection site away from exercising muscles. For example, if you go for a run, avoid using your legs as an injection site.
- Keep rapidly absorbed carbohydrates on hand (glucose tablets, hard candies, or juice).
- If you have had a blood sugar level <54 mg/dL (3 mmol/L) within the past 24 hours, it is important to avoid vigorous exercise.
- Depending on your blood sugar response to exercise, you may need to eat a snack 15 to 30 minutes before exercise and again every 30 minutes during exercise.
- If your blood sugar level becomes low during exercise, treat the low blood sugar with a rapidly absorbed carbohydrate. The amount of carbohydrate needed to treat a low blood sugar depends on the blood sugar level. (See "[Patient education: Hypoglycemia \(low blood glucose\) in people with diabetes \(Beyond the Basics\)](#)".)

- If you are not able to check your blood sugar but you have symptoms of hypoglycemia (eg, sweating and shaking) during exercise, eat 10 to 15 grams of fast-acting carbohydrate.
- If your blood sugar level falls too low after exercise, eat a source of slowly absorbed carbohydrates (dried fruit, fruit jerky, granola bars, or trail mix) immediately after exercise. This can help counter a post-exercise drop in blood sugar levels.
- If you use rapid-acting insulin with meals or an insulin pump, you may need to reduce the dose by 30 percent before or during exercise. It's important to speak with your health care provider before making any changes to your insulin doses.

The pre-exercise examination — People with diabetes who want to start an exercise program should consult with their health care provider first. We typically perform a physical examination in sedentary adults (age >50 years) with diabetes prior to beginning an exercise program. It is best to begin a gentle exercise program and gradually progress to a more vigorous program as tolerated.

Type of exercise — Exercise could mean going to the gym and running on a treadmill, but other examples of exercise include brisk walking, doing housework, dancing, swimming, bicycling, or hiking. Even gentle forms of exercise are good for your health.

If you exercise by doing an activity you enjoy, it will be more fun, and you will also be more likely to stick with it. Choose types of exercise that are enjoyable and can be done comfortably, making it easier to stay motivated and continue a program over time. People who are accustomed to a sedentary lifestyle may find it particularly challenging to start and continue an exercise program. Talk with a health care provider about any barriers that stand in the way of exercise; your provider may be able to suggest solutions.

People with diabetes-related eye complications (severe retinopathy) may be advised to avoid vigorous or high-impact activities and strenuous weightlifting, which can increase blood pressure and cause bleeding in the eye. People with neurologic complications (peripheral neuropathy) are usually advised to avoid traumatic weightbearing exercises such as running, which can lead to foot ulcers and stress fractures, although this depends on the severity of the neuropathy. Non-weightbearing exercises (eg, cycling, chair exercises, swimming) may be more appropriate. (See "[Patient education: Diabetic neuropathy \(Beyond the Basics\)](#)".)

Intensity — Exercise does not have to be intense to be beneficial, and the intensity depends on both the type of activity and a person's level of fitness. Light-intensity physical activities include light housework or slow walking. Moderate-intensity activities include brisk walking or bicycling. In general, a person doing a moderate-intensity activity can talk but not sing during the activity. Finally, vigorous-intensity activities include running or hiking uphill, and

typically a person doing vigorous physical activity will not be able to say more than a few words without pausing for a breath.

If you want to increase the intensity of your exercise, it's important to do so gradually and always stop if you experience worrisome symptoms, such as chest discomfort or nausea.

Duration and frequency — Any amount of physical activity is beneficial compared with being sedentary. To optimize the benefits of exercise, we suggest a goal of 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity physical activity per week, which can be done through any combination of duration and frequency (for example, 30 minutes of moderate-intensity activity five days a week). In general, a longer duration of lower-intensity physical activity is required to gain similar benefits to those from higher-intensity activity. Increase the intensity, frequency, and duration of exercise gradually.

QUITTING SMOKING

Over 25 percent of people newly diagnosed with diabetes actively smoke. Quitting smoking is one of the most important things people can do to improve their health. (See "[Patient education: Quitting smoking \(Beyond the Basics\)](#)".)

People with diabetes who smoke have an increased risk of the following:

- Death, especially from heart attacks and strokes
- High low-density lipoprotein (LDL) ("bad") cholesterol levels
- Worsened blood sugar control compared with nonsmokers
- Nerve damage from diabetes
- Kidney disease leading to dialysis
- Foot ulcer and amputation of toes, feet, or legs, caused by peripheral vascular disease (see "[Patient education: Peripheral artery disease and claudication \(Beyond the Basics\)](#)")

People with diabetes who quit smoking can decrease these risks. Most people who smoke find it difficult to quit; assistance is available from a number of sources. Health care providers have access to self-help materials and can help select a quit date, provide contact information for local support groups, and prescribe nicotine replacement treatment or other medicines if needed.

DIET AND TYPE 2 DIABETES

Changing the type and amount of food eaten can help people with diabetes to lose weight, improve blood sugar levels, and lower blood cholesterol levels and blood pressure. A separate topic discusses the role of diet (including meal planning, carbohydrate counting,

and alcohol intake) in more detail. (See "[Patient education: Type 2 diabetes and diet \(Beyond the Basics\)](#)".)

MEDICATIONS AND BLOOD SUGAR MONITORING IN TYPE 2 DIABETES

The day-to-day management of blood sugar levels can be complicated. The daily regimen may include oral medications and/or insulin, blood sugar monitoring, carefully planned meals and snacks, and exercise. Planning and performing these activities take time. Make sure to talk to your health care provider about how to prioritize these activities and fit them into your daily life.

Setting a routine — Successful management of diabetes should not take the enjoyment out of life. At first, it can be difficult to establish a routine that incorporates all aspects of diabetes care, although many people find that the routine becomes second nature over time. Written schedules may help some patients to remember the details of a routine until they are committed to memory. Some people may find that making too many changes at once is overwhelming and prefer to gradually incorporate various aspects of diabetes care into their life. Aside from day-to-day routine, it is also important to carefully manage situations that can complicate blood sugar control, such as sick days and vacations. You and your health care team should reevaluate your management plan periodically to make sure it seems appropriate and reasonable to you and fits into your daily life.

Medication regimens — People with diabetes may need to take several medications throughout the day. Medications to lower elevated blood pressure and cholesterol levels, as well as low-dose [aspirin](#) may be used to manage and prevent complications. Your health care provider should talk with you about the benefits and risks of your medications, and you should jointly decide which ones are right for you. Any medication is most effective when it is taken exactly as prescribed. If the medication schedule is complex, a pill organizer or written outline may be helpful for remembering to take specific medications at specific times.

Medical costs — Medications and diabetes supplies can be expensive, particularly if insulin is required. Many people with diabetes ration their insulin because of the cost. It is a good idea to share any concerns about medication-related and other costs with your health care provider so they can help find ways to reduce these costs. A few strategies to reduce costs include switching to a similar medication that is covered by insurance; taking advantage of a specific low-cost program, coupon, or discount card; or applying for financial assistance.

ROUTINE MEDICAL CARE IN TYPE 2 DIABETES

Making changes in diet and exercise are an important step in diabetes management. However, routine medical care is also important for long-term health in people with diabetes, particularly for preventing, detecting, and slowing the progression of complications. A health care provider can recommend a regular schedule for visits and screening and monitoring tests based upon the duration of diabetes, any diabetes-related complications, and other medical problems. People with diabetes also should receive routine vaccinations to help prevent common infections. (See "[Patient education: Vaccines for adults \(Beyond the Basics\)](#)".)

Your health care team can also recommend screenings to detect health problems that do not cause symptoms in the early stages. These screenings include eye examinations, foot examinations, blood and urine tests, dental examinations, and electrocardiograms, if needed.

- For women, this may include a cervical cancer screening, mammogram and clinical breast exam, and bone density testing. (See "[Patient education: Cervical cancer screening \(Beyond the Basics\)](#)" and "[Patient education: Breast cancer screening \(Beyond the Basics\)](#)" and "[Patient education: Bone density testing \(Beyond the Basics\)](#)".)
- For men, prostate cancer screening and bone density testing may be recommended. (See "[Patient education: Prostate cancer screening \(Beyond the Basics\)](#)" and "[Patient education: Bone density testing \(Beyond the Basics\)](#)".)
- For both men and women, colon cancer screening is recommended. (See "[Patient education: Screening for colorectal cancer \(Beyond the Basics\)](#)".)

DIABETES DISTRESS

People with diabetes have to perform many daily tasks to manage their blood sugar and optimize their health. In addition to these daily demands, diabetes often gives rise to concerns including medical costs and long-term health. These obligations and concerns often cause feelings of frustration, burnout, and stress. If these feelings become overwhelming and make the daily management of diabetes difficult or impossible, they are described as "diabetes distress."

Many people with diabetes experience diabetes distress. It is important to tell your health care provider if you feel overwhelmed by diabetes and its management for any more than a week or two at a time. Your provider can help find strategies to reduce your stressors and ease your concerns. They may also suggest that you speak with a health care provider who specializes in helping people with diabetes distress. Sharing your feelings with family, friends, or other people in your support network can help reduce diabetes distress.

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: Treatment for type 2 diabetes \(The Basics\)](#)

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

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

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

[Patient education: How to give an insulin shot \(The Basics\)](#)

[Patient education: How to use an insulin pen \(The Basics\)](#)

[Patient education: Walking for health \(The Basics\)](#)

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

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

[Patient education: Diabetic neuropathy \(Beyond the Basics\)](#)

[Patient education: Quitting smoking \(Beyond the Basics\)](#)

[Patient education: Peripheral artery disease and claudication \(Beyond the Basics\)](#)

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

[Patient education: Cervical cancer screening \(Beyond the Basics\)](#)

[Patient education: Breast cancer screening \(Beyond the Basics\)](#)

[Patient education: Bone density testing \(Beyond the Basics\)](#)

[Patient education: Prostate cancer screening \(Beyond the Basics\)](#)

[Patient education: Screening for colorectal cancer \(Beyond the Basics\)](#)

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.

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

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

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

[Overview of general medical care in nonpregnant adults with 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)
(www.diabetes.org)
- Hormone Health Network
(www.hormone.org/diseases-and-conditions/diabetes)

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